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GTE AUTOMATIC ELECTRIC
GENOA, ILLINOIS

40B-S STOCKBOARD
SPECIFICATION & INSTALLATION

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40B-S Manufacturer's Equipment Specification-----Serial #9124 thru

Bank Multiple Numbering-----A-3661

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Circuit Loop Limits-----AB-5500

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GTE AUTOMATIC ELECTRIC
GENOA, ILLINOIS

M-0358
1

40B-S STOCKBOARD
ENGINEERING SPECIFICATION
SERIAL NO. 7248 THRU

THIS SPECIFICATION COVERS ARRANGEMENTS, FEATURES AND OPTIONAL FEATURES FOR THE LEICH 40B ALL RELAY PRIVATE AUTOMATIC BRANCH EXCHANGE (PABX).

WHEN CONTACTING YOUR LOCAL GTE AUTOMATIC ELECTRIC SALES REPRESENTATIVE REGARDING A CERTAIN UNIT, GIVE THE SERIAL NUMBER.

STANDARD EQUIPMENT ISSUED WITH THE 40B-S STOCKBOARD EQUIPMENT SPECIFICATION

	<u>EQUIPPED</u>	<u>WIRED</u>
<u>LINES</u>	40	40
<u>LINKS</u>		
LINK CIRCUITS - 3 PER BAR	6	6
LINK SELECTION CONTROL CIRCUIT		
1 PER LINK RELAY BAR	2	2
LINK SWITCHES - 2 PER BAR	12	12
<u>CITY TRUNKS</u>		
TRUNK RELAY BAR	5	10
TRUNK SWITCH - 1 PER TRUNK	5	10
<u>INWARD ATTENDANT'S TRUNKS (INF)</u>	2	2
<u>OUTWARD ATTENDANT'S TRUNKS (PAX)</u>	1	1
<u>MEET-ME CONFERENCE</u>	1	1
<u>CONFERENCE SWITCHES</u>	0	3
<u>ATTENDANT'S TURRET</u>	1	1

STANDARD FEATURES

- 2 DIGIT LOCAL DIALING.
- UNIVERSAL NIGHT ANSWERING - OPTIONAL WIRING FOR PREDETERMINED NIGHT ANSWER.
- ACCESS - ROTATION CONTROLS FOR 3 TRUNK ON SWITCH GROUPS, UNIVERSAL NIGHT ANSWER, CODE CALL AND 1 TRUNK ON LINE GROUP.
 - 1ST AND 2ND CHOICE ON TRUNK ON SWITCH GROUPS. A TRUNK GROUP CAN BE ARRANGED TO HAVE ACCESS AND ROTATE ON A PORTION OF ITS TRUNKS (1ST CHOICE). WHEN THEY ALL BECOME BUSY, THE ACCESS-ROTATION CONTROL WILL SHIFT TO THE REMAINDER OF THE TRUNKS (2ND CHOICE).
 - LOCAL LINES MAY BE RESTRICTED FROM ACCESS TO TRUNK GROUPS.

STANDARD FEATURES (CONT'D)

- POWER FAILURE TRANSFER, 10 STATIONS, 5 STATIONS ARE PRE-ASSIGNED TO TRUNKS, 1-5. ADDITIONAL 5 STATIONS MAY BE COMBINED WITH TRUNKS AS REQUIRED BY OPTIONAL WIRING OR STRAPPING. SEE 2-E ON M-0358 PAGE 11 FOR SPECIAL REQUIREMENTS AT EXTENSION STATIONS THAT ARE ASSIGNED TO POWER FAILURE.
- A 2-STATION 1 TRUNK CONFERENCE CIRCUIT IS PROVIDED FOR EACH TRUNK EQUIPPED. CHANGES TO BE MADE IN WIRING OPTIONS.
- STATION CONSULTATION-TRANSFER BY A STANDARD TELEPHONE. CONSULTATION CALLS ARE MADE BY EITHER DIALING THE DIGIT "1" OR MOMENTARILY DE-PRESSING THE TELEPHONE HOOKSWITCH.
- LINKS AND TRUNKS
 - A MINIMUM OF 4 LINKS EQUIPPED WITH SWITCHES IS RECOMMENDED.
 - CITY TRUNKS 1 THRU 10 MAY BE EQUIPPED AS REQUIRED.
- POWER PLANT - 6 AMP. BATTERY ELIMINATOR OR CHARGER, 7-1/2 WATT RINGING GENERATOR AND 25 MILLIWATT TONE GENERATOR.

SPECIAL SERVICE DIGIT ASSIGNMENT

THIS STOCKBOARD HAS 10 ACCESS DIGITS WHICH ARE ARRANGED AS FOLLOWS:

<u>DIGIT</u>	<u>LOCAL</u>	<u>TURRET</u>
1	ABSORB REPEATEDLY	BUSY TONE
2	LOCAL LINES	LOCAL LINES
3	LOCAL LINES	LOCAL LINES
4	LOCAL LINES	LOCAL LINES
5	LOCAL LINES	LOCAL LINES
6	BUSY TONE	BUSY TONE
7	BUSY TONE	BUSY TONE
8	UNIVERSAL NIGHT ANSWER	BUSY TONE
9	CITY TRUNK	BUSY TONE
0	ATTENDANT'S TRUNK	BUSY TONE

- DIGIT 1 MAY BE USED TO ACCESS OPTIONAL EQUIPMENT.
 DIGIT 6 IS PRE-WIRED FOR MEET-ME CONFERENCE.
 DIGIT 7 MAY BE STRAPPED AS A RESTRICTED DIGIT AND USED FOR THE SECOND TRUNK GROUP, OR MAY BE USED TO ACCESS OPTIONAL EQUIPMENT.

LOCAL LINE ASSIGNMENT

THIS STOCKBOARD IS EQUIPPED WITH 40 LINE RELAY CIRCUITS. THEY ARE ARRANGED AS FOLLOWS:

21-29, 20	LOCAL LINES
31	LOCAL LINE OR MUST BE USED FOR CODE CALL ANSWER WHEN CODE CALL IS EQUIPPED
32	OUTWARD ATTENDANT'S TRUNK (PAX)
33-39, 30	LOCAL LINES
41-49, 40	LOCAL LINES
51-59, 50	LOCAL LINES

TOTAL LINES AVAILABLE FOR LOCAL USE = 39

BANK MULTIPLE ASSIGNMENT

THIS STOCKBOARD IS EQUIPPED WITH 60 BANK MULTIPLES WHICH ARE ASSIGNED AS FOLLOWS:

<u>BANK MULTIPLE OUTLETS</u>	<u>ASSIGNED</u>
21-50	LOCAL LINES
M1.1 - M1.0	CITY TRUNKS #1-10 (CONSULTATION AND TRANSFER SERVICE)
M2.1 - M2.2	ATTENDANT'S INWARD TRUNKS #1 & 2
M2.3 - M2.0	OPTIONAL

POWER FAILURE AND/OR PREDETERMINED NIGHT ANSWER TRANSFER

SEE 2-E ON PAGE 13 FOR SPECIAL REQUIREMENT AT EXTENSION STATIONS THAT ARE ASSIGNED FOR POWER FAILURE OR PREDETERMINED NIGHT ANSWER.

TRUNKS #1 THRU 5 ARE ARRANGED FOR 2 STATIONS EACH FOR POWER FAILURE TRANSFER. THEY ARE WIRED WITH ONE STATION AND ONE ADDITIONAL STATION CAN BE CROSS CONNECTED BY OPTIONAL STRAPPING PER AE-6322 FIGURE B.

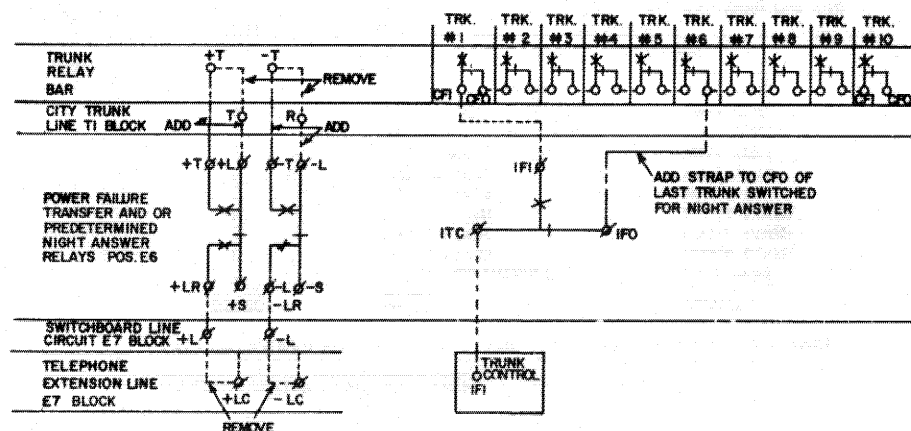
TRUNK #1	POS. D3	ASSIGNED TO STATION 21	OPTIONAL STATION 22
TRUNK #2	POS. D4	ASSIGNED TO STATION 23	OPTIONAL STATION 33
TRUNK #3	POS. D5	ASSIGNED TO STATION 34	OPTIONAL STATION 42
TRUNK #4	POS. D6	ASSIGNED TO STATION 43	OPTIONAL STATION 44
TRUNK #5	POS. D7	ASSIGNED TO STATION 54	OPTIONAL STATION 55

STOCKBOARDS ARE WIRED FOR UNIVERSAL NIGHT ANSWERING. IF PREDETERMINED NIGHT ANSWER IS REQUIRED ON TRUNKS #1-5:

- REMOVE STRAP T1-010 TO T1-09.
- ADD STRAP BETWEEN E6-A23 AND E6-B23.
- ADD JUMPER E6-C22 TO D7-812.

WHEN ANY OF THE TRUNKS #6-10 ARE REQUIRED FOR PREDETERMINED NIGHT ANSWER, THE FOLLOWING CHANGES ARE REQUIRED: (SEE SKETCH BELOW)

- MOVE UNIT BAY WIRES TO TIE POINT ON +T AND -T LEADS OF THE TRUNK GOING TO THE T AND R LEADS OF THE PLUG P5.
- ADD JUMPERS ON +T AND -T LEADS OF THE TRUNK TO +T AND -T LEADS OF AN OPTIONAL TRANSFER CIRCUIT.
- ADD JUMPERS ON +L AND -L LEADS OF TRANSFER CIRCUIT TO -T AND +T LEADS ON THE TRUNK JACK TIE POINT.
- REMOVE STRAPS ON E7 BLOCK BETWEEN A AND B, C AND D (+L AND +LC, -L AND -LC) TERMINALS OF LINE ASSIGNED TO TRANSFER CIRCUIT.
- STRAP THE IFO LEAD E6-C22 AS REQUIRED SO THAT TRUNKS SWITCHED FOR NIGHT ANSWER CANNOT BE SEIZED OUTGOING.

OUTWARD ATTENDANT'S TRUNK (PAX)

LINE 32 IS RESERVED FOR THE ATTENDANT TO HAVE ACCESS TO THE DIAL EQUIPMENT. DO NOT CONNECT STATION LINE CABLE ON THE LINE TERMINAL STRIP FOR LINE 32.

THE AMBER LIGHT ON THE TURRET IS USED WHEN CODE CALL IS EQUIPPED AND WILL FLASH WHEN A CODE CALL (PLACED OVER THE PAX KEY) HAS BEEN ANSWERED WHILE THE ATTENDANT OPERATOR IS ATTENDING A CITY CALL.

ATTENDANT'S MONITOR

IF THE MONITOR FEATURE IS NOT DESIRED, MOVE UNIT BAY WIRE FROM POS. E5-821 TO TIE POINT (MK LEAD).

DIGIT RESTRICTING - SELECTION CONTROL

THE SELECTION CONTROL IS ARRANGED FOR RESTRICTING 3 OPTIONAL DIGITS.

ANY OPTIONAL DIGIT THAT IS TO BE RESTRICTED MUST BE CONNECTED THROUGH TRANSFER CONTACTS OF THE "RD" RELAY.

DIGIT "9" (SEE SKETCH BELOW)

THE STOCKBOARD IS WIRED FOR RESTRICTING ALL SWITCHBOARD LINES FROM SEIZING THE "9" CITY TRUNK GROUP.

DIGIT "7" (SEE SKETCH BELOW)

IF DIGIT "7" IS TO BE RESTRICTED:

- A. REMOVE STRAP BETWEEN A4-C4.
- B. ADD STRAP BETWEEN A4-B5.
- C. ADD STRAP BETWEEN B4-C4.

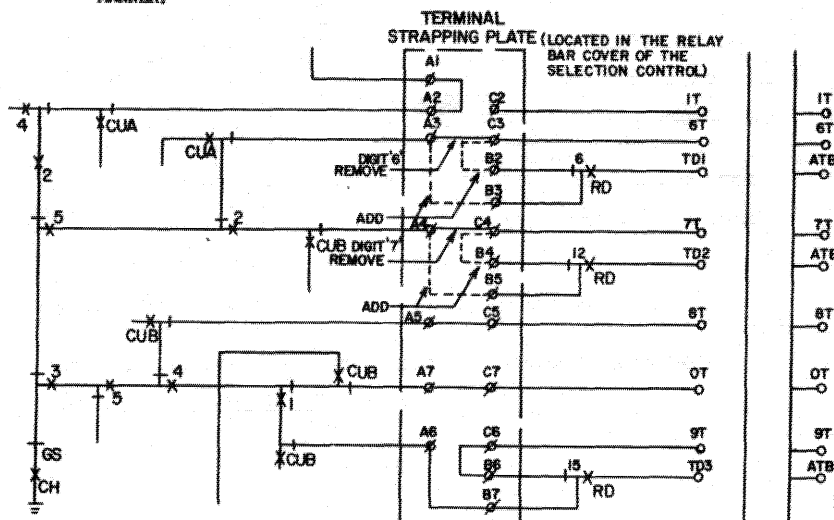
DIGIT "6" (SEE SKETCH BELOW)

IF DIGIT "6" IS TO BE RESTRICTED:

- A. REMOVE STRAP BETWEEN A3-C3.
- B. ADD STRAP BETWEEN A3-B3.
- C. ADD STRAP BETWEEN B2-C3.

DIGITS "1", "8" AND "0"

IF ONE OF DIGITS "1", "8" OR "0" IS TO BE RESTRICTED, IT WILL BE NECESSARY TO OMIT ONE OF THE ABOVE OPTIONS AND CONNECT THE DESIRED DIGIT IN A SIMILAR MANNER.



CITY TRUNK GROUP - DIGIT "9"

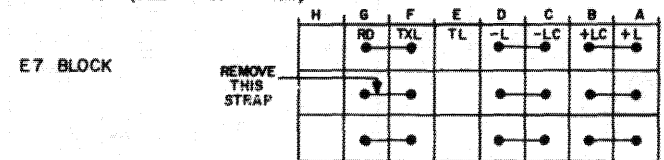
THE STOCKBOARD IS WIRED FOR 1 TRUNK GROUP OF 10 TRUNKS, 1 CONTROL CIRCUIT (H-850332-A) FOR ACCESS AND FULL ROTATION OVER ALL TRUNKS. (SEE AE-6322 (OR CC-6743) FOR CF1-CF CONTROL CIRCUIT).

TRUNK POSITIONS 1-10 ARE WIRED TO SWITCH POSITIONS B1-B10 AND ARE ASSIGNED TO BANK MULTIPLE M1.1 THRU M1.0 FOR CONSULTATION AND TRANSFER SERVICE.

ALL SWITCHBOARD LINES ARE RESTRICTED FROM SEIZING THIS GROUP.

1. NON-RESTRICTED SERVICE ON INDIVIDUAL LINES

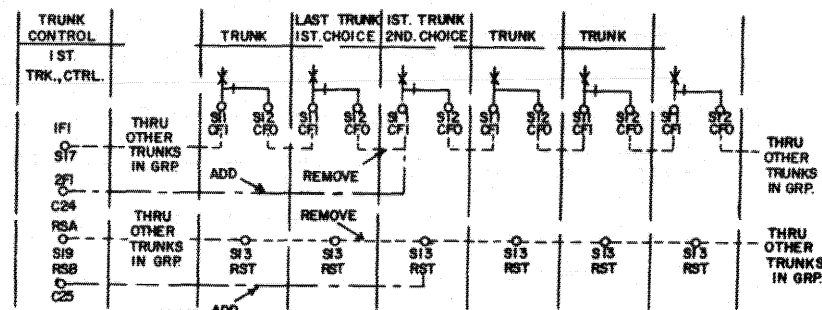
REMOVE STRAP BETWEEN TERMINALS TXL AND RD ON BLOCK E7 OF EACH DESIRED LINE. (SEE SKETCH BELOW)



2. 1ST AND 2ND CHOICE SELECTION

IF THE TRUNK GROUP IS TO BE ARRANGED FOR 1ST AND 2ND CHOICE SELECTION FOR OUTGOING SERVICE. (SEE SKETCH BELOW)

- A. MOVE UNIT BAY TO TIE POINT BETWEEN CFO OF LAST 1ST CHOICE TRUNK AND CF1 OF 1ST TRUNK IN 2ND CHOICE.
- B. MOVE UNIT BAY TO TIE POINT BETWEEN RST OF LAST 1ST CHOICE TRUNK AND RST OF 1ST TRUNK IN 2ND CHOICE.
- C. ADD JUMPER BETWEEN 2F1 OF TRUNK CONTROL CF1 OF 1ST TRUNK IN 2ND CHOICE.
- D. ADD JUMPER BETWEEN RSB OF TRUNK CONTROL AND RST OF 1ST TRUNK IN 2ND CHOICE.



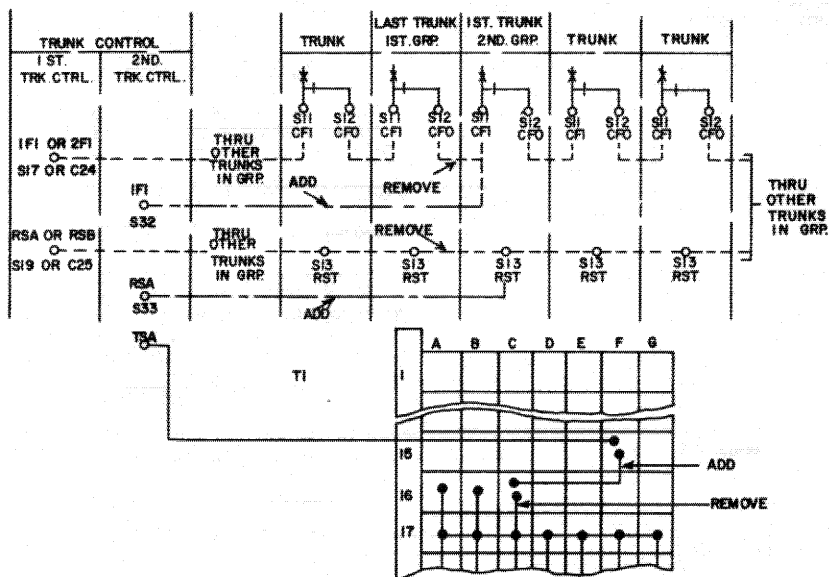
2ND TRUNK GROUP - DIGIT "7"

THE CITY TRUNK GROUP CAN BE SPLIT INTO TWO SEPARATE TRUNK GROUPS.

THE SELECTION CONTROL CIRCUIT MAY BE ARRANGED FOR RESTRICTION ON DIGIT "7" BY CHANGING THE STRAPPING ON THE RD RELAY (SEE PAGE 5).

1. 2ND TRUNK GROUP (SEE SKETCH BELOW)

- MOVE UNIT BAY TO TIE POINT BETWEEN CFO OF LAST TRUNK IN FIRST GROUP AND CF1 OF 1ST TRUNK IN SECOND GROUP.
- MOVE UNIT BAY TO TIE POINT BETWEEN RST OF LAST TRUNK IN FIRST GROUP AND RST OF 1ST TRUNK IN SECOND GROUP.
- REMOVE BARE WIRE STRAP ON T1 BLOCK BETWEEN C16 AND C17.
- ADD JUMPER BETWEEN 1F1 OF TRUNK CONTROL (2ND TRUNK CONTROL) AND CF1 OF 1ST TRUNK IN 2ND TRUNK GROUP.
- ADD JUMPER BETWEEN RSA OF TRUNK CONTROL (2ND TRUNK CONTROL) AND RST OF 1ST TRUNK IN 2ND TRUNK GROUP.
- ADD JUMPER BETWEEN T1 BLOCK C16 7T LEAD AND T1 BLOCK F15 (TSA OF 2ND TRUNK CONTROL).



2ND TRUNK GROUP - DIGIT "8"

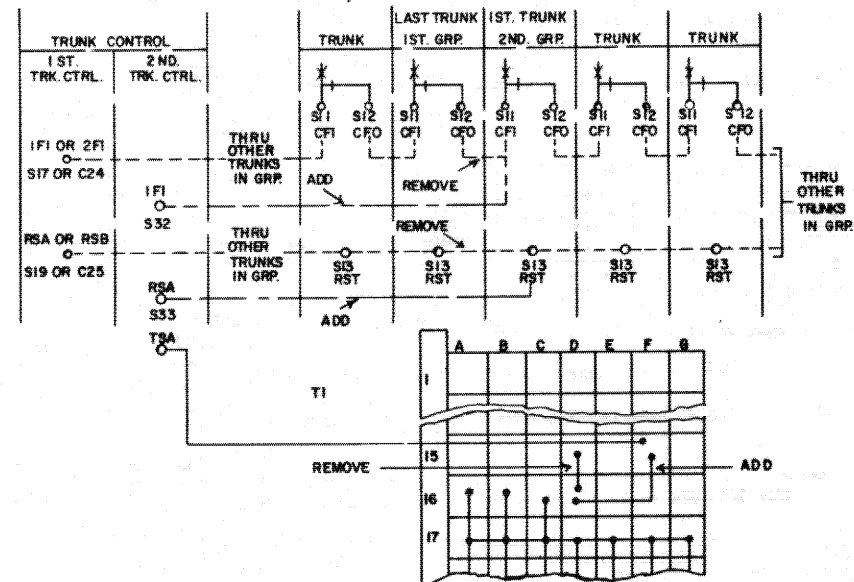
THE CITY TRUNK GROUP CAN BE SPLIT INTO TWO SEPARATE TRUNK GROUPS.

THE SELECTION CONTROL CIRCUIT MAY BE ARRANGED FOR RESTRICTION ON DIGIT "8" BY CHANGING THE STRAPPING ON THE RD RELAY (SEE PAGE 5).

IF DIGIT "8" IS USED FOR 2ND TRUNK GROUP, IT WILL BE NECESSARY TO ASSIGN A DIFFERENT ACCESS DIGIT TO THE UNIVERSAL NIGHT ANSWER CONTROL (SEE PAGE 11).

1. 2ND TRUNK GROUP (SEE SKETCH BELOW)

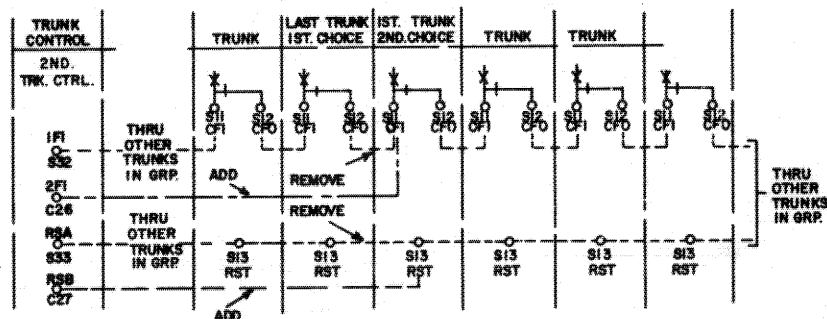
- MOVE UNIT BAY TO TIE POINT BETWEEN CFO OF LAST TRUNK IN FIRST GROUP AND CF1 OF 1ST TRUNK IN SECOND GROUP.
- MOVE UNIT BAY TO TIE POINT BETWEEN RST OF LAST TRUNK IN FIRST GROUP AND RST OF 1ST TRUNK IN SECOND GROUP.
- REMOVE BARE WIRE STRAP ON T1 BLOCK BETWEEN D15 AND D16.
- ADD JUMPER BETWEEN 1F1 OF TRUNK CONTROL (2ND TRUNK CONTROL) AND CF1 OF 1ST TRUNK IN 2ND TRUNK GROUP.
- ADD JUMPER BETWEEN RSA OF TRUNK CONTROL (2ND TRUNK CONTROL) AND RST OF 1ST TRUNK IN 2ND TRUNK GROUP.
- ADD JUMPER BETWEEN T1 BLOCK D16 8T LEAD AND T1 BLOCK F15 (TSA OF 2ND TRUNK CONTROL).



2ND TRUNK GROUP - 1ST AND 2ND CHOICE SELECTION

IF THIS TRUNK GROUP IS TO BE ARRANGED FOR 1ST AND 2ND CHOICE SELECTION FOR OUTGOING SERVICE, SEE SKETCH BELOW.

- MOVE UNIT BAY TO TIE POINT BETWEEN CFO OF LAST 1ST CHOICE TRUNK AND CF1 OF 1ST TRUNK IN 2ND CHOICE.
- MOVE UNIT BAY TO TIE POINT BETWEEN RST OF LAST 1ST CHOICE TRUNK AND RST OF 1ST TRUNK IN 2ND CHOICE.
- ADD JUMPER BETWEEN 2F1 OF TRUNK CONTROL AND CF1 OF 1ST TRUNK IN 2ND CHOICE.
- ADD JUMPER BETWEEN RSB OF TRUNK CONTROL AND RST OF 1ST TRUNK IN 2ND CHOICE.



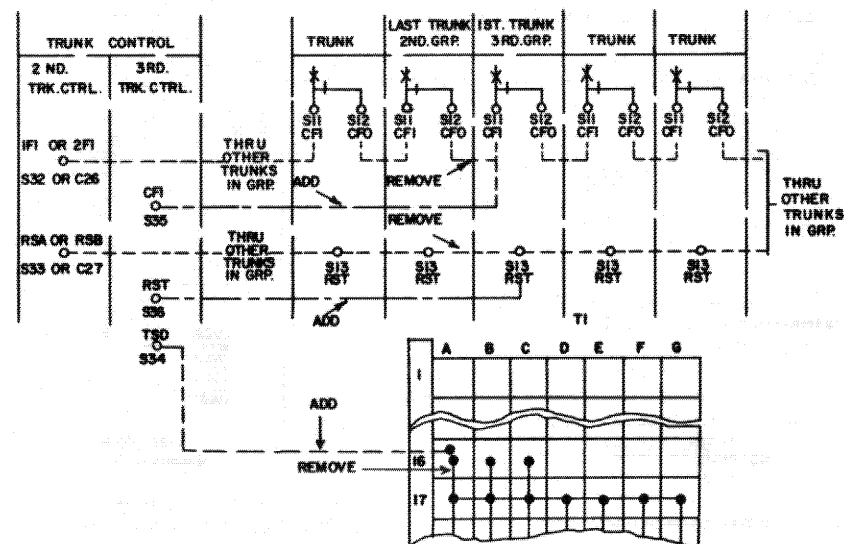
3RD TRUNK GROUP - DIGIT "6"

A 3RD TRUNK GROUP CAN BE OBTAINED BY SPLITTING THE 2ND TRUNK GROUP INTO TWO SEPARATE GROUPS.

THE SELECTION CONTROL CIRCUIT MAY BE ARRANGED FOR RESTRICTION ON DIGIT "6" BY CHANGING THE STRAPPING ON THE RD RELAY (SEE PAGE 5).

1. 3RD TRUNK GROUP (SEE SKETCH BELOW)

- MOVE UNIT BAY TO TIE POINT BETWEEN CFO OF LAST TRUNK IN 2ND GROUP AND CF1 OF 1ST TRUNK IN 3RD GROUP.
- MOVE UNIT BAY TO TIE POINT BETWEEN RST OF LAST TRUNK IN 2ND GROUP AND RST OF 1ST TRUNK IN 3RD GROUP.
- REMOVE BARE WIRE STRAP ON T1 BLOCK BETWEEN A16 AND A17.
- ADD JUMPER BETWEEN CF1 OF 3RD TRUNK CONTROL AND CF1 OF 1ST TRUNK IN 3RD TRUNK GROUP.
- ADD JUMPER BETWEEN RST OF 3RD TRUNK CONTROL AND RST OF 1ST TRUNK IN 3RD TRUNK GROUP.
- ADD JUMPER BETWEEN T1 BLOCK A16 6T LEAD AND D13-S34 (TSD OF 3RD TRUNK CONTROL).



UNIVERSAL NIGHT ANSWER - DIGIT "6" OR "7"

THE STOCKBOARD IS ARRANGED FOR A COMMON UNIVERSAL NIGHT ANSWER CONTROL (H-850332-A) ASSIGNED TO ACCESS DIGIT "8".

IF REQUIRED, ANY AVAILABLE OPTIONAL DIGIT CAN BE ASSIGNED TO THE UNIVERSAL NIGHT ANSWER CONTROL.

DIGIT "6"

IF DIGIT "6" IS TO BE USED FOR UNIVERSAL NIGHT ANSWER CONTROL:

- A. REMOVE STRAP BETWEEN T1-D15 & D16.
- B. REMOVE STRAP BETWEEN T1-A16 & A17.
- C. ADD STRAP BETWEEN T1-A16 & D15.
- D. ADD STRAP BETWEEN T1-D16 & D17 IF DIGIT "8" IS TO RECEIVE BUSY TONE.

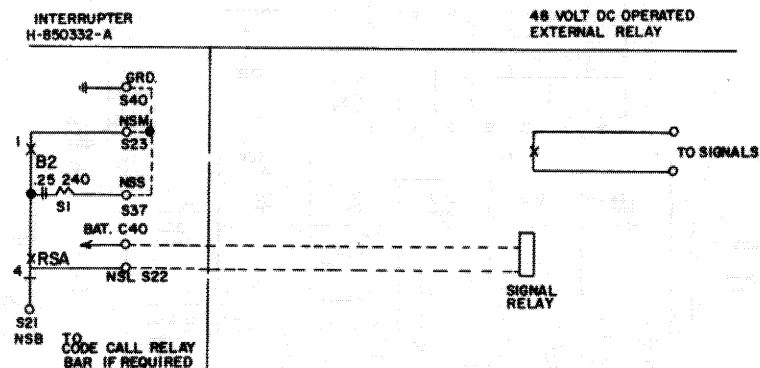
DIGIT "7"

IF DIGIT "7" IS TO BE USED FOR UNIVERSAL NIGHT ANSWER CONTROL:

- A. REMOVE STRAP BETWEEN T1-D15 & D16.
- B. REMOVE STRAP BETWEEN T1-C16 & C17.
- C. ADD STRAP BETWEEN T1-C16 & D15.
- D. ADD STRAP BETWEEN T1-D16 & D17 IF DIGIT "8" IS TO RECEIVE BUSY TONE.

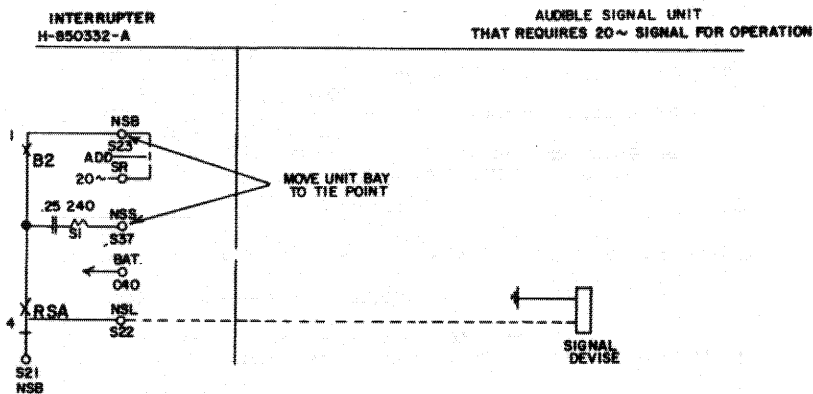
EXTERNAL VISUAL OR AUDIBLE SIGNALS

STOCKBOARD IS WIRED FOR A 48 VOLT D.C. POWER RELAY FOR INCOMING TRUNK CALLS AT NIGHT (SEE SKETCH BELOW).



CONNECTIONS FOR USE WHERE IT IS DESIRED TO HAVE NIGHT ANSWER AND CODE CALL CIRCUIT SHARE COMMON SIGNAL.

OPTIONAL WIRING FOR A 20 CYCLE SIGNAL RELAY INCOMING TRUNK CALLS AT NIGHT (SEE SKETCH BELOW).



CANNOT BE SHARED WITH CODE CALL - SEE CODE CALL CIRCUIT FOR SEPARATE SIGNAL UNIT.

CONFERENCE CIRCUIT - DIGIT "6"

WHEN CONFERENCE CIRCUIT IS EQUIPPED:

- A. REMOVE BARE WIRE STRAPS ON T1 BLOCK BETWEEN A16 AND A17, B16 AND B17.
- B. ADD BARE WIRE STRAP ON T1 BLOCK BETWEEN A15 AND A16.
- C. ADD BARE WIRE STRAP ON T1 BLOCK BETWEEN B15 AND B16.
- D. PLACE A 3 AMP. FUSE IN FUSE PANEL POSITION E4.

OPERATING LIMITS1. GENERAL

A. THE VOLTAGES REQUIRED FOR OPERATION OF THIS SYSTEM ARE:

1. 44 TO 54 VOLTS D.C. FOR OPERATION OF RELAYS, SWITCHES, TRANSMISSION (TALKING BATTERY) AND FOR VISUAL AND AUDIBLE SIGNALS ON THE ATTENDANT'S TURRET.
2. 75 TO 95 VOLTS - 20 CYCLE A.C. FOR OPERATION OF RINGERS.

2. CITY TRUNK CIRCUITS

- A. CONNECTS THIS SYSTEM TO A 24 OR 48 VOLT COMMON BATTERY OR AUTOMATIC PUBLIC EXCHANGE, OR MAY BE ADAPTED TO WORK INTO A MAGNETO OFFICE.
- B. THE MAXIMUM CONDUCTOR LOOP RESISTANCE FROM THE RELAY EQUIPMENT TO THE CENTRAL OFFICE SHOULD BE SUCH THAT NOT LESS THAN THE TEST CURRENT VALUES WILL FLOW THROUGH THE WINDINGS OF THE PREMONITORY BUSY RELAY P. APPROXIMATELY 2000 OHMS MAXIMUM LOOP WHEN CENTRAL OFFICE IS 48 VOLTS AND 1200 OHMS FOR 24 VOLTS.
- C. RECOMMENDED INCOMING RINGING FREQUENCY RANGE IS 16 TO 33-1/3 CYCLES.
- D. WHEN TRANSFER OF CITY TRUNK LINE TO A PREDETERMINED STATION IS USED FOR SERVICE AT NIGHT OR DURING POWER FAILURE, THE TRUNK CONDUCTOR LOOP PLUS STATION LOOP SHOULD NOT EXCEED CENTRAL OFFICE LIMIT.
- E. SPECIAL REQUIREMENTS AT EXTENSION STATIONS ASSIGNED FOR POWER FAILURE:
 1. CITY TRUNK CIRCUIT H-850629-A MAY BE ARRANGED WITH B OR R WIRING (B WIRING IS STANDARD ON STOCKBOARDS). REFER TO WO-850629- FOR WIRING OPTIONS.

B WIRING - OUTGOING LOOP DIALING AND GROUND SEIZURE OF DISTANT END

R WIRING - OUTGOING LOOP DIALING AND SEIZURE (DISTANT END CONNECTOR BANK IS REVERSED FOR PREMONITORY BUSY)

2. CITY TRUNK CIRCUITS (CONT'D)

THEREFORE IF CITY TRUNK CIRCUIT H-850629-A, WITH B WIRING USED, AN EXTENSION STATION ASSIGNED FOR POWER FAILURE OR PREDETERMINED NIGHT ANSWER WILL REQUIRE A GROUNDING BUTTON OR KEY TO INITIATE OUTGOING CALLS. WITH R WIRING, AN EXTENSION STATION ASSIGNED FOR SUCH SERVICE WILL NOT NEED A GROUNDING BUTTON OR KEY, BUT CAN USE A STANDARD TELEPHONE.

3. STATION LINES

- A. THE STATION LINE SIGNAL LOOP LIMIT IS 1000 OHMS, INCLUDING THE INSTRUMENT AND MAY BE EXTENDED BY USE OF LONG LINE ADAPTERS. HOWEVER, SINCE THE LINK CIRCUIT USES A SINGLE BATTERY FEED COIL, IT IS NECESSARY TO LIMIT THE DIFFERENCE BETWEEN THE MAXIMUM AND MINIMUM STATION LOOPS INCLUDING THE INSTRUMENT TO 400 OHMS. WHERE THIS DIFFERENCE EXCEEDS 400 OHMS, THE SHORT LOOP WILL DECREASE THE TRANSMITTER CURRENT AVAILABLE TO THE SET ON THE MAXIMUM LOOP BELOW A VALUE FOR ACCEPTABLE TRANSMISSION UNLESS A LONG LINE ADAPTER IS USED ON THE MAXIMUM LOOP. SEE TABLE I.

TABLE I

IF MIN. STATION LOOP INCLUDING INSTRUMENT IS:	100 OHMS	200 OHMS	400 OHMS	600 OHMS
(TRANSMITTER CURRENT)	77 MA	61 MA	46 MA	36 MA
THEN MAX. STATION LOOP INCLUDING INSTRUMENT MUST NOT EXCEED:	500 OHMS	600 OHMS	800 OHMS	1000 OHMS
(TRANSMITTER CURRENT)	15 MA	20 MA	23 MA	23 MA

4. ATTENDANT'S TURRET

- A. THE TURRET SINGLE CONDUCTOR LIMIT SHOULD NOT EXCEED 25 OHMS. THEREFORE, IF THE TURRET CABLE IS 22 GA., IT SHOULD NOT EXCEED 1,542 FEET, IF CABLE IS 19 GA., IT SHOULD NOT EXCEED 3,100 FEET.

5. LINE BUSY LAMP FIELD

- A. FOR ACCEPTABLE LAMP BRIGHTNESS, THE LINE BUSY LAMP FIELDS POWER SUPPLY SINGLE CONDUCTOR LIMIT SHOULD NOT EXCEED 3 OHMS. THEREFORE, IF THE LINE BUSY LAMP FIELD CABLE IS 22 GA., IT SHOULD NOT EXCEED 186 FEET; IF CABLE IS 19 GA., IT SHOULD NOT EXCEED 375 FEET. GREATER DISTANCE CAN BE OBTAINED THROUGH MULTIPLYING OF CONDUCTORS OR USING LARGER CONDUCTORS.

ZONED UNIVERSAL NIGHT ANSWERING

THE STOCKBOARD IS ARRANGED FOR A COMMON UNIVERSAL ANSWER CONTROL (H-850332-A) ASSIGNED TO ACCESS DIGIT "8".

IF REQUIRED, THREE (3) ADDITIONAL UNIVERSAL NIGHT ANSWER CONTROL CIRCUITS CAN BE ADDED BY AN MO.

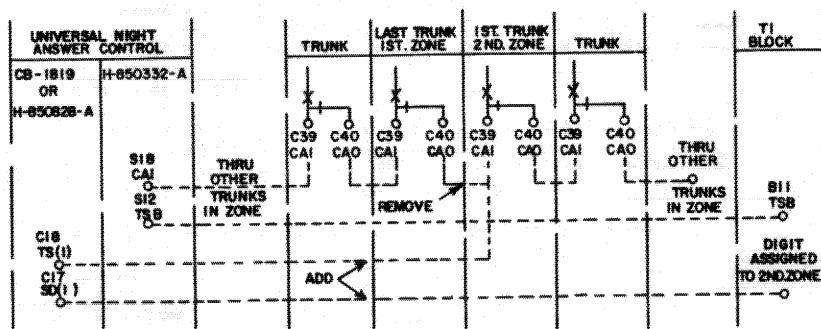
2ND UNIVERSAL NIGHT ANSWER ZONE - DIGIT UNASSIGNED

IF ADDITIONAL UNIVERSAL NIGHT ANSWER CONTROLS ARE OBTAINED THE 1ST UNIVERSAL NIGHT ANSWER ZONE CAN BE SPLIT INTO TWO SEPARATE ZONES.

ANY AVAILABLE DIGIT CAN BE ASSIGNED AS DESIRED.

1. 2ND UNIVERSAL NIGHT ANSWER ZONE (SEE SKETCH BELOW)

- REMOVE WIRE BETWEEN CAO OF LAST TRUNK IN 1ST UNIVERSAL NIGHT ANSWER ZONE AND CA1 OF 1ST TRUNK IN 2ND UNIVERSAL NIGHT ANSWER ZONE.
- ADD JUMPER BETWEEN TS (1) OF UNIVERSAL NIGHT ANSWER CONTROL AND CA1 OF 1ST TRUNK IN 2ND UNIVERSAL NIGHT ANSWER ZONE.
- ADD JUMPER BETWEEN SD (1) OF UNIVERSAL NIGHT ANSWER CONTROL AND ACCESS DIGIT LEAD ASSIGNED TO 2ND ZONE.

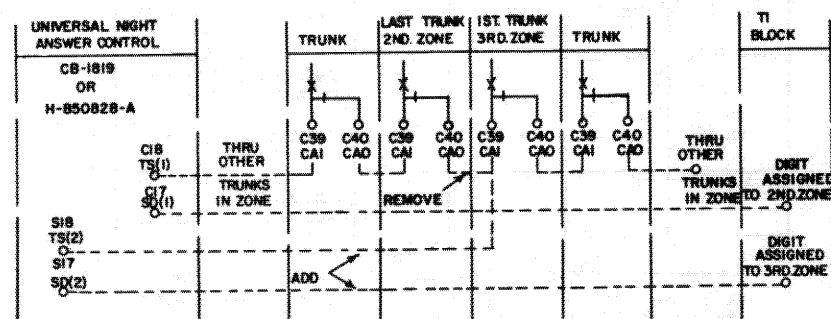
3RD UNIVERSAL NIGHT ANSWER ZONE - DIGIT UNASSIGNED

A 3RD UNIVERSAL NIGHT ANSWER ZONE CAN BE OBTAINED BY SPLITTING THE 2ND UNIVERSAL NIGHT ANSWER ZONE INTO TWO SEPARATE ZONES.

ANY AVAILABLE DIGIT CAN BE ASSIGNED AS DESIRED.

1. 3RD UNIVERSAL NIGHT ANSWER ZONE (SEE SKETCH BELOW)

- REMOVE WIRE BETWEEN CAO OF LAST TRUNK IN 2ND UNIVERSAL NIGHT ANSWER ZONE AND CA1 OF 1ST TRUNK IN 3RD UNIVERSAL NIGHT ANSWER ZONE.
- ADD JUMPER BETWEEN TS (2) OF UNIVERSAL NIGHT ANSWER CONTROL AND CA1 OF 1ST TRUNK IN 3RD UNIVERSAL NIGHT ANSWER ZONE.
- ADD JUMPER BETWEEN SD (2) OF UNIVERSAL NIGHT ANSWER CONTROL AND ACCESS DIGIT LEAD ASSIGNED TO 3RD ZONE.

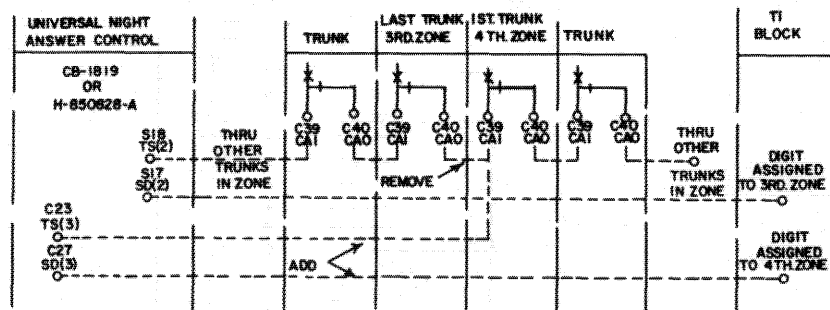
4TH UNIVERSAL NIGHT ANSWER ZONE - DIGIT UNASSIGNED

A 4TH UNIVERSAL NIGHT ANSWER ZONE CAN BE OBTAINED BY SPLITTING THE 3RD UNIVERSAL NIGHT ANSWER ZONE INTO TWO SEPARATE ZONES.

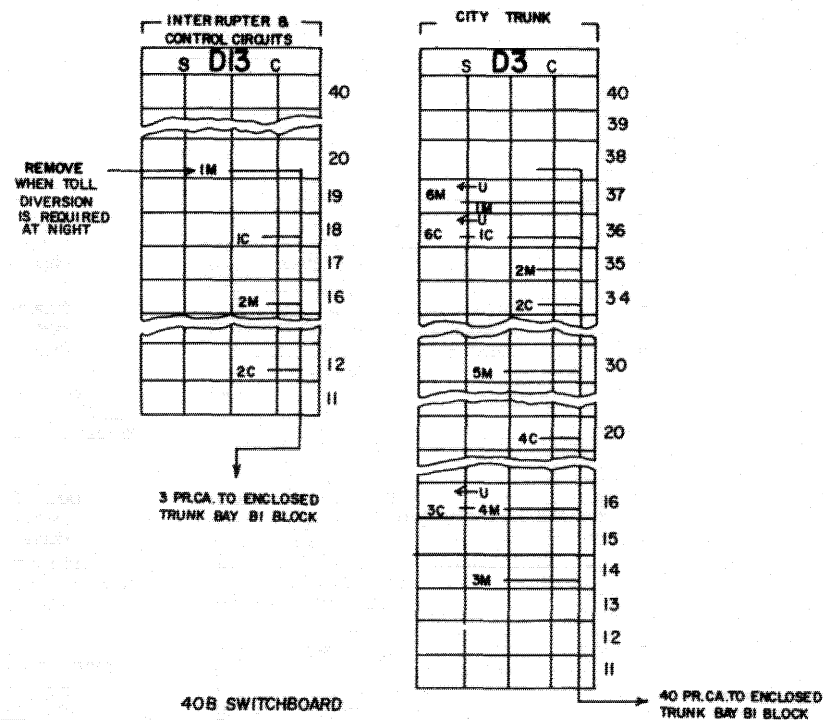
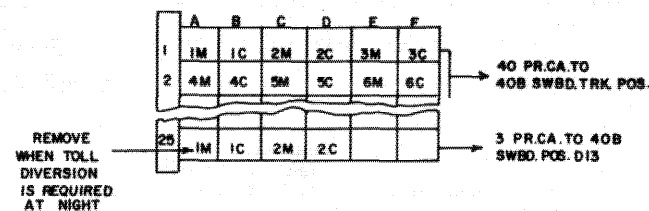
ANY AVAILABLE DIGIT CAN BE ASSIGNED AS DESIRED.

1. 4TH UNIVERSAL NIGHT ANSWER ZONE (SEE SKETCH BELOW)

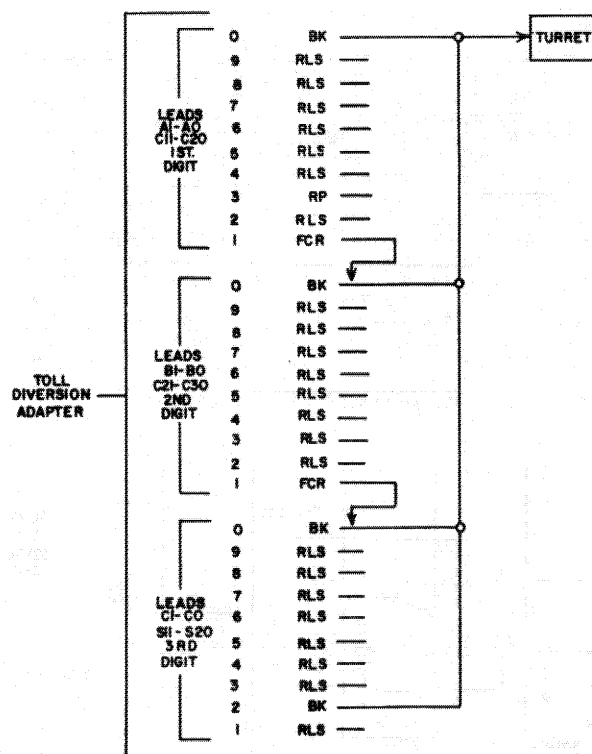
- REMOVE WIRE BETWEEN CAO OF LAST TRUNK IN 3RD UNIVERSAL NIGHT ANSWER ZONE AND CA1 OF 1ST TRUNK IN 3RD UNIVERSAL NIGHT ANSWER ZONE.
- ADD JUMPER BETWEEN TS (3) OF UNIVERSAL NIGHT ANSWER CONTROL AND CA1 OF 1ST TRUNK IN 4TH UNIVERSAL NIGHT ANSWER ZONE.
- ADD JUMPER BETWEEN SD (3) OF UNIVERSAL NIGHT ANSWER CONTROL AND ACCESS DIGIT LEAD ASSIGNED TO 4TH ZONE.

TOLL DIVERSION ADAPTERS - ENCLOSED TRUNK BAY

AN ENCLOSED TRUNK BAY AND TOLL DIVERSION ADAPTERS CAN BE ADDED TO THE STOCKBOARD BY MO'S. THE ENCLOSED TRUNK BAY CAN BE WIRED FOR TOLL DIVERSION ADAPTERS 1-6, 7-10 OR 1-10 AS REQUIRED. IT IS NECESSARY TO ADD CABLE TO CONNECT EACH TRUNK THROUGH ITS ASSOCIATED ADAPTER CIRCUIT AND TO CONNECT THE COMMON LEADS REQUIRED ON THE TOLL DIVERSION ADAPTERS TO THE 40B STOCKBOARD. (SEE SKETCH ON NEXT PAGE). TOLL DIVERSION ADAPTERS JACK TERMINALS C11-C20, C21-C30 AND S11-S20 MUST BE CONNECTED TO RP, FCR, RLS OR SILS FOR REPEATING, FURTHER CHECK, RELEASE OR STEP TO LAST STAGE, AS REQUIRED. BLOCKED DIGITS ARE NOT CONNECTED. (SEE TYPICAL SWITCHING DIAGRAM). ADAPTERS ARE WIRED FOR NO RESTRICTION AT NIGHT OR ANY TIME WHEN THE TURRET NIGHT KEY IS OPERATED. RESTRICTION CAN BE PROVIDED AT ALL TIMES BY REMOVING 1M OF 3 PR. CABLE ON ENCLOSED TRUNK BAY B1 BLOCK TERMINAL A25, AND 40B SWITCHBOARD POS. D13 JACK TERMINAL S20. ADAPTER CIRCUITS ARE EQUIPPED WITH "A" WIRING FOR DIVERSION OF ALL CALLS. IF DIVERSION OF RESTRICTED STATIONS ONLY IS REQUIRED CHANGE WIRING FROM "A" TO "R", SEE E-850746 (OR DB-5562) FOR MORE INFORMATION.

TOLL DIVERSION ADAPTERSB1 BLOCK

TYPICAL SWITCHING DIAGRAM



BK = BLOCKED (DIGIT NOT CONNECTED WILL BE BLOCKED)
RP = REPEATING PERMITTED (REMAINS IN SAME STAGE)
FCR = FURTHER CHECK REQUIRED (SWITCHES TO NEXT STAGE)
RLS = RELEASE
SLS = STEP TO LAST STAGE

AS DIAGRAM IS ARRANGED THE FOLLOWING COMBINATIONS WILL BE BLOCKED:

"0", "10", "112", "110", 30, 330, 310, 3112 AND 3110.

MANUFACTURER'S EQUIPMENT SPECIFICATION
40B-S STOCKBOARD
SERIAL NO. 9124 THRU

PRINTS AND DESCRIPTIONS

1 SET PRINTS AND DESCRIPTIONS ARE SENT WITH EACH SWITCHBOARD.

SPECIFICATION AND INSTALLATION SECTION, CIRCUIT SECTION, DESCRIPTION SECTION, OPERATION AND MAINTENANCE SECTION, RELAY ADJUSTMENT SECTION, WIRING DIAGRAM SECTION AND STOCKLIST SECTIONS ARE ARRANGED PER THEIR TABLE OF CONTENTS.

SPECIFICATION & INSTALLATION SECTION	ISS.	TITLE	DESCRIPTION SECTION	WIRING DIAGRAM SECTION
AE-2098-A	5	TABLE OF CONTENTS	-	-
M-0358		40B-S ENGINEERING SPECIFICATION	-	-
#9124 THRU		40B-S MANUFACTURER'S EQUIPMENT SPECIFICATION	-	-
A-3661		BANK MULTIPLE NUMBERING	-	-
NL-14942-A,B		CABLE TROUGH LAYOUT	-	-
AE-2146		INSTALLATION MATERIAL REQUIREMENTS	-	-
M-0359		INSTALLATION INSTRUCTIONS	-	-
M-0360		INSTALLATION TEST PROCEDURE	-	-
AB-5500		CIRCUIT LOOP LIMITS	-	-

OPERATIONS & MAINTENANCE SECTION	TITLE
AE-2098-B	3 TABLE OF CONTENTS
C-3632	SELECTION SCHEME, 40 LINE PABX
D-3632	SELECTION SCHEME, 40 LINE PABX
A-3660	SELECTION SCHEME, BLOCK DIAGRAM
M-0089	TROUBLE ANALYSIS, 40B SWBD.
M-0199	ROUTINE PROCEDURE, 40B SWBD.
A-1067-A-E	DESIGNATIONS & SYMBOLS

40B-S STOCKBOARD LOCATION
SPECIFICATION FOR EQUIPMENT SPEC. NO. 9124 THRU 9124 THRU
 SERIAL NO. 9124 THRU
 SALES ORDER NO. _____
 SUPPLEMENT NO. _____
 CUSTOMER ORDER NO. _____
 DATE 4-2-74 ISSUE NO. 1
 ENG. W.B. JOHNSON/lmb
 SHIPPING SUMMARY

ITEM	QUANTITY	DESCRIPTION
1	5	MD-20157 CITY TRUNK
2	6	MD-17648 LINK SWITCHES
3	1	MD-20196 ATTENDANT'S TURBET
4	10	NI-15183-A DUMMY FUSE - ONE PER UNEQUIPPED POS.
5	30	NI-14481-A 1-1/3 AMP. FUSES
6	1	NI-14917-A FUSE, 3 AMP.
7	25	CI-504-116 SUBSCRIBER INSTRUCTION CARDS
8	276	NI-14482-F LINE BARS (INCLUDES 2 SPARES)
9	61	NI-14482-LGT LINE BARS (INCLUDES 1 SPARE)
10	61	NI-14482-LCB LINE BARS (INCLUDES 1 SPARE)
11	61	NI-14482-ROT LINE BARS (INCLUDES 1 SPARE)
12	61	NI-14482-RCB LINE BARS (INCLUDES 1 SPARE)
13	1	D-543707-A RUNNING CABLE TO MOP
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		

GENOA, ILL.
 AUTOMATIC ELECTRIC CO
 CH. 11-23-55
 DATE 11-23-55
 SCALE _____
 FINISH _____
 MAT'L _____
 USED ON _____

A-3661
 CHANGES
 ADDED 40B TO TITLE BLOCK
 2/5-31-64(CLO) R.R. KK

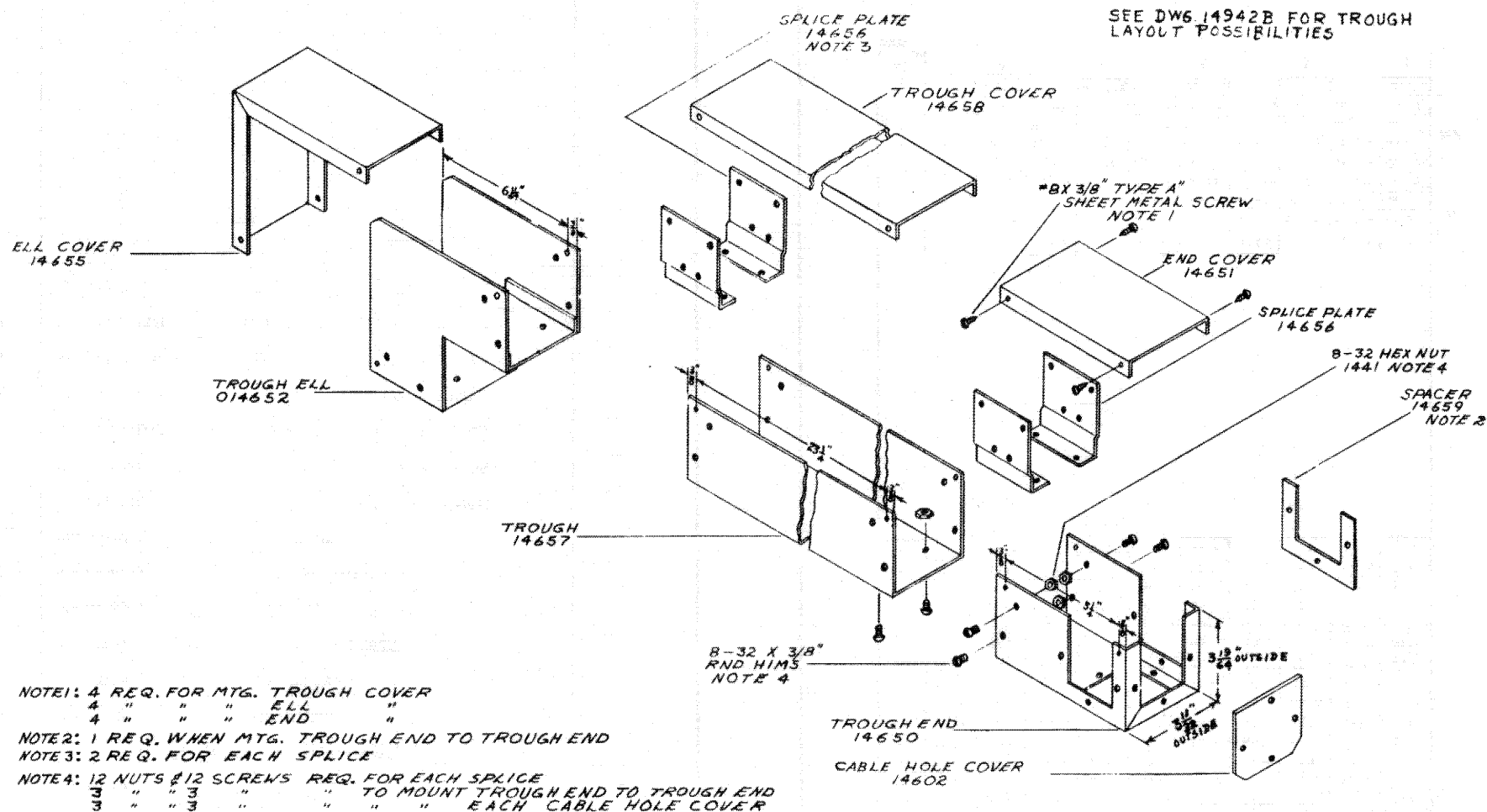
BANK MULTIPLE NUMBERING
 LEFT VIEW
 40B, 40M & 40A PBX
 *
 A-3661
 ISSUE 1, 2

TOLERANCE UNLESS SHOWN OTHERWISE
 DECIMALS ±
 FRACTIONS ±
 ANGLES ±

AR	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	101	103	105	107	109	111	113	115	117	119	121	123	125	127	129	131	133	135	137	139	141	143	145	147	149	151	153	155	157	159	161	163	165	167	169	171	173	175	177	179	181	183	185	187	189	191	193	195	197	199	201	203	205	207	209	211	213	215	217	219	221	223	225	227	229	231	233	235	237	239	241	243	245	247	249	251	253	255	257	259	261	263	265	267	269	271	273	275	277	279	281	283	285	287	289	291	293	295	297	299	301	303	305	307	309	311	313	315	317	319	321	323	325	327	329	331	333	335	337	339	341	343	345	347	349	351	353	355	357	359	361	363	365	367	369	371	373	375	377	379	381	383	385	387	389	391	393	395	397	399	401	403	405	407	409	411	413	415	417	419	421	423	425	427	429	431	433	435	437	439	441	443	445	447	449	451	453	455	457	459	461	463	465	467	469	471	473	475	477	479	481	483	485	487	489	491	493	495	497	499	501	503	505	507	509	511	513	515	517	519	521	523	525	527	529	531	533	535	537	539	541	543	545	547	549	551	553	555	557	559	561	563	565	567	569	571	573	575	577	579	581	583	585	587	589	591	593	595	597	599	601	603	605	607	609	611	613	615	617	619	621	623	625	627	629	631	633	635	637	639	641	643	645	647	649	651	653	655	657	659	661	663	665	667	669	671	673	675	677	679	681	683	685	687	689	691	693	695	697	699	701	703	705	707	709	711	713	715	717	719	721	723	725	727	729	731	733	735	737	739	741	743	745	747	749	751	753	755	757	759	761	763	765	767	769	771	773	775	777	779	781	783	785	787	789	791	793	795	797	799	801	803	805	807	809	811	813	815	817	819	821	823	825	827	829	831	833	835	837	839	841	843	845	847	849	851	853	855	857	859	861	863	865	867	869	871	873	875	877	879	881	883	885	887	889	891	893	895	897	899	901	903	905	907	909	911	913	915	917	919	921	923	925	927	929	931	933	935	937	939	941	943	945	947	949	951	953	955	957	959	961	963	965	967	969	971	973	975	977	979	981	983	985	987	989	991	993	995	997	999	1001	1003	1005	1007	1009	1011	1013	1015	1017	1019	1021	1023	1025	1027	1029	1031	1033	1035	1037	1039	1041	1043	1045	1047	1049	1051	1053	1055	1057	1059	1061	1063	1065	1067	1069	1071	1073	1075	1077	1079	1081	1083	1085	1087	1089	1091	1093	1095	1097	1099	1101	1103	1105	1107	1109	1111	1113	1115	1117	1119	1121	1123	1125	1127	1129	1131	1133	1135	1137	1139	1141	1143	1145	1147	1149	1151	1153	1155	1157	1159	1161	1163	1165	1167	1169	1171	1173	1175	1177	1179	1181	1183	1185	1187	1189	1191	1193	1195	1197	1199	1201	1203	1205	1207	1209	1211	1213	1215	1217	1219	1221	1223	1225	1227	1229	1231	1233	1235	1237	1239	1241	1243	1245	1247	1249	1251	1253	1255	1257	1259	1261	1263	1265	1267	1269	1271	1273	1275	1277	1279	1281	1283	1285	1287	1289	1291	1293	1295	1297	1299	1301	1303	1305	1307	1309	1311	1313	1315	1317	1319	1321	1323	1325	1327	1329	1331	1333	1335	1337	1339	1341	1343	1345	1347	1349	1351	1353	1355	1357	1359	1361	1363	1365	1367	1369	1371	1373	1375	1377	1379	1381	1383	1385	1387	1389	1391	1393	1395	1397	1399	1401	1403	1405	1407	1409	1411	1413	1415	1417	1419	1421	1423	1425	1427	1429	1431	1433	1435	1437	1439	1441	1443	1445	1447	1449	1451	1453	1455	1457	1459	1461	1463	1465	1467	1469	1471	1473	1475	1477	1479	1481	1483	1485	1487	1489	1491	1493	1495	1497	1499	1501	1503	1505	1507	1509	1511	1513	1515	1517	1519	1521	1523	1525	1527	1529	1531	1533	1535	1537	1539	1541	1543	1545	1547	1549	1551	1553	1555	1557	1559	1561	1563	1565	1567	1569	1571	1573	1575	1577	1579	1581	1583	1585	1587	1589	1591	1593	1595	1597	1599	1601	1603	1605	1607	1609	1611	1613	1615	1617	1619	1621	1623	1625	1627	1629	1631	1633	1635	1637	1639	1641	1643	1645	1647	1649	1651	1653	1655	1657	1659	1661	1663	1665	1667	1669	1671	1673	1675	1677	1679	1681	1683	1685	1687	1689	1691	1693	1695	1697	1699	1701	1703	1705	1707	1709	1711	1713	1715	1717	1719	1721	1723	1725	1727	1729	1731	1733	1735	1737	1739	1741	1743	1745	1747	1749	1751	1753	1755	1757	1759	1761	1763	1765	1767	1769	1771	1773	1775	1777	1779	1781	1783	1785	1787	1789	1791	1793	1795	1797	1799	1801	1803	1805	1807	1809	1811	1813	1815	1817	1819	1821	1823	1825	1827	1829	1831	1833	1835	1837	1839	1841	1843	1845	1847	1849	1851	1853	1855	1857	1859	1861	1863	1865	1867	1869	1871	1873	1875	1877	1879	1881	1883	1885	1887	1889	1891	1893	1895	1897	1899	1901	1903	1905	1907	1909	1911	1913	1915	1917	1919	1921	1923	1925	1927	1929	1931	1933	1935	1937	1939	1941	1943	1945	1947	1949	1951	1953	1955	1957	1959	1961	1963	1965	1967	1969	1971	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015	2017	2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039	2041	2043	2045	2047	2049	2051	2053	2055	2057	2059	2061	2063	2065	2067	2069	2071	2073	2075	2077	2079	2081	2083	2085	2087	2089	2091	2093	2095	2097	2099	2101	2103	2105	2107	2109	2111	2113	2115	2117	2119	2121	2123	2125	2127	2129	2131	2133	2135	2137	2139	2141	2143	2145	2147	2149	2151	2153	2155	2157	2159	2161	2163	2165	2167	2169	2171	2173	2175	2177	2179	2181	2183	2185	2187	2189	2191	2193	2195	2197	2199	2201	2203	2205	2207	2209	2211	2213	2215	2217	2219	22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14942-A

CHANGES



SEE DWG 14942B FOR TROUGH LAYOUT POSSIBILITIES

NOTE 1: 4 REQ. FOR MTG. TROUGH COVER

4 " " " ELL

4 " " " END

NOTE 2: 1 REQ. WHEN MTG. TROUGH END TO TROUGH END

NOTE 3: 2 REQ. FOR EACH SPLICE

NOTE 4: 12 NUTS & 12 SCREWS REQ. FOR EACH SPLICE
3 " " 3 " " " " " TO MOUNT TROUGH END TO TROUGH END
3 " " 3 " " " " " EACH CABLE HOLE COVER

TOLERANCE UNLESS SHOWN OTHERWISE

FRACTIONS ±

DECIMALS ±

ANGLES ±

DR 58	SCALE 1/4" = 1"
CH 58	DATE 3-2-56
EN 58	APPR J. K.
AUTOMATIC ELECTRIC CO GENOA BRANCH GENOA, ILL	

TROUGH LAYOUT

40A, 40M, 40KS-1, 80A, 80M, 80KS-1 PABX

ISSUE 1

14942-A

USED ON

ISSUE: 1, 2, 3.
4-2-74

MANUFACTURER'S EQUIPMENT SPECIFICATION
40B-S STOCKBOARD
SERIAL NO. 9124 THRU

PAGE 3

CIRCUIT SECTION	ISS.	DESCRIPTION SECTION	ISS.	WIRING DIAGRAM		TITLE	RELAY ADJUSTMENT		STOCKLIST	
				SECTION	ISS.		SECTION	ISS.	SECTION	ISS.
AE-2098-C	2	AE-2098-D	3	AE-2098-E	3	TABLE OF CONTENTS	AE-2098-F	2	AE-2098-G	3
H-851053-A		E-851053-A				CROSS POINT SWITCH, 60 POINT BANK	-		DH-851053-A91	
(SH. 1, 2, 4 & 12)									DH-851053-A91A	
H-850940-A	3	E-850940-A	2	H-721505	1	LINE CIRCUIT	AH-850940-A	4	DH-850940-A70	4
H-850280-A	6	E-850280-A	2	-		FINDER GUARD	AH-850280-A	3	DH-850280-A41	4
H-850260-A	28	E-850260-A	15	-		LINK SELECTION CONTROL	AH-850260-A	6	DH-850260-A41	6
-		-		WC-3525	3	CROSS CONNECT PLATE	-		-	
						LINK SELECTION CONTROL	-		-	
H-850289-A	8	E-850289-A	4	-		LINK	AH-850289-A	5	DH-850289-A40	9
H-850332-A	13	E-850332-A	4	-		INTERRUPTER, CITY TRUNK, NIGHT	-		-	
						ANSWER AND CODE CALL CONTROLS	AH-850332-A	5	DH-850332-A41	8
H-850627-A	4	E-850627-A	1	-		POWER FAILURE TRANSFER, PREDETERMINED	-		-	
						NIGHT ANSWER AND TURRET REGISTER	AH-850627-A	2	DH-850627-A73	4
AE-6322	3	-		-		PREDETERMINED NIGHT ANSWER	-		-	
						CONNECTING SCHEME	-		-	
H-850350-A	12	E-850350-A	7	-		TURRET POSITION CIRCUIT	AH-850350-A	6	DH-850350-A40	9
-		E-850629-A	19	-		CITY TRUNK	AH-850629-A	15	-	
H-850301-B	4	E-850301-B	1	-		ATTENDANT'S TRUNKS & CONFERENCE	AH-850301-B	2	DH-850301-B42	3
H-850359-A	5	E-850359-A	2	D-56607	10	AUDIBLE SIGNAL UNIT	-		D-56607-A	6
-		-		WD-3768	1	MESSAGE WAITING SERVICE CABLING	-		-	
						40B BAY	-		D-260703	
							-		D-260703-A	
		GSP-507-508-200	1			MODEL NA-100 FILTER VENTILATOR	-		-	
						JUMPERS, CABLING AND MISC.	-		-	
				WS-9243-B	8	UNIT BAY CABLE	-		-	
				WA-7193	3	STRAPPING & TERMINAL ASSIGNMENT	-		-	

ISSUE 2: 4-18-74 DH-850940-A70 WAS ISS. 3. AH-850629-A WAS ISS. 14.
ISSUE 3: 6-24-74 WS-9243-B WAS ISS. 7.

PAGE 2

MANUFACTURER'S EQUIPMENT SPECIFICATION
40B-S STOCKBOARD
SERIAL NO. 9124 THRU

OPERATIONS & MAINTENANCE SECTION	ISS.	TITLE	DESCRIPTION		WIRING DIAGRAM	
			SECTION	ISS.	SECTION	ISS.
R-0004-A-G		RELAY ADJUSTMENT 900 TYPE				
A-1020		RELAY TYPES 910-916				
S-0016		RELAY 910-916				
A-1147		RELAY TYPES 920-926				
S-0025		RELAY 920-926				
A-1148		RELAY TYPES 930-936				
S-0026		RELAY 930-936				
A-1759		RELAY TYPES 940-946				
S-0049		RELAY 940-946				
A-3106		RELAY TYPES 950-956				
S-3106		RELAY 950-956				
D-555195		RELAY 420AA				
D-555195-A		RELAY 420AB				
D-555196		RELAY 420AB				
D-555196-A		RELAY 420AB				
AD-5679		ORDERING INFORMATION FOR GT-90000 SERIES RELAY				

SPECIFICATION FOR EQUIPMENT

LOCATION 40B-S STOCKBOARD SPEC. NO. 9124 THRU
 SERIAL NO. 9124 THRU SALES ORDER NO. _____
 SUPPLEMENT NO. _____
 CUSTOMER ORDER NO. _____ PAGE NO. 4
 ENG. W. R. JOHNSON/lmh DATE 4-2-74 ISSUE NO. 3 (06-24-74)

SHIPPING SUMMARY

ITEM	LINE	QUANTITY	
	1		40B-S SWITCHBOARD BAY & EQUIPMENT
	2	1	D-260703-A 40B SWITCHBOARD BAY E/W WS-9243-B UNIT
*3	3		BAY CABLE, WS ISS. 8, LS ISS. 6:
	4		WA-7193 STRAPPING & TERMINAL ASSIGNMENT
	5		WA ISS. 3' ONE (1) DH-850627-A73A
	6		POWER FAILURE TRANSFER AND TURRET
	7		REGISTER: DH ISS. 4, WITH ISS. 1A:
	8		DH-850940-A70A - LINE RELAY BAR
*2	9		DH ISS. 4, H ISS. 1, RH ISS. 2
	10	2	NL-14470-A LINE BAR GUIDES
	11		POS. B6, B13
	12		NOTE: SEE INSTALLATION INSTRUCTIONS.
	13	2	D-761056-D .164-32 x .375 PHSMS
	14	2	NL-12991-A FIL. HIMS
	15	1	AE-2360-A RELAY BAR DESIGNATIONS
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		

(11) AUTOMATIC ELECTRIC

YM-128(11/71)

SPECIFICATION FOR EQUIPMENT

LOCATION 40B-S STOCKBOARD SPEC. NO. 9124 THRU
 SERIAL NO. 9124 THRU SALES ORDER NO. _____
 SUPPLEMENT NO. _____
 CUSTOMER ORDER NO. _____ PAGE NO. 5
 ENG. W. R. JOHNSON/lmh DATE 4-2-74 ISSUE NO. 1

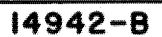
SHIPPING SUMMARY

ITEM	LINE	QUANTITY	
	1		THE FOLLOWING LISTED LINE BAY EQUIPMENT TO BE SHIPPED
	2		SEPARATE FROM THE LINE BAY:
	3	2	DH-850289-A40A LINK RELAY BAR
	4		DH ISS. 9, RH A1 ISS. 4A
	5		POS. D1, D2
	6	1	DH-850332-A41A INTERRUPTER, TRUNK, CODE CALL AND
	7		NIGHT ANSWER CONTROLS
	8		DH ISS. 8, RH A2 ISS. 3A
	9		POS. D13
	10	1	DH-850280-A41A FINDER GUARD
	11		DH ISS. 4, RH A2 ISS. 3A
	12		POS. E1
	13	2	DH-850260-A41A SELECTION CONTROL
	14		CROSS CONNECT PER WC-3525
	15		DH ISS. 6, RH A2 ISS. 1A
	16		POS. E2, E3
	17	1	DH-850301-B42A ATTENDANT'S TRUNKS AND CONFERENCE
	18		DH ISS. 3, RH B3 ISS. 1A
	19		POS. E4
	20	1	DH-850350-A40A TURRET POSITION CIRCUIT
	21		DH ISS. 9, RH A1 ISS. 4A
	22		POS. E5
	23		
	24		

(11) AUTOMATIC ELECTRIC

YM-128(11/71)

CHANGES



ISSUE: 1
11.29.71

GTE AUTOMATIC ELECTRIC
GENOA, ILLINOIS

AE-2146

40B

INSTALLATION MATERIAL REQUIREMENTS

ORDER QUANTITY	PART NUMBER	NO. PAIRS	WIRE GA.	LENGTH	REQUIRED TO CONNECT
1	D-543707	50	24 GA.	27'	Stations 21-50 & trunk lines P4 & P5 plugs to terminal box.
	D-543705-A	75	24 GA.	50'	P1, P2 & P3 plugs to turret and busy lamp field.
	D-543705-B	75	24 GA.	75'	
	D-543705-C	75	24 GA.	100'	
	D-543705-D	75	24 GA.	150'	
	D-543705-E	75	24 GA.	200'	
	D-543705-F	75	24 GA.	300'	

MISCELLANEOUS

QUANTITY	ITEM	REQUIRED FOR
—	#12 Ga. Black plastic covered wire	Earth ground to swbd. bay or pos. battery to ground NOTE 1
—	W-5005 Switchboard Wire, R-32,RW-69, B-33,BW-61,O-34,OW-64,G-31,GW-66, BR-35,BRW-67,RO-71,BO-62,OG-65, RBK-73,BBK-75,OBK-76,GBK-77	Optional features desired on switchboard NOTE 2
—	W-5005 Switchboard wire (paired) R,RW-85,B,BW-81,O,OW-82,G,GW-83, BR,BRW-84	Optional features desired on switchboard. Use paired wire on talking circuits. NOTE 2
—	# Ga. 2 conductor, black and white wire	Swbd. to batteries for discharge leads. NOTE 3
—	# Ga. 2 conductor, black and white wire	Swbd. to batteries for charge leads. NOTE 3
—	# Ga. 2 conductor, black and white wire	Batteries to dynamotor input. NOTE 3
—	# Ga. 2 conductor, black and white wire	Swbd. to dynamotor for A.C. supply to subcycle and tone generator NOTE 3

NOTE 1: Wire size depends on distance between switchboard and earth ground, but should not be less than #12 gauge.

NOTE 2: All colors are not necessarily required. Order only colors that are required. Each color comes in 50 foot rolls.

NOTE 3: Items required only with battery power supply.

NOTE 4: All wires and cable lengths should be distance from top right or left of switchboard bay to external terminals or apparatus.

NOTE 5: Switchboard bay dimensions: 6' high x 4' wide x 15" deep.

ISSUE:
1) 11.29.71
2) 10.18.73

GTE AUTOMATIC ELECTRIC
GENOA, ILLINOIS

M-0359
1

INSTALLATION INSTRUCTIONS
40B PABX

Step #1 - Unpacking and Location of Equipment

Check all the crates and cartons to see that none of them are damaged. A "Packing List" is stapled to the side of the 40B Switchboard Bay crate. Remove the "Packing List", check the list against the material received (do not remove the relay bars and switches from their cartons at this time, their part number is clearly written on the cartons). Also check your work order for the list of MO's that are to be added to the basic stockboard. Note any shortages or damages and report it to the proper authorities.

Move the 40B Switchboard bay to its permanent location. When the bay is in place, remove the doors for ease of working on the switchboard after uncrating. Locate or mount associated equipment (battery cabinet, turret, distributing frame, etc.) in their proper place. Install conduit or trough between bay and distributing frame, bay and turret, bay and battery cabinet as required (do not run the 110 Volt A.C. in the same conduit or trough used for the switchboard cable). See NL-14942-A,B - Cable Trough Layout.

Step #2 - Power Connections

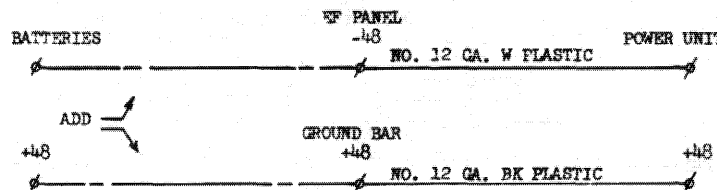
A standard 110 Volt A.C. double convenience outlet is provided as part of the switchboard bay equipment and is located in the rear lower left corner of the bay below the power unit. Conduit or BX cable, whichever is applicable according to electrical code should be used to connect the commercial 110 Volt A.C. line to this outlet. Do not plug the power unit in at this time. The blower if equipped, is to be connected to 110 Volt A.C. line. Do not run blower when the doors are open.

Step #3 - Battery Connections

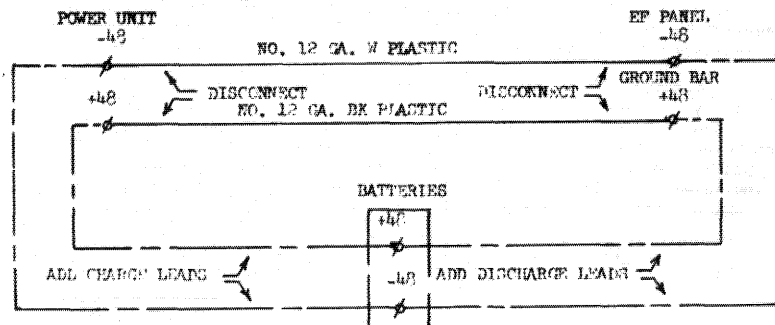
- When batteries are not used, the ground bus bar (BG) rear left of the switchboard bay above the power unit, must be connected to an earth ground with #12 or larger gauge wire.
- When batteries are used, the earth ground connection may be made at the positive terminal of the batteries. The power unit (normally connected for use as a battery eliminator) must be revised and used as a battery charger. This involves a wiring change on the power unit.

Step #3 - Battery Connections (Cont'd)

When batteries are used and the same leads are used for charge and discharge, the positive battery terminal should be connected to the switchboard at the stud on the ground bus bar (EG) and the negative battery terminal should be connected to the switchboard at the stud on fuse panel (EF).



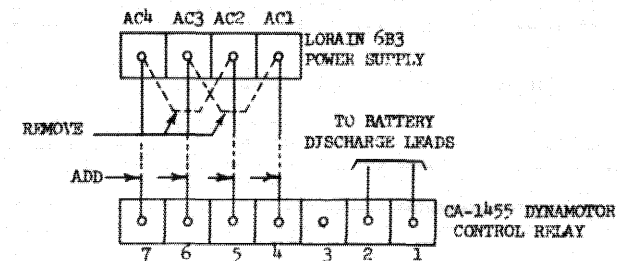
When separate charge and discharge leads are used, disconnect, tape and roll up both ends of the #12 gauge black wire (+48) between power unit and ground bus (EG) bar and #12 gauge white wire (-48) between the power unit and fuse panel (EF). The charge leads are to be connected between the batteries and power unit output terminals. The discharge leads are to be connected between the batteries and fuse panel (-48) and between batteries and ground bus bar (+48).



Step #3 - Battery Connections (Cont'd)

When batteries are used a dynamotor is required to supply A.C. current for the dial tone and ringing generator during periods of power failure. Connect dynamotor as follows:

- Remove white jumper between AC1 and AC3 and black jumper between AC2 and AC4 in power supply unit.
- Connect AC3 and AC4 to dynamotor control relay terminals 6 and 7.
- Connect AC1 and AC2 to dynamotor control relay terminals 4 and 5.
- Connect terminals 1 and 2 of dynamotor control relay to discharge leads of battery.



Step #4 - Cabling

Connect running cable to plugs at top of the cabinet. The three plug cable will go to the turret and the two plug cable will go to the terminal strip or block. Fasten the cables tight.

Step #5 - Jumpering

The "Unit Bay Cable" drawing shows the wiring which is standard in all 40B switchboards and is formed and laced into the "bay cable".

The strapping and terminal assignment (furnished with each 40B) and the "Jumpers & Instructions" drawings (furnished with each optional relay bar that is added to a 40B-S stockboard) show all of the optional wiring and strapping which is not included in the unit bay cable wiring. These wires are run through the jumper rings found in the rear of the switchboard. The strapping and terminal assignment shows the terminal assignment for the terminal blocks. For the jack assignment refer to the circuits.

The layout of the "Unit Bay Cable" drawing is arranged to represent the relative physical location of the relay bar jack terminals and the terminal blocks are viewed from the rear of the switchboard. The middle of the "Unit Bay Cable" drawing represents the relay bar jack terminals for the "D" shelf (see AC-1426) with each relay bar jack represented by its relay bar position number (D1, D2, etc. through D16), separated by heavy vertical lines. The relay bar jack consists of two vertical rows of terminals numbered, bottom up, C11 through C40 and S11 through S40. The "C" jack terminals are the ones on the same side of the jack as the relay coils (See A-1067-D, Fig. 60). The "S" jack terminals are the ones on the same side of the jack as the relay springs, or contacts, of the relay bar. The "Jumpers & Instructions" show that the jack terminals are represented by the two inner columns of squares with each square representing one terminal of the jack. The two outer vertical columns of squares under each relay bar jack position are used on the drawing only to show special wiring where it is necessary at times to remove the unit bay cable or jumper wire from the jack terminal. In these cases, "tie points", (or terminal strips) are furnished which attach to the relay bar jack by means of clips and provide additional terminals to terminate the unit bay cable wires which are removed from the jack terminals. The symbol U found on the "Jumpers & Instructions" means to move the unit bay wires on this terminal to the tie point terminal.

The following stockboard features can be added by jumpers or strapping:

1. Power Failure and/or Predetermined Night Answer
2. Non-Restricted Service on Individual Lines
3. 1ST and 2ND Choice Selection on City Trunks
4. 2ND Trunk Group - Digit "7"
 - A. Restricted or Non-Restricted Service
 - B. 1ST and 2ND Choice Selection
5. 3RD Trunk Group - Digit "6"
 - A. Restricted or Non-Restricted Service
6. Attendant's Monitor

Step #5 - Jumpering (Cont'd.)

See your Work Order for the optional features required on this installation.

See Stockboard Engineering Specification, for proper jumpering and instructions.

Each optional feature such as Code Call has its own "Jumpering & Instructions" drawing. Using these prints, run the jumpers for all the optional equipment to be used in this switchboard. If the 40B is an engineered switchboard, all optional features will be shown on the "Jumpers & Cabling" drawing and jumpered at the factory.

The switchboard bay is now installed, completely jumpered and cabled. After the room and switchboard have been cleaned, the installer can proceed to Step #6.

Step #6 - Installing Switches

Remove the switches (DH-851053-A91A) from their cartons. Make a visual check of each switch to see that all contacts line up and are not bent, that all tens lifts are properly seated, all tens and units armatures move freely, and that each tens armature is equipped with a tens armature pin stop.

Place switches in proper guide position as per 40B Stockboard Specification, the following tables, or per specification on engineered switchboards.

Push into place, making sure switch jack is properly engaged, secure each switch by inserting screws on rear side of top and bottom, after screws have been tightened, loosen by backing off 3/4 turn.

If line bars are of the color coded type (purple, red, yellow, green), install per the following:

The LPT (purple) & LGB (green) bars are for the left hand side of switch shelf and the RPT (red) & RGB (yellow) bars are for the right hand side of switch shelf as viewed facing the front shelf.

Install LPT (purple) & RPT (red) line bars in all + & - designations in columns 1,3,5,7 & 9; LGB (green) & RGB (yellow) in all + & - designations in columns 2,4,6,8 & 0.

If line bars are of the non-color coded type, install per the following:

The LG bars are for the left hand side of switch shelf and the RG bars are for the right hand side of switch shelf as viewed facing the front of shelf.

Install the LG and RG line bars only in the + & - of each line.

Install the F line bars in the T, TX, and the allotter positions on both sides of switch shelf.

After all switches have been put into place, swing switch frame out and insert one (1) line bar in each corner (20,0,21+,M2.ITX per A-3661) pushing each line bar in until it engages the center jack. Be sure bar is perpendicular with end guide when inserting, so that it goes in straight. If undue pressure is required to insert line bar, stop and investigate cause

Step #6 - Installing Switches (Cont'd)

and correct, then continue to insert line bar. Under no circumstances should the bank insulator plates or tens magnet angle be adjusted to correct undue pressure of inserting line bars. Care should be taken not to bend phosphor bronze contact springs or break tens lift while inserting bars. Proceed to install remaining line bars per A-3661.

Retighten screws at rear of each switch.

When removing any switch in the future, remove only those screws holding that particular switch, thereby leaving all other switches in alignment when line bars are again inserted.

Install link switches per the following table:

<u>Number of Links Equipped</u>	<u>Links To Be Equipped</u>	<u>Equip Switch Position</u>	<u>Install Line Bar Guides In Position</u>	<u>Equip Fuse Position</u>
4	2,3,5,6	B15-B19, B21, B24, B26	B20	D1-D2
5	1,2,3,5,6	B15-B19, B21, B23-B26	B20	D1-D2
6	1-6	B15-B26	B13 If Conference is not equipped	D1-D2

Step #6 - Installing Switches (Cont'd)

Install trunk switches per the following table:

<u>Trunk</u>	<u>Trunk Relay Bar Position</u>	<u>Trunk Switch Position</u>	<u>Trunk Fuse Position</u>
1	D3	B1	D3
2	D4	B2	D4
3	D5	B3	D5
4	D6	B4	D6
5	D7	B5	D7
6	D8	B6	D8
7	D9	B7	D9
8	D10	B8	D10
9	D11	B9	D11
10	D12	B10	D12

Note: A line bar guide must be mounted in the adjacent switch position on the spring side (right side) of the relay switch if this position is vacant. No more than five (5) vacant positions should appear together.

Conference Switches

When conference switches are to be equipped, mount relay switches in Pos. B12, B13 and B14. A line bar guide must be in Pos. B21 if it is not equipped with a switch.

Executive Link Switches

See MO's for number of switches required and their locations.

Step #7 - Installing Relay Bars

Remove the relay bars from the cartons. Make a visual check to see that all armatures are properly seated, that all spring lifts or stops are properly seated and that relay springs are not bent. Jack relay bar into their respective positions. (See specifications and MO's for proper positions on 40B stockboards or 40B engineered switchboards).

Step #8 - Toll Diversion Adapters - Enclosed Trunk Bay

If an enclosed trunk bay wired for toll diversion adapters and toll diversion adapter relay bars are provided (MO's), install relay bars per table below:

<u>Toll Diversion Adapter Relay Bar</u>	<u>Enclosed Trunk Bay Relay Bar Position</u>
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

Step #9 - Fusing

Install fuses on fuse panel:

for links, see table on Page

for trunks, see table on Page

for all other basic stockboard relay bars, see equipped positions for MO's, see MO's "Jumpering & Installation Instructions"

Add dummy fuses to all unequipped positions.

Busy out links not equipped with switches.

The doors are to be added to the cabinet. It may be necessary to loosen the screws holding the cabinet and adjust so the doors will close properly.

This switchboard is now ready for testing. Plug in power unit and test per Installation Test Procedure.

GENOA, ILLINOIS
INSTALLATION TEST PROCEDURE
408 PABX SWITCHBOARD

It is suggested that the following equipment be on hand to test this switchboard:

- 1 Hand test telephone (butt-in)
- 1 Volt ohmmeter
- 1 Test lamp
- 2 Standard telephones
- 1 Standard telephone E/W grounding button or key
- 1 Miscellaneous hand tools

It may be necessary to refer to the M-0089, Trouble Analysis, for information if you run into any difficulties.

PABX BAY & LOCAL EQUIPMENT

1. Jack Springs Lifting Off Shorting Clips

A shorting clip is a small metal clip which is fastened to the jack spring stop (from the front of the switchboard look at the relay bar jack position D10 springs S11-S12 or C11-C12). This clip will short two jack springs together to maintain chain circuit continuity when the relay bar position is vacant, but when a relay bar is jacked into this position, the jack springs are lifted off the spring stop assembly, removing the short and placing the relay bar into the chain circuit. Therefore, the following tests are made to insure that the jack springs are lifting off the shorting clips:

- A. Turn off power unit (remove battery from switchboard)
Remove interrupter and trunk control relay bar
Remove the finder guard relay bar
- B. Link Selection Control - Pos. E2 place an ohmmeter across jack springs S11-S12 (P1-F0 chain circuit) and ohmmeter reads a full short. Push up "CX" relay armature and ohmmeter reads infinity (open), repeat on link selection control in Pos. E3.
- C. Link Selection Control - Pos. E2 place an ohmmeter across jack springs C11-C12 (C1-G0 chain circuit) and ohmmeter reads a full short. Push up "CG" relay armature and ohmmeter reads infinity (open), repeat on link selection control in Pos. E3.
- D. Link Selection Control - Pos. E2 place an ohmmeter across jack springs S14-S15 (RS-FS chain circuit) and ohmmeter reads a full short. Push up "CX" relay armature and ohmmeter reads infinity (open), repeat on link selection control in Pos. E3.

- E. Link Selection Control - Pos. E2 place an ohmmeter across jack springs S39-S40 (PB-FC chain circuit) and ohmmeter reads infinity (open). Push up "CX" relay armature and ohmmeter reads a full short, repeat on link selection control in Pos. E3.
- F. City Trunk - Pos. D3 place an ohmmeter across jack springs S11-S12 (C11-C0 chain circuit) and ohmmeter reads a full short. Push up "X" relay armature and ohmmeter reads infinity (open). Repeat on all equipped city trunk positions.
- G. City Trunk - Pos. D3 place an ohmmeter across jack springs C11-C12 (C1-C0 chain circuit) and ohmmeter reads a full short. Push up "S" relay armature and ohmmeter reads infinity (open). Repeat on all equipped city trunk positions.
- H. City Trunk - Pos. D3 place an ohmmeter across jack springs S39-S40 (PB-FC chain circuit) and ohmmeter reads a full short. Push up "S" relay armature and ohmmeter reads infinity (open). Repeat on all equipped city trunk positions.
- I. City Trunk - Pos. D3 place an ohmmeter across jack springs C39-C40 (C11-CA0 chain circuit) and ohmmeter reads a full short. Push up "V" relay armature and ohmmeter reads infinity (open). Hold up "V" relay armature and push up "D" relay armature and ohmmeter reads a full short. Repeat on all equipped city trunk positions.
- J. Replace the Interrupter-Trunk control and finder guard relay bars. Turn on power unit.

2. Finder Guard

The finder guard prevents interference between lines which attempt to land at the same instant and guards against simultaneous attempts to use the allotter bank by more than one link, selection control, register or trunk. Therefore, the following tests are made to insure that the proper tens and units coils are marked in the finder switches.

- Swing the switch shelf frame out and at the end where the line bars are located, you can insert the butt-in between the line bars of the + and - sides of any line. From this point you can land any line and seize a link relay bar. See A-3661 for line bar and bank multiple assignment.
- A. Land the following lines several times. Check that the proper T2-T5, U16-U50, 15 or 16 relays operate in the finder guard and that the correct tens and units armatures are operated in the finder switch of the link that has been seized.

Lines	Finder Guard		Finder Switch Tens-Units
	Relays Operated		
21	T2, U16, 15	20	1
22	T2, U27, 15	20	2
23	T2, U38, 15	20	3
24	T2, U49, 15	20	4
25	T2, U50, 15	20	5
26	T2, U16, 60	20	6
27	T2, U27, 60	20	7
28	T2, U38, 60	20	8
29	T2, U49, 60	20	9
30	T2, U50, 60	20	0
33	T3, U38, 15	30	3
44	T4, U49, 15	40	4
55	T5, U50, 15	50	5

3. Link Rotation

Incoming local calls (extension landing) engage the selection controls and links in rotation. Assuming that all links and selection controls are idle, rotation is as follows:

Busy in all links equipped with switches (indication is slide switch pushed in so that the red target does not show) and busy in both selection controls. Make sure that the CX, LX1, LX2, LX3 relays are operated (if a link is not equipped with relay switches and slide switch is open, its associated LX relay will not operate).

From the switch shelf, using a butt-in, land any line and seize all links.

If links 1-6 are equipped, rotation = 1,4,2,5,3,6
If links 2,3,5 & 6 are equipped, rotation = 2,5,3,6

Selection controls alternate in landing.

4. Relay Switches

Each local connection engages a finder switch to "find" the calling line and on associated connector switch to "connect" it to the called line. (See selection scheme, D-3632 for a complete explanation).

The following tests are made to insure that the bank multiple 21-50 springs on all the switches are making contact with the line bars associated with lines 21-50. (All switchboard lines have to be on restricted service when these tests are made).

Relay Switches (Cont'd.)

By making these tests you can eliminate the time that is required to:

1. Dial every line in every link (connector switches).
2. On every line dialed checking to see if the "E" relay operates (TC lead check).
3. Placing a short between the + and - side of line dialed (+C & -C leads check) and with a test lamp checking to see that there is battery on the "IX" lead (r & C lead check).
4. Dial every line from every trunk (trunk switches) on every line dialed checking to see if the "E" relay operates (TC lead check), placing a short between the + and - side of line dialed (+C and -C leads check).
5. Dial from every line to every meet-me conference circuit (if equipped).

A. Busy out (slide switch on link relay bar open, red target showing) all links but link #3. Connect the test lamp between jack terminal S19 (Pos. D1) and battery (put alligator clip on S19 and test lamp probe under screw head on fuse panel).

Swing the switch shelf frame out and at the end where the line bars are located, you can insert the butt-in between the line bars of the + and - side of a line. From this point you can land and seize a link.

1. With the butt-in from the switch shelf, land line 21 through 1000 ohms ("R" button on butt-in pushed in) several times. Check to see that link 3 has been seized, dial tone is heard, test lamp flashes once and that the CO relay on line 21 operates and holds.

2. Repeat on all lines in switchboard (22-50). See A-3661 for line bar and bank multiple assignment.

B. Remove link relay bar from Position D2.

Remove meet-me conference relay bar (if equipped).

Place an insulator between switch jack terminal #8 (Pos. B21) and switch terminal #8.

Multiple switch jack terminals, 2,3,4,5,6, and 8 (Pos. B21) to switch jack terminals 2,3,4,5,6, and 8 (Pos. B20).

Busy out all links but link #3. Connect the test lamp between jack terminal S19 (Pos. D1) and battery.

Relay Switches (Cont'd.)

1. Using the butt-in from the switch shelf, land line 21 through 1000 ohms ("R" button on butt-in pushed in) several times. Check to see that link #3 has been seized (tens and units operated in B20 switch), dial tone is heard, test lamp flashes once, and that the "CO" relay operates and holds.
 2. Repeat on all lines in switchboard (22-50).
 3. Repeat on all switch positions equipped with a switch (positions B1-B18, B22).
 4. Replace link relay bar in position D2 and meet-me conference (if equipped). Remove insulator from Pos. B21 and test lamp on Pos. D1. Remove multiple from Pos. B21 and last switch tested.
- C. Remove link relay bar from Position D1. Place an insulator between switch jack terminal #8 (Pos. B16) and switch terminal #8. Multiple switch jack terminals, 2,3,4,5,6, and 8 (Pos. B16) to switch jack terminals, 2,3,4,5,6, and 8 (Pos. B23), if equipped. Busy out all links but link #6. Test lamp between jack terminal S19 (Pos. D2) and battery.
1. With the butt-in from the switch shelf, land line 21 through 1000 ohms ("R" button on butt-in pushed in) several times. Check to see that link #6 has been seized (tens and units coil operated in B23 switch), dial tone is heard, test lamp flashes once and that the "CO" relay of line 21 operates and holds.
 2. Repeat on all lines in switchboard (22-50).
 3. Repeat on switch positions B19, B24, B25, and B26.
 4. Replace link relay bar in Position D1. Remove insulator from position B16 and test lamp from position D2. Remove multiple from position B16 and last switch tested.
 5. Busy in all links equipped with relay switches and selection controls.
5. Preference Circuit

This circuit is designed to let the lowest numbered line land first, if several lines are trying to land simultaneously.

Preference Circuit (Cont'd.)

The following tests are made to insure that if a line has trouble in landing, the "TA" relay will release and shift the preference circuit so a high numbered line will land ahead of a lower numbered line that is in trouble and vice versa.

- A. With a butt-in, from the switch shelf, land all tens and units (21,22,33,44,55,56,57,58,59, and 50) with the slide switch on the finder guard open (red target showing) relay "TA" operated - "TB" normal.

Close slide switch. Push up "TB" relay in finder guard and with a butt-in from the switch shelf, land all tens and units (21,22,33,44,55,56,57,58,59, and 50), check that relay "TA" remains operated during the landing of each line.
- B. Multiple Lines 21 and 51 together and connect a telephone to Line 21. Land the telephone (with "TB" relay normal). Line 21 will land first and Line 51 will land second. Repeat several times. If less than 40 lines are equipped, test with highest numbered line available instead of Line 51.

Reland the telephone (with "TB" relay operated). Line 51 will land first and Line 21 will land second. Repeat several times.
- C. Multiple Line 21 and 20 together and connect a telephone to Line 21. Land the telephone (with "TB" relay normal). Line 21 will land first and 20 will land second. Repeat several times.

Reland the telephone (with "TB" relay operated). Line 20 will land first and Line 21 will land second. Repeat several times.
- D. Insulate "CX" relay Springs 4 and 5 of first selection control bar (CX operated). With the butt-in from the switch shelf, attempt to land in any link, check that relay "TA" in finder guard releases. Relay "TB", if operated, will release; and, if "TB" is normal, will operate.

6. Selection Controls

The selection control receives information from the finder guard to cause a calling line to select a link. Then from the link to enable this circuit to complete the selection initiated by the dial of the calling party.

Selection Controls (Cont'd.)

The following tests are made to insure that the proper selections are made and that selections controls will release if dialing is not complete.

- A. Connect a telephone to a non-restricted line. From this telephone, land into the first selection control, check to see that the "RD" relay does not operate, dial special service digits 1, 6-0. Check for correct selections. (See special service digit assignment in Engineering Specification). Repeat on second selection control.
- B. Connect a telephone to a non-restricted line. From this telephone, land into the first selection control.
 1. Dial tens and units (21,22,33,44,55,56,57,58,59 and 50). Check that cutoff (CO) relay of called line circuit operates. Repeat on second selection control.
- C. Connect a telephone to a restricted line. From this telephone, land into the first selection control, check to see if "RD" relay does operate.
 1. Dial tens and units (21,22,33,44,55,56,57,58, 59 and 50). Check that cutoff (CO) relay of called line circuit operates. Repeat on second selection control.
 2. Dial digits "1", "6" - "0", check for correct selections. All City Trunk groups are blocked and busy tone is received. Repeat on second selection control.
- D. Connect a telephone to any line. From this telephone land into the first selection control and listen for dial tone. Selection control should release and busy tone should be heard after about 15 seconds. Land the telephone again into the first selection controls, after about 8 seconds, dial digit "2". Selection control will release in approximately 10-12 seconds and busy tone will be heard again. Repeat on second selection control.

Selection Controls (Cont'd.)

- E. Connect a telephone to any line. Insulate relay "CA" springs 11 and 12 of first selection control. Land into the first selection control and dial the digit "2". Relay "CS" remains normal, relay "CD" will release, busy tone will be heard and selection control will release. Repeat on second selection control.
- F. Connect three telephones to any three lines, busy out both selection controls, remove the handsets of all three telephones as if to land but no telephones will land. Push slide switches in on both selection controls at the same time. Two telephones will land, while the third telephone waits, dial any line from one of the telephones landed and after units selection has been made, selection control releases and the third telephone will land and seize the selection control.

7. Complete Call

This test is made to insure that every link will ring and talking battery is supplied to both parties.

- A. Connect two telephones to two lines in the switchboard. Make a complete call in every link, first telephone ring several times and answer during ring (checks ring-trip) and talk.
- B. Connect two telephones to two lines in the switchboard. Make one telephone busy. Make a complete call in every link to this telephone and check for busy tone.

8. Polarity Test

- A. Connect a test lamp between battery and +C jack (C36) of first link, push up "E" relay armature and the "A" relay will operate. Repeat on all links in switchboard (+C jack on links #1 and #4 is C36, links #2 and #5 is C29, and links #3 and #6 is C22).
- B. Connect a test lamp between battery and +F jack (S36) of first link and the "A" relay will operate. Repeat on all links in switchboard (+F jack on links #1 and #4 is S36, links #2 and #6 is S29 and links #3 and #6 is S22).

9. Power Failure Transfer and/or Predetermined Night Answer

Check specification for lines and trunks assigned to power failure transfer and/or predetermined night answer. Connect a telephone to E7 block, "B" and "C" terminals of transfer line #1, check to see that the bare wire straps are removed between "A"- "B" and "C"- "D" terminals of this line.

With the switchboard normal, complete a call to and from this line. Turn off the power unit and complete a call to and from this city to this line. Repeat on all lines assigned to transfer

When the switchboard is arranged for predetermined night answer, with the night key on turret operated for night service, dial the digit assigned to city trunk from a non-restricted line. Make sure that only trunks not assigned to predetermined night answer can be seized and only lines assigned to predetermined night answer transfer to city lines.

10. Frame Cable

From the distributing frame or box, with the butt-in, land every line twice to check the cabling between frame and switchboard.

CITY TRUNKS AND ATTENDANT'S TURRET

Connect a telephone to a non-restricted switchboard line.
Connect a telephone to a restricted switchboard line.
Connect a telephone to a distant end line assigned to one of the city trunks (disconnect line from a city trunk temporarily).

With these three telephones all the following tests can be made. Test first trunk, then move to the next trunk and continue until all trunks are tested. (Busy out all trunks except the one being tested).

1. Incoming Call and Universal Night Answer

These tests are made to insure that the turret operator received the incoming signal and can extend an incoming call to an extension; also, if the turret operator is not on duty, any extension can answer an incoming call and transfer the call to another extension.

- A. From the city telephone dial the number assigned to the trunk being tested. Answer from the turret and extend call to one of the extensions. Talk and release connections.

Incoming Call - - - (Cont'd.)

- B. Operate "N" night key on turret. From the city telephone, dial the number assigned to trunk. Answer by dialing night answer digit from either extension. Extension dials digit "1" (or flashes hookswitch) and makes a consultation call to the other extension, dials digit "1" (or flashes hookswitch again and return to city; talk; flash hookswitch again and make another consultation call to the other extension. First extension hangs up, thereby transferring trunk call to the second extension.

Make sure night signal operates when incoming city call is flashing on the turret.

- C. Release "N" night key on turret. From the city telephone, dial number assigned to trunk. Dial night answer digit from either extension. Extension will hear busy signal.

2. Outgoing Call and Key Splitting

These tests are made to insure that non-restricted extensions can make outgoing calls, restricted extensions cannot make outgoing calls, and that the turret operator can split calls between city party and extension.

- A. From the non-restricted extension, dial the assigned city trunk digit and before tick-tone stops, dial the number assigned to this city telephone. Answer, talk and release connection.
- B. From the non-restricted extension, dial the assigned city trunk digit. Busy out both selection controls. Wait for tick-tone to stop. Dial another digit, and you will not be able to break city dial tone.
- C. From the restricted extension, dial the assigned city trunk digit. You will not seize a trunk but will hear busy tone.
- D. From the turret, the operator operates the trunk key, receives city dial tone, dial the number assigned to the city telephone with the turret dial, extend trunk call to either extension with her key set, and talk to both parties. The operator then operates the splitting key toward "TRK" position and talks to city without extension overhearing. The operator then operates the splitting key toward "EXT" position and talks to extension without city telephone overhearing.

3. Hold (HD) & Disconnect

To hold a city trunk call, while turret operator is attending to other calls or to block disconnect supervision when required, the turret operator may depress her hold button (HD) which holds the city trunk and flashes a hold signal on the turret.

- A. From the city telephone, dial number assigned to trunk. Turret operator answers and presses the "HD" button, turret operator restores the trunk key and causes the trunk lamp to flash the "holding signal". The turret operator re-operates the trunk key and presses the "KR" button to release the hold feature.
- B. From the city telephone, dial number assigned to trunk. Turret operator answers and extends call to either extension. Before the turret operator restores the trunk key, operate the "HD" button and then restore the trunk key. After extension answers and hangs up, trunk lamp flashes "disconnect signal", turret operator re-operates trunk key, presses "KR" button to release the hold feature, and turret operator can then extend the trunk to another extension.

4. Break-In (BK)

To override a busy condition, the turret operator may momentarily depress the "BK" break-in button.

- A. From the restricted extension, make a complete call to the non-restricted extension. From the city telephone dial the number assigned to the trunk. Turret operator answers and extends call to either extension. When busy tone is heard, turret operator presses the "BK" button, tick-tone is heard replacing the busy tone, and turret operator is now cut through to the extensions.

5. Keyset Release (KR)

If the selection is incomplete, or if busy tone is heard when the turret operator is extending a trunk call, the turret operator can momentarily press the "KR" button. This will release the turret register and relight the keyset lamp.

- A. From the city telephone, dial the number assigned to the trunk. Turret operator answers, extends call to either extension, presses the "KR" button, thereby releasing the connection to the extension.

6. Dial Release (DR)

If the selection is incomplete, or if busy tone is heard when the turret operator is dialing into the central office, the turret operator can press the "DR" button. This will release the trunk loop to release the central office connection and reseize the central office dial tone.

- A. From the turret, the operator operates the trunk key, receives city dial tone, dials the number assigned to the city telephone with the turret dial, then presses the "DR" button momentarily, thereby releasing the connection. Operator will again receive city dial tone.

7. Recall Turret Operator

After a city call has been extended to a station and that extension wishes to signal the turret operator, the extension can make a consultation call the information (INF) trunks.

- A. From the non-restricted extension, dial the assigned city trunk digit and before tick-tone stops, dial the number assigned to the city telephone. When call is completed, and tick-tone stops, have city wait while extension dials digit "1" (or flashes hookswitch) and makes a consultation call to the "INF" trunks. City trunk lamp on turret goes dim (indicating a consultation call is in progress) and turret operator answers "INF" trunk. Turret operator watches trunk lamps, extension hangs up, transfer the city call to the "INF" trunk, when the trunk lamp becomes bright, turret operator operates trunk key, releases "INF" trunk key and talks to city telephone.

8. Consultation-Transfer Service

These tests are made to insure that the consultation-transfer feature works on all city trunks through every link.

A. City Trunk Circuit Equipped with "C" Wiring (Conference Service)

From the city telephone, dial the number assigned to the trunk, turret operator answers and extends the call to either extension. Extension dials digit "1" (or flashes hookswitch) and makes a consultation call to the other extension. First extension again dials digit "1" (or flashes hookswitch), returns to the trunk and both extensions can talk to the city telephone (this is called a 2-station-1 trunk conference). First extension again dials digit "1" (or flashes hookswitch) and only the two extensions can talk to each other. First extension hangs up, thereby transferring the trunk call to the second extension.

Consultation-Transfer Service (Cont'd.)

City Trunk Circuit Without "C" Wiring

From the city telephone dial the number assigned to the trunk, turret operator answers and extends call to either extension. Extension dials digit "1" (or flashes hookswitch) and makes a consultation call to the other extension. First extension again dials digit "1" (or flashes hookswitch), returns to city, only first extension can talk to city telephone. First extension again dials digit "1" (or flashes hookswitch) and extensions can talk to each other. First extension hangs up, thereby transferring trunk call to second extension.

- B. From the city telephone dial the number assigned to the trunk. Turret operator answers and extends the call to either extension. Busy out both selection controls. Extension dials digit "1" (or flashes hookswitch) to make a consultation call. Extension can't get a link and can still talk to city without dialing digit "1" (or flashing hookswitch), push in slide switch of either selection control. Trunk automatically seizes a link. Make a consultation call and transfer to second extension.
- C. From the city telephone, dial the number assigned to the trunk, turret operator answers and extends call to either extension. Extension dials digit "1" (or flashes hookswitch) and makes a consultation to the other extension. First extension hangs up, thereby transferring call to second extension. Repeat consultation-transfer call through all links in switchboard. (This test is made to check the bank multiple assigned to the trunk in each link's finder switch) (M1-1 through M1-0)
- D. From the city telephone, dial the number assigned to the trunk. Turret operator answers and extends call to either extension. Extension dials digit "1" (or flashes hookswitch) and makes a consultation call to another city trunk (make another trunk available for this test). Extension receives busy tone, flashes hookswitch and returns to trunk.

After all the trunks have been tested make the following tests:

Trunk Rotation and Seizure

This test is made to insure that all trunks can be seized from each link and that the trunks rotate.

Trunk Rotation and Seizure (Cont'd.)

Busy out all the links except link #1.
Place all the trunks in service ("X" relay operated).

From the non-restricted telephone, dial the digit assigned to the trunk group. Check to see that the trunks hold and rotate in sequence (1,2,3, etc.). Repeat from all equipped links.

TURRET TESTS

1. Attendant's Out Dial Trunk (PAX)

An attendant's out dial trunk is provided so that she always has a means of calling on the dial unit, if a link is available, and even if other trunks are busy.

- A. Turret operator operates the "PAX" key and with the turret dial, dials either extension. Extension answers, talks, and releases connection.
- B. If code call is equipped, turret operator operates "PAX" key and dials the digit assigned to the code call plus any code (before answering code call). From the city telephone dial the number assigned to any trunk (leaving the "PAX" key operated) answer incoming trunk call, and talk to city telephone. From either extension dial number 31, thereby answering code call. Amber lamp on turret will flash, indicating code call has been answered. Answering extension hear tick-tone indicating turret operator is calling, turret operator places city trunk on hold, restores trunk key, talks to party answering code call, re-operates city trunk key (without restoring "PAX" key) and talks to city without party on PAX overhearing. Amber light starts flashing again and tick-tone is also heard by party on "PAX" trunk. Release hold features on city trunk and disconnect all connections.

2. Attendant's Inward Trunk (INF)

These trunks serve as information trunks and as a means of recalling the attendant (turret operator) on a city trunk call.

These tests are made to insure that the extensions can seize every attendant's inward trunk (INF). Also check to see that the bank multiples assigned to the attendant's inward trunks (INF) make contact with the line bars when dialed in each link (connector switches only).

Attendant's Inward Trunk (Cont'd.)

A. From either extension dial the digit assigned to the (INF) trunks. Turret lamp will flash and extension hears ring-back tone. Turret operator operates "INF" key, lamp lights steady, talk, turret operator restores key, and lamp flashes again until extension hangs up. Repeat on all attendant's inward trunks (INF).

B. From either extension dial every attendant's inward trunks (INF) from every link.

3. Monitor (M)

From the non-restricted extension dial the digit assigned to the trunk group, before tick-tone stops, dial number assigned to the city telephone and talk. Turret operator operates the "M" monitor key and then the trunk key. The turret operator hears both parties and turret operator can talk without either party overhearing.

4. Fuse Alarm

Place a fuse alarm on the switchboard bay fuse panel and the red lamp on the turret will light.

5. Buzzer (B)

With the buzzer "B" key operated, see that the buzzer operates on an incoming call, calls from an extension to attendant's inward trunks (INF), disconnects, and when an extension answers code call placed over the PAX key.

6. City Trunk Guard

From the city telephone dial the number assigned to any trunk, turret operator answers, then without restoring the trunk key, operate another trunk key. Turret operator will not be able to hear city call. Restore the second trunk key; still can't hear city; operator restores and re-operates first trunk key and can talk to city.

7. Turret Keyset Register

These tests are made to insure that the turret operator can extend all the incoming trunk calls to any extension or special feature.

A. Operate any trunk key (equipped trunk), keysend digit "8" thru "0", check for correct selections.

B. Operate any trunk key (equipped trunk), keysend tens and units digits 21, 22, 33, 44, 55, 56, 57, 58, 59, and 50. Check that the cutoff (CO) relay of the called line circuit operates.

Final Inspection

Inspect switchboard bay and distributing box or terminal for good soldering, connections, and stenciling.

OPTIONAL EQUIPMENT

1. Code Call

These tests are made to insure that the bank multiple assigned to code call is making in the connector switches of the links when code call is dialed. Also, that the proper signal corresponds with the digits dialed.

A. From any extension, dial the digit assigned to the code plus any code, from another extension dial 31 (code call answer) and talk. Repeat on all equipped links.

B. Connect a test lamp between battery and code call position, jack terminal C37, from any extension dial the digit assigned to the code call plus code 11, check code dialed by flashes on test lamp. Repeat until all 36 codes are dialed. (Codes are 11-16, 21-26, 31-36, 41-46, 51-56, and 61-66).

2. Conference Circuit - C-5905

These tests are made to insure that the bank multiple assigned to the conference circuit is making in the connector switch of the link when the first conference circuit is dialed. Also, that one trunk and three stations can talk or four stations can talk.

A. From the city telephone, dial the number assigned to any trunk. Turret operator answers and extends call to either extension. Extension dials digit "1" (or flashes hook-switch) and after seizing a link dials the digit assigned to meet-me conference. Extension hears ring-tone when meet-me conference circuit is seized. Before ring-tone stops (6 seconds), extension hangs up and transfers trunk call to meet-me conference circuit. Three extensions dial the digit assigned to meet-me conference, all talk and hear each other.

B. From four extensions dial the digit assigned to meet-me conference (first extension will hear ring-tone for 6 seconds and will hold a link during conference.) All talk. Do not release. From turret, operator attempts to put a trunk on meet-me conference and receives busy tone. First three extensions that formed conference hang up. From turret,

Conference Circuit - C-5905 (Cont'd.)

operator again attempts to put a trunk on meet-me conference and receives busy. Test party on meet-me conference hangs up.

C. From the city telephone, dial the numbers assigned to any trunk. Turret operator answers and keyseeds digit assigned to meet-me conference (no ring-tone is heard). From three extensions, dial the digit assigned to meet-me conference. All talk to trunk party, release. Repeat on all trunks.

D. From any extension, dial the digit assigned to meet-me conference, hear ring-tone and after ring-tone stops, release. Repeat on all links.

3. Conference Circuit - H-850301-A

A. Three extensions dial digit assigned to meet-me conference (first extension and each successive extension will hear a spurt of dial tone when entering conference circuit). All talk. Do not release. From turret, operator attempts to put a trunk on meet-me conference and receives busy tone. First two extensions that formed conference hang up. From turret, operator again attempts to put a trunk on meet-me conference and receives busy tone. Last party on meet-me conference hangs up.

B. From a city telephone dial digit assigned to trunk and turret operator keyseeds digit assigned to meet-me conference. (Attendant will hear a spurt of dial tone.) From three extensions dial digit assigned to meet-me conference. All talk to trunk party. Do not release. From a second city telephone, dial digit assigned to another trunk and turret operator keyseeds digit assigned to meet-me conference. Two trunks and three extensions talk. Release.

C. From a city telephone, dial digit assigned to trunk and turret operator keyseeds digit assigned to meet-me conference. From a second city telephone dial digit assigned to another trunk and turret operator keyseeds digit assigned to meet-me conference. From three extensions dial digit assigned to meet-me conference. All talk. Release.

D. From any extension dial digit assigned to meet-me conference. Repeat from all links.

4. City Trunk Storage

These tests are made to insure that the bank multiples assigned to city trunk storage operates in the connector switch of the links and is transferred into the trunk switch. Also, that the bank multiple assigned to city trunk storage answer operates in the connector switch of the links.

A. 1. Operate "N" night key on turret. From a city telephone, dial the number assigned to a trunk. Answer by dialing the night answer digit from an extension. Extension dials digit "1" (or flashes hookswitch), seizing a link, then dials the digit assigned to city trunk storage circuit, extension hangs up and transfer city trunk call to the city trunk storage circuit (do not release city call).

2. Repeat above procedure until three city trunks are on the city trunk storage circuits.

3. From any extensions dial digit assigned to trunk storage "answer". Talk to city, extension dials digit "1" (or flashes hookswitch) and make a consultation call to another extension. First extension hangs up, thereby, transferring call to second extension. (Be sure storage Circuit #1 releases.) Second extension talks to city and both release.

4. Repeat Step A.1. Call will go into storage Circuit #1.

5. Repeat Step A.3. Be sure trunk storage Circuit #2 releases.

6. Repeat Step A.1. Call will go into storage Circuit #2.

7. Repeat Step A.3. Be sure trunk storage Circuit #3 releases.

8. Repeat Step A.1. Call will go into storage Circuit #3.

9. Repeat Step A.3. Storage Circuit #1 releases.

10. Repeat Step A.3. Storage Circuit #2 releases.

11. Repeat Step A.3. Storage Circuit #3 releases.

B. On trunk storage relay bar position, place an ohmmeter across jack springs S16-S17 and ohmmeter reads infinity, push up "TX" relay armature and ohmmeter reads a full short. Hold up "TX" relay armature and push up "A" relay armature and ohmmeter reads infinity. Repeat on each trunk storage circuit.

AB-5500	SWBD DESCRIPTION	TYPE NBR	DC VOLTAGE RANGE AT PBX OR PABX		MAX. STATION LOOP RESISTANCE INCLUDING INSTRUMENT, IN OHMS		SEE NOTES	C.O. (CITY) TRUNK CIRCUIT	MAX TRUNK CONDUCTOR LOOP RESISTANCE IN OHMS NOTE 17	SEE NOTES	NOTES:
CHANGES			MIN	MAX	FOR STA-STA SIGNALING AND/OR SUPERVISION WITH LINE LAMPS	RECOMMENDED MAX DUE TO TRANSMISSION REQMTS.					
REDRAWN TO UPDATE INFORMATION 318-9-67(CLC)	PBX-CORDLESS	12B, 16B, 20B	20	24	330	740	300	2, 7, 11, 13	C-5555-A OR H-73575-A	C.O. LIMIT MINUS (105 + MAX. PBX STA. LOOP)	1
ADDED CIRCUIT LOOP LIMITS FOR 25M PABX REVISED NOTES 3 & 18	PBX-CORD TYPE	L55, 155-200 TAS-100	20	24	330	780	100	7, 11	C-7397, CA-8133 OR H-83260-A	C.O. LIMIT MINUS (33 + MAX. PBX STA. LOOP)	1
11 WRS K.P. 414-23-68(CLC)	PABX-CORD TYPE ATT CAB.	100 A	44	54	300 NOTE 6	1000 NOTE 15	NOTE 18	8	CA-5168	C.O. LIMIT MINUS 40	1, 4
CHANGED TAS 100 LIMIT FROM 300" TO 500" IN COLUMN HEADED "RECOMMENDED MAX DUE TO TRANSM. REQMTS."		100 C	44	54	300 NOTE 6	1000 NOTE 15	NOTE 18	8	CA-5168 C-3226 C-1360	C.O. LIMIT MINUS 40 C.O. LIMIT MINUS 40 C.O. LIMIT MINUS 280	1, 4 1, 5 1, 5
WRS K.P. 516-26-68(CLC)	PABX-TURRET TYPE	40 A	44	54	NOT USED	1000	400	2, 13	C-5738 CA-5196 CA-5211-Y (OR Z)	C.O. LIMIT MINUS 250 C.O. LIMIT MINUS 250 1900 OR C.O. LIMIT, WHICHEVER IS LESS	1, 3, 9 1, 3, 9 1, 3, 9, 10
		40B & 80A	44	54	NOT USED	1000	400	2, 13	CB-5318 OR H-850629-A	2000 OR C.O. LIMIT MINUS 460, WHICHEVER IS LESS	1, 3, 9, 10, 14
		40M & 80M	44	54	NOT USED	1000	400	2, 13	CB-5164 OR H-850320-A	2000 OR C.O. LIMIT MINUS 460, WHICHEVER IS LESS	1, 3, 9, 10, 14
		88A	44	54	NOT USED	1000	NOTE 18	8	CA-5161	C.O. LIMIT MINUS 40	1, 3, 9
		100T	44	54	NOT USED	1000	NOTE 18	8	CA-5575 CA-5161 CB-5001 OR H-850340-A CD-5080 OR H-850392-A	C.O. LIMIT MINUS 40 C.O. LIMIT MINUS 40 1900 OR C.O. LIMIT, WHICHEVER IS LESS 2000 OR C.O. LIMIT MINUS 460, WHICHEVER IS LESS	1, 3, 9 1, 3, 9 1, 3, 9, 10
	PABX WITH KEYSYSTEM	40KS & 80KS	44	54	NOTE 16	1000 NOTE 15	400	2, 13	CD-6715 OR H-850255-A	2300 OR C.O. LIMIT MINUS 260, WHICHEVER IS LESS	1, 3, 10
	PABX-KEY TEL. SERVES AS ATTDT'S TURRET	25M	44	54	NOT USED	1000	400	2, 13	H-850336-A	1700 OR C.O. LIMIT MINUS 310, WHICHEVER IS LESS	1, 3, 10

USED ON

TOLERANCE, UNLESS SHOWN OTHERWISE

OR J.L. SCALE

CH RJE DATE 12-28-60

EN WEF APPR RVO

AUTOMATIC ELECTRIC CO
GENOA, ILL.

FRACTIONS ±

FINISH MAT'L

CIRCUIT LOOP LIMITS
STATION LINES & CITY TRUNKS
PBX & PABX

DECIMALS ±

ISSUE 3, 4, 5.

ANGLES ±

AB-5500

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C-3632

CHANGES

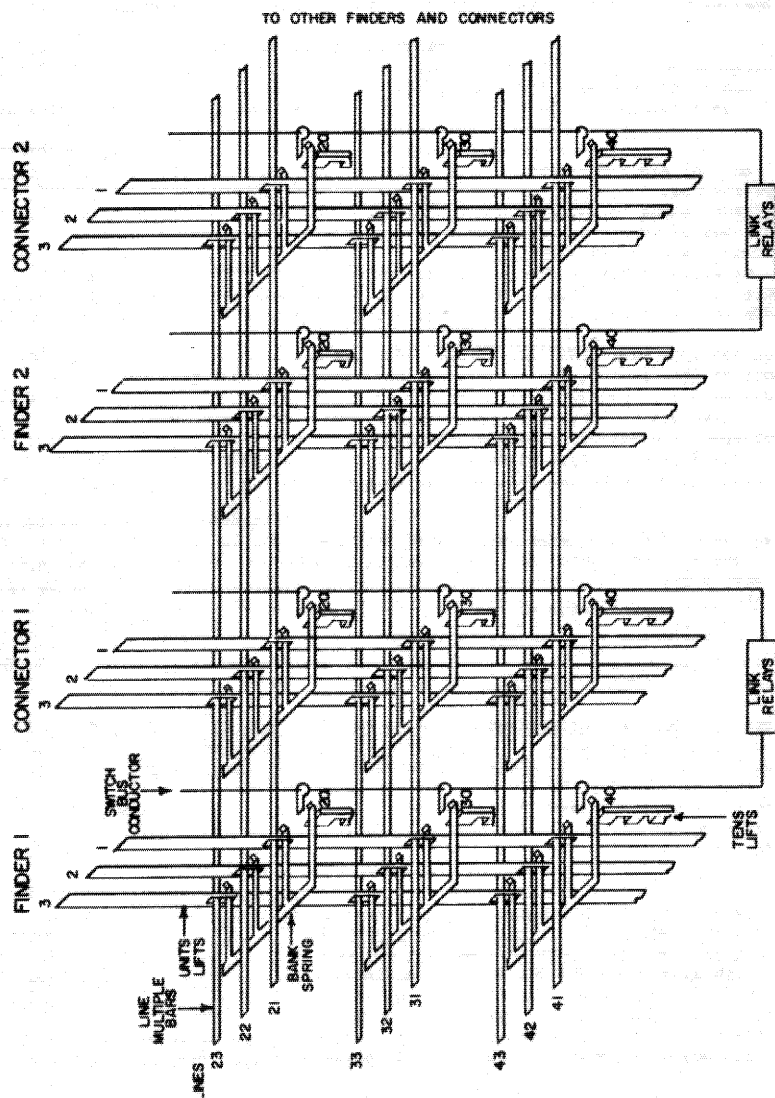
REDRAWN, NO
CHANGE. *MC*

HF FD
3/1-28-59 (CLC)

ADDED 408 TO
TITLE BLOCK

RS. R10

4/5-5-61 *Res* (CLC)



NOTE: FOR CLEARNESS ALL UNITS LIFTS ARE SHOWN OPERATING UPWARD; IN ACTUAL SWITCH UNITS LIFTS 1, 3, 5, 7, 9 OPERATE DOWNWARD.

DR DT	SCALE	FINISH
CH <i>MC</i>	DATE 11-18-55	MAT'L
EN <i>RO</i>	APPR <i>RO</i>	
AUTOMATIC ELECTRIC CO. GENOA BRANCH GENOA, ILL.		

SELECTION SCHEME
OF
LEICH 40M, 40A, 40B, PABX

ISSUE 3, 4.

C-3632

ISSUE
2) 1.12.61

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

*D-3632

1

SELECTION SCHEME

of

LEICH 40A, 40B & 40M PABX

See Drawing C-3632

In a Leich PABX, a unique arrangement of the line selection contacts eliminates many thousands of soldered or welded joints necessary in switchboards of other manufacture to carry the line multiple from one switch or link to the next, and, in relay equipment, to interconnect the selection contacts within each link.

Each line-multiple conductor on a Leich switch consists simply of a stainless steel bar, supported and separated from the others by comb-like Bakelite guide blocks on each switch as it passes from one to the next in a group of switches mounted side by side. Phosphor-bronze bank springs within each switch are arranged with eleven individual fingers which run parallel to and make contact with ten line-multiple bars, as well as with the bus conductor of the switch.

Each local PABX connection engages a finder switch to "find" the calling line and an associated connector switch to connect it to the called line. Each finder and connector switch must have access to every one of the 40 lines in the PABX, and a sufficient number of them must be provided to handle the demand for connections in the busy hour of the day.

Drawing C-3632 illustrates, in a schematic manner, two finder switches and two connector switches of a 40-line PABX. For the sake of clarity, only nine of the 40 lines are shown, and each line is represented by a single conductor, although actually four conductors are necessary in the PABX for each line.

The detailed functions of the link which is associated with each finder and connector pair will not be explained here; they are covered in the circuit description of the link. For the purposes of this description it is sufficient to say that a connection is completed in the following steps:

- 1) A calling line automatically engages an idle finder and link for the duration of the connection.
- 2) The finder, controlled by the line relay, connects the calling line to the link.
- 3) The calling party dials the desired number which is received by the link.
- 4) The link causes the connector to make connection to the called line, if idle.

Finders and connectors must be able to select any one line out of the 40 lines in the PABX. This is done by dividing the 40 line selection into a tens selection and a units selection, corresponding to the tens and units digits of the desired line number. The tens selection picks out that 10-line group which includes the desired line, and the units selection picks out one of these ten lines.

Each switch has six tens lifts, actuated by armatures associated with the horizontal coils at the front of the switch. Three of these lifts (20, 30 and 40) are shown in the drawing. The other three, not shown, effect selections to line group 50 and to two bank-multiple groups, M1 and M2. To make a selection, one of these tens lifts is operated by its armature to cause the eleventh or front finger of the bank spring on that tens level to make contact with the switch bus conductor. This establishes a connection from the link to one of the bank springs in the switch. The ten remaining fingers of the chosen spring are associated with a group of ten lines.

To pick one line out of these ten, each switch has ten units lifts, actuated by armatures associated with the vertical coils at the top and bottom of the switch. For clarity, drawing C-3632 shows three lifts operating upward. Lifts 1, 3, 5, 7 and 9 are actually depressors, as they push the bank spring fingers down onto the bar rather than lifting them up to the bar as do lifts 2, 4, 6, 8 and 0. To make a selection, one of these units lifts is operated by its armature to cause the corresponding finger in each bank spring to make contact with its line multiple bar.

Assuming that line 31 is calling and that finder 1 is seized for the call, tens lift 30 in this finder is operated to connect bank spring 30 to the switch bus conductor, and units lift 1 is operated to connect lines 21, 31, 41, 51 and multiple conductors M1.1 and M2.1 to the bank springs of the switch. Although the #1 finger of every bank spring in the finder is now in contact with a line multiple bar, only bar 31 is connected to the link. Any connection from the bars which are contacted by the other five bank spring sets remains open at the un-operated tens lift contacts.

When the desired number is dialed from line 31, the link relays cause the associated connector switch to operate a tens lift and a units lift. Assuming that 23 is dialed, tens lift 20 functions to connect bank spring 20 to the bus conductor in the connector, and units lift 3 connects lines 23, 33, etc., to the bank springs of the connector. Since only bank spring 20 is connected to the switch bus conductor, the call from the finder and the link is established only to line 23. The other possible connections are kept open at the other tens lift contacts.

To trace the connection back to the calling line, start from line 23 in the upper left hand corner of the diagram, follow the horizontal multiple bar of this line to units lift 3 of connector 1, then to the finger of bank spring 20 which is contacting this bar, across the bank spring to the front finger which is actuated by tens lift 20 into contact with the connector bus conductor, and down to the link. From the link, follow the finder bus conductor to bank spring 30, where tens lift 30 has pushed the front finger into contact with the bus conductor, then across the bank spring to the contact closed by units lift 1, and from there to line multiple bar 31.

While this call is in progress, another call may be set up over finder 2 and connector 2, without in any way affecting the first call. The diagram illustrates only two finders and two connectors, the additional finders and connectors being in every respect the same as those shown.

Attention is called to the fact that each connection set up in a switch includes the operation of one tens lift and one units lift. The units lift closes the

contacts of four lines and two multiple groups, even though only one set of contacts is utilized for any particular connection. Thus, all the units contacts in a switch are actuated rather frequently, as long as there is a working line for each units digit in at least one of the four ten-line groups.

In a similar manner, each of the tens contacts is operated quite frequently, as long as there is at least one working line in each ten-line group and one assigned multiple bar in each of the groups M1 and M2.

This frequent operation of all the contacts in the switch is highly effective in keeping them clean at all times, due to the wiping action incorporated in each contact. This is in marked contrast to some other types of switches which close only those contacts actually used for a particular connection, so that contacts associated with vacant or infrequently-used lines may have a chance to get dirty.

Those familiar with the Strowger switch will recognize that the arrangement of the bank multiple bars is similar to the arrangement of the contact bank in such a switch, and that operating a tens lift is equivalent to selecting a level by means of the vertical steps of the switch, while actuating a units lift corresponds to selecting the desired line in that level by the rotary steps.

2) RBB:mas

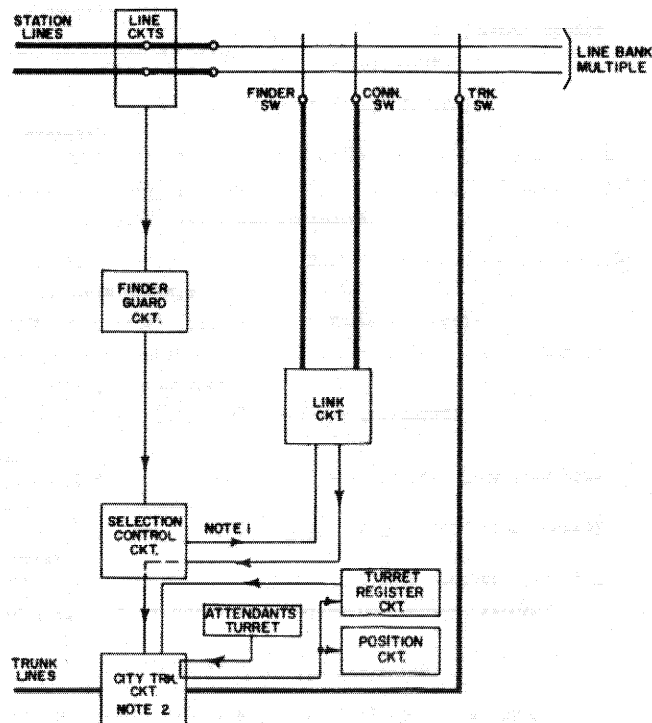
Approved: JR

A-3660

CHANGES

ADDED ATTENDANTS TURRET, POSITION CKT, & TURRET REG. CKT. BLOCKS, 40B TO TITLE; LINE BANK MULT. REF.

Rev. 1/15
215 861 (CLC)



NOTE 1: 2 SELECTION CONTROL CKTS. ARE PROVIDED. SELECTION CONTROL CKTS. DISENGAGE THEMSELVES FROM THE LINKS:
(A) WHEN LINK CUTS THRU TO THE CALLED LINE,
(B) WHEN CALLED LINE TESTS BUSY,
(C) AFTER COMPLETION OF SINGLE DIGIT SELECTIONS (TRKS. ETC.),
(D) APPROX. 20 SEC. AFTER SEIZURE IF DIAL PULSES DO NOT FOLLOW WITHIN THIS PERIOD.

NOTE 2: LINKS ARE RELEASED ON OUT GOING CITY TRK CALLS. INCOMING CITY CALLS ARE COMPLETED THROUGH TRK. SW.

DR. D.T. SCALE
CH. DATE 11-22-55
EN. APPR. /
AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

SELECTION SCHEME
BLOCK DIAGRAM
40A, 40B & 40M

ISSUE 1.2.

A-3660

ISSUE
2) 11. 1.60

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
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44-0089
1

40A & 40B PABX
TROUBLE ANALYSIS

1. General

This outline is furnished as an aid to maintenance personnel in locating switchboard trouble in type 40 PABX'S. It is intended to help locate the circuit which is at fault, but once this has been established, the actual cause in any particular circuit will be most easily located thru the use of the circuit and wiring drawings, and the circuit description of the apparatus involved. The following is a list of possible faults with the logical circuits to be checked for each particular possibility listed.

2. If no station is able to receive dial tone, check the following:

- AC power fuses, battery eliminator or external battery fuse.
- AC supply circuit to Tone Generator circuit, via dynamotor relay, is used.
- Battery eliminator, or charger switch is on; voltage between 44 and 54 volts.
- Finder Guard circuit; attention to normally operated relay "TA", and that allotter guard relay "AG" is not locked up.
- Link rotation and reset circuit; selection control rotation and reset circuit.
- FI - FO chain of selection control circuits.

3. If a group of 20 lines is unable to receive dial tone, check the following:

- Line Circuit fuses.
- TN lead of line circuit corresponding to each ten-line group.
- Finder Guard circuit

4. If a single line is unable to receive dial tone, check the following:

- Line Relay Circuit.
- MDF to line, and station.

5. If a station is intermittently unable to land, check the following:

- Line Relay Circuit.
- MDF to line, and station.
- That the line will land properly in each link.
- Finder switch contacts on any link in which line fails to land properly.

6. If a station is unable to receive a call, check the following:
 - (a) Station ringer
 - (b) Line Relay circuit (cut-off relay of called line)
 - (c) Connector switches for contact failure on +, - or T leads.
 - (d) All links for ringing, talking on connections to line having fault.
7. If a station cannot call, check the following:
 - (a) The line for faults external to the switchboard.
 - (b) MDF connection, heat coils, if used.
 - (c) Station dial and instrument
 - (d) Link for proper pulsing
 - (e) Selection control circuits for counting chain operation.
8. If a link fails to accept a call, check the following:
 - (a) Link busy switch
 - (b) Link "IX" relay on associated Selection Control Circuit.
 - (c) Finder switch associated with link for open contacts (+, -, T of line.
 - (d) Link relay "A" and holding circuits of "C", selection control "CA".
 - (e) Calling line for presence of test wire battery from line circuit.
9. If a link fails to make selections, check the following:
 - (a) Link relay "A" contacts.
 - (b) Counting relay chain of associated selection control circuit.
 - (c) Finder Guard relay "AG" (allotter guard circuit).
 - (d) GI - GO chain circuit
 - (e) Associated connector switch for proper operation and continuity.
10. If no line is able to dial, check the following:
 - (a) Selection control circuits; attention to normally operated relay.
 - (b) GI - GO chain circuits (Shorting clips in vacant link or trunk positions).
 - (c) Finder Guard relay "AG" (allotter guard circuit)
11. If a called station fails to ring, check the following:
 - (a) Called line for faults outside the switchboard (opens, shorts and grounds).
 - (b) Station ringer.

- (c) Subcycle output and overload relay contacts.
 - (d) Relay contacts in ringing circuit of calling link.
 - (e) Open coil, link or trunk ringing relay
12. If the Interrupter circuit fails, and no station will ring, check the following:
 - (a) Interrupter leads, contacts and relay operation.
 - (b) 100 MF capacitor.
 - (c) Ringing lamp circuit.
13. If the called party is unable to trip the ring, check the following:
 - (a) Ringing relay circuit in calling link or trunk.
 - (b) For possible open in called line or connector switch contacts.
 - (c) Resistance of called line loop (should not exceed 1000m)
14. If the calling party does not receive ring-back tone, check the following:
 - (a) Interrupter start circuit.
 - (b) Operation of ringing relay in calling link.
 - (c) Ringing circuit contacts in calling link.
 - (d) .05 MF capacitor in calling link.
15. If a city trunk fails to signal an incoming call, check the following:
 - (a) Ringing signal from distant end (should ring a station ringer if connected across cable pair to the city.
 - (b) City Trunk incoming relay operation.
 - (c) Night Answer signal circuit, if used.
16. If a city trunk cannot be seized outgoing, check the following:
 - (a) CFI - CPO chain circuit of city trunk group.
 - (b) Associated trunk switch for tens or units contact failure on calling line.
 - (c) That calling line is connected for non-restricted service.
 - (d) Operation of outgoing relays in trunk circuit.
 - (e) Trunk Control circuit (mounted on Interrupter relay bar).

2) JRW:kdg

Approved: *R/*

ISSUE: 1,2.
4.14.61
1.29.70

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA ILL.

M-0199
1

**SUGGESTED ROUTINE PROCEDURE
& GENERAL MAINTENANCE INSTRUCTIONS**

40B PABX SWITCHBOARDS

PREVENTIVE MAINTENANCE

Preventive maintenance is a systematic series of operations performed at regular intervals on equipment to eliminate major breakdown and unwanted interruptions in service, and keep the equipment operating at top efficiency. Preventive maintenance differs from repair in that it is intended to prevent break-downs and, therefore, eliminates the need for repair. On the other hand, the prime functions of trouble shooting and repair is to locate and correct existing defects. The importance of preventive maintenance cannot be over emphasized. Therefore the following information and suggested routine procedure outlined below should be used as a guide to insure against operational failures and major repairs. The suggested routine procedure can be or should be altered to agree with the telephone company's practice, equipment room conditions, atmosphere, etc.

I. GENERAL

The only moving parts in a Leitch all-relay exchange are the relay armatures, which move only a few thousandths of an inch to cause relay contacts to make and break in order to establish the desired contacts. Dust particles collecting between relay contacts may seriously affect the operation of the exchange. Therefore, to prevent the accumulation of dust on relays, the exchange room should be kept clean and free of dust. Keep cabinet doors closed at all times, except while performing tests, adjustments or repairs.

The electrical contacts in all-relay exchanges are susceptible to damage from certain vapors, such as turpentine or other volatile solvents. Do not use floor waxes or paints having the odor of turpentine in an all-relay exchange because their use may result in serious damage to the equipment.

Actual practice has indicated that all-relay exchanges require a minimum of Preventive Maintenance and that, unless disturbed, the relays maintain their adjustment for long periods of time. After installation and initial adjustments have been completed, confine PM of the equipment to the routine tests. Be careful in performing routine tests on all-relay equipment. The relays used in an all-relay exchange are very delicate and automatic operation of the exchange depends entirely on the proper functioning of the relays. Careless actions on the part of the operating personnel, such as unintentionally hitting a relay, dropping a tool on the contacts, dropping a relay bar, or not properly jacking-in a relay bar, may disturb the equipment sufficiently to cause a failure of all the equipment serving an entire group of 40 lines. Also, never attempt to manually release an operated

ISSUE:2

M-0199
2

I. GENERAL, (CONT'D)

relay by pulling out on the armature of the relay. This will damage the armature spring clip. If it is necessary to release the relay, do it by opening up the electrical holding circuit of the relay. Do not apply pressure to the armature spring stops. Warning: Excessive pressure applied to the relay spring stops will result in maladjustment of the relay. Never touch relay adjustments unless tests indicate that it is necessary to do so.

II. INSPECTION

Make periodic inspection of the equipment to detect minor defects and signs of worn, damaged or corroded parts which may later cause trouble. Inspection consists of observing all parts of the equipment carefully, noticing their color, placement, state of cleanliness and signs of wear or corrosion. Inspect for the following conditions:

- (1) Overheating. Look for discoloration, blistering, or bulging of the parts or surface of a cover; leakage of insulating compounds; and oxidation of metal contact surfaces.
- (2) Placement. See that all leads and cabling are in their original positions, that insulation has not been damaged, and that soldered connections are in good condition. Make a visual inspection of all switchboard units for damaged and missing parts.
- (3) Cleanliness. Carefully examine all recesses in the units for accumulations of dust, especially between connecting terminals. Parts, connections and joints should be free of dust, corrosion and other foreign matter. In tropical and high-humidity locations, look for fungus growth and mildew.
- (4) Tightness. Check any connection or mounting which appears to be loose. Caution: Do not tighten screws, bolts, and nuts carelessly. Fittings tightened beyond the pressure for which they are designed will be damaged or broken. Do not confuse adjusting screws with mounting screws.

III. SWITCHROOM, CLEANING & CONDITIONING

Dust or dirt in the switchroom causes excessive equipment failures, since it eventually filters into the working parts. Moisture and humidity also cause equipment failures through rust and corrosion of metal, or electrolysis and insulation leakage in electrical apparatus. Take every precaution to exclude dust, dirt, moisture, or insects from the switchroom, and to keep the equipment clean and dry. Reduce or prevent unnecessary travel of personnel through the switchroom to avoid introduction of dirt and dirt-laden air.

III. SWITCHROOM, CLEANING & CONDITIONING, (CONT'D)

Remove accumulated dust and dirt from the equipment with a vacuum cleaner, but do not blow. If a vacuum cleaner is not available, use a clean, but dirt-free cloth. Use a camel hair brush to remove dust from a relay, where space is limited. Keep all parts of switchroom as clean as possible. Linoleum or similar floor covering is desirable. Keep it lightly waxed and clean it a regular intervals with a mop dampened very lightly with water. For switchrooms without floor covering use a push-broom and sweeping compound. Do not use any wax, sweeping compound, or other cleaning materials known to contain turpentine or other volatile substances likely to generate fumes, since relays are easily made inoperative by slight films deposited on the contacts. These films cause service interruptions, and necessitates cleaning and burnishing of contacts in all relays. The common self-polishing types of floor wax are usually suitable for use on switchroom floor coverings.

Only filtered, dust-free air should be circulated in the switchroom. Seal any windows, unnecessary doors, or other openings into the switchroom to prevent entrance of dirt-bearing unfiltered air. Inspect and clean air filters frequently. Replace air filters that cannot be kept serviceable.

When high humidity prevails, the dial central office equipment must be protected from moisture damage. To avoid moisture troubles, keep the switchroom relative humidity below 60% and never above 80%. Temperature should not be allowed to drop below 15° F. due to adverse effect on the batteries. Also, extended periods of 115-120° F. Temperatures might readily result in a reduction of 20-25 percent in the life of the storage batteries.

Steam or hot water central heating, or any other method in which combustion takes place outside the switchroom is satisfactory. If this is not available, use electric type heaters. Heating by means of stoves in the switchroom is unsatisfactory, because of the fumes, smoke and soot likely to be released.

IV. CONTACT FAILURE

Failure of a circuit may be caused by dirt, corrosion, or lint on the contacts or other parts of a relay. When cleaning relay parts, such as armatures and cores, make sure that the parts that touch are clean. Clean the armatures and cores by inserting a clean piece of bond paper between the armature and the core. Press the armature toward the core to apply a slight pressure between the paper and the part being cleaned. Then withdraw the paper. Repeat this operation several times, using a clean spot on the paper, until dirt is no longer deposited on the paper.

Pitted or built-up contacts on relays do not prove that the contacts are useless. Do not replace the spring pile-up because of contact erosion unless contact is almost being made on the base metal. When necessary,

IV. CONTACT FAILURE, (CONT'D)

recondition contacts which are not excessively worn by removing built-ups and cleaning pits. Contacts that fail in service may normally be cleaned with a contact burnisher to remove any foreign material. Clean the blade of the burnisher used on the contacts by wiping it with a clean, dry cloth.

Clean before and after using. When burnishing normally open contacts of a relay, place the blade of the burnisher flat between the contacts and operate the relay manually. At the same time, move the blade back and forth. Rubbing the burnisher blade between the contacts two or three times is usually sufficient. When burnishing normally closed contacts, the tension of the springs themselves usually furnishes sufficient pressure against the burnisher blade. To insert the burnisher, operate the relay and insert the burnisher blade. Warning: Be sure that operation of the relay does not disrupt service for other parts of the switchboard.

When unable to clear contact troubles by burnishing only, because of an oil film or film caused by other types of foreign material clean and flush the contacts with Trichloroethylene or "Chlorothene" or pure grain alcohol. This will happen in only extreme conditions and should not be done unless it is absolutely necessary. Dip the flat end of a toothpick about one-half inch into the liquid. Deposit the liquid on the contacts (held slightly separated) without rubbing. Dip the flat end of another toothpick in the liquid and again deposit it on the contacts without rubbing. This flushes away the dirt loosened by the first application. Keep the solvent from coming in contact with relay spool heads and insulators. Allow the liquid on the contacts to evaporate. When the contacts are thoroughly dry, burnish them as outlined above to insure that no deposit or residue from the solution, or any foreign materials remain on the contacts. After burnishing, check that the requirements covering contacts make and contact separation are still met. Repeated burnishing tends to increase the contact separation and to reduce the contacts make. If necessary, adjust as specified on adjustment sheet covering the particular relay.

Burnish the contacts to be cleaned with the flat blade of the contacts burnisher. Do not attempt to remove a pit from a contact, but burnish only enough to clean the flat, contacting surface surrounding the pit.

If spring pile-up is loose, tighten being careful not to twist off screw.

Defective relays that cannot be made serviceable by readjustment, by contact burnishing, or by performing minor repairs should be replaced. If only the contacts are defective, replace the spring pile-up.

V. SUGGESTED ROUTINE PROCEDURE

In landing lines, it is suggested to swing the switch shelf frame out and remove the black line bar cover. From this point you can insert the butt-in between the line bars of the + & - sides of any lines and seize a link relay bar (landing lines). See A-3661 for line bar and bank multiple assignment.

In dialing lines from the link relay bars with a butt-in, first, the butt-in should be inserted into the link's test jack in such a manner that the plug is seated in the test jack furthest from the test jack mounting bracket. Thus allowing the other plug, which is fitted with a push button and a pair of "make" springs, to seat in the test jack nearest the test jack mounting bracket. Second, with the butt-in inserted into the test jack, the transmitter button up, the link is seized but will not engage its selection control circuit until the pushbutton on the handset plug is pressed momentarily. The link is ready to accept dial pulses.

A. Suggested Monthly or Quarterly Routine

Before starting any work on the equipment, care should be taken to see that no excessive dust is present in the equipment room or on the equipment.

- 1) Disable the finder guard preference circuit by operating the slide switch on the lower handle of the finder guard relay bar until the red target shows. With a butt-in, from the distributing frame, land all lines twice and listen for dial tone.
- 2) Using a butt-in, from the switch shelf, land the following lines several times in all links:

21	22	26
27	28	29
20	33	44
55		

This test is made to insure that the correct tens & units coils are operating in the finder switches.

Restore the slide switch on the finder guard relay bar to normal (red target disappears).

- 3) Insulate a relay contact on the link relay bar (E relay springs 16 & 17) which will prevent the link from ringing a called line. Using a butt-in, from the link's test jack dial the following lines in all links: (remove insulator)

21	22	26
27	28	29
20	33	44
55		

This test is made to insure that the correct tens & units coils are operating in the connector switches.

