

SD-59070-02

BELL TELEPHONE LABORATORIES, INC.

TOLL SYSTEMS
TELEPHONE REPEATER
"V3" TELEPHONE REPEATER
KEY SHEET

INDEX

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 FOR TRANS. MEAS. KEY SHEET SEE SD-95021-01.

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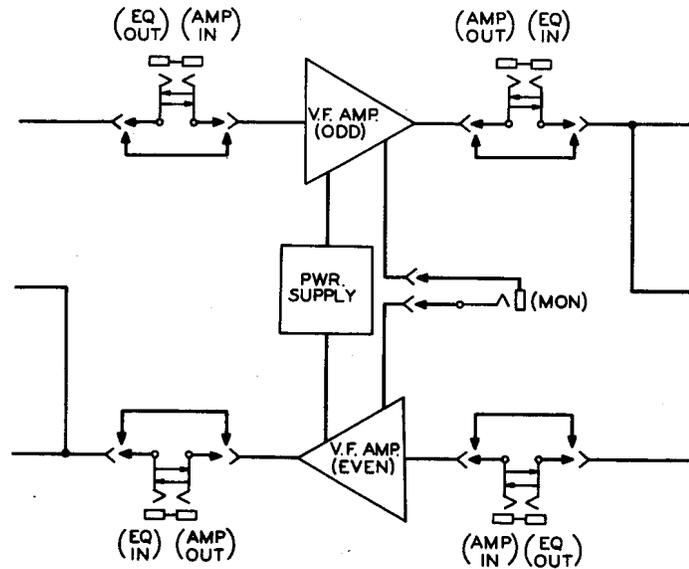
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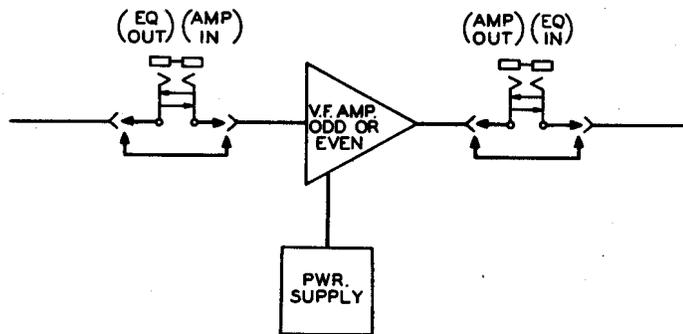
J.J. DARMODX

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"V3" TELEPHONE REPEATER



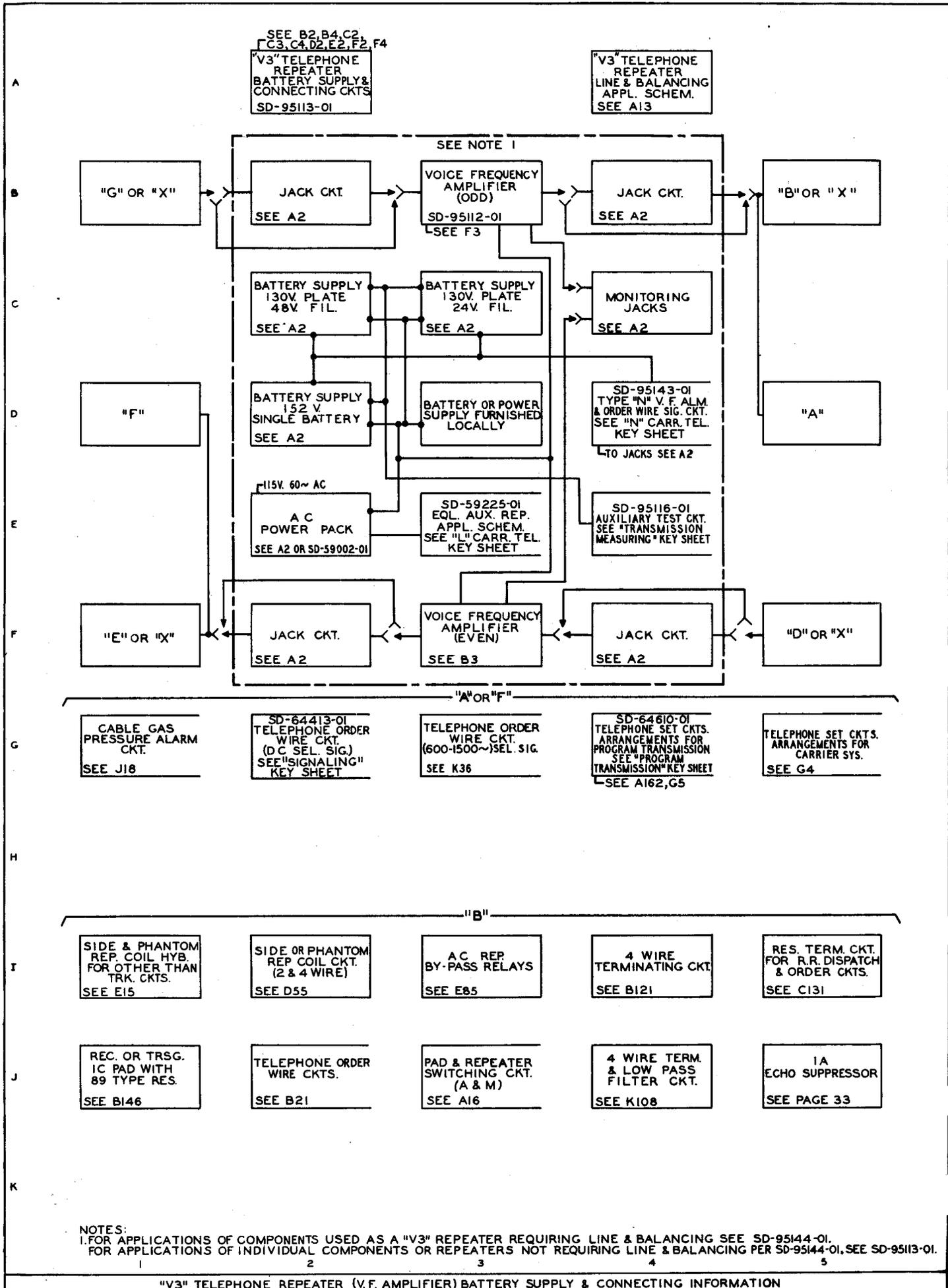
V.F. AMPLIFIER



The V3 Telephone Repeater consists of two one-way, one-stage V.F. amplifiers intended for AC or DC operation with 20V heaters and 130-152 d-c plate voltage. Jacks, used for monitoring or testing circuits or repeaters, may or may not be supplied.

As in the V1 Telephone Repeater, these V.F. amplifiers provide a maximum gain of about 35 db at 1000 cycles, the input and output impedances are about 600 ohms, and the frequency characteristic is substantially flat. Unlike the V1, the gain is continuously adjustable over a 40 db range by means of a potentiometer across the secondary winding of the input transformer. A monitoring winding with pin jacks and a pin jack for measuring cathode current are provided. These amplifiers are considerably smaller than any previous V.F. amplifier occupying about one-sixth the space required for a V1. They are connected to line circuits by means of an eleven pin plug which greatly facilitates maintenance.

Several types of repeater arrangements may be formed by means of associated line and terminating equipment. The repeaters may be used with either 2- or 4-wire line circuits.



NOTES:
 1. FOR APPLICATIONS OF COMPONENTS USED AS A "V3" REPEATER REQUIRING LINE & BALANCING SEE SD-95144-01.
 2. FOR APPLICATIONS OF INDIVIDUAL COMPONENTS OR REPEATERS NOT REQUIRING LINE & BALANCING PER SD-95144-01, SEE SD-95113-01.

"V3" TELEPHONE REPEATER (V.F. AMPLIFIER) BATTERY SUPPLY & CONNECTING INFORMATION

"D"

A

AC REP. BY-PASS RELAYS
SEE G84

AUX. EQL. FOR PROV. OPEN WIRE & EQL. FOR CKTS. WITH 135~ SIG.
SEE F105

FILTER
SEE B110

4 WIRE EQL. CKT.
SEE C115

FILTER CKT. TO PREVENT OPERATION OF ECHO SPR. BY TELEG. THUMP
SEE J115

B

4 WIRE TERMINATING CKT.
SEE C122, C123

RES. TERM. CKT. FOR R.R. DISPATCH & ORDER CKTS.
SEE D131

REC. OR TRSG. IC PAD WITH 89 TYPE RES.
SEE B146

TELEPHONE ORDER WIRE CKTS.
SEE B21

PAD & REPEATER SWITCHING CKT. (A & M)
SEE A16

C

4 WIRE TERMINATING CKT.
SEE K108

REG. NETWORK & TRANSFER CKT.
SD-64937-01 *

SEE: G10, K14, G108, E115, D129, G127, G136, G148, C158

REG. NETWORK & TRANSFER CKT.
SD-64937-02

SEE H6, K15, G109, F111, D130, G128, G137, G149, C157

D

"E"

E

SIDE & PHANTOM CKT. REP. COIL HYB. FOR OTHER THAN TRK. CKTS.
SEE E15

SIDE OR PHANTOM REP. COIL CKT. (FOR 2 OR 4 WIRE)
SEE D55

AC REP. BY-PASS RELAYS
SEE G85

1A ECHO SUPPRESSOR
SEE PAGE 33

F

"G"

G

AUX. EQL. FOR PROV. OPEN WIRE & EQL. FOR CKTS. WITH 135~ SIG.
SEE F105

FILTER
SEE B110

4 WIRE EQL. CKT.
SEE C115

FILTER CKT. TO PREVENT OPERATION OF ECHO SPR. BY TELEG. THUMP
SEE J115

REG. NETWORK & TRANSFER CKT.
SEE C7

H

REG. NETWORK & TRANSFER CKT.
SEE C8

"X"

I

PHYSICAL OR PHANTOM CKT. REP. COIL HYB. FOR 2WIRE LINE ARR. FOR TRK. CKT. USE
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SIGNALING CUT-OFF REL. CKT.
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TELEPHONE ORDER WIRE BRIDGING ARRANGEMENT
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TOLL CONFERENCE SERVICE
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V.F. PTCH. & MON. JKS. AMP. CONTROL PAD & TRK. CKTS.
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J

SD-70515-01 INTERCONNECTING CKT. FOR 40 TYPE CARR. TELEG. SEE "CARR. TELEG." KEY SHEET

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"V1" TEL. REP. OPEN WIRE LINES)
SEE E20

SD-64083-01 CARRIER TRANSFER TERM. & REP. CKTS. SEE KEY SHEET FOR "H" CARRIER TEL.

K

SD-56227-01 ORDER WIRE CKT. AUX. REP. TO RADIO REL. SEE "SIGNALING" KEY SHEET

SD-56228-01 ORDER WIRE CKT. MAIN REP. TO RADIO REL. SEE "SIGNALING" KEY SHEET

V.F. PTCH. & MON. JKS. AMP. CONTROL PAD & TRK. CKT.
SEE H127

*"A&M ONLY" EXCEPT FOR 2W REGULATED SECTIONS. EQUIVALENT TO MORE THAN 96 MILES OF AERIAL CABLE.

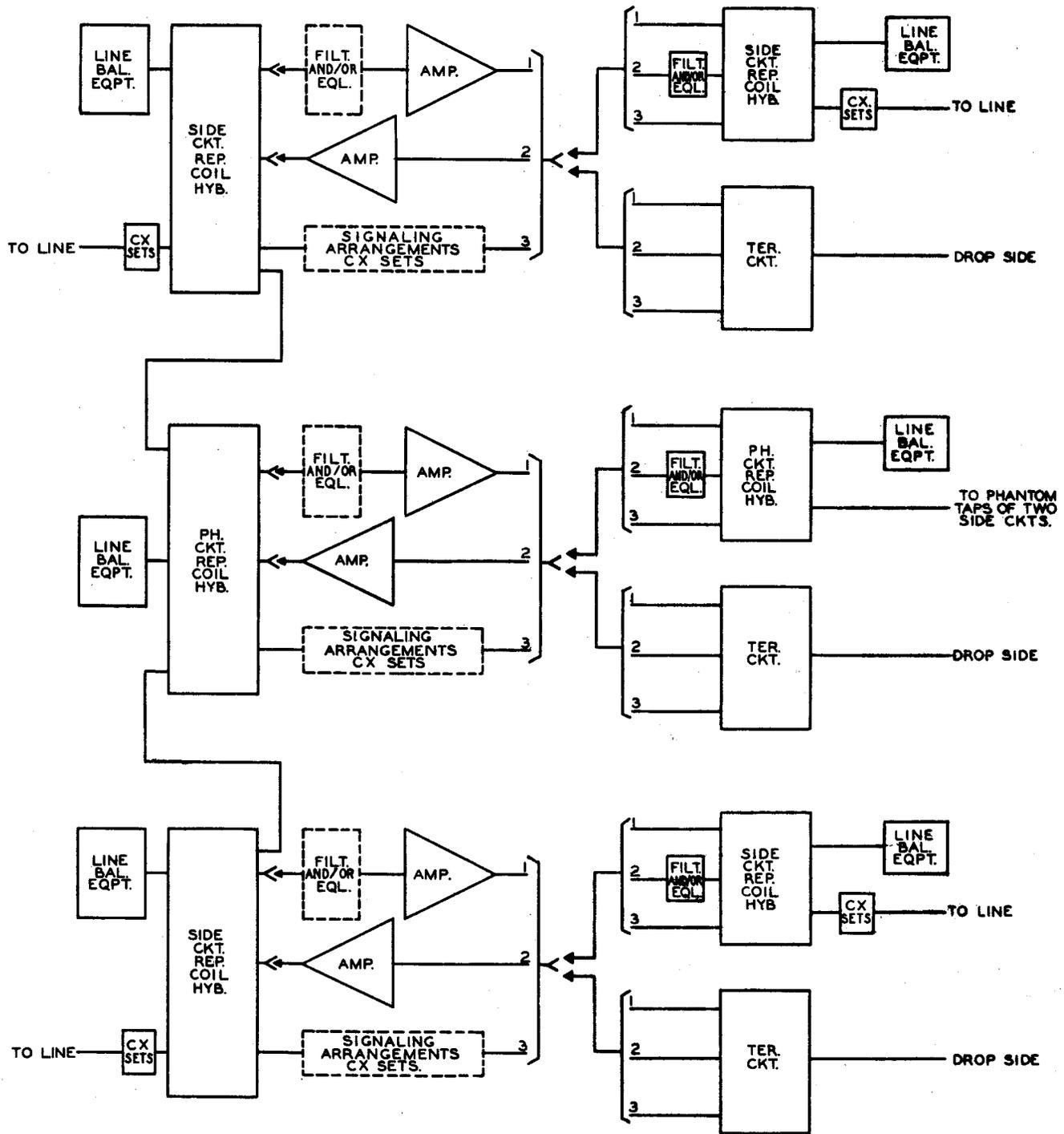
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7

