

SHEET INDEX

[illegible]

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT INFORMATION	J-98703D-(
	ED-97265-(
	J-99321BA-(
	J-99321BB-(
	J-99321BC-(
	J-99321BD-(
	J-99321BE-(
	J-99321BF-(
	J-99321BG-(
	J-99321BH-(
	J-99321BJ-(
	J-99321BK-(
	J-99321BL-(
	J-99321BM-(
	J-99321BN-(
	J-99321BP-(
	J-99321CA-(
	J-99321CB-(
	J-99321CC-(
	J-99321CD-(
	J-99321DA-(
	J-99321DB-(
	J-99321DE-(
	J-99321DF-(
	J-99321E-(
	J-99321F-(
	J-99321G-(
	J-99321H-(
	J-99321I-(
	J-99321J-(
	J-99321K-(
	J-99321L-(
	J-99321M-(
	J-99321N-(
	J-99321O-(
	J-99321P-(
	J-99321Q-(
	J-99321R-(
	J-99321S-(
	J-99321T-(
	J-99321U-(
	J-99321V-(
	J-99321W-(
	J-99321X-(
	J-99321Y-(
	J-99321Z-(
	J-99321AA-(
	J-99321AB-(
	J-99321AC-(
	J-99321AD-(
	J-99321AE-(
	J-99321AF-(
	J-99321AG-(
	J-99321AH-(
	J-99321AI-(
	J-99321AJ-(
	J-99321AK-(
	J-99321AL-(
	J-99321AM-(
	J-99321AN-(
	J-99321AO-(
	J-99321AP-(
	J-99321AQ-(
	J-99321AR-(
	J-99321AS-(
	J-99321AT-(
	J-99321AU-(
	J-99321AV-(
	J-99321AW-(
	J-99321AX-(
	J-99321AY-(
	J-99321AZ-(
	J-99321BA-(
	J-99321BB-(
	J-99321BC-(
	J-99321BD-(
	J-99321BE-(
	J-99321BF-(
	J-99321BG-(
	J-99321BH-(
	J-99321BI-(
	J-99321BJ-(
	J-99321BK-(
	J-99321BL-(
	J-99321BM-(
	J-99321BN-(
	J-99321BO-(
	J-99321BP-(
	J-99321BQ-(
	J-99321BR-(
	J-99321BS-(
	J-99321BT-(
	J-99321BU-(
	J-99321BV-(
	J-99321BW-(
	J-99321BX-(
	J-99321BY-(
	J-99321BZ-(
	J-99321CA-(
	J-99321CB-(
	J-99321CC-(
	J-99321CD-(
	J-99321CE-(
	J-99321CF-(
	J-99321CG-(
	J-99321CH-(
	J-99321CI-(
	J-99321CJ-(
	J-99321CK-(
	J-99321CL-(
	J-99321CM-(
	J-99321CN-(
	J-99321CO-(
	J-99321CP-(
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	J-99321DP-(
	J-99321DQ-(
	J-99321DR-(
	J-99321DS-(
	J-99321DT-(
	J-99321DU-(
	J-99321DV-(
	J-99321DW-(
	J-99321DX-(
	J-99321DY-(
	J-99321DZ-(
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	J-99321EJ-(
	J-99321EK-(
	J-99321EL-(
	J-99321EM-(
	J-99321EN-(
	J-99321EO-(
	J-99321EP-(
	J-99321EQ-(
	J-99321ER-(
	J-99321ES-(
	J-99321ET-(
	J-99321EU-(
	J-99321EV-(
	J-99321EW-(
	J-99321EX-(
	J-99321EY-(
	J-99321EZ-(

SHEET INDEX NOTES

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

* MULTIPLE LISTING OF SHEETS ON THIS INDEX
IS REQUIRED IN ORDER TO MAINTAIN A
SEQUENTIAL ORDER OF FIGURE NUMBERS.

** BEFORE ISSUE 11B SHEET 2A WAS SHOWN AS SHEET 2.

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

PARTIALLY REPLACES SD-95124-01 & SD-95124-02

SD-97272-01

1 NO

COMMON SYSTEMS
N1 AND ON CARRIER TELEPHONE
APPLICATION SCHEMATIC
FOR POWERING
N1A, N1-H, N2, ON1 AND ON2 REPEATERS

BELL TELEPHONE LABORATORIES
INCORPORATED

65

SD-97272-OI-AI

21 SHEETS

PRINTED IN U. S. A.

APPLICATION SCHEMATIC FOR POWERING N1, N1A, N1-H, N2, OM1 & OM2 REPEATERS		(2)	SD-97272-01-A2
BELL TELEPHONE LABORATORIES HOLLYWOOD, CALIF.		DATE 6S	PRINTED IN U.S.A.

101. (CONTINUED)

POWER APPLICATION INFORMATION TABLE *

POWER APPLICATION INFORMATION TABLE *

POWER FOR	LOCALLY POWERED REPEATER	REMOTE POWER STRING EAST OR WEST						INFO FIGURES PWR. PMR WEST EAST	BAT. USED	MAX CABLE SAMPLER RES (OHMS)	CURRENT (AMP)		CURRENT DRAIN LIST 1 & 2 (AMPERES)											
		FG APPL	1ST RPT	FG APPL	2ND RPT	FG APPL	SEAL REAR				TO LINE OR LOCAL RPT	REG	UNREG	REGULATED SUPPLY				UNREGULATED SUPPLY						
														-130V	-48V	+130V	GND	-130V	-48V	+130V	GND			
NI-H REPEATERS (SEE NOTES 11 & 14)	①						NO		101	+130V			.050						.050	.050				
			①				NO	10	118-2119-1		350		.050						.050	.050				
							YES	9	118-2119-2		350		.065						.065	.065				
			①				YES	9,15	118-2119-3		430		.050						.050	.050				
							NO	9	120-1021-1		330		.075						.075	.075				
		II	①				YES	7,9, 10	120-2021-2		270		.090						.090	.090				
			①				NO	9	120-3021-3		270		.075						.075	.075				
							YES	7,9, 10	120-4021-4		230		.090						.090	.090				
			①				NO	8,12	122-1023-1	(M.O.)	800 RD		.050				.050		.050					
							YES	12,13	122-2023-2		640 RD		.065				.065		.065					
			①				YES	12,15	122-3023-3		900 RD		.050				.050		.050					
							NO	12	122-4023-4		680 RD		.075				.075		.075					
		II	①				YES	12,13	122-5023-5		480 RD		.090				.090		.090					
			①				NO	12,15	122-6023-6		600 RD		.075				.075		.075					
							YES	12,13	122-7023-7		440 RD		.090				.090		.090					
			①				NO	12,15	122-8023-8		550 RD		.075				.075		.075					
							YES	12,15	122-9023-9		400 RD		.090				.090		.090					
			①				NO	16	118-1139-1	+130V	330	.050			.050	.050								
							YES	16	118-2119-2		330	.065			.065	.065								
		II	①				NO	16	120-1121-1		275	.075			.075	.075								
		II	①				YES	16	120-2121-2		+130V -48V	400	.090			.090	.090							
							NO	16	120-3121-3	+130V -48V	275	.075			.075	.075								
							YES	16	120-4121-4		400	.090			.090	.090								
			①				NO	12,17	124-1125-1		775		.060				.060		.060					
							YES	12,17	124-2125-2		560		.075				.075		.075					
			①				NO	12,17	124-3125-3	+130V	600		.085				.085		.085					
							YES	12,17	124-4125-4		420		.100				.100		.100					
			①				NO	12,17	124-5125-5		510		.085				.085		.085					
							YES	12,17	124-6125-6		400		.100				.100		.100					
			①				NO	12,17	124-7125-7		460		.085				.085		.085					
							YES	12,17	124-8125-8		350		.100				.100		.100					
			①				NO	12,17	124-9125-9															
							YES	12,17	124-0125-0															

* SEE NOTES 1 THROUGH 5, PTPR AND FGA CODE UNDER NOTE 101 TABLE ON SHEET 2A. THE FOLLOWING ADDITIONAL NOTES APPLY TO N1-H REPEATERS (N1 REPEATERS MODIFIED WITH HINS).
7. CABLE SIMPLEX RESISTANCE TO GND ONLY.
8. MIN CABLE SIMPLEX RES = 400 OHMS. NO POWER IS OBTAINED FROM J90730 POWER PANEL OR N1 TERMINAL.
9. STRAP OUT FIXED 130-0HM RESISTOR IN GND PATH IN J90730 POWER PANEL OR N1 TERMINAL.
10. REQUIRED TO BE 133 OHMS MAX WITH 0 OHMS IN GND PATH.
11. THE 25% REDUCTION OF MAX SIMPLEX RESISTANCE STATED IN NOTE 6 DOES NOT APPLY TO N1-H REPEATERS.
12. REQUIRES REMOVAL OF MTG BRACKETS AT 1ST AND 2ND REPEATERS WHEN MODIFYING EXISTING INSTALLATIONS.
13. THE CURRENT BYPASS RESISTOR CONNECTED TO THE BRACKET OF 1ST REPEATER SEALS IN. SEALS IN CURRENT RESISTORS
14. ARE ADDED TO 2ND REPEATER MOUNTING BRACKET, WHERE APPLICABLE.
15. SEALING CURRENT, ASSOCIATED WITH N1-H REPEATER POWER, = 15mA, EXCEPT FOR FIGS.110-3 AND 119-3 WHERE THE SEALING
16. CURRENT IS 100mA.
17. THE MAX CABLE SIMPLEX RESISTANCE, WHEN USING FIGS.110-3 AND 119-3, INCLUDES THE RESISTANCE OF THE CABLE SECTION
RECEIVING 50A SEALING CURRENT.
18. THE CONSTANT CURRENT REGULATOR, WHEN USED WITH N1-H REPEATERS, MAY BE OPERATING OUT OF ITS REGULATING RANGE.
HOWEVER, THERE IS ADEQUATE MARGIN FOR PROPER OPERATION.
19. REQUIRES USE OF DIODE PACKS FOR VOLTAGE REGULATION AND SUPPLEMENTARY SURGE PROTECTION, AS PROVIDED IN FIG. 50

1. READ NOTES 103,105,108,116 & 301.
2. UNDER ALARM CONDITIONS CURRENT DRAIN IS LESS THAN VALUES SHOWN ABOVE.
3. ABOVE DRAINS APPLY TO EACH LOCAL RPTR. OR TO EACH LINE WHICH IS POWERED.
4. ABOVE DRAINS FOR +130V AND -130V ALSO APPLY FOR +136V AND -136V RESPECTIVELY AS THESE VOLTAGES ARE USED.
5. A CONSTANT CURRENT REGULATOR REQUIRES AN OPERATING CUR DRAIN OF 5MA AND MAINTAINS THE LINE CUR CONSTANT TO WITHIN $\pm 2\%$. THIS 5MA CURRENT DRAIN IS ADDED TO THE LINE CURRENT AND GIVEN IN THE ABOVE TABLE UNDER "REGULATED SUPPLY".
6. IF THE POWER TO REPEATERS IS NOT REGULATED BY A CONSTANT CUR REGULATOR, THE VALUE OF CABLE RESISTANCE GIVEN ABOVE MUST BE REDUCED 25 PERCENT.

** THIS IS NOT A STANDARD ARRANGEMENT.

CODE: ① INDICATES H-L OR L-H REPEATER ② INDICATES H-L REPEATER ONLY ③ INDICATES L-H REPEATER ONLY

④ INDICATES 240 TYPE AMPLIFIER (F.G. AMP) SEE NOTE 120

CKT FIG.	APP OR MIRING
1 101	Z 2A
2 102	Y ZB
3 103	X ZF
4 104	M ZF
5 105	V ZG
6 106	
7 107	ZH
	ZJ
8 108	S ZK
9 109	R ZM
10 110	Q ZN
11 111	ZQ
12 112	ZR
13 113	N ZO
14 114	M ZT
15 115	ZU
16 116	K ZV
17 117	J ZW
18 118	ZX
19 119	H ZY
20 120	G ZZ
21 121	F YA
22 122	YB
23 123	
24	YF
25	YF
26	A YG
27	B YH
28	C YJ
29	D YK
30	YL
31	YM
	YN
33	
34	YR
35	YS
36	YT
37	YU
38	YV
39	YH
40	YX
41	YY
42	YZ
43	HA
44	HB
45	HE
46	MJ HF
47	WH HG
48	AG
49	AC
50	AD

HIGHEST RES & CAP USED ON THIS DWG	
R34	C2
NOT USED	

ISSUE
11B

APPLICATION SCHEMATIC
FOR POWERING
N1-N1A-N1-H-N2-ON1 & ON2 REPEATERS

BELL TELEPHONE LABORATORIES

SD-97272-01-2A

101. (CONTINUED)

EQUIVALENT FOUR-WIRE POWER APPLICATION INFORMATION TABLE *

REV. 10/19/88

EQUIVALENT FOUR-WIRE POWER APPLICATION INFORMATION TABLE *

POWER FOR	LOCALLY POWERED REPEATER	REMOTE POWER STRING EAST OR WEST						INFORMATION FIGURES		BAT- USED	MAX CABLE LOSS (DBMS)	CURRENT (AMP) TO LINE OR LOCAL RPTR		CURRENT DRAIN LIST 1 & 2 (AMPERES)									
		F.G. AMPL	1ST RPTR		2ND RPTR		3RD RPTR		PWR WEST			PWR EAST		REG	UNREG	REGULATED SUPPLY				UNREGULATED SUPPLY			
			1	2	3	4	5	6								-130V	-48V	+130V	GRD	-130V	-48V	+130V	GRD
N2 RPTRS (USED IN A STD N2 RPTR MTG SHELF OR WITH AN ADAPTER IN AN N1 OR N1A MTG SHELF)			①	①					110-3 110-4	111-3 111-4	1480	.085	.110			.085	.090	.005	.110		.110		
			②	③			②		110-5	111-5	+130V 1250					.085	.090	.005	.110		.110		
			③	②			③		110-6	111-6	-130V 1030					.085	.090	.005	.110		.110		
			②	①							+130V 300	.110	.135				.090	.090		.110	.110		
			③	①					112-3	113-3	+130V GRD 740					.085	.090	.005	.110	.110			
			③	①					112-4	113-4	+130V -48V 515					.085	.090	.005	.110	.110			
			③	①							+130V 930	.110	.135			.085	.090	.005	.110	.110			
			③	①					112-7 112-8	113-7 113-8	-130V 960					.085	.090	.005	.110	.110			
			①	②							+130V 555					.110	.115	.005	.135	.135			
			①	③					112-3	113-3	-48V 390	.110	.135			.110	.115	.005	.135	.135			
			①	②					112-4	113-4	+130V 940					.110	.115	.005	.135	.135			
			①	③							-130V 940					.110	.115	.005	.135	.135			
			①	①					112-1	113-1	+130V 440	.110	.135			.110	.110		.135	.135	.135		
			①	①					112-2	113-2	+130V 780					.110	.115	.005	.135	.135			
			①	①	①						-48V 590					.110	.115	.005	.135	.135			
			①	①	①				112-5	113-5	+130V 1100	.110	.135			.110	.115	.005	.135	.135			
			①	①	①				112-6	113-6	+130V -48V 640					.110	.115	.005	.135	.135			
			①	①	①						1140					.110	.115	.005	.135	.135			
			①	①																			