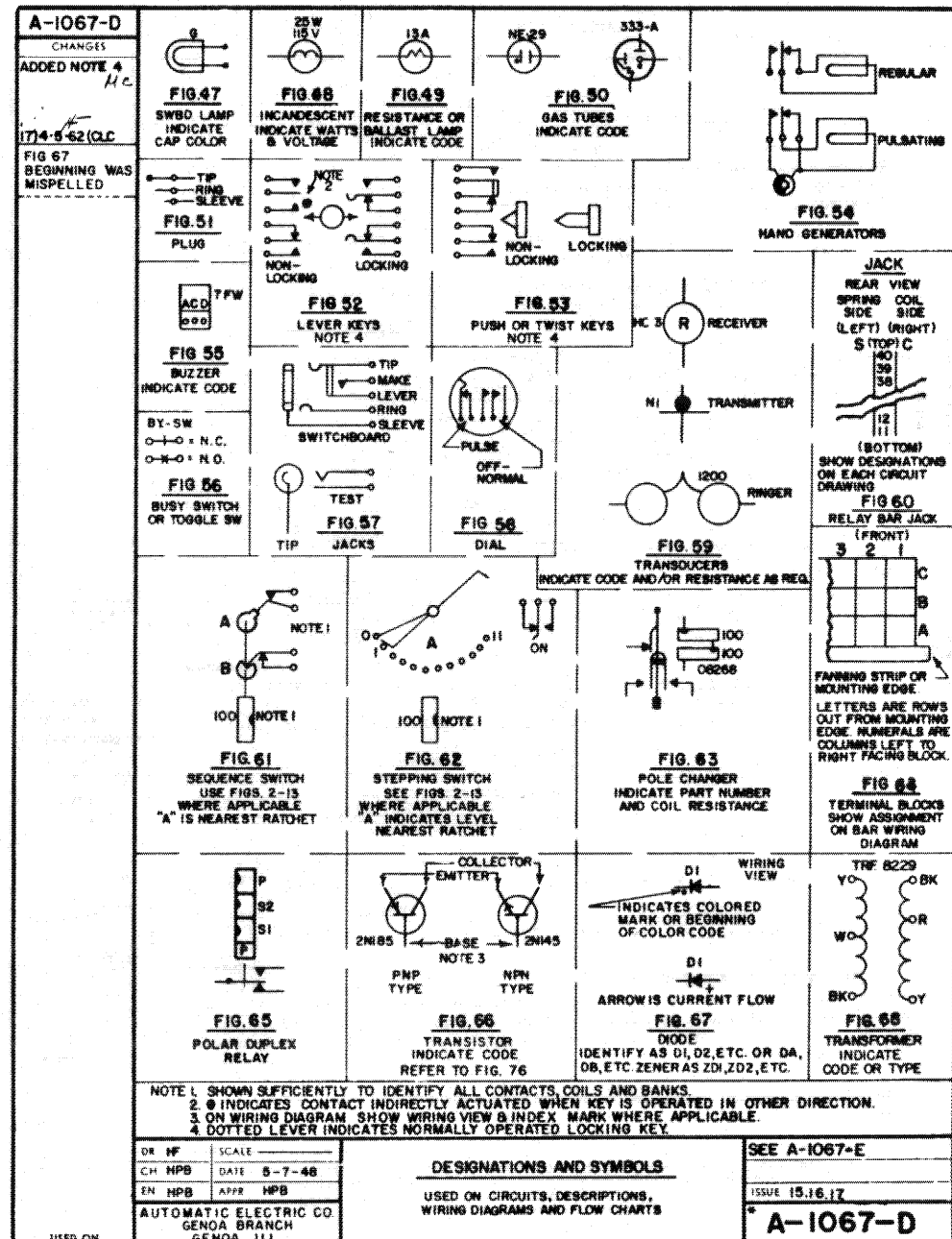
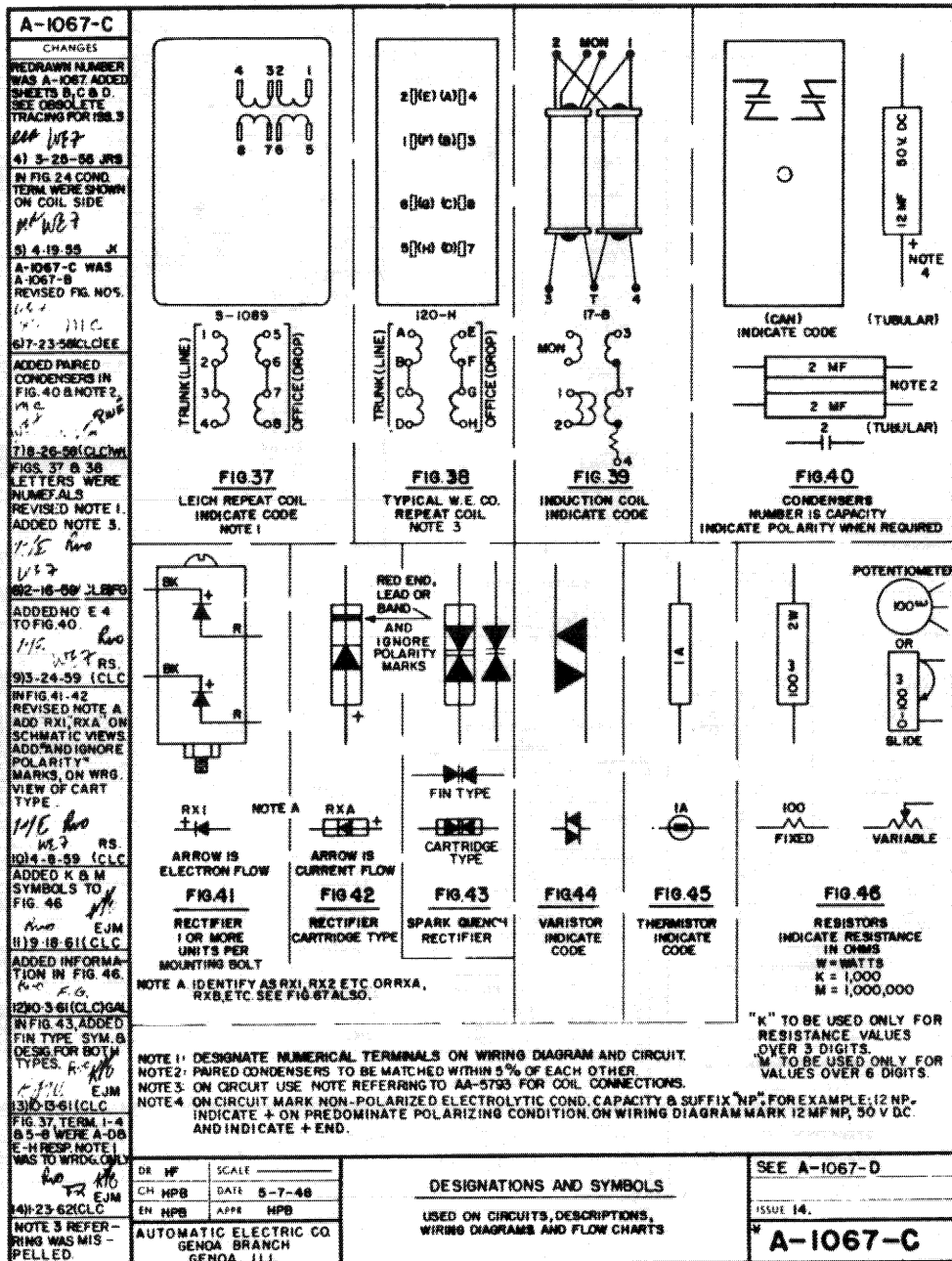
A. Suggested Monthly or Quarterly Routine

- 4) Make a complete call in link #1, answer and talk. Make one extension busy. Make a call to this extension from link #1 and check for busy tone. Repeat on all equipped links.
- 5) Land a line in link #1, but do not dial. Check that the selection control circuit disengage and that busy tone is heard within approximately 12-15 seconds. Repeat on link #2.
- 6) From a non-restricted extension dial assigned city trunk digit and before tick-tone stops dial a city telephone; answer, talk, and release. Repeat on all trunks from each selection control.
- 7) From a restricted extension dial assigned city trunk digit and check for busy tone. Repeat for each selection control.
- 8) From the turret, operate trunk key #1, dial a city telephone, extend trunk call to an extension. Extension answers and dials digit "1" (or flashes hookswitch) and make a consultation call to another extension. First extension hangs-up, thereby transferring the trunk call to the second extension. Repeat on all trunks.
- 9) From an extension, dial digits assigned to the attendant's trunks and talk to turret operator. Repeat from all links.
- 10) From an extension, dial digits assigned to optional equipment. Check for seizure. Repeat from all links.
- 11) Check fuse alarm lamp on attendant's turret for proper operation.
- 12) If batteries are used, read and record voltage and specific gravity on all battery cells. Switch charger to equalize charge (54 volts) for 24 hours.

B. Semi-annual or Annual Routine

- 1) Routine this switchboard per M-0197 (Installation Test Procedure)
- 2) If batteries are used, check the battery & ground terminals to see that they are tight.

A-1067-A		LOCATION NO'S AND LETTERS		57A		2 TERM COIL		3 TERM COIL		LOCATION NO'S AND LETTERS	
CHANGES ADDED TO NOTE A AND USE ETC. 1-1-59 (CLB) ADDED FIG. 8 3/18-17 (CLB) IN FIG. 6, 2K WAS 500. 4/19-51 (CLC) ADDED INFORMATION IN FIG. 9 5/11-24 (CLB) 5/11-24 (CLC) FIG. 5 PARALLELLED WAS MISPELLED REVISED FIG. 16 ADDED LETTERS A-S & NOTE E		VIEW FROM TERMINAL SIDE OR AS ON WIRING DIAGRAM FIG. 1 RELAYS FOR COILS SEE FIGS. 2-10		11 (33) 13 (13) 32 (32) (12) 31 (31) (11) 30 (30) (10) 29 (29) (9)		11 (33) 13 (13) 32 (32) (12) 31 (31) (11) 30 (30) (10) 29 (29) (9)		11 (33) 13 (13) 32 (32) (12) 31 (31) (11) 30 (30) (10) 29 (29) (9)		NOTE A: INDICATE RESISTANCE OF WINDINGS AND USE FIGS. 1-10, 21-27 WHEN APPLICABLE. NOTE B: H = MAKE BEFORE BREAK, EARLY MAKE OR BREAK LAST. NOTE C: S = SPECIAL SEQUENCE SPRING COMBINATION. SEE ADJ. DRAWING FOR RELAY INVOLVED. NOTE D: NOTES B & C TO BE INCLUDED ON CIRCUIT DRAWING WHEN APPLICABLE. NOTE E: LOCATION LETTERS MAY OR MAY NOT BE SHOWN, OR USED IF LOCATION LETTERS ARE USED, LETTERS TO APPEAR LAST. EXAMPLE: 11D.	
FIG. 2 SINGLE OR INSIDE CONCENTRIC WINDING		FIG. 3 OUTSIDE OR HEEL END WINDING		FIG. 11 SINGLE		FIG. 12 SANDWICH OR CONCENTRIC		FIG. 13 2 SECTION		FIG. 14 2 SECTION W/HEEL SLUG	
FIG. 4 NON-IND. RES. RELAY WDG. INDICATE OHMS BY NUMBER & DESIGNATE RLY.		FIG. 5 PARALLELLED, INTERNALLY CONNECTED, NON-IND. RES. WINDING. INDICATE COMBINED RES.		FIG. 15		FIG. 16 (FUT.)		FIG. 17		FIG. 18	
FIG. 6 58A TYPE COILS		FIG. 7 RESISTANCE VALUES OF COIL WINDINGS ARE IN OHMS, DC. K=1000. K TO BE USED ONLY FOR VALUES ABOVE 3 DIGITS.		FIG. 8 SHUNT FIELD COILS. A & B ARE COIL DESIGNATIONS.		FIG. 9		FIG. 10		FIG. 11	
FIG. 12		FIG. 13		FIG. 14		FIG. 15		FIG. 16		FIG. 17	
FIG. 18		FIG. 19		FIG. 20		FIG. 21		FIG. 22		FIG. 23	
FIG. 24		FIG. 25		FIG. 26		FIG. 27		FIG. 28		FIG. 29	
FIG. 30		FIG. 31		FIG. 32		FIG. 33		FIG. 34		FIG. 35	
FIG. 36		FIG. 37		FIG. 38		FIG. 39		FIG. 40		FIG. 41	
FIG. 42		FIG. 43		FIG. 44		FIG. 45		FIG. 46		FIG. 47	
FIG. 48		FIG. 49		FIG. 50		FIG. 51		FIG. 52		FIG. 53	
FIG. 54		FIG. 55		FIG. 56		FIG. 57		FIG. 58		FIG. 59	
FIG. 60		FIG. 61		FIG. 62		FIG. 63		FIG. 64		FIG. 65	
FIG. 66		FIG. 67		FIG. 68		FIG. 69		FIG. 70		FIG. 71	
FIG. 72		FIG. 73		FIG. 74		FIG. 75		FIG. 76		FIG. 77	
FIG. 78		FIG. 79		FIG. 80		FIG. 81		FIG. 82		FIG. 83	
FIG. 84		FIG. 85		FIG. 86		FIG. 87		FIG. 88		FIG. 89	
FIG. 90		FIG. 91		FIG. 92		FIG. 93		FIG. 94		FIG. 95	
FIG. 96		FIG. 97		FIG. 98		FIG. 99		FIG. 100		FIG. 101	
FIG. 102		FIG. 103		FIG. 104		FIG. 105		FIG. 106		FIG. 107	
FIG. 108		FIG. 109		FIG. 110		FIG. 111		FIG. 112		FIG. 113	
FIG. 114		FIG. 115		FIG. 116		FIG. 117		FIG. 118		FIG. 119	
FIG. 120		FIG. 121		FIG. 122		FIG. 123		FIG. 124		FIG. 125	
FIG. 126		FIG. 127		FIG. 128		FIG. 129		FIG. 130		FIG. 131	
FIG. 132		FIG. 133		FIG. 134		FIG. 135		FIG. 136		FIG. 137	
FIG. 138		FIG. 139		FIG. 140		FIG. 141		FIG. 142		FIG. 143	
FIG. 144		FIG. 145		FIG. 146		FIG. 147		FIG. 148		FIG. 149	
FIG. 150		FIG. 151		FIG. 152		FIG. 153		FIG. 154		FIG. 155	
FIG. 156		FIG. 157		FIG. 158		FIG. 159		FIG. 160		FIG. 161	
FIG. 162		FIG. 163		FIG. 164		FIG. 165		FIG. 166		FIG. 167	
FIG. 168		FIG. 169		FIG. 170		FIG. 171		FIG. 172		FIG. 173	
FIG. 174		FIG. 175		FIG. 176		FIG. 177		FIG. 178		FIG. 179	
FIG. 180		FIG. 181		FIG. 182		FIG. 183		FIG. 184		FIG. 185	
FIG. 186		FIG. 187		FIG. 188		FIG. 189		FIG. 190		FIG. 191	
FIG. 192		FIG. 193		FIG. 194		FIG. 195		FIG. 196		FIG. 197	
FIG. 198		FIG. 199		FIG. 200		FIG. 201		FIG. 202		FIG. 203	
FIG. 204		FIG. 205		FIG. 206		FIG. 207		FIG. 208		FIG. 209	
FIG. 210		FIG. 211		FIG. 212		FIG. 213		FIG. 214		FIG. 215	
FIG. 216		FIG. 217		FIG. 218		FIG. 219		FIG. 220		FIG. 221	
FIG. 222		FIG. 223		FIG. 224		FIG. 225		FIG. 226		FIG. 227	
FIG. 228		FIG. 229		FIG. 230		FIG. 231		FIG. 232		FIG. 233	
FIG. 234		FIG. 235		FIG. 236		FIG. 237		FIG. 238		FIG. 239	
FIG. 240		FIG. 241		FIG. 242		FIG. 243		FIG. 244		FIG. 245	
FIG. 246		FIG. 247		FIG. 248		FIG. 249		FIG. 250		FIG. 251	
FIG. 252		FIG. 253		FIG. 254		FIG. 255		FIG. 256		FIG. 257	
FIG. 258		FIG. 259		FIG. 260		FIG. 261		FIG. 262		FIG. 263	
FIG. 264		FIG. 265		FIG. 266		FIG. 267		FIG. 268		FIG. 269	
FIG. 270		FIG. 271		FIG. 272		FIG. 273		FIG. 274		FIG. 275	
FIG. 276		FIG. 277		FIG. 278		FIG. 279		FIG. 280		FIG. 281	
FIG. 282		FIG. 283		FIG. 284		FIG. 285		FIG. 286		FIG. 287	
FIG. 288		FIG. 289		FIG. 290		FIG. 291		FIG. 292		FIG. 293	
FIG. 294		FIG. 295		FIG. 296		FIG. 297		FIG. 298		FIG. 299	
FIG. 300		FIG. 301		FIG. 302		FIG. 303		FIG. 304		FIG. 305	
FIG. 306		FIG. 307		FIG. 308		FIG. 309		FIG. 310		FIG. 311	
FIG. 312		FIG. 313		FIG. 314		FIG. 315		FIG. 316		FIG. 317	
FIG. 318		FIG. 319		FIG. 320		FIG. 321		FIG. 322		FIG. 323	
FIG. 324		FIG. 325		FIG. 326		FIG. 327		FIG. 328		FIG. 329	
FIG. 330		FIG. 331		FIG. 332		FIG. 333		FIG. 334		FIG. 335	
FIG. 336		FIG. 337		FIG. 338		FIG. 339		FIG. 340		FIG. 341	
FIG. 342		FIG. 343		FIG. 344		FIG. 345		FIG. 346		FIG. 347	
FIG. 348		FIG. 349		FIG. 350		FIG. 351		FIG. 352		FIG. 353	
FIG. 354		FIG. 355		FIG. 356		FIG. 357		FIG. 358		FIG. 359	
FIG. 360		FIG. 361		FIG. 362		FIG. 363		FIG. 364		FIG. 365	
FIG. 366		FIG. 367		FIG. 368		FIG. 369		FIG. 370		FIG. 371	
FIG. 372		FIG. 373		FIG. 374		FIG. 375		FIG. 376		FIG. 377	
FIG. 378		FIG. 379		FIG. 380		FIG. 381		FIG. 382		FIG. 383	
FIG. 384		FIG. 385		FIG. 386		FIG. 387		FIG. 388		FIG. 389	
FIG. 390		FIG. 391		FIG. 392		FIG. 393		FIG. 394		FIG. 395	
FIG. 396		FIG. 397		FIG. 398		FIG. 399		FIG. 400		FIG. 401	
FIG. 402		FIG. 403		FIG. 404		FIG. 405		FIG. 406		FIG. 407	
FIG. 408		FIG. 409		FIG. 410		FIG. 411		FIG. 412		FIG. 413	
FIG. 414		FIG. 415		FIG. 416		FIG. 417		FIG. 418		FIG. 419	
FIG. 420		FIG. 421		FIG. 422		FIG. 423		FIG. 424		FIG. 425	
FIG. 426		FIG. 427		FIG. 428		FIG. 429		FIG. 430		FIG. 431	
FIG. 432		FIG. 433		FIG. 434		FIG. 435		FIG. 436		FIG. 437	
FIG. 438		FIG. 439		FIG. 440		FIG. 441		FIG. 442		FIG. 443	
FIG. 444		FIG. 445		FIG. 446		FIG. 447		FIG. 448		FIG. 449	
FIG. 450		FIG. 451		FIG. 452		FIG. 453		FIG. 454		FIG. 455	
FIG. 456		FIG. 457		FIG. 458		FIG. 459		FIG. 460		FIG. 461	
FIG. 462		FIG. 463		FIG. 464		FIG. 465		FIG. 466		FIG. 467	
FIG. 468		FIG. 469		FIG. 470		FIG. 471		FIG. 472		FIG. 473	
FIG. 474		FIG. 475		FIG. 476		FIG. 477		FIG. 478		FIG. 479	
FIG. 480		FIG. 481		FIG. 482		FIG. 483		FIG. 484		FIG. 485	
FIG. 486		FIG. 487									



A-1067-E CHANGES REVISION NUMBER WAS A-1067-0 SHEETS 8,C,D SEE OBSOLETE TRACING FOR ISS.3 4) 3-25-55 JRS ADDED FIG. 56. 5) 1-6-7 91-28-57 EFB IN FIG. 56, ADDED INDICATION OF FILLED END & NOTE 2. WUC 6) 12-18-57, (CLB) A-1067-E WAS A-1067-0 REVISED. FIG. NOS. ADDED FIG. 73. 7) 7-24-58 (CLC) EE ADDED FIG. 74. 8) 4-24-58 (CLC) F ADDED FIG. 75. 9) 10-19-61 (CLC) ADDED FIG. 77. 10) 2-18-62 (CLC) EJM ADDED TOP WRG. VIEW FIG. 76. 11) 1-8-64 (CLC) EJM		RELAYS (DESIGNATION) RSA ADD. SEE R-0004 104 C-CONTACT L-LOCATION L SPRINGS 17-18 B CS (NUMBER OF LEVER) 13-14 (RIGHT PILEUP) 11-12 M CS SPRINGS 7-8 T CS (NUMBER OF LEVER) 5-6 (LEFT PILEUP) 3-4 P CS 1-2 M DT WINDINGS 2-3 AT (TERMINALS) 1-4 R CT		A+ = RELAY A OPERATES A- = RELAY A RELEASES M = MAKE CONTACT B = BREAK CONTACT W = WINDING FIG. 18 WO = WINDING FIG. 19 FIG. 71 ABBREVIATIONS USED IN CIRCUIT DESCRIPTIONS NOTE 2 REFER TO FIG. 66 CKT. VIEW EMITTER LEAD 1 BASE 2 LEAD 4 BASE 1 LEAD 2 2N1671 P TYPE LEAD 2 LEAD 4 LEAD 1 WRG. VIEW BASE LEAD 1 LEAD 2 LEAD 4 WRG. VIEW TOP FIG. 72 CONDENSER- RESISTOR SPARK QUENCH UNIT FIG. 76 UNIJUNCTION TRANSISTOR	
FIG. 69 FLOW CHARTS 1. RELAY OPERATES LAMP LIGHTS STEADY 2. RELAY RELEASES LAMP FLASHES 3. LAMP GOES OUT 4. SLOW OPERATE 5. SLOW RELEASE 6. TIME VARIABLE (USUALLY NOT CIRCUIT CONTROLLED) 7. OMISSION OR REPEATED (AS DIAL PULSES) 8. ALTERNATE FUNCTIONS 9. DIRECTIVE ARROWS (ONLY WHEN REQUIRED)		FIG. 70 DETACHED CONTACT RELAY REFERENCE CHART FOR LEIGH RELAYS Y = TRANSFER CONTACT M = MAKE CONTACT B = BREAK CONTACT P = MAKE BEFORE BREAK CONTACT R = RESISTANCE WINDING B.M.T. = VACANT SPRINGS M = TRANSFER WITH BREAK SPRING VACANT B = TRANSFER WITH MAKE SPRING VACANT -- CONTACTS OF REPEATED CIRCUIT NOT SHOWN ON SCHEMATIC. A1: A-ROW; 1-COLUMN (BORDER REFERENCE)		FIG. 73 DETACHED CONTACT RELAY REFERENCE CHART FOR A.E. RELAYS NOTE 2: BAR INDICATES FILLED END (RESISTANCE END). NOTE 1: "S" INDICATES SELF CONTAINED UNIT; SPECIFY CONDENSER & RESISTOR VALUES. DR. MP SCALE CH. MPB DATE 5-7-48 EN. MPB APPR. MPB AUTOMATIC ELECTRIC CO. GENOA BRANCH GENOA, ILL.	
RELAYS TYPE C-CONTACT L-LOCATION C L SPRINGS 31-32 29-30 27-28 B CS 25-26 B CS 23-24 21-22 M CS SPRINGS 13 11-12 9-10 P CS 7-8 P CS 5-6 T CS 3-4 T CS 1-2 M DT WINDINGS INNER ON ARM OUTER ON HEEL B3 NOTE: SEE FIG. 70 FOR ABBREVIATIONS USED.		FIG. 74 LOUDSPEAKER PLUG SOCKET FIG. 75 AC RECEPTACLE AC PLUG POLARIZED 3 WIRE FIG. 77		DESIGNATIONS AND SYMBOLS USED ON CIRCUITS, DESCRIPTIONS, WIRING DIAGRAMS AND FLOW CHARTS ISSUE 4 5 6 7 8 9 10 11 12. A-1067-E	

R-0004-A CHANGES RETYPED: REVISED SECTIONS 1, 2 & 8. JMT SSC 3) 10-19-64 (d) CORRECTED SPELLING IN PART 8 & TITLE BLK JMT SAC 4) 10-29-64 REVERSED OPERATIONS 4 & 5 IN NOTE 10. ejm 5) 10-15-65 (c) c		Refer to drawing A-1020 for terms used to designate relay parts. GENERAL 1. The tips of make and break springs are held in place by shoulders on bakelite spring stops to insure correct and permanent spacing. With spring piles having 3 levers, spring stops with normal shoulder spacing are used for break-before-make contacts, and spring stops with narrower shoulder spacing for make-before-break contacts. With spring piles having 4 levers, spring stop shoulder spacing for make-before-break contacts is the same as the spacing for break-before-make contacts and the make-before-break action is obtained by adjustment of the tips of the break and make springs per Note 3 of R-0004-C. 2. Lever springs have no tension of their own. Necessary tension is provided by separate tension springs. 3. Spring stops and tension springs can be exchanged after dismantling the spring pile from the frame, the spring pile then being held together by its center screw. ARMATURE ADJUSTMENT 4. Armature must strike flat against core. To obtain this, loosen clip screw; hold armature tight against core, then push armature spring forward tight against armature and tighten clip screw. 5. Armature travel is measured at extreme end of armature legs, with gauge inserted between armature spring and armature legs. Travel must be the same on both legs of armature. Adjustment of travel should rarely become necessary. CONTACT ADJUSTMENT 6. Pressure of make and break springs is measured with gram gauge at tip of springs. Specified pressure must lift springs off spring stop shoulders, on break springs with armature operated, on make springs with armature normal. 7. Follow on make and break springs should be equal as judged by the eye. If necessary to obtain this, bend lever spring near the front end of narrow part of spring. Lever springs should have no tension of their own. 8. Generally, no adjustment is necessary on separate make and separate break contacts. However, where a spring stop provides a narrow shoulder spacing for separate make or break contacts, the makes shall be adjusted to close first, and the breaks to open last, the same as for make-before-break contacts. Where specific adjustment notes conflict with these instructions, the adjustment notes take precedence. Where a particular adjustment is specified, it is obtained by bending the lever spring at the place indicated in Section 7. CURRENT FLOW ADJUSTMENT 9. To meet specified requirements, adjust pressure of tension springs only. Both tension springs should have about the same pressure, judged by feel. 10. Test relay in the following sequence, omitting tests not specified. 1. Soak 2. Hold 3. Release 4. Operate 5. Non-operate 11. After adjustment, all break springs must be lifted off their spring stop shoulders with armature normal and rest against shoulders with armature operated; and all make springs must rest against shoulders with armature normal and must be lifted off shoulders with armature operated. 12. After installation, do not re-adjust relay unless it fails to meet "test" current flow requirements. If it fails to meet them, re-adjust relay to meet "Re-adjust current flow requirements."	
TOLERANCE UNLESS SHOWN OTHERWISE DR. MO SCALE CH. WD DATE 6.3.48 EN. HPB APPR. HPB AUTOMATIC ELECTRIC CO. GENOA BRANCH GENOA, ILL.		FINISH MAT'L RELAY ADJUSTMENTS 910-900 TYPE RELAYS GENERAL INSTRUCTIONS R-0004-A	

R-0004-D		ADJ. NO.	INCH ARM TRVL.	GRAMS SPRING PRESS BREAKS MAKES	TEST WDG.	MILLI-AMPERES										SEE NOTES
CHANGES						TEST					READJUST					OTHER
						OP	NO	HOLD	RLS	OP	NO	HOLD	RLS	WDG. OP		
REDRAWN. NO CHANGES.	201	.015	10-15	15-20	2-3					15.5	13.5					
	202	.015	10-15	15-20	2-3	2.6	1.9			2.5	2.1					
	203	.012	10-15	15-20	2-3	6.8	5.7			6.5	6.0			NOTE 1		
	204	.015	10-15	15-20	2-3	2.1	1.6			2.0	1.7					
	205	.025	10-15	15-20	2-3	6.2	5.3			6.0	5.5					
	206	.015	10-15	15-20	2-3	8.4	6.5			8.0	7.0					
	207	.025	10-15	15-20	2-3	50.0	40.0			47.5	42.0					
	208	.025	10-15	15-20	2-3	8.4	6.5			8.0	7.0					
	209	.025	10-15	15-20	2-3	18.9	14.3			18.0	15.0					
	210	.025	10-15	15-20	2-3	2.2	1.6			2.1	1.7					
	211	.025	10-15	15-20	1-4	11.5	10.5			11.3	10.7					
	212	.025	10-15	20-25	2-3	46.0	38.0			44.0	40.0					
	213	.020	10-15	20-25	SER	14.7	12.5			14.0	13.0					
	214	.015	10-15	20-25	SER	10.5	8.6			10.0	9.0					
	215	.015	10-15	20-25	2-3	36.0	29.0			33.0	30.0					
	216	.020	10-15	15-20	2-3	22.0	15.3			20.0	17.0					
	217	.015	10-15	15-20	SER	3.5	1.3			3.0	1.5					
	218	.025	10-15	15-20	2-3	74.0	63.0			70.0	65.0					
	219	.015	10-15	15-20	2-3	38.0	29.0			37.0	30.0					
	220	.020	10-15	20-25	SER	13.0	11.0			12.5	11.2					
	221	.025	10-15	15-20	1-4	37.0	27.0			34.0	30.0					
	222	.020	10-15	15-20	2-3	16.0	13.0			15.5	13.5					
	223	.025	10-15	15-20	2-3	105.0	88.			100.	90.					
	224	.025	20-25	20-25	2-3	6.2	5.3			6.0	5.6					
	225	.025	20-25	20-25	2-3	20.6	17.5			20.6	18.0					
	226	.025	20-25	20-25	2-3	26.8	20.4			26.0	21.0					
	227	.015	10-15	15-20	2-3	3.0	2.5			2.9	2.6					
	228	.025	10-15	15-20	2-3	29.0	18.0			27.0	20.0			NOTE 2		
	229	.025	10-15	15-20	1-4	10.8	10.2			10.7	10.3					
	230	.025	10-15	15-20	2-3	32.5	26.6			31.0	28.0					
	231	.015	10-15	15-20	2-3	3.4	1.9			3.3	2.0					
	232	.025	10-15	15-20	2-3	14.3	8.1			13.0	9.0			NOTE 3		
	233	.015	10-15	15-20	2-3	400.	175.			375.	200.					
	234	.020	10-15	15-20	2-3	2.2	1.4			2.0	1.5					
	235	.025	10-15	15-20	1-4	14.6	8.1			14.0	9.0			NOTE 3		
	236	.020	10-15	15-20	2-3	2.9	2.3			2.8	2.4					
	237	.025	10-15	15-20	2-3	60.0	36.0			55.0	40.0					
	238	.025	10-15	15-20	2-3	35.0	18.0			32.0	20.0					
	239	.015	10-15	15-20	2-3	3.2	1.8			3.0	2.0					
	240	.020	10-15	15-20	2-3	22.0	12.6			20.0	14.0					
	241	.025	10-15	15-20	2-3	30.0	20.0			29.0	22.0			NOTE 4		
	242	.025	10-15	15-20	2-3	29.0	25.0			28.0	26.0					
	243	.025	10-15	15-20	2-3	59.5	51.0			57.0	53.0					
	244	.025	10-15	15-20	2-3	38.5	36.5	19	12.5	38	37.	19	12.5			
	245	.025	10-15	15-20	2-3	22.5	16.5			22.0	17.0					
	246	.025	10-15	15-20	1-4	31	20			30	23					
	247	.020	20-25	20-25	2-3	20.3	16.2			20.0	16.5					
	248	.015	10-15	15-20	1-4	38.0	34.0			37.0	35.0					
	249	.025	10-15	15-20	2-3	26.5	20			25	21					
	250	.020	10-15	20-25	SER	12.0	9.0			11.5	9.5					

NOTES:
 1. ADJUST ARM TO BE PARALLEL WITH CORE AT .012 TRVL. BREAK SPRING TO BREAK AT .004 TRVL. AND NOT AT .006 TRVL.
 2. SPRINGS 15, 16 MUST NOT BREAK BEFORE SPRINGS 11, 12 MAKE.
 3. ADJ. LEVER SPGS. SO THAT NO BREAK CONTACTS OPEN BEFORE SPGS. 1 & 2 CLOSE.
 4. TENSION OF LEVER & BREAK SPRINGS OF BREAK CONTACTS TO BE 20-25 GRAMS. ALL MAKES OF BOTTOM & CENTER LEVERS TO MAKE BEFORE BREAKS OPEN.

TOLERANCE UNLESS SHOWN OTHERWISE DECIMALS ± FRACTIONS ± ANGLES ±

DR. H.B. SCALE	FINISH	ADJUSTMENTS 201-250 910-990 TYPE RELAYS	ISSUE 49, 50, 51, 52, R-0004-D
CH. C.E.R. DATE 3. 19. 54.	MAT'L		
EN. W.F. APPR. H.G.E.			
AUTOMATIC ELECTRIC CO. GENOA BRANCH GENOA, ILL.		REFER TO GENERAL INSTRUCTIONS R-0004-A	

USED ON

R-0004-E		ADJ. NO.	INCH ARM TRVL.	GRAMS SPRING PRESS BREAKS MAKES	TEST WDG.	MILLI-AMPERES										SEE NOTES
CHANGES						TEST					READJUST					OTHER
						OP	NO	HOLD	RLS	OP	NO	HOLD	RLS	WDG. OP		
REVISED NOTES 9 & 12	251	.015	10-15	15-20	2-3	100	27	22		26	21					
	252	.020	10-15	15-20	1-4		1.8	1.3		1.7	1.4					
	253	.025	10-15	15-20	2-3		31	24		30	27.5					
	254	.025	10-15	15-20	2-3		5.5	4.0		5.0	4.5					
	255	.015	10-15	15-20	1-4		3.0	1.8		2.9	2.0					
	256	.025	10-15	15-20	2-3		32.5	26.6		31.0	28.0			NOTE 1		
	257	.025	10-15	15-20	2-3		22.0	14.4		20.0	16.0			NOTE 2		
	258	.025	10-15	15-20	2-3		19.8	9.0		18.0	10.0			NOTE 3		
	259	.025	10-15	15-20	2-3		26.5	20.0		25.0	21.0			NOTE 3		
	260	.025	10-15	15-20	2-3		14.8	9.0		13.5	10.0			NOTE 4		
	261	.025	10-15	20-25	2-3		20.0	16.1		19.0	17.0					
	262	.025	10-15	25-30	2-3		13	10		12.5	10.5					
	263	.025	10-15	15-20	2-3		48.0	43.0	18.0	16.0	47.0	44.0	18.0	16.0		
	264	.020	10-15	15-20	SER		23.0	17.0		22.0	18.0					
	265	.025	10-15	15-20	2-3		16.5	13.5		16.0	14.0					
	266	.015	10-15	15-20	1-4		18.0	15.5		17.5	16.0			NOTE 11		
	267	.025	10-15	15-20	2-3		18.5	15.0		17.0	16.0					
	268	.025	10-15	15-20	2-3		36.0	26.0		34.0	28.0			NOTE 3		
	269	.025	10-15	15-20	1-4		1.8	1.3		1.7	1.4					
	270	.015	10-15	15-20	1-4		2.1	1.4		2.0	1.5					
	271	.025	10-15	15-20	2-3		17.5	9.0		17.0	10.0					
	272	.025	10-15	15-20	2-3					20	14			NOTE 5		
	273	.025	10-15	15-20	2-3					75	60			NOTE 6		
	274	.025	10-15	15-20	2-3					90	75			NOTE 6		
	275	.025	10-15	15-20	2-3		31	21		30	22			NOTE 7		
	276	.025	10-15	15-20	2-3					75	60			NOTE 8		
	277	.025	10-15	20-25	2-3		9.2	8.3		9.0	8.5					
	278	.020	10-15	20-25	2-3		22.0	19.5		21.5	20.0					
	279	.020	10-15	15-20	1-4		0.92	0.82		0.90	0.85					
	280	.016	10-15	20-25	SER		15.7	14.7		15.6	14.8			NOTE 9		
	281	.025	20-25	15-20	2-3		8.2	7.1		8.0	7.3					
	282	.025	10-15	15-20	2-3		9.6	7.9		9.5	8.0					
	283	.025	10-15	15-20	1-4		73.0	61.0		70.0	64.0					
	284	.025	10-15	15-20	2-3		8.2	5.4		7.5	6.0					
	285	.020	10-15	15-20	1-4		11.2	9.9		10.9	10.2					
	286	.020	10-15	15-20	2-3		20.5	17.5		19.5	18.0					
	287	.025	10-15	15-20	1-4		4.4	3.6		4.3	3.8					
	288	.025	10-15	15-20	1-4		5.9	4.0		5.0	4.5					
	289	.025	10-15	15-20	1-4		5.5	4.6		5.3	4.8					
	290	.025	10-15	15-20	1-4		16.5	10.0		15.0	11.0					
	291	.025	10-15	15-20	SER		24.0	19.0		23.5</						

A-1020

CHANGES

REDRAWN, IT. 1
WAS CORE NUT.
TV 1/4 KF
(12)3-27-61(CLC)

RIGHT SPRING PILE

PER 2ND LETTER
OF RELAY CODE
21-41

SPRING PILE
MTG. SCREWS 2

TENSION
SPRING 6

SPRING
LIFT 7

RIGHT SPRING STOP
PER 3RD LETTER OF RELAY CODE
A B C D E F G H K L
42 42 43 43 44 42 44 45 45 43

ITEM

MAKE-BEFORE-BREAK
42 NONE
43 BOTTOM
44 BOTTOM & CENTER
45 BOTTOM, CENTER & TOP

21-41
PER 1ST LETTER
OF RELAY CODE
LEFT SPRING PILE

CLIP
SCREW 8

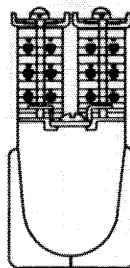
ARM.
CLIP 4

PER 3RD LETTER OF RELAY CODE
A B C D E F G H K L
42 43 43 44 44 44 45 44 42

LEFT SPRING STOP

CONTACTS

TOP
CENTER
BOTTOM



11-20
PER 3RD NUMERAL
OF RELAY CODE
ARMATURE
WITH RESIDUAL

FRAME
3

CORE SCREW
1

REAR

48
COIL

FRONT

EXPLANATION OF RELAY CODE:

TYPE NUMBER OF RELAY

ARMATURE WITH RESIDUAL

LEFT SPRING-PILE

RIGHT SPRING-PILE

LEFT AND RIGHT SPRING STOPS

PART NO. OF COIL TYPE OF COIL

WINDING OF COIL

91 3 BCA

23

AA 102

IF SPECIFIED =
RELAY ADJUSTMENT
PER LIST R-0004

NOTE 1: SEE STOCKLIST S-0016 OF RELAYS 910-919 FOR PART NO. OF ITEMS.

TOLERANCE UNLESS SHOWN OTHERWISE

DECIMALS ±

FRACTIONS ±

ANGLES ±

DR RGM SCALE 1" = 1"
CH PPB DATE 11-14-47
EN HPB APPR HPB
AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

FINISH
MAT'L

RELAY
TYPES 910-919

ISSUE 12.

A-1020

USED ON

S-0016

CHANGES

RETYPE.
ADDED SPACES
PER NO. & LET-
TER CODE.
ADDED ITEM 18.

Ruo

2/5

12)11.10.58(CLC)

ADDED "K" IN
3RD LETTER.
Ruo

13)16.22.59(CLC)

IT 1 WAS 1

11279 NJT.

TV 1/4 KF

14)11.27.61(CLC)

QUAN. PART NO. DESCRIPTION

ITEM ON HAND ISSUED SHORT

1ST & 2ND NUMERALS OF CODE

91	1	19056	CORE SCREW	1			
"	4	11748	SCREW	2			
"	1	12307	FRAME	3			
"	1	12308	CLIP	4			
"	1	12309	ARMATURE SPRING	5			
"	2	12311	LIFT SPRING	6			
"	2	12313	SPRING LIFT	7			
"	1	12325	SCREW	8			
				9			
				10			

3RD NUMERAL OF CODE

0	12301	ARMATURE	NO RESIDUAL	11			
1	012302	"	.003" BRONZE	12			
2	012303	"	.005" BRONZE	13			
3	012304	"	.010" BRONZE	14			
4	012305	"	.016" BRONZE	15			
5	012306	"	.020" BRONZE	16			
6	012350	"	.003" STEEL	17			
7	017900	"	.001" BRASS	18			
				19			
				20			

1ST & 2ND LETTERS OF CODE

A	012331A	SPRING-PILE	14	21			
B	012332A	"	1B	22			
C	012333A	"	1T	23			
D	012334A	"	2M	24			
E	012335A	"	2B	25			
F	012336A	"	2T	26			
G	012337A	"	3M	27			
H	012338A	"	3B	28			
K	012339A	"	3T	29			
L	012340A	"	1B 1M (BOTT.)	30			
M	012341A	"	1T 1M	31			
N	012342A	"	1B 1T	32			
P	012343A	"	1B 2M	33			
R	012344A	"	1T 2M	34			
S	012345A	"	2B 1M	35			
T	012346A	"	2B 1T	36			
U	012347A	"	2T 1M	37			
V	012348A	"	1B 2T	38			
X		"	OMITTED	39			
				40			
				41			

3RD LETTER → A B C D E F G H K L M N

12312	SPRING STOP	2	1	1	1	1	42
12318	"	1	2	1	1	1	43
12319	"	1	2	1	1	1	44
13444	"	1	2	1	1	1	45
							46
							47

4TH & 5TH NUMERALS & LETTERS

1	WOUND COIL	NOTE 2	48			
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IF SPECIFIED: LAST NUMERALS OF CODE = ADJUSTMENT SEE R-0004

NOTE 1: ENTER QUANTITIES FOR ITEMS 11-47 AS INDICATED BY RELAY CODE.

NOTE 2: ENTER 4TH & 5TH NUMERALS AND 4TH & 5TH LETTERS OF RELAY CODE PART NO. OF WOUND COIL IT. 48.

DR RGM SCALE
CH HPB DATE 7.27.47
EN HPB APPR HPB

FINISH
MAT'L

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

RELAY 910-919
2-5 CONTACTS
12311 LIFT SPRING = 0.014"
CONTACT MAT. A = PALLADIUM

ASSEMBLY DRG. A-1020
STOCKLIST

ISSUE 12, 13, 14.

S-0016

USED ON

A-1148

CHANGES

REDRAWN, IT. 1
WAS CORE NUT.
FK R/KF
5) 3-29-61(CLC)
R & L SPG. STOPS
WERE PER 2ND
LETTER.

JWT
EJM
6) 11-64(CLB)

RIGHT SPRING PILE

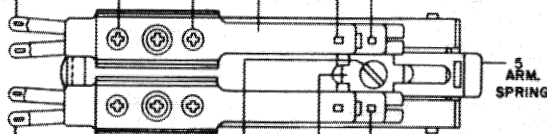
PER 2ND LETTER
OF RELAY CODE
21-41

SPRING PILE
MTG. SCREWS
2

TENSION
SPRING
6

SPRING
LIFT
8

RIGHT SPRING STOP
PER 3RD LETTER OF RELAY CODE



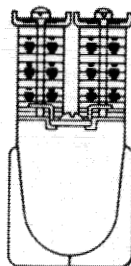
21-41
PER 1ST LETTER
OF RELAY CODE
LEFT SPRING PILE

7
CLIP
SCREW

4
ARM
CLIP

PER 3RD LETTER OF RELAY CODE
LEFT SPRING STOP

CONTACTS
TOP
CENTER
BOTTOM



11-20
PER 3RD LETTER
OF RELAY CODE
ARMATURE
WITH RESIDUAL

FRAME
3

CORE SCREW

REAR

48
COIL

FRONT

EXPLANATION OF RELAY CODE:

TYPE NUMBER OF RELAY
ARMATURE WITH RESIDUAL
LEFT SPRING-PILE
RIGHT SPRING-PILE
ADJUSTMENT - NOTE 2
PART NO. OF COIL
WINDING OF COIL

IF SPECIFIED:
RELAY ADJUSTMENT
PER LIST R-0004

NOTE 1: SEE STOCKLIST S-0026 OF RELAYS 930-939.
NOTE 2: SEE STOCKLIST S-0026 FOR ITEMS 42-47.

TOLERANCE UNLESS SHOWN OTHERWISE

DECIMALS ±

FRACTIONS ±

ANGLES ±

DR	HF	SCALE	1" = 1"	FINISH
CH	CR	DATE	4-12-49	MAT'L
EN	ERS	APPR	LMW	
AUTOMATIC ELECTRIC CO. GENOA BRANCH GENOA, ILL.				

RELAY
TYPES 930-939
8 CONTACTS

ISSUE 5.6.

A-1148

USED ON

FORM AB-1641

S-0026

CHANGES

RETYPE.
ADDED SPACES
PER NO. 8 LET-
TER CODE.
ADDED ITEM 18.

4.2
6) 11.19.58(CLC)

IT 1 WAS 1
11279 NUT.

7) 11.27.61(CLC)

QUAN.	PART NO.	DESCRIPTION	ITEM	ON HAND	ISSUED	SHORT
1ST & 2ND NUMERALS OF CODE						
93	1	19056	CORE SCREW	1		
"	4	11748	SCREW	2		
"	1	12307	FRAME	3		
"	1	12308	CLIP	4		
"	1	12309	ARMATURE SPRING	5		
"	2	12311	LIFT SPRING	6		
"	1	12325	SCREW	7		
"	2	12757	SPRING LIFT-4 LEVERS	8		
				9		
				10		
3RD NUMERAL OF CODE						
0		12301	ARMATURE	11		
1		012302	" .003" BRONZE "	12		
2		012303	" .005" BRONZE "	13		
3		012304	" .010" BRONZE "	14		
4		012305	" .016" BRONZE "	15		
5		012306	" .020" BRONZE "	16		
6		012350	" .003" STEEL "	17		
7		017900	" .001" BRASS "	18		
				19		
				20		
1ST & 2ND LETTERS OF CODE						
A		012770A	SPRING PILE 4M (BOTT.)	21		
A,B		12746	" STOP	22		
B		012771A	" PILE 3M 1T "	23		
C		012772A	" " 2M 1T 1B "	24		
C		12747	" STOP	25		
D		012773A	" PILE 1M 1T 2B "	26		
D		012748	" STOP	27		
E		12774A	" PILE 1T 3B "	28		
E,F		012749	" STOP	29		
F		012775A	" PILE 4B "	30		
				31		
				32		
				33		
				34		
				35		
				36		
				37		
				38		
				39		
				40		
				41		
3RD LETTER OF CODE						
A			NO MAKE-BEFORE-BREAK CONTACTS	42		
B			LEFT SPRING-PILE: PER NOTE 3	43		
C			RIGHT SPRING-PILE: " " "	44		
D			BOTH SPRING-PILES: " " "	45		
				46		
				47		
4TH & 5TH NUMERALS & LETTERS						
1			WOUND COIL	48		
IF SPECIFIED: LAST NUMERALS & LETTERS = ADJUSTMENT SEE R-0004						
NOTE 1: ENTER QUANTITIES FOR ITEMS 11-41 AS INDICATED BY RELAY CODE.						
NOTE 2: ENTER 4TH & 5TH NUMERALS AND 4TH & 5TH LETTERS OF RELAY CODE AS PART NO. OF WOUND COIL IT 48.						
NOTE 3: ADJUST TRANSFER CONTACT TO MAKE-BEFORE-BREAK (ON SPG PILE A ADJUST BOTTOM CONTACT TO MAKE FIRST)						
DR	RGV	SCALE	FINISH	ASSEMBLY DRG. A-1148		
CH	DER	DATE 4.6.49	MAT'L	RELAY 930-939		
EN	ERS	APPR IDW		8 CONTACTS		
AUTOMATIC ELECTRIC CO. GENOA BRANCH GENOA, ILL.				12311 LIFT SPRING = 0.014"		
				CONTACT MAT. = PALLADIUM		
				ISSUE 6.7.		
				S-0026		

USED ON

A-1759
CHANGES

IT 17-19 WAS 16-18
IT 9 WAS 6
IT 20 WAS 18
IT 10-16 WAS 9-15
CHANGING IT 8 TO
5 ELIMINATED
NOTE 2 OF ISS
218-5-18
IT 9 WAS SHOWN
AS ARM. SPG.
100% DR. 5/11/60
5)10-2-56 DC
REVISED ITS. 10-
41 PER STOCK-
LIST S-0049
ISS. 6
2/46 L.H.
4)11-20-58(CLC)
IT 1 WAS CORE
NUT.
5)11-17-61(CLC)F

SPRING STOP
PER 3RD LETTER
OF RELAY CODE
A B
42 43
MAKE-BEFORE-BREAK = 0 1

LEFT SPRING PILE
PER 12TH LETTER
OF RELAY CODE
21-23

RIGHT SPRING PILE
PER 23RD LETTER
OF RELAY CODE
24

FRONT **REAR**

48 COIL

ARMATURE WITH RESIDUAL

EXPLANATION OF RELAY CODE:

TYPE NUMBER OF RELAY
ARMATURE WITH RESIDUAL
LEFT SPRING-PILE
RIGHT SPRING-PILE
SPRING STOP
PART NO. OF COIL
TYPE OF COIL
WINDING OF COIL

94 5 CXA 25 AA 102

IF SPECIFIED =
RELAY ADJUSTMENT
PER LIST R-0004

NOTE 1: SEE STOCKLIST S-0049 OF RELAYS 940-949 FOR PART NO. OF ITEMS.

TOLERANCE UNLESS SHOWN OTHERWISE

DECIMALS ± FRACTIONS ± ANGLES ±

DR HMC SCALE FINISH
CH DATE 3.12.52 MAT'L
EN APPR

**RELAY
TYPES 940-949**

**AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.**

ISSUE 12.3.4.

A-1759

USED ON

S-0049

QUAN. PART NO. DESCRIPTION

1ST & 2ND NUMERALS OF CODE

QUAN.	PART NO.	DESCRIPTION	ITEM	ON HAND	ISSUED	SHORT
94	1	19056 CORE SCREW	1			
"	4	11746 SCREW	2			
"	1	12307 FRAME	3			
"	1	12308 CLIP	4			
"	1	12309 ARMATURE SPRING	5			
"	1	12311 LIFT SPRING	6			
"	1	12313 SPRING LIFT	7			
"	3	12325 SCREW	8			
"	1	13620 BALANCE SPRING	9			
			10			

3RD NUMERAL OF CODE

QUAN.	PART NO.	DESCRIPTION	ITEM	ON HAND	ISSUED	SHORT
0	1	12301 ARMATURE NO RESIDUAL	11			
1	012302	".003" BRONZE RES.	12			
2	012303	".005" BRONZE RES.	13			
3	012304	".010" BRONZE "	14			
4	012305	".016" BRONZE "	15			
5	012306	".020" BRONZE "	16			
6	012350	".003" STEEL "	17			
7	017900	".001" BRASS "	18			
			19			
			20			

1ST & 2ND LETTERS OF CODE

LETTER	PART NO.	DESCRIPTION	ITEM	ON HAND	ISSUED	SHORT
A	012331A	SPRING PILE 1M	21			
B	012332A	SPRING PILE 1B	22			
C	012333A	SPRING PILE 1T	23			
X		SPRING PILE OMITTED	24			
Y		ARM. SPG. (ITEM 9) OMITTED	25			
			26			
			27			
			28			
			29			
			30			
			31			
			32			
			33			
			34			
			35			
			36			
			37			
			38			
			39			
			40			
			41			

3RD LETTER → A B X

QUAN.	PART NO.	DESCRIPTION	ITEM	ON HAND	ISSUED	SHORT
	12312	SPRING STOP 1	42			
	12318	" " 1	43			
			44			
			45			
			46			
			47			

4TH & 5TH NUMERALS & LETTERS

QUAN.	PART NO.	DESCRIPTION	ITEM	ON HAND	ISSUED	SHORT
1		WOUND COIL NOTE 2	48			

IF SPECIFIED: LAST NUMERALS OF CODE = ADJUSTMENT: SEE R-0004

NOTE 1: ENTER QUANTITIES FOR ITEMS 11-47 AS INDICATED BY RELAY CODE.
NOTE 2: ENTER 4 & 5 NUMERALS AND 4 & 5 LETTERS OF RELAY CODE AS PART NO. OF WOUND COIL ITEM 48.

DR HMC SCALE FINISH
CH DATE 3.12.52 MAT'L
EN APPR

RELAY 940-949
1 CONTACT

**AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.**

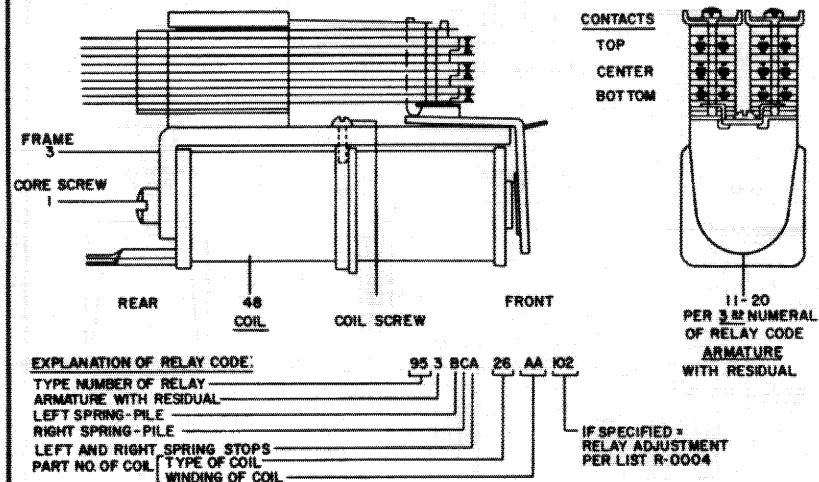
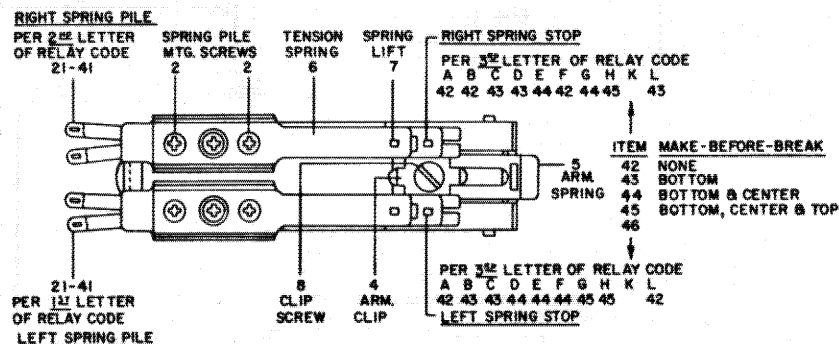
12311 LIFT SPRING = 0.014"
CONTACT MAT A = PALLADIUM

ASSEMBLY DRG. A-1759
STOCKLIST
ISSUE 6.7.

S-0049

USED ON

EDRAWN, IT I
WAS CORE NUT
TH PL
KF
3-27-61(CLC



NOTE 1: SEE STOCKLIST S-3106 OF RELAYS 950-959 FOR PART NO. OF ITEMS.

TOLERANCE UNLESS SHOWN OTHERWISE DECIMALS ± FRACTIONS ± ANGLES ±

DR DT	SCALE 1"=1'	FINISH MAT'L
CH CER	DATE 5-5-55	
EN HPB	APPR RO	
AUTOMATIC ELECTRIC CO. GENOA BRANCH GENOA, ILL.		

RELAY
TYPES 950-959
FOR USE WITH 26 TYPE COIL ONLY

ISSUE 3.

A-3106

USED ON

FORM AB-1641

RETYPE.
ADDED SPACES
PER NO. & LET-
TER CODE.
ADDED ITEM 18.
Two

4) 11. 19. 58) Q.C.

IT 1 WAS 1
11279 NUT.

5) 11.27.61 (QC

QIAN.		PART NO.	DESCRIPTION	ITEM ON HAND	ISSUED	SHORT
1ST & 2ND NUMERALS OF CODE						
95	1	19056	CORE SCREW	1		
"	4	11748	SCREW	2		
"	1	14382	FRAME	3		
"	1	12308	CLIP	4		
"	1	12309	ARMATURE SPRING	5		
"	2	12311	LIFT SPRING	6		
"	2	12313	SPRING LIFT	7		
"	1	12325	SCREW	8		
"	2	14919	RND. HIMS (SEMS)	9		
				10		

— 3RD NUMERAL OF CODE

Y	0	12301	ARMATURE	NO RESIDUAL	11			
	1	012302	"	.003" BRONZE	"	12		
	2	012303	"	.005" BRONZE	"	13		
	3	012304	"	.010" BRONZE	"	14		
	4	012305	"	.016" BRONZE	"	15		
	5	012306	"	.020" BRONZE	"	16		
	6	012350	"	.003" STEEL	"	17		
	7	017900	"	.001" BRASS	"	18		
						19		
						20		

—1ST & 2ND LETTERS OF CODE

A	012331A	SPRING PILE	1M		21				
B	012332A	" "	1B		22				
C	012333A	" "	1T		23				
D	012334A	" "	2M		24				
E	012335A	" "	2B		25				
F	012336A	" "	2T		26				
G	012337A	" "	3M		27				
H	012338A	" "	3B		28				
K	012339A	" "	3T		29				
L	012340A	" "	1B 1M (BOT.)		30				
M	012341A	" "	1T 1M "		31				
N	012342A	" "	1B 1T "		32				
P	012343A	" "	1B 2M "		33				
R	012344A	" "	1T 2M "		34				
S	012345A	" "	2B 1M "		35				
T	012346A	" "	2B 1T "		36				
U	012347A	" "	2T 1M "		37				
V	012348A	" "	1B 2T "		38				
X		" "	OMITTED		39				
					40				
					41				

3RD LETTER →

		12312	SURF STOP	2	1		1	1		42										
		12318	" "	1	2	1		1		43										
		12319	" "			1	2	1	1		44									
		13444	" "					1	2		45									
											46									
											47									

—4TH & 5TH NUMERALS & LETTERS

1	WOUND COIL	NOTE 2	48		
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IF SPECIFIED: LAST NUMERALS OF CODE = ADJUSTMENT SEE R-0004

NOTE 1: ENTER QUANTITIES FOR ITEMS 11-47 AS INDICATED BY RELAY CODE.

NOTE 2: ENTER 4TH & 5TH NUMERALS AND 4TH & 5TH LETTERS OF RELAY CODE AS PART NO. OF WOUND COIL IT 48

DR RGM	SCALE
CH <i>112</i>	DATE 5.9.55
EN <i>Line</i>	APPR <i>R</i>

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

FINISH
MAT'L

RELAY 950-959
2-6 CONTACTS

12311 LIFT SPRING = 0.014"
CONTACT MAT. A. = PALLADIUM

ASSEMBLY DRG. A-3106

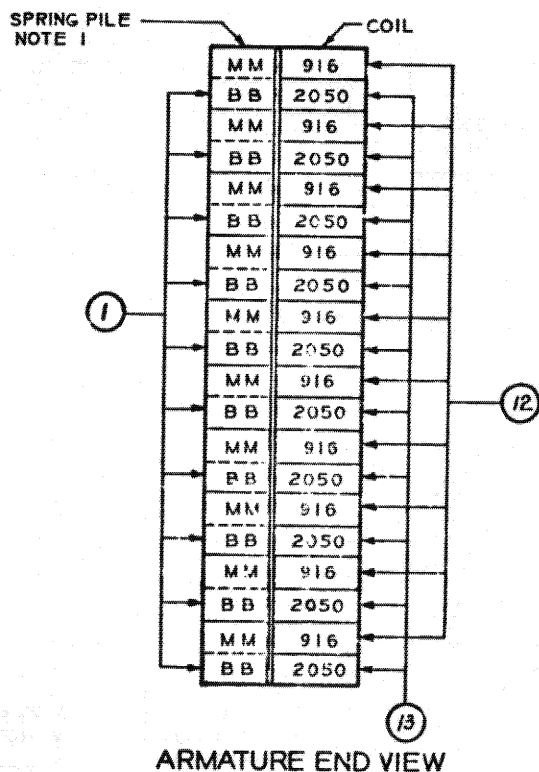
ISSUE 4.5.

S-3106

USED ON

D-555195		SIZE		A		SHEET 1		TOTAL 2	
APPROVAL	DATE	BY	DATE	BY	DATE	BY	DATE	BY	DATE
4348	2-11-71	4348	2-11-71	4348	2-11-71	4348	2-11-71	4348	2-11-71

AUTOMATIC ELECTRIC COMPANY
 FORT LAKE, ILL. U.S.A. GEN. ILL. U.S.A. WA. KENNA, WISC. U.S.A.



MANUFACTURING NOTES:

1-M= MAKE, B= BREAK.

2- FOR SUFFIX A ADJUST PER R-018735-A.

3-USED TO HOLD ARMATURE IN POSITION WHEN IN DEPARTMENT AND DURING SHIPPING.

4- FOR STOCKLIST SEE INDIVIDUAL SUFFIX DRAWING.

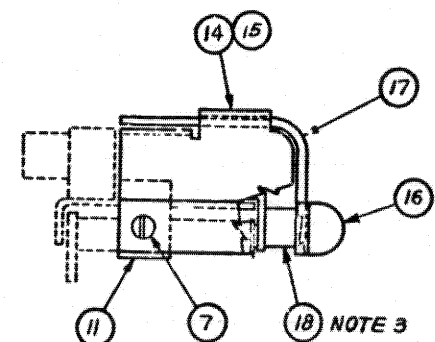
RELAY SPRING & COIL ASSY
CODE 420-AA

D-555195

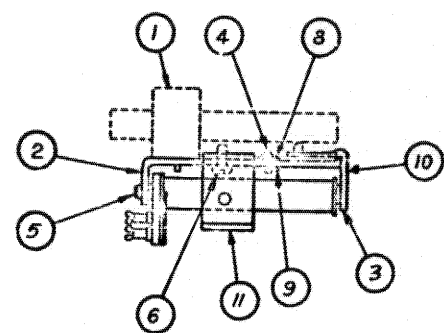
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D-555195		SIZE		A		SHEET 2		TOTAL 2	
APPROVAL	DATE	BY	DATE	BY	DATE	BY	DATE	BY	DATE
4348	2-11-71	4348	2-11-71	4348	2-11-71	4348	2-11-71	4348	2-11-71

AUTOMATIC ELECTRIC COMPANY
 FORT LAKE, ILL. U.S.A. GEN. ILL. U.S.A. WA. KENNA, WISC. U.S.A.



VIEW TO SHOW COVER
AND BRACKET ASSY



D-555195-A

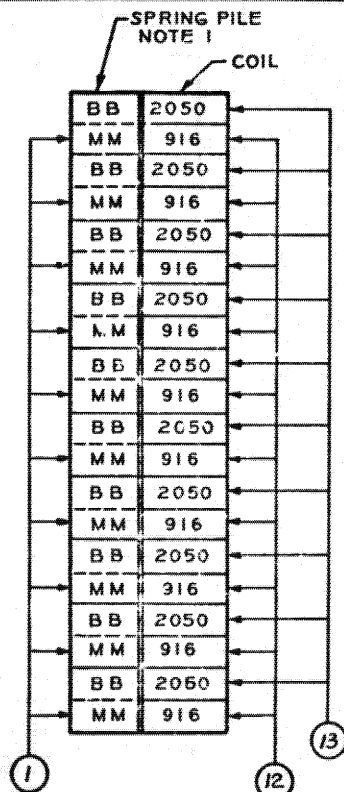
D-555195

72300-112-01

STOCKLIST			
AMT	PART NO	DESCRIPTION	ITEM
10	D-119171-A	MAKE & BREAK SPRINGS	1
2	D-63551-A	RELAY FRAME	2
20	D-71696-A	ARMATURE ASSEMBLY	3
6	D-762025-BA	SCREW	4
20	D-762028-B	SCREW	5
4	D-762029-B	SCREW	6
2	NL-15086-A	SCREW	7
2	NL-16579-A	TOP PLATE	8
2	NL-16580-A	BOTTOM PLATE	9
2	NL-16624-A	HOLD SPRING	10
1	NL-18716-A	RELAY STRIP	11
10	NL-18726-A	COIL	12
10	NL-18749-A	COIL	13
1	NL-19007-A	COVER MOUNTING-LEFT	14
1	NL-19008-A	COVER MOUNTING-RIGHT	15
2	NL-19009-A	COVER LATCH	16
1	NL-19010-A	COVER	17
1	NL-19640-A	GASKET	18

D-555195-4

APP'D: JG/LFL DR OL		SIZE	D-555196	
434 B	CK AS	A	SHEET 1	TOTAL 2
DATE: 2-11-71		AUTOMATIC ELECTRIC COMPANY		
NORTH LAKE, ILL. U.S.A. • CHENAI, ILL. U.S.A. • WAUKESHA, WISC. U.S.A. •				



ARMATURE END VIEW

MANUFACTURING NOTES:

1- M = MAKE, B = BREAK

2-FOR SUFFIX A ADJUST PER R-018736-A.

3-USE TO HOLD ARMATURE IN POSITION
IN DEPARTMENT AND DURING SHIPMENT.

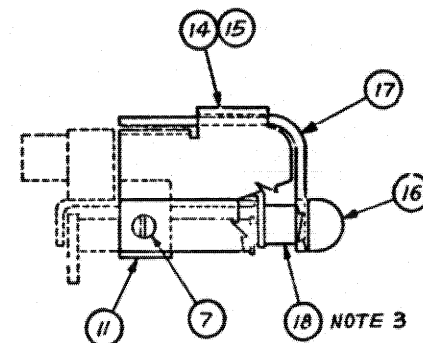
4-FOR STOCKLIST SEE INDIVIDUAL SUFFIX
DRAWING.

RELAY SPRING & COIL ASSY
CODE 420-AB

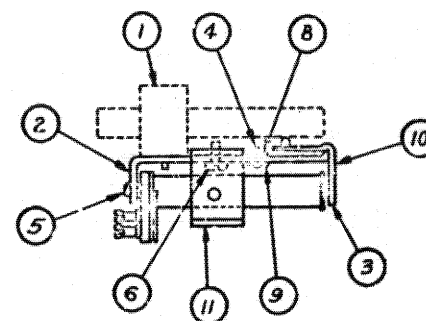
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APP'D: JG/LFL DR OL		SIZE	D-555196	
434 B	CK AS	A	SHEET 2	TOTAL 2
DATE: 2-11-71		AUTOMATIC ELECTRIC COMPANY		
NORTH LAKE, ILL. U.S.A. • CHENAI, ILL. U.S.A. • WAUKESHA, WISC. U.S.A. •				



VIEW TO SHOW COVER
AND BRACKET ASSY



D-555196-A

D-555196

PK-2000-2(11-8)

STOCKLIST			
AMT	PART NO	DESCRIPTION	ITEM
10	D-119170-A	MAKE AND BREAK SPRINGS	1
2	D-63551-A	RELAY FRAME	2
20	D-71696-A	ARMATURE ASSEMBLY	3
6	D-762025-8A	SCREW	4
20	D-762028-B	SCREW	5
4	D-762029-B	SCREW	6
2	NL-15086-A	SCREW	7
2	NL-16579-A	TOP PLATE	8
2	NL-16580-A	BOTTOM PLATE	9
2	NL-16624-A	HOLD SPRING	10
1	NL-18716-A	RELAY STRIP	11
10	NL-18726-A	COIL	12
10	NL-13749-A	COIL	13
1	NL-19007-A	COVER MOUNTING-LEFT	14
1	NL-19008-A	COVER MOUNTING-RIGHT	15
2	NL-19009-A	COVER LATCH	16
1	NL-15010-A	COVER	17
1	NL-19640-A	GASKET	18

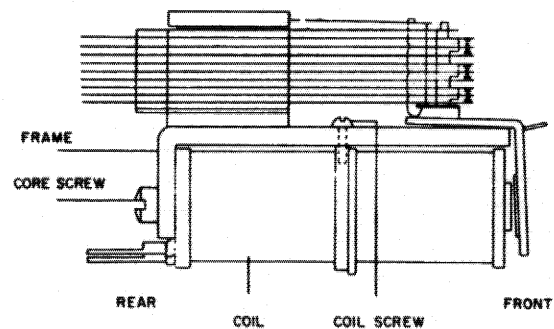
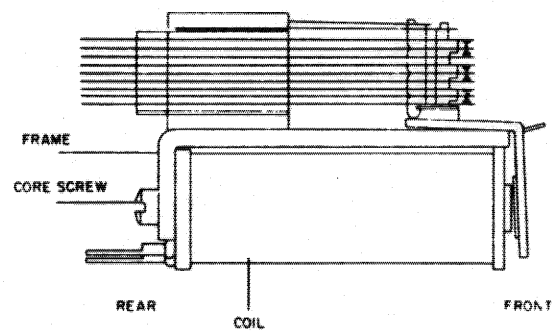
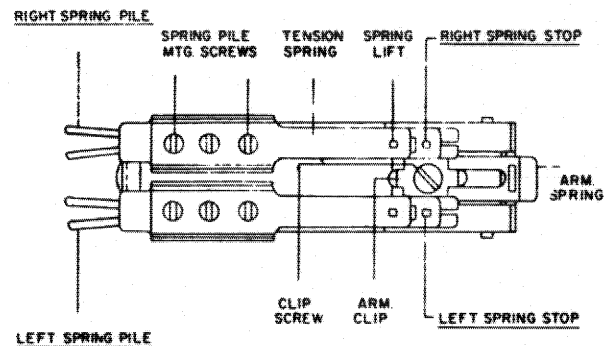
D-555196-A SHEET 1 TOTAL 1 DATE 2-12-71 AUTOMATIC ELECTRIC COMPANY NORTH LAKE ILL. U.S.A.	
ISSUE 1 REV ITEM 7 HLF RS	
ISS 2	

RELAY SPRING AND COIL ASSEMBLY CODE 420-AB	D-555196-A
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FX-2800-112-441

AD-5679

CHANGES

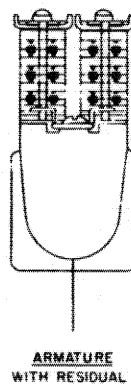


CONTACTS

TOP

CENTER

BOTTOM

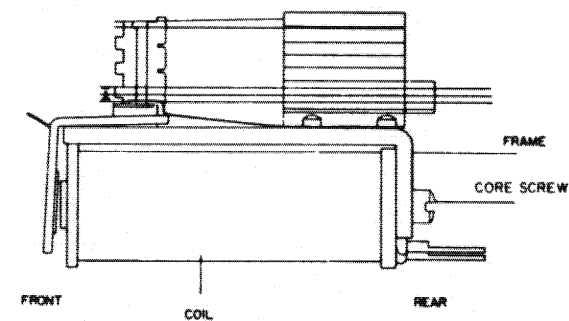
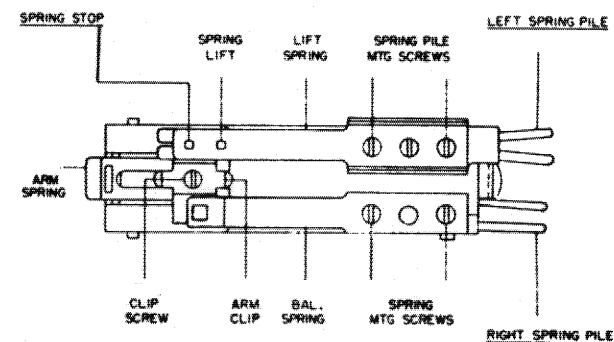
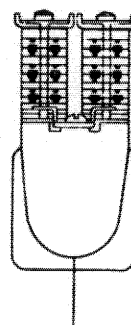


CONTACTS

TOP

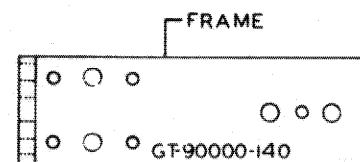
CENTER

BOTTOM



ARMATURE WITH RESIDUAL

TYPICAL RELAY CODE		
GT	90000	140
TYPE	BASIC NO.	ADJUSTMENT



TYPICAL STAMPING VIEW

REPAIR PARTS ORDERING INFO.

When ordering repair parts for GT Type Relays, indicate Relay No. GT-90XXX-XXX as stamped on relay frame or as indicated in stocklist followed by proper part description as shown on this sheet.

EXAMPLE:

QUAN.	RELAY NO.	DESCRIPTION
1	GT-90042-157	Left Spring Pile
1	GT-90046-111	Bal. Spring
1	GT-90101-155	Armature with Residual

USED ON

FORM 88-8817

DR	SCALE
CH	DATE
EN	APPR
AUTOMATIC ELECTRIC CO GENOA, ILL.	

ORDERING INFORMATION
FOR
GT-90000 SERIES RELAYS

ISSUE 1.

AD-5679

ISSUE: 1
12/1/71

GTE AUTOMATIC ELECTRIC INC
GENOA, ILLINOIS

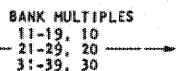
2) 12.5.72

40B-S STOCKBOARD
CIRCUITS

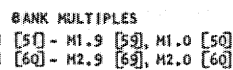
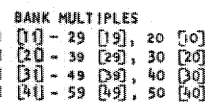
TABLE OF CONTENTS

Cross Point Switch -----	H-851053-A (Sh. 1,2,4 & 12)
Line Circuit-----	H-850940-A
Finder Guard-----	H-850280-A
Link Selection Control-----	H-850260-A
Link-----	H-850289-A
Interrupter and Access Control Circuits for Trunk Groups, Code Call and Universal Night Answer-----	H-850332-A
Power Failure Transfer, Predetermined Night Answer and Turret Register-----	H-850627-A
Power Failure Transfer or Predetermined Night Answer Connecting Scheme-----	AE-6322
Turret Position-----	H-850350-A
Attendant's Trunks and Conference-----	H-850301-B
Audible Signal Unit-----	H-850359-A

RELAY SWITCH CENTER JACK
4 X 30 + SC LEAD
(FOR REF. ONLY)



RELAY SWITCH CENTER JACK
4 X 60 + SC LEAD
(FOR REF. ONLY)



H-851053-A

ENGINEERING NOTES:

51-CONDUCTORS THAT ARE EQUIPPED WITH GOLD PLATED CONTACTS AND SPRINGS ARE FOR TRANSMISSION PATHS.

52-THE CROSS CONNECT TERMINAL STRIP (FIGURE 6A AND 10A) IS PROVIDED TO ALLOW HOTEL PASS STATION LISTED TELEPHONE NUMBER AND ROOM NUMBER TO BE THE SAME. CROSS CONNECT TERMINAL STRIP TERMINALS A10-A00 ARE NORMALLY STRAPPED TO CORRESPONDING TEN COIL TERMINALS C10-C00 RESPECTIVELY. IF A DIFFERENT ARRANGEMENT IS DESIRED, STRAP AS REQUIRED.

EXAMPLE:

ASSUME A HOTEL WITH 2 FLOORS OF 30 ROOMS EACH, WHICH NUMBER 100-129 ON FIRST FLOOR AND 200-229 ON SECOND FLOOR. THEN ASSUME FIRST FLOOR TELEPHONES ARE ASSIGNED TO BANK MULTIPLE 01-09, 00; 11-19, 10; 21-29, -0; AND SECOND FLOOR TELEPHONES ARE ASSIGNED TO BANK MULTIPLE 31-39, 30; 41-49, 40 AND 51-59, 50. FOR THIS ARRANGEMENT THE CONNECTOR SWITCHES WOULD BE STRAPPED PER REFERENCE FIGURE 15.

53-CONNECT LEAD VTJ TO LEAD LK TO SIMULATE A COMPLETED TENS SELECTION WHEN A UN-ASSIGNED TEN DIGIT IS DIALED, THIS WILL ALLOW BUSY TONE TO BE RETURNED AFTER THE UNIT DIGIT.

54-TOP HORIZONTAL COILS PULL THEIR RESPECTIVE "LADDER S" UPWARD AND BOTTOM HORIZONTAL COILS PULL THEIR RESPECTIVE "LADDER S" DOWNWARD.

55-NORMALLY A SWITCH (MATRIX) SHELF IS PROVIDED WITH ONLY ONE (1) ALLOTTER HIGHWAY ("R") THEREFORE, USE "R" TYPE SWITCHES. SOME SWITCH (MATRIX) SHELVES ARE PROVIDED WITH TWO (2) ALLOTTER HIGHWAYS ("R" AND "S") THAT PERMIT TWO (2) SIMULTANEOUS SELECTIONS THEREFORE BOTH "R" OR "T" AND "S" OR "U" TYPE SWITCHES CAN BE USED. "R" TYPE SWITCHES THAT HAVE A SC LEAD IN ALLOTTER POSITION 40 ONLY CAN NOT BE PLACED IN THE SAME SWITCH (MATRIX) SHELF WITH "S" TYPE SWITCHES.

SYMBOLS

- INDICATES BANK (LINE OR ALLOTTER) MULTIPLE BUS BAR (LINE BAR) THRU SWITCHES INTO CENTER JACK.
- HEAVY LINES INDICATES VERTICAL COIL ASSEMBLY CONTACT MULTIPLE BAR
- JACK TERMINAL
- JACK TERMINAL (COMMON)
- TERMINAL ON CROSS-CONNECT TERMINAL STRIP

MANUFACTURING NOTES:

1-NUMBER IN () INDICATES MOUNTING POSITIONS OF THE ALLOTTER SPRINGS IN THE SWITCH BANK PLATES.

2-FOR FIGURE 28 STENCIL VERTICAL COILS ACCORDING TO NUMBERS SHOWN IN []. FOR FIGURE 11B STENCIL VERTICAL AND HORIZONTAL COILS ACCORDING TO NUMBER AND LETTER SHOWN IN [].

ASSOCIATED DRAWINGS

DRAWING NO.	ISS.	DESCRIPTION
E-851053-A	1	EXPLANATION

CROSS POINT SWITCH CIRCUIT

H-851053-A

SHEET 1 OF 15

DESIGNED BY F. KELLOGG OR S.S.
 APP'D S.J. CZARNECKI CK. O.R.
 SCALE: 3/8" = 1" DATE: 3-6-72
 E.P. NOT SCALE DRAWING

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H-851053-A
 H-851053-A
 H-851053-A

CHANGES

REVISION 1 OF 15

REVISION 1

REVISION 1

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FIG. 2A OR 2B

CROSS POINT SWITCH
(4 X 60 + 5C LEAD)
(NOTE 2)

H-851053-A

SHEET 4 OF

ISSUE: 1
SSUT: 2

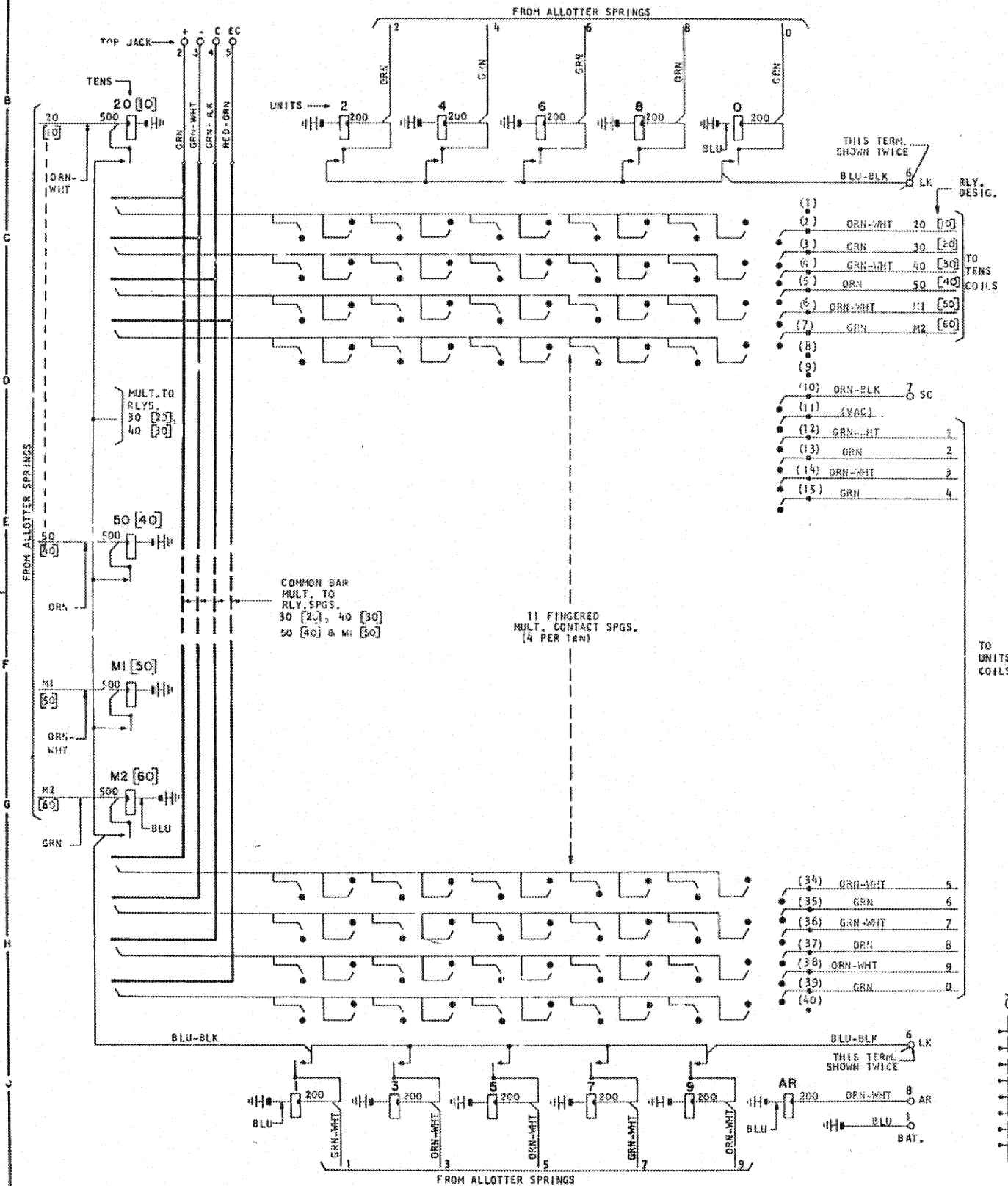


FIG. 2A OR 2B

H-851053-A

SHEET 4 OF

SIZE
CI

AUTOMATIC ELECTRIC COMPANY

NORTH LAKE, ILL., U.S.A. GENOA, ILL., U.S.A. WAUKESHA, WISC., U.S.A.

H-851053-A

SHEET 2 OF

ISSUE: 1
ISSUE: 2

TABLE A

DESCRIPTION (NOTE 55)	ORDERING FIGURE	CENTER FIGURE	GOLDPLATED MTL. JACK CONTACT BARS (NOTE 51)	STOCKLIST	CABLE	REPLACED DRAWING			WHERE USED
						CIRCUIT	BANK MULTIPLE	STOCKLIST	WIRING DIAGRAM
4 X 30 + SC LEAD	1A	CJA	+	DH-851053-A90A H-983500-1			AC-3048	NL-19955-A	WC-3059
4 X 60 + SC LEAD	2A	CJB	+	DH-851053-A91A H-983501-1			A-3661	NL-19951-A	W-3266
4 X 60 + SC LEAD	29	CJB	+	DH-851053-A91 H-983501-2			H-850913-A (FIG. 1A)	DH-721343-90A	
3 X 100 (R)	3A	CJC	+	DH-851053-A92A H-983502-1			H-850913-A (FIG. 1A)	DH-721343-90A	
3 X 100 (T)	3B	CJC	+	DH-851053-A92 H-983502-2			A-1609	NL-19950-R	W-1001
3 X 100 (S)	4A	CJC	+	DH-851053-A93A H-983503-1			A-1509	NL-19950-S	W-2456
3 X 100 (U)	4E	CJC	+	DH-851053-A93 H-983503-2			AC-1832	NL-19951-A	W-2455
3 X 100 + SC LEAD (R)	5A	CJC	+	DH-851053-A94A H-983504-1			H-850928-A (FIG. 1A)	DH-721003-90	W-2455
3 X 100 + 10 DIGIT TRANSLATION (S)	6A	CJC	+	DH-851053-A95A H-983505-1			AA-3408	NL-19952-R	W-2455
4 X 100 (R)	7A	CJD	+	DH-851053-A96A H-983506-1			H-850677-A (FIG. 2A)	NL-19952-S	W-2455
4 X 100 (R)	7B	CJD	+	DH-851053-A96B H-983506-2			H-850920-A (FIG. 1A)	DH-721356-90A	W-2455
4 X 100 (S)	8A	CJD	+	DH-851053-A97A H-983507-1			AA-3408	NL-19952-S	W-2455
4 X 100 (S)	8B	CJD	+	DH-851053-A97B H-983507-2			H-850677-A (FIG. 1A)	NL-19952-S	W-2455
4 X 100 + SC LEAD (R)	9A	CJD	+	DH-851053-A98A H-983508-1			H-850922-A (FIG. 1A)	DH-721356-90A	W-2455
4 X 100 + 10 DIGIT TRANSLATION (S)	10A	CJD	+	DH-851053-A99A H-983509-1			AC-3596	NL-19953-A	W-3549
8 X 50 (R)	11A	CJE	+1, -1, T, R	DH-851053-900A H-983510-1			H-850638-A (FIG. 2A)	DH-721311-90	H-721311
8 X 50 (R)	11B	CJE	TI, RI, TO, RO	DH-851053-900B H-983510-2			H-850913-A (FIG. 1A)	DH-721356-90A	H-721356
8 X 50 (S)	12A	CJE	ALL	DH-851053-901A H-983511-1			H-850638-A (FIG. 2A)	DH-721311-90	H-721311
8 X 50 (S)	13A	CJE	+1, -1, T, R	DH-851053-902A H-983512-1			SK-4287-A		
ALL OTTER SWITCH	14A	CJE		DH-851053-903A H-983513-1					
2 (4 X 25) (R)	15A	CJC	+1, -1, +2, -2	DH-851053-904A H-983514-1			H-850921-A (FIG. 1A)	DH-721357-90A	H-721357

TABLE A

H-851053-A

SHEET 2 OF

SIZE
CIAUTOMATIC ELECTRIC COMPANY
NORTH LAKE, ILL., U.S.A. • GENOA, ILL., U.S.A. • WAUKESHA, WISC., U.S.A. •

INSTALLER'S NOTES:

76-ASSIGNMENT OF LINE BANK MULTIPLE FOR ANY SPECIFIC TRUNK OR CIRCUIT GROUP MUST BE MADE WITHIN A SINGLE TENS GROUP, BUT IT NEED NOT BE CONSECUTIVE WITHIN THAT TENS GROUP.

77-IN FIGURE 98A, USE "C" & OMIT "D" & "E" WIRING IF THE INFORMATION TRUNK GROUP CONSISTS OF ONLY 2 OF THE 4 EQUIPPED FIGURES 1A; USE "D" & OMIT "C" & "E" WIRING FOR A GROUP OF 3 TRUNKS; USE "E" & OMIT "C" & "D" WIRING FOR A GROUP OF 4 TRUNKS.

78-OMIT "F" & USE "G" WIRING AT ANY RELAY A3, A4, B2, B3, WHICH IS NOT ACTUALLY ASSOCIATED WITH A LINE CIRCUIT.

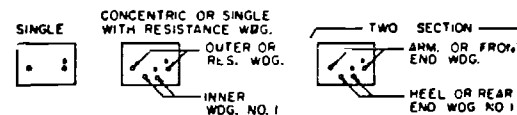
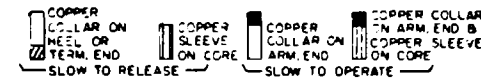
79-OMIT "H" & USE "I" WIRING IF GROUPS A & B ARE TO BE COMBINED INTO A SINGLE GROUP.

80-CONNECT "J" WIRING, WHEN FIGURE 6A IS USED IN TYPE 40 PABX.

81-USE 3 AMP FUSE FOR NEGATIVE BATTERY SUPPLY TO SUB FIGURES 4A & 5A.

82-CONNECT "P" STRAP WHEN FIGURE 9A IS NOT EQUIPPED.

SYMBOLS



- INDICATES INSIDE TERMINAL (START OF WINDING)
- JACK TERMINAL
- JACK TERMINAL (COMMON)
- INDICATES MAKE-BEFORE-BREAK OR EARLY-MAKE
- NORMALLY OPERATED RELAY.
- TERMINAL ON STRAPPING PLATE.

MANUFACTURING NOTES:

- POWER RATINGS SHOWN ARE MINIMUM.
- ALL DIODES ARE FD-1029-DG UNLESS OTHERWISE SPECIFIED.
- SHOP PROVIDES OPTIONAL WIRING & APPARATUS PER TABLE A.
- CAPACITORS C3A, C3B THRU C10A, C10B, AND C15A, C15B THRU C18A, C18B, AND C20A, C20B THRU C32A, C32B MUST BE MATCHED WITHIN 5% OF EACH OTHER.

RELAY TABLE FOR FIG. 8A

RELAYS		C1	C2	C3	C4	C5	CF	XC1	XC2	XC3	XC4	XC5	O1	O2	E1	SS	TX1	TX2
ADJ. SEE R-004		113	131	131	131	131	134	175	175	111	111	111	265	265	137	240	290	
C+CONT.		L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L
SPRINGS	17-18				T K11	T K12	M F5	T F13	T F13	T G14	T H14	T J14						
	15-16	B G14	B G14	T H12	T H13	T J12	M F2		T J14				9 G13		T G10	B G14	B A37	F7
	13-14		M G12				M J14	T J14		T H13	T H13	T J13			M G3		M O3	M F3
	11-12	T F10	M E6	P H8	P H9	P H10	M G6	M F10	T H14	M H8	M H9	M G10	T D10	M G3	M K13	M E5	M O3	T E3
SPRINGS	7-8						M D5	T D10	T D10						B G13	T B3	M F10	P C2
	5-6			M A13	M B13	M C13	M E2	T G7	T G8	T G9	T G10		T D3		B G13		M F10	P C2
	1-2	M B3	M G4	M B13	M C13	M D3	M J2	T J3	T K2	T E11	T E10	T E9	M E3	T B3	P B3	M F12	P R2	P J2
WINDINGS	2-3	B4	H4	A14	B14	C14	D8	H7	H7	H12	H12	J12	O3	F3	F10	F12	E4	G4
	1-4	B4	H4	A14	B14	C14	D8	H7	H7	J9	J10	J11	O3	F3	F10	F12	E4	G4

RELAY TABLE

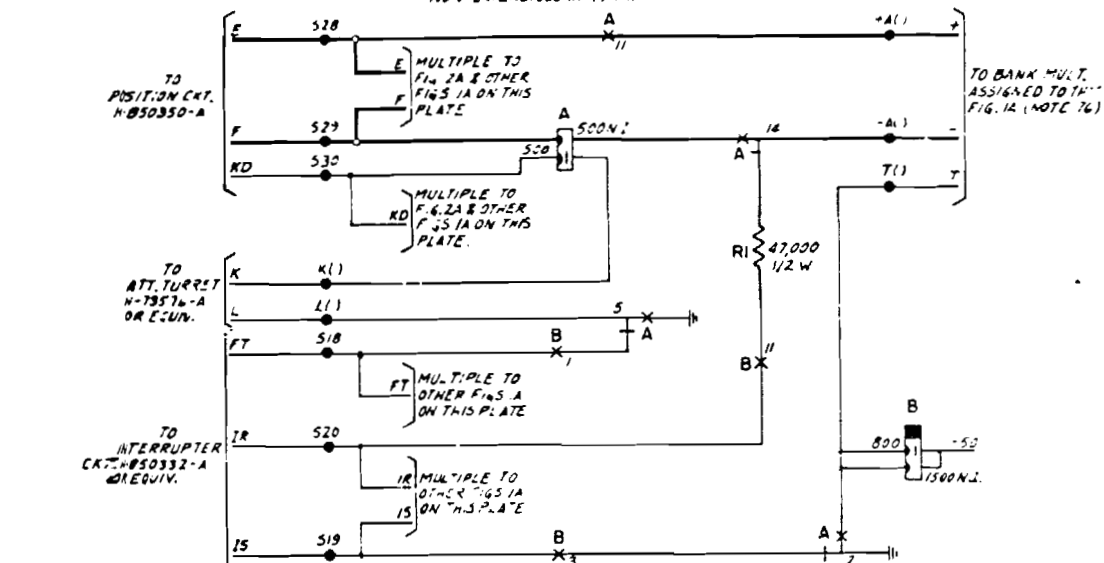
RELAYS	FIG. 1A	FIG. 2A	FIG. 3A
ADJ. SEE R-0004	119 121 175	111	112
C-CONT. L-LOC.	C L C L C L	C L	C L
SPRINGS	17-18 15-16 13-14 11-12		
WINDINGS	1-2 3-4 5-6 7-8		

RELAY TABLE FOR FIG. 4A

RELAYS		C1	C2	C3	C4	CF	D	E	TX	XC1	XC2	XC3	XC4
ADJ. SFE R-0004		118	176	176	176	113	113	137	151	197	112	111	111
C=CONT. 1=LOC		C	I	C	I	C	L	C	L	C	L	C	L
17-18								I	33		I	99	
15-16		B	E	B	F	B	D	M	H	M	D	B	H
11-14		M	D	M	D	M	D	M	D	M	D	M	D
11-12		I	C	I	C	I	C	I	C	I	C	I	C
7-8													
5-6													
3-4		M	B	M	B	M	B	M	B	M	B	M	B
1-2		M	B	M	B	M	B	M	B	M	B	M	B
2-3		B	I	C	I	C	I	C	I	C	I	C	I
1-3		B	I	C	I	C	I	C	I	C	I	C	I

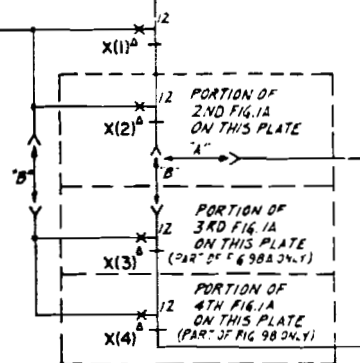
FIG. 1A

NON-EXTENSIBLE INF. TRK.



TO/FROM LINE SELECTION
CONTROL H-850240-A,
SELECTION ROUTING CKT.
H-850687-A OR EQUIV.

TO FIG. 3A



FROM FIG. 3A

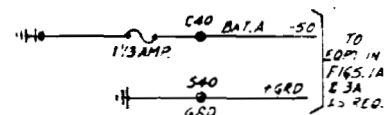
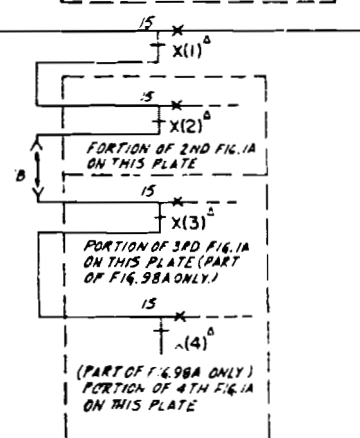


FIG. 2A

ATTENDANT'S OUT DIAL TRK.

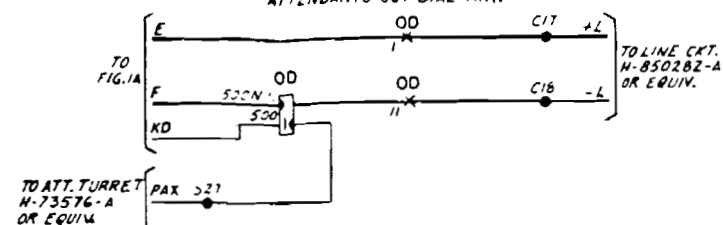
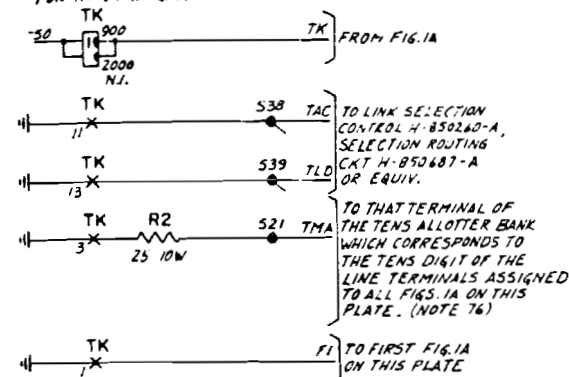
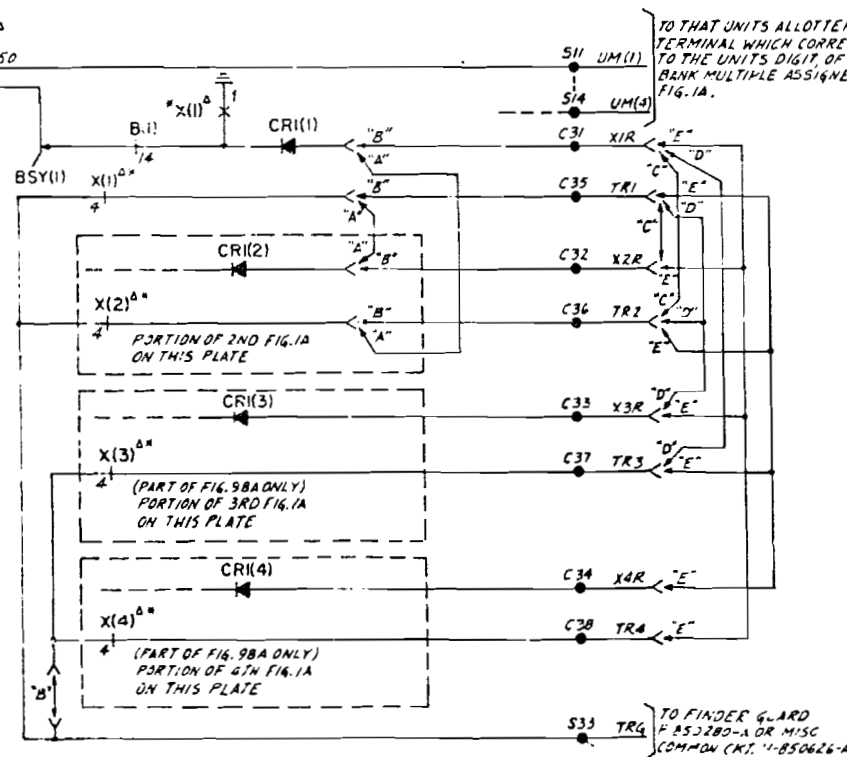


FIG. 3A

COMMON ACCESS CONTROL
FOR INF. TRK. GRP.

TO THAT UNITS ALLOTTER BANK
TERMINAL WHICH CORRESPONDS
TO THE UNITS DIGIT OF THE LINE
BANK MULTIPLE ASSIGNED TO THIS
FIG. 1A.



TO FINDER GLARD
H-850280-A OR MISC.
COMMON CKT. H-850626-A

1 TRK., 3 STA. C24F. CXT.

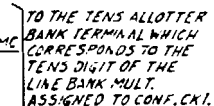


FIG.7A SEE TABLE B)
CONF CKTS. 5-8
(STA. ONLY)

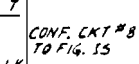


FIG. 5A

CONF. CKT.
2 TRK., 3 STA. OR 1 TRK., 4 STA. OR 5 STA.

TRK. (OR STA.) CONF. CKT.

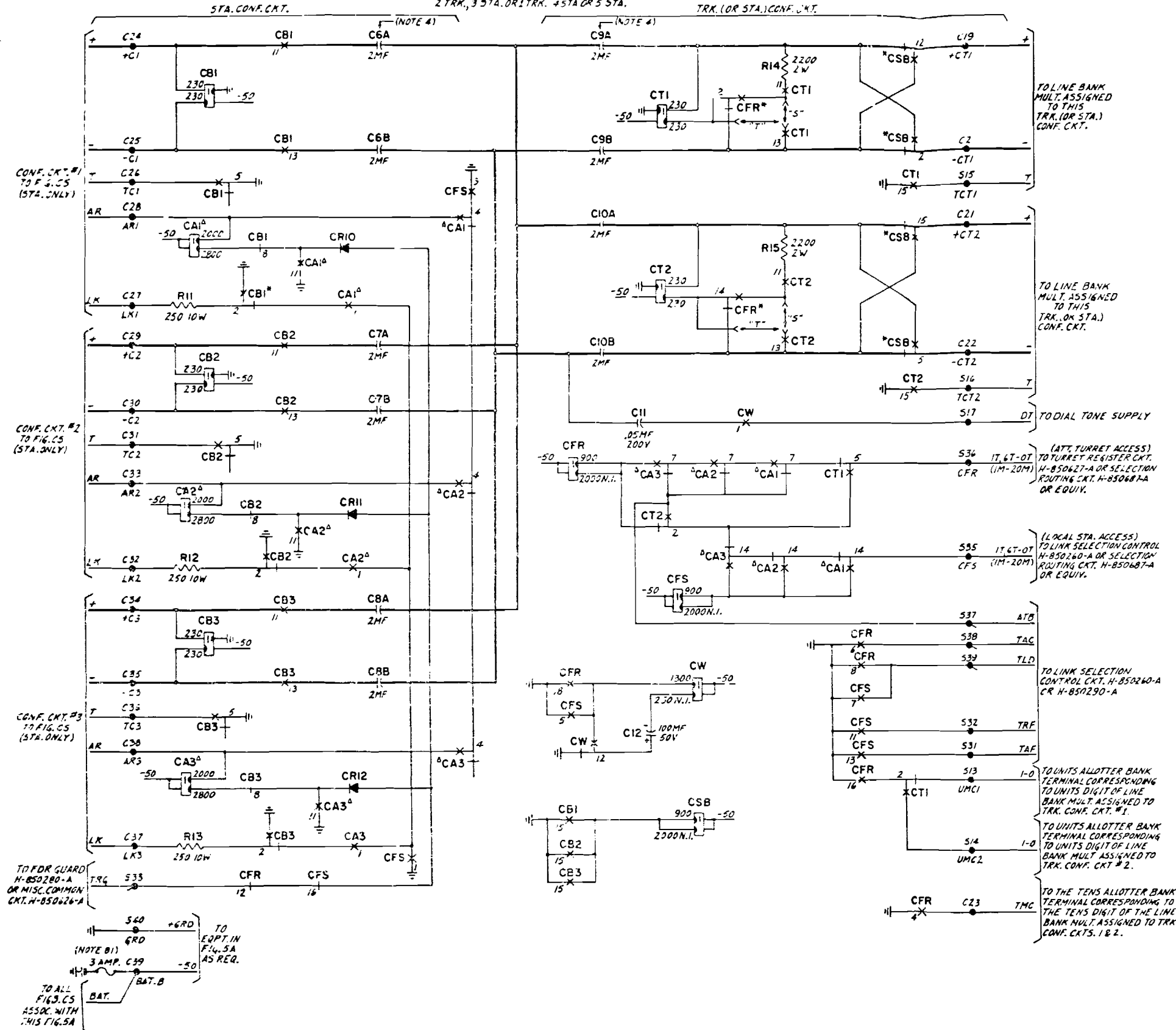


FIG. 5C

CROSS-POINT SWITCH (REF. ONLY)

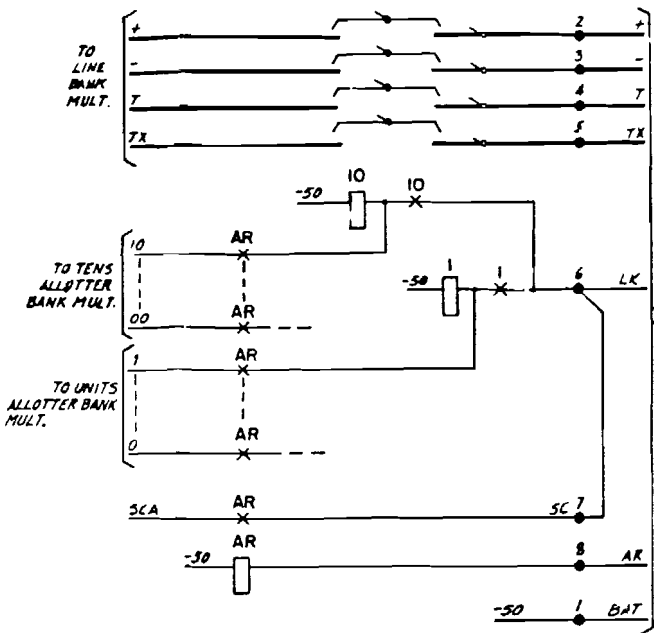
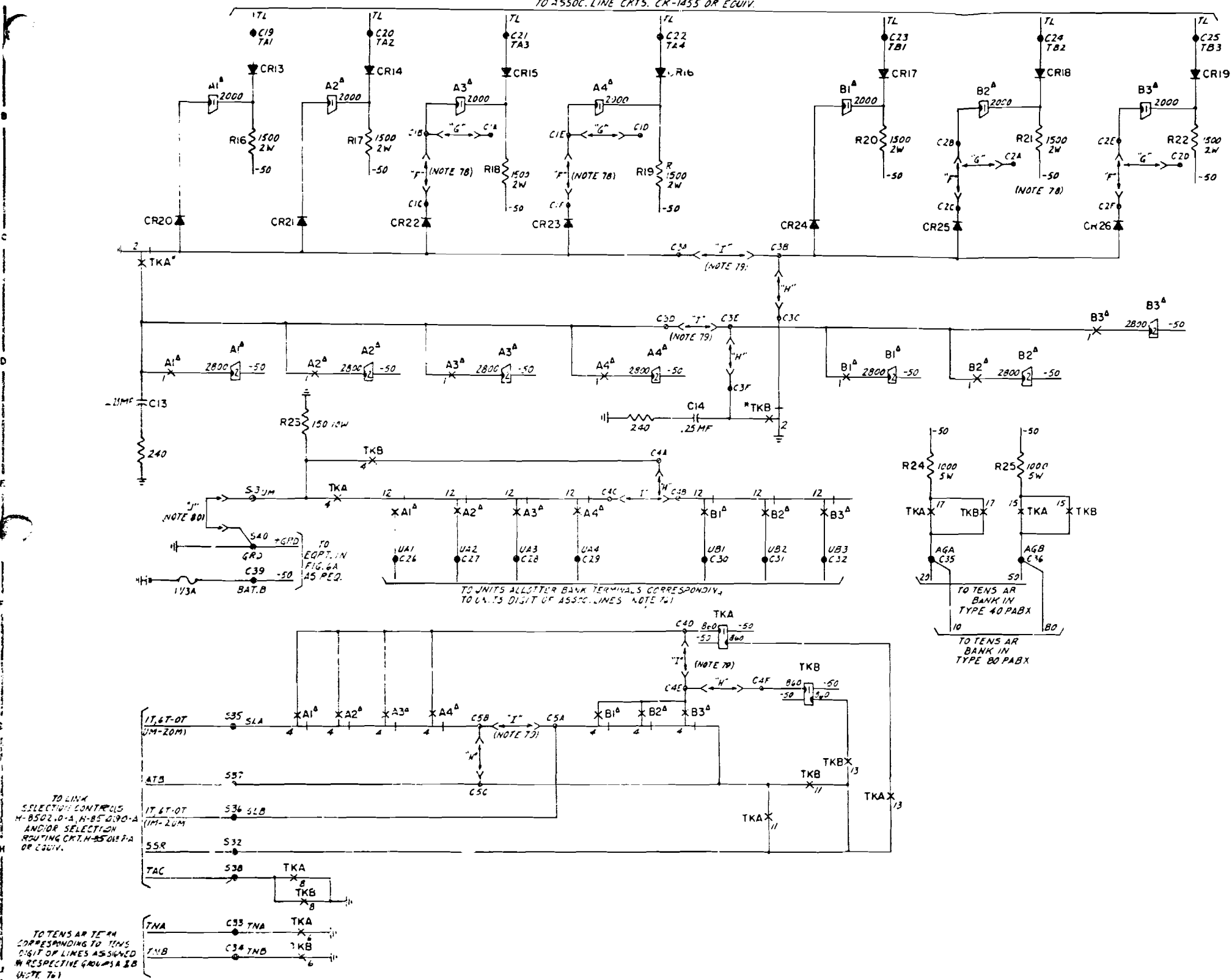


FIG. 6A

PBX TRK. SELECTION CKT.

TO ASSOC. LINE CKTS. CK-1455 OR EQUIV.



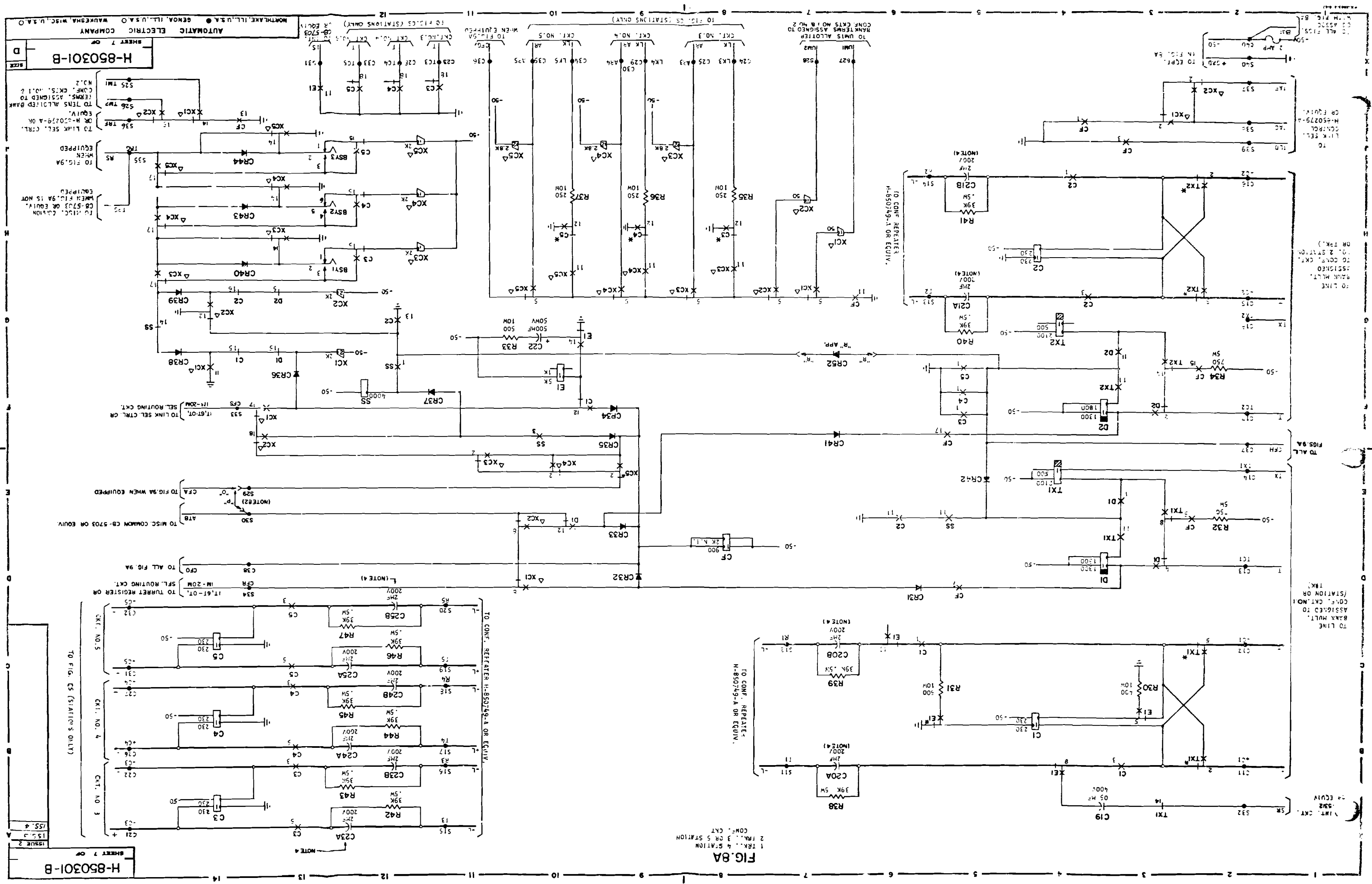


FIG.9A

3 STATION CONF. CKT.

FIG.10A

4 STATION CONF. CKT.

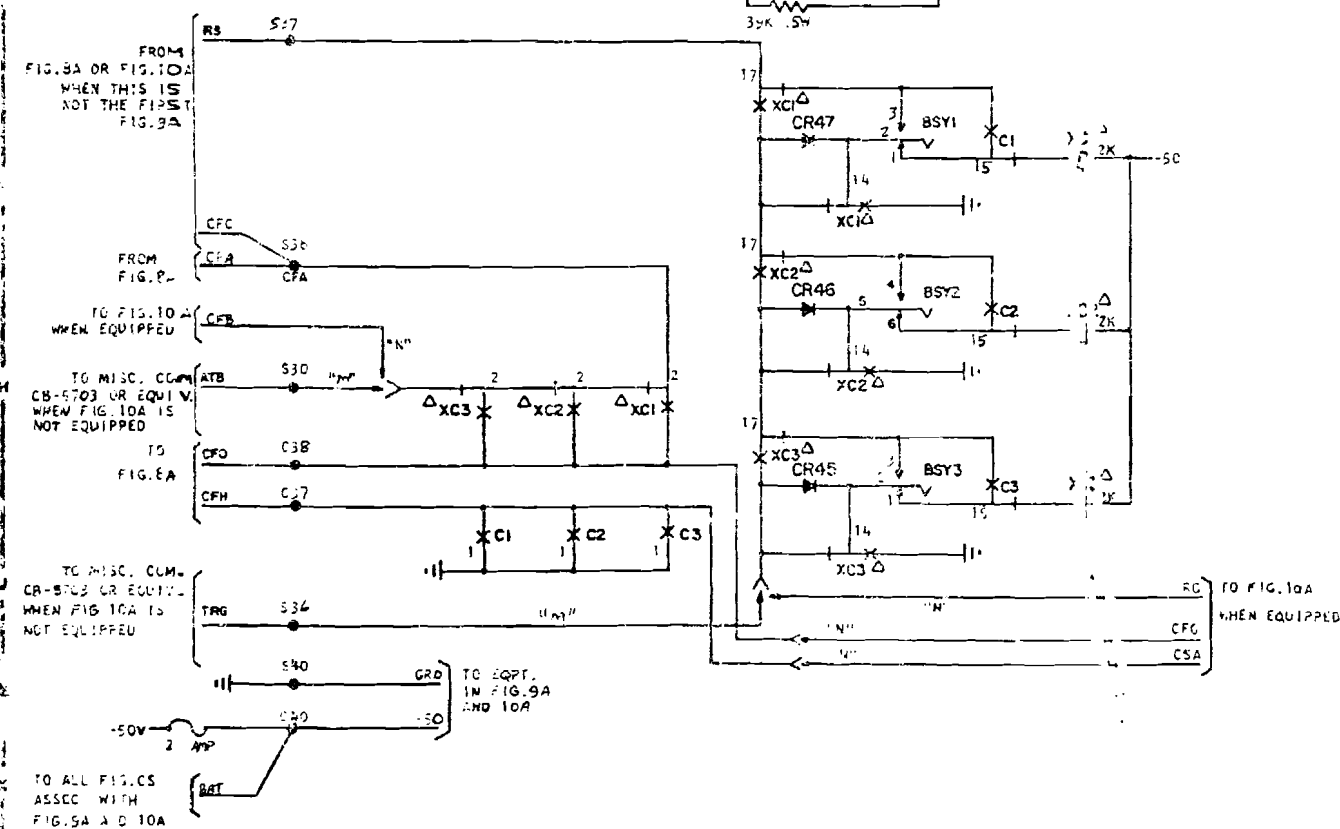
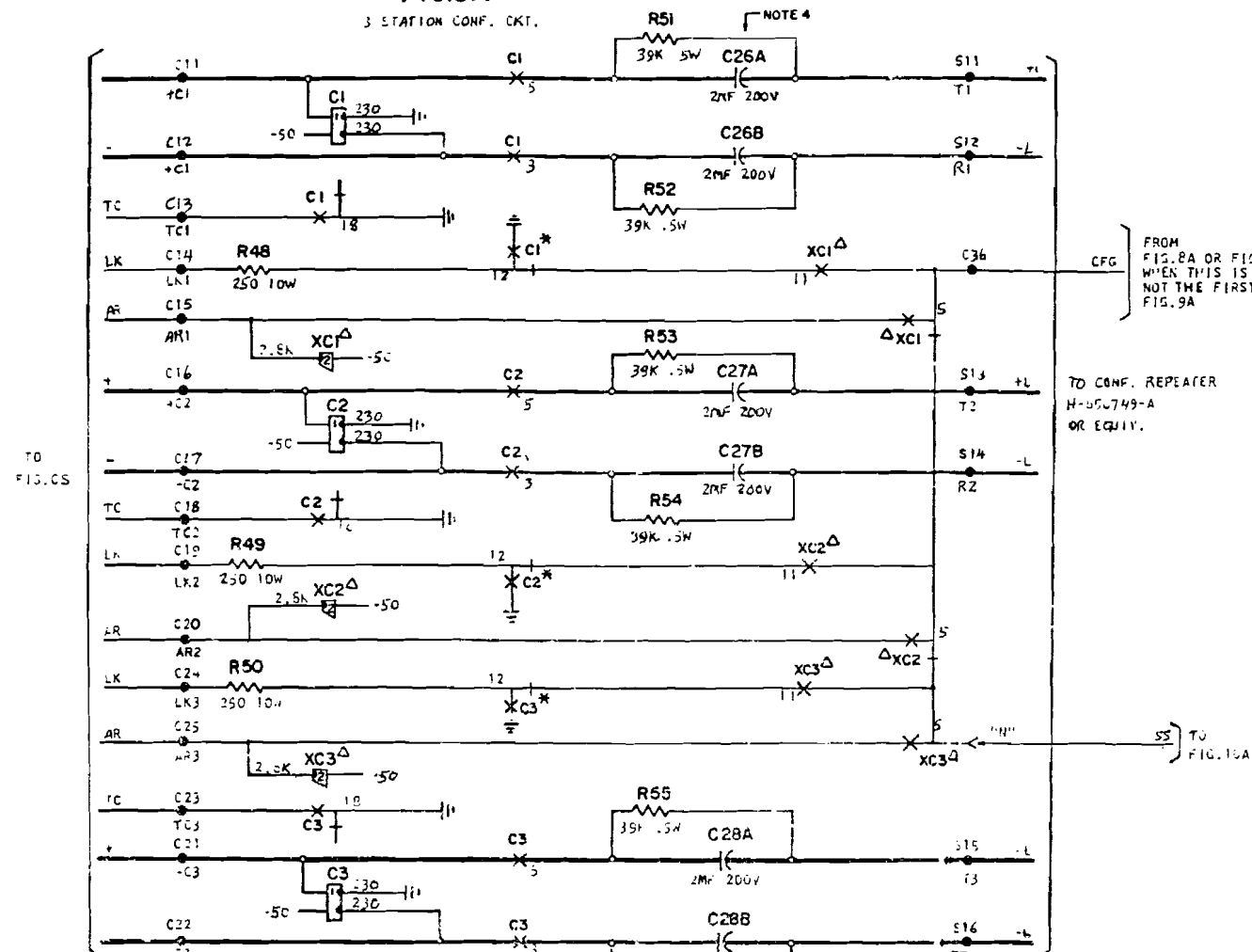
H-850301-B

SHEET 8 OF

ISSUE 2

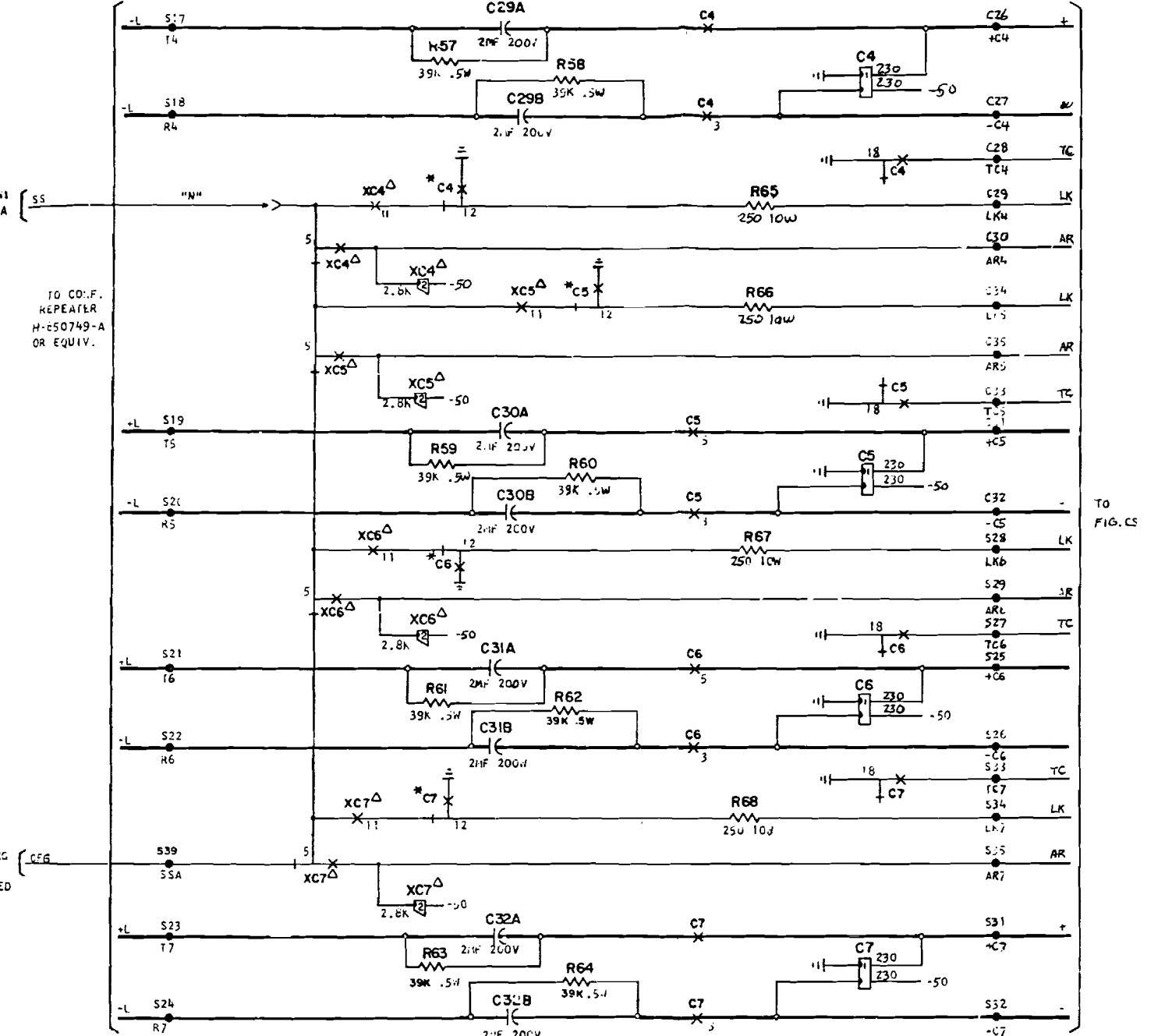
ISS. 3

ISS. 4



TO SUCCEEDING FIG. 9A WHEN EQUIPPED

FROM FIG. 9A



TO FIG. 9S

TO SUCCEEDING FIG. 9A WHEN EQUIPPED

TO MISC. COM. CR-5703 OR EQUIV. WHEN ADDITIONAL FIG. 9A IS NOT EQUIPPED

TO SUCCEEDING FIG. 9A WHEN EQUIPPED

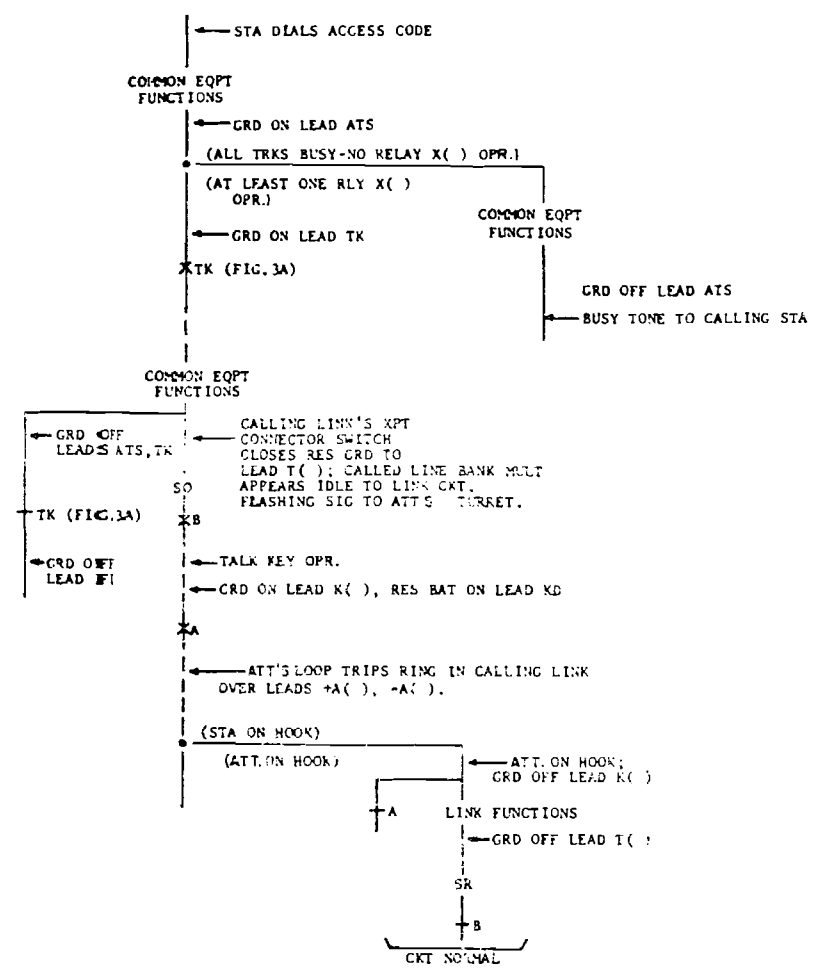
H-850301-B

SHEET 8 OF

AUTOMATIC ELECTRIC COMPANY
NORTHLAKE, ILL., U.S.A. • GENOA, ILL., U.S.A. • WAUKESHA, WISC., U.S.A.

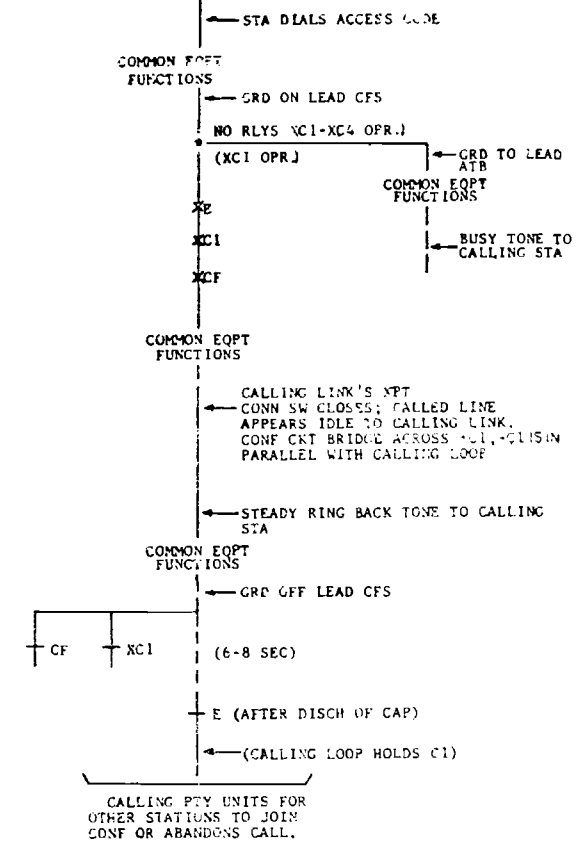
SC1

PABX STA CALLS ATT. INF. TRK. (FIG. 1A)
(RLY X() POSSIBLY OPRD)



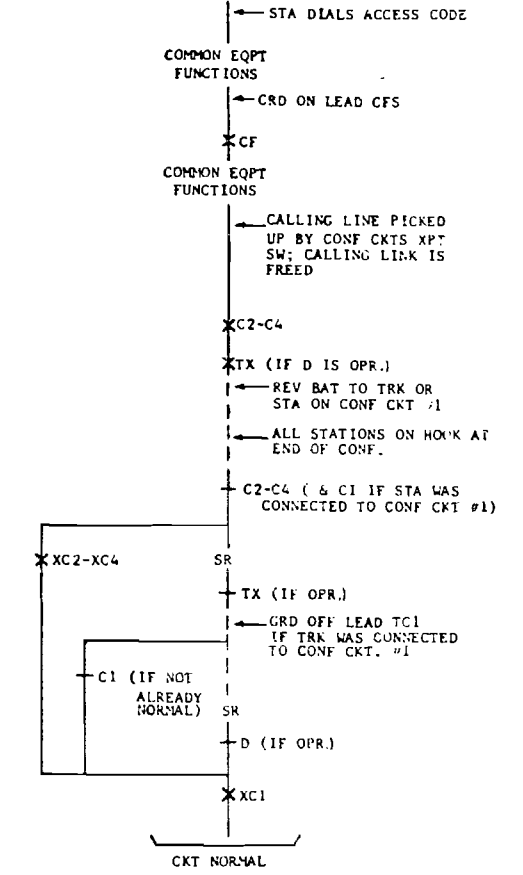
SC2

STA SEIZES CONF CKT #1 (FIG. 4A)
(RLY XC1 POSSIBLY OPR.)



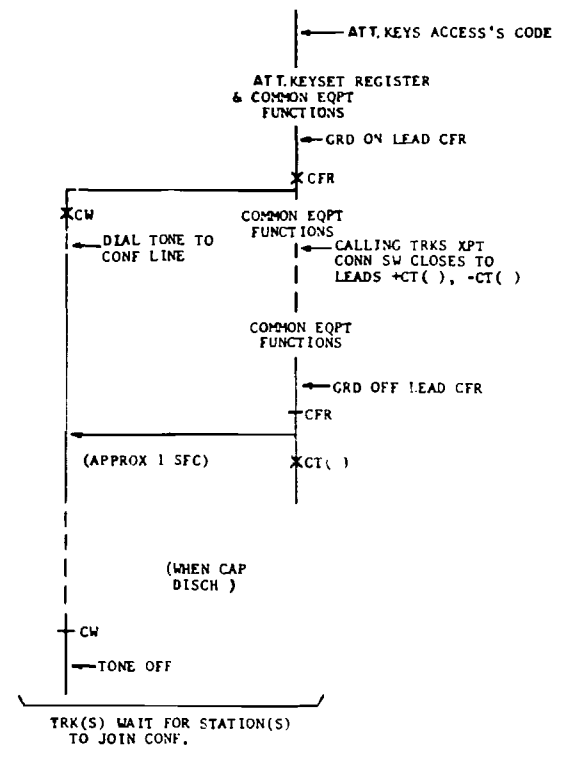
SC5

STA SEIZES ANY CONF CKT 2-4 (FIG. 4A)
(ONE OF RLYS XC2-XC4 OPRD, RLY XC1 NORMAL)



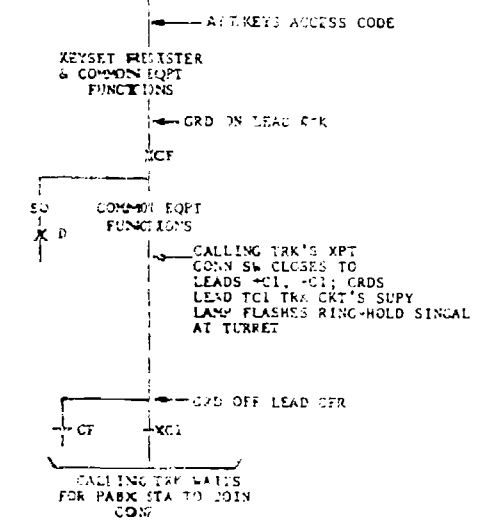
SC6

ATT. CONNECTS TRF TO TRK CONF CKT (FIG. 5A)
(RLYS CT1 OR CT2 NORMAL, RLYS CA1, CA2, CA3 OPR)



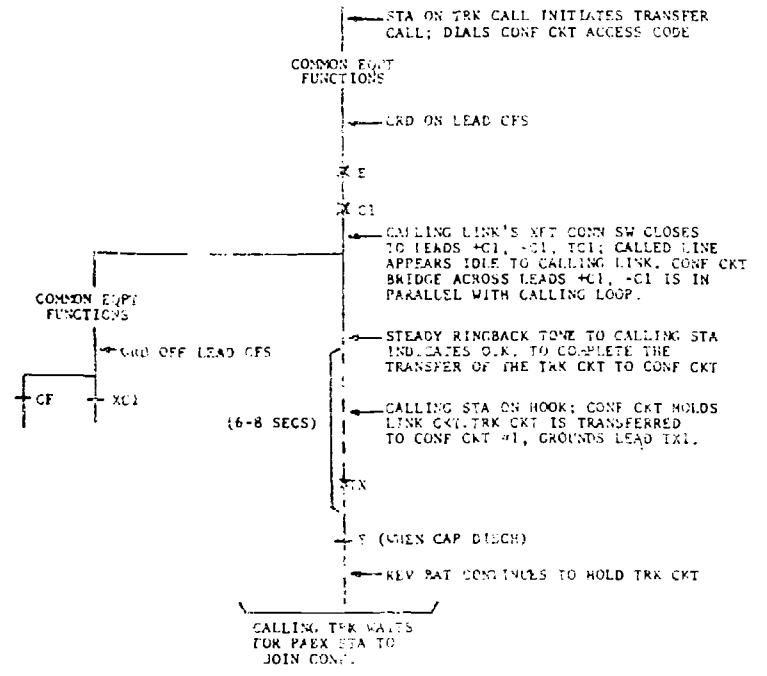
SC3

TRUNK CONNECTED TO CONF CKT #1 (FIG. 5A) BY ATT.
(RLY XC1 OPRD)



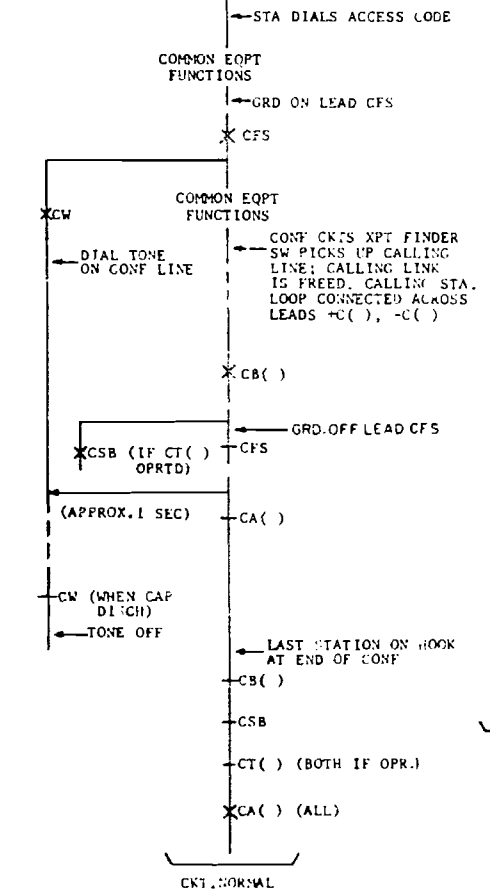
SC4

TRUNK CONNECTED TO CONF CKT #1 (FIG. 4A) VIA TRANSFER SEQUENCE FROM STA.
(RLY XC1 OPR.)



SC7

STA SEIZES CONF CKT (FIG. 5A)
(AT LEAST ONE OF RLYS CA1-CA3 OPR.)



SC8

PBX TRK SELECTION (FIG. 6A)
(ONE OR MORE OF RLYS A1-A4 OPR.)

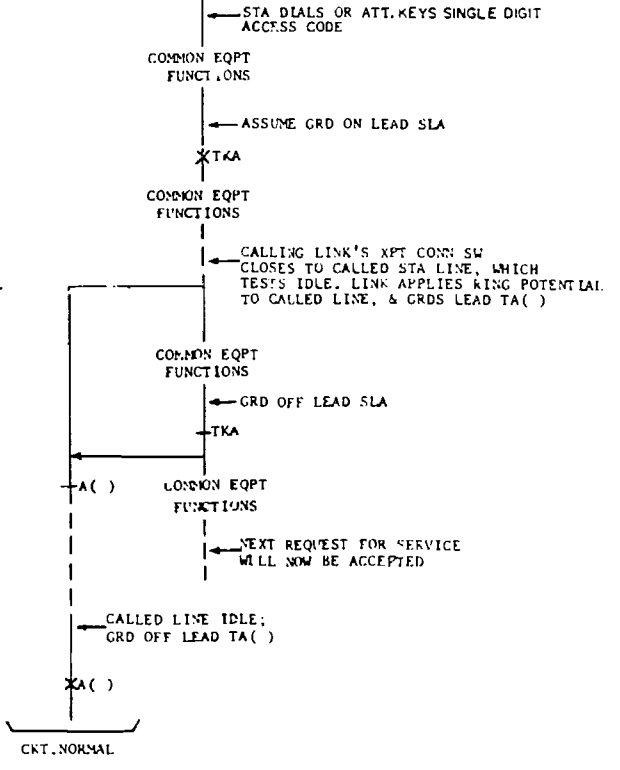
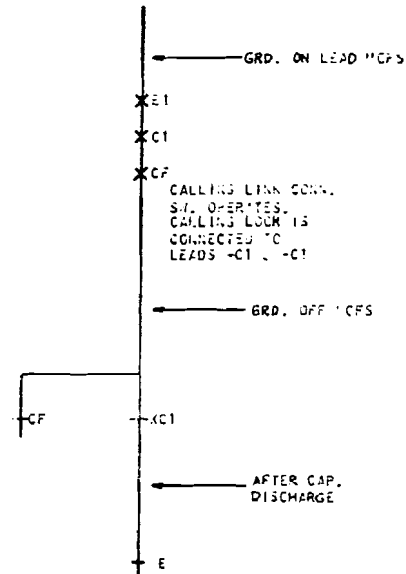


FIG. SC9

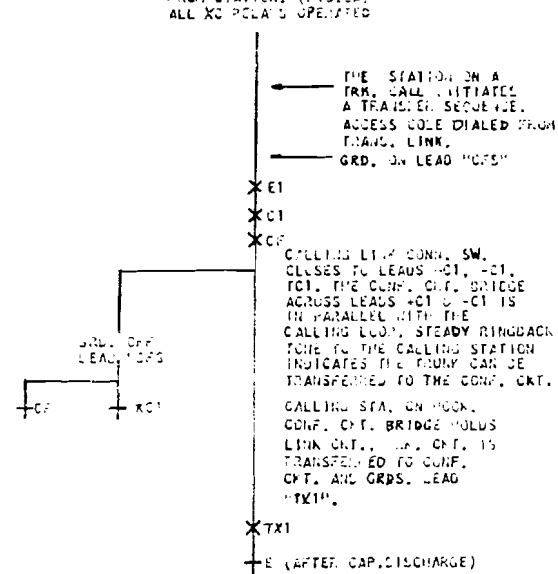
STA. SEIZES CONF. CRT.
(FIG. SC8) ALL EQUIPPED
XC RELAYS OPERATED



CALLING LOOP HOLDS
C1. THE CALLING PARTY
WAITS FOR OTHER
STATIONS TO JOIN THE
CONFERENCE. STATIONS
ONLY MAY JOIN THE
CONFERENCE IF THE
FIRST CIRCUIT WAS
SEIZED BY A STATION.

FIG. SC11

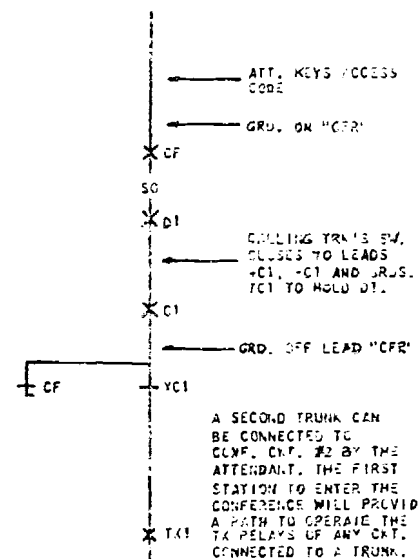
TRUNK CONNECTED TO
CONF. CRT. #1 VIA TRANS.
FROM STATION. (FIG. SC9)
ALL XC RELAYS OPERATED



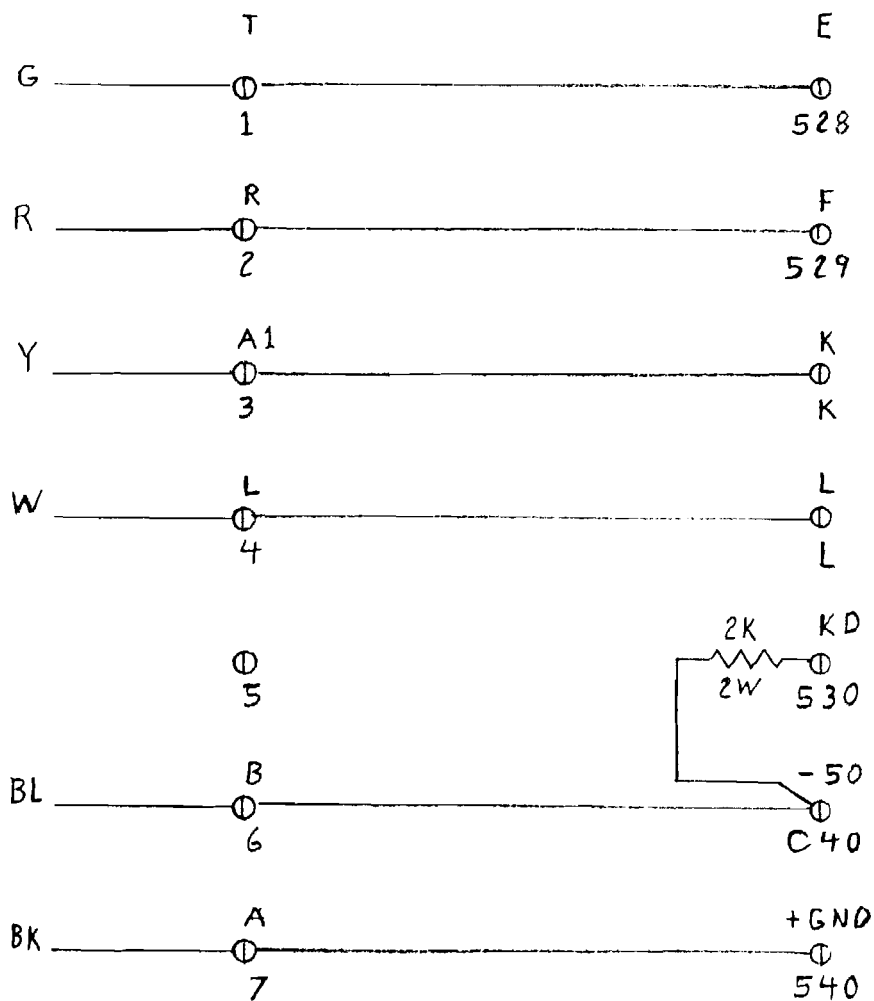
REVERSE BATTERY HOLDS
THE TRUNK UNTIL ONE
OR MORE STATIONS ENTER
THE CONFERENCE. THE TRUNK
WILL BE RELEASED WHEN
ALL STATIONS RELEASE.

FIG. SC10

TRUNK CONNECTED TO
CONF. CRT. #1 BY ATTENDANT
ALL XC RELAYS OPERATED



BATTERY IS REVERSED
TO THE TRUNK WHICH WILL
KEEP THE TRUNK CONNECTED
UNTIL ALL CONNECTED STATIONS
HAVE RELEASED.

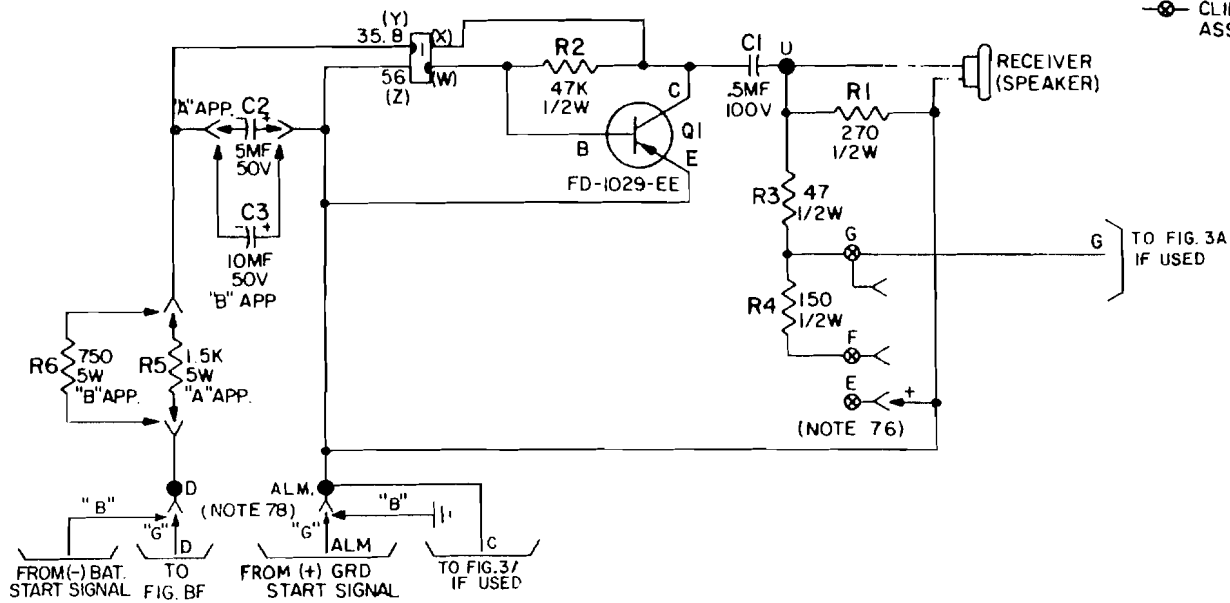
TEL44A BLKATT TK

NOTE :

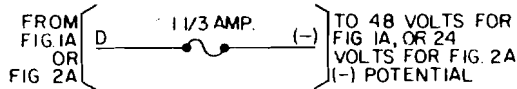
1. INSTALLER TO REMOVE AND TAG DEAD EXISTING WIRING ON ATT TK. REWIRE AS SHOWN ABOVE.
2. SEE PS 870325-1 FOR INSTRUMENT WIRING.
3. THIS USED TO REPLACE TURRET WHEN SYSTEM IS USED AS A PAX.

DRAWN BY DDH	DATE 3/87	APPROVED BY	DATE	DIAL "O" INF. TRUNK H-850301-B FIG 1A	THE DETROIT EDISON COMPANY COMMUNICATION SYSTEMS DIVISION	
REVISED BY	DATE	REMARKS	DATE 3-27-87		SKETCH NO. PS-870327-1	
REVISED BY	DATE	REMARKS				

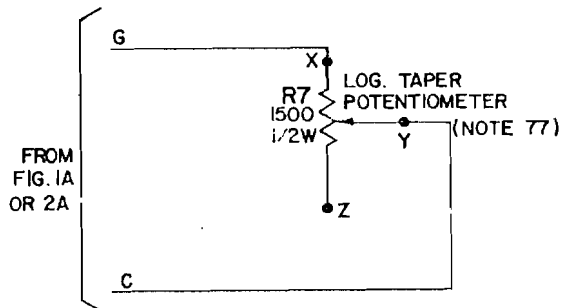
FIG. 2A 24 VOLT OPERATION ("B" APP.)



(FOR REFERENCE ONLY)



VOLUME CONTROL



76-CONNECT (+) TO

- 76-CONNECT (+) TO E FOR MAXIMUM VOLUME,
CONNECT (+) TO F FOR MODERATE VOLUME,
CONNECT (+) TO G FOR MINIMUM VOLUME, WHEN
FIG. 3A IS NOT USED. IF FIG. 3A IS USED, CONNECT (+)
TO TERMINAL E.
- 77-CONNECT R7 SO THAT, WHEN ITS SHAFT IS IN THE
MID POINT POSITION, THE RESISTANCE BETWEEN X &
Y IS SMALL IN COMPARISON TO THE RESISTANCE
BETWEEN Y & Z.
- 78-"G" WIRING FOR (+) GROUND START.
"B" WIRING FOR (-) BATTERY START.

TABLE A				
ORDERING FIGS.	SUB. FIGS.			DESCRIPTION
	1A	2A	3A	
99A		*	*	24V UNIT WITH VOL. CONTR.
98A	*		*	48V UNIT WITH VOL CONTR.
2A		*		24V UNIT W/O VOL. CONTR.
1A	*			48V UNIT W/O VOL. CONTR.

ASSOCIATED DRAWINGS		
DRAWING NO.	ISS.	DESCRIPTION
E-850359-A	2	EXPLANATION

H-850359-A H-850359-A H-850359-A		SHEET 1 OF 1 CHANGES 1 1		24-H-850359-A (REV.) FIG. 1A & 2A: REMOVED TERMS T.V.N. & W. RES. R3 WAS 47K; XSTR WAS DESIG. TRI. REVISED NOTE 7G. ADDED NOTE 7T, FIG. 3A & ASSOC. DRG. TABLE AH & E ISSUE: 2 A.P.N. 9-14-66 AF		3-H-850359-A ADDED WIRING BT V. AND NOTE 7B R.S. 9-5-67 TL ISSUE: 3 4-H-850359-A (REV.) ADDED TABLE A. REV. WRG. OF LEADS G. & C. FROM ASSOC. DRG. TABLE DELETED AH-155.2. S.P. 2-23-68 H.V.		5-H-850359-A (REV.) REVISED DRG. TABLE FIG. 1A & 2A. S.H. 11-13-68 A.F.		155-14 155-15 155-16		155-17 155-18 155-19		155-20 155-21 155-22		155-23 155-24 155-25		155-26 155-27 155-28		155-29 155-30 155-31		155-32 155-33 155-34		155-35 155-36 155-37		155-38 155-39 155-40		155-41 155-42 155-43		155-44 155-45 155-46		155-47 155-48 155-49		155-50 155-51 155-52		155-53 155-54 155-55		155-56 155-57 155-58		155-59 155-60 155-61		155-62 155-63 155-64		155-65 155-66 155-67		155-68 155-69 155-70		155-71 155-72 155-73		155-74 155-75 155-76		155-77 155-78 155-79		155-80 155-81 155-82		155-83 155-84 155-85		155-86 155-87 155-88		155-89 155-90 155-91		155-92 155-93 155-94		155-95 155-96 155-97		155-98 155-99 155-100	
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TO PROVIDE	FOR FIGURE 1A INSTALLER SHALL	
	DISCONNECT WIRING	CONNECT WIRING
NO RING-BACK TONE TO CENTRAL OFFICE WHILE RINGING PABX STATION	"A"	-
PREMONITORY BUSY WITH C.O. LINE CKT. ARRANGED FOR LOOP SEIZURE.	"B" (NOTE 76)	"R" (NOTE 76)
THREE PARTY CONFERENCE SERVICE	"S"	"C"
FOR USE WITH MANUAL CENTRAL OFFICE	"D"	-
RING TRIP RELAY IN GENERATOR RETURN PATH	"E"	"F"
FOR ILLUMINATING BUSY LAMP FIELD WHEN TRUNK IS PLACED ON HOLD	-	"G" (NOTE 78)
FOR USE WITH CAMP-ON BUSY ADAPTER	-	"H" (NOTE 78)
IMPROVED CENTRAL OFFICE RING TRIP WHEN TRUNK CONDUCTOR LOOP EXCEEDS 600 OHMS	-	"I"
NON RESTRICTED CONSULTATION LINE	"X"	"Y" (NOTE 90)
LOCKED IN SIGNAL WHEN CENTRAL OFFICE CAN NOT FURNISH PREMONITORY BUSY SIGNAL	"P"	"L" (NOTE 53)
FOR USE WITH 24 VOLTS CENTRAL OFFICE	-	"W"
LOOP SEIZURE OF C.O. LINE CKT. (NOTE 76)	"BB"	"RR"

INSTALLING NOTES:

76-WHEN "B" WIRING IS USED, GROUND FURNISHED TO THE TIP SIDE OF THE CENTRAL OFFICE LINE CIRCUIT MUST BE REMOVED, AND STATIONS INVOLVED IN POWER FAILURE AND/OR PREDETERMINED NIGHT ANSWER SERVICE WILL REQUIRE A GROUNDING BUTTON OR KEY TO INITIATE OUTWARD CALLS DURING POWER FAILURE OR AT NIGHT.

77-WHEN "R" WIRING IS USED, CENTRAL OFFICE CONNECTOR BANK TIP AND RING MUST BE REVERSED BETWEEN LINE AND CONNECTOR BANKS.

78-WHEN "G" WIRING IS USED, CONNECT LEAD AE TO ASSOCIATED CAMP - ON ADAPTER LEAD AE.

79-WHEN "H" WIRING IS USED, CONNECT LEAD AE TO POSITION CIRCUIT LEAD BLF. DO NOT CONNECT BOTH "G" AND "H" WIRING IN THE SAME RELAY BAR.

79-CONNECT LEAD HT TO TENS AND HU TO UNITS. ALL OTHER BANK TERMINALS CORRESPONDING TO BANK MULTIPLE ASSIGNED TO THIS TRUNK FOR CONSULTATION AND TRANSFER SERVICE.

80-TO ADAPTER CIRCUITS AS REQUIRED.

81-FOR INSTALLER'S OPTIONAL WIRING SEE TABLE A.

82-IF THE TRUNK CONDUCTOR LOOP RESISTANCE EXCEEDS 600 OHMS, "H" WIRING CAN BE CONNECTED TO IMPROVE RING TRIP IN THE DISTANT OFFICE. USE OF "H" WIRING WITH LOOP LESS THAN 600 OHMS MAY CAUSE NOISE DUE TO CIRCUIT UNBALANCE.

OPERATING NOTES:

90-THE FOLLOWING PRECAUTIONS APPLY IN INSTALLATIONS WITH "Y" WIRING. ALTHOUGH "Y" WIRING ALLOWS A CONSULTATION CALL TO BE MADE TO ANY OTHER AVAILABLE TRUNK, THE ORIGINAL TRUNK CAN NOT BE TRANSFERRED TO THE SECOND OR CONSULTED TRUNK. ATTEMPTS TO DO SO WILL RESULT IN THE CALL BEING LOST.

91-A-IF THE CENTRAL OFFICE SUCH THAT RELAY P IS SUBJECTED TO PROLONGED RELEASE WHILE THE TRUNK IS SEIZED, THE USE OF FIGURE 2A IS RECOMMENDED.

B-IF THE CENTRAL OFFICE IS A XBAR OFFICE WHICH OPENS THE LINE AFTER THE TRUNK HAS BEEN SEIZED, ENGINEER TO ORDER FIGURES 2A & 3A, INSTALLER IS TO REMOVE "C" & "D" WIRING AND ADD FIGURES 2A & 3A.

C-LONG CENTRAL OFFICE LOOP CONDITIONS COUPLED WITH HIGH RELEASE CENTRAL OFFICE BATTERY FEED MAY CAUSE RELEASE OF RELAY P AND/OR ON ATTENDANT DIALLED CALL. WHEN THESE CONDITIONS EXIST, ENGINEER TO ORDER FIGURES 2A & 4A, INSTALLER TO REMOVE "C" WIRING AND ADD FIGURES 2A & 4A.

D-NORMALLY FIGURES 3A & 4A ARE NOT REQUIRED ON THE SAME TRUNK CIRCUIT.

ENGINEERING NOTES:

51-TRUNK CONDUCTOR LOOP LIMITS FOR 48 VOLTS DISTANT OFFICE 1500 OHM OR CENTRAL OFFICE LOOP LIMIT MINUS 460 OHM WHICHEVER IS LESS. WITH "Y" WIRING CENTRAL OFFICE LOOP LIMIT MINUS 260 OHM. FOR 24 VOLTS DISTANT OFFICE 800 OHM OR CENTRAL OFFICE LOOP LIMIT MINUS 460 OHM WHICHEVER IS LESS. TRUNK CONDUCTOR LOOP PLUS STATION LOOP SHOULD NOT EXCEED CENTRAL OFFICE LOOP LIMIT FOR THOSE STATIONS ASSIGNED TO POWER FAILURE AND/OR PREDETERMINED NIGHT ANSWER SERVICE.

52-RECOMMENDED INCOMING RINGING FREQUENCY RANGE IS 16 TO 33 1/3 CYCLES.

53-WHEN "L" WIRING IS REQUIRED, FURNISH NIGHT SIGNAL RELEASE ADAPTER CC-2079 OR EQUIVALENT.

54-FURNISH SHORTING CLIPS FOR JACKS S11-S12, S39-S40, C11-C12, C39-C40.