8

9

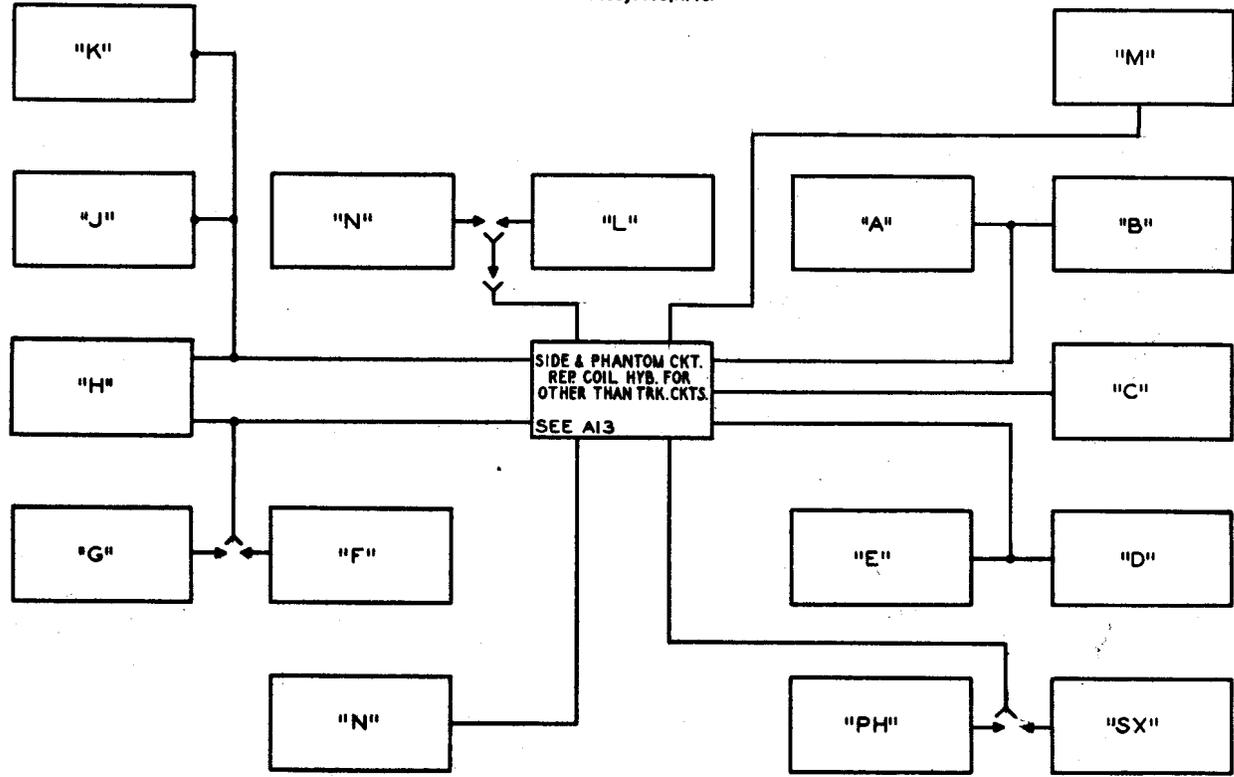
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TYPICAL ARRANGEMENT "V3" TELEPHONE REPEATER & LINE & BALANCING EQUIPMENT

"V3" TEL. REP.
LINE & BALANCING
APPLICATION SCHEMATIC
SD-95144-01

SEE A4, D13, A26, A36, A53, A68,
A73, A78, A83, A93, A98,
A103, A108, B113, A118, A123,
A133, F143, A148.



SD-55194-01
TERM. & INTER. SIG.
SEE "SIGNALING"
KEY SHEET
SEE D48, C62, E66, G10, A127,
C128, C138, E136, F146

SD-68135-01
INTERTOLL INC. TRK. CKT.
SEE "TOLL SW. SYS. NO. 4"
KEY SHEET
SEE D17, H16, K106

SD-68154-01
INTERTOLL OR TOLL TDM
INCOMING TRK. CKT.
SEE "TOLL SW. SYS. NO. 4"
KEY SHEET
SEE D18

SD-68005-01
INTERTOLL OUTGOING
RINGDOWN TRK. CKT.
SEE "TOLL SW. SYS. NO. 4"
KEY SHEET
SEE D19

SD-68113-01 (A&M)
INTERTOLL OUTGOING
TRK. CKT. (DIAL) SEE
"TOLL SW. SYS. NO. 4"
KEY SHEET
SEE D20

SD-68155-01 (A&M)
INTERTOLL OUTGOING
TRK. CKT. (CA) SEE
"TOLL SW. SYS. NO. 4"
KEY SHEET
SEE E16

SD-68285-01
PAD SWITCHING CKT.
SEE "TOLL SW. SYS. NO. 4"
KEY SHEET
SEE E18

AC REPEATER
BY-PASS RELS.
SEE E81, F85

5db PAD CKT. FOR
PROV. OPEN WIRE CKTS.
EQUIPPED WITH 3KC
CARR. LINE FILTER
SEE E96

AUX. EQL. FOR R.R.
DISPATCH CKTS.
SEE B101

FILTER
SEE B106

REC. OR TRSG.
PAD CKT.
SEE B150

AUX. EQL. FOR PROV.
OPEN WIRE & EQL. FOR
CKTS. WITH 135~ SIG.
SEE F101

SD-68327-01
CKT. PATCHING BAY
JACK CKTS.
SEE "TOLL SW. SYS. NO. 4
OR 4A" KEY SHEET
SEE F16, H18, K107

REG. NETWORK &
TRANSFER CKT.
SEE C7

REG. NETWORK &
TRANSFER CKT.
SEE C8

SIDE & PHANTOM CKT. REP. COIL HYBRID (FOR OTHER THAN TRK. CKTS)

"B" CONTINUED

SD-68004-01(A&M)
PAD & REP. SW. CKT.
SEE KEY SHEET FOR
TOLL SW. SYS. NO.4
LSEE G17, K102, J3, B10

2 WAY INTERTOLL
TRK. CKT.
SEE E17

4 WIRE EQL. CKT.
SEE C111

"C"

20~ REPEAT
COIL CKT
SEE A66

3 1/2~ SIGNALING
BY-PASS CKT.
SEE E76, E80

TYPE "D" OR "E"
TERM. CK CKT. OR
TYPE "D" INTER. CK SET
SEE F71

SD-31726-01
INC. TRK. CKT.
SEE KEY SHEETS FOR
NO."1" "350A" OR
"355A" SXS SYS.
LSEE G40, J45, H54,
I60, D122, E131

"D"

SD-55393-01
SIG. CUT-OFF REL. CKT.
SEE "SIGNALING"
KEY SHEET
LSEE C88, D88, J86, D109, F122,
E127, I127, G132, F140, A144, I7

INTERTOLL INCOMING
TRK. CKT
SEE I11

INTERTOLL OR TOLL
TANDEM INC. TRK. CKT
SEE I12

INTERTOLL OUTGOING
RINGDOWN TRUNK CKT
SEE I13

INTERTOLL OUTGOING
TRUNK CKT. (DIAL)
(A & M)
SEE I14

INTERTOLL OUTGOING
TRK. CKT. (CA)
(A & M)
SEE I15

SD-68102-01
2 WAY INTERTOLL
TRK. CKT. SEE
"TOLL SW. SYS. NO. 4"
KEY SHEET
LSEE H17, A17, J110

PAD
SWITCHING
CKT
SEE J11

SD-64903-01
"V1" & "V2" TEL. REP.
(CABLE CKTS.)
SEE "V1" TEL. REP.
KEY SHEET
LSEE G28, K27, C56,
E107, J7

SD-64903-03
"V1" TEL. REP.
(OPEN WIRE LINES)
SEE "V1" TEL. REP.
KEY SHEET
LSEE G28, K28, C57,
E108, J8

CKT. PTCH. BAY
JACK CKTS.
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AC REPEATER
BY-PASS RELAYS
SEE F83, G81

REC. OR TRSG. PAD
SEE B150

"1A" ECHO
SUPPRESSOR
SEE PAGE 33

TELEPHONE ORDER WIRE
BRIDGING ARRANGEMENT
SD-59046-01 C
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E106, I8, A161

"V3" TEL. REP.
SEE B5, F1

PAD & REPEATER
SWITCHING CKT.
(A & M)
SEE A16

"E"

INTERTOLL INCOMING
TRK. CKT.
SEE I11

2 WAY INTERTOLL
TRK. CKT.
SEE E17

CKT. PTCH. BAY
JACK CKTS.
SEE K13

"F"

TO TWO SIDE CKT.
REP. COIL HYBS. FOR
OTHER THAN TRK. CKTS.
SEE F14

TO TWO SIDE CKT.
REP. COIL CKT.
(FOR 2 WIRE)
SEE E40

TO TWO SIDE CKT.
REP. COIL CKT.
SEE E53

"G"

SD-56166-01
TYPE "A" & "C" CX SETS
& CX BAL. SET CKTS.
SEE "SIGNALING"
KEY SHEET
LSEE A22, G41, H43, C61,
D63

SD-64932-01
LINE FILTER CKTS.
SEE KEY SHEET FOR
"U" CARR. TEL.
LSEE B22, I41, E62, C93,
F93, C99

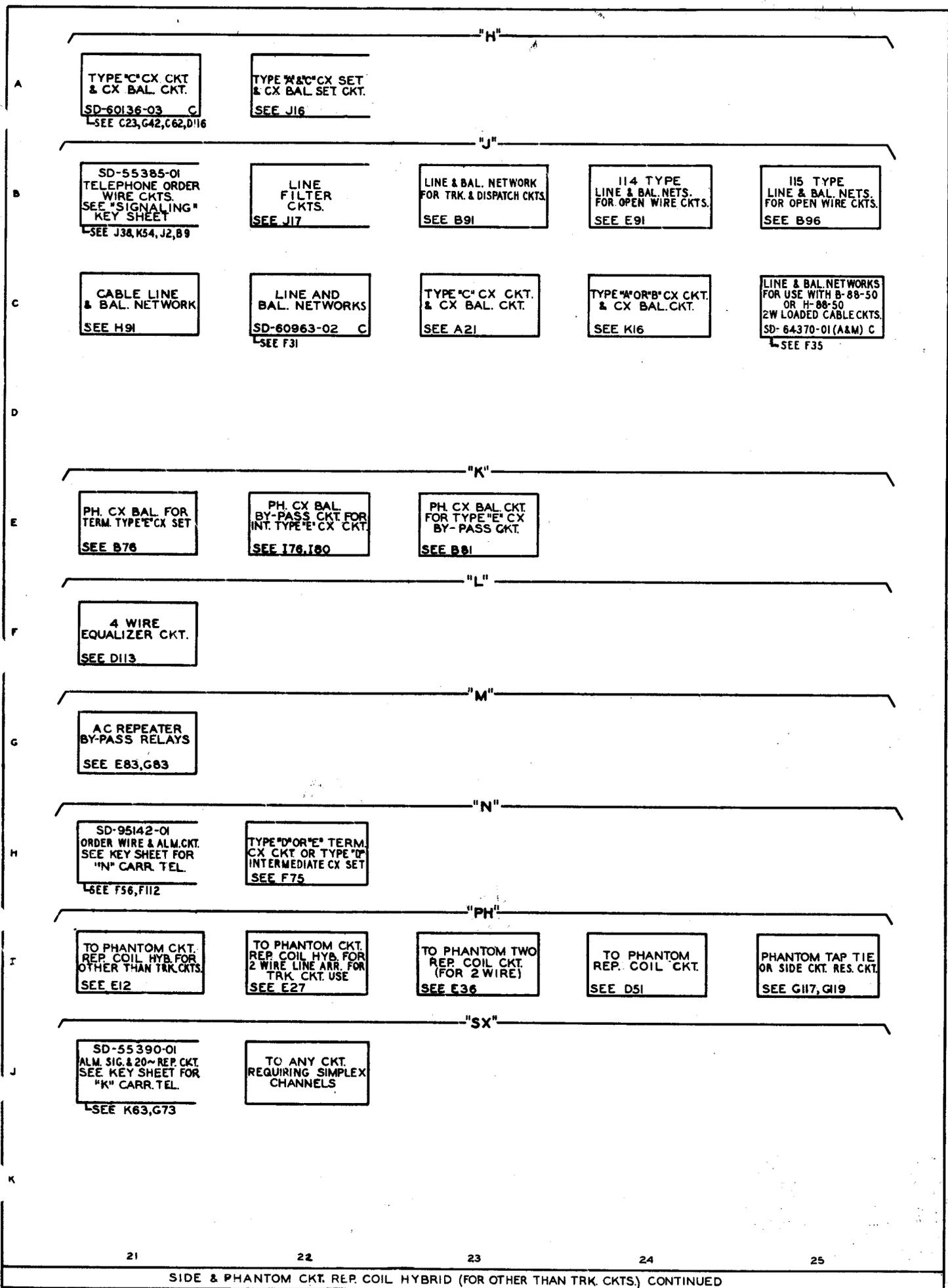
SD-55211-01
CABLE GAS PRESSURE
ALARM CKT.
SEE "TOLL TST. BD"
KEY SHEETS
LSEE H41, D61, F79, G77,
I93, F121, G131, G1

TYPE "C" CX CKT.
& CX BAL. CKT.
SD-60136-02 (A&M) C
LSEE H44, D64

40A
CABLE TERMINAL

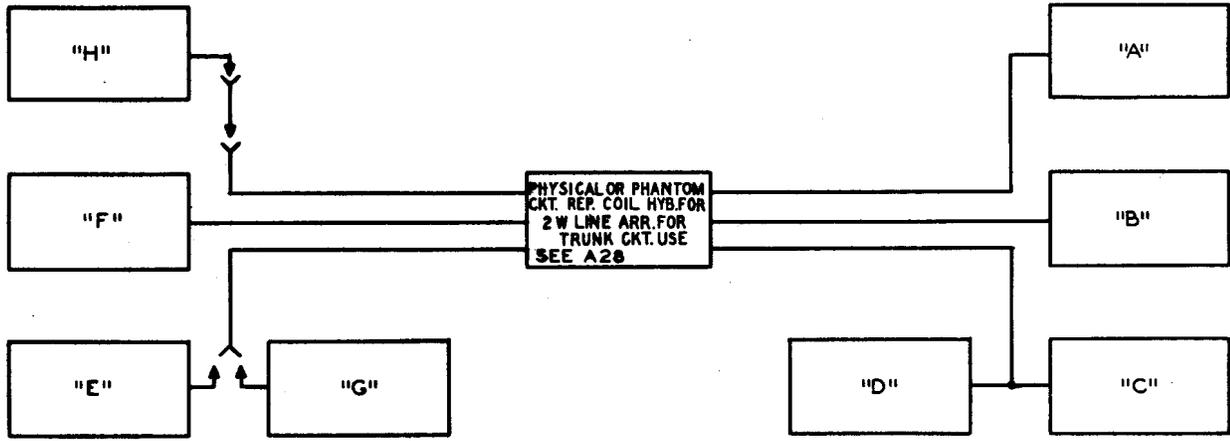
TYPE "A" OR "B" CX CKT.
& CX BAL. CKT.
SD-60548-02 C
LSEE C24, H45, D65

SD-63661-01
PRIMARY JK. CKT.
SEE "TOLL TST. BD"
KEY SHEETS
LSEE B46, E61, E116



"V3" TELEPHONE REPEATER LINE & BALANCING APPL. SCHEM. SEE A13
 SEE D28

A
 B
 C
 D
 E
 F
 G
 H
 I
 J
 K



"A"

- | | | | | |
|------------------------------|---|--|--|--------------------------------------|
| FILTER
SEE B106 | SD-55647-01
MULTI-STATION LINE CKTS.
SEE "SIGNALING" KEY SHEET
SEE I27, K26, C34 | "V1" & "V2" TEL. REP.
(FOR CABLE CKTS.)
SEE E19 | "V1" TEL. REP.
(FOR OPEN WIRE CKTS.)
SEE E20 | "V3" TEL. REP.
SEE B1, B5, F1, F5 |
| 4 WIRE EQL. CKT.
SEE C111 | 5 DB PAD FOR PROV. OPEN WIRE CKTS.
EQUIPPED WITH 3 KC. CARR. LINE FILTER
SEE E96 | AUX. EQL. FOR PROV. OPEN WIRE & EQL. FOR CKTS. WITH 135 ~ SIG.
SEE F101 | | |

"B"

- | | | | | |
|--|-------------------------------------|---|--|--|
| SD-96251-01
DIAL. LONG LINE CKT. TYPE "B" CK. SUPPLIES LINE SUPERVISION WITH OR WITHOUT REPEATERS
SEE KEY SHEETS FOR XDR, SXS, PBX
SEE B32, D31, J121, K131 | MULTI-STATION LINE CKTS.
SEE G27 | SD-55255-01
2 WAY OPERATOR OFFICE TRUNK CKT.
SEE KEY SHEETS FOR TOLL SWBD. 3, 3C, 3CF, 3CL AND SWBD. NO. 11
SEE B31, C33, J40, M46, A56, K57, F125, G135 | | |
|--|-------------------------------------|---|--|--|

