

SHEET INDEX

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FS2 LOOP ADAPTER	B2	1																								
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SC1 SEIZURE (O+ O-) SC2 DISCONNECT CALLING STATION DISCONNECTS FIRST SC3 TSPS DISCONNECTS FIRST SC4 RING BACK WITH ON OR OFF HOOK SUPERVISION WINK SIGNAL FROM TSPS SC5 REVERSE MAKE BUSY	E1	1																								
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CONTENTS	SHEET NO.	ISSUE NO.																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
CAD 1, 2	G1	1																								
CAD 3, 4, 5, 6, 7, 8	G2	1																								
CPS1 ELECTRONIC WINK DETECTOR, SERVICE TONE TIMER, RING BACK TIMER, AND SLOW TO RELEASE SWITCH LATER FOR B AND C RELAYS	J1A	1																								
	J1B	1																								
CPS 2 'A' RELAY ASSEMBLY	J2	1																								
CPS 3 REVERSAL DETECTOR	J3	1																								

SHEET INDEX NOTES

- WHEN CHANGES ARE MADE IN THIS DRAWING, ONLY THOSE SHEETS AFFECTED WILL BE REISSUED.
- THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THIS DRAWING IS REISSUED, OR A NEW SHEET IS ADDED.
- THE NUMBER ASSIGNED TO A SHEET OR INDEX SHEET WILL BE THE SAME AS THE NUMBER OF THE SHEET INDEX.
- SHEETS THAT ARE NOT CHANGED WILL REMAIN THE SAME ISSUE NUMBER.
- THE LAST ISSUE NUMBER OF THE SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE.

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT DRAWING	J33013BF J33013BG ED-35125-() ED-35126-()
EQUIPMENT DESIGN REQTS	J33013 814-520-150

NOTICE

NOT FOR USE OR
DISCLOSURE OUTSIDE
THE BELL SYSTEM
EXCEPT UNDER
WRITTEN AGREEMENT

ISSUE

HW

1099

STEP BY STEP SYSTEMS
NO. 1, 350A, 355A OR 35E97
OUTGOING TRUNK CIRCUIT
LOOP OR E & M LEAD OPERATION
O+, O- OR M OPERATION
WITH CLASS OF SERVICE TONE
AND RING BACK OF CALLING STATION
TSPS/RTA COMPATIBLE

