"PULSE* 120" – SG-1A

ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE

CABLE CONNECTIONS TO MISCELLANEOUS EQUIPMENT

CONTENTS PAGE

1. GENERAL

1.01 This section describes the cable arrangements for connecting traffic measurement, paging, recorded telephone dictation 24V4 repeaters, dial long line circuit equipment, music-on-hold trunks and message registration equipment to the PULSE 120 Electronic Private Automatic Branch Exchange (EPABX). Details of how to extend the console audible signal to a remote location and reserve power supply alarm connections to the console are also described.

1.02 No space is provided in the EPABX cabinet to accomodate miscellaneous equipment. This equipment must be mounted outside the cabinet.

1.03 The miscellaneous trunks are selected by dialing the access code 81 through 87 whichever code is assigned to the trunk. With 3-digit station line numbering, trunks assigned to access codes 81, 85, 86, and 87 may be selected by dialing the unit digit only, except in systems configured for hotel/motel service. Trunks assigned access code 84 can be selected by dialing digit 4, except in systems equipped with call pickup and/or call forward or in systems configured for hotel/motel services. The access codes 80, 82, 83, 88, and 89 apply to both the 2-digit and 3-digit station line numbering arrangements.

1.04 For the lead assignments in the cable from the EPABX to the miscellaneous equipment see Section 553-5011-203.

1.05 All preliminary installation procedures, see Section 553-5011-202, and class-of-service selections, see Section 553-5011-204, must be completed before connecting miscellaneous equipment to the EPABX.

REASON FOR REISSUE

1.06 This section is reissued to add information on the music-on-hold trunk.

MISCELLANEOUS POWER SUPPLY

1.07 The PULSE 120 EPABX can deliver a maximum of 1.5 amperes at –48 volts for power supplies to miscellaneous equipment. Power is distributed through fuses –48F32 and –48F33. These fuses may be bridged at the cross-connecting terminal when maximum power is required.

1.08 There are several bridging points for both fuses on connecting block P130 at the cross-connecting terminal. These bridging points allow the use of bunched cable pairs, when necessary, to minimize the voltage drop in the miscellaneous power leads from the cabinet to the miscellaneous equipment. The pair numbering and color coding of the cable linking the cabinet to P130 are given in Table A.

1.09 The current drain from the EPABX –48 volt supply and the external power supplies required by the miscellaneous equipment are given in Table B.

2. CABLE CONNECTIONS

TRAFFIC MEASUREMENT

2.01 The interface between the PULSE 120 EPABX and traffic measuring equipment is designed to use the ALSTON† traffic usage recorder with the 80321 or 80152 type traffic scanner.

2.02 The interface function is provided by QPJ74 and QPJ78 type circuit packs. Male connectors (KS-16671-L1) are fitted on the handles of each circuit pack to allow the plug-in connection of the traffic measuring equipment connector cables. The ground connector on the traffic usage recorder is bridged to the EPABX ground at the cross-connecting terminal.

2.03 The two types of circuit pack permit the following measurement of traffic parameters.

(a) ***Traffic Measurement No. 1, QPJ74 Type.*** (Connector location 3 on the control shelf.)

(1) ***Universal or Miscellaneous Trunk Overflow Requests.*** A peg count of overflow tone requests is recorded for busy trunks assigned to access codes 81 through 87. Each access code is monitored separately.

(2) ***Central Office (CO) Trunk Overflow Requests.*** A peg count of overflow tone requests is recorded when all CO trunks are busy.

(3) ***DIGITONE Receiver Requests.*** A peg count is recorded of all requests for the use of the DIGITONE* receivers.

(4) ***DIGITONE Receiver Waiting Count.*** A peg count is made of all requests waiting more than 2.25 seconds to use DIGITONE receivers.

(5) ***Line Dial "0" Usage.*** A peg count is made of all dial "0" calls to the attendant from unrestricted, semirestricted, and fully restricted station lines. Only calls to the attendant, which are not processed by the attendant, are excluded from the peg count.

(6) ***Console Work Time.*** The period when any loop key on the attendant console remains depressed (illuminated) is measured. This measurement indicates the active time of the console.

(7) ***Time Slot Usage.*** A peg count is made when 1, 2, 4, 8, 16 and all time slots are busy.

(b) ***Traffic Measurement No. 2, QPJ78 Type.*** (Connector location 1 on the control shelf, for trunks 1 through 15, and connector location 2 on the control shelf, for trunks 16 through 30.)

(1) ***Usage of Busy Trunks.*** The period when incoming (I/C) or outgoing (O/G) trunks are busy is measured on an individual basis.

(2) ***Trunk Requests.*** A peg count of I/C or O/G trunk seizures is made on an individual basis.

2.04 The traffic measurement circuit packs provide ground output signals for peg count and usage measurement.

2.05 A convenient length of 25-pair connector cable (A25B) is required to extend the leads from the QPJ74 type circuit pack to the traffic

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measuring equipment. The cable pairs at the equipment end of the cable should be terminated on a connecting block to facilitate connection of the clip-on (alligator) connector of the traffic usage recorder. The pin and color code assignments of the leads from the QPJ74 type circuit pack are given in Table C.

2.06 Similarly a 16-pair connector cable (A16QA) is required to extend the leads from each of the QPJ78 type circuit packs to the recorder. The pin and color code assignments of the leads from the QPJ78 type circuit packs are given in Tables D and E.

2.07 The 25-pair and 16-pair connector cables may enter the PULSE 120 EPABX cabinet through the rear of the base opening. These cables are placed behind the retaining bars attached to the inside of the cabinet rear panel and secured to the cable harness using cable ties to prevent the connector cables from obstructing the movement of slide 1. The female connectors are inserted in the male connectors on the circuit pack handles and held in position with spring clips. The weight of the connector cable on the connector is lessened by using a cable tie attached to the control shelf.

2.08 The recorder should be located in an area where:

- the noise produced by the machine will not cause annoyance
- interference to the machine by the subscriber will be minimized.

2.09 Most traffic usage recorders require a power supply of −48 volts dc at 2 amperes, not provided by the PULSE 120 EPABX. An auxiliary rectifier and a commercial power outlet, 115 volt, U ground type, must be provided to energize the recorder. The −48 volt dc supply from the rectifier to the traffic measurement circuit packs must not exceed −55 volts.

PAGING TRUNK

2.10 A maximum of five (four, if one or more QPJ181-type music-on-hold trunks are installed) paging trunks (QPJ75-type circuit packs) may be provided from the PULSE 120 EPABX. The circuit packs for the five trunks may be inserted only in connector locations 5 through 9 on trunk shelf 1. (See Section 553-5011-202.) When attendant preemption is required, the paging circuit pack is inserted in connector location 5 (trunk 11).

2.11 A paging trunk may be assigned with any access code, 81 through 87, and station lines or tie trunks may be denied access to the trunk by the insertion of diode pins in the class-of-service (COS) selection blocks on the EPABX control shelf. (See Section 553-5011-204.)

2.12 The busy condition of the paging trunk in connector location 5 is indicated by the illumination of the PAGE button on the attendant console.

2.13 The paging amplifier is mounted externally from the EPABX cabinet.

2.14 The speech path from the EPABX to the paging amplifier is made via the tip and ring leads in the connector cable from trunks 11 through 15 on trunk shelf 1 to connecting block P090 at the cross-connecting terminal (see Section 553-5011-203, Table B) and extended by paired cable to the amplifier. The associated trunk A1 lead, terminated on the P090 connecting block, provides an off-normal ground for switching external equipment on or off e.g., background music. Refer to Section 553-5011-204 for strapping instructions to energize the A1 signaling lead. The connection arrangement for the paging trunk is shown in Fig. 1, including the amplifier ground which must be connected to the EPABX system ground by a 10 AWG wire.

RECORDED TELEPHONE DICTATION TRUNK

2.15 The dictation trunk applique QPJ73 type circuit pack provides facilities for connecting a customer-provided dictation machine

to the PULSE 120 EPABX via a standard recorded telephone dictation trunk (RTDT).

2.16 Two dictation trunk appliques may be provided from the PULSE 120 EPABX and the required QPJ73 type circuit packs are inserted in connector locations 6 and 7 on trunk shelf. (See Section 553-5011-202.)

2.17 An applique may be assigned with a single access code or separate access codes (81 through 87) for each applique. Hunting is automatic if the trunk appliques are assigned a single access code. Station lines or tie trunks may be denied access to the trunk appliques. Access code assignment, access denial, and busy lamp indications are assigned by inserting diode pins and making strapping connections in the EPABX (see Section 553-5011-204). The busy lamp on the external dictation equipment can be extended to a spare lamp on the attendant console by providing a ground signal to the spare lamp lead (See Section 553-5011-203, Table B) from the dictation equipment.

2.18 The dial-controlled RTDT requires 0.75 ampere at –48 volts to operate. This power may be drawn from either the EPABX miscellaneous supply through fuses F32 and F33 (filtering may be neccesary), or a customer provided power supply.