"C"

- | | | | |
|-------------------------------------|---|--|--------------------------------------|
| MULTI-STATION LINE CKTS.
SEE G27 | "V1" & "V2" TEL. REP.
(FOR CABLE CKTS.)
SEE E19 | "V1" TEL. REP.
(FOR OPEN WIRE CKTS.)
SEE E20 | "V3" TEL. REP.
SEE B1, B5, F1, F5 |
|-------------------------------------|---|--|--------------------------------------|

A

"D"

B

2 WAY OPERATOR
OFFICE TRK. CKT.
SEE I28

DIAL LONG LINE CKT.
TYPE "B" CX SIG. SUPPLIES
LINE SUPERVISION WITH
OR WITHOUT REPS.
SEE I26

C

"E"

SD-55038-01
PATCHING, LISTENING &
MAKE BUSY CKT.
SEE KEY SHEETS FOR
NO. 5 TOLL TST. BD. (A & M)
NO. 3CF TOLL SWBD.
SEE J37, K53, F123, G133

SD-55123-01
INTERTOLL TRK. CKT.
2 WAY RINGDOWN
20 OR 135 ~ SIG. SEE
KEY SHEET FOR
TOLL SWBD. NO. 3 OR 3CF
SEE J39, K55, F124, G134

2 WAY OPERATOR
OFFICE TRK. CKT.
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MULTI-STATION
LINE CKTS.
SEE G27

D

DIAL LONG LINE CKT.
TYPE "B" CX SIG. SUPPLIES
LINE SUPERVISION WITH
OR WITHOUT REPS.
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SD-59027-01
LONGITUDINAL NOISE
SUPPRESSION CKT.
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E

"F"

F

LINE BALANCING
NETWORKS
SEE C22

COMPROMISE &
BALANCING NETWORKS
(FOR USE WITH EXCHANGE
AREA CKTS. OR ATT. TELSETS)
SD-90517-01 C
SEE I139

13, 104, 107 & 115 TYPE
CABLE LINE
BALANCING NETWORKS
SEE H91

115 TYPE
LINE BAL. NETWORKS
(FOR OPEN WIRE CKTS.)
SEE B96

LINE BAL. NETWORKS
FOR USE WITH B-88-50
OR H-88-50 2W LOADED
CABLE CKTS. (A & M)
SEE C25

G

"G"

H

TO TWO SIDE CKT.
REP. COIL HYBRIDS
SEE F14

TO TWO SIDE TWO
REP. COIL CKTS.
(FOR 2 WIRE LINE)
SEE E40

TO TWO SIDE
REP. COIL CKTS.
(FOR 2 & 4 WIRE LINE)
SEE E53

I

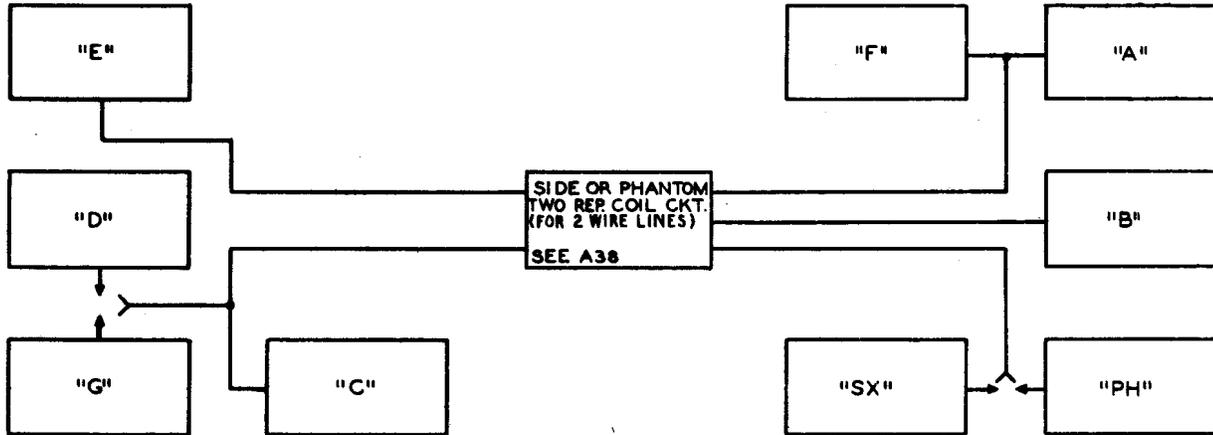
"H"

4 WIRE
EQUALIZER CKT.
SEE D113

J

K

"V3" TELEPHONE
REPEATER
LINE & BALANCING
APPL. SCHEM.
SEE A13
SEE D38



"A"

SD-15362-01 OUTGOING TRK. CKT. TO TOLL OFFICE SEE KEY SHEETS FOR SWBD. 1, C, D, 9C, 9D, 10(A&M) AND SWBD. 11 SEE J41, G55, I56	SD-21866-01 OUTGOING TRK. CKT. TO SXS OFFICE FOR USE WITH CX SIG. SEE "PANEL SYSTEMS" KEY SHEET SEE J42, H51, I57	SD-25905-01 D.P. INCOMING TRK. CKT. SX OR CX SUPERVISION ARR. FOR RERING. & REP. D.P. SEE KEY SHEET FOR XBR. SYSTEMS SEE J43, H52, I58	SD-25909-01 TANDEM OFFICE INCOMING TRK. CKT. MULTI-FREQ. PULSING SEE KEY SHEET FOR XBR. SYSTEMS SEE J44, H53, I59	INCOMING TRK. CKT. SEE B19
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SD-55256-01 2 WAY OPR. OFF. TRK. CKT. K.P. CX OR LOOP SIG. SEE KEY SHEETS FOR TOLL SWBD. NO. 3(A&M), 3C OR 3CL SEE K45, J51, J60	SD-55380-01 TOLL SWITCHING TRK. CKT. REPEATED CX SIG. SEE KEY SHEETS FOR TOLL SWBD. NO. 3(A&M) 3C OR 3CL SEE A49, J52, K58	SD-56202-01 1600 OR 2000 ~ SINGLE FREQ. SIG. CKT. SEE "SIGNALING" KEY SHEET SEE J53, E122, F132	SD-55849-01 INTERTOLL DIALING OUTGOING TRK. CKT. DIAL PULSING FROM SDR. SEE KEY SHEET FOR SWBD. NO. 3C OR 3CL SEE J55, E123, F133	SD-55379-01 INTERTOLL DIALING TOLL SWITCHING TRK. CKT. SX OR CX SIG. TYPE "B" SEE KEY SHEETS FOR NOS. 1 & 3 TYPE TOLL SWBDS. SEE A46, K51, K56
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37

38

39

40

SIDE OR PHANTOM TWO REP. COIL CKT. (FOR 2 WIRE LINES)

"A" (CONTINUED)

A
B
C
D
E
F
G
H
I
J
K

SD-64724-01
PATCHING, MONITORING
& TESTING JACKS
SEE KEY SHEET FOR TOLL
TST. BD. NO. 16 (M.D.) 7B OR 18B
SEE B58, G125, H135, G162

SD-64590-01
INTERTOLL DIALING TRK. CKT.
INC. TO SET CKT. OR
OPERATOR WITH SX OR CX SIG.
SEE KEY SHEET FOR TOLL SWBD.
NO. 11 (A&M), 3(A&M), 3C OR 3CL
SEE B58, H121, J131

SD-63845-01
135-20~ TERM. RINGER
& CUT-OFF RELAY CKT.
SEE "SIGNALING"
KEY SHEET
SEE C58, H122, I132

SD-64824-01
INTERTOLL DIALING TRK. CKT.
FOR CONN. CX SIG. TO LOOP
SIG. CKT.
SEE KEY SHEET FOR TOLL SWBD.
NO. 1(A&M), 3(A&M), 3C OR 3CL
SEE A50, K59, H123, I133

SD-62632-02
AUX. INTERTOLL TRK.
& SW. TRANSMISSION PAD
SEE KEY SHEETS FOR TOLL
SWBD. NO. 3(A&M), 3B OR 3C
AND SWBD. NO. 11
SEE C59, H124, I134

SD-62614-01
R.D. INTERTOLL TRK. CKT.
SEE KEY SHEETS FOR TOLL
SWBD. NO. 3(A&M), 3B, 3C OR 3CL
AND SWBD. NO. 11 (A&M)
SEE C60, H125, I135

SD-64419-01
1000~ RINGER OSCILLATOR
SEE "SIGNALING"
KEY SHEET
SEE D56, I121, J131

SD-62741-01 (A&M)
JACK CKT.
FOR PTCH. MON. TESTING
SEE KEY SHEETS FOR TEST
& CONT. BD. NO. 8 AND TOLL
TST. BD. NO. 16 (M.D.)
SEE D57, I122, J132

SD-64531-01
INTERTOLL DIALING
2 WAY TRK. CKT.
D.P. DIALING
SEE KEY SHEETS FOR NO.
3(A&M), 3C, 3CL OR NO. 11 (A&M)
SWBDS.
SEE D58, I123, J133

SD-64538-01
INTERTOLL DIALING
OUTGOING TRK. CKT.
CX OR SX SUPERVISION
SEE KEY SHEETS FOR TOLL
SWBDS. NO. 3(A&M), 3B, 3C OR 3CL
SEE D59, I124, J134

SD-95060-01
2 WAY TRK. CKT.
TO CONNECT LOOP SIG. TRK.
TO CX SIG. CKT.
SEE XBR. KEY SHEETS
SEE E56

SD-96398-01
AUX. TRK. CKT.
CX SIG. TYPE "B"
SEE KEY SHEETS
FOR XBR. SYSTEMS
SEE B47, E57, K60

SD-96252-01
DIAL LONG LINE CKT.
SEE PBX, XBR.
OR SX'S KEY SHEETS
SEE B48, E58, A61,
J122, K132

"B"

20~ REP. COIL CKT.
(SIDE OR PH. CKT.)
OR 20~ SIG. OR
20~ BY-PASS
SEE A66

TYPE "D" OR "E" TERM. CX CKT.
TYPE "D" INTERMEDIATE
CX SET
SEE F71

"C"

TYPE "A" & "C" CX SET.
& CX BAL. SET CKTS.
SEE J16

TYPE "C" CX CKT.
& CX BAL. CKT.
SEE A21

"D"

CABLE GAS PRESSURE
ALM. CKT.
SEE J18

LONGITUDINAL NOISE
SUPPRESSION CKT.
SEE D32

TYPE "A" & "C" CX SET
& CX BAL. SET CKTS.
SEE J16

TYPE "C" CX CKT.
& CX BAL. CKT.
SEE J19

TYPE "A" OR "B"
CX CKT. &
CX BAL. CKT.
SEE K16

LINE FILTER CKTS.
(FOR JCARR. TEL.)
SEE J17

"E"

OUTGOING TRK. CKT.
TO TOLL OFFICE
SEE G36

OUTGOING TRK. CKT.
TO SX'S OFFICE FOR
USE WITH CX SIG.
SEE G37

D.P. INCOMING TRK.
CKT. SX OR CX SUPERVISION
ARR. FOR RERING &
REP. D.P.
SEE G38

TANDEM OFFICE
INCOMING TRK. CKT.
MULTI-FREQ. PULSING
SEE G39

INCOMING
TRK. CKT.
SEE B19

INCOMING TRK. CKT.
CX OR SX SIG.
SEE H36

INCOMING TRK. CKT.
CX TYPE "B" OR SX SIG.
SEE H37

RECORDING COMPLETING
TRK. CKT.
FOR CX SIG. TYPE "B"
SEE H38

INTERTOLL DIALING
OUTGOING TRK. CKT.
SEE H39

2WAY OPR. OFF. TRK. CKT.
K.P., CX, OR LOOP SIG.
SEE I36

"E"(CONTINUED)

INTERTOLL DIALING
TOLL SWITCHING TRK. CKT.
SX OR CX SIG. TYPE "B"
SEE I40

SD-55560-01
20~ DC & DC-20~
TERM. & INTERMEDIATE SIG.
SEE "SIGNALING"
KEY SHEET
L-SEE E125,F135

2 WAY OPERATOR
OFFICE TRK. CKT.
SEE I28

TOLL SWITCHING
TRUNK CKT.
SEE I37

INTERTOLL DIALING
TRUNK CKT. FOR CONN.
CX SIG. TO LOOP
SIG. CKT.
SEE A44

PRIMARY
JACK CKT.
SEE K17

AUX. TRK. CKT.
CX SIG. TYPE "B"
SEE C43

DIAL
LONG LINE
CKT.
SEE C44

"F"

TERM. &
INTERMEDIATE SIG.
SEE H11

20~ REP
COIL CKT.
SEE A70

"G"

TO TWO SIDE CKT.
REP. COIL HYBRIDS
FOR OTHER THAN TRK. CKTS.
SEE F14

TO TWO SIDE CKT.
TWO REP. COIL CKTS.
(FOR 2 WIRE)
SEE E40

TO TWO SIDE CKT.
REP. COIL CKTS.
(FOR 2 & 4 WIRE)
SEE E53

"PH"

TO PHANTOM CKT.
REP. COIL HYBRID
FOR OTHER THAN TRK. CKTS.
SEE E12

TO PHANTOM CKT.
REP. COIL HYBRID
FOR 2 WIRE LINE ARR.
FOR TRK. CKT. USE
SEE E27

TO PHANTOM CKT.
TWO REP. COIL CKT.
SEE E36

TO PHANTOM
REP. COIL CKT.
(FOR 2 & 4 WIRE)
SEE D51

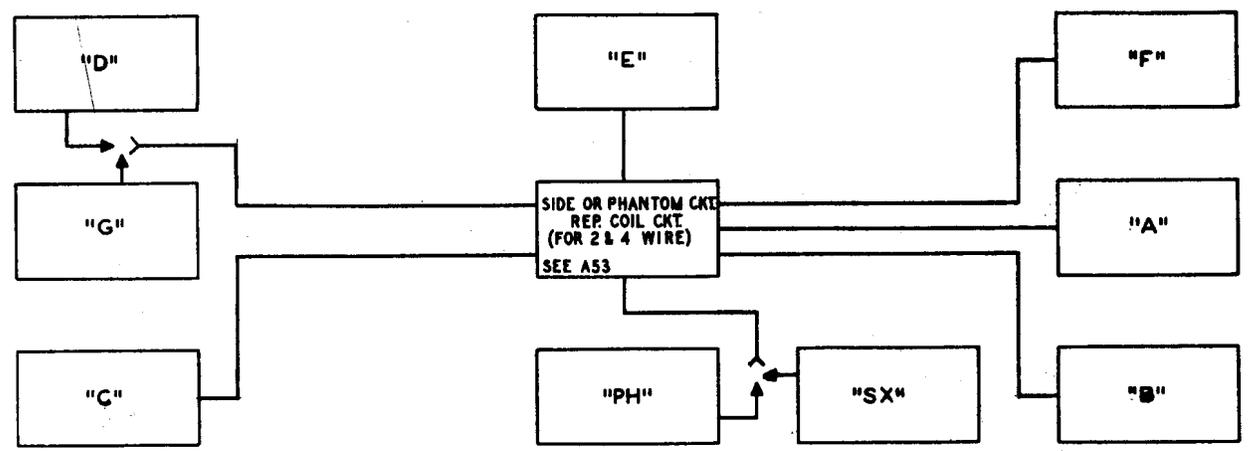
PHANTOM TAP TIE
OR SIDE CKT.
RES. CKT.
SEE G17, G19

"SX"

TO ANY CKT.
REQUIRING
SX CHANNELS

"V3" TEL. REP.
LINE & BALANCING
APPL. SCHEM.
SEE A13

SEE D53



"A"