SYMBOLS

COPPER COLLAR ON NEEL OR TERM END

COPPER SLEEVE ON CORE

COPPER COLLAR ON ARM END

SINGLE

CONCENTRIC

TWO SECTION

SINGLE

CONCENTRIC OR SINGLE WITH RESISTANCE WDG

OUTER OR RES WDG

INNER WDG NO. 1

TWO SECTION

ARM OR FRONT END WDG

NEEL OR REAR END WDG NO. 1

TYPE 900 RELAY COILS (REAR)

INDICATES INSIDE TERMINAL (START OF WINDING)

(S1) SLOW TO OPERATE

(S2) SLOW TO RELEASE

JACK TERMINAL

JACK TERMINAL (COMMON)

MAKE-BEFORE-BREAK

NORMALLY OPERATED (SHOWN UNOPERATED)

NIL/ONMS

LAST TO OPERATE

MANUFACTURING NOTES:

- POWER RATING VALUES SHOWN ARE MINIMUM.
- CAPACITORS C10 MUST BE MATCHED WITHIN $\pm 5\%$ OF EACH OTHER.
- CAPACITORS C12 MUST BE MATCHED WITHIN 10 μF OF EACH OTHER.
- DIODES CR1-CR39 ARE ML-18335.
- PRIOR TO ISSUE 20, "U" SPRING 12 AND "M" SPRING 12 WERE MAKE BEFORE BREAK.
- SHOP TO FURNISH OPTIONAL WIRING PER TABLE C.
- PRIOR TO ISSUE 21, "BB" WIRING WAS PART OF CIRCUIT & "RR" WIRING WAS NOT SHOWN.
- PRIOR TO ISSUE 22, "CC" WIRING & APPARATUS WERE PART OF THE CIRCUIT; "DD" WIRING & APPARATUS WERE NOT SHOWN. BEGINNING WITH ISSUE 22, "DD" WIRING & APPARATUS SUPERSEDE "CC" WIRING & APPARATUS.
- PRIOR TO ISSUE 23, ADJUSTMENT NUMBERS FOR RELAYS X, E, M & S WERE 112, 245, 122 & 140 RESPECTIVELY. RESISTANCE OF NO. 1 WINDING OF RELAY X WAS 2000 OHMS.
- PRIOR TO ISSUE 24, ADJUSTMENT NUMBER FOR RELAY T WAS 145.
- IN FIGURE 1A, PRIOR TO ISSUE 32, RESISTOR R1 WAS 3300 OHMS, 2 WATTS.
- IN FIGURE 1A, PRIOR TO ISSUE 33, RELAY E SPRINGS 7, 8 & 9 WERE BREAK-MAKE INSTEAD OF MAKE-BEFORE-BREAK.

TABLE B - OPERATING LIMITS			
MAXIMUM STATION LOOP RESISTANCE, INCLUDING INSTRUMENT- 1200 OHMS.			
TRK. LOOP RES. PLUS STATION LOOP RES. MUST NOT EXCEED C.O. LOOP LIMIT FOR THOSE STATIONS ASSIGNED TO PREDETERMINED NIGHT ANSWER AND/OR POWER FAILURE TRANSFER SERVICE.			
MINIMUM STATION LOOP INSULATION RESISTANCE- 15,000 OHMS. MINIMUM TRUNK CONDUCTOR INSULATION RESISTANCE- 50,000 OHMS.			
TYPE OF SERVICE	CIRCUIT REQUIREMENT	MAXIMUM ALLOWABLE EXTERNAL CKT. RESISTANCE * IN OHMS, WITH MINIMUM VOLTAGE AT THE DISTANT C.O. OF	
		44 VOLTS	50 VOLTS
OUTGOING OR INCOMING	OPERATE & HOLD REL. P IN SERIES WITH TRUNK LOOP.	2000	2400
INCOMING	OPERATE REL. V WITH RINGING CURRENT FOR INCOMING SIGNAL.	16-33 1/2 CYCLES RECOMMENDED.	
* EXTERNAL CIRCUIT RESISTANCE INCLUDES CONDUCTOR LOOP PLUS RESISTANCE OF ALL APPARATUS EXTERNAL TO TERMINALS OF THIS CKT. THE LIMITS SHOWN APPLY ONLY TO THIS CKT. AND SHOULD NOT BE EXCEEDED. IN PRACTICE, THE LOOP LIMIT & DIAL PULSE RECEIVING REQUIREMENTS OF THE DISTANT C.O. WILL USUALLY BE THE DETERMINING FACTOR IN ARRIVING AT THE PERMISSIBLE LOOP RESISTANCE BETWEEN THIS CKT. & THE DISTANT OFFICE. NORMALLY, THIS WILL BE THE DISTANT OFFICE'S LOOP LIMIT MINUS 460 OHMS. (OR MINUS 260 OHMS IF "H" WIRING IS CONNECTED) SEE NOTE 82.			

TABLE C - OPTIONS

APP. AND/OR WIRING	ISSUES		WAS PART OF	SUPERSEDED BY	WIRED BY	FIGURE OR SUFFIX	TABLE NOTES
	FIRST USED	LAST USED					
A	1				X	A	
B	8				X	A	76
C	1				X	A	
D	1				X	A	
E	16				X	A	
F	16				X	A	
G	14				X	A	78
H	14				X	A	78
I							
J	22	26	DD	K			
K	27				X		
L	11				X	A	63
M							
N							
O							
P	11				X	A	53
Q							
R	1				X	A	76
S	8				X	A	
T	11				X	A	82
U							
V							
W	1				X	A	
X	13				X	A	90
Y	13				X	A	90
Z							
BB	1				X	A	7,76
CC	1	21	DD				8
DD	22						8
RR	21				X	A	7,76
CI	1				X	1A	91
DI	1				X	1A	91

ASSOCIATED DRAWINGS

DRAWING NO.	ISS	DESCRIPTION
AH-850629-A	1/4	ADJUSTMENT
E-850629-A	20	EXPLANATION

CURRENT DRAIN DATA AMPS.
FG 1A-HOLDING CURRENT 0.37

STOCKLIST - H-850629 (FIG 2A)
STOCKLIST - DH-850629-A40(F.3,1A,1B)
STOCKLIST - DH-720982-40 (FIG 1A)

C.O. TRUNK CIRCUIT
40B, 00A PABX

H-850629-A

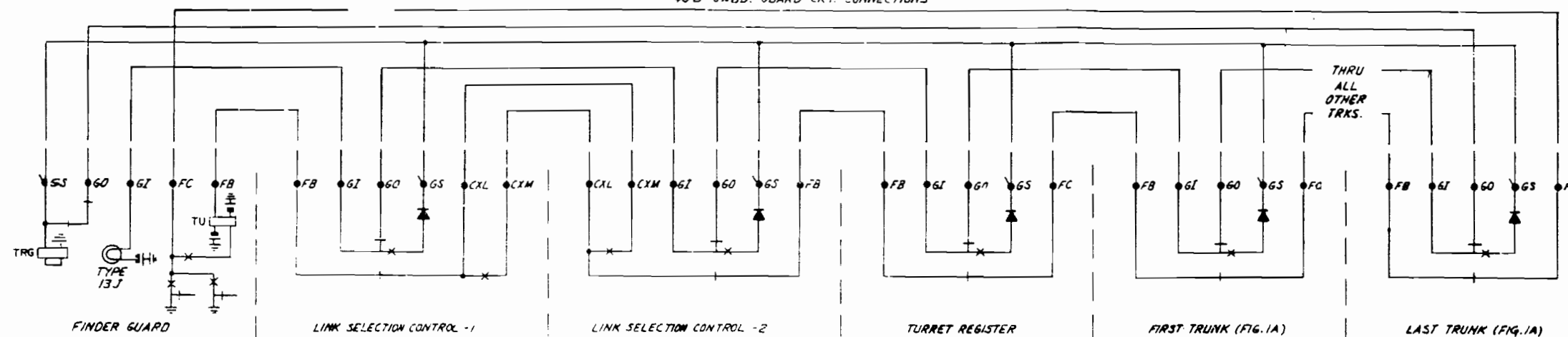
SHEET 1 OF 4

AUTOMATIC ELECTRIC COMPANY
NORTHLAKE, ILL., U.S.A. GENOA, ILL., U.S.A. WAUKESHA, WISC., U.S.A.

FIG.GC

GUARD CHAIN
(FOR REF. ONLY)

40 B SWBD. GUARD CKT. CONNECTIONS



80 A SWBD. GUARD CONNECTIONS

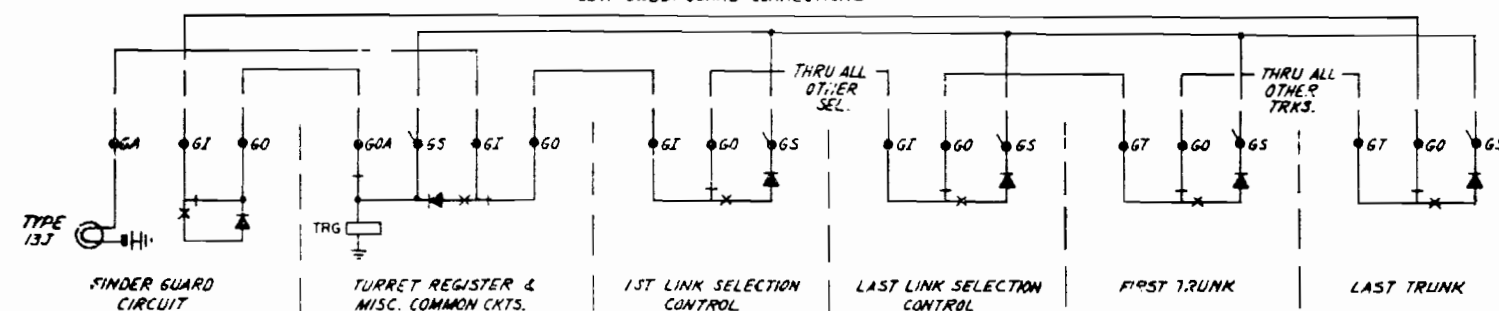


FIG.TS

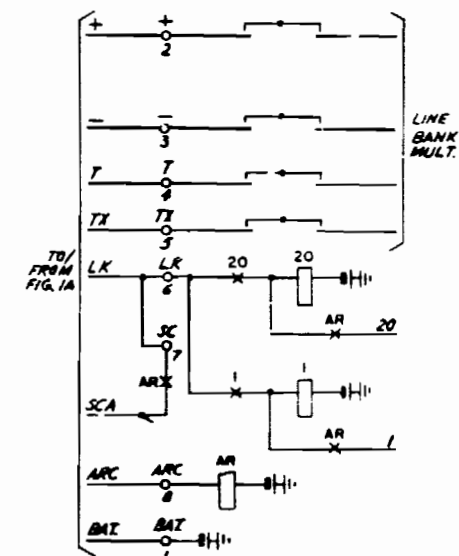
TRUNK SWITCH
(FOR REF. ONLY)

FIG.TA

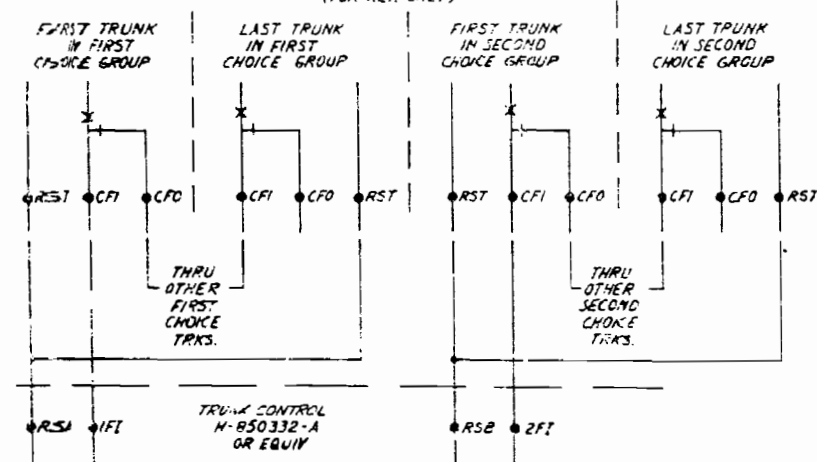
OUTGOING TRUNK ACCESS CHAIN
(FOR REF. ONLY)

FIG.PF

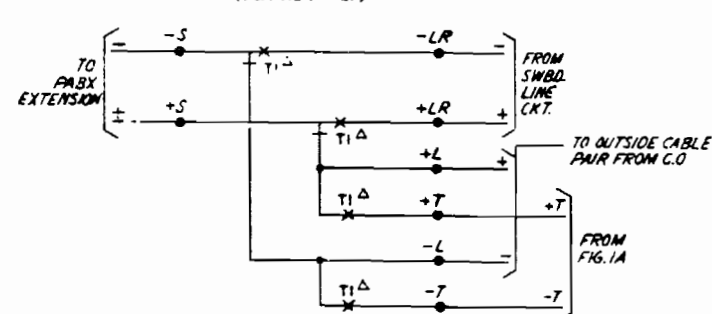
POWER FAILURE TRANSFER AND/OR
PREDETERMINED NIGHT ANSWER CKT
(FOR REF. ONLY)

FIG.NA

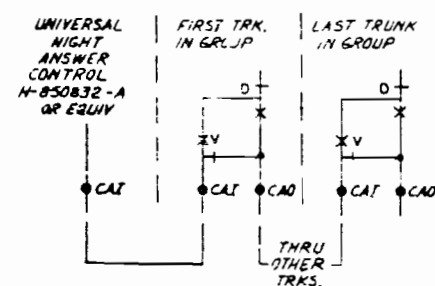
UNIVERSAL NIGHT ANSWER CHAIN
(FOR REF. ONLY)

FIG.FP

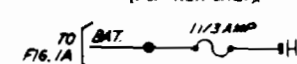
FUSE PANEL
(FOR REF. ONLY)

FIG.GB

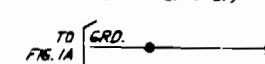
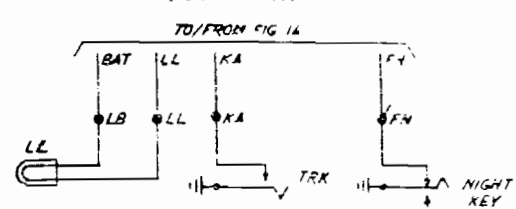
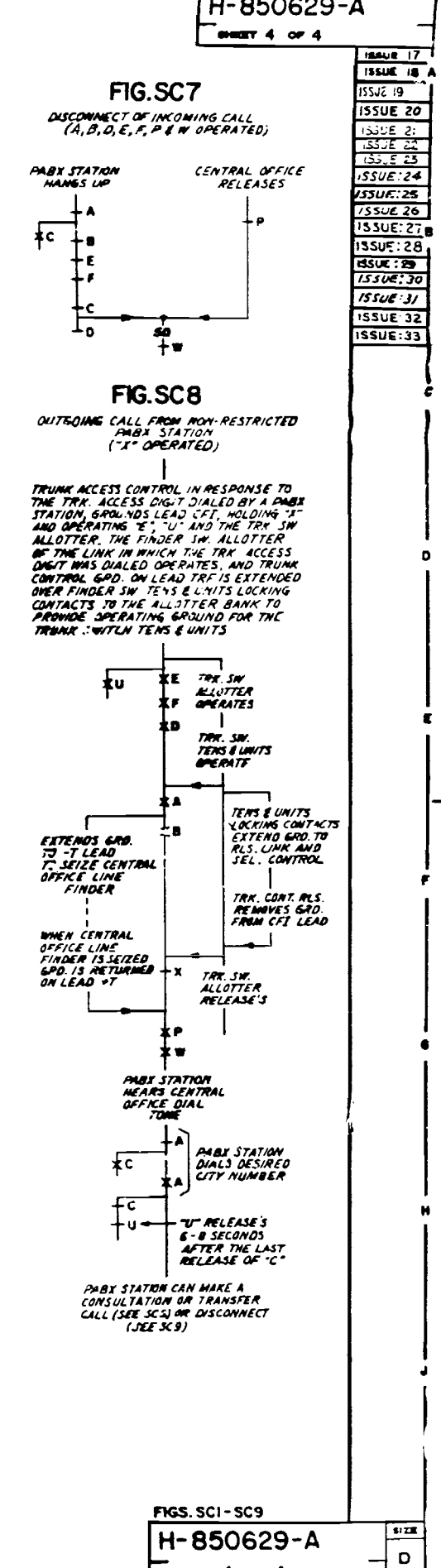
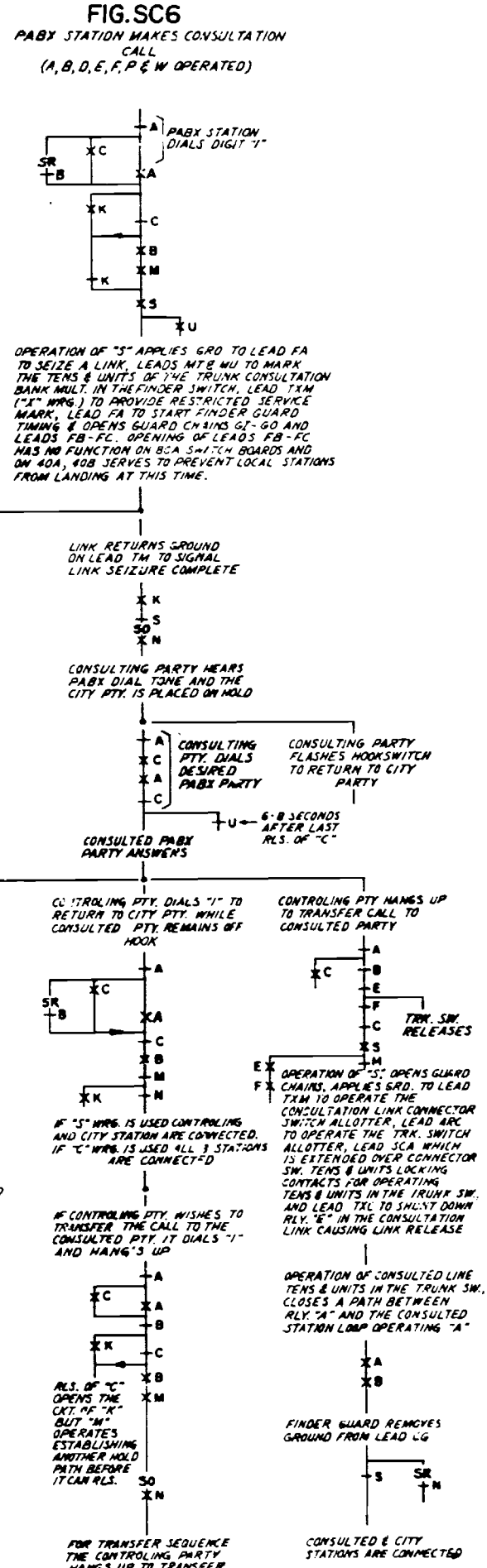
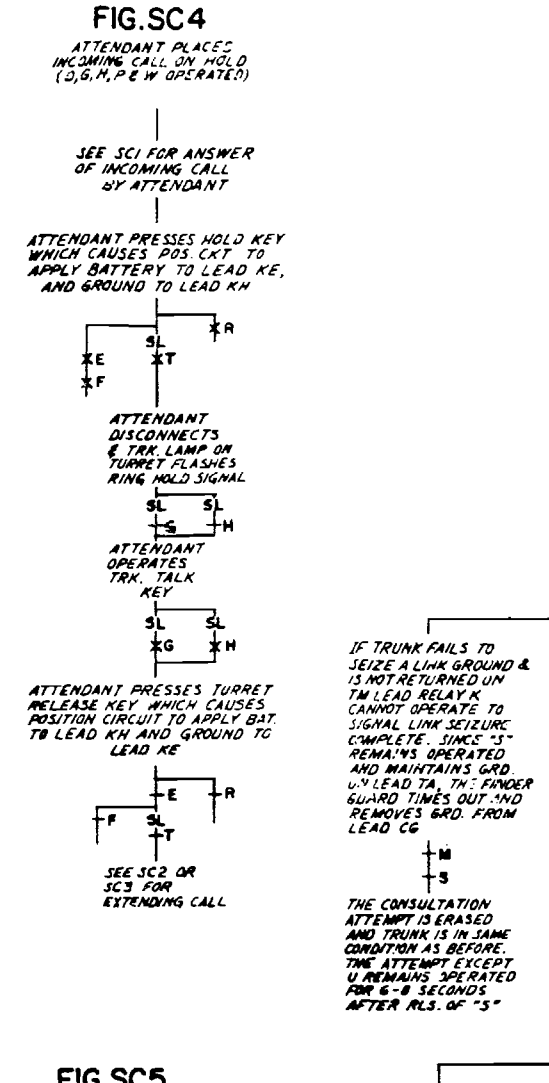
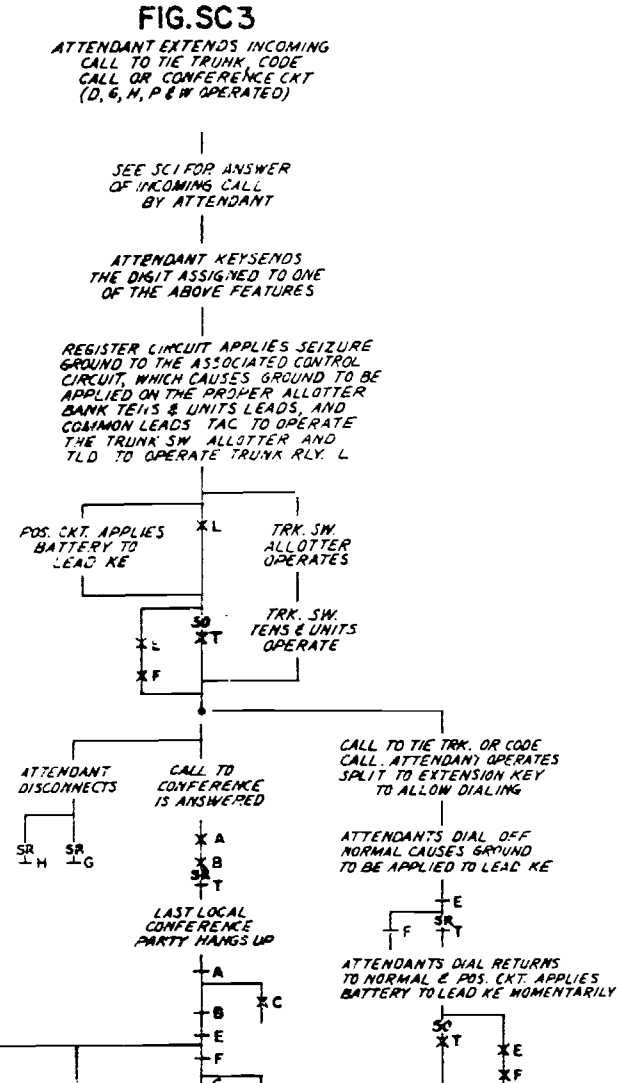
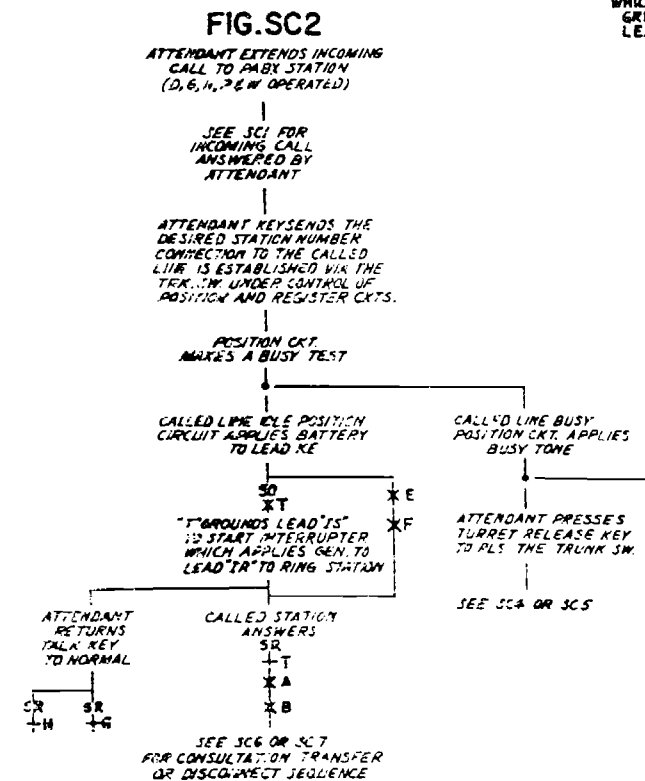
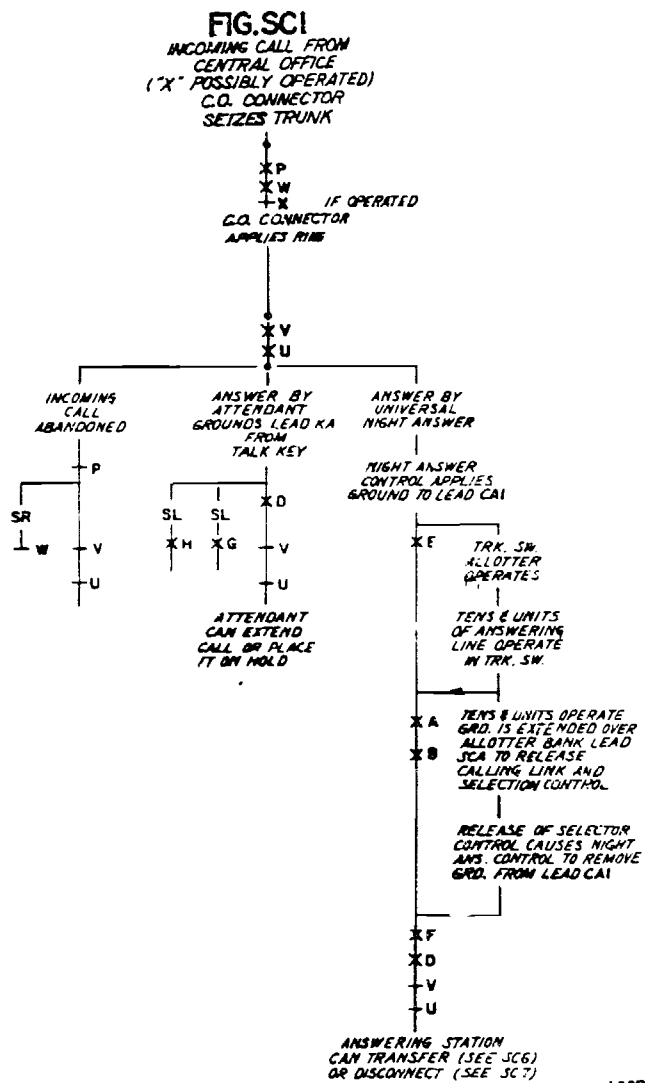
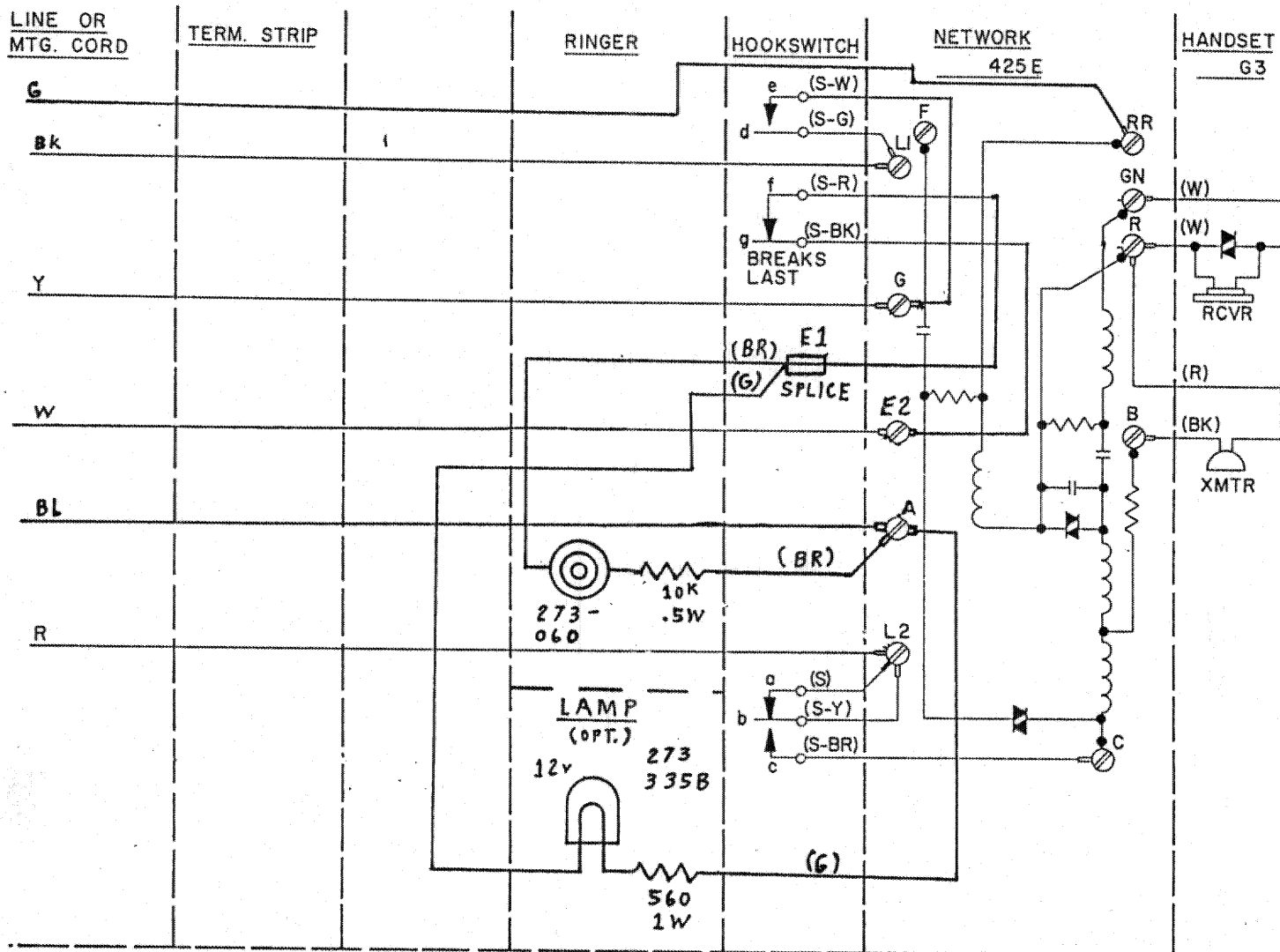
GROUND BUS
(FOR REF. ONLY)

FIG.AT

ATTENDANTS TURRET
(FOR REF. ONLY)





DRAWN BY DDH	DATE 3/87	APPROVED BY	DATE	500 MANUAL WIRING DIAGRAM	THE DETROIT EDISON COMPANY COMMUNICATION SYSTEMS DIVISION	
REVISED BY	DATE	REMARKS			DATE 3-25-87	SKETCH NO. PS-870325-1
REVISED BY	DATE	REMARKS				

TYPE 187 (CONNECTOR ENDED) TELEPHONE WITH DIAL

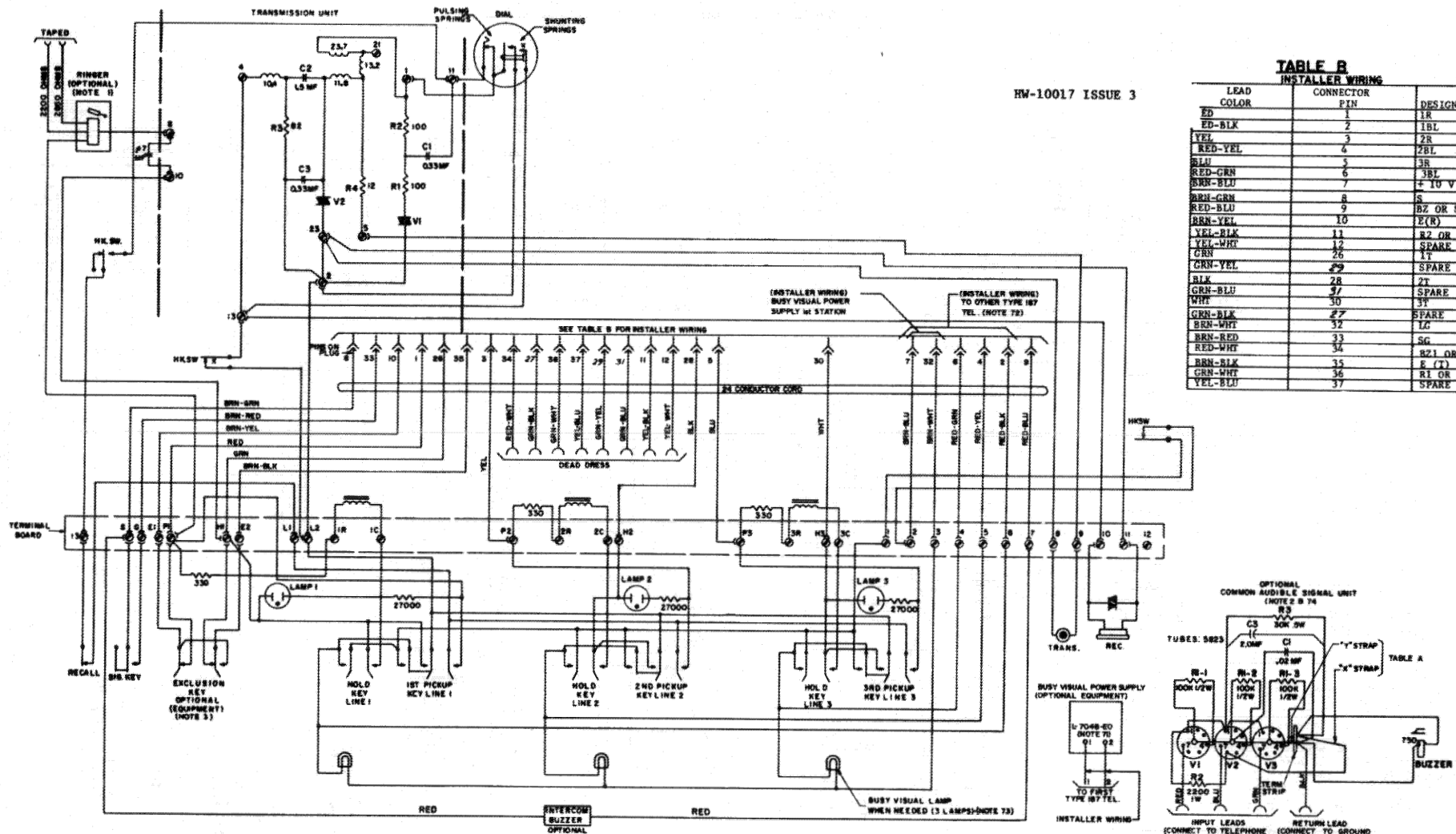
GENERAL

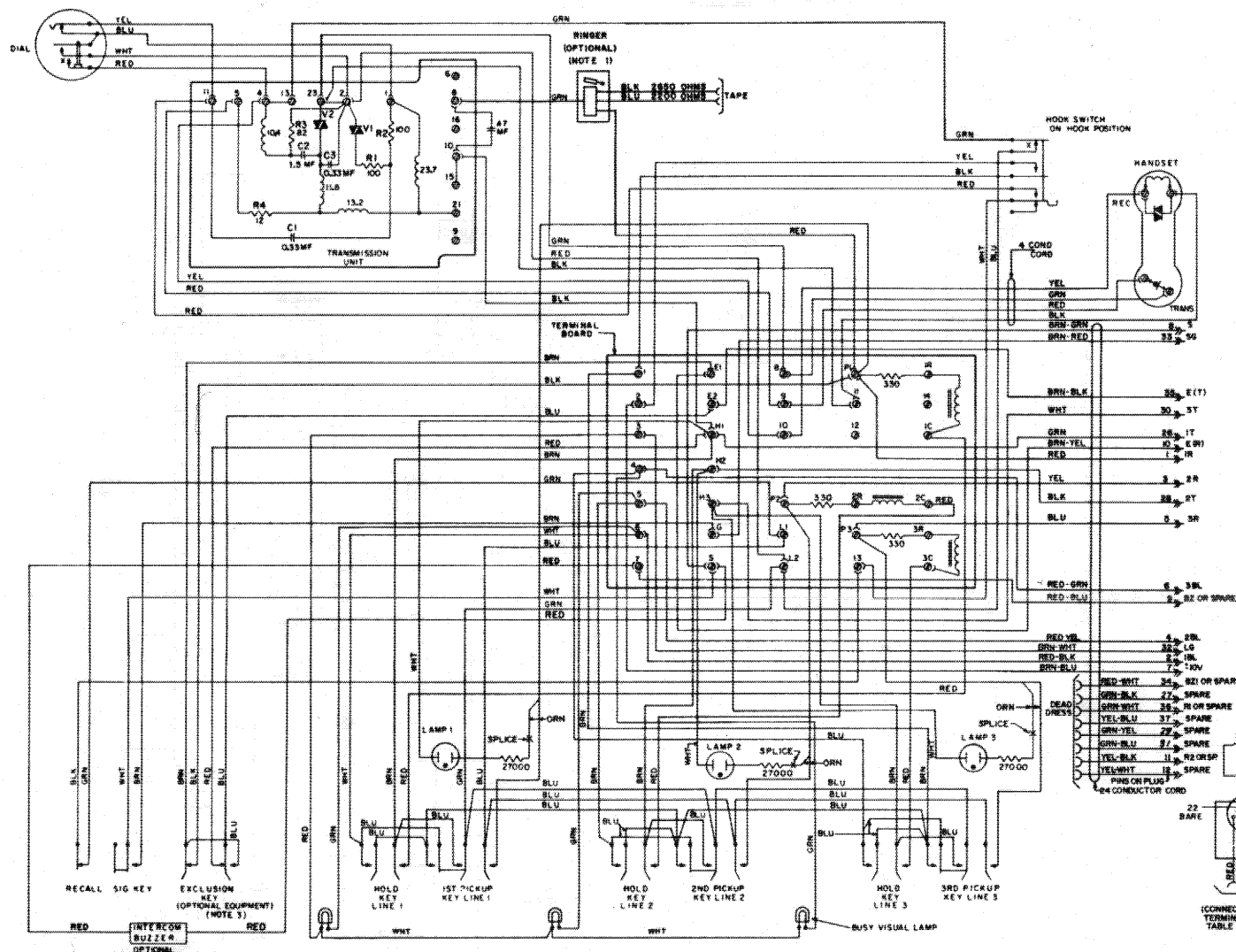
This sheet provides installation information for the Type 187 (Connector Ended) Key Telephone as supplied from the factory. Detail installation and field maintenance information is provided in the 473-513 series of the General System Practices.

HW-10017 ISSUE 3

TABLE B
INSTALLER WIRING

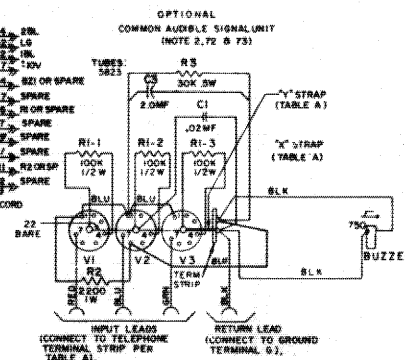
LEAD COLOR	CONNECTOR PIN	DESIGNATION
ED	1	1R
ED-BLK	2	1BL
YEL	3	2R
RED-YEL	4	2BL
BLU	5	3R
RED-GRN	6	3BL
BRN-BLU	7	+ 10 V
BRN-GRN	8	S
RED-BLU	9	BZ OR SPARE
BRN-YEL	10	E(R)
YEL-BLK	11	E2 OR SPARE
YEL-WHT	12	SPARE
GRN	25	1T
GRN-YEL	27	SPARE
BLK	28	2T
GRN-BLU	29	SPARE
WHT	30	3T
GRN-BLK	32	SPARE
BRN-WHT	33	LC
BRN-RED	34	SG
RED-WHT	35	BZ1 OR SPARE
BRN-BLK	36	E (T)
GRN-WHT	37	R1 OR SPARE
YEL-BLU		SPARE





MANUFACTURING NOTES:

- 1-RINGER OPTION:
RINGER MAY BE PLACED ACROSS ANY LINE BY CONNECTING RED RINGER LEAD AND BLACK CAPACITOR LEAD ON TERMINALS P1 & H1, P2 & H2, OR P3 & H3. BLUE (2200 OHMS) AND BLACK (2650 OHMS) RINGER COIL TAP LEADS ARE TAPED AND NOT CONNECTED.
- 2-THE COMMON AUDIBLE SIGNAL UNIT MAY BE APPLIED ONLY WHEN ALL LINES ARE SERVED BY SWITCHING EQUIPMENT WITH ONE TYPE OF RINGING SCHEME. STRAP OPTIONS AND CONNECTION TO TELEPHONE TERMINAL STRIP TO BE DETERMINED BY TABLE A AND NOTE 74.
- 3-EXCLUSION KEY MAY BE USED TO EXCLUDE EXTENSION PHONE FROM ANY ONE LINE ONLY, BY PLACING BLACK AND RED LEADS OF EXCLUSION KEY ON P1 AND H1, P2 AND H2 OR P3 AND H3. TELEPHONE IS WIRED WITH EXCLUSION KEY CONNECTED ACROSS LINE ONE.
- 4-LEADS ON CAPACITORS AND RESISTORS ARE PART OF RESPECTIVE COMPONENT (SLEEVE PIGTAIL LEAD).
- 5-"X" CONTACTS ON HOOKSWITCH BREAK LAST.



INSTALLING NOTES:

- 71-NUMBER OF STATIONS TO BE SERVED BY BUSY VISUAL POWER SUPPLY NOT TO EXCEED FIVE.
- 72-RUNNING CABLE MUST TERMINATE AT SAME CONNECTING BLOCK TERMINAL AT EACH STATION HAVING BUSY VISUAL SERVICE.
- 73-BUSY VISUAL LAMPS ARE A PART OF TELEPHONE ASSEMBLY.

HW-50010 ISSUE 3

TABLE A
INSTALLATION WIRING

GENERATOR CONNECTION	RINGING CONDUCTOR	TERMINAL BLOCK CONNECTIONS	STANDS USED	STANDS USED
BATTERY	TIP (+)	H1 H2 H3 G	X Y	Y
	RING (-)	P1 P2 P3 Q	R Y	NONE
GROUND	TIP (+)	H1 H2 H3 G	X Y	Y
	RING (-)	P1 P2 P3 Q	Y Y	NONE

RE-CONNECT X STRAP IF RINGING VOLTAGE IS TOO LOW TO SOUND BUZZER.

- 74-CUT X STRAP ON COMMON AUDIBLE SIGNAL UNIT EXCEPT WHEN GROUND CONNECTED GENERATOR IS BELOW 90V RMS.

WO-850629		SIZE		A		SHEET		1		TOTAL		3	
DR. REM		DATE: 10-1-69		NORTH LAKE, ILL., U.S.A.		AUTOMATIC ELECTRIC COMPANY		GENOA, ILL., U.S.A.		WAUKESHA, WISC., U.S.A.		O	
2ND-850629 CL. A CHANGED PER MODIFIED PRINT REM REM 10-2-70 ISSUE: 2 3ND-850629 CL. A CHANGED BY WEG. PER MODIFIED PRINT REM REM 10-2-70 ISSUE: 3													

INSTALLER'S NOTES:

76-THIS DRAWING FOR CUSTOMER'S OR INSTALLER'S USE ONLY.

77-ASSOCIATED DRAWINGS:

CIRCUIT - H-850629-A FIGURE 1A
M. OF. A- DH-850629-A40

78-FOR REQUIRED OPTION(S) AND ADDITIONAL WIRING
INFORMATION REFER TO NOTES ON ASSOCIATED CIRCUIT.

79-FOR LOCATION OF "A", "X" & "Y" WIRING SEE FIGURE A
ON LAST SHEET.

80-FOR COMPONENT DESIGNATIONS & POSITION NUMBERING REFER
TO ASSOCIATE METHOD OF ASSEMBLY.

81-JACK FIELD

"C" - DENOTES COIL

"S" - DENOTES SPRING

82-ALL LEADS TO BE GREEN WIRE EXCEPT BATTERY LEADS TO BE
BLUE & GROUND LEADS TO BE RED.

83-FOR WIRING USE D-543386 PVC WIRE, 24 AWG.

84-SLASH (/) IN RELAY SPRING SPACE DENOTES NO SPRING
AND IS NOT TO BE NUMBERED SEE FIGURE C FOR EXAMPLE
OF NUMBERING IN THIS CASE.

85-SEE FIGURE: B OR C FOR TYPICAL NUMBERING OF RELAY
SPRINGS AND WINDINGS.

WIRING OPTIONS
FOR
CITY TRUNK
40B, 80A PABX

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WO-850629

THE FOLLOWING OPTIONAL WIRES ARE NORMALLY FURNISHED IN THE EQUIPMENT. THEY MAY OR MAY NOT HAVE TO BE REMOVED DEPENDING UPON OPTION(S) REQUIRED REFER TO ASSOCIATED CKT.

CKT.	TYPE WRG.	LENGTH	POS	CONT		POS	CONT	INST. WRG.
1	P	11 IN	05	012	AT	14	002	
1	E GRD		17	005	AT	17	011	
1	E	03 IN	17	103	AT	17	008	
1	D	32 IN	01	008	AT	25	032	
1	E	34 IN	17	102	AT	23	C019	
1	BB	48 IN	20	001	AT	26	011	
1	S	11 IN	26	002	AT	26	027	
1	S	11 IN	26	003	AT	26	028	
1	BB GRD	02 IN	20	016	AT	20	015	

"B WIRING CONNECTED" TO REMOVE, CUT STRAP BETWEEN POS 26 CONT .042 & POS 26 CONT 043.

THE FOLLOWING OPTIONAL WIRES ARE NOT NORMALLY FURNISHED IN THE EQUIPMENT THEY MAY OR MAY NOT HAVE TO BE ADDED DEPENDING UPON OPTION(S) REQUIRED. REFER TO ASSOCIATED CKT.

CKT	TYPE WRG.	LENGTH	POS	CONT		POS	CONT	INST. WRG.
1	GRD	02 IN	15	013	AT	15	011	H
1		02 IN	20	018	AT	20	017	RR
1		03 IN	15	014	AT	14	002	G
1		03 IN	17	005	AT	17	102	F
1	GRD	03 IN	17	011	AT	17	103	I
1		44 IN	13	003	AT	26	027	C
1		44 IN	13	012	AT	26	028	C

PA 144 REV (4/69)

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SHEET 2 OF 3

SIZE

WO-850629

ISSUE NO. 003

A

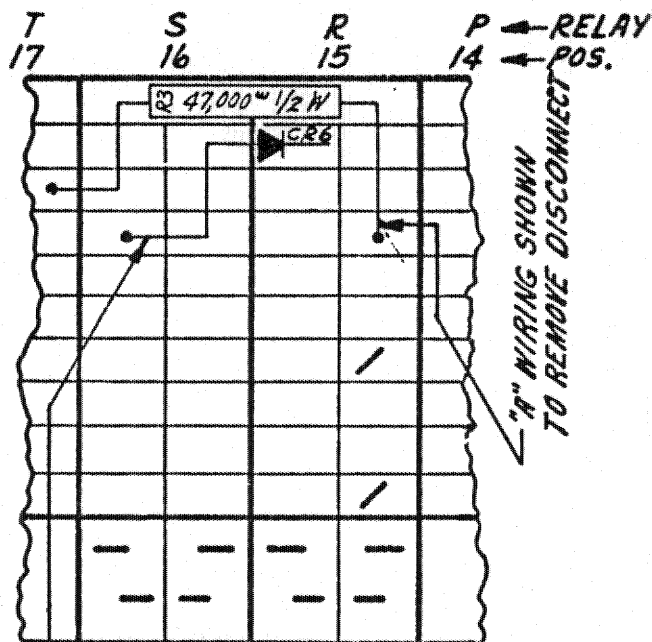
AUTOMATIC ELECTRIC COMPANY

NORTHLAKE, ILL., U S A

DATE

DRG NO.

CKT	TYPE WRG.	LENGTH	POS	CONT	POS	CONT	INST. WRG.
1		14 IN	15	104 AT	05	012	L
1		34 IN	17	008 AT	23	CO19	F
1		46 IN	14	104 AT	26	043	W
1		17 IN	08	012 AT	21	SO36	T
1		18 IN	05	017 AT	20	003	RR
1	GRD		26	016 AT	26	043	R



"X" WIRING SHOWN, FOR
"Y" WIRING MOVE TO CONTACT 009

FIG. A

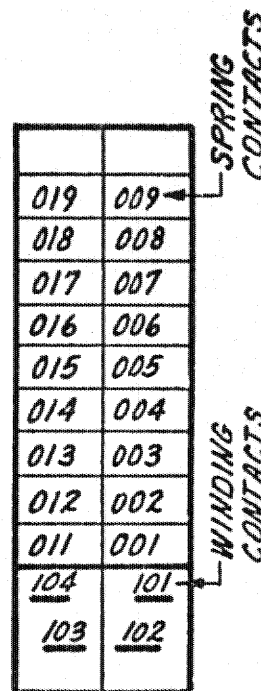


FIG. B
TYPICAL NUMBERING
OF RELAY CONTACTS

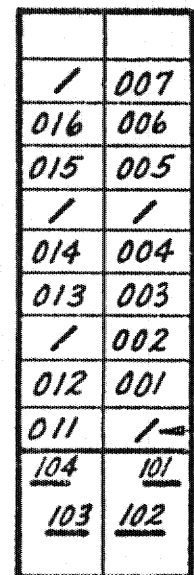


FIG. C
(NOTE: 84)

FIG. 144 REV. (4/60)

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SHEET 3 OF 3

ISSUE NO. 003

SIZE

A

WO-850629

AUTOMATIC ELECTRIC COMPANY

NORTHLAKE, ILL., U S A

DATE

DRG NO.

CC-2079

CHANGES

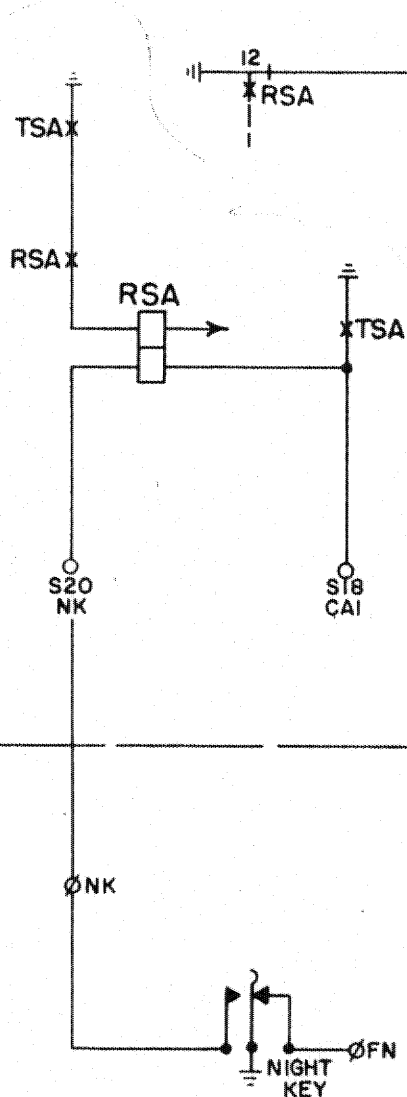
FN OF KEY WAS
TO C34.EJM
4-63(CLC)

INTERRUPTER CKT.

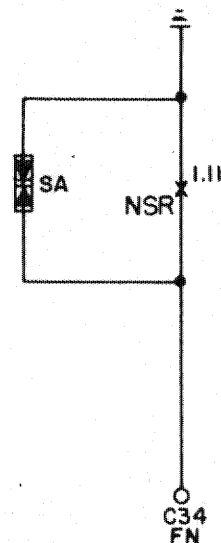
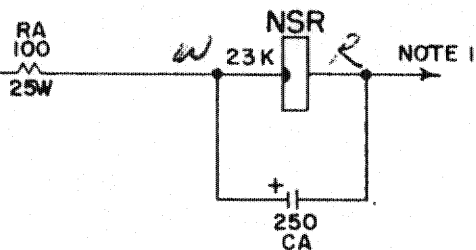
CB-5312

FIG. B

UNIVERSAL NIGHT ANSWER CONTROL



ATTENDANT'S TURRET

NIGHT SIGNAL RELEASE ADAPTER
(MOUNTED ON INTERRUPTER CB-5312)

JACK
(INTERRUPTER
RLY. BAR)
REAR VIEW
SPRING COIL
SIDE SIDE
S C
GRD 40 BAT
39
38
37
36
35
34 FM
33
32
31

SEE R-0004
RLY. ADA
NSR 270

NOTES

- 1: NORMALLY OPERATED RELAY
- 2: SEE CA-1922 FOR 40-A, SWITCHBOARDS USING C-5802 INTERRUPTERS.

TOLERANCE UNLESS SHOWN OTHERWISE

DECIMALS $\pm$ FRACTIONS $\pm$ ANGLES $\pm$

DR D.W.
CH *FB*
EN *JH*
SCALE
DATE 11-14-61
APPR *FK*
AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

NIGHT SIGNAL RELEASE ADAPTER
FOR PERIODIC RELEASE OF LOCKED SIGNALS ON
CITY TRKS OR MAGNETO LINE CKT. WHERE PERSONNEL
ARE NOT ALWAYS PRESENT TO
ANSWER INCOMING CALLS AT NIGHT
40B, 40M, 80A, 80M PABX

WD-6010

ISSUE 1. 2.

CC-2079

USED ON

ISSUE: 1

12/1/71

2) 2.7.72

1) 12.5.72

GTE AUTOMATIC ELECTRIC INC

GENOA, ILLINOIS

40B-S STOCKBOARD

DESCRIPTIONS

TABLE OF CONTENTS

Line Circuit-----	E-850940-A
Finder Guard-----	E-850280-A
Link Selection Control-----	E-850260-A
Link-----	E-850289-A
Interrupter and Access Control Circuits for Trunk Groups, Code Call and Universal Night Answer-----	E-850332-A
Power Failure Transfer, and Predetermined Night Answer and Turret Register-----	E-850627-A
Turret Position-----	E-850350-A
City Trunk-----	E-850629-A
Attendant's Trunks and Conference-----	E-850301-B
Audible Signal Unit-----	E-850359-A
Model NA-100 Filter Ventilator -----	GSP-507-508-200

THE STATE OF TEXAS,
COUNTY OF DALLAS.

Know all men by these presents, that

JOHN A. SMITH, of the County of Dallas, State of Texas, for and in consideration of the sum of \$10,000, to him in hand paid by

JOHN B. SMITH, the receipt of which is hereby acknowledged, have granted, sold and conveyed, and by these presents do grant, sell and convey unto the said

JOHN B. SMITH, his heirs and assigns forever, all that certain

lot or lots of land situated in the County of Dallas, State of Texas, to-wit:

Lot 1, Block 1, Subdivision 1, of the

Tract of Land known as the

Tract of Land known as the

Tract of Land known as the

Tract of Land known as the

Tract of Land known as the

Tract of Land known as the

Tract of Land known as the

Tract of Land known as the

E- 851053-A SHEET 1 TOTAL 3 A AUTOMATIC ELECTRIC CO. MORTONDALE, ILLINOIS U.S.A.	CIRCUIT EXPLANATION M CROSSPOINT SWITCH H-851053-A
11/72: mb Issue 1	(Written specifically for circuit issue 1, but may also apply to later issues. Refer to H print for appropriate E issue number.) <u>GENERAL</u> The crosspoint switch is a matrix switching device which provides transmission and control paths under the direction of other circuitry. FIG. 15A provides two (2) transmission and control outlets simultaneously. All other figures provide one transmission path and one control path per outlet. For simplification of this description, relay switch position 11 is chosen for switch-through, which means that relay 10 of the TEN'S relay and relay 1 of the UNIT'S relay are seized (relays 20 and 1 of FIG. 2B). For eight (8) conductor switches, relays 10A and 10B of the TEN'S relay and relay 1 of the UNIT'S relay are seized, (relays 10A and 10B and 100 of FIG. 11B). Other relay switch positions for the remaining outlets follow the same pattern of operation. <u>FEATURES</u> (a) Provides a means of selecting and holding any one group of four or eight conductors to any of fifty or one hundred outlets (b) Springs and contact bars used for transmission paths are equipped with gold plated contact surfaces (+, -). Spring contacts are phosphor bronze and bars are of stainless steel for control circuits (C, EC, AR)
WRITTEN BY P. M. Gazo <i>P. M. Gazo 11/9/72</i>	APPROVED <i>R. H. Hargis</i> ISSUE 1 DRAWING NO. E- 851053-A

E- 851053-A SHEET 2	CIRCUIT OPERATION
1.00 FIGS. 1A, 2A and 2B 1.01 <u>Seizure</u> Ground forwarded on terminal AR closes relay AR. Ground is connected to the allotter multiple bars associated with terminals (1) and (5) (terminals (2) and (12) of FIGS. 2A and 2B). Relay AR operates and closes relays 10 and 1 (relays 20 and 1 of FIG. 2A). Relays 10 and 1 operate (20 and 1 of FIG. 2A), lock to ground on terminal LK and switch leads "+", "-", C and EC through to the bank multiple bars. After the call has been switched through, ground is removed from terminal AR, opening relay AR. Relay AR restores. 1.02 <u>Release</u> Removal of ground from lead LK opens the TENS and UNITS relay (10 and 1 of FIGS. 1A and 2B and 20 and 1 of FIG. 2A in this example). The TENS and UNITS relays restore and disconnect leads "+", "-", C and EC from the multiple bars. The circuit is now at normal. 2.00 FIGS. 3A, 3B, 4A, 4B and 5A Operation is similar to that described in Section 1.01 except that the ground is connected to the allotter multiple bars associated with terminals (1) or (2) and (21) or (23) ("S" or "R" wiring). Locking ground of the UNITS relay of FIGS. 3B and 4B is through terminal LKU ("T" or "U" wiring). Switch-through leads are "+", "-", "C" and only. 3.00 FIGS. 6A and 10A Operation is similar to that described in Section 1.00 except that ground is connected to the allotter multiple bar associated with terminals (1) and (23) (assumes that the cross-connect terminal strip A10 is connected to C10). Switch-through leads of FIG. 6A are "+", "-", "C" and only. 4.00 FIGS. 7A, 7B, 8A, 8B and 9A Operation is similar to that described in Section 2.00 except that the switch-through leads are "+", "-", "C" and EC. 5.00 FIGS. 11A, 11B, 12A and 13A	
ISSUE 1	DRAWING NO. E- 851053-A

5.01 Seizure

Ground forwarded on terminal AR closes relay AR. Ground is connected to the allotter multiple bars associated with terminals (1) and (23) or (2) and (21) ("S" or "R" wiring). Relay AR operates and closes relays 10A, 10B and 1 (relays TOA, TOB and UO of FIG. 11B). Relays 10A, 10B and 1 operate (TOA, TOB and UO of FIG. 11B), lock to ground on lead LK and switch leads +1, -1, T, R, CO, EC2, EC1 and CF (T1, R1, TO, RO, H, EC1, ECO and CR of FIG. 11B) through to the bank multiple bars. After the call has been switched through, ground is removed from terminal AR. Relay AR restores.

5.02 Release

Removal of ground from lead LK opens the TENS and UNITS relays. Relays 10A, 10B and 1 (TOA, TOB and UO of FIG. 11B) restores and disconnects leads +L, -L, T, R, CO, EC2, EC1 and CF (T1, R1, TO, RO, H, EC1, ECO and CR of FIG. 11B) from the bank multiple bars. This circuit is now at normal.

6.00 FIG. 15A

Operation is similar to that described in Section 1.00 except that ground is connected to the allotter multiple bars associated with terminals (2) and (21) and switch-through leads are designated +2, -2, C2 and EC2.

ISSUE	DRAWING NO.
1	E- 851053-A

E- 850940-A SHEET 1 TOTAL 5 AUTOMATIC ELECTRIC CO. NORTH PLANE, ILLINOIS U.S.A.	CIRCUIT EXPLANATION		M
	LINE CIRCUIT TYPE 40B, 40M, 80M PABX H-850940-A		
	(Written specifically for circuit issue 1, but may also apply to later issues. Refer to H print for appropriate E issue number.)		
	GENERAL		
Formerly Genoa DC-1455 Issue 1 Rewritten 2/71: am -R- Issue 2	Each PABX line is served by a line relay (LR) which controls the seizure of a link and by a cut off relay (CO) which disconnects the line relay whenever the line is connected to a Link or Trunk. These relays are mounted in groups of 40 serving 20 lines. Any line may be restricted from calling City Trunks.		
FEATURES			
(a) Capable of handling a maximum of 40 (4 groups of 10) lines (b) Provides the option to restrict service on any line (PABX line restricted from making City Calls) (c) Provides capability for message metering service (d) Provides the option to include message waiting service for any line			
CIRCUIT OPERATION			
1.00 Outgoing Calls			
1.01 Seizure			
When the PABX calling party lifts the handset of a station instrument, a d-c bridge is closed across that line operating the corresponding line relay. For the line shown on the circuit drawing as an example, a loop is closed across leads "4" (+LC) and "-" (-LC) ("A" wiring) closing relay LRI via either circuit provided ground ("B" wiring) or ground on lead MWI ("C" wiring). Relay LRI operates and			
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and connects terminal H5 (leads U1) via diode CR1 to terminal H1 (lead TN20 or leads TN10 and TN50) causing the Finder Guard to select the first idle Link and Selection Control.

When terminals F1 and G1 are strapped ("D" wiring), the operation of the line relay (LRI) also connects ground to lead TX causing the Selection Control circuit to restrict that line from seizing a City Trunk. If terminals F1 and G1 are not strapped ("D" wiring omitted), the calling party can make a city call if desired.

1.02 Idle Link Seized (Operated: Relay LRI)

When seizure of the first idle link has been completed, that link connects ground to lead T (terminal E1) closing relay C01. Relay C01 operates and disconnects ground (either via "B" or "C" wiring) and resistance (relay LRI) battery from leads "+" and "-", respectively, opening relay LRI, clearing the line for dialing and allowing the Link to be held over the loop of the station instrument. Relay LRI restores, disconnects terminal H5 (leads U1) from terminal H1 (lead TN20 or leads TN10 and TN50), and removes direct ground from lead TX ("D" wiring used).

1.03 Call To City Trunk (Operated: Relay C01)

If the call has been from a non-restricted station to a City Party via Trunk Circuit H-850320-A or equivalent and a sustained answer is received, battery is connected to lead MR via lead TX operating the message register relay associated with the calling station to record the call on a meter at the Turret.

1.04 Release (Operated: Relay C01)

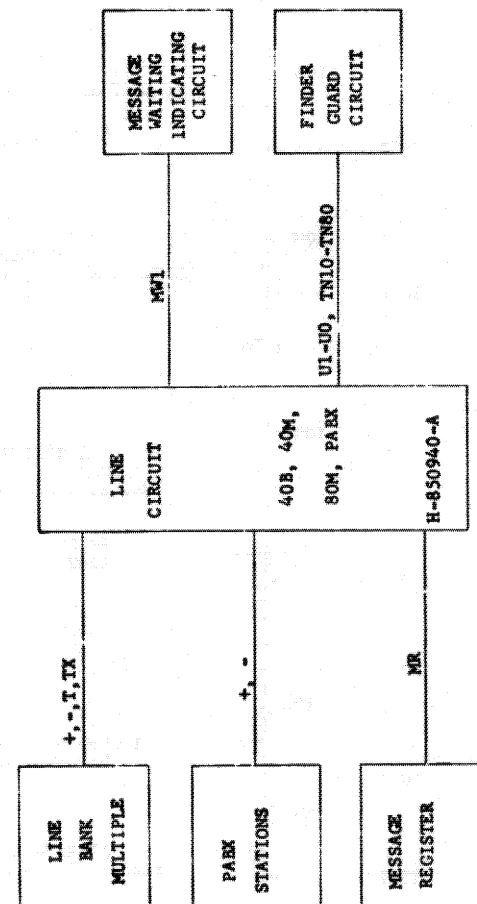
When the calling party disconnects, the loop across leads "+" (terminal B1) and "-" (terminal C1) is opened releasing the associated Link. The Link restores and removes ground from lead T opening relay C01. Relay C01 restores and connects ground (either via "B" or "C" wiring) and resistance (relay LRI) battery to leads "+" and "-", respectively. The circuit is now at normal.

2.00 Incoming Call

2.01 Seizure

When the line is called, the calling link connects ground to lead T closing relay C01. Relay C01 operates and disconnects ground (via "B" or "C" wiring) and resistance (relay LRI) battery from leads "+" and "-", respectively,

FIG 8D

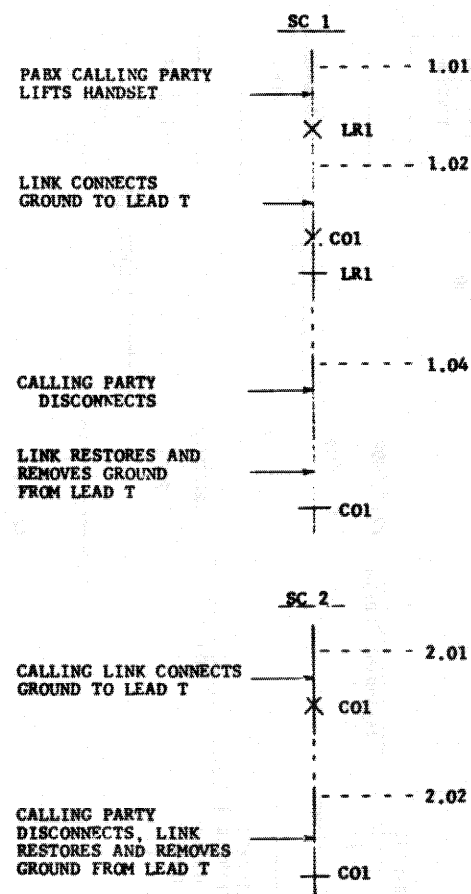


TYPICAL SYSTEM ARRANGEMENT

clearing the line for ringing and talking.

2.02 Release (Operated: Relay C01)

When the calling party disconnects, the link restores and removes ground from lead T opening relay C01. Relay C01 restores as described in Section 1.04.



EXPLANATION
OF
FINDER GUARD CKT.
LEICH 40B PABX
TYPE 900 RELAYS
E-850280-A

General

See A-1067 for an explanation of circuit symbols and abbreviations. Each PABX line is served by a line relay LR which controls seizure of a Link, and by a cut-off relay CO which disconnects LR whenever the line is connected to a Link or trunk. These relays are mounted in groups of 40, serving 20 lines. Any line may be restricted from calling City Trunks.

The Finder Guard prevents interference between lines which attempt to land at the same instant, and provides a preference circuit to maintain service under various faulty conditions. The Finder Guard also prevents reset of trunk or Link shift relays during selections, and guards against simultaneous attempts to use the Allotter bank by more than that one Link, Selection Control, register or trunk.

FEATURES

1. Identifies calling lines to the Linefinder switch of an idle Link.
2. Guards against seizure of an idle Link by more than one calling line at a time.
3. Arranged to reverse the order of preference of accepting originating calls to prevent blocking the progress of other calls should any line(s) be unable to seize an idle Link.
4. Capable of identifying a maximum of 40 (4 groups of 10) lines.
5. Guards against double selections in Connector switches by blocking other selections while the Allotter Lift of any switch is operated.
6. Guards the rotation reset of trunk groups.

OPERATION

1. Selection of Calling Line (Operated: Relays TA and TRG)

Each lead in the group TN20 - TN50 is associated with a different group of ten lines, and identifies the tens digit of the calling line. Leads U1 - U0 are wired in multiple to each group of ten lines and identify the units digit of the calling line. The line numbers begin with 21, rather than 11, in order to avoid false selections in the 11 - 10 group resulting from outside line faults or accidental jiggling of the hookswitch as the handset is lifted, since such operations often transmit a false preliminary pulse.

Lifting the handset of a station instrument closes a d-c bridge across that line, operating the corresponding line relay LR. For line 21, shown on the circuit drawing as an example, LR1 connects lead TN20 to lead U1, to start selection of that line.

When terminals RD - TXL are strapped, the operation of the line relay grounds lead TXL to cause the Selection Control circuits to restrict the line from seizing a City Trunk.

With TA normally operated, the operation of LR1 closes a circuit for T2 and U16, which operate and in turn operate TG and TH. T2 and U16 lock in series with relay 15 while opening chain circuits which might otherwise hold T2 - T5 and U27 - U50. For example, one circuit opened is that for T3 and U27, serving line 32. Thus, while more than one combination of relays T2 - T5 and U16 - U50 may operate at the same time, the pair associated with the lowest numbered line normally takes preference and the other T and U relays restore.

T2 prepares a circuit to allotter bank lead 20, while opening the path to leads 30 - 50. U16 prepares a circuit to units allotter bank lead 1 (or 6), while opening the circuits to all other units allotter bank leads. Slow to operate relay 15 operates after a brief delay, to mark the call as one of lines 1 - 5 rather than 6 - 0, opens the circuit for relay 60, and closes a circuit for TU. If the Selection Controls and register are free and no attempt is being made to transfer or consult on a City Trunk, TU operates; locks; holds TG, TH to prevent restoring these relays when T2 and U16 release; shunts TA (see Section 4); removes battery from lead GS; applies ground to the selected tens and units allotter bank leads; removes ground from lead RS; and applies direct ground to lead FA, to seize the first idle Selection Control and Link.

Other lines land in a similar manner. For example; line 26 in landing operates 60 instead of 15, thus marking allotter bank leads 20 and 6.

2. Release of Finder Guard (Operated: Relays TA, TRG, LR, TG, TH, T2, U16, 15 or 60, and TU)

The Link places ground on lead TL of the calling line, operating CO1, which releases LR1. This clears the line for dialing; opens ground on lead RD; and disconnects lead TN20 from lead U1, causing T2 and U16 to restore, and opening the circuit to 15. This removes ground from Allotter Bank leads 20 and 1 and from lead FA, and opens one circuit of TG, TH. TG and TH hold under control of TU, so that calls which may be waiting to land cannot operate T2 - T5 and U16 - U50 prematurely. Slow relay 15 releases after a brief delay, thus restoring TG, TH to return the Finder Guard to normal in preparation for another call.

3. All Links or Both Selection Controls Busy

When all Links or both Selection Controls are busy, or when any City Trunk is using the Allotter Bank during initiation of a consultation call or transfer of a call, the operating path of TU is opened between leads FB and FC to prevent the Finder Guard from attempting to use the Allotter Bank at that time. Calls attempting to land during this time are deferred for a moment, since TU cannot operate until the Allotter Bank has been cleared and until a Link and Selection Control are available.

4. Preference Circuit

When TB is normal, the order of preference in accepting calls begins with the lowest numbered line, as described in Section 1. For example, if simultaneous calls should be made from lines 21, 33 and 55, they would seize Links in that order. TB also controls the preference of Link seizure within the tens group, such as from lines 21 and 26. With TB normal, a shunt (TA) is maintained on the winding of 60, thus making this relay more slow-to-operate than 15, which allows a call from line 21 to land before one from 26.

If a line is unable to complete its seizure of a Link within the normal interval due to a fault in the Link, Finder Switch, or cut-off relay circuit, the shunt which TU places on the winding of TA (Section 1) causes TA to release after a short delay. This removes the marking grounds from the Allotter Bank leads; removes ground from lead FA, to release the Link; opens the circuits of TA - T5 and U16 - U50; and changes the state of TB from normal to operated or vice versa. Assuming TB normal, the release of TA operates TB. After TU has released, following 15 (or 60), TA re-operates and removes the shunt from TC.w, so that TC operates and holds in series with TB.w. The next release of TA, on a failure to seize a Link, energizes the opposing winding of TB, restoring TB and holding TC. The subsequent release of TU then allows TA to re-operate again, restoring TC.

For example, if line 33 is unable to reach a Link and the calling party does not restore his handset within a reasonable interval, TA releases as explained above and by operating TB reverses the order of preference so that higher numbered lines may land first. Since TB transfers the shunting ground to 15.w, lines 50-34 are then able to land without difficulty, while line 21 is the last choice line to seize a Link. So long as a loop remains closed on line 33, the Finder Guard permits that line repeated attempts to seize a Link, releasing TA on each unsuccessful attempt and thereby alternating the condition of TB and the order of preference in extending calls. This gives lines 21-32 an opportunity to land after every other attempt by line 33, and thus keeps all lines in service. When the subscriber loop is opened on line 33, TB remains in the condition it holds at that time, leaving the order of preference unchanged until such time as another attempt to land is unsuccessful.

T

TA, while operated, also applies ground over lead CG to the City Trunks, in order to operate a trunk relay which provides a loop to hold the Link on a consultation call. During attempts to make such a call, City Trunks ground lead TA, shunting TA in the same manner as does TU when a line is landing. Normally, this shunting ground on TA is not maintained long enough to cause TA to restore, but if the Link cannot be seized (as, for example, when a connection is not completed between leads T of the trunk and of the Link) ground is kept on lead TA so long that TA releases. This removes ground from lead CG to restore the trunk relay which holds the loop. The attempt to land in that Link is thus abandoned, and since the Finder Guard is released, other selections may take place. Although a preference shift occurs at this time, it has no effect on the trunk.

TA thus avoids blocking the equipment if a fault on any line circuit should keep the line from reaching a Link, or if an attempted consultation call should fail to pick up a Link.

A slide switch SW is provided on the relay bar foot to allow service personnel to disable the preference shift feature during routine testing, in order to detect lines which are not landing properly. This switch should remain closed at all other times to insure the continuity of service to working lines.

5. Trunk Reset Guard

To insure that no trunk may reset its shift relay during the time that a selection is being made by the Selection Controls or register, or during the time that a City Trunk is using the Allotter Bank for a consultation or transfer call, the ground required to operate these shift relays is supplied over lead TRG by the Finder Guard. High resistance relay TRG is normally operated whenever battery appears on lead GS. When a selection is being made by any of the circuits mentioned above, the circuit making the selection places low resistance ground from its guard relay on lead GS to shunt TRG, and then removes battery from lead GO, so that TRG releases and removes ground from lead TRG. When the selection is completed, the GI - GO chain again applies battery to lead GS, reoperating TRG, which again places ground on lead TRG and allows trunks to reset.

This feature prevents a call from dropping out of one trunk and seizing another, or appearing on two trunks, if another trunk which is ahead of the trunk being selected in the seizure chain should become idle during the time the trunk selection is being made.

6. Allotter Guard

To prevent a selection from taking place before a preceding selection has completely cleared the Allotter Bank, AG operates over lead 20 and/or lead 50 to battery from the allotter coil or coils each time any allotter lift engages the Allotter Bank. The high resistance circuit of AG prevents false energization of the allotter coil or coils in its series

CIRCUIT OPERATION

1.00 Seizure (Operated: Relays LX1-LX3, GD and CX)

Ground on lead F1 is extended to leads AF and C1 causing resistance battery to be connected to lead CS and extending ground to lead L(). Resistance battery on lead CS closes CA. Relay CA operates, opens #1CX, closes #2CB, connects ground to lead HR (if used, see note 77, H-850260-A), and lights lamp BL. Relay CB operates, opens GD, and connects either lead P or lead PC (see note 77, H-850260-A) to #1CB, #1-2 and #1-1 in multiple, and connects lead DT to lead DTC or lead CMA (see note 77, H-850260-A). Relay GD remains operated due to the discharge current of its associated capacitor C4. When a Link has been seized, ground is removed from lead F1, opening #2CX, LX() and removes ground from leads AF and C1. Relay CX restores, transfers lead F1 from #2CX, LX() and lead AF to lead F0, removes ground from lead MG, disconnects lead CXM from lead FB, and connects lead CXR to lead RS. Relay LX1 restores (assuming the first idle Link is seized), transfers lead AF from #2LX1 to the next higher numbered #2LX2, disconnects lead C1 from #2CX and lead AF, connects lead LX3 and leads RS and CXR via #1LX3 in series with diode CR4, removes resistance (#1LX1) ground from lead LX1, and connects lead C2 to lead AF via diode CR11 and to #2CX.

Approximately 15 seconds are allowed for the calling party to dial the tens digit. When pulsing is not completed within this time, GD restores and grounds lead F causing battery to be removed from lead CS. Battery removed from lead CS opens CA. Relay CA restores, removes ground from lead HF (if used, see note 77, H-850260-A), opens #2CB and RD (if operated- see Section 4.00 on restricted service), connects lead CRS to resistance (#1CX) battery via diode CR5, and extinguishes lamp BL. Relay CB restores, closes GD, charges capacitor C4, disconnects either lead P or lead PC (see note 77, H-850260-A) from #1CB, #1-2 and #1-1, and disconnects lead DT from either lead DTC or lead CMA. Relay GD operates and removes ground from lead F. The circuit is now at normal.

2.00 Call to Local Station2.01 Dialing Tens Digit (Operated: Relays CA, CB, GD, and possibly RD)

On the first pulse, ground via either lead P or lead PC (see note 77, H-850260-A) closes #1CB and #1-1. Relay 1 operates, opens #2CB, removes ground from lead HR (if

used, see note 77, H-850260-A), and short-circuits #1-2. At the end of pulse, ground removed from either lead P or lead PC (see note 77, H-850260-A), closes #1-1 in series with #1-2, and opens #1CB. Relay 2 operates, disconnects lead DT from lead DTC, or lead CMA (if used), and transfers either lead P or lead PC (see Note 77, H-850260-A) from #1-1 and #1-2 to #2-1, #2-2 and #1-3 in multiple. Relay CB remains operated due to its associated diode CR7.

On the second pulse, ground via either lead P or lead PC (see note 77, H-850260-A) closes #1CB, #2-2, #1-3, and #2-1 in opposition to its #1 winding. Relay 1 restores, closes #2CB, connects ground to lead HR (if used, see note 77, H-850260-A), opens #2-1, #1-2 and #1-1, and short-circuits #1-4. Relay 3 operates, locks via its #2 winding, removes ground from lead HR (if used, see note 77, H-850260-A), and opens #2CB. At the end of the pulse, ground removed from either lead P or lead PC (see note 77, H-850260-A), opens #1CB, #1-3 and #2-2. Relay 2 restores, removes the short-circuit from #1-4, and transfers either lead P or lead PC (see note 77, H-850260-A) from #2-2, and #1-3 to #1-1 and #1-2. Relay CB remains operated due to its associated diode CR7.

On the third pulse, ground via either lead P or lead PC (see note 77, H-850260-A), closes #1CB and #1-1. Relay 1 re-operates as described previously. Ground removed from either lead P or lead PC (see note 77, H-850260-A), closes #1-2 in series with #1-1, and opens #1CB. Relay 2 operates, closes #2-3 in series with #1-4, transfers either lead P or lead PC (see note 77, H-850260-A) from #1-1 and #1-2 to #2-1 and #2-2 in multiple. Relay 4 operates, locks via #2-4 and disconnects #1-3 from either lead P or lead PC (see note 77, H-850260-A).

On the fourth pulse, ground via either lead P or lead PC (see note 77, H-850260-A), closes #1CB, #2-2 and #2-1 in opposition to #1-1. Relay 1 restores, opens #2-1, #1-2 and #1-1, and short-circuits #1-4. At the end of the pulse, ground removed from either lead P or lead PC (see note 77, H-850260-A) opens #1CB and #2-2. Relay 2 restores and transfers either lead P or lead PC (see note 77, H-850260-A) from #2-2 to #1-2 and #1-1 in multiple.

On the fifth pulse, ground via either lead P or lead PC (see note 77, H-850260-A), closes #1CB and #1-1. Relay 1 operates, opens #2-3, removes the short-circuit from #1-4, and short-circuits #1-2. Relay 3 restores and connects lead DT to lead DTC or lead CMA, (if used). At the end of the pulse, ground removed from either lead P or lead PC (see note 77,

H-850260-A), closes #1-2 in series with #1-1 and opens #1CB. Relay 2 operates, disconnects lead DT from lead DTC or lead CMA, (if used), and transfers either lead P or lead PC (see note 77, H-850260-A) from #1-2 and #1-1 to #1-5, #2-1 and #2-2 in multiple.

On the sixth pulse, ground via either lead P or lead PC (see note 77, H-850260-A), closes #1CB, #1-5, #2-2 and #2-1 in opposition to #1-1. Relay 1 restores, closes #2CB connects ground to lead HR (if used, see note 77, H-850260-A), opens #1-2 and #1-1, short-circuits #1-4 and opens #2-1. Relay 5 operates, locks via #2-5, opens #2CB, removes ground from lead HR (if used, see note 77, H-850260-A), and transfers #2-4 from ground to either lead P or lead PC (see note 77, H-850260-A). At the end of the pulse, ground removed from either lead P or lead PC (see note 77, H-850260-A), opens #1CB, #2-2, #2-4 and #1-5. Relay 2 restores, removes the short-circuit from #1-4, and transfers either lead P or lead PC (see note 77, H-850260-A) from #1-5, #2-4 and #2-2 to #1-1 and #1-2. Relay 4 restores. Relay CB remains operated during pulsing due to its associated diode CR7.

The remaining pulses, 7th-10th, repeat the cycle of pulses 1 through 4 as previously described except 5 is operated and locked.

2.02 Completion of Tens Selection (Operated: Relays CA, CB, GD, 1-5 and possibly RD)

When pulsing of tens digit stops, CB restores, after its slow-to-release interval due to its associated diode CR7, closes GD, CG and CH, charges capacitor C4, disconnects either lead P or lead PC (see note 77, H-850260-A) from #1CB and counting relays (1-5) and disconnects lead DT from lead DTC or lead CMA, (if used). Relay CG operates, locks via lead G1, transfers lead G1 from lead GO, CG and CH, connects lead TAC to lead AC via diode CR12, connects lead AF to lead TAF, connects lead TRF to lead RF, and connects lead ATB to lead F. Relay CH operates, locks via lead G1 (thru contact of CG), grounds lead 20-50, corresponding to digit dialed, transfers CD from resistance (R3) battery to resistance ground, starting 1 second time out (GD holds for 1 second on a discharge current of capacitor C4), connects leads AF and TAF to lead DT via diode CR9 (provided RD is operated), disconnects lead FB from lead CXL, and connects resistance battery and GS to lead SCA.

Ground via lead SCA closes GS. Relay GS operates, closes CT, opens counting relays (1-5), connects lead TLD to resistance (R6) ground and lead LD, removes ground from marked lead 20-50, grounds lead SSR (C16) via diode CR1

("A" wiring) or grounds lead SSR (S23) via diode CR1 ("G" wiring), transfers GS from lead SCA to ground, charges capacitor C4, and connects resistance (R3) battery to GD, ending 1 second time out. Relay CT operates and short-circuits CUA and CUB. Relays 1-5 restore, close #2CB, connects ground to lead HR (if used, see note 77, H-850260-A) and open CG and CH. Relay CB operates, opens GS, and connects either lead P or lead PC (see note 77, H-850260-A) to #1-1 and #1-2. Relay CG restores, disconnects lead ATB from lead F, disconnects lead TRF from lead RF, disconnects lead AF from lead TAF, transfers lead G1 from CG and CH to lead GO, and disconnects lead TAC from lead AC. Relay CH restores, disconnects resistance ground from GD and capacitor C4, connects lead FB to lead CXL, removes resistance battery from lead SCA, and disconnects lead TAF from lead DT via CR9 (if relay RD is operated). Relay GS restores, removes the short circuit from CUA and CUB, closing CUA and CUB in series with CT, disconnects lead TLD from resistance (R6) ground and lead LD, removes ground from lead SSR (C16) ("A" wiring) or from lead SSR (S23) ("G" wiring), connects GS to resistance battery, and opens GD. Relays CUA and CUB operate and lock. Relay CUA transfers the circuit from the Allotter leads 20-50 to leads 2-5. Relay GD remains operated due to the discharge current of its associated capacitor C4.

2.03 Dialing Units Digit (Operated: Relays GD, CA, CB, CT, CUA, CUB and possibly RD)

When the units digit is dialed, ground via either lead P or lead PC (see note 77, H-850260-A) closes 1-5 (corresponding to the digit dialed) and #1CB. Relays 1-5 operate. The following operation is similar to that described in Section 2.01 except CT, CUA and CUB are operated.

When the pulsing stops, #1 and #2CB are open. After its slow-to-release interval due to its associated diode CR7, CB restores, closes GD, CG and CH, charges capacitor C4, and disconnects either lead P or lead PC (see note 77, H-850260-A) from #1CB and counting relays (1-5). Relay CG operates, locks via lead G1, transfers lead G1 from lead GO to CG and CH, grounds lead AC, connects lead AF to lead TAF, connects lead TRF to lead RF, and connects lead ATB to lead F. Relay CH operates, locks via lead G1 (thru contact of CG), grounds lead 1-0 corresponding to digit dialed, transfers GD from resistance (R3) battery to resistance ground, starting 1 second time out, connects leads AF and TAF to lead DT via diode CR9 (if RD is operated), connects resistance battery and GS to lead SCA, and disconnects lead FB from lead CXL.

Ground via lead SCA closes GS. Relay GS operates, closes GD ending 1 second time out, opens counting relays (1-5), charges capacitor C4, connects lead TLD to lead LD and resistance (R6) ground, removes ground from marked leads 1-0, transfers GS from lead SCA to ground, and grounds leads F, ATB and SSR (via diode CR1). Relays 1-5 restore, close #2CB, connects ground to lead HR (if used, see note 77, H-850260-A), and open CG and CH. Relay CB operates and connects either lead P or lead PC (see note 77, H-850260-A), to #1-1, #1-2 and #1CB. Relay CG restores, disconnects lead ATB from lead F removing ground from lead ATB, disconnects lead TRF from lead RF, disconnects lead AF from leads TAF and DT (via diode CR9) (if relay RD is operated), transfers lead G1 from CG and CH to lead GO, disconnects lead TAC from lead AC. Relay CH restores, disconnects resistance ground ground from GD and capacitor C4 in multiple, connects lead CXL to lead FB, disconnects resistance battery from lead SCA, and disconnects lead TAF from lead DT (if RD operates).

2.04 Release of Selection Control (Operated: Relays GD, GS, CA, CB, CUA, CUB, CT and possibly RD)

The Link checks the called line for busy or idle. In either case, battery is removed from lead CS and the Selection Control disengages from the Link. Removal of battery from lead CS opens CA. Relay CA restores, removes ground from lead HR (if used, see note 77, H-850260-A), removes ground from either lead DTC or lead CMA (see NOTE 77, H-850260-A) (if relay RD is operated), opens #2CB, GS, CT, CUA, CUB and RD (if operated), and extinguishes lamp BL. Relay GS restores, opens GD (GD remains operated due to the discharge current of its associated capacitor C4), disconnects lead TLD from lead LD and resistance (R6) ground in multiple, connects GS to resistance (#2CUA and #2CUB in series) battery, and removes ground from leads F and SSR ("A" wiring) or lead SSR ("G" wiring). Relay CT restores, disconnects #1CT from #1CUA and #1CUB in multiple, connects lead DT to lead DTC (or to lead CMA, if used,) and to relay RD and resistance (#2RD) battery in multiple via diode CR6 and short-circuits #2CUA. Relays CUA and CUB restore and disconnect lead F from lead SSR. After its slow-to-release interval due its associated diode CR7, CB restores, closes GD, charges capacitor C4, disconnects either lead P or lead PC (see note 77, H-850260-A) from #1-1, #1-2, and #1CB. After its slow-to-release interval, RD (if operated) restores, and closes #1CX to prepare the Link Selection Control for its next call. The circuit is now at normal.

3.00 Call to Trunk Groups or Special Service (Operated: Relays CA, CB, GD and possibly LX2, LX3 and RD)

When the digit (for example, the digit 9) assigned to Trunk Group or Special Service Trunk access is dialed, ground via either lead P or lead PC (see note 77, H-850260-A) closes #1CB and counting relays (1-5) associated with digit dialed. Relays 1-5 operate and open #2CB, removing ground from lead HR (if used). When pulsing stops, ground removed from either lead P or lead PC (see note 77, H-850260-A) opens #1CB. After its slow-to-release interval due to its associated diode CR7, CB restores, closes GD, CG and CH, charges capacitor C4, and disconnects either lead P or lead PC (see note 77, H-850260-A) from #1CB and counting relays (1-5). Relay CG operates, locks via lead G1 transfers lead G1 from lead GO to CG and CH, connects lead TAC to lead AC, connects lead AF to lead TAF, connects lead TRF to lead RF, and connects lead ATB to lead F. Relay CH operates, locks via G1, transfers GD from resistance (R) battery to resistance ground, starting 1 second time out, grounds lead 9T (if digit 9 has been dialed) causing the Trunk Control circuit to select a trunk if one is idle, disconnects lead FB from lead CXL, and connects resistance battery and GS to lead SCA and connects leads AF and TAF to lead DTC (if relay RD is operated).

Upon completion of the selection and after an idle trunk has been seized (non restricted service), ground via lead SCA closes GS. Relay GS operates, closes CT, opens counting relays (1-5), connects lead TLD to lead LD and resistance (R6) ground, causing battery to be removed from lead CS, and opening CA, removes ground from lead 9T, grounds lead SSR (C16) via diode CR1 ("A" wiring) or grounds lead SSR (S23) via diode CR1 ("G" wiring), transfers GS from lead SCA to ground, charges capacitor C4, and connects resistance (R3) battery to GD, closing GD and ending 1 second time out. Relay CT operates, removes the short-circuit from #2CUA, and short-circuits CUA and CUB. Relays 1-5 restore, close #2CB, connects ground to lead HR (if used, see note 77, H-850260-A), and open CG and CH. Relay CB operates, and connects lead P (or lead PC) to #1-1, #1-2 and #1CB. Relays CG and CH restore. Relay CA restores and releases the Selection Control as explained in Section 2.04.

When the circuit is strapped for restricted service on digit "9" or any other unassigned digit as required, ground on lead ATB is extended to Link via lead F causing Link to remove battery from lead CS. Battery removed from lead CS opens CA. Relay CA restores, opens CG, CH, RD and counting relays (1-5), extinguishes lamp BL, removes ground from lead DTC (or lead CMA if used) and removes resistance battery and GS from lead SCA. Relay CG restores, disconnects lead ATB from lead F, disconnects lead TRF from lead RF, disconnects lead AF from leads TAF and DT, and transfers lead G1 from CG and CH to lead GO. Relay CH restores, disconnects resistance ground from GD and capacitor C4, connects lead FB to lead CXL, disconnects lead DT from lead TAF via diode CR9, and removes ground from lead 9T (if digit "9" has been dialed). Relays 1-5 restore. After its slow-to-release interval, RD restores and connects lead CRS to #1CX. The next application of ground over lead CRS will reoperate CX. The circuit is now at normal.

4.00 Restricted Service (Operated: Relays GD, CX and LX1-LX3)

When the originating call is from a restricted station, ground via lead DT closes RD, and connects ground to lead DTC (or lead CMA, if used). Relay RD operates, opens #1CX and prepares to restrict service to a trunk group associated with the digit "9" (or any other unassigned digit as desired) (see Section 3.00). When the preceding circuit (line circuit) removes ground from lead DT, RD is opened. Relay RD remains operated due to its slow-to-release characteristics until the subsequent operation of CA (see Section 1.00) recloses RD. Battery removed from lead CS opens CA as described in Section 3.00. Relay CA restores and opens RD. After its slow-to-release interval, RD restores and connects lead CRS to #1CX. On the next selection ground via lead CRS will reoperate CX to prepare this circuit for a subsequent call.

5.00 Digit Absorption (Operated: Relays GD, CA, CB and possibly RD)

When tens digit "1" is dialed, ground via either lead P or lead PC (see note 77, H-850260-A) closes #1CB and #1-1. Relay 1 operates, opens #2CB, removes ground from lead HR (if used, see note 77, H-850260-A), and short-circuits #1-2. At the end of pulse, ground removed from either lead P or lead PC (see note 77, H-850260-A), closes #1-1 in series with #1-2, and opens #1CB. Relay 2 operates, disconnects lead DT from lead DTC, and transfers either lead P or lead PC (see note 77, H-850260-A) from #1-1 and #1-2 to #2-1, #2-2 and #1-3. After its slow-to-release interval, due to its associated diode CR7, CB restores, closes GD, CH and CG, charges capacitor C7

and disconnects either lead P or lead PC (see note 77, H-850260-A) from #1CB and counting relays (1-5). Relay CH operates, closes DA, transfers GD from resistance (R3) battery to resistance ground (opening GD), connects resistance battery and GS to lead SCA, connects lead TAF to lead DT (if relay RD is operated), and disconnects lead FB from lead CXL. Relay CG operates, locks via lead G1, transfers lead G1 from lead GO to CG and CH, connects lead AF to leads TAF and DT (if RD is operated), connects lead TRF to lead RF, connects lead TAC to lead AC via diode CR12, and connects lead ATB to lead F. Relay DA operates, closes GS, and prevents the operation of CT, keeping the call from proceeding to a units selection. Relay GS operates, locks, opens DA and counting relays (1-2), closes GD, charges capacitor C4, connects lead TLD to lead LD and resistance (R6) ground, and grounds lead SSR (C16) via diode CR1 ("A" wiring) or grounds lead SSR (S23) via CR1 ("G" wiring). Relays 1-5 restore, close #2CB, connects ground to lead HR (if used, see note 77, H-850260-A), and open CH and CG. Relay DA restores. Relay CB operates, opens GS and connects either lead P or lead PC (see note 77, H-850260-A), to #1-1, #1-2, and #1CB. Relay CH restores, disconnects resistance ground from GD and capacitor C4, connects lead FB to lead CXL, disconnects leads AF and TAF from lead DT (if relay RD is operated), disconnects resistance battery from lead SCA. Relay CG restores, disconnects lead ATB from lead F, disconnects lead TRF from lead RF, disconnects lead AF from lead TAF, transfers lead G1 from CG and CH to lead GO and disconnects lead TAC from lead AC. Relay GS restores. The next dialed digit will be treated as a tens digit.

E- 850289-A SHEET 1 TOTAL 5 A AUTOMATIC ELECTRIC CO. NORTH LAKE, ILLINOIS U.S.A.	CIRCUIT EXPLANATION LINK CIRCUIT TYPE 40, 80 PAX 100D PAX TYPE 900 RLYS H-850289-A	M
Changed Title & Sections 1,2,3,5.1 5.2, & 6 2/68:sm O'Connell DFO 6/5/77 ISSUE 2 Changed Section 2 5/70:jk D. BARNES 5/6/77 ISSUE 3 Changed Sections 1.30,2.00, 5.01 and 5.00 5/70:jk BRIGNULL 5/6/77 ISSUE 4	(Written specifically for circuit issue 7, but may also apply to later issues. Refer to H print for appropriate E issue number.) <u>GENERAL</u> The link establishes the connection between the calling and the called lines. The circuit consists of six relays which receive dial pulses and transmit this information to the associated Selection Control circuit. Separate from, but associated with the link are a crosspoint Finder Switch which connects this circuit to the calling line, and a Connector Switch which selects the called line. The Connector Switch is under control of the link relays and the associated Selection Control. Approximately 15 seconds are allowed for the calling party to dial the first digit. If no pulses are received within this time, the Selection Control causes the link to return busy tone to the calling party and thereupon disengages itself from that link and prepares to accept another call. The same holds true in the case of the maximum time allowed between dialing of the first and second and second and third digits of the three-digit number. Tie trunks terminate on switches. The Conference Circuit uses links. <u>Link Relay Functions</u> A Battery feed relay for both calling and called parties; receives dial pulses. B Slow-to-release hold relay; holds link and Selection Control circuit under control of A; makes test for cutoff battery on test wire of calling line.	
WRITTEN BY R.C. Loman	APPROVED ABN/ANN/MP 8-21-64	ISSUE 4 DRAWING NO. E- 850289-A

E- 850289-A SHEET 2	C Connects Link to Selection Control under control of B, F and L. E Busy test relay; cuts through to called line if line is idle. F Ring and ring trip relay; connects ringing potential to the called line; trips ring when the called party answers; connects calling party to called party. L Trunk relay; cuts calling station directly through to trunk; controls release of link on calls to trunks terminated on switches. <u>CIRCUIT OPERATION</u> <u>1.00 Seizure</u> The associated Selection Control circuit connects ground to leads C1 and AF. Ground on lead C1 closes #2C via diode CR4 and is extended to lead L ("J" wiring) seizing the associated TCMF Link Adapter circuit (if used, see NOTE 76, H-850289-A). Relay C operates, closes #2A via diode CR1 and lead AF, connects leads AC, DT, AF and RF to leads ARC, TXF, ARF and -F (via diode CR1), and LKF and resistance (lamp BL and resistance R6) battery from lead LX1, and connects resistance (#1L) battery and resistance (#2F) battery to leads LD and F, respectively. Relay A operates, locks via the calling loop, and closes #2B via battery on lead TF (if battery from the Line circuit is open due to a fault in the Line circuit or Finder Switch relay B cannot operate and after a short delay, the Finder Guard removes ground from leads AF and C1, releasing relays A and C, respectively, to make the Link busy). Relay B operates, looks via its #1 winding, connects resistance (#1C and resistor R6 in series) battery to lead CS which holds the associated Selector Control circuit either directly ("H" wiring) or via the associated TCMF Link Adapter ("J" wiring), lights busy lamp BL, connects resistance (resistor R2) ground to leads LKF and RF, connects resistance (resistor R1) ground to lead LKC, short-circuits #2B, and connects ground to lead TF. <u>2.00 Dialing</u> (Operated: Relays A, B and C) The Selection Control circuit grounds lead F closing #2F. If the line is idle, #1E is closed via battery on lead TC. Relay E operates, locks via its #2 winding, short-circuits its #1 winding, grounds lead TC, removes resistance (#2A) battery from lead AF, disconnects "-F" line from lead DT, and connects leads +C and -C to leads +F and -F, respectively. After its slow-to-operate interval, relay
ISSUE 4	DRAWING NO. E- 850289-A

F operates, locks via resistor R4, grounds lead IS to start the Interrupter if not already running on another call, opens #1C to release the Selection Control, removes the short circuit from #1E, and either connects lead IR to lead -C and resistance (#1F) ground to lead +C ("F" WRG) or connects lead IR to lead -C via #1F and grounds lead +C ("E" wiring) and disconnects leads +F and -F from leads +C and -C respectively. After its slow-to-release interval due to diode CR5, relay C restores, removes resistance (resistor R2) ground from lead RF, transfers lead TXF from lead DT to lead ARC ("T" WRG), removes resistance (#2F) battery from lead F, removes resistance (#1L) battery from lead LD, disconnects lead AF from lead ARF, and disconnects lead AC from lead ARC.

3.00 Called Line Busy (Operated: Relays A, B and C)

If the called line is busy, ground via lead TC short-circuits #1E. After its slow-to-operate interval, relay F operates, locks, opens #1C, removes resistance (#1E) ground from lead TC, grounds lead IS, and connects lead BT to lead -F via resistor R5 and capacitor C1. After its slow-to-release interval due to diode CR5, relay C restores as described in Section 2.00. A call to an un-equipped line, or a fault in the line circuit or in the Connector Switch also prevents operation of relay E and makes the line test busy.

4.00 Ringin and Called Party Answer (Operated Relays A, B, E and F)

Relay F has a sleeved coil which causes it to be unaffected by ringing current. A small amount of ringing potential is diverted over capacitor C1 to serve as ring-back tone for the calling line.

When the called party answers, battery via lead +C ("F" WRG) or lead IR ("E" WRG) closes #1F in magnetic opposition to #2F. After its slow-to-release interval, relay F restores, removes ground from lead IS, disconnects lead IR from lead -C and removes resistance (#1F) ground from lead +C ("F" WRG) or disconnects lead IR from lead -C via #1F and removes ground from lead +C ("E" WRG), and connects leads +C and -C to leads +F and -F, respectively.

5.00 Release of Link (Operated: Relays A, B, and E)

5.01 From Completed Call

Nothing happens in this circuit until both parties restore. When both parties have restored, the loop across leads +F and -F (called party restores last) or leads +C and -C (calling party restores last)

is opened, opening relay A. Relay A restores and opens #1B. After its slow-to-release interval, relay B restores, removes ground from lead IF, removes resistance (resistor R2) ground from lead LKF, removes resistance (resistor R1) ground from lead LKC, extinguishes busy lamp BL, opens E, and connects resistance (resistor R6) battery to lead LXI. Relay E restores, removes ground from lead TC, disconnects leads -F and -F from leads +C and -C, respectively, and disconnects lead TNF from lead ARC ("T" wiring).

5.02 From Called Line Busy (Operated: Relays A, B, and F)

When the calling party restores, the loop is opened across leads +F and -F, opening A. Relay A restores and opens B. After its slow-to-release interval, relay B restores, as described in Section 5.01 except relay F is opened instead of relay E and lead LXI remains open. After its slow-to-release interval, relay F restores, connects resistance (#1E) ground to lead TC, removes ground from lead IS, disconnects lead BF from leads -F and TNF via capacitors C1 and C2 respectively, and connects resistance battery to lead LXI to return the link to the rotation for its next call.

6.00 Calls to Tie Trunks Terminated on Switches (Operated: Relays A, B, and C)

After the digit assigned to a Tie Trunk is dialed into a link for an outgoing call, the Selection Control grounds lead LD, closing L. Relay L operates, locks via its #2 winding, connects leads +F and -F directly to leads +C and -C, respectively, removes resistance (#1E) ground from lead TC, and opens A and #1C. Relay A restores, grounds lead P, and opens B. Relay C restores as described in Section 2.00, except that ground is also removed from lead P. After its slow-to-release interval, relay B restores and opens #2L. Relay L restores, removes ground from lead TF, removes resistance (resistor R2) ground from lead LKF, removes resistance (resistor R1) ground from lead LKC, extinguishes lamp BL, disconnects leads +F and -F from leads +C and -C, respectively, disconnects lead ARC from lead TNF ("T" wiring), connects resistance (resistor R6) battery to lead LXI, and connects resistance (#1E) ground to lead TC. The Link may then serve other calls, and the call to the trunk is completed in the Trunk Switch.

7.00 Calls to Tie Trunks Terminated on Switchboard Lines

Tie Trunks terminated on switchboard lines may be provided if an installation so requires. These trunks are reached by single-digit selections and so relay F is not operated. These circuits maintain ground on their test wire, so that relay E is not operated. The Trunk Control routes the selection ground to operate the lens and units lifts required to extend the link to the bank multiple position of the Tie Trunk, or routes it to lead F, if all trunks are busy. If the selection is successful, ground is connected to lead LD, closing #1L. Relay L operates and further operation is similar to that described in Section 6.00 except, when relay B restores, ground via lead IC closes #2L and relay L remains operated. When the connection is released, ground is removed from lead IC, opening #2L. Relay L restores as described in Section 6.00.

Incoming calls from circuits terminated on switchboard lines, such as Tie Trunks, cause the line relay of the Line circuit associated with the trunk to operate and land the call in the same manner as a local call. The distant pulses are repeated in the Trunk circuit and the call is completed in the link in the same manner as for a local call.

8.00 Calls to Meet-Me Conference

Calls from links to Meet-Me Conference are made in a manner similar to that described in Section 6.00, except that on the single-digit selection, relay F is not operated. If no conference line is available, relay F is closed. Relay F operates as described in Section 3.00. If a conference line is available, relay E is closed. Relay E operates as described in Section 2.00. When selection is completed, ground is connected to lead LD, closing relay L. Relay L operates and opens #1C. After its slow-to-release interval due to diode CR5, relay C restores as described in Section 2.00, opening relay L. Relay L restores. When the calling party disconnects, the sequence is similar to that described in Section 5.00 except that other parties participating in the conference have no effect on the release of this circuit.

ISSUE 4 DRAWING NO. E-850289-A

DATE	1-7-64	ISSUE	4
APPROVED		GENOA	DB-5312
BY		1-4-61	
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		850332-	
		Class C	
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SIZE E-850332-A
SHEET 1
TOTAL 7
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AUTOMATIC ELECTRIC COMPANY
MORTON, ILL. U.S.A.O. OF M.O. ILL. U.S.A.O. MORTON, ILL. U.S.A.O.

EXPLANATION OF

INTERRUPTER FOR MESSAGE
WAITING CIRCUIT
O.G. TRUNK GROUP, U.N.A. &
CODE CALL ACCESS CONTR. CKTS.
LEICH TYPE 40 & 80 PABX
TYPE 900 RELAYS
H-850332-A

FEATURES

1. Interrupts output of ringing and tone generators to provide ringing and 60 IPM tone signals. Interrupts message waiting booster battery for message waiting signal.
2. Interrupts ground on various output leads, used for supervisory lamp signals on Attendant's Turret.
3. Controls outgoing access and rotation of traffic for two groups of Trunks, terminated on individual cross point switches, with option in each group of "first and second choice" outgoing Trunk seizure.
4. Controls the answering of incoming CO Trunk calls via Universal Night Answer digit.
5. Controls outgoing access and rotation of traffic for one group of Trunks terminated on line equipment.
6. Controls access of code call equipment.
7. Controls outgoing access and rotation of traffic to a single group of Trunks terminated on individual cross-point switches, without the option of first and second choice in outgoing Trunk seizure (FIG 2A).

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E-850332-A	SHEET 2	TOTAL 7
A		
AUTOMATIC ELECTRIC COMPANY NORTLAKE, ILL. U.S.A.O. CHICAGO, ILL. U.S.A.O. WASHINGTON, D.C. U.S.A.O.		

OPERATION

1. Interrupter

This circuit is divided into two parts, the Busy Interrupter and the Ringing Interrupter, to clarify the explanation. Relays B1-B3 constitute the Busy Interrupter and R1-R2 constitute the Ringing Interrupter.

1.1 Busy Interrupter

When seized, ground on lead IS or TS closes #1B1 and #2B1. After its slow-to-operate interval, due to its associated capacitor (C3), B1 operates, closes #1B2 and #2B2 in series, grounds leads FT and FS, connects lead BTG via capacitor (C7) to lead ET and connects battery via capacitor (C6) to #2B3. After its slow-to-operate interval, due to its associated capacitor (C4), E2 operates, removes ground from lead FT, connects lead MWB to lead M/K and opens #1B1 and #2B1. After its slow-to-release interval, due to its associated capacitor (C3), B1 restores, removes ground from lead FS, opens #1B2 and #2B2, grounds lead FT and disconnects lead BTG from lead BT. After its slow-to-release interval, due to its associated capacitor (C4), B2 restores, removes ground from lead FT connects #1B1 to lead TS, closes #1B3 and disconnects lead MWB from lead M/K. Relay B3 operates momentarily, due to discharge current of capacitor (C6), and transfers ground from lead FR to lead FRC. Relay B3 restores and transfers ground from lead FRC to lead FR. As long as ground is connected to lead IS or TS, B1 re-operates as before and the cycle is repeated.

1.2 Ringing Interrupter

When seized, ground on lead IS closes #2R1, #1B1 and #2B1. After its slow-to-operate interval, due to its associated capacitor (C3), B1 operates and the cycle of operation

E-850332-A

E-850332-A	SHEET 3	TOTAL 7
A		
AUTOMATIC ELECTRIC COMPANY NORTLAKE, ILL. U.S.A.O. CHICAGO, ILL. U.S.A.O. WASHINGTON, D.C. U.S.A.O.		

Described in Section 1.1 is performed. After its slow-to-operate interval, R1 operates, connects ground via capacitor (C5) to #1R1, transfers lead IR from resistance (R10) battery to lead RL via lamp RL, grounds lead BLT and closes R2. Relay R2 operates and opens #2R1. After its slow-to-release interval, due to its associated capacitor (C5), R1 restores, transfers lead IR from lead RL via lamp RL to resistance (R10) battery, removes ground from lead BLT, connects ground via capacitor (C5) to R2 and opens R2. After its slow-to-operate interval, due to its associated capacitor (C5), R2 restores, removes ground via capacitor (C5) from its winding and connects #2R1 to lead IS. As long as ground is connected to lead IS, R1 re-operates and the cycle is repeated.

2. Universal Night Answer Control (FIG 1A)

When the NIGHT KEY is operated ground is connected lead NK. On each incoming City Trunk call, battery is connected to lead CA1, closing #1RSA. Relay RSA operates, grounds lead IS, to start the Ringing Interrupter, transfers lead NS from lead NSB to ground and transfers lead "8" from lead ATB to #1TSA and #2TSA. When the digit assigned to night answer is dialed from any PABX station, ground is connected to lead "8", closing #1TSA and #2TSA. Relay TSA operates, grounds lead CA1, short-circuits #1RSA, closes #2RSA to hold it operated and grounds leads TLD, TRF, TAF and TMI.

When the selection is completed, ground is removed from lead "8", opening #1TSA and #2TSA. Relay TSA restores, removes the short-circuit from #1RSA, opens #2RSA and removes ground from leads TLD, TRF, TAF and TMI. Relay RSA restores, transfers lead NS from ground to lead NSB, transfers lead "8" from #1TSA to lead ATB and removes ground from lead IS, releasing the Busy and Ringing Interrupter circuits.

E-850332-A

SIZE E-850332-A SHEET 4 TOTAL 7 AUTOMATIC ELECTRIC COMPANY NORTH AVE., ILL., U.S.A.	When the digit assigned to night answer is dialed and the NIGHT KEY is not operated or no call is waiting to be answered, RSA does not operate and ground on lead "8" is connected to lead ATB. 3. <u>Code Call Control</u> (FIG 1A) When the code call is idle, ground is connected to lead TL holding RSC operated via its #1 winding. When this circuit is seized, ground is connected to lead "7", closing #1TSC and #2TSC. Relay TSC operates, closes #2RSC and grounds leads "1", "10", TLD and TAC. At the end of the selection, ground is removed from lead "7", opening #1TSC, #2TSC and #2RSC in multiple. Relay TSC restores and removes ground from leads "1", "10", TLD and TAC. Seizure of the code call causes ground to be removed from lead TL, opening #1RSC. Relay RSC restores and transfers lead "7" to lead ATB. When the code call is released, ground is connected to lead TL, closing #1RSC. Relay RSC operates and connects lead "7" to #1TSC and #2TSC. 4. <u>Tie Trunk Control</u> (FIG 1A) When a call is made to a Tie Trunk, ground is connected to lead XM, closing #1TTC and #2TTC. Relay TTC operates and grounds leads TSL, TLD, TAC and "10". When the selection is completed, ground is removed from lead XM, opening #1TTC and #2TTC. Relay TTC restores and removes ground from leads TSL, TLD, TAC and "10". 5. <u>City Trunk Control</u> (Single Choice Outgoing Access) (FIG 2A) When any City Trunk is idle, battery is connected to lead FI, holding RA3 operated. When seized, ground is connected to lead "6", closing #1TS3 and #2TS3. Relay TS3 operates,
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E-850332-A
 FIG. 20004 (11-48)

SIZE E-850332-A SHEET 5 TOTAL 7 AUTOMATIC ELECTRIC COMPANY NORTH AVE., ILL., U.S.A.	grounds lead FI shunting #1RA3, closes #2RA3 and grounds leads TAF, TRF, TLD, TMO3 and FI and opens #2RA3. Battery from the next idle trunk via lead FI holds RA3 operated on its #1 winding. When all the trunks in the group have been used in rotation, battery is removed from lead FI, opening #1RA3. Relay RA3 restores and transfers lead "6" from #1TS3 to lead ATB and TOM3. When both TS3 and RA3 are restored, ground is extended via TRG to lead RST, resetting the idle Trunks. The Trunks that are reset connect battery to lead FI, closing #1RA3. Relay RA3 operates, disconnects lead TRG from RST and transfers lead "6" from leads TOM3 and ATB to #1TS3 and #2TS3. 6. <u>City Trunk Control</u> (1st and 2nd Choice Outgoing Access) (FIG 1A) Battery from the idle Trunks of both first and second choice groups is connected to lead FI (terminals S17 and C24) closing #1RA1 (RA2) and #1RE1 (RB2). Relays RA1 (RA2) and RB1 (RB2) operate and disconnect lead TRG from lead RST. When seized ground via lead "9" closes #1 and #2TS1 (TS2). Relay TS1 (TS2) operates, closes #2RA1 (RA2), grounds leads TMO1 (TMO2), TAF, TRF, TLD and FI of the first choice group. Ground on lead FI (terminal S17) seizes the idle trunk and short-circuits #1RA1 (RA2). When the selection is completed, ground is removed from lead "9", opening #1 and #2TS1 (TS2). Relay TS1 (TS2) restores, opens #2RA1 (RA2), removes ground from leads TMO1 (TMO2), FI, TAF, TRF and TLD. If a Trunk of the first choice group is idle, battery is connected to lead FI (terminal S17), closing #1RA1 (RA2). Relay RA1 (RA2) re-operates and the circuit is at normal.
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E-850332-A
 FIG. 20004 (11-48)

E-850627-A		SHEET 1		TOTAL 10	
SIZE	A	AUTOMATIC ELECTRIC COMPANY			
DATE		NORTH LAKE, ILL., U.S.A. SEDA, ILL., U.S.A. WALKERS, WISC., U.S.A.			

ISSUE 1
6-23-66

EXPLANATION

OF

TURRET KEYSSET REGISTER &
POWER FAILURE TRANSFER CKT.

LEICH TYPE 40 PABX

(TYPE 900 RELAYS)

H-850627-A

FEATURES

Turret Keyset Register (FIG 1A)

1. Receives coded digit information from the Attendant's Turret Keyset, stores same; converts the stored information to digital form, and begins sending automatically if and when no other selections are in progress.
2. Accepts and sends one digit at a time or will store 2 digits if momentarily unable to send due to other selections being in progress.
3. Release of this circuit is controlled by Attendant's Position Circuit.
4. Times out and signals the Position Circuit if a selection is unable to be completed.

E-850627-A

M

E-850627-A		SHEET 2		TOTAL 10	
SIZE	A	AUTOMATIC ELECTRIC COMPANY			
DATE		NORTH LAKE, ILL., U.S.A. SEDA, ILL., U.S.A. WALKERS, WISC., U.S.A.			

ISSUE 1

Power Failure Transfer Circuit (FIG 2A, 3A or 4A)

Transfers CO trunk cable pair from PABX trunk to PABX station during power failure or under control of Attendant's Night Key if Predetermined Night Answer Service is used.

GENERAL

The Turret Keyset Register receives digit information over 4 leads from the Attendant's Keyset, stores it if required, and sends it in translated form over 15 leads to the Allotter bank thereby controlling line selections made by the Trunk switches, or over 6 leads for selection of optional features such as Code Call, Tie Trunks, etc.

Station numbers have two digits, and are selected by depressing and releasing in sequence the keyset buttons corresponding to the listing of the desired station. The first button should be released before the second is depressed.

In the following explanation (FIG 1A) the selection of line 24 will be used as a general example. The Operation for other line selections is similar. Relays N1-N4 are operated in various combinations for different selections. Lead ACA is grounded only if one of the digits 2, 3, 4, or 5 is registered as a first digit. Digits 1, 6-0, when keyed as a first digit, are used for reaching trunks.

The Power Failure and/or Night Answer Transfer Circuit (FIG 2A, 3A, or 4A) provides a maximum of 10 transfer circuits. Each circuit provides a means of transferring City Trunks from their associated circuits to individual PABX lines, disconnecting the latter from their respective line circuits. This arrangement may be used for night service when the Universal Night Answer feature is not provided in the PABX, or for emergency trunk service in the event of power failure.

E-850627-A

FX-2000-5 (11-66)

DATE:	DR.	SIZE	E-850627-A	
	CH.			
		A	SHEET 3	TOTAL 10
AUTOMATIC ELECTRIC COMPANY NORTH JAVI, ILL., U.S.A. ○ GENOA, ILL., U.S.A. ○ WILKES-BA, WISC., U.S.A. ○				

For the purpose of simplifying the explanation of this circuit only Transfer Circuits 2-4 are described fully. Transfer circuits 1, 5-10 are basically the same with the following exceptions:

- 1) Transfer Circuit 1 has only one relay (T1) and wiring facilities for one PABX station. When T1 restores lead F1 is transferred from lead CFI to lead CFO.
- 2) Transfer circuits 5-10 are not wired for access from ACCESS & ROTATION CONTROL CIRCUIT; H-850332-A OR EQUIVALENT.

OPERATION

A. Turret Keypad Register (FIG 1A)

1. Registering and Sending First Digit (Normally Operated Relay GD)

Assume that digit "2" is to be registered and that the Trunk Key on the Attendant's Turret has been operated causing ground to be connected to lead KR.

When the Attendant depresses the keyset button "2", ground is connected to lead N2, closing #1N2. Relay N2 operates and short circuits #1T. When the Attendant releases the keyset button, ground is disconnected from lead N2, removing the short circuit from #1T and closing #1T in series with #1N2. Relay T operates, locks via its #2 winding, transfers lead N2 from #1N2 to #2TA via capacitor C2 and connects lead KR to lead

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	CR.			
DATE:		A	SHEET 4	TOTAL 10
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GS via #1G and #1H in multiple, closing G and H if no other selection is in progress. Relay G operates, locks to resistance battery on lead GI, disconnects lead GI from lead GO, disconnects resistance (#2UB) battery from #1GD, opening GD, disconnects lead FB from lead FC, disconnects lead ATB from lead BY, and grounds lead ACA. Relay H operates, connects lead TAC to lead ACA and ground, connects lead TLD to lead LDA, connects lead KR to lead 20 (grounding lead 20), and connects lead SCA to #1 and #2GS. Relay GD remains operated due to the discharge current of its associated capacitor C5.

After the selection has been made in the trunk switch, ground is connected to lead SCA, closing #1GS. Relay GS operates, locks, closes #1U, opens #1G and #1H and grounds lead SSR. Relay U operates, locks, opens #1T and N2 and removes ground from leads TAC and ACA. Relay G restores, disconnects lead KR from lead 20, removing ground from lead 20, disconnects lead TAC from lead ACA, disconnects lead ATB from lead BY, connects lead FB to lead FC and transfers lead GI from lead GS and #1H in multiple with #1G to lead GO. Relay H restores, closes #1GD, charges capacitor C5, disconnects lead TLD from lead LBA and disconnects lead SCA from lead KR and #1 and #2GS. Relay N2 restores and opens GS. Relay GS restores, closes #1UA and #1UB and removes ground from lead SSR. Relay UA operates. Relay UB operates, locks, and connects lead BY to lead SSR. The circuit is now ready to register and send the next digit.

2. Registering and Sending Second Digit (Operated: Relays
GD, T, U, UA and UB)

Assume that digit "4" is to be registered.

When the Turret Attendant depresses the keyset button "4", ground is connected to leads N2 and N3, charging capacitors C2 and C3. When the Attendant releases the keyset button, ground is removed from leads N2 and N3, closing #2TA. Relay TA operates to its "X" contacts from partial discharge of capacitors C2 and C3, operates fully and locks via its #1 winding, opens its #2 winding (#2TA), preventing further discharge of capacitors C2 and C3 at this time, and opens #2T. Relay T restores and closes #1N2 and #1N3. Relay N2 operates from further discharge of capacitor C2, locks and closes #1G and #1H. Relay N3 operates from further discharge of capacitor C3 and locks. Relay G operates, locks to resistance battery on lead GI, opens #1GD, grounds lead ACA, disconnects lead GI from lead GO, disconnects lead FB from lead FC, and connects lead ATB to leads BY and SSR. Relay H operates, connects lead TAC to lead ACA and ground, connects lead TLD to lead LDA, connects lead KR to lead 4, grounding lead 4 and connects lead SCA to #1 and #2GS in multiple. Relay GD remains operated due to the discharge current of its associated capacitor C5.

After the selection has been made in the Trunk switch, ground is connected to lead SCA, closing #1GS. Relay GS operates, locks, opens #1G and #1H and transfers ground from leads TAC and ACA to leads SSR, ATB and BY in multiple. Relay G restores, disconnects lead KR from lead 4 (removing ground from lead 4), disconnects lead TAC from lead ACA, disconnects lead ATB from ground and leads BY and SSR in multiple, connects lead FB to lead FC and transfers resistance battery on lead GI from #1H and #1G in multiple to lead GO. Relay H restores, closes #1GD, charges capacitor C5, disconnects lead TLD from lead LDA and disconnects lead SCA from #1 and #2GS and lead KR in multiple.

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After the associated circuit makes a busy test, ground is removed from lead KR, opening #1GS, #1TA, #1U, #1UA, #1UB, #1N2 and #1N3. Relay GS restores, connects lead KR to #1G and #1H, and removes ground from leads BY and SSR. Relay TA restores and connects lead N1-N4 to N1-N4, respectively. Relay U restores, shunts capacitors C2 and C3, discharging capacitors completely and disconnects lead KR from #1G and #1H. Relay UA restores. Relay UB restores and disconnects lead BY from lead SSR. Relays N2 and N3 restore. The circuit is now at normal.

3. Registering Both Digits Before Any One Sent (Normally Operated Relay GD)

On fast key operation, or if the Register is momentarily unable to send due to other selections being in progress, it is possible to register (store) two digits before any are sent. Assume that digits "24" are to be registered and that the Trunk Key on the Attendant's Turret has been operated causing ground to be connected to lead KR.

The operation of registering the first digit (digit "2") is the same as described in Section A-1 through the operation of T. Relay T operates, locks via its #2 winding, transfers lead N2 from #1N2 to #2TA via capacitors C2 and connects lead KR to #1G and #1H in multiple. When the Turret Attendant depresses the keyset button "4" for the second digit, ground is connected to leads N2 and N3, charging capacitors C2 and C3. When the Attendant releases the keyset button, ground is removed from leads N2 and N3, closing #2TA. Relay TA operates to its "X" contacts from the partial discharge of capacitors C2 and C3, operates fully, and locks via its #1 winding, opens its #2 winding (#2TA) and opens #2T (T remains operated on its #1 winding).

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4. Sending After Both Digits Have Been Registered (Operated: Relays GD, N1-N4, T and TA)

When the associated circuit connects battery to lead GS, #1G and #1H are closed in multiple. Relay G operates, locks, transfers resistance battery on lead GI from lead GO to #1G and #1H in multiple, disconnects lead FB from lead FC, grounds lead ACA, connects lead BY to lead ATB and disconnects resistance (#1UB) battery from #1GD, opening GD. Relay H operates, connects lead TAC to lead ACA and ground, connects lead TLD to lead LDA, connects lead KR to lead 20 (grounding lead 20) and connects lead SCA to #1 and #2GS. Relay GD remains operated due to its associated capacitor C5.

After the first registered selection has been made in the Trunk switch, ground is connected to lead SCA, closing #1GS. Relay GS operates, locks, closes #1U and #2T, opens #1G and #1H and grounds lead SSR. Relay U operates, locks, opens #1N2 and #1T, and removes ground from leads TAC and ACA. Relay G restores, disconnects lead KR from lead 20 (removing ground from lead 20), disconnects lead TAC from lead ACA, disconnects lead ATB from lead BY, connects lead FB to lead FC and transfers resistance battery on lead GI from #1G and #1H in multiple to lead GO. Relay H restores, closes #1GD, charges capacitor C5, disconnects lead TLD from lead LDA and disconnects lead SCA from #1 and #2GS and lead KR in multiple. Relay N2 restores and opens #1GS. Relay GS restores, closes #1UA and #1UB, opens #2T, removes ground from lead SSR and transfers lead KR from #1 and

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5. Incomplete Selection For Any Digit (Operated: Relays GD, N1-N4, T, TA, G and H)

Assume that some fault prevents the operation of GS.

On the normal selection when G and H operate, #1G is opened. Relays G and H do not keep GD open long enough to permit GD to restore (GD remains operated on the discharge current of its associated capacitor C5). However, if for any reason the selection is not completed, G and H will remain operated longer than the normal time, allowing GD to restore. After its slow-to-release interval due to its associated capacitor C5, GD restores, removes ground from leads TAC and ACA and disconnects lead ATB from lead BY, grounding lead BY. Ground on lead BY causes the associated circuit to remove ground from lead KR, opening #1G, #1H, #1TA, T and N1-N4. Relay G restores, connects lead FB to lead FC, transfers lead GI from lead GS and #1G and #1H in multiple to lead GO and disconnects lead KR from lead 1-0 (for the first digit) and from lead 20-50 (for the second digit). Relay H restores, closes #1GD, charges capacitor C5, disconnects lead TLD from lead LDA and disconnects lead SCA from #1 and #2GS and resistance (#1UA) battery in multiple. Relay

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TA restores. Relay T restores, connects leads N1-N4 to N1-N4, respectively, and shunts capacitors C1-C4, discharging capacitors completely. Relays N1-N4 restore. Relay CD operates and removes ground from lead BY. The circuit is now at normal. 6. <u>Selection of Trunks</u> Selection of Trunks terminated on lines or on the bank multiple, for connection to City Trunk Circuits, requires the use of the keyset to select leads 6T-0T. In special cases, digit "1" may be made available to the keyset, although normally this digit is strapped to return busy signal to the Attendant, as well as the leads for City Trunk and Information Trunk Access. If keyset button "1", or one of the keys in the group 6-0 depressed as a first digit, with UA and UB at normal, the selection ground is extended to the corresponding lead in the group 1T, 6T-0T (for example to 9T), where it may be connected to an appropriate Trunk Control lead, or be strapped to lead ATB to cause return of busy signal. B. <u>Power Failure and/or Predetermined Night Answer</u> (FIG 2A, 3A or 4A) 1. <u>Power Failure Transfer</u> (Normally Operated Relays T1-T4 and T2A-T4A) When commercial power failure occurs all of the relays in the group T1-T4 and T2A-T4A are opened. Relays T2A-T4A restore, disconnects leads +T and -T from leads T and R, respectively, and transfers lead FI from lead CFI to lead CF0. Relays T1-T4 restore, transfer lead "+" from lead +L to lead T and transfers lead "-" from lead -L to lead R.								

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When power is restored to normal, T1-T4 and T2A-T4A are closed. Relays T1-T4 operate, transfer lead "+" from lead T to lead +L and transfers lead "-" from lead R to lead -L. Relays T2A-T4A operate, connect lead +T and -T to leads T and R, respectively and transfer lead FI from lead CF0 to lead CFI. The circuit is now at normal. 2. <u>Predetermined Night Answer</u> If Predetermined Night Answer Service is required, lead FN is connected to one or more leads T1-T4 ("A" wiring). When the Night Key on Attendant's Turret is restored, ground is connected to lead FN, operating such relays in the group T1-T4, T2A-T4A as are jumpered for night answer. The remaining relays in the group are wired permanently to ground and are continuously operated under normal conditions. When the Night Key is operated, ground is removed from lead FN, opening and restoring all relays in the group T1-T4 and T2A-T4A which are not permanently grounded. The operation is the same as described in Section B-1. (1) RW:kjv								

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SIZE E-850350-A SHEET 1 TOTAL 13	CIRCUIT EXPLANATION TURRET POSITION CIRCUIT TYPES 40. and 80 PABX H-850350-A <u>FEATURES</u> (a) Permits Attendant to answer and extend incoming Trunk calls to a PABX station. (b) Provides busy tone to the Attendant if PABX station is busy and allows Attendant to over-ride the busy condition. (c) Splitting off Trunk or extension station. (d) Monitor City Trunk calls in progress. (e) Optional tick-tone to monitored stations. (f) Keyset release (g) Hold a City Trunk call while attending other calls. (h) Place outgoing calls to city. (i) Answer Attendant's inward (information) Trunk calls. (j) Place calls to PABX station (Out-dial Trunk). (k) Live transmitter when Attendant Monitors ("L" wiring)
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 Changed Section 13.00
 for H-12 1/72; mb
 D. Barnes
 14.3
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Written by

F. Bukowski

Approved

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CIRCUIT OPERATION

1.00 City Trunk - Talk, Selection and Busy Test

When the Attendant seizes a City Trunk, resistance ground and ground are connected to leads KB and KC, respectively, via the City Trunk, closing #1MD and both windings of AD in opposition. Relay MD operates, closes #2AA, disconnects leads E and F from the REP COIL, connects #1 and #2ME across leads E and F via diodes CR3 and CR2, respectively, and connects lead TR to the REP COIL, closing #1 and #2AB via ground on terminal S33 (NOTE 76 H-850350-A). Relay AA operates and grounds lead BLF. Relay AB operates and disconnects lead RA from lead RB. The Attendant is now connected to the City Trunk and may converse with both parties if present.

Should the City Trunk be idle, resistance battery is connected to lead KG, closing #1RG. Relay RG operates, closes #1RG1, and grounds leads PL and KR. Relay RG1 operates and connects resistance (#2BK) ground to lead RCA. The Attendant may now key send.

Upon completion of the selection, a test is made of the termination. If the termination is idle, battery is connected to lead KT, closing #1RE, or if the termination is a special service circuit, ground is connected to lead LDA, closing #2RE. In either case, RE operates, locks via its #2 winding, short circuits its #1 winding, grounds lead KT, connects resistance (#2RH) battery in multiple with resistance (R6) battery to lead KE and disconnects lead BY from #1BY. The Trunk then removes resistance battery from or connects ground to lead KG, opening or shunting #1RG, respectively. In

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either case, RG restores, opens #1RG1, opens #2RE and removes ground from leads PL and KR. Relay RE restores, transfers lead KT from ground to resistance (#1RE) ground, removes resistance (#2RH and R6) battery from lead KE and connects lead BY to #1BY. After its slow-to-release interval, RG1 restores and removes resistance (#2BK) ground from lead RCA.

The Attendant may now either disconnect from the City Trunk, wait for the called party to answer or further extend a special service call as described in Section 11.00

When the Attendant disconnects from the City Trunk, resistance ground and ground are removed from leads KB and KC, respectively, opening #1MD and both windings of AD. After its slow-to-release interval, MD restores, removes #1 and #2ME via diodes CR3 and CR2 from across leads E and F, connects leads E and F to the REP COIL, and opens #2AA. Relay AA restores, removes ground from lead BLF, and disconnects lead TB from the REP COIL, opening #1 and #2AB. Relay AB restores and connects lead RA to lead RB. The circuit is now at normal.

2.00 City Trunk Guard (Operated: Relays MD, AA, and AB)

Should the Attendant attempt to connect to a City Trunk before disconnecting from a previous City Trunk, the resistance ground connected to lead KB via the two City Trunks is reduced since they are in parallel. This causes #2AD to become magnetically stronger than #1AD and therefore, AD operates, locks and removes resistance battery from lead KB, preventing the relays in the City Trunk from operating.

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The Attendant must then disconnect from both City Trunks, removing resistance ground and ground from leads KB and KC, respectively, opening #1MD and #2AD. After its slow-to-release interval, MD restores, removes #1 and #2ME via diodes CR3 and CR2, respectively, from across leads E and F, connects leads E and F to the REP COIL, and opens #2AA and #1AD. Relay AA restores, removes ground from lead BLF and disconnects lead TB from the REP COIL, opening #1 and #2AB. Relay AD restores and connects resistance battery to lead KB. Relay AB restores and connects lead RA to lead RB. The circuit is now at normal.

3.00 Trunk Splitting (Operated: Relays MD, AA and AB)

Should the Attendant desire to talk to the party on leads A and B only, ground is connected to lead SE (NOTE 76) by the Attendant, closing #1SE. Relay SE operates and disconnects leads C and D from the REP COIL. When the Attendant removes ground from lead SE, #1SE is opened. Relay SE restores and connects leads C and D to the REP COIL.

When the Attendant desires to ask the calling party for instructions after attempting to extend an incoming call to a busy line (BY operated) the Attendant operates a Turret key, connecting ground to lead SE, closing #1SE. Relay SE operates as described above and also disconnects lead BT from the REP COIL. Busy tone is thus removed from the Attendant and the calling party, allowing them to converse.

Should the Attendant desire to talk to the party on leads C and D only, ground is connected to lead SM by the Attendant, closing #1SM. Relay SM operates, disconnects leads A and B from the REP COIL and connects resistor R4 across leads A and B. When the Attendant removes ground from lead SM, #1SM is opened. After its slow-to-release interval, SM restores, removes resistor R4 from across leads A and B, and connects leads A and B to the REP COIL.

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4.00 Monitoring a City Trunk Call ("K" or "L" wiring--see NOTE 77, H-850350-A)

Should the Attendant desire to monitor a City Trunk call in progress, ground is connected to lead MK first ("K" wiring), closing #1DB. Relay DB operates, disconnects lead RA from lead RB, connects lead FRC (if used) (see note 52 on H-850350-A) to lead TB via resistor R10, grounds lead TS and removes the short-circuit from across capacitor C4 and resistor R5. The Attendant then connects to the desired City Trunk, connecting resistance ground and ground to leads KB and KC respectively, closing #1MDK and both windings of AD in opposition. Relay MD operates, connects leads TB and FRC to the REP COIL, giving a warning tone to both parties, disconnects leads E and F from the REP COIL, connects #1 and #2ME via diodes CR3 and CR2, respectively, across leads E and F, and closes #2AA. Relay AA operates and grounds lead BLF. The Attendant can now monitor the call.

When it is desired to converse with the two parties the Attendant removes ground from lead MK opening #1DB. Relay DB restores, connects lead RA to lead RB, disconnects lead FRC (if used) from lead TB via resistor R10, removes ground from lead TS, short-circuits capacitor C4 and resistor R5 and closes both windings of relay AB. Relay AB operates and disconnects lead RA from lead RB. The Attendant may now converse with the two parties.

When Attendant is permitted to monitor only with a "live" transmitter relay AB is operated ("L" wiring) via ground at terminal S33 (NOTE 76), and disconnects lead RA from lead RB. Operation is similar to preceding paragraphs except relay DB does not operate and Attendant may converse with the two parties.

Unless the Attendant desires to talk to the two parties, resistance ground and ground are removed from leads KB and KC first, opening #1MD and both windings of AD. After its slow-to-release interval, MD restores, connects leads E and F to the REP COIL, opens #2AA and removes #1 and #2ME from across leads E and F via diodes CR3 and CR2, respectively. Relay AA restores, removes ground from lead BLF and disconnects leads TB and FRC from the REP COIL. The Attendant then removes ground from lead MK, opening #1DB. Relay DB restores, disconnects lead FRC from lead TB, removes ground from lead TS, connects lead RA to lead RB and short-circuits capacitor C4 and resistor R5. The circuit is now at normal.

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5.00 City Trunk Call - Called Termination Busy (Operated: Relays AA, AB, RG and RGI)

Should the called termination be busy, ground is connected to leads KT and BY, short-circuiting #1RE and closing #1BY, respectively. Relay BY operates, locks, grounds lead TS, connects lead BT to the REP COIL via resistor #2SE, transfers lead PL from ground to lead FT and removes ground from lead KR.

The Attendant may either release this circuit as described in Section 8.00 or break-in on the busy line as described in Section 6.00.

6.00 Break-In on a Busy Condition (Operated: Relays MD, AA, AB, RG, RGI and BY)

In order to over-ride a busy condition, the Attendant momentarily grounds lead BK, closing #1BK. Relay BK operates, locks, disconnects lead ET from the REP COIL, connects lead FT to the REP COIL via resistor #2DC, giving a warning tone to both parties, and closes #1SM and #1DC. Relay SM operates, disconnects leads A and B from the REP COIL and connects resistor R4 across leads A and B. Relay DC operates, connects leads KP and KN to the REP COIL and grounds lead KT. The Attendant is now connected to the two parties on the busy line and may talk with them.

When "L" wiring is used the Attendant can not over-ride a busy condition without talking to the two parties.

When the Attendant desires to over-ride a busy condition without talking to the two parties, the trunk is held as described in Section 7.00, then the Attendant grounds lead MK, closing #1DB ("K" wiring). Relay DB operates, opens #1 and #2AB, removes the short-circuit from across

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capacitor C4 and resistor R5 and disconnects lead BT from the REP COIL. Relay AB restores and connects lead FRC to the REP COIL via resistor R10.

The Attendant then grounds lead BK, closing #1BK. The operation is the same as described previously, except that lead FT is not connected to the REP COIL, therefore no warning tone is given but a tone via lead FRC (if required) and resistor R10 is given to indicate to both parties on the busy line that the call is being monitored. Should the Attendant desire to talk to the parties on the busy line, ground is removed from lead MK, opening #1DB. Relay DB restores, short-circuits capacitor C4 and resistor R5, closes #1 and #2AB, connects lead RA to lead RB and transfers the REP COIL from lead FRC to lead FT, to give a warning tone that the Attendant has entered the connection. Relay AB operates and disconnects lead RA from lead RB. The Attendant may now converse with both parties on the busy line.

In order to release this circuit the Attendant grounds lead RK and the operation is the same as described in Section 8.00

7.00 Trunk Hold (Operated: Relays MD, AA, and AB)

In order to hold a City Trunk while attending to other calls, the Attendant momentarily grounds lead HK, closing #1RH. Relay RH operates, connects resistance (#2SM) ground to lead KH and connects resistance (resistor R6 and #2RH in multiple) battery to lead KE, causing the Trunk to be held. When ground is removed from lead HK, #1RH is opened. Relay RH restores, removes resistance (#2SM) ground from lead KH and removes resistance (resistor R6 and #2RH in multiple) battery from lead KE.

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8.00 Release (Operated: Relays MD, AA, AB and possibly RG, RGI, RE, BY, BK, SM and DC)

In order to release this circuit after an incorrect selection, receiving a busy signal, break-in on a busy condition or holding a City Trunk, the Attendant momentarily grounds lead RK, closing #2RK. Relay RK operates, locks, connects lead KRA to lead KRB, removes resistance (#2BK) ground from lead RCA, opens #2BY (if operated), connects resistance (R7) battery to lead KH, removes ground from lead PL or disconnects lead FT from lead PL (BY operated), grounds lead KE and connects #2RG in series with #1RG, to make RG slow-to-release. Relay BY restores, opens #1BK, disconnects lead BT from the REP COIL and connects resistance (R1) battery to lead KR. Relay BK restores and opens #1DC and #1SM. After its slow-to-release interval, DC restores, disconnects leads KP and KN from the REP COIL, removes ground from lead KT, opens #1RK and removes resistance (R1) battery from lead KR. After its slow-to-release interval, SM restores, removes resistor R4 from across leads A and B and connects leads A and B to the REP COIL. Relay RK restores, disconnects lead KRA from lead KRB, grounds lead KR (RG operated), short-circuits #2RG, removes resistance (R7) battery from lead KH, connects resistance (#2BK) ground to lead RCA, removes ground from lead KE and grounds lead PL. The circuit is now ready for a new selection.

9.00 Audible Signal

Incoming City Trunk or information Trunk calls connect battery to lead FT, closing #1FS. Relay FS operates, grounds lead TS and connects lead FC to lead FD, sounding a buzzer, when the Attendant connects ground to lead FC. The Interrupter then places flashing ground on lead

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E-850350-A SHEET 11 TOTAL 13 AUTOMATIC ELECTRIC COMPANY NORTH PLATTE, NEBRASKA 68901 MADE IN U.S.A.	resistance (#2BK) ground to lead RCA, and grounds leads KE and KT. The loop via leads KP and KN is opened on each pulse. Upon completion of a digit, ground is removed from lead DA, opening #2DB and #1DA. Relay DB restores, opens #2DA and #1DC and removes ground from leads TS and KE. Relay DA restores, opens #1SE, disconnects leads DC and DB from leads KP and KN, respectively, and connects leads KP and KN to the REP COIL. Relay SE restores and connects leads C and D to the REP COIL. After its slow-to-release interval, DC restores, removes resistance (#2BK) ground from lead RCA, removes ground from lead KT and disconnects leads KP and KN from the REP COIL. When the call has been established, the Attendant removes ground from lead SM, opening #1SM. After its slow-to-release interval, SM restores, removes resistor R4 from across leads A and B and connects leads A and B to the REP COIL. In order to release a busy or incorrect connection, the Attendant grounds lead RK and the operation is the same as described in Section 8.00. 12.00 Information Trunks When the Attendant connects to an Information Trunk, ground is connected to lead KD, closing #1AA. Relay AA operates, grounds lead BLF and connects lead TB to the REP COIL, closing #1 and #2AB. Relay AB operates and disconnects lead RA from lead RB. The call on the Information Trunk is extended to the Attendant via leads E and F and the REP COIL.
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E-850350-A SHEET 12	Should the Attendant connect to a City Trunk while maintaining connection to an Information Trunk, the operation is the same as described in Section 1.00. The Information Trunk is held by #2ME via diode Ck2 across leads E and F. When the Attendant disconnects from the City Trunk, the operation is the same as described in Section 1.00, paragraph 5 and the Attendant is reconnected to the Information Trunk. When the attendant disconnects from the Information Trunk, ground is removed from lead KD, opening #1AA. Relay AA restores, removes ground from lead ELF, and disconnects lead TB from the REP COIL, opening #1 and #2AB. Relay AB restores and connects lead RA to lead RB. The circuit is now at normal. 13.00 Attendant's Out-Dial Trunk When the Attendant connects to an Out-Dial Trunk, operation of a key at the Attendant's turret grounds lead PAX, closing relay OD and #1AA in series. Relay AA operates, grounds lead BLF, and connects lead TB to the REP COIL, closing #1 and #2AB. Relay OD operates and connects leads "+" and "-" to leads E and F via resistors R11 and R12, respectively. Relay AB operates and disconnects lead RA from lead RB. When the Attendant dials, the operation is the same as described in Section 10.00, paragraph 2, except the pulsing loop is via leads "+" and "-" and resistors R11 and R12, respectively. Should the Attendant connect to a City Trunk while maintaining connection to an Out-Dial Trunk the operation is the same as described in Section 1.00. The Out-Dial Trunk is held by #2ME across leads "+" and "-" and resistors R11 and R12 via diode Ck2. When the Out-Dial Trunk call is answered and reverses polarity to give answer supervision, #1ME is closed. Relay ME operates, grounds lead TS and connects lead WL to lead "+" via #2MD and resistor R11. When the Attendant disconnects from the City Trunk, #1MD is opened as described in Section 1.00, paragraph 5. After its slow-to-release interval, MD restores, opens #1ME, connects lead "+" via resistor R11 and lead "-" via resistor R12 to the REP COIL, and opens #2AA. Relay ME restores, disconnects lead WL from lead "+" via #2MD and resistor R11 and removes ground from lead TS. The Attendant is now connected to the party on the Out-Dial Trunk.
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Should the called party on the Out-Dial Trunk disconnect before the Attendant answers, the polarity on leads "+" and "-" is returned to normal, opening #1ME. Relay ME restores, disconnects lead WL via #2MD and resistor R11 from lead "+" and removes ground from lead TS.

When the Attendant disconnects from the Out-Dial Trunk, ground is removed from lead PAX, opening relay OD and #1AA. Relay AA restores, removes ground from lead BLF, and disconnects lead TB from the REP COIL, opening #1 and #2AB. Relay OD restores and disconnects leads "+" and "-" via resistors R11 and R12 from leads E and F, respectively. Relay AB restores and connects lead RA to lead RB. The circuit is now at normal.

E-850629-A SHEET 1 TOTAL 28 AUTOMATIC ELECTRIC COMPANY CHICAGO, ILL. U.S.A.	EXPLANATION OF C.O. TRUNK 40B, 80A PABX TYPE 900 RELAYS H-850629-A
ISSUE Changed Sections A2.2, A6.1, A8, B1 and C1 for H29 5/71: am Bentley B Bentley 19	FEATURES a) Connects the Leich Type 40 or 80 PABX to a 24 or 48 volt common battery or Automatic Central Office. b) Outgoing loop dialing with ground seizure of distant end. c) Ringdown inward with instantaneous busy. d) Universal night answering. e) Use with Toll Diversion Adapter CB-5562 or equivalent. f) Incoming calls to be answered and extended to PABX station by Turret Attendant. g) Dial or hookswitch controlled consultation and transfer service. h) Optional 3 party conference. i) Attendant C.O. Trunk hold, break-in on busy line and split. j) Reseizure of Central Office in the event that the distant end disconnects with PABX party "off hook" on an incoming call.
Written By W. S. Dubicki	Approved <i>[Signature]</i> 5-16-67
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E-850629-A SHEET 2 TOTAL 28 AUTOMATIC ELECTRIC COMPANY CHICAGO, ILL. U.S.A.	CIRCUIT OPERATION
ISSUE 19	A. Incoming Call From Central Office 1. Seizure (Operated: Possibly relay X) 1.1 "P" Wiring When the Central Office seizes the trunk, battery is connected to lead +T, closing #1 and #2P ("R" and "RR" wiring). Relay P operates, closes #1W in multiple with #2W, charges capacitor C6 and grounds lead AE ("G" wiring). Relay W operates, opens #2X, lights lamp L, grounds lead LL, and connects lead AP to #1 and #2X. Relay X restores (if operated) disconnects #1E, #1X and lead AD from lead CFI and connects lead CFI to lead CFO to remove the Trunk from the outgoing access chain. Ring current applied by the Central Office via leads +T and -T, closes #1V in series with #2S and Thermistor TR1. Relay V operates, locks via its #2 winding, closes #1U, and transfers lead CAI from lead CAO to #1E and to leads ARC and BAT (via resistor R14). Relay U operates, grounds leads TS and AB, connects lead LL and lamp L to "flashing" ground on lead FT, extends the "flashing" ground via lead FT and capacitor C3 to lead "-", and connects lead +M to lead -N via resistors R5 and R6. 1.2 "L" Wiring Ring current from Central Office closes #1V in series with #2S. Relay V operates, locks to ground on lead FN, closes #1U and #1W (in multiple with #2W), disconnects lead CAI from lead CAO and connects lead CAI to #1E and
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to leads ARC and BAT (via resistor R14). Relay U operates, grounds leads AB and TS, connects lead LL and lamp L to "flashing" ground on lead FT, extends the "flashing" ground via lead FT and capacitor C3 to lead "-", connects lead +M to lead -M, and opens #2X (if operated). Relay W operates and connects resistance battery to lead AP via #1 and #2K. Relay X restores (if operated), disconnects #1E, #1X and lead AD from lead CF1, and connects lead CF1 to lead CFO to remove the Trunk from the outgoing access chain.

2. Answer (Operated: Relays P, U, V and W)

2.1 Answer By Attendant ("B" and "BB" wiring)

When the Attendant operates a trunk key in response to the flashing line signal, ground is connected to lead KA, closing #2D, #1G and #1H, while leads KB and KC guard against connecting the Turret to more than one Trunk at a time as explained in the description of the Position Circuit. Relay D operates, opens #1 and #2V and P (relay P may release briefly as D operates, but then either holds or re-operates from ground on lead +T and battery on lead -T via the POS CKT), disconnects lead LL and lamp L from leads FT and "-" via capacitor C3, transfers lead CAI from #1E and leads ARC and BAT (via resistor R14) to lead CAO and connects resistance battery via #2D to lead AB.

Relay G operates, connects resistance (#2N) battery to lead KG causing the POSITION CKT to light the keyset-ready lamp, connects leads A and B to trunk leads +T and -T, respectively (when trunk conductor loop exceeds 600 ohms, "T" wiring is used - see TABLE A; H-850629-A), connects

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leads "+" and "-" to leads KP and KN, respectively, and connects lead RCA to lead LK and lead ACA to leads ARC and BAT (via resistor R14). Relay H operates connects lead LDA to lead LL via #1L and lead KT to lead T, connects resistance (#1R) battery to lead KH and resistance (#2T) ground to lead KE. Relays G and H (in combination), insert the Position Circuit into the Trunk to trip the ring.

After its slow-to-release interval due to its associated capacitor C6, V restores shifts the chain of leads CAI-CAO to lead CAI of the next Trunk, and opens #1U. Relay U restores, after capacitor C8 has become fully charged, removes ground from lead TS to stop the busy Interrupter, disconnects lead FT from resistance (R2) battery and leads KN and "-" via capacitor C3 and disconnects lead +M from lead -M via resistors R5 and R6.

In installations where "R" and "RR" wiring is connected rather than "B" and "BB" (See NOTE 76; H-850629-A) the operation is the same as described above except that battery and ground are reversed on leads +T and -T. Relay P holds in series with the DC bridge in the Position Circuit as in the case of "B" and "BB" wiring.

2.2 Night Answer-Universal

When a night key is operated and universal night answer service is provided, dialing the digit assigned to trunk answer from any PABX station in response to the night call signal causes direct ground to be returned via lead CAI. Ground on lead CAI, closes #1E and grounds leads ARC and BAT (via resistor R14) (operating trunk switch). Relay E operates, connects #1 and #2A via repeat coil

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RC to leads "+" and "-" respectively, short circuits #1F, connects resistance (R15) ground to lead LK and grounds lead T.

When the call is answered, a loop is connected across leads "+" and "-", closing A. Relay A operates, closes #1B and connects lead +T to lead -T via repeat coil RC. Relay B operates, locks, closes #2E, transfers lead AP from #1 and #2K to #1C and charges capacitor C7 via resistor R19.

When ground is removed from lead CAI, #1E is opened and the short circuit is removed from #1F, closing #1F in series with #2F. Relay F operates, closes #2D, and transfers lead FT from lead LL to ground. Relay D operates, connects lead +T and -T via #1P, the REP COIL, and resistor R20 or "T" wiring, (see TABLE A; H-850629-A), grounds lead AB, transfers lead CAI from #1E and leads ARC and BAT to lead CAO, switching the call to the next idle Trunk, and opens V and #2P. After its slow-to-release interval due to its associated capacitor C6, V restores and opens #1U. Relay U restores, after capacitor C8 has become fully charged, shunts the pulsing contact of A, removes ground from lead TS to halt the busy Interrupter, disconnects lead FI from resistance (R2) battery and lead "-" via capacitor C3, and disconnects lead -M from lead +M. Relay P remains operated via leads +T and -T. Relay W remains operated due to its slow-to-release characteristics.

When the incoming call is answered, the party at the answering station may either disconnect or initiate a transfer. (See Section C for consultation and transfer calls; E-850629-A).

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2.3 Night Answer-Predetermined

If a night key at the Turret is operated and predetermined night answer service is provided, leads +T and -T are disconnected from the Trunk leads which are terminated instead at one of the PABX stations. An incoming call in such instances does not cause the operations described in Sections 1.1 and 1.2, but merely sounds the ringer of the station instrument.

3. Incoming Call Abandoned (Operated: Relays P, U, V and W)

If the call is abandoned by Central Office before it can be answered, lead +T is grounded, short circuiting P, and ringing potential is removed from #1V in series with #2S and Thermistor TR1 via leads +T and -T. Relay P restores. Relay V restores, opens #1U and W and transfers lead CAI from #1E, leads ARC and BAT (resistance R14 battery) to lead CAO. After its slow-to-release interval, W restores and disconnects resistance (#1 and #2K) battery from lead AP. After its slow-to-release interval due to its associated capacitor C8, U restores, removes ground from lead TS to stop the busy Interrupter, disconnects lead FT from #2X, lamp L (extinguishing lamp L) and leads LL and "-" via capacitor C3 and disconnects lead +M from -M. This circuit is now at normal.

4. Call To PABX Station

4.1 Attendant Extends Incoming Call (Operated: Relays D, G, H, P and W)

To select the desired PABX line, the Attendant presses in sequence the key-set buttons corresponding to its

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number. The connection to the called line is established via the Trunk switch under control of Position and Register Circuits.

4.2 Called Line Idle

If the called line is idle, the associated (Position) circuit connects resistance battery to lead KE. Resistance battery via lead KE closes #2E and #2T. Relay T operates, grounds lead IS and transfers lead IL from ground to lead FR, flashing the Turret line lamp as a ringing signal for the Attendant. Relay E operates, locks via its #2 winding, closes #1 and #2F, transfers #2T from lead KE to resistance (R13) battery, connects resistance (R15) ground to leads LK and RCA, disconnects leads KP and KN from leads "+" and "-", respectively, connects lead IR via #1T to lead "-" and ground to lead "+" ("E" wiring) or connects lead IR to lead "-" and ground via #1T to lead "+" ("F" wiring). Relay F operates and disconnects resistance (#2N) battery from lead KG, causing the Position Circuit to extinguish the keyset-ready lamp and remove battery from lead KE.

After extending the incoming call to an idle called station, the Attendant may wait until the called station answers or he may disconnect. When the Attendant disconnects, ground is removed from lead KA, opening #1H and #1G. After its slow-to-release interval, G restores, transfers leads +T and -T from leads A and B of POS CKT to the repeat coils RC, disconnects lead LK from lead RCA and lead ACA from leads ARC and BAT [resistance (R14) battery]. After its slow-to-release interval, H restores, disconnects leads C and D of POS CKT from leads +T and -T, respectively,

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removes resistance (#1R) battery from lead KH, and disconnects lead KT from lead T.

4.3 Called Line Busy

If the called line is busy, the associated circuit, extends ground to lead KT via lead T, prevents E and T from operating by withholding battery from lead KE, and returns busy tone to the Attendant. In this case the Attendant may operate a break-in key to break in on the busy line when busy tone is heard, or he may disconnect by operating the Turret release key. No Trunk relays operate or restore during break in period.

When the Attendant disconnects, ground is removed from lead KA, opening #2D, #1G and #1H. Relay D restores, connects P across leads +T and -T, ("B" and "3B" wiring) connects #1V in series with #2S and Thermistor TR1 across leads +T and -T, via capacitor C11 disconnects resistance (#2D and #2U) battery from leads AB and TM. After its slow-to-release interval, G restores, disconnects resistance (#2T) ground from lead KE, disconnects lead RCA from lead LK, disconnects lead ACA from leads ARC and BAT (resistance (R14) battery), disconnects leads KN and KP from leads "-" and "+", respectively, and disconnects leads A and B of POS CKT from leads +T and -T, respectively. After its slow-to-release interval, H restores, disconnects resistance (#1R) battery from lead KH, disconnects leads C and D of POS CKT from repeat coil RC and disconnects lead LDA from lead LL via #1L.

When the Central Office disconnects, the loop is opened to P via leads +T and -T. Relay P restores and opens W. After its slow-to-release interval, W restores, disconnects

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Restoring a Trunk key when the Attendant disconnects, removes ground from lead KA, opening #1H and #1G. After its slow-to-release interval, H restores, disconnects resistance (#1R) battery from lead KH, disconnects lead KT from lead T, disconnects leads C and D of POS CKT from repeat coil RC, and disconnects lead LDA from lead LL via #1L. After its slow-to-release interval, G restores, disconnects lead RCA from lead LK, disconnects lead ACA from leads ARC and BAT (via resistor R14), disconnects leads KN and KP from leads "-" and "4", respectively, and transfers leads +T and -T from leads A and B of POS CKT to repeat coil RC. The conversation may now take place.