2.19 The connection arrangements for rotary and DIGITONE dial controlled RTDT are given in Fig. 2 and 3.

2.20 The tip, ring, and sleeve leads from trunks 12 and 13 on trunk shelf 1 are extended in a connector cable to connecting block P090 at the cross-connecting terminal (see Section 553-5011-203, Table B). Paired cable from P090 completes the connection to the dictation equipment.

2.21 The tone, ringing, and power supplies required by the RTDT equipment are extended from the EPABX through connector cables to P130 at the cross-connecting terminal. These supply leads and the leads attached to the RTDT equipment have identical designations (see Table A, Fig. 2, and 3). Leads ***must*** be matched when connecting the RTDT to the EPABX at P130.

2.22 The strapping and wiring required in the dial and voice controlled dictation trunk units for options and features on the RTDT are listed in Table F (for SD-65788-01) and Table G (for SD-5E038-01). This information is extracted from the schematic drawings, other information contained in the SD is not applicable to an RTDT connected to the PULSE 120 EPABX.

2.23 The RTDT units referred to in Fig. 2 and 3 consist of the assembly wiring and equipment required for one unit.

2.24 When DIGITONE service is required, a J99289B-1 type DIGITONE receiver ust be provided for each J58827E-1 type RTDT unit. Two plug-in DIGITONE receivers are accommodated on a J99289A-1 type mounting shelf which requires three 2-inch by 23-inch mounting plate positions.

24V4 REPEATERS

2.25 The 24V4 repeater provides facilities for connecting a trunk QPJ69 type circuit pack to a 4-wire facility and permits the trunk to operate in the 4-wire mode.

2.26 The 24V4 repeaters are mounted outside from the PULSE 120 EPABX cabinet.

2.27 A repeater requires 0.036 ampere at –48 volts dc to operate. This power may be drawn from the EPABX miscellaneous supply through fuses F32 or F33 (Table A) or a customer-provided power supply.

2.28 The connection arrangements for a 24V4 repeater (J98615AJ-1 or J98615BJ-1/SD-97047-01) to an EPABX QPJ69 type trunk (11 through 15 and 26 through 30) operating in the 4-wire duplex signaling mode are given in Fig. 4 and 5.

2.29 The 24V4 repeater shelf (J98615AJ-1) consists of wiring and equipment requiring

one 2-inch by 23-inch mounting plate position and arranged to accommodate the following plug-in units for –48 V operation.

(a) ***Terminating Set, NE-1B.*** Provides 4-wire to 2-wire termination of trunk. The nominal impedance of 4-wire branches and the 2-wire trunk side is 600 Ω.

(b) ***Two Amplifiers NE-227 Type.***

(c) ***Plug NE-359 or -434 Type.*** Intended for use with 4-wire lines having 600 Ω impedance when equalization is not required.

or

Equalizer NE-359 Type. Intended for use in conjunction with NE-227 type amplifiers to equalize 19, 22, 24, and 26 AWG, loaded cable over the frequency range of 200 through 3000 Hz.

Note: These plug-in units are typical of those used when the trunk QPJ69 type circuit pack is operating in the 4-wire duplex signaling mode. For other types of connections see SD-97047-01.

DIAL LONG LINE CIRCUIT

2.30 The dial long line (DLL) circuit effectively increases the maximum supervisory range of a PULSE 120 EPABX station line.

2.31 A DLL unit requires 0.16 ampere at –48 volts dc to operate. This power may be drawn from the EPABX miscellaneous supply through fuses F32 or F33 (see Table A) when the unit is located near the EPABX (filtering may be necessary) or a customer provided supply when the unit is remotely located. The ringing supplies in both situations are supplied from the EPABX.

2.32 There are three different ringing arrangement options for the DLL circuit, as shown in Table I. The connection arrangements for near and remote DLL units are given in Fig. 6. The strapping and wiring options are given in Table H.

EXTENSION OF CONSOLE AUDIBLE SIGNAL

2.33 The tone signal on the attendant console may be extended to a remote location without effecting the normal operation of the console. The required circuit components are assembled using normal shop practice and the assembly is connected at the EPABX cross-connecting terminal as shown in Fig. 7. No modification is necessary to shelves on circuit packs in the PULSE 120 EPABX.

2.34 The following customer provided parts are required:

- a 12V relay with two make contacts
- a IN4385 diode or equivalent
- a bell or equivalent

2.35 The TG GND lead, which normally supplies a ground to operate the tone generator in the console, provides a path for the Remote Bell (RB) relay to operate. The operation of RB connects the ground on the GND CC lead to the console to operate the tone generator, and supplies an 86V ringing supply to the remote bell. The remote bell and tone generator sound simultaneously.

RESERVE POWER SUPPLY ALARM CONNECTIONS TO CONSOLE

2.36 When the PULSE 120 EPABX is equipped with a Lorain Guardac 102 GAB reserve power supply, the alarm indications from the supply may be extended to three spare lamps on the attendant console (Fig. 8). These lamps are wired to a 12 V power supply and need only the application of a ground to light them.

Note 1: The attachment of active devices to spare lamp leads is not recommended since all the available current is used to drive the lamps.

Note 2: The complete information on the reserve power supply is given in Lorain Catalog Form 2775 and Specification Guide Form 2795.

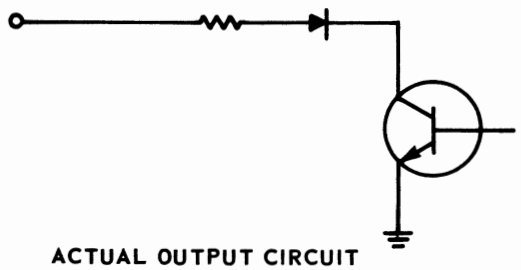
2.37 With circuit connected as shown in Fig. 8, the alarms will be indicated by those lamps in the lower display on the console.

2.38 Table J gives the normal state of each lamp and explains the alarm indications.

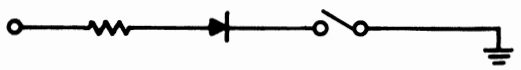
HOTEL/MOTEL MESSAGE REGISTRATION EQUIPMENT

2.39 Connections to message registration equipment are made at the cross-connecting terminal (Table K). Plugs P040, P050 and P060 provide the interconnection between the cross-connecting terminal and the Pulse 120 EPABX message registration circuitry. The total distance between the message registration equipment and the Pulse 120 EPABX should not exceed three hundred (300) feet.

2.40 The Pulse 120 EPABX is compatible with 24V dc or 48V dc electro-mechanical registers. Electronic message registration systems can be used provided they are compatible with the Pulse systems output circuit. This circuit is polarity-sensitive and, as shown in the following figure, appears as a diode in series with a switch connected to ground. The open-circuit voltage presented by the input leads of electronic message registration systems must be positive with respect to ground and no greater than 50V dc. The input circuit of the electronic system should have sufficient internal resistance to limit the current pulse into the Pulse output circuit to 60 mA.



ACTUAL OUTPUT CIRCUIT



EQUIVALENT OUTPUT CIRCUIT

2.41 Ground wires (14 AWG) must be provided between the system ground at the cross-connecting terminal and the ground terminals of message registration equipment and any external power supply. (See Section 553-5011-202, Para. 8.11).

2.42 The interconnection between trunk third wires (when used for message registration control) and the Pulse 120 EPABX are made at the cross-connecting terminal (Table L). One QPJ99-type circuit pack is required for 1 to 15 CO trunks, two QPJ99-type packs are required for 16 to 30 trunks. Plug 131 provides the interconnection between the cross-connecting terminal and the Pulse 120 EPABX.

2.43 One QPJ83* circuit pack is required for each installed line shelf. Administrative lines are not normally connected to message registration equipment.

2.44 Figure 9 shows the required connection to the message registration equipment. A diode across the coil of each electro-mechanical register must be installed as shown to protect the active circuitry in the Pulse 120 EPABX. The message registers used can be 24V dc or 48V dc (with an external power supply). A typical 48V electro-mechanical message registration system for up to 100 registers is the Northern Telecom MR-100-W or MR-100-IS. These systems are described in NEP 534-6001-200.

If it is desired to use message registers other than those manufactured by Northern Telecom, the following information provides guidance in selecting appropriate units.

1) Minimum Coil Resistance

24V Application	300 Ohms
48V Application	600 Ohms

2) Maximum Operate Time

Either voltage	40 milliseconds

2.45 When 48V message registers are used, an external +48V power supply is required. The output from this supply must be routed through the Pulse 120. Figure 9 shows the required connections.

2.46 The cross-connecting field gives the flexibility to assign any message register to any room number (or administrative line). Figure 10 shows typical message register cross-connections.

MUSIC-ON-HOLD TRUNK

2.47 A music-on-hold trunk (QPJ181-type circuit pack) may be used (QPJ81-type circuit pack) wherever a CO/FX gain trunk can be used, provided the application is NON-VNL. (See Section 553-5011-204, 5.21 through 5.24.)