A-C REPEATER BY-PASS RELAYS SEE F83, G81, F85, E81	4-WIRE EQL. CKT. SEE C111	4 WIRE TERM. CKT. SEE B125	REC. OR TRSG. IC PAD SEE B150	OUTGOING TRK. CKT. TO TOLL OFFICE SEE G36
OUTGOING TRK. CKT. TO SXS OFFICE FOR USE WITH CX SIG. SEE G37	D.P. INCOMING TRK. CKT. SX OR CX SUPERVISION ARR. FOR RERING & REP. D.P. SEE G38	TANDEM OFFICE INCOMING TRK. CKT. MULTI-FREQ. PULSING SEE G39	INCOMING TRK. CKT. SEE B19	INCOMING TRK. CKT. CX OR SX SIG. SEE H36
INCOMING TRK. CKT. CX TYPE "B" OR SX SIG. SEE H37	RECORDING COMPL. TRK. CKT. FOR CX SIG. TYPE "B" SEE H38	SD-55574-01 TEL. ORDER WIRE CKT. 1000~RINGDOWN SIG. SEE "SIGNALING" KEY SHEET SEE E133	INTERTOLL DIALING OUTGOING TRK. CKT. SEE H39	PATCHING JK. CKT. (A & M) SEE H40
2 WAY OPR. OFFICE TRK. CKT. K.P., CX, OR LOOP SIG. SEE I36	TOLL SW. TRK. CKT. REPEATED CX SIG. SEE I37	1600 OR 2000~ SINGLE FREQ. SIG. CKT. SEE I38	IA ECHO SUPPRESSOR SEE PAGE 33	INTERTOLL DIALING OUTGOING TRK. CKT. D.P. FROM SENDER SEE I39
INTERTOLL DIALING TOLL SW. TRK. CKT. SX OR CX SIG. TYPE "B" SEE I40	135~-DC SIG. CKT. THRU & TERM. SEE J36	PTCH. LISTENING, & MAKE BUSY CKT. SEE C31	TEL. ORDER WIRE CKTS. SEE B21	INTERTOLL TRK. CKT. 2 WAY RINGDOWN 20 OR 135~ SIG. SEE C32

"A" (CONTINUED)

A

2 WAY OPR.
OFF. TRK. CKT.
SEE I28

TELEPHONE ORDER
WIRE BRIDGING
ARRANGEMENT
SEE F20

TELEPHONE ORDER
WIRE CKT.
600-1500~SEL. SIG.
SEE K36

SIG. CONVERTER CKT.
FOR CONN. CX SIG. CKT. TO
20" RINGDOWN CKT.
SEE K38

B

INTERTOLL DIALING
OUTGOING TRK. CKT.
SEE K39

INTERTOLL DIALING
OUTGOING TRK. CKT.
(A & M)
SEE K40

PATCHING, MONITORING,
AND TESTING JACKS
SEE A41

INTERTOLL DIALING TRK. CKT.
INC. TO SET CKT. OR
OPR. WITH CX OR SX SIG.
SEE A42

SD-64303-01
V.F. PATCHING & MON.
JACKS AMP. CONTROL,
PAD & TRK. CKTS.
SEE KEY SHEETS FOR
"C" & "H" CARR. TEL.
SEE E126, G129, I128,
G138, A145, I10

C

"V1" & "V2" TEL. REP.
(CABLE CKTS.)
SEE E19

"V1" TEL. REP.
(OPEN WIRE LINES)
SEE E20

135-20" TERM. RINGER
& ASSOC. CUT-OFF RELAY
SEE A43

AUX. INTERTOLL TRK.
& SW. TRANSMISSION PAD
SEE A45

R. D. INTERTOLL
TRK. CKT.
SEE B41

D

1000~
RINGER OSCILLATOR
SEE B42

JACK CKT.
FOR PATCHING, MONITORING
AND TESTING
(A & M)
SEE B43

INTERTOLL DIALING
2 WAY TRK. CKT.
D. P. DIALING
SEE B44

INTERTOLL DIALING
OUTGOING TRK. CKT.
CX OR SX SUPERVISION
SEE B45

E

INTERTOLL DIALING
INCOMING TRK. CKT.
WITH CX OR SX SIG. TYPE "B"
SEE C42

AUX. TRK. CKT.
CX SIG. TYPE "B"
SEE C43

DIAL LONG LINE
CKT.
SEE C44

"V3" TEL. REP.
SEE B5 OR F1

SD-95121-C1
"N1" CARR. TEL.
APPL. SCHEMATIC
SEE KEY SHEET FOR
"N" CARR. TEL.
SEE E128, G130,
I129, D150

F

TYPE "M" CARR. ORDER
WIRE AND ALM. CKT.
SEE H21

G

H

"B"

I

OUTGOING TRK. CKT.
TO TOLL OFFICE
SEE G36

OUTGOING TRK. CKT.
TO SXS OFF. FOR
USE WITH CX SIG.
SEE G37

D. P. INCOMING TRK. CKT.
SX OR CX SUPERVISION
ARR. FOR RERING & REP. D. P.
SEE G38

TANDEM OFF.
INCOMING TRK. CKT.
MULTI-FREQ. PULSING
SEE G39

INCOMING TRK.
CKT.
SEE B19

J

INCOMING TRK. CKT.
CX OR SX SIG.
SEE H36

INCOMING TRK. CKT.
CX TYPE "B" OR SX SIG.
SEE H37

RECORDING COMPLETING
TRK. CKT.
FOR CX SIG. TYPE "B"
SEE H38

INTERTOLL DIALING
OUTGOING TRK. CKT.
SEE H39

2 WAY OPR. OFF. TRK. CKT.
K. P., CX, OR LOOP. SIG.
SEE I36

K

INTERTOLL DIALING
TOLL SWITCHING TRK. CKT.
SX OR CX SIG. TYPE "B"
SEE I40

2 WAY OPERATOR
OFF. TRK. CKT.
SEE I28

TOLL SWITCHING TRK. CKT.
REPEATED CX SIG.
SEE I37

INTERTOLL DIALING TRK. CKT.
FOR CONN. CX SIG. TO LOOP
SIG. CKT.
SEE A44

AUX. TRK. CKT.
CX SIG. TYPE "B"
SEE C43

"B" (CONT.)

A

DIAL
LONG LINE CKT.
SEE C44

4 WIRE
EQL. CKT.
SEE D113

B

"C"

C

TYPE "A" & "C"
CX SET & CX BAL.
SET CKTS.
SEE J16

TYPE "C" CX CKT.
& CX BAL. CKT.
SEE A21

TYPE "D" OR "E"
TERM. CX CKT.
TYPE "D" INTERMEDIATE
CX SET
SEE F71

D

"D"

CABLE GAS
PRESSURE
ALARM CKT.
SEE J18

LONGITUDINAL NOISE
SUPPRESSION CKT.
SEE D32

TYPE "A" & "C"
CX SET & CX BAL.
SET CKTS.
SEE J16

TYPE "C" CX SET
& CX BAL. CKT.
SEE J19

TYPE "A" OR "B"
CX SET & CX
BAL. CKT.
SEE K16

E

PRIMARY
JACK CKT.
SEE K17

LINE FILTER
CKTS.
SEE J17

"E"

F

20~ REP. COIL CKT.
FOR 20~ SIG. OR
20~ BY-PASS
SEE A66

TYPE "D" OR "E"
TERM. CX CKT.
TYPE "D" INTERMEDIATE
CX SET
SEE F71

"F"

G

20~ REP. COIL CKT.
FOR 20~ SIG. OR
20~ BY-PASS
SEE A70

TERM. &
INTERMEDIATE SIG.
SEE H11

"G"

H

TO TWO SIDE CKT.
REP. COIL HYBRIDS
FOR OTHER THAN
TRK. CKTS.
SEE F14

TO TWO SIDE CKT.
TWO REP. COIL CKTS.
(FOR 2 WIRE)
SEE E40

TO TWO SIDE CKT.
REP. COIL CKTS.
(FOR 2 & 4 WIRE)
SEE E53

"PH"

I

TO PHANTOM CKT.
REP. COIL HYBRID
FOR OTHER THAN
TRK. CKTS.
SEE E12

TO PHANTOM CKT.
REP. COIL HYBRID
(FOR 2 WIRE LINE ARR.
FOR TRK. CKT. USE)
SEE E27

TO PHANTOM CKT.
TWO REP. COIL CKT.
(FOR 2 WIRE)
SEE E36

TO PHANTOM CKT.
REP. COIL CKT.
(FOR 2 & 4 WIRE)
SEE D51

PHANTOM TAP TIE
& SIDE CKT.
RES. CKT.
SEE G117, G119

J

SD-64310-01
TEL. TRK. CKT.
SEE KEY SHEET
FOR "K" CARR. TEL.
SEE K61

"SX"

K

TEL. TRK.
CKT.
SEE J61

ALARM TRK.
CKT.
SD-64542-01 C
SEE C161

ALARM SIG. &
20~ REP. CKT.
SEE J21

TO ANY CKT.
REQUIRING
SIMPLEX CHANS.

A
B
C
D
E
F
G
H
I
J
K

"B"

"V3" TEL.
REPEATER
LINE & BALANCING
APPL. SCHEMATIC
SEE A13
SEE B68, D68

"A"

20~ REP. COIL CKT. SIDE OR PHANTOM

"SX"

20~ REP. COIL CKT.
(SIDE OR PH.) FOR 20~
SIG. OR 20~ BY-PASS
SEE A68

"C"

"A"

TO SIDE OR PH. TWO
REP. COIL CKT.
FOR 2 WIRE LINE
SEE C39

TO SIDE OR PH. CKT.
REP. COIL CKT.
(2 & 4 WIRE)
SEE C55

TO ANOTHER
20~ REP. COIL CKT.
SEE A68

TO 4 WIRE TERM.
CKT.
SEE C125

TO RES. TERMINATING
CKT.
SEE D135

TERM. & INTER.
SIGNALING
SEE H11

"B"

TO SIDE OR PH. CKT.
REP. COIL HYB. FOR OTHER
THAN TRK. CKTS.
SEE D15

TO SIDE OR PH. TWO
REP. COIL CKT.
FOR 2 WIRE LINE
SEE D40

TO SIDE OR PH. CKT.
REP. COIL CKT.
(2 & 4 WIRE)
SEE C53

"C"

TO DC BLOCKING
CKT. FOR TERM. REP.
SEE J66

"SX"

TO RET. FOR DERIVING
PH. SX
SEE B75

TO ANY CKT.
REQUIRING SX
CHANNELS

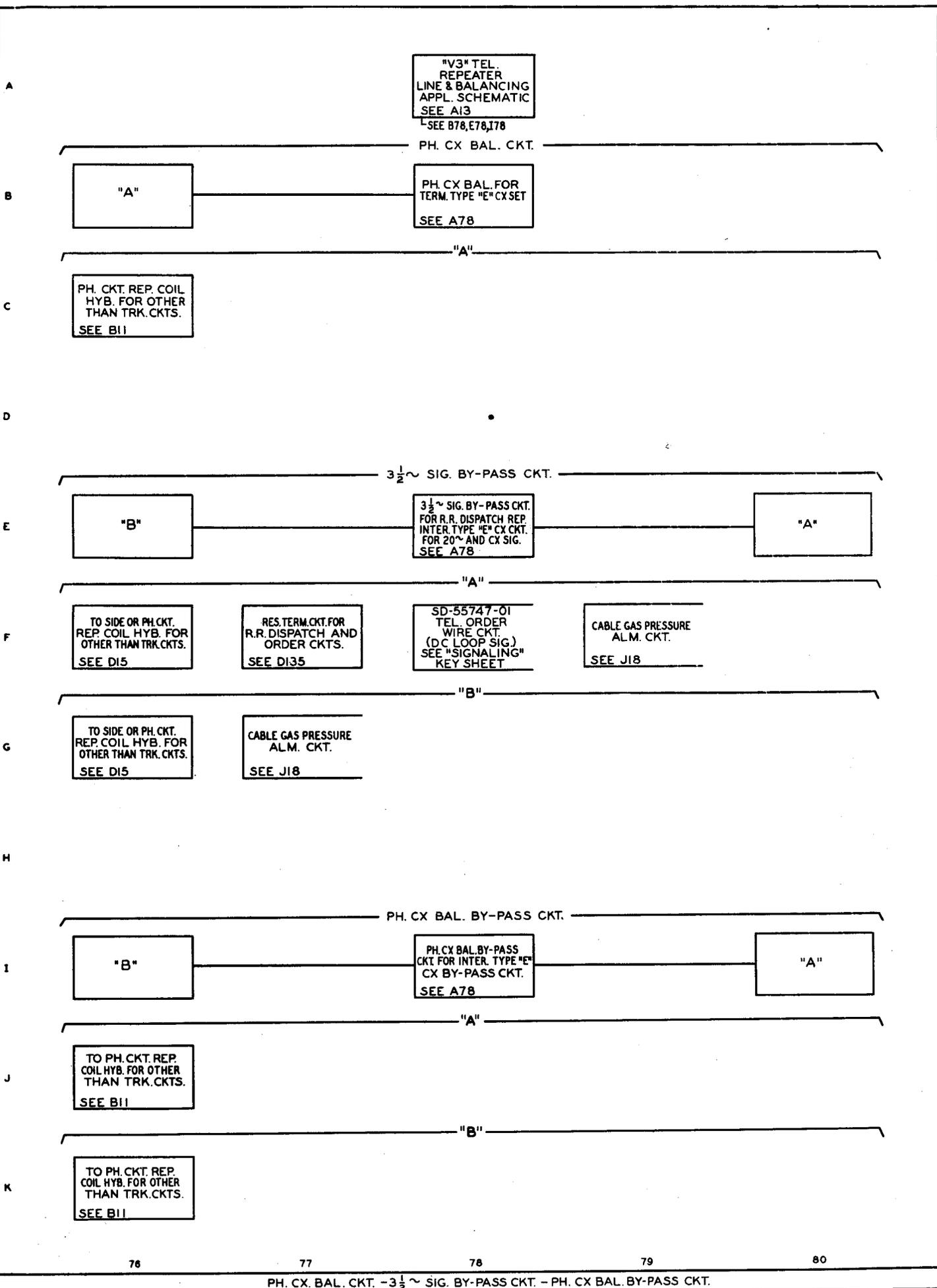
DC BLOCKING CKT. FOR TERM.