101. (CONTINUED)

EQUIVALENT FOUR-WIRE POWER APPLICATION INFORMATION TABLE *

POWER FOR	LOCAL RPTRS IN REMOTE POWER STRING (PAR TMTD FROM LOCAL RPTR)										INFORMATION FIG. FOR PAR TMTD		BATT USED	MAX CABLE SIMPLEX RES (OHMS)	CURRENT TO LINE OR LOCAL RPTR		CURRENT DRAIN LIST 1&2 (AMPERES) REGULATED SUPPLY			
	2ND RPTR WEST		1ST RPTR WEST		1ST RPTR EAST		2ND RPTR EAST		REG	UNREG					-130V	-48V	+130V	GRD		
	WEST	EAST	F.G. ANPL	WEST	F.G. ANPL	1ST RPTR ANPL	1ST RPTR F.G. ANPL	1ST RPTR F.G. EAST	2ND RPTR F.G. ANPL	2ND RPTR EAST	WEST	EAST								
N2 RPTRS (WITH LOCAL RPTR IN REMOTE POWER STRING)						①		①			114-1	114-10	+130V	700	.085			.090	.090	
						①		①			114-11	114-10		810				.085	.090 .005	
			①		①						114-2	114-5	+130V -48V	810				.085	.090 .005	
					②		②	②			114-15	114-16	+130V	580				.085	.090 .005	
					②		②	②	②				1250					.085	.090 .005	
					②		②	②	②				-130V	1030				.085	.090 .005	
	②	③		②							114-6	114-7	+130V -48V	580				.085	.090 .005	
	②	③		②							114-7		+130V -130V	1250				.085	.090 .005	
	③	②		②									+130V -130V	1030				.085	.090 .005	
			②		②			②			114-4	114-13		1170				.085	.090 .005	
			③		②			③			114-5	114-14		950				.085	.090 .005	
					②	①							115-10	115-11	+130V	350			.090 .090	
					①	①							115-1	115-2	+130V -48V	350			.085 .090 .005	
				①	②								115-2		+130V	350			.090 .090	
				①	②								115-3, 115-12		+130V -48V	350			.085 .090 .005	
				①	②	①							115-4			680			.085 .090 .005	
				①	②	①							115-5			680			.085 .090 .005	
				①	②	①							115-3, 115-12		+130V -130V	980			.085 .090 .005	
				①	②	①							115-13			980			.085 .090 .005	
					①		①	①	①				115-16			800			.085 .090 .005	
		①	①		①								115-17			800			.085 .090 .005	
					①	①	①	①				115-5	115-14	+130V -48V	600	.110		.110	.115 .005	
				①	①	①						115-6	115-15		600			.110	.115 .005	
					①	①	①	①						+130V -130V	940			.110	.115 .005	
				①	①	①									940			.110	.115 .005	
					②	①	⑤		②				115-17		1070			.110	.115 .005	
					②	①	②		②				115-18		870			.110	.115 .005	
					②		③	①	②						920			.110	.115 .005	
					②		②	①	②						820			.110	.115 .005	
	②		③	①	②								115-8		1070			.110	.115 .005	
	③		②	①	②							115-9			870			.110	.115 .005	
	②	①	③		②										920			.110	.115 .005	
	③	①	②		②										820			.110	.115 .005	
					①	①	①	①					115-16		850			.110	.115 .005	
		①	①	①	①								115-7		850			.110	.115 .005	

101. (CONTINUED)

EQUIVALENT FOUR-WIRE POWER APPLICATION INFORMATION TABLE *

POWER FOR	LOCALLY POWERED RPTR	REMOTE POWER STRING EAST OR WEST								SEAL CURRENT	SEE NOTE	INFO FIGURES		BATT USED	MAX CABLE SIMPLEX RES (OHMS)	CURRENT (AMP) TO LINE OR LOCAL RPTR		CURRENT DRAIN LIST 1 & 2 (AMPERES)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		F.G. AMPL	1ST RPTR	F.G. AMPL	2ND RPTR	PAIR WEST	PAIR EAST	REG	UNREG			REGULATED SUPPLY				UNREGULATED SUPPLY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
												-130V	-48V			+130V	GRD	-130V	-48V	+130V	GR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
N1-H RPTRS (SEE NOTES 11 & 14)	①										101					.050																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</

20. FOR USE WITH N1 TERMINALS PER OPTION "MM" ON SD-95121-01.
21. PROVIDE OPTION "DK" ON SD-95124-01 FOR USE WITH $\pm 130V$ VOLT SUPPLY.
22. RESISTANCE VALUES LISTED FOR EQUIVALENT FOUR-WIRE APPLICATIONS WITH FLAT-GAIN (240 TYPE) AMPLIFIERS ARE CALCULATED FOR WORST CASE CONDITIONS. SINCE LOCAL CONDITIONS VARY, EACH FLAT-GAIN AMPLIFIER APPLICATION SHOULD BE ENGINEERED ON AN INDIVIDUAL BASIS.
23. WHEN 98A PHASE EQUALIZERS ARE USED WITH EQUIVALENT FOUR-WIRE APPLICATIONS, ADJUST THE "MAX CABLE SIMPLEX RESISTANCE" IN THE TABLES AS FOLLOWS:
- A. SUBTRACT 50 OHMS FOR EACH PHASE EQUALIZER PANEL INSTALLED AT POWER FEED POINTS EQUIPPED FOR $\pm 130V$ & GRD OR $\pm 130V$ & $\pm 48V$.
- B. SUBTRACT 65 OHMS FOR EACH PHASE EQUALIZER PANEL INSTALLED AT POWER FEED POINTS EQUIPPED FOR $\pm 130V$ & $\pm 130V$.
- PHASE EQUALIZER PANELS INSTALLED AT NON-POWER FEED POINTS ARE TREATED THE SAME AS REMOTE-POWERED FLAT-GAIN (240 TYPE) AMPLIFIERS.

(PART OF NOTE 19)

LINE CURRENT (AMPERES)	ADD TO CABLE SIMPLEX RESISTANCE			FOR MAX CABLE TEMPERATURE	INCREASE MAXIMUM CABLE SIMPLEX RES
	-48 $\pm$ 2V	+130 $\pm$ 5V	-130 $\pm$ 5V	DEGREES F	PERCENT
0.050	40	50	50	140	0
0.065	33	42	42	130	2
0.075	27	33	33	120	4
0.085	24	29	29	110	6
0.090	22	28	28	100	8
0.095	21	26	26	90	10
0.110	18	23	23	80	12
0.120	17	21	21	70	14
0.135	15	18	18	60	16
0.145	14	17	17	50	18
0.160	13	16	16		

- * SEE NOTES 1 THROUGH 17 ON SHEET 2A.
18. THE MAX CABLE SIMPLEX RESISTANCE FOR EQUIVALENT FOUR-WIRE OPERATION INCLUDES THE LOOP RESISTANCE OF THE DIRECTIONAL FILTER CRY AND IS BASED ON THE FOLLOWING CONDITIONS:
- EXPECTED VARIATIONS FOR THE $\pm 130V$ & $\pm 130V$ BATTERIES ARE ± 7.5 VOLTS.
 - EXPECTED VARIATIONS FOR THE $\pm 48V$ BATTERY ARE ± 4 VOLTS.
 - THE MAXIMUM EXPECTED CABLE TEMPERATURE IS $\pm 140^\circ F$. (CABLE RESISTANCE IN THE TABLE IS AT $\pm 68^\circ F$).
 - THE CABLE SIMPLEX RESISTANCE DOES NOT INCLUDE THE SEALING CURRENT SECTION BUT DOES INCLUDE THE BYPASS RESISTOR FOLLOWING THE LAST REPEATER. IF SEALING CURRENT IS NOT PROVIDED, 88 OHMS MAY BE ADDED TO THE RESISTANCE IN THE TABLE. SEE NOTE 116.
 - CABLE SIMPLEX RESISTANCE AT $\pm 68^\circ F$ IS 85 OHMS/MILE FOR 19 GAUGE CABLE AND 170 OHMS/MILE FOR 22 GAUGE CABLE.
19. IF THE ABOVE BATTERY AND TEMPERATURE VARIATIONS ARE NOT TO BE ENCOUNTERED, CONSULT THE ADJACENT TABLES FOR ALLOWABLE ADDITIONS TO THE CABLE RESISTANCE LISTED IN THE TABLES ABOVE.

APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, N2, ON1 & ON2 REPEATERS

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CIRCUIT NOTES: (CONTINUED)

102. AT EACH REPEATER THE CONNECTION OF LEADS V1 AND V2 ARE TERMINATED BY THE CONDITIONS ON THE LINE TO THE WEST. THE CONNECTION OF LEADS V3 AND V4 BY THE CONDITIONS ON THE LINE TO THE EAST, AND THE CONNECTION OF LEADS P+ AND P- BY THE METHOD POWERING THE REPEATER ITSELF.
103. THE PWR APPLICATION SHOWN IN FIGS. 114-9 AND 114-10 FOR PWR FOUR N2 RPTRS IN A COMMON LOOP IS CHARACTERISTICALLY THE SAME AS THE APPLICATION SHOWN IN FIGS. 114-8 AND 114-17, HENCE THE LATER APPLICATION ONLY IS GIVEN IN NOTE 101.
104. **N1** DESIGNATES ONE N1, ON1 OR ON2 ELECTRON TUBE REPEATER OR AN N2 REPEATER WITH ADAPTER IN AN N1 RPTR MOUNTING.
- N1A OR N2** DESIGNATES ONE N1A OR N2 TRANSISTORIZED REPEATER.
- 240** DESIGNATES A PAIR OF 240-TYPE FLAT GAIN AMPLIFIERS. THESE AMPLIFIERS ARE POWERED TWO IN SERIES ON A GIVEN SIMPLEX LINE. THEY MAY BE USED TO AMPLIFY THE TRANSMISSION CARRIER OF TWO SYSTEMS IN ONE DIRECTION OR BOTH DIRECTIONS OF A SINGLE SYSTEM. THE LOCATION OF THESE AMPLIFIERS ALONG THE REPEATERED LINE AND THE NUMBER OF AMPLIFIER PAIRS PARO ON A COMMON PARO LOOP ARE SHOWN AS OPTIONAL ARRANGEMENTS IN FIGS. 112, 113 AND 115. EACH AMPLIFIER PAIR IS PROVIDED (OR OMITTED) TO AGREE WITH THE SPECIFIC EQUIPMENT ARRANGEMENTS LISTED IN NOTE 101, ALSO SEE NOTE 120.
- N1-H** DESIGNATES ONE N1-H REPEATER.
105. POWER MAY BE TRANSMITTED OVER THE SIMPLEX CIRCUIT OF THE CARRIER CABLE PAIRS TO REMOTE "H" OR "OH" REPEATERS FROM ONE OF SIX OFFICE FACILITIES. POWER IS TRANSMITTED FROM:
1. AN N1 RPTR BAY (FIG. 24 OR 42);
 2. AN N1A RPTR BAY (FIG. 24 OR 43);
 3. AN N2 RPTR BAY (FIG. 31);
 4. AN N1 CARR TERM (FIG. 44);
 5. AN N2 OR N3 CARR TERM (FIG. 30);
 6. A LINE BUILD-OUT BAY (FIG. 28).
106. SEALING CURRENT OF ABOUT 20 MA SHOULD BE PROVIDED OVER CABLE SECTIONS WITH UNSOLDERED JOINTS TO REDUCE JOINT TRANSMISSION TROUBLES. SEE NOTES 14 & 15 OF NOTE 101.
107. WHEN FOUR N2 RPTRS ARE TO BE POWERED IN SERIES CARE MUST BE TAKEN NOT TO EXCEED THE MAXIMUM CABLE LENGTH WHICH IS LIMITED BY THE "MAX CABLE SIMPLEX RESISTANCE" SPECIFIED IN NOTE 101.
108. TO MINIMIZE HEAT DISSIPATION IN THE LOCAL SUPPLY USED TO POWER THE LINE, THE MINIMUM AVAILABLE VOLTAGE (-48V & GRD, +130V & GRD, +130V & -48V, OR +130V & +130V) WHICH WILL SUPPLY THE REQUIRED CURRENT TO THE LOAD SHOULD BE USED.
109. IF POWER IS TRANSMITTED OVER THE LINE FROM A CARRIER TERMINAL RATHER THAN FROM A REPEATER BAY, STRAPPING AT THE REPEATERS RECEIVING POWER REMAINS THE SAME.
110. THE DIRECTION OF THE LINE CURRENT IS DETERMINED BY THE ARBITRARY RULE THAT CURRENT FLOWS IN THE SAME DIRECTION AS CARRIER TRANSMISSION. THE POLARITY (+) AND (-) IS INDICATED AT THE TERMINATING POINTS. THERE IS ONLY EXCEPTION TO THIS RULE. A SPECIAL CASE WHERE SEALING CURRENT ONLY IS FED ON THE LINE FROM AN N2 REPEATER LOCATION OR FROM A LINE BUILD-OUT BAY EQUIPPED FOR FEEDING POWER OVER THE LINE: FOR THIS CASE ONLY, THE CURRENT FLOWS IN THE REVERSE DIRECTION FROM A -48 VOLT BATTERY.