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When the PABX Station disconnects, the loop is opened across leads "+4" and "-", opening #1 and #2A. Relay A restores, closes #1C and opens #1B. Relay C operates, locks, and grounds lead TM. After its slow-to-release interval, B restores, opens #2E, and connects resistance (#1 and #2K) battery to lead AP. After its slow-to-release interval due to its associated capacitor C7, E restores, opens #1F, removes ground from lead T, and removes resistance ground from lead LK. Relay F restores, opens #1C, and disconnects the loop across leads +T and -T, opening P. Relay P restores. After its slow-to-release interval due to its associated capacitor C5, C restores, opens #2D and #1W, and removes ground from

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leads TM and AB. Relay D restores, connects P across leads +T and -T, and disconnects resistance (#2D and #2U) battery from leads AB and TM. After its slow-to-release interval, W restores, disconnects resistance (#1 and #2K) battery from lead AP, extinguishes lamp L, removes ground from lead LL and connects resistance (R2) battery to leads RSA OR RSB via #2X. The circuit is now at normal.

5.2 Local Station Disconnects First

5.21 "B" and "BB" Wiring

When the local party disconnects first, the loop is opened across leads "+" and "-", opening #1 and #2A. Relay A restores, closes #1C and opens #1B. Relay C operates, locks, and grounds lead TM. After its slow-to-release interval, B restores, opens #2E, and connects resistance (#1 and #2K) battery to lead AP. After its slow-to-release interval due to its associated capacitor C7, E restores, disconnects lead "+" and "-" from repeat coil RC, opens #1F, removes ground from lead T, and removes resistance ground from lead LK. Relay F restores, opens #1C, and disconnects the loop across leads +T and -T, opening P. Relay P restores. After its slow-to-release interval due to its associated capacitor C5, C restores, opens #2D and #1W, and removes ground from leads TM and AB. Relay D restores, connects P across leads +T and -T in series with resistor R1 or directly ("W" wiring, if central office is 24 volts), ("B" and "BB" wiring) or to lead +T and ground ("R" and "RR" wiring, see NOTE 76; H-850629-A) and disconnects resistance (#2D and #2U) battery from leads AB and TM. If the Central Office party has not yet disconnected, P re-operates, and holds W operated to maintain the busy indication.

When the Central Office disconnects, the loop is opened to P via leads +T and -T. Relay P restores and opens W.

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After its slow-to-release interval, W restores, disconnects resistance (#1 and #2K) battery from lead AP, extinguishes lamp L, removes ground from lead LL and connects resistance (R2) battery to leads RSA OR RSB via #2X. The circuit is now at normal.

5.22 "R" and "RR" Wiring

When the local party disconnects first, the loop is opened across leads "+" and "-", opening #1 and #2A. Relay A restores, closes #1C and opens #1B. Relay C operates and grounds lead TM. After its slow-to-release interval, B restores, opens #2E, and connects resistance (#1 and #2K) battery to lead AP. After its slow-to-release interval due to its associated capacitor C7, E restores, opens #1F, removes ground from lead T, and removes resistance ground from lead LK. Relay F restores, opens #1C, opens P, and disconnects the loop across leads +T and -T. Relay P restores. After its slow-to-release interval due to its associated capacitor C5, C restores, opens #2D and #1W, and removes ground from leads TM and AB. Relay D restores, closes P via battery on lead +T, and disconnects resistance (#2D and #2U) battery from leads AB and TM. Relay P operates and closes W.

When the Central Office disconnects, battery is removed from lead +T, opening P. Relay P restores and opens W. After its slow-to-release interval, W restores, disconnects resistance (#1 and #2K) battery from lead AP, extinguishes lamp L, removes ground from lead LL, and connects resistance (R2) battery to leads RSA OR RSB via #2X. The circuit is now at normal.

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6. Conference

6.1 Attendant Extends Incoming Call (Operated: Relays D, G, H, P and W)

When the Attendant key sends the digit assigned to the Tie Trunk, code call, or conference circuit, ground is connected to lead LDA, closing #1L, and battery is connected to lead KE, closing #2E and #2T. Relay T operates, transfers lead LL from lead LDA to lead FR, opening #1L, and grounds lead IS. Relay E operates, closes #1 and #2F, transfers leads "+" and "-" from leads XP and KN to the repeat coil RC, grounds leads T and KT, and connects resistance (R15) ground to leads LK and RCA. Relay L operates, locks via its #2 winding, disconnects #2A from lead "-" and connects #1A across leads "+" and "-" via diode CR4 and repeat coil RC. Relay F operates, connects lead +T to lead -T via #1P, resistor R20 or "T" wiring (see TABLE A; H-850629-A) and repeat coil RC, shunts the pulsing contact of A, disconnects resistance (#2N) battery from lead KG, and grounds lead AB.

6.2 Attendant Disconnects (Operated: Relays D, E, F, G, H, L, P, T and W)

When the Attendant disconnects from the C.O. Trunk, ground is removed from lead KA, opening #1H and #1G. After its slow-to-release interval, G restores, transfers leads +T and -T from leads A and B of POS CKT to the repeat coil RC, disconnects lead LK from lead RCA, disconnects lead ACA from leads ARC and BAI [resistance (R14) battery]. After its slow-to-release interval, H restores, disconnects leads C and D of POS CKT from leads +T and -T, respectively, removes resistance (#1R) battery from lead KH, and disconnects lead KT from lead T.

6.3 Answer (Operated: Relays D, E, F, L, P, T and W)

When the call is answered, the polarity on leads "+" and "-" is reversed, closing #1A. Relay A operates and closes #1B. Relay B operates, locks, via its #1 winding, opens #2T, and connects resistance (#1C) battery to lead AP. After its slow-to-release interval, T restores, transfers lead LL from lead FR to ground and removes ground from lead IS.

6.4 Disconnect (Operated: Relays A, B, D, E, F, L, P and W)

6.4.1 Last Local Conference Party Disconnects

When the last local conference party disconnects, battery polarity is restored to normal via leads "+" and "-", opening #1A. Relay A restores, closes #1C and opens #1B. Relay C operates, locks, and grounds lead TM. After its slow-to-release interval, B restores, opens #2E, and connects resistance (#1 and #2K) battery to lead AP. After its slow-to-release interval due to its associated capacitor C7, E restores, opens #1 and #2F, disconnects resistance (R15) ground from lead LK, removes ground from leads T (ground from the associated circuit maintains L operated via lead T), and disconnects repeat coil RC from leads "+" and "-". When ground is removed from lead T, #2L is opened. Relay L restores. Relay F restores, opens #1C and disconnects the loop across lead +T and -T, opening P. Relay P restores. After its slow-to-release interval due to its associated capacitor C3, C restores, opens #2D and #1W, and removes ground from leads TM and AB. Relay D restores, connects P across leads +T and -T, and disconnects resistance (#2D and #2U in multiple) battery from leads TM and A3. Relay W remains operated due to its slow-to-release characteristics. Relay P operates.

SIZE SHEET 15 TOTAL 28 A AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A.O. BEND, ILL., U.S.A.O. WAUWATAM, WIS., U.S.A.O.	6.42 <u>Central Office Releases</u> When the party at Central Office disconnects, the loop is opened to P via leads +T and -T. Relay P restores and opens W. After its slow-to-release interval, W restores, disconnects resistance (#1 and #2K) battery from lead AP, extinguishes lamp L, removes ground from lead LL and connects resistance (R2) battery to lead RSA OR RSB via #2X. The circuit is now at normal. 7. <u>Tie Trunk or Code Call</u> 7.1 <u>Attendant Extends Incoming Call</u> (Operated: Relays D, G, H, P and W) The operation is the same as described in Section A-6.1. 7.2 <u>Dialing</u> (Operated: Relays D, E, F, G, H, L, P, T and W) When the Attendant dials a number assigned to Tie Trunk or Code Call, ground is connected to lead KE, short circuiting #2E, and ground is connected to lead KT. Relay E restores, opens #2T, and #1 and #2F, transfers leads "+" and "-" from the repeat coil RC to leads KP and KN, respectively, removes ground from leads T and KT, and disconnects resistance (R15) ground from leads LK and PCA. After its slow-to-release interval, T restores, transfers lead LL from lead FR to lead LDA via #1L, and removes ground from lead IS. Relay F restores, disconnects lead +T from -T, removing the shunt across the pulsing contact of A, connects resistance (#2N) battery to lead KG, and removes ground from lead AB.
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SIZE SHEET 16 TOTAL 28 A AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A.O. BEND, ILL., U.S.A.O. WAUWATAM, WIS., U.S.A.O.	When the Attendant completes the digit(s), battery is momentarily connected to lead KE, closing #1E and #2T. The following operation is similar to that described in Section A-6.1, except that L is operated. 7.3 <u>Attendant Disconnects</u> (Operated: Relays D, E, F, G, H, L, P, T and W) The operation is the same as described in Section A-6.2. 7.4 <u>Answer</u> (Operated: Relays D, E, F, L, P, T and W) When a Tie Trunk or Code Call is answered, the polarity on leads "+" and "-" is reversed, closing #1A. The following operation is the same as described in Section A-6.3. 7.5 <u>Disconnect</u> (Operated: Relays A, B, D, E, F, L, P and W) 7.51 <u>C.O. Party Disconnects</u> When city party disconnects first, the loop is opened across leads +T and -T, opening #1P. Relay P restores and opens W. After its slow-to-release interval, W restores, connects resistance (R18) battery to lead +T via #1P, ("B" and "BB" wiring), disconnects resistance (#1C) battery from lead AP, and grounds lead -T via the repeat coil and resistor R20 or "T" wiring ("D" and "BB" wiring) (see TABLE A; H-850629-A), seizing the Central Office equipment. The Central Office returns ground via lead +T, closing #1P. Relay P operates and closes #1 and #2W. Relay W operates. The following operation is similar to that described in Section A-5.1 except that P restores as the loop is opened and does not re-operate, so W restores shortly thereafter.
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7.52 Tie Trunk or Code Call Party Disconnects

When Tie Trunk or Code Call party disconnects first, the polarity on leads "+" and "-" is returned to normal, opening #1A. Relay A restores, and the following operation is the same as described in Section A-6.41.

7.53 Central Office Releases

The operation is the same as described in Section A-6.42.

8. Attendant's C.O. Trunk Hold (Operated: Relays D, G, H, P, W and possibly X)

In order to place the C.O. Trunk on "hold", the Attendant, operates a hold key, causing resistance ground to be connected to lead KH, closing #1R, and resistance battery to be connected to lead KE, closing #2T and #2E. Relay R operates, locks via its #2 winding, grounds lead TS starting the busy Interrupter, grounds lead AE (via "H" wiring), if required, and shunts the pulsing contact of A. Relay T operates, transfers lead LL from LDA to lead FR and grounds lead IS. Relay E operates, closes #1 and #2F, transfers leads "+" and "-" from leads KP and KN to repeat coil RC, grounds lead T and KT, and connects resistance (R15) ground to leads LK and RCA. Relay F operates and removes resistance (#2N) battery from lead KG.

The Attendant may now disconnect and attend to other calls by removing ground from lead KA, opening #1G and #1H. The following operation is the same as described in Section A-6.2.

E-850629-A

E-850629-A		SHEET 18 TOTAL 28	
SIZE	A	DATE	19
AUTOMATIC ELECTRIC COMPANY NORTH AVE., N.E., OMAHA, ILL., U.S.A. OMAHA, ILL., U.S.A.			

To release the C.O. Trunk from the "hold" condition, the Attendant operates TRK TALK KEY, closing #1G and #1H via lead KA. Relay G operates, connects resistance (R15) ground and lead LK to lead RCA, connects lead ACA to leads ARC and BAT [resistance (R14) battery], transfers leads +T and -T from the repeat coil RC to lead A and B of POS CKT, respectively. Relay H operates, connects leads C and D to the repeat coil RC, grounds lead KT, and connects resistance (#1R) battery to lead KH. The Attendant then operates Turret Release key, connecting battery to lead KH, shunting #1R, and grounds lead KE, short circuiting #2E. Relay R restores, disconnects lead KH from lead FN via #2R, removes ground from lead TS, removes ground from lead AE (via "H" wiring), if provided, and connects resistor R3 to repeat coil RC if "A" wiring is used. Relay E, restores, opens #2T and #1 and #2F, connects leads "+" and "-" to leads KP and KN, respectively, removes resistance (R15) ground from leads LK and RCA, and removes ground from leads T and KT. Relay F restores, disconnects lead +T from lead -T, removing the shunt from across the pulsing contact of A, and connects resistance (#2N) battery to lead KG. After its slow-to-release interval, T restores, transfers lead LL from lead FR to lead LDA via #1L, and removes ground from lead IS. The Attendant may now extend the C.O. Trunk call as described in Sections A-4, 6 and 7.

3. Outgoing Call

1. Seizure

1.1 From Nonrestricted Line (Operated: Relay X)

When this circuit is seized by a nonrestricted PABX station, ground is connected to lead CFI, grounding leads AD and ARC, closing #1E and #1U ("D" wiring).

E-850629-A

SIZE 19 SHEET 19 TOTAL 28 E-850629-A AUTOMATIC ELECTRIC COMPANY CHICAGO, ILL. U.S.A.O.	Relay E operates, closes #1 and #2F, grounds lead T, connects resistance (R15) ground to lead LK, and connects leads "+" and "-" to the repeat coil RC. Relay U operates, grounds leads TS and AB, connects lead FT to lamp L and leads LL and "-" via capacitor C3, and disconnects lead +M from -M via resistors R5 and R6. Relay V operates, closes #2D, and transfers lead LL from lead FT to ground. Relay D operates, connects resistance (R18) battery to lead +T via #1P, disconnects #1V and #2S from across leads +T and -T, and transfers lamp L from lead Fx to ground. When the PABX station is connected to leads "+" and "-", a loop is closed via leads "+" and "-", closing #1A. Relay A operates, closes #1B and grounds lead -T via resistor R20 or "T" wiring and repeat coil RC, seizing the Central Office. Relay B operates, locks, and closes #2E. When ground is removed from lead CFI, #1X is opened. Relay X restores and connects lead CFI to lead CFO, removing the Trunk from the outgoing access chain. The Central Office returns ground via lead +T, closing #1P via resistance (R18) battery. Relay P operates and closes #1 and #2W. Relay W operates, opens #1U, connects resistance (#1C) battery to lead AP, and connects #1P across leads +T and -T via repeat coil RC and resistor R20 or "T" wiring. Relay U remains operated for an extended interval due to its associated capacitor C8 while the calling party receives identifying dialing tone. When the calling party dials the desired number, A follows the pulses and, when at normal, opens the loop across leads +T and -T, opening #1P, opens #1B and closes #1C. Relay C operates, closes #1U and grounds lead TM.
19	E-850629-A

SIZE 19 SHEET 20 TOTAL 28 E-850629-A AUTOMATIC ELECTRIC COMPANY CHICAGO, ILL. U.S.A.O.	Relay P restores. Relays B and C remain operated during pulsing due to their slow-to-release interval. At the end of pulsing, A operates, closes #1B, opens #1C and removes the shunt from #1P. Relay P operates. After its slow-to-release interval, C restores and opens #1U. The calling party receives identifying tone for another extended interval in which the next digit must be dialed. After the last digit, A re-operates, closes the loop to the Central Office, opens #1C and closes #1B. After its slow-to-release interval, C restores, opens #1U and removes ground from lead TM. After its extended slow-to-release interval, due to its associated capacitor C8, U restores, removes ground from lead TS and AB, disconnects lead +M and -M, and disconnects lead FT from lead "-", removing tone from lead "-". Consultation or transfer calls may now be made or the call may be released in the usual manner. 2. <u>Disconnect</u> (Operated: Relays A, B, D, E, F, P and W) 2.1 <u>Central Office Disconnects First</u> When the Central Office disconnects first, the operation is the same as described in Section A-5.1. 2.2 <u>Local Station Disconnects First</u> When the PABX station disconnects first, the operation is the same as described in Section A-5.2.
19	E-850629-A

E-850629-A SHEET 21 TOTAL 28 AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A.O. CHICAGO, ILL., U.S.A.O. WAUKESHA, WIS., U.S.A.O.	SIZE IN. 1/2 FR. 1/2 DATE:	A 19	C. <u>Consultation And Transfer Call</u> 1. <u>Consultation Call</u> ("X" wiring) Operated: Relay A, B, D, E, F, P and W) The local party may initiate a consultation call during an incoming or outgoing trunk call by dialing the digit 1, provided the repeated background blip sound is not audible. When the dial pulse is sent, the loop is opened across leads "+" and "-", opening #1 and #2A. Relay A restores, closes #1C, opens #1B, and grounds lead AP. Relay C operates, locks, and grounds lead TM. Upon completion of the dial pulse, A re-operates. After its slow-to-release interval, B restores, closes #1K and opens #1C. Relay K operates and charges capacitor C4. After its slow-to-release interval due to its associated capacitor C5, C restores, closes #1B, opens #1K, and removes ground from lead AP. Relay B operates, locks, and connects capacitor C4 to #1M. Relay M operates on discharge current from its associated capacitor C4, locks via resistor R12, connects resistance (R17) battery to lead TM via #1N, and transfers lead LL from ground to lead RG (resistance ground) via resistor R11. After its slow-to-release interval, K restores, connects lead MG to lead GS via #1S, and disconnects lead TM from resistance (R17) battery via #1N. Battery on lead GS and ground on lead MG closes #1S. Relay S operates, locks to battery on lead GI, disconnects lead GI from lead GO, disconnects lead FB from lead FC, grounds leads TA, FA, ME, MU and TXM, transfers #1M to ground on lead CG via resistor R12, and closes #1E and #1U. Relay U operates, locks, connects lead FT to lead "-" via capacitor C3, connects leads +M and -M, and grounds leads TS and AB.	E-850629-A SHEET 22 TOTAL 28 AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A.O. CHICAGO, ILL., U.S.A.O. WAUKESHA, WIS., U.S.A.O.
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E-850629-A

E-850629-A SHEET 22 TOTAL 28 AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A.O. CHICAGO, ILL., U.S.A.O. WAUKESHA, WIS., U.S.A.O.	SIZE IN. 1/2 FR. 1/2 DATE:	A 19	Ground on lead TM closes K. Relay K operates and disconnects lead MG from lead GS, opening #1S. Relay S restores, connects lead GI to lead GO, removes ground from leads MT, MU, FA, TA and TXM, connects lead FB to lead FC, connects lead TM to resistance (R17) battery via #1N, and opens #1E and #1U. Relay U remains operated due to its associated capacitor C8. Ground via lead TM closes #1N. Relay N operates, transfers the repeat coil RC from lead +T and -T to leads +M and -M via resistors R5 and R6, respectively; and connects #1U and resistor R10 across leads +T and -T via #1P and resistor R20 or "T" wiring, (see TABLE A; H-850629-A). When the consulting party hears PABX dial tone, dialing commences. Relay A follows the dial pulse(s) and when at normal, opens the loop via leads +M and -M, closes #1C and opens #1B. Relay C operates and closes #1U. After the last pulse(s), A re-operates, connects lead +M to -M, closes #1B and opens #1C. After its slow-to-release interval due to its associated capacitor C5, C restores and opens #1U. After its extended slow-to-release interval due to its associated capacitor C8, U restores, removes ground from leads TS & AB disconnect lead FT from lead "-", removing tone from lead "-". Consultation may now take place. If the Trunk fails to seize a Link, ground is not returned on lead TM and K cannot re-operate. Ground on lead TA caused ground to be removed from lead CG, opening #1M. Relay M restores, transfers lead LL from lead RG (resistance ground) to ground and opens #1S. Relay S restores, connects lead GI to lead GO, removes ground from leads MT, MU, FA, TA and TXM, connects lead FB to lead FC, and opens #1U. With the opening of U, the	E-850629-A SHEET 22 TOTAL 28 AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A.O. CHICAGO, ILL., U.S.A.O. WAUKESHA, WIS., U.S.A.O.
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E-850629-A

E-850629-A		SHEET 23 TOTAL 28	
A		A	
AUTOMATIC ELECTRIC CO. INC. NEW YORK, N.Y. U.S.A.O. WAREHOUSE, W.B.C. U.S.A.O.			
19			

consultation attempt is erased and the Trunk is in the same condition as before the attempt, except U remains operated for 6-8 seconds after release of S due to its associated capacitor C8.

2. Consultation Call ("Y" wiring) (Operated: Relay A, B, D, E, F, P and W)

If the local stations are to be permitted to consult with someone at a C.O. station during the progress of an incoming or outgoing call, "Y" wiring is substituted for normally connected "X" wiring and the operation is similar to that described in Section C-1 except lead TXM is not grounded. Therefore, the Selection Control treats the bank multiple as though it were a non-restricted station and consultation calls can be completed from this circuit outward over any other available Trunk in the switchboard.

The following precautions should be understood before "Y" wiring is connected:

- A. A consultation call can be made to any other available Trunk but the original Trunk can not be transferred to the second or consulted Trunk. Attempts to do so will result in the call being lost.
- B. While connected to a Trunk with "Y" wiring, a restricted station will be able to access an outgoing Trunk in any Trunk group by way of the consultation path of the original Trunk.

E-850629-A

E-850629-A		SHEET 24 TOTAL 28	
A		A	
AUTOMATIC ELECTRIC CO. INC. NEW YORK, N.Y. U.S.A.O. WAREHOUSE, W.B.C. U.S.A.O.			
19			

C. A call placed to another Trunk by way of the consultation path will be released if the controlling station returns to the distant party on the first Trunk.

2. Return To Trunk From Consultation (Operated: Relays A, B, D, E, F, K, M, N, P, W and possibly U)

To return to the Central Office connection, the controlling party dials the digit 1, after the consulted party disconnects and after U has restored. Relay A follows the pulse and, when at normal, opens #1B, closes #1C, and grounds lead AP. Relay C operates, locks and grounds leads TM and AB. Upon completion of the dial pulse, A re-operates. After its slow-to-release interval, B restores and opens #1C. After its slow-to-release interval due to its associated capacitor C5, C restores, closes #1B and removes ground from leads AP, TM, opening #1K and #1N. Relay B operates and connects capacitor C4 to #2M, closing #2M in opposition to #1M. Relay M restores and transfers lead LL from lead RC (resistance ground) to ground. After its slow-to-release interval, K restores. Relay N restores, disconnects #1D and resistor R10 from across leads +T and -T and transfers repeat coil RC from leads +M and -M to leads +T and -T via #1P and resistor R20 or "T" wiring, (see TABLE A; R-850629-A). Controlling and C.O. Stations are now connected.

To return to C.O. party while consulted party remains "off-hook", the controlling party dials the digit 1. Relay A follows the dial pulse and when at normal, opens #1B and closes #1C. The following operation is similar to that described previously, except when M restores, K operates.

E-850629-A

E-850629-A	SIZE	A	SHEET 25	TOTAL 28	
					AUTOMATIC ELECTRIC COMPANY 100 WALL STREET, NEW YORK 100, N.Y.
					19

3. Three Party Conference (Operated: Relays A, B, D, E, F, K, M, N, P, W and possibly U)

To arrange a three-party conference after a consultation has been established ("C" wiring provided), the controlling party first requests that the consulted party remain on the line, maintaining ground on lead TM. Ground on lead TM holds K, M and N, and prevents the Consultation Link from releasing. The consulting party then initiates a return to the Trunk as described in Section C-2, except that K does not release. The pair of capacitors in series with "C" wiring permits a three way conversation.

4. Disconnect Of Central Office During Consultation Call (Operated: Relays A, B, D, E, F, K, M, N, P, W and possibly U)

When the Central Office party disconnects while a consultation call is in progress, the loop is opened across leads +T and -T, opening P ("B" and "BB" wiring). When "R" and "RR" wiring is used, P is opened when the Central Office either switches lead +T from battery to ground, or momentarily interrupts ground on lead +T. Relay P restores and opens W. Relay W restores, grounds lead -T to seize the Central Office equipment and connects resistance (R18) battery via #1P to lead +T, closing P. Relay P operates and closes W. Relay W operates, removes ground from lead -T and connects #1P across leads +T and -T. The Central Office circuit is held via the loop across leads +T and -T to prevent re-seizure from that end.

5. Optional Consultation Procedure

A consultation call may also be initiated by operating the hookswitch, opening the loop across leads "+" and

E-850629-A

E-850629-A	SIZE	A	SHEET 26	TOTAL 28	
					AUTOMATIC ELECTRIC COMPANY 100 WALL STREET, NEW YORK 100, N.Y.
					19

6. Transfer Call (Operated: Relays A, B, D, E, F, K, M, N, P, W and possibly U)

To transfer an incoming call to a PABX station, the local party makes a consultation call as described in Section C-1 and then disconnects. When the local party or the controlling party disconnects, the loop is opened across leads "+" and "-", opening #1 and #2A. Relay A restores, opens #1B, closes #1C, and grounds lead AP. Relay C operates. After its slow-to-release interval, B restores and opens #2E and #1U (if operated). After its slow-to-release interval due to its associated capacitor C7, E restores, opens #1 and #2F, disconnects leads "+" and "-" from repeat coil RC, removes ground from lead T, and removes resistance (R15) ground from lead LK. After its slow-to-release interval due to its associated capacitor C8, U restores (if operated), and disconnects lead FT from lead "-", closes the loop across leads +M and -M, and removes ground from leads TS & AB. Relay F restores, opens #1C and opens the loop across leads +M and -M via repeat coil RC. After its slow-to-release interval due to its associated capacitor C5, C restores, opens #1K, connects lead TM to lead GS via #1S, closing S. Relay S operates, locks to battery on lead CG, closes #1E, disconnects lead GO from lead GI, disconnects lead FB from lead FC, grounds leads TXM, ("X" wiring, see TABLE A; H-850629-A), TA, TX, SCA, ARC and BAT (via resistor R14) and closes #2M in opposition to its #1 winding. Relay E operates, closes #1 and #2F, grounds lead T, connects resistance (R15) ground to lead

E-850629-A

E-850629-A		SIZE		A		SHEET 27		TOTAL 28	
DATE:		APPROVED:		FOR:		BY:		CHECKED:	
AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A. OGDEN, ILL., U.S.A. OGDEN, ILL., U.S.A. OGDEN, ILL., U.S.A. OGDEN, ILL., U.S.A.									

19

1K, and connects leads "+" and "-" to the repeat coil RC. Relay M restores, disconnects lead TM from lead GS via #1S, transfers lead LL from resistance (R11) ground to ground. Relay F operates, grounds lead TX, and closes the loop across leads +M and -M. Relay K remains operated due to its slow-to-release characteristics.

When the consulted party is connected to leads "+" and "-", a loop is closed across leads "+" and "-", closing #1A and #2A. Relay A operates and closes #1B. Relay B operates and closes #2E. When ground is removed from lead CG, #1S and #1N are opened. Relay S restores, opens #1E, connects lead FB to lead FC, and removes ground from leads TXM, TA, TX, SCA, ARC and BAT (via resistor R14). Relay N restores, removes #1D from across the leads +T and -T, and transfers repeat coil RC from leads +M and -M to leads +T and -T, respectively. Consulted and C.O. Stations are now connected.

If controlling party wishes to transfer the call to the consulted party, it dials the digit 1 and disconnects. When the controlling party disconnects, the loop is opened across leads "+" and "-", opening #1 and #2A. Relay A follows the dial pulse and, when at normal, closes #1C opens #1B, and grounds lead AP. Relay C operates, locks, and grounds lead TM. Upon completion of the dial pulse, A re-operates. After its slow-to-release interval, B restores, closes #1K and opens #1C. Relay K operates and charges capacitor C4. After its slow-to-release interval due to its associated capacitor C5, C restores, closes #1B, opens #1K and removes ground from lead AP. Relay B operates, locks, and connects capacitor C4 to #1M closing #1M. Relay M operates on discharge current from its

E-850629-A

E-850629-A		SIZE		A		SHEET 28		TOTAL 28	
DATE:		APPROVED:		FOR:		BY:		CHECKED:	
AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A. OGDEN, ILL., U.S.A. OGDEN, ILL., U.S.A. OGDEN, ILL., U.S.A. OGDEN, ILL., U.S.A.									

19

associated capacitor C4, locks, closes #1N and #1K (maintaining K operated), connects resistance (R17) battery to lead TM via #1N, and transfers lead LL from ground to lead RC resistance (R11) ground. Relay N operates, connects #1D across the leads +T and -T, and transfers repeat coil RC from leads +T and -T to lead +M and -M, respectively.

D. Trunk Rotation

When a Trunk is engaged, X restores as described in Sections A-1 and B-1.1 to transfer subsequent calls to other available Trunks. After all Trunks have been used in rotation, all X relays are normal and lead CFI remains open after the last selection, causing busy tone to be returned to a party attempting a Trunk call. Ground is returned on lead RSA or RSB closing the X relays of all idle Trunks. The X relays operate, lock and connect resistance battery to lead CFI. The idle circuits are now at normal.

E. Special Requirements For Central Office Line Circuit

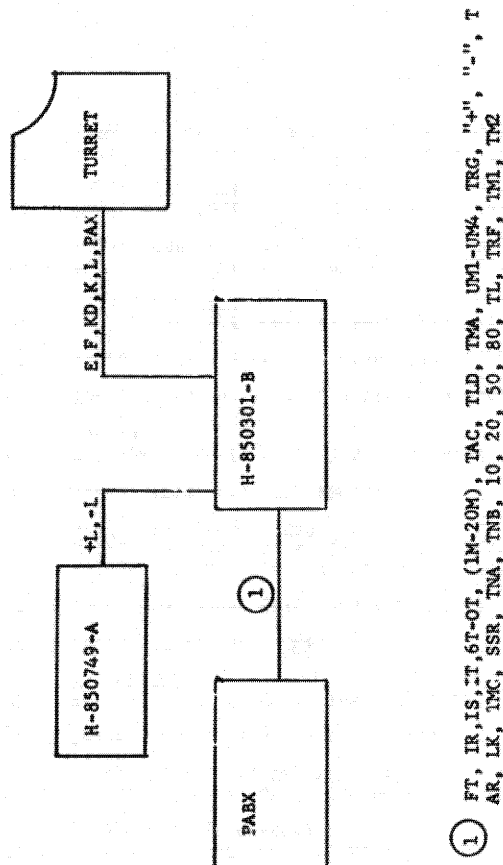
When the Central Office equipment is arranged so that the positive Trunk conductor is normally open and seizure of this end is effected by grounding that conductor, "B" and "BB" wiring should be connected in this circuit rather than "R" and "RR" wiring. On an outgoing call, the Central Office equipment is seized by placing ground on the negative Trunk conductor.

When the C.O. line circuit is arranged for loop seizure with premonitory busy "R" and "RR" wiring is connected rather than "B" and "BB" wiring.

E-850629-A

SIZE E- 850301-B SHEET 1 TOTAL 4 8 AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS U.S.A.	CIRCUIT EXPLANATION M ATT'S TRKS. CONFERENCE & PBX TRK. SELECTION CKTS. TYPE 40, 80 PABX H-850301-B
8/73: mb Issue 1	(Written specifically for circuit issue 1, but may also apply to later issues. Refer to H print for appropriate E issue number.) <u>GENERAL</u> This circuit was designed to permit a PABX station to call the Operator for assistance via a non-extendible trunk, and allows the attendant to access a PABX line. Meet-me conferences can be arranged between stations only, or between stations and C.O. Trunks. Also, facility is provided for Trunk transfer by a PABX station, or connection of a Trunk to this circuit by an attendant. <u>FEATURES</u> (a) Provides non-extendible information trunks (b) Provides attendant out-dial trunk (c) Provides single digit access (d) Provides access control common to a single group (e) Provides PBX trunk selection circuit (f) Provides for various combinations of all PABX station, or station and trunk conferences (g) Provides add-on all station conference circuits (h) Provides for trunk transfer by a PABX station (i) Provides trunk connection by an attendant <u>OUTLINE</u> 1.00 Non-Extendible Inf. Trk. and Common Access Control for Inf. Trk. Grp.
WRITTEN BY G. Naumczik <i>H.N.</i>	APPROVED: <i>1/2 6/4/73</i> ISSUE 1 DRAWING NO. E- 850301-B

SIZE E- 850301-B SHEET 2	1.01 FIGS. 1A, 3A ("A" or "B" WRG.) (Operated: Relays X1-X4) 1.01.1 Seizure by a PABX Station 1.02 Release (FIGS. 1A & 3A) ("A" or "B" WRG.) 1.02.1 Attendant Releases First (Operated: Relays A & B) 1.02.2 PABX Party Releases First (Operated: Relays A & B) 1.03 All Trunks Busy ("A" or "B" WRG.) (Operated: Relays A & B) 2.00 Attendant Recall 2.01 FIGS. 1A & 3A ("A" or "B" WRG.) 3.00 Attendant's Out-Dial Trunk 3.01 FIG. 2A 3.01.1 Seizure by the Attendant 3.02 Release (FIG. 2A) 3.02.1 Attendant Release (Operated: Relay OD) 4.00 1 Trk. 3 Sta. Conf. Ckt., & Conf. Ckts. 5-8 4.01 Seizure and Trunk Transfer by a PABX Station (FIGS. 4A & 7A) ("K" WRG.) 4.01.1 Seizure of Conf. Ckt. #1 by a PABX Station (Operated: Relays XCl-XC8) 4.01.2 Trunk Transfer by a PABX Station (Operated: Relays Cl, XC2-XC8) 4.01.3 Seizure of Conf. Ckt. #2 by a PABX Station (Operated: Relays Cl, TX, XC2-XC8) 4.01.4 Seizure of Conf. Ckt. #3 by a PABX Station (Operated: Relays Cl, C2, TX, D, XC3-XC8) 4.01.5 Seizure of Conf. Ckt. #4 by a PABX Station (Operated: Relays Cl-C3, TX, D, XC4-XC8)
ISSUE 1	DRAWING NO. E- 850301-B

FIG. 4D
TYPICAL ARRANGEMENT OF EQUIPMENT

ISSUE	DRAWING NO.
1	E- 850301-B

- 4.01.6 Seizure of Conf. Ckt. #5 by a PABX Station (Operated: Relays C1-C4, TX, D, XC5-XC8)
- 4.01.7 Seizure of Conf. Ckt. #6 by a PABX Station (Operated: Relays C1-C5, TX, D, XC6-XC8)
- 4.01.8 Seizure of Conf. Ckt. #7 by a PABX Station (Operated: Relays C1-C6, TX, D, XC7, XC8)
- 4.01.9 Seizure of Conf. Ckt. #8 by a PABX Station (Operated: Relays C1-C7, D, TX, XC8)
- 4.02 Release (FIGS. 4A & 7A) ("K" WRG.)
 - 4.02.1 Release of Conf. Ckt. #2 (Operated: Relays D, TX, C1-C8)
 - 4.02.2 Release of Conf. Ckt. #3 (Operated: Relays D, TX, C1, C3-C8, XC2)
 - 4.02.3 Release of Conf. Ckt. #4 (Operated: Relays D, TX, C1, C4-C8, XC2, XC3)
 - 4.02.4 Release of Conf. Ckt. #5 (Operated: Relays D, TX, C1, C5-C8, XC2-XC4)
 - 4.02.5 Release of Conf. Ckt. #6 (Operated: Relays D, TX, C1, C6-C8, XC2-XC5)
 - 4.02.6 Release of Conf. Ckt. #7 (Operated: Relays D, TX, C1, C7, C8, XC2-XC6)
 - 4.02.7 Release of Conf. Ckt. #8 (Operated: Relays D, TX, C1, C8, XC2-XC7)
 - 4.02.8 Release of Conf. Ckt. #1 (Operated: Relays D, TX, C1, XC2-XC8)
- 5.00 1 Trk. 3 Sta. Conf. Ckt.
- 5.01 Seizure and Trunk Transfer by PABX Stations (FIG. 4A) ("L" WRG.)
- 5.01.1 Seizure of Conf. Ckts #1-4 by PABX Stations
- 5.02 Release (FIG. 4A) ("L" WRG.)

ISSUE	DRAWING NO.
1	E- 850301-B

- 5.02.1 Release of Conf. Ckts. #1-4 (Operated: Relays D, TX, C1-C4)
- 6.00 1 Trk., 3 Sta. Conf. Ckt. & Conf. Ckts. 5-8
- 6.01 Access From Turret (FIGS. 4A & 7A) ("K" WRG.)
- 6.01.1 Attendant Connects a Trunk to Conf. Ckt. #1 (Operated: Relays XC1-XC8)
- 6.01.2 Seizure of Conf. Ckt. #2 by a PABX Station (Operated: Relays C1, D, XC2-XC8)
- 6.01.3 Seizure of Conf. Ckts. 3-8 by PABX Stations (Operated: Relays D, TX, C1, C2, XC3-XC8)
- 6.02 Release (FIGS. 4A & 7A) ("K" WRG.)
- 6.02.1 Release of Conf. Ckts. 1-8 (Operated: Relays D, TX, C1-C8)
- 7.00 1 Trk., 3 Sta. Conf. Ckt.
- 7.01 Access from Turret (FIG. 4A) ("L" WRG.)
- 7.01.1 Seizure of Conf. Ckt. #1 by an Attendant and Seizure of Conf. Ckts. 2-4 by PABX Stations (Operated: Relays XC1-XC4)
- 7.02 Release (FIG. 4A) ("L" WRG.)
- 7.02.1 Release of Conf. Ckts. 1-4 (Operated: Relays D, TX, C1-C4)
- 8.00 2 Trk., 3 Sta. or 1 Trk., 4 Sta or 5 Sta, Conf. Ckt.
- 8.01 Seizure by PABX Stations (FIG. 5A)
- 8.01.1 Seizure of Conf. Ckt. #1 by a PABX Station (Operated: Relays CA1-CA3)
- 8.01.2 Seizure of Conf. Ckt. #2 by a PABX Station (Operated: Relays CSB, CB1, CA2, CA3)
- 8.01.3 Seizure of Conf. Ckt. #3 by a PABX Station (Operated: Relays CSB, CB1, CB2, CA3)
- 8.01.4 Seizure of Conf. Ckt. via Terminals +CT1, -CT1 by a PABX Station (Operated: Relays CSB, CB1-CB3)

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- 8.01.5 Seizure of Conf. Ckt. via Terminals +CT2, -CT2 by a PABX Station (Operated: Relays CSB, CB1-CB3, CT1)
- 8.02 Release (FIG. 5A)
- 8.02.1 Release of Conf. Ckt. #1 (Operated: Relays CSB, CB1-CB3, CT1, CT2)
- 8.02.2 Release of Conf. Ckt. #2 (Operated: Relays CSB, CB2, CB3, CT1, CT2, CA1)
- 8.02.3 Release of Conf. Ckt. #3 (Operated: Relays CSB, CB3, CT1, CT2, CA1, CA2)
- 8.02.4 Release of Conf. Ckt. via Terminals +CT1, -CT1 (Operated: Relays CT1, CT2, CA1-CA3)
- 8.02.5 Release of Conf. Ckt. via Terminals +CT2, -CT2 (Operated: Relays CT2, CA1-CA3)
- 8.03 Access from Turret (FIG. 5A)
- 8.03.1 Attendant Connects a Trunk to Conf. Ckt. via Terminals +CT1, -CT1 (Operated: Relays CA1-CA3)
- 8.03.2 Attendant Connects a Trunk to Conf. Ckt. via Terminals +CT2, -CT2 (Operated: Relays CT1, CA1-CA3)
- 8.03.3 Seizure of Conf. Ckt. #1 By a PABX Station (Operated: Relays CT1, CT2, CA1-CA3)
- 8.03.4 Seizure of Conf. Ckt. #2 by a PABX Station (Operated: Relays CB1, CB2, CSB, CT1, CT2, CA3)
- 8.03.5 Seizure of Conf. Ckt. #3 by a PABX Station (Operated: Relays CB1, CB2, CSB, CT1, CT2, CA3)
- 8.04 Release (FIG. 5A)
- 8.04.1 Release of Conf. Ckt. #1 (Operated: Relays CSB, CB1-CB3, CT1, CT2)
- 8.04.2 Release of Conf. Ckt. #2 (Operated: Relays CSB, CB2, CB3, CT1, CT2, CA1)
- 8.04.3 Release of Conf. Ckt. #3 (Operated: Relays CSB, CB3, CT1, CT2, CA1, CA2)

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- 8.04.4 Release of Conf. Ckt. via Terminals +CT1, -CT1
(Operated: Relays CT1, CT2, CA1-CA3)
- 8.04.5 Release of Conf. Ckt. via Terminals +CT2, - CT2
(Operated: Relays CT2, CA1-CA3)
- 9.00 PBX Trunk Selection Ckt. (FIG. 6A) ("H" & "F" WRG.)
- 9.01 Group A, 1 Group of 4 Lines
 - 9.01.1 Seizure (Operated: Relays A1-A4, B1-B3)
 - 9.01.2 Release (Operated: Relays B1-B3)
- 9.02 Group B, 1 Group of 3 Lines
 - 9.02.1 Seizure (Operated: Relays A1-A4 and B1-B3)
 - 9.02.2 Release (Operated: Relays A1-A4)
- 10.00 1 Trk., 4 Station, 2 Trk., 3 or 5 Station Conf. Ckt.
- 10.01 Seizure and Trunk Transfer by a PABX Station (FIG. 8A)
 - 10.01.1 Seizure of Conf. Ckt. #1 by a PABX Station (Operated: Relays XC1-XC5)
 - 10.01.2 Trunk Transfer by a PABX Station (Operated: Relays E1, C1, XC2-XC5)
 - 10.01.3 Seizure of Conf. Ckt. #2 by a PABX Station (Operated: Relays C1, TX1, XC2-XC5)
 - 10.01.4 Seizure of Conf. Ckt. #3 by a PABX Station (Operated: Relays SS, TX1, D1, C1, C2, XC3-XC5)
 - 10.01.5 Seizure of Conf. Ckt. #4 by a PABX Station (Operated: Relays SS, TX1, D1, C1-C2, XC4, XC5)
 - 10.01.6 Seizure of Conf. Ckt. #5 by a PABX Station (Operated: Relays SS, TX1, D1, C1-C4, XC5)
- 10.02 Release (FIG. 8A)

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- 10.02.1 Release of Conf. Ckt. #2 (Operated: Relays SS, TX1, D1, C1-C5)
- 10.02.2 Release of Conf. Ckt. #3 (Operated: Relays SS, TX1, D1, C1, C3-C5, XC2)
- 10.02.3 Release of Conf. Ckt. #4 (Operated: Relays SS, TX1, D1, C1, C4, C5, XC2, XC3)
- 10.02.4 Release of Conf. Ckt. #5 (Operated: Relays SS, TX1, D1, C1, C5, XC2-XC4)
- 10.02.5 Release of Conf. Ckt. #1 (Operated: Relays TX1, D1, XC2-XC5)
- 10.03 Access from Turret (FIG. 8A)
 - 10.03.1 Attendant Connects a Trunk to Conf. Ckt. #1 (Operated: Relays XC1-XC5)
 - 10.03.2 Attendant Connects a Trunk to Conf. Ckt. #2 (Operated: Relays D1, C1, XC2-XC5)
 - 10.03.3 Seizure of Conf. Ckt. #3 by a PABX Station (Operated: Relays D1, D2, C1, C2, XC3-XC5)
 - 10.03.4 Seizure of Conf. Ckt. #4 by a PABX Station (Operated: Relays D1, D2, TX1, TX2, C1-C3, XC4, XC5)
 - 10.03.5 Seizure of Conf. Ckt. #5 by a PABX Station (Operated: Relays D1, D2, TX1, TX2, C1-C4, XC5)
- 10.04 Release (FIG. 8A)
 - 10.04.1 Release of Conf. Ckt. #5 (Operated: Relays D1, D2, TX1, TX2, C1-C5)
 - 10.04.2 Release of Conf. Ckt. #4 (Operated: Relays D1, D2, TX1, TX2, C1-C4, XC5)
 - 10.04.3 Release of Conference Ckt. #3 (Operated: Relays D1, D2, TX1, TX2, C1-C3, XC4, XC5)
 - 10.04.4 Release of Conf. Ckt. #2 (Operated: Relays D1, D2, TX1, TX2, C1, C2, XC3-XC5)
 - 10.04.5 Release of Conf. Ckt. #1 (Operated: Relays D1, TX1, C1, XC2-XC5)

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- 11.00 3 Station Conference
- 11.01 Seizure (FIG. 9A) ("M" & "N" WRG.)
- 11.01.1 Seizure of Conf. Ckt. via Terminals +C1, -C1
(Operated: Relays XC1-XC3)
- 11.01.2 Seizure of Conf. Ckt. via Terminals +C2, -C2
(Operated: Relays C1, XC2, XC3)
- 11.01.3 Seizure of Conf. Ckt. via Terminals +C3, -C3
(Operated: Relays C1, C2, XC3)
- 11.02 Release (FIG. 9A) ("M" & "N" WRG.)
- 11.02.1 Release of Conf. Ckt. via Terminals +C1, -C1
(Operated: Relays C1-C3)
- 11.02.2 Release of Conf. Ckt. via Terminals +C2, -C2
(Operated: Relays C2, C3, XC1)
- 11.02.3 Release of Conf. Ckt. via Terminals +C3, -C3
(Operated: Relays C3, XC1, XC2)
- 12.00 4 Station Conf. Ckt.
- 12.01 Seizure (FIG. 10A)
- 12.01.1 Seizure of Conf. Ckt. via Terminals +C4, -C4
(Operated: Relays XC4-XC7)
- 12.01.2 Seizure of Conf. Ckt. via Terminals +C5, -C5
(Operated: Relays C4, XC5-XC7)
- 12.01.3 Seizure of Conf. Ckt. via Terminals +C6, -C6
(Operated: Relays C4, C5, XC6, XC7)
- 12.01.4 Seizure of Conf. Ckt. via Terminals +C7, -C7
(Operated: Relays C4-C6, XC7)
- 12.02 Release (FIG. 10A)
- 12.02.1 Release of Conf. Ckt. via Terminals +C4, -C4
(Operated: Relays C4-C7)
- 12.02.2 Release of Conf. Ckt. via Terminals +C5, -C5
(Operated: Relays C5-C7, XC4)

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- 12.02.3 Release of Conf. Ckt. via Terminals +C6, -C6
(Operated: Relays C6, C7, XC4, XC5)
- 12.02.4 Release of Conf. Ckt. via Terminals +C7, -C7
(Operated: Relays C7, XC4-XC6)
- 13.00 Test Facilities Busy Keys
- 13.01 FIGS. 1 & 3 ("A" or "B" WRG.) [Operated: Relays X(1)-X(4)]
- 13.02 FIG. 8A (Operated: Relays XC3-XC5)
- 13.03 FIGS. 9A & 10A ("M" or "N" WRG.) (Operated: Relays XC1-XC7)
- CIRCUIT OPERATION

1.00 Non-Extendible Inf. Trk. and Common Access Control For Inf. Trk. Grp.

1.01 FIGS. 1A, 3A ("A" or "B" WRG.) (Operated: Relays X1-X4)

1.01.1 Seizure by a PABX Station

When the digit assigned to information is dialed in a Link by a PABX station, ground is connected to terminal ATS by Link Selection Control H-850260-A, Selection Routing Ckt. H-850687-A or equivalent, closing TK. Relay TK operates, connects ground to leads TAC, TLD, resistance (resistor R2) ground to lead TMA and resistance [X(1)] ground to lead UMI. This causes the Connector Switch to connect the calling party loop to leads "+", "-", and T. Ground on test lead T closes B. After its slow-to-operate interval, relay B operates, connects ground to lead IS to start the Ringing Interrupter; lead FT (120 IPM flashing ground) to lead L to signal the attendant; and lead IR (ringback tone) to lead "-" via resistor R1. After the selection is completed ground is disconnected from terminal ATS opening TK. Relay TK restores, disconnects ground from leads TAC, TLD, resistance (resistor R2) ground from lead TMA, and resistance [X(1)] ground from lead UMI opening X(1). Relay X(1) restores. With resistance battery from Position Ckt. H-850350-A connected to lead KD, the attendant operates the Information Trunk Talk Key and connects ground to lead K closing A. At this time the Position Ckt. connects the attendant to leads E and F. Relay A operates, transfers lead L from lead FT to ground (steady lamp), disconnects ground from lead IS, stopping the Interrupter, transfers lead "-" from lead IR via resistor R1 to lead F via #2A, and connects lead E to lead "+"; this removes ringback tone and connects the attendant to the calling party. Conversation may now take place and the operation of circuits 2-4 is similar to circuit 1 described above.

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1.02 Release (FIGS. 1A & 3A) ("A" or "B" WRG.)

1.02.1 Attendant Releases First (Operated: Relays A & B)

When the attendant restores the trunk key at the conclusion of a call, ground is disconnected from lead K opening A. Relay A restores, connects ground to lead IS, transfers lead "-" from lead F via #2A, to lead IR via resistor R1, disconnects lead E from lead "+" and transfers lead L from ground to lead FT. The calling party then releases, disconnects ground from lead T opening B. Relay B restores, disconnects ground from lead IS, lead FT from lead L, lead IR from lead "-" via resistor R1, and connects resistance [#2X(1)] battery via diode CR1(1) to terminal TRG (A WRG.) or to lead X1R ("B" WRG.). When no other selections are in progress, the Finder Guard H-850280-A or Misc. Common Ckt. H-850626-A connects ground to lead TRG closing X(1) via diode CR1(1) ("A" WRG.) or to leads TR1, X2R, TR2, TR3, and TR4 ("B" WRG.). Relay X(1) operates and locks. Circuits 2-4 release in a similar manner. The circuit is now at normal.

1.02.2 PABX Party Releases First (Operated: Relays A & B)

Circuit operation is the same as Section 1.02.1 except that when relay A restores it also opens relay B.

1.03 All Trunks Busy ("A" or "B" WRG.) (Operated: Relays A & B)

If all four circuits are busy, terminal ATS is transferred from relay TK to lead ATB causing busy tone to be sent to the calling party when the assigned digit is dialed and ground is connected to terminal ATS.

2.00 Attendant Recall

2.01 FIGS. 1A & 3A ("A" or "B" WRG.)

If a local party engaged on a city trunk call wishes to recall the attendant, a consultation call is made to an Information Trunk as described in Section 1.00. The PABX party may release the Information Trunk and return to the city connection or may transfer the call to the Attendant. If the Attendant is to dispose of the call, the PABX party hangs up to complete the transfer and the City Trunk is identified to the Attendant who operates the corresponding City Trunk key before restoring the Information Trunk key. The Attendant may then extend the call with the keyset in the usual manner.

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3.00 Attendant's Out Dial Trunk

3.01 FIG. 2A

3.01.1 Seizure by the Attendant

To call a PABX station or any of the special feature circuits to which the Link Circuits have access, the Attendant operates the PAX key and connects ground to lead PAX, with resistance battery from Position Ckt. H-850350-A in FIG. 1A connected to lead KD this closes OD. Relay OD operates, connects lead +L to lead E of FIG. 1A, lead -L via #20D, to lead F of FIG. 1A, connecting the Attendant's loop to Line Ckt. H-850282-A or Equivalent. The Attendant receives dial tone and can now use the Turret dial in the same manner as any PABX station.

3.02 Release (FIG. 2A)

3.02.1 Attendant Release (Operated: Relay OD)

When the Attendant restores the PAX key, ground is disconnected from lead PAX opening OD. Relay OD restores, disconnects lead +L from lead E of FIG. 2, and lead -L via #20D, from lead F of FIG. 2 opening and disconnecting the Attendant's loop from the line circuit. The circuit is now at normal.

4.00 1 Trunk, 3 Station Conf. Ckt. & Conf. Ckts. 5-8

4.01 Seizure and Trunk Transfer by PABX Station (FIGS. 4A and 7A) ("K" WRG.)

4.01.1 Seizure of Conf. Ckt. #1 by a PABX Station (Operated: Relays XC1-XC8)

Conferences must be prearranged when using this circuit. When the digit assigned to conference is dialed by any PABX station, ground is connected to terminal CFS from the Link Selection Control (H-850260-A) or Selection Routing Ckt. (H-850687-A) closing relay E. Relay E operates, connects ground to lead IS, disconnects resistance (#1C1) ground, and resistance #2C1 battery from terminals +C1, -C1, respectively, connects a resistance bridge across terminals +C1, -C1, closes C1 via resistor R3 and locks to charged capacitor C2 in series with battery connected resistor R9, to provide a slow release when ground is later disconnected from relay E. Relay C1 operates, connects (steady ringing) lead SR to terminal +C1 via capacitor C1 and transfers terminal CFS from E to CF via diode CR9

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closing CF, disconnecting ground from E causing capacitor C2 to discharge. Relay CF operates, connects resistance (#1D1) battery to terminal CFR via diode CR6, resistance (#1XC1) ground to terminal UMC, closing #1XC1, ground to leads TLD, TAC, and resistance (resistor R10) ground to lead TMC, causing the Connector Switch to connect the station loop to terminals +C1, -C1 and ground to terminal TC1. After the selection is completed ground is disconnected from terminal CFS opening CF. Relay CF restores, disconnects resistance (#1D1) battery from terminal CFR, resistance (#1XC1) ground from terminal UMC opening XC1, ground from leads TLD, TAC and resistance (resistor R10) ground from lead TMC. Relay XC1 restores, transfers terminal CFR from resistance (CF) battery via diode CR7 to lead ATB, terminal CFS from resistance (#2XC1) via diode CR8 and resistance (CF) battery via diode CR9, to resistance (CF) battery. After the discharge of capacitor C2 relay E restores, disconnects lead SR from terminal +C1, ground from lead IS, ground via resistor R3 from #2C1, the resistance bridge from terminals +C1, -C1, connects terminals +C1, -C1 to #1C1, #2C1 respectively, to the other conference circuits holding C1 via the station loop and transfers battery connected resistor R9 in series with capacitor C2 from E to ground to restore capacitor C2 to the charged condition. If the station party intends to initiate a purely local conference, the applied ringback tone and bridge of #1C1 and resistor R4 are purely incidental, the only effect being that the latter holds the Link Circuit during the period that E is operated, even if the calling party should disconnect. Conversation may now take place.

4.01.2 Trunk Transfer by a PABX Station (Operated: Relays C1, XC2-XC8)

If the station party having been connected to a city trunk desires to place the trunk on conference, assuming resistance (resistor R5) battery is connected to terminal TC1 indicating Conf. Ckt. #1 is idle, connection to this circuit is established by making a consultation call whereby Conf. Ckt. #1 is seized and operates the same as Section 4.01.1 except as follows:

The resistance bridge is essential to give off-hook supervision so that the trunk can be transferred to conference. Since only Conf. Ckt. #1 is equipped to provide this bridge, the ringback tone feature provides positive identification that the conference line being seized is line 1. PABX users can therefore be instructed to attempt a trunk transfer only when this tone is heard upon placing a consultation call to conference, and to effect the transfer by hanging up immediately upon hearing this identification. This avoids loss of a trunk call

which will occur if transfer is attempted on conference lines 2-8, or after the resistance bridge is opened on line 1 by release of E. Since the conversation path between conference line 1 and the remaining 7 lines is opened during application of ringback tone, no possibility exists of this tone being heard upon seizure of lines 2-8.

When a trunk is transferred to conference line 1 in this manner, the connector switch releases and the trunk switch establishes a new connection to leads +C1 and -C1. In addition the trunk connects a momentary ground to terminal TX1 closing TX; TX operates and reverses battery to leads +C1 and -C1, and thereby holds the trunk; TX also disconnects lead SR from terminal +C1, rather than when relay E restores, and locks to ground on terminal TC1. The transfer is completed and conversation may now take place.

4.01.3 Seizure of Conf. Ckt. #2 By a PABX Station (Operated: Relays C1, TX, XC2-XC8)

Conference lines 2-8 are terminated on switches rather than on a bank multiple. With a city trunk connected to Conf. Ckt. #1 and the digit assigned to conference is dialed from any PABX station ground is connected to terminal CFS closing CF. Relay CF operates, connects ground to leads TLD, TAF, and TRF which operates the finder switch allotter of the calling link and consequently marks the allotter bank multiple associated with the number of the calling line, CF also connects ground to terminal AR2 closing #2XC2 and operates the allotter of the Conference Link Switch. This causes the corresponding lifts in the conference switch to be operated, as in the finder. The conference switch operates and connects the loop of the calling line to leads +C2, -C2 closing C2. Relay C2 operates, connects terminals +C2, -C2 to the other conference circuits via capacitors C3A and C3B respectively, connects ground to terminal TC2 (marking the calling line busy), and connects resistance (resistor R6) ground to terminal LK2 holding the tens and units relays operated in the Conference Switch, and closes D. After its slow-to-operate interval, relay D operates and transfers terminal TC1 from #2TX to #1D locking D. After the selection is completed ground is disconnected from terminal CFS opening CF. Relay CF restores, disconnects ground from leads TLD, TAF, TRF, opens XC2 and disconnects ground from terminal AR2. Relay XC2 restores. Conversation may now take place.

4.01.4 Seizure of Conf. Ckt. #3 by a PABX Station (Operated: Relays C1, C2, TX, D, XC2-XC8)

When the digit assigned to conference is dialed by a PABX

station ground is connected to terminal CFS closing CF. Relay CF operates, connects ground to leads TLD, TAF, TRF, terminal AR3 and closes #2XC3. This causes the Conference Switch to connect the station party loop to terminals +C3, -C3 closing C3. Relay C3 operates, connects terminals +C3, -C3 via capacitors C4A, C4B, respectively to the other conference circuits, ground to terminal TC3, and resistance (resistor R7) ground to terminal LK3. After the selection is completed, ground is disconnected from terminal CFS opening CF. Relay CF restores, disconnects ground from leads TLD, TAF, TRF and terminal AR3 opening XC3. Relay XC3 restores. Conversation may now take place.

4.01.5 Seizure of Conf. Ckt. #4 by a PABX Station (Operated: Relays C1-C3, TX, D, XC4-XC8)

When the digit assigned to conference is dialed by a PABX station, ground is connected to terminal CFS closing CF. Relay CF operates, connects ground to leads TLD, TAF, TRF and terminal AR4, closing #2XC4. This causes the Conference Switch to connect the station party loop to terminals +C4, -C4 closing C4. Relay C4 operates, connects terminals +C4, -C4 via capacitors C5A, C5B respectively to the other conference circuits, ground to terminal TC4 and resistance (resistor R7) ground to terminal LK3. After the selection is completed ground is disconnected from terminal CFS opening CF. Relay CF restores, disconnects ground from leads TLD, TAF, TRF and terminal AR4 opening XC4. Relay XC4 restores. Conversation may now take place.

4.01.6 Seizure of Conf. Ckt. #5 by a PABX Station (Operated: Relays C1-C4, TX, D, XC5-XC8)

When the digit assigned to conference is dialed by a PABX station, ground is connected to terminal CFS closing CF. Relay CF operates, grounds leads TLD, TAF, TRF and terminal AR5 closing #2XC5. This causes the Conference Switch to connect the station party loop to terminals +C5, -C5, closing C5. Relay C5 operates, connects terminals +C5, -C5 via capacitors C15A, C15B, respectively, to the other conference circuits, ground to terminal TC5 and resistance (resistor R26) ground to terminal LK5. After the selection is completed ground is disconnected from terminal CFS opening CF. Relay CF restores, disconnects ground from leads TLD, TAF, TRF and terminal AR5 opening XC5. Relay XC5 restores. Conversation may now take place.

4.01.7 Seizure of Conf. Ckt. #6 by a PABX Station (Operated: Relays C1-C5, TX, D, XC6-XC8)

When the digit assigned to conference is dialed by a PABX station, ground is connected to terminal CFS closing CF. Relay CF operates, connects ground to leads TLD, TAF, TRF and terminal AR6 closing #2XC6. This causes the Conference Switch to connect the station party loop to terminals +C6, -C6 closing C6. Relay C6 operates, connects terminals +C6, -C6 via capacitors C16A, C16B, respectively, to the other conference circuits, ground to terminal TC6, and resistance (resistor R27) ground to terminal LK6. After the selection is completed, ground is disconnected from terminal CFS opening CF. Relay CF restores, disconnects ground from leads TLD, TAF, TRF, terminal AR6 opening XC6. Relay XC6 restores. Conversation may now take place.

4.01.8 Seizure of Conf. Ckt. #7 by a PABX Station (Operated: Relays C1-C6, TX, D, XC7, XC8)

When the digit assigned to conference is dialed by a PABX station, ground is connected to terminal CFS closing CF. Relay CF operates, connects ground to leads TLD, TAF, TRF and terminal AR7 closing #2XC7. This causes the Conference Switch to connect the station party loop to terminals +C7, -C7, closing C7. Relay C7 operates, connects terminals +C7, -C7 via capacitors C17A, C17B respectively, to the other conference circuits, ground to terminal TC7 and resistance (resistor R28) ground to terminal LK7. After the selection is completed, ground is disconnected from terminal CFS opening CF. Relay CF restores, disconnects ground from leads TLD, TAF, TRF and terminal AR7 opening XC7. Relay XC7 restores. Conversation may now take place.

4.01.9 Seizure of Conf. Ckt. #8 by a PABX Station (Operated: Relays C1-C7, TX, D, XC8)

When the digit assigned to conference is dialed by a PABX station, ground is connected to terminal CFS closing CF. Relay CF operates, connects ground to leads TLD, TAF, TRF and terminal AR8 closing #2XC8. This causes the Conference Switch to connect the station party loop to terminals +C8, -C8 closing C8. Relay C8 operates, connects terminals +C8, -C8 via capacitors C18A, C18B, respectively to the other conference circuits, ground to terminal TC8, resistance (resistor R29) ground to terminal LK8, and resistance (#1XC8) battery from terminal TRG. After the selection is completed, ground is disconnected from terminal CFS opening CF. Relay CF

restores, disconnects ground from leads TLD, TAF, TRF and terminal AR8 opening XC8. Relay XC8 restores and transfers terminal CFS from resistance (CF) battery to terminal CFR and lead ATB. Conversation may now take place.

4.02 Release (FIGS. 4A & 7A) ("K" WRC.)

4.02.1 Release of Conf. Ckt. #2 (Operated: Relays D, TX, C1-C8, Conf. Ckts. 1-8 release at random when connected to PABX stations, however, when Conf. Ckt. #1 is connected to a City Trunk by a PABX station or an Attendant, Conf. Ckts. #1 is held indefinitely or until the last PABX station releases on Conf. Ckts. 2-8. For the sake of clarity Conf. Ckts. #2-8 will release sequentially and Conf. Ckt. #1 will release last as described below. The party connected to terminals +C2, -C2 hangs up and opens the loop to C2 opening C2. Relay C2 restores, disconnects terminals +C2, -C2, via capacitor C3A, C3B, respectively, from the other Conf. Ckts., ground from terminal TC2, resistance (resistor R6) ground from terminal LK2, and connects resistance (#1XC2) battery to lead TRG via diode CR3. The Finder Guard Ckt. H-850780-A or Misc. Common Ckt. H-850626-A connects ground to lead TRG closing XC2 via diode CR3. Relay XC2 operates, locks, connects resistance (#2XC2) battery to terminal AR2, and transfers terminal CFS from terminal CFR and lead ATB to resistance (CF) battery. The circuit is now at normal.

4.02.2 Release of Conf. Ckt. #3 (Operated: Relays D, TX, C1, C3-C8, XC2)

The party connected to terminals +C3, -C3 hangs up and opens the loop to C2 opening C2. Relay C2 restores, disconnects terminals +C2, -C2 via capacitors C4A, C4B, respectively, from the other Conf. Ckts., ground from terminal TC3, resistance (resistor R7) ground from terminal LK3 and closes XC3 via diode CR4. Relay XC3 operates, locks and connects resistance (#2XC3) battery to terminal AR3. The circuit is now at normal.

4.02.3 Release of Conf. Ckt. #4 (Operated: Relays D, TX, C1, C4-C8, XC2, XC3)

The station party connected to terminals +C4, -C4 hangs up and opens the loop to C4 opening C4. Relay C4 restores, disconnects terminals +C4, -C4 via capacitors C5A, C5B respectively, from the other Conf. Ckts., ground from terminal TC4, resistance (resistor R8) ground from terminal LK4, and closes XC4 via diode CR5. Relay XC4 operates, locks and connects resistance (#2XC4) battery to terminal AR4. The circuit is now at normal.

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4.02.4 Release of Conf. Ckt. #5 (Operated: Relays D, TX, C1, C5-C8, XC2-XC4)

The station party connected to terminals +C5, -C5 hangs up and opens the loop to C5 opening C5. Relay C5 restores, disconnects terminals +C5, -C5 via capacitors C15A, C15B respectively from the other Conf. Ckts., ground from terminal TC5 resistance (resistor R26) ground from terminal LK5, and closes XC5 via diode CR27. Relay XC5 operates, locks, and connects resistance (#2XC5) battery to terminal AR5. The circuit is now at normal.

4.02.5 Release of Conf. Ckt. #6 (Operated: Relays D, TX, C1, C6-C8, XC2-XC5)

The station party connected to terminals +C6, -C6 hangs up and opens the loop to C6, opening C6. Relay C6 restores, disconnects terminals +C6, -C6 via capacitors C16A, C16B respectively, from the other Conf. Ckts., ground from terminal TC6, resistance (resistor R27) ground from terminal LK6, and closes XC6 via diode CR28. Relay XC6 operates, locks and connects resistance (#2XC6) to terminal AR6. The circuit is now at normal.

4.02.6 Release of Conf. Ckt. #7 (Operated: Relays D, TX, C1, C7, C8, XC2-XC6)

The station party connected to terminals +C7, -C7 hangs up and opens the loop to C7, opening C7. Relay C7 restores, disconnects terminals +C7, -C7 via capacitors C17A, C17B respectively, from the other Conf. Ckts., ground from terminal TC7, resistance (resistor R28) ground from terminal LK7 and closes XC7 via diode CR29. Relay XC7 operates, locks and connects resistance (#2XC7) battery to terminal AR7.

4.02.7 Release of Conf. Ckt. #8 (Operated: Relays D, TX, C1, C8, XC2-XC7)

The station party connected to terminals +C8, -C8 hangs up and opens the loop to C8 opening C8. Relay C8 restores, disconnects terminals +C8, -C8 via capacitors C18A, C18B respectively, from the other Conf. Ckts., ground from terminal TC8, resistance (resistor R29) ground from terminal LK8, closes XC8 via diode CR30, and opens TX. Relay XC8 operates, locks and connects resistance (#2XC8) battery to terminal AR8. The circuit is now at normal.

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4.02.8 Release of Conf. Ckt. #1 (Operated: Relays D, TX, CI, XC2-XC8)

Relay TX restores, restoring battery polarity to normal, which releases the city trunk connected to terminals +C1, -C1. The City Trunk releases, disconnects ground from terminal TC1 opening D, and opens the loop to terminals +C1, -C1, opening CI. Relay CI restores, and disconnects terminals +C1, -C1 from the other Conf. Ckts. Relay D restores, transfers terminal TC1 from resistance (#1D) battery to resistance (resistor R5) battery and closes XC1. Relay XC1 operates, locks, transfers terminal CFR from lead ATB to resistance (CF) battery via diode CR7, and terminal CFS from resistance (CF) battery to resistance (E) and (#2XC1 via diode CR8) batteries. The circuit is now at normal.

5.00 1 Trk., 3 Sta. Conf. Ckt.

5.01 Seizure and Trunk Transfer by PABX Stations (FIG. 4A) ("L" WRG.)

5.01.1 Seizure of Conf. Ckts. #1-4 by PABX Stations (Operated: Relays XC1-XC4)

Circuit operation is the same as described in Sections 4.01.1 through 4.01.5 except that when relay XC4 restores it also transfers terminal CFS from resistance (CF) battery to lead ATB and terminal CFR, also Conf. Ckts. 5-8 are omitted.

5.02 Release (FIG. 4A) ("L" WRG.)

5.02.1 Release of Conf. Ckts. 1-4 (Operated: Relays D, TX, CI-C4)

Circuit operation is the same as described in Sections 4.02.1 through 4.02.3 and 4.02.8 except that when relay C4 restores it also opens relay TX, and Conf. Ckts. 5-8 are omitted.

6.00 1 Trk., 3 Sta. Conf. Ckt. & Conf. Ckts. 5-8

6.01 Access From Turret (FIGS. 4A & 7A) ("K" WRG.)

6.01.1 Attendant Connects a Trunk to Conf. Ckts. #1 (Operated: Relays XC1-XC8)

A trunk party may be connected to Conf. Ckt. #1 by way of the Attendant's keyset and Register as follows. While connected to a City Trunk, the Attendant dials the access digit and

ground is connected to terminal CFR from Turret Register H-850627-A, or Selection Routing Ckt. H-850687-A closing CF via diode CR7. Relay CF operates, closes D via diode CR6, connects resistance (#1XC1) ground to terminal UMC, ground to leads TLD, TAC and resistance (resistor R10) ground to lead TMC. This connects the Trunk Switch along with the trunk party loop to terminals +C1, -C1 closing CI, and connects ground to terminal TC1. After its slow-to-operate interval, relay D operates, transfers terminal TC1 from battery connected resistor R5 to #1D locking D. Relay CI operates, connects terminals +C1, -C1 to the other Conf. Ckts., and transfers terminal CFS from resistance (E, and #2XC1 via diode CR8) batteries to resistance (CF via diode CR9 and #2XC1 via diode CR8) batteries. After the selection is completed, ground is disconnected from terminal CFR opening CF. Relay CF restores, disconnects resistance (#1XC1) ground from terminal UMC, opening XC1, ground from leads TLD, TAC and resistance (resistor R10) ground from lead TMC. Relay XC1 restores, transfers terminal CFR from resistance (CF) battery via diode CR7 to lead ATB, and terminal CFS from resistance (#2XC1 via diode CR8, CF via diode CR9) batteries to resistance (CF) battery. Conversation may now take place.

6.01.2 Seizure of Conf. Ckt. #2 by a PABX Station (Operated: Relays CI, D, XC2-XC8)

When the digit assigned to conference is dialed by a PABX station, ground is connected to terminal CFS closing CF. Relay CF operates, connects ground to terminal AR2 closing #2XC2, and leads TLD, TAF, TRF. This causes the Conference Switch to connect the PABX station loop to terminals +C2, -C2 closing C2. Relay C2 operates, connects terminals +C2, -C2 via capacitors C3A and C3B respectively, to the other Conf. Ckts., ground to terminal TC2, resistance (resistor R6) ground to terminal LK2, and closes TX. Relay TX operates and reverses battery polarity across terminals +C1 and -C1 for answer supervision after the selection is completed, ground is disconnected from terminal CFS opening CF. Relay CF restores, disconnects ground from terminal AR2 opening XC2, and ground from leads TLD, TAF, and TRF. Relay XC2 restores and disconnects resistance (#2XC2) battery from terminal AR2. Conversation may now take place.

6.01.3 Seizure of Conf. Ckts. 3-8 by PABX Stations (Operated: Relays D, TX, CI, C2, XC3-XC8)

Circuit operation is the same as described in Sections 4.01.4 through 4.01.9.

6.02 Release (FIGS. 4A & 7A) ("K" WRG.)

6.02.1 Release of Conf. Ckts. 1-8 (Operated: Relays D, TX, CI-C8)

Circuit operation is the same as Section 4.02.

7.00 1 Trk., 3 Sta. Conf. Ckt.

7.01 Access from Turret (FIG. 4A) ("L" WRG)

7.01.1 Seizure of Conf. Ckt. #1 by an Attendant, and Seizure of Conf. Ckts. 2-4 by PABX Stations (Operated: Relays XCI-XC4)

Circuit operation is the same as described in Sections 6.01.1, 6.01.2, 4.01.4 and 4.01.5 except that when relay XC4 restores it also transfers terminal CFS from resistance (CF) battery to lead CFS and terminal CFR, also Conf. Ckts. 5-8 are omitted.

7.02 Release (FIG. 4A) ("L" WRG.)

7.02.1 Release of Conf. Ckts. 1-4 (Operated: Relays D, TX, CI-C4)

Circuit operation is the same as described in Sections 4.02.1 through 4.02.3 and 4.02.8 except that when relay C4 restores it also opens relay TX and Conf. Ckts. 5-8 are omitted.

8.00 2 Trk., 3 Sta. or 1 Trk., 4 Sta. or 5 Sta. Conf. Ckt.

8.01 Seizure by PABX Stations (FIG. 5A)

8.01.1 Seizure of Conf. Ckt. #1 by a PABX Station (Operated: Relays CA1-CA3)

Conferences must be prearranged when using this circuit. When the digit assigned to conference is dialed by any PABX station, ground is connected to terminal CFS from the Link Selection Control H-850260-A or Selection Routing Ckt. H-850687-A or Equivalent closing CFS. Relay CFS operates, connects ground to leads TLD, TRF, TAF, terminal ARI, closing #1CA1, resistance (resistor R11) ground to terminal LK1, disconnects resistance (#2CA1-#2CA3 in multiple via diode CR10-CR12 respectively) battery from terminal TRG, and closes CW. This causes the Conference Switch to connect the PABX stations loop to terminals +C1, -C1, closing CBI. Relay CW operates, locks to charged capacitor C12 in series with #2CW to provide a slow release when CW is later opened by restoring relays CFS

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or CFR as required, and connects lead DT to all the Conf. Ckts. via capacitor C11 and their respective capacitors. Relay CBI operates, connects terminals +C1, -C1 via capacitor 6A, C6B respectively to the other Conf. Ckts., ground to terminal TC1, disconnects terminal LK1 via resistor R11, from terminals LK2, LK3 via resistors R12, R13 respectively and closes CSB. Relay CSB operates and reverses battery polarity across terminals +CT1, -CT1, +CT2, -CT2, although without effect to the circuit at this time. After the selection is completed ground is disconnected from terminal CFS opening CFS. Relay CFS restores, disconnects ground from leads TLD, TRF, TAF, terminal ARI opening CA1, connects resistance (#2CA2, #2CA3 in multiple, via diodes CR11, CR12, respectively), battery to terminal TRG and opens CW.

Relay CA1 restores and transfers terminal CFR from resistance (CFR) battery to lead ATB. After capacitor C12 discharges, relay CW restores, transfers capacitor C12 from resistance (#1CW) battery to ground, charging capacitor C12 and disconnects lead DT from all the Conf. Ckts. Conversation may now take place.

8.01.2 Seizure of Conf. Ckt. #2 by a PABX Station (Operated: Relays CSB, CBI, CA2, CA3)

When the digit assigned to conference is dialed by a PABX station ground is connected to terminal CFS closing CFS. Relay CFS operates, connects ground to leads TLD, TRF, TAF, terminal AR2, closing #1CA2, resistance (resistor R12) ground to terminal LK1, disconnects resistance (#2CA2, #2CA3 in multiple via diodes CR11, CR12 respectively) battery from terminal TRG and closes CW. This causes the Conference Switch to connect the PABX station's loop to terminals +C2, -C2 closing CB2. Relay CW operates, locks to charged capacitor C12 in series with #2CW, and connects lead DT to all the Conf. Ckts. via capacitor C11 and their respective capacitors. Relay CB2 operates, connects terminals +C2, -C2 via capacitors C7A, C7B, respectively to the other Conf. Ckts., ground to terminal TC2 and disconnects terminal LK2 via resistor R12 from terminal LK3 via resistor R13. After the selection is completed, ground is disconnected from terminal CFS opening CFS. Relay CFC restores, disconnects ground from leads TLD, TRF, TAF, terminal AR2 opening CA2, connects resistance (#2CA3) battery via diode CR12 to terminal TRG and opens CW. Relay CA2 restores. After capacitor C12 discharges, relay CW restores, transfers capacitor C12 from resistance (#1CW) battery to ground charging capacitor C12, and disconnects lead DT from all the Conf. Ckts. Conversation may now take place.

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8.01.3 Seizure of Conf. Ckt. #3 by a PABX Station (Operated: Relays CSB, CBI, CB2, CA3)

When the digit assigned to conference is dialed by a PABX station, ground is connected to terminal CFS closing CFS. Relay CFS operates, connects ground to leads TLD, TRF, TAF, terminal AR2, closing #1CA3, resistance (resistor R13) ground to terminal LK3, disconnects resistance (#2CA3) battery, via diode CR12 from terminal TRG, and closes CW. This causes the Conference Switch to connect the PABX station's loop to terminals +C3, -C3 closing CB3. Relay CW operates, locks to charged capacitor C12 in series with #2CW, and connects lead DT to all the Conf. Ckts. via capacitor C11 and their respective capacitors. Relay CB3 operates, connects terminals +C3, -C3 via capacitors C8A, C8B respectively to the other Conf. Ckts. and ground to terminal TC3. After the selection is completed, ground is disconnected from terminal CFS opening CFS. Relay CFS restores, disconnects ground from leads TLD, TRF, TAF, terminal AR3, opening CA3 and opens CW. Relay CA3 restores and transfers terminal CFS from resistance (CFS) battery to resistance (CFR) battery. After capacitor C12 discharges, relay CW restores, transfers capacitor C12 from resistance (#1CW) battery to ground, charging capacitor C12 and disconnects lead DT from all the Conf. Ckts. Conversation may now take place.

8.01.4 Seizure of Conf. Ckt. via Terminals +CT1, -CT1 by a PABX Station (Operated: Relays CSB, CBI-CR1)

When the digit assigned to conference is dialed by a PABX station, ground is connected to terminal CFS closing CFR. Relay CFR operates, disconnects resistance (#2CT1) and (#2CT2) battery from terminals +CT1 and +CT2 respectively, connects ground to leads TAC, TLD, TMC, terminal UMC1 and closes CW. This causes the Connector Switch to connect the PABX station's loop to terminals +CT1, -CT1. Relay CW operates, locks to charged capacitor C12 in series with #2CW, and connects lead DT to all the Conf. Ckts. via capacitor C11, and their respective capacitors.

After the selection is completed, ground is disconnected from terminal CFS opening CFR. Relay CFR restores, connects #2CT1 and #2CT2 to terminals +CT1 and +CT2 respectively, closing relay CT1 via the PABX station's loop, disconnects ground from leads TAC, TLD, TMC, terminal UMC1, and opens CW. Relay CT1 operates and connects ground to terminal TC1. After capacitor C12 discharges relay CW restores, transfers capacitor C12 from

resistance (#1CW) battery to ground charging capacitor C12, and disconnects lead DT from all the Conf. Ckts. Conversation may now take place.

8.01.5 Seizure of Conf. Ckt. via Terminals +CT2, -CT2 by a PABX Station (Operated: Relays CSB, CBI-CB3, CT1)

When the digit assigned to conference is dialed by a PABX station, ground is connected to terminal CFS closing CFR. Relay CFR operates, connects resistance bridge (resistor R14) across terminals +CT1, -CT1, holding CT1 while CFR is operated, disconnects resistance (#2CT2) battery from terminal -CT2, connects ground to leads TAC, TLD, TMC, terminal UMC2, and closes CW. This causes the Connector Switch to connect the PABX station's loop to terminals -CT2, -CT2. Relay CW operates, locks to charged capacitor C12 in series with #2CW, and connects lead DT to all the Conf. Ckts. via capacitor C11 and their respective capacitors. After the selection is completed, ground is disconnected from terminal CFS opening CFR. Relay CFR restores, disconnects the resistance (resistor R14) bridge from terminals +CT1, -CT1, connects #2CT2 to terminal +CT2 closing CT2 via the PABX station's loop, disconnects ground from leads TAC, TLD, TMC, terminal UMC2 and opens CW. Relay CT2 operates, connects ground to terminal TCT2, and transfers terminal CFS from resistance (CFR) battery to lead ATB. After capacitor C12 discharges, relay CW restores, transfers capacitor C12 from resistance (#1CW) battery to ground charging capacitor C12 and disconnects lead DT from all the Conf. Ckts. Conversation may now take place.

8.02 Release (FIG. 5A)

8.02.1 Release of Conf. Ckt. #1 (Operated: Relays CSB, CBI-CB3, CT1, CT2)

Conf. Ckts. #1-3 and Conf. Ckts. associated with terminals +CT1, -CT1 and +CT2, -CT2, when connected to PABX stations, may release at random but for the sake of clarity shall release sequentially as shown below. The PABX station connected to terminals +C1, -C1 hangs up and opens the loop to CBI, opening CBI. Relay CBI restores, disconnects terminals +C1, -C1 via capacitors C6A, C6B respectively, from the other Conf. Ckts., ground from terminal TC1, resistance (resistor R11) ground from terminal LK1, and connects resistance (#2CA1) battery to lead TRG via diode CR10. With no selections being made, the FDR. Guard H-850280-A or Misc. Common Ckt. H-850626-A connects ground to lead TRG closing CA1 via diode CR10. Relay CA1 operates, locks and transfers terminal CFS from lead ATB to resistance (CFS) battery. The circuit is now at normal.

8.02.2 Release of Conf. Ckt. #2 (Operated: Relays CSB, CB2, CB3, CT1, CT2, CA1)

The PABX station connected to terminals +C2, -C2 hangs up and opens the loop to CB2, opening CB2. Relay CB2 restores, disconnects terminals +C2, -C2, via capacitors C7A, C7B, respectively, from the other Conf. Ckts., ground from terminal TC2, resistance (resistor R12) ground from terminal LK2, and closes CA2 via diode CR11. Relay CA2 locks, and connects terminal LK2 via resistor R12 to terminal LK1 via resistor R11. The circuit is now at normal.

8.02.3 Release of Conf. Ckt. #3 (Operated: Relays CSB, CB3, CT1, CT2, CA1, CA2)

The PABX station connected to terminals +C3, -C3 hangs up and opens the loop to CB3 opening CB3. Relay CB3 restores, disconnects terminals +C3, -C3 via capacitors C8A, C8B, respectively, from the other Conf. Ckts., ground from terminal TC3, resistance (resistor R13) ground from terminal LK3, opens CSB, and closes CA3 via diode CR12. Relay CA3 operates, locks, and connects terminal LK3 via resistor R13 to terminals LK1, LK2 via resistors R11 and R12, respectively. Relay CSB restores and returns battery polarity to normal across terminals +CT1, -CT1, +CT2, -CT2. The circuit is now at normal.

8.02.4 Release of Conf. Ckt. via Terminals +CT1, -CT1 (Operated: Relays CT1, C12, CA1-CA3)

The PABX station connected to terminals +CT1, -CT1 hangs up and opens the loop to CT1 opening CT1. Relay CT1 restores, disconnects ground from terminal TCT1, resistance (#2CT1) battery from terminal -CT1, and transfers terminal CFR from lead ATB to resistance (CFR) battery. The circuit is now at normal.

8.02.5 Release of Conf. Ckt. via Terminals +CT2, -CT2 (Operated: Relays CT2, CA1-CA3)

The PABX station connected to terminals +CT2, -CT2 hangs up and opens the loop to CT2, opening CT2. Relay CT2 restores, disconnects resistance (#2CT2) battery from terminal -CT2, and ground from terminal TCT2. The circuit is now at normal.

8.03 Access From Turret (FIG. 5A)

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8.03.1 Attendant Connects a Trunk to Conf. Ckt. via Terminals +CT1, -CT1 (Operated: Relays CA1-CA3)

The Attendant may connect City Trunks to Conf. Ckts. on terminals +CT1, -CT1, +CT2 and -CT2 whereby the Attendant key sends the digit assigned to conference while connected to a City Trunk, and the Turret Register Ckt. H-250627-A or Selection Routing Ckt. H-850687-A or Equivalent connects ground to terminal CFR closing CFR. Relay CFR operates, disconnects resistance (#2CT1) and (#2CT2) battery from terminals -CT1, -CT2 respectively, resistance (#2CA1-#2CA3 in multiple via diodes CR10-CR12) battery from lead TRG, connects ground to leads TAC, TLD, TMC, terminal UMC1 and closes CW. This causes the Trunk Switch to connect the Trunk party's loop to terminals +CT1, -CT1. Relay CW operates, locks to charged capacitor C12 in series with #2CW and connects lead DT to all the Conf. Ckts. via capacitor C11 and their respective capacitors. After the selection is completed, ground is disconnected from terminal CFR opening CFR. Relay CFR restores, connects #2CT1, #2CT2 to terminals -CT1, -CT2 respectively, closing CT1 via the PABX stations loop, connects resistance (#2CA1-#2CA3 in multiple via diodes CR10-CR12) battery to lead TRG, disconnects ground from leads TAC, TLD, TMC, terminal UMC1, and opens CW. Relay CT1 operates, and connects ground to terminal TCT1. After capacitor C12 discharges, relay CW restores, transfers capacitor C12 from resistance (#1CW) battery to ground, charging capacitor C12, and disconnects lead DT from all the Conf. Ckts. Conversation may now take place.

8.03.2 Attendant Connects a Trunk to Conf. Ckt. via Terminals +CT2, -CT2 (Operated: Relays CT1, CA1-CA3)

The Attendant key sends the digit assigned to conference, while connected to a City Trunk, and connects ground to terminal CFR closing CFR. Relay CFR operates, connects resistance bridge (resistor R14) across terminals +CT1, -CT1, disconnects resistance (#2CT2) battery from terminal -CT2, connects ground to leads TAC, TLD, TMC, terminal UMC2, disconnects resistance (#2CA1-#2CA3 in multiple, via diodes CR10-CR12 respectively) battery from lead TRG and closes CW. This causes the Trunk Switch to connect the trunk party's loop to terminals +CT2, -CT2. Relay CW operates, locks to charged capacitor C12 in series with #2CW, and connects lead DT to all the Conf. Ckts. via capacitor C11 and their respective capacitors. After the selection is completed, ground is disconnected from terminal CFR opening CFR. Relay CFR restores, disconnects the resistance bridge (resistor R14) from terminals

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+CT1, -CT1, ground from leads TAC, TLD, TMC, terminal UMC2, connects resistance (#2CA1 - #2CA3 in multiple via diodes CR10-CR12 respectively) battery to lead TRG, opens CW and closes CT2 via the Trunk party's loop. Relay CT2 operates, connects ground to terminal TCT2, and transfers terminal CFR from resistance (CFR) battery to lead ATB. After capacitor C12 discharges relay CW restores, transfers capacitor C12 from resistance (#1CW) battery to ground, charging capacitor C12, and disconnects lead DT from all the Conf. Ckts. Conversation may now take place.

8.03.3 Seizure of Conf. Ckts. #1 by a PABX Station (Operated: Relays CT1, CT2, CA1-CA3)

Circuit operation is the same as Section 8.01.1 except that when relay CSB operates, it does have effect at this time and reverses battery polarity across terminals +CT1, -CT1, +CT2, and -CT2 for answer supervision, and when relay CA1 restores it does not transfer terminal CFR from resistance (CFR) battery to lead ATB.

8.03.4 Seizure of Conf. Ckt. #2 by a PABX Station (Operated: Relays CB1, CSB, CT1, CT2, CA2, CA3)

Circuit operation is the same as described in Section 8.01.2.

8.03.5 Seizure of Conf. Ckt. #3 by a PABX Station (Operated: Relays CB1, CB2, CSB, CT1, CT2, CA3)

Circuit operation is the same as described in Section 8.01.3 except that when relay CA3 restores, it transfers terminal CFS from resistance (CFS) battery to lead ATB instead of resistance (CFR) battery.

8.04 Release (FIG. 5A)

8.04.1 Release of Conf. Ckt. #1 (Operated: Relays CSB, CB1-CB3, CT1, CT2)

Release is the same as described in Section 8.02.1 except that Conf. Ckts. associated with terminals +CT1, -CT1, +CT2 and -CT2 are connected to City Trunks instead of PABX stations.

8.04.2 Release of Conf. Ckt. #2 (Operated: Relays CSB, CB2, CB3, CT1, CT2, CA1)

Circuit operation is the same as described in Section 8.02.2.

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8.04.3 Release of Conf. Ckt. #3 (Operated: Relays CSB, CB3, CT1, CT2, CA1, CA2)

Circuit operation is the same as Section 8.02.3 except that when relay CSB restores, it causes the City Trunks to release as battery polarity across terminals +CT1, -CT1, +CT2 and -CT2 is returned to normal.

8.04.4 Release of Conf. Ckt. via Terminals +CT1, -CT1 (Operated: Relays CT1, CT2, CA1-CA3)

Conf. Ckts. associated with terminals +CT1, -CT1, +CT2 and -CT2 release together as the trunks release and open the loops to CT1, CT2, but for clarity the Conf. Ckt. associated with terminals +CT1 and -CT1 shall release first as follows. The trunk connected to terminals +CT1 and -CT1 releases, as battery polarity is returned to normal, and opens the loop to CT1, opening CT1. Relay CT1 restores and the circuit operation is similar to that described in Section 8.02.4.

8.04.5 Release of Conf. Ckt. via Terminals +CT2, -CT2 (Operated: Relays CT2, CA1-CA3)

The trunk connected to terminals +CT2 and -CT2 releases, as battery polarity is returned to normal, and opens the loop to CT2, opening CT2. Relay CT2 restores and the circuit operation is similar to that described in Section 8.02.5.

9.00 PBX Trk. Selection Ckt. (FIG. 6A) ("H" & "F" WRG.)

9.01 Group A, 1 Group of 4 Lines

9.01.1 Seizure (Operated: Relays A1-A4 and B1-B3)

When the access digit assigned to Group A is dialed, Selection Controls H-850260-A, H-850290-A, or Selection Routing Ckt. H-850687-A or equivalent connects ground to terminal SLA and closes #1TKA. Relay TKA operates, connects resistance (resistors R24 and R25) battery to terminals AGA, AGB respectively, disabling the Finder Guard until the selection is completed, ground to lead TAC, operating the Allotter in the Connector Switch, ground to lead TNA, operating the tens lift of this group, resistance (resistor R23) ground to terminal UA1, operating the units lift in the switch, transfers ground from #1A1-#1A4 via diodes CR20-CR23 respectively to #2A1-#2A4 and RC network C13, holding A1-A4 and connects resistance (#2TKA) battery to leads SSR and ATB so that when the line tests idle the Link will connect ringing current to the line. With the selection completed, ground is transferred from terminal SLA to lead SSR opening #1TKA and closes #2TKA, holding TKA, while the Link performs a busy test, and finding the line idle

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the Link connects ground to terminal TA1 via diode CR13. Ground is then disconnected from lead SSR opening TKA. Relay TKA restores, disconnects resistance (resistors R24 and R25) battery from terminals AGA and AGB, respectively, ground from leads TAC and TNA, resistance (resistor R23) ground from terminal UA1, transfers ground from #2A1-#2A4 and RC network C13 to #1A1-#1A4 via diodes CR20-CR23, respectively, short-circuiting #1A1, and disconnects resistance (#2TKA) battery from leads ATB and SSR. Relay A1 restores, disconnects resistance (#2A1) battery from RC network C13 and #2A2-#2A4, and the next calling party is advanced to the next idle line via terminal UA2 in conjunction with terminal TA2. The circuit operation of Line Ckts. TA2-TA4 is similar to TA1 except that when relay A4 restores it also transfers terminal SLA from resistance (#1TKA) battery to lead ATB (A1-A4 restored) and returns busy tone to the next calling party.

9.01.2 Release (Operated: Relays B1-B3)

Line Ckts. associated with terminals TA1-TA4 may release at random, but for the sake of clarity shall release sequentially. Release of each line is controlled by the last party to release, and when the last party connected to terminal TA1 hangs up, ground is disconnected from terminal TA1, removing the short circuit from #1A1, closing #1A1. Relay A1 operates, connects resistance (#2A1) battery to RC network C13 and transfers terminal SLA from lead ATB to resistance (#1TKA) battery. Relays A2-A4 operate similar to A1 except they do not transfer terminal SLA from lead ATB to resistance (#1TKA) battery. Group A is now at normal.

9.02 Group B, 1 Group of 3 Lines

9.02.1 Seizure (Operated: Relays A1-A4, B1-B3)

When the access digit assigned to Group B is dialed, ground is connected to terminal SLB closing #1TKB. Relay TKB operates, transfers ground from #1B1-#1B3 via diodes CR24-CR26 respectively to RC network C14 and #2B1-#2B3 holding B1-B3, connects resistance (resistors R24 and R25) battery to terminals AGA and AGB respectively, resistance (resistor R23) ground to terminal UB1, resistance (#2TKB) battery to leads ATB and SSR, and ground to leads TAC and TNB. With the selection completed ground is transferred from terminal SLB to lead SSR opening #1TKB and closing #2TKB, holding TKB,

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while the Link performs a busy test, and finding the line idle, the Link connects ground to terminal TB1 via diode CR17. Ground is then disconnected from lead SSR opening TKB. Relay TKB restores, transfers ground from RC network C14 and #2B1-#2B3 to #1B1-#1B3 via diodes CR24-CR26, short-circuiting #1B1, disconnects resistance (resistors R24 and R25) battery from terminals AGA and AGB respectively, resistance (resistor R23) ground from terminal UB1, resistance (#2TKB) battery from leads SSR, ATB and ground from leads TAC, and TNB. Relay B1 restores, disconnects resistance (#2B1) battery from RC network C12 and #2B2 and #2B3 and the next calling party is advanced to the next idle line via terminal UB2 in conjunction with terminal TB2.

The circuit operation of Line Ckts. TB2 and TB3 is similar to TB1 except that when relay B3 restores it also transfers terminal SLB from resistance (#1TKB) battery to lead ATB (TB1-TB3 restored) and returns busy tone to the next calling party.

9.02.2 Release (Operated: Relays A1-A4)

The Line Ckts. associated with terminals TB1-TB3 may release at random, but for clarity shall release sequentially. Release of each line is controlled by the last party to release and when the last party connected to terminal TB1 hangs up, ground is disconnected from terminal TB1, removing the short circuit from #1B1 closing #1B1. Relay B1 operates, connects resistance (#2B1) battery to RC network C14 and transfers terminal SLB from lead ATB to resistance (#1TKB) battery. Relays B2 and B3 operate similar to B1 except they do not transfer terminal SLB from lead ATB to resistance (#1TKB) battery. Group B is now at normal.

10.00 1 Trk., 4 Station; 2 Trk., 3 or 5 Station Conf. Ckt.

10.01 Seizure and Trunk Transfer by a PABX Station (FIG. 6A)

10.01.1 Seizure of Conf. Ckt. #1 by a PABX Station (Operated: Relays XCI-XCS)

When the digit assigned to conference is dialed by a PABX station, the Link Selector Control or Selector Routing Ckt. connects ground to terminal CFS and closes relay E1. Relay E1 operates, transfers capacitor C22 in series with resistance (resistor R23) battery from ground to terminal CFS locking E1,

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transfers resistance (#2C1) battery from terminal -C1 to resistance (resistor R30) ground closing C1, transfers terminal +C1 from resistance (#1C1) ground to terminal -C1 via #1C1 in series with resistor R31, providing a holding bridge for use later, and connects ground to lead IS. Relay C1 operates, connects steady ringing from lead SR to terminal +C1 via capacitor C19 to notify a station party that a trunk can be transferred to this conference circuit, and transfers terminal CFS from resistance (E1) battery, opening E1, (but E1 is held operated as capacitor C22 discharges) to resistance (CF) battery via diode CR34, closing CF. Relay CF operates, connects resistance (resistor R32) battery to terminal TC1, connects resistance (#1D1) battery to terminal CFR via diode CR31, connects resistance (resistor R34) battery to terminal TC2, connects ground to lead TLD, TAC, and TM1 and connects resistance (#1XC1) ground to lead UMI holding XC1. This connects the calling party's loop to terminals +C1, -C1 via the Connector Switch. Ground is then disconnected from terminal CFS opening CF. Relay CF restores, disconnects resistance (#1D1) battery via diode CR31 from terminal CFR, resistance (resistor R32) battery from terminal TC1, resistance (resistor R34) battery from terminal TC2, ground from leads TM1, TLD and TAC and resistance (#1XC1) ground from lead UMI opening XC1. Relay XC1 restores, transfers terminal CFS from resistance (CF) battery and lead CFO via diode CR34 and terminal CFR via diodes CR34 in series with diode CR32, to resistance (SS) battery via diode CR37, also transfers terminal CFR from resistance (CF) battery and lead CFO via capacitor CR32 and terminal CFS via diode CR34 in series with diode CR32, to lead ATB. After a short interval capacitor C22 discharges, relay E1 restores, simultaneously transfers terminal +C1 from lead SR and terminal -C1 via #1C1 in series with resistor R31 to terminal T1 via capacitor C20A in multiple with resistor R38 and resistance (#1C1) ground, also resistance (#2C1) battery is transferred from resistance (resistor R30) ground to terminal R1 via capacitor C20B in multiple with resistor R39 and terminal -C1, ground is disconnected from lead IS, and capacitor C22 in series with resistance (resistor R33) battery is transferred from resistance (#1E1) battery to ground. This removes ringback tone and relay C1 is held operated via the PABX stations loop connected to terminals +C1 and -C1.

10.01.2 Trunk Transfer by a PABX Station (Operated: Relays E1, C1, XC2-XC5)

If the calling station, connected to a City Trunk, desires to place the Trunk on conference, connection to this circuit is established by means of a consultation call similar to that described in Section .01.2 except the trunk connects

ground to terminal TX1 and closes relay TX1. Relay TX1 operates, disconnects lead SR, via capacitor C19, from terminal +C1, removing ringback tone, connects resistance (#2D1) battery to lead CFH via diode CR42, and locks to ground on terminal TC1. After capacitor C22 discharges relay E1 restores, transfers terminal +C1 from terminal -C1 via resistor R31 in series with #1C1 to resistance (#2C1) battery and terminal R1 via capacitor C20B in multiple with resistor R39, transfers terminal -C1 from terminal +C1 via #1C1 in series with resistor R31 to resistance (#1C1) battery, and terminal T1 via capacitor C20A in multiple with resistor R38, transfers resistance (#2C1) battery from resistance (resistor R30) ground to terminal +C1 and terminal R1 via capacitor C20B in multiple with resistor R39, transfers capacitor C22 in series with resistance (resistor R33) battery from resistance (#1E) battery to ground, and disconnects ground from lead IS. This, in conjunction with operated relay TX1, disconnects the holding bridge from and applies battery reversal to terminals +C1 and -C1 holding the trunk circuit: Release of the trunk circuit is now controlled by the last station party to release and capacitor C22 recharges.

10.01.3 Seizure of Conf. Ckt. #2 by a PABX Station (Operated: Relays C1, TX1, XC2-XC5)

When the digit assigned to conference is dialed by any PABX station, the Link Selection Control or Selection Routing Circuit connects ground to terminal CFS and closes SS via diode CR37. Relay SS operates, connects ground to lead CFO and closes CF via diode CR35. Relay CF operates, connects ground to leads TM2, TLD, TAC, connects resistance (#1XC2) ground to lead UM2 and connects resistance (resistor R34) battery to terminal TC2. This causes the calling station Connector Switch to connect the calling party to terminals +C2 and -C2 closing C2. Relay C2 operates, connects terminal +C2 to terminal T2 via capacitor C21A in multiple with resistor R40, connects terminal -C2 to terminal R2 via capacitor C21B in multiple with resistor R41, and closes relay D1. Relay D1 operates, transfers terminal TC1 from resistance (#2TC1) battery to resistance (#1D1) battery locking D1, connects resistance (#2TX1) battery to lead CFH via diode CR42, and transfers terminal CFR from lead ATB to resistance (CF) battery and lead CFO via diode CR33, also transfers lead ATB to resistance (#1D2) via diode CR41. After the selection is completed, ground is disconnected from terminal CFS, removing ground from lead CFO and opening CF via diode CR35.

Relay CF restores, disconnects resistance (resistor R34) battery from terminal TC2, disconnects ground from leads TLD, TLD and TAC, disconnects resistance (#1XC2) ground from lead UM2, opening XC2, also disconnects resistance (#1D2) battery from terminal CFR via diode CR41. Relay XC2 restores, transfers terminal CFR from resistance (CF) battery and lead CFO via diode CR33 to lead A1B, also transfers terminal CFS from resistance (SS) battery via diode CR37, resistance (CF) battery and lead CFO via diode CR35, to resistance (CF) battery and lead CFO.

10.01.4 Seizure of Conf. Ckt. #3 by a PABX Station
(Operated: Relays SS, TX1, D1, C1, C2, XC3-XC5)

When a PABX station dials the access digit ground is connected to terminal CFS. This closes CF and connects ground to lead CFO. Relay CF operates, connects ground to leads TLD, TAF and TRF, terminal AR3 closing #2XC3, connects resistance (resistor R35) ground to terminal LK3 and connects resistance (resistor R34) battery to terminal TC2, this transfers the PABX stations loop from the Finder Switch to a Conference Switch which in turn connects the loop to terminals +C3 and -C3 closing C3. Relay C3 operates, connects terminal +C3 to terminal T3 via capacitor C23A in multiple with resistor R42, connects terminal -C3 to terminal R3 via capacitor C23B in multiple with resistor R43, connects ground to terminal TC3, ground to lead CFH and disconnects terminal LK3, via resistor R35 from terminal AR3 and #2XC3. When the selection is completed ground is disconnected from terminal CFS opening CF and disconnecting ground from lead CFO. Relay CF restores, disconnects ground from leads TLD, TAF and TRF, terminal AR3, opening XC3 and resistance (resistor R34) battery from terminal TC2. Relay XC3 restores. Conversation may now take place.

10.01.5 Seizure of Conf. Ckt. #4 by a PABX Station
(Operated: Relays SS, TX1, D1, C1-C3, XC4, XC5)

When a PABX station dials the access digit ground is connected to terminal CFS, closing CF and connecting ground to lead CFO. Relay CF operates, connects ground to leads TLD, TAF, TRF and terminal AR4, closing #2XC4 and resistance (resistor R36) ground to terminal LK4. The station party's loop is connected to terminals +C4 and -C4 closing C4. Relay C4 operates, connects terminal +C4 to terminal T4 via capacitor C24A in multiple with resistor R44, terminals -C4 to terminal R4 via capacitor C24B in multiple with resistor R45, ground to terminal AR4 and #2XC4 via resistor R36. After the selection is completed ground is disconnected from terminal CFS opening

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CF and disconnecting ground from lead CFO. Relay CF restores, disconnects ground from leads TLD, TAF, TRF and terminal AR4 opening XC4. Relay XC4 restores. Conversation may now take place.

10.01.6 Seizure of Conf. Ckt. #5 by a PABX Station
(Operated: Relays SS, TX1, D1, C1-C4, XC5)

When a PABX station dials the access digit, ground is connected to terminal CFS closing CF and connecting ground to lead CFO. Relay CF operates, connects ground to leads TLD, TAF, TRF and terminal AR5, closing #2XC5 and resistance (resistor R37) ground to terminal LK5. The station party's loop is connected to terminals +C5 and -C5 closing C5. Relay C5 operates, connects terminal +C5 to terminal T5 via capacitor C25A in multiple with resistor R46, terminal -C5 to terminal R5 via capacitor C25B in multiple with resistor R47, ground to terminal TC5, disconnects terminal LK5 from terminal AR5 and #2XC5 via resistor R37 and resistance (#1XC5) battery via diode CR44 from terminal TRG. After the selection is completed ground is disconnected from terminal CFS opening CF and disconnecting ground from lead CFO. Relay CF restores, disconnects ground from leads TLD, TAF, TRF and terminal AR5 opening XC5. Relay XC5 restores. Conversation may now take place.

10.02 Release (FIG. 8A)

10.02.1 Release of Conf. Ckt. #2 (Operated: Relays SS, TX1, D1, C1-C5)

Conf. Ckts. 1-5 release at random when connected to PABX station, however, when Conf. Ckt. #1 or Conf. Ckts. #1 and #2 are connected to City Trunks they are held indefinitely or until the last PABX station releases. For the sake of clarity Conf. Ckts. 2-5 will release sequentially and Conf. Ckt. #1 last as described below. The PABX station connected to terminals +C2 and -C2 hangs up and opens the loop to C2 opening C2. Relay C2 restores, disconnects terminal +C2 from terminal T2 via capacitor C21A in multiple with resistor R40, terminal -C2 from terminal R2 via capacitor C21B in multiple with resistor R41 and connects resistance (#2XC2) battery via diode CR39 to terminal TRG. Misc. Common CB-5703 or Equivalent connects ground to terminal TRG via leads TRG and RS closing XC2 via diode CR39. Relay XC2 operates, locks, transfers terminal CFS from resistance (CF) battery and lead CFO to resistance (CF) battery, lead CFO via diode CR35, and resistance (SS) battery via diode CR37, also, transfers terminal

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CFR from lead ATB to resistance (CF) battery and lead CFO via diode CR33. The circuit is now at normal.

10.02.2 Release of Conf. Ckt. #3 (Operated: Relays SS, TX1, D1, C1, C3-C5, XC2)

The PABX station connected to terminal +C3 and -C3 hangs up and opens the loop to C3 opening C3. Relay C3 restores, disconnects terminal +C3 from terminal T3 via capacitor C23A in multiple with resistor R42, terminal -C3 from terminal R3 via capacitor C23B in multiple with resistor R43, ground from terminal TC3, resistance (resistor R35) ground from terminal LK3, and closes XC3 via diode CR40. Relay XC3 operates, locks and connects terminal LK3 to terminal AR3 and resistance (#2XC3) battery via resistor R35. The circuit is now at normal.

10.02.3 Release of Conf. Ckt. #4 (Operated: Relays SS, TX1, D1, C1, C4, C5, XC2, XC3)

The PABX station connected to terminals +C4 and -C4 hangs up and opens the loop to C4 opening C4. Relay C4 restores, disconnects terminal +C4 from terminal T4 via capacitor C24A in multiple with resistor R44, terminal -C4 from terminal R4 via capacitor C24B in multiple with resistor R45, ground from terminal TC4, resistance (resistor R36) ground from terminal LK4, and closes XC4 via diode CR43. Relay XC4 operates, locks and connects terminal LK4 to terminal AR4 and resistance (#2XC4) battery via resistor R36. The circuit is now at normal.

10.02.4 Release of Conf. Ckt. #5 (Operated: Relays SS, TX1, D1, C1, C5, XC2-XC4)

The PABX station connected to terminals +C5 and -C5 hangs up and opens the loop to C5 opening C5. Relay C5 restores, disconnects terminal +C5 from terminal T5 via capacitor C25A in multiple with resistor R46, terminal -C5 from terminal R5 via capacitor C25B in multiple with resistor R47, ground from terminal TC5, resistance (resistor R37) ground from terminal LK5, opens TX1, SS and closes XC5, via diode CR44. Relay SS restores, and disconnects resistance (CF) battery and lead CFO via diode CR35 from terminal CFS. Relay XC5 operates, locks, and connects terminal LK5 to terminal AR5 and resistance (#2XC5) battery via resistor R37. The circuit is now at normal.

10.02.5 Release of Conf. Ckt. #1 (Operated: Relays TX1, D1, XC2-XC5)

After its slow-to-release interval, relay TX1 restores, disconnects resistance (#2D1) battery in multiple with resistance (#2TX1) battery from lead CFH via diode CR42, and restores battery polarity to normal across terminals +C1 and -C1 releasing the City trunk. The trunk releases, opens the loop to terminals +C1 and -C1 opening C1 and disconnects ground from terminal TC1 opening D1. Relay C1 restores, disconnects terminal +C1 from terminal T1 via capacitor C20A in multiple with resistor R38, and terminal -C1 from terminal R1 via capacitor C20B in multiple with resistor R39. Relay D1 restores, closes XC1 via diode CR38, transfers terminal CFR from resistance (CF) battery and lead CFO via diode CR33 to lead ATB, disconnects resistance (#2TX1) battery from lead CFH via diode CR42 and resistance (#1D1) battery from terminal TC1. Relay XC1 operates, locks, transfers terminal CFS from resistance (SS) battery via diode CR37 to resistance (#1E1) battery and resistance (#2XC1) battery via diode CR36, and terminal CFR from lead ATB to resistance (CF) battery and lead CFO via diode CR32. The circuit is now at normal.

10.03 Access From Turret (FIG. 8A)

10.03.1 Attendant Connects a Trunk to Conf. Ckt. #1 (Operated: Relays XC1-XC5)

When the attendant keys the digit assigned to conference the Turret Register or Selection Routing Circuit connects ground to terminal CFR thus closing CF and grounding lead CFO via diode CR32. Relay CF operates, connects resistance (resistors R32 and R34) battery to terminals TC1, and TC2 respectively, connects ground to leads TML, TLD and TAC, connects resistance (#1XC1) ground to lead UML and closes D1 via diode CR31. After its slow-to-operate interval, relay D1 operates, locks, transfers terminal TC1 from resistance (resistor R32) battery to resistance (#1D1) battery and lead CFR via diode CR31, connects resistance (#1D2) battery to lead ATB via diode CR41, and connects resistance (#2TX1) battery to lead CFH via diode CR42. The calling Trunk Switch closes a loop to terminals +C1 and -C1 closing C1. Relay C1 operates, connects terminal T1 to terminal +C1 via capacitor C20A in multiple with resistor R38, terminal R1 to terminal -C1 via capacitor C20B in multiple with resistor R39, and transfers terminal CFS from resistance (E1) battery and resistance (#2XC1) battery via diode CR36 to resistance (CF) battery and lead CFO via diode CR34. Ground is then disconnected

from terminal CFR opening CF and removing ground from lead CFO. Relay CF restores, disconnects resistance (resistor R34) battery from terminal TC2, ground from leads TM1, TLD and TAC, resistance (#1XC1) ground from lead UM1, opening XC1, resistance (#1D1) battery via diode CR31 from terminal CFR, and resistance (#1D2) battery via diode CR41 from lead ATB. Relay XC1 restores, transfers terminal CFS from resistance (#2XC1) battery via diode CR36, resistance (CF) battery and lead CFO via diode CR34 to resistance (SS) battery via diode CR37, terminal CFR from resistance (CF) battery and lead CFO via diode CR32 to resistance (CF) battery and lead CFO via diode CR33.

10.03.2 Attendant Connects a Trunk to Conf. Ckt. #2
(Operated: Relays D1, C1, XC2-XC5)

The Attendant keys the access digit as described above, connecting ground to terminal CFR thus closing CF and grounding lead CFO via diode CR33. Relay CF operates, connects resistance (#1D2) battery to terminal CFR via diode CR41 closing D2, ground to leads TLD, TAC and TM2, resistance (resistor R42) battery to terminal TC2, and resistance (#1XC2) ground to lead UM2. After its slow-to-operate interval, relay D2 operates, transfers terminal TC2 from resistance (resistor R34) battery to resistance (#1D2) battery, locks and connects resistance (#2TX2) battery to lead CFH. The calling Trunk Switch connects the calling loop to terminals +C2 and -C2, closing the loop to C2 and connects ground to terminal TC2. Relay C2 operates, connects terminal +C2 to terminal T2 via capacitor C21A in multiple with resistor R40 connects terminal -C2 to terminal R2 via capacitor C21E in multiple with resistor R41. Ground in then disconnected from terminal CFR, opening CF and removing ground from lead CFO via diode CR33. Relay CF restores, disconnects ground from leads TLD, TAC and TM2, resistance (#1XC2) ground from lead UM2, opening XC2, and resistance (#1D2) battery from terminal CFR via diode CR41. Relay XC2 restores, transfers terminal CFR from resistance (CF) battery and lead CFO via diode CR33 to lead ATB, terminal CFS from resistance (SS) battery via diode CR37 to resistance (CF) battery and lead CFO.

10.03.3 Seizure of Conf. Ckt. #3 by a PABX Station
(Operated: Relays D1, D2, C1, C2, XC3-XC5)

When a station dials the access digit, ground is connected to terminal CFS closing CF and grounding lead CFO. Relay CF operates, connects ground to terminals TLD, TAF and TRF, terminal AR3 closing #2XC3, and resistance (resistor R35) ground to

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terminal LK3. This transfers the calling line loop from the Finder Switch to the Conference Switch and the calling party is connected to terminals +C3 and -C3 closing relay C3. Relay C3 operates, connects ground to terminal TC3, lead CFH, closes TX1 via diode CR42, TX2, connects terminal +C3 to terminal T3 via capacitor C23A in multiple with resistor R42, terminal -C3 to terminal R3 via capacitor C23B in multiple with resistor R43, and disconnects terminal LK3 from terminal AR3 and #2XC3 via resistor R35.

Relays TX1, and TX2 operate. Relay TX1 operates and reverses polarity across terminals +C1 and -C1 for answer supervision. Relay TX2 operates and reverses polarity across terminals +C2 and -C2 for answer supervision. After the selection is completed ground is disconnected from terminal CFS opening CF and removing ground from lead CFO. Relay CF restores, disconnects ground from lead TLD, TAF and TRF and terminal AR3 opening XC3. Relay XC3 restores.

10.03.4 Seizure of Conf. Ckt. #4 by a PABX Station
(Operated: Relays D1, D2, TX1, TX2, C1-C3, XC4, XC5)

A PABX station dials the access digit and connects ground to terminal CFS closing CF and grounding lead CFO. Relay CF operates, connects ground to leads TLD, TAF and TRF and terminal AR4 closing (#2XC4) and connects resistance (resistor R36) ground to terminal LK4. This transfers the calling loop from the Finder Switch to the Conference Switch and the calling party is connected to terminals +C4 and -C4 closing C4. Relay C4 operates, connects ground to terminal TC4, disconnects terminal LK4 from terminal AR4 and #2XC4 via resistor R36, connects terminal +C4 to terminal T4 via capacitor C24A in multiple with resistor R44, terminal -C4 to terminal R4 via capacitor C24B in multiple with resistor R45. After the selection is completed ground is disconnected from terminal CFS opening CF and removing ground from lead CFO. Relay CF restores, disconnects ground from leads TLD, TAF, TRF and AR4, opening XC4. Relay XC4 restores.

10.03.5 Seizure of Conf. Ckt. #5 by a PABX Station
(Operated: Relays D1, D2, TX1, TX2, C1-C4, XC5)

The station party dials the access digit and connects ground to terminal CFS, closing CF and grounding lead CFO. Relay CF operates, connects ground to leads TLD, TAF, TRF and terminal AR5, closing #2XC5. This transfers the calling loop

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from the Finder Switch to the Conference Switch connecting the calling party loop to terminals +C5 and -C5 closing C5. Relay C5 operates, connects ground to terminal TC5, disconnects resistance (#1XC5) battery from terminal TRG via diode CR44, terminal LK5 from terminal AR5 and #2XC5 via resistor R37, connects terminal +C5 to terminal T5 via capacitor C25A in multiple with resistor R46, terminal -C5 to terminal R5 via capacitor C25B in multiple with resistor R47. After the selection is completed ground is disconnected from terminal CFS opening CF and removing ground from lead CFO. Relay CF restores, disconnects ground from leads TLD, TAF, TRF and terminal AR5 opening XC5. Relay XC5 restores.

10.04 Release (FIG. 8A)

10.04.1 Release of Conf. Ckt. #5 (Operated: Relays D1, D2, TX1, TX2, C1-C5)

For the sake of simplicity Conf. Ckts. 1-5 shall release in reverse order. The station connected to terminals +C5 and -C5 hangs up and opens the calling loop to C5 opening C5. Relay C5 restores, disconnects ground from terminal TC5, resistance (resistor R37) ground from terminal LK5, terminal +C5 from terminal T5 via capacitor C25A in multiple with resistor R46, terminal -C5 from terminal R5 via capacitor C25B in multiple with resistor R47, connects resistance (#1XC5) battery to terminal TRG, and with no selections being made, ground is connected to terminal TRG by Miscellaneous Common Ckt. CB-5703 or equivalent, via lead TRG, or by FIG. 9A when equipped via lead RS, closing XC5 via diode CR44. Relay XC5 operates, locks and connects terminal LK5 to terminal AR5 and resistance (#2XC5) battery via resistor R37.

10.04.2 Release of Conf. Ckt. #4 (Operated: Relays D1, D2, TX1, TX2, C1-C4, XC5)

The station connected to terminals +C4 and -C4 hangs up and opens the calling loop to C4 opening C4. Relay C4 restores, disconnects ground from terminal TC4, resistance (resistor R36) ground from terminal LK4, terminal +C4 from terminal T4 via capacitor C24A in multiple with resistor R44, terminal -C4 from terminal R4 via capacitor C24B in multiple with resistor R45, and closes XC4 via diode CR43. Relay XC4 operates, locks, and connects terminal LK4 to terminal AR4 and resistance (#2XC4) battery via resistor R36.

10.04.3 Release of Conf. Ckt. #3 (Operated: Relays D1, D2, TX1, TX2, C1-C3, XC4, XC5)

The station connected to terminals +C3 and -C3 hangs up and opens the calling loop to C3 opening C3. Relay C3 restores, disconnects ground from terminal TC3, resistance (resistor R35) ground from terminal LK3, terminal +C3 from terminal T3 via capacitor C23A in multiple with resistor R42, terminal -C3 from terminal R3 via capacitor C23B in multiple with resistor R43, closes XC3 via diode CR40 and opens TX1 via diode CR42, TX2 and transfers lead CFH from ground to resistance (#2D1, #2TX1, #2D2, #2TX2 in multiple) battery. Relay XC3 operates, locks and connects terminal LK3 to terminal AR3 and resistance (#2XC3) battery via resistor R35.

10.04.4 Release of Conf. Ckt. #2 (Operated: Relays D1, D2, TX1, TX2, C1, C2, XC3-XC5)

For the sake of clarity circuits 1 and 2 shall release separately, although they release simultaneously. Relay TX2 restores, restores battery polarity to normal at terminal +C2 and terminal T2 via capacitor C21A in multiple with resistor R40, also terminal -C2 and terminal R2 via capacitor C21B in multiple with resistor R41. This releases the trunk circuit and when the trunk releases it opens the loop to C2, opening C2 and disconnects ground from terminal TC2 opening D2. Relay C2 restores, disconnects terminal +C2 from terminal T2 via capacitor C21A in multiple with resistor R40, also terminal -C2 from terminal R2 via capacitor C21B in multiple with resistor R41. Relay D2 restores, disconnects resistance (#1D2) battery from terminal TC2 and closes XC3 via diode CR39. Relay XC3 reoperates, locks, transfers terminal CFS from resistance (CF) battery and lead CFO to resistance (SS) battery via diode CR37, and transfers terminal CFR from lead ATB to resistance (CF) battery and lead CFO via diode CR33.

10.04.5 Release of Conf. Ckt. #1 (Operated: Relays D1, TX1, C1, XC2-XC5)

Relay TX1 restores, restores battery polarity to normal on terminal +C1 and T1 via capacitor C20A in multiple with resistor R38, terminal -C1 and terminal R1 via capacitor C20B in multiple with resistor R39. This releases the trunk circuit and when the trunk releases it opens the loop to C1 opening C1 and disconnects ground from TC1 opening D1. Relay C1 restores, disconnects terminal +C1 from terminal T1 via capacitor C20A in multiple with resistor R38, also terminal -C1

from terminal R1 via capacitor C20B in multiple with resistor R39. Relay D1 restores, transfers terminal CFR from resistance (CF) battery and lead CFO via diode CR33 to lead A18, resistance (#2TX1) battery via diode CR42, from lead CFH, disconnects resistance (#1D1) battery from terminal TCl and closes XC1 via diode CR38. Relay XC1 operates, locks, transfers terminal CFR from lead ATB to resistance (CF) battery and lead CFO via diode CR32 and terminal CFS from resistance (SS) battery via diode CR37, to resistance (E1) battery. The circuit is now at normal.

11.00 3 Station Conf. Ckt.

11.01 Seizure (FIG. 9A) ("M" & "N" WRG.)

11.01.1 Seizure of Conf. Ckt. via Terminals +C1, -C1 (Operated: Relays XC1-XC3)

When the access digit is dialed, the following occurs in FIG. 8, assuming conference circuits 1-5 are busy (XC1-XC5 restored) and trunks are connected to circuits 1 and 2, ground is connected to terminal CFS closing CF (See NOTE 82). Relay CF operates, connects ground to leads TLD, TAF, TRG and CFG and therefore lead CFG in this FIG. To avoid repetition it will be understood that during the seizure of each circuit only ground connected to lead CFG will be discussed, also, after the selection is completed, relay CF restores and disconnects ground from leads TLD, TAF, TRG and CFG in FIG. 8, and therefore lead CFG in this FIG. Again, to avoid repetition, only ground disconnected from lead CFG will be discussed below. When a station dials the access digit, ground is connected to lead CFG. This connects resistance (resistor R48) ground to terminal LK1, ground to terminal AR1, and closes #2XC1. The calling loop is connected to terminals +C1 and -C1 closing C1. Relay C1 operates, connects ground to terminal TCl, leads CFH, CSA ("N" WRG.), disconnects terminal LK1 from lead CFG, terminal AR1 and #2XC1 via resistor R48, connects terminal +C1 to terminal T1 via capacitor C26A in multiple with resistor R51, terminal -C1 to terminal R1 via capacitor C26B in multiple with resistor R52. After the selection is completed, ground is disconnected from lead CFG opening XC1 and disconnecting ground from terminal AR1. Relay XC1 restores and transfers lead CFG from terminal AR1 and resistance (#2XC1) battery to terminal LK2 via resistor R49, terminal AR2 and resistance (#2XC2) battery.

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11.01.2 Seizure of Conf. Ckt. via Terminals +C2, -C2 (Operated: Relays C1, XC2, XC3)

When a station dials the access digit, ground is connected to lead CFG and this connects resistance (resistor R49) ground to terminal LK2, ground to terminal AR2 and closes #2XC2. The calling loop is connected to terminals +C2 and -C2 closing C2. Relay C2 operates, connects ground to terminal TC2, disconnects terminal LK2 from lead CFG, terminal AR2 and #2XC2 via resistor R49, connects terminal +C2 to terminal T2 via capacitor C27A in multiple with resistor R53, terminal -C2 to terminal R2 via capacitor C27B in multiple with resistor R54. After the selection is completed, ground is disconnected from lead CFG opening XC2 and disconnecting ground from terminal AR2. Relay XC2 restores, transfers lead CFG from terminal AR2 and resistance (#2XC2) battery to terminal LK3 via resistor R50, terminal AR3 and resistance (#2XC3) battery.

11.01.3 Seizure of Conf. Ckt. via Terminals +C3, -C3 (Operated: Relays C1, C2, XC3)

When a station dials the access digit, ground is connected to lead CFG and this connects resistance (resistor R50) ground to terminal LK3, ground to terminal AR3 and closes (#2XC3). The calling loop is connected to terminals +C3 and -C3 closing C3. Relay C3 operates, connects ground to terminal TC3, disconnects terminal LK3 via resistor R50 from lead CFG, terminal AR3 and #2XC3, connects terminal +C3 to terminal T3 via capacitor C28A in multiple with resistor R55, terminal -C3 to terminal R3 via capacitor C28B in multiple with resistor R56, and disconnects resistance (#1XC3) battery from leads TRG("M" WRG), RS via diode CR45. After the selection is completed ground is disconnected from lead CFG opening XC3 and disconnecting ground from terminal AR3. Relay XC3 restores, disconnects terminal AR3 and resistance (#2XC3) battery from lead CFG or transfers lead CFG from the aforementioned to lead SS ("N" WRG.) and transfers terminal CFA from lead CFO to lead ATB ("M" WRG.) or lead CFB ("N" WRG.).

11.02 Release (FIG. 9A) ("M" & "N" WRG.)

11.02.1 Release of Conf. Ckt. via Terminals +C1, -C1 (Operated: Relays C1-C3)

Station parties connected to terminals +C1, -C1, +C2, -C2, +C3 and -C3 may release at random but for the sake of clarity shall release sequentially. The party connected terminals +C1 and -C1 hangs up and opens the calling loop to C1 opening

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C1. Relay C1 restores, disconnects ground from terminal TC1, resistance (resistor R48) ground from terminal LK1, terminal +C1 from terminal T1 via capacitor C26A in multiple with resistor R51, terminal -C1 from terminal R1 via capacitor C26B in multiple with resistor R52, and transfers lead TRG ("N" WRG.) or lead RG ("N" WRG.) from lead RS to resistance (#1XC1) battery via diode CR47, and assuming that no selections are being made, ground is then connected by Misc. Common CB-5703 or equivalent to leads TRG ("N" WRG.) or RG ("N" WRG.) via leads RG and TRG of FIG. 10 with relays XC4-XC7 operated, and closes XC1. Relay XC1 operates, locks, connects lead CFG to terminal LK1 via resistor R48, terminal AR1 and resistance (#2XC1) battery or transfers lead CFG from lead SS ("N" WRG.) to the aforementioned, transfers terminal CFA from leads ATB ("N" WRG.) or CFB ("N" WRG.) to lead CFO and connects lead RS to #1XC1, via diode CR47, plus leads TRG ("N" WRG.), RG ("N" WRG.) grounding lead RS.

11.02.2 Release of Conf. Ckt. via Terminals +C2, -C2 (Operated: Relays C2, C3, XC1)

The party connected to terminals +C2 and -C2 hangs up and opens the calling loop to C2 opening C2. Relay C2 restores, disconnects ground from terminal TC2, resistance (resistor R49) ground from terminal LK2, terminal +C2 from terminal T2 via capacitor C27A in multiple with resistor R53, terminal -C2 from terminal R2 via capacitor C27B in multiple with resistor R54, and closes XC2 via diode CR45. Relay XC2 operates, locks, and connects terminal LK2 to terminal AR2, resistance (#2XC2) battery via resistor R49.

11.02.3 Release of Conf. Ckt. via Terminals +C3, -C3 (Operated: Relays C3, XC1, XC2)

The party connected to terminals +C3, -C3 hangs up and opens the calling loop to C3 opening C3. Relay C3 restores, disconnects ground from terminal TC3, resistance (resistor R50) ground from terminal LK3, terminal +C3 from terminal T3 via capacitor C28A in multiple with resistor R55, terminal -C3 from terminal R3 via capacitor C28B in multiple with resistor R56, ground from lead CFH, lead CSA ("N" WRG.) and closes XC3 via diode CR45. Relay XC3 operates, locks and connects terminal LK3 to terminal AR3, and resistance (#2XC3) battery via resistor R50. The circuit is now normal.

12.00 4 Station Conf. Ckt.

12.01 Seizure (FIG. 10A)

12.01.1 Seizure of Conf. Ckt. via Terminals +C4, -C4 (Operated: Relays XC4-XC7)

When a station party dials the access digit, the following occurs in FIG. 8A, assuming conference circuits 1-5 are busy (XC1-XC5 restored) and trunks are connected to circuits 1 and 2, ground is connected to terminal CFS closing CF (see NOTE C2). Relay CF operates, connects ground to leads TLD, TAF, TRF, and CFG and therefore lead SS in this FIG. via leads CFG and SS ("N" WRG.) in FIG. 9A (XC1-XC3 restored). To avoid repetition it will be understood that during the seizure of each circuit only ground connected to lead SS will be discussed, also after the selection is completed, relay CF restores and disconnects ground from leads TLD, TAF, TRF and lead CFG in FIG. 8A and therefore lead SS in this FIG. via leads CFG and SS ("N" WRG.) in FIG. 9A. Again, to avoid repetition, only ground disconnected from lead SS will be discussed. When a calling station dials the access digit ground is connected to lead SS, this connects resistance (resistor R65) ground to terminal LK4, ground to terminal AR4 and closes #2XC4. The calling loop is connected to terminals +C4 and -C4 closing C4. Relay C4 operates, connects ground to terminal TC4, lead CSA, disconnects terminal LK4 from terminal AR4, #2XC4, lead SS, via resistor R65, connects terminal +C4 to terminal T4 via capacitor C29A in multiple with resistor R57, terminal -C4 to terminal R4 via capacitor C29B in multiple with resistor R58. After the selection is completed, ground is disconnected from lead SS and therefore terminal AR4 opening XC4. Relay XC4 restores and transfers lead SS from terminal AR4 and resistance (#2XC4) battery to terminal LK5 via resistor R66, terminal AR5 and resistance (#2XC5) battery.

12.01.2 Seizure of Conf. Ckt. via Terminals +C5, -C5 (Operated: Relays C4, XC5-XC7)

When a calling party dials the access digit, ground is connected to lead SS, this connects resistance (resistor R66) ground to terminal LK5, ground to terminal AR5, and closes #2XC5. The calling loop is connected to terminals +C5 and -C5 closing C5. Relay C5 operates, connects ground to terminal TC5, disconnects terminal LK5 from terminal AR5, #2XC5, and lead SS via resistor R66, connects terminal +C5 to terminal T5 via capacitor C30A in multiple with resistor R59, and terminal -C5 to terminal R5 via capacitor C30B in multiple with resistor R60. After the selection is completed, ground is disconnected from lead SS and therefore terminal AR4 opening XC5. Relay XC5 restores and transfers lead SS from

terminal AR5 and resistance (#2XC5) battery to terminal LK6 via resistor R67, terminal AR6 and resistance (#2XC6) battery.

12.01.3 Seizure of Conf. Ckt. via Terminals +C6, -C6
(Operated: Relays C4, C5, XC6, XC7)

When a calling station dials the access digit, ground is connected to lead SS, this connects resistance (resistor R67) ground to terminal LK6, ground to terminal AR6, and closes #2XC6. The calling loop is connected to terminals +C6 and -C6 closing C6. Relay C6 operates, connects ground to terminal TC6, disconnects terminal LK6 from lead SS, terminal AR6, #2XC6, via resistor R67, connects terminal +C6 to terminal T6 via capacitor C31B in multiple with resistor R61, terminal -C6 to terminal R6 via capacitor C31B in multiple with resistor R62. After the selection is completed, ground is disconnected from lead SS and therefore terminal AR6, opening XC6. Relay XC6 restores and transfers lead SS from terminal AR6 and resistance (#2XC6) battery to terminal LK7 via resistor R68, terminal AR7 and resistance (#2XC7) battery.

12.01.4 Seizure of Conf. Ckt. via Terminals +C7, -C7
(Operated: Relays C4-C6, XC7)

When a calling station dials the access digit, ground is connected to lead SS, this connects resistance (resistor R6b) ground to terminal LK7, ground to terminal AR7 and closes #2XC7. The calling loop is connected to terminals +C7 and -C7 closing C7. Relay C7 operates, connects ground to terminal TC7, disconnects terminal LK7 from terminal AR7, #2XC7, lead SS, connects terminal +C7 to terminal T7 via capacitor C32A in multiple with resistor R63, terminal -C7 to terminal R7 via capacitor C32B in multiple with resistor R64, and disconnects resistance (#1XC7) battery via diode CR51 from lead RG and terminal TRG. After the selection is completed ground is disconnected from lead SS and therefore terminal AR7, opening XC7. Relay XC7 restores, transfers lead SS from terminal AR7 and resistance (#2XC7) battery to lead CFG, and lead CFB from lead CFO to terminal ATB.

12.02 Release (FIG. 10A)

12.02.1 Release of Conf. Ckt. via Terminals +C4, -C4
(Operated: Relays C4-C7)

Station parties connected to terminals +C4, -C4, +C5, -C5, +C6, -C6, +C7 and -C7 may release at random, but for the

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sake of clarity shall release sequentially as follows.

The party connected to terminals +C4, and -C4 hangs up and opens the loop to C4 opening C4. Relay C4 restores, disconnects ground from terminal TC4, disconnects resistance (resistor R65) ground from terminal LK4, disconnects terminal +C4 from terminal T4 via capacitor C29A in multiple with resistor R57, terminal -C4 from terminal R4 via capacitor C29B in multiple with resistor R58 and transfers terminal TRG from lead RG to resistance (#1XC4) battery via diode CR48. Assuming that no selections are being made, ground is then connected to terminal TRG by Misc. Common CB-5703 or equivalent via lead TRG closing XC4. Relay XC4 operates, locks, transfers lead SS from lead CFG to terminal LK4 via resistor R65, terminal AR4 and resistance (#2XC4) battery, lead CFB from terminal ATJ to lead CFO and connects lead RG to #1XC4 and terminal TRG grounding lead RG.

12.02.2 Release of Conf. Ckt. via Terminals +C5, -C5
(Operated: Relays C5-C7, XC4)

The party connected to terminals +C5 and -C5 hangs up and opens the loop to C5 opening C5. Relay C5 restores, disconnects ground from terminal TC5, resistance (resistor R66) ground from terminal LK5, closes XC5 via diode CR49, disconnects terminal +C5 from terminal T5 via capacitor C30A in multiple with resistor R59, and disconnects terminal -C5 from terminal R5 via capacitor C30B in multiple with resistor R60. Relay XC5 operates, locks and connects terminal LK5 to terminal AR5 and resistance (#2XC5) battery via resistor R66.

12.02.3 Release of Conf. Ckt. via Terminals +C6, -C6
(Operated: Relays C6, C7, XC4, XC5)

The party connected to terminals +C6 and -C6 hangs up and opens the loop to C6 opening C6. Relay C6 restores, disconnects ground from terminal TC6, resistance (resistor R67) ground from terminal LK6, terminal +C6 from terminal T6 via capacitor C31A in multiple with resistor R61, terminal -C6 from terminal R6 via capacitor C31B in multiple with resistor R62, and closes XC6 via diode CR50. Relay XC6 operates, locks and connects terminal LK6 to terminal AR6 and resistance (#2XC6) via resistor R67.

12.02.4 Release of Conf. Ckt. via Terminals +C7, -C7
(Operated: Relays C7, XC4-XC6)

The party connected to terminals +C7 and -C7 hangs up and opens the loop to C7, opening C7. Relay C7 restores,

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disconnects ground from terminal TC7, lead CSA, resistance (resistor R68) ground from terminal LK7, terminal +C7 from terminal T7 via capacitor C32A in multiple with resistor R63, terminal -C7 from terminal R7 via capacitor C32B in multiple with resistor R64 and closes XC7 via diode CR51. Relay XC7 operates, locks and connects terminal LK7 to terminal AR7 and resistance (#2XC7) battery via resistor R68. The circuit is now at normal.

13.00 Test Facilities Busy Keys

13.01 FIGS. 1 & 3 ("A" or "B" WRG.) (Operated: Relays X(1)-X(4))

During the idle state, resistance (TK) battery is connected to terminal ATS, circuits 1 & 2 ("A" WRG.) are marked busy by operating their respective busy keys. For example when only busy key BSY(1) is operated, and opens #2X(1), relay X(1) restores and transfers the units marking lead from UM1 to UM2, advancing the next calling party to circuit 2. Also, when busy keys BSY(1) and BSY(2) are both operated [X(1) and X(2) restored], terminal ATS is transferred from resistance (CF) battery to lead ATB sending busy tone to the calling party. When busy keys BSY(1) and BSY(2) are restored, relays X(1) and X(2) operate, lock and transfer terminal ATS from lead ATB to resistance (TK) battery and the circuit is now at normal. When "B" WRG. is used, circuit operation is similar to the above except 4 circuits are utilized instead of 2.

13.02 FIG. 8A (Operated: Relays XC3-XC5)

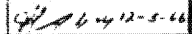
Assuming Conf. Ckts. #1 and #2 are busy, and circuits #3-#5 are idle, resistance (CF) battery is connected to terminal CFS. Circuits 3-5 are marked busy by operating their respective busy keys. For example, the operation of busy key BSY1 opens #2XC3 and its reset circuit, but retains the reset capability of circuits #1, 2, 4, and 5 via terminal TRG. Relay XC3 restores, and transfers the next calling party from terminals LK3, AR3 to terminals LK4, AR4; this prevents seizure of Conf. Circuit #3, and advances the calling party to circuit #4. Also, when busy keys BSY1 - BSY3 are operated, (XC1-XC5 restored), terminal CFS is transferred from resistance (CF) battery to lead ATB (see NOTE 82) sending busy tone to the next calling party. When busy keys BSY1 - BSY3 are restored and Conf. Ckts. 1 and 2 have released, relays XC1-XC5 operate and transfer lead CFS from lead ATB to resistance (E1) battery. The circuit is now at normal.

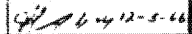
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13.03 FIGS 9A & 10A ("M" or "N" WRG.) (Operated: Relays XC1-XC7)

Circuit operation is similar to Section 13.02.

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E-850359-A SHEET 1 TOTAL 2 AUTOMATIC ELECTRIC COMPANY NORTH AVE, ILL. U.S.A. Q. WALKER, WISC. U.S.A. Q.	EXPLANATION OF AUDIBLE SIGNAL UNIT 24 OR 48 VOLT H-850359-A
DATE: _____ CHANGED SECTION: _____ FOR H-2 12/66-mj ISSUE 2	<u>FEATURES</u> 1. This circuit is capable of three levels of volume which may be selected by a movable terminal clip. 2. Provides resistor and capacitor network for 24 or 48 volt operation. 3. Optional external volume control. <u>OPERATION</u> 1. <u>48 VOLT</u> ("A" Apparatus) Assuming the proper DC Potential to be connected to terminal D, application of ground to lead ALM (terminal C) causes capacitor C2 to charge and transistor Q1 to conduct. As the current through winding (X) (Y) increases, due to Q1 conducting, a voltage is induced in the (W) (Z) winding causing Q1 to conduct more heavily. When the current flow through the (X) (Y) winding has reached a steady state, a voltage is no longer induced in the (W) (Z) winding thereby causing Q1 to conduct less heavily. As the tank circuit consisting of winding (X) (Y) and capacitor C2 approaches resonance, Q1 starts to conduct more heavily and the cycle is repeated.
Written By V. G. Grencions	Approved  12-5-66 E-850359-A

E-850359-A SHEET 2 TOTAL 2 AUTOMATIC ELECTRIC COMPANY NORTH AVE, ILL. U.S.A. Q. WALKER, WISC. U.S.A. Q.	EXPLANATION OF AUDIBLE SIGNAL UNIT 24 OR 48 VOLT H-850359-A
DATE: _____ CHANGED SECTION: _____ FOR H-2 12/66-mj ISSUE 2	The variations in voltage due to Q1 conducting more and less heavily are capacitor coupled, via capacitor C1, to the RECEIVER (SPEAKER) and the shunt network consisting of some combination of resistors R1, R3, and R4. Depending upon the connection of terminal C to terminals E, F, or G as per note 76 of H-850359-A, three levels of volume may be realized (FIG 3A not used). If external VOLUME CONTROL (FIG 3A) is used, terminal C is connected to terminal E (see NOTE 76 on H-850359-A), and the level of volume is controlled by adjusting the resistance of the LOG TAPER POTENTIOMETER (R7); (see NOTE 77 on H-850359-A). The frequency of the tone output is determined by the values of winding (X) (Y) and capacitor C2 ("A" apparatus). 2. <u>24 VOLT</u> ("B" Apparatus) Operation is similar to 48 volt operation except that "B" apparatus is used.
Written By V. G. Grencions	Approved  12-5-66 E-850359-A

MODEL NA-100 FILTER VENTILATOR FOR TELEPHONE EQUIPMENT CABINETS
DESCRIPTION, INSTALLATION AND MAINTENANCE

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1. GENERAL

1.01 This section provides a description, installation instructions, and maintenance procedures for the Model NA-100 Filter Ventilator used on telephone equipment cabinets.

1.02 The Model NA-100 Filter Ventilator is normally used with the Leich 40 and 80 PABX cabinets; however, its use is not restricted to these cabinets as it can be used with any cabinet type telephone equipment requiring pressurization and circulation of the heated air.

2. DESCRIPTION

2.01 The Model NA-100 Filter Ventilator, shown in Figure 1, provides dust free filtered air to supply circulatory, slightly pressurized cooling to telephone equipment cabinets. The air movement is kept at a level low enough to eliminate relay disturbance but high enough to maintain a slightly positive pressure with sufficient circulation to dispel most of the heat generated within the cabinet.

Filter Unit Components

2.02 The Model NA-100 Filter Ventilator consists of the following components and appurtenant devices (see Figures 1, 2, 3, and 4):

- (a) Filter guard
- (b) Filter cartridge
- (c) Motor—115V, 60 Hz, 0.75A, 55W
- (d) Blower
- (e) Blower housing and mounting base
- (f) "J" box (new Models only)
- (g) ON-OFF switch (New Models Only)
- (h) 3 ampere fuse cartridge type (New Models Only)
- (i) Fuse holder cartridge type (New Models Only)
- (j) 6-foot cord equipped with fused plug (older Models Only)
- (k) Gaskets for mounting base, two types
- (l) Filter Service Indicator
- (m) Filter Service Indicator mounting clips (2)
- (n) Reminder labels (New Models Only)

New Models

2.03 The new models of the Filter Ventilator, see Figure 1, are equipped with a "J" box which consists of a factory pre-wired ON-OFF switch and a fuse cartridge with a 3 ampere fuse. The "J" box is factory mounted on the rear of the motor and provides an external motor shut off for the Filter Ventilator so that the motor may be shut off prior to opening the cabinet doors. This eliminates a dust surge into the cabinet when the doors of the cabinet are opened. The 3 ampere fuse isolates the Filter Ventilator from the cabinet circuit; therefore, if an electrical failure occurs in the Filter Ventilator it will not effect the operation of the telephone equipment nor will it be necessary to expose the cabinet electrical equipment to repair the Filter Ventilator.

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ISSUE 1

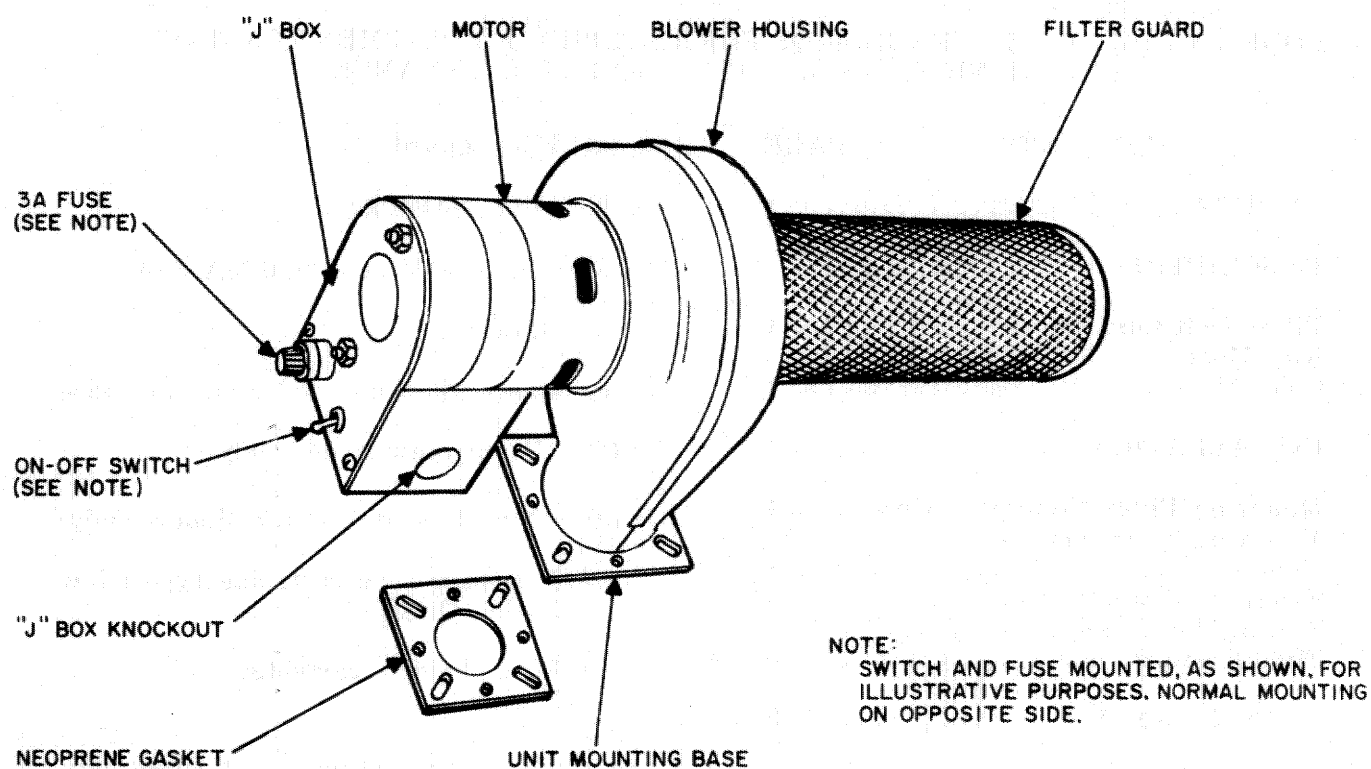


Figure 1. Assembled Filter Ventilator (New Model).

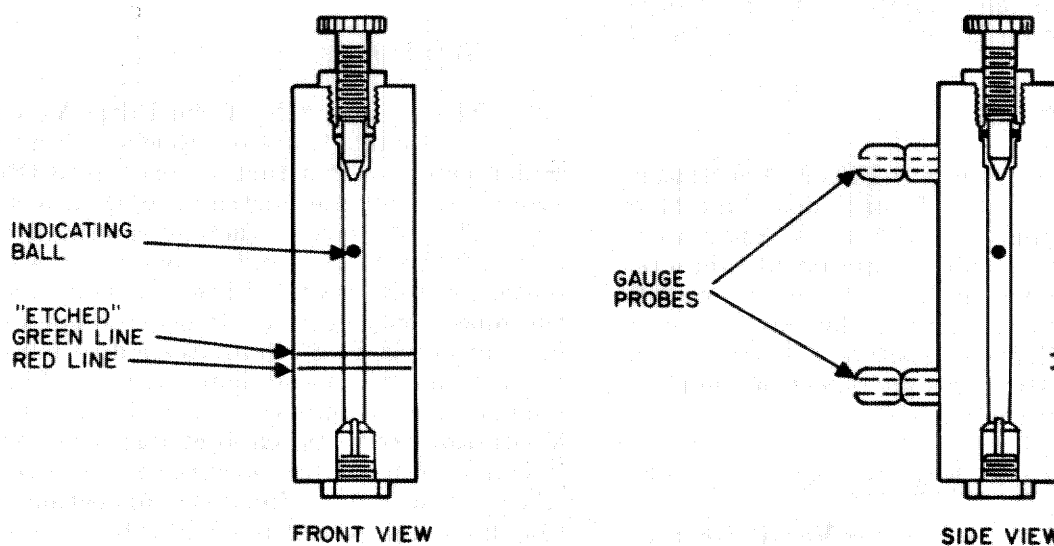


Figure 2. Filter Service Indicator.

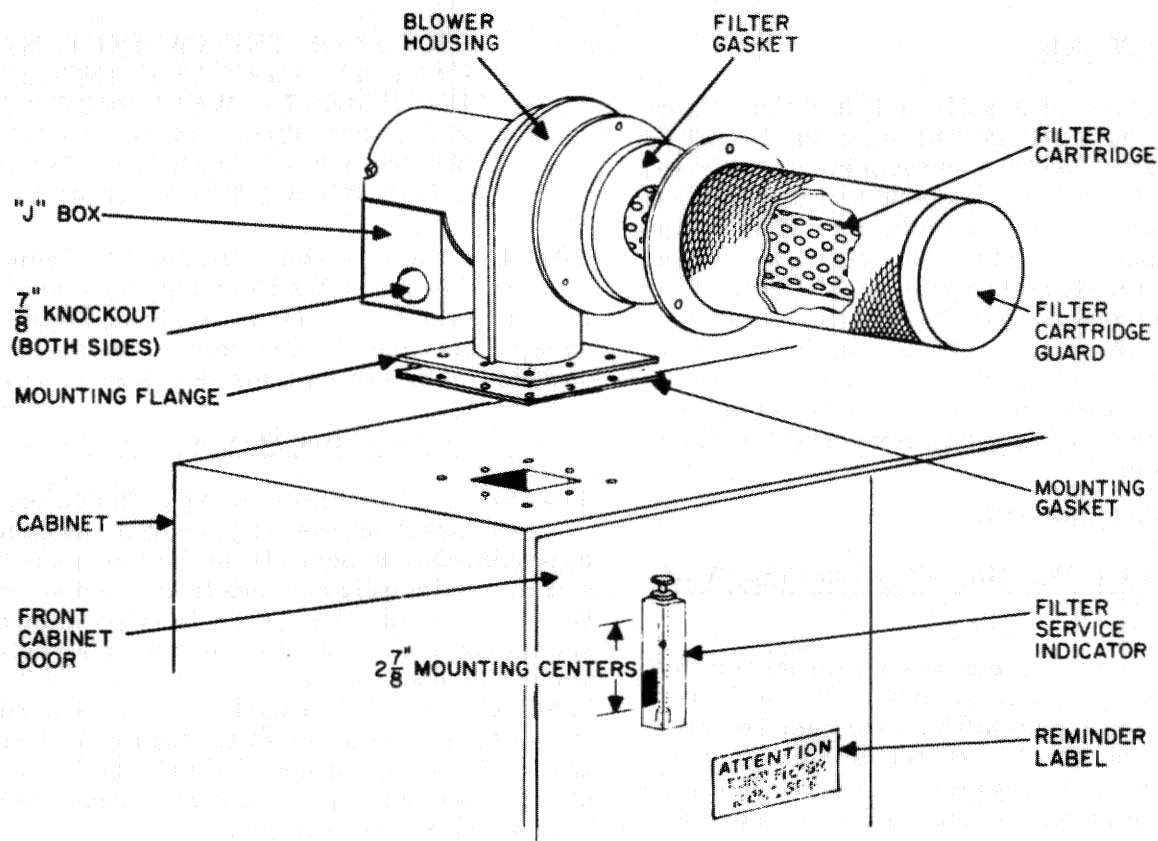


Figure 3. Typical Cabinet Mounting.

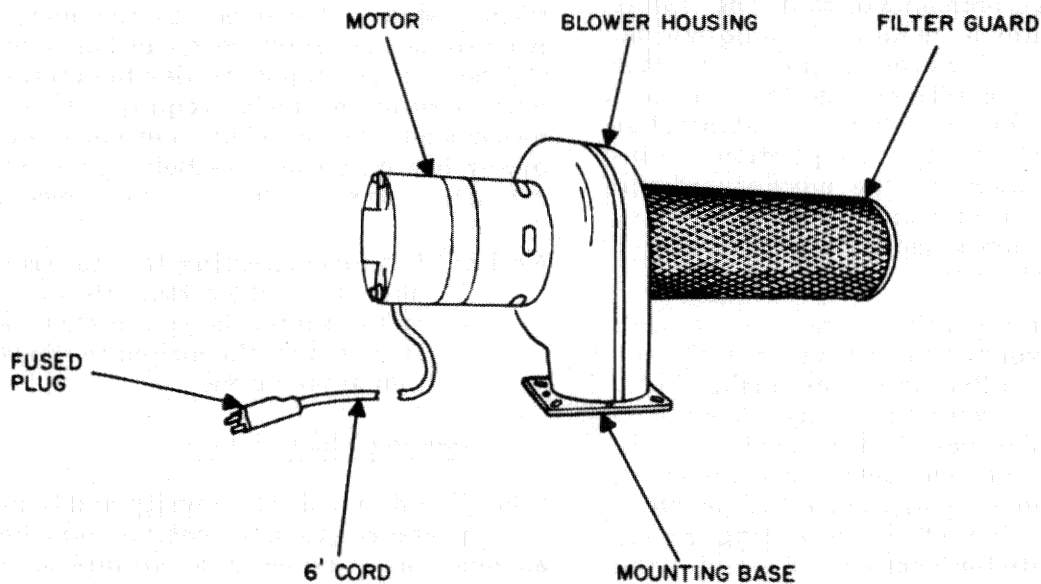


Figure 4. Older Model Filter Ventilator.

Older Models

2.04 The older models of the Filter Ventilator (see Figure 4) do not have an ON-OFF switch or external fuse, consequently, the cabinet doors must first be opened to unplug the Filter Ventilator. The circulatory effect from the fan operating when the doors are open causes an undesirable surge of dust into the cabinet. The older model Filter Ventilators did come equipped with a fused plug, however, it was still required to open the cabinet doors to replace the fuse. The older models cannot be converted to accept the "J" box without replacing the motor.

3. INSTALLATION

Mounting The Model NA-100 Filter Ventilator

3.01 Find a suitable location, preferably on the top of the cabinet, to mount the Filter Ventilator. See Figure 3. The filter guard mounting screws, the ON-OFF switch, and fuse holder (on newer models only) must be accessible for maintenance purposes. On the Leich 40 and 80 PABX cabinets the unused cable entry port on the top of the cabinet can be used to mount the Filter Ventilator. If other cabinets are used, a circular hole with a diameter of 2 inches must be drilled in the mounting location on the cabinet to accommodate the blower outlet.

NOTE: It is recommended that the Filter Ventilator be mounted in a horizontal position. However, if space will not permit, it can be mounted in a vertical position on the side of the cabinet, but the vertical mounting position will increase wear on the bearings of the ventilator and may tend to increase maintenance and shorten the life of the ventilator.

3.02 Locate the mounting base of the blower housing over the blower outlet in the top of the cabinet and line up the pre-drilled holes in the blower base with the existing mounting holes for the cable duct in the Leich 40 or 80 cabinets, or if other cabinets are being used, drill mounting holes using the base of the blower housing or either of the mounting gasket pads as a template for locating and aligning the mounting holes.

NOTE: IF IT IS NECESSARY TO DRILL MOUNTING HOLES IN THE SIDE

OR TOP OF THE CABINET, MAKE CERTAIN THAT THE INTERNAL EQUIPMENT IS WELL PROTECTED AGAINST THE POSSIBILITY OF METAL CHIPS BEING SCATTERED THROUGHOUT THE CABINET.

3.03 Use the selected self-adhering neoprene gasket and affix the adhering side of the gasket to the blower mounting base. Mount the Filter Ventilator to the cabinet using locally supplied nuts and bolts or self-tapping screws.