2.48 When the trunk circuit pack is used to supply music-on-hold, a customer-supplied audio source is applied to the party connected to the trunk tip and ring under certain non-talking conditions (see Section 553-5011-204, Table N).

2.49 The customer-supplied audio source is connected to the trunk via pins 30 and 31 on the option strapping block at the rear of the trunk shelf. The audio source should be balanced, with the high and low sides connected to pins 30 and 31, respectively. The audio source appears on the option strapping block via a pair of signaling leads of one of the universal trunk connectors (connectors 11 to 15 in trunk shelf no. 1 and connectors 26 to 30 in trunk shelf no. 2). The high side of the audio source appears on pin 17 (A1/M lead) and the low side appears on pin 21 (B1/E lead). (See Section 553-5011-204, 4.35 through 4.38, and 5.28 through 5.30.)

2.50 The trunk installed in the connector chosen for connection to the audio source cannot be an E&M trunk (QPJ69-type circuit pack) or a paging trunk (QPJ75-type circuit pack).

2.51 The connection arrangement for the audio source for the music-on-hold trunk is shown in Fig. 11. Refer to Section 553-5011-203 to determine the appropriate pins in P090 (for trunk shelf no. 1) and P120 (for trunk shelf no. 2) to which the customer-supplied audio source is to be connected at the cross-connecting terminal.

2.52 The required transmission characteristics for the customer supplier audio source are the following:

Audio Source Level:	2.0V rms (average of peaks observed over a 3-second interval.
Audio Source Impedance:	$\leq$10Ω from 50 Hz to 4000Hz.

TABLE A
EPABX MISCELLANEOUS SUPPLIES

CONNECTOR CABLE FROM CONNECTOR P130 TERMINATED ON CONNECTING BLOCK P130

PAIR	PIN	PAIR COLOR	LEAD DESIGNATION WITH FUSE NUMBER WHEN APPLICABLE	FUNCTION
1T	26	W-BL	SPARE	
R	1	BL-W	SPARE	
2T	27	W-O	RG (-24F27)	Recorded Dictation and Dial Long Line Ringing Supply
R	2	O-W	CR (86F39)	
3T	28	W-G	RG (-24F27)	Recorded Dictation and Dial Long Line Ringing Supply
R	3	G-W	CR (86F39)	
4T	29	W-BR	SPARE	
R	4	BR-W	SPARE	
5T	30	W-S	RING. GRD	Dial Long Line Ringing Supply
R	5	S-W	105F42	
6T	31	R-BL	RING. GRD	Dial Long Line Ringing Supply
R	6	BL-R	105F42	
7T	32	R-O	SPARE	
R	7	O-R	SPARE	
8T	33	R-G	SPARE	
R	8	G-R	SPARE	
9T	34	R-BR	AUX. GRD 1	Recorded Dictation and Dial Long Line Power Supply (Bunched as necessary to overcome voltage drop in cable)
R	9	BR-R	-48F32	
10T	35	R-S	AUX. GRD 1	
R	10	S-R	-48F32	
11T	36	BK-BL	AUX. GRD 1	
R	11	BL-BK	-48F32	
12T	37	BK-O	AUX. GRD 1	
R	12	O-BK	-48F32	
13T	38	BK-G	AUX. GRD 1	
R	13	G-BK	-48F32	
14T	39	BK-BR	AUX. GRD 1	
R	14	BR-BK	-48F32	
15T	40	BK-S	AUX. GRD 1	
R	15	S-BK	-48F32	
16T	41	Y-BL	AUX. GRD 1	
R	16	BL-Y	-48F32	
17T	42	Y-O	AUX. GRD 1	Dial Long Line Power Supply (Bunched as necessary)
R	17	O-Y	-48F33	
18T	43	Y-G	AUX. GRD 1	
R	18	G-Y	-48F33	
19T	44	Y-BR	AUX. GRD 1	
R	19	BR-Y	-48F33	
20T	45	Y-S	AUX. GRD 1	
R	20	S-Y	-48F33	
21T	46	V-BL	SPARE	
R	21	BL-V	SPARE	
22T	47	V-O	DARB 12	Recorded Dictation Trunk 1 Tone Supplies
R	22	O-V	DARA 12	
23T	48	V-G	DTTTB 12	
R	23	G-V	DTTA 12	
24T	49	V-BR	DARB 13	Recorded Dictation Trunk 2 Tone Supplies
R	24	BR-V	DARA 13	
25T	50	V-S	DTTB 13	
R	25	S-V	DTTA 13	

Note: The total current drawn through fuse 32 and 33 for miscellaneous equipment power supplies must not exceed 1.5 Amperes.

TABLE B
MISCELLANEOUS EQUIPMENT POWER SUPPLY REQUIREMENTS

EQUIPMENT	CURRENT DRAIN AT -48 V (Amperes)	REQUIRED EXTERNAL INPUT POWER	REMARKS
Traffic measurement (ALSTON scanner/recorder)	2.0	115 V ac	Supplied by separate rectifier
Paging amplifier	–	115 V ac	
Recorded telephone dictation trunk (SD-65788-01 or SD-5E038-01)			
• Dial control	0.75	–	
• Voice control	1.0	–	
• Recording machine	–	115 V ac	
• DIGITONE* receiver (SD-98148-01)	1.33	–	
24V4 repeater (SD-97047-01)	0.036	–	
Dial long line circuit (SD-96555-01)	0.16	–	

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TABLE C
QPJ74* TRAFFIC MEASUREMENT NO. 1 (CONNECTOR 3)
PIN AND COLOR CODE ASSIGNMENTS

PAIR NO.	PIN NO.	PAIR COLOR	LEAD DESIGNATION
1T	26	W-BL	Spare
R	1	BL-W	To ground connection
2T	27	W-O	8 Time slots busy
R	2	O-W	Spare
3T	28	W-G	8 Time slots busy
R	3	G-W	Universal trunks accessed by code 86
4T	29	W-BR	8 Time slots busy
R	4	BR-W	Spare
5T	30	W-S	8 Time slots busy
R	5	S-W	Universal trunks accessed by code 85
6T	31	R-BL	8 Time slots busy
R	6	BL-R	Spare
7T	32	R-O	8 Time slots busy
R	7	O-R	Universal trunks accessed by code 82
8T	33	R-G	8 Time slots busy
R	8	G-R	Spare
9T	34	R-BR	8 Time slots busy
R	9	BR-R	Universal trunks accessed by code 84
10T	35	R-S	16 Time slots busy
R	10	S-R	All Time slots busy
11T	36	BK-BL	16 Time slots busy
R	11	BL-BK	Universal trunks accessed by code 87
12T	37	BK-O	16 Time slots busy
R	12	O-BK	1 Time slot busy
13T	38	BK-G	16 Time slots busy
R	13	G-BK	Universal trunks accessed by code 83
14T	39	BK-BR	16 Time slots busy
R	14	BR-BK	2 Time slots busy
15T	40	BK-S	16 Time slots busy
R	15	S-BK	Universal trunks accessed by code 81
16T	41	Y-BL	16 Time slots busy
R	16	BL-Y	2 Time slots busy
17T	42	Y-O	16 Time slots busy
R	17	O-Y	CO trunk outgoing busy condition
18T	43	Y-G	16 Time slots busy
R	18	G-Y	4 Time slots busy
19T	44	Y-BR	16 Time slots busy
R	19	BR-Y	DIGITONE receiver unavailability
20T	45	Y-S	16 Time slots busy
R	20	S-Y	4 Time slots busy
21T	46	V-BL	16 Time slots busy
R	21	BL-V	DIGITONE receiver requests
22T	47	V-O	16 Time slots busy
R	22	O-V	4 Time slots busy
23T	48	V-G	16 Time slots busy
R	23	G-V	Dial 0 directed calls
24T	49	V-BR	16 Time slots busy
R	24	BR-V	4 Time slots busy
25T	50	V-S	16 Time slots busy
R	25	S-V	Console work time

TABLE D
QPJ78* TRAFFIC MEASUREMENT NO. 2 (CONNECTOR 1)
PIN AND COLOR CODE ASSIGNMENTS

PAIR NO.	PIN NO.	PAIR COLOR	LEAD DESIGNATION
1T	26	W-BL	Spare
R	1	BL-W	To ground connection
2T	27	W-O	I/C trunk 15
R	2	O-W	I/C trunk 14
3T	28	W-G	I/C trunk 7
R	3	G-W	I/C trunk 12
4T	29	W-BR	I/C trunk 13
R	4	BR-W	I/C trunk 10
5T	30	W-S	I/C trunk 2
R	5	S-W	I/C trunk 11
6T	31	R-BL	I/C trunk 4
R	6	BL-R	I/C trunk 3
7T	32	R-O	I/C trunk 6
R	7	O-R	I/C trunk 9
8T	33	R-G	O/G trunk 12
R	8	G-R	I/C trunk 5
9T	34	R-BR	O/G trunk 9
R	9	BR-R	I/C trunk 1
10T	35	R-S	O/G trunk 10
R	10	S-R	O/G trunk 13
11T	36	BK-BL	O/G trunk 15
R	11	BL-BK	O/G trunk 11
12T	37	BK-O	O/G trunk 3
R	12	O-BK	O/G trunk 2
13T	38	BK-G	O/G trunk 7
R	13	G-BK	O/G trunk 1
14T	39	BK-BR	O/G trunk 14
R	14	BR-BK	O/G trunk 6
15T	40	BK-S	O/G trunk 8
R	15	S-BK	I/C trunk 8
16T	41	Y-BL	O/G trunk 5
R	16	BL-Y	O/G trunk 4