111. FURNISH OPTIONS IN FIG. 24 AS FOLLOWS:

LOCAL RPTR	BAT.	OPT.
LN N1A	-48V	Y
HL N1A	-48V	Z
N1, ON1, ON2	+130V OR +136V	W
HL N1A	+130V, +136V OR +152V	W
LN N1A	+130V, +136V OR +152V	W
N1, ON1, ON2	+152V	W

112. FURNISH OPTIONS IN FIG. 26 AND 27 AS FOLLOWS:

LOCAL RPTR	BAT.	OPT.	FIG.
LN N1A	-48V	H	26
HL N1A	-48V	G	26
N1, ON1, ON2	+130V OR +136V	J, K, M	27
LN N1A	+130V OR +136V	F, J, M	27
HL N1A	+130V OR +136V	F, M, R	27
N1, ON1, ON2	+152V	Q	27
LN N1A	+152V	F, J, N	27
HL N1A	+152V	F, N, R	27

CIRCUIT NOTES: (CONTINUED)

113. FURNISH OPTIONS IN FIG. 2, 4, 6, 8, 9, 10, 11, 13, 15, 17, 20, 21, 22 AND 46 AS FOLLOWS:

PWR ARRANGEMENT	LOCATION	OPTIONS
N1, N1A, OR N1-H RPTR	POLE TYPE CABINET	2A, 2E, 2G, 2J, 2N, 2Q, 2S, 2U, 2N, 2Y, 2M, 2Q, 2Y, 2N, 2Z, 2E, 2H
N1, N1A, OR N1-H RPTR	ALL BUT POLE TYPE CABINET	2B, 2F, 2H, 2K, 2N, 2Z, 2Y, 2V, 2X, 2Z, 2Y, 2N, 2Y, 2X, 2M, 2F, 2J
N2 RPTR	ALL	2A, 2B, 2E, 2F, 2G, 2H, 2J, 2K, 2Y, 2V, 2Y, 2M, 2G, 2K

114. IN FIGURES WHERE THE N1A OR N2 REPEATER BEYOND THE 240-TYPE AMPLIFIER IS A HIGH-LOW REPEATER THERE MUST BE A MINIMUM OF 200 OHMS RESISTANCE IN THE SIMPLEX LOOP (IN ADDITION TO THE REPEATER) IN ORDER TO MAINTAIN THE REQUIRED VOLTAGE AT THE 240 TYPE AMPLIFIER. IF THE LINE RESISTANCE BETWEEN RPTR AND 240 AMPL IS LESS THAN 200 OHMS, PROVIDE AT THE RPTR A RESISTOR TERMINATION PER FIGS. 8, 11, 13 OR 14.
115. FIG. 31 GROUPS THE POWER SUPPLIES USED IN N2 RPTR BAYS OR IN MISC ARRANGEMENTS WITH N1 AND N1A RPTR BAYS. THESE SUPPLIES PROVIDE REGULATED CONSTANT CURRENT TO THE LINE FOR REMOTE PWRD "H" AND "OH" RPTRS AND PROVIDE A RESISTOR UNIT FOR TRNG PWR TO 240 AMPLS AND/OR SEALING CURRENT.
116. THE "MAX CABLE SIMPLEX RES" IS THE RESISTANCE OF ONLY THE TOTAL CABLE SIMPLEX WHICH COMPLETES THE DC POWER LOOP FROM THE POWER SOURCE TO THE MOST REMOTE REPEATER RECEIVING POWER. THE SIMPLEX RESISTANCE OF A CABLE SECTION BEYOND THE LAST REMOTE POWERED REPEATER WHICH HAS EITHER SEALING CURRENT OR 240 TYPE AMPLIFIERS IS NOT TO BE ACCOUNTED AS PART OF THE "MAX CABLE SIMPLEX RESISTANCE"; THAT SECTION MAY BE ANY NORMAL CABLE SPAN BETWEEN TWO REPEATER LOCATIONS. WHEN BOTH SEALING CURRENT AND 240 TYPE AMPLIFIERS ARE USED ON THE END SECTION OF A POWER LOOP, THAT SECTION IS CONSIDERED AS ANY OTHER SPAN BETWEEN REPEATERS IN TERMS OF "MAX CABLE SIMPLEX RESISTANCE". SEE NOTES 101 & 122.
117. CHANGES IN FIGURE NUMBERS
- | ON ISSUE 50 | WAS (PRECEDING ISSUE 5) |
|-------------|-------------------------|
| FIG. 8 | FIG. 35 |
| FIG. 11 | FIG. 36 |
| FIG. 13 | FIG. 38 |
| FIG. 14 | FIG. 37 |
| FIG. 30 | FIG. 33 |
| FIG. 31 | FIG. 34 |
| A, B | FIG. 13 |
| C | FIG. 11, 12 |
| D | FIG. 30, 31, 32 |
118. LOCAL N2 REPEATERS POWERED IN SERIES WITH REMOTE REPEATERS ARE CONNECTED TO THE REGULATED POWER SOURCE PER FIG. 23, E, F, OR G, SEE FIG. 116.
119. THE SEALING CURRENT ARRANGEMENT IN FIGURES 114-119, 114-20, 115-9 AND 115-20 REPLACES THE POWER-FEED-POINT ARRANGEMENTS OF OTHER APPLICATIONS IN FIGURES 114 AND 115 WHEN SEALING CURRENT IS REQUIRED IN THE OPPOSITE DIRECTION FROM WHICH REMOTE REPEATERS ARE BEING POWERED. FIG. 115-5, FOR EXAMPLE, CAN FEED SEALING CURRENT ON LINE EAST BY RE-ARRANGING THE POWER FEED POINT PER FIG. 115-19.
120. WHEN TWO 240 TYPE AMPLIFIER LOCATIONS ARE DESIRED BETWEEN ADJACENT REPEATERS OR TERMINALS, EACH OF THE 240 TYPE AMPLIFIER LOCATIONS IS REPRESENTED BY A SEPARATE FIG. 112, 113 OR 115 AND EACH SHALL BE POWERED FROM A SEPARATE SYSTEM.
121. THE C1 CAPACITOR, FIG. 47 AND/OR FIG. 45 OR 46 ARE USED TO REDUCE 60 HZ INTERFERENCE. FIG. 45 AND 46 ARE REPLACEMENTS FOR FIG. 5 AND 22, RESPECTIVELY, TO CONNECT N1A OR N2 REPEATERS IN THE POSITIVE (+) BATTERY SUPPLY LEAD IN THE WEST DIRECTION, AS SHOWN IN FIG. 117.
122. IF SEALING CURRENT IS USED AND CONDITION (D) AND/OR (E) IS INVOLVED:
- (D) 240 TYPE AMPLIFIERS ARE USED,
 - (E) MAX CABLE SIMPLEX RESISTANCE REQUIREMENTS ARE NOT MET. USE FIG. 2, 3, 17 OR 19 AS APPROPRIATE AT THE LAST REPEATER POINT IN A POWER LOOP. IN A TANDER POWER LOOP, FIG. 49 IS REQUIRED IN ADDITION TO FIG. 5 AT THE FIRST REPEATER POINT. THE FIG. 49 OPTIONS ARE USED AS FOLLOWS:
 - (F) SEALING CURRENT ONLY (WHEN FIG. 2 OR 17 ARE USED AT 2ND RPTR) OPTION B OR AD.
 - (G) 240 TYPE AMPLIFIER FOLLOWS 1ST OR 2ND REPEATER (SEALING CURRENT NOT PROVIDED) OPTION C OR AC.
 - (H) SEALING CURRENT PROVIDED AND 240 TYPE AMPLIFIER FOLLOWS 1ST OR 2ND REPEATER OPTION D OR AD.
123. OPTION AD REQUIRES TWO 18-TYPE RESISTORS IN PARALLEL TO MEET POWER REQUIREMENTS.

EQUIPMENT NOTES:

201. THE RS-8512, L() RESISTORS IN FIGS. 2, 4, 6, 8, 9, 10, 11, 13, 14, 15, 17, 20, 21, 22 AND 46 ARE PROVIDED ON J98703D-1.
202. THE 18 AND 19 TYPE RESISTORS IN FIGS. 2, 4, 6, 8, 9, 10, 11, 13, 14, 15, 17, 20, 21, 22, 26, 27 AND 46 ARE PROVIDED ON ED-97265-1.
203. THE RS-14403, L() RESISTORS IN FIGS. 4, 6, 8, 9, 10, 11, 13, 14, 15, 20, 21 AND 46 ARE PROVIDED ON ED-3C061 AND FIGS. 33 THROUGH 40 ARE PROVIDED ON ED-3C214.
204. THE CHASSIS CONNECTIONS (//) SHOWN ON FIGURES 1 THROUGH 22, 45 AND 46 APPLY TO N1 OR N1A REPEATERS ONLY. THE CHASSIS CONNECTIONS FOR THE N2 REPEATERS IS SHOWN ON THE APPLICATION SCHEMATIC FOR N2 REPEATERS, SD-97374-01.
205. FIG. 31 MAY BE USED TO PROVIDE REGULATED CONSTANT CURRENT TO THE LINE FROM AN N1 OR N1A REPEATER BAY. FIG. 31 IN THIS CASE CONSISTS OF MISCELLANEOUS MOUNTED SHELF (S) EQUIPPED WITH CONSTANT CURRENT REGULATORS AND FUSE AND ALARM CIRCUITS.
206. TERMINAL STRIP TS1 (ED-3C049) IN FIG. D, E, F & G CONSISTS OF SCREW-DOWN TERMINALS LOCATED AT THE BACK OF EACH N2 REPEATER MOUNTING POSITION. CONNECTOR P1 IS PART OF THE PRINTED CIRCUIT PATH ON ED-3C214, ED-3C061 OR P-49X029.
207. WHEN POWER IS PROVIDED BY PANEL J993210, TS2 SHALL BE PROVIDED AND WIRED AS FOLLOWS:
- | DESIGNATION | TS2 TERM. NO. |
|-------------|----------------|
| V1 | 1, 3, 5, 7 |
| V2 | 2, 4, 6, 8 |
| V3 | 9, 11, 13, 15 |
| V4 | 10, 12, 14, 16 |
| P+ | 17, 19, 21, 23 |
| P- | 18, 20, 22, 24 |
- CIRCUIT NOTES: (CONTINUED)
- (M.D.) 124. IN TANDER POWERING OF N1-H REPEATERS CARE MUST BE TAKEN TO APPROXIMATELY MATCH THE CURRENT DRAINS OF THE HINS USED IN THE TWO REPEATERS IN THE POWER LOOP TO PERMIT BOTH REPEATERS TO MEET VOLTAGE REQUIREMENTS. ALSO, WHEN HINS ARE CHANGED IN A REPEATER, VOLTAGE MEASUREMENTS MUST BE MADE ON BOTH TANDER REPEATERS TO ENSURE THAT REQUIREMENTS CAN BE MET. IN ADDITION SUPPLEMENTARY SURGE PROTECTORS CANNOT BE USED AT THE FIRST REPEATER IN A TANDER POWER STRING.
125. CR1-10 ARE 521H DIODES, THE DIODES ARE BIDIRECTIONAL, SO THE DIODE PACK CONNECTIONS TO P+ AND P- NEED NO POLARIZATION. ALTERNATE DIODE PACK CONNECTORS, FIGS 9, 10 OR 11 OF SD-97274-01, MAY BE USED IN PLACE OF FIG. 50.
126. ON EQUIVALENT FOUR-WIRE LINES, POLARITY REQUIREMENTS FOR PINS 4 & 5 OF THE DIRECTIONAL FILTER MUST BE MET.

PWR APPL	RPTR	WEST FILTER	EAST FILTER
		PIN POLARITY (V)	PIN POLARITY (V)
PWR RECEIVED	L-H	4 POS	V1 4 NEG
		5 NEG	V2 5 POS
FROM WEST	H-L	4 NEG	V2 4 POS
		5 POS	V1 5 NEG
PWR RECEIVED	L-H	4 NEG	V1 4 POS
		5 POS	V2 5 NEG
FROM EAST	H-L	4 POS	V2 4 NEG
		5 NEG	V1 5 POS

127. WHEN 986A PHASE EQUALIZER PANELS ARE INSTALLED IN EQUIVALENT FOUR-WIRE LINE SECTIONS, USE THESE TABLES IN NOTE 101 DESIGNATED "EQUIVALENT FOUR-WIRE" IN CONJUNCTION WITH NOTE 23 TO DETERMINE THE VALUE OF MAXIMUM CABLE SIMPLEX RESISTANCE. LIKEWISE, USE THE FOUR-WIRE TABLES AND NOTE 23 FOR PHASE EQUALIZER PANELS INSTALLED IN FOUR-WIRE LINE SECTIONS.
128. SINCE INFORMATION FIGURES 101 THRU 125 DO NOT SHOW 986A PHASE EQUALIZER PANELS, INSTALLED AT POWER FEED POINTS, REFER TO NOTE 23 IN NOTE 101 FOR CORRECTIONS TO THE "MAX CABLE SIMPLEX RESISTANCE." WHEN 986A PHASE EQUALIZER PANELS ARE INSTALLED AT NON-POWER FEED POINTS, TREAT THE SAME AS REMOTE-POWERED FLAT GAIN AMPLIFIERS AND USE THE APPROPRIATE FIGURES.

INFORMATION NOTES:

301. FROM THE TABLE IN NOTE 101 THE APPROPRIATE INFORMATION FIGURE (101 THRU 115) MAY BE SELECTED FOR A PARTICULAR COMBINATION OF REPEATERS, 240 TYPE AMPLIFIERS AND SEALING CURRENT. THE INFORMATION FIGURES SPECIFY THE STRAPPING FIGURES 1 TO 22, 33 TO 40 TO BE USED AT EACH REPEATER. AT THE END REPEATERS OF A POWER SECTION MORE THAN ONE STRAPPING FIGURE WILL BE REQUIRED SINCE THE END REPEATERS MUST BE CONSIDERED IN RELATION TO BOTH EAST AND WEST POWER SECTIONS. THE TABLE IN NOTE 101 ALSO PROVIDES INFORMATION FOR EACH SPECIFIED SYSTEM WITHIN THE GIVEN LIMITS OF CABLE RESISTANCE.
302. SEE SD-97154-01 FOR CONNECTING INFORMATION FOR 240 TYPE AMPLIFIERS.
303. THE REPEATER MOUNTING BRACKET OF FIG. 23 IS SHOWN ON DRAWINGS SD-97124-03, SD-97260-01, SD-97261-01 AND SD-97374-01.

APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, N2, ON1 & ON2 REPEATERS

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FIG. 101

LOCAL POWER TO N1, N1A, N1-H, N2,
ON1 OR ON2 REPEATERS

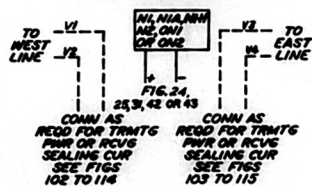


FIG. 102

SEALING CURRENT ONLY TRANSMITTED WEST
SEE NOTE 105 & 106

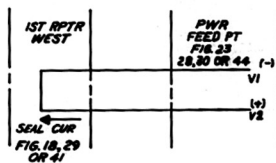


FIG. 103

SEALING CURRENT ONLY TRANSMITTED EAST
SEE NOTE 105 & 106

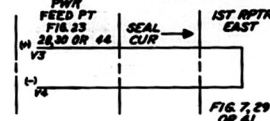


FIG. 104

POWER TRANSMITTED WEST TO 240 TYPE
AMPLIFIER ONLY
SEE NOTE 105 & 302

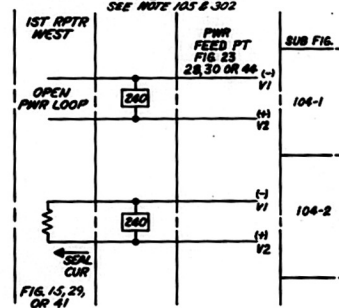


FIG. 105

POWER TRANSMITTED EAST TO 240 TYPE
AMPLIFIERS ONLY
SEE NOTES 105 & 302

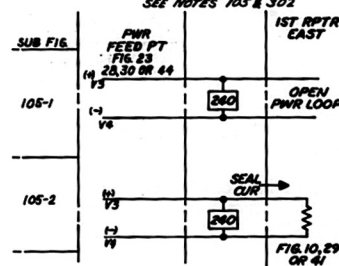


FIG. 106

POWER TRANSMITTED WEST TO N1 REPEATERS ONLY
SEE NOTE 105

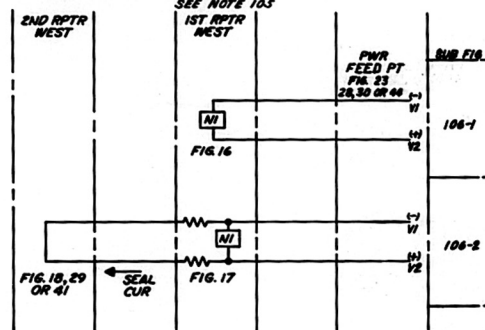
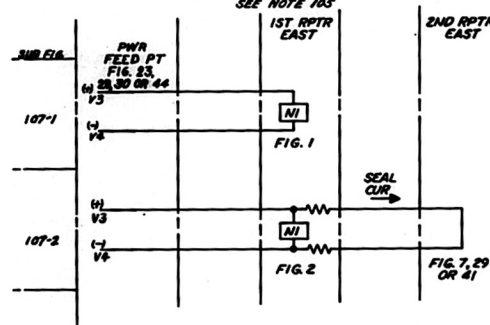


FIG. 107

POWER TRANSMITTED EAST TO N1 REPEATERS ONLY
SEE NOTE 105



APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, N2, ON1 & ON2 REPEATERS

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FIG. 108

POWER TRANSMITTED WEST TO N1 REPEATERS AND 240 TYPE AMPLIFIERS
SEE NOTES 105 & 302

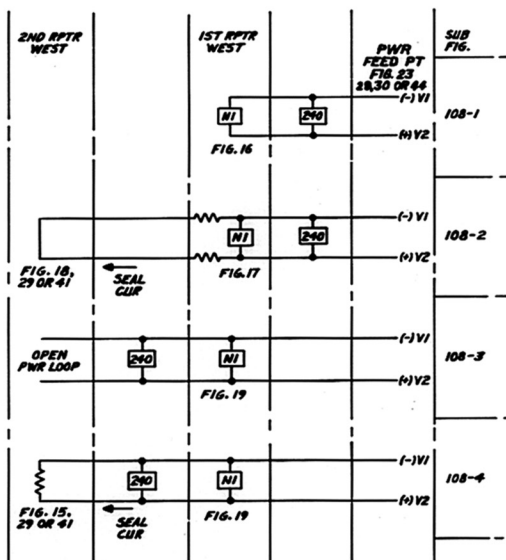
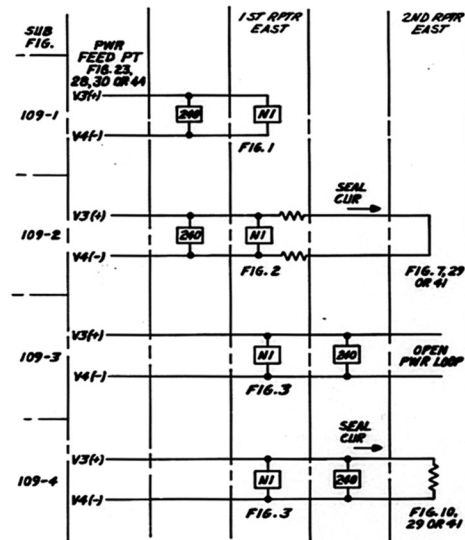


FIG. 109

POWER TRANSMITTED EAST TO N1 REPEATERS AND 240 TYPE AMPLIFIERS
SEE NOTES 105 & 302



APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, N2, ON1 & ON2 REPEATERS

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FIG. 110

POWER TRANSMITTED WEST TO N1A OR N2 REPEATERS ONLY
SEE NOTES 105 & 101

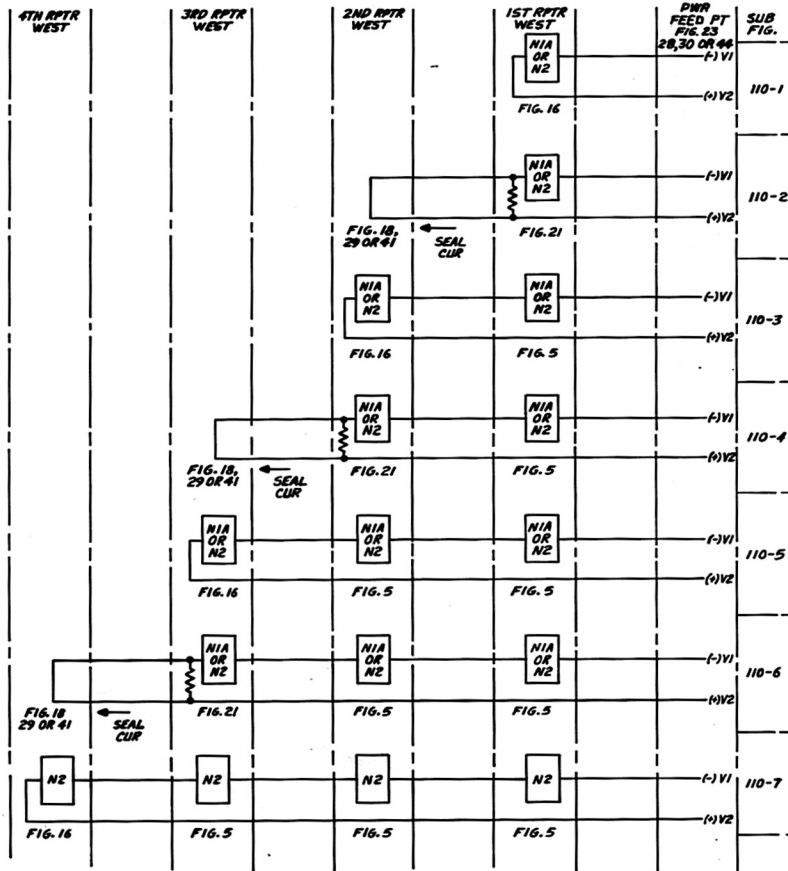


FIG. 111

POWER TRANSMITTED EAST TO N1A OR N2 REPEATERS ONLY
SEE NOTE 105

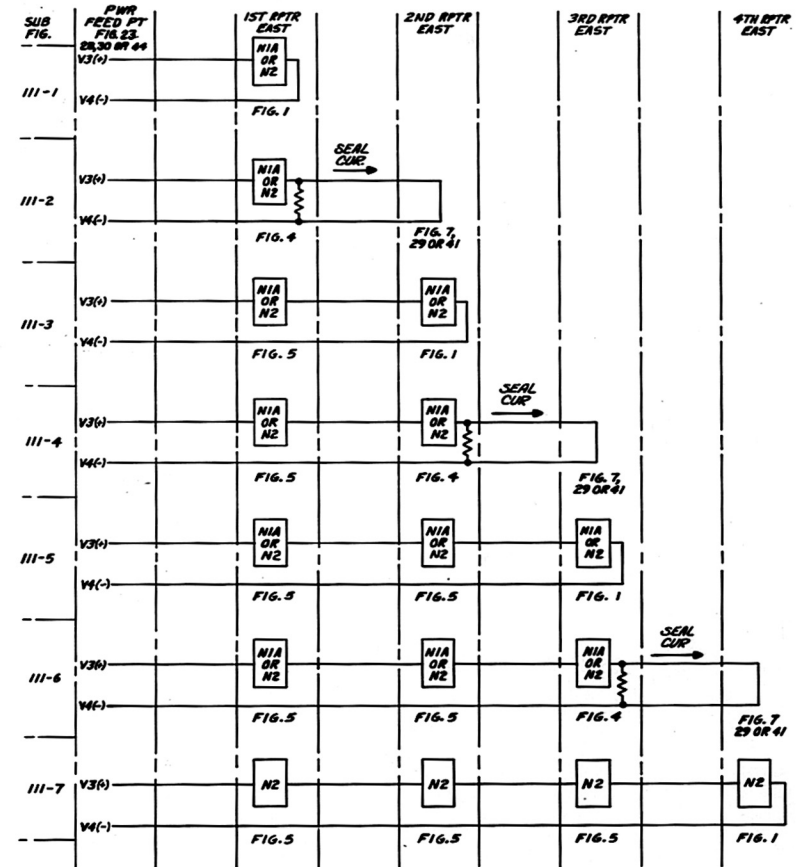


FIG. 112
POWER TRANSMITTED WEST TO N1A OR N2 REPEATERS AND 240 TYPE AMPLIFIERS
SEE NOTES 104, 105, 121 & 302

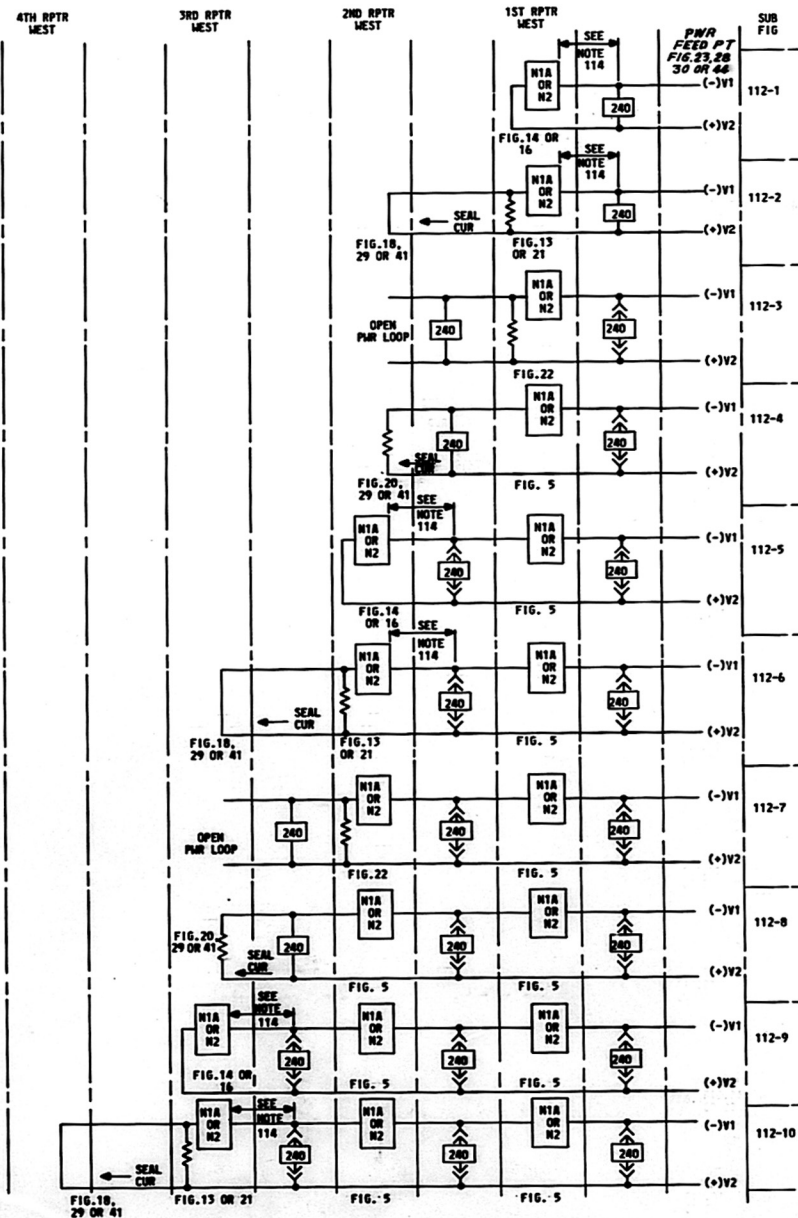
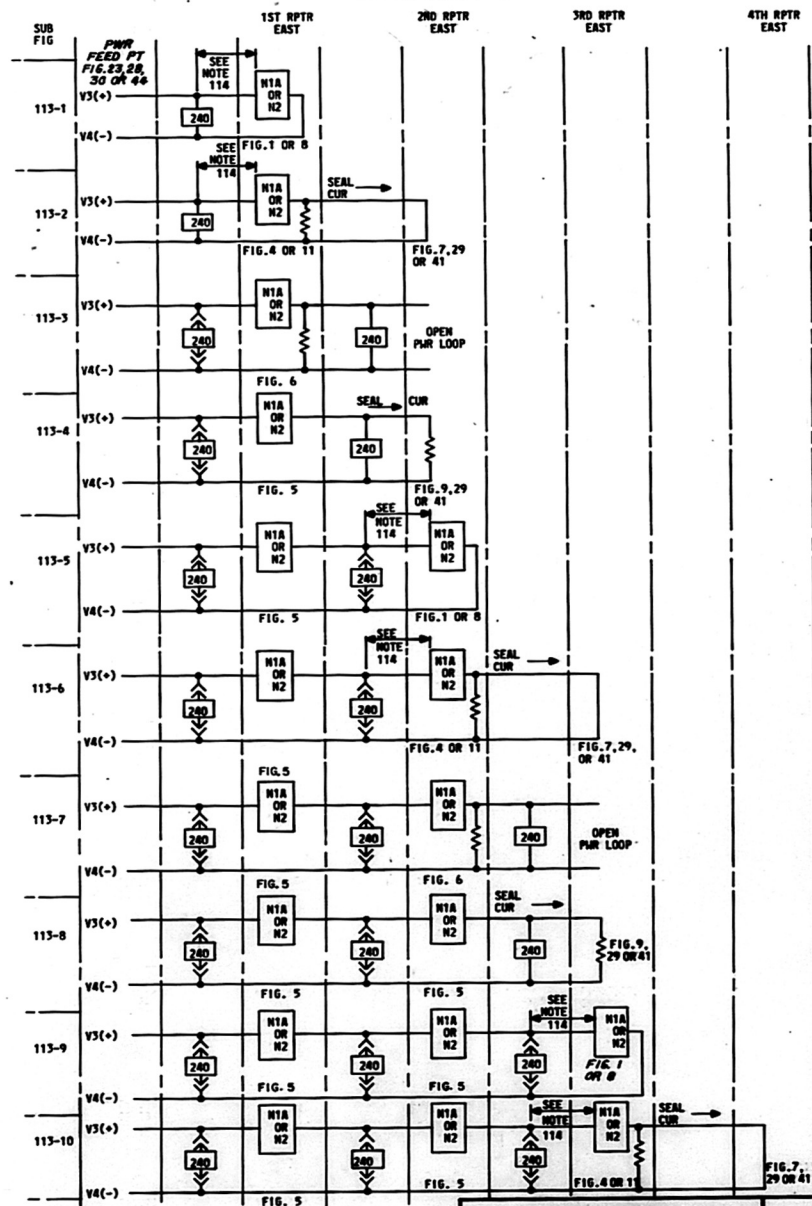


