

SD-59070-01

BELL TELEPHONE LABORATORIES, INC.

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TOLL SYSTEMS
TELEPHONE REPEATER
VI TELEPHONE REPEATER
KEY SHEET

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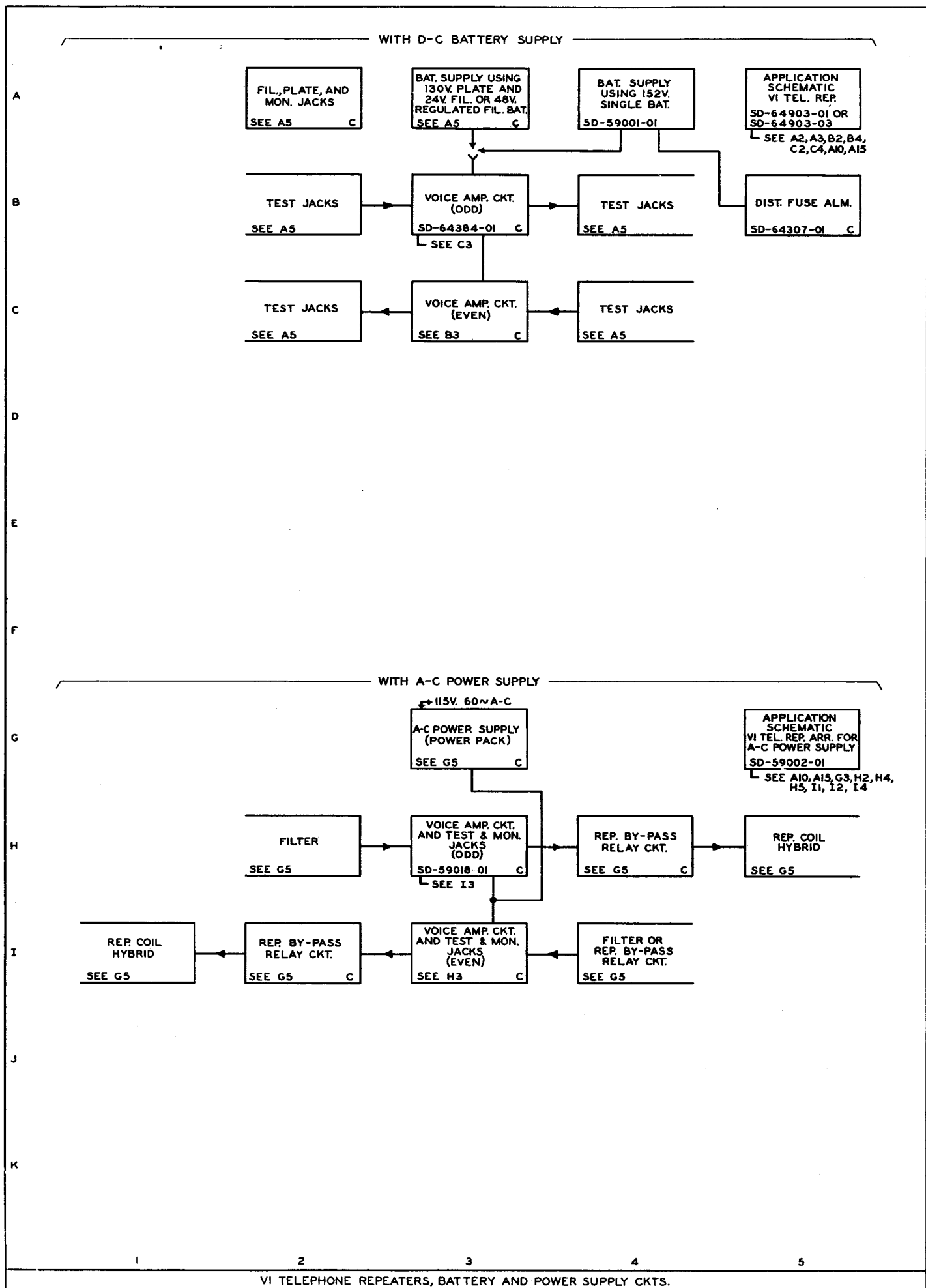
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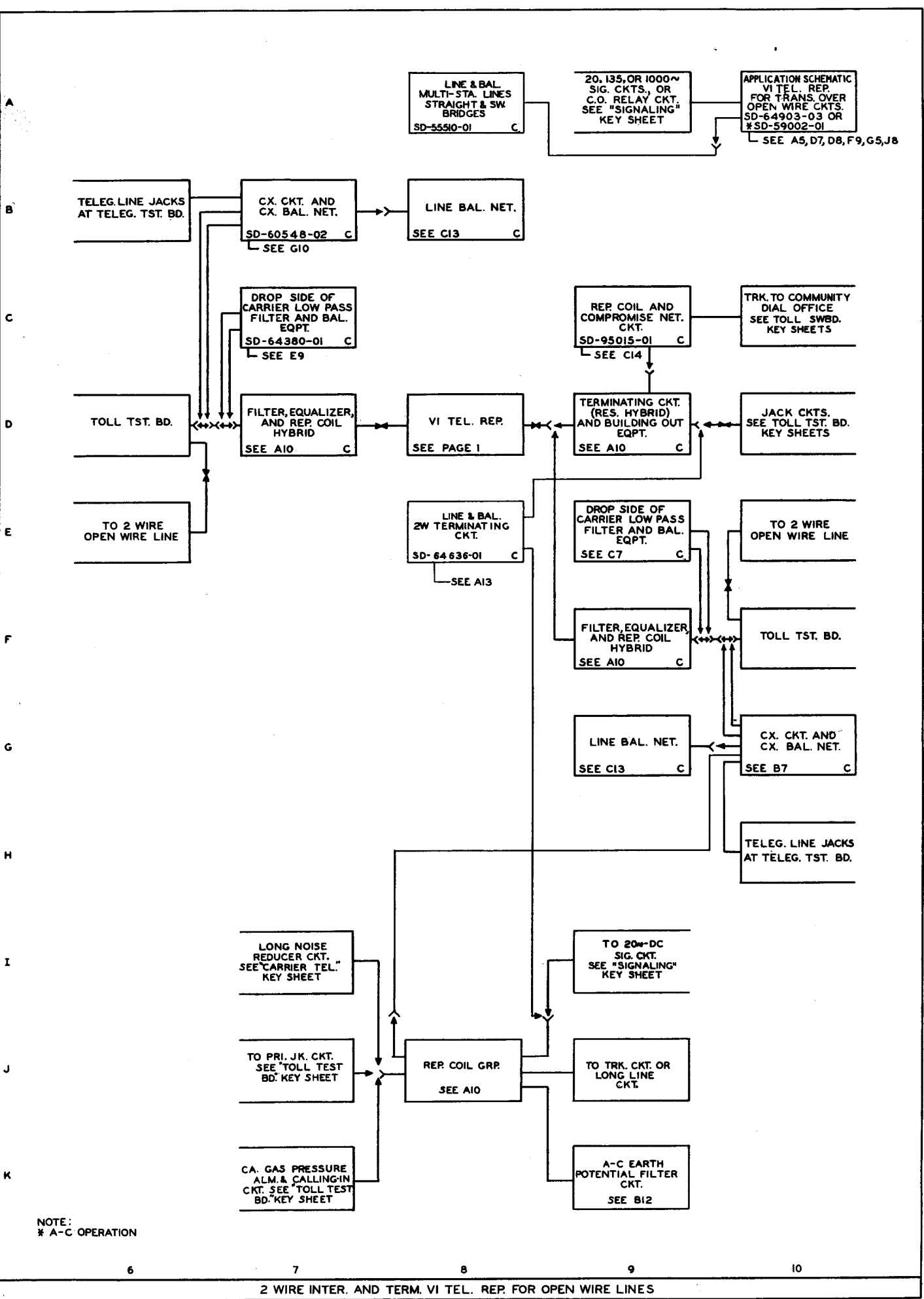
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STANDARD