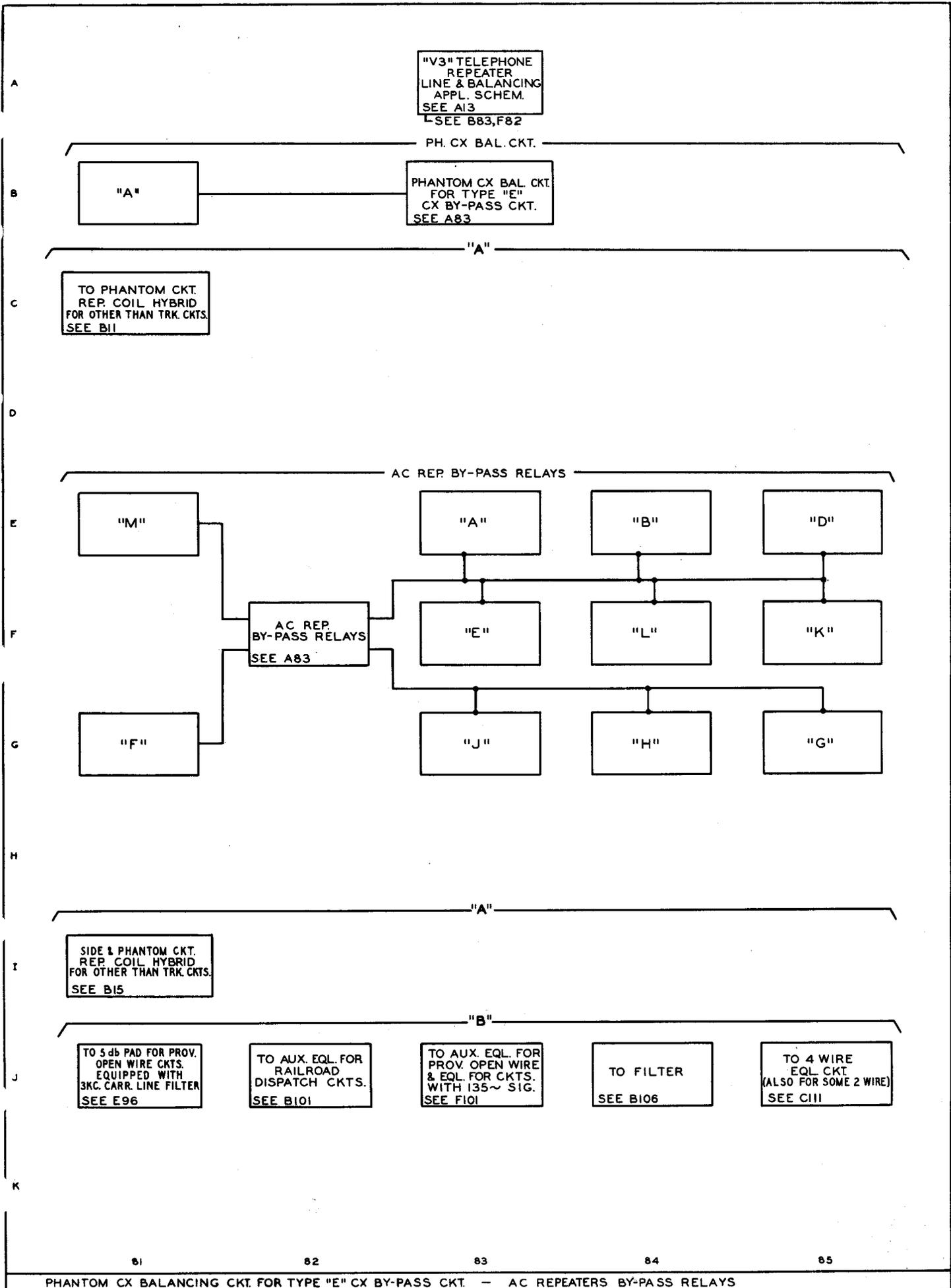
"A"

DC BLOCKING
CKT. FOR TERM.
REP.

"A"

TO 20~ REP.
COIL CKT.
SEE B70





"V3" TELEPHONE REPEATER
LINE & BALANCING APPL. SCHEM.
SEE A13
L-SEE B83,F82

PH. CX BAL. CKT.

"A"

PHANTOM CX BAL. CKT.
FOR TYPE "E"
CX BY-PASS CKT.
SEE A83

"A"

TO PHANTOM CKT.
REP. COIL HYBRID
FOR OTHER THAN TRK. CKTS.
SEE B11

AC REP. BY-PASS RELAYS

"M"

"A"

"B"

"D"

AC REP.
BY-PASS RELAYS
SEE A83

"E"

"L"

"K"

"F"

"J"

"H"

"G"

"A"

SIDE & PHANTOM CKT.
REP. COIL HYBRID
FOR OTHER THAN TRK. CKTS.
SEE B15

"B"

TO 5 db PAD FOR PROV.
OPEN WIRE CKTS.
EQUIPPED WITH
3KC. CARR. LINE FILTER
SEE E96

TO AUX. EQL. FOR
RAILROAD
DISPATCH CKTS.
SEE B101

TO AUX. EQL. FOR
PROV. OPEN WIRE
& EQL. FOR CKTS.
WITH 135~ SIG.
SEE F101

TO FILTER
SEE B106

TO 4 WIRE
EQL. CKT.
(ALSO FOR SOME 2 WIRE)
SEE C111

A

"D"

"V3" TEL. REPEATER
SEE B5

TEL. ORDER WIRE BRIDGING ARRANGEMENT
SEE F20

B

"E"

SIDE & PH. CKT. REP. COIL HYB. FOR OTHER THAN TRK. CKTS.
SEE E15

SIDE OR PH. REP. COIL CKT. (FOR 2 & 4 WIRE)
SEE D55

SIG. CUT-OFF REL. CKT.
SEE D16

C

"F"

SIDE & PH. CKT. REP. COIL HYB. FOR OTHER THAN TRK. CKTS.
SEE E15

SIDE OR PH. REP. COIL CKT. (FOR 2 & 4 WIRE)
SEE D55

SIG. CUT-OFF REL. CKT.
SEE D16

D

"G"

"V3" TEL. REPEATER
SEE F1

TEL. ORDER WIRE BRIDGING ARRANGEMENT
SEE F20

E

"H"

5db PAD FOR PROV. OPEN WIRE CKTS. EQUIPPED WITH 3KC CARR. LINE FILTERS
SEE E96

AUX. EQL. FOR R.R. DISPATCH CKTS.
SEE B101

AUX. EQL. FOR PROV. OPEN WIRE & EQL. FOR CKTS. WITH 135" SIG.
SEE F101

FILTER
SEE B106

4 WIRE EQL. CKT. (ALSO FOR SOME 2 WIRE)
SEE C111

F

G

RES. TERM. CKT. FOR R.R. DISPATCH & ORDER CKTS.
SEE B135

"V3" TEL. REPEATER
SEE F5

"J"

SIDE & PH. CKT. REP. COIL HYB. FOR OTHER THAN TRK. CKTS.
SEE B15

H

"K"

SIDE & PH. CKT. REP. COIL HYB. FOR OTHER THAN TRK. CKTS.
SEE C15

SIDE OR PH. REP. COIL CKT. (FOR 2 & 4 WIRE)
SEE D55

RES. TERM. CKT. FOR R.R. DISPATCH & ORDER CKTS.
SEE B135

I

"L"

SIG. CUT-OFF REL. CKT.
SEE D16

J

"M"

SIDE & PH. CKT. REP. COIL HYB. FOR OTHER THAN TRK. CKTS.
SEE C15

SIDE OR PH. REP. COIL CKT. (FOR 2 & 4 WIRE)
SEE D55

K

A
B
C
D
E
F
G
H
I
J
K

"V3" TELEPHONE REPEATER LINE & BALANCING APPL. SCHEM. SEE A13
SEE B93,E93,H93

ADJUSTABLE LINE BAL. NET.

"A"

ADJ. LINE BAL. NET. FOR TRK. & DISPATCH CKTS. SEE A93

"A"

SIDE & PHANTOM CKT. REP. COIL HYBRID FOR OTHER THAN TRK. CKTS. SEE C11

SD-64 380-01 LINE & BALANCING AND TRANSFER CKTS. SEE KEY SHEET FOR "C" CARR. TEL. SEE F92,C98

LINE FILTER CKTS. SEE J17

114 TYPE LINE BAL. NETS.

"A"

114 TYPE LINE BALANCING NETWORKS FOR OPEN WIRE CKTS. SEE A93

"A"

SIDE & PHANTOM CKT. REP. COIL HYBRID FOR OTHER THAN TRK. CKTS. SEE C11

LINE & BALANCING & TRANSFER CKTS. SEE C92

LINE FILTER CKTS. SEE J17

13,104,107,115 TYPE CABLE LINE BAL. NETS.

"A"

13,104,107 & 115 TYPE CABLE LINE BAL. NETWORKS SEE A93

"A"

SIDE & PHANTOM CKT. REP. COIL HYBRID FOR OTHER THAN TRK. CKTS. SEE C11

PHYSICAL OR PHANTOM CKT. REP. COIL HYBRID FOR 2 WIRE LINE ARR. FOR TRK. CKT. USE SEE D26

CABLE GAS PRESSURE ALARM CKT. SEE J18

SD-68242-01 TOLL SW. TRUNK CKT. DIAL OR MULTI-FREQ. PULSING STD. SEE KEY SHEET FOR TOLL SW. SYS. NO. 4A
SEE C100

A
B
C
D
E
F
G
H
I
J
K

"V3" TEL. REP.
LINE & BALANCING
APPL. SCHEM.
SEE A13

SEE B98, E98

115 TYPE LINE BAL. NETS.

"A"

115 TYPE
LINE BAL. NETS. FOR
OPEN WIRE CKTS.
SEE A98

"A"

SIDE & PH. CKT.
REP. COIL HYB.
FOR OTHER THAN
TRK. CKTS.
SEE C11

PHYSICAL OR PH.
CKT. REP. COIL HYB.
FOR 2W LINE ARR.
FOR TRK. CKT. USE
SEE D26

LINE & BALANCING
& TRANSFER CKTS.
SEE C92

LINE FILTER
CKTS.
SEE J17

TOLL SW. TRK.
CKT. DIAL OR MF
PULSING STFD.
SEE I94

5db PAD FOR PROV. OPEN WIRE CKTS.

"C"

5db PAD FOR PROV.
OPEN WIRE CKTS.
EQUIPPED WITH 3 KC.
CARR. LINE FILTER
SEE A98

"A"

"B"

"A"

AUX. EQL. FOR
PROV. OPEN WIRE
& EQL. FOR CKTS.
WITH 135~ SIG.
SEE F101

TEL. ORDER
WIRE BRIDGING
ARRANGEMENT
SEE F20

"B"

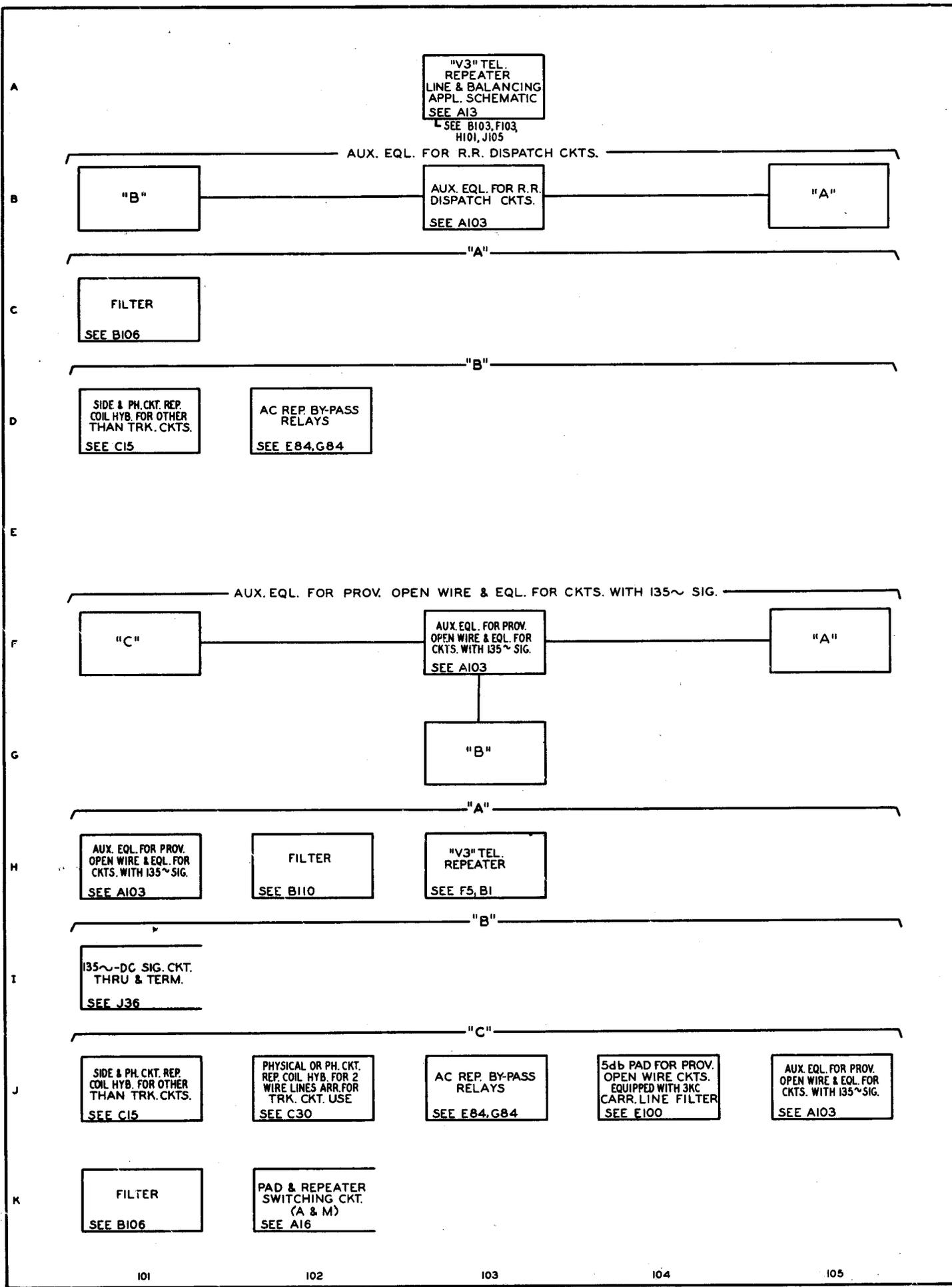
135~-DC SIG. CKT.
THRU & TERM.
SEE J36

"C"

SIDE & PH. CKT.
REP. COIL HYB.
FOR OTHER THAN
TRK. CKTS.
SEE C15

PHYSICAL OR PH.
CKT. REP. COIL HYB.
FOR 2W LINE ARR.
FOR TRK. CKT. USE
SEE C30

A-C REP. BY-PASS
RELAYS
SEE E84, G84



AUX. EQL. FOR R.R. DISPATCH CKTS. - AUX. EQL. FOR PROV. OPEN WIRE & EQL. FOR CKTS. WITH 135 ~ SIG.