TABLE E
QPJ78* TRAFFIC MEASUREMENT NO. 2 (CONNECTOR 2)
PIN AND COLOR CODE ASSIGNMENTS

PAIR NO.	PIN NO.	PAIR COLOR	LEAD DESIGNATION
1T	26	W-BL	Spare
R	1	BL-W	To ground connection
2T	27	W-O	I/C trunk 30
R	2	O-W	I/C trunk 29
3T	28	W-G	I/C trunk 22
R	3	G-W	I/C trunk 27
4T	29	W-BR	I/C trunk 28
R	4	BR-W	I/C trunk 25
5T	30	W-S	I/C trunk 17
R	5	S-W	I/C trunk 26
6T	31	R-BL	I/C trunk 19
R	6	BL-R	I/C trunk 18
7T	32	R-O	I/C trunk 21
R	7	O-R	I/C trunk 24
8T	33	R-G	O/G trunk 27
R	8	G-R	I/C trunk 20
9T	34	R-BR	O/G trunk 24
R	9	BR-R	I/C trunk 16
10T	35	R-S	O/G trunk 25
R	10	S-R	O/G trunk 28
11T	36	BK-BL	O/G trunk 30
R	11	BL-BK	O/G trunk 26
12T	37	BK-O	O/G trunk 18
R	12	O-BK	O/G trunk 17
13T	38	BK-G	O/G trunk 22
R	13	G-BK	O/G trunk 16
14T	39	BK-BR	O/G trunk 29
R	14	BR-BK	O/G trunk 21
15T	40	BK-S	O/G trunk 23
R	15	S-BK	I/C trunk 23
16T	41	Y-BL	O/G trunk 20
R	16	BL-Y	O/G trunk 19

TABLE F
TELEPHONE RECORDED DICTATION UNIT: OPTION STRAPPING AND WIRING (PER SD65788-01)

FEATURE OR OPTION			REQUIRED STRAPPING AND WIRING	
			FIGURE NUMBER ON SD65788-01	APPARATUS OR WIRING ON SD65788-01
PULSE 120 EPABX compulsory strapping			1	X, ZC
Dictation machine start and stop controlled by	Dial '1'		– –	W, ZO
	Voice		–	V, ZH
Dictation machine provides ground signal to indicate playback is in progress	No		–	T
	Yes		–	R, S
Dictation machine attendant playback key			2	–
Playback controlled by dialing '2'	No		–	E
	Yes		–	B
Dictation machine unavailable to record	Signals dictation attendant and busies trunk circuit		–	G
	busies trunk circuit		–	ZA
Dictation machine requires	Dial playback repeatedly	No	–	S, T
		Yes	–	A, R
	Termination of playback by dialing '1'	No	–	R
		Yes	–	A, S, T

TABLE G
TELEPHONE RECORDED DICTATION UNIT: OPTION STRAPPING AND WIRING (PER SD5E038-01, PAGE D1)

FEATURE OR OPTION			REQUIRED STRAPPING AND WIRING	
			FIGURE NUMBER ON SD5E038-01	APPARATUS OR WIRING ON SD5E038-01
PULSE 120 EPABX compulsory strapping			1, 3	S, ZJ
Dictation machine start and stop controlled by	Dial '1' – DIGITONE – Rotary		– –	W, ZG
	Voice		–	V
Playback controlled by dialing '2'	No		–	E
	Yes		–	F
Dictation machine unavailable to record	Signals dictation attendant and busies trunk circuit		–	B
	Busies trunk circuit		–	ZA
DIGITONE operation	Not required		–	ZB
	Required with	4 x 3 DIGITONE Receiver	4	ZC
		4 x 4 DIGITONE Receiver	4	ZC, ZD
Additional machine playback features (select one feature group)	Feature Group 1 – Dial '1' ends playback		2	R
	Feature Group 2 – Machine provides playback signal – Dial 3 extends playback		2	N
	Feature Group 3 – Machine provides playback signal – Dial '1' ends playback		2	Q
	Feature Group 4 – Machine provides playback signal – Dial '3' extends playback – Dial '1' ends playback		2	A
Dictation attendant telephone loop resistance	Less than 300 Ω		–	ZL
	More than 300 Ω		–	ZM

TABLE H
DIAL LONG LINE UNIT:
OPTION STRAPPING AND WIRING (PER SD-9655-01)

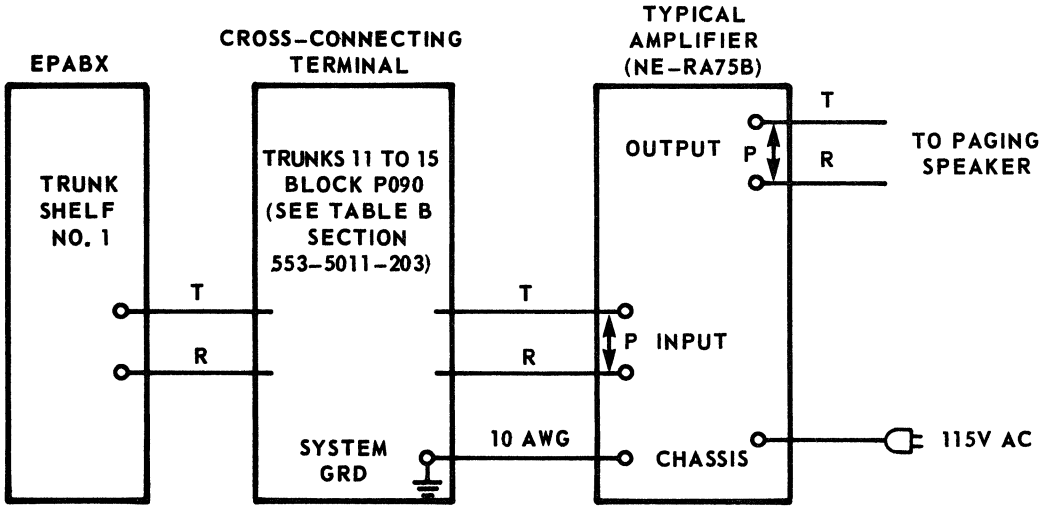
FEATURE OR OPTION		REQUIRED STRAPPING AND WIRING	
		FIGURE NUMBER ON SD96555-012	APPARATUS OR WIRING ON SD96555-011
Pulsing relay bias resistor		Fig. B	Y
Bypassed ringing		–	ZI
Relayed ringing (105F42) with tripping during silent interval only		–	P
Relay ringing with tripping during ringing interval and during silent interval (ac-dc)		–	S,T
DLL circuit ringing supplied from Pulse 120 EPABX		–	QZ
DLL unit loop resistance to EPABX	0 – 250Ω	–	W
	over 250Ω	–	X
Not arranged for use with 24V4 repeaters		–	ZC,ZE
Arranged for use with 24V4 repeaters	Conventional tip and ring lead arrangement	– –	ZD, ZE
	Loop signaling on simplex legs of repeater with DLL unit located at EPABX	–	ZH

TABLE I
RINGING OPTIONS FOR DLL CIRCUIT
SD-96555-01/J99234T-2

TYPE OF RINGING	DLL MOUNTED NEARBY (EPABX MISCELLANEOUS SUPPLY)	DLL MOUNTED REMOTELY (CUSTOMER PROVIDED SUPPLY)
Bypassed	Ringing from EPABX line circuit.	
Relayed	105 V, 20 Hz ringing, ground return.	105 V, 20 Hz ringing, ground return.
Relayed	86 V, 20 Hz ringing superimposed on +24 V, -24 V ground return.	86 V, 20 Hz ringing superimposed on -48 V (less audible ringback), ground return.