FOR EXPLANATION OF CONVENTIONS
SEE MASTER KEY SHEET SD-90250-01

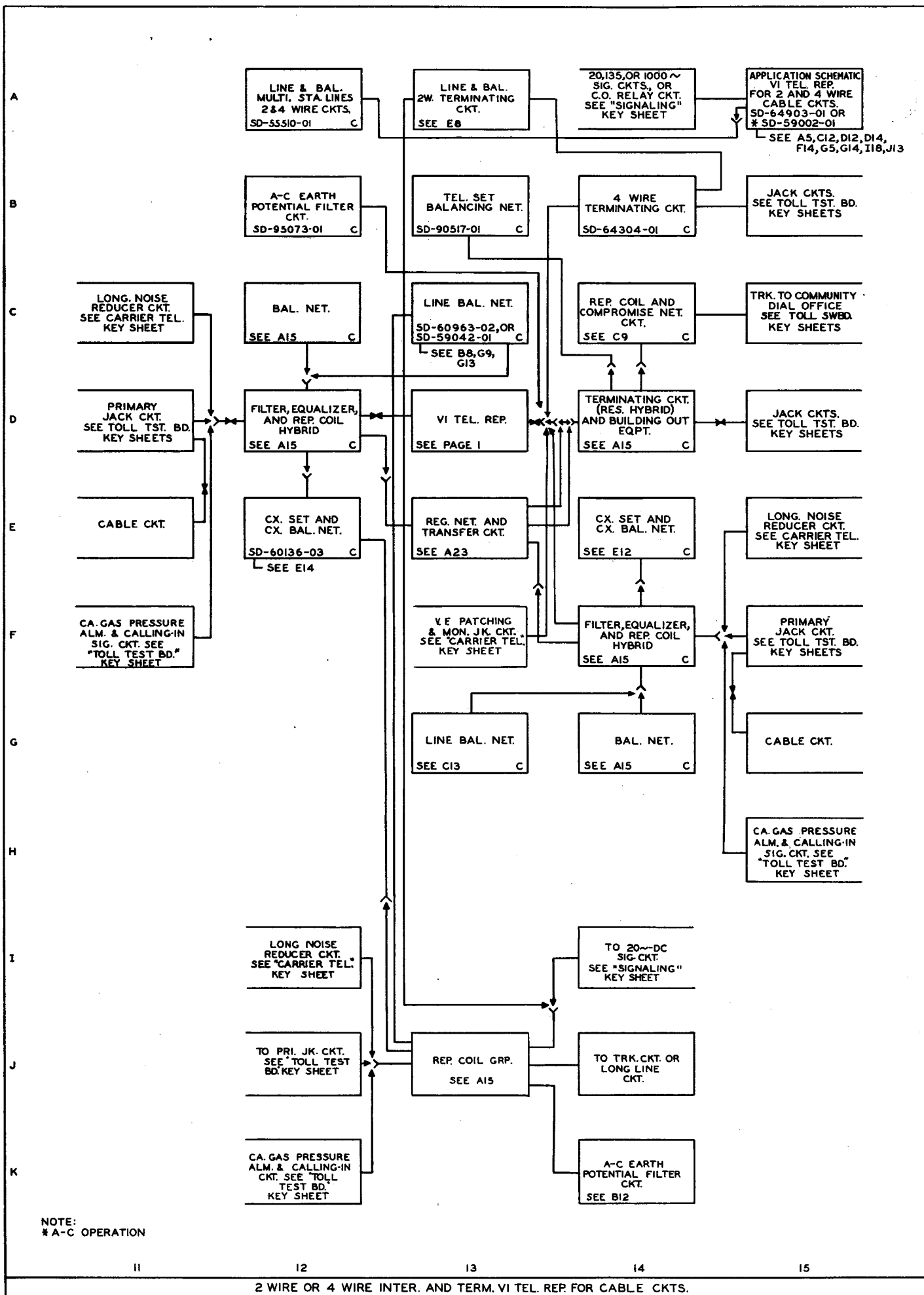
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J. J. DARMODY