2

BELL TELEPHONE LABORATORIES
INCORPORATED

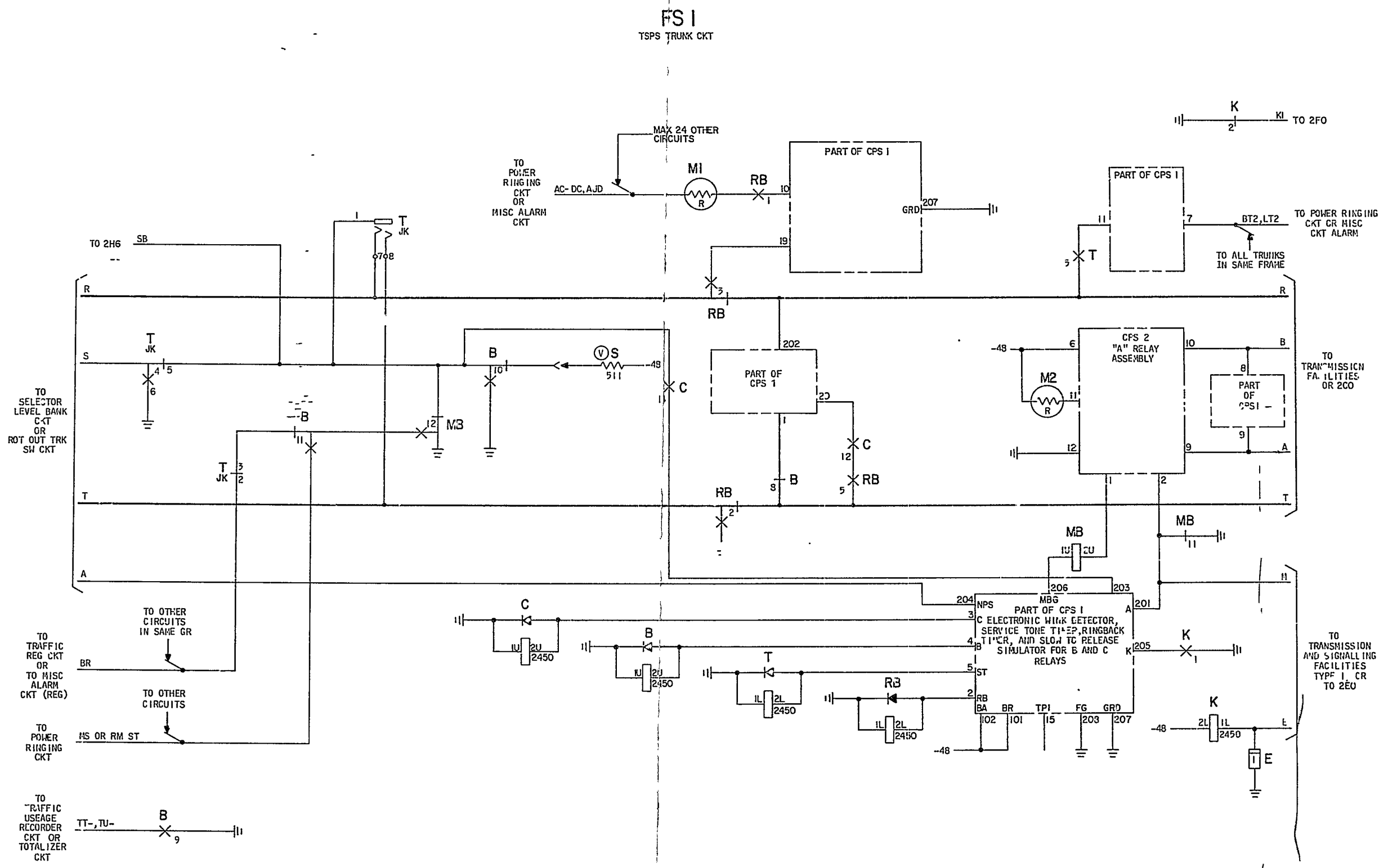
6S

AT&T CO
STANDARD
A&M ONLY FOR
350A A 35E97

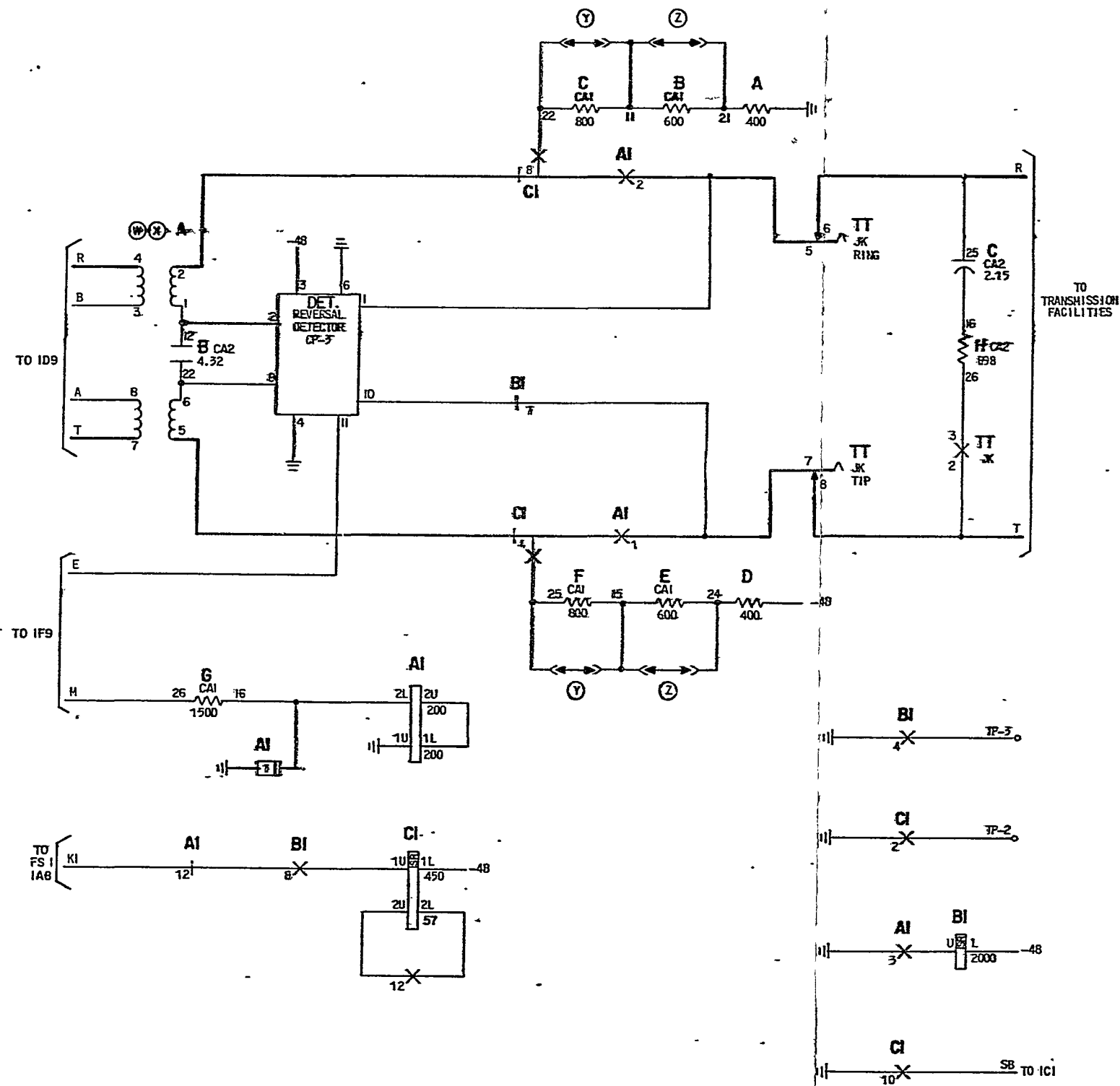
SD-35059-01-A1

13 SHEETS

APPARATUS INDEX												LEAD INDEX												OPTIONAL INDEX																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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	APP FIG.	SH NO.	EQPT		FS	APP FIG.	EQPT		FS	APP FIG.	EQPT		FS	CAD	FS		CAD	FS	CAD																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
CIRCUIT PACKS												RESISTORS												POWER RINGING CKT												TRAFFIC REGISTER CKT OR TO HISC ALARM CKT (REG)												TRANSMISSION & SIGNALING FACILITIES TYPE 1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
DET (CP-3)	2	C2						A	2B4	2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												



FS 2 LOOP ADAPTER



SD-35059-01-B2

OUTGOING TRUNK CIRCUIT		2	SD-35059-01-B2
BELL TELEPHONE LABORATORIES INCORPORATED		6S	PRINTED IN U.S.A.

APP FIG. 1

DESIG	K		F8				-		C				RB		B				DESIG
CODE	AK23						AK24						AK4						CODE
OPTION	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	OPTION
	ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		ARR		
12			BM	ID3					BM	ID6					M				12
11			BM	IE8					BM	ID5					EBM	ID2			11
10			-	-					-	-					EBM	IC3			10
9			-	-					M						EMB	IG1			9
8			-	-					M						EMB	ID5			8
7																			7
6																			6
5	-	-					M	IC7					EMB	ID6					5
4	-	-					M						EMB						4
3	-	-					-	-					EBM	IC5					3
2	BM	IA8					BM						EBM	ID5					2
1	SM	IF8					BM						M	IB5					1
COIL		IF8		IE7				IF5		IF4				IF6		IE4			COIL

DESIG																	DESIG
CODE																	CODE
OPTION																	OPTION
✕	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	CONT ARR	LOC	✕
12																	12
11																	11
10																	10
9																	9
8																	8
7																	7
6																	6
5																	5
4																	4
3																	3
2																	2
1																	1
COIL	✕		✕		✕		✕		✕		✕		✕		✕		COIL

CIRCUIT PACKS

DESIG	LOC	CODE
CPS 1	IB6,IB7,ID5,ID8, IF7	ED-35125-()
CPS 2	ID7	ED-35126-30

WACK

SEE CONNECTOR

NETWORK

DESIG	LOC	CODE
E	IF8	IB5A

RESISTANCE LAMPS

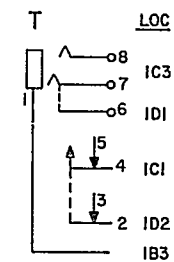
DESIG	LOC	CODE
R1	IB5	13D
R2	ID7	13A

RESISTORS

OPT	DESIG	LOC	CODE
V	S	IC4	KS-14603, LIA 511

CONNECTOR

458CM



DIODES

DESIG	LOC	CODE
B	IE4	446F
C	IE4	
T	IF5	
RB	IF6	

APP FIG 2

DESIG	A1				B1				C1								DESIG
CODE	AJ155				AGB				AG3B								CODE
OPTION	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	OPTION
12	B	2F1							EM	2G2							12
11																	11
10									M	2H5							10
9									B								9
8					M	2F2			EBH	2R3							8
7					B	2D5			B								7
6					BM				EMB								6
5									B								5
4					M	2F5			EBH	2D3							4
3	M	2G5															3
2	M	2B3							M	2F5							2
1	M	2D3															1
COIL		2E2				2G5				2F2							COIL