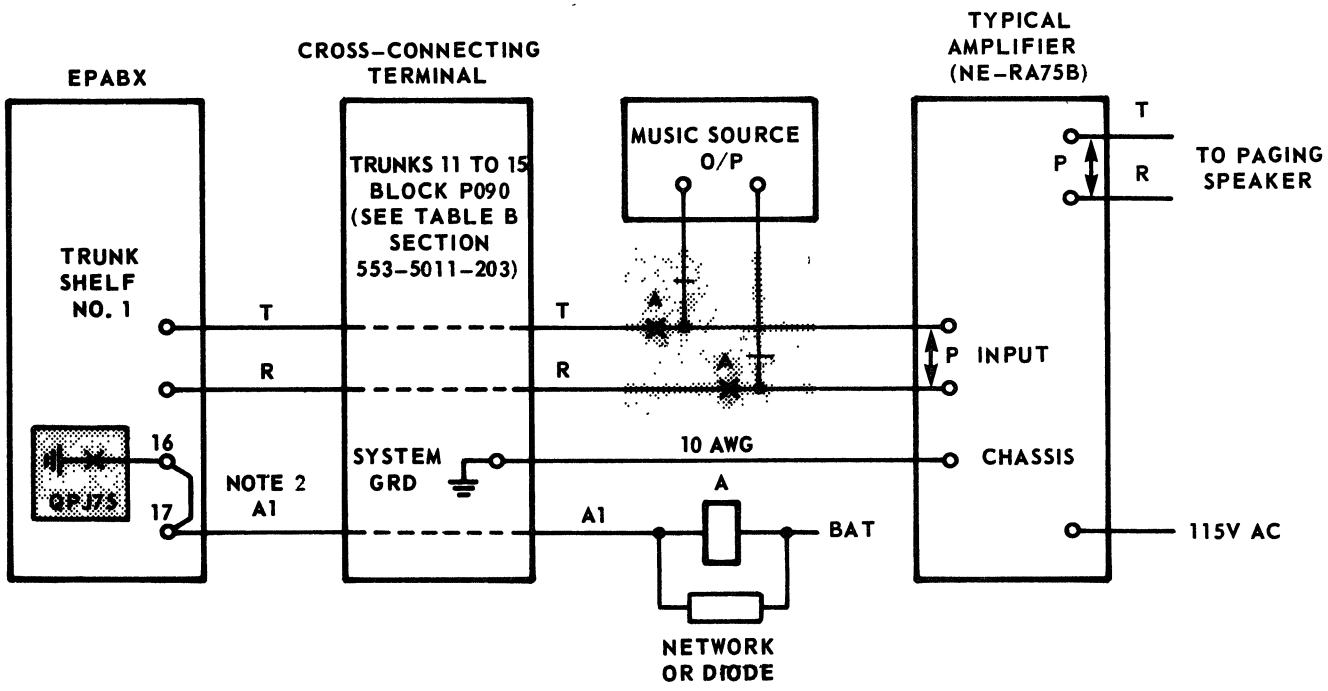
TABLE J
RESERVE POWER SUPPLY ALARM INDICATIONS ON CONSOLE

SPARE LAMP NUMBER	DESIGNATION	NORMAL STATE	INDICATION
6.	Inverter Running (IR)	Extinguished	Lights when the reserve power unit is delivering power to the EPABX during a commercial power supply failure.
5.	Power On (PO)	Lit	Extinguished when the commercial and reserve power supplies fail.
4.	Trouble Alarm (TA)	Extinguished	Lights when a major trouble occurs in the reserve power supply unit.



NOTE: TRUNK 11 IS EQUIPPED WITH ATTENDANT PREEMPTION FEATURE.

(a) Paging Amplifier Only

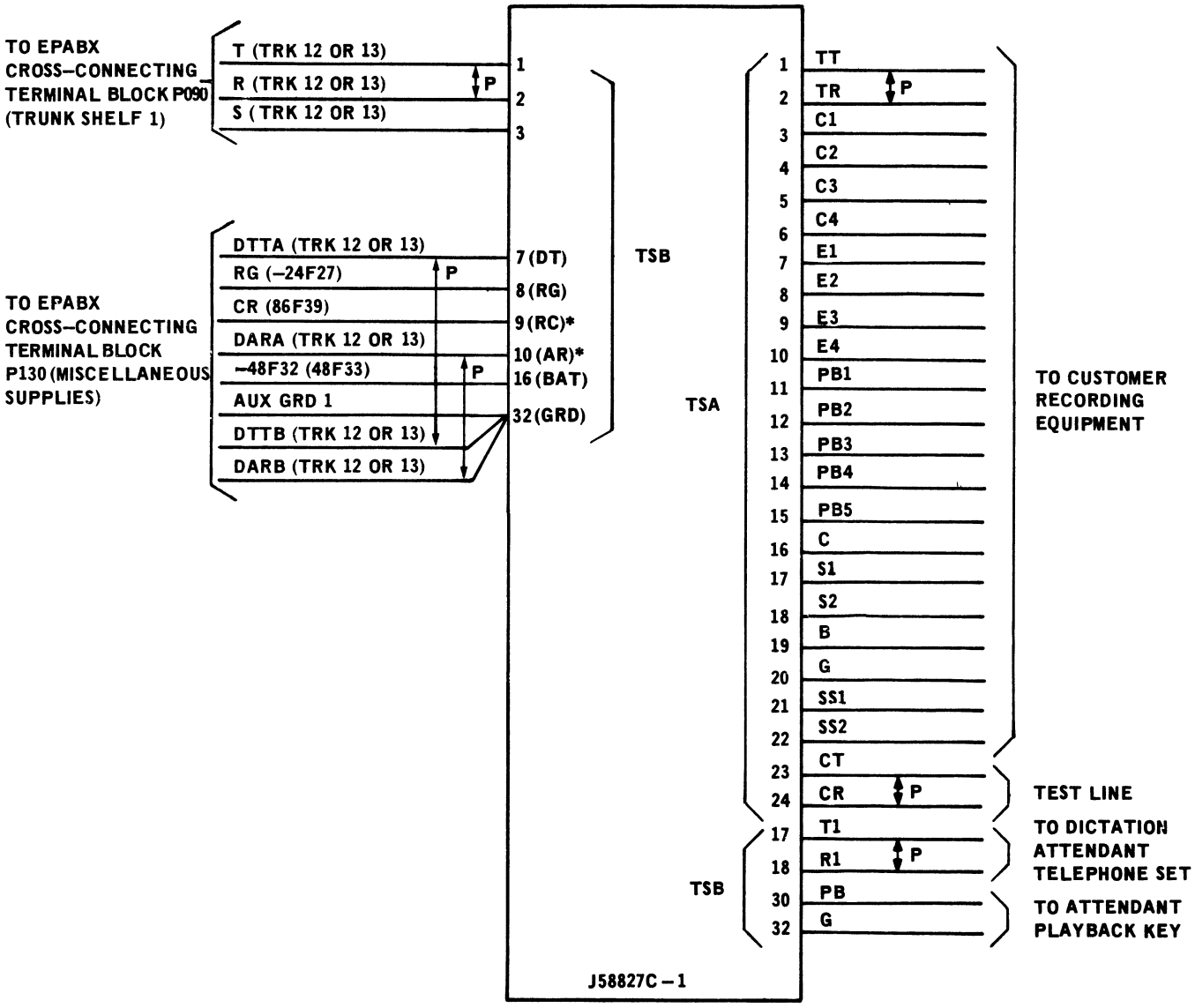


NOTES:

1. TRUNK 11 IS EQUIPPED WITH ATTENDANT PREEMPTION FEATURE.
2. SEE SECTION 553-5011-204 TABLE M FOR STRAPPING EXPLANATION.