NOTE:
* A-C OPERATION



TOLL CONFERENCE SERVICE

VOICE OPERATED
LOSS CONTROL AND
SUPPRESSOR CKT.
(VOLCAS)
SD-64366-01

VI TEL. REP.
SEE PAGE 1

TRK. CKTS. FOR
USE WITH TOLL
SWBD. NO. 1
(A&M ONLY)
SD-64623-01 C

JACK CKT. AS SPEC.
SEE TOLL SWBD.
KEY SHEETS

APPLICATION
SCHEMATIC
REPEATERS AND
VOLCAS
SD-55334-01
SEE C19

TRK. CKTS. FOR
USE WITH TOLL
SWBD. NO. 3
SD-64625-01 C

A-C LAMP RELAY
CKT. OR BUSY SIG.
RELAY CKT.
SEE TOLL SWBD.
KEY SHEETS

REP. ATTENDANT'S
TEL. SET
SD-61301-01 C
SEE D20

ONE WAY
CONTROL CKT.
SEE B18

ECHO SUPPRESSOR & COMPANDOR

IA COMPANDOR
APPLICATION
SCHEMATIC
SD-59068-01

VI TEL. REP.
APPLICATION
SCHEMATIC
SEE PAGE 1

IA ECHO SUPPRESSOR
APPLICATION
SCHEMATIC
SD-59035-01

MON. COIL CKT.
SD-59051-01 C

TELEPHONE
SET
SD-55537-01 C

4 WIRE TERMINATING
SET
SEE TEL. REP.
4 WIRE KEY SHEET

OSCILLATOR
ECHO SUPPRESSOR
PORTABLE
TESTING CKT.
SD-59034-01 C

IA ECHO SUPPRESSOR
SD-59031-01 C

IA COMPRESSOR
CKT.
SD-59040-01 C

IA EXPANDOR
CKT.
SD-59041-01 C

TESTING & MAINTENANCE

AUDIBLE & VISUAL
ALARM CKT. WITH
AISLE PILOT &
DISTINCTIVE ALARM
SD-96188-01 C
SEE H21

AUDIBLE & VISUAL
ALARM & ALARM
TRANSFER CKT. FOR
24V. ABS.
SD-95063-01 C
SEE H21

ALM. TRK. CKT.
ARR. TO EXTEND
ALMS.
SD-95310-01 C

INDIVIDUAL ALARM CKT.
FOR VF AUX. STA. WITH
152V. OR 24V. & 152V. BAT.
SD-55378-01 C

AUDIBLE & VISUAL
ALARM & ALARM
TRANSFER CKT. FOR
COMB. TOLL & SXS 355A
WITH 48V. ABS.
SD-95075-01 C
SEE H21

VI TEL. REP.
UNDER TEST

ALARM TRUNK
CKT.
SD-64542-01 C

POWER DISCHARGE
CKT. SEE
"POWER SYSTEMS"
KEY SHEET

IR TUBE TEST
SET
SD-64031-01 C

ATTENUATOR CKT.
WITH JACKS
SD-59020-01 C

SWITCHING CKT.
WITH JACKS
SD-59021-01 C

TO TDM. PTCH. BAY
TDM. PTCH. TRK.
SD-62488-01 C
PATCHING CORDS

JACK AND KEY CKT.
AT REP. BAYS
FOR 40B
TRANS. MEAS.
SD-64355-01 C
SEE D25

SWITCHING CKT.
VI TEL. REP.
SEE PAGE 1

VI TEL. REP.
APPLICATION
SCHEMATIC
SEE A15

SELECTOR CKT.
TEL. ORDER WIRE
STATION GROUP
CKTS.
SD-64413-01 C

JACKS AT REP. BAY
FOR TRANS. MEAS. TST.
TRK. TO MULTI-FREQ.
TEST BAY
SD-95100-01 C

APPLICATION
SCHEMATIC
TEL. ORDER
WIRE CKTS.
SEE "SIGNALING"
KEY SHEET

VI TEL. REP.
APPLICATION
SCHEMATIC
SEE PAGE 1

VI TEL. REP.
APPLICATION
SCHEMATIC
SEE PAGE 1

TEL. ORDER WIRE
BRIDGING
ARRANGEMENTS
4 WIRE
SD-59046-01 C

TRANS. MEAS. EQPT.
SEE "TRANS. MEAS."
KEY SHEET

"L" CARRIER TEL.
ORDER WIRE
CKT. FOR
SIGNALING BETWEEN