DESIG																	DESIG
CODE																	CODE
OPTION	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	OPTION
12																	12
11																	11
10																	10
9																	9
8																	8
7																	7
6																	6
5																	5
4																	4
3																	3
2																	2
1																	1
COIL																	COIL

CIRCUIT PACK

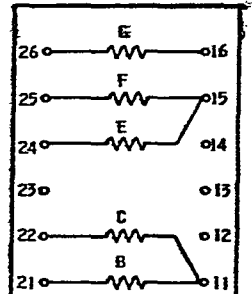
DESIG LOC
DET (CP-3) 2C2

CODE
ED-35017-30
(REV DET)

COMPONENT ASSEMBLY

278A TS E/W

CA1



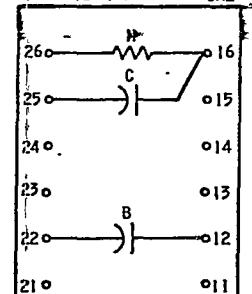
RESISTORS

DESIG	LOC	CODE
B	2E4	KS-16315, L3A 600
C	2E3	KS-16314, L3A 800
F	2E5	
G	2E1	KS-16315, L3A 1500

COMPONENT ASSEMBLY

278A TS E/W

CA2

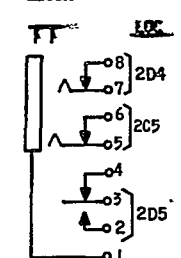


CAPACITORS

DESIG	LOC	CODE
B	2C1	535GH
C	2C5	535FW

RESISTORS

DESIG	LOC	CODE
H	2C5	KS-20289, L3C 898

JACK
280CM

NETWORK

DESIG	LOC	CODE
A1	2F2	1B5A

RESISTORS

DESIG	LOC	CODE
A	2B4	
D	2E4	1B8G

TRANSFORMERS

OPT	DESIG	LOC
M	A	2C1
X		

CODE
1200 (REP COIL)
120C (REP COIL)

OUTGOING
TRUNK CIRCUITBELL TELEPHONE LABORATORIES
INCORPORATED

2

6S

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CIRCUIT NOTES:

101.

DESIG	FLSE AMP	POTENTIAL	ONE PER
	1 1/3	TALK	APP FIG.1 & APP FIG.2
ST2* LT2	1 1/3	BJSY TO'E	FRAME
AC-DC* AUD	1/2 HV	GENERATOR	MAX 25 CIRCUITS
		GRD	APP FIG.1 & APP FIG. 2
BATTERY SYMBOL		VOLTAGE RANGE	
-48		45-52	

* PROVIDE IN NO.1 & 35CA ONLY

102.

FEATURE OR OPTION		PROVIDE		
		APP FIG.	APP OR WRG	QUANTITY
TRUNK CIRCUIT	E & H OPERATION	1		ONE PER CIRCUIT
	LOOP OPERATION	1,2		ONE PER CIRCUIT
LOOP SIGNALING	CPEL: W,RE OR LESS T-A, 3 MILES OF CABLE		Y *, Z *	
	8-14 MILES OF CABLE		Z*	
	14-32 MILES OF CABLE			
35E97	YES		V	
	NC			

* NON RECORD OPTIC

103.

NETWORK VALUES		
NETWORK NO.	RESISTANCE IN OHMS	CAPACITANCE IN UF
1	470	0.11

104.

RECORD OF APP FIGURES, WIRING AND APPARATUS CHANGES						
CHANGED DATE	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT		
				STD	A & M	HD

105. PROVIDE REPEAT COIL A (APP FIG.2) IN ACCORDANCE WITH THE FOLLOWING TABLE:

TRANS- FAC INP AT 1KHZ	CODE	OPTION		WINDING RATIO 2-1, 6-5 TO 4-3, 8-7	WINDING RESISTANCE	
		APP	WRG		2-1 OR 6-5	4-3 OR 8-7
UP TO 1.1 K	120C	X		1:1	7.8	5.5
1.1 K OR GREATER	120D	W		1:1.5	12.7	5.5

106. THE RING BACK FEATURE IS TO BE USED FOR SINGLE PARTY LINES ONLY.

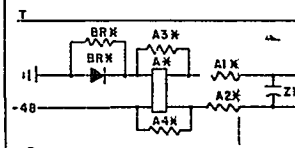
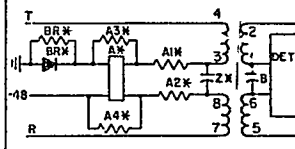
INFORMATION NOTES:

301. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE OHMS, CAPACITANCE VALUES ARE IN MICROFARADS, AND VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.

WORKING LIMITS

MAX EXT CKT LOOP RES 1500
MIN INSULATION RES 15KDET
REVERSAL DETECTORMAX EXT CKT LOOP RES 10K
MIN INSULATION RES 30K
MAX EARTH POTENTIAL ±5V
MAX SUPERVISORY "E" LEAD RES 50

PULSING	TYPE OF TRUNK	BREAK	VOLTAGE
RELAY A	E & H	71% MAX	52
LOOP 1600	LOOP	71% MAX	52
LEAK A	E & H	48% MIN	52
	LOOP	48% MIN	52

TRANSMISSION TEST REQUIREMENTS (1KHZ LOSS BETWEEN 600 TERMINATIONS)					
APP FIG.1			MAX ALLOWABLE CIRCUIT LOSS (dB)		
			SEE NOTE 2		
APP FIG.1 & 2(A)			MAX ALLOWABLE CIRCUIT LOSS (dB)		
			OPTION X .4		
			OPTION W .7		
ALLOWABLE INDIVIDUAL APPARATUS LOSSES (dB)					
APPARATUS	DESIG	CODE	MAX LOSS	MIN LOSS	REMARKS
CAPACITOR	Z, z	355C	18.7	17.9	
REPEATING COIL	A	120C	.4	.2	OPTION X
		120D	.7	.4	OPTION W
1. * INDICATES APPARATUS FOR WHICH INDIVIDUAL LOSSES ARE NOT REQUIRED. 2. THE (Z) CAPACITOR AND THE (A) RELAY WHICH CONNECTS TO THE MIDPOINTS OF THE ASSOCIATED REPEATING COIL CIRCUIT DO NOT AFFECT THE MAX ALLOWABLE REQUIREMENTS OF THE ASSOCIATED REPEATING COIL CIRCUIT.					