A
B
C
D
E
F
G
H
I
J
K

"V3" TEL.
REPEATER
LINE & BALANCING
APPL. SCHEMATIC
SEE A13
L SEE B108

"C"

FILTER
SEE A108

"A"

"B"

"A"

AUX. EQL. FOR PROV.
OPEN WIRE & EQL. FOR
CKTS. WITH 135~SIG.
SEE F105

"V3" TEL.
REPEATER
SEE F5, B1

1A ECHO
SUPPRESSOR
SEE PAGE 33

SIG. CUT-OFF
RELAY CKT.
SEE D16

TOLL CONFERENCE
SERVICE
SEE PAGE 33

TEL. ORDER
WIRE BRIDGING
ARRANGEMENT
SEE F20

"V1" & "V2" TEL.
REPEATER
(CABLE CKTS.)
SEE E19

"V1" TEL.
REPEATER
(OPEN WIRE LINES)
SEE E20

"B"

135~-DC SIG. CKT.
THRU & TERM.
SEE J36

TERM. & INTERMEDIATE
SIG.
SEE H11

REG. NETWORK
& TRANSFER CKT.
SEE C7

REG. NETWORK
& TRANSFER CKT.
SEE C8

"C"

SIDE & PH. CKT. REP.
COIL HYB. FOR OTHER
THAN TRK. CKTS.
SEE C15

PHYSICAL OR PH. CKT.
REP. COIL HYB. FOR 2W
LINE ARR. FOR TRK. CKT. USE
SEE C30

A C REP. BY PASS
RELAYS
SEE E84, G84

AUX. EQL. FOR R. R.
DISPATCH CKTS.
SEE B105

AUX. EQL. FOR PROV.
OPEN WIRE & EQL. FOR
CKTS. WITH 135~SIG.
SEE F101

4 WIRE EQL. CKT.
(ALSO FOR SOME 2W)
SEE C115

4 WIRE TERM.
CKT.
SEE C123

RES. TERM. CKT. FOR
R. R. DISPATCH &
ORDER CKTS.
SEE D131

REC. OR TRSG. IC
PAD WITH 89 TYPE
RES.
SEE B146

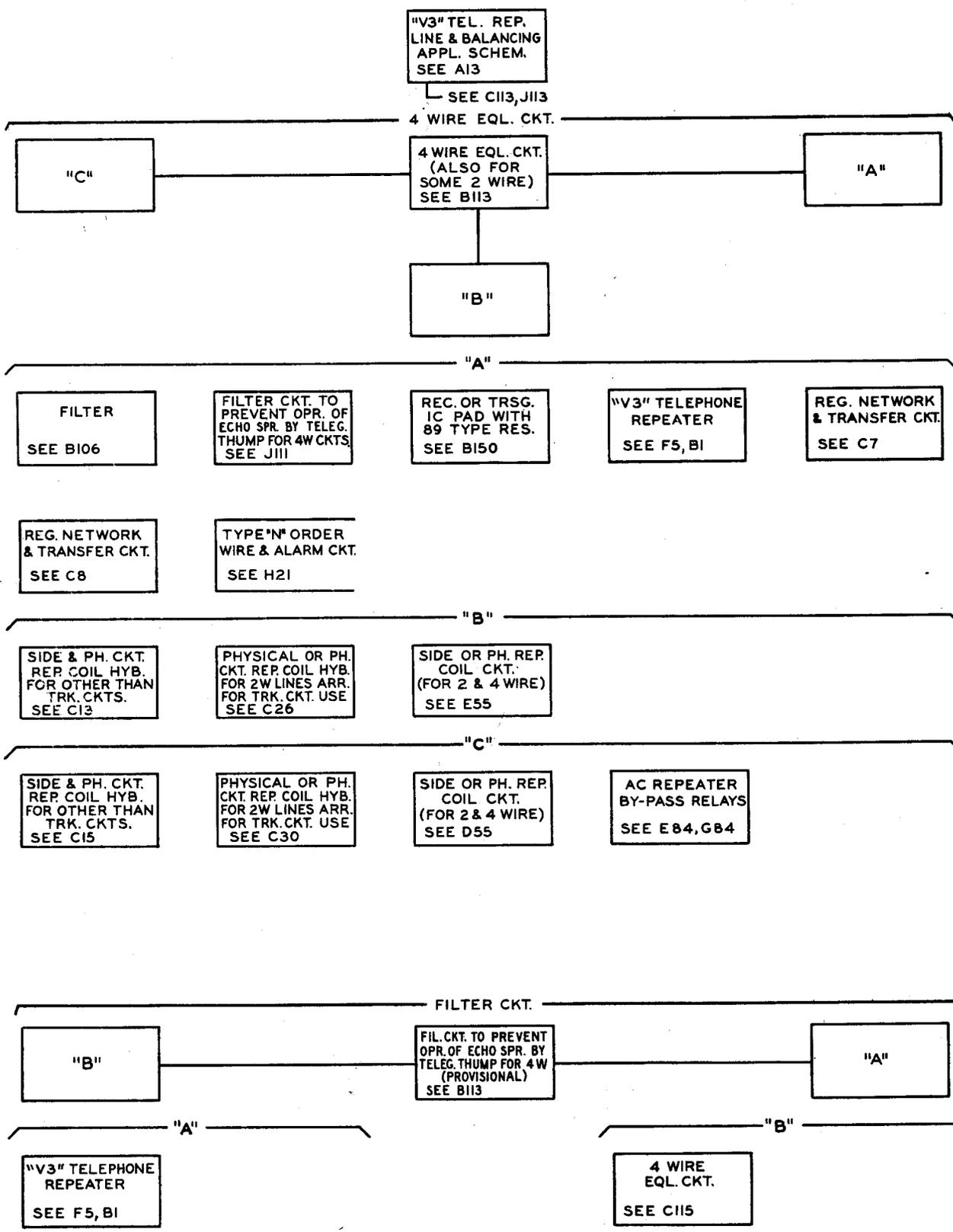
2 WAY INTERTOLL
TRK. CKT.
SEE E17

INTERTOLL INC.
TRK. CKT.
SEE I11

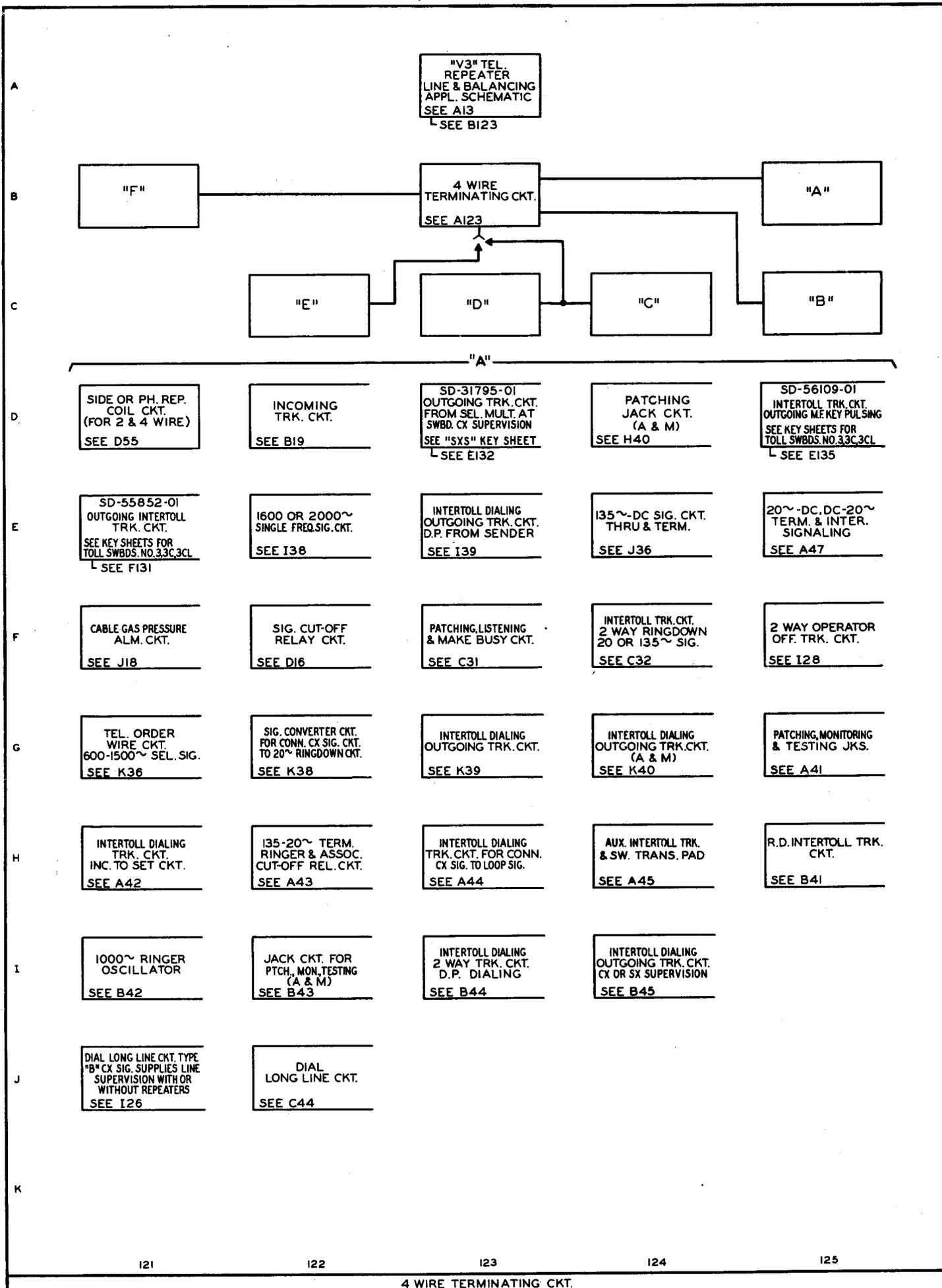
CKT. PATCHING BAY
JACK CKTS.
SEE K13

4 WIRE TERM. &
LOW PASS FILTER CKTS.
SD-64304-01 C
L SEE J4, C6

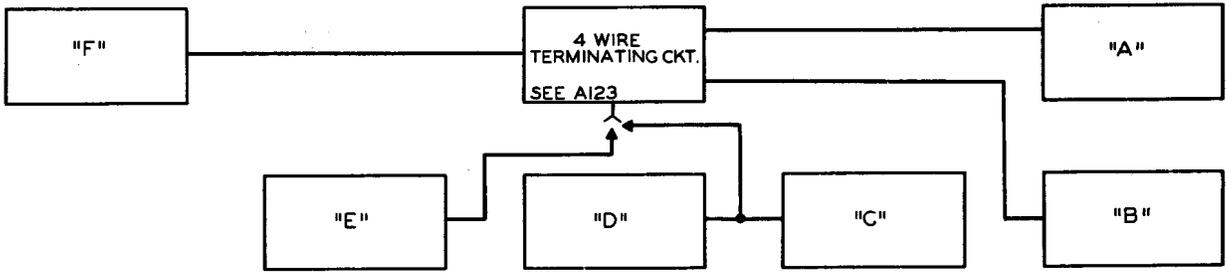
A
B
C
D
E
F
G
H
I
J
K



III 112 113 114 115
4 WIRE EQL. CKT. — FILTER CKT. FOR PREVENTING OPERATION OF ECHO SUPPRESSOR BY TELEGRAPH THUMP



"V3" TEL.
REPEATER
LINE & BALANCING
APPL. SCHEMATIC
SEE A13
L SEE B123



"A"

SIDE OR PH. REP. COIL CKT. (FOR 2 & 4 WIRE) SEE D55	INCOMING TRK. CKT. SEE B19	SD-31795-01 OUTGOING TRK. CKT. FROM SEL. MULT. AT SWBD. CX SUPERVISION SEE "SXS" KEY SHEET L SEE E132	PATCHING JACK CKT. (A & M) SEE H40	SD-56109-01 INTERTOLL TRK. CKT. OUTGOING M.F. KEY PULSING SEE KEY SHEETS FOR TOLL SWBDS. NO. 3.3C.3CL L SEE E135
SD-55852-01 OUTGOING INTERTOLL TRK. CKT. SEE KEY SHEETS FOR TOLL SWBDS. NO. 3.3C.3CL L SEE F131	1600 OR 2000~ SINGLE FREQ. SIG. CKT. SEE I38	INTERTOLL DIALING OUTGOING TRK. CKT. D.P. FROM SENDER SEE I39	135~-DC SIG. CKT. THRU & TERM. SEE J36	20~-DC, DC-20~ TERM. & INTER. SIGNALING SEE A47
CABLE GAS PRESSURE ALM. CKT. SEE J18	SIG. CUT-OFF RELAY CKT. SEE D16	PATCHING, LISTENING & MAKE BUSY CKT. SEE C31	INTERTOLL TRK. CKT. 2 WAY RINGDOWN 20 OR 135~ SIG. SEE C32	2 WAY OPERATOR OFF. TRK. CKT. SEE I28
TEL. ORDER WIRE CKT. 600-1500~ SEL. SIG. SEE K36	SIG. CONVERTER CKT. FOR CONN. CX SIG. CKT. TO 20~ RINGDOWN CKT. SEE K38	INTERTOLL DIALING OUTGOING TRK. CKT. SEE K39	INTERTOLL DIALING OUTGOING TRK. CKT. (A & M) SEE K40	PATCHING, MONITORING & TESTING JKS. SEE A41
INTERTOLL DIALING TRK. CKT. INC. TO SET CKT. SEE A42	135-20~ TERM. RINGER & ASSOC. CUT-OFF REL. CKT. SEE A43	INTERTOLL DIALING TRK. CKT. FOR CONN. CX SIG. TO LOOP SIG. SEE A44	AUX. INTERTOLL TRK. & SW. TRANS. PAD SEE A45	R.D. INTERTOLL TRK. CKT. SEE B41
1000~ RINGER OSCILLATOR SEE B42	JACK CKT. FOR PTCH., MON. TESTING (A & M) SEE B43	INTERTOLL DIALING 2 WAY TRK. CKT. D.P. DIALING SEE B44	INTERTOLL DIALING OUTGOING TRK. CKT. CX OR SX SUPERVISION SEE B45	
DIAL LONG LINE CKT. TYPE "B" CX SIG. SUPPLIES LINE SUPERVISION WITH OR WITHOUT REPEATERS SEE I26	DIAL LONG LINE CKT. SEE C44			

121

122

123

124

125

4 WIRE TERMINATING CKT.

"B"

20^v REP. COIL
CKT. FOR 20^v SIG.
OR 20^v SIG.
BY-PASS
SEE A70

TERM. &
INTERMEDIATE
SIGNALING
SEE H11

"C"

TERM. &
INTERMEDIATE
SIGNALING
SEE H11

"D"

FILTER
SEE B106

"V3" TELEPHONE
REPEATER
SEE F5

1A ECHO
SUPPRESSOR
SEE PAGE 33

REG. NETWORK &
TRANSFER CKT.
SEE C7

REG. NETWORK &
TRANSFER CKT.
SEE C8

V.F. PTCH. & MON. JKS.
AMP. CONT. PAD &
TRK. CKTS.
SEE B60

SIGNALING CUT-OFF
RELAY CKT.
SEE D16

"N1" CARRIER TEL.
APPL. SCHEMATIC
SEE E60

"E"

1A ECHO
SUPPRESSOR
SEE PAGE 33

REG. NETWORK &
TRANSFER CKT.
SEE C7

REG. NETWORK &
TRANSFER CKT.
SEE C8

V.F. PTCH. & MON. JKS.
AMP. CONT. PAD &
TRK. CKTS.
SEE B60

"N1" CARRIER TEL.
APPL. SCHEMATIC
SEE E60

"V3" TELEPHONE
REPEATER
SEE F5

SD-59329-01
V.F. PTCH. & MON. JKS. AMP.
CONT. PAD & TRK. CKTS.
SEE KEY SHEET FOR
TYPE "N" CARRIER TEL.
LSEE J126, G139, B141,
G150, K8

"F"