FIG. 113
POWER TRANSMITTED EAST TO N1A OR N2 REPEATERS AND 240 TYPE AMPLIFIERS
SEE NOTES 104, 105 & 302



APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, N2, ONT & ON2 REPEATERS

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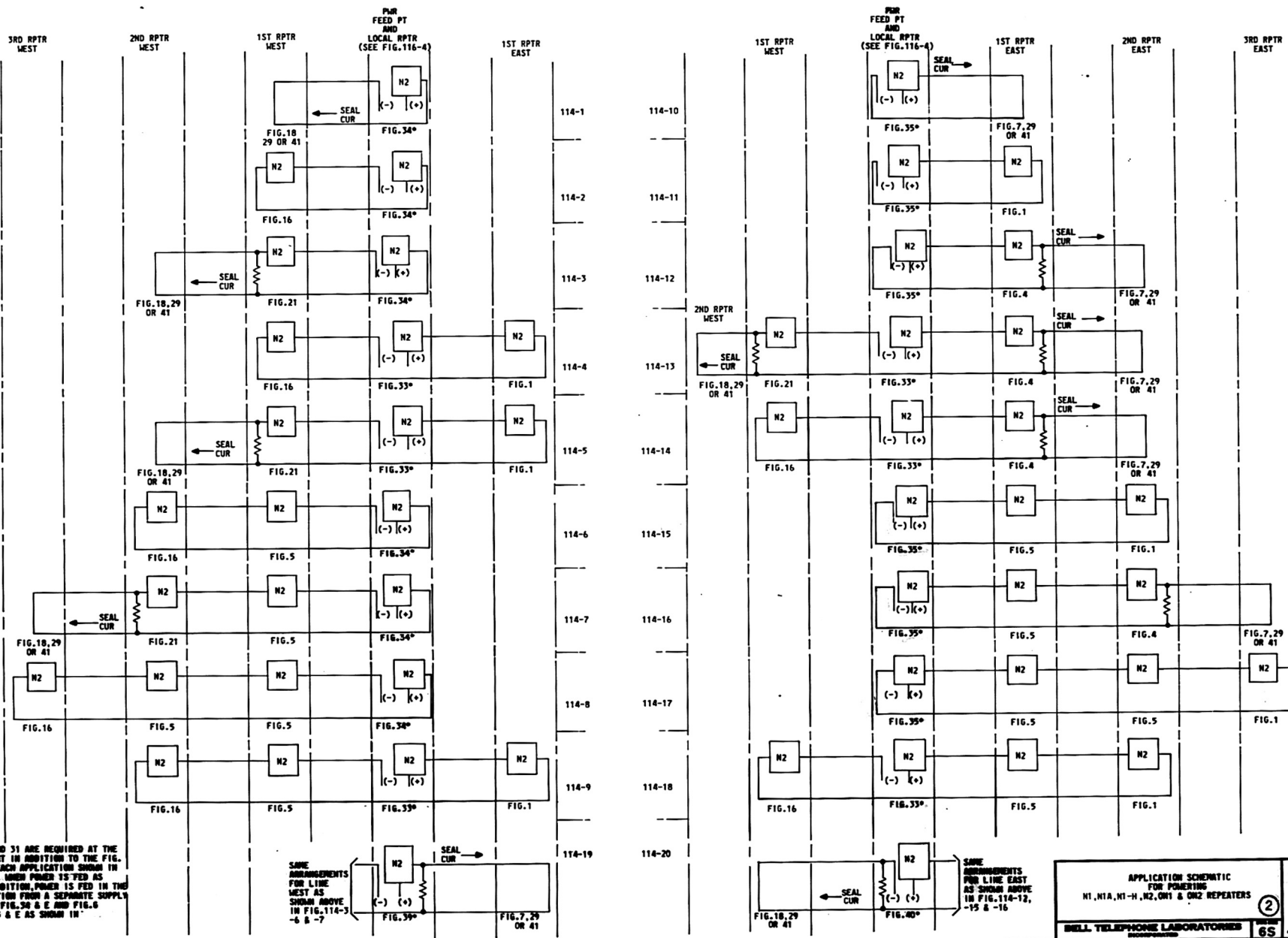
9B

68
68

30-97272-01-7

FIG. 114

POWER TRANSMITTED EAST AND/OR WEST TO W2 REPEATERS ONLY
INCLUDING THE LOCAL W2 RPTR IN THE PWR LOOP
(SEE NOTES 103,105,119 & 121)



*FIGURES 23, E AND 31 ARE REQUIRED AT THE POWER FEED POINT IN ADDITION TO THE FIG. SPECIFIED FOR EACH APPLICATION SHOWN IN FIGS. 114 & 115. WHEN POWER IS FED AS SHOWN AND, IN ADDITION, POWER IS FED IN THE OPPOSITE DIRECTION FROM A SEPARATE SUPPLY, FIG. F REPLACES FIG. 30 & E AND FIG. 6 REPLACES FIG. 35 & E AS SHOWN IN FIG. 114-5.

SAVE
ARRANGEMENTS
FOR LINE
WEST AS
SHOWN ABOVE
IN FIG. 114-3
-6 & -7

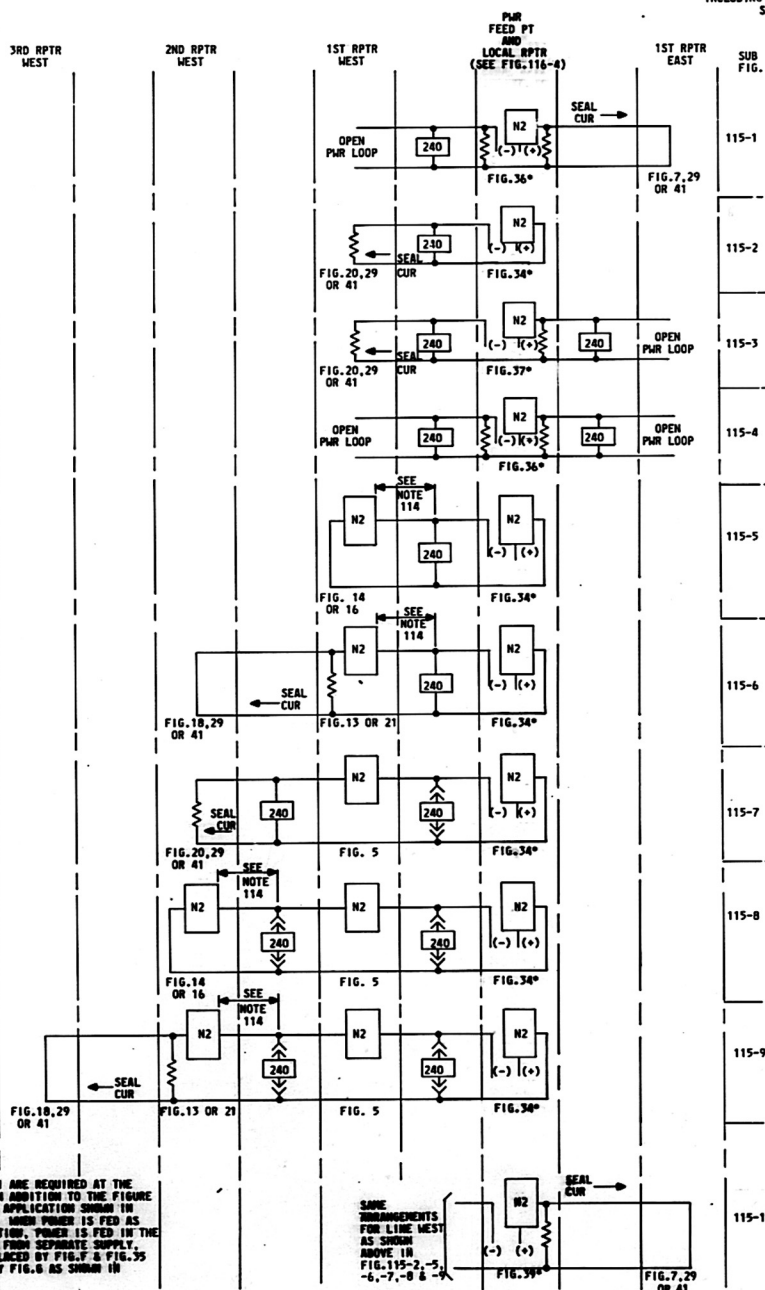
SAVE
ARRANGEMENTS
FOR LINE EAST
AS SHOWN ABOVE
IN FIG. 114-12,
-15 & -16

**APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, N2, OM1 & OM2 REPEATERS**

② SD-97272-01-8

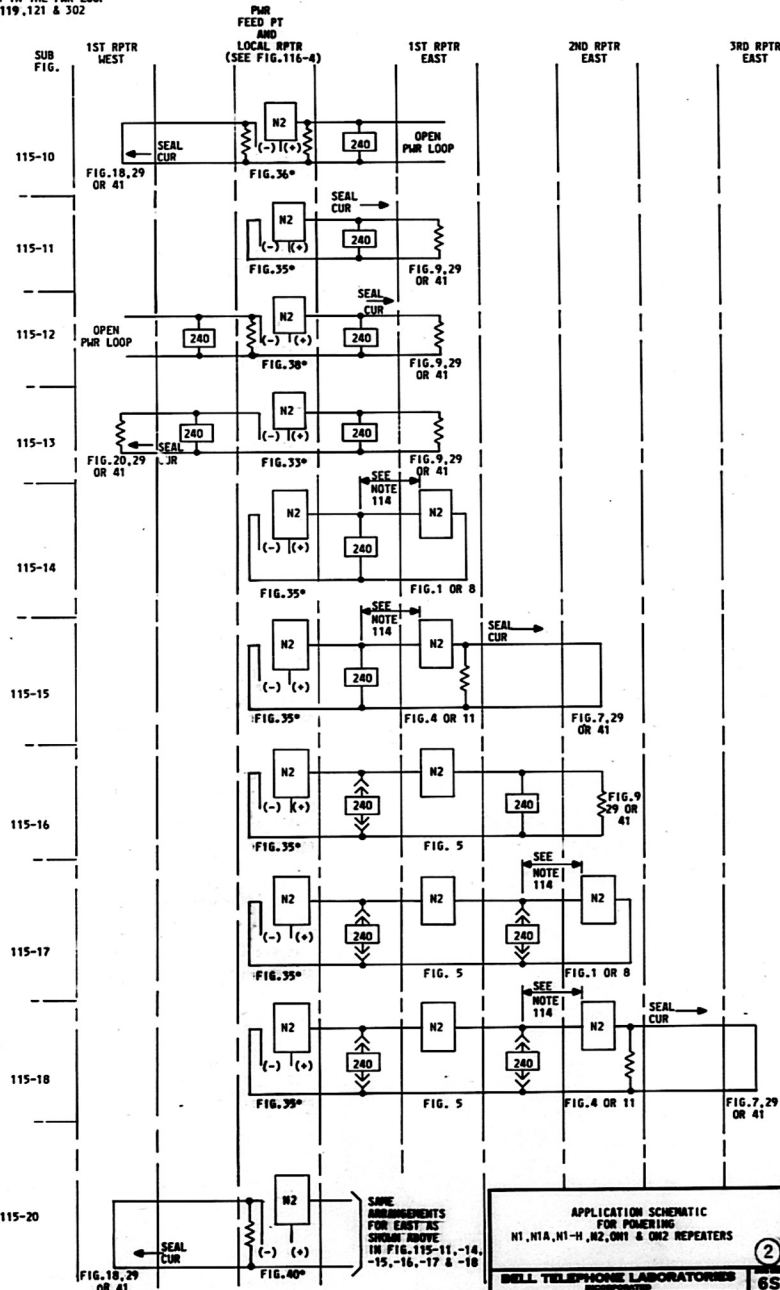
9E

POWER TRANSMITTED EAST AND/OR WEST TO N2 REPEATERS AND 240 TYPE AMPLIFIERS
INCLUDING THE LOCAL N2 RPTR IN THE PWR LOOP
SEE NOTES 104, 105, 119, 121 & 302



*FIGURES 23, E AND 31 ARE REQUIRED AT THE POWER FEED POINT IN ADDITION TO THE FIGURE SPECIFIED FOR EACH APPLICATION SHOWN IN FIGURES 114 & 115. WHEN POWER IS FED AS SHOWN AND, IN ADDITION, POWER IS FED IN THE OPPOSITE DIRECTION FROM SEPARATE SUPPLY, FIG. 34 & E ARE REPLACED BY FIG. F & FIG. 35 & E ARE REPLACED BY FIG. G AS SHOWN IN FIG. 116-3.