OUTGOING
TRUNK CIRCUIT

2

SD-35059-01-DI

BELL TELEPHONE LABORATORIES
INCORPORATED

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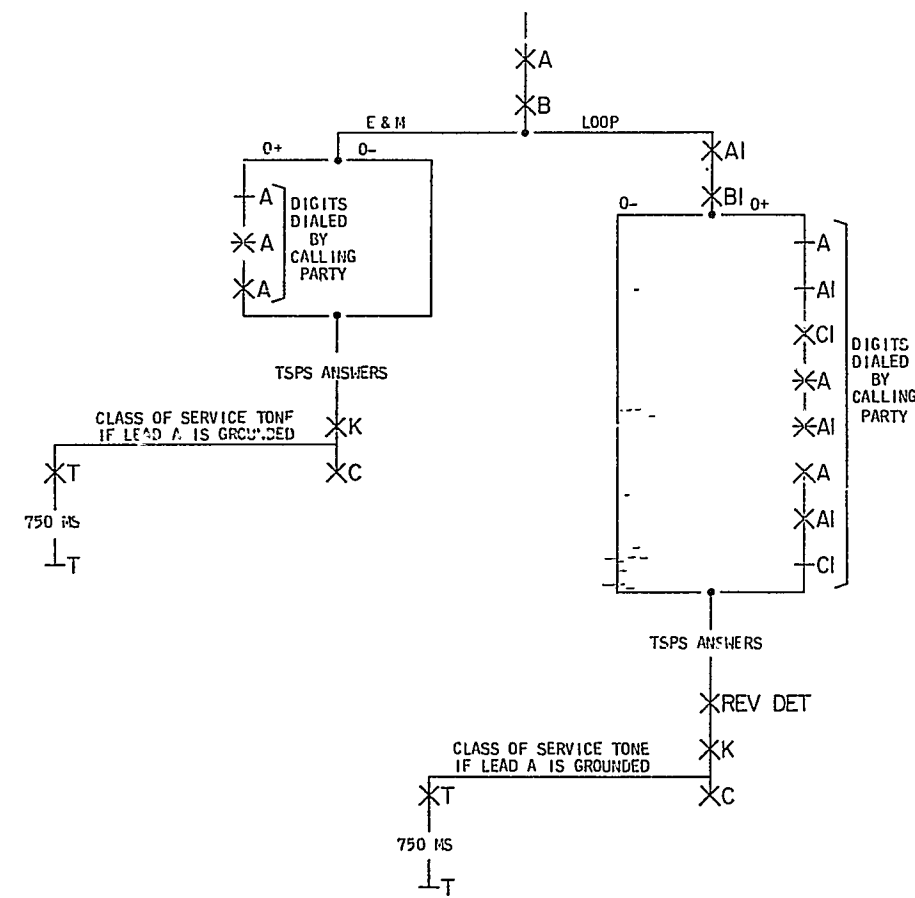
SD-35059-01-DI

A B C D E F G H J K L M N P Q R S T U V W X Y Z AA AB AC AD AE AF

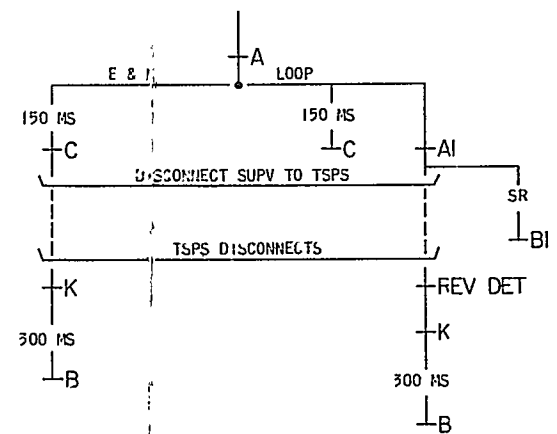
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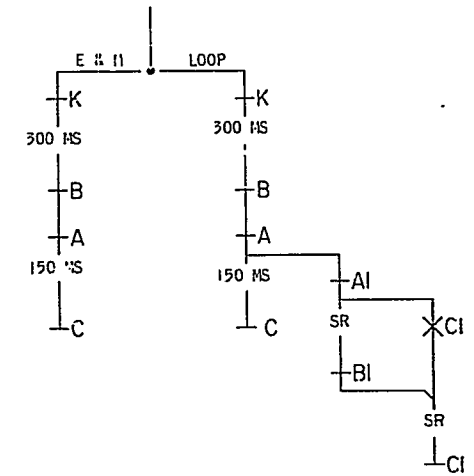
SC 1
SEIZURE
(0+ 0-)



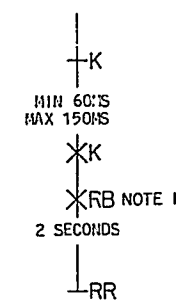
SC 2
DISCONNECT
CALLING STATION
DISCONNECTS FIRST



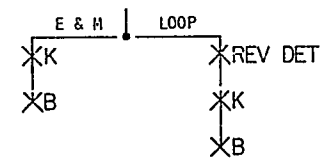
SC 3
TSPS DISCONNECTS FIRST



SC 4
RING BACK WITH
ON OR OFF HOOK
SUPERVISION
WINK SIGNAL FROM
TSPS



SC 5
REVERSE MAKE BUSY



NOTES:
1. RELAY "A" WILL BE HELD OPERATED IF RING BACK IS AGAINST "OFF HOOK" SUPERVISION.