Mounting Filter Service Indicator

3.04 Install the Filter Service Indicator, see Figure 2, on the front door of the cabinet approximately 8 inches from the top of the door and approximately 8 inches from the door edge. When installed, the Filter Service Indicator should clear all cabinet edges and obstructions when the door is opened. Drill two 5/16 inch holes with 2-7/8 inch centers to accommodate the gauge probes of the Filter Service Indicator. Insert the gauge probes through the holes and attach the retaining clips over the gauge probes to lock the indicator in place.

Electrical Connections

3.05 Remove the cover plate on the rear of the "J" box to gain access to the motor leads. Use a locally supplied cord or other connection device which is in accordance with local electrical codes and connect to the motor leads. Knockouts are provided on either side of the "J" box to accommodate flexible metallic conduit or other media as required. Connect the motor leads, as intended, to either the internal handy box on either the Leich 40 or 80 PABX cabinets or to an external 115-volt power source.

NOTE: Before completing the electrical connections, make certain that the blower motor switch is in the OFF position. Do not turn the switch to the ON position at this time.

Sealing The Cabinet

3.06 To provide dust integrity and to allow for pressurization, the cabinet must be sealed as much as possible. Seal around all cabinet doors with a contact type weather stripping. All cable holes, the holes drilled for the accommodation of the gauge probes of the Filter Service Indicator, and the mounting holes provided

or drilled for the Filter Ventilator mounting. Should be sealed with a sealing compound (540891-Albaseal or equivalent). The cabinet base should also be sealed if necessary to maintain the required pressure within the cabinet.

Final Preparation

3.07 Affix the two reminder labels to the cabinet doors, one to the front door and one to the rear door (These reminder labels are furnished only with the newer model Filter Ventilator). Turn on the switch of the Filter Ventilator and observe that the indicating ball in the Filter Service Indicator is floating well above the green line etched into the Filter Service Indicator.

4. MAINTENANCE

4.01 A periodic filter cartridge replacement (430945) will be necessary. A regular check on the Filter Service Indicator, shown on Figure 2, will ensure proper determination of the necessity to replace the filter cartridge. When the ball in the Filter Service Indicator floats

close to or below the green line of the indicator, the filter cartridge should be replaced.

NOTE: Do not attempt to clean the filter by tapping or by blowing out the filter by the use of compressed air. This procedure will likely damage the filter element and defeat the purpose of the unit.

4.02 To change the filter cartridge, remove the filter guard by removing the 3 screws that attach the filter guard to the blower housing. Remove the guard from around the filter cartridge, dispose of the cartridge, and replace with a new cartridge. Replace the filter guard and cartridge onto the blower housing.

4.03 If, after replacing the filter cartridge, the Filter Service Indicator ball does not move to a satisfactory level above the etched green line, recheck the sealing of the cabinet and re-seal where necessary to allow the pressure within the cabinet to reinstate to a satisfactory level. No further maintenance is required on the Filter Ventilator under normal operation.

NIGHT SIGNAL RELEASE ADAPTER

40A, 40B, 80A PABX

1. General

See A-1067 for an explanation of circuit symbols and abbreviations. This circuit operates in conjunction with the universal night answer control feature which is a part of interrupter circuit C-5802 (40A PABX) or CB-5312 (40B, 80A PABX). (All issues of interrupter circuit C-5802 prior to issue ten may be used with issue three of CA-1922, while subsequent issues of CA-1922 are used with issues ten and above of that same interrupter).

The night signal release adapter is provided in installations where the universal night answer feature is equipped, but where personnel may not always be available to answer incoming calls at night in response to the night call signal. In such instances, this adapter interrupts ground on lead FN of all city trunk or magneto line circuits approximately one to one and one-half minutes after an incoming call has seized the night answer control. This causes the circuit of ground from the operated night key over interrupter lead CAI to be opened so that the night signals will be discontinued.

2. Operation

When the night key at the attendant's turret is operated and the universal night answer control circuit is idle, its relay RSA extends ground in series with 100 ω to operate high resistance relay NSR while charging its associated 250 MF capacitor. While operated, NSR maintains ground on leads FN of all available city trunk or magneto line circuits.

NSR+

When the night call signals are sounded as an indication of an incoming call, ground applied over lead FN holds an associated relay or relays in the trunk or magneto line circuit which applies battery over universal night answer control lead CAI to operate RSA in series with ground through the operated night key at the attendant's turret. Operation of RSA opens the circuit of NSR whose associated 250 MF capacitor begins discharging through the high resistance of NSR.w.

If no one is available within the vicinity of the sounding night signals to answer such calls, the capacitor will become fully discharged after an interval of between 60 and 90 seconds, thereby restoring NSR to open the circuit of direct ground over lead FN. The release of the ringing relay(s) in the calling trunk or magneto line causes that circuit to open its lead CAI, thereby restoring universal night answer control relay RSA. In this manner, the locked night signals are released, and this adapter circuit is restored to normal.

NSR-

(NSR+)

1) OLP:kdg

Approved: /

FIG.AT

ATTENDANT'S TURRET
(FOR REF. ONLY)

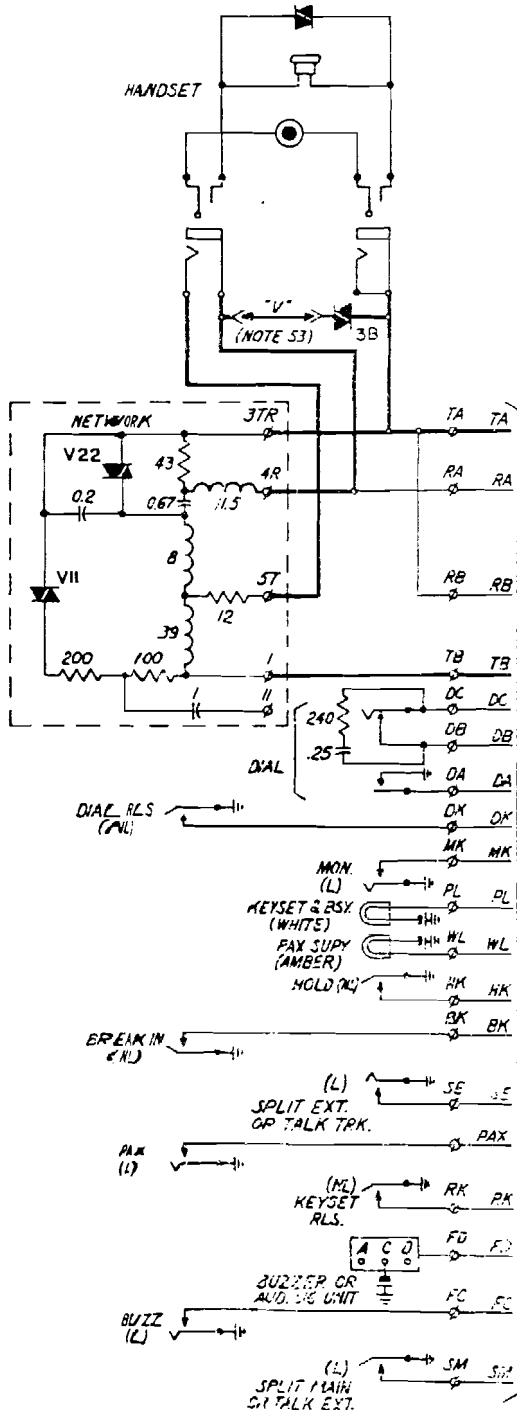
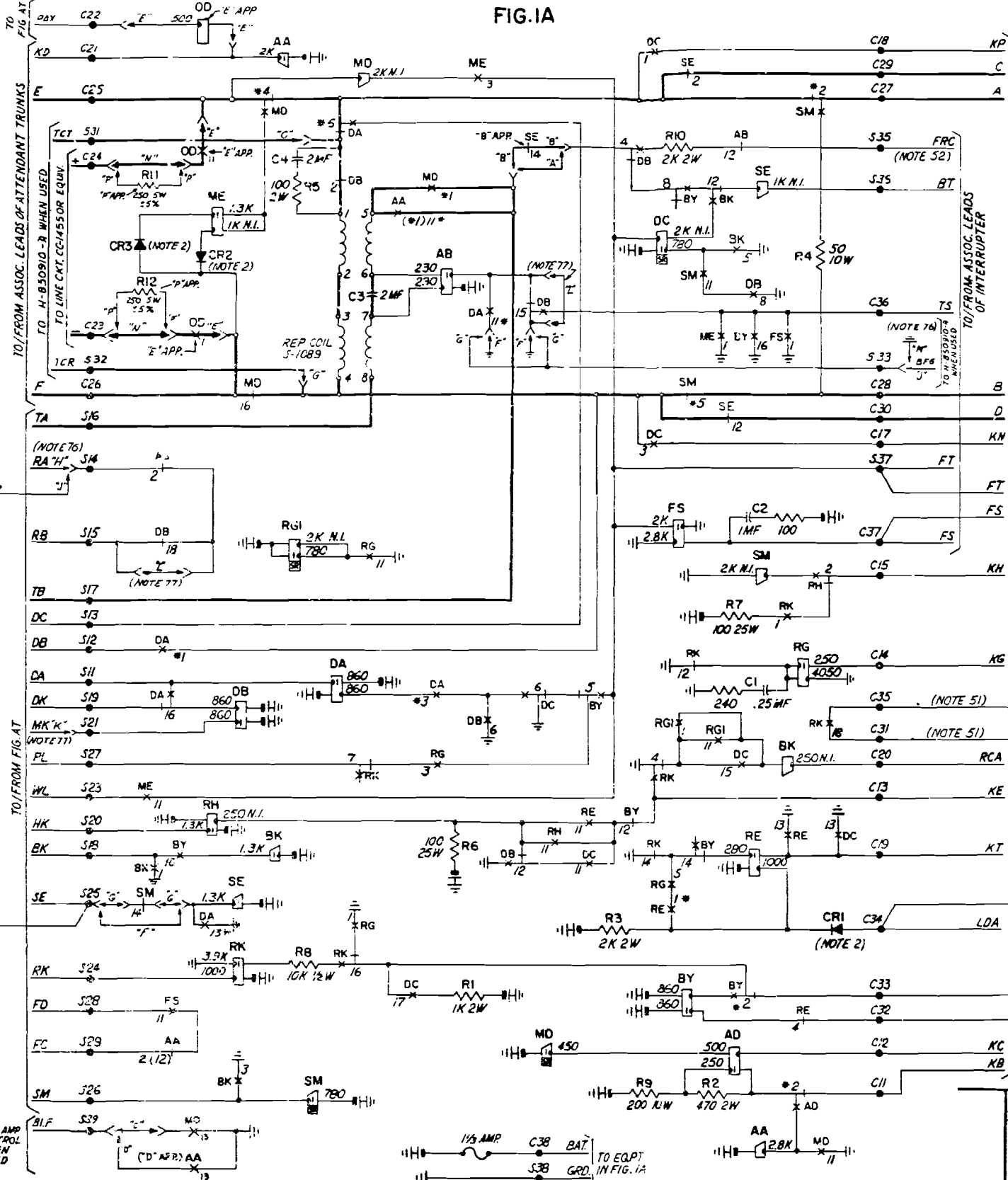
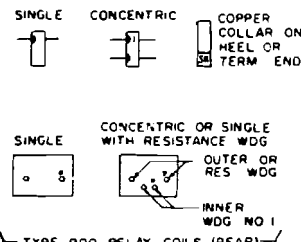


FIG.1A



SYMBOLS



MANUFACTURING NOTES:

- 1-POWER RATING VALUES ARE MINIMUM.
- 2-PRIOR TO ISSUE 12, DIODE CR1 WAS NL-10335 AND DIODES CR2 & CR3 WERE SELENIUM RECTIFIERS. BEGINNING WITH ISSUE 12, ALL DIODES ARE FO-1029-DG UNLESS SPECIFIED.
- 3-L CCMOTES LOCKING, NL DENOTES NON-LOCKING.
- 4-PRIOR TO ISSUE 12, "A" WIRING WAS PART OF CIRCUIT AND "B" WIRING & APPARATUS WAS NOT SHOWN. BEGINNING WITH ISSUE 12, "B" WIRING & APPARATUS SUPERSEDES "A" WIRING.
- 5-SHOP PROVIDES WIRING & APPARATUS PER TABLE A

INSTALLING NOTES:

- 76-OMIT "H" & "W" AND USE "J" WIRING IF H-850350-A TCMF ADAPTER IS USED WITH ATTENDANT'S TURRET.
- 77-DISCONNECT "K" WIRING & CONNECT "E" WIRING TO DISABLE ATTENDANT'S MONITOR FEATURE.

ENGINEERING NOTES:

- 51-TO BE CONNECTED TO TURRET CONDENSER REGISTER WHEN USED ON 80A OR 80M PABX'S ONLY.
- 52-CONNECT TO INTERRUPTER LEAD FRC TO PROVIDE TICK-TONE, IF REQUIRED, WHILE ATTENDANT TURRET MONITOR KEY IS OPERATED.
- 53-"V" WIRING TO BE CONNECTED ONLY WHEN TURRET HANDSET DOES NOT CONTAIN VARISTOR.

JACK

REAR VIEW

SPRING COIL

SIDE SIDE

S C

40

39

38

37

36

35

34

33

32

31

30

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28

27

26

25

24

23

22

21

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19

18

17

16

15

14

13

12

11

10

9

8

7

6

5

4

3

2

1

ASSOCIATED DRAWINGS		
DRAWING NO.	ISS.	DESCRIPTION
AH-850350-A	6	ADJUSTMENT
E-850350-A	7	EXPLANATION

CURRENT DRAIN DATA
HOLDING CURRENT AMPS.
0.22

STOCKLIST DH-850350-A40 (FIG.1A)
STOCKLIST DH-720882-40 (FIG.1A)

RELAYS	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ
ADJ. SEE P-0004	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	
C-CONT.	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	
SPRINGS	17-17																									
	15-16																									
	13-14	M	55																							
	11-12	M	B7	B	B9	B	(VAC)	T	B9	S	F3															
SPRINGS	7-8																									
	5-6																									
	3-4																									
	1-2	B	B5	B	D5	T	H10	M	G5	T	G9															
WINDINGS	1-3	A6																								
	1-4	A5	A9																							

DESIGNED APPRO. <i>FK</i>	DATE <i>3-1-52</i>	SCALE 1"=10"	FIG. 1A
TURRET POSITION CIRCUIT TYPES 40, 80 PABX			
H-850350-A			
SHEET 1 OF 2			
AUTOMATIC ELECTRIC COMPANY			

SC1- CITY TRUNK: MONITOR; TALK; SELECTION & BUSY TEST; BREAK-IN; & EXTENDING TO SPECIAL SERVICE.

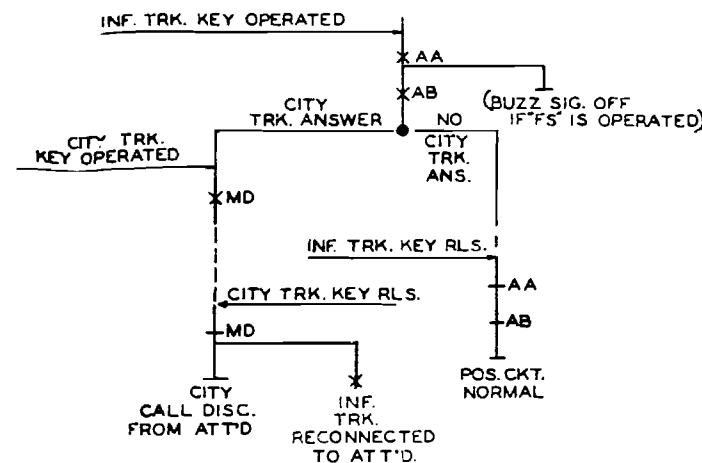
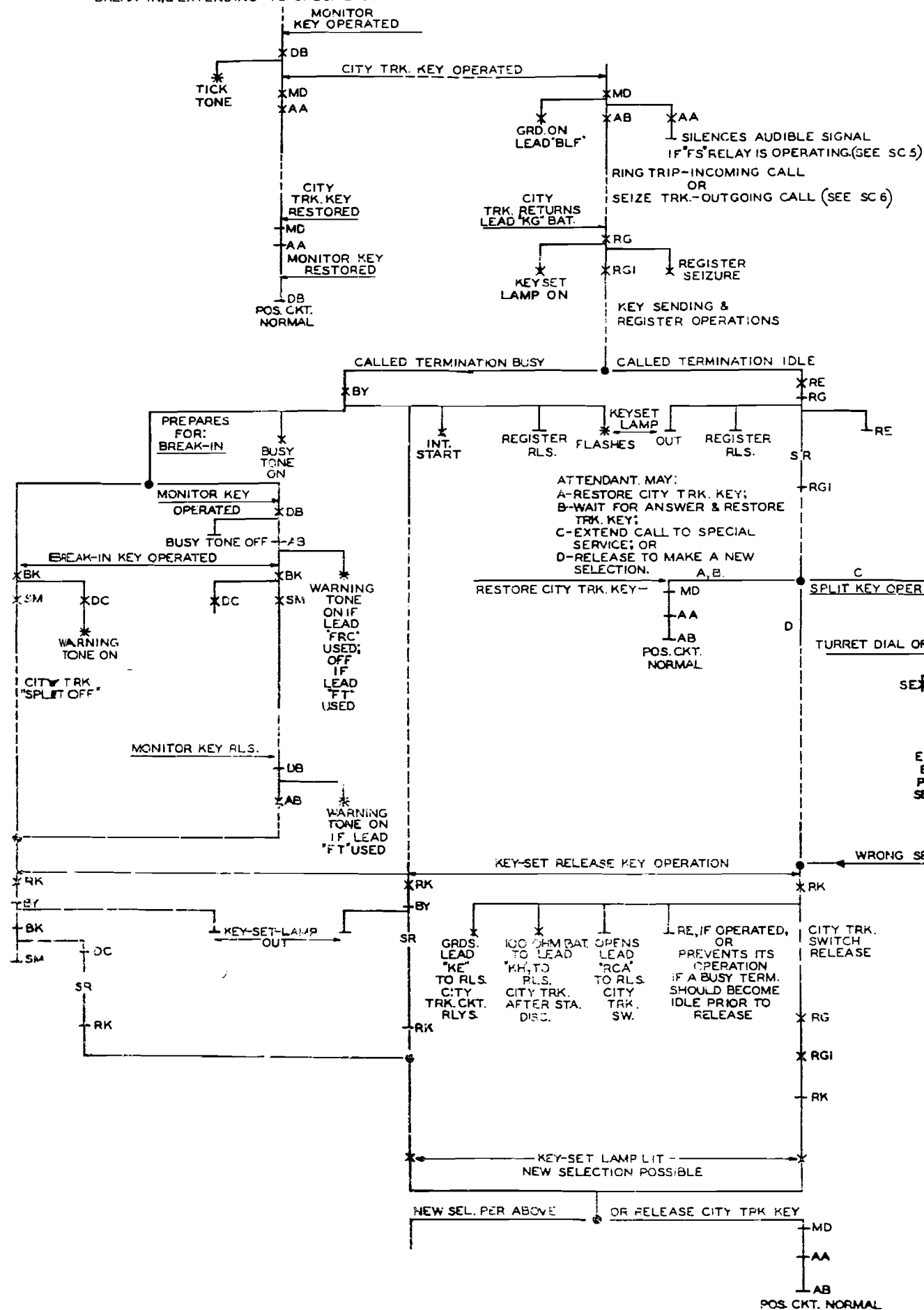
SEQUENCE CHARTS

SC2- INFORMATION TRUNK

SC7- OUT GOING CITY TRUNK CALL (MD, AA, AB, RG, RGI OPERATED PER SC1)

H-850350-A
SHEET 2 OF 2

ISSUE: 6
ISSUE: 7
ISSUE: 8
ISSUE: 9
ISSUE: 10
ISSUE: 11
ISSUE: 12



SC3- CITY TRUNK GUARD

OPERATION OF MORE THAN ONE CITY TRK. KEY

ALL CITY TRK. KEYS RESTORED

SC4 - SPLIT KEY

SPLIT KEY OPERATED:
A-TO TRK. POSITION

ATT'D. CAN TALK TO TRUNK & NOT TO EXTERNAL OR TRK. SW. CONNECTION

B-TO EXTERNAL POSITION

ATT'D. CAN TALK TO EXTERNAL OR TRK. SW. CONNECTION BUT NOT TO TRK.

SPLIT KEY RELEASE

SE (OR SM)

SC5- AUDIBLE SIGNAL (BUZZ KEY OPERATED)

INC. CITY TRUNK OR INF. TRK. CALL

INT. START RLY 'AA' OPERATE PER SC1 OR SC2

BUZZ ON
LEAD 'FD' OPEN BUZZ OFF

SC6- CITY TRK. HOLD

HOLD KEY 'HD' OPERATE

HOLDS CITY TRK. OR BLOCKS SUPN.

KEY-SET RLS. KEY OPER. AS ON SC1

SC8 - ATTENDANTS OUT-DIAL TRUNK

PAX KEY OPERATION

ATTENDANT USES TURRET DIAL

END OF PULSE SERIES

PAX KEY RLS. & DISCONNECT

CITY TRK. KEY OPERATION DURING PAX CALL

(CITY TRK. OPERATIONS PER SC1)
OUT DIAL CALL ANSWER & REV. BAT. SUPN.

PAX SUPPLY LAMP FLASHES
TICK TONE ON PAX CALL

PAX PTY. DISC. ME

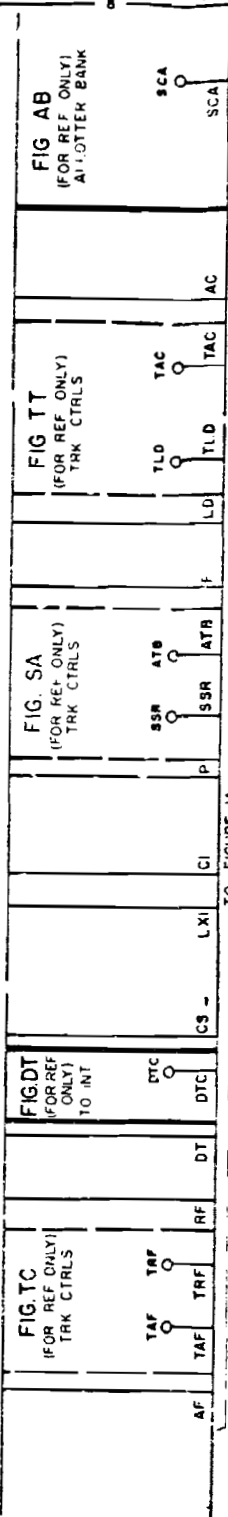
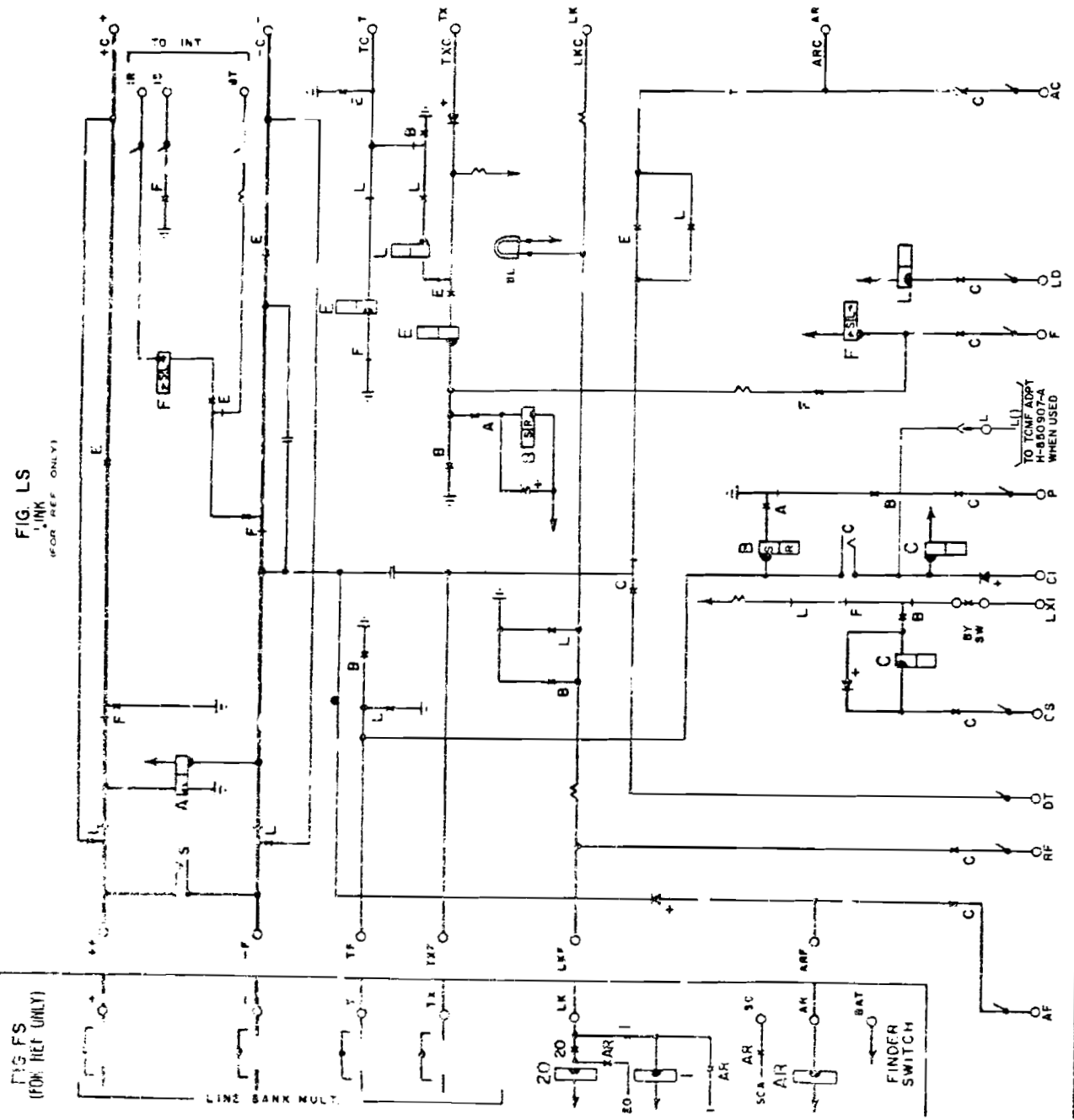
TONE & PAX LAMP OFF

PAX KEY RELEASE

H-850350-A
SHEET 2 OF 2

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ISS: 23
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ISSUE 27
ISSUE 28



APP AND/OR WIRING	ISSUES		WAS PART OF	WIRED BY		FIGURE OR SUFFIX	TABLE NOTES
	FIRST USED	LAST USED		FACTORY	INSTALLER		
A	1			*		1A	76
B	1			*		1A	77
C	26			*		1A	77
D	1			*		1A	77
E	26			*		1A	77
F							
G	23			*		1A	76
H							
I							
J							
K							
L							
M							
N							
O							
P							
Q							
R							
S							
T							
U							
V							
W							
X							
Y							
Z							

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FIG. SC-1
COUNTING CHAIN

(CA, CB, GO & POSSIBLY RD OPERATED)

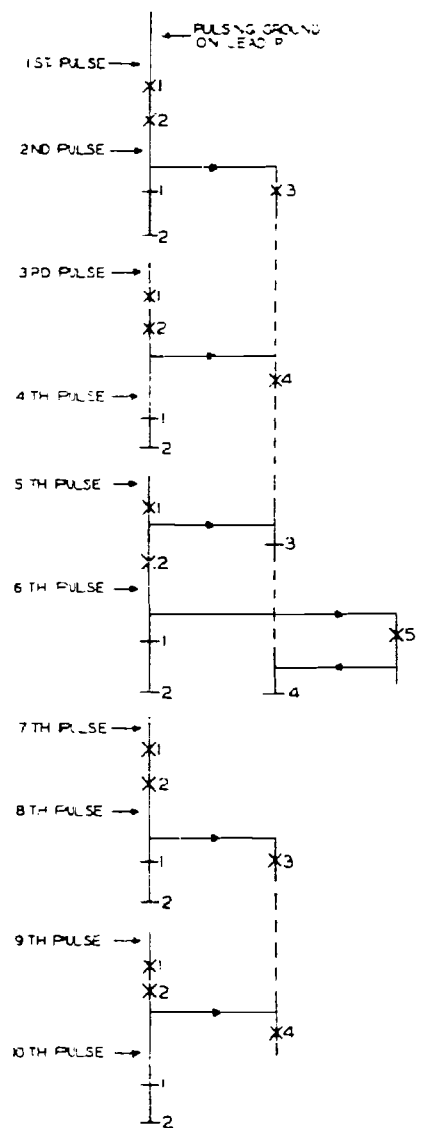


FIG. SC-2
SEIZURE

(GD, CX, LX1-LX3 OPERATED)

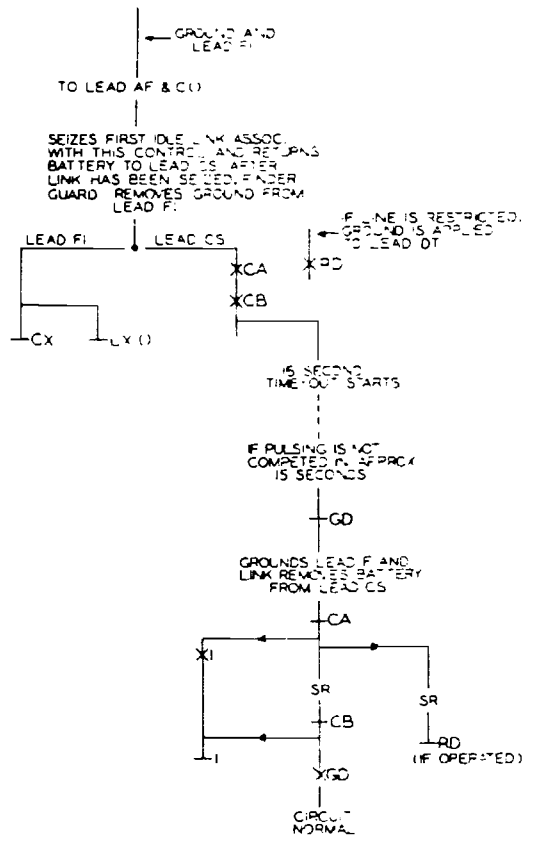


FIG. SC-5
DIGIT ABSORPTION

(CA, CB, GO & POSSIBLY X2, X3, X4, X5 OPERATED)

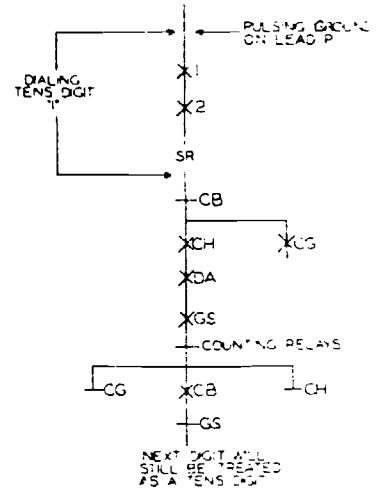


FIG. SC-3
CALL TO LOCAL STATION

(CA, CB, GO & POSSIBLY X2, X3, X4, X5 OPERATED)

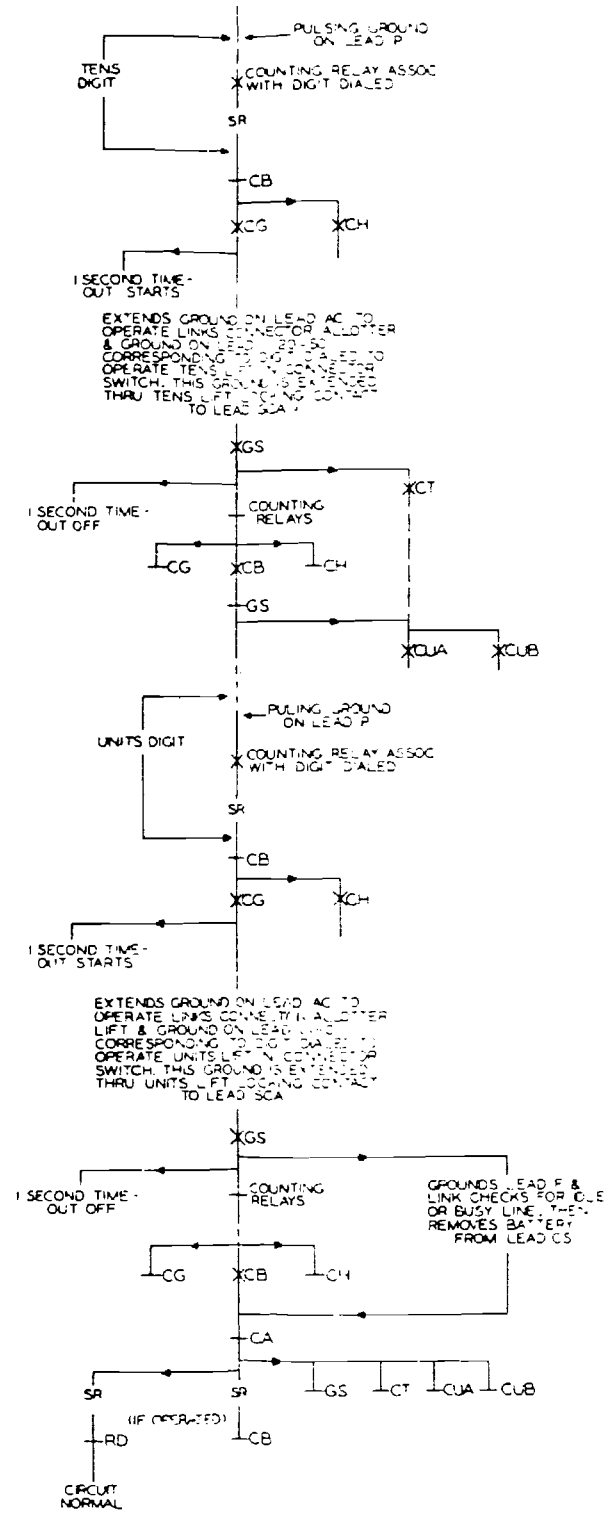
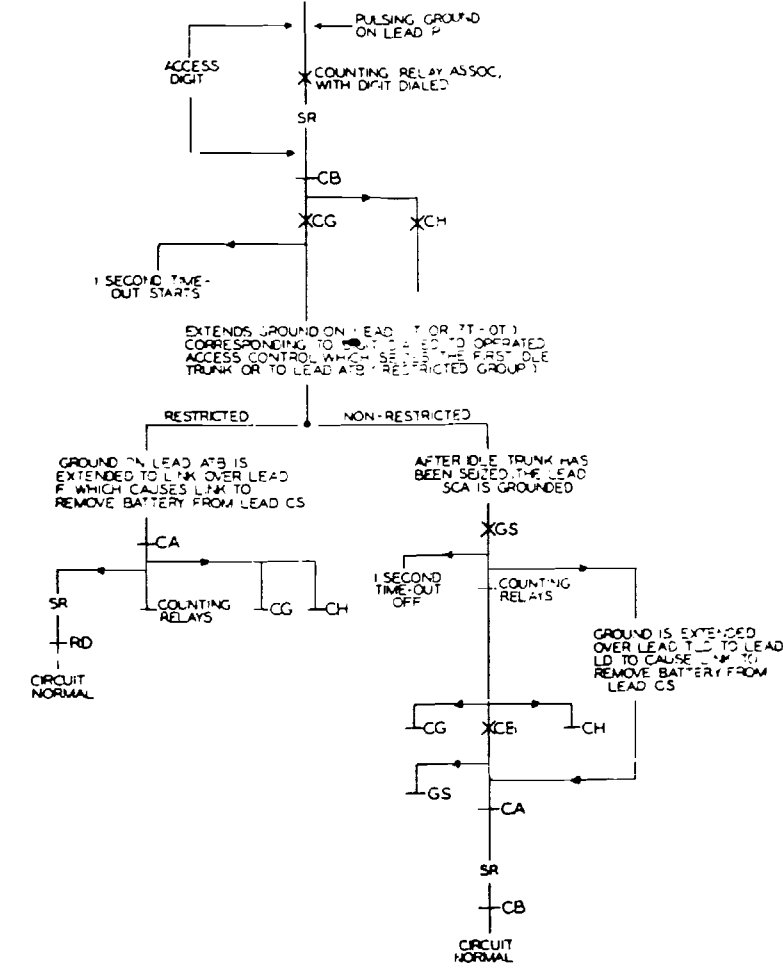


FIG. SC-4
CALL TO TRUNK GROUPS OR SPECIAL SERVICE

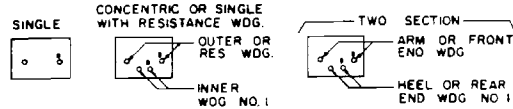
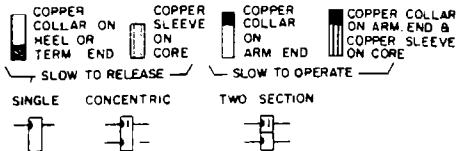
(CA, CB, GO & POSSIBLY X2, X3, X4, X5 OPERATED)



MAINTENANCE NOTES:

90-SWITCH SW TO BE OPENED ONLY DURING ROUTINE TESTING TO DISABLE PREFERENCE TRANSFER CIRCUIT.

SYMBOLS



TYPE 900 RELAY COILS (REAR)

INDICATES INSIDE TERMINAL (START OF WINDING)

JACK TERMINAL

JACK TERMINAL (COMMON)

BLOCK TERMINAL

NORMALLY OPERATED (SHOWN UNOPERATED)

MANUFACTURING NOTES:

1-DIODES CR1-CR4 ARE NL-18335

ENGINEERING NOTES:

51-RELAYS TA, TRG NORMALLY OPERATED.

JACK
REAR VIEW
SPRING
SIDE
S

COIL
SIDE
C

GRD 40 BAT
39
38 TRG.
37 RS
36 GS
35 GO
34 G1
33 FC
CG 32 FB
TA 31 FA
30 U0
29 U9
28 U8
27 U7
26 U6
25 U5
TN50 24 U4
TN40 23 U3
TN30 22 U2
TN20 21 U1

20 0
19 9
18 8
17 7
SCA 16 6
M2 15 5
M1 14 4
50 13 3
40 12 2
30 11 1

RELAYS	TA	TB	TC	TG	TH	TU	T2	T3	T4	T5	U16	U27	U38	U49	U50	15	60	AG	TRG
ADJ. SEE R-0004	117	140	111	134	134	129	216	216	216	216	145	145	145	145	145	172	172	137	109
E-COMT	L-LOC	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L
SPRINGS	17-18 15-16 13-14 11-12	T D6 M B4 M E15	T D10 M E6 M D5		B B9 B B9 B B9	B B15 B B14 B B13	M D6 M D5 M D9	T E10 T E10 M D4	T E11 T E11 M D4	T E11 T E11 M D4	T C12 T C12 M D4	T C13 T C13 M D4	T C14 T C14 M D4	T C15 T C15 M D4	T C15 T C15 M D4	M E14 M E14 M E13	M E15 M E14 M E13	B E7	M E4
SPRINGS	7-8 5-6 3-4 1-2	T C12 M D12 M D10	T C8 T C4 T C4		B B7 B B6 B B5	B B13 B B12 B B11	M D12 M D10 T E15	T C5 T C5 T C5	T C6 T C6 T C6	T C7 T C7 T C7	T C8 T C8 T C8	T C9 T C9 T C9	T C10 T C10 T C10	T C11 T C11 T C11	T C11 T C11 T C11	M E12 M E12 M E12	M E13 M E12 M E12	B E8	M E4
WINDINGS	2-3 1-4	R D10 R D10	E5 E5	D5 D5	R D5 R D5	R C5 R C5	D9 D9	B5 B5	B6 B6	B6 B6	B7 B7	B12 B12	B13 B13	B13 B13	B14 B14	B15 B15	D8 D8	D12 D12	D9 D9

DH-850280-A40 (FIG. 1A)
DH-720804-41 (1 CKT.)



FORMERLY GENOA DRAWING CC-6766.

ASSOCIATED DRAWINGS		
DRAWING NO.	ISS.	DESCRIPTION
AH-850280-A	3	ADJUSTMENT
E-850280-A	2	EXPLANATION

DESIGNED RVD
APPD. RVD
SCALE: DO NOT SCALE DRAWING
DATE: 3-21-61

FINDER GUARD CKT.
LEIGH 40B PABX
TYPE 900 RELAYS

H-850280-A

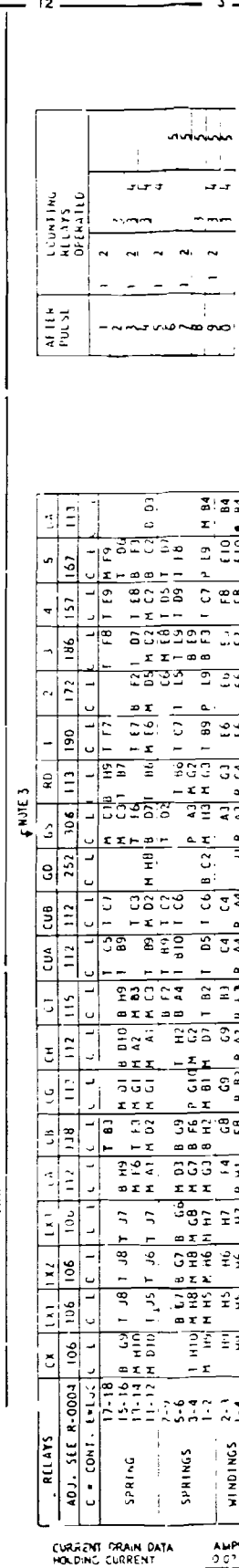
SHEET 1 OF 3

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REVISIONS
1. 4-12-68
2. 4-12-68
3. 4-12-68
4. 4-12-68
5. 4-12-68
6. 4-12-68
7. 4-12-68
8. 4-12-68
9. 4-12-68
10. 4-12-68
11. 4-12-68
12. 4-12-68
13. 4-12-68
14. 4-12-68
15. 4-12-68
16. 4-12-68
17. 4-12-68
18. 4-12-68
19. 4-12-68
20. 4-12-68

H-850280-A
H-850280-A

SHEET 1 OF 3



ENGINEERING NOTES:

51- * MAKE JUMPER BREAK OR EARLY MAKE.

52-NORMALLY OPERATED RELAY.

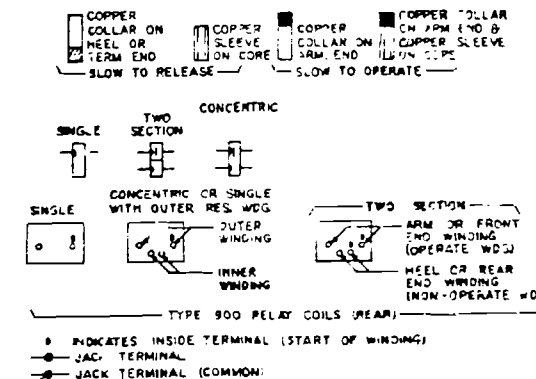
53-STRAPPED FOR RESTRICTED SERVICE ON DIGIT "9"
SEE CROSS CONNECT DRAWING FOR STRAPPING.
SEE ENGINEERING SPECIFICATIONS FOR
UNRESTRICTING DIGIT "9" OR FOR RESTRICTING
ANY OPTIONAL DIGIT.

54-JUMPER T01, T02, T03 TO COMMON TOLL
DIVERSION CIRCUIT IF USED. OTHERWISE STRAP
TO ATB.

INSTALLING NOTES

76-"A" WIRING NORMALLY FURNISHED WHEN T-15 CIRCUIT IS BEING ADDED TO A 408 PAKA PRIOR TO SERUM. NO 2325 REMOVE "A" WIRING AND G WIRING, AND STAP LEADS TD1-TD3 PER NOTE 54

77-REMOVE "B", OMIT "D", AND USE "C" & "E" WIRING WHEN TOCME REGSTER H B50909-A IS EQUIPPED



STOCKLIST DH-850260-A41 (FIG 1A)		
STOCKLIST DH-120796-A1 (FIG 1A)		
ASSOCIATED DRAWINGS		
DRAWING NO	ISS	DESCRIPTION
AH-850260-A	6	ADDITIVE 1
E-120796-A	15	EXPLANATION



SHEET 1 OF 3	H-850260-A	DESIGNED RVD	DR D.T.	LINK SELECTION						
					APPRO RVD	BY H.B.	CONTROL CKT			
								SCALE	DATE 12-2-55	TYPE 40B PABX
H-850260-A										
SHEET 1 OF 3										
AUTOMATIC ELECTRIC COMPANY										
NORTH AVE. J. L. U.S.A. • GENOA J. L. U.S.A. • RAURESHA J. L. U.S.A. •										

H-850260-A

SHEET 1 OF 3

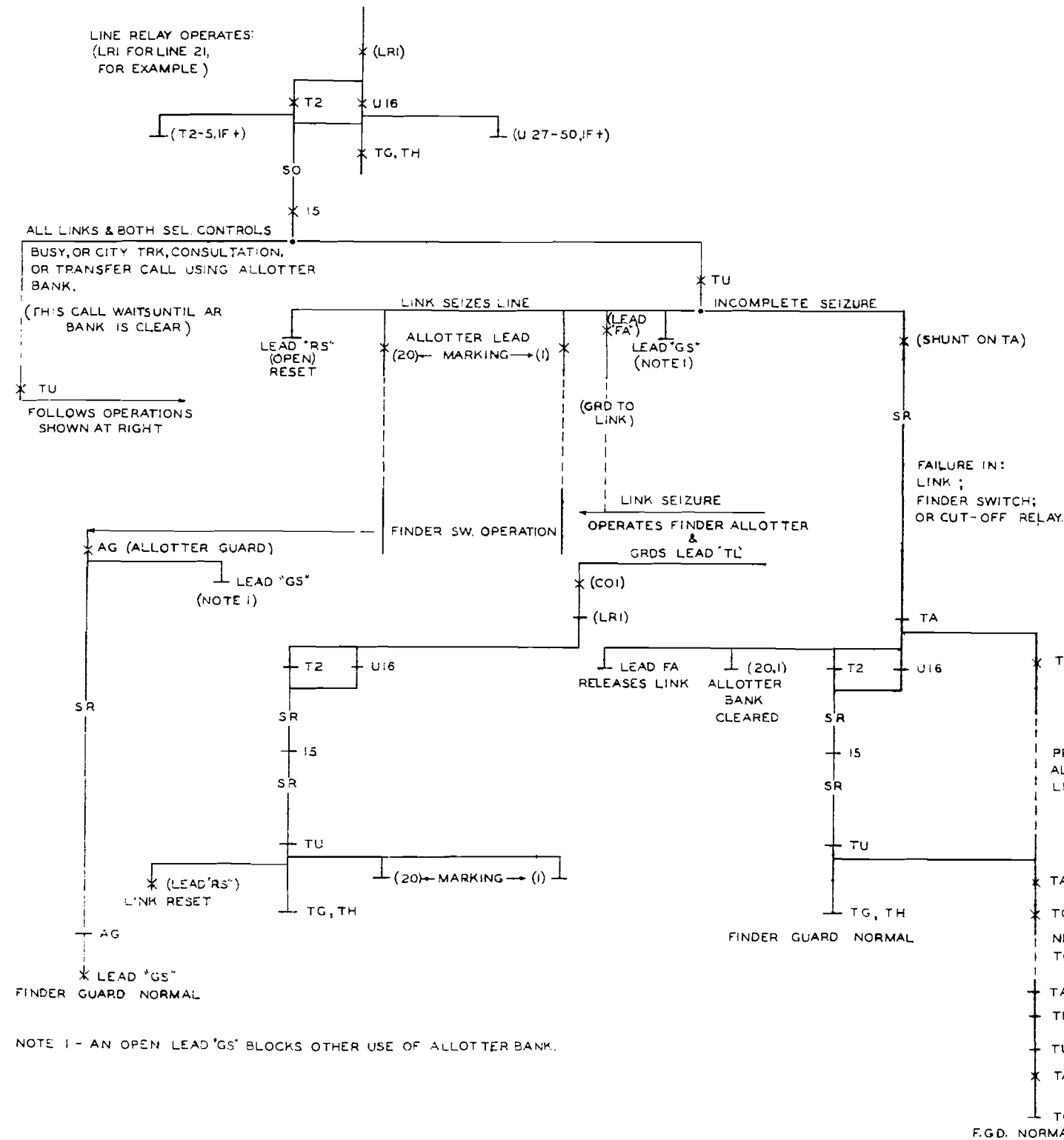
AUTOMATIC ELECTRIC COMPANY
U.S.A. • GENOVA, I.T. • U.S.A. • WAUKESHA, WISC. U.S.A. •

SEQUENCE CHARTS

H-850280-A
SHEET 3 OF 3

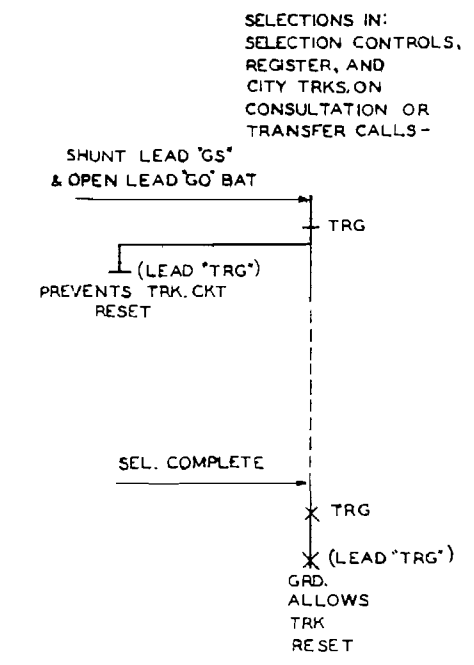
ISSUE 4
ISS. 5
ISSUE 6

SC 1. FINDER GUARD
(TA OPERATED)



NOTE 1 - AN OPEN LEAD "GS" BLOCKS OTHER USE OF ALLOTTER BANK.

SC 2. TRUNK RESET GUARD
(TRG OPERATED)



H-850280-A
SHEET 3 OF 3

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NORTHLAKE, ILL., U.S.A. • GENOA, ILL., U.S.A. • WAUKESHA, WISC., U.S.A. •

FIG. 1A, 1B, 1C OR 1D
LINK CIRCUIT

FIG. FS
FINDER SWITCH
(FOR REFERENCE ONLY)

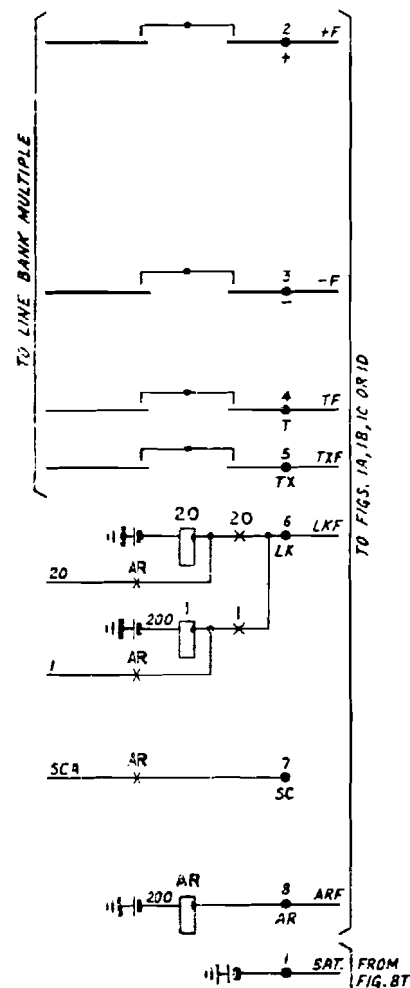
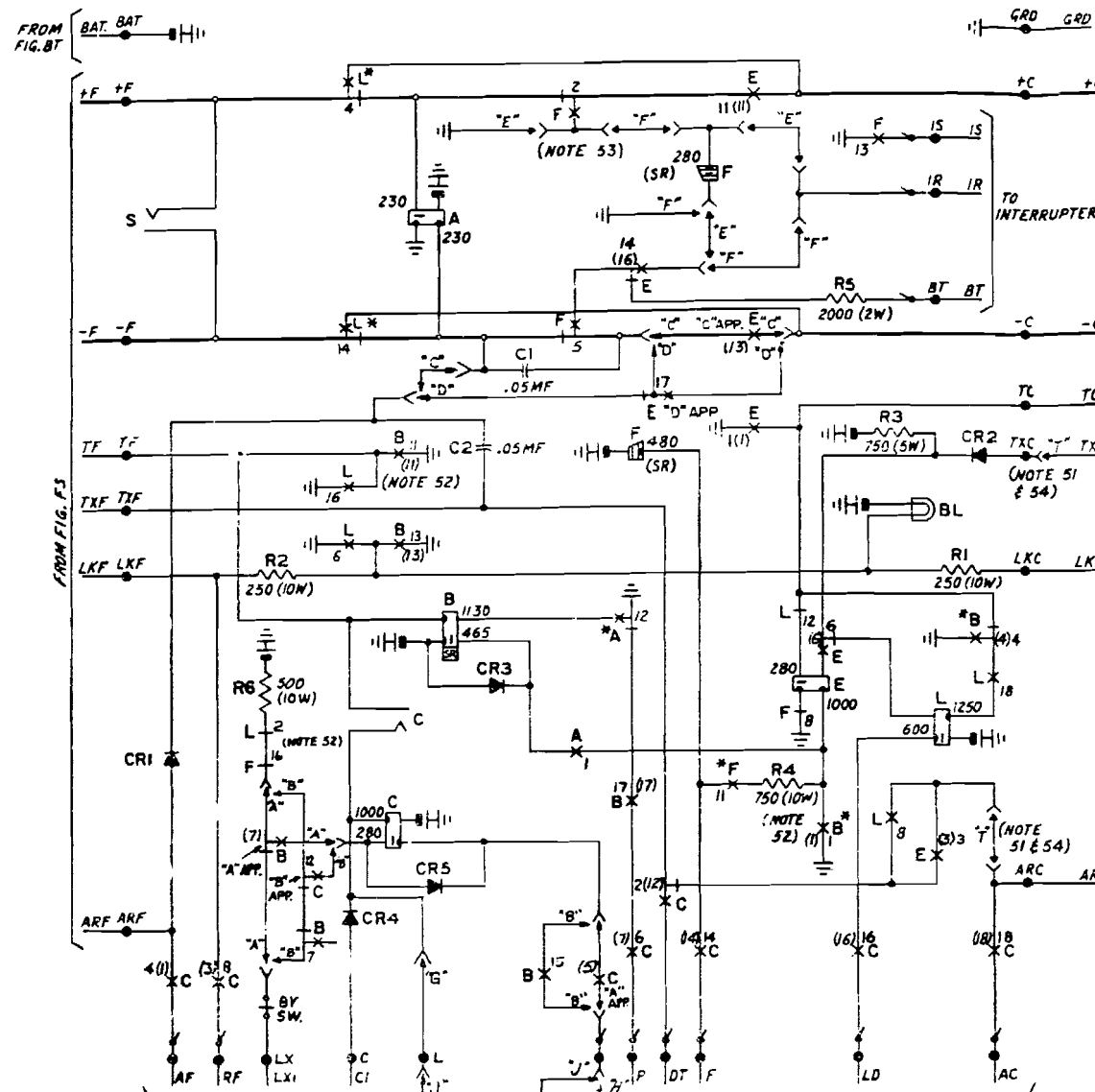
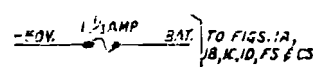


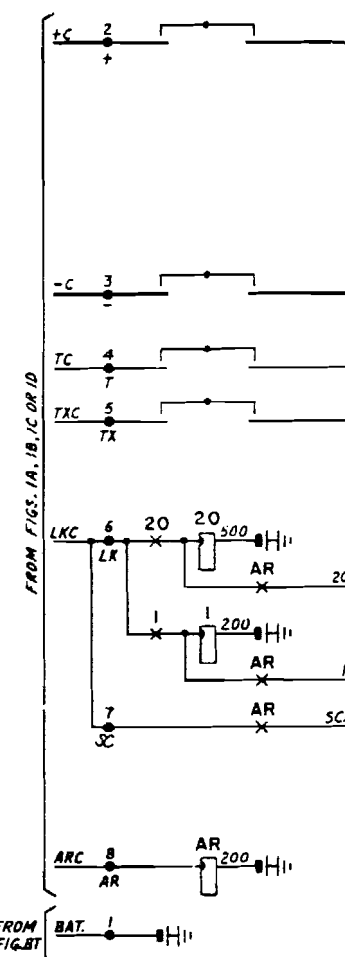
FIG. B7
(FOR REFERENCE ONLY)



LOG										BEGINNING WITH 195.5			
PRIOR TO 195.5													
RELAY	A	B	C	E	F	L	C	E					
ADJ. SEE R-5064	176	331	308	256	327	147	332	256					
C = CONT. L = LOC.	C L	C L	C L	C L	C L	C L	C L	C L					
SPRINGS	17-18 15-16 13-14 11-12 P D6	M E6 M F4 M D5 M C5	M F8 M F4 M F7 T F6	T B6 T M C7 M A7	B E5 M B8 M E7	M D8 M C5 P C5 B D7	M F8 M F7 F T7 E M	C					
SPRINGS	7-8 5-6 3-4 1-2 H E6	T F5 P D5 M E7	M F6 M F4 M F4	T D7 M C8 M E7	B E7 T C6 T A5	M E8 M D5 P A5 B E5	M F4 F T6 M E7 F M	D7 E7 C7					
WINDINGS	2-3 1-4 B5	D5 D5	E5 E5	D7 C6	B7 C6	E8 E8		D					

ASSOCIATED DRAWINGS		
DRAWING NO	ISS	DESCRIPTION
AH-850289-A	5	ADJUSTMENT
E-850289-A	4	EXPLANATION

FIG. CS
CONNECTOR SWITCH
(FOR REFERENCE ONLY)



INSTALLING NOTES:

76-USE "J" AND OMIT "H" WIRING WHEN
TCMF ADAPTER H-850907-A IS EQUIPPED;
OTHERWISE USE "H" AND OMIT "J" WIRING.

TABLE B (OPTIONS)

[illegible]

 COPPER COLLAR ON HEEL OR TERM END COPPER SLEEVE ON CORE COPPER COLLAR ON ARM END

ES SINGLE CONCENTRIC TWO SECTION

SINGLE

CONCENTRIC OR SINGLE WITH RESISTANCE WDG.

TWO SECTION

ARM OR FRONT END WDG

HEEL OR REAR END WDG NO. 1

TYPE 900 RELAY COILS (REAR)

- INDICATES INSIDE TERMINAL (START OF WINDING)
- (SO) SLOW TO OPERATE
- (SR) SLOW TO RELEASE
- JACK TERMINAL
- JACK TERMINAL (COMMON)
- * INDICATES MAKE BEFORE BREAK OR EARLY MAKE

MANUFACTURING NOTES:

1-WATTAGE VALUES SHOWN ARE MINIMUM.

2-DIGITS CRI - CAS ARE NL-10335.

3-PRIOR TO ISSUE 5, SPRINGS OF RELAYS B & C WERE NUMBERED AS SHOWN IN PARENTHESES. "A" WIRING & APPARATUS WERE PART OF THE CIRCUIT & "B" WIRING & APPARATUS WERE NOT SHOWN. BEGINNING WITH ISSUE 5, SPRING NUMBERING IS THAT WHICH IS NOT IN PARENTHESES & "B" WIRING & APPARATUS SUPERSEDE "A" WIRING & APPARATUS.

4-ISSUES 1-3, RELAY "E" HAD 14 SPRINGS NUMBERS IN ().
ISSUE 6 AND LATER, USE SPRING NUMBERS NOT IN ().

ENGINEERING NOTES:

51-DISCONNECT "T" WIRING ON ALL 40M & 80M SWITCHBOARDS.

~~52-RELAY B, SPRINGS 1,2 MUST MAKE BEFORE SPRINGS
11,12. RELAY F, SPRINGS 11,12 MUST MAKE
BEFORE SPRINGS 15,16 BREAK.~~

53-"E" WIRING FURNISHED. DISCONNECT "E" WIRING AND CONNECT "F" WIRING TO INSERT THE RING TRIP RELAY IN THE RINGING GENERATOR RETURN PATH. (SEE TABLE A)

54-WHEN STATION METERING IS PROVIDED, "T"
WIRING MUST BE OMITTED.

TABLE A FEATURES				
FIG.	RING TRIP RELAY IN SERIES WITH GEN. LEAD "E" WRG.	RING TRIP RELAY IN SERIES WITH GEN. RETURN "F" WRG.	CONSULTATION TRANSFER SERVICE FROM CITY TRUNKS "T" WRG.	STOCKLIST
1A	*		*	DM-720840-40A
1B		*	*	DM-720840-40B
1C	*		NOTE 54	DM-720840-40C
1D		*	NOTE 54	DM-720840-40D

V-682058-H		H-850289-A	
SHEET /	OF 2	CHANGES	APP'D.
ISSUE: 1		CHG 050289-A (AFC) CANCEL DOWNT 153.95 PFC 4.6 GZ 503 JFC 7-27-69 AS RVD. 403744 H.K. 7-28-69	
ADDED TIGDAME CHARTS 5C1-5C6		RVD.	
A.R.L. 11-6-64		A.F.	
ISSUE: 3		RVD.	
H-850289-A, REG ADJ NUMBER FOR ATC P. WAS BTL.		11-3-64	
A.R.L. 11-6-64		A.N.	
ISSUE: 4			
5-H-850289-A (TNG) ADDED NOTE 3, CANCEL OUT NOTE 5E, NEW TITLE BLOCK, ADDED 452.40 DMS, TABLE A-4 E. ISS 3-22-69 L.Y. 2-3-68		RVD. 11-3-64 L.S. 2-1-68 A.V.	
ISSUE: 5			
6-H-850289-A (TLO) ADDED NOTE 4 AND TABLE A-4 A.R.L. 2-18-70		J.C.C. J.F.H.	
ISSUE: 6		RVD.	
7-H-850289-A (Z) ADJ ADDED NOTE 10, A.F. RZ 5-26-70		J.F.H.	
ISSUE: 7			
ASSOCIATED GRANTS AN WAS ISSUE: 4 11-2-29-70 W.H.		M.R.R.	
ISSUE: 8			

CURRENT DRAIN DATA	AMPS
HOLDING CURRENT	0.3

FIG.A OF GENOA DRGS.:
C-6756 ISS.19
CC-6209 ISS.12
CC-6426 ISS.9
CC-6882 ISS.2

LINK CIRCUIT
TYPE 40,80 PABX,
100D PAX

H-850289-A

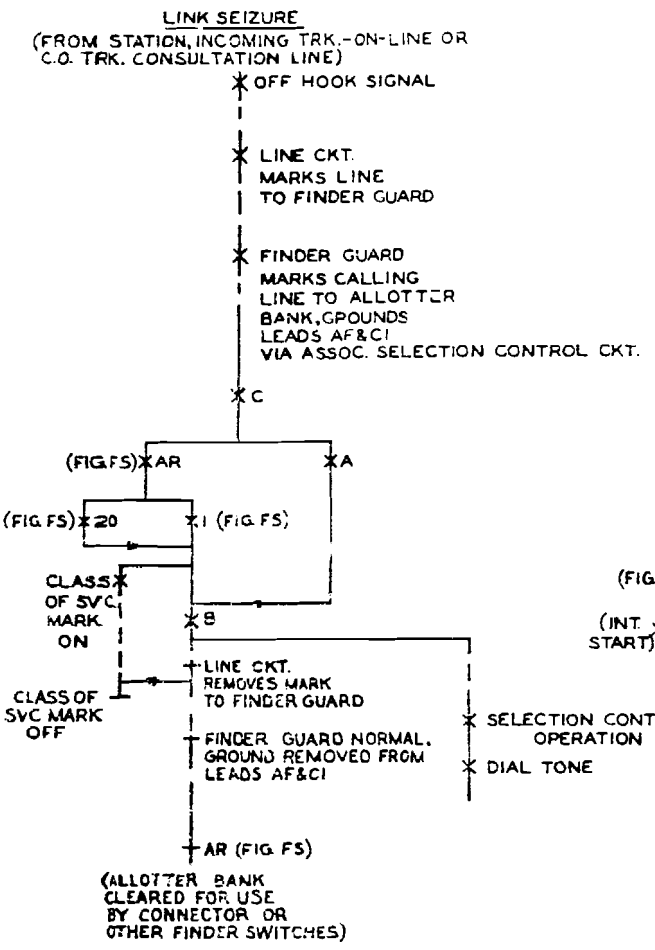
SHEET 1 OF 1

AUTOMATIC ELECTRIC COMPANY

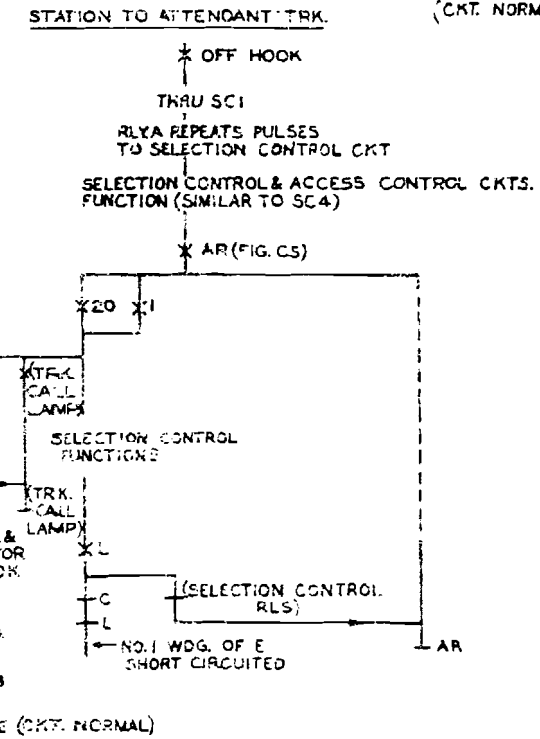
NORTH LAKE, ILL., U.S.A. • GENOA, ILL., U.S.A. • WAUKESHA, WISC., U.S.A. • O

SEQUENCE CHARTS

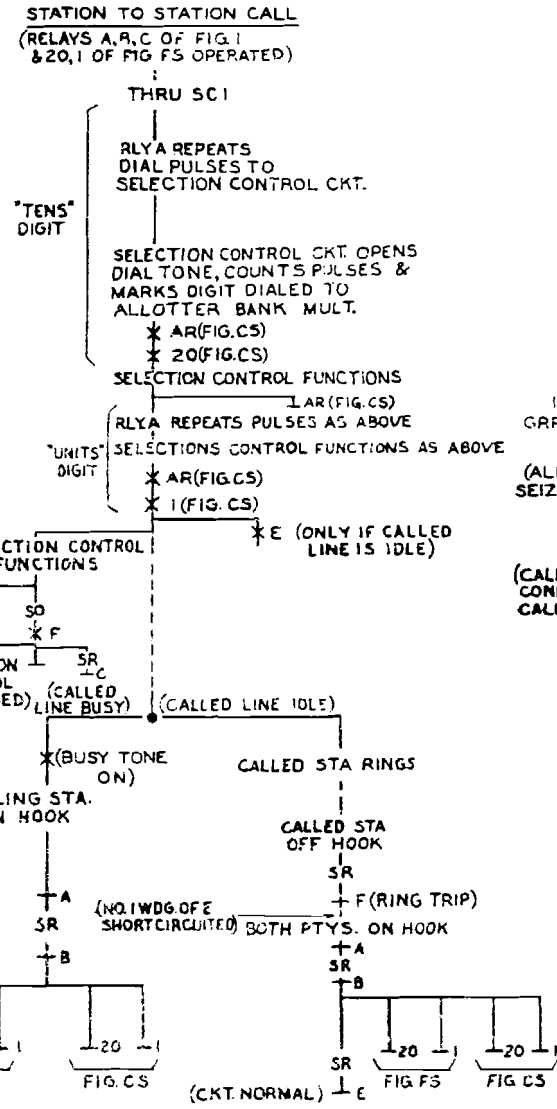
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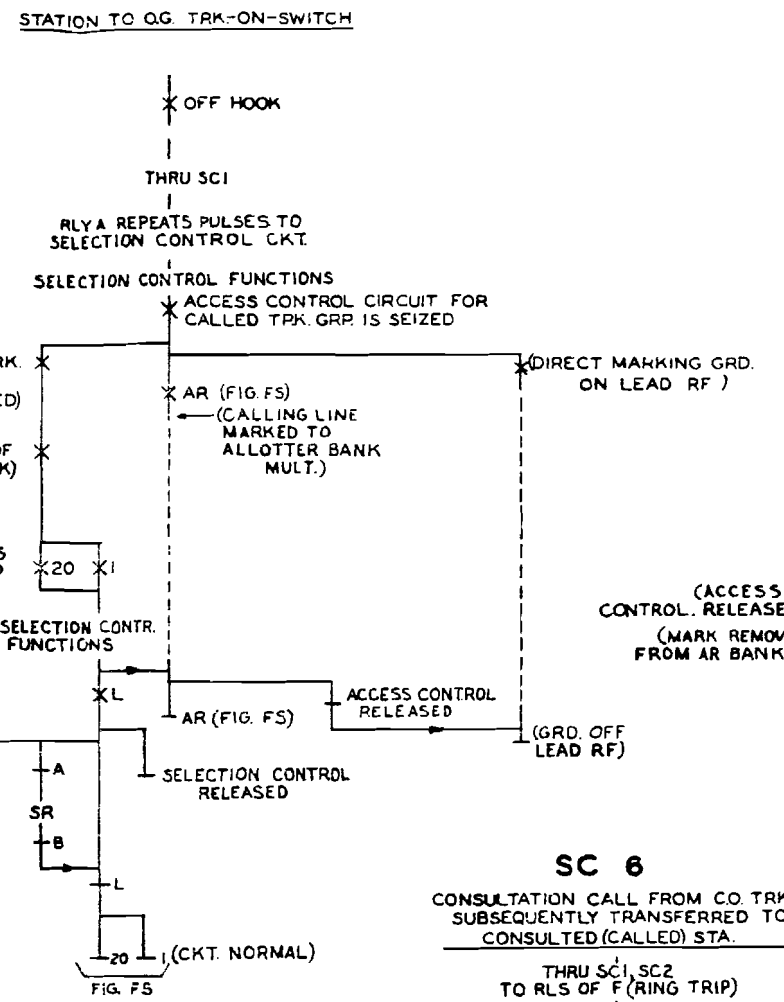
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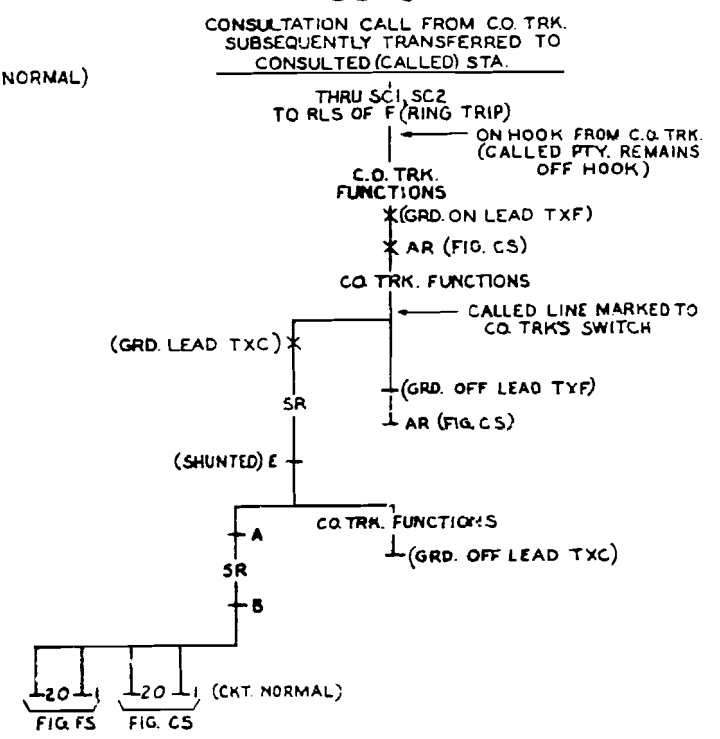
SC 2



SC 3



SC 6



SC 4

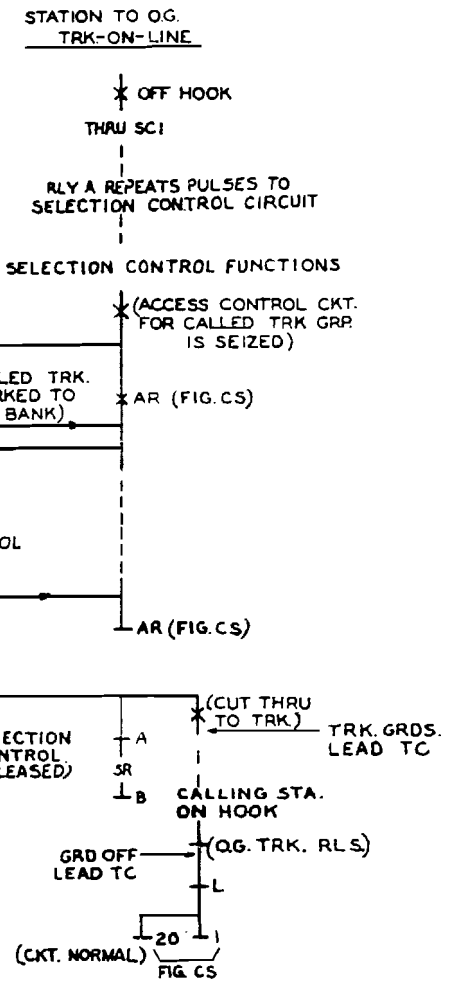
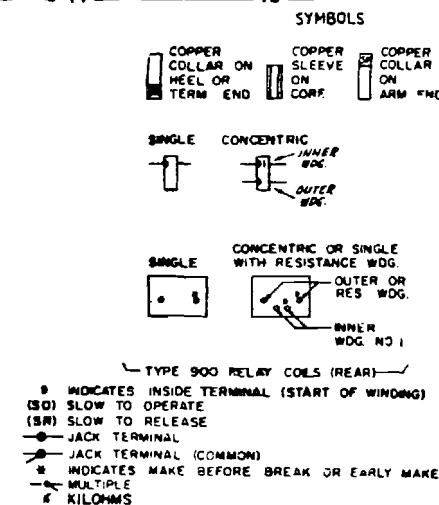


TABLE B - OPTIONS									
APP. AND/OR WIRING	ISSUES		WAS PART OF	SUPERSEDED BY	WIRED BY	FIGURE OR SUFFIX	TABLE	NOTES	
	FIRST USED	LAST USED							
A	1					A		3	
B	1					1A		3	
C	1					1A		3	
D	1					1A		76	
E	1					1A		76	
F	12					1A			
G									
H									
I									
J									
K									
L									
M									
N									
O									
P									
Q									
R									
S									
T									
U									
V									
W									
X									
Y									
Z									

ENGINEERING NOTES:
51-DIGIT IS NORMALLY ASSIGNED BUT ANY AVAILABLE DIGIT MAY BE USED IF APPROPRIATE CONNECTIONS ARE MADE.



MANUFACTURING NOTES:

1-ALL DIODES ARE AL-18335.

2-UNLESS OTHERWISE NOTED, RESISTORS ARE 1 WATT.

3-"A" & "B" WIRING NORMALLY CONNECTED. SHOP TO ADJUST RESISTORS R7 & R2 AS NECESSARY TO OBTAIN 1 TO 1-1/2 SECONDS RING AND 4-1/2 TO 5 SECONDS SILENT PERIODS. INCREASE RESISTANCE OF R7 (DISCONNECT "B" & CONNECT "C" WIRING IF NECESSARY) TO LENGTHEN SILENT PERIOD; DECREASE RESISTANCE OF R7 (CONNECT BOTH "B" & "C" WIRING IF NECESSARY) TO SHORTEN SILENT PERIOD. INCREASE RESISTANCE OF R2 (DISCONNECT "A" WIRING IF NECESSARY) TO LENGTHEN RINGING PERIOD; DECREASE TO SHORTEN.

4-BATTERY C LEAD SUPPLIES ONLY RELAYS TSC & RSC OF FIG. 1A. LEAD BATTERY (C40) SUPPLIES ALL OTHER RELAYS.

5-IN FIGURE 1A, DESIGNATIONS IN PARENTHESES () ARE FOR 2ND TRUNK GROUP CONTROL CIRCUIT.

6-PRIOR TO ISSUE 12, SPRINGS OF RELAYS B1, B2 WERE NUMBERED AS SHOWN IN PARENTHESES. BEGINNING WITH ISSUE 12, SPRINGS ARE NUMBERED AS SHOWN NOT IN PARENTHESES.

INSTALLING NOTES:

76-"D" WIRING NORMALLY CONNECTED FOR 50V DC NIGHT SIGNAL. IF 20 CYCLE NIGHT SIGNALS ARE USED, REMOVE "D" & CONNECT "E" WIRING. SUBSTITUTE 20 CYCLE SIGNAL FOR THE DC SIGNAL SHOWN IN FIGURE 1A. IF CCCE CALL IS ALSO EQUIPPED, A SEPARATE SIGNAL SYSTEM WILL BE REQUIRED FOR IT WHEN 20 CYCLE NIGHT SIGNALS ARE USED.

TABLE A		
ORDERING FIGURE	SUB FIGURE	STOCKLIST
21A	1A	OH-720865-40
22A	1A, 2A	OH-720865-41

ASSOCIATED DRAWINGS		
DRAWING NO.	ISS	DESCRIPTION
AM-850332-A	5	ADJUSTMENT
E-850332-A	4	EXPLANATION

DESIGNED

APPD.

SCALE:

DO NOT SCALE DRAWING

RINGING & TONE INTERRUPTER AND TRUNK GROUP ACCESS CONTROL CIRCUITS TYPE 40, 80 PABX

H-850332-A

SHEET 1 OF 3

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H-850332-A

H-850332-A

SHEET 1 OF 3

CHANGES

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ISSUE 2

ISSUE 3

ISSUE 4

ISSUE 5

ISSUE 6

ISSUE 7

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FIG. 1A

ANNUNCIATOR, TONE & SUPPLY SIGNAL INTERRUPTER
ACCESS CONTROLS FOR 2 TRK-ON-SWITCH GROUPS
UNIVERSAL NIGHT ANSW. CODE CALL & 1 TRK-ON-LINE GRP

FIG. 1A
TYPICAL TERMINAL
LINE EQUIPMENT
CA-5007 OR EQUIV.
(FOR REFERENCE ONLY)

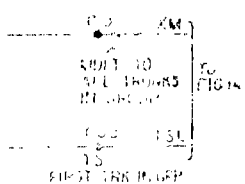


FIG. 1A
TYPICAL TERMINAL
LINE EQUIPMENT
CA-5007 OR EQUIV.
(FOR REFERENCE ONLY)

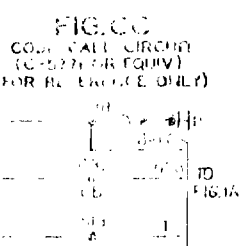
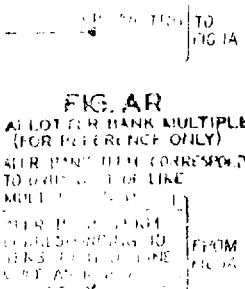


FIG. 1A
TYPICAL TERMINAL
LINE EQUIPMENT
CA-5007 OR EQUIV.
(FOR REFERENCE ONLY)

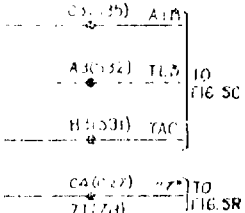
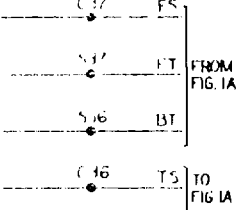


FIG. 1A
TYPICAL TERMINAL
LINE EQUIPMENT
CA-5007 OR EQUIV.
(FOR REFERENCE ONLY)



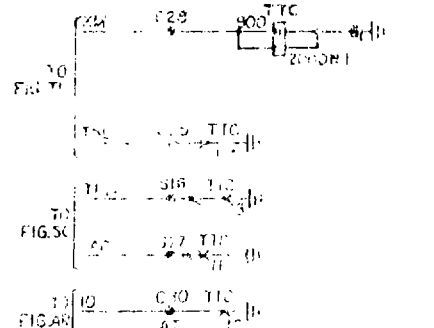
JACK
REAR VIEW
SPRING COIL
SIDE SIDE
S C

GRD 40 BAT
M 39 BAT C
MWB 38 TOM 3
NSB 37 TOM 2
RST 36 TMO 1
C 35 TOM 1
TSD 34 TOM 2
NSA 33 TOM 2
T 32 TOM 2
TSA 31 TOM 1

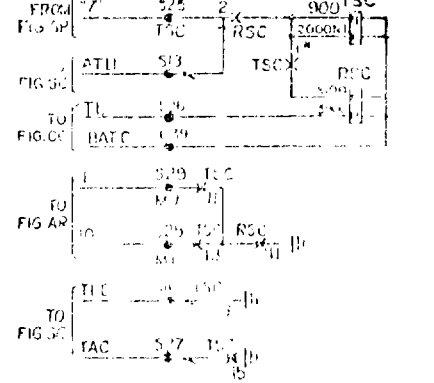
BLT 10 AT
M 9 TSL
RT 28 SH
TAC 27 HSB
TL 26 TFI
TSC 25 RSB
TRG 24 TFI
NSM 23 FRC
NSL 22 SR
NSB 21 BTG

NK 20 DTG
NSA 19 RL
CA 18 IR
IFI 17 TS
TLD 16 IS
TRI 15 DTG
TAF 14 BT
ATB 13 FI
TSB 12 FS
TSA 11 FR

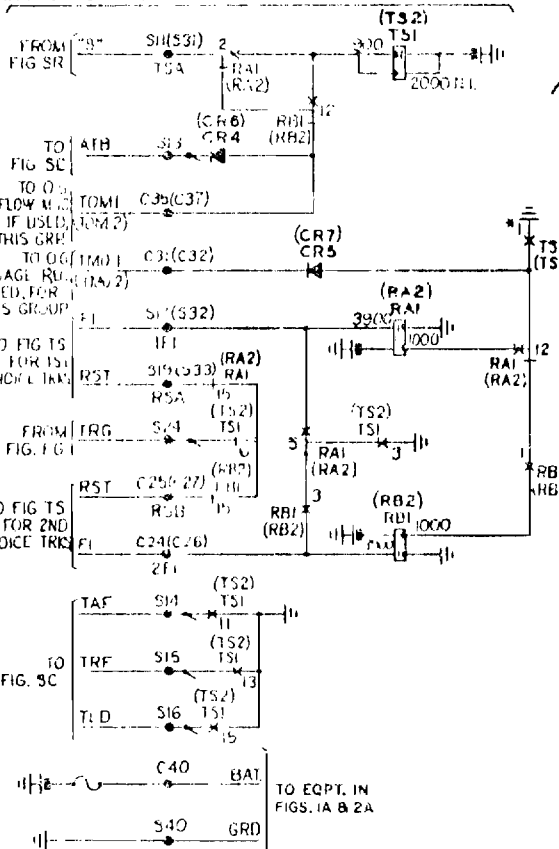
ACCESS CONTROL CKT. FOR TRK-ON-LINE GRP



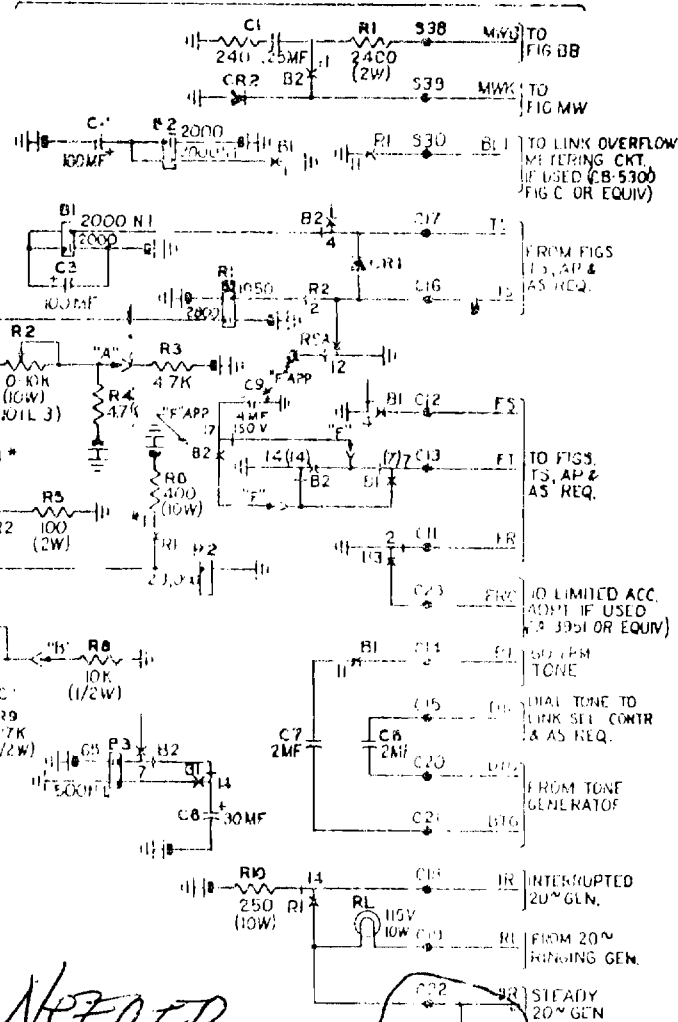
ACCESS CONTR. CKT. FOR CODE CALL



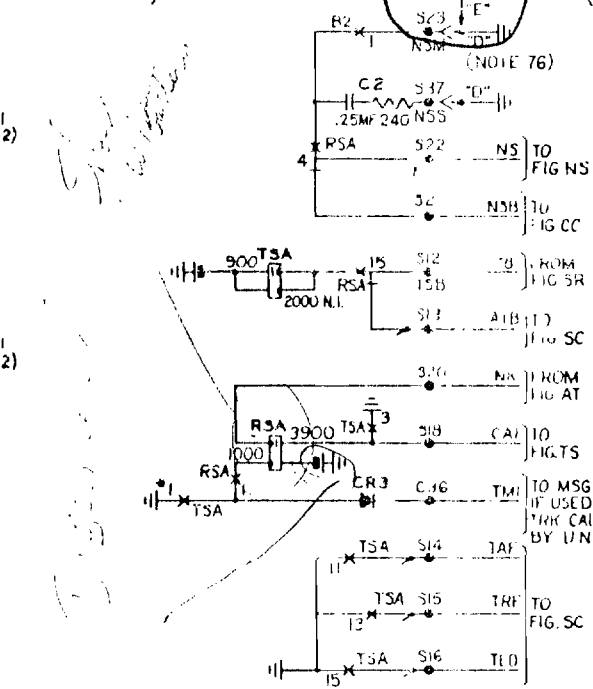
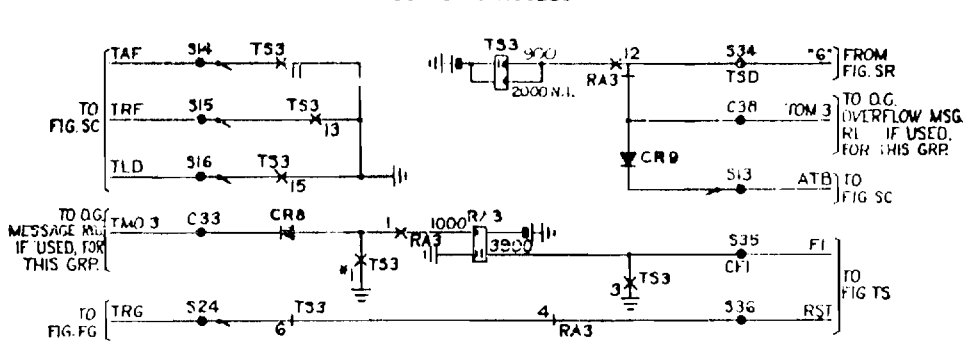
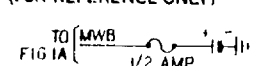
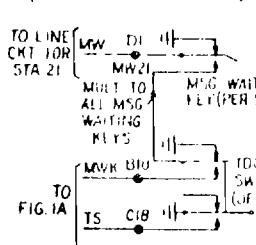
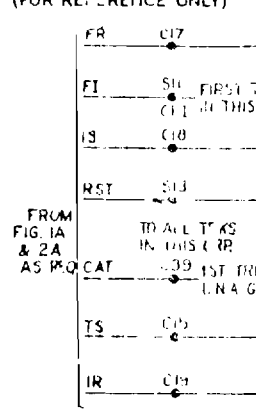
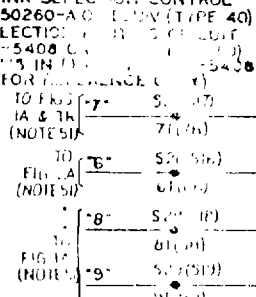
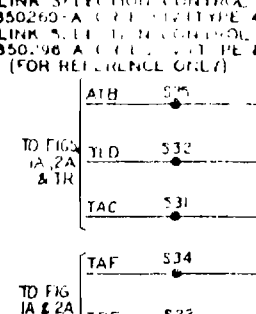
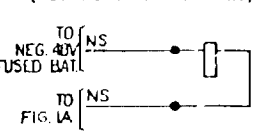
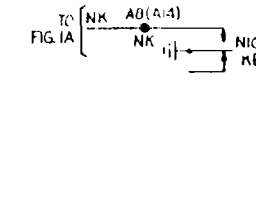
ACCESS & ROTATION CONTR. CKT. FOR TRK-ON SWITCH GROUP



INTERRUPTER CIRCUIT



UNIVERSAL NIGHT ANSWER CONTROL CIRCUIT

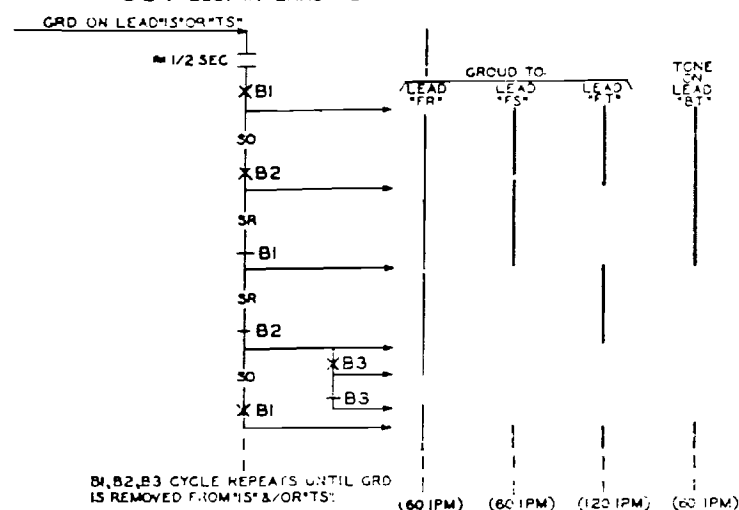
FIG. 2A
ACCESS & ROTATION CONTROL CKT.
FOR 3RD TRK-ON-SWITCH GROUP
ARR. ONLY FOR SINGLE CHOICE
OUTGOING ACCESSFIG. 1B
50V BOOSTER BAT. SUPPLY
(FOR REFERENCE ONLY)FIG. 1C
MESSAGE WAITING TURRET
(CB-3713 OR EQUIV.)
(FOR REFERENCE ONLY)FIG. 1D
TRK. CKT. TERMINATED ON SW.
(CB-5310 OR EQUIV.)
(FOR REFERENCE ONLY)FIG. 1E
LINK SELECTION CONTROL
(H-850260-A OR EQUIV. TYPE 40)
SELECTION OF TRK. GROUPS
CB-5408 OR EQUIV. TYPE 80
(FOR REFERENCE ONLY)FIG. 1F
LINK SELECTION CONTROL
(H-850260-A OR EQUIV. TYPE 40)
LINK SELECTION OF TRK. GROUPS
H-850260-A OR EQUIV. TYPE 80
(FOR REFERENCE ONLY)FIG. 1G
50V DC OPERATED,
EXTERNALLY MTD. NIGHT SIG.
(FOR REFERENCE ONLY)FIG. 1H
ATTENDANT'S TURRET
CB-5311 (26 TRKS) OR EQUIV.
TERMS IN (1) ARE FOR CB-5311
(FOR REFERENCE ONLY)

LAYS	B1	B2	B3	R1	R2	RA1	RA2	RA3	RB1	RB2	RSA	RSC	TSA	TS1	TS2	TS3	TSC	TTC
ADJ. SEE R-0004	208	208	207	208	269	104	104	103	103	103	103	103	113	113	113	113	113	113
C-CONT. L=LOC	C L	C L	C L	C L	C L	C L	C L	C L	C L	C L	C L	C L	C L	C L	C L	C L	C L	C L
SPRINGS	17-18 15-16 13-14 11-12	T E6 M D5	T D4 M D2	T D6 M D2	T F4 M D2	B G6 T F8	B G8 T F3	B G9 T D12	B G9 T G7	B G9 T G7	D9 T D3	M G5 M D10	M D1 M G10	M G10 M G10	M G10 M G10	M F12 M G10	M G5 M G5	M G3 M G3
SPRINGS	7-8 5-6 3-4 1-2	T D4 M D2	T D3 M D2	T D4 M D2	P F4 M E4	B D3 T G7	T G9 T G7	B D13 M E13	M G9 M F9	M G9 M F9	T D8 M D10	M D9 M E10	B G9 M G9	B G9 M G9	B G9 M G9	B F13 M E13	M G5 M G5	M G2 M G2
WINDINGS	2-3 1-4	E3 R E3	E2 R E2	E5 R E5	D3 D3	E4 G8	G8 G8	E13 G9	G9 G9	G9 G9	D9 D10	G4 R D9	D9 R D9	G7 R G7	G7 R G7	E12 R E12	G4 R G4	G2 R G2

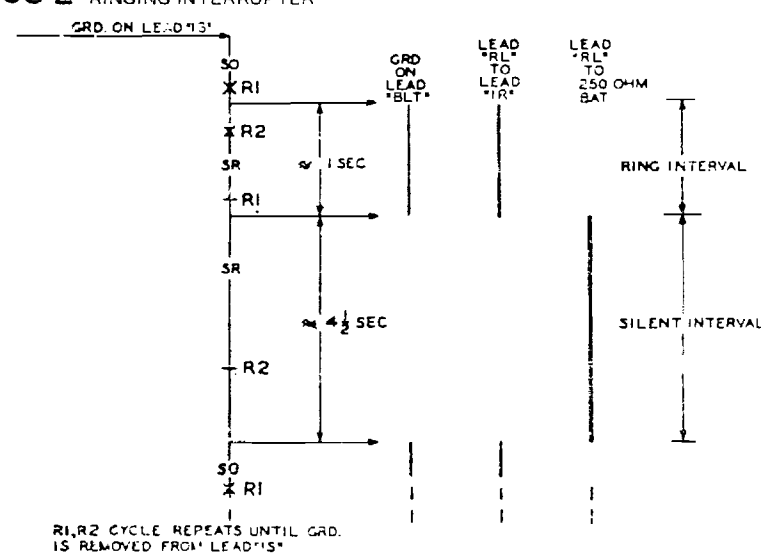
H-850332-A
SHEET 2 OF 3

H-850332-A
SHEET 2 OF 3
NORTH AVE. ELIZABETH, N.J.
AUTOMATIC ELECTRIC CO. NY
MADE IN U.S.A.

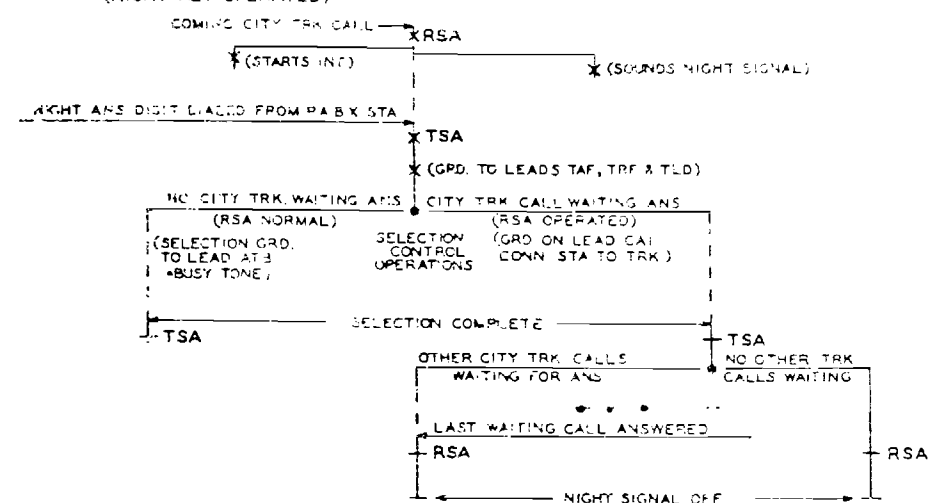
SC 1-BUSY INTERRUPTER



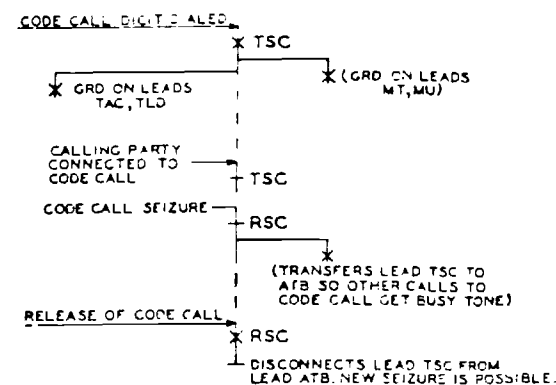
SC 2-RINGING INTERRUPTER



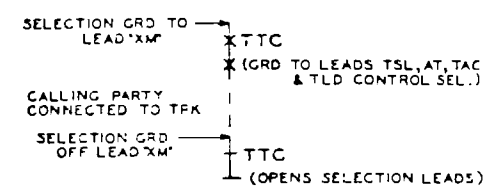
SC 3-UNIVERSAL NIGHT ANSWER CONTROL (NIGHT KEY OPERATED)



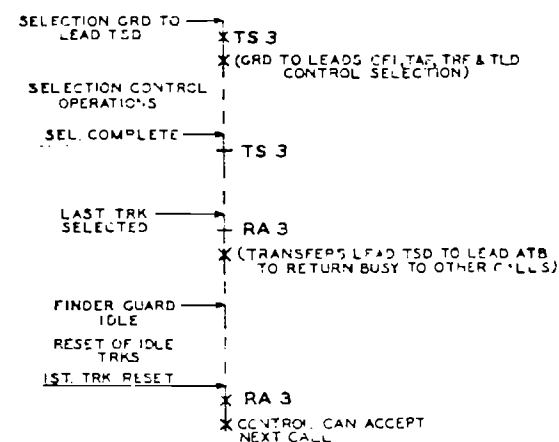
SC 4-CODE CALL CONTROL (RSC OPERATED WITH CONTROL IDLE)



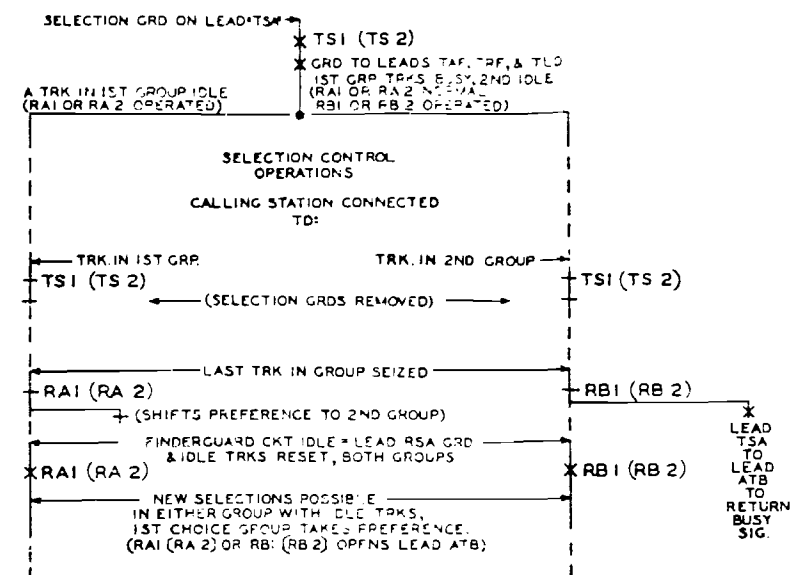
SC 5-TIE TRUNK CONTROL



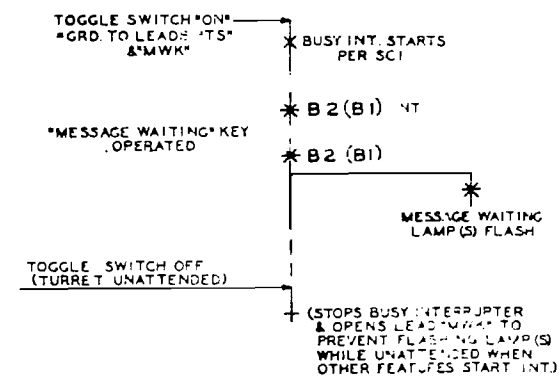
SC 6-CITY TRK CONTROL (SINGLE CHOICE OUTGOING ACCESS) RA 3 OPERATED WHEN ANY CITY TRK IS IDLE FIG 2A



SC 7-CITY TRUNK CONTROL-1ST & 2ND CHOICE OG. ACCESS (RA1 OPERATED WHEN ANY 1ST CHOICE TRK IS IDLE) (RB1 OPERATED WHEN ANY 2ND CHOICE TRK IS IDLE)



SC 8-MESSAGE WAITING SERVICE



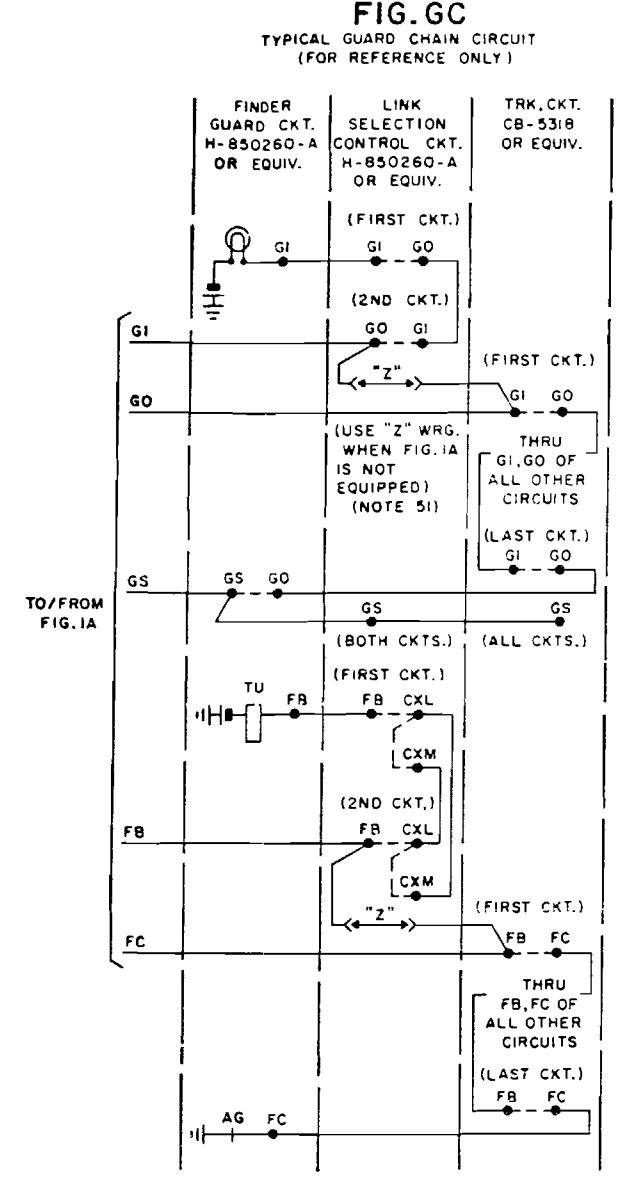
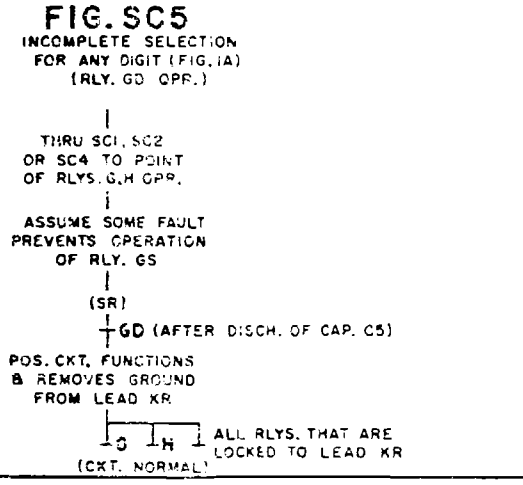
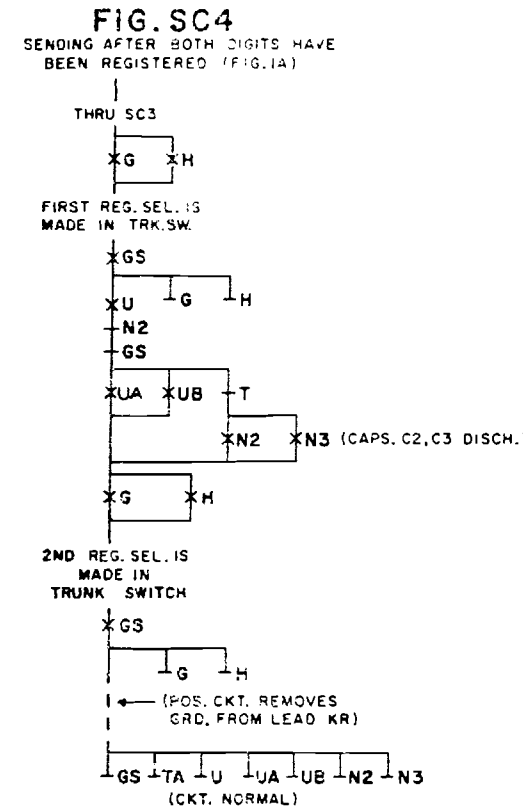
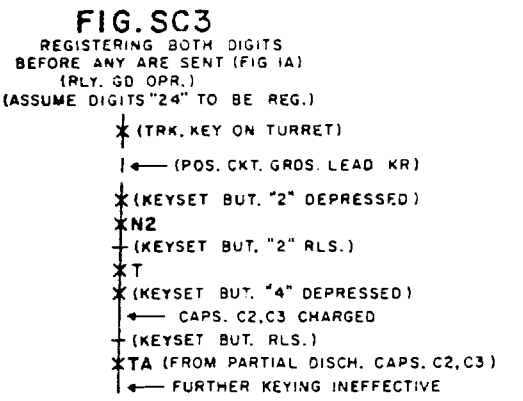
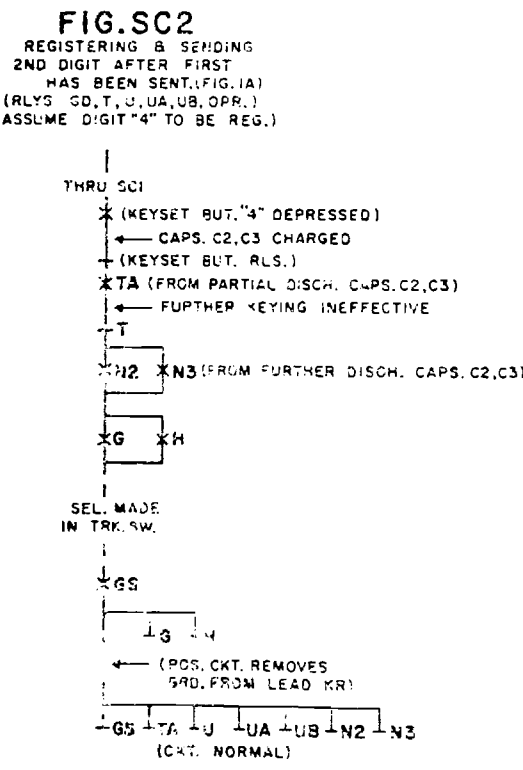
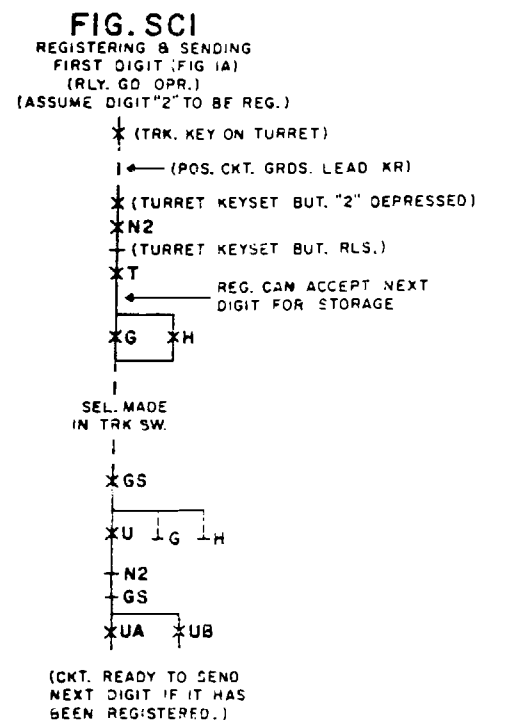
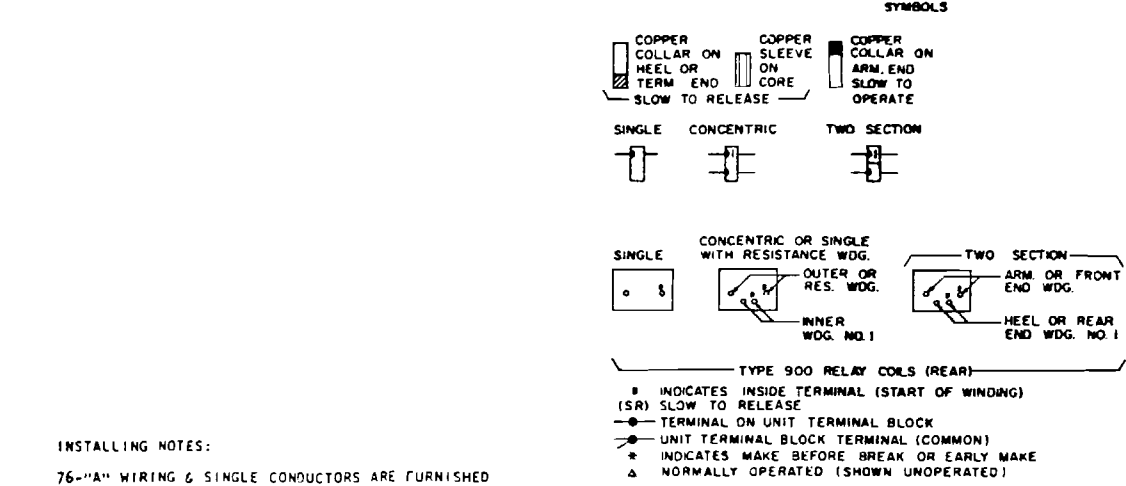


TABLE A					
ORDERING FIG.	EQUIPPED FIGURES				STOCKLIST
	1A TURRET KEYSET REGISTER	POWER FAILURE TRANSFER CKTS.			
		2A (4 CKTS.)	3A (7 CKTS.)	4A (10 CKTS.)	
21A	*				DM-721020-70
22A	*	*			DM-721020-71
23A	*		*		DM-721020-72
24A	*			*	DM-721020-73
25A		*			DM-721020-74
26A			*		DM-721020-75
27A				*	DM-721020-76



INSTALLING NOTES:

76-"A" WIRING & SINGLE CONDUCTORS ARE FURNISHED FOR LEADS N1, N2, N3, N4 BETWEEN SWITCHBOARD & ATTENDANT TURRET. SEE TABLE B FOR USE OF "A" & "B" WIRING & DOUBLE CONDUCTORS IN THESE LEADS.

77-SEE JUMPERS & CABLING DRAWING FOR THIS JOB. REFER TO TERMINAL BLOCK T1, LEADS NG, N1, N2, N3, N4. CONNECT A SPARE SINGLE CONDUCTOR IN MULTIPLE WITH THE ONE SHOWN FOR LEAD NG. USE OTHER SPARE CONDUCTORS FOR LEADS N1, N2, N3, N4 WHEN TABLE B INDICATES THAT DOUBLE CONDUCTORS ARE REQUIRED FOR THE LATTER 4 LEADS. CONNECT THE SAME CONDUCTORS TO THEIR RESPECTIVE TERMINALS AT THE ATTENDANT'S TURRET.

78-REFER TO JOB DRAWING FOR ACTUAL EXTERNAL CONNECTIONS USED.

79-CONNECT "C" WIRING IF PREDETERMINED NIGHT ANSWER IS USED.

MANUFACTURING NOTES:

1-RELAY TA, SPRINGS B 2 MUST CLOSE BEFORE ANY BREAKS OPEN.

2-ALL DIODES ARE ML-18335 UNLESS OTHERWISE INDICATED.

ENGINEERING NOTES:

51-INSTRUCT INSTALLER TO STRAP TERMINALS GI, GO & FB, FC IF FIGURE 1A IS NOT EQUIPPED.

52-FURNISH A JOB DRAWING SHOWING ACTUAL EXTERNAL CONNECTIONS TO TRUNKS, STATION & LINE EQUIPMENT FROM FIGURES 2A, 3A OR 4A.

53-LEAD F1 FROM ACCESS CONTROL CIRCUIT MUST BE SWITCHED SO AS TO BY-PASS THE CFI, CFI LEADS OF ONLY THOSE TRUNK CIRCUITS INVOLVED IN PREDETERMINED NIGHT ANSWER SERVICE WHEN THE NIGHT KEY IS OPERATED. THIS BUSIES THESE TRUNKS TO OUTGOING PABX TRAFFIC DURING PERIODS WHEN THE NIGHT KEY IS OPERATED. TWO SETS OF BREAK-MAKE CONTACTS ARE PROVIDED FOR THIS PURPOSE AS REQUIRED.

TABLE B (NOTE 76)					
IF RES. OF SINGLE COND. IN CABLE BETWEEN SWBD. & ATTS. TURRET IS:	USE WIRING			FOR LEADS N1-N4, NG BETWEEN SWBD. & ATTS. TURRET USE	
	"A"	"B"	"A" & "B"	SINGLE CONDUCTOR (NOTE 77)	DOUBLE CONDUCTORS (NOTE 77)
0-5 OHMS	*			*	
5-10 OHMS	*			*	*
10-15 OHMS	*	*		*	*
15-20 OHMS	*	*		*	*
20-25 OHMS	*	*	*	*	*

CURRENT DRAIN DATA
MOLDING CURRENT

AMPS.
0.07

FORMERLY GENOA DRG:
CB-5580; CC-6743; CC-6864;
CC-6935; CD-6751

ASSOCIATED DRAWINGS		
DRAWING NO.	ISS.	DESCRIPTION
AH-850627-A	2	ADJUSTMENT
E-850627-A	1	EXPLANATION

DESIGNED R.V. OLDHAM 9-7-65 OR T.Y.
APP'D. L.L. SMITH CK. A.F.
SCALE: DATE: 9-14-65
DO NOT SCALE DRAWING

TURRET KEYSET REGISTER &
POWER FAILURE TRANSFER CKT.
LFCH TYPE 40 PABX
(TYPE 900 RELAYS)

H-850627-A

SHEET 1 OF 3

AUTOMATIC ELECTRIC COMPANY
NORTHLAKE, ILL., U.S.A. GENOA, ILL., U.S.A. WAUKESHA, WISC., U.S.A.

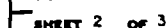
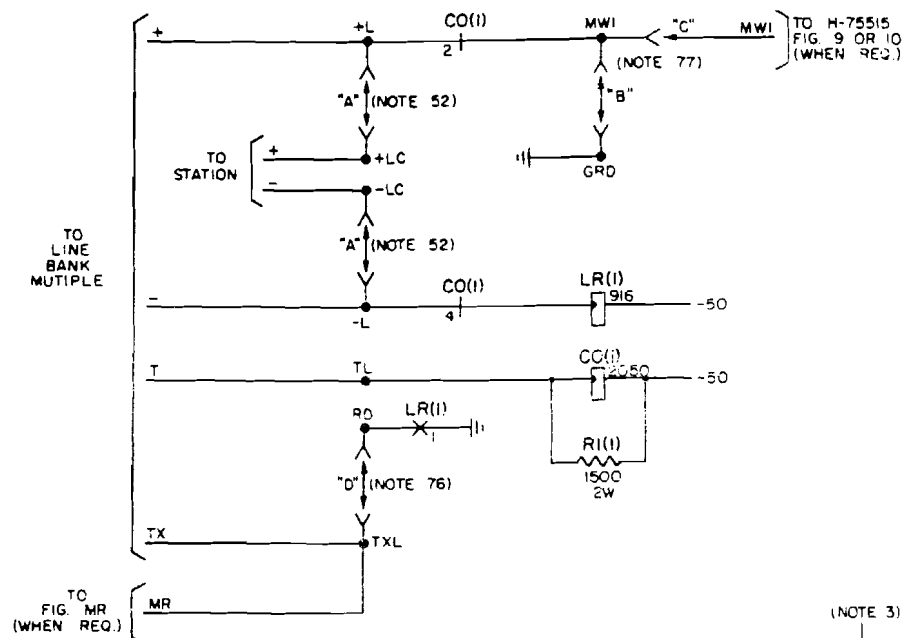


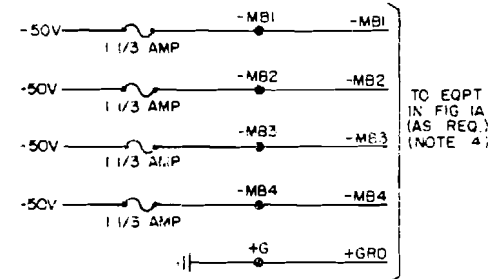
FIG. 1A
LINE CIRCUIT

FIG. MR
MESSAGE REGISTER
(FOR REF ONLY)
(NOTE 51)

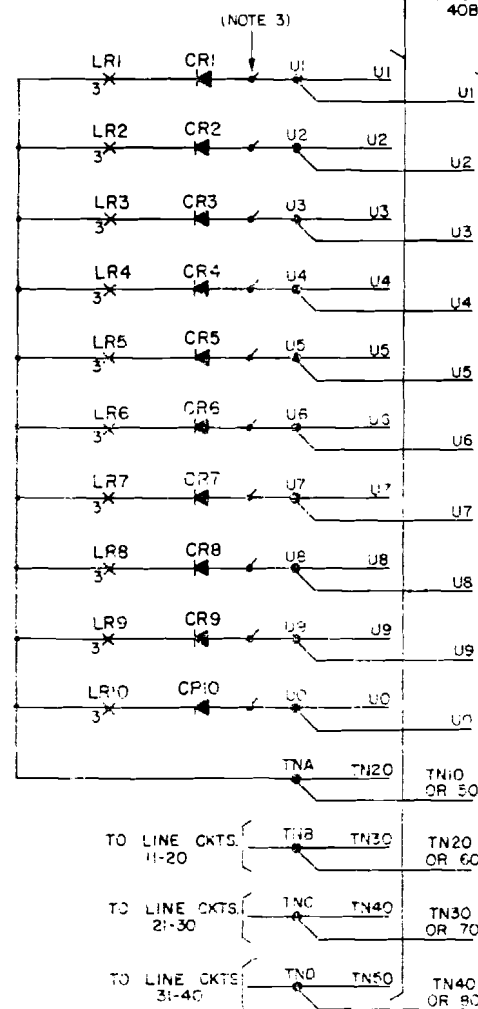
TO FIG 1A (WHEN REQ.)



TO H-850280-A
WHEN USED WITH
40B OR 40M



TO EQPT
IN FIG 1A
(AS REQ.)
(NOTE 4)



TO LINE CKTS. 11-20
TO LINE CKTS. 21-30
TO LINE CKTS. 31-40

TERM. BLKS. A(8X26) & B(7X26)
FOR FIG. 1A (40 LINE CKTS.)
RIGHT SIDE=INST. SIDE
(FRONT OF TERM. BLKS.)

A								B							
(TOP TERM. BLK.)								(BOTTOM TERM. BLK.)							
TNA	RD	TXL	TL	-L	-LC	+LC	+L	RD	TXL	TL	-L	-LC	+LC	+L	
TNB	.	.	.	.	.	.	(1)	.	.	.	.	.	.	(1)	
TNC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
TND	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
U1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
U2	.	.	.	.	.	.	(5)	.	.	.	.	.	.	(5)	
U3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
U4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
U5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
U6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
U7	.	.	.	.	.	.	(9)	.	.	.	.	.	.	(9)	
U8	.	.	.	.	.	.	1-20	.	.	.	.	.	.	21-40	
U9	.	.	.	.	.	.	LINE	.	.	.	.	.	.	5	
U0	.	.	.	.	.	.	5	.	.	.	.	.	.	(5)	
-MB1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
-MB2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
-MB3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
-MB4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
+G	RD	TXL	TL	-L	-LC	+LC	+L	RD	TXL	TL	-L	-LC	+LC	+L	
.	MW16	GRD	MW1	MW6	GRD	MW1	(20)	.	MW36	GRD	MW31	MW26	GRD	MW21	
.	MW17	GRD	MW12	MW7	GRD	MW2	.	.	MW37	GRD	MW32	MW27	GRD	MW22	
.	MW18	GRD	MW13	MW8	GRD	MW3	.	.	MW38	GRD	MW33	MW28	GRD	MW23	
.	MW19	GRD	MW14	MW9	GRD	MW4	.	.	MW39	GRD	MW34	MW29	GRD	MW24	
.	MW20	GRD	MW15	MW10	GRD	MW5	.	.	MW40	GRD	MW35	MW30	GRD	MW25	
.	.	.	.	.	.	.	(26)	.	.	.	.	.	.	(26)	

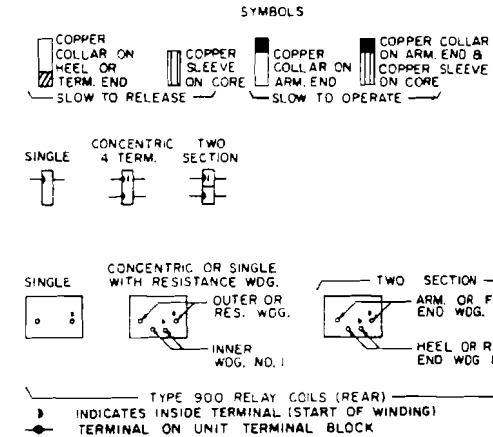
TABLE A - OPTIONS

APP. AND/OR WIRING	SSELS		WAS PART OF	SUPERSEDED BY	WIRED BY		FIGURE OR SUFFIX	TABLE NOTES
	FIRST USED	LAST USED			FACTORY	INSTALLER		
A	3				*		1A	52
B	3				*		1A	77
C	3				*		1A	77
D	3				*		1A	76
E								
F								
G								
H								
I								
J								
K								
L								
M								
N								
O								
P								
Q								
R								
S								
T								
U								
V								
W								
X								
Y								
Z								

ENGINEERING NOTES:

51-MESSAGE REGISTER MUST HAVE MINIMUM 2800 OHM RESISTANCE AND BE ADJUSTED TO OPERATE AT .013 AMP., NON-OPERATE AT .012 AMP. TRUNK CIRCUIT H-850320-A OR EQUIVALENT MUST BE USED TO PROVIDE MESSAGE METERING SERVICE.

52-ALL LINES EXCEPT THOSE ASSIGNED TO POWER FAILURE AND/OR PREDETERMINED NITE ANSWER ARE WIRED PER "A" WIRING.



MANUFACTURING NOTES:

- 1-POWER RATINGS SHOWN ARE MINIMUM.
- 2-ALL DIODES ARE FD-1029-DG OR EQUIVALENT.
- 3-MULTIPLE TO ALL LINE CIRCUITS ON THIS MOUNTING BAR WHICH ARE ASSOCIATED WITH THE SAME UNITS DIGIT.
- 4-BATTERY 1 SERVES 1ST 10 LINES, BATTERY 2 SERVES 2ND 10 LINES, ETC. ON THIS MOUNTING BAR.

INSTALLING NOTES:

- 76-DISCONNECT "D" WIRING OF ASSOCIATED LINE CIRCUIT FOR NON-RESTRICTED SERVICE ON ANY STATION.
- 77-DISCONNECT "B" WIRING AND CONNECT "C" WIRING TO PROVIDE MESSAGE WAITING SERVICE FOR ANY LINE.

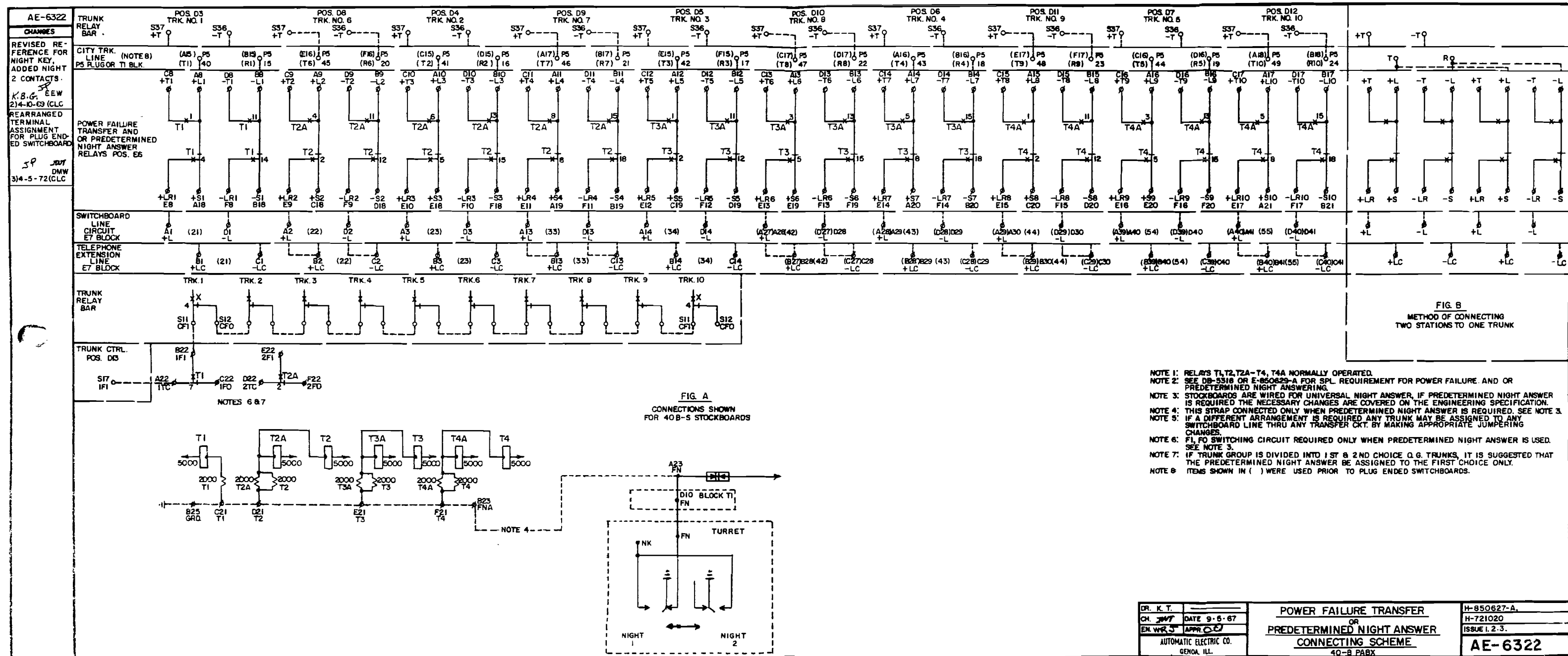
CURRENT DRAIN DATA
HOLDING CURRENT

AMPS.
0.05

STOCKLIST OH-850940-A70 (FIG. 1A)

ASSOCIATED DRAWINGS		
DRAWING NO.	ISS	DESCRIPTION
AH-850940-A	4	ADJUSTMENT
E-850940-A	2	EXPLANATION

DESIGNED R.V. OLDHAM APP'D. R.V.O. SCALE: 3-21-61 DO NOT SCALE DRAWING	DR. J.L. CK. R.K. DATE: 3-21-61	LINE CIRCUIT 40B, 40M, 80M PABX H-850940-A
	THIS DRAWING IS THE PROPERTY OF AUTOMATIC ELECTRIC COMPANY. ITS USE IS LIMITED TO THE PROJECT AND CANNOT BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF AUTOMATIC ELECTRIC COMPANY. THE COMPANY ASSUMES NO LIABILITY FOR THE ACCURACY OF THE INFORMATION CONTAINED HEREIN.	
	AUTOMATIC ELECTRIC COMPANY NORTHLAKE, ILL., U.S.A. • GENOA, ILL., U.S.A. • WAUKESHA, WISC., U.S.A.	
	SHEET 1 OF 1	



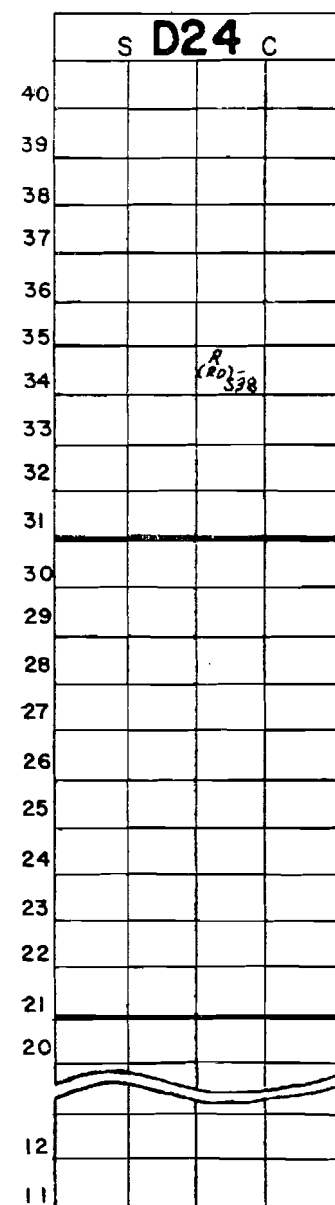
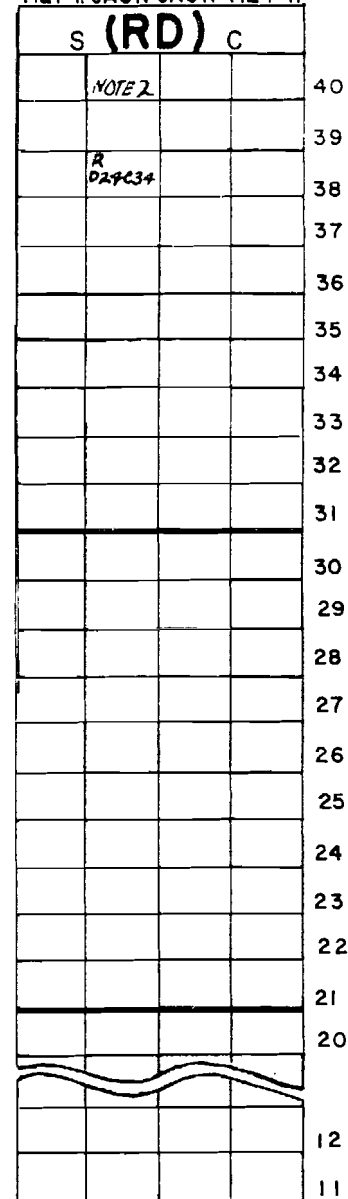
ISSUE: 1
12/1/71
2) 5.24.72
3) 12.5.72

GTE AUTOMATIC ELECTRIC INC
GENOA, ILLINOIS

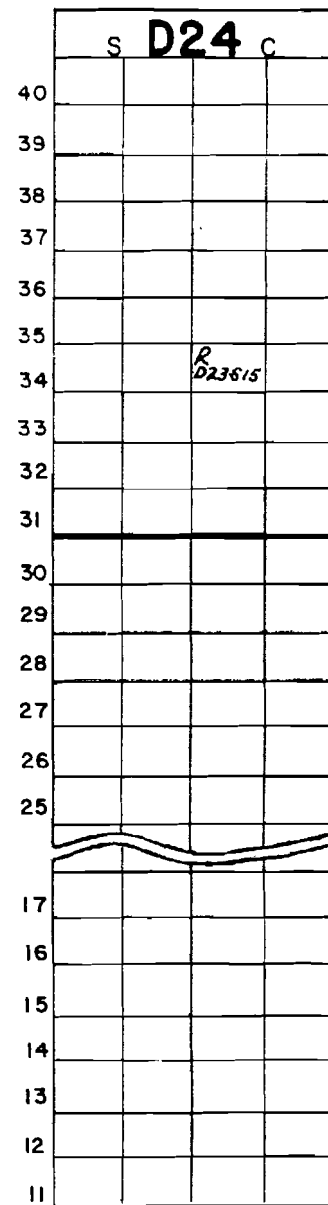
40B-S STOCKBOARD
WIRING DIAGRAMS

TABLE OF CONTENTS

Line Circuit-----	H-721505
Cross Connect Plate-----	WC-3525
Audible Signal Unit-----	D-56607
Message Waiting Service Cabling-----	WD-3768
Strapping and Terminal Assignment-----	WA-7193
Unit Bay Cable-----	WS-9243-B
(Located in rear of book)	

INTERRUPTER &
TRK. CONTROLSTWO-WAY RING-
DOWN ADAPTERNOTE 1
TIE PT. JACK JACK TIE PT.INTERRUPTER &
TRK. CONTROLS

CITY TRUNK #1



TIE PT. JACK JACK TIE PT.

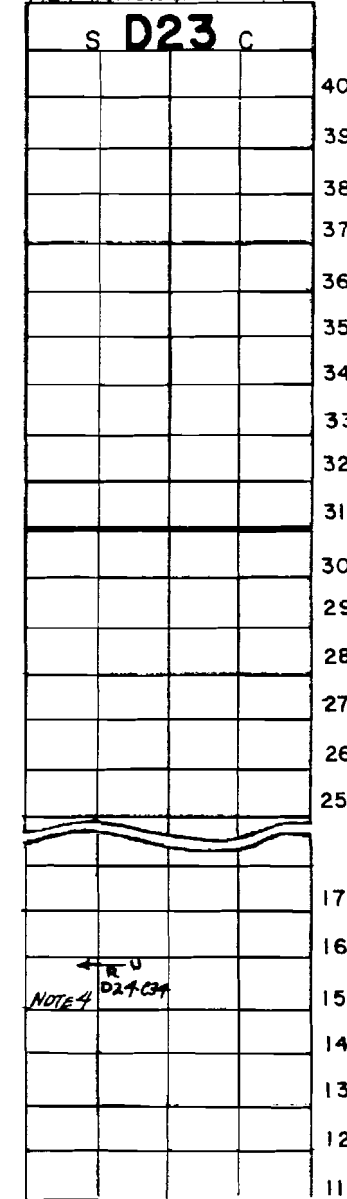


FIG. A

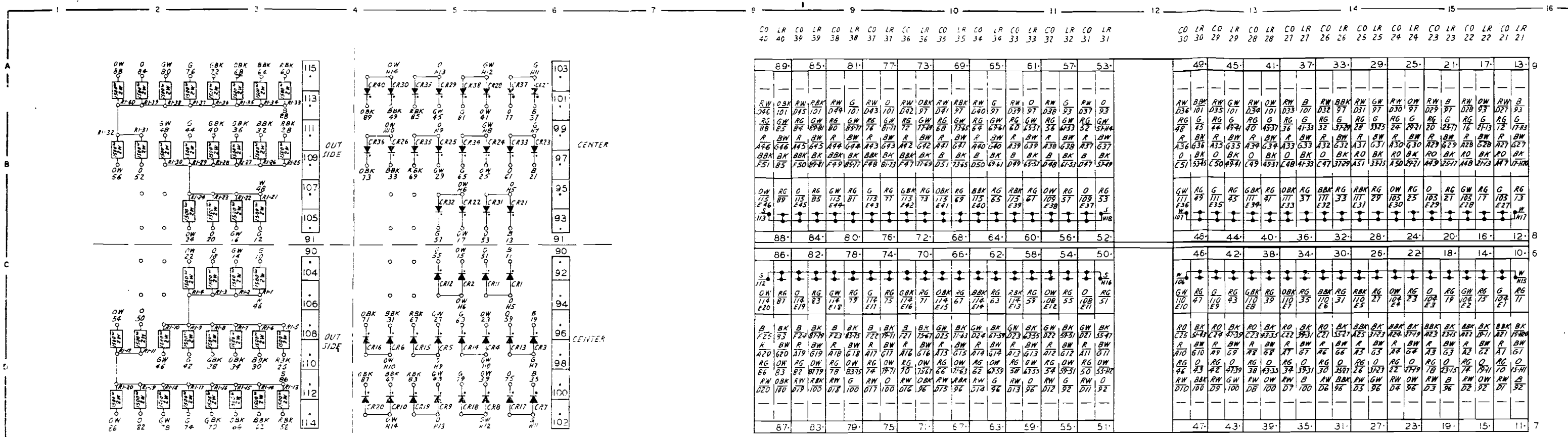
NIGHT SIGNAL RELEASE ADAPTER CONNECTED
TO TWO-WAY RING-DOWN ADAPTER. NOTE 7

FIG. B

NIGHT SIGNAL RELEASE ADAPTER
CONNECTED TO CITY TRUNKS.
NOTE 5

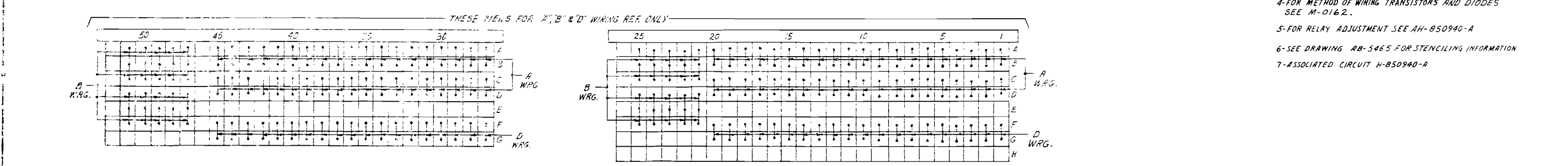
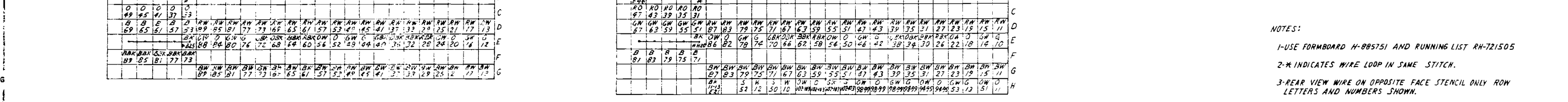
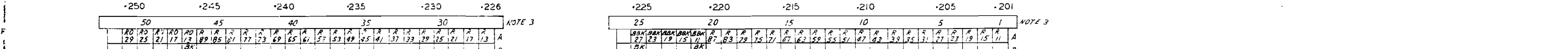
INSTALLERS INSTRUCTIONS

- NOTE 1: IN FIG. A, THE DESIGNATION (RD) HAS BEEN ASSIGNED TO THE POSITION THAT THE TWO-WAY RING-DOWN ADAPTER RELAY BAR IS INSTALLED IN.
- NOTE 2: REMOVE BK JUMPER WIRE BETWEEN (RD)-S38 & (RD)-S40 (SHOWN ON JUMPERS & INSTRUCTIONS FOR ADDING TWO-WAY RING-DOWN ADAPTER.)
- NOTE 3: U → MOVE UNIT BAY CABLE WIRE AS SHOWN BY ARROW.
- NOTE 4: MOVE WIRE GOING TO T4 BLOCK ONLY.
- NOTE 5: DISCONNECT "P" & "B" WIRING & CONNECT "L" WIRING IN THE CITY TRUNK RELAY BARS THAT REQUIRE THE USE OF THE NIGHT SIGNAL RELEASE ADAPTER. (FIG. B ONLY)
- NOTE 6: MOUNT & CONNECT NIGHT SIGNAL RELEASE ADAPTER EQUIPMENT ON INTERRUPTER RELAY BAR (POS. D24) PER WD-6010.
- NOTE 7: CONNECT "B" WIRING IN CITY TRUNK RELAY BARS THAT REQUIRE THE USE OF THE NIGHT SIGNAL RELEASE ADAPTER. DO NOT CONNECT "Y" WIRING IN TWO-WAY RING-DOWN ADAPTER (FIG. A ONLY)



20 20 19 19 18 18 17 17 16 16 15 15 14 14 13 13 12 12 11 11
CO LR CO LR CO LR CO LR CO LR CO LR CO LR CO LR CO LR CO LR CO LR

10 10 9 9 8 8 7 7 6 6 5 5 4 4 3 3 2 2 1 1
CO LR CO LR CO LR CO LR CO LR CO LR CO LR CO LR CO LR CO LR CO LR CO LR



DESIGNED
APP'D. J.F. CZART
SCALE: 1" = 100'
DO NOT SCALE DRAWING

DR. C.S.
CK. R.C.M.
DATE: 5-26-71

WIRING DIAGRAM
FOR
LINE CIRCUIT 40B, 40M, 80M PABX
TYPE 400 RELAYS

H-721505

SHEET 1 OF 1

AUTOMATIC ELECTRIC COMPANY
NORTHLAKE, ILL., U.S.A. • GENOA, ILL., U.S.A. • WAUKESHA, WISC., U.S.A. •

NOTE 3

1-USE FORMBOARD H-885751 AND RUNNING LIST RH-721505

2-* INDICATES WIRE LOOP IN SAME STITCH.

3-REAR VIEW WIRE ON OPPOSITE FACE STENCIL ONLY ROW LETTERS AND NUMBERS SHOWN.

4-FOR METHOD OF WIRING TRANSISTORS AND DIODES SEE M-0162.

5-FOR RELAY ADJUSTMENT SEE AH-850940-A

6-SEE DRAWING AB-5465 FOR STENCILING INFORMATION

7-ASSOCIATED CIRCUIT H-850940-A

THESE WIRING FOR "A", "B" & "D" WIRING REF ONLY

50 45 40 35 30

25 20 15 10 5 1

A WPG.

B WPG.

C WPG.

D WPG.

E WPG.

F WPG.

G WPG.

H WPG.

10
11

42

5	10	15	20	25	30	35	40	45
×	×	×	×	×	×	×	×	×
-51	-56	-71	-76	NA	-81	-86	-91	-96
×	×	×	×	×	×	×	×	×
-40	-55	-70	-75	-76	-80	-85	-90	-95
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
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×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
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2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
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48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
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-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
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-49	-54	-59	-64	-69	-74	-79	-84	-89
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48	53	58	63	68	73	78	83	88
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2	7	12	17	22	27	32	37	42
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×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39	44
×	×	×	×	×	×	×	×	×
-49	-54	-59	-64	-69	-74	-79	-84	-89
×	×	×	×	×	×	×	×	×
48	53	58	63	68	73	78	83	88
×	×	×	×	×	×	×	×	×
2	7	12	17	22	27	32	37	42
×	×	×	×	×	×	×	×	×
-47	-52	-57	-62	-67	-72	-77	-82	-87
×	×	×	×	×	×	×	×	×
4	9	14	19	24	29	34	39</	

25	20	-36	-41	-64	+25	+20	+36	+41	
5	10	15	20	25	30	35	40	45	
-24	-29	-35	-30	-45	+44	+29	+35	+30	-45
4	9	14	19	24	29	34	39	44	+45
-23	-18	-34	-39	-44	+23	+28	+34	+39	+44
7	8	13	18	23	28	33	38	43	48
2	-27	-33	-18	-43	+22	+17	+33	+38	+43
2	7	12	17	22	27	32	37	42	47
-21	-26	-31	-37	-42	+21	+26	+31	+37	+42
1	6	11	16	21	26	31	36	41	46

MR

20	30	40	50	60	70	80	90	59
21	31	41	51	61	71	81	91	60
22	32	42	52	62	72	82	92	61
23	33	43	53	63	73	83	93	62
24	34	44	54	64	74	84	94	63
25	35	45	55	65	75	85	95	64
26	36	46	56	66	76	86	96	65
27	37	47	57	67	77	87	97	66
28	38	48	58	68	78	88	98	67
29	39	49	59	69	79	89	99	68
30	40	50	60	70	80	90		69
31	41	51	61	71	81	91		70
32	42	52	62	72	82	92		71
33	43	53	63	73	83	93		72
34	44	54	64	74	84	94		73
35	45	55	65	75	85	95		74
36	46	56	66	76	86	96		75
37	47	57	67	77	87	97		76
38	48	58	68	78	88	98		77
39	49	59	69	79	89	99		78
40	50	60	70	80	90			79
41	51	61	71	81				80
42	52	62	72					81
43	53	63						82
44	54							83
45								84
46								85
47								86
48								87
49								88
50								89
51								90
52								91
53								92
54								93
55								94
56								95
57								96
58								97
59								98
60								99

[illegible]

5

X	K03	K08	KK	N2	7B3	L43	L48	NK	N1	45
	5	10	15	20	25	30	35	40		
X	K02	K07	KN	DC	7B	L42	L47	FJ	DB	TA
	4	9	14	19	24	29	34	39	44	49
	K01	K06	FC	DA	MK	L41	L46	TA	PL	SM
	3	8	13	18	23	28	33	38	43	48
X	K2	K05	K010	SP	SE	L2	L45	L40	DA	N4
	2	7	12	17	22	27	32	37	42	47
	K1	K04	K09	NK	N4	L1	L44	L49	DA	N3
	1	6	11	16	21	26	31	36		TA

23

LINE	NO	DESCRIPTION	AMOUNT	CREDIT	DEBIT	BALANCE
1						
2						
3						
4						
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81						
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83						
84						
85						
86						
87						
88						
89						
90						

[illegible][illegible]

23

LINE

[illegible][illegible]

11

T

[illegible]

STRAPPING ASSIGNMENT

Column	Row	Value
A	1	1
A	2	2
A	3	3
A	4	4
A	5	5
A	6	6
A	7	7
A	8	8
A	9	9
A	10	10
A	11	11
A	12	12
A	13	13
A	14	14
A	15	15
A	16	16
A	17	17
A	18	18
A	19	19
A	20	20
A	21	21
A	22	22
A	23	23
A	24	24
A	25	25
B	1	1
B	2	2
B	3	3
B	4	4
B	5	5
B	6	6
B	7	7
B	8	8
B	9	9
B	10	10
B	11	11
B	12	12
B	13	13
B	14	14
B	15	15
B	16	16
B	17	17
B	18	18
B	19	19
B	20	20
B	21	21
B	22	22
B	23	23
B	24	24
B	25	25
C	1	1
C	2	2
C	3	3
C	4	4
C	5	5
C	6	6
C	7	7
C	8	8
C	9	9
C	10	10
C	11	11
C	12	12
C	13	13
C	14	14
C	15	15
C	16	16
C	17	17
C	18	18
C	19	19
C	20	20
C	21	21
C	22	22
C	23	23
C	24	24
C	25	25
D	1	1
D	2	2
D	3	3
D	4	4
D	5	5
D	6	6
D	7	7
D	8	8
D	9	9
D	10	10
D	11	11
D	12	12
D	13	13
D	14	14
D	15	15
D	16	16
D	17	17
D	18	18
D	19	19
D	20	20
D	21	21
D	22	22
D	23	23
D	24	24
D	25	25
E	1	1
E	2	2
E	3	3
E	4	4
E	5	5
E	6	6
E	7	7
E	8	8
E	9	9
E	10	10
E	11	11
E	12	12
E	13	13
E	14	14
E	15	15
E	16	16
E	17	17
E	18	18
E	19	19
E	20	20
E	21	21
E	22	22
E	23	23
E	24	24
E	25	25
F	1	1
F	2	2
F	3	3
F	4	4
F	5	5
F	6	6
F	7	7
F	8	8
F	9	9
F	10	10
F	11	11
F	12	12
F	13	13
F	14	14
F	15	15
F	16	16
F	17	17
F	18	18
F	19	19
F	20	20
F	21	21
F	22	22
F	23	23
F	24	24
F	25	25
G	1	1
G	2	2
G	3	3
G	4	4
G	5	5
G	6	6
G	7	7
G	8	8
G	9	9
G	10	10
G	11	11
G	12	12
G	13	13
G	14	14
G	15	15
G	16	16
G	17	17
G	18	18
G	19	19
G	20	20
G	21	21
G	22	22
G	23	23
G	24	24
G	25	25

DR VV	SCALE
CH M.K.C.	DATE 9-25-71
ENG J ¹	APPROV ¹
AUTOMATIC ELECTRIC CO.	
GENOA BRANCH	
GENOA, IL	

STRAPPING & TERMINAL ASSIGNMENT

40B PABX STOCKBOARD

ISSUE 1.23.