SAME
 ARRANGEMENT
 FOR LINE 1
 AS SHOWN
 ABOVE IN
 FIG. 115-2
 -6, -7, -8



**APPLICATION SCHEMATIC
FOR POWERING
N1,N1A,N1-H,N2,ON1 & ON2 REPEATERS**

BELL TELEPHONE LABORATORIES

SD-97272-01-9A

FIG. 116
POWER CONNECTIONS AT LOCAL N2 REPEATER

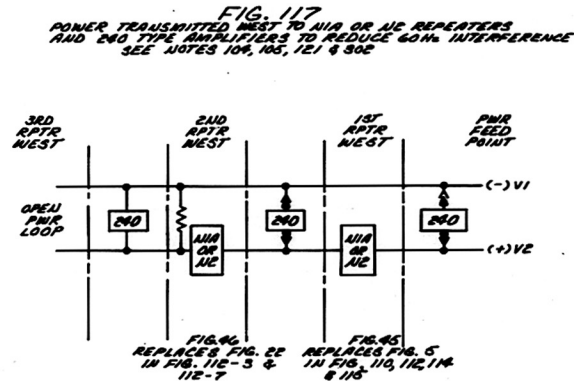
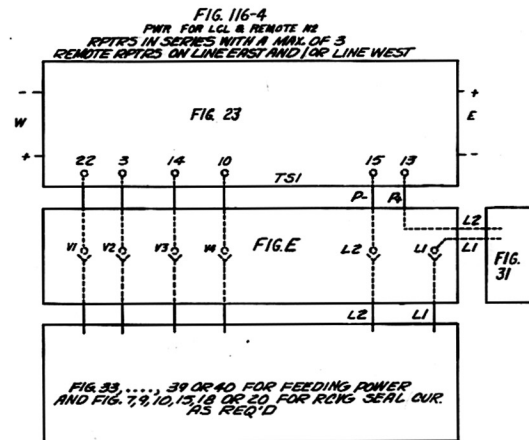
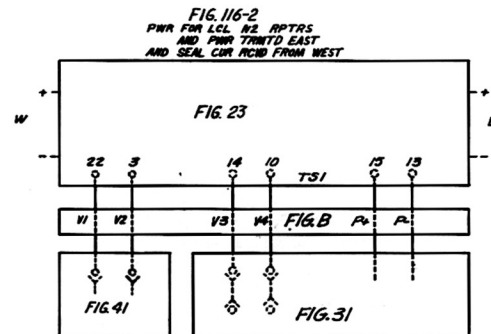
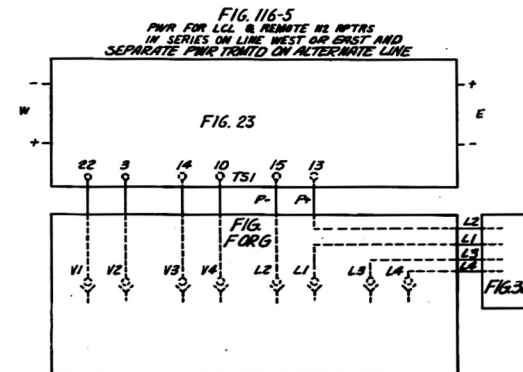
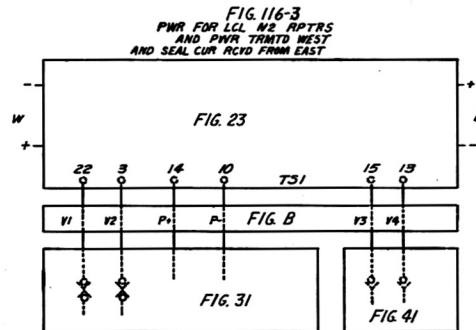
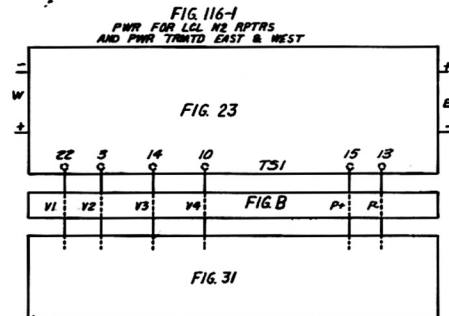


FIG. 118

POWER TRANSMITTED WEST TO N1-H REPEATERS ONLY
SEE NOTES 105 & 122

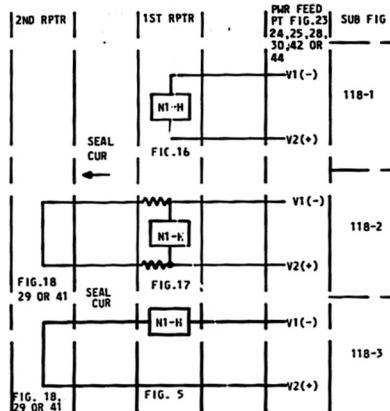


FIG. 119

POWER TRANSMITTED EAST TO N1-H REPEATERS ONLY
SEE NOTES 105 & 122

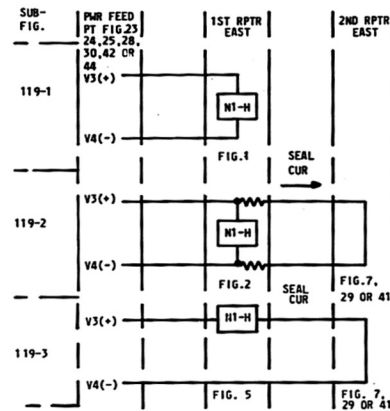


FIG. 120

POWER TRANSMITTED WEST TO N1-H REPEATERS
AND 240 TYPE AMPLIFIERS
SEE NOTES 105 & 302

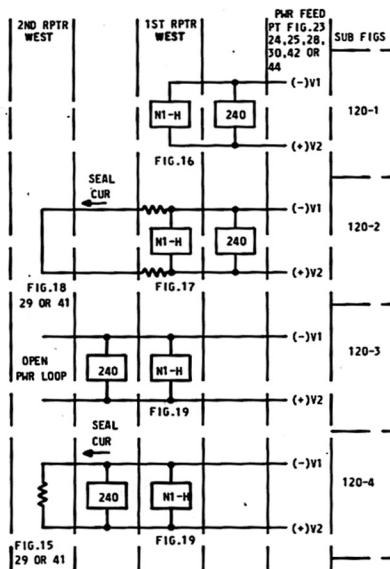
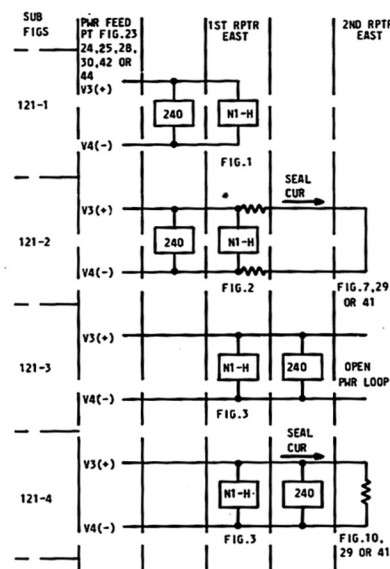


FIG. 121

POWER TRANSMITTED EAST TO N1-H REPEATERS
AND 240 TYPE AMPLIFIERS
SEE NOTES 105 & 302



APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, ON1 & ON2 REPEATERS

BELL TELEPHONE LABORATORIES
INCORPORATED

SD-97272-01-9C

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FIG 122 (SPECIAL)(MD)

POWER TRANSMITTED WEST TO TWO TANDEN POWERED
N1-H REPEATERS WITH OR WITHOUT 240 TYPE AMPLIFIER
AND/OR SEALING CURRENT
SEE NOTES 104,119,121,122,124 & 302

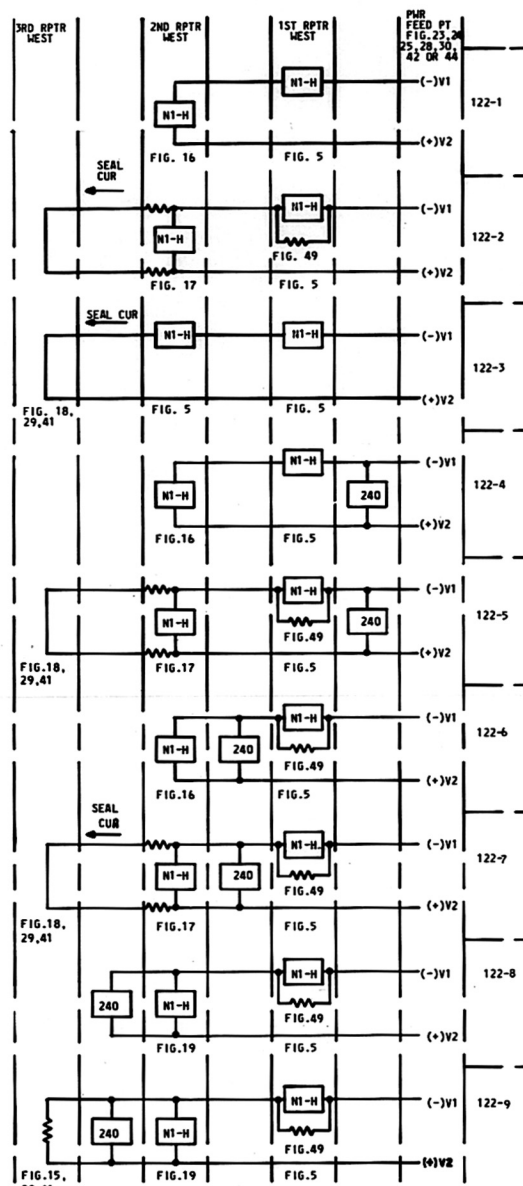
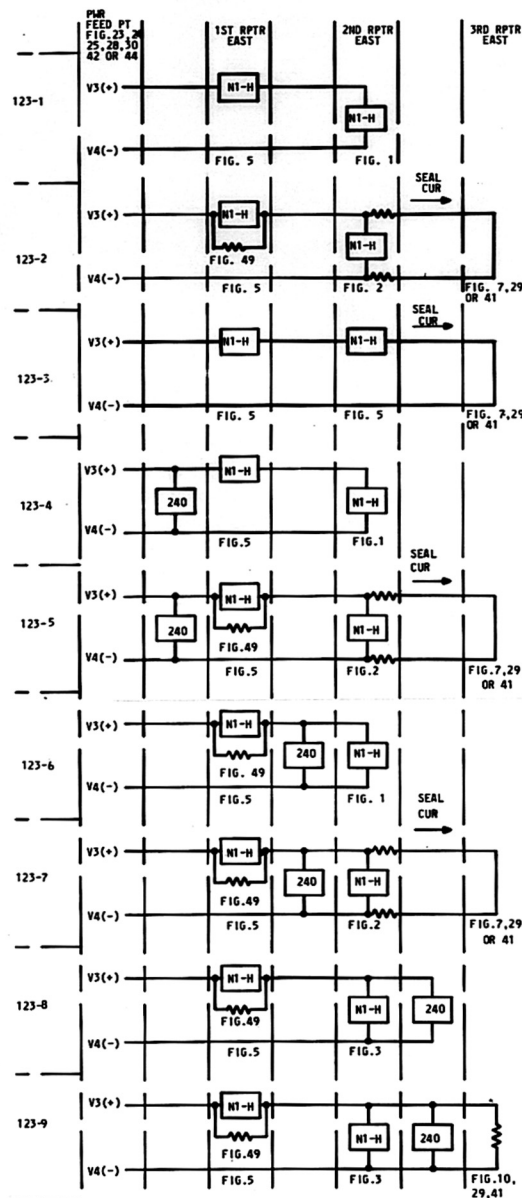


FIG 123 (SPECIAL)(MD)

POWER TRANSMITTED EAST TO TWO TANDEN POWERED
N1-H REPEATERS WITH OR WITHOUT 240 TYPE AMPLIFIERS
AND/OR SEALING CURRENT
SEE NOTES 104,119,121,122,124 & 302



APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, N2, ON1 & ON2 REPEATERS

BELL TELEPHONE LABORATORIES
INCORPORATED

SD-97272-01-9D

65

FIG. 124

POWER TRANSMITTED WEST TO TWO TANDEN POWERED
N1-H REPEATERS WITH OR WITHOUT 240 TYPE AMPLIFIER
AND/OR SEALING CURRENT
SEE NOTES 104, 122, 125 & 302