SD-35000-01-E1

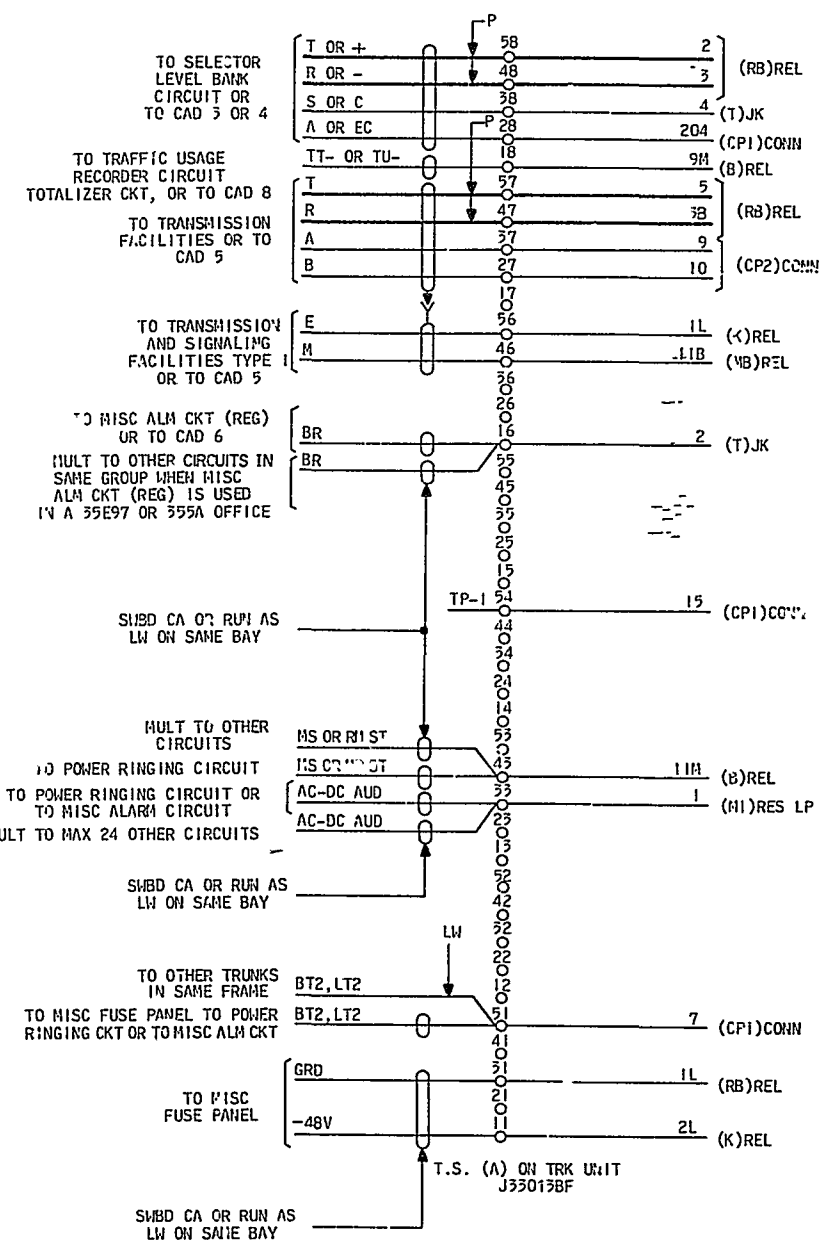
OUTGOING TRUNK CIRCUIT		ISSUE 1
BELL TELEPHONE LABORATORIES INCORPORATED		SD-35000-01-E1
6S		PRINTED IN U.S.A.

TIMING REQUIREMENTS													CIRCUIT REQUIREMENTS																
APPARATUS			CIRCUIT PREPARATION			TEST SET PREP			SEE NOTE	TIMING REQ'T ms		REMARKS	APPARATUS			VECH REQ'T			CIRCUIT REPARATION			TEST SET PREP	STF TEST NOTE	DIRECT CURRENT FLOW REQ'T				REMARKS	
DESIG	OPT	FIG.	BLOCK OR INSULATE	TEST CLIP DATA	CONN BK	CONN R	CONN W	SEND KEY		RCV SW	START		STOP	DESIG	CODE	OPT	FIG.	BSP FIG.	CONT PREC	ARM. TRVL	BLOCK OR INSULATE			TEST CLIP DATA	CONN BAT.	CONN GRD	TEST WDG		TEST FOR
A																													
	BI		2		GRD	U(BI)	TSA45	MK	GRD	OC	I	190	390																
	CI		2		GRD	IU(CI)	TSA25	MK	GRD	OC	I	96	210																

0 1 2 3 4 5 6 7 8 9

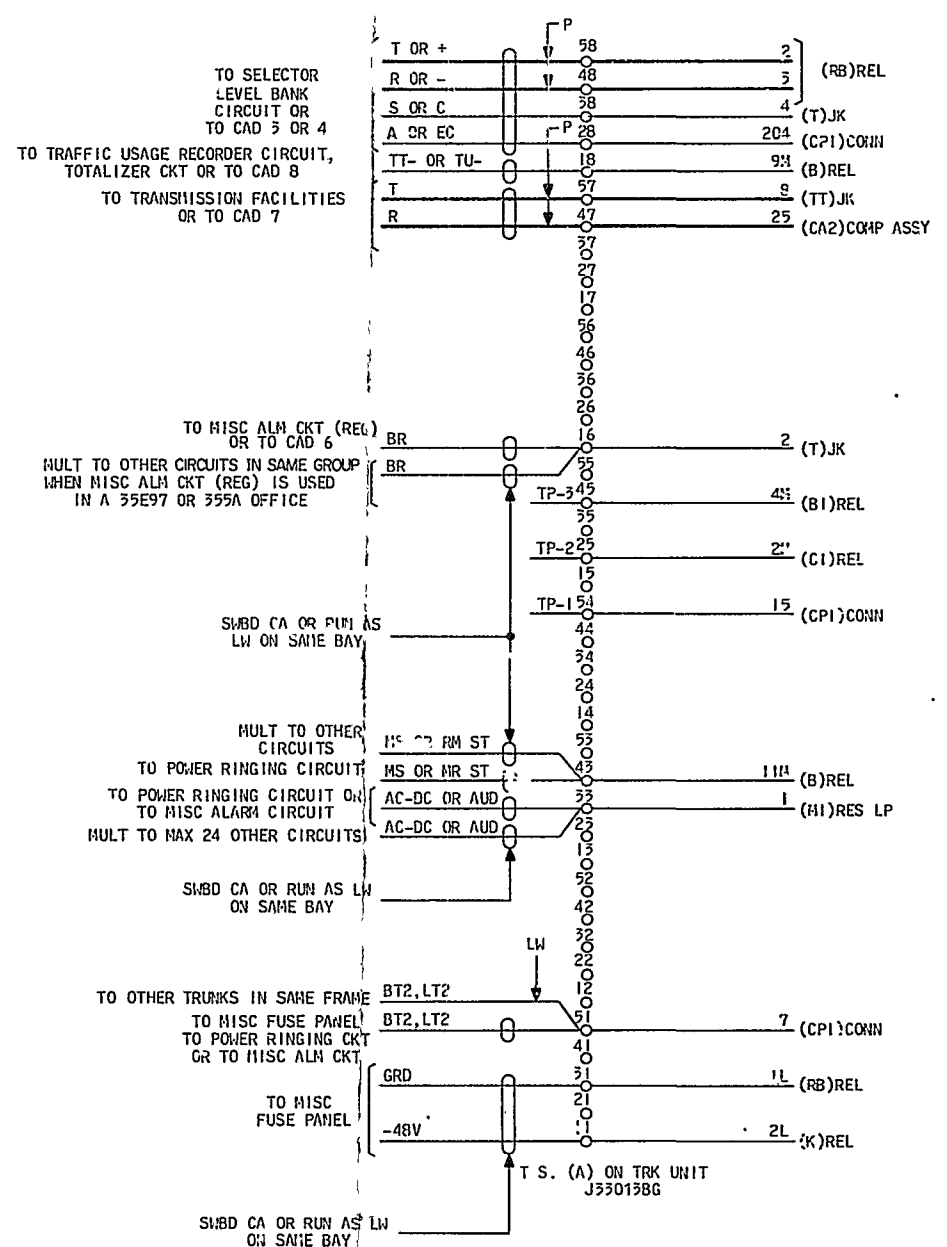
CAD 1

(FOR APP FIG. 1)