* WA- 7193

FIG. 1A "A" APPARATUS
FIG. 2A "B" APPARATUS
BUSY LAMP POWER SUPPLY & CONTROL CIRCUIT
(NOTES 51,52)

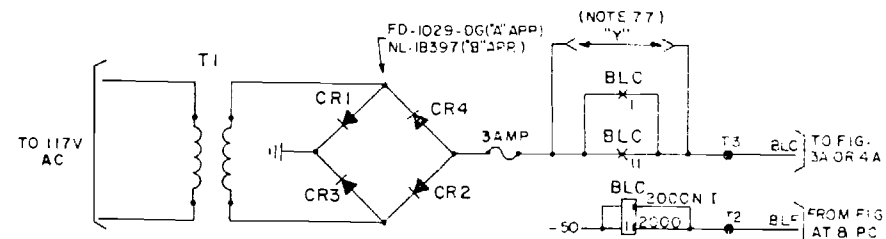


FIG. 3A
BUSY LAMP FIELD FOR TYPE 40 PABX
(NOTE 51)

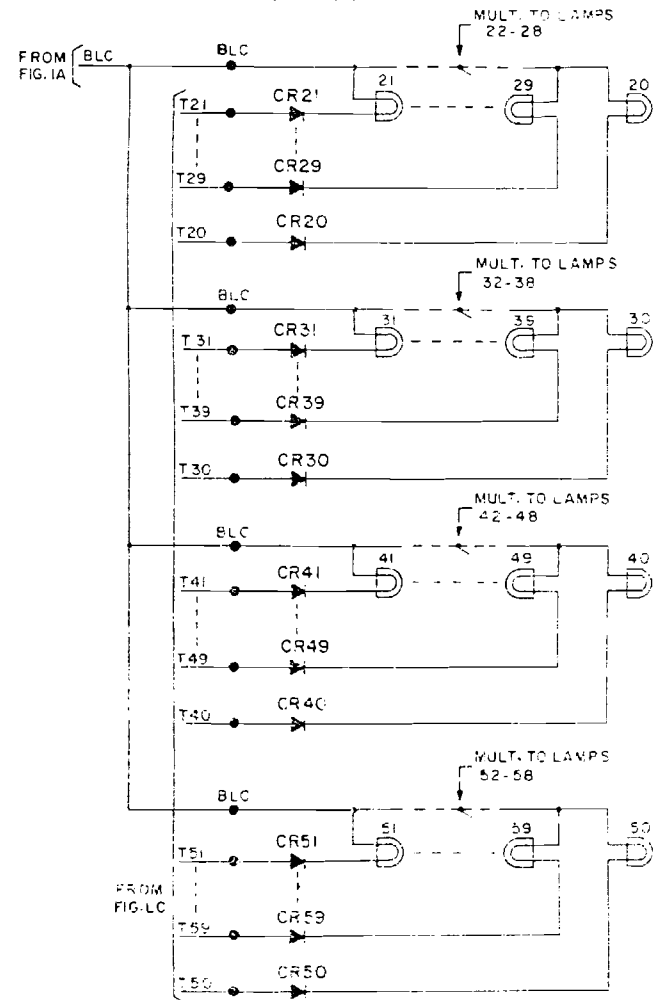


FIG. 4A
ATTENDANT'S TURRET
(FOR REF. ONLY)

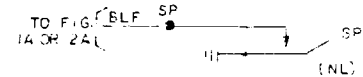


FIG. LC
LINE CIRCUIT
(FOR REF. ONLY)

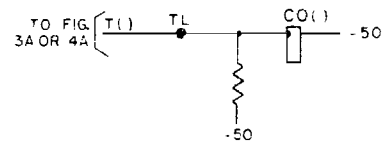


FIG. PC
POSITION CIRCUIT
(FOR REF. ONLY)

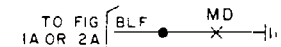


FIG. 4A
BUSY LAMP FIELD FOR TYPE 80 PABX
(NOTE 52)

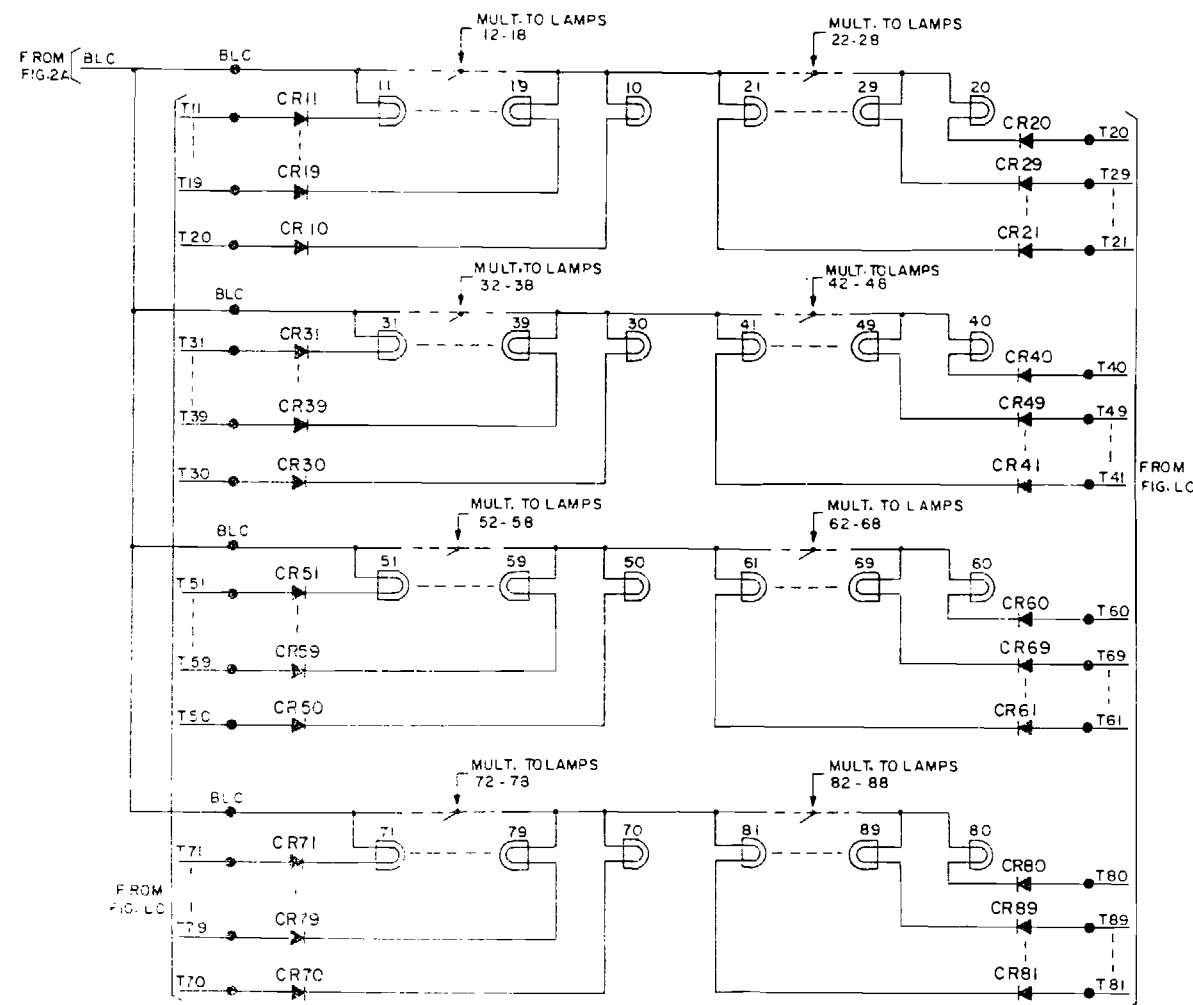
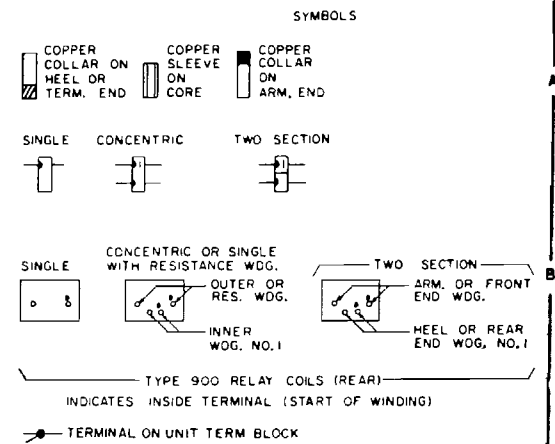


TABLE A
MAXIMUM LENGTH OF NEGATIVE POWER LEAD BETWEEN POWER SUPPLY AND BUSY LAMP FIELD (IN FEET) BASED ON 0.7 OHMS RESISTANCE FOR TYPE 40 PABX AND 0.5 OHMS FOR TYPE 80 PABX

A.W.G.	TYPE 40 PABX		TYPE 80 PABX	
	COPPER	ALUMINUM	COPPER	ALUMINUM
22	42 FT		30 FT	
18	107		76	
14	273		192	
12	433		308	
10	683		490	
8	1190	650	780	465
6	1735	990	1240	710

ENGINEERING NOTES:

- 1-PROVIDE FIGURE 1A AND 3A FOR TYPE 40 PABX'S.
- 2-PROVIDE FIGURE 2A AND 4A FOR TYPE 80 PABX'S.
- 3-POWER SUPPLY OUTPUT 9-11 VOLTS DC, 2 AMPS.



MANUFACTURING NOTES:

- 1-ALL DIODES IN FIGURES 3A & 4A ARE FD-1029-DG.
- 2-ALL LAMPS IN FIGURES 3A & 4A ARE D-94085-A.

INSTALLING NOTES:

- 76-SELECT CABLES PER TABLE A AND B.
- 77-CONNECT "Y" WIRING TO DISPLAY LAMPS AT ALL TIMES.

TABLE B
ALLOWABLE CABLE LENGTH (IN FEET) BETWEEN SWITCHBOARD LINE CIRCUITS AND BUSY LAMP FIELD BASED ON 15 OHMS FOR TYPE 40 PABX AND 5 OHMS FOR TYPE 80 PABX.

A.W.G. COPPER	TYPE 40 PABX	TYPE 80 PABX
26	360 FT	120 FT
24	570	190
22	910	300
19	1820	605

STOCKLIST NL-19536 (FIG. 4A)
STOCKLIST NL-19500 (FIG. 3A)
STOCKLIST NL-19531 (FIG. 1A)
STOCKLIST NL-19473 (FIG. 2A)

ASSOCIATED DRAWINGS

DRAWING NO.	ISS.	DESCRIPTION
AH-73578-A	1	ADJUSTMENT
E-73578-A	1	EXPLANATION

CURRENT DRAIN DATA AMPS.
HOLDING CURRENT 0.05

DESIGNED R.E. BEILKE
APP'D. L.L. SMITH
SCALE: DO NOT SCALE DRAWING
DATE: 12-6-67

BUSY LAMP FIELD CIRCUIT
TYPE 40 AND 80 PABX
TYPE 900 RELAYS

H-73578-A
SHEET 1 OF 1

AUTOMATIC ELECTRIC COMPANY
NORTH LAKE, ILL., U.S.A. GENOA, ILL., U.S.A. WAUKESHA, WISC., U.S.A. O.R.

PLUG 1 (BLUE BINDER)						PLUG 2 (ORANGE BINDER)					
PIN	TERM BD DESIG	COLOR	PIN	TERM BD DESIG	COLOR	PIN	TERM BD DESIG	COLOR	PIN	TERM BD DESIG	COLOR
1	K1	BLU-WHT	26	L1	WHT-BLU	1	WL	BLU-WHT	26	PAX	WHT-BLU
2	K2	GRN-WHT	27	L2	WHT-GRN	2	BAT	GRN-WHT	27	BAT	WHT-GRN
3	KA1	GRN-WHT	28	LL1	WHT-GRN	3	GRD	GRN-WHT	28	GRD	WHT-GRN
4	KA2	GRN-WHT	29	LL2	WHT-BRN	4	LB2	BRN-WHT	29	LB1	WHT-BRN
5	KA3	SL-WHT	30	LL3	WHT-SL	5	LB4	SL-WHT	30	LB3	WHT-SL
6	KA4	BLU-RED	31	LL4	RED-BLU	6	LB6	BLU-RED	31	LB5	RED-BLU
7	KA5	GRN-RED	32	LL5	RED-GRN	7	LB8	GRN-RED	32	LB7	RED-GRN
8	KA6	GRN-RED	33	LL6	RED-GRN	8	LB10	GRN-RED	33	LB9	RED-GRN
9	KA7	BRN-RED	34	LL7	RED-BRN				34	SPL	RED-BRN
10	KA8	SL-RED	35	LL8	RED-SL						
11	KA9	BLU-BLK	36	LL9	BLK-BLU						
12	KA10	GRN-BLK	37	LL10	BLK-GRN						
13	FC	GRN-BLK	38	FA	BLK-GRN						
14	FN	BRN-BLK	39	FD	BLK-BRN						
15	RK	SL-BLK	40	NK	BLK-SL						
16	HK	BLU-YEL	41	DK	YEL-BLU						
17	SP	GRN-YEL	42	BK	YEL-GRN						
18	DA	GRN-YEL	43	PL	YEL-GRN						
19	DC	BRN-YEL	44	DB	YEL-BRN						
20	N2	SL-YEL	45	M1	YEL-SL						
21	N4	BLU-VIO	46	M3	VIO-BLU						
22	SE	GRN-VIO	47	NG	VIO-GRN						
23	MK	GRN-VIO	48	SM	VIO-GRN						
24	TE	BRN-VIO	49	TA	VIO-BRN						
25	RB	SL-VIO	50	RA	VIO-SL						

MANUFACTURING NOTES:
1-DRAWN AS SEEN FROM REAR OF UNIT.

ENGINEERING NOTES:
51- FOR ASSOCIATED DRAWINGS:
CIRCUIT H-73576-B ISS:1
STOCKLIST H-889217-1 & -2 ISS:1
FIG. 1 & 2 LOCAL CABLE H-983003

TERM BD 1										TOP
1	2	3	4	5	6	7	8	9	10	
K2	KA2	KA4	KA6	KA8	KA10	FN	HK	DA	N2	G
GRN-WHT	BRN-WHT	BLU-RED	GRN-RED	SL-RED	GRN-BLK	BRN-BLK	BLU-YEL	GRN-YEL	SL-YEL	
SE	TB	WL	LB4	LB8	L2	LL2	LL4	LL6	LL8	F
GRN-VIO	BRN-VIO	BLU-WHT	SL-WHT	GRN-RED	WHT-GRN	WHT-BRN	RED-BLU	RED-GRN	RED-SL	
LL10	FD	DK	PL	M1	NG	TA	PAX	GRD	LB3	E
BLK-GRN	BLK-BRN	YEL-BLU	YEL-GRN	YEL-SL	VIO-GRN	VIO-BRN	WHT-BLU	GRN-WHT	WHT-SL	
LB7	SPL	K1	KA1	KA3	KA5	KA7	KA9	FC	RK	D
RED-GRN	RED-BRN	BLU-WHT	GRN-WHT	SL-WHT	GRN-RED	BRN-RED	BLU-BLK	GRN-BLK	SL-BLK	
SP	DC	N4	MK	RB	LB2	LB6	LB10	L1	LL1	C
GRN-YEL	BRN-YEL	BLU-VIO	GRN-VIO	SL-VIO	BRN-WHT	BLU-RED	GRN-RED	WHT-BLU	WHT-GRN	
LL3	LL5	LL7	LL9	FA	NK	BK	DB	N3	SM	B
WHT-SL	RED-GRN	RED-BRN	BLK-BLU	BLK-GRN	BLK-SL	YEL-GRN	YEL-BRN	VIO-BLU	VIO-GRN	
RA	BAT	LB1	LB5	LB9						A
VIO-SL	WHT-GRN	WHT-BRN	RED-BLU	RED-GRN						
										BOT

H-59477	SHEET / OF /	CHANGES	H-59477	SHEET / OF /	DESIGNED	DR. T.J.	WIRING DIAGRAM FOR TERMINAL BOARD TO PLUGS (12 TRUNK TURRET)
					APP'D LFC	CK. APN	
					SCALE:	DATE: 2-27-71	
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AUTOMATIC ELECTRIC COMPANY NORTHLAKE, ILL., U.S.A. GENOA, ILL., U.S.A. WAUKESHA, WISC., U.S.A. O							

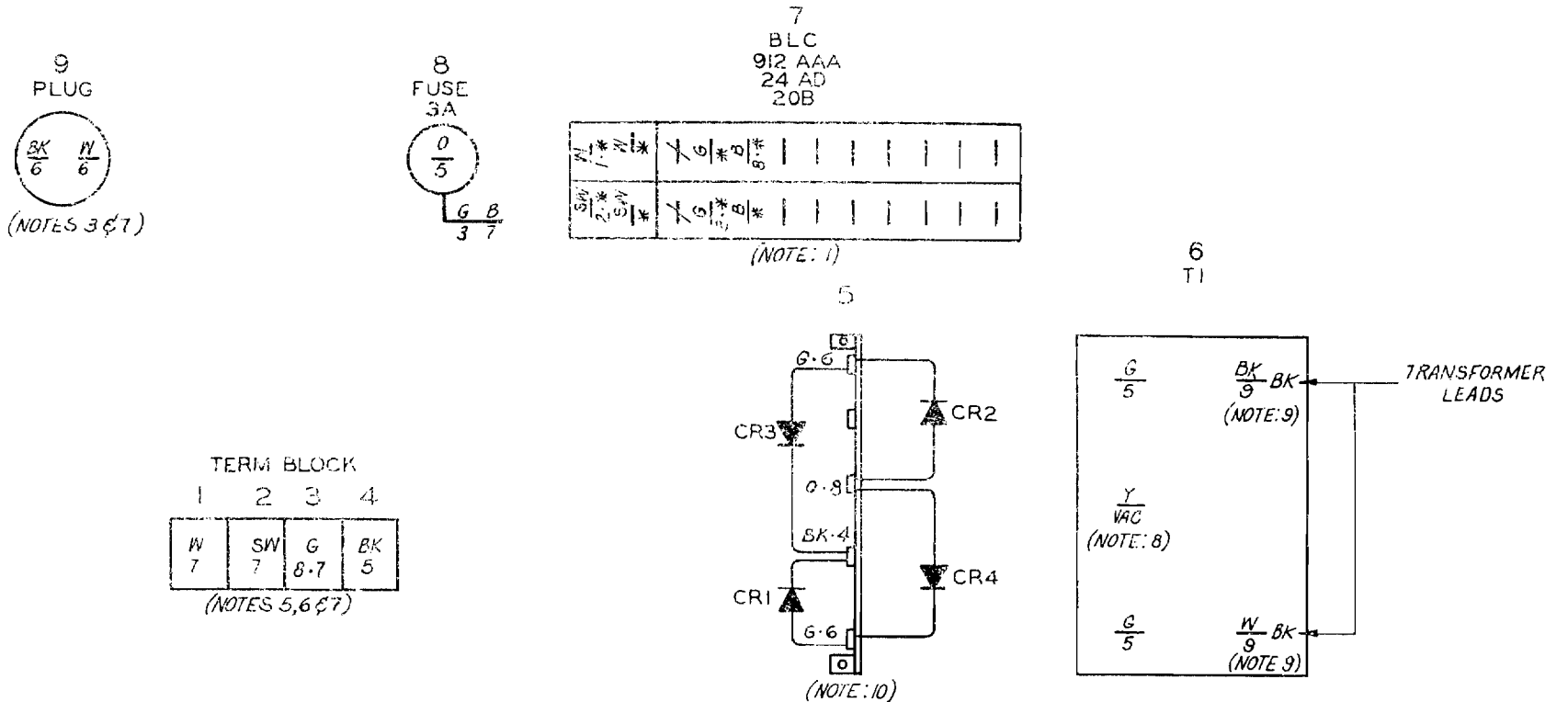


FIG. 1

MANUFACTURING NOTES:

- 1 - RELAY ADJUSTMENT SEE R-0004.
- 2 - * INDICATES WIRE LOOP IN THE SAME STITCH.
- 3 - WIRES ARE IN RUBBER JACKETED CORD. CORD MUST EXTEND 48" BEYOND MOUNTING BASE.
- 4 - SOLDER AND SLEEVE.
- 5 - STENCIL NUMBERS SHOWN IN 1/8" BLACK CHARACTERS ALONG TERMINAL BLOCK.
- 6 - TERMINAL BLOCK TO BE WIRED ON OUTER SURFACE OF MOUNTING BASE.
- 7 - CORD ATTACHED TO PLUG AND WIRES TO TERMINAL BLOCK TO EXTEND THROUGH RUBBER GROMMET'S IN MOUNTING BASE.
- 8 - ROLL UP AND TAPE YELLOW LEAD
- 9 - BK AND W WIRES OF CORD TO BE CONNECTED TO BK LEADS OF TRANSFORMER.
- 10 - DIODE LEADS TO BE 1" MINIMUM AND SLEEVED.

TABLE A

STOCKLIST	CIRCUIT	FIG	WIRING			REMARKS
			"Y" WRG	"A" APP		
NL-19531	H-73578-A	1A	*	*		

CONVERTED TO A.E. STANDARDS. CHANGED TO AGREE WITH CKT H-73578-A ISSUE: 1 A/B 1-15-69 A/B ISSUE: 4	ISSUE: 3 WB-5926 CHANGES	SHEET 1 OF 1	H-721174	421122-H	DESIGNED	DR.	WIRING DIAGRAM FOR BUSY LAMP FIELD CONTROL CIRCUIT 40A, 40B, 40M PABX
					APP'D	CK.	
					SCALE:	DATE:	
					DO NOT SCALE DRAWING		
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ISSUE: 1
12/1/71

GTE AUTOMATIC ELECTRIC INC
GENOA, ILLINOIS

2) 12.5.72

40B-S STOCKBOARD
RELAY ADJUSTMENT SHEETS

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UNITED STATES DEPARTMENT OF JUSTICE
FEDERAL BUREAU OF INVESTIGATION

CONFIDENTIAL

REPORT OF SPECIAL AGENT IN CHARGE

TO DIRECTOR, FBI

FROM SAC, NEW YORK (100-100000)

SUBJECT: [REDACTED]

RE: [REDACTED]

DATE: [REDACTED]

CLASSIFICATION: [REDACTED]

REFERENCE: [REDACTED]

ADDITIONAL INFORMATION: [REDACTED]

ADMINISTRATIVE: [REDACTED]

REMARKS: [REDACTED]

RELAYS		SPRING GAUGING		TEST FOR:	RESIST. AT SOV.		CURRENT		TESTING INSTRUCTIONS	
					READJ.	TEST	READJ.	TEST		
LK1-LR50 FIG. 1 PC. NO. 018735, 018736 COIL NO. D-018726 NO. 1 916				NO. 1 NO. 2	0 NO	2300 2810	2020 3160	.0155 .0134	.017 .0122	INS. SPGS. 3 & 4 OF ASSOC. RLY. CO. POS. TO SPG. 3 OF RLY. CO.
CO1-C080 PC. NO. 018735, 018736 COIL NO. D-018749 NO. 1 2050				NO. 1 NO. 2	0 NO	500 820	430 900	.0367 .0298	.0384 .0284	
				NO. 1						
				NO. 2						
				NO. 1						
				NO. 2						
				NO. 1						
				NO. 2						

AUTOMATIC ELECTRIC COMPANY
 NORTHLAKE, ILLINOIS, U.S.A.
 2M-1462 (REV. 9/69)

CIRCUIT OR SWITCH ADJUSTMENT

CKT. H-850940-A 2 SHEETS 2
 AM-850940-A

DESCRIPTION	MFG. ADJ.	FIELD G.S.P.	EXPLANATION OF TERMS
GENERAL REQUIREMENTS	100		—#1—INSIDE OR ARMATURE END WINDING.
SW. TEST & SH. JKS., ETC.	101	230-005-703	—#2—OUTSIDE OR HEEL END WINDING.
CLASS A & Z	110	040-500-706	—S.L.A.—SHORT LEVER ARMATURE.
" B	300	040-500-502	S.R.—SLOW TO RELEASE. S.O.—SLOW TO OPERATE.
" C	301	040-500-502	A.C.—ALTERNATING CURRENT.
" W	784	040-500-102	O—OPERATE. N.O.—NON-OPERATE. H—HOLD.
TYPE 10 A.C.	118	040-501-702	R—RELEASE. O.C.—OPEN CIRCUIT.
TYPE 59 CODEL UNIT	783	040-500-501	RESID.—RESIDUAL ADJUSTMENT VALUE.
V. O. N.	120		—TEST VALUES ARE FOR INSPECTION ONLY.
CUP & SHAFT SPGS.	121		—READJ. VALUES ARE FOR ADJUSTING ONLY.
CAM SPGS.	122		—CURRENT IS SHOWN IN AMPERES.
NORMAL POST	123		—POS.—TEST WITH POSITIVE BAT. THRU RESIST. OF TEST SET.
RLSE. SPGS.	124	230-005-703	—NEG.—TEST WITH NEGATIVE BAT. THRU RESIST. OF TEST SET.
R. O. N.	126		—RELAYS PREFIXED BY GR OR GT HAVE WIRE WRAP TERMINALS.
VERT. MECH.	130		RELAYS PREFIXED BY R OR RT HAVE SOLDER TERMINALS.
DOGS	131		THIS ADJUSTMENT APPLIES IN EITHER CASE.
ROT. MECH.	132		WIRE WRAP TERM. SOLDERED TERM.
RLSE. MECH.	133		
SHAFTS, WIPERS, ETC.	135		
MINOR SW.	136	230-007-708	
TESTING LP PULSED SWS.	144	230-200-504	
TESTING SX PULSED SWS.	145		
TIMING SWITCHES & RLYS.	146		
44 ROT. SW.	163	230-007-736	
45 " "	162	230-007-705	
SHUNT FIELD RELAY	175	040-500-706	
280 POLAR RLY.	201	040-401-701	
KEYS	753	032-305-700	
SWITCHBOARD JACKS	754	032-320-700	
* LEICH SERIES 400 RLYS.	78		

AUTOMATIC ELECTRIC COMPANY
 NORTHLAKE, ILLINOIS, U.S.A.
 2M-1460 (REV. 9/69)

ENG. CH APP'D: HHA
 CIRCUIT OR SWITCH ADJUSTMENT

CKT. H-850940-A 2 SHEETS 1
 AM-850940-A

SWITCH STAND ROT. SWITCH
 TEST POSITION

LINE CIRCUIT
 40B, 40M, 80M, PABX

AH-850280-A		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES		TA FIG.1	0	2480			REMOVE RLY. BAR FROM JACK WHILE TESTING.
3)11.21.67(4)	1005 11.21.67	PC. NO. 911 DRA 49AA 117	NO	.015			DISCONNECT WIRES ON TA WDG. TERM. 3.
		WDG. 243 850 0		.4150			POS. BAT. TO TA WDG. TERM. 2.
		WDG. 144 2000 0		.010			NEG. BAT. THRU RES TO TA WDG. TERM. 3
		GT 90044-117					
		COIL D-284750-A					
		TR	0	1310			INS. TB SPGS. 12 & 14.
		PC. NO. 911 KRA 23AB 140		.023			POS. THRU RES. TO TB SPG. 14.
		WDG. 243 860 0	NO	2080			
		WDG. 144 860 0		.017			
		GT 90045-140					
		COIL D-284732-A					
		TC	0	3300			INS. TC SPGS. 2 & 3.
		PC. NO. 911 CXA 23AB 111		.012			POS. THRU RES. TO TB SPG. 13.
		WDG. 243 860 0	NO	6290			
		WDG. 144 860 0		.007			
		GT 90046-111					
		COIL D-284732-A					
		TG & TH	0	355			TEST WITH 2000 0 IN MULT. WITH TG & TH IN SERIES AND WITH 250 0 IN SERIES WITH THAT COMBINATION.
		PC. NO. 921 FHA 44AA 134		.0338			POS. THRU RES. TO TV SPG. 14.
		WDG. 243 780 0	NO	885			
		WDG. 144 2000 0		.0249			
		GT 90047-134					
		COIL D-284726-A					
		TU	0	722			TEST IN MULT. WITH 2000 0.
		PC. NO. 921 CGA 48AC 149		.0130			INS. AG SPGS. 1 & 2.
		WDG. 243 1300 0	NO	982			POS. THRU RES. TO JACK TERM. C32.
		WDG. 144 1800 0		.0282			
		GT 90048-129					
		COIL D-28479-A					
		T2-T5	0	2340	2110		T2: POS. THRU RES. TO JACK TERM. S21.
		PC. NO. 911 FMA 24AZ 216		.020	.022		T3: POS. THRU RES. TO JACK TERM. S22.
		WDG. 243 160 0	NO	2780	3110		T4: POS. THRU RES. TO JACK TERM. S23.
		WDG. 144 250 0		.017	.0153		T5: POS. THRU RES. TO JACK TERM. S24.
		GT 90049-216					
		COIL D-284744-A					
		U16, U27, U38, U49, U50	0	1600			INS. TB SPGS. 4 & 5.
		PC. NO. 911 KVA 23AK 145		.025			U16: NEG. THRU RES. TO JACK TERM. C21
		WDG. 243 400 0	NO	2540			U27: NEG. THRU RES. TO JACK TERM. C22
		WDG. 144 400 0		.017			U38: NEG. THRU RES. TO JACK TERM. C23
		GT 90050-145					U49: NEG. THRU RES. TO JACK TERM. C24
		COIL D-284735-A					U50: NEG. THRU RES. TO JACK TERM. C25
		PC. NO.					
		WDG. 243					
		WDG. 144					
		GT					
		COIL					
		15 & 60	0	1070			15: NEG. THRU RES. TO TB SPG. 5.
		PC. NO. 912 RCA 49AP 172		.038			60: NEG. THRU RES. TO TB SPG. 6.
		WDG. 243 250 0	NO	1420			
		WDG. 144 2000 0		.030			
		GT 90051-172					
		COIL D-284751-A					
NOTE 1: TEST WITH 50 VOLTS D.C.							
NOTE 2: TESTS ON THIS BAR SHOULD BE CARRIED OUT WHEN THE BOARD IS IDLE TO AVOID INTERRUPTING TRAFFIC.							
DR.		DATE. 11-21-67		FINDER GUARD		CKT. H-850280-A	
CH.		APPR. PL		40B PAXX		SEE SH. 2 ADJ. SH. 3	
EN. JM						ISSUE 3	
AUTOMATIC ELECTRIC CO.				AH-850280-A			
NORTHLAKE, ILLINOIS							

AH-850280-A		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES		AG FIG.1	0	5000			REMOVE RLY. BAR FROM JACK WHILE TESTING.
3)11.21.67(4)		PC. NO. 911 BBA 24AF 137		.005			DISCONNECT WIRES ON AG WDG. TERM. 3
		WDG. 243 5000 0	NO	11700			POS. BAT. TO JACK TERM. S40.
		WDG. 144 2000 0		.003			NEG. BAT. THRU RES. TO AG WDG. TERM. 3.
		GT 90052-137					
		COIL D-284720-A					
		PC. NO.					
		WDG. 243					
		WDG. 144					
		GT					
		COIL					
		TRG	0	7500			REMOVE RLY. BAR FROM JACK WHILE TESTING.
		PC. NO. 912 AAA 24AS 109		.004			DISCONNECT WIRES ON TRG WDG. TERMS. 2 & 3.
		WDG. 243 5000 0	NO	11700			POS. BAT. TO TRG WDG. TERM. 2.
		WDG. 144 5000 0		.003			NEG. BAT. THRU RES. TO TRG WDG. TERM. 3
		GT 90053-109					
		COIL D-284742-A					
		PC. NO.					
		WDG. 243					
		WDG. 144					
		GT					
		COIL					
		PC. NO.					
		WDG. 243					
		WDG. 144					
		GT					
		COIL					
		PC. NO.					
		WDG. 243					
		WDG. 144					
		GT					
		COIL					
		PC. NO.					
		WDG. 243					
		WDG. 144					
		GT					
		COIL					
NOTE 3: RELAYS ARRANGED FOR WIRE WRAP CONNECTIONS HAVE PREFIX GT, COILS HAVE SUFFIX A. THIS ADJUSTMENT APPLIES IN EITHER CASE.							
DR.		DATE. 11-21-67		FINDER GUARD		CKT. H-850280-A	
CH.		APPR. PL		40B PAXX		SEE SH. 2 ADJ. SH. 2	
EN. JM						ISSUE 3	
AUTOMATIC ELECTRIC CO.				AH-850280-A			
NORTHLAKE, ILLINOIS							

AH-850260-A	
CHAS. 3	
TRACING WORK RETIRED	
5) 11.14.67(24)	
G.N. 7:24.70	
EXPLANATION OF TERMS: O = OPERATE: NO = NON-OPERATE: H = HOLD: R = RELEASE: POS. = TEST WITH POSITIVE BATTERY THRU RESISTANCE OF TEST SET. NEG. = TEST WITH NEGATIVE BATTERY THRU RESISTANCE OF TEST SET.	
NOTES: 1: TEST WITH BOTH WINDINGS IN SERIES. 2: TEST ON NO.1 WDG. (INNER OR ARM. END) 3: TEST ON NO.2 WDG. (OUTER OR REEL END) 4: TEST WITH BOTH WINDINGS IN MULT.	
GENERAL NOTES FOR GENERAL INSTRUCTIONS AND RELAY ADJUSTMENT SEE R-0004. RELAYS ARRANGED FOR WIRE WRAP CONNECTIONS HAVE PREFIX CT, COILS HAVE SUFFIX A. THIS ADJUSTMENT APPLIES IN EITHER CASE. TEST WITH 50 VOLTS D.C. REMOVE RELAY BAR FROM JACK WHILE TESTING. CONNECT GRD. TO RELAY BAR JACK 838 AND NEG. BAT. TO JACK C38.	
DR. SCALE CH. DATE EN. HHA APPR. ARN 2/77 AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS	LINK SELECTION CONTROL TYPE 40B PARK CKT. H-850260-A SHEET 1 OF 4 ISSUE 5.6 AH-850260-A

AH-850260-A		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES		CX	FIG. 1	0	3000	2	POS. TO SPG. 11 OF RLY. GD.
RETIRED		PC. NO. 911 MFR 23AM 106			.010		
5) 11.14.67(24)		WDG. 243 2000 R	NO		.000		
		WDG. 144 2000 R			.005		
6) 11.14.67(26)		GT 90026-106					
		COIL D-284711-A					
		LX1, LX2, LX3	0	3000		2	CPD. TO SPG. 2 OF RLY. UNDER TEST. NEG. TO COIL TERM. #3 OF RLY. UNDER TEST.
		PC. NO. 911 MFR 23AM 106			.010		
		WDG. 243 2000 R	NO		.000		
		WDG. 144 2000 R			.005		
		GT 90027-106					
		COIL D-284711-A					
		CA	0	2590		2	TEST IN MULTIPLE WITH 2000 R. NEG. TO COIL TERM. #2.
		PC. NO. 911 MFR 24EP 112			.012		
		WDG. 243 500 R	NO		.000		
		WDG. 144 1000 R			.012		
		GT 90028-112					
		COIL D-284745-A					
		CR	0	1870		2	INS. SPGS. 4 & 5 OF RLY. 2. POS. TO SPG. 5 OF RLY. 2.
		PC. NO. 916 MUA 23EM 138			.022		
		WDG. 243 400 R	NO		.020		
		WDG. 144 800 R			.016		
		GT 90029-138					
		COIL D-284739-A					
		CG	0	1270		2	TEST IN MULTIPLE WITH 1300 R. INS. SPGS. 11 & 12 OF RLY. CH. GRD. TO SPG. 5 OF RLY. CB. NEG. TO SPG. 5 OF RLY. CG.
		PC. NO. 911 MFR 24ED 112			.026		
		WDG. 243 1300 R	NO		.010		
		WDG. 144 250 R			.018		
		GT 90030-112					
		COIL D-284740-A					
		CH	0	1270		2	TEST IN MULTIPLE WITH 1300 R. INS. SPGS. 11 & 12 OF RLY. CH. GRD. TO SPG. 5 OF RLY. CB. NEG. TO SPG. 5 OF RLY. CG.
		PC. NO. 911 MFR 24ED 112			.026		
		WDG. 243 1300 R	NO		.010		
		WDG. 144 250 R			.018		
		GT 90031-112					
		COIL D-284746-A					
		CT	0	2130		2	INS. SPGS. 11 & 12 OF RLY. CT. POS. TO SPG. 17 OF RLY. GS.
		PC. NO. 911 MFR 24AR 116			.015		
		WDG. 243 500 R	NO		.000		
		WDG. 144 2000 R			.008		
		GT 90032-116					
		COIL D-284741-A					
		CHA	0	1270		2	TEST IN MULTIPLE WITH 1300 R. GRD. TO SPG. 17 OF RLY. CB. NEG. TO SPG. 11 OF RLY. CT.
		PC. NO. 911 MFR 24BD 112			.026		
		WDG. 243 1300 R	NO		.010		
		WDG. 144 250 R			.018		
		GT 90033-112					
		COIL D-284746-A					
		CHB	0	1270		2	TEST IN MULTIPLE WITH 1300 R. GRD. TO SPG. 17 OF RLY. CB. NEG. TO SPG. 11 OF RLY. CT.
		PC. NO. 911 MFR 24BD 112			.026		
		WDG. 243 1300 R	NO		.010		
		WDG. 144 250 R			.018		
		GT 90034-112					
		COIL D-284746-A					
DR.							CKT. H-850260-A
CH. DATE							SEE SH. 3 ADJ. SH. 2
EN. HHA APPR. ARN 2/77							ISSUE 5.0
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS							AH-850260-A

AH-850260-A		RELAY		TEST	ADJ.	RESP.	NOTE	TESTING INSTRUCTION
CHANGES	GD	FIG. 1		0	6400	NR000		INS. SPGS. 5 & 6 OF RLY. CH. DISCHARGE CAPACITOR C4. REMOVE LEADS FROM COIL TERM. #4. NEG. TO COIL TERM. #4.
RETYPE'D	PC. NO. 917 BAC 21AD 252			NO	0017	0018		
5)11.14.67(24	WDG. 243			NO	12700	15400		
	WDG. 144 23000 R				0014	0013		
	GT 90035-252							
	COIL D-284730-A							
6)6.11.70(26	GS			0	1760	1570	4	SPGS. 4 & 5 MUST CLOSE BEFORE SPGS. 11 & 12 OPE..
	PC. NO. 921 UCE 24AC 306			NO	0232	0262		INS. SPGS. 16 & 17 OF RLY. CB.
	WDG. 243 400 R				2290	2590		INS. SPGS. 3 & 4 OF RLY. GS.
	WDG. 144 2000 R				0191	0171		NEG. BAT. TO COIL TERM. #3.
	GT 90036-306							POS. TO COIL TERM. #2.
	COIL D-284718-A							
	PC. NO.							
	WDG. 243							
	WDG. 144							
	GT							
	COIL							
	RD			0	2060		4	POS. TO SPG. 2 OF RLY. RD.
	PC. NO. 916 RYA 44AA 113			NO	0191			
	WDG. 243 780 R				3500			
	WDG. 144 2000 R				0123			
	GT 90037-113							
	COIL D-284726-A							
	1			0	660		2	INS. SPGS. 4 & 5 OF RLY. 2.
	PC. NO. 913 FUA 23AC 190			NO	055			INS. SPGS. 14 & 15 OF RLY. 1.
	WDG. 243 230 R				650			POS. TO SPG. 4 OF RLY. 2.
	WDG. 144 230 R				045			
	GT 90038-190							
	COIL D-284733-A							
	2			0	1040		2	NEG. BAT. TO COIL TERM. #3.
	PC. NO. 911 KLR 23AL 172			NO	038			POS. TO SPG. 15 OF RLY. 1.
	WDG. 243 280 R				1390			
	WDG. 144 1000 R				030			
	GT 90039-172							
	COIL D-284736-A							
	3			0	910		2	INS. SPGS. 13 & 14 OF RLY. 4.
	PC. NO. 921 RYA 23AC 186			NO	044			POS. TO SPG. 13 OF RLY. 4.
	WDG. 243 230 R				1330			
	WDG. 144 230 R				032			
	GT 90040-186							
	COIL D-284733-A							
	4			0	1510		2	NEG. BAT. TO SPG. 18 OF RLY. 5.
	PC. NO. 911 KUA 23AL 157			NO	028			POS. TO SPG. 3 OF RLY. 2.
	WDG. 243 280 R				1990			
	WDG. 144 1000 R				022			
	GT 90041-157							
	COIL D-284736-A							
	5			0	1150		2	INS. SPGS. 3 & 4 OF RLY. 3.
	PC. NO. 921 RYC 23AL 167			NO	035			POS. TO SPG. 3 OF RLY. 3.
	WDG. 243 280 R				1640			
	WDG. 144 1000 R				026			
	GT 90042-167							
	COIL D-284736-A							
DR.	DATE.			CMT. H-850260-A				
EN. HHA	APPR. AR			SEE SM. 4 ADJ. SM. 3				
AUTOMATIC ELECTRIC CO.				ISSUE 5.6				
NORTHLAKE, ILLINOIS				AH-850260-A				

AH-850260-A		RELAY		TEST	ADJ.	RESP.	NOTE	TESTING INSTRUCTION
CHANGES	DA	FIG. 1		0	2060		4	INS. SPGS. 1 & 2 OF RLY. DA.
RETYPE'D	PC. NO. 916 ABA 44AA 113			NO	0191			POS. TO SPG. 1 OF RLY. DA.
5)11.14.67(24	WDG. 243 780 R				3500			
	WDG. 144 2000 R				0123			
	GT 90043-113							
	COIL D-284726-A							
6)6.11.70(26	PC. NO.							
	WDG. 243							
	WDG. 144							
	GT							
	COIL							
	PC. NO.							
	WDG. 243							
	WDG. 144							
	GT							
	COIL							
	PC. NO.							
	WDG. 243							
	WDG. 144							
	GT							
	COIL							
	PC. NO.							
	WDG. 243							
	WDG. 144							
	GT							
	COIL							
	PC. NO.							
	WDG. 243							
	WDG. 144							
	GT							
	COIL							
	PC. NO.							
	WDG. 243							
	WDG. 144							
	GT							
	COIL							
DR.	DATE.			CMT. H-850260-A				
EN. HHA	APPR. AR			SEE SM. 4 ADJ. SM. 3				
AUTOMATIC ELECTRIC CO.				ISSUE 5.6				
NORTHLAKE, ILLINOIS				AH-850260-A				

AH-850289-A		CHANGES	
TRACING WORK			
RETIRED			
3)11.12.67(5)			
4)3.10.70(6)			
5)2-11-71(8)			

EXPLANATION OF TERMS:
O = OPERATE. NO = NON-OPERATE.
H = HOLD. R = RELEASE.
POS. = TEST WITH POSITIVE BATTERY THRU RESISTANCE OF TEST SET.
NEG. = TEST WITH NEGATIVE BATTERY THRU RESISTANCE OF TEST SET.

NOTES:
1: TEST WITH BOTH WINDINGS IN SERIES.
2: TEST ON NO.1 WDG. (INNER OR ARM. END)
3: TEST ON NO.2 WDG. (OUTER OR HEEL END)
4: TEST WITH BOTH WINDINGS IN MULT.

GENERAL NOTES

FOR GENERAL INSTRUCTIONS AND RELAY ADJUSTMENT SEE R-0004.

RELAYS ARRANGED FOR WIRE WRAP CONNECTIONS HAVE PREFIX GT; COILS HAVE SUFFIX A. THIS ADJUSTMENT APPLIES IN EITHER CASE.

TEST WITH 50 VOLTS D.C.

REMOVE RELAY BAR FROM JACK WHILE TESTING.
CONNECT GRD. TO RELAY BAR JACK 8A0 AND
NEG. BAT. TO JACKS C37-C40.

DATE	11-13-71	CHK. H-850289-A
BY	APPR. A. J. J.	SHEET 1 OF 1
AUTOMATIC ELECTRIC CO.		ISSUE 3.4.5
NORTHLAKE, ILLINOIS		AH-850289-A

LINK CIRCUIT
TYPES 40, 80 PAX, 1000 PAX
TYPE 900 RELAYS

CHANGES	RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
3)11.12.67(5)	PC. NO. 913 ACC 33AA 176	NO	2480		1	CONNECT RESISTANCE ACROSS JACK 8.
4)3.10.70(6)	WDG. 213 230 R	NO	.017			
5)2-11-71(8)	WDG. 144 230 R	NO	.012			
	ST 90020-176					
	COIL D-284724-A					
	B	O	1510		2	POS. TO SPG. 2 OF RLY. A.
	PC. NO. 926 UAE 53AL 141		.021			
	WDG. 213 465 R	NO	4080			
	WDG. 144 1130 R		.011			
	ST 90021-331					
	COIL D-284752-A					
	C	O	1640	1700	2	THIS RELAY SUPPLIED PRIOR TO ISS.3.
	PC. NO. 926 UAE 53AL 331		.021	.0231		
	WDG. 213 465 R	NO	4080	4580		
	WDG. 144 1130 R		.011	.0099		
	ST 90021-331					
	COIL D-284752-A					
	C	O	1640	1550	2	SPGS. 16 & 17 MUST MAKE BEFORE SPGS. 5 & 6.
	PC. NO. 931 ARA 23AL 308		.026	.0273		
	WDG. 213 280 R	NO	2220	2350		
	WDG. 144 1000 R		.020	.019		
	ST 90022-332					
	COIL D-284736-A					
	C	O	1640	1550	2	THIS RELAY SUPPLIED PRIOR TO ISS.3.
	PC. NO. 931 BBA 23AL 332		.026	.0273		
	WDG. 213 280 R	NO	2220	2350		
	WDG. 144 1000 R		.020	.019		
	ST 90022-332					
	COIL D-284736-A					
	PC. NO.					
	WDG. 213					
	WDG. 144					
	ST					
	COIL					
	B	O	1330	1260	2	SPGS. 1 & 2 MUST NOT MAKE BEFORE SPGS. 6 & 7 MAKE.
	PC. NO. 911 BBA 23AL 256		.031	.0525		
	WDG. 213 280 R	NO	1510	1600		
	WDG. 144 1000 R		.028	.0266		
	ST 90023-256					
	COIL D-284736-A					
	F	O	1150		2	GRD. TO COIL TERM. #3.
	PC. NO. 911 VPL 83AG 167		.035			
	WDG. 213 280 R	NO	1640			
	WDG. 144 480 R		.026			
	ST					
	COIL					
	PC. NO.					
	WDG. 213					
	WDG. 144					
	ST					
	COIL					

THIS RELAY SUPPLIED PRIOR TO ISS.2.

DATE	11-13-71	CHK. H-850289-A
BY	APPR. A. J. J.	SHEET 1 OF 1
AUTOMATIC ELECTRIC CO.		ISSUE 3.4.5
NORTHLAKE, ILLINOIS		AH-850289-A

AH-850289-A		RELAY	TEST	ADJ.	RESP.	NOTE	TESTING INSTRUCTION
CHANGES		FIG. 1	O	1150		2	SPGS. 11 & 12 MUST MAKE BEFORE SPGS. 15 & 16 BREAK.
RETIPTED		PC. NO. 911 VPL 81A6 327		.035			CRD. TO COIL TERM. #3.
3) 11.12.67(5)		Wdg. 113 280 Ω	NO	1640			NEG. TO COIL TERM. #2.
4) 3.10.70(6)		Wdg. 114 480 Ω		.020			THIS RELAY SUPPLIED BEGINNING WITH ISSUE 2.
5) 2-11-71(1)		GT 90024-327					
		COIL D-284727-A					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		I	O	1320		2	POS. TO SPG. 16 OF RLY. C.
		PC. NO. 931 CDD 23AA 147		.026			
		Wdg. 213 600 Ω	NO	1900			
		Wdg. 114 1250 Ω		.020			
		GT 90025-147					
		COIL D-284731-A					
		E	O	1330 1260		2	SPGS. 1 & 2 MUST NOT MAKE BEFORE SPGS. 6 & 7 MAKE.
		PC. NO. 911 RUA 23AL 256		.011 .0325			INS. SPGS. 11 & 12 OF RLY. L.
		Wdg. 213 280 Ω	NO	1510 1600			GRD. TO SPG. 7 OF RLY. F.
		Wdg. 114 1000 Ω		.028 .0266			NEG. TO SPG. 12 OF RLY. L.
		GT 90514-256					
		COIL D-284736-A					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					
		COIL					
		PC. NO.					
		Wdg. 213					
		Wdg. 114					
		GT					

AH-850332-A		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	R1	FIG.1	0	4250	3950	2	REMOVE LEADS FROM COIL TERM. #2.
4)2.13.69(1)	PC. NO. 911 UMA 24AD 208			.0080	.0084		POS. TO COIL TERM. #2.
5)630.70(12)	Wdg. 213 2000 Ω	NO		5150	5700		
	Wdg. 114 2000 Ω			.0070	.0065		
	ST 90054-208						
	COIL D-284719-A						THIS RLY. SUPPLIED PRIOR TO ISS. #5.
	R2		0	4250	3950	2	REMOVE LEADS FROM COIL TERM. #2.
	PC. NO. 911 UMA 24AD 208			.0080	.0084		POS. TO COIL TERM. #2.
	Wdg. 213 2000 Ω	NO		5150	5700		
	Wdg. 114 2000 Ω			.0070	.0065		
	ST 90054-208						
	COIL D-284719-A						THIS RLY. SUPPLIED PRIOR TO ISS. #5.
	R3		0	985	935	2	INS. SPGS. 6 & 7 OF RLY. E2.
	PC. NO. 912 CCA 24EG 207			.0475	.050		POS. TO SPG. 7 OF RLY. E2.
	Wdg. 213 65 Ω	NO		1125	1185		
	Wdg. 114 500 Ω			.042	.040		
	ST 90055-207						
	COIL D-284747-A						
	R1		0	3450	3150	2	REMOVE LEADS FROM COIL TERM. #2.
	PC. NO. 911 18F 58AB 208			.008	.0084		POS. TO COIL TERM. #2.
	Wdg. 213 2500 Ω	NO		4350	4900		
	Wdg. 114 1050 Ω			.007	.0065		
	ST 90056-208						
	COIL D-284754-A						
	R2		0	6400	4800	3	REMOVE LEADS FROM COIL TERM. #1.
	PC. NO. 911 BCA 21AD 269			.0017	.0018		NEG. TO COIL TERM. #1.
	Wdg. 213	NO		12700	15400		
	Wdg. 114 23000 Ω			.0014	.0013		
	ST 90057-269						
	COIL D-284730-A						
	RSA		0	4430		2	GRD. TO COIL TERM. #2.
	PC. NO. 912 MFA 23BE 103			.006			NEG. TO SPG. 4 OF RLY. TSA.
	Wdg. 213 3900 Ω	NO		8600			
	Wdg. 114 1000 Ω			.004			
	ST 90058-103						
	COIL D-284737-A						
	TSA & TSC		0	1880		2	TEST IN MULTIPLE WITH 2000 Ω
	PC. NO. 912 DGB 24AA 113			.020			RLY. TSA: POS. TO SPG. 16 OF RLY.
	Wdg. 213 900 Ω	NO		3280			RSA
	Wdg. 114 2000 Ω			.0128			RLY. TSC: POS. TO SPG. 3 OF RLY.
	ST 90059-113						RSC.
	COIL D-284740-A						
	RSC		0	4430		2	POS. TO COIL TERM. #2.
	PC. NO. 912 CAA 23BE 103			.006			
	Wdg. 213 3900 Ω	NO		8600			
	Wdg. 114 1000 Ω			.004			
	ST 90060-103						
	COIL D-284737-A						
	TTC		0	1880		2	TEST IN MULTIPLE WITH 2000 Ω
	PC. NO. 912 DCA 24AA 113			.020			POS. TO COIL TERM. #2
	Wdg. 213 900 Ω	NO		3280			
	Wdg. 114 2000 Ω			.0128			
	ST 90061-113						
	COIL D-284740-A						
DR.			CMT. H-850332-A				
CR.	DATE 2-28-69	SEE SH. 3		ADJ. SH. 2			
ED.	APPR. YEAR 64	ISSUE 1,2,3,4,5					
AUTOMATIC ELECTRIC CO.		AH-850332-A					
NORTH LAKE, ILLINOIS							

AH-850332-A		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	RA1 & RA2	FIG.1	0	3250		2	NEG. TO COIL TERM. 3.
4)2.13.69(1)	PC. NO. 912 FNA 23BE 104			.007			
5)630.70(12)	Wdg. 213 3900 Ω	NO		8600			
	Wdg. 114 1000 Ω			.004			
	ST 90062-104						
	COIL D-284737-A						
	RB1 & RB2		0	4430		2	NEG. TO COIL TERM. 3.
	PC. NO. 912 DNA 23BE 103			.006			
	Wdg. 213 3900 Ω	NO		8600			
	Wdg. 114 1000 Ω			.004			
	ST 90063-103						
	COIL D-284737-A						
	TS1 & TS2		0	1880		2	TEST IN MULTIPLE WITH 2000 Ω
	PC. NO. 912 FGB 24AA 113			.020			POS. TO COIL TERM. 2.
	Wdg. 213 900 Ω	NO		3280			
	Wdg. 114 2000 Ω			.0128			
	ST 90064-113						
	COIL D-284740-A						
	RA3	FIG.2	0	4430		2	NEG. TO SPG. 4 OF RLY. TS3.
	PC. NO. 912 LCA 23BE 103			.006			
	Wdg. 213 3900 Ω	NO		8600			
	Wdg. 114 1000 Ω			.004			
	ST 90065-103						
	COIL D-284737-A						
	TS3		0	1880		2	TEST IN MULTIPLE WITH 2000 Ω
	PC. NO. 912 FGB 24AA 113			.020			POS. TO SPG. 13 OF RLY. RA3.
	Wdg. 213 900 Ω	NO		3280			
	Wdg. 114 2000 Ω			.0128			
	ST 90064-113						
	COIL D-284740-A						
	E1 & E2	FIG.1	0	4250	3950	2	REMOVE LEADS FROM COIL TERM. #2.
	PC. NO. 911 UUA 24AD 208			.008	.0084		POS. TO COIL TERM. #2.
	Wdg. 213 2000 Ω	NO		5150	5700		
	Wdg. 114 2000 Ω			.007	.0065		
	ST 90135-208						THIS RELAY SUPPLIED BEGINNING WITH
	COIL D-284719-A						ISSUE #5.
PC. NO.							
Wdg. 213							
Wdg. 114							
ST							
COIL							
PC. NO.							
Wdg. 213							
Wdg. 114							
ST							
COIL							
PC. NO.							
Wdg. 213							
Wdg. 114							
ST							
COIL							
DR.			CMT. H-850332-A				
CR.	DATE 2-28-69	SEE SH. 3		ADJ. SH. 3			
ED.	APPR. YEAR 64	ISSUE 1,2,3,4,5					
AUTOMATIC ELECTRIC CO.		AH-850332-A					
NORTH LAKE, ILLINOIS							

AH-850627-A

AN ISSUE CKT.

2) 3-11-71 (2)
054 3-15-71-EXPLANATION OF TERMS-

O = OPERATE
R = RELEASE
POS. = TEST WITH POSITIVE BAT. THRU RESIST. OF TEST SET.
NEG. = TEST WITH NEGATIVE BAT. THRU RESIST. OF TEST SET.

N.O. = NON-OPERATE
H = HOLD

-NOTES-

- 1- TEST WITH BOTH WINDINGS IN SERIES.
- 2- TEST ON #1 WINDING.
(INNER OR ARM. END) TERMS. 2 & 3.
(SINGLE WOUND COIL) TERMS. 1 & 4.
- 3- TEST ON #2 WINDING.
(OUTER OR REEL END) TERMS. 1 & 4.
- 4- TEST WITH BOTH WINDINGS IN MULT.

-GENERAL REQUIREMENTS-

FOR GENERAL INSTRUCTIONS AND RELAY ADJUSTMENT SEE R-0004.

TEST WITH 50 VOLTS. D.C.

RELAYS ARRANGED FOR WIRE WRAP CONNECTIONS HAVE PREFIX GT.
THIS ADJUSTMENT APPLIES IN EITHER CASE.W WIRE WRAP TERM. Y SOLDERED TERM.

ENG.: RHA

APP'D: ABN

AUTOMATIC ELECTRIC COMPANY
NORTHLAKE, ILLINOIS, U.S.A.

TURRENT KEYSET REGISTER &
POWER FAILURE TRANSFER CKT.
LEIGH TYPE 40 PABX
TYPE 900 RELAY

CKT.-H-850627-A

AH-850627-A

4 SHEETS 1

AH-850627-A

CHANGES	RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
2) 3-11-71 (2)	G FIG.1	0	1270		2	TEST IN MULT. WITH 1300 Ω. INS. SPGS. 1 & 2 OF RLY. H. NEG. BAT. TO SPG. 3 OF RLY. G. POS. TO SPG. 2 OF RLY. U.
	PC. NO. 911 TGF 24ED 112		026			
	WGS. 243 1300 Ω	NO	2130			
	WGS. 144 250 Ω		018			
	GT 90662-112					
	COIL D-284746-A					
	GD	0	2160		2	DISCHARGE CAPACITOR C5. REMOVE LEADS FROM COIL TERM. #3. NEG. TO COIL TERM. #3.
	PC. NO. 911 ACA 24AD 177		012			
	WGS. 243 2000 Ω	NO	3000			
	WGS. 144 2000 Ω		010			
	GT 90663-177					
	COIL D-284719-A					
	GS	0	990		2	TEST IN MULT. WITH 250 Ω. NEG. BAT. TO SPG. 7 OF RLY. U. POS. TO COIL TERM. #3.
	PC. NO. 911 SUA 24AZ 155		0859			
	WGS. 243 160 Ω	NO	1170			
	WGS. 144 250 Ω		0393			
	GT 90664-155					
	COIL D-284744-A					
	H	0	1270		2	TEST IN MULT. WITH 1300 Ω. INS. SPGS. 1 & 2 OF RLY. H. NEG. BAT. TO SPG. 3 OF RLY. G. POS. TO SPG. 2 OF RLY. U.
	PC. NO. 911 GFA 24BD 112		026			
	WGS. 243 1300 Ω	NO	2130			
	WGS. 144 250 Ω		018			
	GT 90665-112					
	COIL D-284746-A					
	N1	0	2660		2	INS. SPGS. 1 & 2 OF RLY. T. POS. TO SPG. 1 OF RLY. T.
	PC. NO. 911 LMA 24AX 177		012			
	WGS. 243 1300 Ω	NO	3700			
	WGS. 144 1000 Ω		010			
	GT 90121-177					
	COIL D-284743-A					
	N2	0	2560		2	INS. SPGS. 4 & 5 OF RLY. T. POS. TO SPG. 4 OF RLY. T.
	PC. NO. 911 PFA 24AX 177		010			
	WGS. 243 1300 Ω	NO	3700			
	WGS. 144 1000 Ω		010			
	GT 90666-177					
	COIL D-284743-A					
	N3	0	2550		2	INS. SPGS. 7 & 8 OF RLY. T. POS. TO SPG. 7 OF RLY. T.
	PC. NO. 911 GFA 24AX 112		013			
	WGS. 243 1300 Ω	NO	4260			
	WGS. 144 1000 Ω		009			
	GT 90667-112					
	COIL D-284743-A					
	N4	0	2550		2	INS. SPGS. 13 & 14 OF RLY. T. POS. TO SPG. 13 OF RLY. T.
	PC. NO. 921 EFA 24AX 112		013			
	WGS. 243 1300 Ω	NO	4260			
	WGS. 144 1000 Ω		009			
	GT 90668-112					
	COIL D-284743-A					
	U	0	2300		4	INS. SPGS. 3 & 4 OF RLY. GS. POS. TO SPG. 2 OF RLY. GS.
	PC. NO. 925 VCA 24AA 111		0171			
	WGS. 243 900 Ω	NO	4430			
	WGS. 144 2000 Ω		0099			
	GT 90669-111					
	COIL D-284750-A					
DR.						CKT. H-850627-A
CH. DATE: 3-11-71						SEE DR. 3 ADJ. DR. 2
EN. HGA APPR. ABN						ISSUE 2
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS						AH-850627-A

PS-1014 (10/70)

AH-850627-A

PS-0511 (07/70)

AH-850627-A		RELAY		TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	UA	FIG. 1		0	960		2	TEST IN MULT. WITH 788 Ω . POS. TO SPG. 14 OF RLY. UB.
2)3-11-71(2)	PC. NO.	911 KKA 24ED 112		NO	10345			
	WGS. 213	1300 Ω			1000			
	WGS. 118	253 Ω			0239			
	ST	90033-112						
	COIL	D-284746-A						
	UB			0	960		2	TEST IN MULT. WITH 788 Ω . INS. SPGS. 6 & 7 OF RLY. G. POS. TO SPG. 4 OF RLY. GS.
	PC. NO.	921 KKA 24AX 112		NO	10345			
	WGS. 213	1300 Ω			1600			
	WGS. 118	1000 Ω			0239			
	ST	90670-112						
	COIL	D-284743-A						
	T			0	2630		2	INS. SPGS. 17 & 18 OF RLY. TA. NEG. BAT. TO SPG. 4 OF RLY. U. POS. TO SPG. 16 OF RLY. U.
	PC. NO.	926 KKA 23EP 117		NO	1015			
	WGS. 213	700 Ω			4330			
	WGS. 118	2100 Ω			010			
	ST	90671-117						
	COIL	D-284767-A						
	TA			0	2720	2570	3	ADJ. LEVER SPGS. SO THAT NO BREAK CONTACTS OPEN BEFORE SPGS. 1 & 2 CLOSE. REMOVE LEADS FROM COIL TERM. #4. POS. TO COIL TERM. #4.
	PC. NO.	917 DVE 23EY 235		NO	010	0146		
	WGS. 213	825 Ω			4710	5320		
	WGS. 118	850 Ω			0090	10081		
	ST	90672-235						
	COIL	D-284762-A						
	T1	FIGS. 2 - 4		0	3330		2	POS. TO COIL TERM. #2 OF RLY. UNDER TEST. NOTE: IN AN OPERATING EXCHANGE REMOVE LEAD FROM COIL TERM. #2 OF RLY. UNDER TEST. POS. TO COIL TERM. #2 OF RLY. UNDER TEST.
	PC. NO.	911 UMA 24AE 102		NO	1006			
	WGS. 213	5000 Ω			11700			
	WGS. 118	2000 Ω			1003			
	ST	90673-102						
	COIL	D-284720-A						
	PC. NO.							
	WGS. 213							
	WGS. 118							
	ST							
	COIL							
	T2, T3 & T4			0	1660		2	FIGS. 2, 3 & 4 RLY. T2 FIGS. 3 & 4 RLY. T3 FIG. 4 RLY. T4 TEST IN MULT. WITH 5000 Ω . POS. TO COIL TERM. #2 OF RLY. UNDER TEST. NOTE: IN AN OPERATING EXCHANGE TEST IN MULT. WITH 5000 Ω . RLY. T2-REMOVE LEADS FROM COIL TERM. #1 OF RLYS. T2 & T2A. RLY. T3-REMOVE LEADS FROM COIL TERM. #1 OF RLYS. T3 & T3A. RLY. T4-REMOVE LEADS FROM COIL TERM. #1 OF RLYS. T4 & T4A. RLYS. T2, T3 & T4- POS. TO COIL TERM. #2 OF RLY. UNDER TEST.
	PC. NO.	911 KKA 24AE 102		NO	012			
	WGS. 213	5000 Ω			5850			
	WGS. 118	2000 Ω			1006			
	ST	90674-102						
	COIL	D-284720-A						
	PC. NO.							
	WGS. 213							
	WGS. 118							
	ST							
	COIL							
	PC. NO.							
	WGS. 213							
	WGS. 118							
	ST							
	COIL							
	PC. NO.							
	WGS. 213							
	WGS. 118							
	ST							
	COIL							
DE.	DATE: 3-11-71		CH. H-850627-A					
CH.	APPR. AEM		SEE SH. 4 ADJ. SH. 3					
ED. HHA	APPR. AEM		ISSUE 2					
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS			AH-850627-A					

AH-850627-A		RELAY		TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	T2A	FIGS. 2-4		0	1660		2	TEST IN MULT. WITH 5000 Ω . POS. TO COIL TERM. #2 OF RLY. UNDER TEST. NOTE: IN AN OPERATING EXCHANGE TEST IN MULT. WITH 5000 Ω . REMOVE LEADS FROM COIL TERM. #1 OF RLYS. T2 & T2A. POS. TO COIL TERM. #2 OF RLY. UNDER TEST.
2)5-11-71(2)	PC. NO.	921 EGA 24AE 102		NO	012			
	WGS. 213	5000 Ω			5850			
	WGS. 118	2000 Ω			1006			
	ST	90675-102						
	COIL	D-284720-A						
	PC. NO.							
	WGS. 213							
	WGS. 118							
	ST							
	COIL							
	T3A & T4A	FIGS. 3-4		0	1660		2	FIGS. 3 & 4 RLY. T3A FIG. 4 RLY. T4A TEST IN MULT. WITH 5000 Ω . POS. TO COIL TERM. #2 OF RLY. UNDER TEST. NOTE: IN AN OPERATING EXCHANGE TEST IN MULT. WITH 5000 Ω . RLY. T3A-REMOVE LEADS FROM COIL TERM. #1 OF RLYS. T3 & T3A. RLY. T4A-REMOVE LEADS FROM COIL TERM. #1 OF RLYS. T4 & T4A. RLYS. T3A & T4A-POS. TO COIL TERM. #2 OF RLY. UNDER TEST.
	PC. NO.	911 EGA 24AE 102		NO	012			
	WGS. 213	5000 Ω			5850			
	WGS. 118	2000 Ω			1006			
	ST	90676-102						
	COIL	D-284720-A						
	PC. NO.							
	WGS. 213							
	WGS. 118							
	ST							
	COIL							
	PC. NO.							
	WGS. 213							
	WGS. 118							
	ST							
	COIL							
	PC. NO.							
	WGS. 213							
	WGS. 118							
	ST							
	COIL							
DE.	DATE: 3-11-71		CH. H-850627-A					
CH.	APPR. AEM		SEE SH. 4 ADJ. SH. 3					
ED. HHA	APPR. AEM		ISSUE 2					
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS			AH-850627-A					

AH-850350-A
 CHANGES
 5/5-10-59(10)
 J. R. 6-11-61

EXPLANATION OF TERMS:

O = OPERATE: NO = NON-OPERATE:
 H = HOLD: R = RELEASE:
 POS. = TEST WITH POSITIVE BATTERY THRU
 RESISTANCE OF TEST SET.
 NEG. = TEST WITH NEGATIVE BATTERY THRU
 RESISTANCE OF TEST SET.

NOTES:

- 1: TEST WITH BOTH WINDINGS IN SERIES.
- 2: TEST ON NO.1 WDG. (INNER OR ARM. END)
- 3: TEST ON NO.2 WDG. (OUTER OR HEEL END)
- 4: TEST WITH BOTH WINDINGS IN MULT.

GENERAL NOTES

FOR GENERAL INSTRUCTIONS AND RELAY ADJUSTMENT
SEE R-0004.

RELAYS ARRANGED FOR WIRE WRAP CONNECTIONS HAVE
PREFIX GT, COILS HAVE SUFFIX A. THIS ADJUSTMENT
APPLIED IN EITHER CASE.

TEST WITH 50 VOLTS D.C.

REMOVE RELAY BAR FROM JACK WHILE TESTING.
CONNECT GRD. TO RELAY BAR JACK S38 AND NEG. BAT.
TO JACK C38.

DR SCALE
 CH DATE 6-10-69
 EN JM APPR FI.
 AUTOMATIC ELECTRIC CO.
 NORTHLAKE, ILL.

TURRET POSITION CIRCUIT
 TYPES 40, 50 PAEX
 TYPE 900 RELAYS

CKT. H-850350-A
 SHEET 1 OF 4
 ISSUE 6.
 AH-850350-A

USED ON
 10-10-61

CHANGES	RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
4) 12.7.67(0)	AA FIG. 1	0	3000		2	POS. TO COIL TERM. 2.
	PC. NO. 911 ARA 23AM 106		.010			
	WDG. 213 2000 R	NO	.800			
5) 3.18.69(9)	WDG. 114 2000 R		.005			
	GT 90066-106					
6) 6-10-69(10)	COIL D-284713-A					THIS RLY. SUPPLIED PRIOR TO ISS. 5.
	AE	0	1000		2	GRD. TO SPG. 14 OF RLY. DE. NEG. TO COIL TERM. 3.
	PC. NO. 911 BEA 33AA 172		.035			
	WDG. 213 230 R	NO	.1540			
	WDG. 114 230 R		.030			
	GT 90067-172					
	COIL D-284724-A					
	AD	0	1100		2	TEST IN MULT. WITH 470 R AND IN SERIES WITH 200 R.
	PC. NO. 911 CFE 23AD 132		.027			
	WDG. 213 250 R	NO	.1810			
	WDG. 114 500 R		.023			INS. SPGS. 2 & 3 OF RLY. AD. POS. TO SPG. 2 OF RLY. AD.
	GT 90068-132					
	COIL D-284734-A					
	EK	0	2030		2	POS. TO SPG. 19 OF RLY. FY.
	PC. NO. 911 GCA 24PD 119		.015			
	WDG. 213 1300 R	NO	.2860			
	WDG. 114 250 R		.012			
	GT 90069-119					
	COIL D-284740-A					
	EY	0	1640		2	POS. TO SPG. 4 OF RLY. RE.
	PC. NO. 921 KCC 23AE 128		.020			
	WDG. 213 800 R	NO	.2710			
	WDG. 114 800 R		.014			
	GT 90070-128					
	COIL D-284732-A					
	DA	0	1040		2	INS. SPGS. 16 & 17 OF RLY. IA. POS. TO COIL TERM. 2.
	PC. NO. 911 RRT 23AB 128		.020			
	WDG. 213 800 R	NO	.2710			
	WDG. 114 800 R		.014			
	GT 90071-128					
	COIL D-284732-A					
	DB	0	1520		2	POS. TO COIL TERM. 2.
	PC. NO. 921 CVA 23AB 141		.021			
	WDG. 213 800 R	NO	.3090			
	WDG. 114 800 R		.011			
	GT 90072-141					
	COIL D-284732-A					
	DC	0	2000		2	POS. TO SPG. 6 OF RLY. EK.
	PC. NO. 926 RAA 44AA 122		.013			
	WDG. 213 750 R	NO	.4220			
	WDG. 114 2000 R		.010			
	GT 90073-122					
	COIL D-284726-A					
	RE	0	2350		2	INS. SPGS. 13 & 14 OF RLY. RE. GRD. TO SPG. 13 OF RLY. EY. NEG. TO SPG. 14 OF RLY. DC
	PC. NO. 911 LDB 23AL 134		.019			
	WDG. 213 280 R	NO	.3290			
	WDG. 114 1000 R		.014			
	GT 90074-134					
	COIL D-284736-A					

DR SCALE
 CH DATE 12/7/67
 EN JM APPR FI.
 AUTOMATIC ELECTRIC CO.
 NORTHLAKE, ILLINOIS

CKT. H-850350-A
 SHEET 3 OF 4
 ISSUE 5. 6.
 AH-850350-A

10-10-61 (10/67)

CHANGES	RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
4) 12.7.67(8)	RG PC. NO. 911 CAA 23BM 152 Wdg. 213 250 Ω Wdg. 114 4050 Ω ST 90075-152 COIL D-284738-A		0 .030 NO .022	1420 2020 2020	2	GRD. TO SPG. 11 OF RLY. PK. NEG. TO COIL TERM. 3.
5) 3.18.69(9)	RM PC. NO. 911 CAA 24BD 119 Wdg. 213 1300 Ω Wdg. 114 250 Ω ST 90076-119 COIL D-284740-A		0 .015 NO .012	2030 2860 2860	2	POS. TO COIL TERM. 2.
6) 6-10-69(10)	RV PC. NO. 926 UDA 23BE 246 Wdg. 213 3900 Ω Wdg. 114 1000 Ω ST 90077-246 COIL D-284737-A		0 .030 NO .021	610 1300 1500 1500	3	POS. TO COIL TERM. 1.
	FS PC. NO. 911 CAA 23BM 106 Wdg. 213 2000 Ω Wdg. 114 2600 Ω ST 90078-106 COIL D-284733-A		0 .010 NO .005	3000 8000 1940	2	NEG. TO SPG. 6 OF RLY. FY.
	SE PC. NO. 911 FEA 24AX 119 Wdg. 213 1300 Ω Wdg. 114 1000 Ω ST 90079-119 COIL D-284743-A		0 .015 NO .012	2030 2860 2860	2	POS. TO SPG. 14 OF RLY. DA.
	SM PC. NO. 916 MIF 84AA 111 Wdg. 213 785 Ω Wdg. 114 2000 Ω ST 90080-111 COIL D-284726-A		0 .012 NO .007	3380 6370 1007	2	POS. TO SPG. 4 OF RLY. BK.
	RG PC. NO. 916 AAA 44AA 113 Wdg. 213 780 Ω Wdg. 114 2000 Ω ST 90081-113 COIL D-284726-A		0 .0194 NO .0125	2520 340 1025	4	POS. TO SPG. 12 OF RLY. RG.
	MD PC. NO. 916 VPF 44AD 122 Wdg. 213 450 Ω Wdg. 114 2000 Ω ST 90082-122 COIL D-284745-A		0 .018 NO .010	2330 4550 1010	2	POS. TO COIL TERM. 2.
DR.	DATE 12/1/67	CT. H-850350-A	SEE DR. 4	ADJ. SH. 3	ISSUE D. 6.	AN-850350-A
ED. JM	APPR. PK. 257					
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS						

CHANGES	RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
4) 12.6.67(8)	NE PC. NO. 911 DAA 24AX 112 Wdg. 213 1300 Ω Wdg. 114 1000 Ω ST 90081-112 COIL D-284743-A		0 .011 NO .009	2550 4260 4260	2	GRD. TO COIL TERM. 2. NEG. TO SPG. 5 OF RLY. MD.
5) 3.18.69(9)	OD PC. NO. 911 PDL 23AM 106 Wdg. 213 2500 Ω Wdg. 114 2800 Ω ST 90146-106 COIL D-284733-A		0 .010 NO .005	3000 8000 1940	2	POS. TO COIL TERM. 2.
6) 6-10-69(10)	OD PC. NO. 911 AAA 21AB 111 Wdg. 213 500 Ω Wdg. 114 1000 Ω ST 90145-111 COIL D-284772-A		0 .012 NO .007	1650 465 107	2	POS. TO COIL TERM. 2.
	RV PC. NO. 926 UDA 23BE 334 Wdg. 213 3900 Ω Wdg. 114 1000 Ω ST 90077-334 COIL D-284737-A		0 .030 NO .020	610 1300 1500 1500	1	NEG. TO COIL TERM. 3.
	SE PC. NO. 911 AAA 21AB 211 Wdg. 213 500 Ω Wdg. 114 1000 Ω ST 90145-211 COIL D-284772-A		0 .0113 NO .0107	1850 1850 2250 2250	2	TEST IN SERIES WITH 2000 Ω. POS. TO COIL TERM. #1.
	PC. NO. Wdg. 213 Wdg. 114 ST COIL					THIS RLY. SUP. BEGINNING WITH ISS. 5.
	PC. NO. Wdg. 213 Wdg. 114 ST COIL					THIS RELAY SUPPLIED PRIOR TO ISS. 6.
	PC. NO. Wdg. 213 Wdg. 114 ST COIL					THIS RLY. SUP. BEGINNING WITH ISS. 5.
	PC. NO. Wdg. 213 Wdg. 114 ST COIL					THIS RLY. SUP. BEGINNING WITH ISS. 6.
	PC. NO. Wdg. 213 Wdg. 114 ST COIL					
	PC. NO. Wdg. 213 Wdg. 114 ST COIL					
	PC. NO. Wdg. 213 Wdg. 114 ST COIL					
DR.	DATE 12/1/67	CT. H-850350-A	SEE DR. 4	ADJ. SH. 3	ISSUE D. 6.	AN-850350-A
ED. JM	APPR. PK. 257					
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS						

AH-850629-A

 AH ISSUE CKT.
 15) 10-23-73 (34)
 200 10-25-73
-EXPLANATION O. TERMS-

O = OPERATE N.O. = NON-OPERATE
 R = RELEASE H = HOLD
 POS. = TEST WITH POSITIVE BAT. THRU RESIST. OF TEST SET.
 NEG. = TEST WITH NEGATIVE BAT. THRU RESIST. OF TEST SET.

-NOTES-

- 1- TEST WITH BOTH WINDINGS IN SERIES.
- 2- TEST ON #1 WINDING.
(INNER OR HEEL END) TERMS. 2 & 3.
(SINGLE WOUND COIL) TERMS. 1 & 4.
- 3- TEST ON #2 WINDING.
(OUTER OR ARM. END) TERMS. 1 & 4.
- 4- TEST WITH BOTH WINDINGS IN MULT.

-GENERAL REQUIREMENTS-

FOR GENERAL INSTRUCTIONS AND RELAY ADJUSTMENT SEE R-0004.

TEST WITH 50 VOLTS. D.C.

RELAYS ARRANGED FOR WIRE WRAP CONNECTIONS HAVE PREFIX GT. THIS ADJUSTMENT APPLIES IN EITHER CASE.

X WIRE WRAP TERM. X SOLDERED TERM.
 REMOVE RELAY BAR FROM JACK WHILE TESTING.
 CONNECT GRD. TO RELAY BAR JACK S38 AND
 NEG. BAT. TO JACK C38.

ENG.: HHA

APP'D: ABN

 C.O. TRUNK CIRCUIT
 40B, 80A PABX

 AUTOMATIC ELECTRIC COMPANY
 NORTHLAKE, ILLINOIS, U.S.A.

CKT.-H-850629-A

 5 SHEETS 1
 AH-850629-A

AH-850629-A

73-850629-A				TESTING INSTRUCTION	
CHARGES	RELAY	TEST	ADJ.	RESP.	NOTE
TRACING	X	FIG. 1	0	1350	2
WORN	PC. NO. 912 UDA 23AM 112		.013		
RETYPE	WDC. 213 500 0	NO	3520		
	WDC. 114 250 0		.009		
	GT				
8) 11.6.67 (24)	COIL				THIS RLY. SUPPLIED PRIOR TO 163.7.
9) 5-13-69 (25)	X		0	1570	2
	PC. NO. 912 UDA 23AM 140		.021		
	WDC. 213 500 0	NO	2530		
	WDC. 114 250 0		.017		
10) 8-7-70 (7)	GT 90001-140				THIS RELAY SUPPLIED BEGINNING WITH ISSUE #7.
	COIL D-204714-A				
	A	0	210	2050	1
	PC. NO. 914 C.A. 33AA 296		.0195	.0190	
11) 8-7-70 (28)	WDC. 213 250 0	NO	2990	3.40	
	WDC. 114 250 0		.0145	.0142	
	GT 90001-296				
	COIL D-204724-A				
	B	0	2660	2610	1
12) 3-29-71 (29)	PC. NO.		.016	.0163	
	WDC. 213	NO	4540	4690	
	WDC. 114		.010	.0097	
13) 8-6-71 (31)	GT				THIS ADJUSTMENT CAN BE APPLIED TO EXISTING RLY. A (914 C.A. 33AA-296) OR (GT-90001-296) WHEN THE TR. K CONDUCTOR LOOP IS BETWEEN 500 & 1500 0. CONNECT RESISTANCE ACROSS JACK S.
	COIL				
14) 10-20-72 (33)	PC. NO.				
	WDC. 213				
	WDC. 114				
	GT				
	COIL				
15) 10-23-73 (34)	B	0	3350		2
	PC. NO. 926 CKA 24PM 112		.013		
	WDC. 213 500 0	NO	5060		
	WDC. 114 250 0		.007		
	GT 90002-112				
	COIL D-284723-A				(SEE SHEET 5). THIS RLY. SUPPLIED PRIOR TO 163.7-13.
	C	0	1.60		2
	PC. NO. 917 L.A. 24AH 111		.012		
	WDC. 213 500 0	NO	62.0		
	WDC. 114 250 0		.007		
	GT 90003-111				
	COIL D-284721-A				
	D	0	680		2
	PC. NO. 921 KDA 23BC 195		.064		
	WDC. 213 100 0	NO	900		
	WDC. 114 250 0		.05		
	GT 90004-195				
	COIL D-284716-A				
	E	0	1770	1720	2
	PC. NO. 927 KEE 23BK 245		.022	.0225	
	WDC. 213 500 0	NO	2440	2530	
	WDC. 114 3500 0		.017	.0165	
	GT				
	COIL				THIS RLY. SUPPLIED PRIOR TO 163.7.
DR.	DATE: 11.6.67			REV. H-850629-A	
CH.	APP'D: ABN			SEE SH. 3	
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS				ADJ. SH. 2	
				ISSUE 14.15	
				AH-850629-A	

PA-1010 110/071

CHANGES	DATE	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTIONS
9) 11.6.67	PC NO. 9A-205 44AA 117					POS. TO SPG. 13 OF RLY. K.
9) 5-13-69	GT 90701-117					THIS RELAY SUPPLIED PRIOR TO AH ISS. 15 & CKT. ISS. 34.
10) 5-7-70	COIL 1-284723-A					SPGS. 1 & 2 MUST NOT CLOSE UNTIL MAKE SPGS. OF ALL OTHER SPG. FILES HAVE CLOSED.
11) 5-7-70	PC NO. 911 PRA 83AG 335					GRD. TO COIL TERM. #3.
	WOG. 213 280 0					NEG. TO COIL TERM. #2.
	WOG. 118 480 0					THIS RLY. SUPP. BEGINNING WITH ISS. 9.
	GT 90015-341					
	COIL 1-284727-A					
12) 3-2-71	PC NO. 7-CK-100 M-116					POS. TO SPG. 6 OF RLY. C.
	WOG. 213 280 0					
	WOG. 118 480 0					
13) 5-6-71	GT 90701-117					THIS RLY. SUPPLIED BEGINNING WITH ISSUE #1.
14) 10-10-73	COIL 1-284723-A					POS. TO COIL TERM. #2.
15) 10-23-73	PC NO. 911 PRA 83AG 341					THIS RELAY SUPPLIED BEGINNING WITH AH ISS. 15 & CKT. ISS. 34.
	WOG. 213 280 0					
	WOG. 118 480 0					
	GT 90015-341					
	COIL 1-284727-A					
	PC NO.					
	WOG. 213					
	WOG. 118					
	GT					
	COIL					
	PC NO.					
	WOG. 213					
	WOG. 118					
	GT					
	COIL					
	PC NO.					
	WOG. 213					
	WOG. 118					
	GT					
	COIL					
	PC NO.					
	WOG. 213					
	WOG. 118					
	GT					
	COIL					
RE.	DATE 11.6.67					CKT. H-850629-A
EN.						SEE SH. ADJ. SH. 5
FR. HUA	APPR. AEN					ISSUE 1415
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS						AH-850629-A

PA-1014 (10/67)

AH-850301-B	
AH ISSUE CKT. 1) 10-6-70 (1) #14 10/1/70 2) 5-3-71 (2) RW 5-7-71	-EXPLANATION OF TERMS- O = OPERATE R = RELEASE POS. = TEST WITH POSITIVE BAT. THRU RESIST. OF TEST SET. NEG. = TEST WITH NEGATIVE BAT. THRU RESIST. OF TEST SET. -NOTES- 1- TEST WITH BOTH WINDINGS IN SERIES. 2- TEST ON #1 WINDING. (INNER OR ARM. END) TERMS. 2 & 3. (SINGLE WOUND COIL) TERMS. 1 & 4. 3- TEST ON #2 WINDING. (OUTER OR REEL END) TERMS. 1 & 4. 4- TEST WITH BOTH WINDINGS IN MULT. -GENERAL REQUIREMENTS- FOR GENERAL INSTRUCTIONS AND RELAY ADJUSTMENT SEE R-0004. TEST WITH 50 VOLTS. D.C. RELAYS ARRANGED FOR WIRE WRAP CONNECTIONS HAVE PREFIX GT. THIS ADJUSTMENT APPLIES IN EITHER CASE. X WIRE WRAP TERM. SOLDERED TERM. REMOVE RELAY BAR FROM JACK WHILE TESTING. CONNECT GRD. TO RELAY BAR JACK S38 & NEG. BAT. TO JACK C38.
ENG.: N. McDonough APP'D: B. E. Law	ATT'S. TRKS. CONFERENCE, & PABX TRK. SELECTION CKTS. TYPE 40,80 PABX
AUTOMATIC ELECTRIC COMPANY NORTHLAKE, ILLINOIS, U.S.A.	CKT. H-850301-B 6 SHEETS 1 AH-850301-B

FD-5011 (10/70)

AH-850301-B		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	A	FIG. 1	0	2850		2	CRD. TO COIL TERM. #2. NEG. TO COIL TERM. #3.
1)10-6-70(1	PC. NO.911 FMA 24BA 119		015				
2)5-3-71(2	Wdg. 213 500 R		NO	3650			
	Wdg. 144 500 R			012			
	GT - 90147-119						
	COIL D-284774-A						
	R		0	1560		4	POS. TO SPG. 3 OF RLY. A.
	PC. NO.911 D/A 59AB 121		0241				
	Wdg. 213 800 R		NO	2770			
	Wdg. 144 1500 R			0152			
	GT - 90141-121						
	COIL D-284775-A						
	X1-X4		0	500		3	INS. SPGS. 13 & 14 OF RLY. B(1). POS. TO COIL TERM. #1.
	PC. NO.912 LFF 23AG 175		020				
	Wdg. 213 50 A		NO	1120			
	Wdg. 144 2000 R			016			
	GT - 90139-175						
	COIL D-284773-A						
	OD FIG. 2		0	3660		2	GRD. TO COIL TERM. #2. NEG. TO COIL TERM. #3.
	PC. NO.911 AAA 24BA 111		012				
	Wdg. 213 500 R		NO	6650			
	Wdg. 144 500 R			007			
	GT - 90138-111						
	COIL D-284774-A						
	TK FIG. 3		0	2070		4	POS. TO SPG. 13 OF RLY. X(1).
	PC. NO.912 DDA 24AA 112		0186				
	Wdg. 213 900 R		NO	3250			
	Wdg. 144 2000 R			0129			
	GT - 90061-112						
	COIL D-284740-A						
	XC1 FIG. 4		0	510		2	INS. SPGS. 14 & 15 OF RLY. C1. GRD. TO SPG. 3 OF RLY. XC1. NEG. TO COIL TERM. #3.
	PC. NO.911 KUA 23AG 197		090				
	Wdg. 213 50 R		NO	620			
	Wdg. 144 2000 R			075			
	GT - 90148-197						
	COIL D-284773-A						
	CF FIG. 5		0	1870		4	POS. TO SPG. 6 OF RLY. XC2.
	PC. NO.912 DGA 24AA 113		0200				
	Wdg. 213 900 R		NO	3250			
	Wdg. 144 2000 R			0129			
	GT - 90149-113						
	COIL D-284740-A						
	TX FIG. 6		0	1170		2	POS. TO COIL TERM. #2.
	PC. NO.911 KLF 53AG 151		030				
	Wdg. 213 500 R		NO	2000			
	Wdg. 144 2100 R			020			
	GT - 90150-151						
	COIL D-284785-A						
	D FIG. 7		0	2270		2	POS. TO SPG. 2 OF RLY. CF.
	PC. NO.911 CLA 48AC 113		016				
	Wdg. 213 1300 R		NO	4260			
	Wdg. 144 1800 R			709			
	GT - 90151-113						
	COIL D-284749-A						
DR.							
CH.	DATE 10-6-70						
ED. NMCD	APPR. BEL						
AUTOMATIC ELECTRIC CO.		DET. H-850301-B		SEE SH. 3		ADJ. SH. 2	
NORTH LAKE, ILL. 60151		AH-850301-B		ISSUE #1-#2			

AH-850301-B		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	E	FIG. 4	0	5000		2	REMOVE LEADS FROM COIL TERM. #2 POS. TO COIL TERM. #2.
10-6-70(1	PC. NO.916 KUA 24BC 137		005				
2)5-3-71(2	Wdg. 213 5000 R		NO	11700			
	Wdg. 144 1000 R			003			
	GT - 90152-137						
	COIL D-284784-A						
	C1		0	2870		1	CONNECT RESISTANCE ACROSS SPGS. 1 & 3 OF RLY. TX. GRD. TO SPG. 5 OF RLY. E.
	PC. NO.911 DNA 33AA 118		015				
	Wdg. 213 230 R		NO	4100			
	Wdg. 144 230 R			011			
	GT - 90153-118						
	COIL D-284724-A						
	XC2-XC4		0	2160		2	INS. SPGS. 15 & 16 OF RLY. UNDER TEST. POS. TO COIL TERM. #2 OF RLY. UNDER TEST.
	PC. NO.911 FGA 23AM 111		012				
	Wdg. 213 2000 R		NO	5150			
	Wdg. 144 2800 R			007			
	GT - 90154-111						
	COIL D-284713-A						
	C2-C4		0	2480		1	CONNECT RESISTANCE ACROSS COIL TERMINALS #1 & #3 OF RLY. UNDER TEST.
	PC. NO.911 GFA 33AA 176		017				
	Wdg. 213 230 R		NO	3700			
	Wdg. 144 230 R			012			
	GT - 90155-176						
	COIL D-284724-A						
	XC5-XC8		0	2160		2	INS. SPGS. 15 & 16 OF RLY. UNDER TEST. POS. TO COIL TERM. #2 OF RLY. UNDER TEST.
	PC. NO.911 FGA 23AM 111		012				
	Wdg. 213 2000 R		NO	5150			
	Wdg. 144 2800 R			007			
	GT - 90154-111						
	COIL D-284713-A						
	C5-C8		0	2480		1	CONNECT RESISTANCE ACROSS COIL TERMINALS #1 & #3 OF RLY. UNDER TEST.
	PC. NO.911 GFA 33AA 176		017				
	Wdg. 213 230 R		NO	3700			
	Wdg. 144 230 R			012			
	GT - 90155-176						
	COIL D-284724-A						
	CT1 & CT2 FIG. 5		0	1330	1200	2	INS. SPGS. 13 & 14 OF RLY. UNDER TEST. NEG. TO COIL TERM. #3 OF RLY. UNDER TEST.
	PC. NO.911 FGA 33AA 238		032	035			
	Wdg. 213 230 R		NO	2270	2550		
	Wdg. 144 230 R			020	018		
	GT - 90156-238						
	COIL D-284724-A						
	CW		0	4260	4150	2	DISCHARGE CAP. C12. INS. SPGS. 12 & 13 OF RLY. CW. POS. TO SPG. 19 OF RLY. CFR.
	PC. NO.911 ACA 24BD 277		009	0092			
	Wdg. 213 1300 R		NO	4580	4720		
	Wdg. 144 250 R			0085	0083		
	GT - 90157-277						
	COIL D-284746-A						
	CSR		0	2070		4	INS. SPGS. 2 & 3 AND 13 & 14 OF RLY. CFR. POS. TO SPG. 16 OF RLY. CBI.
	PC. NO.911 FFE 24AA 112		0186				
	Wdg. 213 900 R		NO	3252			
	Wdg. 144 2000 R			0129			
	GT - 90158-112						
	COIL D-284740-A						
DR.							
CH.	DATE 10-6-70						
ED. NMCD	APPR. BEL						
AUTOMATIC ELECTRIC CO.		DET. AH-850301-B		SEE SH. 4		ADJ. SH. 3	
NORTH LAKE, ILLINOIS		AH-850301-B		ISSUE #1-#2			

AH-850301-B		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHARGES	CFR	FIG. 5	0	11570		4	POS. TO SPG. 1 OF RLY. CT2.
1)10-6-70(1	PC. #0931 RCD 24AA 121		0	1228			
2)5-3-71(2	Wdg. 213 900 R		NO	1280			
	Wdg. 114 2000 R			0143			
	GT - 90159-121						
	COIL D-284740-A						
	CF3		0	11730		4	POS. TO SPG. 15 OF RLY. CA3.
	PC. #0921 APA 24AA 119		0	1211			
	Wdg. 213 900 R		NO	12300			
	Wdg. 114 2000 R			0171			
	GT - 90160-119						
	COIL D-284740-A						
	CA1-CA3		0	12160		2	INS. SPGS. 11 & 12 OF RLY. UNDER TEST.
	PC. #0911 UMA 23AM 111		0	1212			
	Wdg. 213 2000 R		NO	15150			
	Wdg. 114 2800 R			007			
	GT - 90161-111						
	COIL D-284711-A						
	CB1-CB3		0	11160		2	INS. SPGS. 15 & 16 OF RLY. UNDER TEST.
	PC. #0911 VGB 33AA 168		0	1236			
	Wdg. 213 230 R		NO	12900			
	Wdg. 114 230 R			016			
	GT - 90162-168						
	COIL D-284724-A						
	A1-A4, B1-B3 FIG. 6		0	660		2	TEST IN SERIES WITH 1500 R. INS. SPGS. 1 & 2 OF RLY. TKA.
	PC. #0913 MCA 23AM 111		0	1212			
	Wdg. 213 2000 R		NO	13650			
	Wdg. 114 2500 R			037			
	GT - 90163-111						
	COIL D-284713-A						
	TKA & TKB		0	1060		2	TKA: POS. TO SPG. 5 OF RLY. #4.
	PC. #0932 BAR 23AB 147		0	1026			
	Wdg. 213 860 R		NO	1640			
	Wdg. 114 860 R			020			
	GT - 90164-147						
	COIL D-284732-A						
	C1	FIG. 8	0	12870		1	CONNECT RESISTANCE ACROSS COIL TERM 1 & 3. GRD. TO SPG. 2 OF RLY. E1.
	PC. #0911 DNA 33AA 118		0	1015			
	Wdg. 213 230 R		NO	14100			
	Wdg. 114 230 R			011			
	GT - 90153-118						
	COIL D-284724-A						
	C2		0	12170		1	CONNECT RESISTANCE ACROSS SPGS. 3 & 6 OF RLY. TX2.
	PC. #0911 DPA 33AA 131		0	1019			
	Wdg. 213 230 R		NO	13110			
	Wdg. 114 230 R			014			
	GT - 90678-131						
	COIL D-284724-A						
	C3-C5		0	12170		1	CONNECT RESISTANCE ACROSS SPGS. 3 & 5 OF RLY. UNDER TEST.
	PC. #0911 GRL 33AA 131		0	1019			
	Wdg. 213 230 R		NO	13110			
	Wdg. 114 230 R			014			
	GT - 90679-131						
	COIL D-284724-A						
DR.	DATE 10-6-70	CMT. AH-850301-B					
ENMCD.	APPR. BEL	SEE SH. 5 ADJ. SH. 4					
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS		ISSUE #1-#2					
		AH-850301-B					

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AH-850301-B		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHARGES	CF	FIG. 8	0	12220		4	POS. TO SPG. 3 OF RLY. XC5.
2)5-3-71(2	PC. #0932 AAA 24AA 134		0	1271			
	Wdg. 213 900 R		NO	1890			
	Wdg. 114 2000 R			0199			
	GT - 90680-134						
	COIL D-284740-A						
	XC1		0	500		3	INS. SPGS. 14 & 15 OF RLY. D1. POS. TO SPG. 14 OF RLY. D1.
	PC. #0911 KUA 23AG 175		0	1020			
	Wdg. 213 50 R		NO	1120			
	Wdg. 114 2000 R			016			
	GT - 90148-175						
	COIL D-284773-A						
	XC2		0	500		3	INS. SPGS. 4 & 5 OF RLY. D2. POS. TO SPG. 4 OF RLY. D2.
	PC. #0911 KKA 23AG 175		0	1020			
	Wdg. 213 50 R		NO	1120			
	Wdg. 114 2000 R			016			
	GT - 90681-175						
	COIL D-284773-A						
	XC3-XC5		0	2160		2	INS. SPGS. 14 & 15 OF ASSOC. RLY. UNDER TEST (C3-C5). POS. TO SPG. 14 OF ASSOC. RLY. UNDER TEST (C3-C5).
	PC. #0911 EVA 23AM 111		0	1012			
	Wdg. 213 2000 R		NO	13110			
	Wdg. 114 2800 R			007			
	GT - 90682-111						
	COIL D-284713-A						
	D1		0	1820	1730	2	POS. TO SPG. 8 OF RLY. CF.
	PC. #0911 MNA 48AC 265		0	1016	10165		
	Wdg. 213 1300 R		NO	2270	2400		
	Wdg. 114 1800 R			014	0135		
	GT - 90683-265						
	COIL D-284749-A						
	D2		0	1820	1730	2	POS. TO SPG. 18 OF RLY. CF.
	PC. #0911 NAA 48AC 265		0	1016	10165		
	Wdg. 213 1300 R		NO	2270	2400		
	Wdg. 114 1800 R			014	0135		
	GT - 90684-265						
	COIL D-284749-A						
	F1		0	15000		2	REMOVE LEADS FROM COIL TERM. #2. POS. TO COIL TERM. #2.
	PC. #0917 KUB 24BC 137		0	1005			
	Wdg. 213 5000 R		NO	11700			
	Wdg. 114 1000 R			003			
	GT - 90685-137						
	COIL D-284784-A						
	SS		0	16000	5100	2	INS. SPGS. 11 & 12 OF RLY. XC2. POS. TO SPG. 2 OF RLY. SS.
	PC. #0911 DLA 21AE 188		0	1005	10055		
	Wdg. 213 4000 R		NO	7100	8500		
	Wdg. 114 4000 R			045	004		
	GT - 90686-288						
	COIL D-284860-A						
	TX1		0	1230	1120	3	POS. TO SPG. 2 OF RLY. D1.
	PC. #0911 KLF 53AG 290		0	1015	0163		
	Wdg. 213 500 R		NO	2450	2900		
	Wdg. 114 2100 R			011	010		
	GT - 90150-290						
	COIL D-284785-A						
DR.	DATE 5-3-71	CMT. H-850301-B					
ENMCD.	APPR. HRA	SEE SH. 6 ADJ. SH. 5					
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILLINOIS		ISSUE #2					
		AH-850301-B					

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AH-850301-B		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	A	FIG. 1	0	2850		2	GRD. TO COIL TERM. #2. NEG. TO COIL TERM. #3.
1) 10-6-70(1)	PC. NO. 911 FMA 24BA 119			015			
2) 5-3-71(2)	Wdg. 213 500 Ω		NO	3650			
	Wdg. 144 500 Ω			012			
	GT - 90147-119						
	COIL D-284774-A						
	B		0	1560		4	POS. TO SPG. 3 OF RLY. A.
	PC. NO. 911 DTA 59AB 121			0241			
	Wdg. 243 800 Ω		NO	1270			
	Wdg. 144 1500 Ω			0152			
	GT - 90141-121						
	COIL D-284775-A						
	Xi-X4		0	500		3	INS. SPGS. 13 & 14 OF RLY. B(1). POS. TO COIL TERM. #1.
	PC. NO. 912 LFF 23AG 175			020			
	Wdg. 243 50 Ω		NO	1120			
	Wdg. 144 2000 Ω			016			
	GT - 90139-175						
	COIL D-284773-A						
	OD FIG. 2		0	3660		2	GRD. TO COIL TERM. #2. NEG. TO COIL TERM. #3.
	PC. NO. 911 AAA 24BA 111			012			
	Wdg. 243 500 Ω		NO	6650			
	Wdg. 144 500 Ω			007			
	GT - 90138-111						
	COIL D-284774-A						
	TK FIG. 3		0	2070		4	POS. TO SPG. 13 OF RLY. X(1).
	PC. NO. 912 DDA 24AA 112			0186			
	Wdg. 243 900 Ω		NO	3250			
	Wdg. 144 2000 Ω			0129			
	GT - 90061-112						
	COIL D-284740-A						
	XC1 FIG. 4		0	510		2	INS. SPGS. 14 & 15 OF RLY. C1. GRD. TO SPG. 3 OF RLY. XC1. NEG. TO COIL TERM. #3.
	PC. NO. 911 KUA 23AG 197			090			
	Wdg. 243 50 Ω		NO	620			
	Wdg. 144 2000 Ω			075			
	GT - 90148-197						
	COIL D-284773-A						
	CF FIG. 5		0	1870		4	POS. TO SPG. 6 OF RLY. XC2.
	PC. NO. 912 DGA 24AA 113			0200			
	Wdg. 243 900 Ω		NO	3250			
	Wdg. 144 2000 Ω			0129			
	GT - 90149-113						
	COIL D-284740-A						
	TX FIG. 6		0	1170		2	POS. TO COIL TERM. #2.
	PC. NO. 911 KLF 53AG 151			030			
	Wdg. 243 500 Ω		NO	2000			
	Wdg. 144 2100 Ω			020			
	GT - 90150-151						
	COIL D-284785-A						
	D FIG. 7		0	2270		2	POS. TO SPG. 2 OF RLY. CF.
	PC. NO. 911 CLA 48AC 113			014			
	Wdg. 243 1300 Ω		NO	4260			
	Wdg. 144 1800 Ω			009			
	GT - 90151-113						
	COIL D-284749-A						
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILL. 60161							
DR.	DATE 10-6-70	CET. H-850301-B		AH-850301-B			
EN. NMCD. APPR. BEL		SEE SH. 3	ADJ. SH. 2				
		ISSUE #1-#2					

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AH-850301-B		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	E	FIG. 4	0	5000		2	REMOVE LEADS FROM COIL TERM. #2. POS. TO COIL TERM. #2.
1) 10-6-70(1)	PC. NO. 916 KUA 24BC 137			005			
2) 5-3-71(2)	Wdg. 213 5000 Ω		NO	11700			
	Wdg. 144 1000 Ω			003			
	GT - 90152-137						
	COIL D-284784-A						
	C1		0	2870		1	CONNECT RESISTANCE ACROSS SPGS. 1 & 3 OF RLY. TX. GRD. TO SPG. 5 OF RLY. E.
	PC. NO. 911 DNA 33AA 118			015			
	Wdg. 243 230 Ω		NO	4100			
	Wdg. 144 230 Ω			011			
	GT - 90153-118						
	COIL D-284724-A						
	XC2-XC4		0	2160		2	INS. SPGS. 15 & 16 OF RLY. UNDER TEST. POS. TO COIL TERM. #2 OF RLY. UNDER TEST.
	PC. NO. 911 FGA 23AM 111			012			
	Wdg. 243 2000 Ω		NO	5150			
	Wdg. 144 2800 Ω			007			
	GT - 90154-111						
	COIL D-284713-A						
	C2-C4		0	2480		1	CONNECT RESISTANCE ACROSS COIL TERMINALS #1 & #3 OF RLY. UNDER TEST.
	PC. NO. 911 GPA 33AA 176			017			
	Wdg. 243 230 Ω		NO	3700			
	Wdg. 144 230 Ω			012			
	GT - 90155-176						
	COIL D-284724-A						
	XC5-XC8		0	2160		2	INS. SPGS. 15 & 16 OF RLY. UNDER TEST. POS. TO COIL TERM. #2 OF RLY. UNDER TEST.
	PC. NO. 911 FGA 23AM 111			012			
	Wdg. 243 2000 Ω		NO	5150			
	Wdg. 144 2800 Ω			007			
	GT - 90154-111						
	COIL D-284713-A						
	C5-C8		0	2480		1	CONNECT RESISTANCE ACROSS COIL TERMINALS #1 & #3 OF RLY. UNDER TEST.
	PC. NO. 911 GPA 33AA 176			017			
	Wdg. 243 230 Ω		NO	3700			
	Wdg. 144 230 Ω			012			
	GT - 90155-176						
	COIL D-284724-A						
	CT1 & CT2		0	1330	1200	2	INS. SPGS. 13 & 14 OF RLY. UNDER TEST. NEG. TO COIL TERM. #3 OF RLY. UNDER TEST.
	PC. NO. 911 FGA 33AA 238			032	035		
	Wdg. 243 230 Ω		NO	2270	2550		
	Wdg. 144 230 Ω			020	018		
	GT - 90156-238						
	COIL D-284724-A						
	CW		0	4260	4150	2	DISCHARGE CAP. C12. INS. SPGS. 12 & 13 OF RLY. CW. POS. TO SPG. 19 OF RLY. CFR.
	PC. NO. 911 ACA 24BD 277			009	0092		
	Wdg. 243 1300 Ω		NO	4580	4720		
	Wdg. 144 250 Ω			0085	0083		
	GT - 90157-277						
	COIL D-284746-A						
	CSB		0	2070		4	INS. SPGS. 2 & 3 AND 13 & 14 OF RLY. CFR. POS. TO SPG. 16 OF RLY. CB1.
	PC. NO. 911 FFE 24AA 112			0186			
	Wdg. 243 900 Ω		NO	3257			
	Wdg. 144 2000 Ω			0123			
	GT - 90158-112						
	COIL D-284740-A						
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILL. 60161							
DR.	DATE 10-6-70	CET. AH-850301-B		AH-850301-B			
EN. NMCD. APPR. BEL		SEE SH. 4	ADJ. SH. 3				
		ISSUE #1-#2					

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AH-850301-B		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	CFR	FIG. 5	0	1570		4	POS. TO SPG. 1 OF RLY. CT2.
1) 10-6-70(1)	PC. #0931 RCD 24AA 121		0228				
2) 5-3-71(2)	Wdg. 253 900 R		NO 2880				
	Wdg. 144 2000 R		0143				
	GT - 90159-121						
	COIL D-284740-A						
	CFS		0	1730		4	POS. TO SPG. 15 OF RLY. CA3.
	PC. #0921 APA 24AA 119		0213				
	Wdg. 253 900 R		NO 2300				
	Wdg. 144 2000 R		0171				
	GT - 90160-119						
	COIL D-284750-A						
	CA1-CA3		0	160		2	INS. SPGS. 11 & 12 OF RLY. UNDER TEST.
	PC. #0911 EKA 23AG 175		012				POS. TO SPG. 5 OF RLY. UNDER TEST.
	Wdg. 253 2000 R		NO 5150				
	Wdg. 144 2800 R		007				
	GT - 90161-111						
	COIL D-284713-A						
	CB1-CB3		0	1160		2	INS. SPGS. 15 & 16 OF RLY. UNDER TEST.
	PC. #0911 VGB 33AA 168		036				NEG. TO COIL TERM. #3 OF RLY. UNDER TEST.
	Wdg. 253 230 R		NO 2900				
	Wdg. 144 230 R		016				
	GT - 90162-168						
	COIL D-284724-A						
	AI-A4, B1-B3 FIG. 6		0	660		2	TEST IN SERIES WITH 1500 R. INS. SPGS. 1 & 2 OF RLY. TKA. POS. TO COIL TERM. #2 OF RLY. UNDER TEST.
	PC. #0913 MCA 23AM 111		012				
	Wdg. 253 2000 R		NO 3650				
	Wdg. 144 2800 R		007				
	GT - 90163-111						
	COIL D-284713-A						
	TKA & TKB		0	1060		2	TKA: POS. TO SPG. 5 OF RLY. #4. TKB: POS. TO COIL TERM. #2.
	PC. #0932 BAR 23AB 147		026				
	Wdg. 253 860 R		NO 1640				
	Wdg. 144 860 R		020				
	GT - 90164-147						
	COIL D-284732-A						
	C1 FIG. 8		0	2870		1	CONNECT RESISTANCE ACROSS COIL TERM. 1 & 3. GRD. TO SPG. 2 OF RLY. E1.
	PC. #0911 DNA 33AA 118		015				
	Wdg. 253 230 R		NO 4100				
	Wdg. 144 230 R		011				
	GT - 90153-118						
	COIL D-284724-A						
	C2		0	2170		1	CONNECT RESISTANCE ACROSS SPGS. 3 & 6 OF RLY. TX2.
	PC. #0911 DPA 33AA 131		019				
	Wdg. 253 230 R		NO 3110				
	Wdg. 144 230 R		014				
	GT - 90678-131						
	COIL D-284724-A						
	C3-C5		0	2170		1	CONNECT RESISTANCE ACROSS SPGS. 3 & 5 OF RLY. UNDER TEST.
	PC. #0911 CKL 33AA 131		019				
	Wdg. 253 230 R		NO 3110				
	Wdg. 144 230 R		014				
	GT - 90679-131						
	COIL D-284724-A						
DR.	DATE 10-6-70	CT. AH-850301-B					
CR.	DATE 5-3-71	SEE SH. 5 ADJ. SH. 4					
ENRMC, APPR. REL.	DATE 5-3-71	ISSUE #1-#2					
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILL. 60062			AH-850301-B				

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AH-850301-B		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES	CF	FIG. 8	0	1220		4	POS. TO SPG. 3 OF RLY. XC5.
2) 5-3-71(2)	PC. #0932 AAA 24AA 134		0271				
	Wdg. 253 900 R		NO 1890				
	Wdg. 144 2000 R		0199				
	GT - 90680-134						
	COIL D-284740-A						
	XC1		0	500		1	INS. SPGS. 14 & 15 OF RLY. D1. POS. TO SPG. 14 OF RLY. D1.
	PC. #0911 KUA 23AG 175		020				
	Wdg. 253 50 R		NO 1120				
	Wdg. 144 2000 R		016				
	GT - 90148-175						
	COIL D-284773-A						
	XC2		0	500		3	INS. SPGS. 4 & 5 OF RLY. D2. POS. TO SPG. 4 OF RLY. D2.
	PC. #0911 KKA 23AG 175		020				
	Wdg. 253 50 R		NO 1120				
	Wdg. 144 2000 R		016				
	GT - 90681-175						
	COIL D-284773-A						
	XC3-XC5		0	2160		2	INS. SPGS. 14 & 15 OF ASSOC. RLY. UNDER TEST (C3-C5). POS. TO SPG. 14 OF ASSOC. RLY. UNDER TEST (C3-C5).
	PC. #0911 FUA 23AM 111		012				
	Wdg. 253 2000 R		NO 3110				
	Wdg. 144 2800 R		007				
	GT - 90682-111						
	COIL D-284713-A						
	D1		0	1820	1730	2	POS. TO SPG. 8 OF RLY. CF.
	PC. #0911 MNA 48AC 265		016	0165			
	Wdg. 253 1300 R		NO 2270	2400			
	Wdg. 144 1800 R		014	0135			
	GT - 90683-265						
	COIL D-284749-A						
	D2		0	1820	1730	2	POS. TO SPG. 18 OF RLY. CF.
	PC. #0911 NAA 48AC 265		016	0165			
	Wdg. 253 1300 R		NO 2270	2400			
	Wdg. 144 1800 R		014	0135			
	GT - 90684-265						
	COIL D-284749-A						
	E1		0	5000		2	REMOVE LEADS FROM COIL TERM. #2. POS. TO COIL TERM. #2.
	PC. #0917 KUB 24BC 137		005				
	Wdg. 253 5000 R		NO 11700				
	Wdg. 144 1000 R		003				
	GT - 90685-137						
	COIL D-284784-A						
	SS		0	6000	5100	2	INS. SPGS. 11 & 12 OF RLY. XC2. POS. TO SPG. 2 OF RLY. SS.
	PC. #0911 DLA 21AE 288		005	0055			
	Wdg. 253 4000 R		NO 7100	8500			
	Wdg. 144 4000 R		045	004			
	GT - 90686-288						
	COIL D-284860-A						
	TX1		0	1230	1120	3	POS. TO SPG. 2 OF RLY. D1.
	PC. #0911 KLF 53AG 290		015	0165			
	Wdg. 253 500 R		NO 2450	2900			
	Wdg. 144 2100 R		011	010			
	GT - 90150-290						
	COIL D-284785-A						
DR.	DATE 5-3-71	CT. H-850301-B					
CR.	DATE 5-3-71	SEE SH. 6 ADJ. SH. 5					
ENR, APPR. HNA	DATE 5-3-71	ISSUE #2					
AUTOMATIC ELECTRIC CO. NORTHLAKE, ILL. 60062			AH-850301-B				

PS-1010 (10/67)

AH-850301-B		RELAY	TEST	ADJ.	INSP.	NOTE	TESTING INSTRUCTION
CHANGES 2) 5-3-71 (2)	TX2	FIG. 8	0	1230	1120	3	POS. TO SPG. 12 OF RLY. D2.
	PC. #0911 FMF 53AG 290			015	0165		
	Wdg. 253 500 R		NO	2450	2900		
	Wdg. 124 2100 R			011	010		
	GT -90687-290						
	COIL D-284785-A						
	C1-C3	FIG. 9	0	2170		1	CONNECT RESISTANCE ACROSS COIL TERMS. 1 & 3 OF RLY. UNDER TEST.
	PC. #0911 CKL 33AA 131			019			
	Wdg. 253 230 R		NO	3110			
	Wdg. 124 230 R			214			
GT -90679-131							
COIL D-284724-A							
XC1-XC3		0	2160		2	INS. ASSOC. SPGS. 14 & 15 OF RLY. C1-C3. POS. TO COIL TERM. #2 OF RLY. UNDER TEST.	
PC. #0911 FVA 23AM 111			012				
Wdg. 253 2000 R		NO	5150				
Wdg. 124 2800 R			007				
GT -90682-111							
COIL D-284713-A							
C4-C7	FIG. 10	0	2170		1	CONNECT RESISTANCE ACROSS COIL TERMS. 1 & 3 OF RLY. UNDER TEST.	
PC. #0911 CKL 33AA 131			019				
Wdg. 253 230 R		NO	3110				
Wdg. 124 230 R			014				
GT -90679-131							
COIL D-284724-A							
XC4-XC7		0	2160		2	INS. ASSOC. SPGS. 14 & 15 OF RLY. C4-C7. POS. TO COIL TERM. #2 OF RLY. UNDER TEST.	
PC. #0911 FVA 23AM 111			012				
Wdg. 253 2000 R		NO	5150				
Wdg. 124 2800 R			007				
GT -90682-111							
COIL D-284713-A							
PC. #0.							
Wdg. 253							
Wdg. 124							
GT							
COIL							
PC. #0.							
Wdg. 253							
Wdg. 124							
GT							
COIL							
PC. #0.							
Wdg. 253							
Wdg. 124							
GT							
COIL							
PC. #0.							
Wdg. 253							
Wdg. 124							
GT							
COIL							
PC. #0.							
Wdg. 253							
Wdg. 124							
GT							
COIL							
REV. DATE. 5-3-71 REV. RW APPR. HHA MYNATIC ELECTRIC CO. NORTLAKE, ILLINOIS							REV. H-850301-B REV. SH. ISSUE #2 ADJ. SH. 6 AH-850301-B



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ISSUE: 3
12.5.72

GTE AUTOMATIC ELECTRIC
GENOA, ILLINOIS

40B-S STOCKBOARDS
STOCKLISTS

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Cross Point Switch - - - - -	DH-851053-A91 DH-851053-A91A
Line Relay - - - - -	DH-850940-A70
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Link Selection Control - - - - -	DH-850260-A41
Link - - - - -	DH-850289-A40
Interrupter, City Trunk, Night Answer and Code Call Controls - - - - -	DH-850332-A41
Power Failure Transfer, Predetermined Night Answer and Turret Register - - - - -	DH-850627-A73
Turret Position Circuit - - - - -	DH-850350-A40
Attendant's Trunk and Conference - - - - -	DH-850301-B42
Audible Signal Unit - - - - -	D-56607-A
40B Bay - - - - -	D-260703 D-260703-A

MEMORANDUM FOR THE DIRECTOR
FROM: SAC, NEW YORK (100-100000)

SUBJECT: [Illegible]

TO: SAC, NEW YORK (100-100000)

On 10/10/64, [Illegible] advised that [Illegible] had been contacted by [Illegible] who stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64.

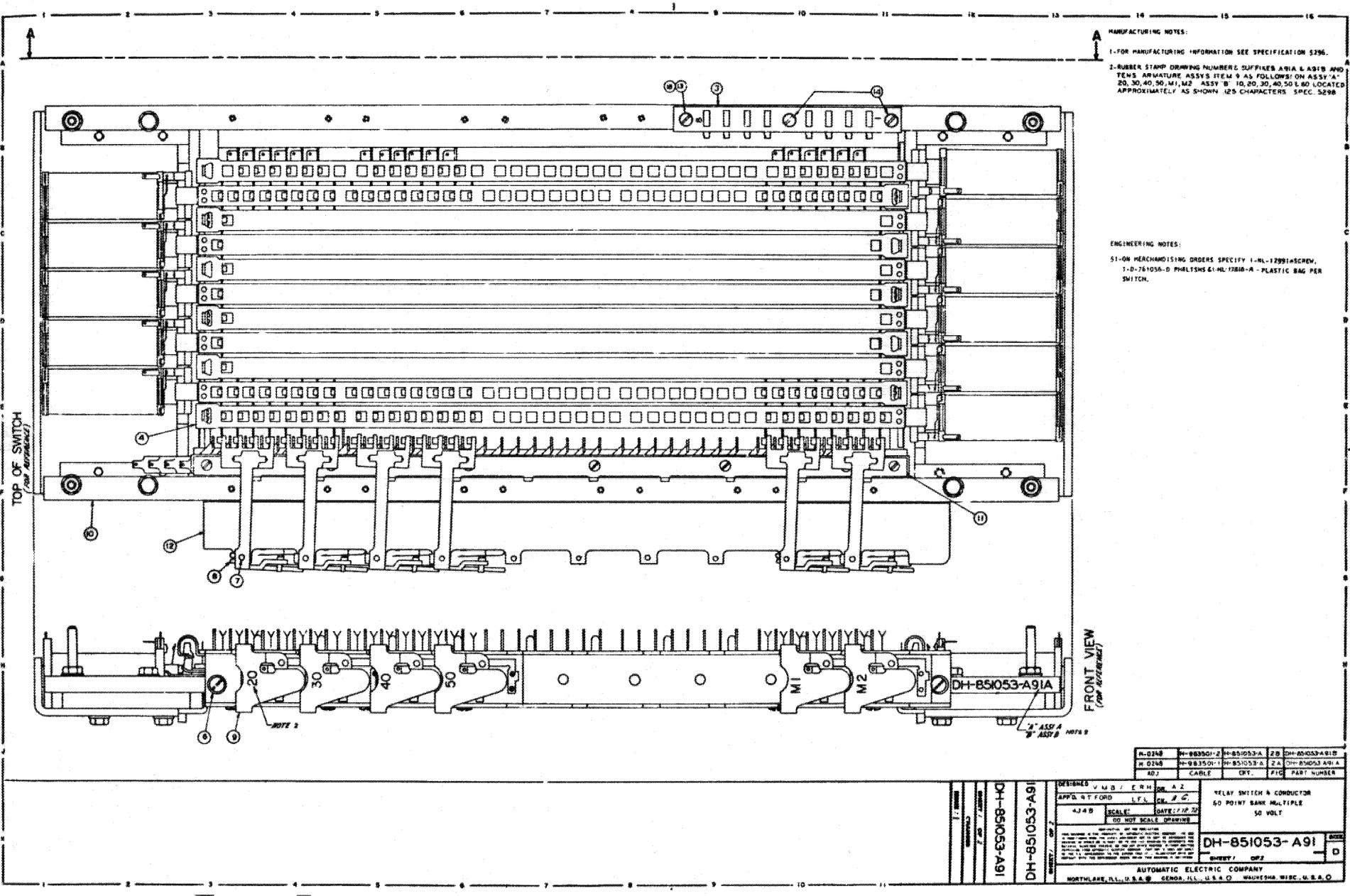
On 10/10/64, [Illegible] advised that [Illegible] had been contacted by [Illegible] who stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64.

On 10/10/64, [Illegible] advised that [Illegible] had been contacted by [Illegible] who stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64.

On 10/10/64, [Illegible] advised that [Illegible] had been contacted by [Illegible] who stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64.

On 10/10/64, [Illegible] advised that [Illegible] had been contacted by [Illegible] who stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64.

On 10/10/64, [Illegible] advised that [Illegible] had been contacted by [Illegible] who stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64. [Illegible] stated that [Illegible] was currently in New York City and was planning to travel to [Illegible] on 10/11/64.



MANUFACTURING NOTES:
 1.-FOR MANUFACTURING INFORMATION SEE SPECIFICATION 5296.
 2.-RUBBER STAMP DRAWING NUMBERS, SUFFIXES A91A & A91B AND TENS. ARMATURE ASSY'S ITEM 9 AS FOLLOWS: ON ASSY 'A' 20, 30, 40, 50, M1, M2 ASSY 'B' 10, 20, 30, 40, 50 & 60 LOCATED APPROXIMATELY AS SHOWN 125 CHARACTERS SPEC. 5298

ENGINEERING NOTES:
 51-ON MERCHANDISING ORDERS SPECIFY 1-ML-12991W SCREW.
 1-D-761055-D PHLETSMS 61-ML-12840-A - PLASTIC BAG PER SWITCH.

H-0248	H-083501-2	H-851053-A	2B	DH-851053-A91B
H-0248	H-083501-1	H-851053-A	2A	DH-851053-A91A
ADJ.	CABLE	CRY.	FIG.	PART NUMBER

DESIGNED	V. M. S. / E. R. H.	BY	A. Z.
APPROVED	R. T. FORD	DATE	11/12/57
SCALE	1" = 1"	DATE	11/12/57
DO NOT SCALE DRAWING			
RELAY SWITCH & CONDUCTOR 50 POINT BANK MULTIPLE 50 VOLT DH-851053-A91			
AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A. & CHICAGO, ILL., U.S.A. & WAUKESHA, WISC., U.S.A. &			

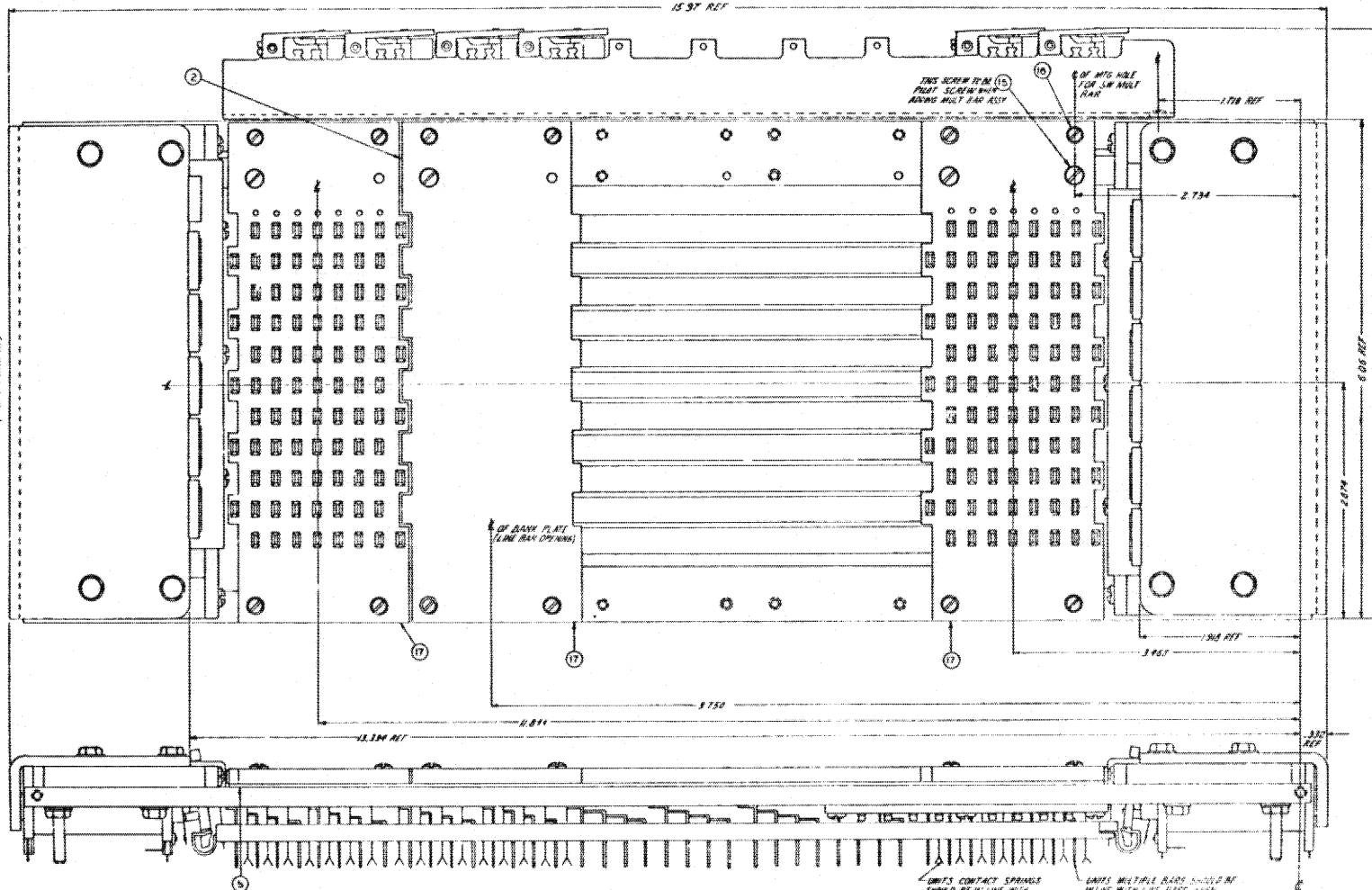
TOLERANCES:
ONE PLACE DECIMAL .1
TWO PLACE DECIMAL .02
THREE PLACE DECIMAL .005
ANGULAR

DH-851053-A91

SHEET 2 OF 2

ISSUE

TOP OF SWITCH
(SEE REVISIONS)



VIEW A-A

DH-851053-A91

SHEET 2 OF 2

AUTOMATIC ELECTRIC COMPANY

NORTH APT. ILL. U.S.A. ® ST. LOUIS, ILL. U.S.A. ® WAUKESHA, WISC. U.S.A. ®

DRAWING STOCK LIST

AMT	U/M	PART NUMBER	ADJ	ITEM	G P	DESCRIPTION
1.00	PC	H 983501	1	1		CABLE
1.00	PC	NL 11378	A	2		FRAME INSULATOR
1.00	PC	D 42828	A	3		8 PT JACK
11.00	PC	NL 19981	A	4		TENS LIFT
1.00	PC	NL 13183	A	5		SPRING RETAINER
2.00	PC	D 761133	C	6		125-40X250 PH STT S'MS
6.00	PC	NL 19650	A	7		UNITS ARMATURE HINGE PIN
6.00	PC	NL 19653	A	8		ARMATURE HINGE PIN STOP
6.00	PC	NL 19964	A	9		UNITS ARMATURE
1.00	PC	H 889115	1	10		TENS MTG & FRAME BAR
1.00	PC	NL 19960	A	11		SWITCH MULTIPLE BAR
1.00	PC	H 889109	1	12		UNITS CHANNEL
1.00	PC	NL 19241	A	13		NUT HEX BR 4-36X1/4
2.00	PC	D 761052	C	14		PHSMS 112-36 X 1/4
4.00	PC	D 762248	D	15		112-36 X 5/16 PSLTHSMS
12.00	PC	D 762248	E	16		112-36 X 3/8 PSLTHSMS
3.00	PC	NL 19949	E	17		BANK PLATE
1.00	PC	D 761052	G	18		PHSMS 112-36 X 1/2

ISSUE <i>01/2</i>	DATE 2-2-72	SHEET TOTAL 1 OF 1	DESCRIPTION RELAY SWITCH	GENOA E-BILL PART NUMBER DH 851053 A91A
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A

AUTOMATIC ELECTRIC COMPANY
NORTHLAKE, ILL., U. S. A.

SECRET - NOFORN - EYES ONLY

MEMORANDUM FOR THE DIRECTOR, CENTRAL INTELLIGENCE AGENCY

FROM: [illegible]

SUBJECT: [illegible]

1. [illegible]

2. [illegible]

3. [illegible]

4. [illegible]

5. [illegible]

6. [illegible]

7. [illegible]

8. [illegible]

9. [illegible]

10. [illegible]

11. [illegible]

12. [illegible]

13. [illegible]

14. [illegible]

15. [illegible]

16. [illegible]

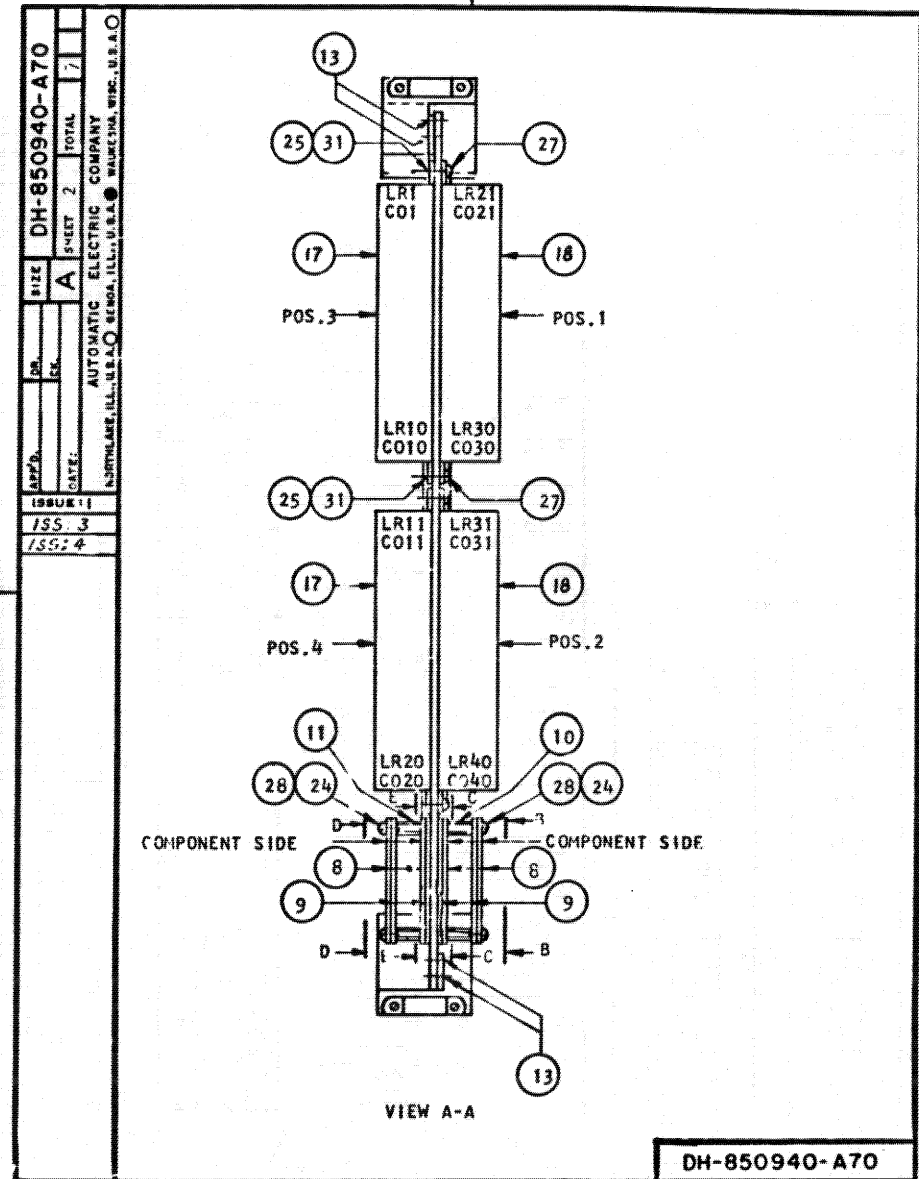
17. [illegible]

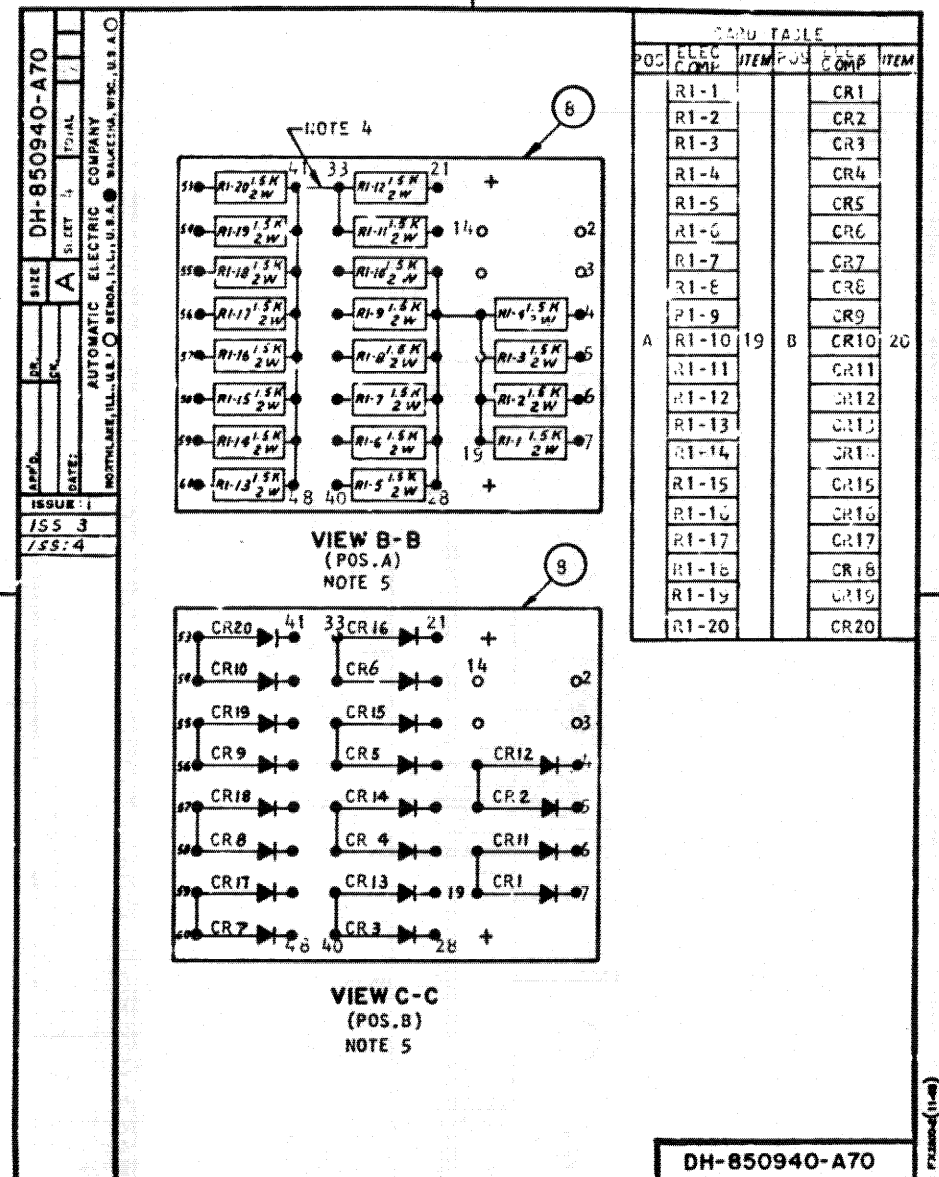
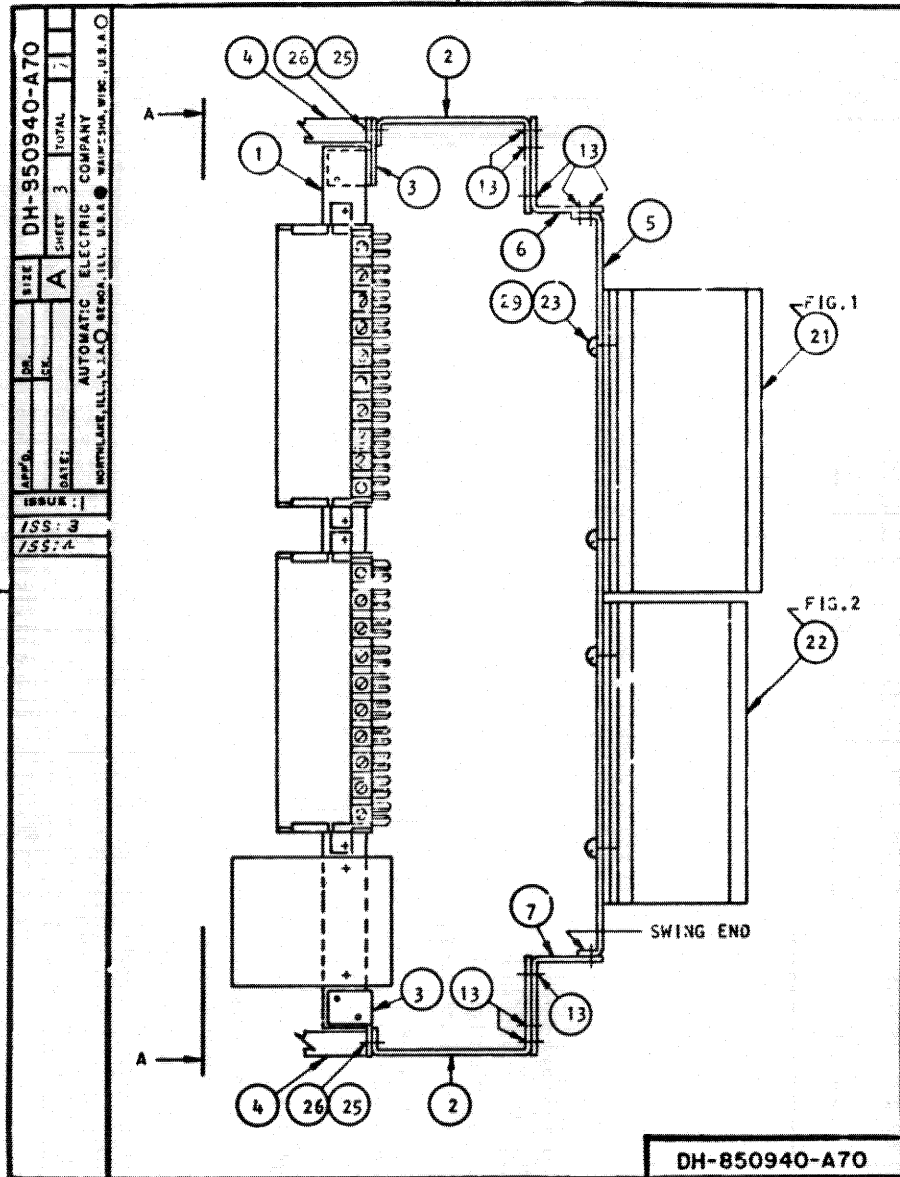
18. [illegible]

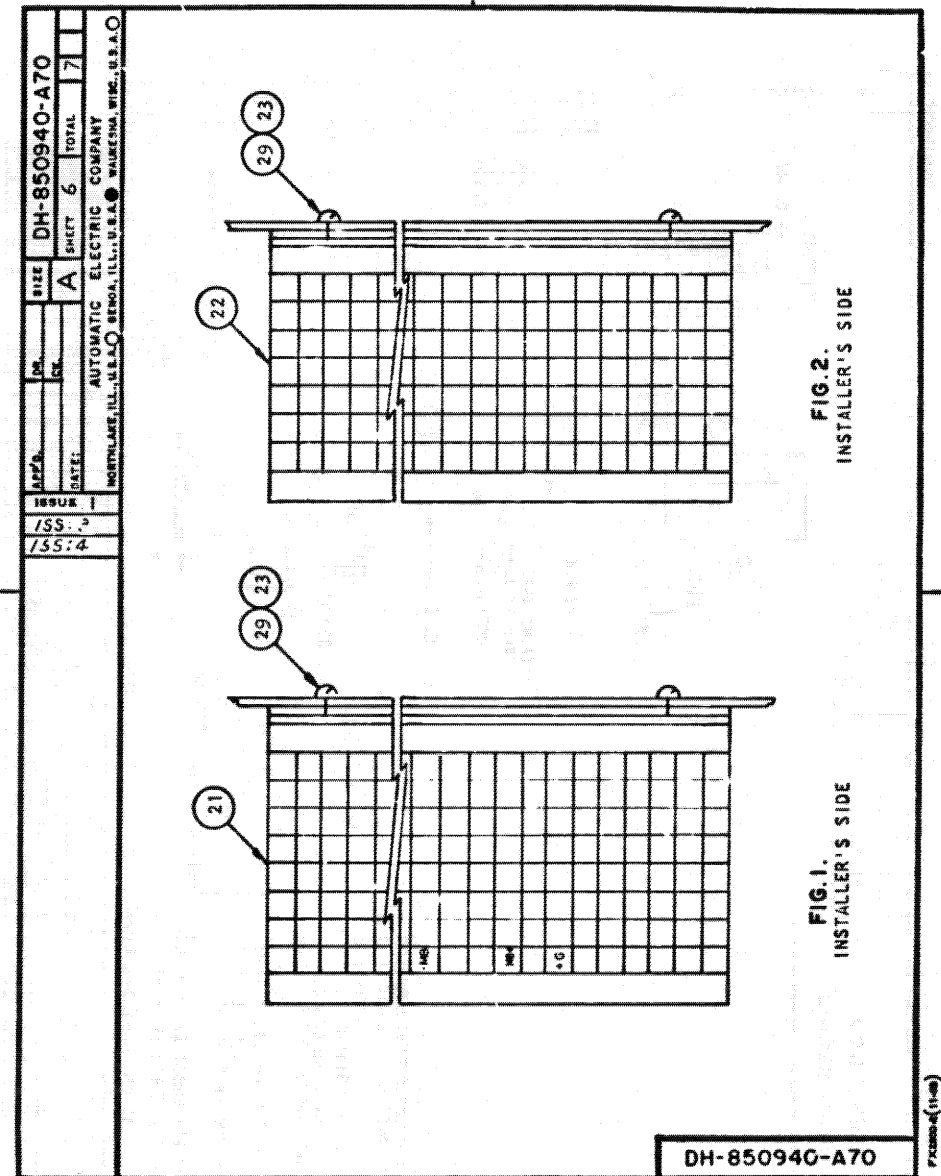
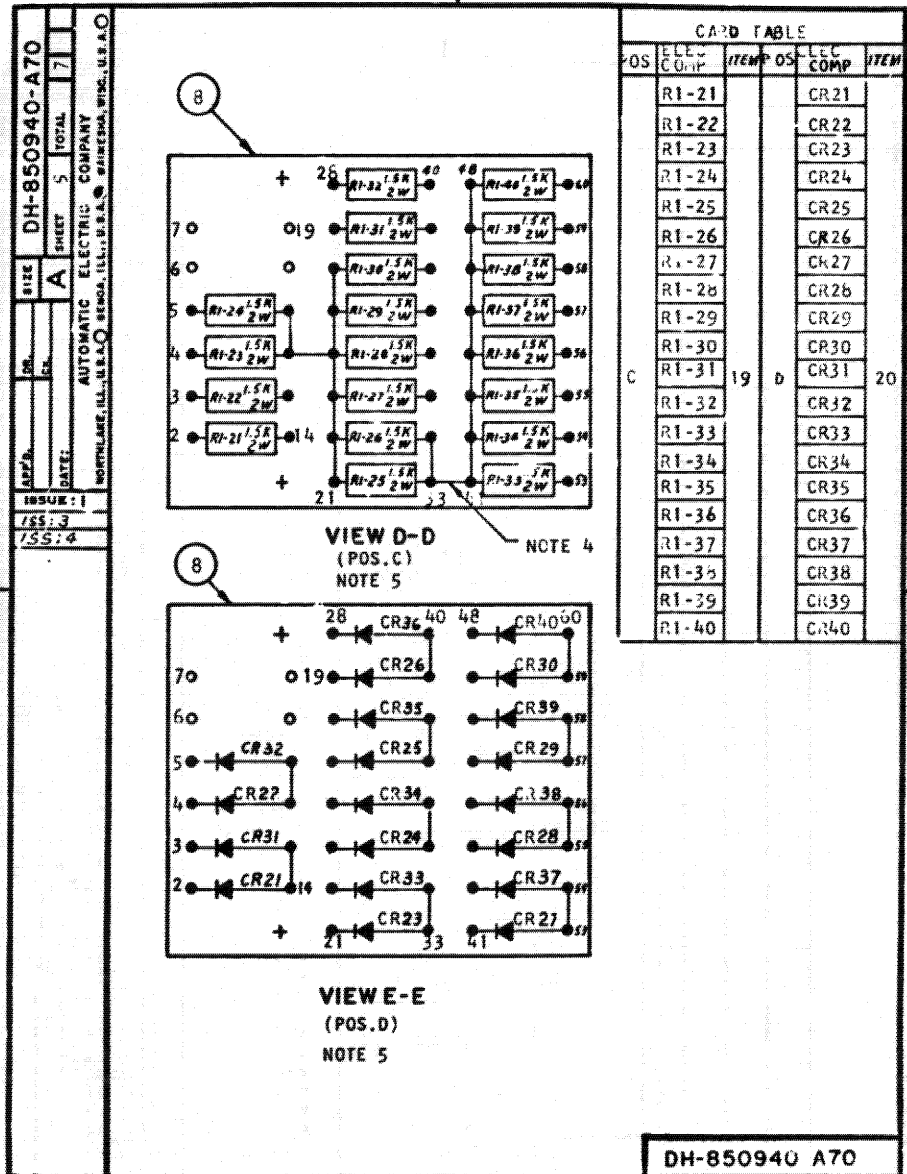
19. [illegible]

20. [illegible]

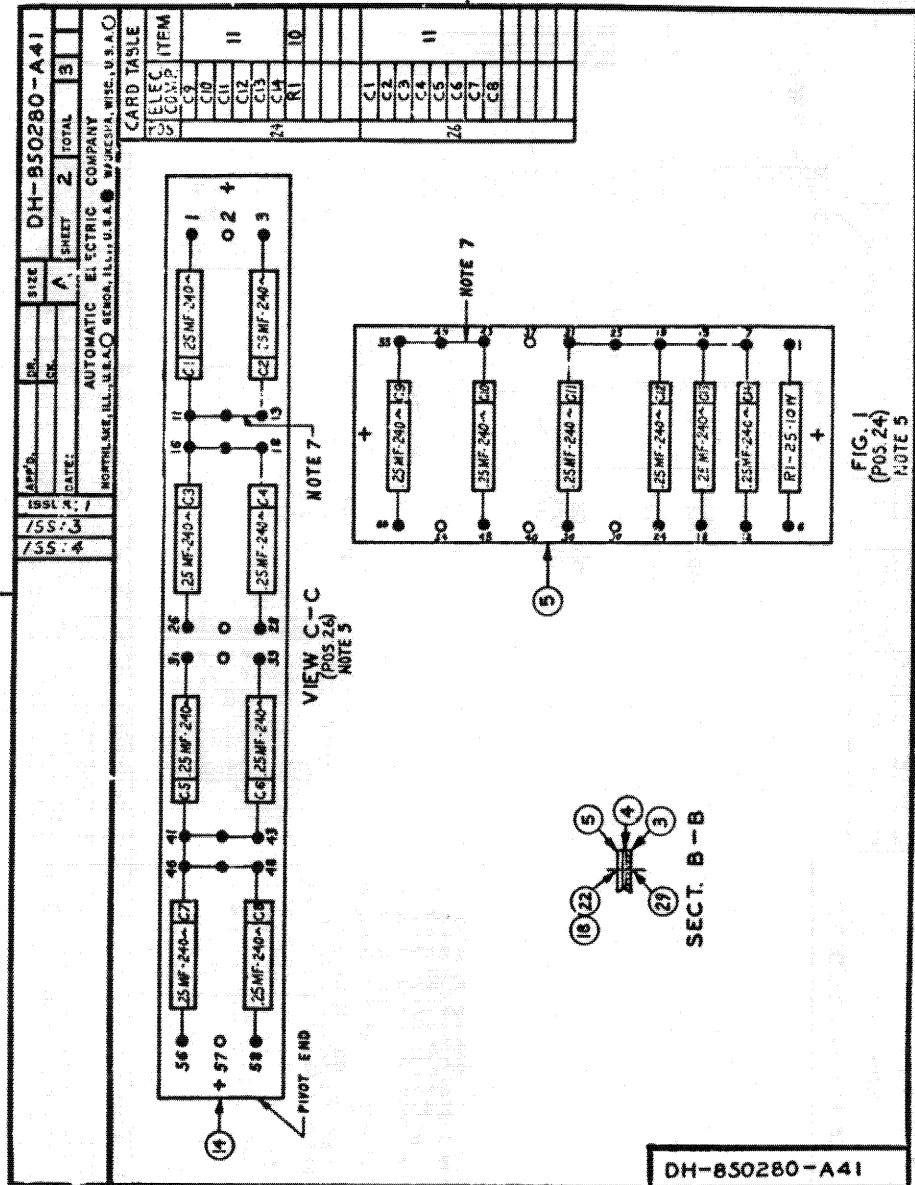
DH-850940-A70		SIZE	A		SHEET	1	TOTAL	7
DATE: 3-26-71		AUTOMATIC ELECTRIC COMPANY NORTH LAKE, ILL., U.S.A. • WAREHOUSING, WISC., U.S.A. •						
MANUFACTURING NOTES:								
1-FOR MFG. INF. SEE SPEC. 5256.								
2-STAMP FUNCTION DESIGNS PER H-43286 FIG. 59.								
3-FOR WRC USE D-543386 PVC WIRE 24 AWG.								
4-●●● DENOTE: W-3014-24 TINNED COPPER WIRE USED FOR STRAPPING.								
5-DO NOT STAMP FUNCTION DESIGNS ON COMPONENTS POS. A, B, C, D								
6-PRIOR TO ISSUE 4 RELAY D-555195-A ITEM 17 WAS NL-18735-A RELAY D-555196-A ITEM 18 WAS NL-18736-A								
LINE EQPT.		40B, 40M & 80M PABX						
DH-850940-A70A		PART NO.						
40		H-850940-A						
H-721505		FIG.						
CMT.		CKT & W.D.						







DII-850540-A70		SIZE	A	SHEET	7	TOTAL	7
DATE		REV.	A	7	7	7	7
ISS: 3		AUTOMATIC ELECTRIC COMPANY					
ISS: 4		NORTH LAKE, ILL., U.S.A. GEN. O. GEN. O. GEN. O. GEN. O. GEN. O. GEN. O.					
STOCKLIST							
AMT	PRG NO	DESCRIPTION				ISSUED	SHORT
ON HAND							
1	RL-1710-A	RLY. BAR				1	
2	RL-1710-A	RLY. BAR				2	
2	RL-1711-A	RLY. BAR				2	
2	RL-1712-A	RLY. BAR				2	
1	RL-1713-A	RLY. BAR				1	
1	RL-1714-A	RLY. BAR				1	
1	RL-1715-A	RLY. BAR				1	
1	RL-1716-A	RLY. BAR				1	
1	RL-1717-A	RLY. BAR				1	
1	RL-1718-A	RLY. BAR				1	
1	RL-1719-A	RLY. BAR				1	
1	RL-1720-A	RLY. BAR				1	
1	RL-1721-A	RLY. BAR				1	
1	RL-1722-A	RLY. BAR				1	
1	RL-1723-A	RLY. BAR				1	
1	RL-1724-A	RLY. BAR				1	
1	RL-1725-A	RLY. BAR				1	
1	RL-1726-A	RLY. BAR				1	
1	RL-1727-A	RLY. BAR				1	
1	RL-1728-A	RLY. BAR				1	
1	RL-1729-A	RLY. BAR				1	
1	RL-1730-A	RLY. BAR				1	
1	RL-1731-A	RLY. BAR				1	
1	RL-1732-A	RLY. BAR				1	
1	RL-1733-A	RLY. BAR				1	
1	RL-1734-A	RLY. BAR				1	
1	RL-1735-A	RLY. BAR				1	
1	RL-1736-A	RLY. BAR				1	
1	RL-1737-A	RLY. BAR				1	
1	RL-1738-A	RLY. BAR				1	
1	RL-1739-A	RLY. BAR				1	
1	RL-1740-A	RLY. BAR				1	
1	RL-1741-A	RLY. BAR				1	
1	RL-1742-A	RLY. BAR				1	
1	RL-1743-A	RLY. BAR				1	
1	RL-1744-A	RLY. BAR				1	
1	RL-1745-A	RLY. BAR				1	
1	RL-1746-A	RLY. BAR				1	
1	RL-1747-A	RLY. BAR				1	
1	RL-1748-A	RLY. BAR				1	
1	RL-1749-A	RLY. BAR				1	
1	RL-1750-A	RLY. BAR				1	
1	RL-1751-A	RLY. BAR				1	
1	RL-1752-A	RLY. BAR				1	
1	RL-1753-A	RLY. BAR				1	
1	RL-1754-A	RLY. BAR				1	
1	RL-1755-A	RLY. BAR				1	
1	RL-1756-A	RLY. BAR				1	
1	RL-1757-A	RLY. BAR				1	
1	RL-1758-A	RLY. BAR				1	
1	RL-1759-A	RLY. BAR				1	
1	RL-1760-A	RLY. BAR				1	
1	RL-1761-A	RLY. BAR				1	
1	RL-1762-A	RLY. BAR				1	
1	RL-1763-A	RLY. BAR				1	
1	RL-1764-A	RLY. BAR				1	
1	RL-1765-A	RLY. BAR				1	
1	RL-1766-A	RLY. BAR				1	
1	RL-1767-A	RLY. BAR				1	
1	RL-1768-A	RLY. BAR				1	
1	RL-1769-A	RLY. BAR				1	
1	RL-1770-A	RLY. BAR				1	
1	RL-1771-A	RLY. BAR				1	
1	RL-1772-A	RLY. BAR				1	
1	RL-1773-A	RLY. BAR				1	
1	RL-1774-A	RLY. BAR				1	
1	RL-1775-A	RLY. BAR				1	
1	RL-1776-A	RLY. BAR				1	
1	RL-1777-A	RLY. BAR				1	
1	RL-1778-A	RLY. BAR				1	
1	RL-1779-A	RLY. BAR				1	
1	RL-1780-A	RLY. BAR				1	
1	RL-1781-A	RLY. BAR				1	
1	RL-1782-A	RLY. BAR				1	
1	RL-1783-A	RLY. BAR				1	
1	RL-1784-A	RLY. BAR				1	
1	RL-1785-A	RLY. BAR				1	
1	RL-1786-A	RLY. BAR				1	
1	RL-1787-A	RLY. BAR				1	
1	RL-1788-A	RLY. BAR				1	
1	RL-1789-A	RLY. BAR				1	
1	RL-1790-A	RLY. BAR				1	
1	RL-1791-A	RLY. BAR				1	
1	RL-1792-A	RLY. BAR				1	
1	RL-1793-A	RLY. BAR				1	
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1	RL-1795-A	RLY. BAR				1	
1	RL-1796-A	RLY. BAR				1	
1	RL-1797-A	RLY. BAR				1	
1	RL-1798-A	RLY. BAR				1	
1	RL-1799-A	RLY. BAR				1	
1	RL-1800-A	RLY. BAR				1	
1	RL-1801-A	RLY. BAR				1	
1	RL-1802-A	RLY. BAR				1	
1	RL-1803-A	RLY. BAR				1	
1	RL-1804-A	RLY. BAR				1	
1	RL-1805-A	RLY. BAR				1	
1	RL-1806-A	RLY. BAR				1	
1	RL-1807-A	RLY. BAR				1	
1	RL-1808-A	RLY. BAR				1	
1	RL-1809-A	RLY. BAR				1	
1	RL-1810-A	RLY. BAR				1	
1	RL-1811-A	RLY. BAR				1	
1	RL-1812-A	RLY. BAR				1	
1	RL-1813-A	RLY. BAR				1	
1	RL-1814-A	RLY. BAR				1	
1	RL-1815-A	RLY. BAR				1	
1	RL-1816-A	RLY. BAR				1	
1	RL-1817-A	RLY. BAR				1	
1	RL-1818-A	RLY. BAR				1	
1	RL-1819-A	RLY. BAR				1	
1	RL-1820-A	RLY. BAR				1	
1	RL-1821-A	RLY. BAR				1	
1	RL-1822-A	RLY. BAR				1	
1	RL-1823-A	RLY. BAR				1	
1	RL-1824-A	RLY. BAR				1	
1	RL-1825-A	RLY. BAR				1	
1	RL-1826-A	RLY. BAR				1	
1	RL-1827-A	RLY. BAR				1	
1	RL-1828-A	RLY. BAR				1	
1	RL-1829-A	RLY. BAR				1	
1	RL-1830-A	RLY. BAR				1	
1	RL-1831-A	RLY. BAR				1	
1	RL-1832-A	RLY. BAR				1	
1	RL-1833-A	RLY. BAR				1	
1	RL-1834-A	RLY. BAR				1	
1	RL-1835-A	RLY. BAR				1	
1	RL-1836-A	RLY. BAR				1	
1	RL-1837-A	RLY. BAR				1	
1	RL-1838-A	RLY. BAR				1	
1	RL-1839-A	RLY. BAR				1	
1	RL-1840-A	RLY. BAR				1	
1	RL-1841-A	RLY. BAR				1	
1	RL-1842-A	RLY. BAR				1	
1	RL-1843-A	RLY. BAR				1	
1	RL-1844-A	RLY. BAR				1	
1	RL-1845-A	RLY. BAR				1	
1	RL-1846-A	RLY. BAR				1	
1	RL-1847-A	RLY. BAR				1	
1	RL-1848-A	RLY. BAR				1	
1	RL-1849-A	RLY. BAR				1	
1	RL-1850-A	RLY. BAR				1	
1	RL-1851-A	RLY. BAR				1	
1	RL-1852-A	RLY. BAR				1	
1	RL-1853-A	RLY. BAR				1	
1	RL-1854-A	RLY. BAR				1	
1	RL-1855-A	RLY. BAR				1	
1	RL-1856-A	RLY. BAR				1	
1	RL-1857-A	RLY. BAR				1	
1	RL-1858-A	RLY. BAR				1	
1	RL-1859-A	RLY. BAR				1	
1	RL-1860-A	RLY. BAR				1	
1	RL-1861-A	RLY. BAR				1	</



SIZE DH-850280-A41
SHEET 3 TOTAL 3
DATE: 1/55:3
1/55:4

APP'N. 1
1/55:3
1/55:4

AUTOMATIC ELECTRIC COMPANY
NORTH LAKE, ILL., U.S.A. GERMANY, ILL., U.S.A. WYSECHIA, WISC., U.S.A.