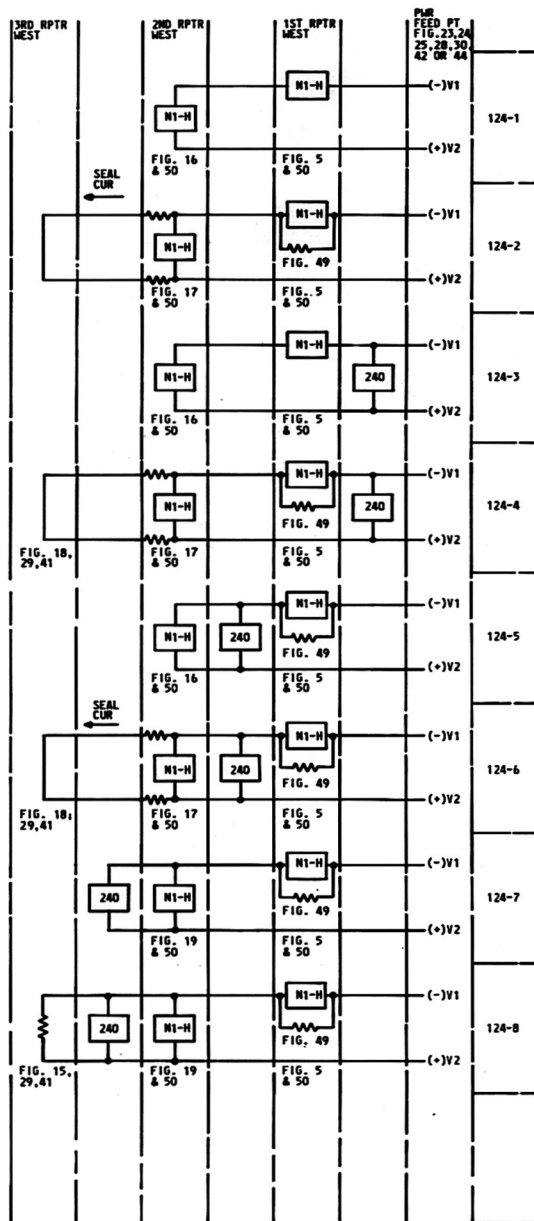
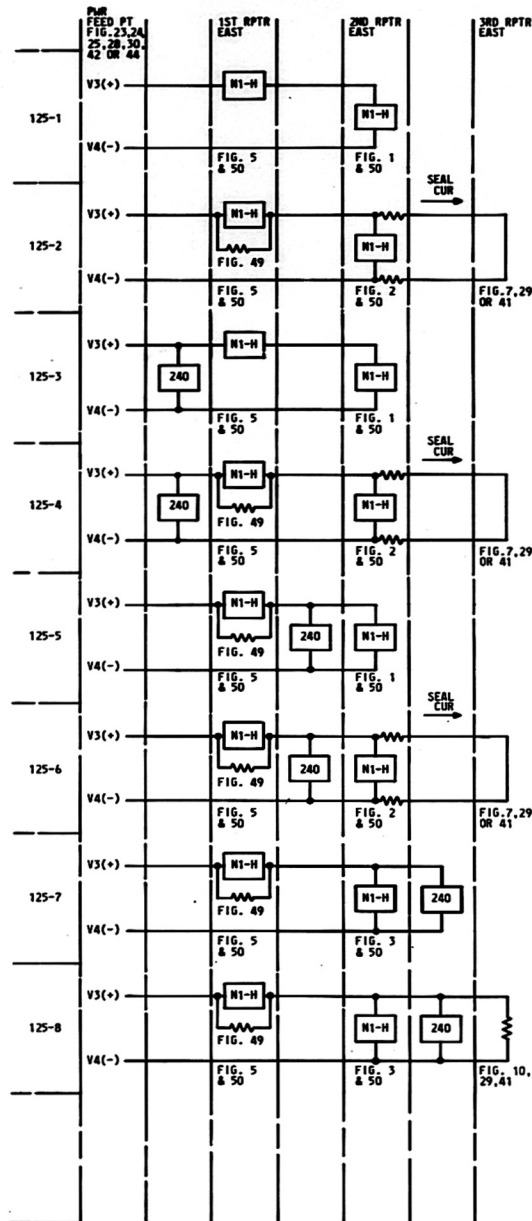


FIG. 125

POWER TRANSMITTED EAST TO TWO TANDEN POWERED
N1-H REPEATERS WITH OR WITHOUT 240 TYPE AMPLIFIERS
AND/OR SEALING CURRENT
SEE NOTES 104, 122, 125 & 302



APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, N2, ON1 & ON2 REPEATERS

BELL TELEPHONE LABORATORIES
INCORPORATED

65

SD-97272-01-9E

11B

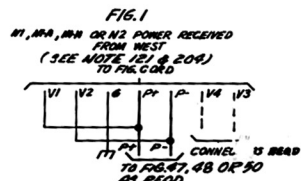


FIG. 2
N1A OR N1H POWER RCVD FROM WEST &
SEALING CURRENT TRMTD TO EAST
(SEE NOTE 113)

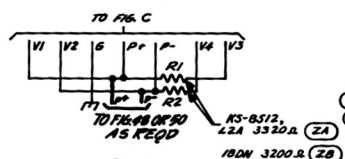


FIG. 3
N1A OR N1H POWER RCVD FROM WEST & FS
AMPL. POWER TRMTD TO EAST

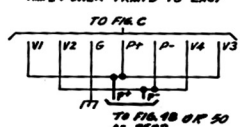


FIG. 4
N1-A OR N2 POWER RCVD FROM WEST &
SEALING CURRENT TRMTD TO EAST
(SEE NOTES 113, 121 & 204)
TO FIG. C OR D

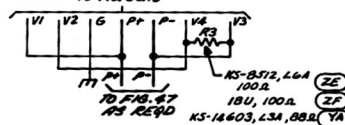


FIG. 5
N1-A, N1-H OR N2 POWER RCVD FROM WEST &
TRMTD TO EAST OR RCVD FROM
EAST & TRMTD TO WEST
(SEE NOTES 121 & 204)
TO FIG. C OR D

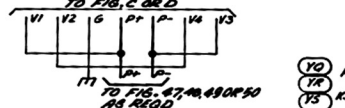


FIG. 6
N1A OR N2 POWER RCVD FROM WEST &
FS AMPL. POWER TRMTD TO EAST
WITHOUT SEALING CURRENT
(SEE NOTES 113, 121 & 204)
TO FIG. C OR D

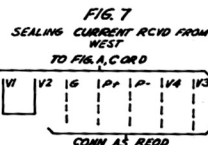
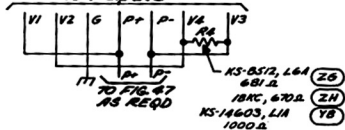


FIG. 8
N1A OR N2 POWER RCVD FROM WEST (SEE
NOTES 113, 114, 121 & 204)
TO FIG. C OR D

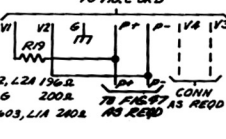


FIG. 9
SEALING CURRENT RCVD FROM WEST
(SEE NOTE 113)
TO FIG. A, C OR D

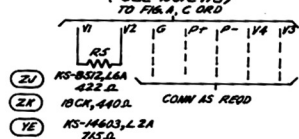


FIG. 10
SEALING CURRENT RCVD FROM WEST
(SEE NOTE 113)
TO FIG. A, C OR D

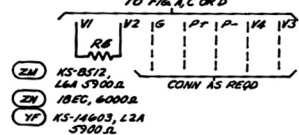


FIG. 11
N1A OR N2 POWER RCVD FROM WEST &
SEALING CURRENT TRMTD TO EAST
(SEE NOTES 113, 114, 121 & 204)
TO FIG. C OR D

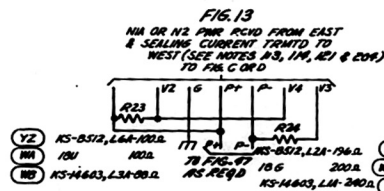
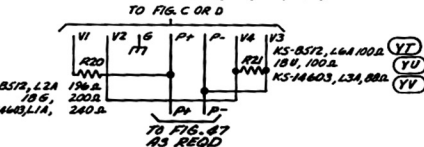


FIG. 14
N1A OR N2 POWER RCVD FROM EAST
(SEE NOTES 113, 114, 121 & 204)
TO FIG. C OR D

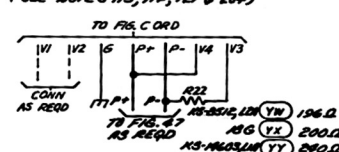


FIG. 15
SEALING CURRENT RCVD FROM EAST
(SEE NOTE 113)
TO FIG. A, C OR D

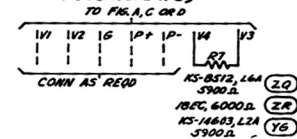


FIG. 16
N1, N1A, N1H OR N2 POWER RCVD FROM EAST
(SEE NOTES 113 & 204)
TO FIG. C OR D

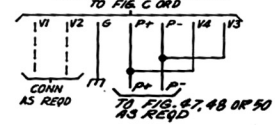


FIG. 17
N1A OR N2 POWER RCVD FROM EAST &
SEALING CURRENT TRMTD TO WEST
(SEE NOTE 113)
TO FIG. C

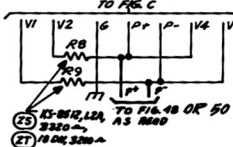


FIG. 18
SEALING CURRENT RCVD FROM EAST
(SEE NOTE 113)
TO FIG. A, C OR D

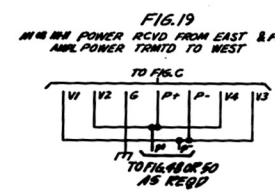
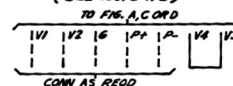


FIG. 20
SEALING CURRENT RCVD FROM EAST
(SEE NOTE 113)
TO FIG. A, C OR D

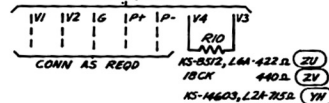


FIG. 21
N1A OR N2 POWER RCVD FROM EAST &
SEALING CURRENT TRMTD TO WEST
(SEE NOTES 113, 121 & 204)
TO FIG. C OR D

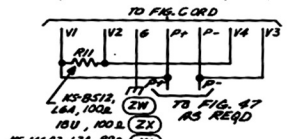


FIG. 22
N1A OR N2 POWER RCVD FROM EAST & FS
AMPL. POWER TRMTD TO WEST WITHOUT
SEALING CURRENT (SEE NOTES
113, 121 & 204)
TO FIG. C OR D

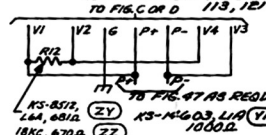


FIG. 33
POWER FOR LOCAL N2 RPTTR & TRMTD
EAST & WEST TO N2 RPTTR & SEAL CUR
TRMTD WEST
TO FIG. E

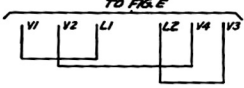


FIG. 34
POWER FOR LOCAL N2 RPTTR & TRMTD
EAST TO N2 RPTTR & FS AMPL.
TO FIG. E

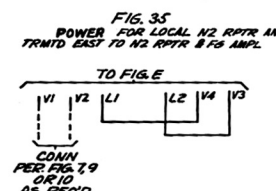
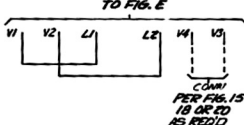


FIG. 36
POWER FOR LOCAL N2 RPTTR & TRMTD
EAST & WEST TO FS AMPL.
TO FIG. E

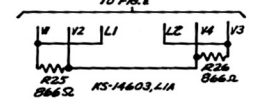


FIG. 37
POWER FOR LOCAL N2 RPTTR & TRMTD
EAST TO FS AMPL. & WEST TO FS AMPL. & SEAL CUR
TRMTD WEST
TO FIG. E

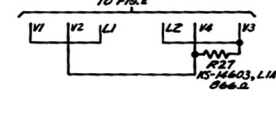


FIG. 38
POWER FOR LOCAL N2 RPTTR & TRMTD
WEST TO FS AMPL. & EAST TO FS AMPL. & SEAL CUR
TRMTD EAST
TO FIG. E

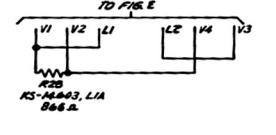


FIG. 39
POWER FOR LOCAL N2 RPTTR & TRMTD
WEST TO N2 RPTTR & SEAL CUR
TRMTD EAST
TO FIG. E

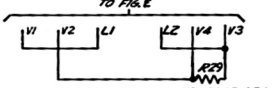
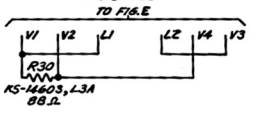


FIG. 40
POWER FOR LOCAL N2 RPTTR & TRMTD
EAST TO N2 RPTTR & SEAL CUR
TRMTD WEST
TO FIG. E



F16.23
POWER CONNECTIONS ON H1, H1A OR H2 REPEATER
MOUNTING BRACKET SEE NOTE 102 & 303

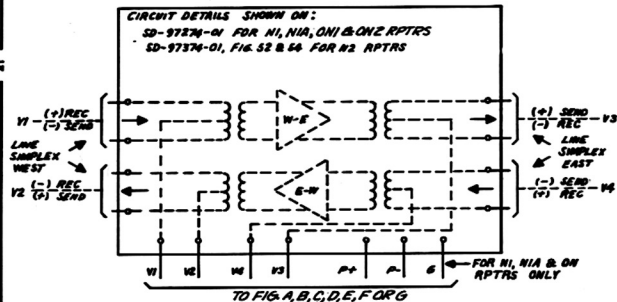


FIG. A
POWER CONNECTIONS FOR HI OR NM RPTRS
LOCALLY POWERED

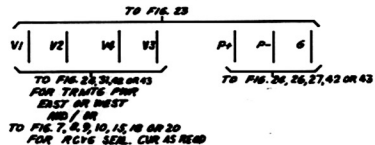


FIG. B
POWER CONNECTIONS FOR H2 REPEATERS
LOCALLY POWERED
(SEE NOTE 118 & FIG. 116)
TO FIG. 23

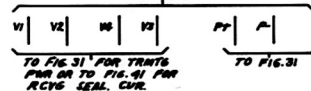


FIG. C
POWER CONNECTIONS FOR HI OR HM REPEATERS
REMOTELY POWERED

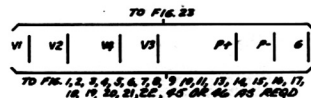


FIG. D
POWER CONNECTIONS FOR 82 REPEATERS
REMOTELY POWERED
SEE NOTE 206
TO FIG. 23

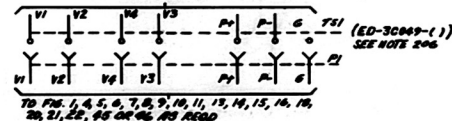


FIG. E
POWER CONNECTIONS FOR N2 REPEATERS
-LOCAL RPTR POWERED IN SERIES
WITH REMOTE REPEATERS
(SEE FIG. 116 & NOTE 207)

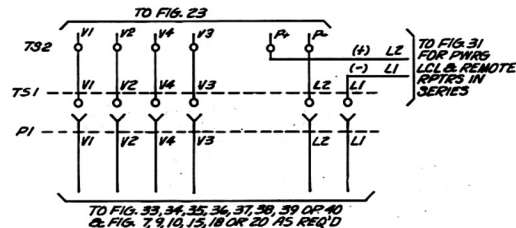


FIG. F
POWER CONNECTIONS FOR NZ REPEATERS
-LOCAL RPTR POWERED IN SERIES
WITH REMOTE RPTRS ON LINE WEST
& SEPARATE PWR TRMTO ON LINE EAST
(SEE FIG. 11G)

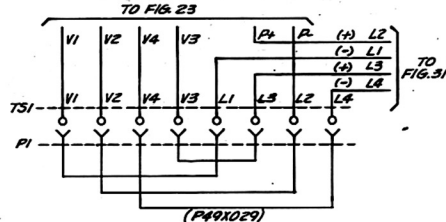


FIG. G
POWER CONNECTIONS FOR N2 REPEATERS
-LOCAL RPTR POWERED IN SERIES
WITH REMOTE RPTRS ON LINE EAST
& SEPARATE PWR TRMTO ON LINE WEST
(SEE FIG. 11G)