(b) Paging Amplifier Plus Music Source

Fig. 1 – Connection Arrangement for Customer Provided Paging Amplifier

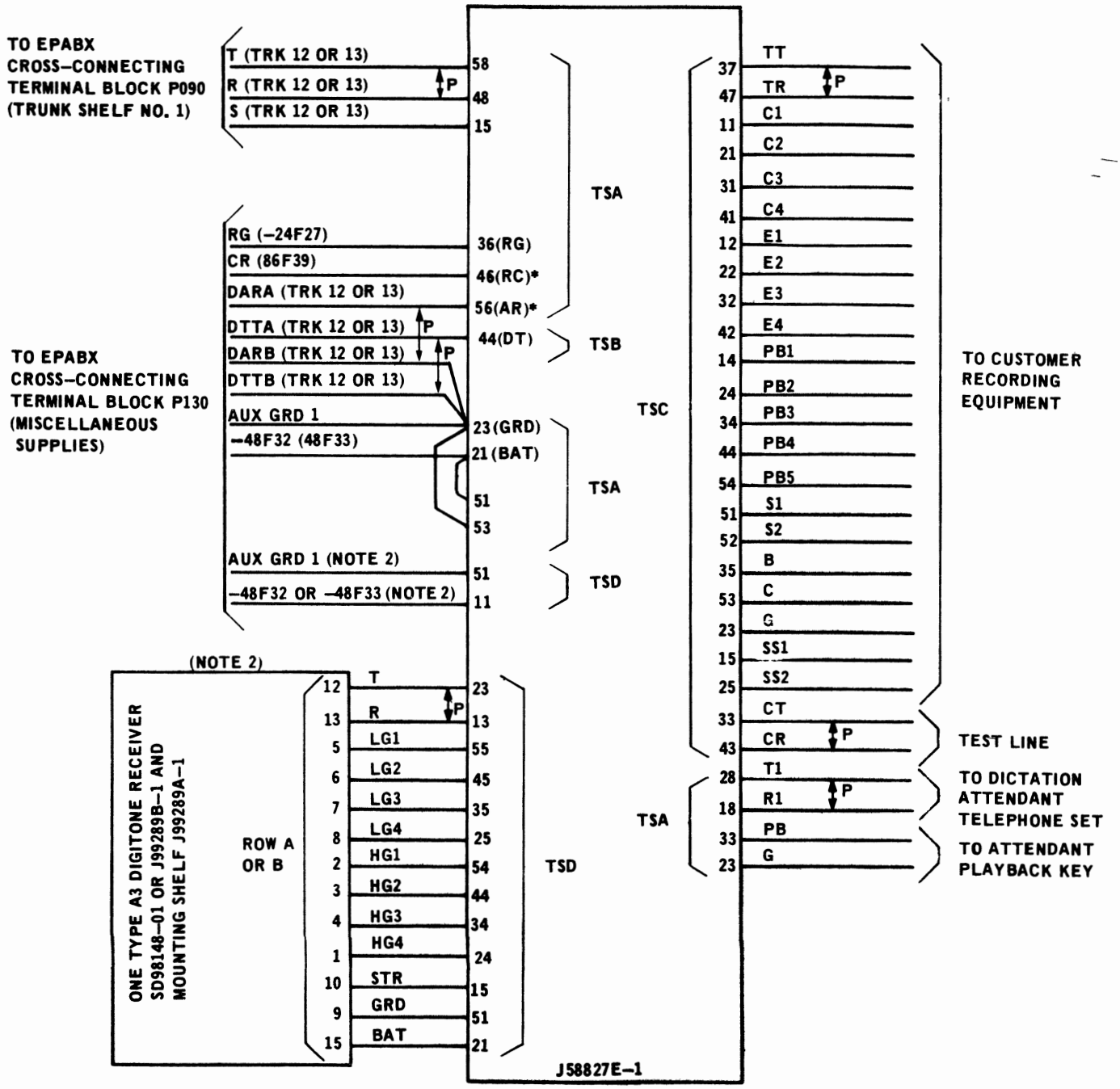


NOTES:

1. FOR OPTION STRAPPING SEE TABLE F. STRAPS ARE REQUIRED ON TSA, TSB, AND TSC AS PER JOB REQUIREMENT [SEE SD65788-01-G1 (CAD 1)].
2. A METALLIC CONNECTION IS REQUIRED BETWEEN MOUNTING PLATES AND CUSTOMER PROVIDED CABINET OR RACK FRAME. THE MOUNTING PLATE MUST BE CONNECTED TO THE EPABX SYSTEM GROUND AT THE CROSS-CONNECTING TERMINAL USING A 10 AWG WIRE.

* DO NOT STRAP TSB 9 TO 10, DAMAGE WILL RESULT ON DICTATION TRUNK APPLIQUE CARD IF STRAPPED.

Fig. 2 – Connections for Rotary Dial Controlled RTDT
J58827C-1/SD-65788-01 Mounted Externally



NOTES:

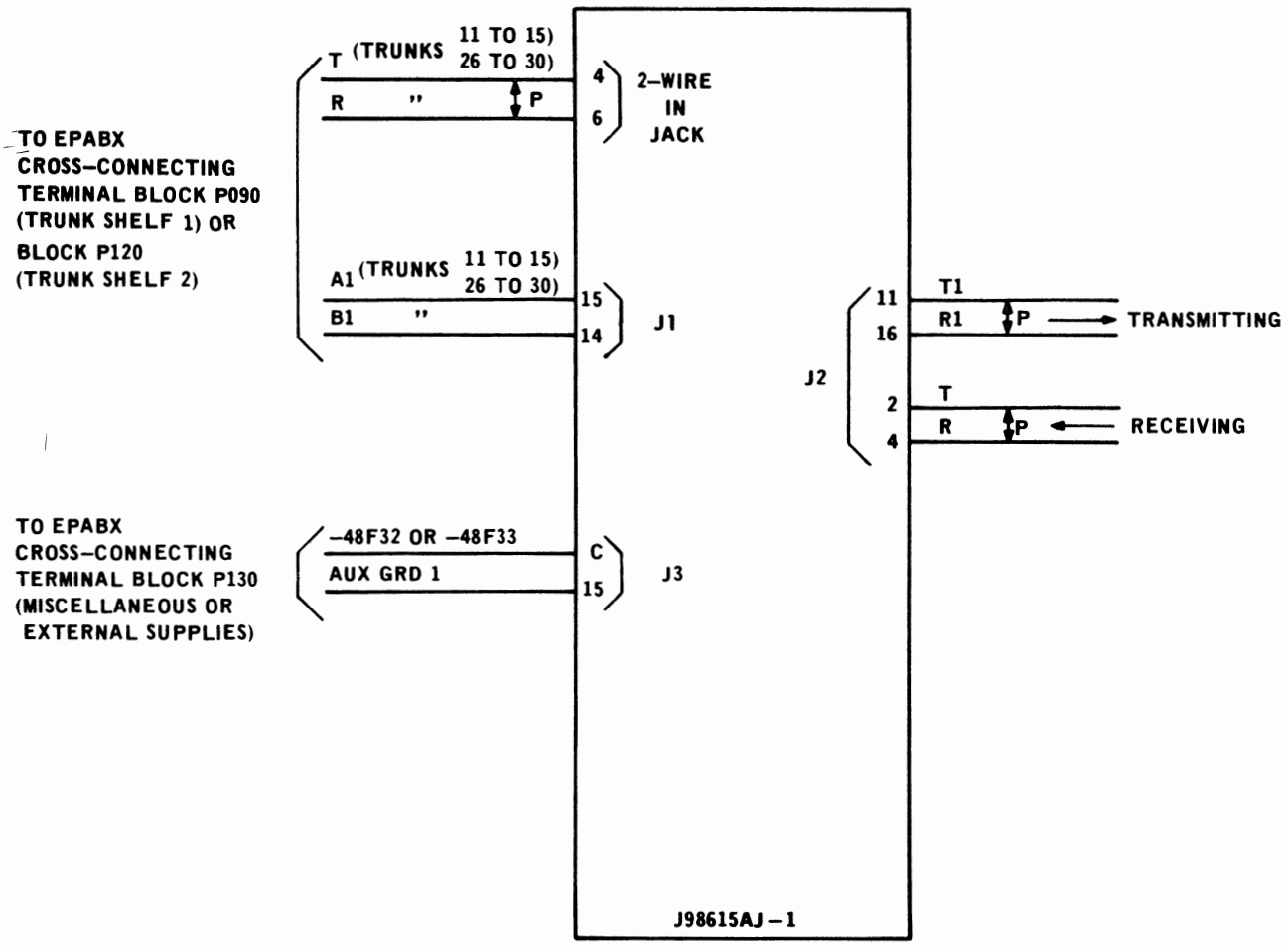
1 FOR OPTION STRAPPING SEE TABLE F. STRAPS ARE REQUIRED ON TSA, B, C & D AS PER JOB REQUIREMENT [SEE SD5E038-01-G1(CAD1) AND -G2(CADS 2,3)].

2 CONNECT TYPE A3 RECEIVER BATTERY, AND DIGITONE OPERATION STRAPS WHEN DIGITONE SERVICE IS PROVIDED.

3 A METALLIC CONNECTION IS REQUIRED BETWEEN MOUNTING PLATES AND CUSTOMER PROVIDED CABINET OR RACK FRAME. THE CABINET OR RACK FRAME MUST BE CONNECTED TO THE EPABX SYSTEM GROUND AT THE CROSS-CONNECTING TERMINAL USING 10 AWG WIRE.