STOCKLIST (CONT'D)

AMT	DRG NO	DESCRIPTION	ITEM	ISSUED	SHORT	ON HAND
1	S-0042	RLY. BAR	1			
1	NL-11464-A	REAR COVER	2			
1	NL-12353-A	RES. INS.	3			
1	NL-12368-A	RES. MTG.	4			
1	NL-12455-A	RES. LP. MTG.	5			
1	D-57116-A	PLY. BAR JK.	6			
1	NL-14280-A	RES. LP.	7			
1	NL-14437-A	RES. -25-10W	8			
14	NL-16033-A	SPARK QUENCH UNIT	9			
4	NL-18335-A	DIODE - NOTE 5	10			
1	NL-18478-A	RES. INS.	11			
1	NL-18479-A	RES. MTG.	12			
1	D-1745-A	10 WASHER - LP MTG.	13			
4	D-17170-F	4 LCK WR-RES 1.TG.	14			
1	D-17375-A	10 SHP. WR-LP. SOC.	15			
1	D-77055-A	10-32 NUT-LP. SOC.	16			
38	D-750213-A	6-32 SEMS-RLYS	17			
4	D-77358-A	4-36 NUT-RES. MTG.	18			
16	D-543074-D	SLEEVING	19			
2	D-543112-B	SLEEVING	20			
6	D-760905-A	138-32X250 RHTAPS RLY BAR JK.	21			
4	D-762003-C	112-36X1 1/4 FHS LTSMS	22			
1	D-762051-B	190-32X 5/16 PHSLT SMS	23			
1	GT-90044-117		24			
1	GT-90045-140		25			
1	GT-90046-111		26			
2	GT-90047-134		27			
1	GT-90048-129		28			
4	GT-90049-216		29			
5	GT-90050-145		30			
2	GT-90051-172		31			
1	GT-90052-137		32			
1	GT-90053-107		33			
			34			
			35			
			36			
			37			
			38			
			39			
			40			
			41			
			42			
			43			

DH-850280-A41

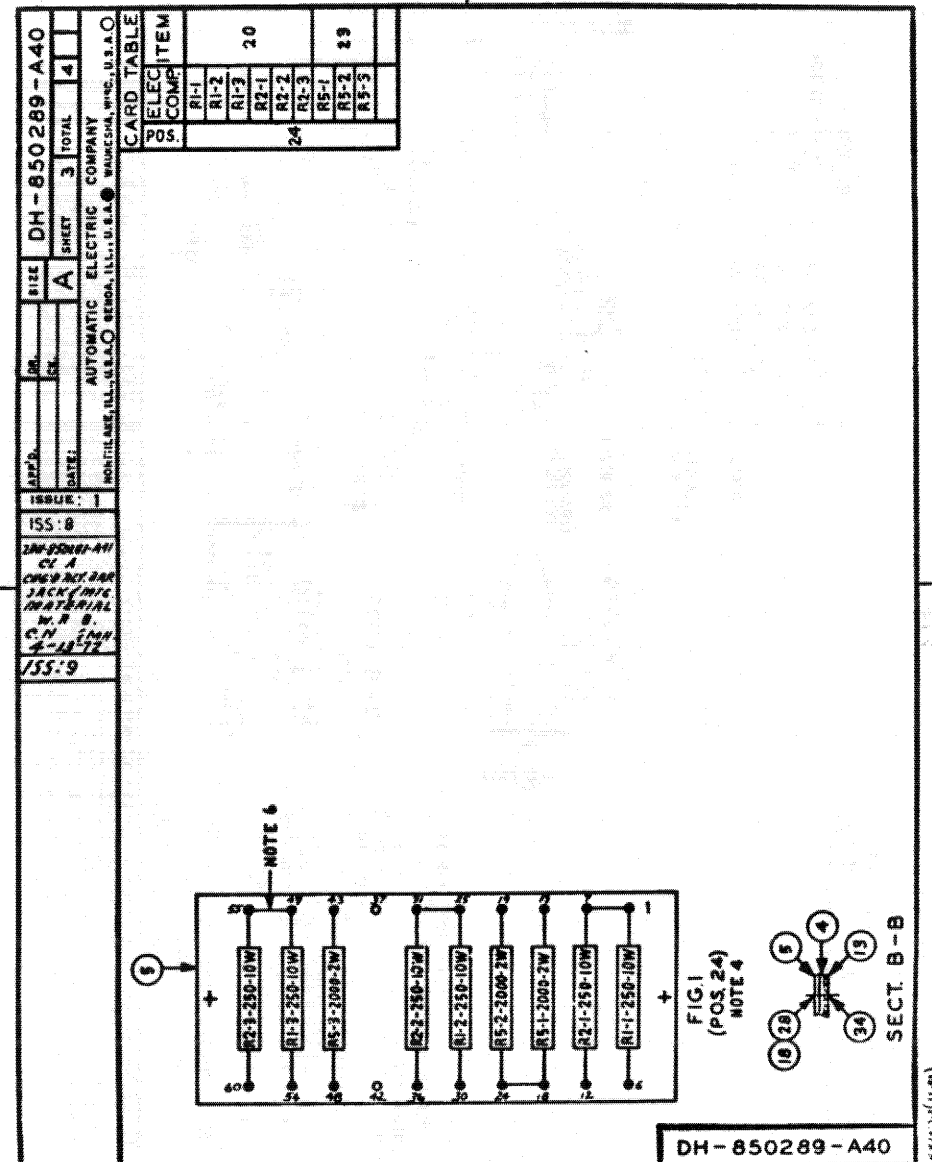
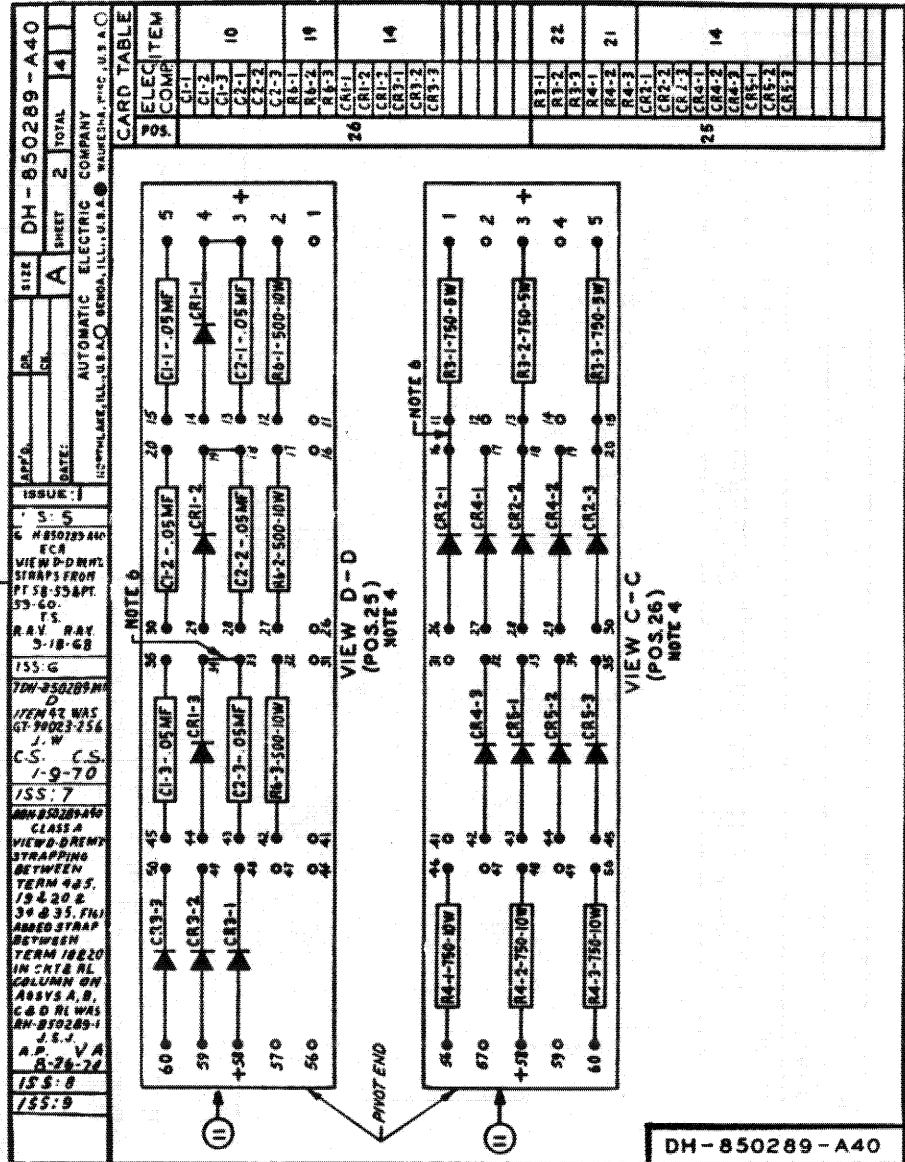


FIG. 2
(POS. 24)
NOTE 4

FIG. 1
(POS. 24)
NOTE 4

FIG. 2
(POS. 24)
NOTE 4

FIG. 1
(POS. 24)
NOTE 4

STOCKLIST (CONT'D)				ISSUED	SHORT	ON HAND
AMT	DRG NO	DESCRIPTION	ITEM			
1	S-0017	RELAY BAR	1			
			2			
1	NL-11464 -A	REAR COVER	3			
1	NL-12353 -A	RES INS	4			
1	NL-12368 -A	RES MTG	5			
			6			
1	D-57166 -A	RLY BAR JACK	7			
1	NL-13833 -A	LP SOCKET	8			
1	NL-13935 -A	RES MTG BRKT	9			
1	NL-14409 -A	RES-400-10W	10			
1	NL-14533 -A	LAMP	11			
2	NL-14679 -A	RES-10,000-10W	12			
2	NL-16033 -A	SPARK QUENCH UNIT	13			
8	NL-18335 -A	DIODE-NOTE 7	14			
1	NL-18478 -A	RES INS	15			
1	NL-18479 -A	RES MTG	16			
1	NL-14564 -A	CAP 4 MF	17			
			18			
4	D-1724-A	138 WASHER-RES	19			
1	D-1745-A	130 WASHER-RES MTG. BRKT	20			
4	D-17170-F	112 LCK. WR-RES MTG	21			
5	D-17566-A	130 SHP WR-RES & LAMP MTG	22			
1	D-17375-A	130 SHP WR-RES MTG BRKT	23			
			24			
1	D-284075-A11	RES-250-10W	25			
1	D-284080-A14	RES-10,000-.5W	26			
1	D-284080-A18	RES-27,000-.5W	27			
2	D-284081-B34	RES-4,700-1W	28			
1	D-284086-B7	RES-2,400-2W	29			
1	D-284086-B30	RES-100-2W	30			
2	D-68741-CU	CAP -2 MF	31			
2	D-68758-AA	CAP-100 MF	32			
1	D-68758-AB	CAP-250 MF	33			
1	D-68758-DU	CAP-30 MF	34			
			35			
			36			
8	D-75321-A	BUSHING-RES	37			
38	D-760213-A	138-32 SEMS-RLYS	38			
			39			
5	D-7701-A	138-32 NUT-RES & LAMP MTG	40			
1	D-77055-A	130-32 NUT-RES MTG BRKT	41			
4	D-77358-A	112-36 NUT-RES MTG	42			
			43			
20	D-543074-D	SLEEVING	44			
1	D-543112-B	SLEEVING	45			
			46			
6	D-760905-A	138-32X1/4 RHNTAPS	47			
4	D-762003-C	112-36X1/4 PHSLT5MS	48			
4	D-762047-V	138-32X2-1/4 PHSLT5MS	49			
1	D-762051-A	190-32X1/4 PHSLT5MS	50			
1	D-762047-F	138-32X3/8 PHSLT5MS	51			
			52			
			53			
			54			
			55			

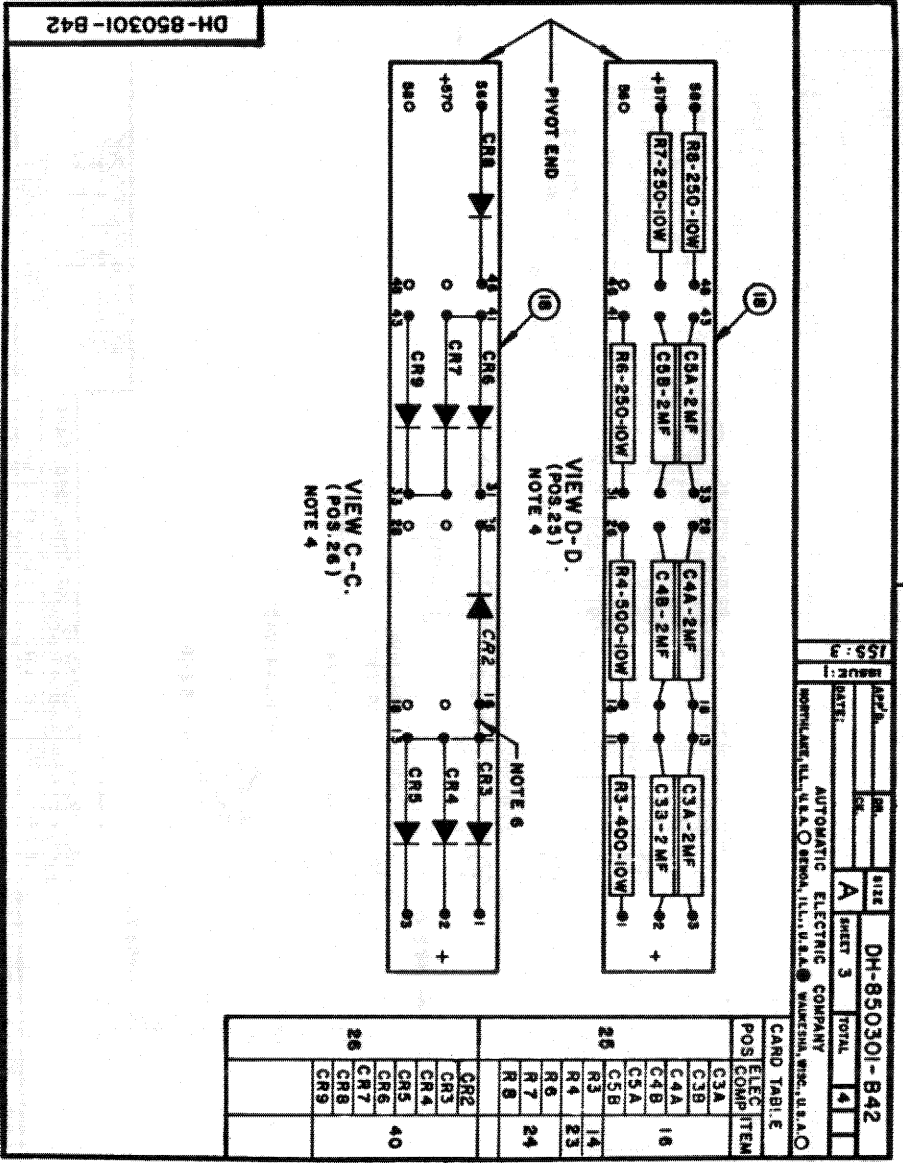
DH-850332-A41

DH-850350-A40				STOCKLIST (CONT'D)				ISSUED	SHORT	ON HAND
DATE	ISSUE	SIZE	SHEET	AMT	DRG NO	DESCRIPTION	ITEM			
1	1	1	4	1	S-0017	RLY BAR	1			
1	1	1	4	1	D-284683-A	REP COIL	2			
1	1	1	4	1	NL-17908-A	REAR COVER	3			
1	1	1	4	1	NL-12353-A	RES INS	4			
1	1	1	4	1	NL-12368-A	RES MTG	5			
1	1	1	4	1	D-57166-A	RLY BAR JK	6			
1	1	1	4	1			7			
1	1	1	4	1			8			
1	1	1	4	1			9			
1	1	1	4	1	NL-15284-A	RES-50-10W	10			
1	1	1	4	1	NL-18360-A	RES-200-10W	11			
1	1	1	4	1	NL-16033-A	SPARK QUENCH UNIT	12			
1	1	1	4	1			13			
1	1	1	4	1			14			
1	1	1	4	1			15			
1	1	1	4	1			16			
1	1	1	4	1	D-284843-B5	RES-2000-2W	17			
1	1	1	4	1	D-284081-A49	RES-470-2W	18			
1	1	1	4	1	NL-18655-A	SPARK QUENCH UNIT	19			
1	1	1	4	1	NL-18478-A	RES. INS.	20			
1	1	1	4	1	NL-18479-A	RES. MTG.	21			
1	1	1	4	1	FD-1029-DG	DIODE	22			
1	1	1	4	1			23			
1	1	1	4	1			24			
1	1	1	4	1	D-17170-F	1/2 LCK WR-RES MTG	25			
1	1	1	4	1	D-17375-A	1/2 LCK WR-REP COIL	26			
1	1	1	4	1			27			
1	1	1	4	1	D-284076-C5	RES-1 K-5W	28			
1	1	1	4	1	D-284076-B7	RES-100-5W	29			
1	1	1	4	1	D-284080-A14	RES-10K-5W	30			
1	1	1	4	1	D-284088-A7	RES-100-25W	31			
1	1	1	4	1	D-284076-B21	RES.-250-5W	32			
1	1	1	4	1	D-68741-CU	CAP -2 MF	33			
1	1	1	4	1			34			
1	1	1	4	1			35			
1	1	1	4	1			36			
1	1	1	4	1	D-77358-A	1/2-36 NUT-RES MTG	37			
1	1	1	4	1			38			
1	1	1	4	1			39			
1	1	1	4	1	D-760213-A	1/8-32 SEMS-RLYS	40			
1	1	1	4	1			41			
1	1	1	4	1			42			
1	1	1	4	1			43			
1	1	1	4	1			44			
1	1	1	4	1	D-780905-A	1/8-32 X 250 RHT APR 3MS-RLY BAR JK	45			
1	1	1	4	1	D-762003-C	1/12-36 X 1/4 FHSL TSMS-RES MTG	46			
1	1	1	4	1			47			
1	1	1	4	1	D-761052-C	1/12-36 X 1/4 PHS TSMS-REP COIL	48			
1	1	1	4	1	D-762051-B	1/8-32 X 5/16 PHS TSMS-REP COIL	49			
1	1	1	4	1			50			
1	1	1	4	1			51			
1	1	1	4	1			52			
1	1	1	4	1	GT-90146-106	RLY. POS.	53			
1	1	1	4	1	GT-90067-172	RLY. POS.	54			
1	1	1	4	1	GT-90068-132	RLY. POS.	55			

DH-850350-A40

DH-850350-A40				STOCKLIST (CONT'D)				ISSUED	SHORT	ON HAND
DATE	ISSUE	SIZE	SHEET	AMT	DRG NO	DESCRIPTION	ITEM			
1	1	1	5	1	GT-90069-119		56			
1	1	1	5	1	GT-90070-128		57			
1	1	1	5	1	GT-90071-128		58			
1	1	1	5	1	GT-90072-141		59			
1	1	1	5	1	GT-90073-122		60			
1	1	1	5	1	GT-90074-134		61			
1	1	1	5	1	GT-90075-152		62			
1	1	1	5	1	GT-90076-119	RLY. POS.	63			
1	1	1	5	1	GT-90077-334		64			
1	1	1	5	1	GT-90078-106		65			
1	1	1	5	1	GT-90079-119		66			
1	1	1	5	1	GT-90080-111		67			
1	1	1	5	1	GT-90081-113		68			
1	1	1	5	1	GT-90082-122		69			
1	1	1	5	1	GT-90083-112		70			
1	1	1	5	1			71			
1	1	1	5	1	GT-90145-211		72			

DH-850350-A40



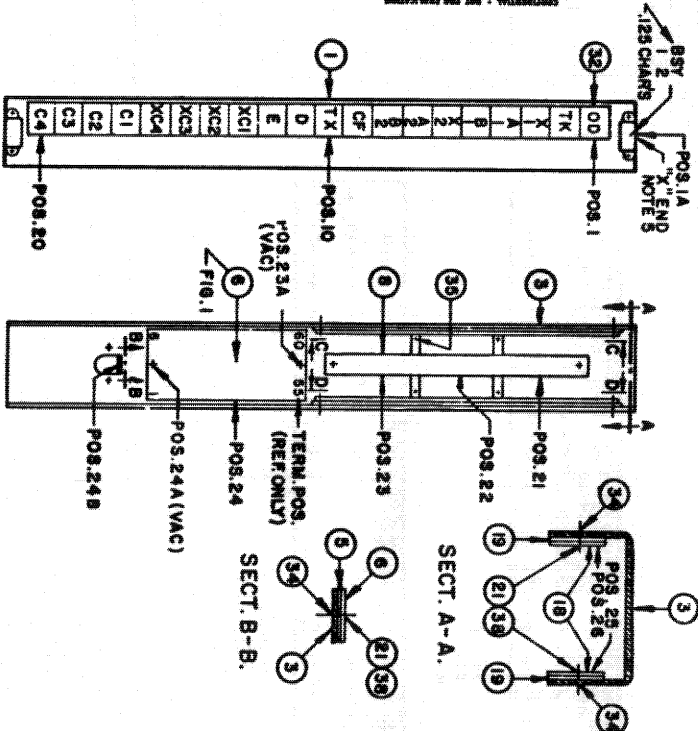
DH-850301-B42

DH-850301-B42			
AMT	DWG NO	DESCRIPTION	ITEM
1	S-0064	RLY BAR	1
1	NL-11464-A	REAR COVER	2
1	NL-12353-A	RES INS	3
1	NL-12368-A	RES MTG	4
1	D-57166-A	RLY BAR JK	5
1	NL-13805-A	CAP .05 MF	6
2	NL-14437-A	RES-25-10W	7
1	NL-15179-A	RES-400-10W	8
3	NL-17871-A	CAP-2 & 2 MF	9
2	NL-18479-A	RES MTG	10
2	NL-18478-A	RES INS	11
6	D-17170-F	.112 LCK WR-RES MTG	12
2	D-284075-B6	RES-500-10W	13
3	D-284075-G6	RES-250-10W	14
1	D-284076-B10	RES-750-5W	15
2	D-284030-A33	RES-47K-.5W	16
4	D-543074-D	SLEEVING	17
1	D-68758-B4	CAP-500MF	18
40	D-760213-A	.138-32 SEMS-RLYS	19
6	D-762003-C	.112-36X1/4FHS1TSM5-RES MTG	20
6	D-760905-A	.138-32X1/4FHS1TSM5-RLY BAR JK	21
6	D-77358-A	.112-36 NUT-RES MTG	22
10	FD-1023-DG	DIODE	23
2	GT-90139-175	GT-90139-175	24
2	GT-90147-119	GT-90147-119	25
2	GT-90141-121	GT-90141-121	26
1	GT-90138-111	GT-90138-111	27
1	GT-90061-112	GT-90061-112	28
1	GT-90169-113	GT-90169-113	29
1	GT-90150-151	GT-90150-151	30
1	GT-30151-113	GT-30151-113	31
1	GT-90152-137	GT-90152-137	32
1	GT-90148-197	GT-90148-197	33
3	GT-90154-111	GT-90154-111	34
1	GT-90153-118	GT-90153-118	35
3	GT-90155-176	GT-90155-176	36
1	18.19620	18.19620	37
54			38
53			39
52			40
51			41
50			42
49			43
48			44
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34			58
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32			60
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19			73
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12			80
11			81
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9			83
8			84
7			85
6			86
5			87
4			88
3			89
2			90
1			91
1			92
1			93
1			94
1			95
1			96
1			97
1			98
1			99
1			100

DH-850301-B42

APPROVED		DATE	DR. A.P.	SIZE	DH-850301-B42	
7-30-63		7-30-63	CE. V.A.	A	SHEET 1	TOTAL 4
AUTOMATIC ELECTRIC COMPANY NORTHHALE, ILL. U.S.A. WAUKEGA, WIS. U.S.A.						

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- MANUFACTURING NOTES:**
- 1- FOR MFG. INF. SEE SPEC. 5296.
 - 2- STAMP FUNCT. DESIG. PER H-43286 FIG. 1
 - 3- FOR WRG. USE D-543386 PVC. WIRE 24 AWG.
 - 4- DO NOT STAMP FUNCT. DESIG. ON POS. 2, 4, 26 & 28. THEY ARE FOR REF. ONLY.
 - 5- X END INDICATES PIVOT END OF RLY. BAR.
 - 6- -- DENOTES W-3014-24 TINNED COPPER WIRE USED FOR STRAPPING.

ECT. FIG. 1A	H-850301-B	97A	DH-850301-B42A
CKT. FIG. 2A, 3A, 4A	RH-850301-B3	FIG.	PART NO.
EQUIPPED WITH	CKT. 8 RL	FIG.	PART NO.

ATTENDANTS TRUNK
CONFERENCE & PBX
TRUNK SELECTION
EQUIP.
TYPE 40880 PABX
TYPE 900 RLYS

FX-2800-1(9-44)

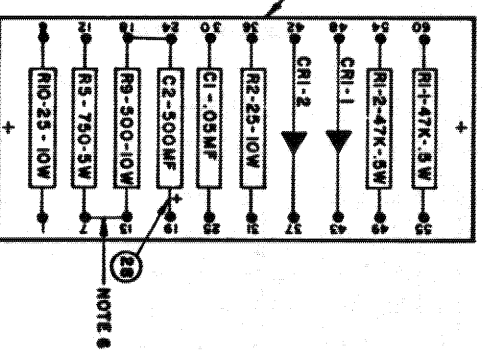


FIG. 1
(POS. 24)
NOTE 4

CARD TABLE	
POS	ELEC. ITEM
1	C1 10
2	C2 30
3	R1-1 26
4	R1-2 12
5	R2 12
6	R3 25
7	R4 23
8	R5 23
9	R6 23
10	R7 23
11	R8 23
12	R9 23
13	R10 23
14	R11 23
15	R12 23
16	R13 23
17	R14 23
18	R15 23
19	R16 23
20	R17 23
21	R18 23
22	R19 23
23	R20 23
24	R21 23
25	R22 23
26	R23 23
27	R24 23
28	R25 23
29	R26 23
30	R27 23
31	R28 23
32	R29 23
33	R30 23
34	R31 23
35	R32 23
36	R33 23
37	R34 23
38	R35 23
39	R36 23
40	R37 23

ISSUE: 3	
DATE:	SIZE: DH-850301-B42
AUTOMATIC ELECTRIC COMPANY NORTHHALE, ILL. U.S.A. WAUKEGA, WIS. U.S.A.	

DH-850301-B42

FX-2800-1(1-44)

4. The fourth part of the document discusses the various methods used to collect and analyze financial data, including the use of spreadsheets, databases, and specialized accounting software. It also discusses the importance of data security and the need for proper backup procedures to prevent data loss.

5. The fifth part of the document focuses on the importance of maintaining accurate records of all transactions and the role of the accounting department in ensuring the integrity of the financial data. It also highlights the need for regular audits and the importance of transparency in financial reporting.

APP'D.	DR.	SIZE	DH-850629-A40	
CK.		A	SHEET	3
DATE:			TOTAL	5
AUTOMATIC ELECTRIC COMPANY				
NORTH LAKE, ILL., U.S.A. GENOA, ILL., U.S.A. WAUKESHA, WISC., U.S.A.				
ISSUE: 1				
ISS: 8				
ISS: 10				
11DH-850629-A40				
CLASS A				
REMOVED ITEM				
33. ADDED				
1-ITEM 43.				
C.S.				
V.A. V.A.				
9-30-69				
ISS: 11				
12DH-850629-A40				
A				
VIEW C-C ADDED				
STRAPPING \$1 TO				
46				
C.S.				
C.S. C.S.				
1-20-70				
ISS: 12				
13DH-850629-A40				
CLASS A				
ASSY A IN				
CHT & RL				
COLUMN RL				
WAS				
RH-850629-1				
J. S. J.				
A.P. V.A.				
8-26-70				
ISS: 13				
14DH-850629-A40				
CL. B				
ASSY B RATED				
MFG. DIS				
STD2 MT6 POS.				
& STKL.				
J.S.J.				
A.P. V.A.				
8-4-71				
ISS: 14				
ISS: 17				

CARD TABLE		
T.S.	ELEC	ITEM
	COMP.	
	C1	11
	C4	39
	C5	
	C6	40
24	C7	
	C8	42
	C12	18
	C14	41
	R19	35
	R20	25

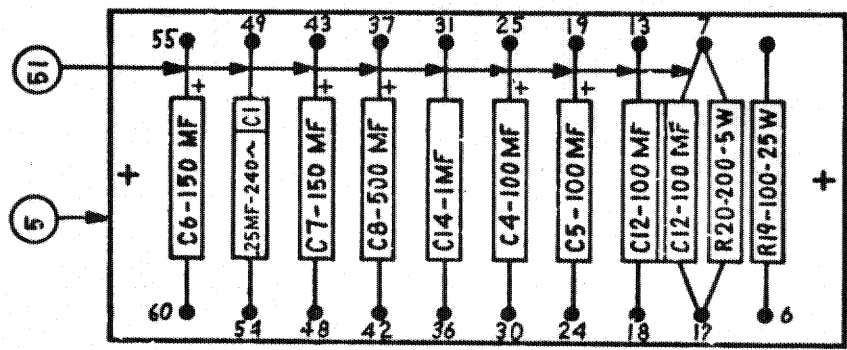
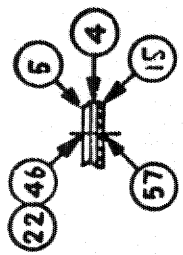


FIG.1
(POS 24)
NOTL 5



SECT. B-B

DH-850629-A40

STOCKLIST (CONT'D)				ISSUED	SHORT	ON HAND
AMT	DRG NO	DESCRIPTION	ITEM			
1	S-0035	RELAY BAR	1			
1	D-284683-A	REP. COIL	2			
			3			
1	NL-12353-A	RES. INS.	4			
1	NL-12368-A	RES. MTG.	5			
1	NL-12375-A	TEST JACK	6			
			7			
1	D-57166-A	RELAY BAR JACK	8			
3	NL-13132-A	RELAY SHIELD	9			
1	NL-13805-A	CAP .05 MF	10			
2	NL-16033-A	SPARK QUENCH UNIT	11			
1	NL-17871-A	CAP. 2X2 MF	12			
1	NL-17902-A	RES MTG	13			
2	NL-17903-A	RES INS	14			
1	NL-17908-A	REAR COVER	15			
39	NL-18335-A	DIODES-NOTE 3	16			
1	NL-18841-A	RES MTG	17			
1	NL-19013-A	CAP 100X100 MF	18			
			19			
			20			
			21			
6	D-17170-F	4 LCK WR- RES MTG	22			
1	D-17375-A	10 SHP WR-REP COIL	23			
5	D-284075-G6	RES-250-10W	24			
1	D-284076-B2	RES-200-5W	25			
1	D-284076-B7	RES-100-5W	26			
1	D-284076-B10	RES-750-5W	27			
1	D-284076-B29	RES-360-5W	28			
2	D-284076-C14	RES-220-5W	29			
1	D-284363-A207	RES-10,5K-5W	30			
1	D-284080-A18	RES-27,000-5W	31			
1	D-284080-A33	RES-47,000-5W-NOTE 3	32			
1	D-284081-A11	RES-1,000-2W	33			
2	D-284081-A46	RES-270-1W	34			
1	D-284088-A7	RES-100-25W	35			
1	D-284363-A23	RES-600-1W	36			
1	D-68741-CU	CAP-2 MF	37			
1	D-68744-BN	CAP-1 MF	38			
2	D-68758-AA	CAP-100 MF	39			
2	D-68758-AG	CAP-150 MF	40			
1	D-68744-DT	CAP-1 MF	41			
1	D-68758-BJ	CAP-500 MF	42			
1	D-284076-C5	RES-1000-5W	43			
			44			
40	D-760213-A	6-32 SEMS-RLYS	45			
6	D-77358-A	4-36 NUT- RES MTG	46			
2	D-77318-A	3-48 NUT-TEST JACK	47			
1	D-94071-A	SWBD LAMP	48			
			49			
1	FD-1029-AD	THERMISTOR-60,500	50			
5-2	D-543074-D	SLEEVING	51			
2	D-543112-A	SLEEVING	52			
			53			
			54			
6	D-760905-A	138-32X250 RHTAPS RLY. BAR. JK.	55			

DH-850629-A40

DH-850629-A40

SIZE

DR.

CK.

APP'D.

DATE:

ISSUE: 1

ISS: 8

ISS: 9

10-DH-850629-A40

CLASS "A"

ADDED

VIEW E-E

STANDARDIZED

SCREWS.

T.S.

R.A.V.J.S.J.

7-21-69

ISS: 10

ISS: 15

10-DH-850629-A40

CLASS "A"

CHANGED

RY BAR INK

B.MTG.

MATERIAL

V.M.B.

J.B. G.M.H.

4-3-72

ISS: 16

ISS: 17

STOCKLIST (CONT'D)

AMT

DRG NO

DESCRIPTION

ITEM

ISSUED

SHORT

ON HAND

6

D-762003-D

112-36X5//6 RHIMS- RES MTG

56

57

2

D-761052-C

112-36X1/4 RHIMS-REP COIL

58

1

D-762051-B

110-32X5/16 RHIMS-REP COIL

59

60

61

62

63

1

GT-90000-140

1

64

1

GT-90001-296

2

1

GT-90701-116

3

65

1

GT-90003-111

4

66

1

GT-90004-195

5

67

1

GT-90828-139

6

68

1

GT-90006-121

7

69

1

GT-90007-167

8

70

1

GT-90008-238

9

71

1

GT-90009-117

RLY POS

10

72

1

GT-90010-143

11

73

1

CT-90011-141

12

74

1

GT-90012-106

13

75

1

GT-90013-299

14

76

1

GT-90014-282

15

77

1

GT-90015-145

16

78

1

GT-90016-335

17

79

1

GT-90017-137

18

80

1

GT-90018-104

19

81

1

GT-90012-117

20

82

DH-850629-A40

PX-2810-21 (8-64)

DRAWING STOCK LIST

AMT	U/M	PART NUMBER	ADJ	ITEM	G P	DESCRIPTION
1.00	PC	H 886286	1	1		MOUNTING PLATE
1.00	PC	H 886286	2	2		MOUNTING PLATE
2.00	PC	D 17377	A	4		LOCKWASHER 4 SHAKEPROOF
1.00	PC	D 284076	B28	5		RESISTOR
1.00	PC	D 284080	A33	6		RESISTOR
1.00	PC	D 284080	A66	7		RESISTOR
1.00	PC	D 284080	B102	8		RESISTOR
1.00	PC	D 284080	B139	9		RESISTOR
1.00	PC	D 284656	A	10		COIL
1.00	PC	D 51031	A	11		RECEIVER
.83	FT	D 542410	C	12		SLEEVING
1.00	PC	D 68741	CY	13		CAPACITOR
1.00	PC	D 68758	BN	14		CAPACITOR
2.00	PC	D 762048	B	15		PHSMS 138-40 X 3/16
2.00	PC	D 77299	C	16		NUT HEX 112-40 X 1/4
1.00	PC	D 762002	C	17		FHSMS 099-48 X 1/4
2.00	PC	D 762004	C	18		FHSMS 112-40 X 1/4
2.00	PC	D 762044	E	19		PHSMS 112-40 X 3/8
1.00	PC	FD 1029	EE	20		TRANSISTOR
1.00	PC	FD 1030	AY	21		TERMINAL STRIP
1.00	PC	D 543644	A	22		WIRE & TERMINAL
1.00	PC	NL 19564	A	23		SPEAKER COVER
2.00	PC	D 543070	DB	25		ONE CONDUCTOR CORD

GENOA E-BILL

ISSUE	DATE	SHEET TOTAL	DESCRIPTION	PART NUMBER
6	10-5-70	1 OF 1	AUDIBLE SIGNAL UNIT	D 56607 A

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TABLE "A"

STKL. OR ASSY.	DESCRIPTION	CKT. & FIG.	WIRING DIAGRAM	REMARKS	MTG. POSITION	NOTES
A D-260703-A	40B PABX ASSY. EQUIPPED WITH: SWITCH GATE, POWER UNIT, FUSE PANEL, POWER TRANSFER RELAY BAR, TURRET REC. & LINE RELAY BAR. ARRANGED FOR: 26 SWITCHES, 21 JACK-IN RELAY BAR POSITIONS & 60 BANK MULTIPLE OUTLETS			ORDER ONE FOR EACH 40B SWITCH BOARD REQUIRED		54
B SG-6567	LINE RELAY BAR	CG-1455	WG-6567	ORDER TWO PER D-260703-A	FIG. 1	
NL-15183-A	DUMMY FUSE			ONE PER VACANT POSITION	FIG. 1	
NL-14881-A	FUSE 1-1/3 AMP			ORDER 30 PER STOCKBOARD	FIG. 1	
NL-14482-F	LINE BAR			ORDER 276 PER STOCKBOARD		52
C NL-14482-RG	LINE BAR			ORDER 122 PER STOCKBOARD		52
NL-14482-LG	LINE BAR			ORDER 122 PER STOCKBOARD		52
NL-14470-A	LINE BAR GUIDE			ORDER AS REQUIRED	FIG. 1	
	JUMPERS & CABLING		WG-9672	ORDER ONE PER D-260703-A		
DH-721020-73A	POWER FAILURE TRANSFER AND TURRET REGISTER	H-850627-A FIG. 24A	H-721020 1	ORDER ONE PER D-260703-A	FIG. 1	
D DH-850289-A40A	LINK RELAY BAR	H-850289-A FIG. 1A		ORDER TWO PER STOCKBOARD	FIG. 1	
DH-850332-A40A	INTERRUPTER, TRUNK, CODE CALL AND NIGHT ANSWER CONTROLS	H-850332-A FIG. 22A		ORDER ONE PER STOCKBOARD	FIG. 1	
DH-850280-A40A	FINDER GUARD	H-850280-A FIG. 1A		ORDER ONE PER STOCKBOARD	FIG. 1	
DH-850260-A41A	SELECTION CONTROL	H-850260-A FIG. 1A		ORDER TWO PER STOCKBOARD	FIG. 1	
E S-6870	ATTENDANT'S TRUNKS & CONFERENCE	C-5905	W-6870	ORDER ONE PER STOCKBOARD	FIG. 1	53
DH-850350-A40A	TURRET POSITION CIRCUIT	H-850350-A FIG. 1A		ORDER ONE PER STOCKBOARD	FIG. 1	
F D-260703-B	40B PABX ASSY EQUIPPED WITH: SWITCH GATE, FUSE PANE, POWER TRANSFER RELAY BAR & LINE RELAY BARS ARRANGED FOR: 26 SWITCHES, 21 JACK-IN RELAY BAR POS & 60 BANK MULTIPLE OUTLETS			ORDER ONE FOR EACH 40B SWITCHBOARD REQUIRED LESS POWER UNIT.		54
S-424172	FILTER BLOWER KIT			ORDER ONE PER UNIT AS REQUIRED		
S-430945	BOX OF 6 REPLACEMENT FILTERS			ORDER ONE WHEN BLOWER IS REQUIRED		
MO-20157	TRUNK RELAY BAR	H-850629-A FIG. 1A		ORDER TEN PER STOCKBOARD	FIG. 1	
G MO-17648	LINK SWITCHES			ORDER SIX PER STOCKBOARD	FIG. 1	
MO-20196	ATTENDENTS TURRET & BUSY LAMP FIELD			ORDER ONE PER STOCKBOARD		

TABLE "B"

ASSY. A OR B		CIRCUIT CAPACITY & EQUIPMENT				
AMT.		CIRCUIT	FIG.	WIRING DIAGRAM	FIG.	TITLE
W	E					NOTES
1	1	H-850940-A	1A	H-721505		LINE RELAY BAR
1	1			H-888868-11		UNIT BAY CABLE & CENTER JACK
1	1			WA-7193		STRAPPING & TERMINAL ASSIGNMENT
1	1	H-850627-A	24A			POWER FAILURE TRANSFER & TURRET REGISTER
2	0	H-850289-A	1A			LINK RELAY BAR 3 LINKS PER BAR
1	0	H-850332-A	22A			INTERRUPTER TRUNK & CODE CALL CONTROLS
1	0	H-850280-A	1A			FINDER GUARD
2	0	H-850260-A	1A			SELECTION CONTROL
1	0	C-5905		W-6870		ATTENDANTS TRUNKS & CONFERENCE
1	0	H-850350-A	1A			TURRET POSITION CIRCUIT
10	0	H-850629-A	1A			TRUNK RELAY BAR

MANUFACTURING NOTES:

1-"W" DENOTES WIRED AND "E" DENOTES EQUIPPED.

2-REFER TO FIGURE 1 OF THIS DRAWING FOR MOUNTING OF SWITCHES, RELAY BARS, ETC.

ENGINEERING NOTES:

51-ENGINEER SHALL REFER TO D-260703 TABLE "A" STOCKLIST A OR B AND TABLE "B" FOR ORDERING AND MOUNTING OF SWITCHES, RELAY BARS, ETC.

52-SPARES INCLUDED IN TABLE "A" ARE (2)NL-14482-F (2)NL-14482-RG AND (2)NL-14482-LG.

53-TO MAKE CONFERENCE OPERATIONAL ORDER THREE MO-18825 SWITCHES.

54-FOR METHOD OF ASSEMBLY SEE DRAWING H-889078.

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2-D-260703-CL B
 NOTES: 1. 11-15-60
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DESIGNED: R. DEL VECCHIO DR. W.M.
 APP'D. M.R. REID / E.J.R. CK. F.R.
 43.4A SCALE: DATE: 6-24-71
 DO NOT SCALE DRAWING

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ORDERING INFORMATION
 FOR TYPE 40B P.A.B.X.

D-260703

SHEET 1 OF 2

SIZE
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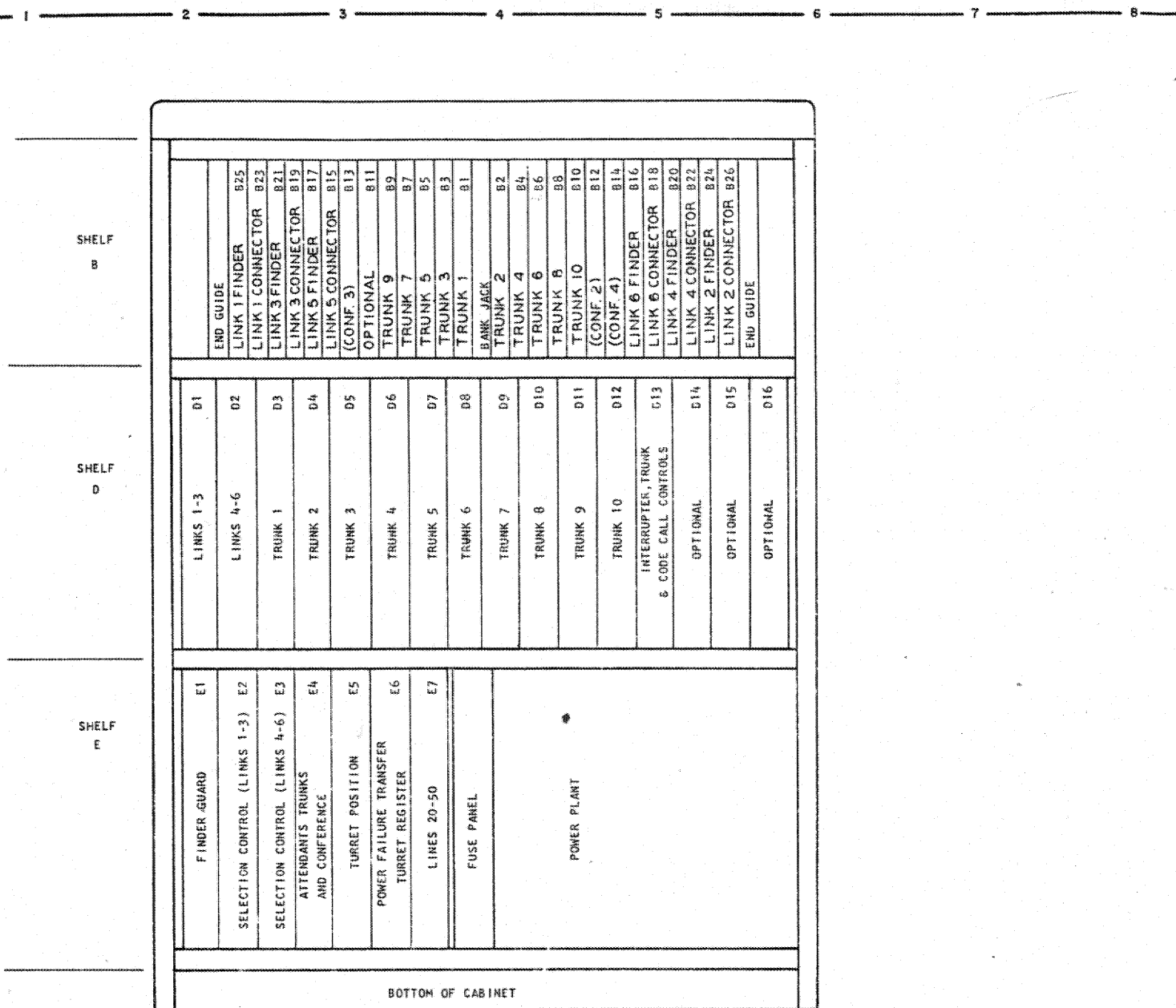


FIG. 1
(FRONT VIEW OF .AY)

MO-20196

CHANGES	QUAN.	PART NO.	DESCRIPTION	ITEM	ISSUED	SHORT	ON HAND
RETYPE: ITS.			MATERIAL AND EQUIPMENT REQUIRED				
0-23 WERE							
7-20. ADDED							
ITS. 7-9 &	1	H-889217-1	TURRET	1			
NOTE 1.	1	CL-504-143	ATTENDANT'S INSTRUCTIONS	2			
WRT RJE dmw 34.5.73(cle	1	NL-19531-A	BUSY LAMP FIELD POWER SUPPLY AND CONTROL RELAY	3			
ITEMS 10 &	1	NL-12948-A	TIE POINT	4			
11 WERE ISS	50'	W-5005	SWITCHBOARD JUMPER WIRE: RW-69, W-4, BK-5, S-36	5			
3 & 1 RESP.	1	NL-12343-A	SPRING PILE PREADJUSTED FOR RLY. M.D.	6			
WRT JMT dmw 48.29.73(cle	4	NL-14240-A	SPACER NOTE 1	7			
	4	NL-19506-GL6	HEX HD. 8-32 X .500" NOTE 1	8			
	1	NL-17818-A	PLASTIC BAG NOTE 1	9			
			NOTE 1: INSERT ITEMS 7 AND 8 INTO ITEM 9 FOR SHIPPING				
			WHEN SHIPPING INCLUDE THE FOLLOWING PRINTS				
			ISS.				
	1	MO-20196	4 MO STOCKLIST	10			
	1	H-73576-B	3 ATTENDANT TURRET CIRCUIT	11			
	1	E-73576-B	1 ATTENDANT TURRET EXP.	12			
	1	H-59476	2 BUSY LAMP FIELD W.D.	13			
	1	H-889217	3 TURRET ASSEMBLY	14			
	1	H-889217-1	5 TURRET STOCKLIST	15			
	1	WE-5290	2 JUMPERS & INSTRUCTIONS	16			
	1	M-0373	1 MODIFICATION INSTRUCTIONS	17			
	1	AC-2325	1 POWER SUPPLY SPOTTING PRING	18			
	1	H-59477	1 TERMINAL BOARD W.D.	19			
	1	H-73578-A	1 BUSY LAMP FIELD CIRCUIT	20			
	1	E-73578-A	1 BUSY LAMP FIELD EXP.	21			
	1	AH-73578-A	1 BUSY LAMP FIELD RLY. ADJ	22			
	1	H-721174	4 BUSY LAMP FIELD CONTROL CKT.	23			

DR DMW	SCALE
CH	DATE 12.15.71
EN JP	APPR WEM

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.12 TRUNK TURRET
WITH BUSY LAMP FIELD

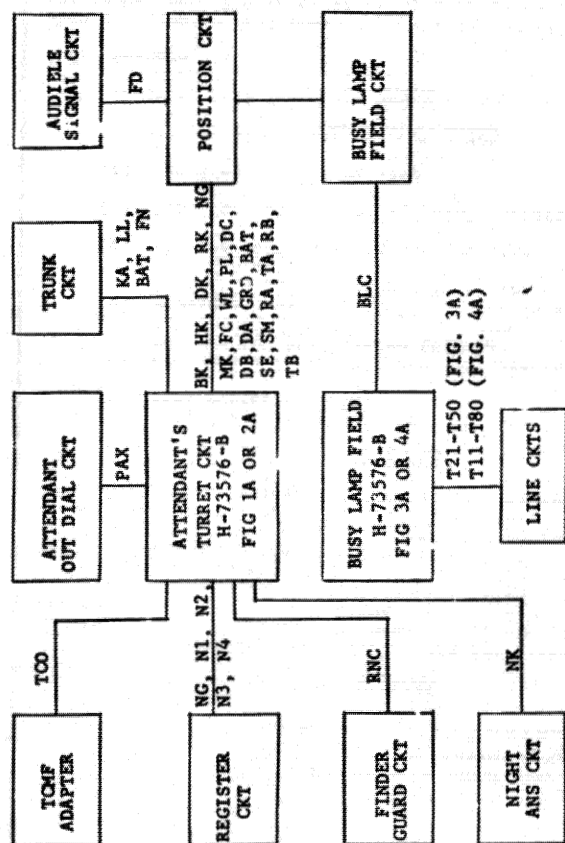
40B 40M

SEE SH. STOCKLIST
ISSUE 3, 4.

MO-20196

AUTOMATIC ELECTRIC CO. MORTON, ILLINOIS, U.S.A.		1/12; mb Issue 1		E-73576-B		SHEET 7		TOTAL 7		E-73576-B	
CIRCUIT EXPLANATION ATTENDANT'S TURRET CIRCUIT FOR TYPE 40, 80 OR 100 PABX H-73576-B (Written specifically for circuit issue 1, but may also apply to later issues. Refer to H print for appropriate E issue number.) GENERAL This circuit provides means for a PABX Attendant to be connected to trunk circuits for normal functions of establishing and supervising trunk-to-station connections. Incoming trunk calls are extended to local stations by means of a keyset. The Attendant uses the dial when originating outgoing trunk calls or when using the Attendant's out-dial line to call a local station (ICMP adapter not used). Each local station is associated with a lamp on the busy lamp field (if provided). See FIG 8D for a typical arrangement of equipment. FEATURES (a) Provides a 12 trunk turret for use in a Type 40 PABX system (FIG 1A) (b) Provides a 26 trunk turret for use in a Type 80 or Type 100 PABX system (FIG 2A) (c) Provides busy lamp field for use in a Type 40 PABX (FIG 3A) or for use in a Type 80 PABX (FIG 4A) (d) Provides optional headset amplifier (FIG 5A) (e) Provides both keyset and dial operation (f) Provides tuse alarm lamp CIRCUIT OPERATION 1.00 Incoming Call from City Trunk 1.01 Seizure When an incoming call comes into the Attendant's turret, the trunk lamp (FIG 1A or 2A used) associated with the											
K. Y. Young						APPROVED <i>[Signature]</i>		ISSUE 1		DRAWING NO. E-73576-B	
WRITTEN BY						E-73576-B		1		E-73576-B	

E-73576-B		SHEET 2		E-73576-B	
calling trunk flashes. 1.02 Attendant Answers To answer the incoming call, the Attendant operates the trunk key, TRK() (FIG 1A or 2A used), associated with the flashing trunk lamp. Operation of key TRK() grounds lead KA, causing the trunk lamp to be extinguished and lamp KEY SET AND BUSY to light steadily to indicate the keyset may be used to extend the call. Conversation may now take place between the Attendant and the outside party. 1.02.1 Attendant Places Call on Hold The Attendant places the call on hold by momentarily operating key RD, grounding lead HK. The trunk key, TRK() (FIG 1A or 2A used) associated with the trunk, being placed on hold, is restored, causing lamp KEY SET AND BUSY to extinguish and the associated trunk lamp, (FIG 1A or 2A used) to flash. The trunk remains in hold condition until the Attendant returns to the call. 1.02.2 Attendant Extends the Call To extend the call to a local station, the Attendant depresses keyset buttons (keys 0 - 9) in the sequence corresponding to the desired station's number. If an error is made in keying, the Attendant operates key KR momentarily, grounding lead RK, and the Attendant may then re-key the station's number. When the local station is idle, lamp KEY SET AND BUSY is extinguished and the trunk lamp flashes the ringing signal. The Attendant may disconnect by restoring the trunk key TRK() When the local station is busy, lamp KEY SET AND BUSY flashes and the Attendant receives busy tone. To release from the busy condition, the Attendant operates key KR momentarily, grounding lead RK. When lamp KEY SET AND BUSY lights steadily, the Attendant may extend the call again or place the call on hold as described in Section 1.02.1. 1.03 Called Party Answers When the called party answers, the trunk lamp lights steadily. Conversation may now take place.					
PAGE 10-40					

FIG 8D
TYPICAL ARRANGEMENT OF EQUIPMENT

ISSUE	DRAWING NO.
1	E- 73576-B

1.04 Attendant Returns to Call Placed on Hold

To return to the call placed on hold, the Attendant operates the trunk key TRK(), grounding lead KA, associated with the trunk placed on hold and momentarily operates key KR, grounding lead RK, extinguishing the trunk lamp and lighting lamp KEY SET AND BUSY. The Attendant may now extend the call as described in Section 1.02.2.

1.05 Busy Override

When the Attendant extends the call to a busy local station, the Attendant may override the busy condition by operating key BK, grounding lead BK. The Attendant may now converse with the parties on the busy line. If the called station agrees to accept the call, the Attendant momentarily operates key KR, grounding lead RK and calls the desired station again.

1.06 Splitting the Call.

When the Attendant extends the call to a local station as described in Section 1.02.2, the Attendant may remain in the connection after the called party answers. The Attendant may converse with the trunk party without being heard by the local station by operating key SPLIT TO TRK, grounding lead SE and lighting lamp SPLIT TO TRK. The Attendant may talk to the local station without being heard by the trunk party by operating key SPLIT TO EXT, grounding lead SM and lighting lamp SPLIT TO EXT.

1.07 Automatic Recall of Attendant

When the calling trunk wishes to talk to several local stations, one at a time, this may be done without placing separate calls. The Attendant extends the call to the first local station similar to that described in Section 1.02.2 except that the Attendant momentarily operates key HD, grounding lead HK.

When the local station disconnects, the trunk lamp flashes once per second to indicate recall. The Attendant answers the call by operating the trunk key TRK() associated with the flashing lamp, grounding lead KA and operates key KR, grounding lead RK. The Attendant extends the call to the second local station as described in Section 1.02.2.

1.08 Code Call

To make a code call, the Attendant places the incoming trunk call on hold as described in Section 1.02.1. The Attendant then operates key PAX, grounding lead PAX, and

ISSUE	DRAWING NO.
1	E- 73576-B

lighting lamp PAX. The Attendant then uses the DIAL to dial the digit(s) assigned for code calls. The Attendant may at this time connect to another City Trunk while maintaining connection to the Out-Dial Trunk. When the called party answers, by dialing the digits assigned to code call answer, the amber PAX SUPY lamp will flash. When the Attendant disconnects from the City Trunk the PAX SUPY lamp extinguishes and the Attendant informs the party of the waiting call. If the party accepts the call, the Attendant restores key PAX, removing ground from lead PAX, and extinguishes lamp PAX, operates the trunk key TRK() associated with the trunk placed on hold and momentarily operates key KR. The Attendant extends the call to local station the same as that described in Section 1.02.2.

1.09 Release from Completed Call

When the called local station disconnects, the trunk lamp is extinguished.

2.00 Outgoing Call Via City Trunk

The Attendant may originate a call via a city trunk by operating a trunk key TRK() of an idle city trunk. Operation of key TRK() grounds lead KA. When dial tone is returned, the Attendant then dials the number of the desired party. If an error is made in dialing, the Attendant momentarily operates key DR, grounding lead DK. The Attendant may then re-dial the number.

When the called party answers, the Attendant may extend the call to a local station the same as that described in Section 1.02.2.

3.00 Attendant's Information Trunks

A local station may call the Attendant via an Information trunk by dialing "0", causing the ATT TRK 1 or ATT TRK 2 LAMP (FIG 1A used) or TRK() lamp (FIG 2A used) to flash. To answer the call, the Attendant operates the trunk key ATT TRK 1 or ATT TRK 2 (FIG 1A used) or TRK() (FIG 2A used), grounding lead K1 or K2, or lead KA, respectively and causing the associated trunk lamp to light steadily. Conversation may now take place between the Attendant and local station.

When the call is completed, the local station disconnects and the Attendant restores trunk key ATT TRK 1 or ATT TRK 2 (FIG 1A used) or TRK() (FIG 2A used), removing ground

from lead K1 or K2, or lead KA, respectively and causing the associated trunk lamp to be extinguished.

4.00 Monitoring a Busy Line

To monitor a call in progress on a city trunk, the Attendant operates key MON, grounding lead MK, and lighting lamp MON, and operates key TRK() associated with the trunk to be monitored, grounding lead KA. The Attendant may monitor the call, but cannot converse with the parties on the line.

5.00 Night Service

For night service, key NIGHT 2 is operated, transferring ground from lead FN to NK and lighting lamp NIGHT 2 or key NIGHT 1 is operated, grounding lead NK and lighting lamp NIGHT 1. Incoming trunk calls will sound the night signals and can be answered by any local station by dialing the night answer number.

6.00 Buzzer

Operation of key BUZ grounds lead FC, lights lamp BUZ, and will cause the buzzer to sound on incoming trunk call, information trunk calls, and Attendant recall.

7.00 Fuse Alarm

When a fuse blows in the PABX, battery via lead FA ("X" wiring) or ground via lead AF ("Y" wiring) lights lamp FUSE ALARM. When the blown fuse is replaced, lamp FUSE ALARM is extinguished.

8.00 Restricted Night Service

If night calling is to be restricted, the Attendant operates either key SPL ("D" wiring) or the External Locking Key or SPST Switch (FIG EK) ("F" wiring) and connects ground to lead RNC and lights lamp STL. The Finder Alarm Circuit, H-850283-A, then causes the link to return busy tone when one extension dials another.

9.00 TCMF Used for Outgoing Call Via City Trunk

If the TCMF call option is provided, the Attendant may originate a TCMF call via a city trunk by operating the trunk key TRK() of an idle city trunk and key SPL. Operation of key TRK() connects ground to lead KA seizing the trunk. After seizing a trunk, the Attendant operates key SPL connecting ground to lead TCO ("E" wiring). Ground on lead TCO seizes the TCMF Adapter Circuit, H-850910-A. When

dial tone is returned, the Attendant then keys the number of the desired party. The associated TCMF Adapter Circuit converts the dc marks from the Attendant's Turret Circuit Keypad to TCMF tones. When the Attendant finishes keying the number, key SPL is restored, removing ground from lead TCO ("E" wiring) releasing the TCMF Adapter Circuit.

When the called party answers, the Attendant may extend the call to a local station as described in Section 1.02.2.

10.00 BUSY LAMP FIELD Used (FIG 3A or FIG 4A)

When the Attendant operates the trunk key, TRK() (FIG 1A or 2A) to answer an incoming call, battery via the Busy Lamp Field Circuit is connected to lead BLC (FIG 3A or 4A), lighting all station lamps having ground connected to their respective T() leads. The lighted lamps correspond to busy extension lines. Any lamp that is not lighted, corresponds to an idle line and when the Attendant extends the incoming call to an idle station as described in Section 1.02.2, the corresponding station lamp in the BUSY LAMP FIELD (FIG 3A or 4A) is lighted.

When the Attendant disconnects by restoring the trunk Key TRK(), battery is disconnected from lead BLC, extinguishing all lamps that were lit in the BUSY LAMP FIELD. When the Attendant places the call on hold, ground on lead HK holds the City Trunk and the BUSY LAMP FIELD (FIG 3A or 4A) operated.

When the Attendant makes an outgoing call via a City Trunk, operation of trunk key TRK() grounds lead KA and connects battery to lead BLC via Position Circuit and Busy Lamp Field Circuit to light all lamps on the BUSY LAMP FIELD associated with a busy station.

76-70 OPTIONAL EQUIPMENT AS REQUIRED NOT ALWAYS
USED.

70-DISCONNECT "E" WIRING AND USE "Y" WIRING
WHEN THIS CIRCUIT IS USED WITH TYPE 100 PAK.

79-WHEN TCM ADAPTER H-25010-A IS USED, THE TUNNET KEY "SP1" MUST BE DEDICATED TO THE CONTROL OF THAT CIRCUIT. (OMIT "D" & USE "H WIRING"). IF RESTRICTED NIGHT CALLING SERVICE IS ALSO PROVIDED, AN EXTERNAL KEY OR SWITCH MUST BE PROVIDED TO CONTROL THAT FEATURE (OMIT "D" AND USE "H WIRING). WITHOUT TCM, "D" WIRING MAY BE USED FOR CONTROL OF RESTRICTED NIGHT CALLING OR A SIMILAR FEATURE.

80-SELECT CAPLEX PER TABLE C4 D FOR FIGURES
3A & 4A.

51-NON-LOCKING KEY "SP" IS 1 SPARE PUSH TYPE KEY, AVAILABLE FOR ATT' DAILY CONTROL OF OPTIONAL EQUIPMENT AS REQUIRED (E.G. TURRET TRANSFER ETC.)

52. IF ATTENDANT REQUIRES A HEADSET, ORDER ONE FIGURE 5A HEADSET AMPLIFIER UNIT H-88661-2 PER TURPET AND INSTRUCT INSTALLER TO CUT STRAP "C" AND CONNECT FIGURE 5A AS SHOWN.

59-CONNECTORS ARE USED WHEN CONNECTOR KNOWN CABLE IS SUPPLIED ON INSTALLER'S SIDE OF TERMINAL BLOCK (FOR QUICK CONNECT FACILITIES).

54. BATTERY AND GROUND LEADS IN FIGURE CT1 AND BATTERY LEADS IN FIGURE CT2 SHALL BE TERMINATED ON COMMON BATTERY AND GROUND TERMINALS OF RESPECTIVE BARRIER STRIP OR TERMINAL BLOCK.

L - DENOTES LOCKING
 NL - DENOTES NON LOCKING
 - MALE PLUG
 - FEMALE PLUG
 - TERMINAL ON TERMINAL BOARD ASSY.
 - TERMINAL ON DIODE BOARD ASSY

1-IN FIGURE 2A ONLY, GROUND "A" MULTIPLES TO KEYS AND/OR SW. NO. 10, 11 AND THE RED ALARM LAMP. GROUND "B" MULTIPLES TO THE "HONK" "SPL. BUZZER" "AX" "WIGHT 1" "WIGHT 2" AND "SPL. KEYS & DIAL. GROUND "C" MULTIPLES TO THE TALK KEYS FOR TRUNKS 1-25. GROUND "D" MULTIPLES TO THE TALK KEYS FOR TRUNKS 1 THRU 20. THE FOUR GROUND MULTIPLES ARE FURNISHED TO AID SHOP TESTING AND FIELD MAINTENANCE.

2-ALL DIOWES ARE FD-1029-00 UNLESS OTHERWISE SPECIFIED.

3-LEADS BETWEEN DIODES AND LAMP'S ARE A PART OF DIODE BOARD ASSEMBLY.

CABLE NO.	ISSUES		M.C. PART OF SUPERSEDED BY	WIRED TO FACTORY INSTALLATION	FIGURE OR SUFFIX	TABLE NOTE
	FIRST USED	LAST USED				
A						
B						
C	1			*	1A, 2A	52
D	1			*	1A, 2A	79
E	1			*	1A, 2A	79
F	1			*	1A, 2A	79
G						
H						
I						
J						
K						
L						
M						
N						
O						
P						
Q						
R						
S						
T						
U						
V	1			*	1A, 2A	77
W						
X	1			*	1A, 2A	78
Y				*	1A, 2A	79
Z						

CRY FIDS.	12 THR. TURRET	16 THR. TURRET	BUSY LAMP FIELD FOR TYPE 40 PAGE	BUSY LAMP FIELD FOR TYPE 80 PAGE
ODR. FIDS.	FIG.1A	FIG.2A	FIG.3A	FIG.4A
1A	*			
2A		*		
3A	*		*	
4A				

M.O.A. M-889217 (FIVE, 1A, 2A, 3A & 4A)

ASSOCIATED EXAMINER

ASSOCIATED DRAWINGS		
DRAWING NO.	ISS.	DESCRIPTION
E-73376-B	1	EXPLANATION

ATTENDANCE'S TURNKEY CIRCUIT
FOR TYPE 40, 90 OR
100 PAX

H-73576-B

[illegible]

513 AUTOMATIC ELECTRIC

NORTHAMPTON, U.S.A. SENDA, IL, U.S.A. NAUKOWA, WI, U.S.A. MONTVILLE, W.V., U.S.A.

TABLE C (NOTE 50)

MAXIMUM LENGTH OF NEGATIVE POWER LEAD BETWEEN POWER SUPPLY AND BUSY LAMP FIELD (IN FEET) BASED ON 0.7 OHMS RESISTANCE FOR TYPE AO PABX AND 0.5 OHMS FOR TYPE BO PABX			
ANG.	TYPE AO PABX		TYPE BO PABX
	COPPER	ALUMINUM	COPPER ALUMINUM
22	102 FT.	30 FT.	
18	107 FT.	76 FT.	
14	220 FT.	132 FT.	
12	520 FT.	300 FT.	
10	685 FT.	490 FT.	
8	1120 FT.	610 FT.	780 FT. 565 FT.
6	1785 FT.	990 FT.	1240 FT. 710 FT.

TABLE D (NOTE 50)

ALLOWABLE CABLE LENGTH (IN FEET) BETWEEN SWITCHBOARD LINE CIRCUITS AND BUSY LAMP FIELD BASED ON 0.9 OHMS FOR TYPE AO PABX AND 0.5 OHMS FOR TYPE BO PABX		
A.W.G. COPPER	TYPE AO PABX	TYPE BO PABX
26	350 FT.	130 FT.
22	500 FT.	190 FT.
20	910 FT.	300 FT.
18	1820 FT.	605 FT.

TABLE E

DIODE BOARD LAMP TERMINATIONS 26 TRUNK TURRET			
LAMP NO.	DIODE NO. TERMINAL	CKY. DESIG.	
20	2	T20	5
21	2	T21	26
22	1	T22	1
23	4	T23	27
24	3	T24	2
25	6	T25	28
26	5	T26	3
27	8	T27	29
28	7	T28	4
29	10	T29	30
30	12	T30	10
31	13	T31	31
32	11	T32	6
33	14	T33	32
34	13	T34	7
35	1	T35	33
36	15	T36	8
37	18	T37	34
38	17	T38	9
39	20	T39	35
40	19	T40	12
41	22	T41	36
42	21	T42	11
43	24	T43	37
44	23	T44	13
45	26	T45	38
46	25	T46	13
47	28	T47	39
48	27	T48	14
49	30	T49	40
50	29	T50	20
51	32	T51	41
52	31	T52	16
53	34	T53	42
54	33	T54	17
55	36	T55	43
56	35	T56	18
57	38	T57	44
58	37	T58	19
59	40	T59	45
60	39	T60	21
61	42	T61	46
62	41	T62	22
63	44	T63	47
64	43	T64	23
65	46	T65	48
66	45	T66	24
67	48	T67	49
68	47	T68	25
69	50	T69	50
70	49	T70	26
71	52	T71	51
72	51	T72	27
73	54	T73	52
74	53	T74	28
75	56	T75	53
76	55	T76	29
77	58	T77	54
78	57	T78	30
79	60	T79	55
80	59	T80	31
81	62	T81	56
82	61	T82	32
83	64	T83	57
84	63	T84	33
85	66	T85	58
86	65	T86	34
87	68	T87	59
88	67	T88	35
89	70	T89	60
90	69	T90	36
91	72	T91	61
92	71	T92	37
93	74	T93	62
94	73	T94	38
95	76	T95	63
96	75	T96	39
97	78	T97	64
98	77	T98	40
99	80	T99	65
100	79	T100	41
101	82	T101	66
102	81	T102	42
103	84	T103	67
104	83	T104	43
105	86	T105	68
106	85	T106	44
107	88	T107	69
108	87	T108	45
109	90	T109	70
110	89	T110	46
111	92	T111	71
112	91	T112	47
113	94	T113	72
114	93	T114	48
115	96	T115	73
116	95	T116	49
117	98	T117	74
118	97	T118	50
119	100	T119	75
120	99	T120	51
121	102	T121	76
122	101	T122	52
123	104	T123	77
124	103	T124	53
125	106	T125	78
126	105	T126	54
127	108	T127	79
128	107	T128	55
129	110	T129	80
130	109	T130	56
131	112	T131	81
132	111	T132	57
133	114	T133	82
134	113	T134	58
135	116	T135	83
136	115	T136	59
137	118	T137	84
138	117	T138	60
139	120	T139	85
140	119	T140	61
141	122	T141	86
142	121	T142	62
143	124	T143	87
144	123	T144	63
145	126	T145	88
146	125	T146	64
147	128	T147	89
148	127	T148	65
149	130	T149	90
150	129	T150	66
151	132	T151	91
152	131	T152	67
153	134	T153	92
154	133	T154	68
155	136	T155	93
156	135	T156	69
157	138	T157	94
158	137	T158	70
159	140	T159	95
160	139	T160	71
161	142	T161	96
162	141	T162	72
163	144	T163	97
164	143	T164	73
165	146	T165	98
166	145	T166	74
167	148	T167	99
168	147	T168	75
169	150	T169	100
170	149	T170	76
171	152	T171	101
172	151	T172	77
173	154	T173	102
174	153	T174	78
175	156	T175	103
176	155	T176	79
177	158	T177	104
178	157	T178	80
179	160	T179	105
180	159	T180	81
181	162	T181	106
182	161	T182	82
183	164	T183	107
184	163	T184	83
185	166	T185	108
186	165	T186	84
187	168	T187	109
188	167	T188	85
189	170	T189	110
190	169	T190	86
191	172	T191	111
192	171	T192	87
193	174	T193	112
194	173	T194	88
195	176	T195	113
196	175	T196	89
197	178	T197	114
198	177	T198	90
199	180	T199	115
200	179	T200	91
201	182	T201	116
202	181	T202	92
203	184	T203	117
204	183	T204	93
205	186	T205	118
206	185	T206	94
207	188	T207	119
208	187	T208	95
209	190	T209	120
210	189	T210	96
211	192	T211	121
212	191	T212	97
213	194	T213	122
214	193	T214	98
215	196	T215	123
216	195	T216	99
217	198	T217	124
218	197	T218	100
219	200	T219	125
220	199	T220	101
221	202	T221	126
222	201	T222	102
223	204	T223	127
224	203	T224	103
225	206	T225	128
226	205	T226	104
227	208	T227	129
228	207	T228	105
229	210	T229	130
230	209	T230	106
231	212	T231	131
232	211	T232	107
233	214	T233	132
234	213	T234	108
235	216	T235	133
236	215	T236	109
237	218	T237	134
238	217	T238	110
239	220	T239	135
240	219	T240	111
241	222	T241	136
242	221	T242	112
243	224	T243	137
244	223	T244	113
245	226	T245	138
246	225	T246	114
247	228	T247	139
248	227	T248	115
249	230	T249	140
250	229	T250	116
251	232	T251	141
252	231	T252	117
253	234	T253	142
254	233	T254	118
255	236	T255	143
256	235	T256	119
257	238	T257	144
258	237	T258	120
259	240	T259	145
260	239	T260	121
261	242	T261	146
262	241	T262	122
263	244	T263	147
264	243	T264	123
265	246	T265	148
266	245	T266	124
267	248	T267	149
268	247	T268	125
269	250	T269	150
270	249	T270	126
271	252	T271	151
272	251	T272	127
273	254	T273	152
274	253	T274	128
275	256	T275	153
276	255	T276	129
277	258	T277	154
278	257	T278	130
279	260	T279	155
280	259	T280	131
281	262	T281	156
282	261	T282	132
283	264	T283	157
284	263	T284	133
285	266	T285	158
286	265	T286	134
287	268	T287	159
288	267	T288	135
289	270	T289	160
290	269	T290	136
291	272	T291	161
292	271	T292	137
293	274	T293	162
294	273	T294	138
295	276	T295	163
296	275	T296	139
297	278	T297	164
298	277	T298	140
299	280	T299	165
300	279	T300	141
301	282	T301	166
302	281	T302	142
303	284	T303	167
304	283	T304	143
305	286	T305	168
306	285	T306	144
307	288	T307	169
308	287	T308	145
309	290	T309	170
310	289	T310	146
311	292	T311	171
312	291	T312	147
313	294	T313	172
314	293	T314	148
315	296	T315	173
316	295	T316	149
317	298	T317	174
318	297	T318	150
319	300	T319	175
320	299	T320	151
321	302	T321	176
322	301	T322	152
323	304	T323	177
324	303	T324	153
325	306	T325	178
326	305	T326	154
327	308	T327	179
328	307	T328	155
329	310	T329	180
330	309	T330	156
331	312	T331	181
332	311	T332	157
333	314	T333	182
334	313	T334	158
335	316	T335	183
336	315	T336	159
337	318	T337	184
338	317	T338	160
339	320	T339	185
340	319	T340	161
341	322	T341	186
342	321	T342	162
343	324	T343	187
344	323	T344	163
345	326	T345	188
346	325	T346	164
347	328	T347	189
348	327	T348	165
349	330	T349	190
350	329	T350	166
351	332	T351	191
352	331	T352	167
353	334	T353	192
354	333	T354	168
355	336	T355	193
356	335	T356	169
357	338	T357	194
358	337	T358	170
359	340	T359	195
360	339	T360	171
361	342	T361	196
362	341	T362	172
363	344	T363	197
364	343	T364	173
365	346	T365	198
366	345	T366	174
367	348	T367	199
368	347	T368	175
369	350	T369	200
370	349	T370	176
371	352	T371	201
372	351	T372	177
373	354	T373	202
374	353	T374	

TABLE 1	
Year	Population
1950	1,000,000
1955	1,100,000
1960	1,200,000
1965	1,300,000
1970	1,400,000
1975	1,500,000
1980	1,600,000
1985	1,700,000
1990	1,800,000
1995	1,900,000
2000	2,000,000
2005	2,100,000
2010	2,200,000
2015	2,300,000
2020	2,400,000
2025	2,500,000
2030	2,600,000
2035	2,700,000
2040	2,800,000
2045	2,900,000
2050	3,000,000

TABLE 2	
Year	Population
1950	1,000,000
1955	1,100,000
1960	1,200,000
1965	1,300,000
1970	1,400,000
1975	1,500,000
1980	1,600,000
1985	1,700,000
1990	1,800,000
1995	1,900,000
2000	2,000,000
2005	2,100,000
2010	2,200,000
2015	2,300,000
2020	2,400,000
2025	2,500,000
2030	2,600,000
2035	2,700,000
2040	2,800,000
2045	2,900,000
2050	3,000,000

TABLE 3	
Year	Population
1950	1,000,000
1955	1,100,000
1960	1,200,000
1965	1,300,000
1970	1,400,000
1975	1,500,000
1980	1,600,000
1985	1,700,000
1990	1,800,000
1995	1,900,000
2000	2,000,000
2005	2,100,000
2010	2,200,000
2015	2,300,000
2020	2,400,000
2025	2,500,000
2030	2,600,000
2035	2,700,000
2040	2,800,000
2045	2,900,000
2050	3,000,000

12 TRUNK TURKEY	26 TRUNK TURKEY
(SEE TABLE A)	

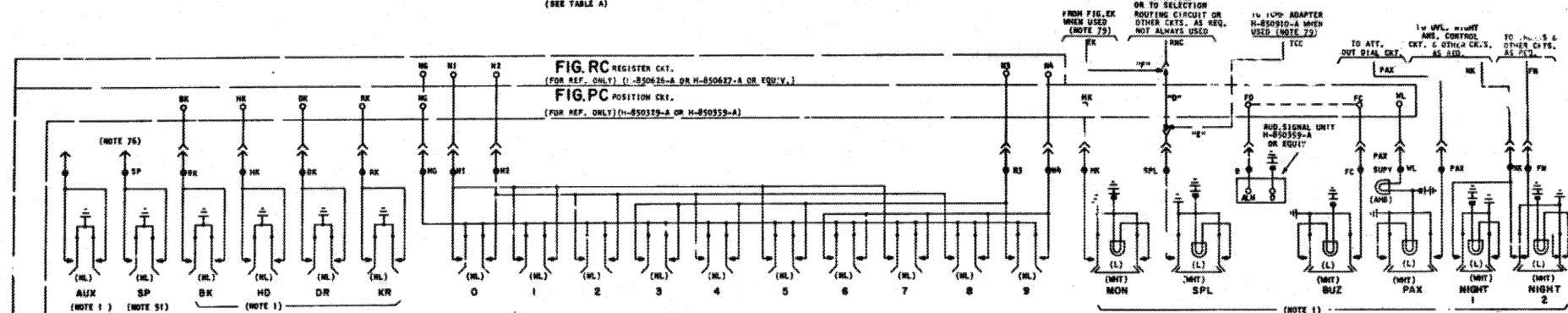


FIG. RC REGISTER CKT.
(FOR REF. ONLY) (1) 850626-A OR H-850627-A OR EQUIV.)

FIG. PC POSITION CRT.
(FOR REF. ONLY)(H-850379-A OR H-850359-A)

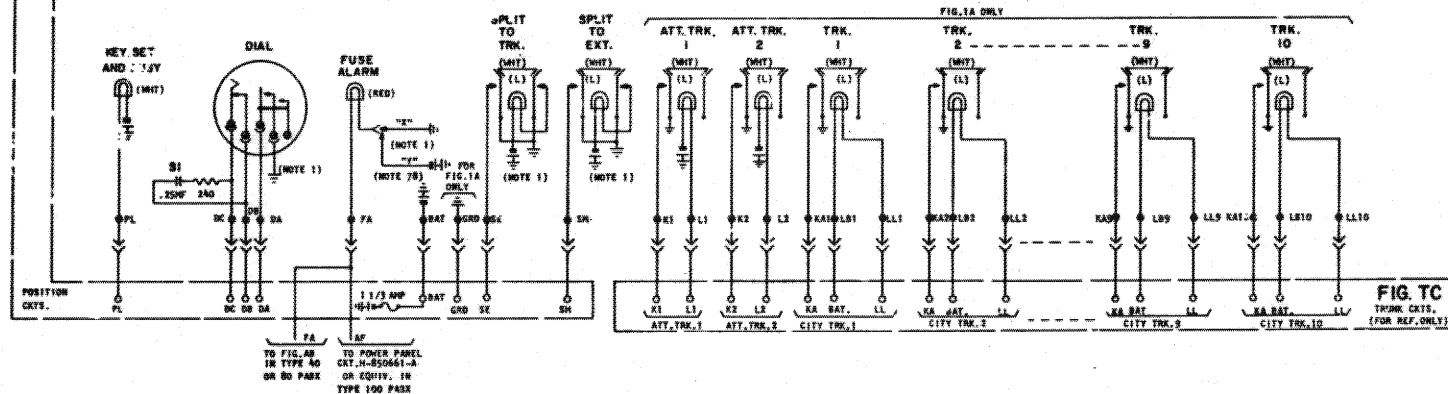


FIG. 61
TERMINAL ASSIGNMENT

FIG. 1A
12 TRK. TURNST

{NOTE 53}	
PLUG	
	TERMINA

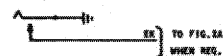
FIN	CRITICAL DESIGNATION	P1
26	K1	1
27	K2	1
28	K3	1
29	K4	1
30	K5	1
31	K6	1
32	K7	1
33	K8	1
34	K9	1
35	K10	1
36	K11	1
37	K12	1
38	K13	1
39	K14	1
40	K15	1
41	K16	1
42	K17	1
43	K18	1
44	K19	1
45	K20	1
46	K21	1
47	K22	1
48	K23	1
49	K24	1
50	K25	1
51	K26	1
52	K27	1
53	K28	1
54	K29	1
55	K30	1
56	K31	1
57	K32	1
58	K33	1
59	K34	1
60	K35	1
61	K36	1
62	K37	1
63	K38	1
64	K39	1
65	K40	1
66	K41	1
67	K42	1
68	K43	1
69	K44	1
70	K45	1
71	K46	1
72	K47	1
73	K48	1
74	K49	1
75	K50	1
76	K51	1
77	K52	1
78	K53	1
79	K54	1
80	K55	1
81	K56	1
82	K57	1
83	K58	1
84	K59	1
85	K60	1
86	K61	1
87	K62	1
88	K63	1
89	K64	1
90	K65	1
91	K66	1
92	K67	1
93	K68	1
94	K69	1
95	K70	1
96	K71	1
97	K72	1
98	K73	1
99	K74	1
100	K75	1

PLUG 2		
0.200	TERMINAL	0.1

FIN	TERMINAL DESIGNATION	P1
26	PAX	1
27	RAL	2
28	GRD	3
29	LEI	4
30	LE3	5
31	LE5	6
32	LE7	7
33	LE2	8
34	SPL	9
35		10
36		11
37		12
38		13
39		14
40		15
41		16
42		17
43		18
44		19
45		20
46		21
47		22
48		23
49		24

.....

FIG. EK
EXTERNAL LOCKING KEY
ON SPST SWITCH
(FOR REF. ONLY)

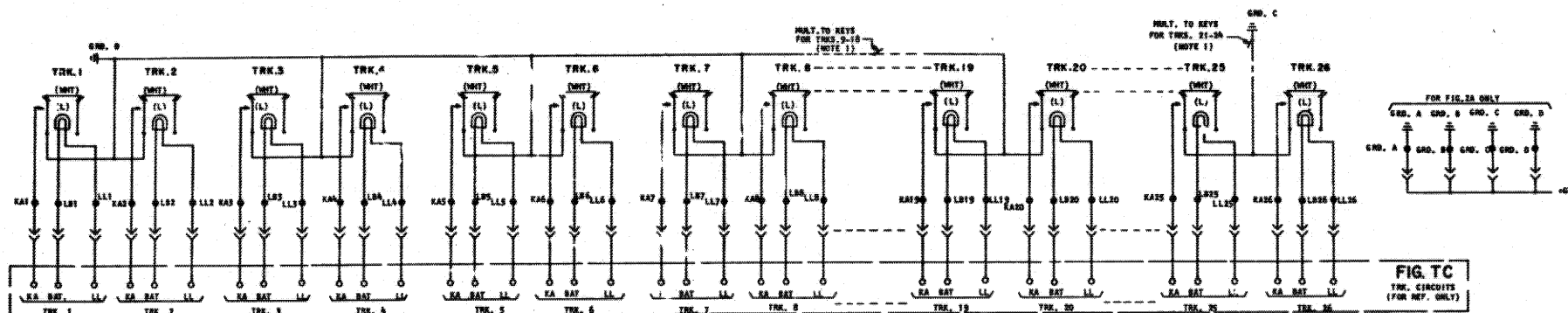


TERMINAL BOARD 1
FOR FIG. 1A & 2A
(AS SEEN FROM REAR OF UNIT)
INSTALLER'S SIDE

HZ	KAZ	KAA	KAG	KAO	KAT	FW	HK	DA	HZ
SE	TS	WL	LBA	LBB	LZ	LLZ	LLA	LLG	LLB
LLIO	PD	OK	PL	NI	HQ	TA	PAN	GRD	LES
LET	SPL	KI	KAI	KAS	KAG	KAZ	KAS	FC	HK
SP	DC	NA	HK	RS	LES	LBS	LBIO	L1	LL1
LL3	LL5	LL7	LL9	FA	HK	SK	DB	H3	SH
BA	ZAT	BS1	LBS	LS9					

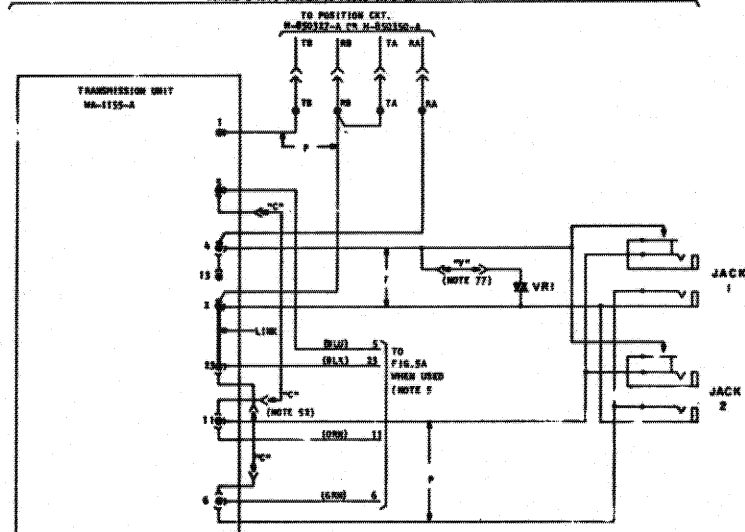
FIG. TC
TRUCK CKTS.
(FOR REF. ONLY)

H-73576-B

PART OF FIG. 2A (TABLE A)
26 TRUNK TURRET

PART OF FIG. 1A ON 2A

WIRING & APP. CORRESP. TO FIGS. 1A & 2A

TERMINAL BOARD 2
FOR FIG. 2A
(AS SEEN FROM REAR OF UNIT)
INSTALLER'S SIDE

TIMALAK'S STORE															
LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8	LL9	LL10	LL11	LL12	LL13	LL14	LL15	LL16
LL17	LL18	LL19	LL20	LL21	LL22	LL23	LL24	LL25	LL26	LL27	LL28	LL29	LL30	LL31	LL32
LL33	LL34	LL35	LL36	LL37	LL38	LL39	LL40	LL41	LL42	LL43	LL44	LL45	LL46	LL47	LL48
LL49	LL50	LL51	LL52	LL53	LL54	LL55	LL56	LL57	LL58	LL59	LL60	LL61	LL62	LL63	LL64
LL65	LL66	LL67	LL68	LL69	LL70	LL71	LL72	LL73	LL74	LL75	LL76	LL77	LL78	LL79	LL80
LL81	LL82	LL83	LL84	LL85	LL86	LL87	LL88	LL89	LL90	LL91	LL92	LL93	LL94	LL95	LL96
LL97	LL98	LL99	LL100	LL101	LL102	LL103	LL104	LL105	LL106	LL107	LL108	LL109	LL110	LL111	LL112
LL113	LL114	LL115	LL116	LL117	LL118	LL119	LL120	LL121	LL122	LL123	LL124	LL125	LL126	LL127	LL128
LL129	LL130	LL131	LL132	LL133	LL134	LL135	LL136	LL137	LL138	LL139	LL140	LL141	LL142	LL143	LL144
LL145	LL146	LL147	LL148	LL149	LL150	LL151	LL152	LL153	LL154	LL155	LL156	LL157	LL158	LL159	LL160
LL161	LL162	LL163	LL164	LL165	LL166	LL167	LL168	LL169	LL170	LL171	LL172	LL173	LL174	LL175	LL176
LL177	LL178	LL179	LL180	LL181	LL182	LL183	LL184	LL185	LL186	LL187	LL188	LL189	LL190	LL191	LL192
LL193	LL194	LL195	LL196	LL197	LL198	LL199	LL200	LL201	LL202	LL203	LL204	LL205	LL206	LL207	LL208
LL209	LL210	LL211	LL212	LL213	LL214	LL215	LL216	LL217	LL218	LL219	LL220	LL221	LL222	LL223	LL224
LL225	LL226	LL227	LL228	LL229	LL230	LL231	LL232	LL233	LL234	LL235	LL236	LL237	LL238	LL239	LL240
LL241	LL242	LL243	LL244	LL245	LL246	LL247	LL248	LL249	LL250	LL251	LL252	LL253	LL254	LL255	LL256
LL257	LL258	LL259	LL260	LL261	LL262	LL263	LL264	LL265	LL266	LL267	LL268	LL269	LL270	LL271	LL272
LL273	LL274	LL275	LL276	LL277	LL278	LL279	LL280	LL281	LL282	LL283	LL284	LL285	LL286	LL287	LL288
LL289	LL290	LL291	LL292	LL293	LL294	LL295	LL296	LL297	LL298	LL299	LL300	LL301	LL302	LL303	LL304
LL305	LL306	LL307	LL308	LL309	LL310	LL311	LL312	LL313	LL314	LL315	LL316	LL317	LL318	LL319	LL320
LL321	LL322	LL323	LL324	LL325	LL326	LL327	LL328	LL329	LL330	LL331	LL332	LL333	LL334	LL335	LL336
LL337	LL338	LL339	LL340	LL341	LL342	LL343	LL344	LL345	LL346	LL347	LL348	LL349	LL350	LL351	LL352
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LL1313	LL1314														

FIG. 3A (TABLE E)

BURY LAMP FIELD FOR TYPE NO PARK

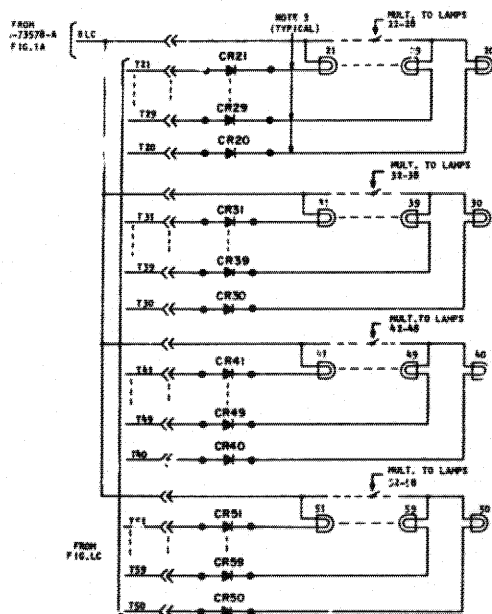


FIG. 4A (TABLE F)

BURY LAMP FIELD FOR TYPE 80 PARK

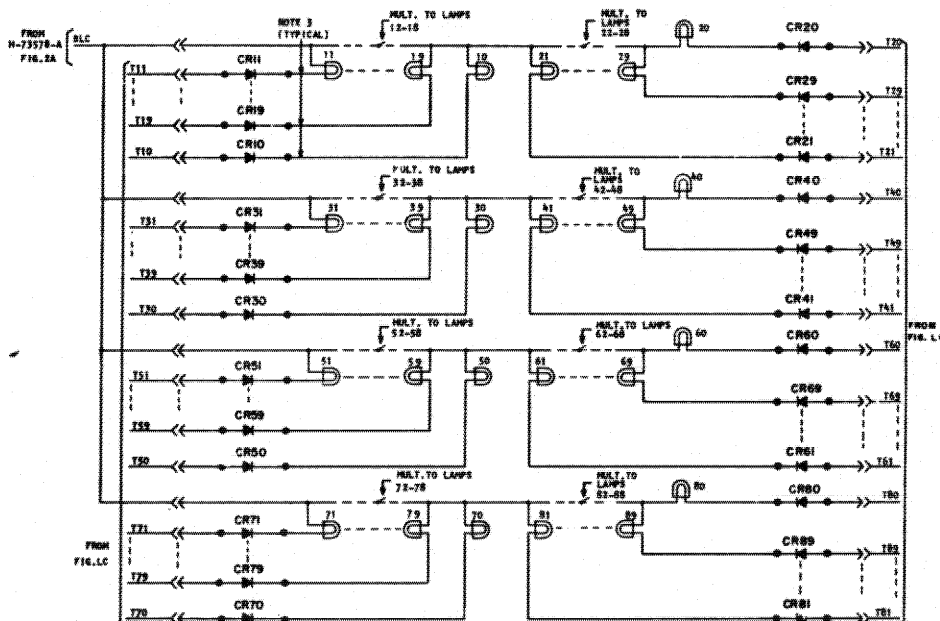


FIG. 5A (NOTE 52)

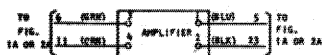
HEADSET AMPLIFIER
H-886661-2


FIG. AB

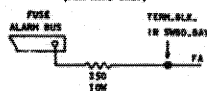
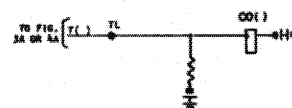
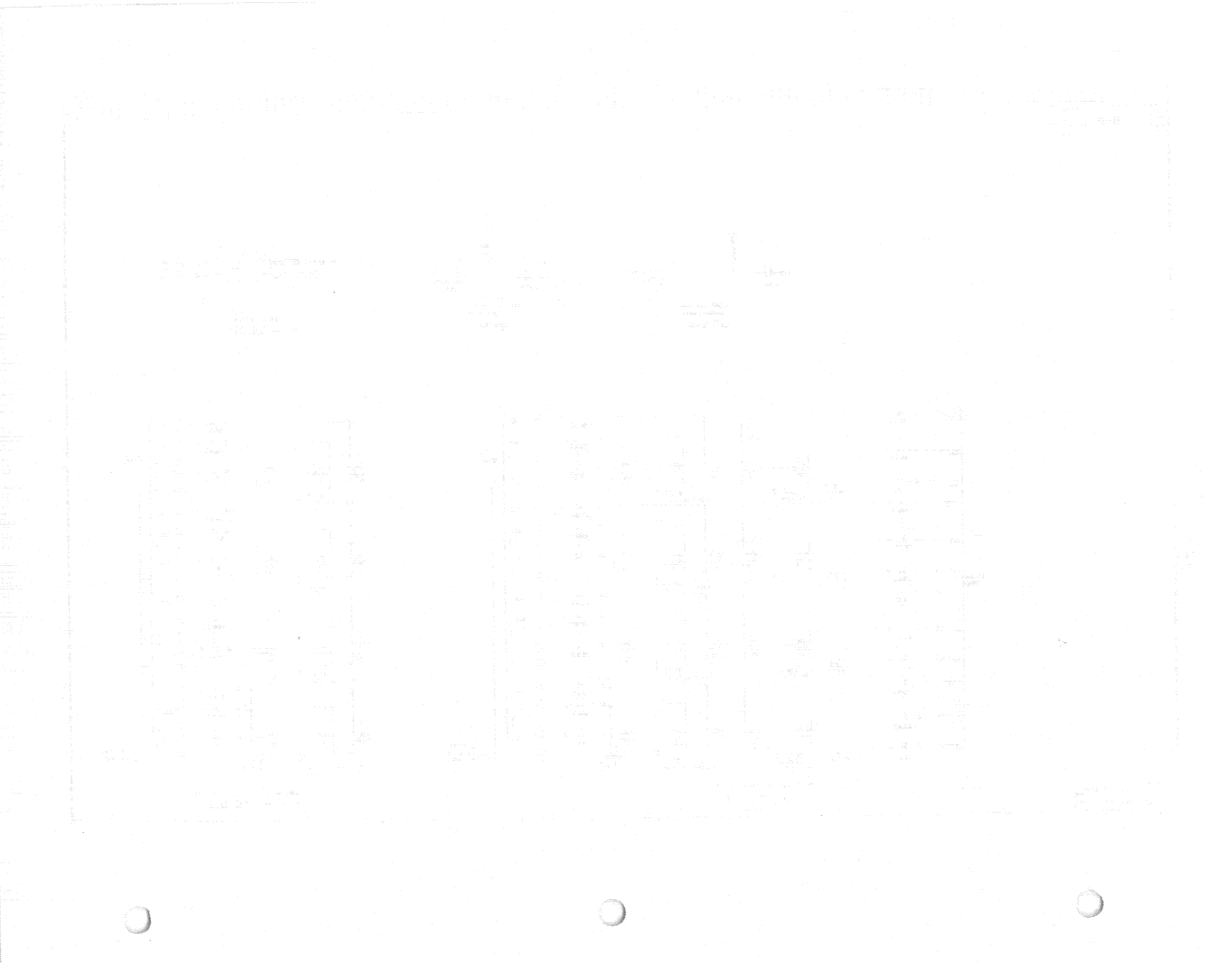
ALARM BUS
TYPES NO & 80 PARK
(FOR REF. ONLY)


FIG. 1C

LINE CIRCUIT
(FOR REF. ONLY)




CIRCUIT EXPLANATION

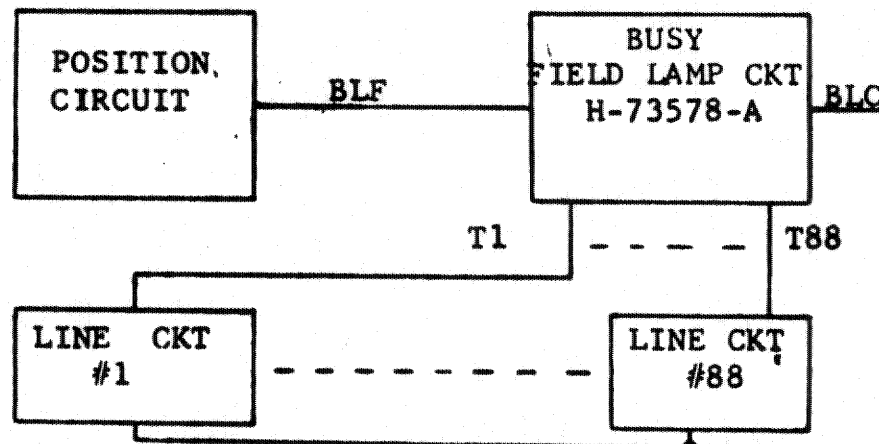
BUSY LAMP FIELD CIRCUIT
TYPE 40 AND 80 PABX
TYPE 900 RELAYS
H-73578-A

(Written specifically for circuit issue 1,
but may also apply to later issues. Refer
to H print for appropriate E issue number.)

GENERAL

This circuit is used with a type 40 or 80 PABX system having an Attendant's Turret equipped with an optional busy lamp field. Each station line is represented by an individual lamp on the busy lamp field. Whenever a station line is busy, ground is connected to one side of the lamp associated with that particular line. When a key is operated at the Attendant's Turret, battery is connected to the common side of the busy field lamps thereby lighting the lamps associated with the busy station lines. This arrangement allows the Attendant to determine at a glance which trunks are busy or available for use. This arrangement also eliminates the need of the Attendant having to key up a number of extension lines in order to determine the availability of extension lines.

FIG BD



A TYPICAL ARRANGEMENT OF EQUIPMENT

WRITTEN BY

J.F. Zurawski

APPROVED
KJ 4/26

ISSUE

1

DRAWING NO.

E- 73578-A

FEATURES

- (a) Provides an individual busy lamp for every extension in the PABX system

CIRCUIT OPERATION

When the Attendant operates a trunk key to answer a trunk call, ground is connected to lead BLF, closing relay BLC. Relay BLC operates and connects battery via the busy field power supply to the common battery lead of the busy lamp field, thereby lighting all lamps having ground connected to their respective "T" leads. The lighted lamps correspond to the busy extension lines.

Any lamp that is not lighted, corresponds to an idle line, and the Attendant may extend the incoming call by keying the particular number of the idle line.

The Attendant may operate a special key instead of an individual trunk key at any time in order to determine which lines are busy. The following operation is the same as that previously described.

When "Y" wiring is used, the Attendant does not have to operate any key in order to obtain a visual busy indication. Anytime a PABX extension becomes busy, its associated busy lamp lights and remains lighted for the duration of the call.

TABLE A

TABLE A			
STKL OR ASSY	DESCRIPTION	CIRCUIT OR WIRING DIAGRAM	METHOD OF ASSY.
H-889217-1 ASSY	ATTENDANTS TURRET FOR TYPE 40 PABX WITH BUSY LAMP FIELD.	W.D. H-59476 ASSOCIATED CIRCUIT H-73576-B FIG. 99A	H-889217
H-889217-3 ASSY	ATTENDANTS TURRET FOR TYPE 40 PABX WITH BUSY LAMP FIELD LESS CORD AND PLUG ASSY.		
H-889217-2 ASSY	ATTENDANTS TURRET FOR TYPE 40 PABX LESS BUSY LAMP FIELD.	W.D. H-59476 ASSOCIATED CIRCUIT H-73576-B FIG. 1A	
H-889217-4 ASSY	ATTENDANTS TURRET FOR TYPE 40 PABX LESS BUSY LAMP FIELD LESS CORD AND PLUG ASSY.		
H-889217-5 ASSY	ATTENDANTS TURRET FOR TYPE 80 PABX WITH BUSY LAMP FIELD.	W.D. H-59476 ASSOCIATED CIRCUIT H-73576-B FIG. 93A	
H-889217-7 ASSY	ATTENDANTS TURRET FOR TYPE 80 PABX WITH BUSY LAMP FIELD LESS CORD AND PLUG ASSY.		
H-889217-6 ASSY	ATTENDANTS TURRET FOR TYPE 80 PABX LESS BUSY LAMP FIELD.	W.D. H-59476 ASSOCIATED CIRCUIT H-73576-B FIG. 2A	
H-889217-8 ASSY	ATTENDANTS TURRET FOR TYPE 80 PABX LESS BUSY LAMP FIELD LESS CORD AND PLUG ASSY.		
H-886661-2 STKL	HEADSET AMPLIFIER KIT PROVIDES 12 DB GAIN FOR SUBSTITUTION OF AN OPERATOR HEADSET FOR TELEPHONE HANDSET WITHOUT LOSS IN TRANSMIT LEVEL.	H-27758	

MANUFACTURING NOTES:

- H-889217-1 TYPE 40 TURRET WITH BUSY LAMP, LAMP FIELD.
H-889217-2 TYPE 40 TURRET LESS BUSY LAMP, LAMP FIELD.
H-889217-3 TYPE 40 TURRET WITH BUSY LAMP, LAMP FIELD LESS CORD AND PLUG ASSEMBLY.
H-889217-4 TYPE 40 TURRET LESS BUSY LAMP, LAMP FIELD AND LESS CORD AND PLUG ASSEMBLY.
H-889217-5 TYPE 80 TURRET WITH BUSY LAMP, LAMP FIELD.
H-889217-6 TYPE 80 TURRET LESS BUSY LAMP, LAMP FIELD.
H-889217-7 TYPE 80 TURRET WITH BUSY LAMP, LAMP FIELD AND LESS CORD AND PLUG ASSEMBLY.
H-889217-8 TYPE 80 TURRET LESS BUSY LAMP, LAMP FIELD AND LESS CORD AND PLUG ASSEMBLY.
- "89" DENOTES COMBINING OF "81" ITEMS AND FACTORY MOUNTED ITEMS.
- "81" ITEMS ARE NOT MOUNTED BY FACTORY.
- WIRE PER H-73576-B CIRCUIT.
H-59476 WIRING DIAGRAM.
- FOR TYPICAL MOUNTING OF PUSH KEYS SEE FIGURE D.
- DIMENSIONS IN PARENTHESES () ARE FOR REFERENCE ONLY.
- ITEM 124 GREEN CORD AND ITEM 126 GREEN-WHITE CORD TO BE PAIRED BY TWISTING TOGETHER PRIOR TO SOLDERING IN ASSEMBLY; ITEM 125 BLUE CORD AND ITEM 127 BLUE-WHITE CORD TO BE PAIRED BY TWISTING TOGETHER PRIOR TO SOLDERING IN ASSEMBLY.

ENGINEERING NOTES:

- WHEN OPERATOR'S HEADSET IS SUBSTITUTED FOR THE HANDSET ORDER:
(1) H-886661-2 AMPLIFIER
(1) D-762047-C PHIMS
TO ACHIEVE 12 DB GAIN AND OVERCOME LOSS IN TRANSMIT LEVEL.

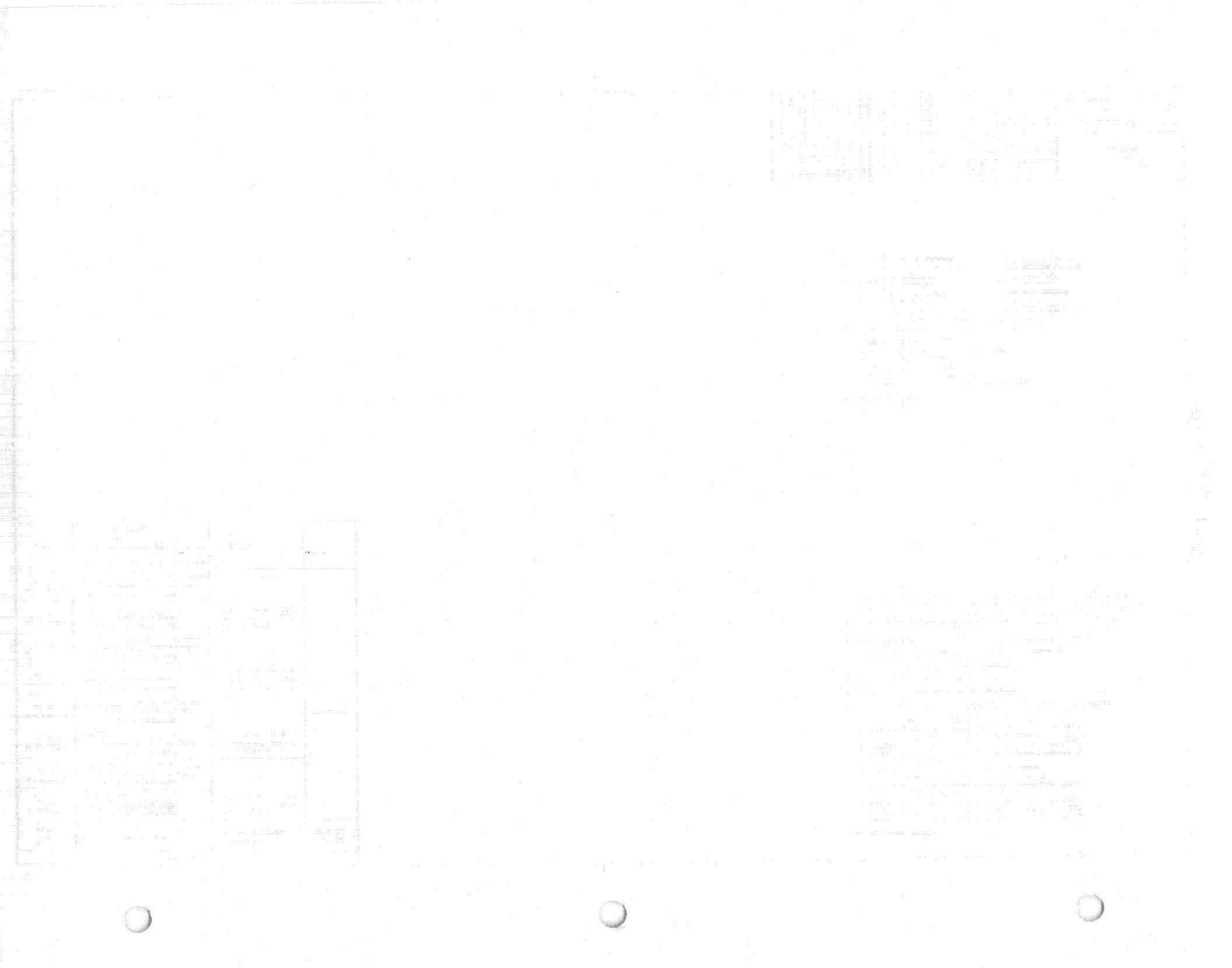
- ITEM 3 FACEPLATE IS ORDERED SEPARATELY PER COLOR SPECIFIED BY CUSTOMER AS FOLLOWS.

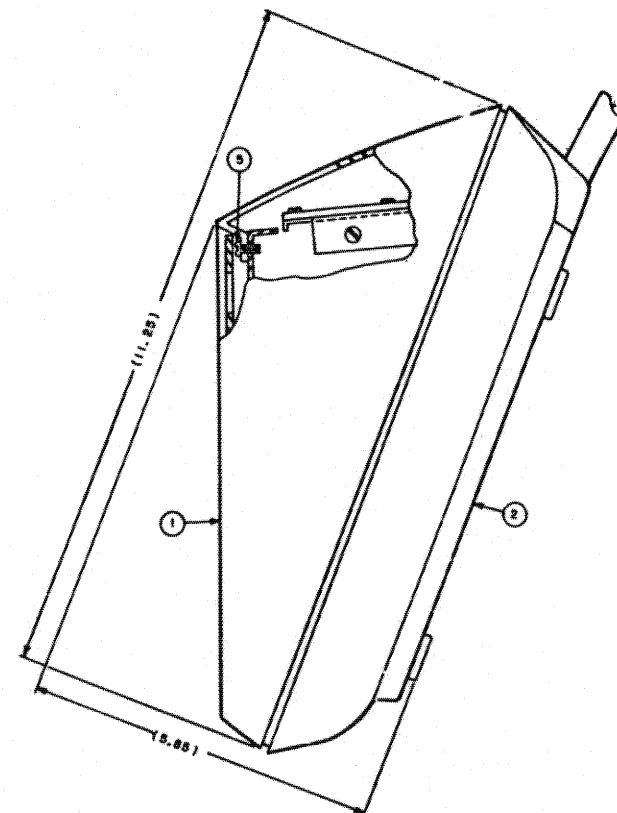
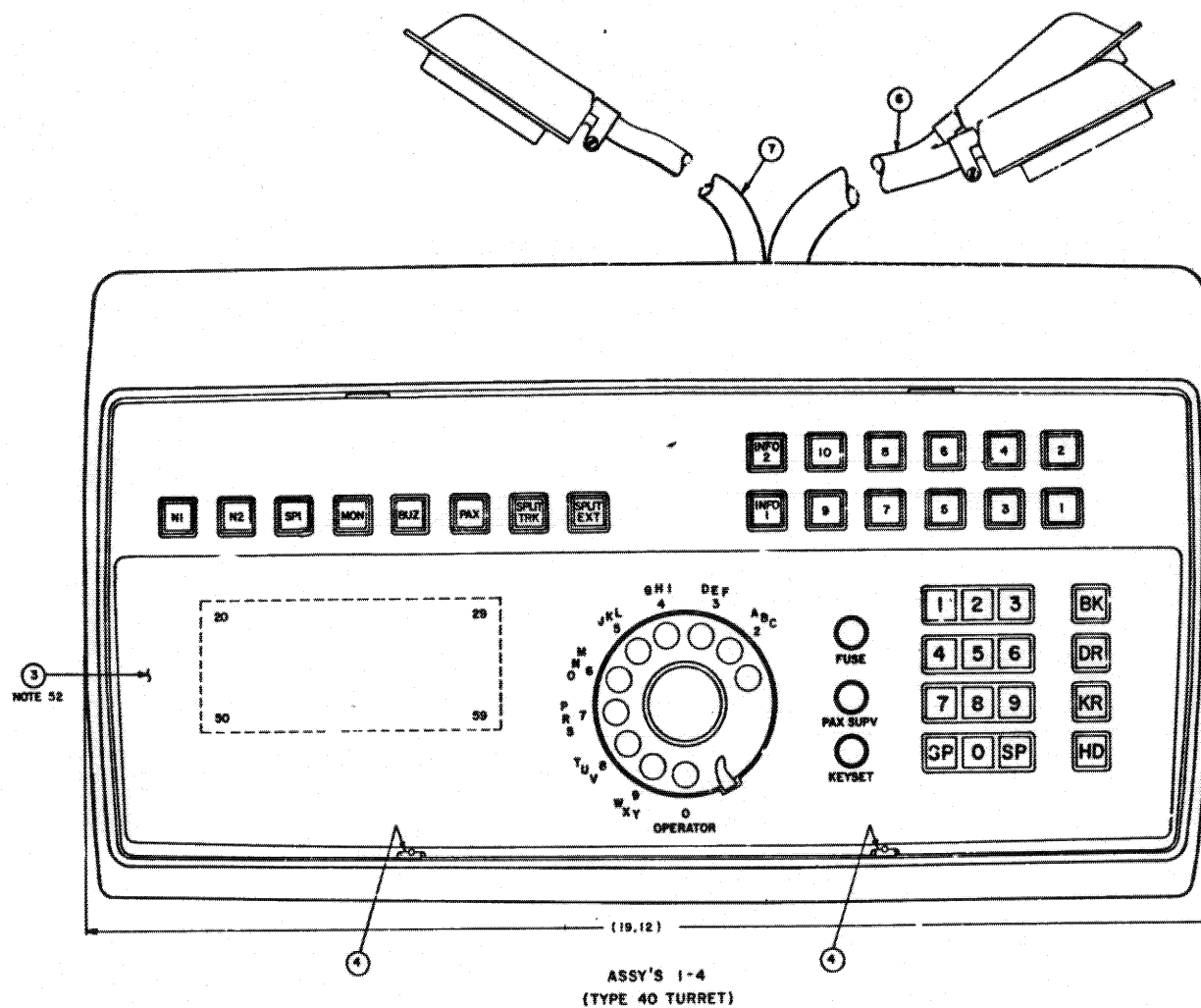
TYPE 40 TURRET	TYPE 80 TURRET
-A BLUE	-A BLUE
-B RUST BROWN	-B RUST BROWN
-C AVOCADO	-C AVOCADO
-D TAN GRAY	-D TAN GRAY
-E MEDIUM YELLOW	-E MEDIUM YELLOW
-F BURNT ORANGE	-F BURNT ORANGE

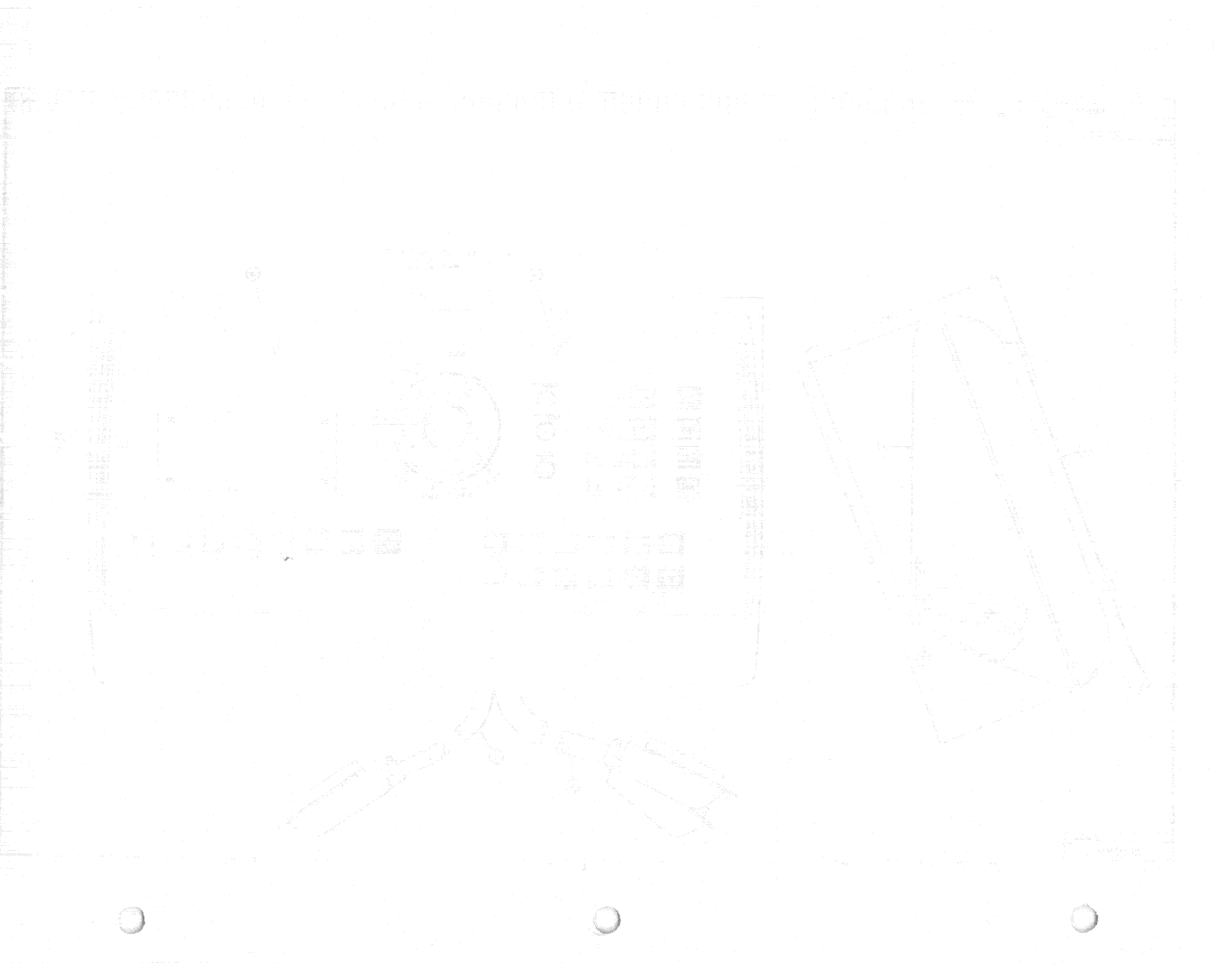
D-781098

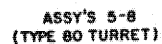
D-781101

DESIGNED G.A. POST	DR. JC	TYPE 40 AND 80 PABX TURRET REDESIGN
APPROVED L. F. LANGE	DR. J. V.	
4348	DATE 11/1/73	
DO NOT SCALE DRAWING		
THE DRAWING IS THE PROPERTY OF AUTOMATIC ELECTRIC COMPANY, INC. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM AUTOMATIC ELECTRIC COMPANY, INC.		H-889217 SHEET 1 OF 7 AUTOMATIC ELECTRIC COMPANY NORTH AVE., ILL. U.S.A. • GENEVA, ILL. U.S.A. • WILMINGTON, DE. U.S.A.
H-889217 112688-H SHEET 1 OF 7 CHANGES 1. 11/1/73 2. 11/1/73 3. 11/1/73 4. 11/1/73 5. 11/1/73 6. 11/1/73 7. 11/1/73 8. 11/1/73 9. 11/1/73 10. 11/1/73 11. 11/1/73 12. 11/1/73 13. 11/1/73 14. 11/1/73 15. 11/1/73 16. 11/1/73 17. 11/1/73 18. 11/1/73 19. 11/1/73 20. 11/1/73 21. 11/1/73 22. 11/1/73 23. 11/1/73 24. 11/1/73 25. 11/1/73 26. 11/1/73 27. 11/1/73 28. 11/1/73 29. 11/1/73 30. 11/1/73 31. 11/1/73 32. 11/1/73 33. 11/1/73 34. 11/1/73 35. 11/1/73 36. 11/1/73 37. 11/1/73 38. 11/1/73 39. 11/1/73 40. 11/1/73 41. 11/1/73 42. 11/1/73 43. 11/1/73 44. 11/1/73 45. 11/1/73 46. 11/1/73 47. 11/1/73 48. 11/1/73 49. 11/1/73 50. 11/1/73 51. 11/1/73 52. 11/1/73 53. 11/1/73 54. 11/1/73 55. 11/1/73 56. 11/1/73 57. 11/1/73 58. 11/1/73 59. 11/1/73 60. 11/1/73 61. 11/1/73 62. 11/1/73 63. 11/1/73 64. 11/1/73 65. 11/1/73 66. 11/1/73 67. 11/1/73 68. 11/1/73 69. 11/1/73 70. 11/1/73 71. 11/1/73 72. 11/1/73 73. 11/1/73 74. 11/1/73 75. 11/1/73 76. 11/1/73 77. 11/1/73 78. 11/1/73 79. 11/1/73 80. 11/1/73 81. 11/1/73 82. 11/1/73 83. 11/1/73 84. 11/1/73 85. 11/1/73 86. 11/1/73 87. 11/1/73 88. 11/1/73 89. 11/1/73 90. 11/1/73 91. 11/1/73 92. 11/1/73 93. 11/1/73 94. 11/1/73 95. 11/1/73 96. 11/1/73 97. 11/1/73 98. 11/1/73 99. 11/1/73 100. 11/1/73		









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SHEET 4

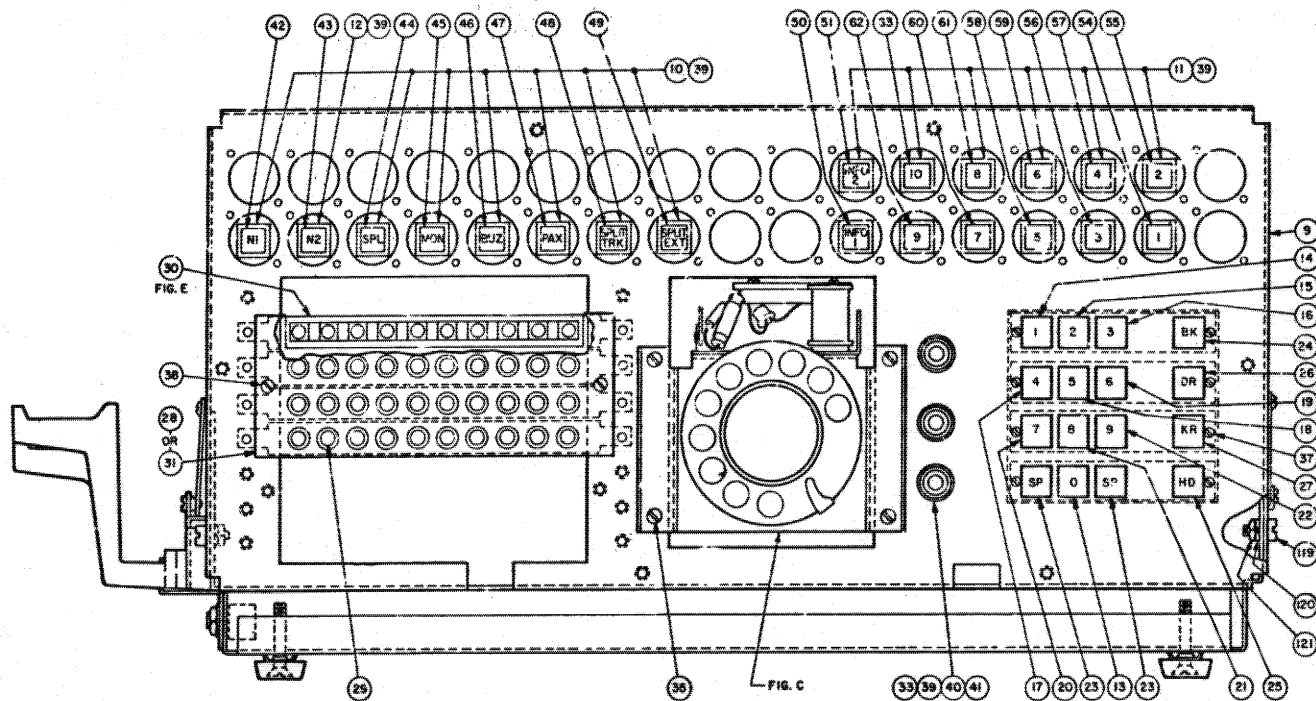
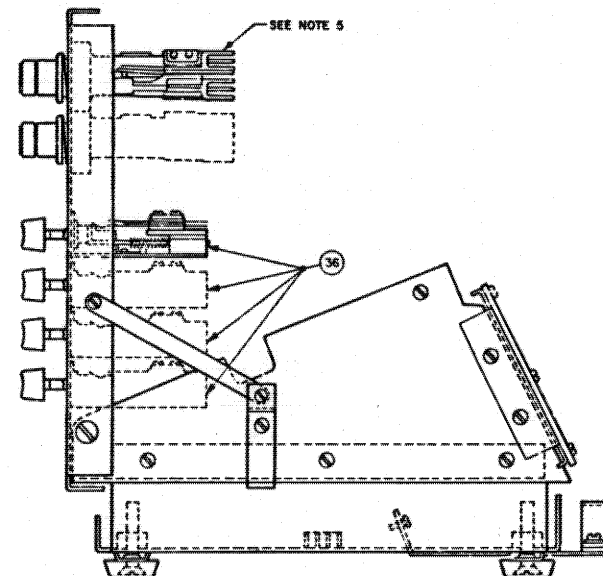


FIG. A
(TYPE 40 TURRET MINUS FACE PLATE)



H-889217

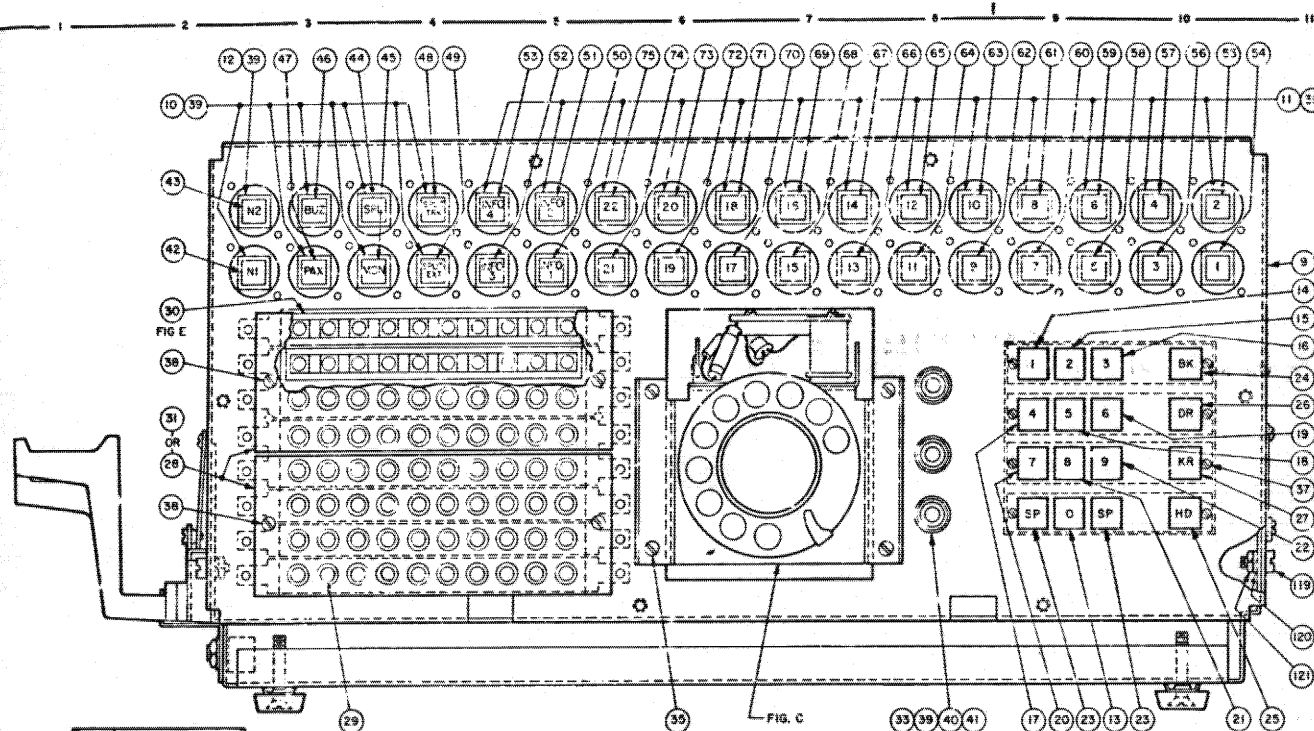
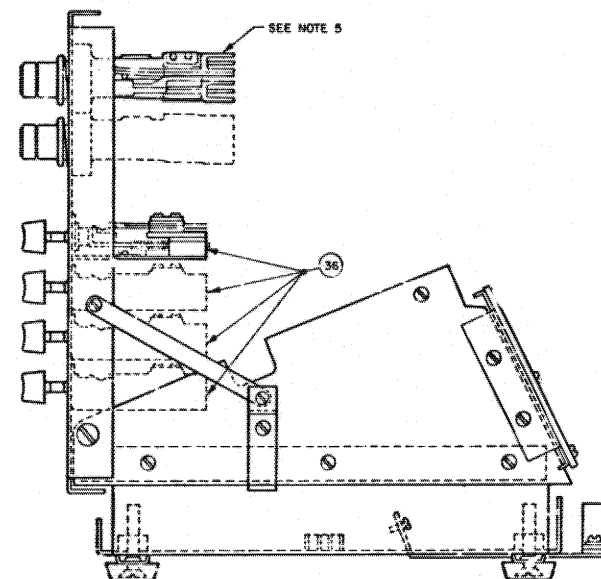
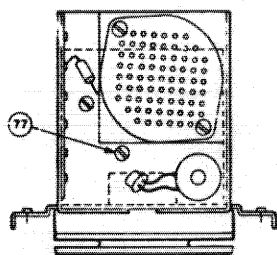
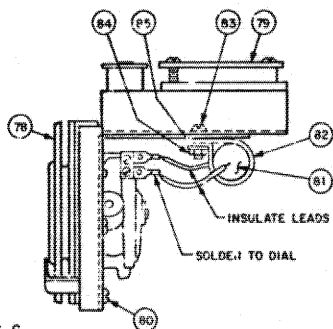
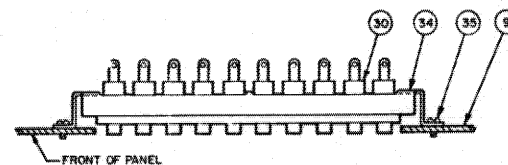
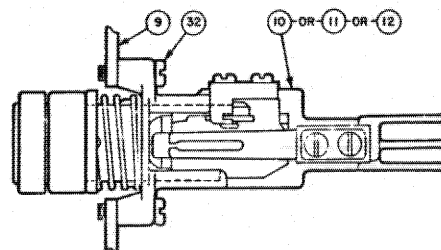
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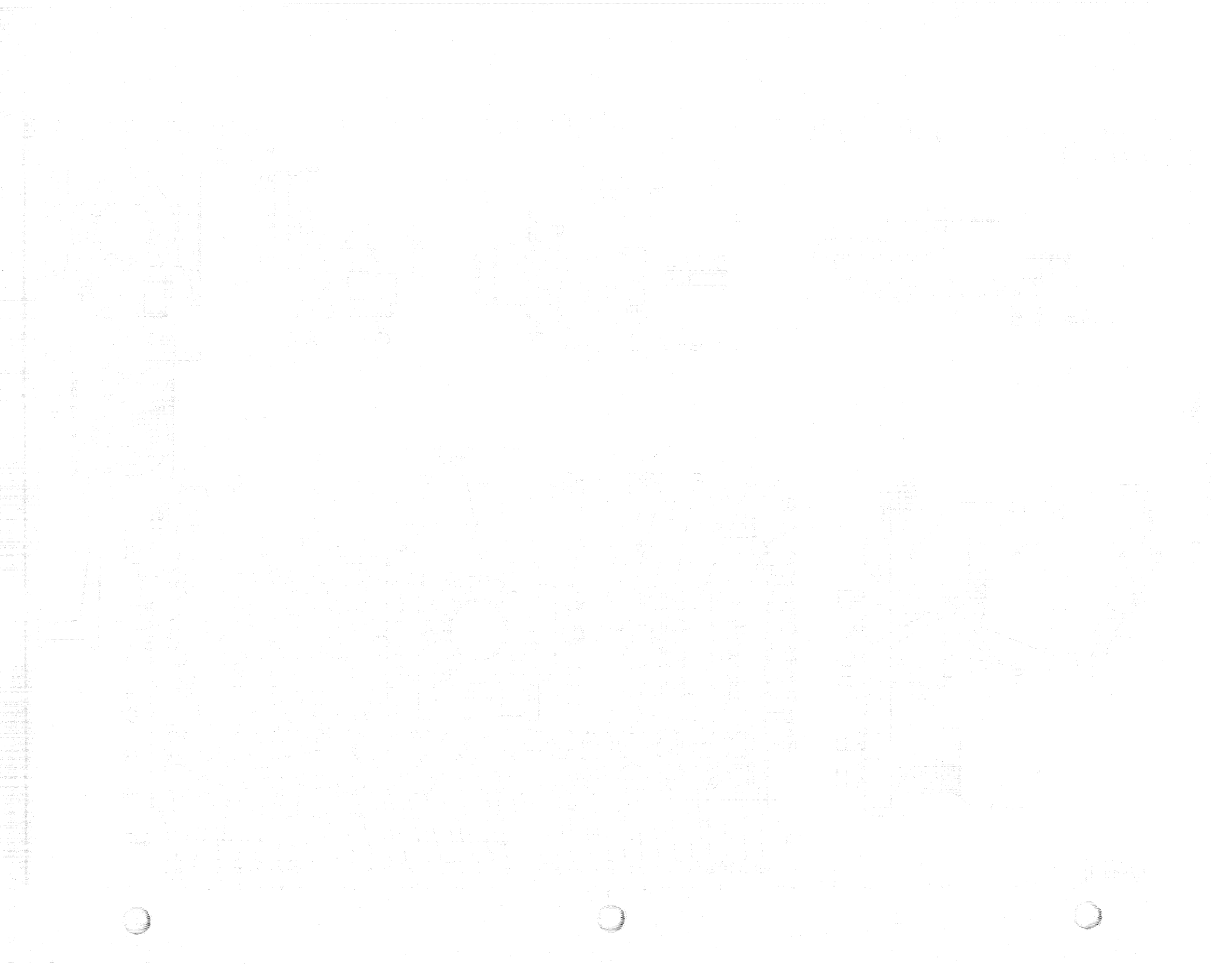
AUTOMATIC ELECTRIC

NOT TO BE USED FOR ANY OTHER PURPOSES THAN FOR WHICH IT WAS DESIGNED

SIZE

D

FIG. B
(TYPE 80 TURRET MINUS FACE PLATE)FIG. E
LAMP STRIP MOUNTING DETAIL
TYPICALFIG. C
DIAL & AUDIBLE SIGNAL UNITFIG. D
PUSH KEY MOUNTING DETAIL
TYPICAL



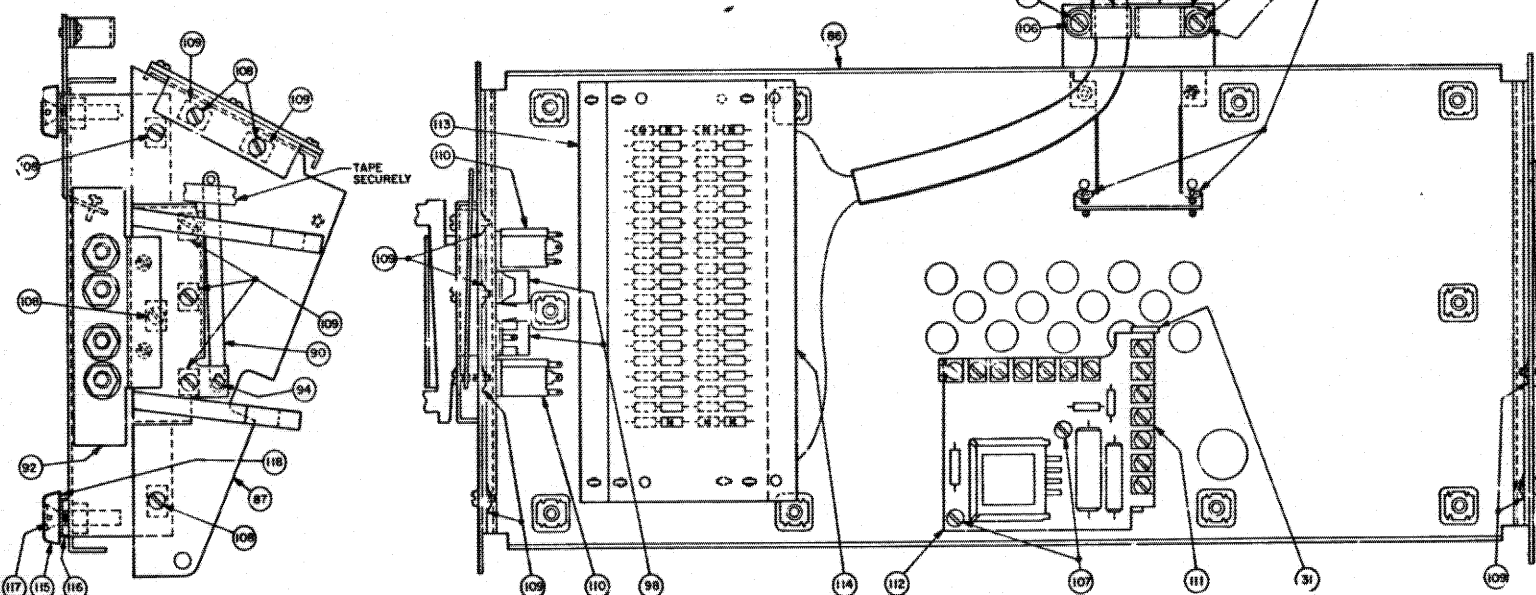
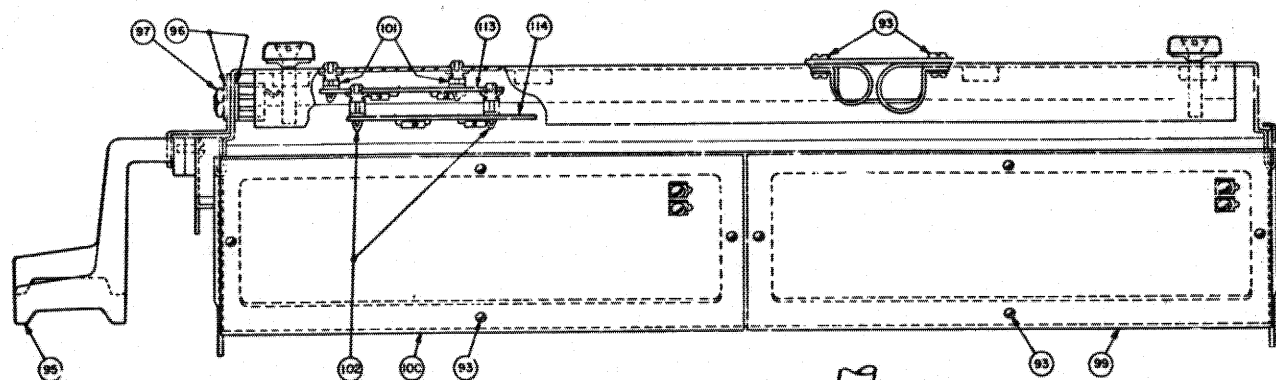
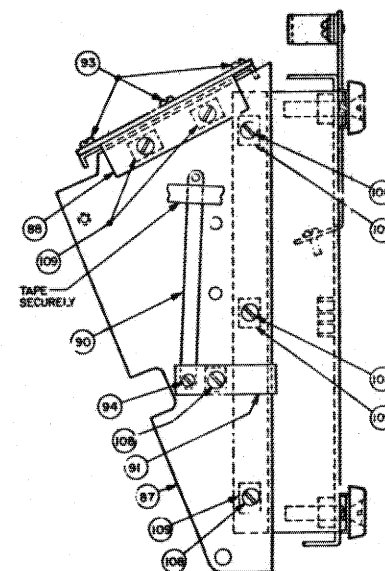
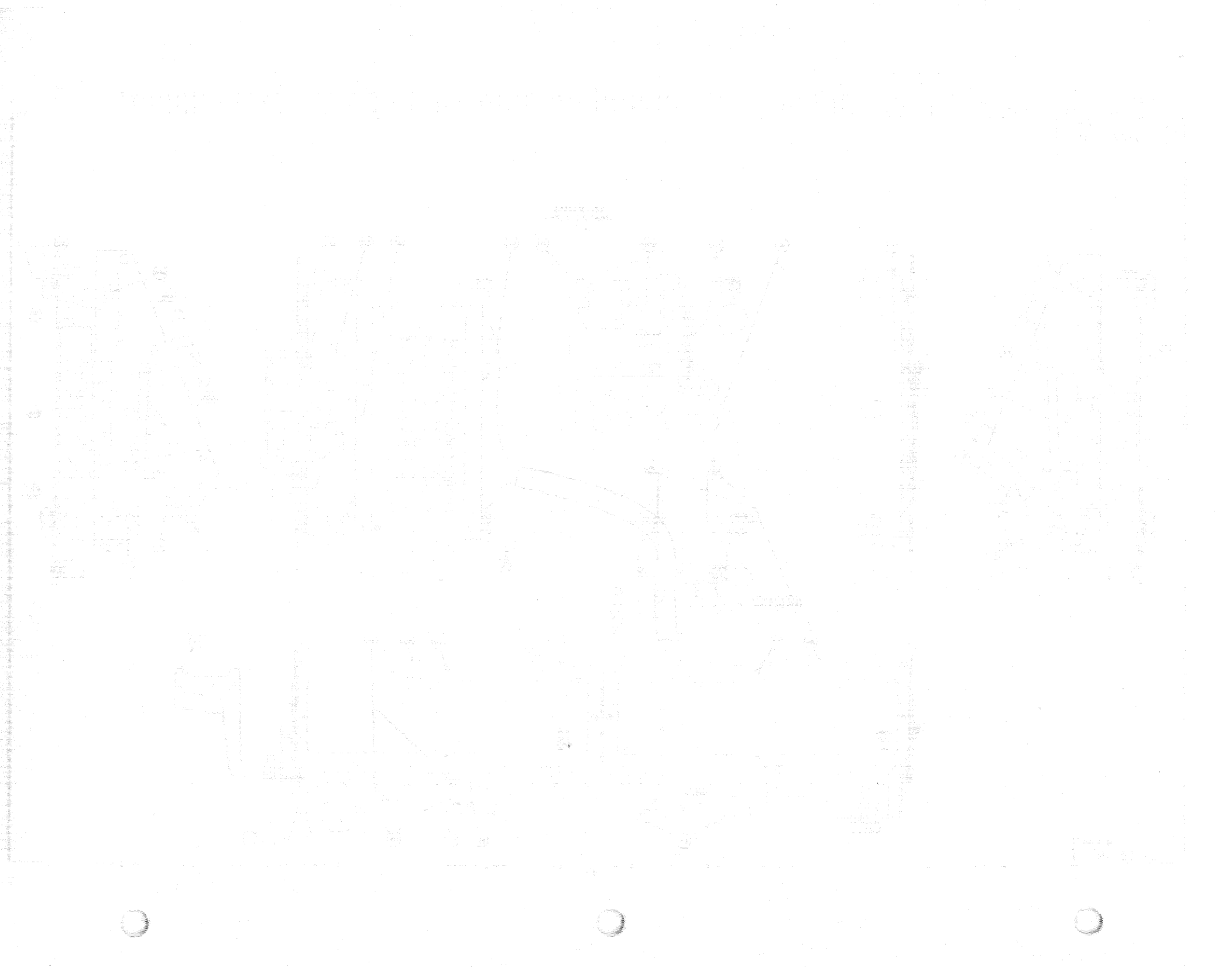


FIG. F
CHASSIS ASSEMBLY
(ASSY'S 1-8)





H-889217

SHEET 7

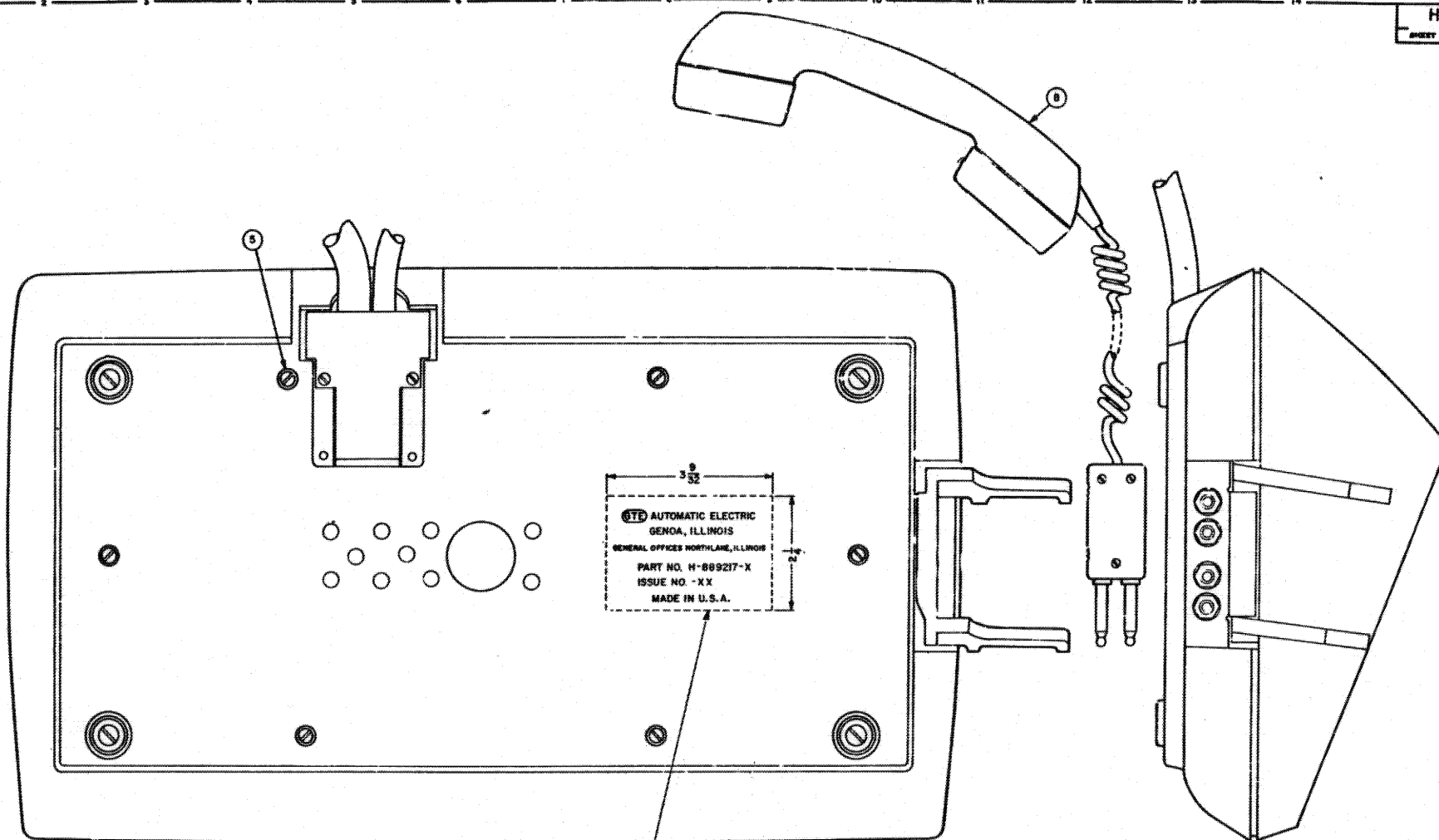


FIG. G
BOTTOM VIEW OF TURRET
(ASSY'S 1-8)

RUBBER STAMP—
LOCATE APPROXIMATELY AS SHOWN
"GTE AUTOMATIC ELECTRIC" SHALL
CONFORM TO DRAWING H-88092-33.

H-889217

SHEET 7

SIZE

D

GTE AUTOMATIC ELECTRIC

WORTHMAN, ILL. GENOA, ILL. & BOSTON, MASS. U.S.A.

THE UNIVERSITY OF CHICAGO LIBRARY



AH-73578-A		RELAY	TEST	ADJ	INSP	NOTE	NOTES
CHANGES	ELC	FIGS. 1&2	0	2180	2030	1	POS. TC COIL TERM. #2.
1) 1.31.68(1	PC NO.	912 /AA 24AD 208		.0157	.0165		
	WDG 2 B 3.	2000 Ω	NO	2250	2900		
	WDG 1 B 4.	2000 Ω		.0137	.0128		
	PC NO.						
	WDG 2 B 3.						
	WDG 1 B 4.						
	PC NO.						
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	WDG 1 B 4.						
	PC NO.						
	WDG 2 B 3.						
	WDG 1 B 4.						
	PC NO.						
	WDG 2 B 3.						
	WDG 1 B 4.						
	PC NO.						
	WDG 2 B 3.						
	WD						

4. The fourth part of the document discusses the implications of the findings. It highlights the potential applications of the research in various fields and the need for further investigation.

5. The fifth part of the document provides a conclusion and a summary of the key points. It reiterates the importance of the study and the need for continued research in this area.

6. The sixth part of the document includes a list of references and a bibliography. It cites the works of other researchers in the field and provides a comprehensive overview of the current state of knowledge.

7. The seventh part of the document contains a list of appendices and supplementary materials. These include additional data, charts, and tables that provide further detail on the study.

8. The eighth part of the document includes a list of figures and a list of tables. These provide a visual representation of the data and a summary of the key findings.

9. The ninth part of the document includes a list of equations and a list of symbols. These provide a mathematical representation of the concepts and variables used in the study.

10. The tenth part of the document includes a list of definitions and a list of abbreviations. These provide a clear and concise explanation of the terms and symbols used throughout the document.

AH-7578-A
CHART 1

1) 1.31.6% 1

Fig. 2-2-48

EXPLANATION OF TERMS:

O - OPERATE: NC - NON-OPERATE:
H - HOLD P - RELEASE:
POS. - TEST WITH POSITIVE BATTERY THRU
RESISTANCE OF TEST SET.
NEG. - TEST WITH NEGATIVE BATTERY THRU
RESISTANCE OF TEST SET.

NOTES:

- 1: TEST WITH BOTH WINDINGS IN SERIES.
- 2: TEST ON NO.1 WDG. (INNER OR ARM. END)
- 3: TEST ON NO.2 WDG. (OUTER OR HEEL END)
- 4: TEST WITH BOTH WINDINGS IN MULT.

GENERAL NOTES

FOR GENERAL INSTRUCTIONS AND RELAY ADJUSTMENT
SEE R-0004.

TEST WITH 50 VOLTS D.C.

DR	SCALE
CH	DATE 1-31-68
LN YEAR	APPR YEAR NYC
AUTOMATIC ELECTRIC CO. CHICAGO, ILL.	

FUSY LAMP FIELD CIRCUIT
TYPE 40 AND 60 PAIX
TYPE 900 RELAYS

AH-7578-A	
BOOK	OF
PAGE 1	
AH-7578-A	

USED ON

10/10/10

10/10/10

10/10/10

10/10/10

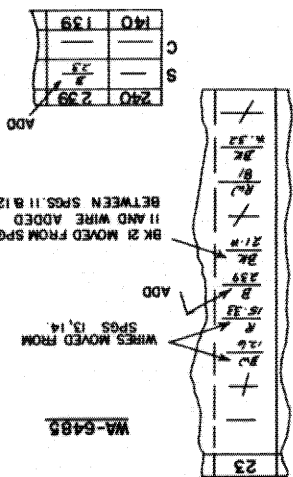
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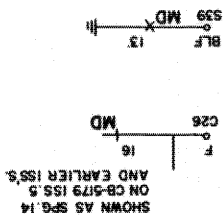
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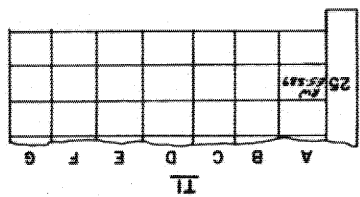
WA-6485

POSITION CIRCUIT MODIFICATION

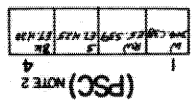
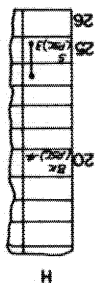


CB-5179

FIG. A



E7



(PSC) NOTE 2

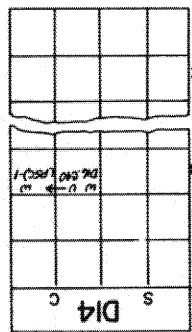


FIG. B

40B PABX

OR DMW	SCALE	CH JMT	DATE 1-7-72	APPR (C)	AUTOMATIC ELECTRIC CO GENOA BRANCH GENOA, ILL.
--------	-------	--------	-------------	----------	--

LINE BUSY LAMP FIELD
JUMPERS & INSTRUCTIONS

40B & 40M

WE-5290

H-73578-A, H-72174
MO-20196, MO-20197
ISSUE 1, 2

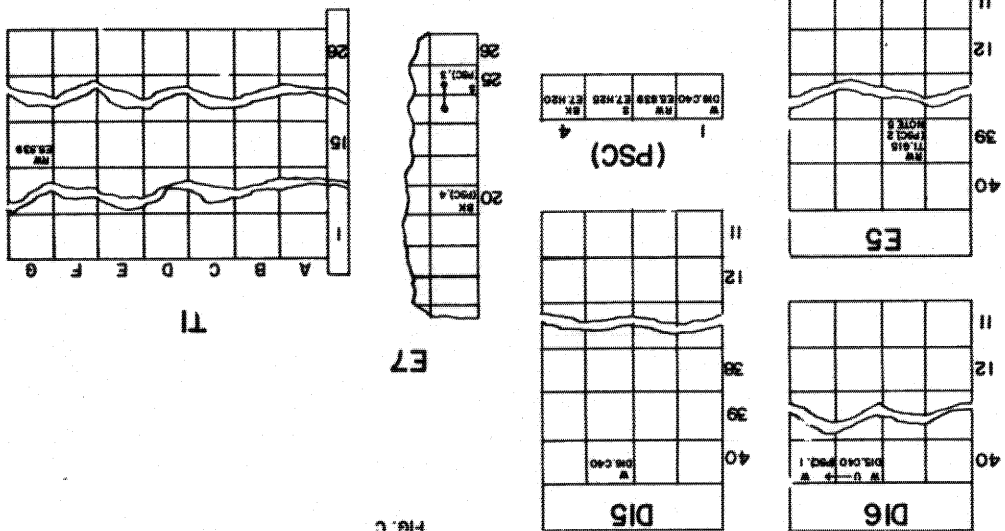


FIG. C

40M PABX

- NOTE 1: FIG. B = JUMPING REQUIRED FOR 40B PABX.
- NOTE 2: MOUNT LINE BUSY LAMP FIELD POWER SUPPLY & CONTROL RELAY UNIT PER AC-2325, THE DESIGN. (PSC) HAS BEEN ASSIGNED TO THE TERMINAL STRIP ON THE UNIT. PLUG UNIT INTO 117V AC OUTLET LOCATED ON THE REAR OF THE SWBD IN THE LOWER LEFT HAND CORNER.
- NOTE 3: PUT FUSE IN POS. EF15, ON 40B PABX.
- NOTE 4: ON 40B WHEN USING CITY TRUNKS WC-6452 ISS IS OR LATER (CB-5318 ISS IS 14 OR LATER) AND IT IS DESIRED TO HAVE THE BUSY LAMP FIELD ILLUMINATED WHEN A TRUNK IS PLACED ON HOLD, CONNECT "H" WIRING IN CITY TRUNK RELAY BAR PER NOTE 23 ON CB-5318 OR NOTE 78 ON H-850629-A. CONNECT RW JUMPER FROM E5-539 TO D3-531 (AE LEAD). MULT. D3-531 OF ALL TRUNK POSITION D3-081.
- NOTE 5: ON 40M WHEN USING CITY TRUNKS WC-6278 ISS IS OR LATER (CB-5164 ISS IS 10 OR LATER), AND IT IS DESIRED TO HAVE THE BUSY LAMP FIELD ILLUMINATED WHEN A TRUNK CALL IS PLACED ON HOLD, CONNECT RW JUMPER FROM E5-539 TO D3-531 (BLF LEAD). MULT. D3-531 OF ALL TRUNK POSITION (D3-081).
- NOTE 6: REPLACE RELAY "MD" SPRING PILE ON POS CKT. CB-5179 ISS 5, WA-6485 ISS 4 OR EARLIER. ISS. MOVE B WIRE AS SHOWN IN FIG. A. MARK YOUR CKT. DRAWING CB-5179 TO AGREE.