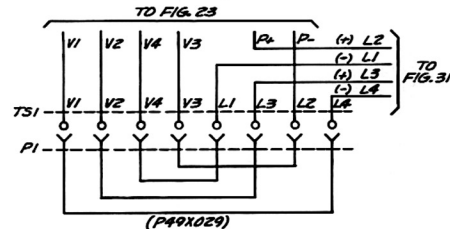


FIG. 24
LOCAL & LINE POWER CIRCUIT
IN AN NI OR NIA RPTR BAY
(SUPERSEDES CKT SHOWN IN FIGS.
42 & 43) (SEE NOTE 111)

FUSE & ALM CKT FOR LOCAL RPTR
WITH LINE FEED TO REMOTE RPTR
SD-9762-01

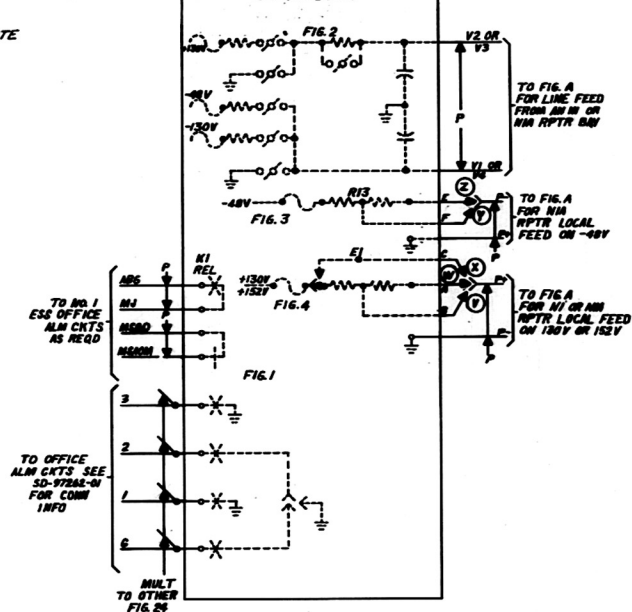


FIG. 25
LOCAL POWER CIRCUIT
IN AN N2, N1A, OR N1B REPTER BAY
(SUPERSEDES CKT SHOWN IN FIG. 42 & 43)
SEE NOTE 112

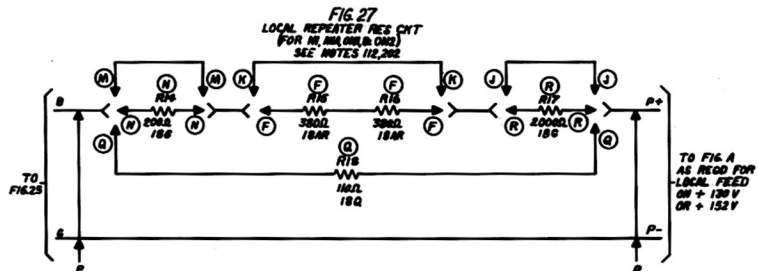
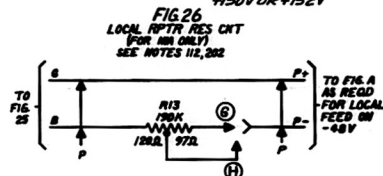
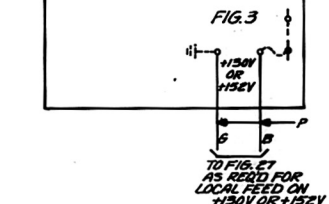
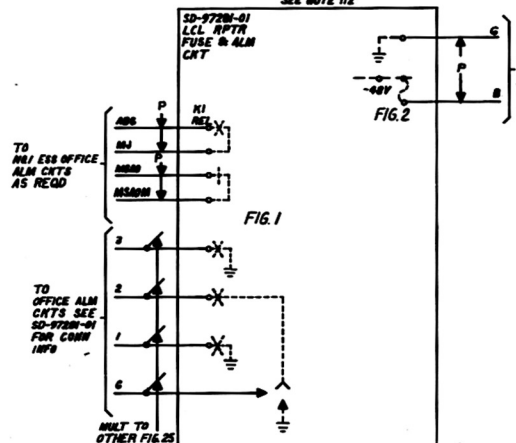


FIG. 28
LINE POWER CIRCUIT
IN AN N2 LINE BUILD-OUT BAY
(FOR FEEDING REMOTE "N" RPTRS)

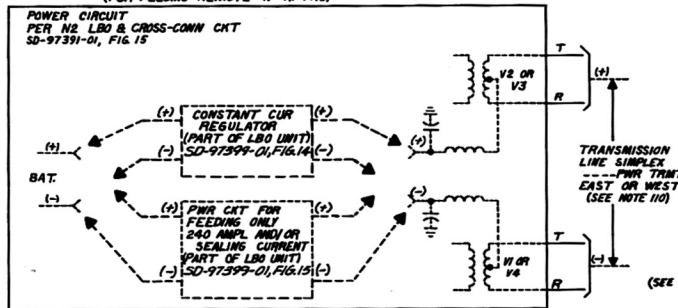


FIG. 30
LINE POWER CIRCUIT
IN AN N2 OR N3 CARRIER TERMINAL
FOR FEEDING REMOTE "N" RPTRS

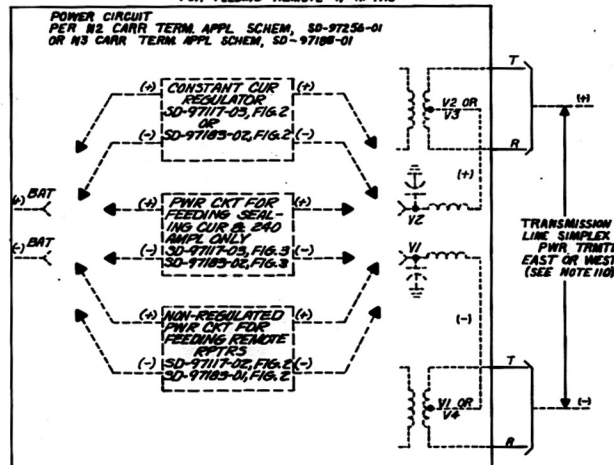


FIG. 31
LOCAL LINE POWER CIRCUIT
IN AN N2 RPTR BAY OR IN A MISC INTD ASSEMBLY

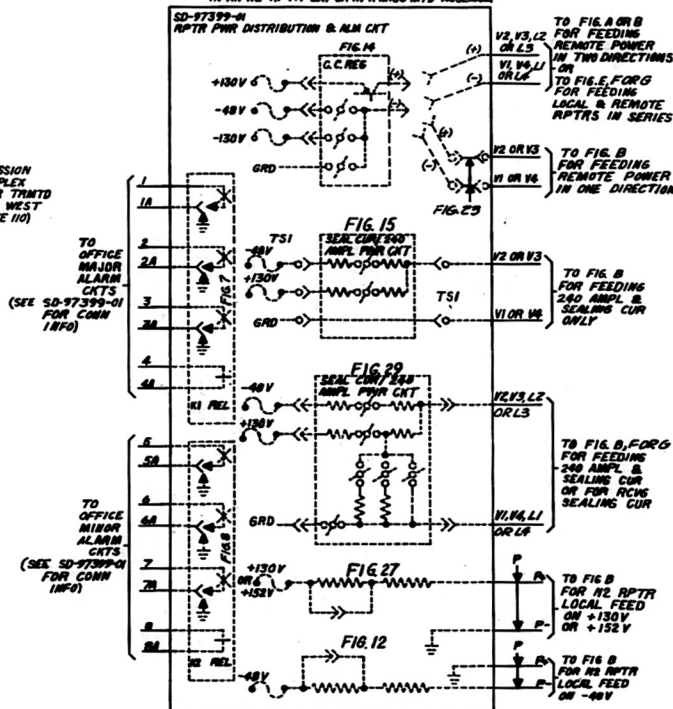
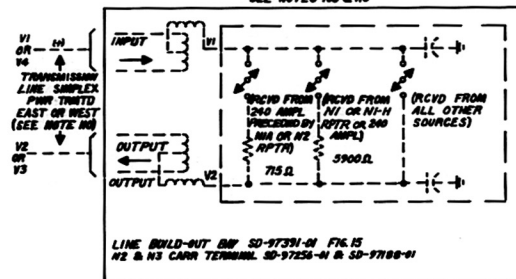


FIG. 29
SEALING CURRENT TERMINATION
FOR SEAL CUR RCVD AT A
TERMINAL OR LINE BUILD-OUT BAY
SEE NOTES 116 & 110



APPLICATION SCHEMATIC
FOR POWERING
N1, N1A, N1-H, N2, ON1 & ON2 REPEATERS

BELL TELEPHONE LABORATORIES
INCORPORATED

2

6S

SD-97272-01-12

10B

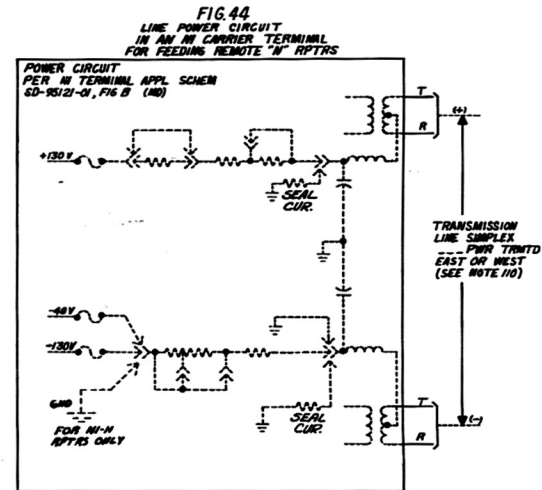
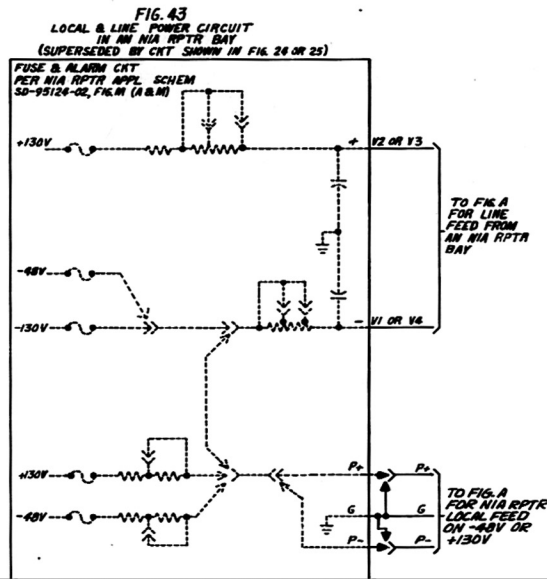
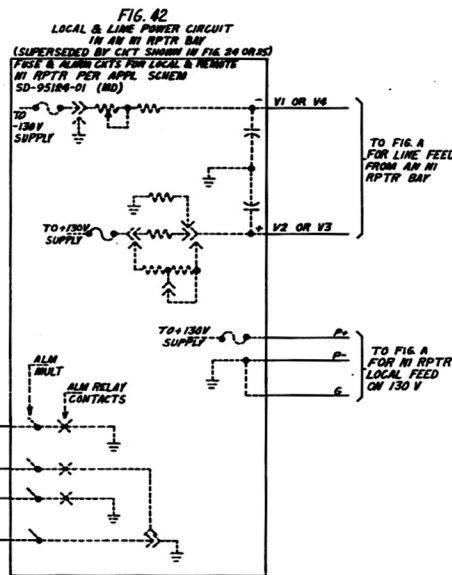


FIG. 46
NIA OR NIE PWR RCD FROM EAST & FG AMPL
PWR TRMTD TO WEST - USED ONLY TO REDUCE 60 HZ INTERFERENCE
(SEE NOTES 113, 121, & 204)

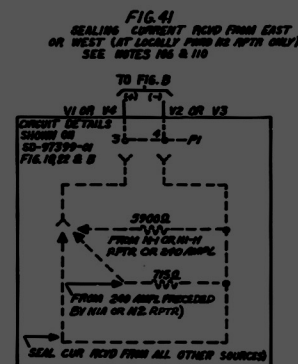


FIG. 47
60 HZ INTERFERENCE
REDUCTION CAPACITOR
NIA OR NIE RPTR ONLY
(SEE NOTE 181)



FIG. 45
NIA OR NIE PWR RCD FROM EAST &
TRMTD TO WEST - USED ONLY TO REDUCE
60 HZ INTERFERENCE
(SEE NOTES 121 & 204)

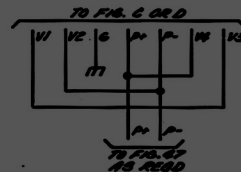


FIG. 48
60 HZ INTERFERENCE
REDUCTION CAPACITOR
NIA OR NIE RPTR ONLY



FIG. 49
CURRENT BYPASS RESISTOR
FOR TRANSMISSION
OF NI-N RPTRS
(SEE NOTE 122 & 123)
TO FIG. 5 AS REQ'D

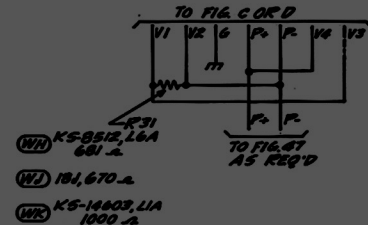
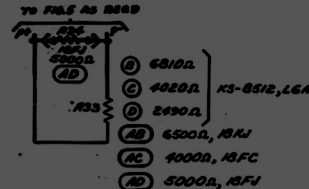
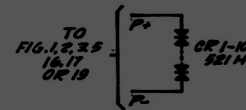


FIG. 50
VOLTAGE REGULATION AND SUPPLEMENTARY
SURGE PROTECTION DIODE PACK (FOR
CONNECTION TO REPEATER MOUNTING BRACKET NI-N
TANDEN POWERED REPEATER)
EP-3675-1
(SEE NOTE 123)



APPLICATION SCHEMATIC
FOR POWERING
NI, NIA, NI-N, N2, ON1 & ON2 REPEATERS

2

BELL TELEPHONE LABORATORIES

6S

SD-97272-01-13

11B

SD-97272-01-13