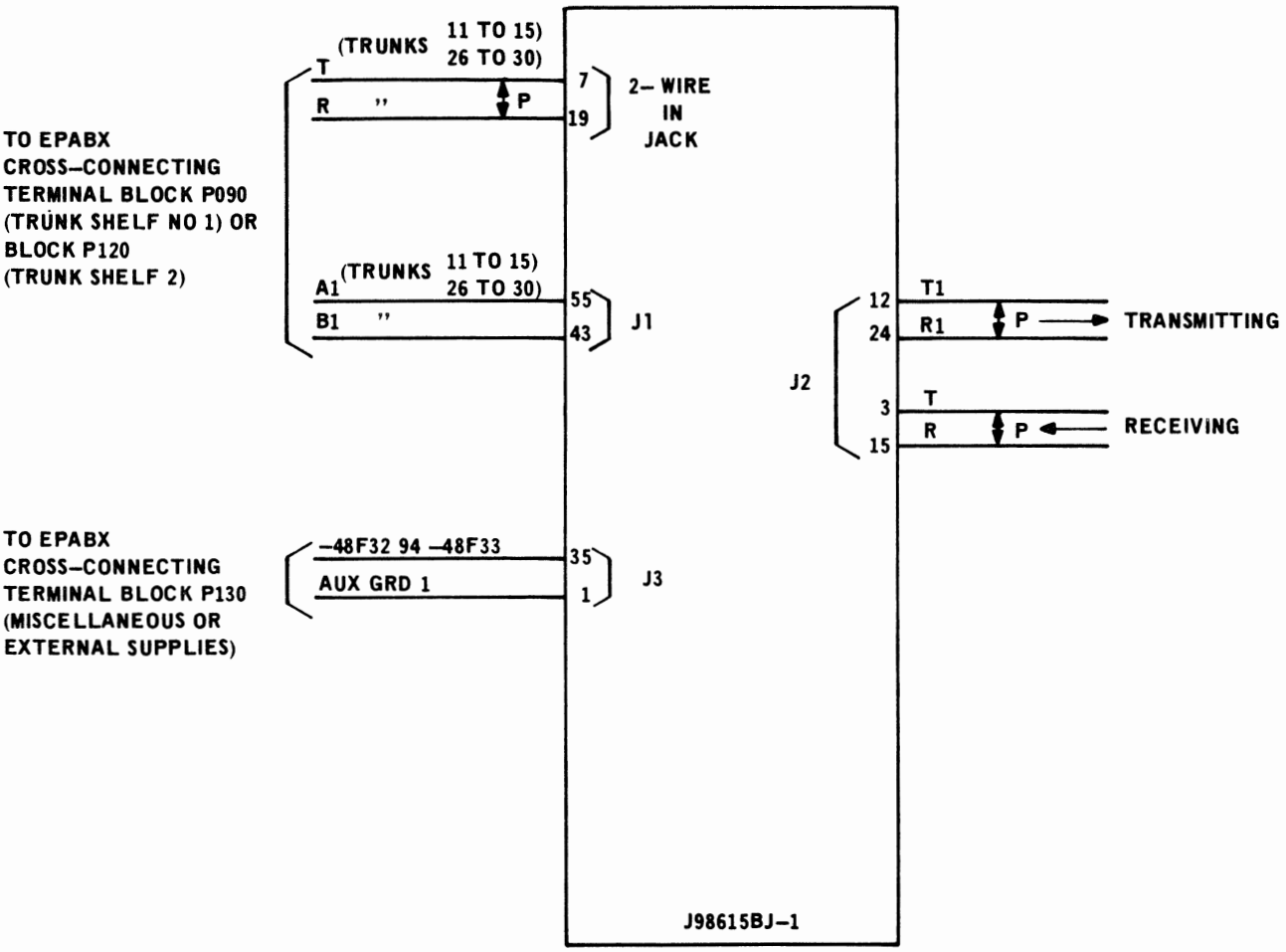
* DO NOT STRAP TSA 46 TO 56, DAMAGE WILL RESULT ON DICTATION TRUNK APPLIQUE CARD IF STRAPPED.

Fig. 3 – Connections for Rotary Dial or Rotary and DIGITONE Dial Control J58827E-1/SD-5E038-01 Mounted Outside the Cabinet



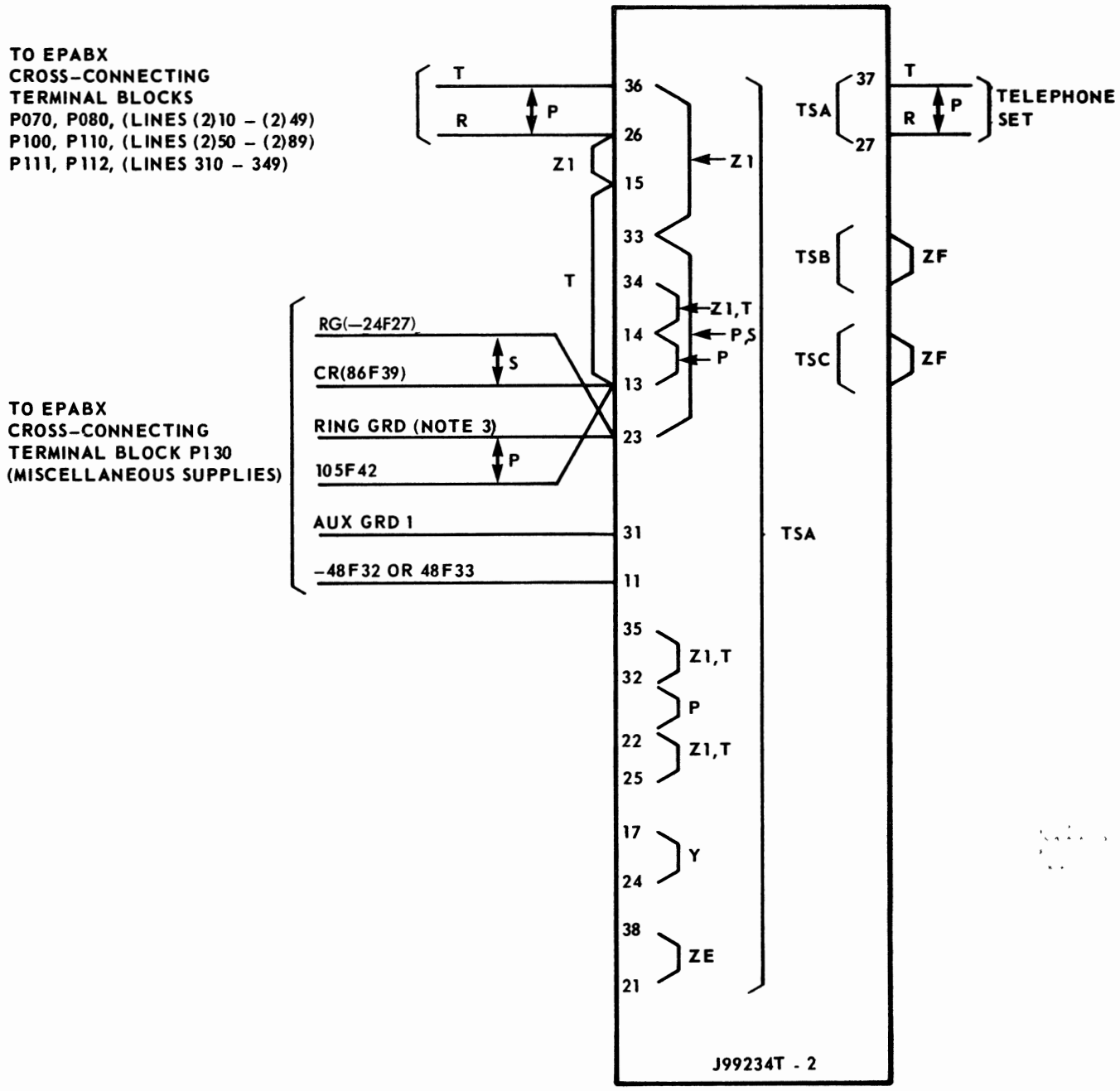
NOTE: A METALLIC CONNECTION IS REQUIRED BETWEEN MOUNTING PLATES AND CUSTOMER PROVIDED CABINET OR RACK FRAME. THE MOUNTING PLATE MUST BE CONNECTED TO THE EPABX SYSTEM GROUND AT THE CROSS-CONNECTING TERMINAL USING A 10 AWG WIRE.

Fig. 4 – Connection Arrangements for a 24V4 Repeater Shelf J98615AJ-1/SD-97047-01



NOTE: A METALLIC CONNECTION IS REQUIRED BETWEEN MOUNTING PLATES AND CUSTOMER PROVIDED CABINET OR RACK FRAME. THE MOUNTING PLATE MUST BE CONNECTED TO THE EPABX SYSTEM GROUND AT THE CROSS–CONNECTING TERMINAL USING A 10 AWG WIRE.

Fig. 5 – Connection Arrangements for a 24V4 Repeater Shelf J98615BJ-1SD-97047-01



NOTES:

1. FOR OPTION STRAPPING SEE SD96555–01, NOTE 102, SHEET 1; AND TABLE H. WHEN ARRANGED FOR USE WITH 24V4 REPEATER, SEE SD96555–01, CAD8 FOR INPUT (TSA 36 & 26) AND OUTPUT (TSA 37 & 27) CONNECTIONS.
2. FOR WORKING LIMITS SEE SD96555–01, SHEET 3.
3. AN NE–13C RESISTANCE LAMP SHOULD BE PROVIDED AS PER JOB REQUIREMENT TO PROTECT THE RINGING GENERATOR FROM OVERLOAD.
4. A METALLIC CONNECTION IS REQUIRED BETWEEN MOUNTING PLATES AND CUSTOMER PROVIDED CABINET OR RACK FRAME. THE MOUNTING PLATE MUST BE CONNECTED TO THE EPABX SYSTEM GROUND AT THE CROSS–CONNECTING TERMINAL USING A 10 AWG WIRE.