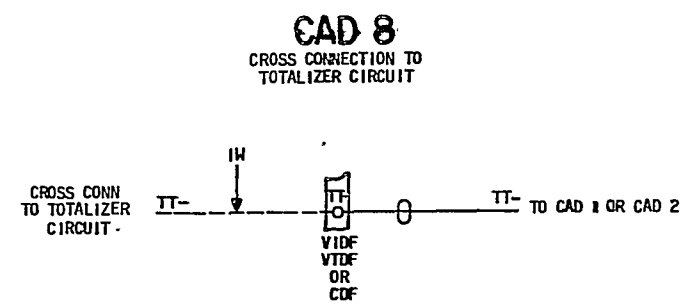
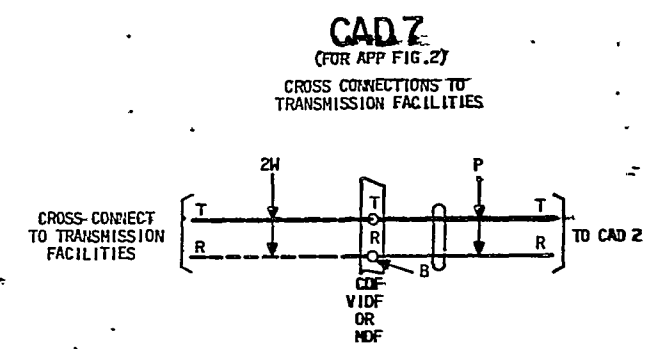
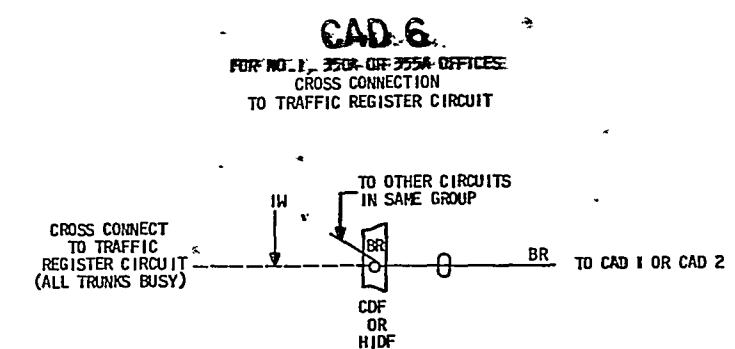
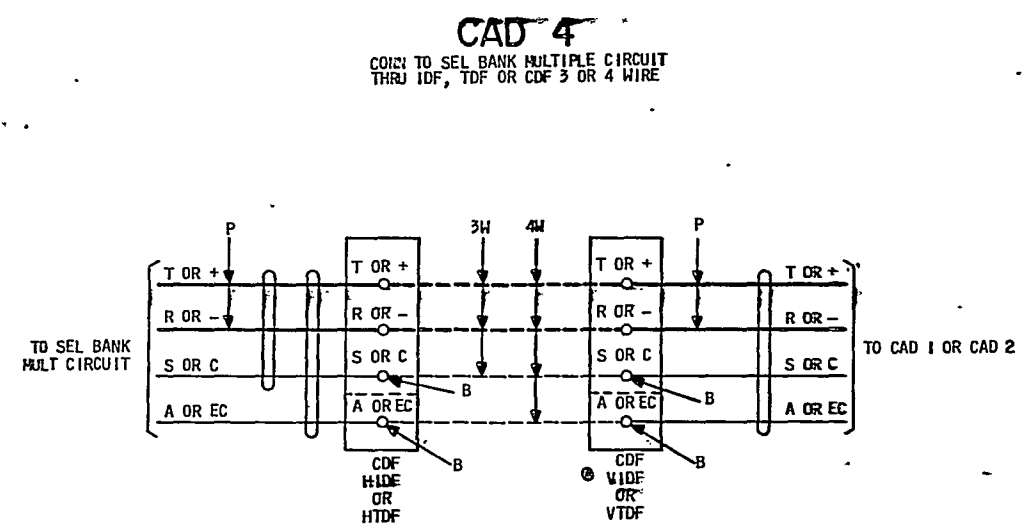
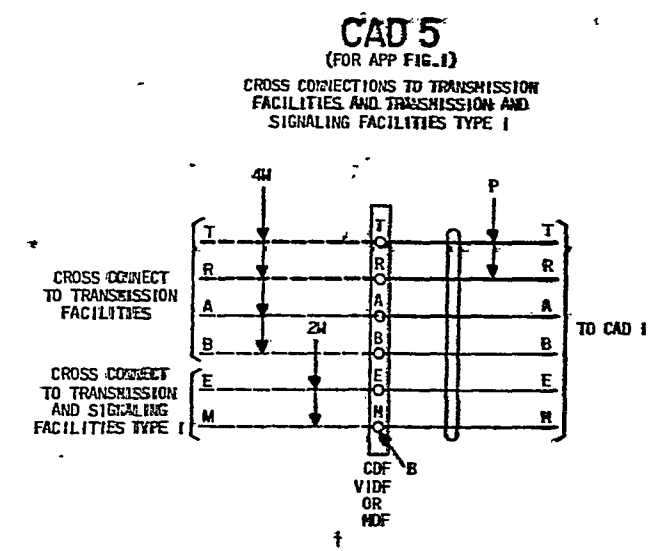
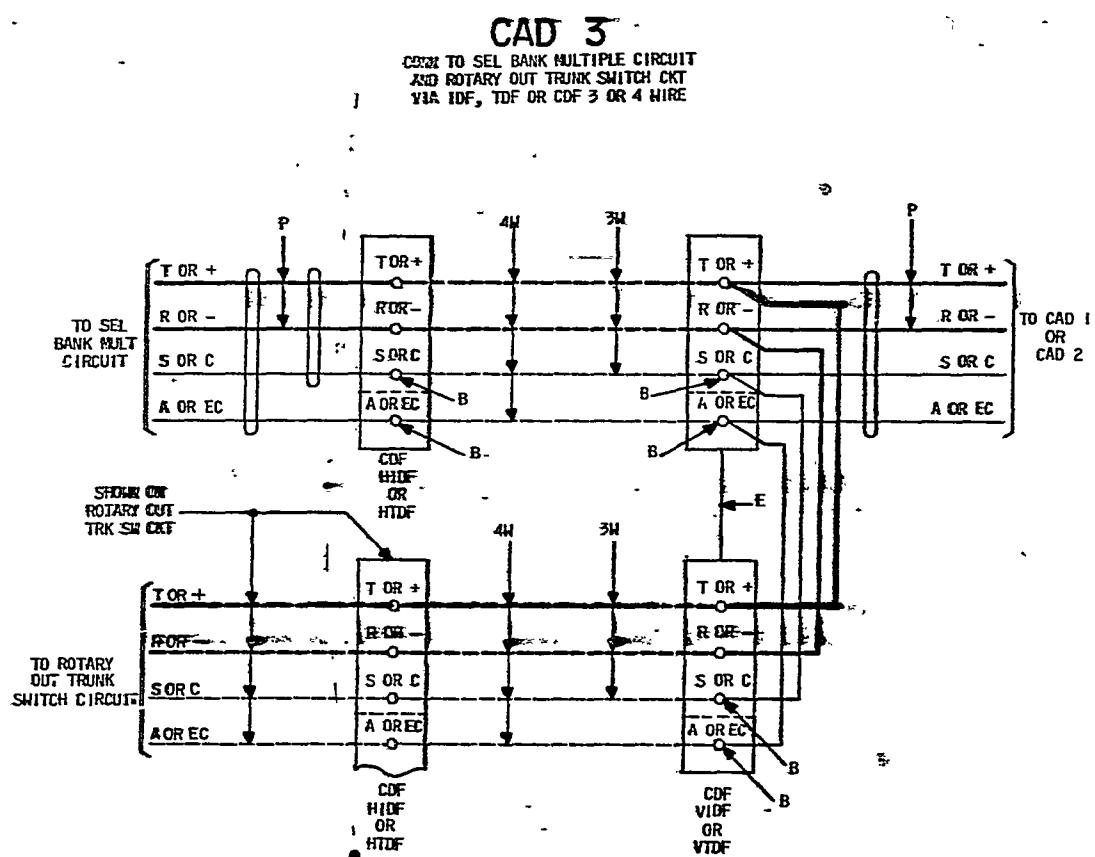