1A ECHO
SUPPRESSOR
SEE PAGE 33

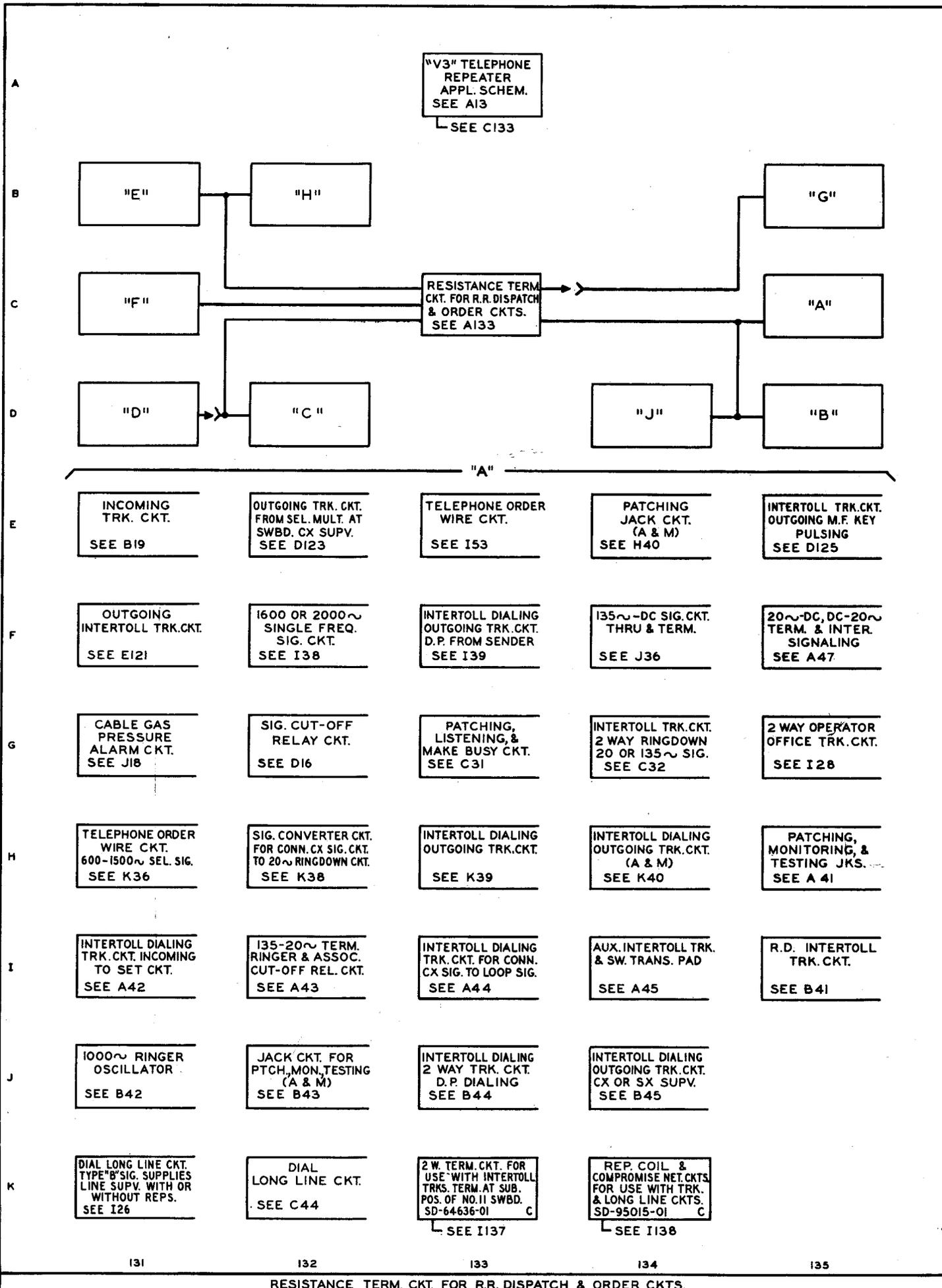
SIGNALING CUT-OFF
RELAY CKT.
SEE D16

V.F. PTCH. & MON. JKS.
AMP. CONT. PAD &
TRK. CKTS.
SEE B60

"N1" CARRIER TEL.
APPL. SCHEMATIC
SEE E60

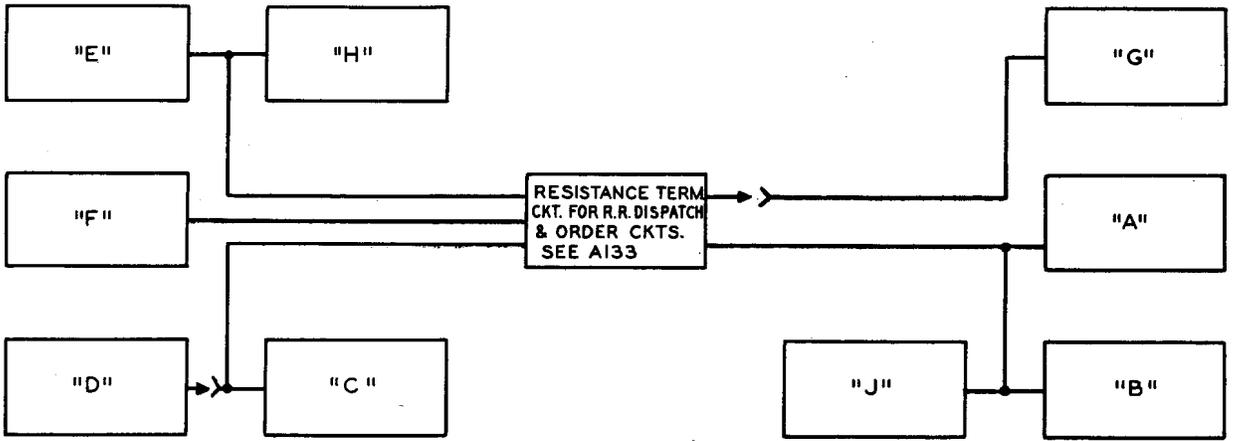
"V3" TELEPHONE
REPEATER
SEE B5

V.F. PTCH. & MON. JKS.
AMP. CONT. PAD &
TRK. CKTS.
SEE H127



"V3" TELEPHONE REPEATER
APPL. SCHEM.
SEE A13

SEE C133



A
B
C
D
E
F
G
H
I
J
K

INCOMING TRK. CKT.
SEE B19

OUTGOING TRK. CKT. FROM SEL. MULT. AT SWBD. CX SUPV.
SEE D123

TELEPHONE ORDER WIRE CKT.
SEE I53

PATCHING JACK CKT. (A & M)
SEE H40

INTERTOLL TRK. CKT. OUTGOING M.F. KEY PULSING
SEE D125

OUTGOING INTERTOLL TRK. CKT.
SEE E121

1600 OR 2000~ SINGLE FREQ. SIG. CKT.
SEE I38

INTERTOLL DIALING OUTGOING TRK. CKT. D.P. FROM SENDER
SEE I39

135~-DC SIG. CKT. THRU & TERM.
SEE J36

20~-DC, DC-20~ TERM. & INTER. SIGNALING
SEE A47

CABLE GAS PRESSURE ALARM CKT.
SEE J18

SIG. CUT-OFF RELAY CKT.
SEE D16

PATCHING, LISTENING, & MAKE BUSY CKT.
SEE C31

INTERTOLL TRK. CKT. 2 WAY RINGDOWN 20 OR 135~ SIG.
SEE C32

2 WAY OPERATOR OFFICE TRK. CKT.
SEE I28

TELEPHONE ORDER WIRE CKT. 600-1500~ SEL. SIG.
SEE K36

SIG. CONVERTER CKT. FOR CONN. CX SIG. CKT. TO 20~ RINGDOWN CKT.
SEE K38

INTERTOLL DIALING OUTGOING TRK. CKT.
SEE K39

INTERTOLL DIALING OUTGOING TRK. CKT. (A & M)
SEE K40

PATCHING, MONITORING, & TESTING JKS.
SEE A 41

INTERTOLL DIALING TRK. CKT. INCOMING TO SET CKT.
SEE A42

135-20~ TERM. RINGER & ASSOC. CUT-OFF REL. CKT.
SEE A43

INTERTOLL DIALING TRK. CKT. FOR CONN. CX SIG. TO LOOP SIG.
SEE A44

AUX. INTERTOLL TRK. & SW. TRANS. PAD
SEE A45

R.D. INTERTOLL TRK. CKT.
SEE B41

1000~ RINGER OSCILLATOR
SEE B42

JACK CKT. FOR PTCH, MON, TESTING (A & M)
SEE B43

INTERTOLL DIALING 2 WAY TRK. CKT. D.P. DIALING
SEE B44

INTERTOLL DIALING OUTGOING TRK. CKT. CX OR SX SUPV.
SEE B45

DIAL LONG LINE CKT. TYPE "B" SIG. SUPPLIES LINE SUPV. WITH OR WITHOUT REPS.
SEE I26

DIAL LONG LINE CKT.
SEE C44

2 W. TERM. CKT. FOR USE WITH INTERTOLL TRKS. TERM. AT SUB. POS. OF NO. 11 SWBD.
SD-64636-01 C

REP. COIL & COMPROMISE NET. CKTS. FOR USE WITH TRK. & LONG LINE CKTS.
SD-95015-01 C

SEE I137

SEE I138

131

132

133

134

135

RESISTANCE TERM. CKT. FOR R.R. DISPATCH & ORDER CKTS.

A
B
C
D
E
F
G
H
I
J
K

"B"

TERM. &
INTERMEDIATE
SIGNALING
SEE H11

20^m REP. COIL
CKT. FOR 20^m SIG.
OR 20^m SIG.
BY-PASS
SEE A70

3^{1/2}^m SIG. BY-PASS CKT.
FOR R.R. DISPATCH REP.
INTER. TYPE "C" CK. CKT.
FOR 20^m & CX SIG.
SEE E80

"C"

TERM. &
INTERMEDIATE
SIGNALING
SEE H11

"D"

FILTER
SEE B106

REC. OR TRSG.
IC PAD WITH
89 TYPE RES.
SEE B150

"V3" TELEPHONE
REPEATER
SEE F5

1A ECHO
SUPPRESSOR
SEE PAGE 33

SIGNALING CUT-OFF
RELAY CKT.
SEE D16

REG. NETWORK &
TRANSFER CKT.
SEE C7

REG. NETWORK &
TRANSFER CKT.
SEE C8

V.F. PTCH. & MON. JKS.
AMP. CONT. PAD &
TRK. CKTS.
SEE B60

V.F. PTCH. & MON. JKS.
AMP. CONT. PAD &
TRK. CKTS.
SEE H127

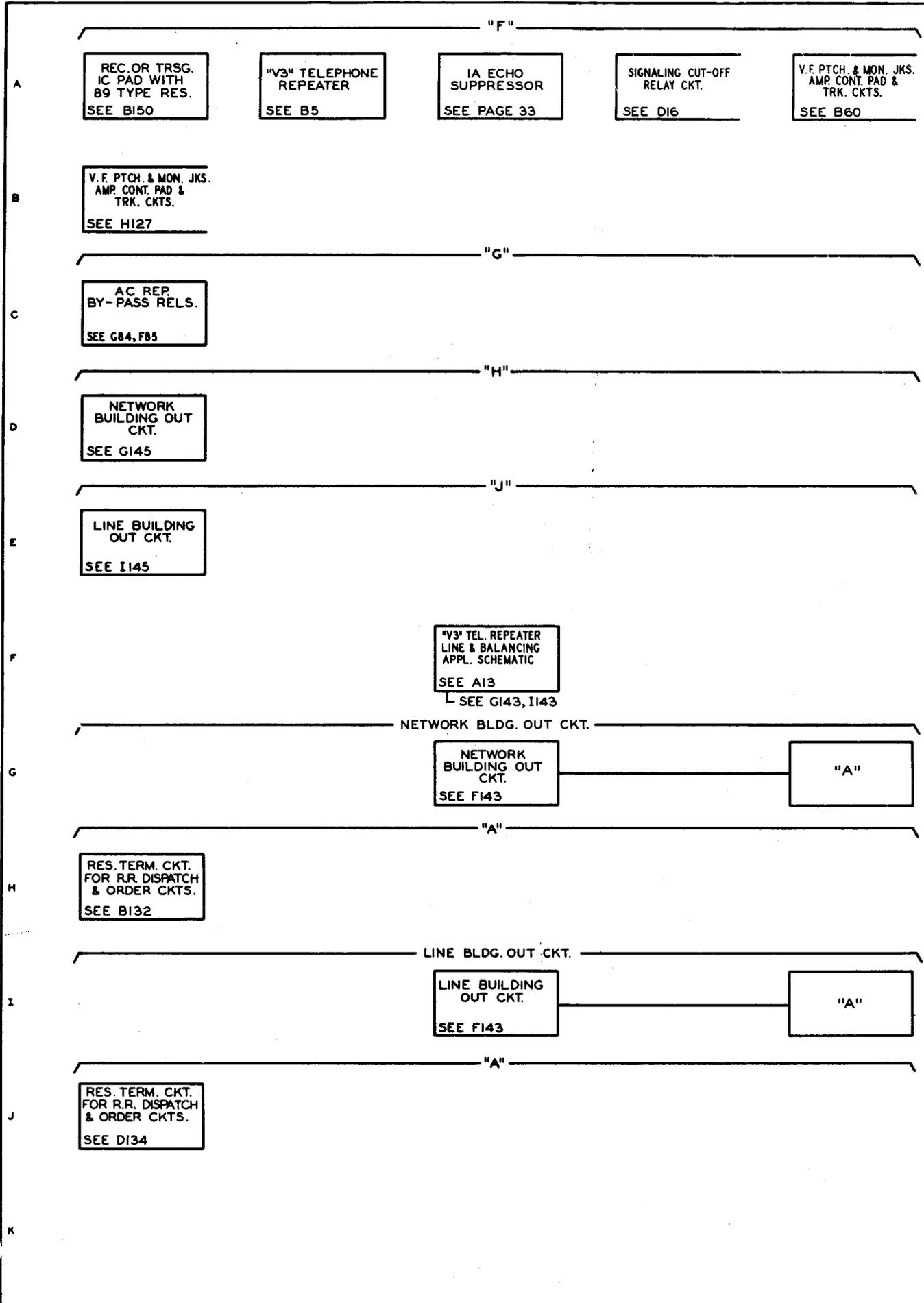
"E"

COMPROMISE BAL.
NETWORK CKT.
SEE I150

2 WIRE TERM. CKT.
FOR USE WITH INTERTOLL
TRKS. TERM. AT SUBSCRIBER
POSITIONS OF NO.11 SWBD.
SEE K133

REP. COIL &
COMPROMISE NET. CKT.
FOR USE WITH TRK.
& LONG LINE CKTS.
SEE K134

COMPROMISE &
BALANCING NETS.
(FOR USE WITH EXCHANGE
AREA CKTS. OR ATT. TEL SETS)
SEE F32



REC. OR TRSG.
IC PAD WITH
89 TYPE RES.
SEE B150

"V3" TELEPHONE
REPEATER
SEE B5

1A ECHO
SUPPRESSOR
SEE PAGE 33

SIGNALING CUT-OFF
RELAY CKT.
SEE D16

V.F. PTCH. & MON. JKS.
AMP. CONT. PAD &
TRK. CKTS.
SEE B60

V. F. PTCH. & MON. JKS.
AMP. CONT. PAD &
TRK. CKTS.
SEE H127

AC REP.
BY-PASS RELS.
SEE G84, F85

NETWORK
BUILDING OUT
CKT.
SEE G145

LINE BUILDING
OUT CKT.
SEE I145

"V3" TEL. REPEATER
LINE & BALANCING
APPL. SCHEMATIC
SEE A13
SEE G143, I143

NETWORK BLDG. OUT CKT.

NETWORK
BUILDING OUT
CKT.
SEE F143

"A"

RES. TERM. CKT.
FOR R.R. DISPATCH
& ORDER CKTS.
SEE B132

LINE BLDG. OUT CKT.