INSTALLERS NOTES

ISSUE:
1)12-14-71

M-0373
1 END

MODIFICATION INSTRUCTIONS TO ADD PUSH BUTTON TURRET TO 40B-S
SERIAL NO. 7247 OR BELOW AND/OR TO 40M-S SERIAL NO. 175 OR
BELOW.

DO NOT CONNECT PUSH BUTTON TURRET UNTIL THE FOLLOWING CHANGES HAVE
BEEN MADE TO THE SWITCHBOARD.

FOR 40B: ON T1 BLOCK (REFER TO WG-9672)

REMOVE: 28M, 28C, 31M, 31C, 34M, 34C, 35M, 35C, 36M, 36C, 37M, 37C,
38M, 38C

ADD: 27M AND 27C TO A14
28M AND 28C TO C14
29M TO G5
29C TO G6
30M TO G7
30C TO G8
31M TO G9
31C TO G10
32M TO G11
32C TO G12
33M TO G13
33C TO G14

FOR 40M ON T1 BLOCK

SAME AS ABOVE

PLUS REMOVE 39M ON E18 AND ADD 34M ON E18.

SECRET
TOP SECRET

SECRET
TOP SECRET

THE FOLLOWING INFORMATION IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE

DATE 01-01-01 BY 1045

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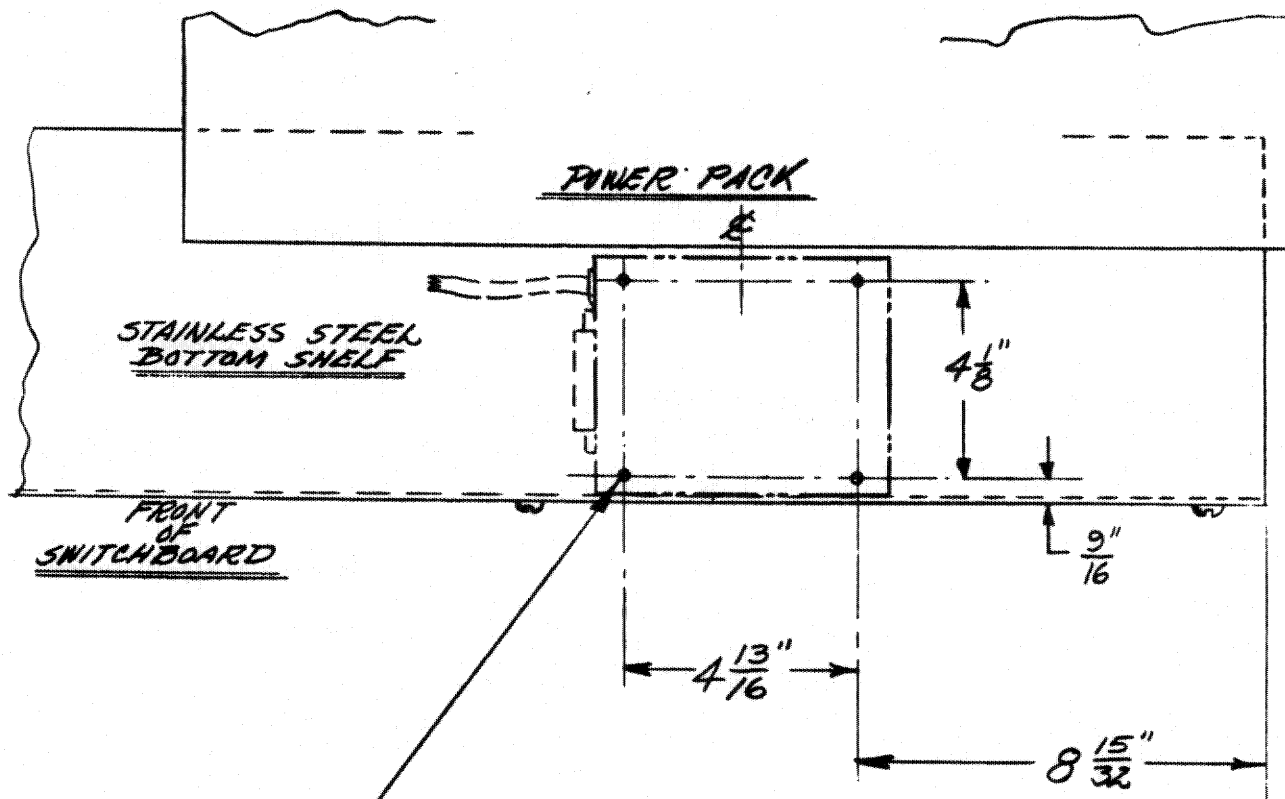
DATE 01-01-01 BY 1045

SECRET

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE

AC-2325

CHANGES



SPOT AND DRILL (4) HOLES AS SHOWN
WITH A NO. 26 DRILL (.147" DIA.) FOR
(4) THREAD FORMING SCREWS FURNISHED
TO MOUNT THE POWER SUPPLY UNIT.

NO 19541
NO 19540
NO 19539
NO 19538
NO 19537

USED ON

TOLERANCE UNLESS SHOWN OTHERWISE

DECIMALS ±

FRACTIONS ±

ANGLE ±

DR	HF	SCALE	1/4" = 1"
CH		DATE	2-12-62
EN		APPR	MC

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

FINISH
MAT'L

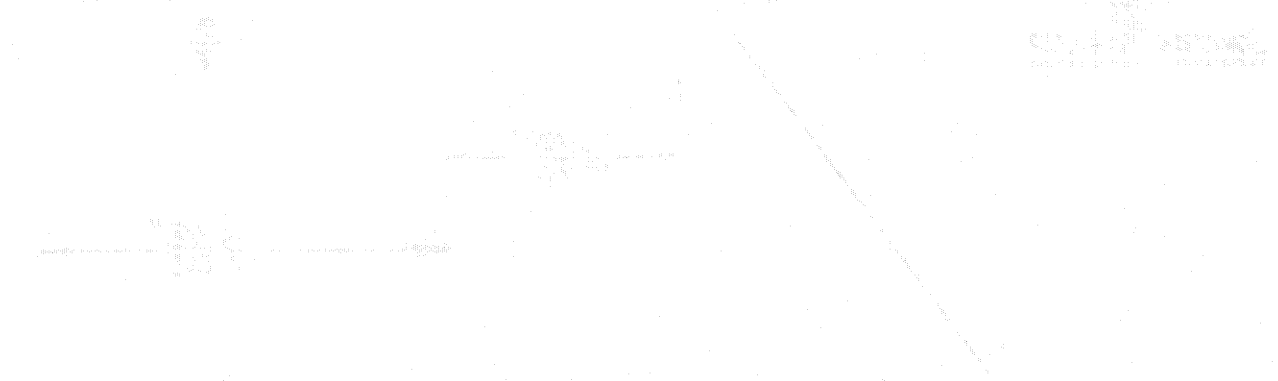
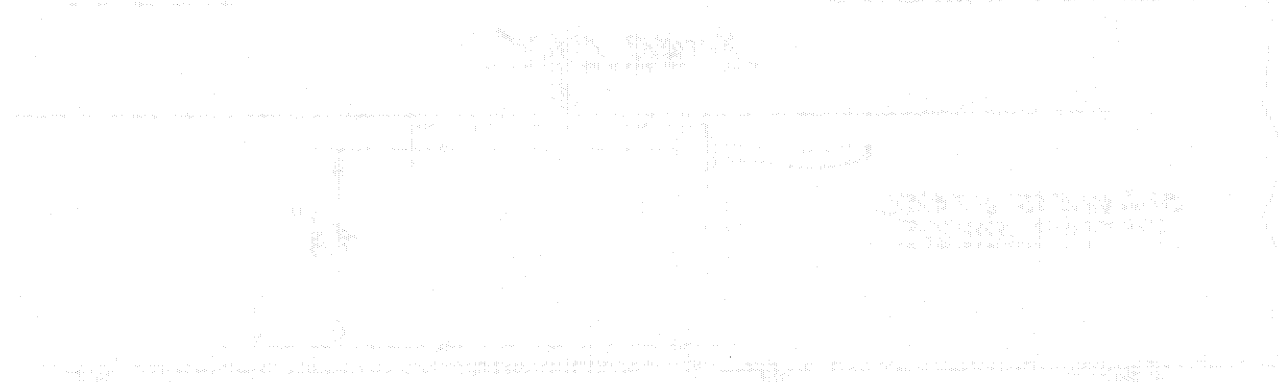
BUSY LAMP FIELD

POWER SUPPLY-SPOTTING PRINT

ISSUE 1

FOR
TYPE 40 & 80 SWITCHBOARDS

(AC-2325)



DRAWING STOCK LIST

AMOUNT	U M	ITEM	ADJ	ITEM	C P	DESCRIPTION
1.00	PC	D 530416	T10	49		DESIG CARD
1.00	PC	D 530416	T11	50		DESIG CARD
1.00	PC	D 530416	T12	51		DESIG CARD
1.00	PC	D 530416	X1	54		DESIG CARD
1.00	PC	D 530416	X2	55		DESIG CARD
1.00	PC	D 530416	X3	56		DESIG CARD
1.00	PC	D 530416	X4	57		DESIG CARD
1.00	PC	D 530416	X5	58		DESIG CARD
1.00	PC	D 530416	X6	59		DESIG CARD
1.00	PC	D 530416	X7	60		DESIG CARD
1.00	PC	D 530416	X8	61		DESIG CARD
1.00	PC	D 530416	X9	62		DESIG CARD
1.00	PC	D 530416	X10	63		DESIG CARD
1.00	PC	D 732340	A	76		DIAL MTG BRKT
1.00	PC	D 762047	B	77		PHSMS 138-32 X 3/16
1.00	PC	D 84875	A	78		DIAL ASSY
1.00	PC	D 56607	A	79		AUDIBLE SIGNAL UNIT
3.00	PC	D 761052	B	80		PHSMS 112-36 X 3/16
1.00	PC	NL 16033	A	81		SPARK QUENCH UNIT
1.00	PC	D 731449	K	82		PLASTIC CLAMP SUPPORT
1.00	PC	D 762047	G	83		PHSMS 138-32 X 1/2
1.00	PC	D 77110	A	84		HEX NUT
1.00	PC	D 17197	A	85		WASHER
1.00	PC	D 781100	A	86		BASE PLATE ASSY
2.00	PC	D 781094	A	87		SIDE PLATE
1.00	PC	D 732339	A	88		TERMINAL STRIP MTG BRKT
1.00	PC	D 732344	A	89		CABLE CLAMP BRACKET
2.00	PC	D 62141	A	90		MAINTENANCE HOOK
1.00	PC	D 732342	A	91		MAINTENANCE HOOK BRKT
1.00	PC	D 781095	A	92		ESCUTCHEON PLATE
12.00	PC	D 762047	D	93	S9	PHSMS 138-32 X 5/16
2.00	PC	D 760864	A	94		SPL FFILHINS 5-40X7/32
1.00	PC	D 62154	A	95		CPADLE HOOK BRKT ASSY
8.00	PC	NL 15283	A	96		FIBER STOP WASHER
2.00	PC	NL 14290	A	97		NUT HEX BR 3/8-32X1/2
2.00	PC	NL 17781	A	98		JACK
1.00	PC	D 150434	A	99		TERMINAL STRIP ASSY
4.00	PC	FD 1036	BB1	101		CIRCUIT BOARD SUPPORT
1.00	PC	D 731449	F	104		PLASTIC CLAMP
1.00	PC	D 731449	H	105		MAGNETIC COMP BRACKET
2.00	PC	D 17475	A	106		CUP SPRING WASHER
2.00	PC	D 760733	A	107		PHSMS SEMS 6-40X3/8
16.00	PC	D 761056	C	108		PHSMS 164-32 X 5/16
14.00	PC	D 77371	AU	109		SINGLE THREAD NUT
2.00	PC	FD 1036	BA	110		HI-D JACK
1.00	PC	WA 1155	A	111		TRANSFORMER UNIT CARD

GENOA E-BILL				PART NUMBER		ISSUE	
DATE	SHEET TOTAL	DESCRIPTION		PKT	BASE	S	
	2 OF 3	TURRET		H	889217	1	5

GE AUTOMATIC ELECTRIC

A

SOUTHEASTERN ELECTRIC

LEICH SWITCHES GENERAL ADJUSTMENTS

CONTENTS	PAGE
1. GENERAL.....	1
2. ADJUSTMENT APPARATUS.....	2
3. UNITS ASSEMBLY ADJUSTMENT..	2
Stop Adjustment For Switches Not Having An Armature Stop.....	3
Armature Travel (Stroke) Adjust- ment.....	3
Locking Contact Spring Adjustment...	4
Multiple Spring Adjustment.....	4
Operate and Hold Adjustments.....	4
4. TENS ASSEMBLY ADJUSTMENT...	5
Armature Travel (Stroke) Adjust- ment.....	5
Tens Locking Contact Spring Adjustment.....	5
Multiple Spring Adjustment Gauging.....	5
Electrical Tests.....	5
5. ALLOTTER ASSEMBLY AD- JUSTMENT.....	6
Electrical Tests.....	6
6. COMMON ALLOTTER SWITCH.....	6

1. GENERAL

1.01 This section is reissued to revise the terminology used for various components of the Leich switch. Marginal arrows, indicating changes, have been omitted because of the quantity of revisions. Remove and destroy all copies of Section 040-310-700, Issue 1, and addendum.

1.02 This section covers the mechanical adjustments and electrical tests which are common to all Leich switches (Figure 6). Armature, locking contact and lift adjustments may be made with the switch placed in a horizontal position on the work bench (not mounted in the equipment bay). Multiple contact adjustments must be made with simulated bank multiple bars in place. Factory adjustments

are made in a jig which lowers the switch over a bank of 1-1/2 to 2-inch multiple bars. A similar test fixture can be assembled locally, using a bank multiple end guide and short lengths of multiple bar.

1.03 In this section, units coils and their associated contacts, armatures, etc. are the small coils or those coils in the front of the switch with the switch in its mounted position. Tens coils are the larger coils mounted at the top and bottom of the switch. On some switches, such as those used in the 40B and 40M PABX switchboards, switch functions are assigned to these coils in a manner exactly opposite to that just described.

1.04 All screws and nuts shall be tight. Screws, nuts, and other parts shall not be marred or mutilated, nor shall they be defective in any manner.

1.05 Spring assemblies shall be free from sharp bends or kinks in the springs. A gradual bow in a spring is permissible.

1.06 Bar contacts must strike so they engage the full width of the precious metal surface of the mating contact as shown in Figure 1 and as judged by eye. Multiple springs shall not rub against the sides of the tens lift in either the operated or unoperated position. The multiple springs shall engage at least 3/4 of their associated switch multiple bar or line multiple bar in the operated position as judged by eye. See Figure 2. The multiple springs shall strike flat against the switch multiple bar or line multiple bar as judged by eye.

1.07 Spring operating studs shall be perpendicular to the face of the armature and shall strike the lever spring along its approximate center line as judged by eye. All springs shall rest against their operating studs or lifts when the relay is not operated.

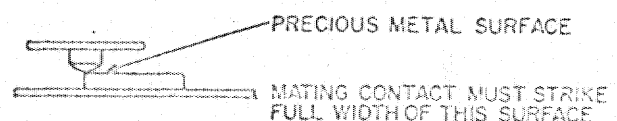


Figure 1. Example of Contact Alignment.

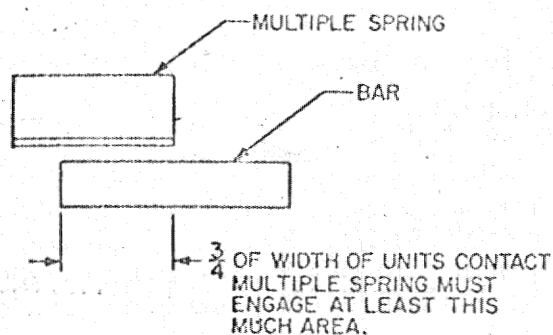


Figure 2. Example of Multiple Bar Alignment.

1.08 Equipment shall be free from grease, grit, or any other foreign substance which is likely to impair operation or detract from appearance.

1.09 When gauges are to be inserted between the armature and core for checking armature travel or contact break or make, the gauges shall be inserted as described below. For the units armature, the gauges shall be inserted so that a 1/16 inch gauge covers the area of the core as shown in Figure 3 and as judged by eye. For the tens armature, the gauges shall be positioned so that the core is covered from the center of the core, $\pm .010$ inch, to the top of the core as judged by eye.

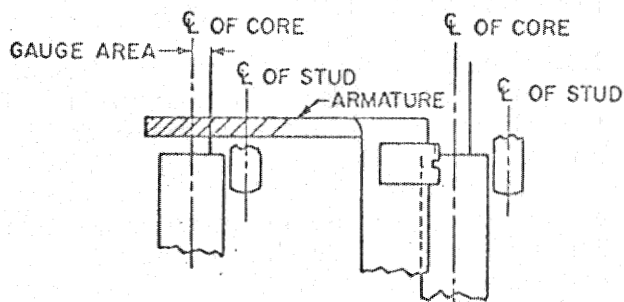


Figure 3. Gauging of Coil.

1.10 All armature and contact adjustments shall be checked by operating the armatures manually and electrically. The armatures shall not bind as judged by eye and feel.

1.11 Adjustments and tests are given in the order which experience has indicated to be the proper sequence to follow in order to prevent, as far as possible, interference of one adjustment with another. Maintenance routines should be performed using the "TEST" values as shown in Parts 3 and 4 of this section. If adjustments are required, use the values as shown in the "READJUST" columns.

2. ADJUSTMENT APPARATUS

2.01 The following equipment will be used when making adjustments in this section.

- (a) A.E.Co. (Genoa Branch) Armature Arm Bending Tool, T-5932.
- (b) A.E.Co. H-74611 Duckbill Pliers.
- (c) W.E.Co. KS-6909 Thickness Gauge.
- (d) W.E.Co. 35-F Current Flow Test Set.
- (e) A.E.Co. (Genoa Branch) Spring Bending Tool No. 012861.
- (f) Bates 325 Probing Stick.

3. UNITS ASSEMBLY ADJUSTMENT

3.01 Switches produced since the last quarter of 1963 are provided with an adjustable arm on the units armature. This is used to adjust the position of the operating stud of the locking spring to meet its gauging requirements. The sequence of adjustments, as compared to that for switches of earlier manufacture, is not affected by this change, only the method of adjustment.

3.02 At the same time, switches were equipped with an armature stop, eliminating the need to create a stop from one of the switch multiple bars. This affected the sequence of adjustments in addition to the method of adjustment.

3.03 The sequence of adjustments and tests for those switches not equipped with an armature stop is as follows:

- (1) Stop adjustment.
- (2) Armature travel adjustment.
- (3) Locking contact spring adjustment.
- (4) Multiple spring adjustment.
- (5) Electrical tests.

3.04 The sequence of adjustments and test for those switches with an armature stop is as follows:

- (1) Multiple spring adjustment.

- (2) Locking contact spring adjustment.
- (3) Armature travel adjustment.
- (4) Electrical tests.

Stop Adjustment For Switches Not Having An Armature Stop

3.05 The test (T) multiple bar shall be used as the stop. This is to be obtained by bending the +, -, and ET switch multiple bars, using the No. 012861 spring bending tool, toward their associated multiple spring so that the spring lift touches only the test switch multiple bar, or bend test units bar away from its multiple spring to achieve the same results. (See Figure 4.)

NOTE: Clearance between the three above mentioned multiple bars and the spring lift shall be perceptible to .005 inch.

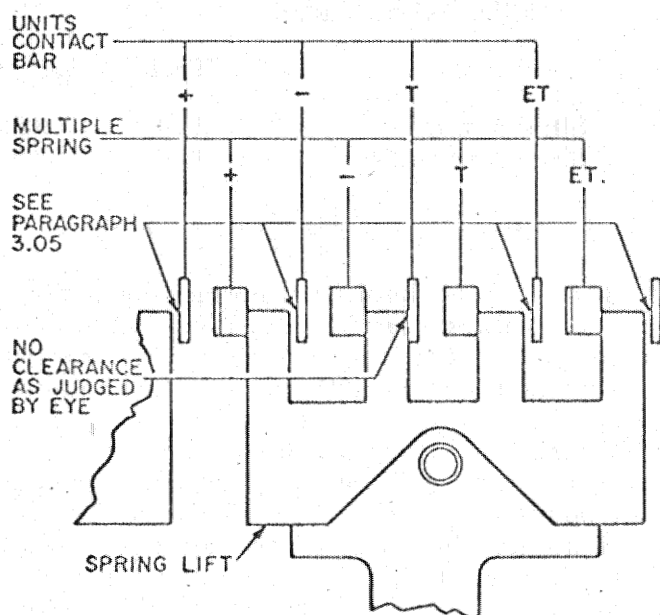


Figure 4. Stop Adjustment For Switches Not Having An Armature Stop.

Armature Travel (Stroke) Adjustment

3.06 When the switch does not have an armature stop except as created in Paragraph 3.05; with the armature arm bending tool T-5932 or equivalent, bend the armature arm between the units armature pin and spring lift. Bend the arm slightly toward or away from the test (T) switch multiple bar to meet

the gauging requirements. Care should be exercised not to bend the test (T) switch multiple bar. Insert the adjustment gauge between the armature and the core as described in Paragraph 1.07. If the gauge cannot be inserted without forcing it manually, operate the armature electrically and, with tool, bend the arm away from the stop.

3.07 When the switch has an armature stop (Figure 5) insert the adjustment gauge between the armature and the core as described in Paragraph 1.07. If the gauge cannot be inserted by forcing, bend the stop with duckbill pliers or equivalent as required. The stop can be bent above or below the armature arm as desired. There shall be perceptible clearance as judged by eye between the fingers of the spring lift and the switch multiple bars so the switch multiple bars do not inadvertently act as a stop. If this requirement is not met, bend the switch multiple bars away from the spring lift fingers with duckbill pliers or equivalent. Recheck the multiple spring gauging if the switch multiple bars are bent.

NOTE: Clearance between the switch multiple bars and the spring lift shall be perceptible to .005 inch as gauged by eye.

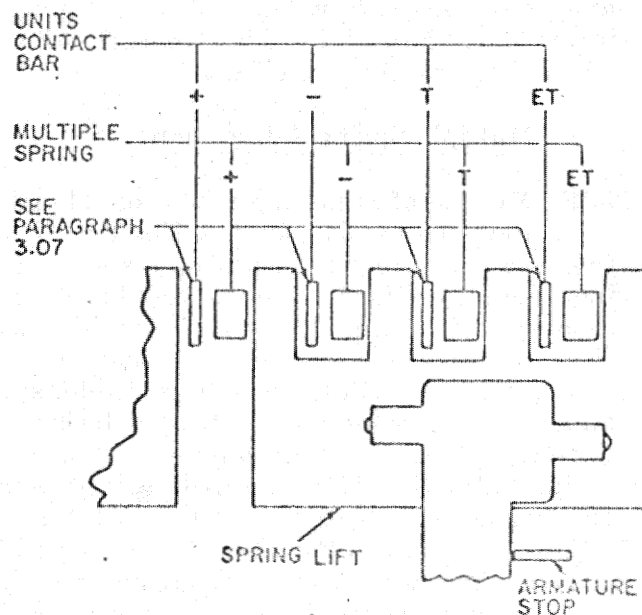


Figure 5. Armature Travel Adjustment.

3.08 Insert a combination of gauges equaling .0325 inch. On switches where the test (T) switch multiple bar is the stop, the spring lift shall not leave the stop, as judged by eye with the coil energized. On switches with an armature stop, the armature arm shall not leave the stop, as judged by eye with the coil energized. This requirement shall be considered as having been met if the spring lift or armature arm: (1) leaves its respective stop when a .029 inch gauge is inserted; (2) does not leave its stop when a .035 inch gauge is inserted.

Locking Contact Spring Adjustment

3.09 When the armature does not have an adjustable arm, adjust the spring with a wiping action between the form and the contact to meet the gauging requirements. Use the No. 012861 spring bender. It is permissible to form a gentle bow as judged by eye. Do not bend more than necessary.

3.10 With an armature which has the adjustable arm, bend the arm with duckbill pliers or equivalent, to meet the gauging requirements. Do not bend more than necessary.

3.11 The spring shall be adjusted so that the contact is made with a .012 inch gauge inserted as specified. This requirement shall be considered as having been met if the contact makes when a .010 inch gauge is inserted and does not make when a .016 inch gauge is inserted as judged by eye. Energize the coil when checking the gauging.

Multiple Spring Adjustment

3.12 Method of adjusting when test (T) switch multiple bar is the stop. The tip (+), ring (-), and extra test (ET) multiple spring gauging requirements can be met by bending the associated switch multiple bars toward or away from the multiple spring with duckbill pliers or equivalent. The test (T) multiple spring gauging requirements can be met by bending the multiple spring in a wiping action with a spring adjuster. Use the No. 012861 spring bender. Do not bend the test (T) switch multiple bar since it is the armature stop and has already been adjusted. After adjusting, check for perceptible clearance as judged by eye between the spring lift fingers and the tip, ring, and extra test switch multiple bars.

3.13 Method of adjusting when the switch multiple assembly has an armature stop. Assuming that the switch multiple bars are straight and have been preadjusted to their approximate proper position, the arm of the armature can be bent with tool T-5932 or equivalent, so that all three or four springs meet or nearly meet their gauging requirements. The bending shall be done between the units armature pin and the spring lift. Insert the gauge, energize the coil, and then bend the armature. Final adjustments can be made by bending the individual switch multiple bars with duckbill pliers or equivalent. Do not bend excessively as repeated bending may cause a crack or fracture in the part. Be sure the fingers of the spring lift are not touching the switch multiple bars as judged by eye. It should not be necessary to bend the multiple spring except to straighten or remove kinks, and so it will squarely strike the switch multiple bar as judged by eye.

3.14 Gauging requirements. The test and re-adjust values are:

	<u>Test</u>	<u>Readjust</u>
Shall Make	.018"	.020"
Shall Not Make	.026"	.024"

Operate and Hold Adjustments

3.15 Should the lift not operate or hold on the values specified, tension should first be relieved on the locking spring by applying pressure with a Bates 325 probing stick against the spring just behind the stud near the form of the spring. Apply a small amount of pressure several times, if necessary, rather than a large amount of pressure once. This will keep from changing the form of the spring more than necessary. If this does not allow proper operation, the multiple springs should be bent at the bank plate. Bend no more than necessary. Bend each spring approximately the same amount. Gauging should be rechecked if adjustment is required.

3.16 The operate values are as follows:

	<u>Test</u>	<u>Readjust</u>
Voltage, D.C..	50	50
External Resistance		
Value, Ohms	310	350
Current Flow Value, mA	61.7	58.8

3.17 The hold values are as follows:

	<u>Test</u>	<u>Readjust</u>
Voltage, D.C.	50	50
External Resistance Value, Ohms	1450	1550
Current Flow Value, mA	25.6	24.4

4. TENS ASSEMBLY ADJUSTMENT

Armature Travel (Stroke) Adjustment

4.01 The armature stroke nominal value is .036 inch. This requirement shall be considered as having been met if:

- (a) When a .040 inch gauge is inserted, the armature does not leave its stop as judged by eye with the coil energized.
- (b) When a .033 inch gauge is inserted, the armature shall leave its stop as judged by eye when the coil is energized.

NOTE: The stop shall always strike the embossed area of the armature as judged by eye.

Tens Locking Contact Spring Adjustment

4.02 Switches produced since the last quarter of 1963 have a tens assembly equipped with an adjustable make spring. When so equipped, the gauging requirements are met by bending the make spring. There shall be a minimum of .010 inch clearance between the make spring and the adjustable hinge on the tens lift with the coil energized.

4.03 If the assembly does not have the adjustable make spring, the gauging requirements are met by bending the locking contact lever spring between its operating stud and the contact.

4.04 The spring is to be adjusted so that the contacts make when a .012 inch gauge is inserted. The requirement shall be considered as having been met when the contact makes with a .010 inch gauge inserted and does not make with a .016 inch gauge inserted as judged by eye. Gauge with the coil energized.

Multiple Spring Adjustment Gauging

4.05 The multiple spring can be adjusted three ways:

- (a) General adjustment can be made by loosening the four screws that go through the tens magnet angles into the spacer bar. This allows the tens magnet angles to be moved in or out so that the multiple springs are positioned approximately .032 inch from the line bar or equivalent.
- (b) Later switches have an adjustable hinge on the tens lift. The hinge can be opened or closed approximately .015 inch to position a column of multiple springs.
- (c) Finally, the individual multiple springs are adjusted by bending the multiple spring between the tens lift and the form at the tip of the multiple spring.

4.06 The gauging values are specified below. The coil shall be energized when gauging.

	<u>Test</u>	<u>Readjust</u>
Shall Make	.016"	.018"
Shall Not Make	.026"	.024"

Electrical Tests

4.07 Should the lift not operate or hold on the values specified, tension should be relieved on the tens lift retaining spring with the spring bender. The spring should be straightened with the spring bender, probing stick, or equivalent, as judgement dictates but no more than necessary to achieve the operate and hold values. Relieving too much tension will provide a longer release time than necessary.

4.08 The operate values are as follows:

	<u>Test</u>	<u>Readjust</u>
Voltage, D.C.	50	50
External Resistance Value, Ohms	156	170
Current Flow Value, mA.	142	135

4.09 The hold values are as follows:

	<u>Test</u>	<u>Readjust</u>
Voltage, D.C.	50	50
External Resistance Value, Ohms	570	600
Current Flow Value, mA	65	62.5

5. ALLOTTER ASSEMBLY ADJUSTMENT

5.01 All items listed under Part 4 for the tens assembly adjustment apply to the allotter assembly adjustment except there is no locking contact adjustment and the electrical tests are different.

Electrical Tests

5.02 Operate and non-operate adjustments. Should the assembly not meet the operate and non-operate adjustments, tension should be added or removed by adjusting the allotter lift retaining spring with the spring bender. Straightening the springs will remove tension and allow the lift to operate and hold. Tension can be added by bending the spring to provide more of a form so that the lift will not operate. Care should be exercised so that

the minimum amount of bending occurs. Bending shall be applied with a spring bender, or equivalent, as judgement dictates.

5.03 The operate values are as follows:

	<u>Test</u>	<u>Readjust</u>
Voltage, D.C.	50	50
External Resistance Value, Ohms	156	170
Current Flow Value, mA	142	135

5.04 The non-operate values are as follows:

	<u>Test</u>	<u>Readjust</u>
Voltage, D.C.	50	50
External Resistance Value, Ohms	450	386
Current Flow Value, mA	77	86

6. COMMON ALLOTTER SWITCH

6.01 All of the general requirements of the switch must be met. The allotter assembly must meet the same requirements as those listed in Part 5.

RELAYS
LEICH 900 SERIES
FIELD INSPECTION AND ADJUSTMENT

CONTENTS	PAGE	1. GENERAL
1. GENERAL.	1	1.01 This Section describes the procedures to be followed for the field inspection and adjustment of the Leich 900 series relay.
2. ADJUSTMENT AND INSPECTION APPARATUS	2	1.02 The type 900 relay is used extensively on the removable plug in relay bars for Leich TPL and PABX dial switchboards.
3. FIELD CLEANING AND INSPECTION PROCEDURES	2	1.03 The nomenclature used in this Section will refer to parts as indicated in Figure 1.
Cleaning.	2	1.04 When adjusting springs, do not remove kinks unless the kink interferes with proper adjustment of the spring pile-up. Removing kinks tends to weaken and shorten the life of the spring.
Inspection.	2	
4. FIELD ADJUSTMENT PROCEDURES	3	
Armature Adjustment.	3	
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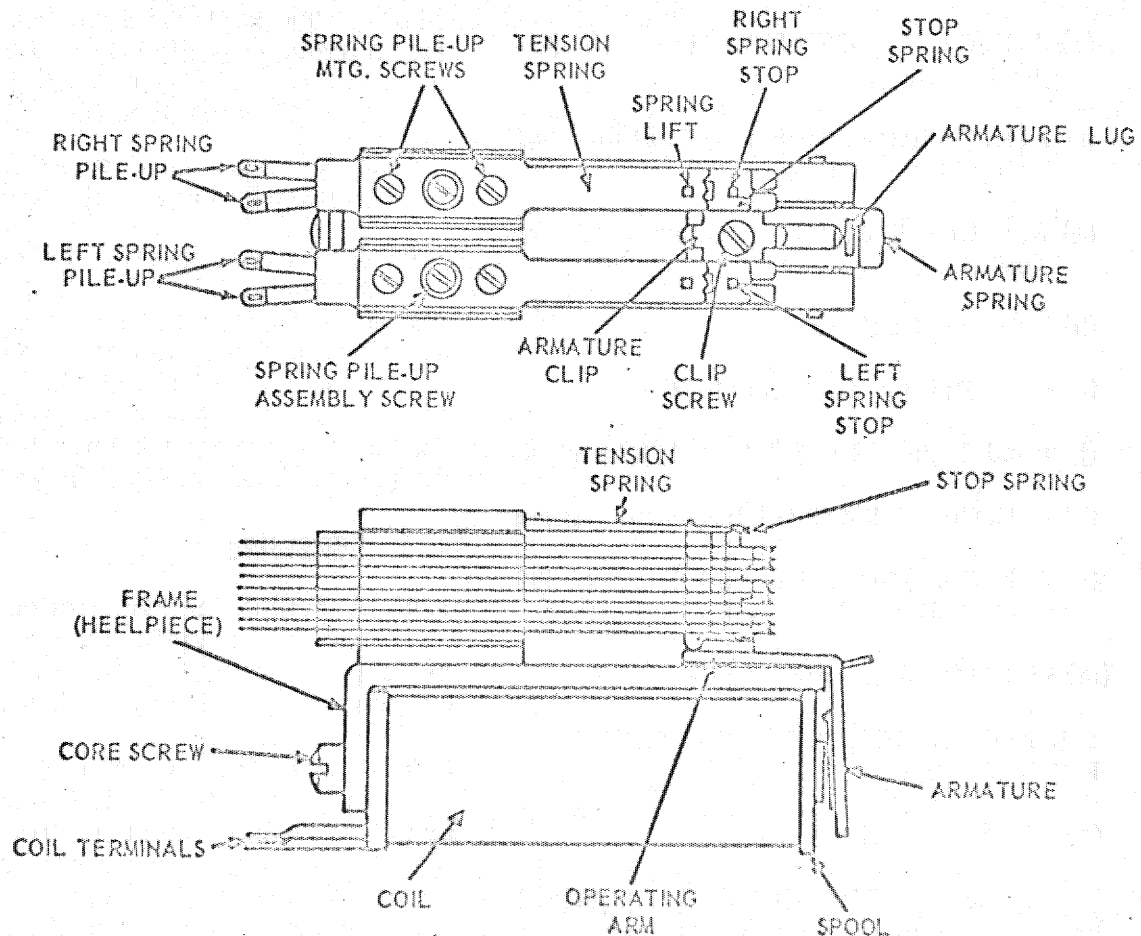


Figure 1. Typical Leich 900 Relay.

1.05 The mechanical and electrical requirements for the relay are indicated by the three digit suffix of the relay part number and appear on adjustment specification drawing R-0004-B and succeeding suffixes.

2. ADJUSTMENT AND INSPECTION APPARATUS

2.01 The following apparatus will be required when performing adjustments on the Leitch type 900 relays.

- (a) A. E. Co. H-880622-1 Screwdriver or similar
- (b) A. E. Co. H-882816-1 Tension Gauge or similar
- (c) A. E. Co. (Genoa Branch) Part #12861 Relay Spring Bender
- (d) A. E. Co. H-885842-1 Armature Adjusting Tool
- (e) A. E. Co. H-885843-1 Armature Adjusting Tool
- (f) A. E. Co. (Genoa Branch) Part #017308 Relay Travel Gauge
- (g) A. E. Co. H-882790-1 Current Flow Test Set or similar
- (h) Rubberset 912 Brush
- (i) Hard Bristle Toothbrush (2)
- (j) Bond Paper #20, 1/2" x 2 1/2" strips
- (k) A. E. Co. H-880922-1 Inspection Lamp
- (l) A. E. Co. (Genoa Branch) Part #13939 Contact Burnishing Tool or similar
- (m) W. E. Co. 92H Thickness Gauge

3. FIELD CLEANING AND INSPECTION PROCEDURES

Cleaning

3.01 The exposed surfaces of the relay should be free of dust and dirt. Use the rubber set 912 brush and dust the relay.

3.02 If the contact springs are not clean, use one toothbrush to pick up the greatest accumulation of dirt. Another toothbrush should be used to pick up the remaining dirt.

NOTE: Exercise care using the toothbrushes so that the spring lifts and spring stops are not dislocated.

3.03 If contacts are dirty, burnish them with the contact burnishing tool.

NOTE: Do not apply excessive force to the set of contacts while passing a burnishing tool between the contacts; except in cases of unusual contamination.

3.04 If foreign material is trapped between the armature and the heelpiece, it will be necessary to remove the armature and clean this area. To remove the armature, raise the armature spring off the armature lug and withdraw the armature. Clean the heelpiece area under the operating arms and the arms of the armature with a soft bristle brush or clean cloth. To replace the armature, raise the armature spring slightly and insert the armature. Be sure that the armature spring drops down over the armature lug.

NOTE: Exercise care so as not to deform or damage the armature spring.

3.05 The area between the coil core and the armature should be clean. To clean, insert a clean piece of #20 bond paper between the armature and the coil core; operate the armature manually so that it is flush against the coil core. Pull the paper from between the two. Repeat this procedure until no dirt appears on the paper. Avoid ripping the paper.

Inspection

3.06 A mechanical inspection of the relay should be made before any attempt is made to alter its adjustment. If corrective operations are necessary, refer to Part 4.

3.07 Check that the armature spring is properly seated over the armature lug. The armature spring must be firmly clamped by the clip and clip screw. It must lay flat on the frame in the area of the operating arm ends and possess enough tension at the front end to hold the armature in position against the frame.

- 3.08 Check that the coil screw is tight and that the coil core is flush against the heelpiece.
- 3.09 Check that the spring stops are properly seated in the armature clip and stop spring. The spring stop must be aligned with the spring pile-up to insure that the split make and break spring tips rest firmly on the shoulders of the spring stop.
- 3.10 Check that the spring lifts are properly seated under the lift springs and that clearance exists between the sides of the spring lift and the make and break springs.
- 3.11 Check visually that all springs assembled on the relay are aligned uniformly with respect to each other and to the relay structure proper.
- 3.12 Check contacts for pits or craters. Springs having contacts with noticeable pits or craters (exceeding .003") should be replaced.
- 3.13 The spring pile-up assembly screws and the spring pile-up mounting screws should be tight.
- ✓ 3.14 Check that, in both the normal and operated spring positions, a clearance exists between springs (minimum of .010") not designed to make contact.

4. FIELD ADJUSTMENT PROCEDURES

Armature Adjustment

- 4.01 Readjustment of the armature is seldom required unless it becomes necessary to replace parts because of wear or damage.
- 4.02 The armature spring shall be flat against the heelpiece in the area at the end of the operating arms and shall possess sufficient tension to fully engage the armature lug so as to hold the armature firmly in place. This condition is considered satisfied if a light pressure applied at the front edge of the spring produces no follow. If the above conditions are not satisfied, remove the armature spring and, preferably, replace it with a new, properly formed part. If a new part is not available, the defective armature spring may be hand formed. Avoid excessive bowing of the armature spring. Excessive bowing will result in too much ten-

sion against the armature and thus affect contact clearances. Overforming will result in excessive tension against the armature causing it to tilt in the operated direction.

- 4.03 To remove the armature spring, first remove the armature as instructed under paragraph 3.04. Loosen the clip screw 1-1/2 to 2 turns and draw the armature spring forward. To replace the armature spring, insert the ends of the spring under the clip and push toward the rear. Reposition the spring as explained under paragraph 4.04.

4.04 With the armature pressed flush against the coil core, the armature spring shall be positioned so that the rear edge of the spring slot just touches but does not bind on the rear edge of the armature lug. With the clip screw loosened 1 to 2 turns, the spring is slid forward or back as required. After positioning the armature spring, retighten the clip screw. The armature travel adjustment must be checked after making this adjustment.

4.05 Both operating arms of the armature shall rest against the ears at the rear of the armature spring with the relay de-energized. This condition is met if tapping the operating arms lightly, at a point just above the end of the heelpiece, does not produce an audible click. When a "click" is heard, the operating arm opposite to the side producing the click is high. Check the armature travel as explained under paragraphs 4.06 through 4.16 before altering the adjustment of either arm.

4.06 Unless otherwise specified by the individual relay adjustment, the armature travel is .025" measured at the top of the spring lift or measured between the operating arm and the ears at the rear of the armature spring.

4.07 Armature travel is preferably measured with the 017308 relay gauge (Figure 2) which is a dial indicator type. Although the gauge may be used with the relay bar in the switchboard, it is usually best to remove the bar and place it horizontally on its side on a flat surface, preferably a table, with the relay springs upward. The dial face will then be in a horizontal position when the gauge is used, thereby permitting easy observation. The rear cover should be removed from the bar to permit access to the relay coil terminals with battery potential. Mount the gauge as follows:

- (a) Rotate the dial registering point away from the spool clamping end of the gauge to avoid interference which might occur if the point should strike the relay springs.
 - (b) Turn the thumb screw counter-clockwise to open the clamp far enough to slip over the end of the spool and armature.
 - (c) Bring the gauge up to the relay and position the small pin (located opposite the shoulder clamp) so that it rests in and at the forward end of the slot of the armature spring.
 - (d) Slowly tighten the thumb screw while positioning the shoulder clamps squarely on the spool head. When positioned correctly, tighten the thumb screw firmly.
- 4.08 Rotate the dial registering point until it is positioned over either of the relay spring lifts. Using the adjustment on the dial registering point and the two knurled nuts, carefully lower the indicator until the dial registering point rests lightly on the spring lift. The dial hand should just start to register. This assures that the point is resting correctly on the lift. Set the dial so that the dial hand rests on zero.
- 4.09 Apply battery potential to the coil terminals and operate the relay. It should not be operated manually as this may give an inaccurate reading. The dial hand indicates the amount of armature travel in thousandths of an inch.
- 4.10 Compare the reading obtained with the armature travel adjustment specified in R-0004. On relays which have a specified armature travel of .025" the readings may vary from +.001" to -.002" of the specification. For re-

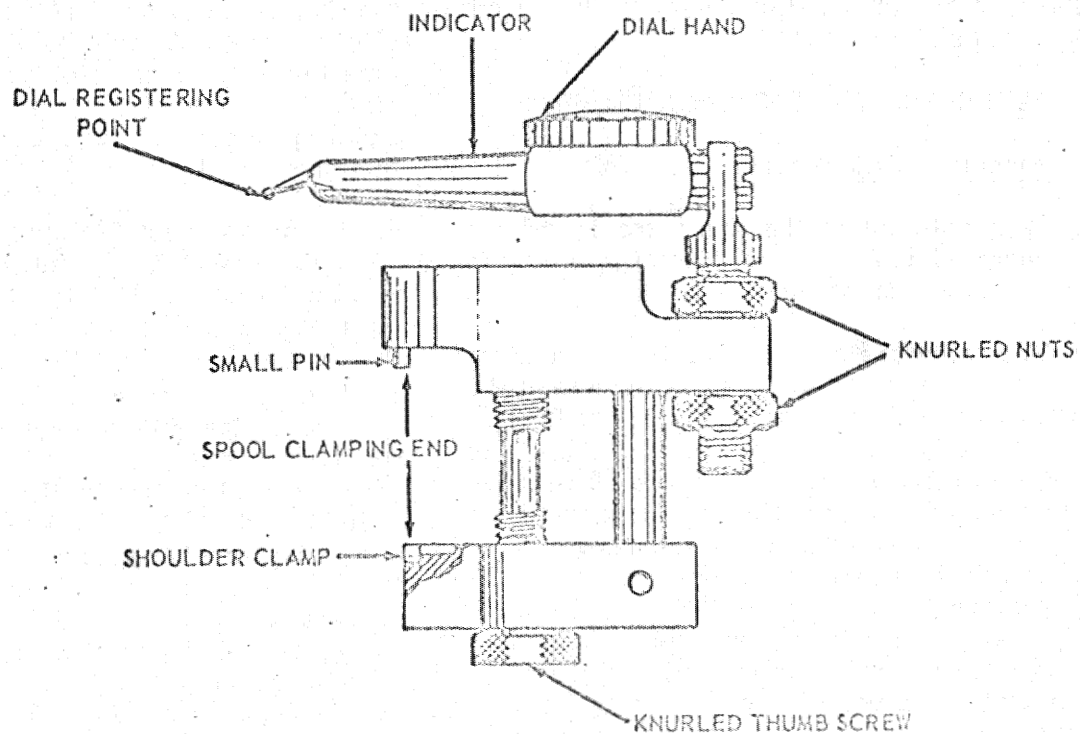


Figure 2. Relay Gauge (017308).

lays which require an armature travel of less than .025" the allowable variation is $\pm .001$ " from that specified.

4.11 Repeat paragraphs 4.08 through 4.10 on the other relay spring lift.

4.12 If the gauge (017308) is not available, use a W.E.Co. 92H thickness gauge. Place the gauge (with relay operated) between the operating arm and the ears at the rear of the armature spring directly below the spring lift. The gauge should just fit if the armature is adjusted properly.

4.13 If the armature travel does not meet its specified value, the armature should be adjusted.

4.14 To increase armature travel, operate the relay manually; insert tool H-885843-1 between the armature arm and the heelpiece and rotate in a clockwise direction as shown in Figure 3.

4.15 To decrease armature travel, operate the relay manually; insert tool H-885842-1 over the armature arm and the heelpiece and rotate in a clockwise direction as shown in Figure 4.

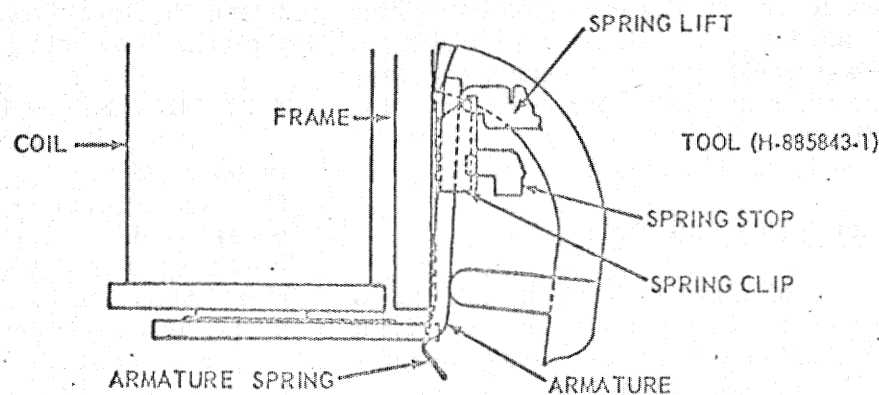


Figure 3. Increasing Armature Travel.

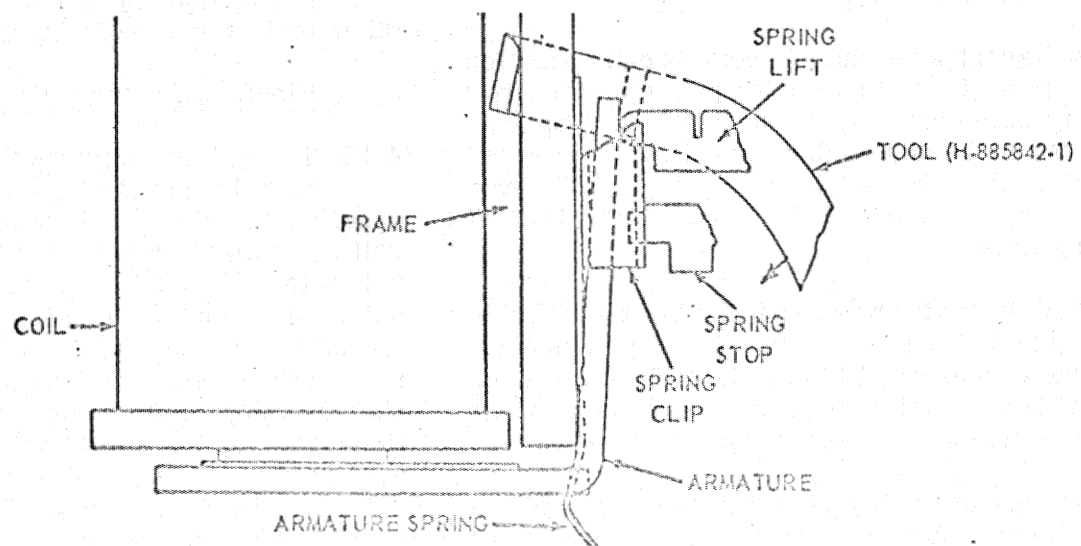


Figure 4. Decreasing Armature Travel.

4.16 After adjustment of the armature, the electrical requirements of the relay should be checked as explained under Part 5.

Contact Spring Alignment

4.17 The spring stops shall be perpendicular to the heelpiece, as gauged by eye, and shall not bind on the sides of the springs.

4.18 The spring lifts shall be perpendicular to the heelpiece, as gauged by eye, and shall not bind on the sides of the springs.

4.19 Contacts must cross and the area of contact shall be the full width of the contacts.

4.20 If the relay does not meet all of the above requirements, it may be necessary to replace the spring pile-up in question. Because of the great force that is exerted on the spring pile-up at assembly, it is not advisable to loosen the assembly screw. Loosening the assembly screw is a difficult operation requiring a holding fixture and, preferably, a pneumatic press such as is used in their assembly.

Contact Spring Adjustment

4.21 Pressure of make and break springs is measured at the tip of the spring with a H-882816-1 tension gauge. Test make springs with the relay at normal; test break springs with the relay operated. Springs shall not leave their stop when the minimum specified pressure is applied and shall leave their stop when the maximum specified pressure is applied.

4.22 Except when make before break operation is required on a spring pile-up having four spring combinations, make and break springs are not to be adjusted. Correct and permanent spacing of make and break springs is insured by the spring stops which support the tips of the springs.

4.23 Unless otherwise specified on the individual relay adjustment, lever springs shall be free of tension. This condition is considered met if break springs approach their stops when the pressure of the tension spring is relieved.

4.24 With the relay at normal, there shall be perceptible clearance between break springs and their stops. With the relay operated,

there shall be perceptible clearance between make springs and their stops. Clearance of make and break springs shall be approximately equal. In order to meet this requirement, a gradual bow may be formed at the narrow portion of the lever springs using A. E. Co. Genoa Spring Bender #12861.

4.25 Except for make before break spring combinations, or unless otherwise specified, all break contacts of a spring pile-up shall open at approximately the same time and all make contacts shall close at approximately the same time. In order to meet this requirement, a gradual bow may be formed at the narrow portion of the lever springs, using Genoa spring bender #12861.

4.26 On transfer spring combinations, there shall be minimum .005" clearance between the lever contacts and make contacts as the break contacts just open.

4.27 Make before break operation on relays having three or fewer spring combinations is obtained by stop selection. On relays having four spring combinations, make before break operation is obtained by bending the make and break springs toward the lever spring at a point in front of the stop, using A. E. Co. Genoa spring bender #12861. There shall be perceptible clearance between the break spring and its stop and the make spring and its stop at some point during the relay operation.

4.28 The make contacts of a make before break spring combination shall close before any other make contact of a spring pile-up.

Electrical Requirements

4.29 The values of current to which the relays must be adjusted are given on adjustment specification drawing R-0004-B and succeeding suffixes. Adjustment specifications prepared prior to 1954 provided readjustment values only. Beginning with 1954, test values are included in the specification where applicable. On more recent circuits, adjustment instruction sheets, carrying the same numerical identification as the circuit but with the prefix RC or AH, are provided. The instruction sheets include notes for the connection of current flow test set H-882790-1, to permit testing the relay under field conditions, in addition to providing resist-

ance and current flow values for Readjust/Adjust and Test/Insp. Relays falling within the Test/Insp. values should not be readjusted. However, any relay falling outside of the Test/Insp. values should be brought within the limits of the Readjust/Adjust values.

4.30 The electrical requirements of the relay shall be met by varying the force of the tension spring, located at the top of the spring pile-up, against the spring lift.

4.31 The tension spring pressure of both spring pile-ups shall be approximately equal and shall in all cases be sufficient to cause all break springs to leave their stops when the relay is de-energized.

4.32 Electrical test requirements shall be applied in the following sequence omitting those tests not required by the adjustment specification.

(1) Soak

(2) Hold

(3) Release

(4) Non-Operate

(5) Operate

4.33 If the Release or Non-Operate requirement is not met, the tension spring will have to be re-formed with an appropriate spring bending tool. If this does not help remove the spring pile-up mounting screws and the tension spring; re-form the spring by hand. Removal of the tension spring is necessary only in extreme cases.

4.34 If the Hold or Operate requirement is not met, gradually relieve the tension spring pressure against the spring lift by lifting the tip of the tension spring and stroking the spring surface with the index finger. This can be performed on a relay mounted on a relay bar.

5. TESTS

5.01 After readjusting relays, check that the relay functions properly under circuit operating conditions and perform appropriate operating tests to insure reliable functioning of the circuit.

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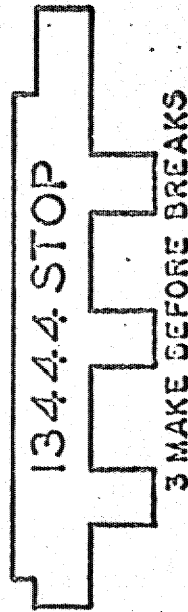
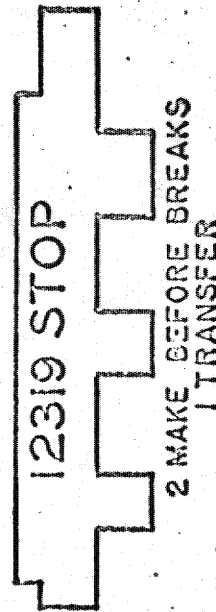
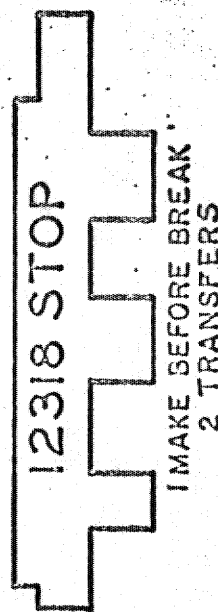
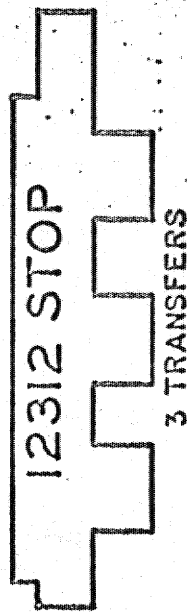
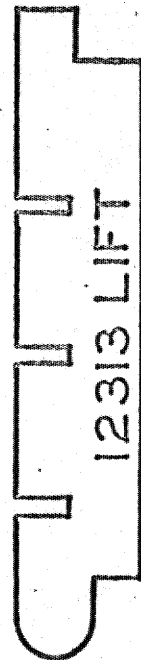
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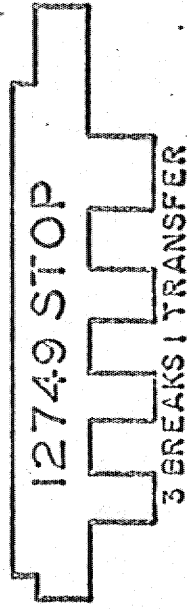
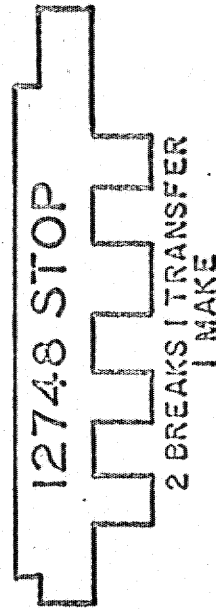
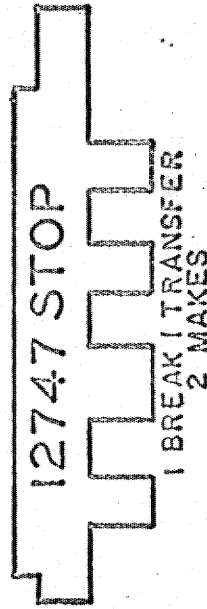
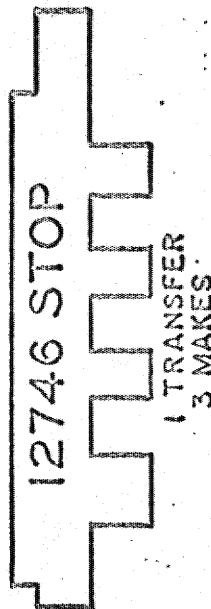
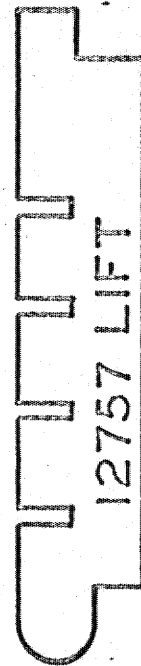
the other side of the mountain
the other side of the mountain
the other side of the mountain

LEICH RELAY SPRING LIFTS & STOPS 900 TYPE RELAYS

910 & 920 SERIES



920 & 930 SERIES



SECRET OCT 20 1960

SECRET OCT 20 1960

SECRET OCT 20 1960

LEAD SYMBOLS

C-6220

T	TEST	NF	NORMAL FINDER
CO	CUT OFF	1F-5F	1-5 FINDER (ALTERNATES)
LR	LINE RELAY	FPA-FID	FINDER BUSY A-D
BAT.	BATTERY (NEGATIVE)	FC	FINDER CALL METER
GR.	GROUND (POS. BAT.)	FOA-FOB	FINDER OVERFLOW A & B
LA	LOCKOUT ALARM	FOM	FINDER OVERFLOW METER
LOA	LOCKOUT ALARM	OM	OVERFLOW METER
TN	TEN	FS	PAYSTATION START
U	UNIT	TS	TOE START
RX	RECTIFIER	BAB	BLOCKING A BREAK) BBB, BBL, BBVI
IC	LOCKOUT TIMING LEAD C	BAL	BLOCKING A LEVER) ECB, ECL, ECM &
IS	LOCKOUT TIMING LEAD S	DAM	BLOCKING A MAKE) EDB, EDL, EDM ALTERNATE CKTS.
IT	LOCKOUT TIMING LEAD T	RKU	RECTIFIER UNITS
FAL	FINDER ALARM	EKA	BLOCKING A
FSA	FINDER SWITCHING ARM. A	1-0	UNITS ALLOTTED MULTIPLES
FSB	FINDER SWITCHING ARM. B	10-00	TENS ALLOTTED MULTIPLES
TSA-TSD	TRUNK SELECTION A-D	UI-UO	UNITS LEADS
TSW	TRUNK SELECTION W	TNIO-TN00	TENS LEADS
UA-UE	UNITS LEADS A-E	AM	ALTERNATE MARKING
FI	FINDER IN		
FO	FINDER OUT		
RS	RESET		
RXT	RECTIFIER TENS		

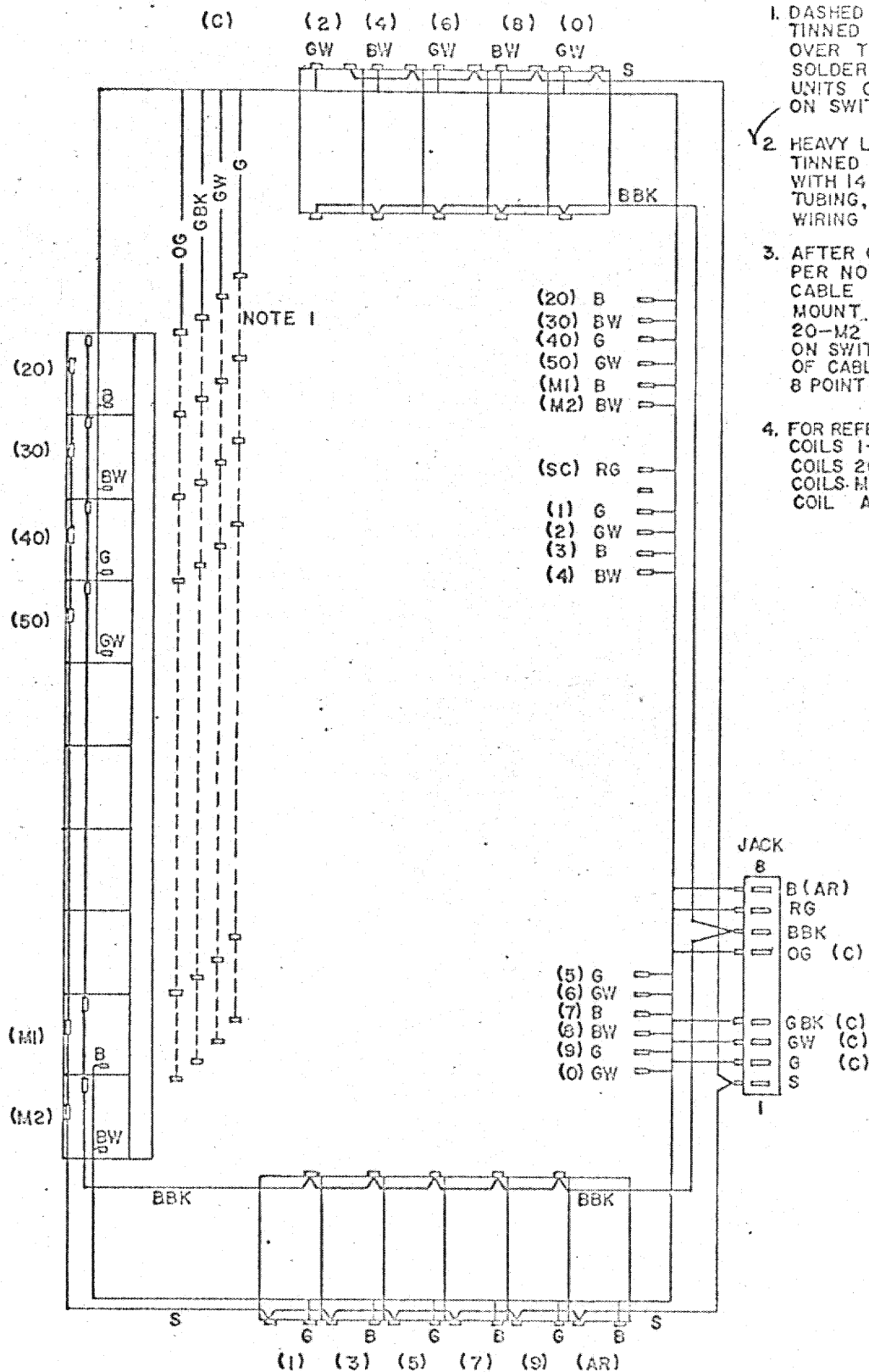
IS 11 Interrupter Start

W-3266

CHANGES

TITLE BLK. WAS
WIRING, RELAY-
SWITCH 014430,
POINT OUT-
CABLE
4429.

2) 2-15-57 EFB



NOTES.

1. DASHED LINES = 24 GA. BARE TINNED COPPER WIRE, STRETCH OVER TERMINAL NOTCHES AND SOLDER BEFORE MOUNTING UNITS CONTACT ASSEMBLY ON SWITCH.

2. HEAVY LINES = 24 GA. BARE TINNED COPPER WIRE COVERED WITH 141 MAT. INSULATING TUBING, WIRE BEFORE WIRING CABLE.

3. AFTER COMPLETING WIRING PER NOTES 1 AND 2. WIRE CABLE TO COILS 20-50, M1, M2, MOUNT AND ADJUST ARMATURES 20-M2 THEN MOUNT CHANNEL ON SWITCH & WIRE REMAINDER OF CABLE BEFORE MOUNTING 8 POINT JACK ON SWITCH.

4. FOR REFERENCE ONLY.
COILS 1-0-011429A
COILS 20-50-011430A
COILS M1-M2-011430A
COIL AR-011433A

ALLOTTER-AR
SEL. CONTROL-SC
LOCKING-LK
CONTROL-TX

TEST WIRE-T
- LINE
+ LINE
BATT.

TOLERANCE UNLESS SHOWN OTHERWISE

DECIMALS ±

FRACTIONS ±

ANGLES ±

DR D.T.	SCALE	FINISH
CH 1/51	DATE 8-11-55	MAT'L
EN	APPR 1.0	

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

RELAY - SWITCH

60 BANK OUTLETS
CABLE 014429

ISSUE 1.2.

W-3266

USED ON

CC-1206

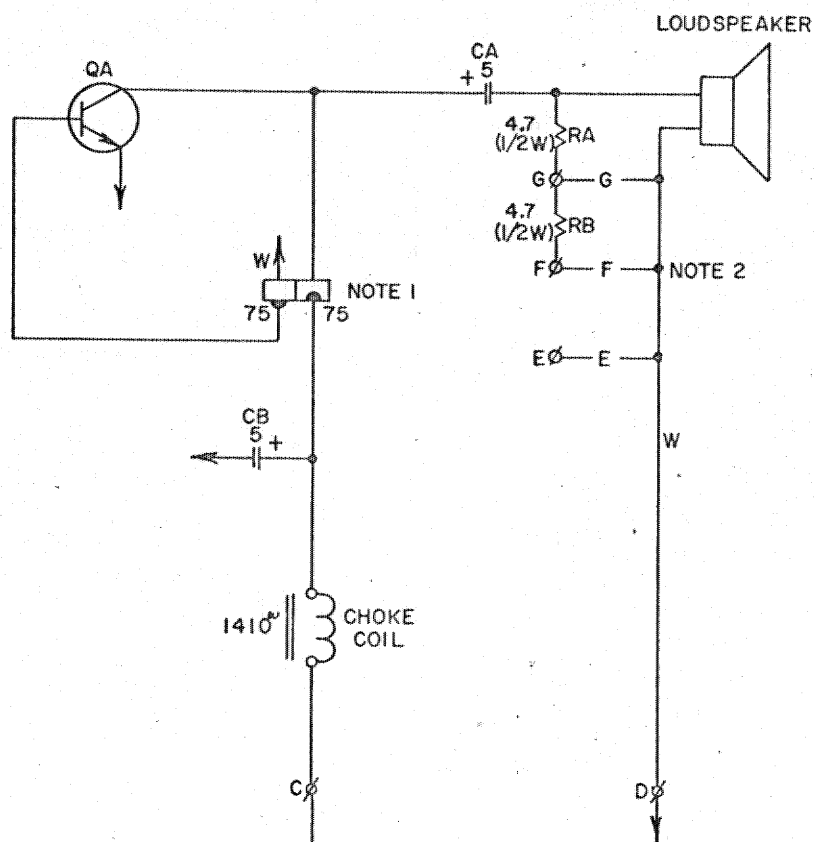
CHANGES

ADDED NOTE 1.

R_T FA *AK*2) 11-1-61(CLC) *F*ADDED RES. RA,
RB; E, F & G WRG.;
EXTERIOR WRG.
& NOTE 2.

FG

3) 3-16-62(CLB

ADDED 48 V
OPERATION TO
TITLE BLK.

POSITION CIRCUIT

TURRET

NOTES: POWER RATINGS SHOWN ARE MINIMUM VALUE.
 1. RELAY COIL WITHOUT SPRINGS USED AS TRANSFORMER.
 2. CONNECT E-WRG. FOR MAXIMUM VOLUME; F-WRG. FOR MODERATE VOLUME; G-WRG. FOR MINIMUM VOLUME.

DR L. H.	SCALE
CH <i>PK</i>	DATE 4-24-60
EN <i>RT</i>	APPR <i>110</i>

LEICH ELECTRIC CO.
GENOA, ILL.

USED ON

AUDIBLE SIGNAL UNIT

48-VOLT OPERATION

12 & 26 TRK TURRETS

019131, WC-2432.

ISSUE 1, 2, 3.

CC-1206

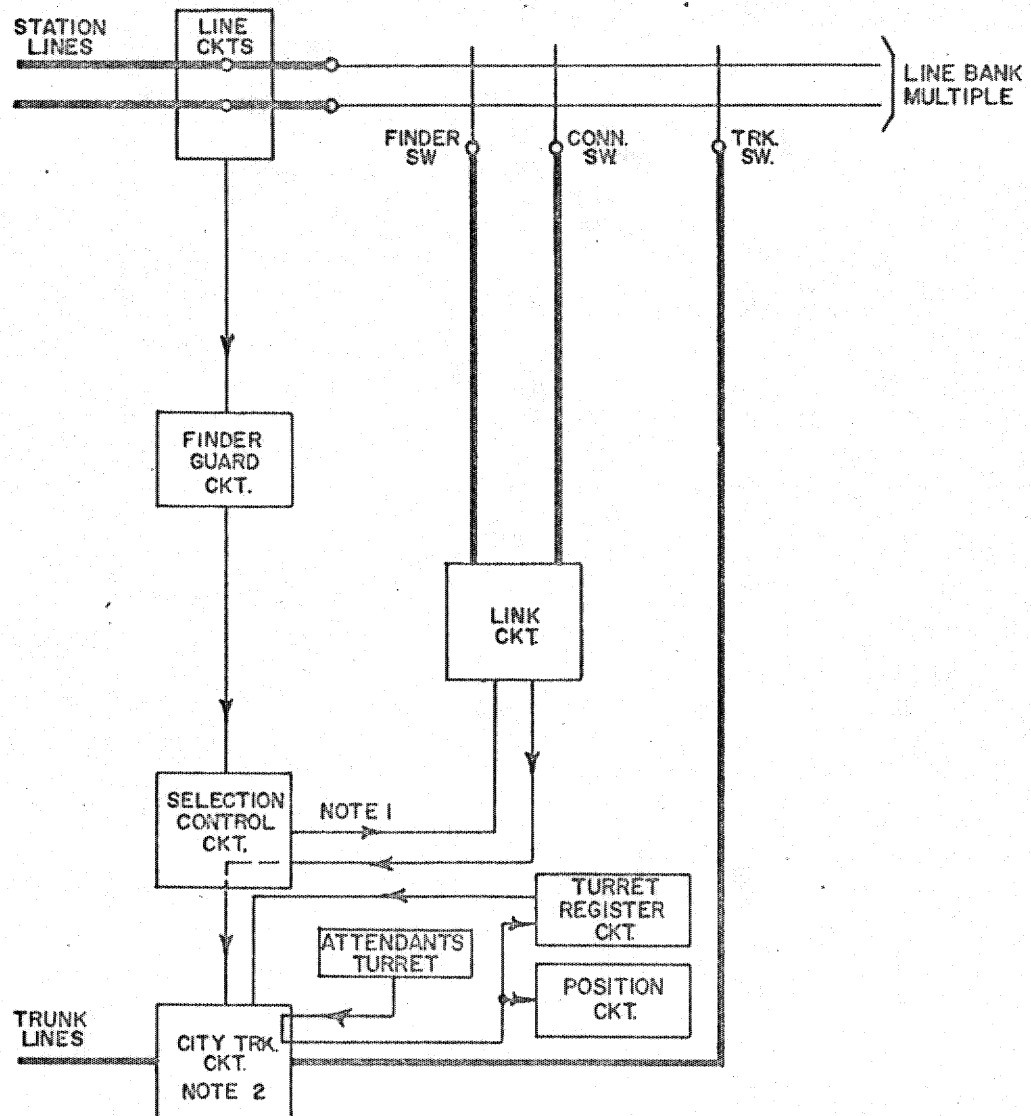
LEICH 40/80 PABX
Counting Relays Operations

<i>Released</i> <i>contact pulses</i> A-	<i>operated</i> A+	<i>Relays</i> <i>After</i> <i>Pulse</i>
1. 1+	2+	1,2
2. 1-3+	2-	3
3. 1+	2+4+	1,2,3,4
4. 1-	2-	3,4
5. 1+3-	2+	1,2,4
6. 1-5+	2-4-	5
7. 1+	2+	1,2,5
8. 1-3+	2-	3,5
9. 1+	2+4+	1,2,3,4,5
0. 1-	2-	3,4,5

A-3660

CHANGES

ADDED:ATTEN-
DANTS TURRET,
TION CKT. &
ET REG. CKT.
BLOCKS; 40B TO
TITLE; LINE BANK
MULT. REF
2). 31 (CLC



NOTE 1: 2 SELECTION CONTROL CKTS. ARE PROVIDED.
SELECTION CONTROL CKTS. DISENGAGE THEMSELVES FROM THE LINKS:

- (A) WHEN LINK CUTS THRU TO THE CALLED LINE,
- (B) WHEN CALLED LINE TESTS BUSY,
- (C) AFTER COMPLETION OF SINGLE DIGIT SELECTIONS (TRKS. ETC.),
- (D) APPROX. 20 SEC. AFTER SEIZURE IF DIAL PULSES DO NOT FOLLOW WITHIN THIS PERIOD.

NOTE 2: LINKS ARE RELEASED ON OUT GOING CITY TRK CALLS.
INCOMING CITY CALLS ARE COMPLETED THROUGH TRK. SW.

DR D.T.	SCALE
CH	DATE 11-22-55
EN AC	APPR AC
AUTOMATIC ELECTRIC CO GENOA BRANCH GENOA. ILL	

SELECTION SCHEME BLOCK DIAGRAM

40A, 40B & 40M

ISSUE 1.2.

*

A-3660

USED ON

CHANGES

REMOVED SA FROM BETWEEN BLC SPGS 2-12 AND GRD.

2) 62 (CLB)

ADDED POS. CKT. TO BLF.

ADDED NOTE 3.

3) 3-20-63 (CLC)

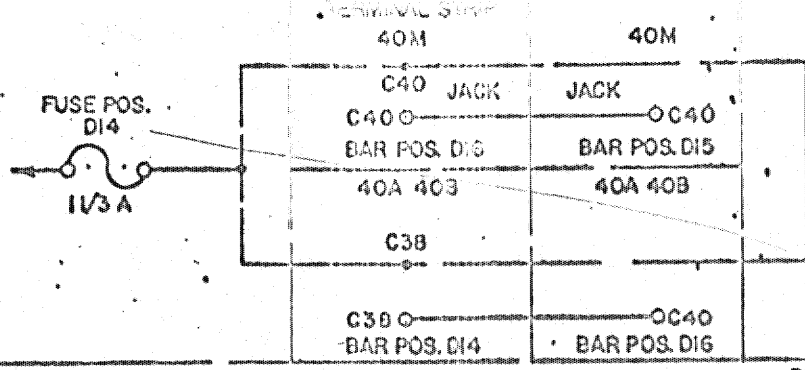


FIG. A
FUSED BATTERY CONNECTIONS

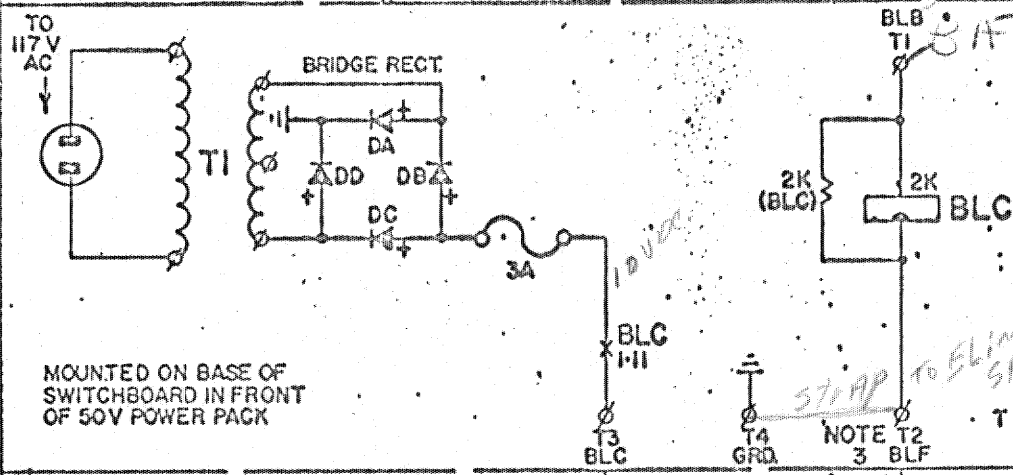
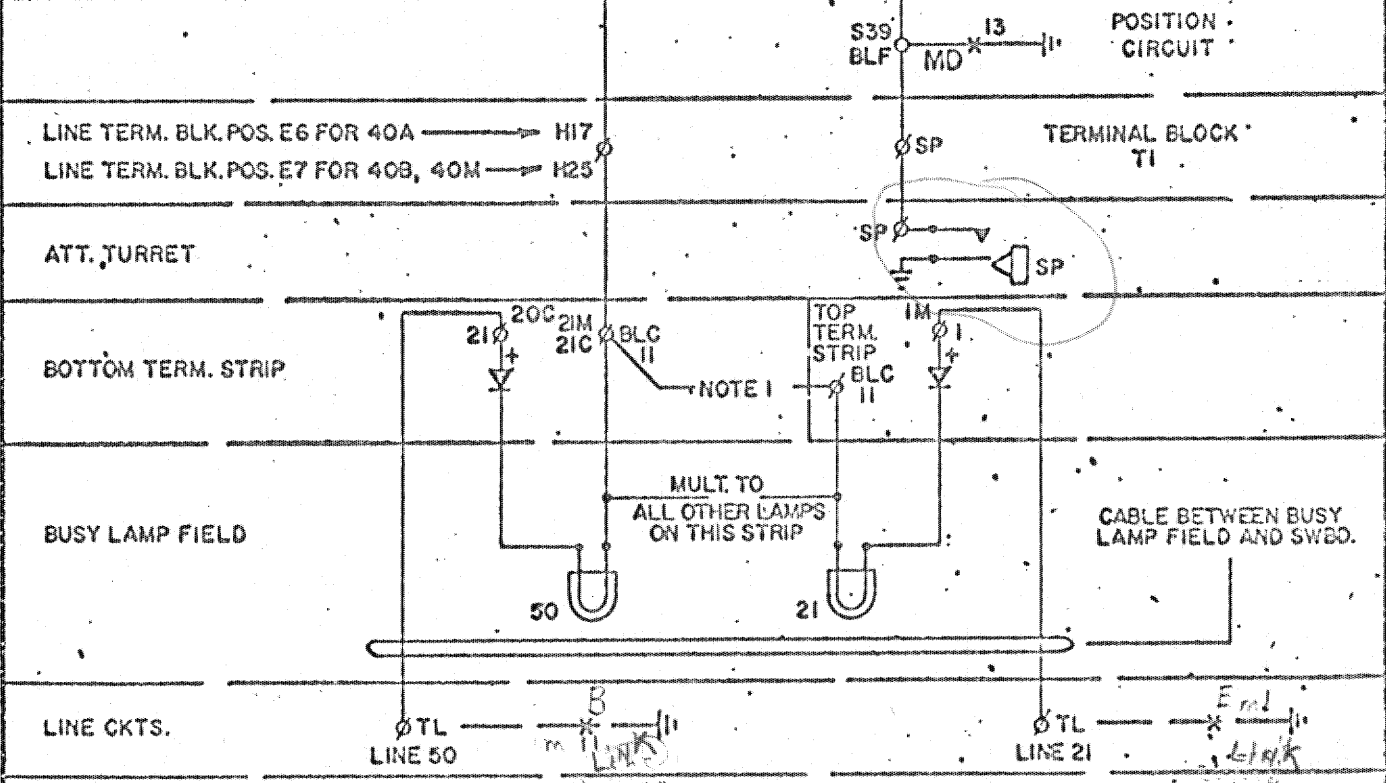


FIG. B
BUSY LAMP FIELD
POWER SUPPLY AND
CONTROL RELAY

WB-5926

SEE R-0004
RLY. ADJ.
BLC 208

T	BLB	BLF	BLC	GRD.
---	-----	-----	-----	------



NOTE 1. INSTALLER MUST MULTIPLE BLC OF EACH TERMINAL STRIP TO BLC OF LAMP POWER SUPPLY.

NOTE 2. OUTPUT OF LAMP POWER SUPPLY SHOULD MEASURE 9-11 VOLTS D.C.

NOTE 3. GROUND TO LEAD BLF ALSO AVAILABLE FROM AN APPLICABLE TRUNK CIRCUIT WHICH ATTENDANT HAS PLACED ON HOLD.

DR EJM

CH. *R/K*

EN

SCALE

DATE 2-21-62

APPR *R/K*

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

BUSY LAMP FIELD CONTROL CIRCUIT

ARRANGED TO MOUNT ON BASE OF SWBD.
IN FRONT OF POWER PACK

40A, 40B, 40M PASX

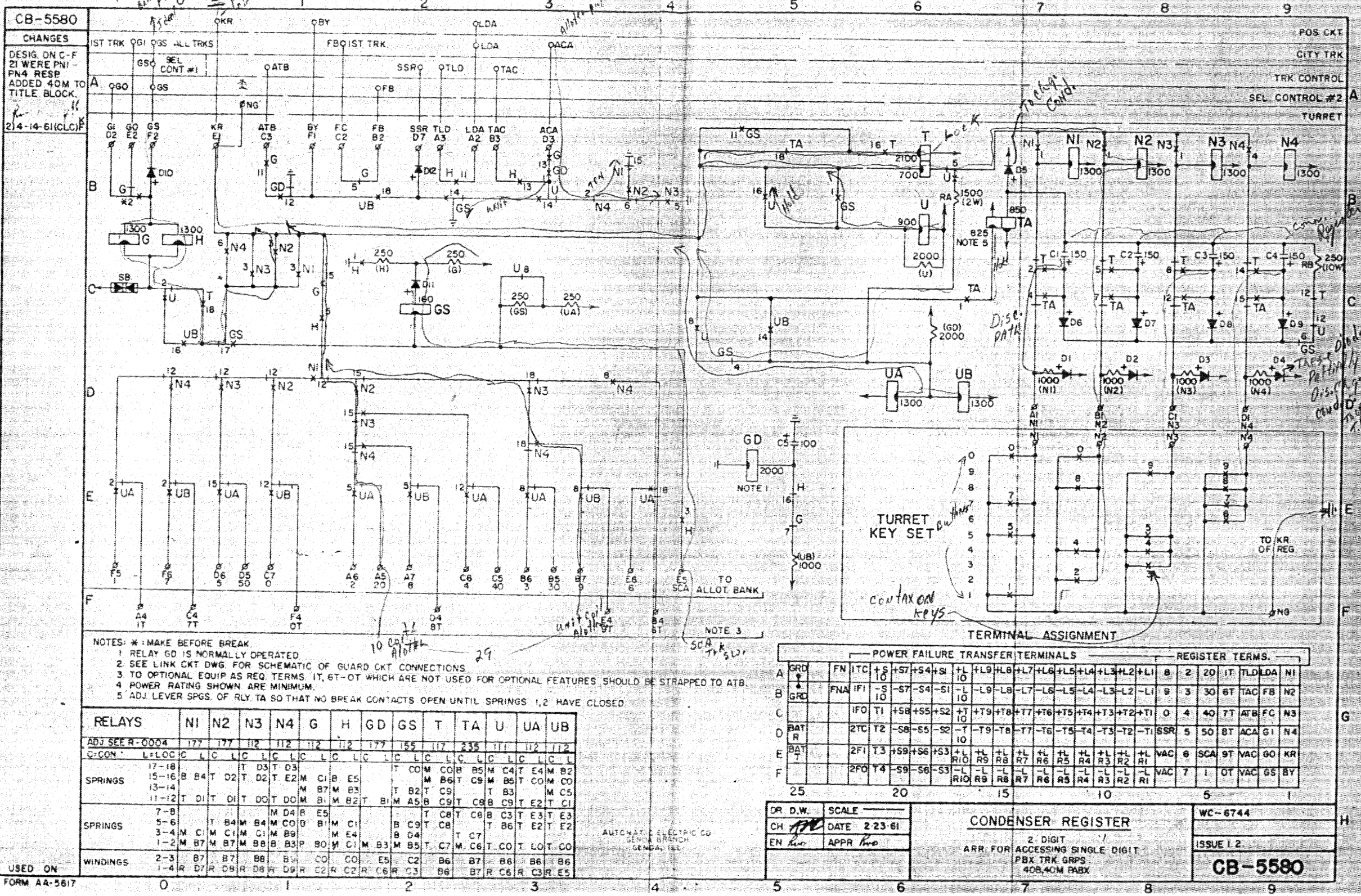
WB-5926

ISSUE 1, 2, 3

* CC-2301

USED ON

[illegible][illegible]



CB-5318

CHANGES

REDRAWN, COND
CG WAS TO REP
COIL TERM. 6.
REVERSED
WDG. 283 OF
RLY G. RLY P.
WDG. 1 WAS 10K.
RLY R ADJ. WAS
104. REVISED
NOTE 19. ADDED
NOTES 20 & 21.
L.R.T. WRG.

11/2-29-61 (CLB)

REVERSED & RE-
DESIGNED & RE-
TERMINATION ON
REPT. COIL.

12/2-5-62 (CLC EJM)

ADDED X & Y-WRG
B NOTE 22.

13/3-3-62 (CLB)

R SPGS. 15, 16 &
17 WERE SPGS.
13, 14 & 15
RESP. COND.
CG WERE
MATCHED.
ADDED LEAD
S31 AE, R113,
G & H WRG. &
NOTE 23.

14/1-7-63 (CLB)

RLY. W ADJ. WAS
113. W17 WAS
K612. D1 WAS
WAS TO V4, V3
WAS TO GRD.
B17 WAS TO K3.
K4 WAS TO RES.
RV, B13 & E12.
ADDED DIODE
D43 & Vm3.

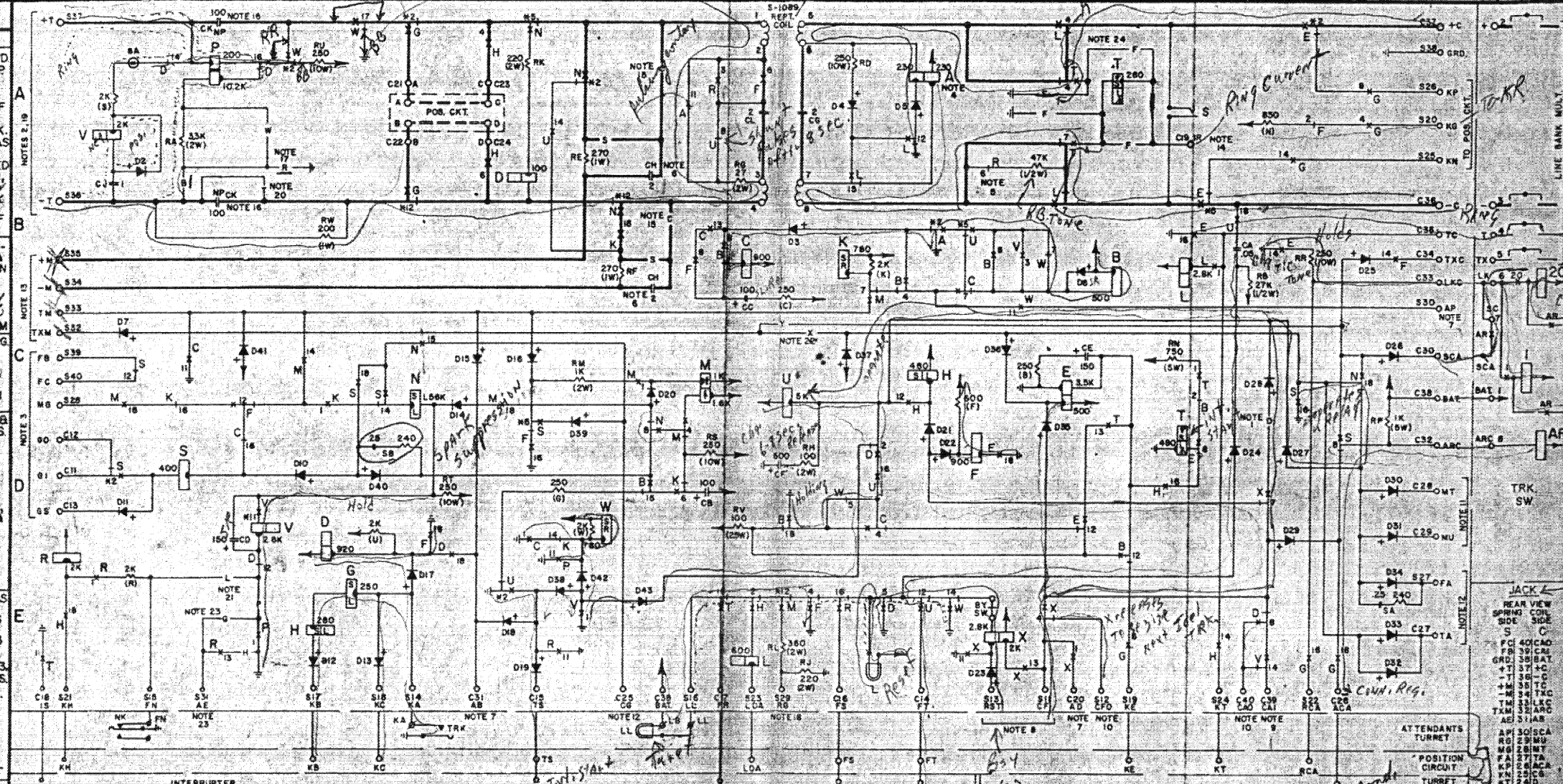
15/6-17-63 (CLB)

IS WAS SHOWN
AS 518.

ADDED E & F
WRG. & NOTE 24
CAPACITOR CL
WAS CG PAIRED.

16/9-9-63 (CLB)

USED ON



- NOTES: 1. MAKE BEFORE BREAK OR EARLY MAKE. POWER RATING VALUES ARE MIN. 2. TO ELIMINATE 8-8 SEC. DELAY IN MAKING CONSULTATION CALLS AFTER D.C. SEIZURE. 3. TO DISTANT END DIRECTLY OR THRU PWR. FAILURE TRANSFER CKT. STATIONS INVOLVED IN PWR. FAILURE TRANSFER & FOR PREDETERMINED NITE ANS. SERVICE WILL RES. GROUNDING BUT TON OR KEY TO INITIATE OUTWARD CALLS DURING PWR. FAILURE OR AT NITE WHEN B-WRG. IS USED SEE DB-5318 FOR SPEC. REQ. FOR DIST. END LINE CKT. 4. SEE LINK & FINDER GUARD CKT. FOR SCHEMATIC OF GUARD CKT. CONN. FURNISH SHORTING CLIPS FOR JACKS SR, S12, S39, S40, C12, C39, C40. 5. READJ. RLY. A TO ADJ. NBR 297(R-000) IF TRK. CONDTR. LOOP EXCEEDS 500'. 6. DISC. 47K RES. IF RING BACK TONE TO DIST. END IS UNDESIRABLE. 7. CAPACITORS 'CH' MUST BE MATCHED WITHIN 25% OF EACH OTHER. 8. TO ADAPTER CKTS. AS REQUIRED. 9. TO TRK. GRP ACCESS CONTROL CKT. 10. TO UNIVERSAL NITE ANS. CONTROL CKT. 11. CONNECT C10 TO C11 OF NEXT TRK., CAD TO C41 OF NEXT TRK. 12. TO TENS & UNITS ALLOTTER BANK TERMS. CORRESPONDING TO BANK MULT. ASSIGNED TO THIS TRK. FOR CONSULTATION & CONFERENCE SERVICE. 13. TO FINDER GUARD CKT. 14. TO BANK MULT. ASSIGNED TO THIS TRK. FOR CONSULTATION & CONFERENCE SERVICE. 15. TO INTERRUPTER CKT. 16. S-WRG. FURNISHED FOR 3PTY. CONF. SERVICE USE C-WRG. INSTEAD. CAPACITORS 'CK' MUST BE MATCHED WITHIN 10% OF EACH OTHER. 17. S-WRG. FURNISHED. USE B-WRG. INSTEAD OF S-WRG. FOR PRECAUTIONARY BUSY WHEN DIST. END CONN. BANK IS REV. USE W-WRG. IF DIST. END IS 24V. OFFICE. 18. TO TURRET TRANSFER CKT. IF USED. 19. TRK. CONDUCTOR LOOP LIMITS FOR 48V DIST. OFFICE: 15K' OR CENTRAL OFFICE LOOP LIMIT MINUS 460'. WHICHEVER IS LESS, OR WITH T-WRG. CENTRAL OFFICE LOOP LIMIT MINUS 460'. WHICHEVER IS LESS, OR WITH T-WRG. FOR 24V DIST. OFFICE: 800' OR CENTRAL OFFICE LOOP LIMIT MINUS 460', WHICHEVER IS LESS. TRK. CONDUCTOR LOOP PLUS STATION LOOP SHOULD NOT EXCEED CENTRAL OFFICE LOOP LIMIT. FOR THESE STATIONS ASSIGNED TO THIS TRK. FAILURE & FOR PREDETERMINED NITE ANS. SERVICE, RECOMMENDED INCOMING RINGING FREQ. RANGE IS 18 TO 33 1/3. 20. T-WRG. MAY BE CONNECTED TO IMPROVE CENTRAL OFFICE RING TRIP IF TRK. CONDUCTOR LOOP EXCEEDS 600'. 21. P-WRG. NORMALLY CONNECTED. DISCONNECT P-WRG. & CONNECT L-WRG. WHEN DIST. END. CAN NOT FURNISH PREMONITORY BUSY SIGNAL. WHEN L-WRG. IS USED, FURNISH NITE SIGNAL RELEASE ADAPTER CK-2078 OR EQUIV. & DISCONNECT S-WRG. 22. X-WRG. FURNISHED. DISCONNECT X-WRG. & CONNECT Y-WRG. TO PERMIT CONSULTATION CALLS TO AN UNRESTRICTED TRUNK. SEE DB-5318, ITEM 16, FOR PRECAUTIONARY PROCEDURE REGARDING Y-WRG. 23. CONNECT 'C'-WRG. IF IT IS DESIRED TO ILLUMINATE BUSY LAMP FIELD. WHEN A TRUNK IS PLACED ON HOLD, CONNECT LEAD AE TO POSITION CKT. LEAD BLF. CONNECT 'D'-WRG. WHEN CAMP-ON BUSY ADAPTERS ARE USED AND CONNECT LEAD AE TO ASSOCIATED CAMP-ON ADAPTER LEAD AE. DO NOT CONNECT G-AND H-WIRING IN THE SAME RELAY BAR. 24. E-WRG. FURNISHED. DISCONNECT E-WRG. AND CONNECT F-WRG. TO INSERT THE RING TRIP RELAY IN THE RINGING GENERATOR RETURN PATH.

RELAYS	X	A	B	C	D	E	F	G	H	K	L	M	N	P	R	S	T	U	V	W
ADJ. SEE P-0004	112	299	112	111	185	245	21	167	238	117	143	122	108	299	282	140	145	137	104	117
C1 CONT. L.C.	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18
SPRINGS	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18	17-18
SPRINGS	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8	7-8
WINDINGS	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3

DR. D.E. SCALE

CH. F.G. DATE 10-26-60

EN. R.V.O. APPR. R.V.O.

AUTOMATIC ELECTRIC CO.

GENOA BRANCH

GENOA, ILL.

CITY TRUNK

OUTGOING LOOP DIAL WITH GRD. SEIZURE OF DISTANT END. RINGDOWN INWARD. DIAL OR HOOKSWITCH CONTROLLED CONSULTATION TRANSFER & 3PTY. CONFERENCE SERVICE

408, 80A PABX

WC-6452

ISSUE 11, 12, 13, 14, 15, 16.

CB-5318

ABE - a DURING CONVERSATION

FIG. FS
PULLER SWITCH
(FOR REFERENCE ONLY)

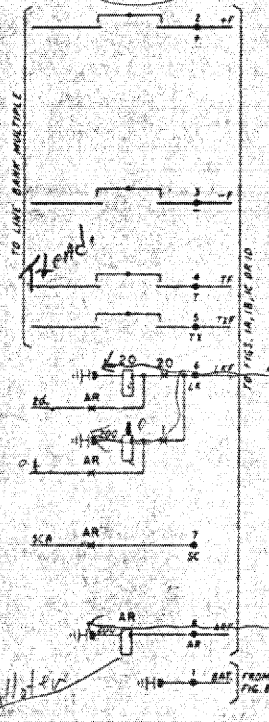


FIG. BT
(FOR REFERENCE ONLY)



FIG. IA, IB, IC, ID
LINK CIRCUIT

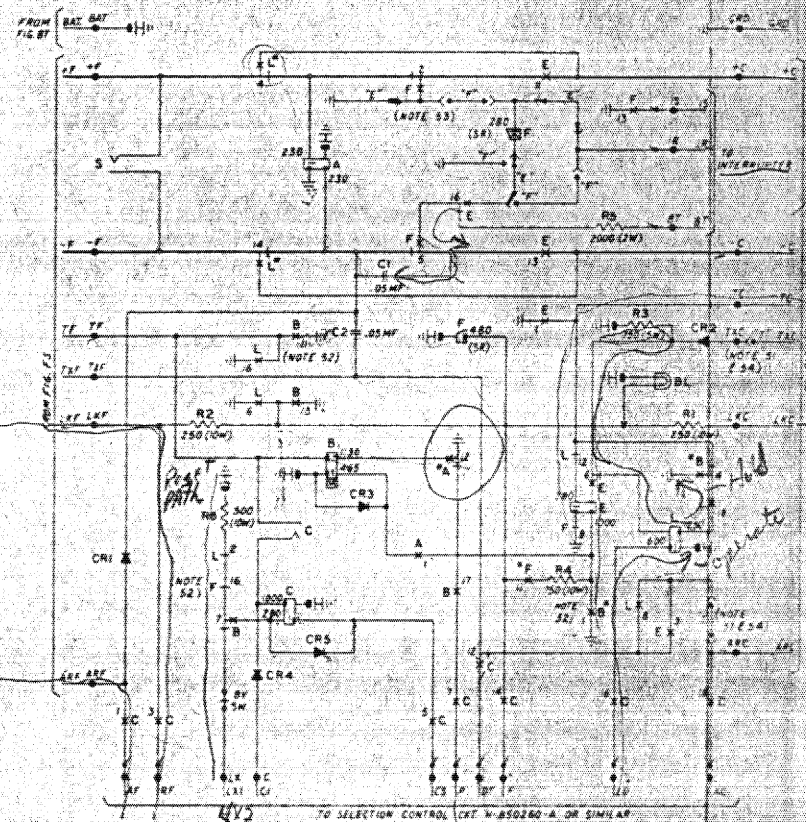
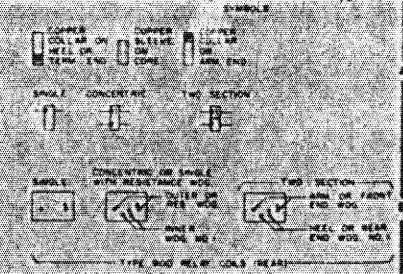
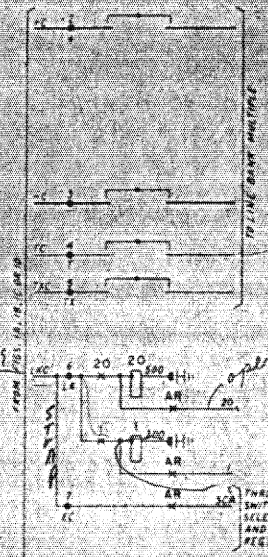


FIG. CS
DISCONNECT SWITCH
(FOR REFERENCE ONLY)

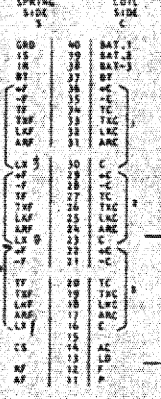


INDICATED INSIDE TERMINAL START OF WINDING
INDICATED INSIDE TERMINAL END OF WINDING
INDICATED INSIDE TERMINAL BREAK OR EARLY MAKE

MANUFACTURING NOTES:
1-WATTAGE VALUES SHOWN ARE MINIMUM
2-DIGITS ON CHS ARE 41-1933

ENGINEERING NOTES:
S1-DISCONNECT "W" WIRING ON ALL 40M & 80M SWITCHBOARDS.
S2-RELAY B, SPRINGS 1,2 MUST MAKE BEFORE SPRINGS 11,12. RELAY F, SPRINGS 11,12 MUST MAKE BEFORE SPRINGS 15,16 BREAK.
S3-"W" WIRING FURNISHED. DISCONNECT "W" WIRING AND CONNECT "W" WIRING TO INSERT THE RING TRIP RELAY IN THE RINGING GENERATOR.
S4-WHEN STATION WITNESS IS PROVIDED, "W" WIRING MUST BE OMITTED.

JACK
(REAR VIEW)



RELAY	A	B	C	D	E	F	L
ADJ. SEE R-900H	176	141	308	256	327	147	
C=CONT. L=LOC.	C	L	C	L	C	L	C
SPRINGS	17-18 19-20 21-22 23-24	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13
SPRINGS	2-8 3-4 5-6 7-8	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13	M 16 M 15 M 14 M 13
WINDINGS	2-3 1-4	M 16 M 15	M 16 M 15	M 16 M 15	M 16 M 15	M 16 M 15	M 16 M 15

TABLE A FEATURES			
FIG.	RING TRIP RELAY IN SERIES WITH GEN. LEAD "W" WIRING	RING TRIP RELAY IN SERIES WITH GEN. RETURN "W" WIRING	CONDUITATION TRANSFER SERVICE FROM CITY TRUNKS "W" WIRING
1A	*	*	*
1B	*	*	*
1C	*	*	*
1D	*	*	*

Lin K

DESIGNED BY: H-850289-A
CHECKED BY: H-850289-A
DATE: 11-1-44
SCALE: 1/8" = 1"

FIG. A OF GENCO. BRGSS:
C-6756-155.9
C-6756-155.9
C-6756-155.9
C-6756-155.9

PARK LINK CIRCUIT
LEIGH TYPE 40A 40B 40M
80A & 80M PARK
1000 PAX
(RELAYS TYPE 900)

H-850289-A
SHEET 1 OF 2
D

AUTOMATIC ELECTRIC COMPANY
NORTH AVE. 11, U.S.A. GENCO. 11, U.S.A. O. WHEATON, WISC. U.S.A. O.

use with Description

SEQUENCE CHARTS

H-850350-A

SHEET 2 OF 2

SC1 - CITY TRUNK MONITOR; TALK, SELECTION & BUSY TEST;
BREAK-IN & EXTENDING TO SPECIAL SERVICE

SC2 - INFORMATION TRUNK

SC7 - OUT GOING CITY TRUNK CALL
(MO, AA, AB, RC, RG OPERATED PER SC1)
CITY TRK SEIZED

SC3 - CITY TRUNK GUARD

SC8 - ATTENDANT'S OUT-DIAL TRUNK

SC4 - SPLIT KEY

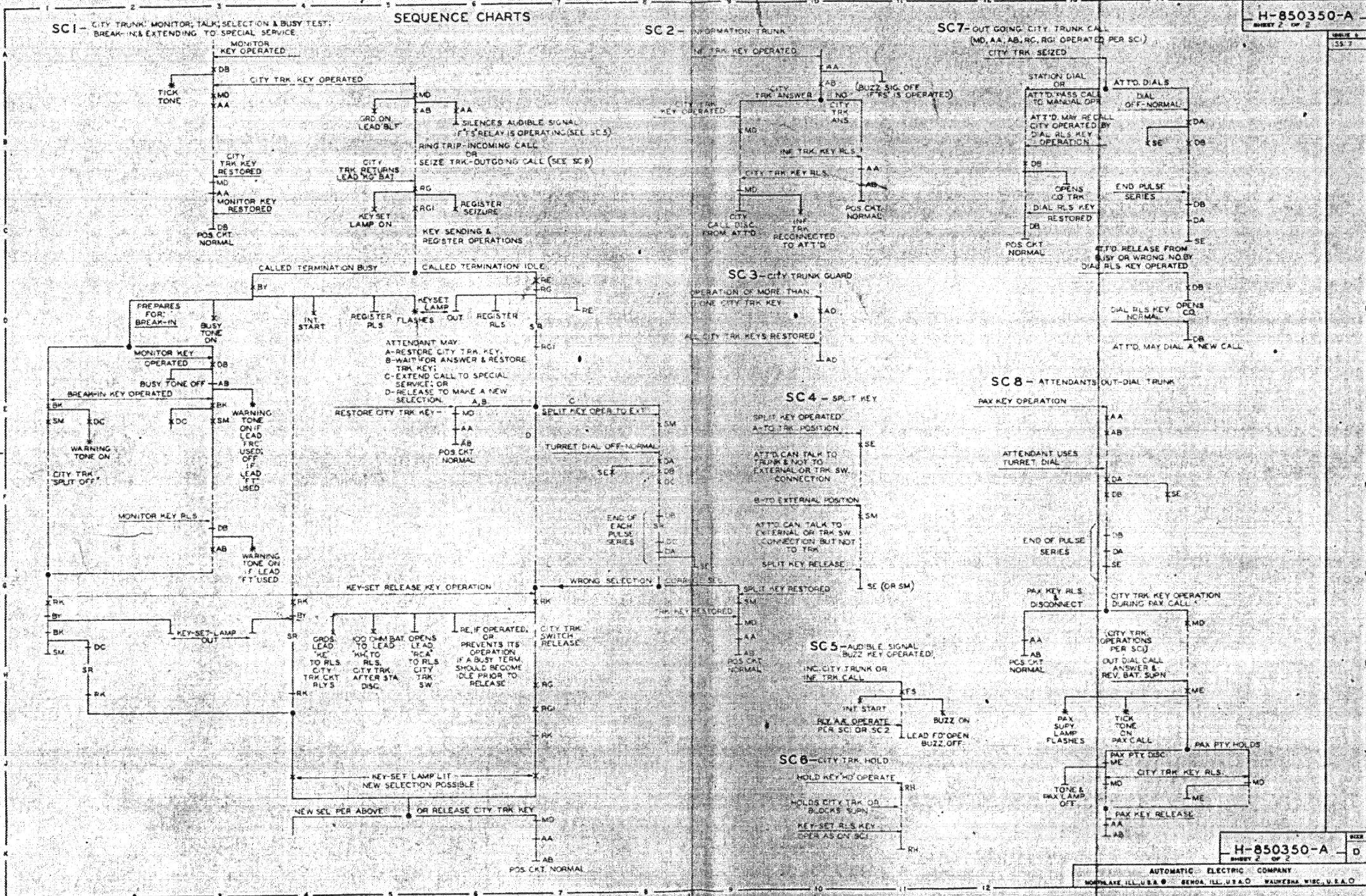
SC5 - AUDIBLE SIGNAL
BUZZ KEY OPERATED

SC6 - CITY TRK HOLD

H-850350-A

SHEET 2 OF 2

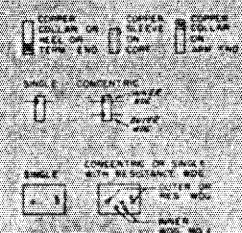
AUTOMATIC ELECTRIC COMPANY
MORRIS, ILL. U.S.A. • BEND, ILL. U.S.A. • WAUKESHA, WISC. U.S.A. •



ENGINEERING NOTES:

SI-DIGIT SHOWN IS NORMALLY ASSIGNED BUT ANY AVAILABLE DIGIT MAY BE USED IF APPROPRIATE CONNECTIONS ARE MADE.

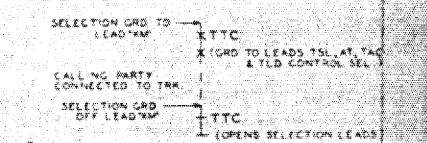
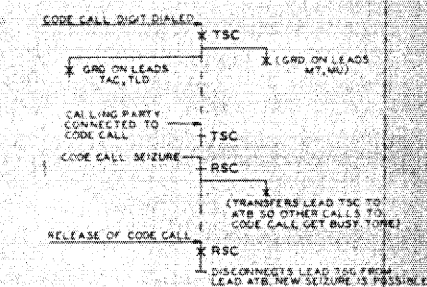
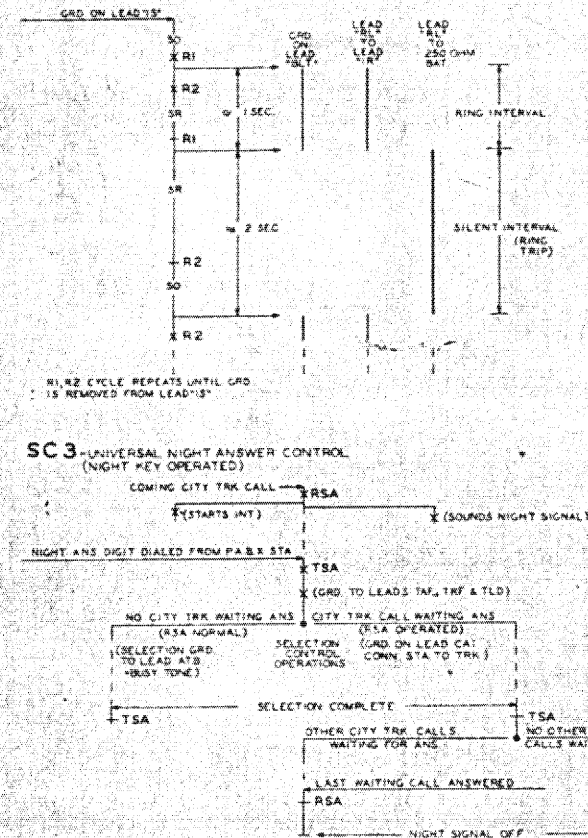
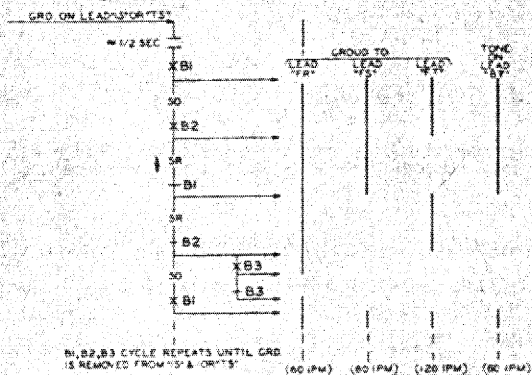
SYMBOLS:



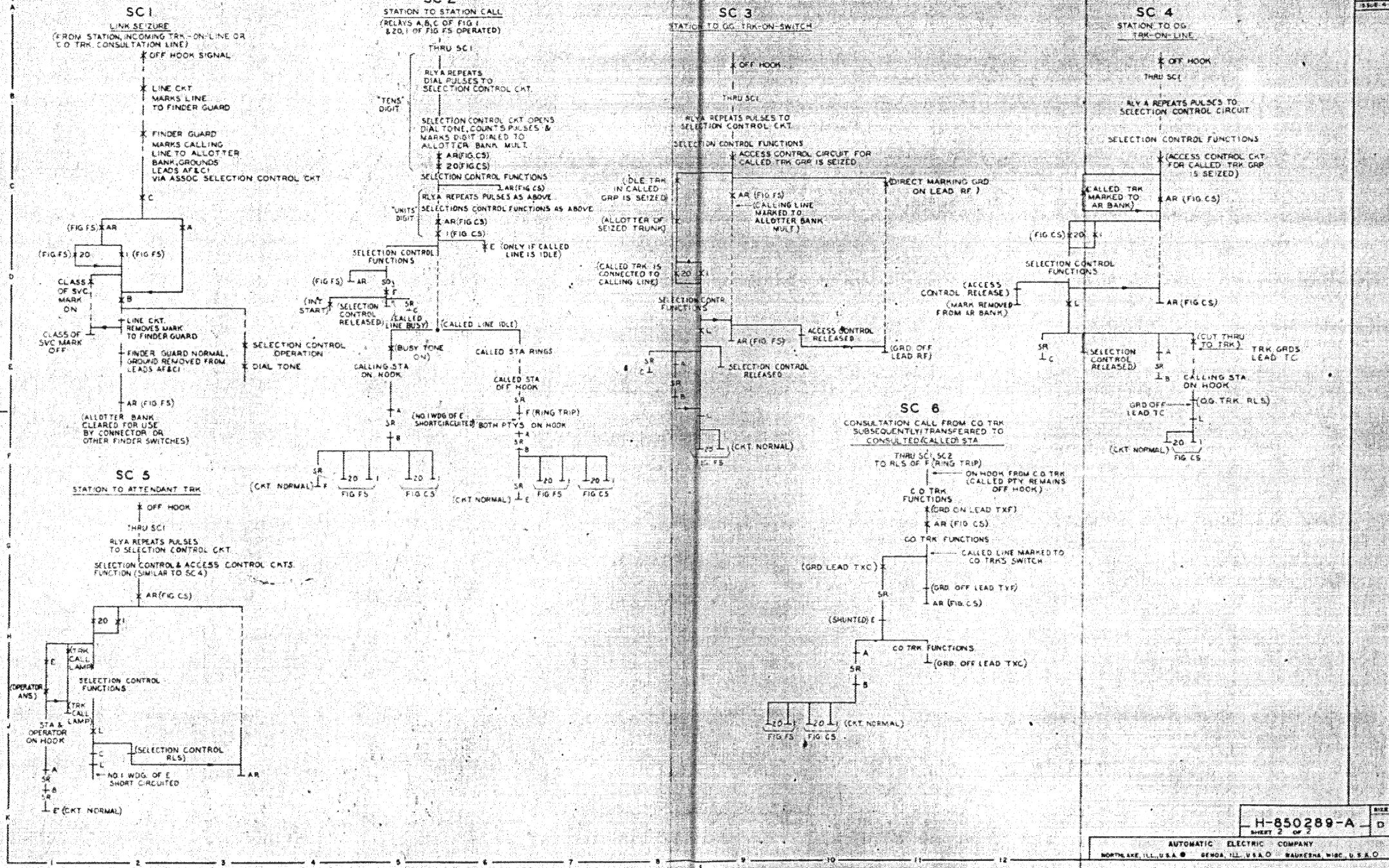
INDICATES INSIDE TERMINAL (START OF WINDING)
 INDICATES OUTSIDE TERMINAL (END OF WINDING)
 JACK TERMINAL
 JACK TERMINAL (COMMON)
 INDICATES MAKE BEFORE BREAK OR EARLY MAKE
 MULTIPLE
 UNKNOWN

MANUFACTURING NOTES:

- 1-ALL DIODES ARE 1N4001
- 2-UNLESS OTHERWISE NOTED, RESISTORS ARE 1/2 WATT
- 3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-1044-1045-1046-1047-1048-1049-1050-1051-1052-1053-1054-1055-1056-1057-1058-1059-1060-1061-1062-1063-1064-1065-1066-1067-1068-1069-1070-1071-1072-1073-1074-1075-1076-1077-1078-1079-1080-1081-1082-1083-1084-1085-1086-1087-1088-1089-1090-1091-1092-1093-1094-1095-1096-1097-1098-1099-1100-1101-1102-1103-1104-1105-1106-1107-1108-1109-1110-1111-1112-1113-1114-1115-1116-1117-1118-1119-1120-1121-1122-1123-1124-1125-1126-1127-1128-1129-1130-1131-1132-1133-1134-1135-1136-1137-1138-1139-1140-1141-1142-1143-1144-1145-1146-1147-1148-1149-1150-1151-1152-1153-1154-1155-1156-1157-1158-1159-1160-1161-1162-1163-1164-1165-1166-1167-1168-1169-1170-1171-1172-1173-1174-1175-1176-1177-1178-1179-1180-1181-1182-1183-1184-1185-1186-1187-1188-1189-1190-1191-1192-1193-1194-1195-1196-1197-1198-1199-1200-1201-1202-1203-1204-1205-1206-1207-1208-1209-1210-1211-1212-1213-1214-1215-1216-1217-1218-1219-1220-1221-1222-1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SEQUENCE CHARTS



SEQUENCE CHARTS

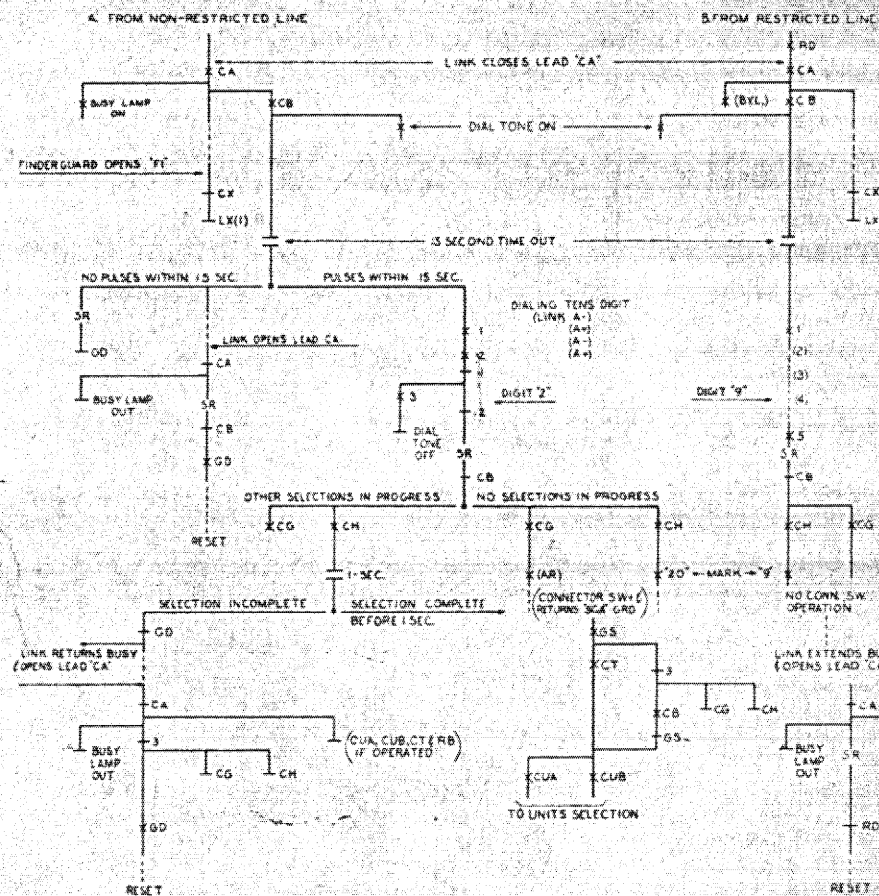
H-850260-A

SHEET 3 OF 3

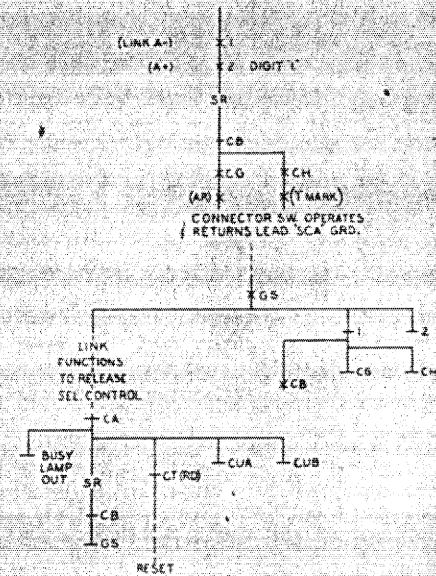
REVISION 21
135,22

1. CALL LANDS (GD, CX, LX (1)-(3) OPERATED)

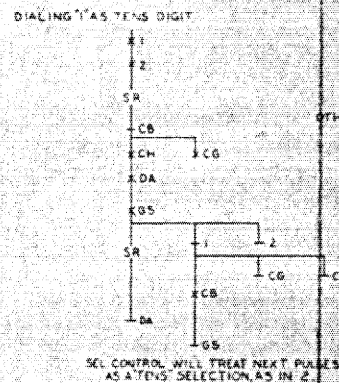
(FINDER SWITCH FUNCTIONS)



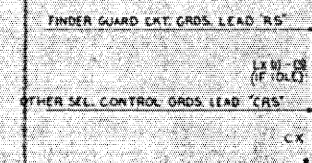
2. UNITS DIGIT (5 SEC. 1 SEC. TIME-OUTS AS IN APPLY) (GD, CA, CB, CT, CUA, CUB & POSSIBLY RD +)



3. DIGIT ABSORPTION (GD, CA, CB, & POSSIBLY RD +)



4. RESET (GD OPERATED)



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SHEET 3 OF 3

REVISION 21
135,22

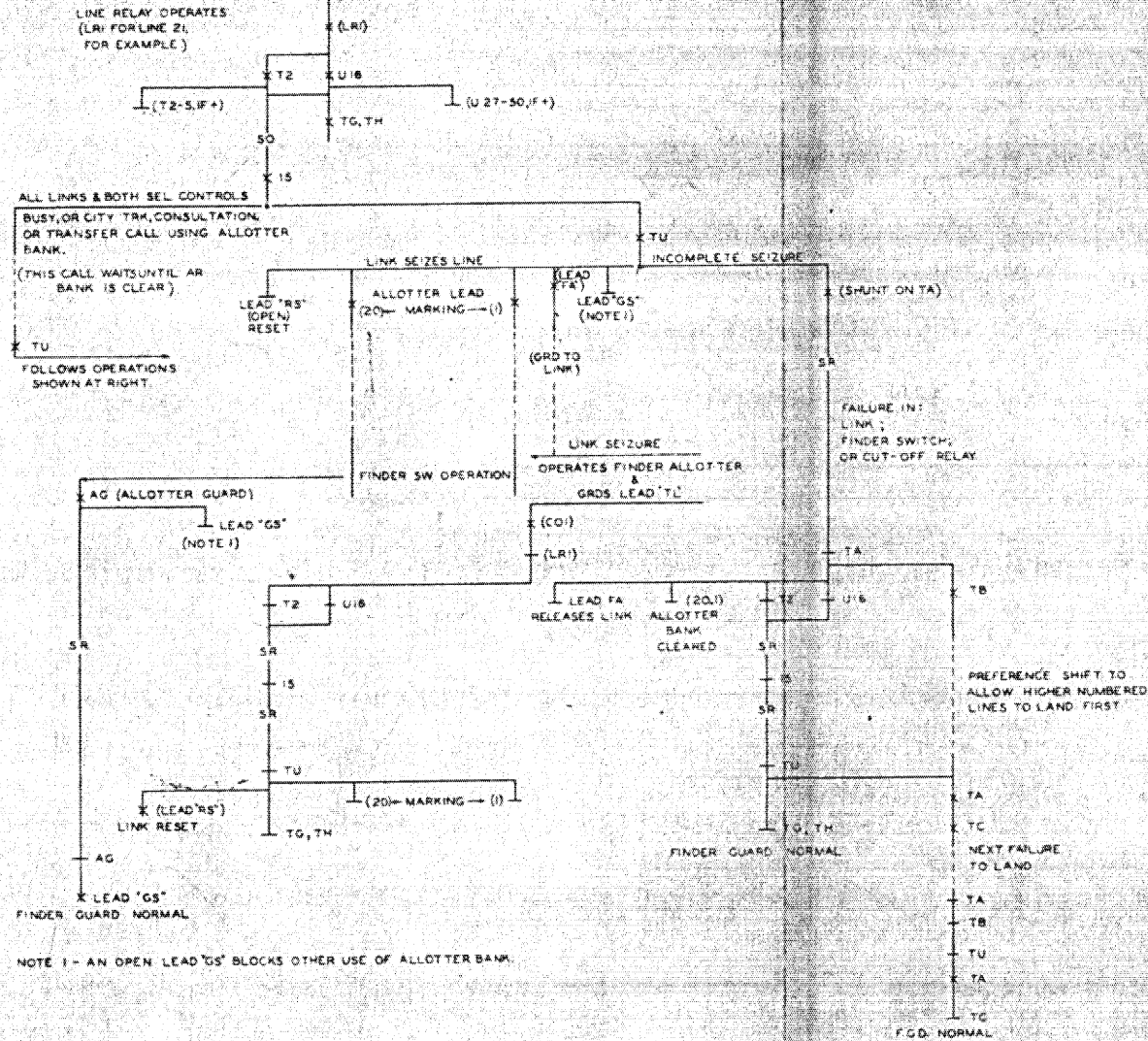
AUTOMATIC ELECTRIC COMPANY
NORTH LAKE, ILL., U.S.A. & BERDA, ILL., U.S.A. & WAUKESHA, WISC., U.S.A. & O.

SEQUENCE CHARTS

H-850280-A

SHEET 2 OF 2

SC 1. FINDER GUARD (TA OPERATED) *T.R.R.*



NOTE 1 - AN OPEN LEAD "GS" BLOCKS OTHER USE OF ALLOTTER BANK.

H-850280-A

SHEET 2 OF 2

AUTOMATIC ELECTRIC COMPANY
NORTH AVE. ILL. U.S.A. • GENEVA, ILL. U.S.A. • MADISON, WISC. U.S.A.

FIG. AT
ATTENDANT'S TURRET
(FOR REF ONLY)

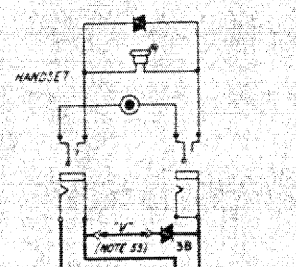
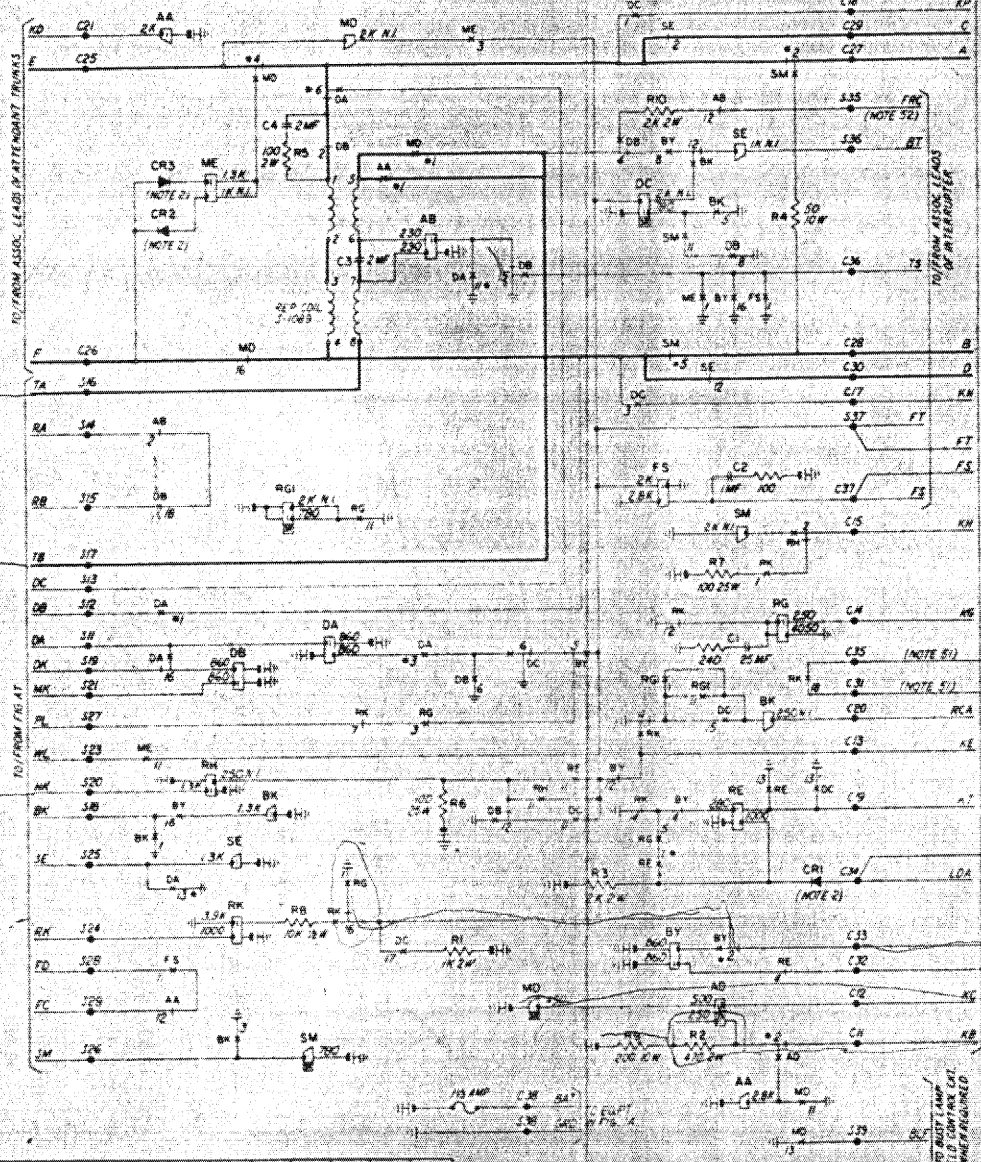


FIG. 1A



- SYMBOLS
- SINGLE
 - CONCENTRIC
 - COPPER COLLAR ON WIRE ON TERM. END
 - WIRE WIDE, NO. 1
 - WIRE WIDE, NO. 2
 - TYPE 900 RELAY COIL (FRESH)
 - INDICATES WIDE TERMINAL, START OF WINDING (SHE SLOW TO RELEASE)
 - JACK TERMINAL
 - INDICATES BREAK BEFORE BREAK OR EARLY MAKE
 - K = KILLING

- MANUFACTURING NOTES:
- 1-Power Rating Values are Minimum.
 - 2-CR1, 15 & HE15228 DYODE, CR2 & CR3 ARE SELENIUM RECTIFIERS.
 - 3-L DENOTES LOCKING, NL DENOTES NON-LOCKING.

- ENGINEERING NOTES:
- 51-TO BE CONNECTED TO TURRET CONDENSER RESISTOR WHEN USED ON BOX OR BOX PARTS ONLY.
 - 52-CONNECT TO INTERRUPTER LEAD FRC TO PROVIDE TICK-TONE, IF REQUIRED, WHILE ATTENDANT TURRET MONITOR KEY IS OPERATED.
 - 53-1/4" WIRING TO BE CONNECTED ONLY WHEN TURRET HANDSET DOES NOT CONTAIN VARIATION.

JACK
REAR VIEW
SPRING SIDE
COIL SIDE
C

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V-050350-A

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CHANGE

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EJM

1214-16-62(CLB

REVERSED CAD
TERMS ON
BUZZER ADDED
AUDIBLE SIG.
UNIT.

17. 10/11/1944

379-18-62 (CLC)

VAR WAS TYPE
3A

Journal of Interpersonal Violence 26(10)br/>© The Author(s) 2011
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44. 45

FIN

13A12-17-66CLC



NOTES

1. LEAD SP USED, IF 8 AS REQUIRED
2. TO CITY TRKS. & OTHER CKTS. AS REQUIRED
3. TO UNIVERSAL NIGHT ANSWER CONTROL CKT. & OTHER CKTS. AS REQUIRED
4. TO ALL SWBO. ALARM BUSES: OF 40A, 40B, 40M, 80A, 80M. TO POWER RELAY
BAR TERM. AF OF 100T OR 100M
5. TO ATTENDANT'S OUT DIAL TRUNK.
6. FURNISHED ON ALL 40M, 80M, 100M SWBOS. MAY BE OPTIONALLY EQUIPPED ON: 40A,
40B, 80A OR 100T SWBOS
7. TO SELECTION ROUTING CKT. OR AS REQUIRED *
8. X-WRG NORMALLY FURNISHED. DISCONNECT X-WRG. & CONNECT Y-WRG WHEN THIS
IS USED WITH 100T PABX.
9. Y-WRG USED WHEN HEADSET OR HANDSET DOES NOT CONTAIN VARISTOR.
10. TO SOURCE OF GROUND

1		6						12						18						TOR
K2	KA	KA	KA	KA	KA	FN	HK	DA	N2	SE	TB	WL		LB	LB			D		
	2	4	6	8	10									4	8					
L2	LL	LL	LL	LL	LL	FD	DK	PL	NI	NG	TA	PAX	GRD	LB	LB	RNC		C		
	2	4	6	8	10									3	7					
KI	KA	KA	KA	KA	KA	FC	RK	SP	DC	N4	MK	RB		LB	LB	LB		B		
	1	3	5	7	9									2	6	10				
LI	LL	LL	LL	LL	LL	FA	NK	BK	DB	N3	SM	RA	BAT	LB	LB	LB		A		
	1	3	5	7	9									1	5	9		R		

TERMINAL ASSIGNMENT

DR GAL	SCALE
CH <i>1/4</i>	DATE 2 28 62
EN <i>1/2</i>	APPR <i>R</i>
AUTOMATIC ELECTRIC CO. GENOA BRANCH GENOA ILL.	

ATTENDANT'S TURRET

WITH TRANSMISSION NETWORK
40A, 40B, 40M,
80A, 80M, 100T, 100M PABX

019552

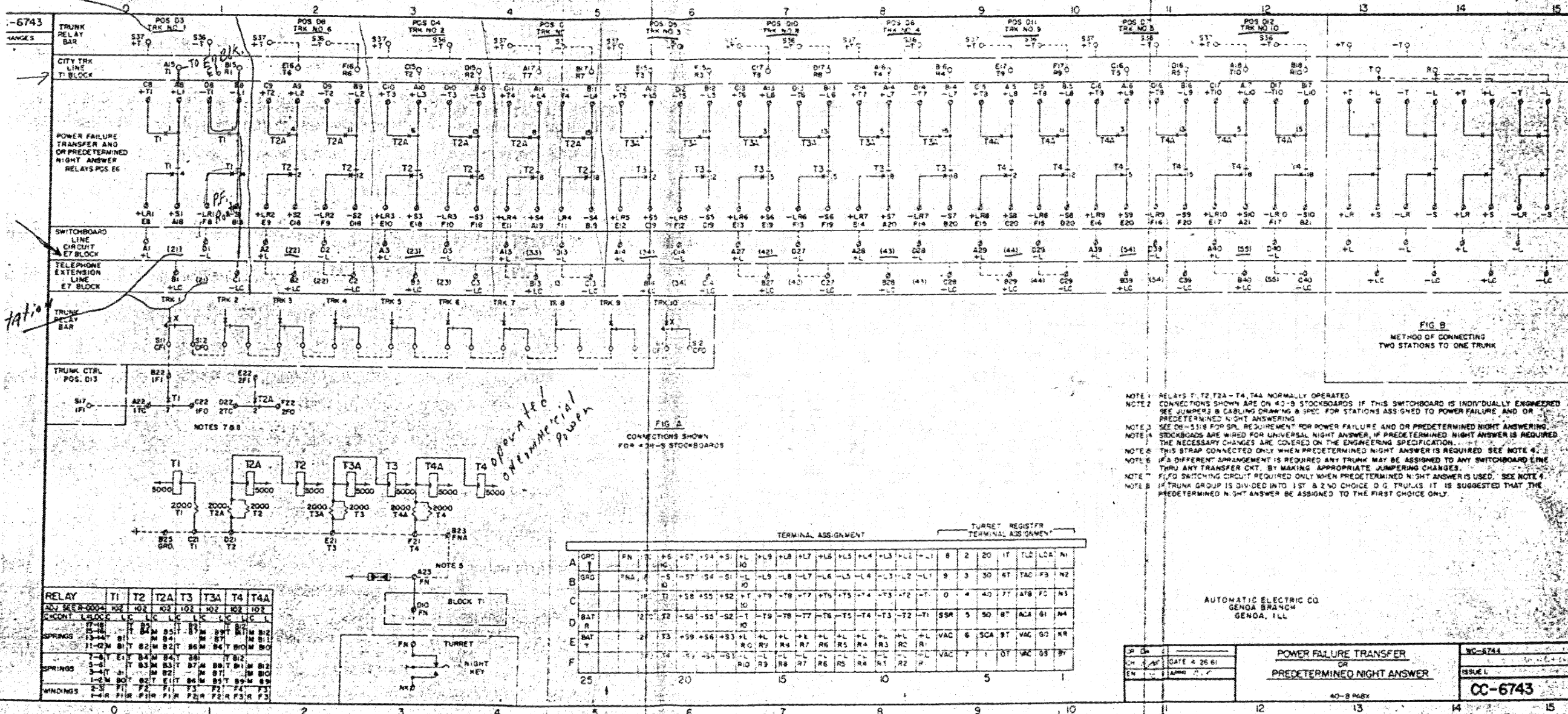
WD-6094

ISSUE 2.3 (34)

CB-5891

Trunk

First 5. Prewired Factory



- NOTE 1: RELAYS T1, T2, T2A - T4, T4A NORMALLY OPERATED
- NOTE 2: CONNECTIONS SHOWN ARE ON 40-B STOCKBOARDS IF THIS SWITCHBOARD IS INDIVIDUALLY ENGINEERED. SEE JUMPER 2 & CABLING DRAWING & SPEC. FOR STATIONS ASSIGNED TO POWER FAILURE AND OR PREDETERMINED NIGHT ANSWERING.
- NOTE 3: SEE 08-5318 FOR SP. REQUIREMENT FOR POWER FAILURE AND OR PREDETERMINED NIGHT ANSWERING.
- NOTE 4: STOCKBOARDS ARE WIRED FOR UNIVERSAL NIGHT ANSWER, IF PREDETERMINED NIGHT ANSWER IS REQUIRED THE NECESSARY CHANGES ARE COVERED ON THE ENGINEERING SPECIFICATION.
- NOTE 5: THIS STRAP CONNECTED ONLY WHEN PREDETERMINED NIGHT ANSWER IS REQUIRED. SEE NOTE 4.
- NOTE 6: IF A DIFFERENT ARRANGEMENT IS REQUIRED ANY TRUNK MAY BE ASSIGNED TO ANY SWITCHBOARD LINE THRU ANY TRANSFER CKT. BY MAKING APPROPRIATE JUMPING CHANGES.
- NOTE 7: ALSO SWITCHING CIRCUIT REQUIRED ONLY WHEN PREDETERMINED NIGHT ANSWER IS USED. SEE NOTE 4.
- NOTE 8: IF TRUNK GROUP IS DIVIDED INTO 1ST & 2ND CHOICE OF TRUNKS IT IS SUGGESTED THAT THE PREDETERMINED NIGHT ANSWER BE ASSIGNED TO THE FIRST CHOICE ONLY.

AUTOMATIC ELECTRIC CO.
GENOA BRANCH
GENOA, ILL.

DATE 4-26-61	POWER FAILURE TRANSFER OR PREDETERMINED NIGHT ANSWER	CC-6743
EN. 11	40-B PABX	ISSUE 1
		CC-6743

40B, 40M, 60M PABX

STATION TO STATION CALL

SEQUENCE CHART

Calling Line Circuit	Finder Guard	Sel Control	Link	Finder Switch	Conn Switch	Called Line Circuit	Notes
	TA+ TRG+	LX1+ LX2+ LX3+ GD+ CX+					Normally operated
LR+ (21)	T2+ U16+ TG+ TH+ 15+ TU+ TRG-						
	AG+		C+ A+	AR+ Tens+ Units+			
CO+ LR-	T2- U16-	CA+	B+ B Lamp+				Finder Guard Restores
	15- TU- TG- TH- AG- TRG+	LX1- CX- B Lamp+, CB+		AR-			Dial Tone
----- Dialing Tens Digit -----							
		CB- CG+ CH+	A- A+		AR+ 20+ (tens)		See Chart of counting relays for operation
		GS+					Mark Digit Counting Relays Restore
		CT+			AR-		
		CG- CH- CB+ GS- CUA+ CUB+					
----- Dialing Units Digit -----							
		CB- CG+ CH+	A- A+		AR+ 1+ (Units)	CO+	See Chart for operation of counting relays
		GS+	E+				Mark Digit If idle Line
			F+		AR-		Counting relays restore
		CG- CH-	C-				Sel. Cont. restores
		CA-GS-CT- CUA- CUB-					Called Sta. rings Called off hook
			F-				Conversation
CO-			A- Both parties hang up B- Find. Swch- E- Restores	Find. Swch- Restores	Conn Swch- Restores	CO-	Both parties

Both seize in series at once
The first 4 Relays Have to operate to operate 15



Station User's Guide



for 40B, 80A & 100T



PABX'S



COMMUNICATIONS

SERVICE

ADVISOR

This booklet contains station user instructions for the Type 40B, 80A, and 100T PABX Systems.

Individual installations will probably not contain all of the service features included in this booklet, and for this reason we have not suggested specific digits for any particular services.

The Communications Service Advisor can use these instructions as a guide when preparing the directory instruction pages, and at this time, specific digits can be assigned.

We hope that you will find these instructions helpful.

GTE AUTOMATIC ELECTRIC INCORPORATED
NORTHLAKE, ILLINOIS

INTRODUCTION

Your telephone system is the most modern and efficient communications network in use today. The telephone on your desk is an important part of this network.

Your telephone works in conjunction with the turret operated by the attendant in your office and with your local telephone exchange.

In order to obtain the best possible results from the system, read these instructions carefully, and use them as a reference until you become familiar with the various procedures. Touch Calling information applies only to the 40B and 80A PABX'S.

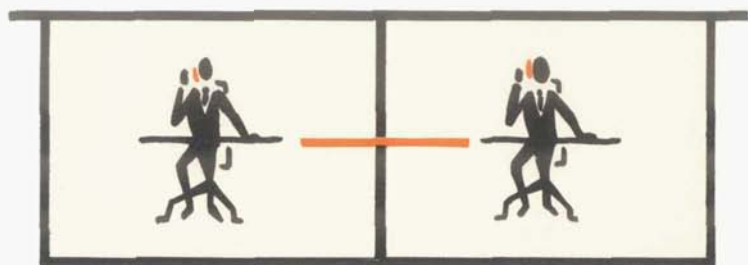
If you have any questions, ask your attendant.

YOUR TELEPHONE COMPANY

TO MAKE AN INSIDE CALL

Lift the telephone handset and listen for dial tone.

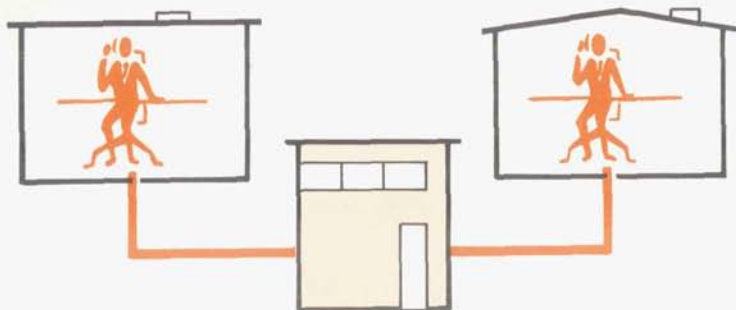
Dial or keysend the number of the party you wish to talk to. The switchboard connects you automatically if the called line is idle.



INCOMING CALLS

Calls from the outside are usually answered by your attendant. She will connect you with the calling party.





TO MAKE AN OUTSIDE CALL

Lift the telephone handset and listen for dial tone. Dial or keysend "9", listen for the second dial tone, then dial or keysend the number of the party you wish to talk to. When making outside calls, particularly long distance calls that you dial or keysend direct, have the complete number readily available for fast, even dialing or key-sending.

If your telephone is restricted from dialing or keysending outside calls, dial or keysend "0" for your attendant and she will place your call.

The telephone user has 6 to 8 seconds to begin dialing or keysending and to dial or keysend each digit. If this time is exceeded, the call will not be completed.



TO CALL YOUR ATTENDANT

To call your attendant, dial or keysend "0".



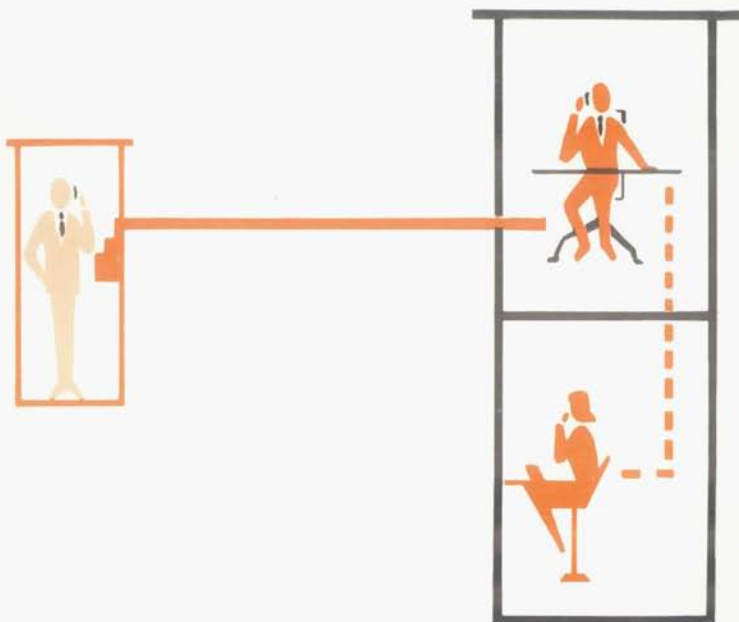
TO TRANSFER AN OUTSIDE CALL TO ANOTHER INSIDE STATION

Inform the outside party of your intention, then dial "1".* Listen for dial tone, and dial* or keysend the desired inside party's number. When he answers, tell him he has a call and hang up your handset. The call is then transferred automatically. To receive a transferred call, the transfer party must wait on the line without replacing handset.

If called party does not answer (after waiting for at least four rings), dial "1".* You will again be connected to the outside party.

If called party's phone is busy, press the hookswitch plunger down and release it immediately. You will again be connected with the outside party. (Or . . . wait 8 seconds and dial "1"* again.)

* With Touch Calling telephones, flash the hookswitch plunger once. Do not keysend "1".



TO RECALL YOUR ATTENDANT

To recall your attendant while you are talking to an outside party, inform the outside party to hold the line, and dial "1".*Listen for dial tone, and dial or keysend "0". You may now talk to the attendant. The outside party cannot hear your conversation with the attendant. After giving the attendant the necessary information, hang up your handset and the outside party is automatically connected to the attendant.

*With Touch Calling telephones, flash the hookswitch plunger once. Do not keysend "1".



CONSULTATION CALLS

Inform the outside party to hold the line. Dial "1",* listen for the dial tone, and dial or keysend the desired inside party's number. You may now talk to the called inside party without the outside party hearing the conversation.

If the inside party's telephone is busy, press the hook-switch plunger down and release immediately. (Or . . . wait 8 seconds and dial "1"* again.)

If you wish to return to the outside party temporarily, ask the inside party to stay on the line. Dial "1"* When you dial "1"* to return to the outside party, the inside party cannot hear your conversation. By dialing "1"* again (without dialing or keysending the inside party's number), you will be reconnected to the inside party, and the outside party cannot hear the conversation. Any number of consultation calls can be made if each party consulted hangs up when finished.

* With Touch Calling telephones, flash the hookswitch plunger once. Do not keysend "1".

CONSULTATION AND CONFERENCE CALLS

If your telephone system has this optional feature, disregard the instructions for Consultation Calls on the preceding page.

Consultation

To call another party for consultation, while you are talking with an outside party, dial "1".* Listen for dial tone, and dial or keysend the desired inside party's number. You may now talk to the called inside party without the outside party hearing the conversation.

If the inside party's telephone is busy, press the hook-switch plunger down and release immediately. (Or . . . wait 8 seconds and dial "1".*

If you wish to return to the outside party, ask the inside party to hang up, and dial "1".*

Any number of such consultation and conference calls may be made without releasing the outside connection.



To Include Outside Party In Conference

Ask the inside party to remain on the line. Dial "1"* to set up a 3-way conference. If the party initiating the conference call wishes to retire from the conference, he must dial "1"* before hanging up. The call is transferred to the consulted party.

* With Touch Calling telephones, flash the hookswitch plunger once. Do not keysend "1".



MEET-ME CONFERENCE (40B or 80A PABX)

If you are talking to an outside party and wish to have a conference call with other parties, tell the outside party of your intention. Inform him that there will be some delay in setting it up, then dial "1".* Listen for dial tone. Dial or keysend _____, the number assigned to the conference.

If you hear busy tone or no tone at all, the conference circuit is busy. Return to the outside party by pressing the hookswitch plunger down and immediately releasing it.

If you hear continuous ringback tone, it indicates that the conference circuit is idle and you have six seconds in which to complete the transfer by restoring your telephone handset to its cradle.

Call the desired inside parties (no more than 2), and ask them to call the conference number. After notifying the last participant, you may join the conference by dialing or keysend _____, the number assigned to conference.

A Meet-Me conference may also be arranged by the following procedure: Dial 1****,* listen for the dial tone, then dial (or keysend) "O" to reach the attendant and ask her to set up the conference.

*With Touch Calling telephones, flash the hookswitch plunger once. Do not keysend "1".



"MEET-ME" CONFERENCE (100T PABX)

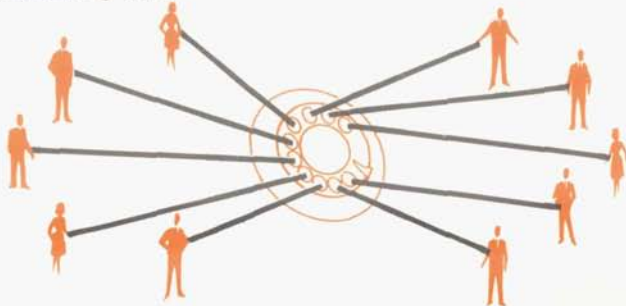
If you are talking to an outside party and wish to have a conference call with other parties, tell the outside party of your intention. Inform him that there will be some delay in setting up the conference; then dial "1"*, listen for dial tone, and dial or keysend "0" to reach the attendant. When the attendant answers, inform her that you want the outside party put in conference; then restore the handset. The outside party is automatically transferred to the attendant for placing in the conference in the normal manner.

Call the desired inside parties (no more than 2) and ask them to call the conference number. After notifying the last participant, you may join the conference by obtaining dial tone and dialing or keysending _____, the conference number.

*With Touch Calling telephones, flash the hookswitch plunger once. Do not keysend "1".

CAMP-ON BUSY

If you should receive an outside call while using your telephone, you will hear a "splash" of tone. This indicates that you have another outside call waiting. When you hang up, your telephone will ring and you will be connected to the incoming call.



CODE CALL

Some of the people in your company have been assigned code numbers so that they can be reached when they are away from their particular telephone. (Not useable with Touch Calling telephones.)

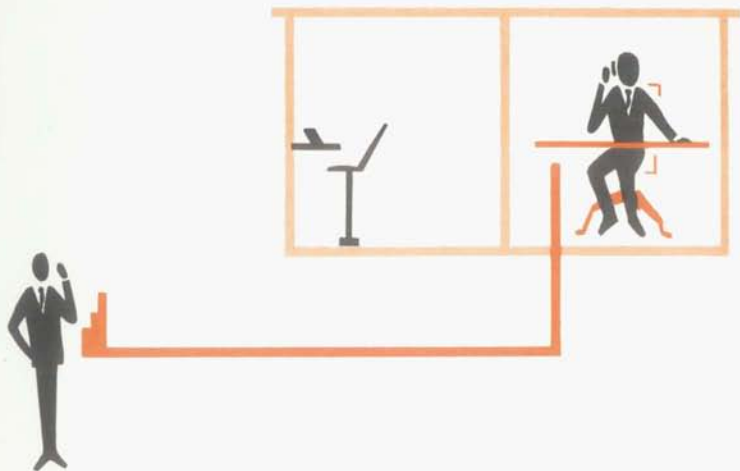
Originating Party

To contact a person who has a code, when he is not at this telephone, dial or keysend _____, then the desired person's code number.

Answering Party

Upon hearing your signal, go to the nearest telephone and dial or keysend _____, the code call answering number. You will be automatically connected to the calling party.

If your conversation will be a prolonged one, have the calling party give you his station number and call him back at that number so you do not tie up the code call equipment.



TO ANSWER INCOMING CALLS

When the attendant is absent, or if your system is not operator attended, you may answer incoming calls in one of two ways.

Universal Answering

Incoming calls sound an audible signal. To answer, dial or keysend _____ from any telephone. You can transfer as previously described. Do not place the outside party on hold (dial "1"*) in order to answer a second call — in doing so, you will lose the connection. Either answer the second call on another station, or dispose of the original call.

Pre-Assigned Telephone

Incoming calls ring a pre-assigned telephone. To answer, pick up the telephone handset and begin speaking in the usual manner (no transfers are possible with this method).

* With Touch Calling telephones, flash the hookswitch plunger once. Do not keysend "1".

MESSAGE WAITING SERVICE

If after being away from your telephone, you return and find the message waiting lamp flashing, the attendant has accepted a message for you while you were absent. Dial or keysend "0", and when the attendant answers, ask her for the message.