CAD 2

(FOR APP FIGURES 1 & 2)

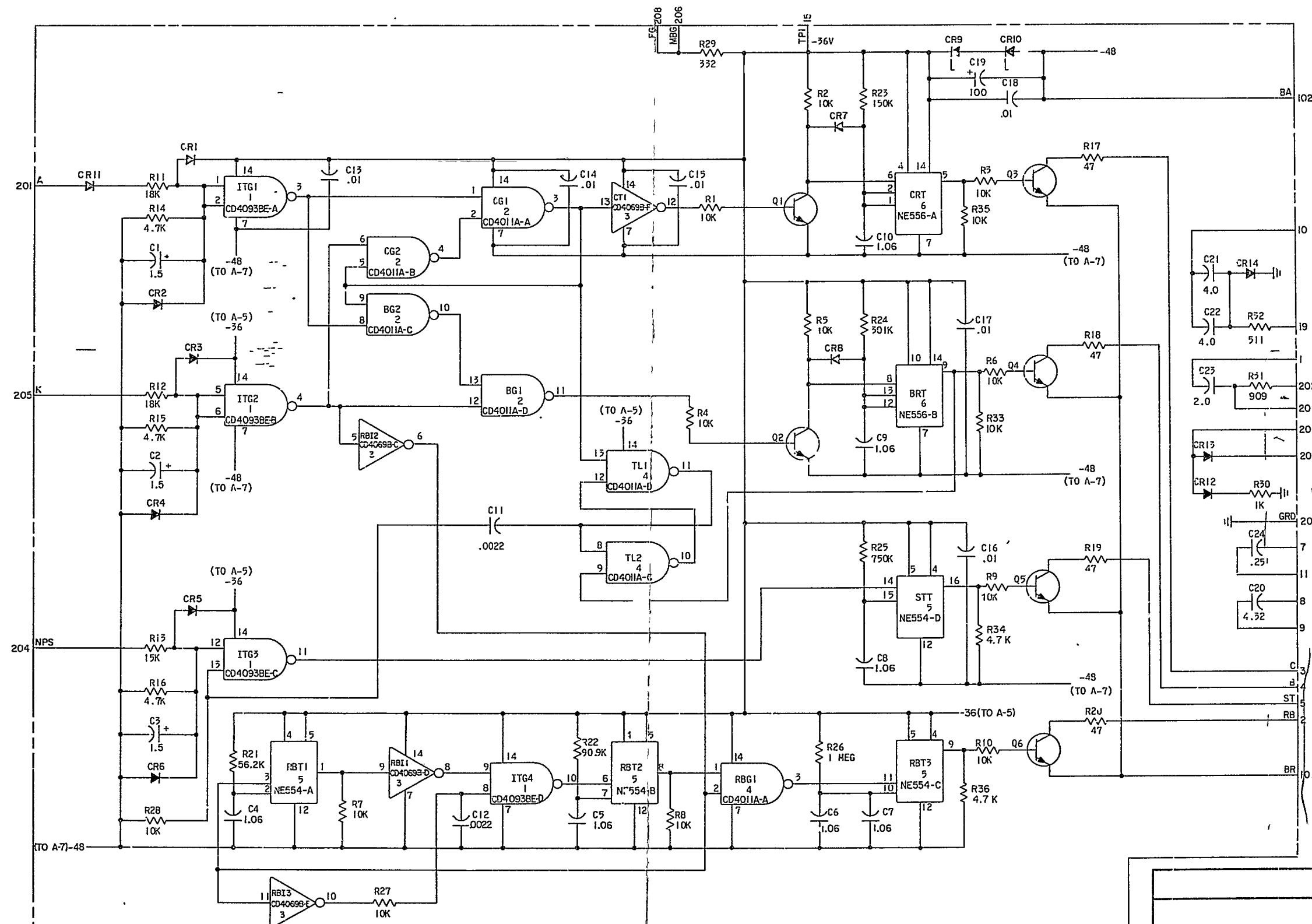


SD-35059-01-G1



PART OF CPS I

ELECTRONIC TRUNK DETECTOR, SERVICE TONE TIMER,
RING BACK TIMER, AND SLOW TO RELEASE SIMULATOR
FOR B AND C RELAYS



CPS I

OUTGOING TRUNK CIRCUIT		DWG SIZE	ISSUE
		65	1
BELL LABORATORIES		SD-35059-01-	
		JIA	

PART OF CPS I

COMPONENT LIST
INTEGRATED CIRCUITS

CP LOC	1		2		3		4		5		6		CP LOC
CODE	CD4093BE		CD4011A		CD4069B		CD4011A		NE554		NE556		CODE
ELEMENT IDENT	DESIG	SH LOC	DESIG	SH LOC	DESIG	SH LOC	DESIG	SH LOC	DESIG	SH LOC	DESIG	SH LOC	ELEMENT IDENT
A	ITG1	IAC2	CG1	IAC3	SPARE		RBG1	IAG5	RT1	IAG2	CRT	IAC6	A
B	ITG2	IAD2	CG2	IAC3	SPARE		SPARE		RT2	I G4	BR1	IAD6	B
C	ITG3	IAF2	BG2	IAC3	RB12	IAD3	TL2	IAE4	RT3	IAG6			C
D	ITG4	IAG4	BG1	IAD3	RB11	IAG3	TL1	IAE4	STT	IAF6			D
E					RB13	IAH2							E
F					CT1	IAC4							F
G													G