AUX. REPS & MAIN
STA. SEE "CARRIER
TEL." KEY SHEET

VI TEL. REP.
APPLICATION
SCHEMATIC
SEE PAGE 1

VI TEL. REP.
APPLICATION
SCHEMATIC
SEE A15

TELEPHONE
& ASSOCIATED
CONT. CKTS. FOR
CARRIER TEL. & PROG.
TRANS.
SD-64610-01 C

REC. 44 TYPE
REP. SEE
4 WIRE TEL. REP.
KEY SHEET

**CURRENT DRAIN DATA
AMPERE HOURS PER BUSY HOUR**

CIRCUIT DRAWINGS		SEE NOTE NO.	REMARKS	DRAINS LIST 1 AND 2										
				24 VOLTS					48 VOLTS		130V.	115V.	152 VOLTS	
CIRCUIT TITLE	CIRCUIT NO.			SIG. BAT.	FIL. BAT.	R. R. GRD.	F. BD. GRD.	SWBD GRD.	FIL. BAT.	F. BD. GRD.	PLT. BAT.	A-C	BAT.	F. BD. GRD.
TELEPHONE REPEATER														
VI	SD-64903-01		24V. REG. BAT. OFFICE		.320		.310				.010			
	SD-64903-03		24V. NON-REG. BAT. OFFICE		.430		.420				.010			
			48V. REG. BAT. OFFICE						.320	.310	.010			
	SD-59002-01		115V. A-C									.160		
BATTERY SUPPLY, VI	SD-59001-01	5	152V. SINGLE BAT. OFFICE										.320	.320
REGULATING NETS. & TRANSFER	SD-64937-01			.082		.034								
	SD-64937-02			.034		.098								
PILOT WIRE REGULATING														
MASTER RELAY	SD-55096-01	2	PER FIG. 2	.072		.072								
GUARD & MASTER RELAY	SD-55442-01		PER FIG.1	.096		.096								
		2	PER FIG. 1			.120								
			PER FIG. 4	.136		.136								
		2	PER. FIG.4	.064										
PROG. APPLIQUE & SEC. MASTER	SD-55443-01	2		.40		.40								
MASTER RELAY	SD-55444-01		PER FIG. 1	.08		.08								
		2	PER FIG. 1			.143								
			PER FIG. 2	.192		.192								
		2	PER FIG. 2			.132								
			PER FIG. 3	.288		.288								
		2	PER FIG. 3			.143								
MASTER RELAY	SD-55472-01	3	PER FIG. 1	.064										
		4	PER FIG. 2	.064										
TOLL CONFERENCE SERVICE														
APPLICATION SCHEMATIC (EXCLUSIVE OF VI REPS.)	SD-55334-01			NEGL.		NEGL.								
VOLCAS	SD-64366-01			NEGL.	.640	NEGL.	.589				.051			
ECHO SUPPRESSOR														
(1A) APPLICATION SCHEMATIC	SD-59035-01		24V. REG. BAT. OFFICE	.096	.640	.096	.630				.010			
			24V. NON-REG. BAT. OFFICE	.096	.850	.096	.840				.010			
COMPANDOR														
(1A) APPLICATION SCHEMATIC														
1A COMPRESSOR	SD-59068-01	1,6	24V. REG. BAT. OFFICE	A.360	.640	A.360	.624				.016			
			24V. NON-REG. BAT. OFFICE	A.360	.850	A.360	.834				.016			
1A EXPANDOR		1,6	24V. REG. BAT. OFFICE	A.360	.640	A.360	.624				.016			
				24V. NON-REG. BAT. OFFICE	A.360	.850	A.360	.834				.016		

NOTES:

1. "A" ADD WHEN OVEN IS HEATED BY 24V. SIG. BAT.