LINE BUILDING
OUT CKT.
SEE F143

"A"

RES. TERM. CKT.
FOR R.R. DISPATCH
& ORDER CKTS.
SEE D134

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142

143

144

145

A
B
C
D
E
F
G
H
I
J
K

"V3" TEL. REPEATER
LINE & BALANCING
APPL. SCHEMATIC
SEE A13

SEE B148, I148

REC. OR TRSG. IC PAD

"C"

REC. OR TRSG.
IC PAD WITH
89 TYPE RES.
SEE A148

"A"

"B"

"A"

SIDE & PH. CKT. REP.
COIL HYB. FOR OTHER
THAN TRK. CKTS.
SEE C15, E15

SIDE OR PH. REP.
COIL CKT.
(FOR 2 & 4 WIRE)
SEE D55

4 WIRE EQL.
CKT.
SEE C115

RES. TERM. CKT.
FOR R.R. DISPATCH
& ORDER CKTS.
SEE D131, C131

"N" CARRIER TEL.
APPL. SCHEMATIC
SEE E60

"B"

TERM. &
INTERMEDIATE
SIG. CKT.
SEE H11

"C"

FILTER
SEE B106

"V3" TELEPHONE
REPEATER
SEE B5, F5

REG. NETWORK
& TRANSFER CKT.
SEE C7

REG. NETWORK
& TRANSFER CKT.
SEE C8

V.F. PTCH. & MON. JKS.
AMP. CONT. PAD &
TRK. CKTS.
SEE H127

COMPROMISE BAL. NET

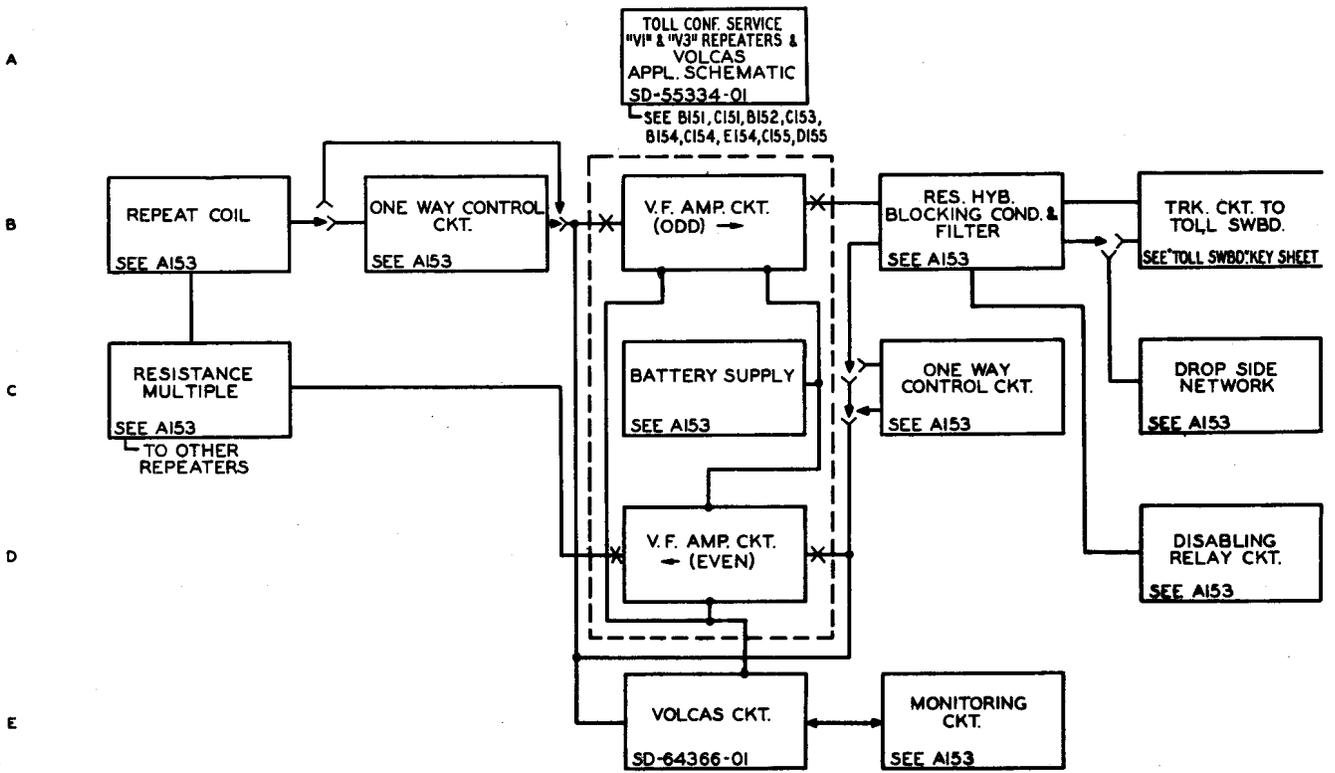
COMPROMISE
BALANCING
NETWORK
SEE A148

"A"

"A"

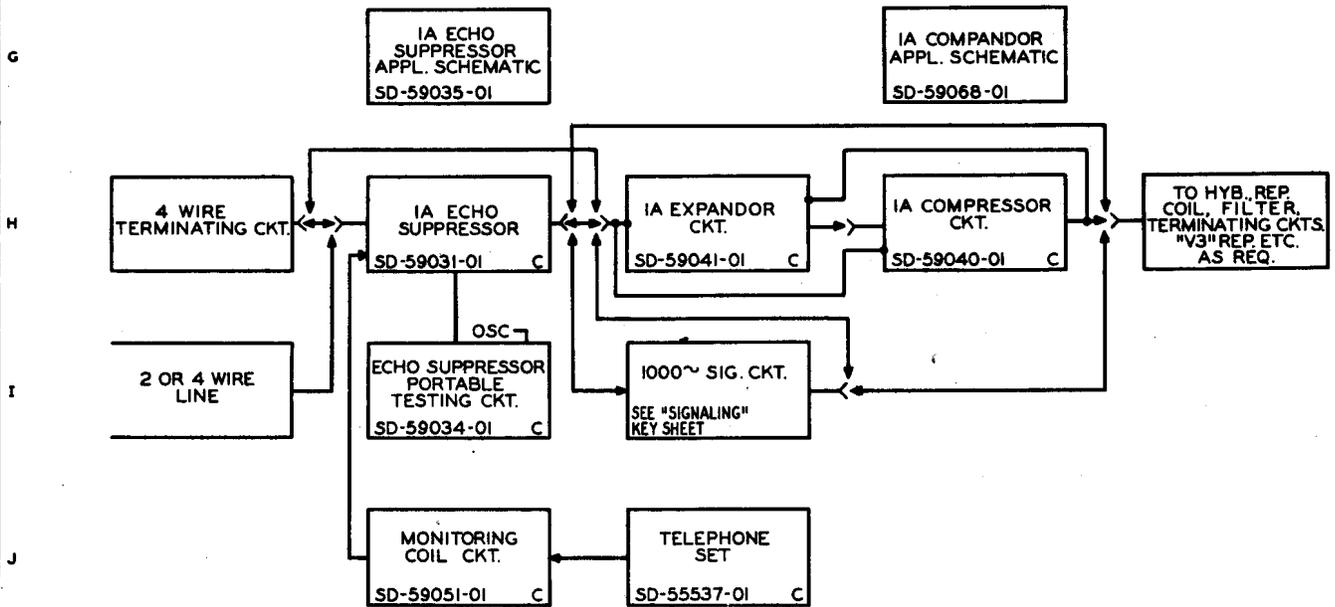
RES. TERM. CKT.
FOR R.R. DISPATCH
& ORDER CKTS.
SEE B131

TOLL CONFERENCE SERVICE



NOTE:
"X" INDICATES JACKS.

ECHO SUPPRESSOR AND COMPANDOR



151

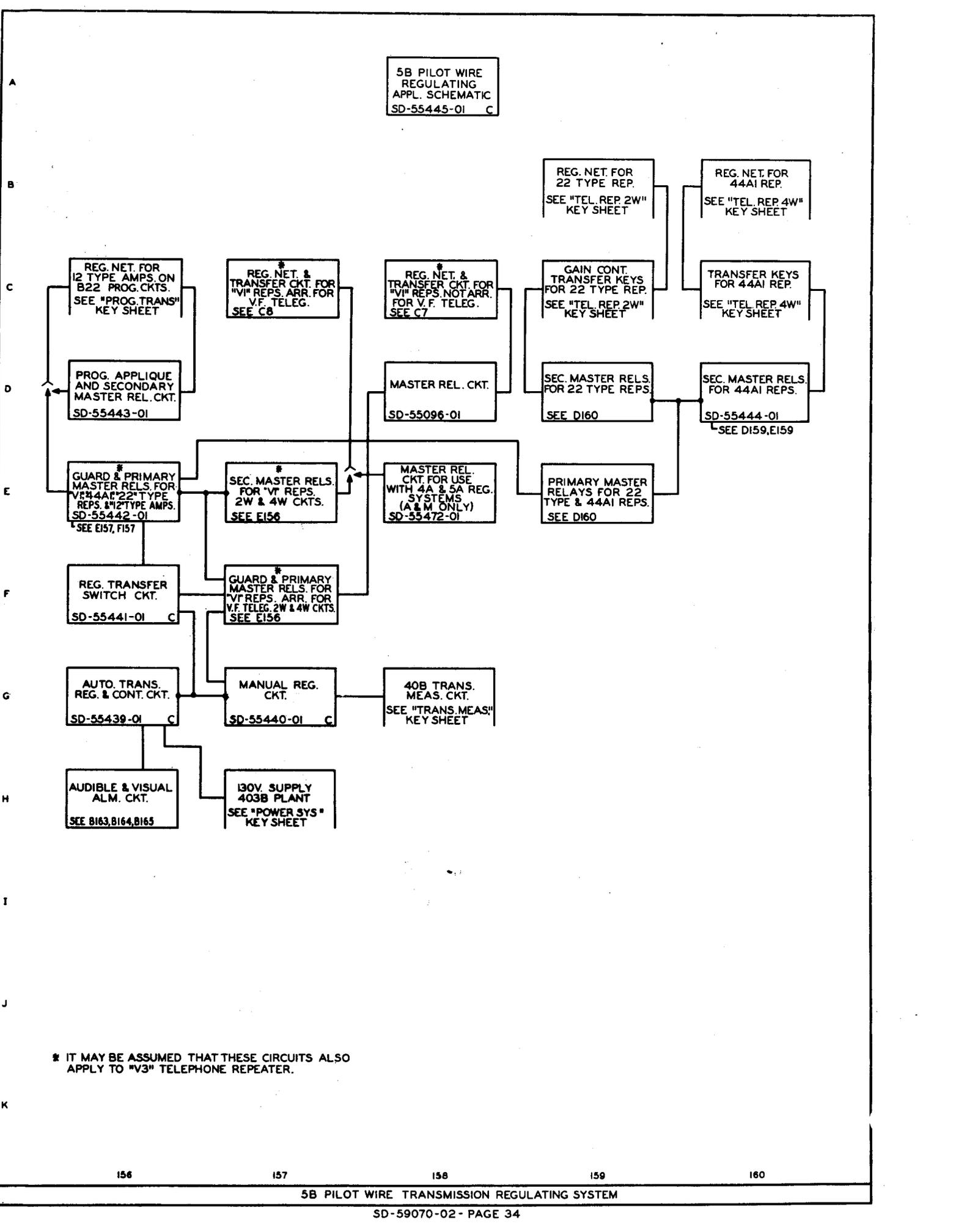
152

153

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5B PILOT WIRE
REGULATING
APPL. SCHEMATIC
SD-55445-01 C



* IT MAY BE ASSUMED THAT THESE CIRCUITS ALSO APPLY TO "V3" TELEPHONE REPEATER.

TESTING & MAINTENANCE

A
B
C
D
E
F
G
H
I
J
K

TEL. ORDER WIRE BRIDGING ARRANGEMENTS
SEE F20

TEL. SET CKTS. ARRANGEMENTS FOR PROGRAM TRANS.
SEE G4

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

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

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

AUDIBLE & VISUAL ALM. CKT. WITH AISLE PILOT & DISTINCTIVE ALM.
SD-96188-01 C
SEE H156

AUDIBLE & VISUAL ALARM & ALARM TRANSFER CKT. FOR 24V. ABS
SD-95063-01 C
SEE H156

AUD. & VIS. ALM. & ALM. TRANSFER CKT. FOR COMB. TOLL & SXS 355A WITH 48V. ABS
SD-95075-01 C
SEE H156

ALARM TRK. CKT.
SEE K62

POWER DISCHARGE CKT. SEE "POWER SYSTEMS" KEY SHEET

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

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

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

MISCELLANEOUS

MISCELLANEOUS JACK & PTCH. CORD CKTS.
SD-59446-01 C

S.F. TEST TONE TRK. JKS. AT TST. BD.
SEE A41

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**CURRENT DRAIN
AMPERE HOURS PER BUSY HOUR**

CIRCUIT DRAWINGS		SEE NOTE NO.	REMARKS	DRAINS LIST 1 AND 2										
				24 VOLTS				48 VOLTS		130 VOLTS		152 VOLTS.		
CIRCUIT TITLE	CIRCUIT NO.			SIG. BAT.	FIL. BAT.	R. R. GRD.	F. BD. GRD.	FIL. BAT.	F. BD. GRD.	BAT.	F. BD. GRD.	BAT.	F. BD. GRD.	
TELEPHONE REPEATER														
V3 (V. F. AMPLIFIER)	SD-95113-01		24V. REG. BAT. - PER AMP.		.050		.044			.006				
			PER 2 AMPS. OR PER REP.		.100		.088			.012				
			48V. REG. BAT. - PER AMP.					.050	.044	.006				
			PER 2 AMPS. OR PER REP.					.050	.038	.012				
			130V. PLATE & FIL. - PER AMP.							.056	.056			
			PER 2 AMPS. OR PER REP.							.062	.062			
			152V. PLATE & FIL. - PER AMP.									.056	.056	
			PER 2 AMPS. OR PER REP.									.062	.062	
REGULATING NETS. & TRANSFER	SD-64937-01			.082		.034								
	SD-64937-02			.034		.098								
PILOT WIRE REGULATING														
MASTER RELAY	SD-55096-01		PER FIG. 2	.072		.072								
		2	PER FIG. 2			.048								
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								
						.12								
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 REPS.)	SD-55334-01			NEGL.		NEGL.								
VOLCAS	SD-64366-01			NEGL.	.640	NEGL.	.589			.051				
ECHO SUPPRESSOR														
(IA) 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														
(IA) APPLICATION SCHEMATIC														
IA COMPRESSOR	SD-59068-01	1	24V. REG. BAT. OFFICE	A.440	.640	A.440	.624			.016				
			24V. NON-REG. BAT. OFFICE	A.440	.850	A.440	.834			.016				
IA EXPANDOR	SD-59068-01	1	24V. REG. BAT. OFFICE	A.440	.640	A.440	.624			.016				
			24V. NON-REG. BAT. OFFICE	A.440	.850	A.440	.834			.016				

NOTES:

1. WHEN FIL. BAT. IS NOT AVAILABLE, FIL. BAT. SHALL BE CONSIDERED AS 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.

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

GENERAL DESCRIPTION AND EXPLANATIONS

1. EXPLANATION OF KEY SHEET

In order to cover the greatest amount of information as clearly as possible, the form of this Key Sheet deviates from the usual, as follows:

Instead of connecting one circuit to another, each circuit has been shown diagrammatically connected to a Key Lead (in block) designated "A", "B", "C", etc. Immediately following each diagram is a breakdown of those circuits which may connect at each individual Key Lead, i.e. all those circuits which connect at Key Lead "A", are listed under the heading "A" for the diagram in question.

These Key Leads cover one specific diagram at a time and do not follow through from one diagram to another; i.e. Key Lead "A" of one diagram does not necessarily connect to the Key Lead "A" of another diagram.

If the information shown in the breakdown for one Key Lead carries over to another Key Lead of the same or different diagram, those diagrams connect directly through the leads indicated. If this is not the case, the information contained in the breakdown will show the circuit drawing number and, in the case of a drawing covered in another system, indicate the Key Sheet showing additional connecting information.

2. GENERAL DESCRIPTION

Several types of repeater arrangements may be formed by means of associated line and terminating equipment. The line and terminating equipment may also be used for non-repeated circuits. These circuits are intended for use with 2- or 4-wire (toll and exchange area) cable, 2-wire open wire, and 2- or 4-wire order wire circuits and shows application of line and 2-wire balancing equipment for repeated and non-repeated circuits, and for physical, phantom group, and split phantom group circuits.

These circuits provide means for employing repeaters for the purpose of inserting amplification in a 2- or 4-wire circuit, terminating a 2- or 4-wire circuit with or without repeaters, adapting standard message circuit arrangements to dispatch and order wire circuits, by-passing A-C operated repeaters in case of power failure, signaling, compositing, and associated network balancing.

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 intermediate 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 originate on the line side of the compandor equipment.

The 5B Pilot Wire Transmission Regulating System controls the gain of cable repeaters connected to it 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 a 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 current drain information is to be used in determining the size of the toll power plant, and the power leads. These 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.

No current drain information is given for drawings forming part of other systems.

INDEX OF DRAWINGS
FORMING PART OF "V3" (V.F. AMPLIFIER) & LINE & BALANCING

<u>Drawing No.</u>	<u>Description</u>	<u>Location</u>	<u>Drawing No.</u>	<u>Description</u>	<u>Location</u>
SD-55096-01	Master Relay Ckt.	D158	SD-59446-01	Misc. Jack & Ptch. Cord Ckts.	G161
SD-55334-01	Toll Conf. Service V1 and V3 Repeaters and Volcas Appl. Schematic	A153	SD-60136-02	Type "C" CX Ckt. & CX Bal. Ckt.	J19
SD-55378-01	Individual Alm. Ckt. for V.F.Aux. Sta. with 152V or 24V and 152V Batt.	B162	SD-60136-03	Type "C" CX Ckt. & CX Bal. Ckt.	A21
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