ICS: CD - OBTAIN FROM RCA (OR EQUIVALENT)
NE - OBTAIN FROM SIGNETICS (OR EQUIVALENT)
ALL ICS ARE DUAL-IN-LINE PACKAGES

CAPACITORS

DESIG	CODE	
[3] C1-3	605C	1.5 AT 60V DC
[7] C4-10	555BB	1.06 ± 1%
[2] C11,12	KS-15774, L1	.0022 (224K)
[6] C13-18	KS-19708, L4K.01	(105K)
C19	6.2A	100 ± 10% 20V DC
C20	555GH	
[2] C21,22	579G	
C23	542F	
C24	542C	

DIODES

DESIG	CODE	
[9] CR1-8,11	458A	
[3] CR9,10	426AT	6.2V, ± 5%, 1 WATT ZENER DIODE
[1] CR12	533A	
[2] CR13,14	533F	

RESISTORS

DESIG	CODE	
[14] R1-10,27,23,33,35	KS-20616, L1A	1/8 WATT 1% .0K
[2] R11,12	KS-20616, L1A	1/8 WATT 1% .18K
R13	KS-20616, L1A	1/8 WATT 1% .5K
[5] R14-16, R34-36	KS-20616, L1A	1/8 WATT 1% 4.7K
[+] R17-20	KS-20616, L1A	1/8 WATT 1% 47
R21	KS-20810, L1A	1/2 WATT 56.2K
R22	KS-20810, L1A	1/2 WATT 90.9K
R23	KS-20810, L1A	1/2 WATT 150K
R24	KS-20810, L1A	1/2 WATT 301K
R25	KS-20810, L1A	1/2 WATT 750K
R26	KS-20810, L1A	1/2 WATT 1.1EG
R27	KS-14603, L2A	10 WATT CERAM C 332
R30	KS-20289, L6C	1K
R31	KS-20289, L6C	909
R32	KS-20289, L6C	511

TRANSISTORS

DESIG	CODE
[6] Q1-6	66J

INPUT/OUTPUT INFORMATION
SEE CD 35059-01

CIRCUIT DESCRIPTION
CD-35059-01

SYMBOL

15	CPS1	102
206		10
208		19
201		1
205		202
204		20
		201
		203
		207
		7
		11
		8
		9
		3
		4
		5
		2
		101

MANUFACTURING REFERENCES TABLE

CATEGORY	NO.
CIRCUIT PACK CODE	ED-35125-,)
CONNECTOR ON FRAME	927B

BATTERY (-36V) AND GROUND (-48V) CONNECTIONS FOR INTEGRATED CIRCUITS		
CODE	-36V	-48V
CD4093BE	14	7
CD4011A	14	7
CD4069B	14	7
NE554	5	12
NE556	4, 10, 14	7

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS,
CAPACITANCE VALUES ARE IN MICROFARADS,
VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS)
ARE IN VOLTS.
2. ⊥ GROUND RETURN.

CPS I

OUTGOING TRUNK CIRCUIT		DRW SIZE	ISSUE
		65	1
CELL LABORATORIES	SD-35059-01-	JIB	

CPS 2 A RELAY ASSEMBLY

COMPONENTS:

RELAYS

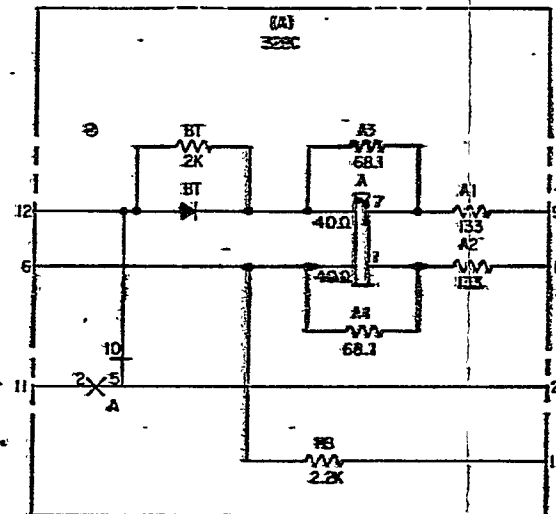
DESIG	CODE
A	328C

DIODES

DESIG	CODE
BT	533A

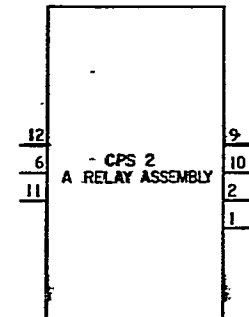
RESISTORS

DESIG	CODE
BT	KS-20810, L1A 2K
[2] A1, A2	KS-14603, L1G 133 .5 WATT
[2] A3, A4	KS-20810, L1A 68.1
MB	KS-20269, L6C 2.2K



NOTES:
* RELAY IS POSITION SENSITIVE

SYMBOL



INPUT/OUTPUT INFORMATION
SEE CD-35059-01

CIRCUIT DESCRIPTION
CD-35059-01

MANUFACTURING REFERENCES

CATEGORY	NO.
CIRCUIT PACK CODE	ED-35126-30
CONNECTOR ON FRAME	KS-19437, L1

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS,
CAPACITANCE VALUES ARE IN MICROFARADS,
VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS)
ARE IN VOLTS.
2. $\perp$ GROUND RETURN.

CPS 2

ISSUE

HW

OUTGOING TRUNK CIRCUIT

2

SD-35059-01-J2

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6S

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REVERSAL DETECTOR



- NOTES :

CATEGORY

C-E HIT BACK

CIRCUIT PACK
ASSEMBLY DRAWING

ASSEMBLY DRAWING

CONTROLLING C

CONNECTOR ON I

11

CPS 3

OUTGOING TRUNK CIRCUIT

2

SD-35059-01-13

BELL TELEPHONE LABORATORIES

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