2. ADD PER CONNECTING NETWORK.

3. PER CONNECTED REG. NET. OR PER SEC. MASTER RELAY
CKT. (FIG 2) AS SPEC.

4. PER CONNECTED REG. NET.

5. FIL. DRAIN FOR ANY NUMBER OF VI REPS FROM 1 TO 7
INCL. ADD .010 AMP DRAIN FOR THE PLATES OF EACH
VI REP CONNECTED.

6. WHEN FIL. BAT. IS NOT AVAILABLE FIL. BAT. SHALL BE
CONSIDERED AS SIG. BAT.

GENERAL DESCRIPTION

The VI telephone repeater consists of two one-way, one-stage amplifiers, which may be operated in pairs on 24 volt or 48 volt filament battery and 130 volt plate battery, on 152 volt combined filament and plate battery, or on 115 volt 60 cycle a-c filament and rectified a-c plate supply. Jacks facing both ways are provided at the amplifier inputs and outputs. They are used for amplifier maintenance, measuring line attenuation, return loss, and for 21 and 22 tests. Several types of repeater arrangements may be formed from a pair of amplifiers by means of associated line and terminating equipment.

The amplifiers employ heater type tubes. The maximum gain is about 35 db and the input and output impedances are each nominally 600 ohms. The gain is substantially flat with frequency, adjustable over a 5 db range by means of a potentiometer in the feedback circuit, and five taps at intervals of 4 db are provided on the high side of the input transformer. A monitoring winding is provided on the output transformer. Grid potential is obtained by the cathode drop method. Stability of amplifier gain is obtained by feedback.

Several types of repeater arrangements may be formed by means of associated line and terminating equipment. The repeaters may be used in 2 wire intermediate or terminal repeater arrangements and on 4 wire circuits where the gain required does not necessitate the use of 44A1 telephone repeater set and where the repeater is not regulated. Line and balancing circuits, including repeating coil hybrids, terminating, equalizer and filter circuits, and signaling and associated circuits, are provided.

Toll conference service arrangements consist essentially of six repeaters connected on one side to a resistance multiple and on the other side to individual multiple jack appearances at a toll switchboard over special trunk circuits which provide switching pads and terminations for the conference repeaters when not in use. Associated with these trunks is a holding and disabling circuit and an optional feature which permits the operator to provide one way transmission from one of the connected lines to all others connected to the conference circuit. A volcas (voice operated loss control and suppressor) may be permanently associated with any conference repeater to reduce objectionable echo effects. This device serves to decrease losses in the transmitting direction and increase losses in the reverse direction.

The 1A echo suppressor is provided for use on 2 or 4 wire circuits at terminal or in-

termediate points. This circuit in addition to suppressing echoes provides a "break-in" feature which allows the listening subscriber to break in by talking at a higher level than the talking subscriber. A portable test set is provided with which sensitivity, time and filament activity tests may be made when connected to the echo suppressor by means of a 15 conductor patching cord. Facilities for monitoring and talking are provided as required. Connection to the 1A compandor circuits may be made to reduce the effects of noise and crosstalk which originates on the line side of the compandor equipment.

The 5B pilot wire transmission regulating system controls the gain of cable repeaters connected to it so as to compensate for resistance changes in the cable due to temperature variations. A regulator and master relay circuit is provided with keys so that either regulator or manual dial switch can be used with the master relay circuit. Connection is provided to regulating network and transfer circuits, in which variable attenuators connected in the repeater circuit are adjusted automatically by the master regulator circuit. A manual control dial can be connected to the idle master relay circuit for testing and controlling the office equipment in an emergency.

The switching circuit provides a means of substituting a spare repeater for one in service without interruption of the transmission path, primarily for use in routine testing. An attenuator allows the gain of the replacing or spare amplifier to meet the gain adjustments of the replaced amplifier. Jacks are provided to permit the use of the attenuator and spare amplifier for general test purposes. Other testing and maintenance circuits such as tube test set, telephone order wires, interbay trunks and jack circuits, are provided.

The current drain data is to be used in determining the size of the toll power plant, and the power leads. This data shall be used in all cases, except for those deviations specifically authorized by the Bell Telephone Laboratories, Inc. in accordance with the routing set-up covering special practices.

The drains are on an equipment basis, i.e., the drain given for each circuit represents the average throughout the busy hour. Therefore, the number of units of a given type of equipment multiplied by its drain will give the busy hour drain of all the units of that type of equipment. The total busy hour drain will be the sum of all the drains of the various types of equipment in the office.