Fig. 6 – Typical Connection Arrangements Located at the EPABX, for DLL Unit J99234T-2/SD-96555-01

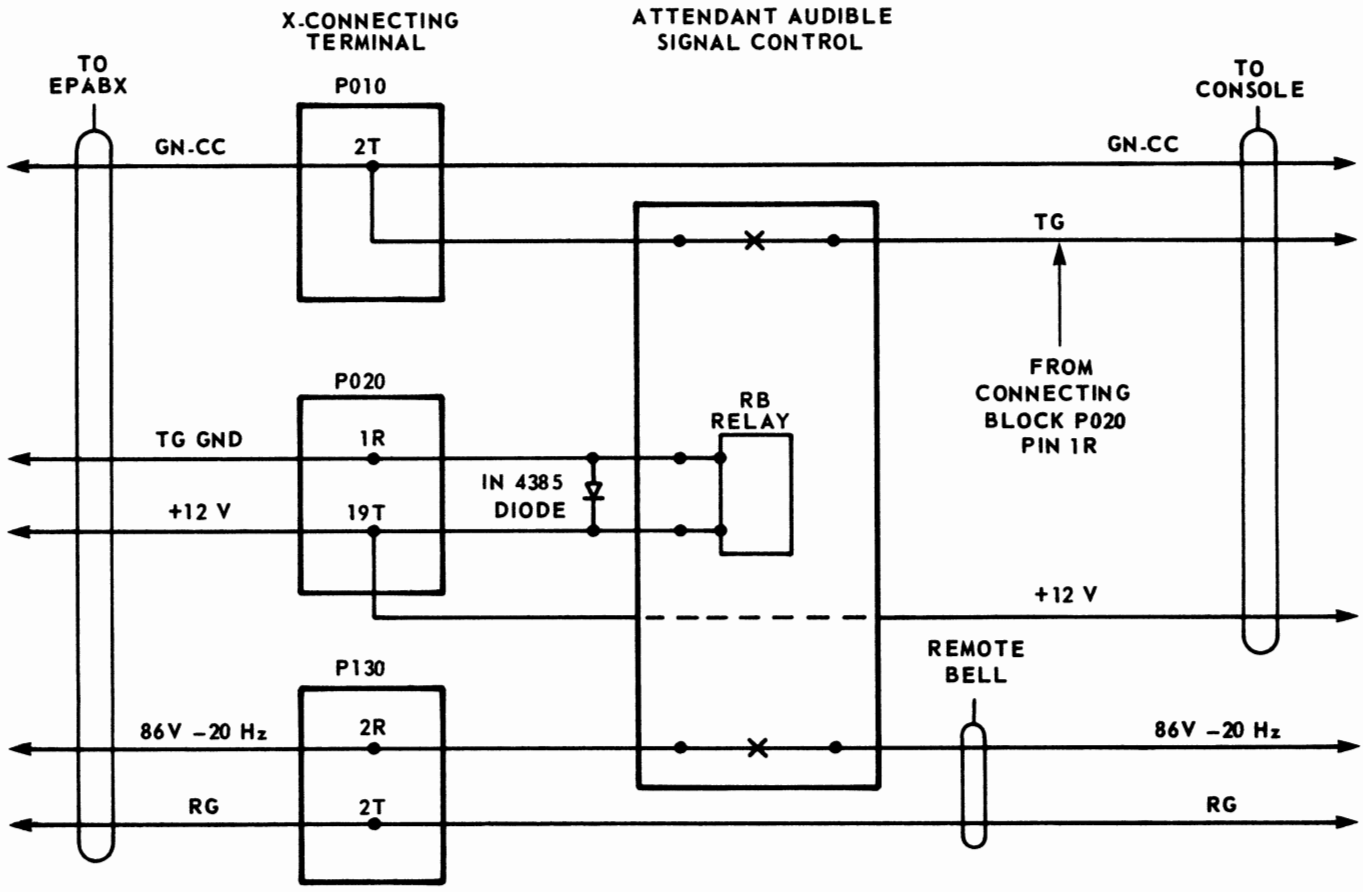
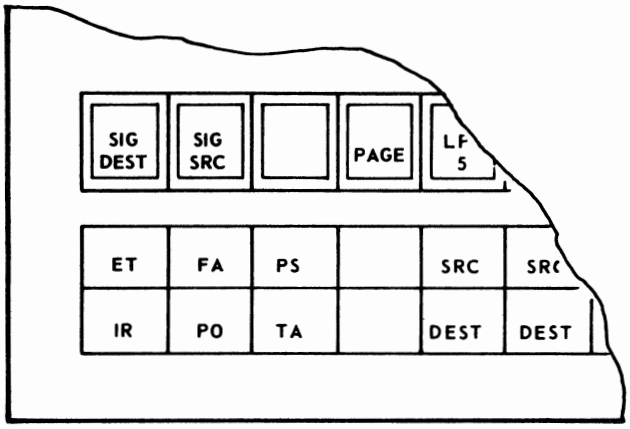
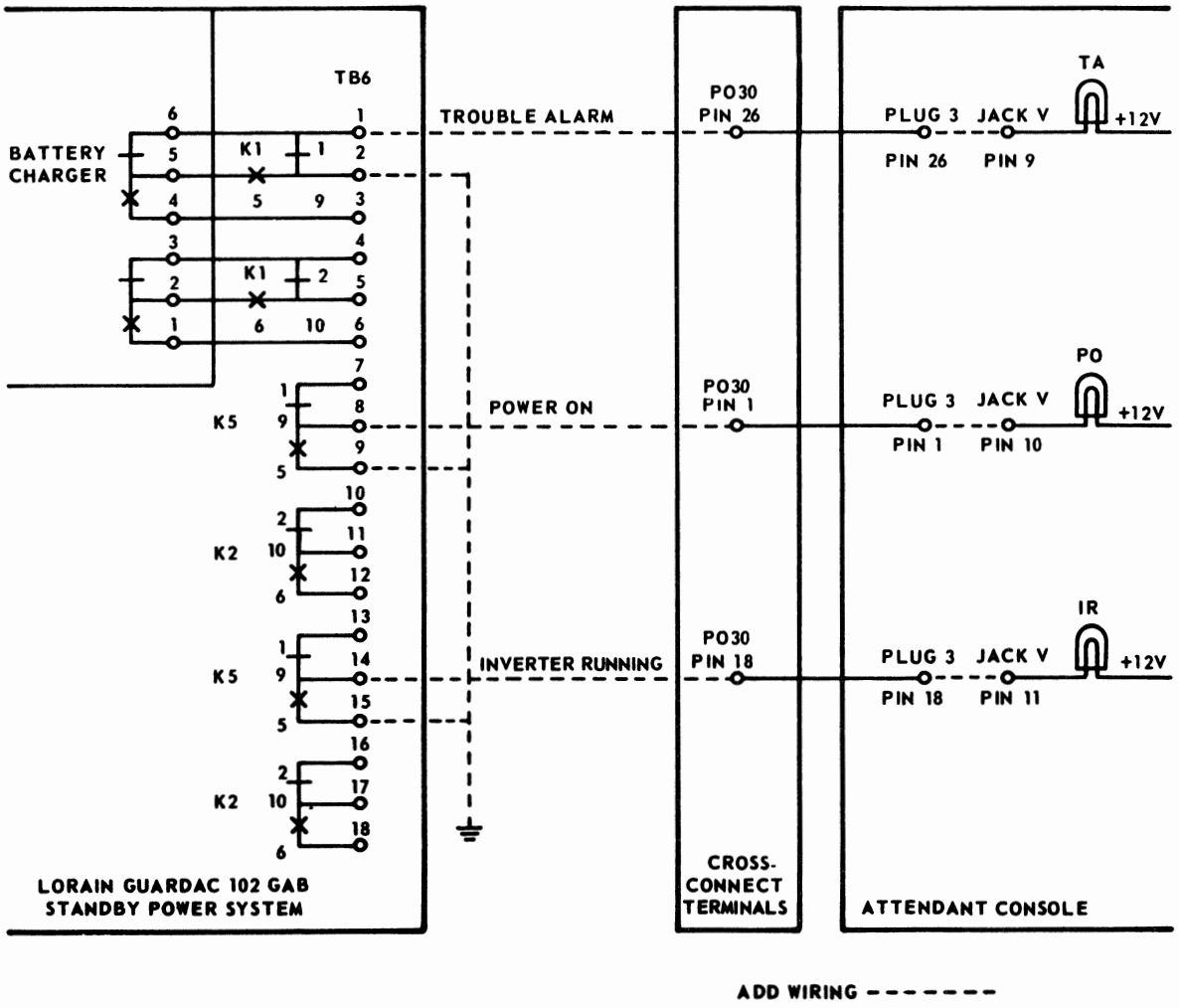


Fig. 7 – Attendant Audible Signal – Connections for Extension to a Remote Location



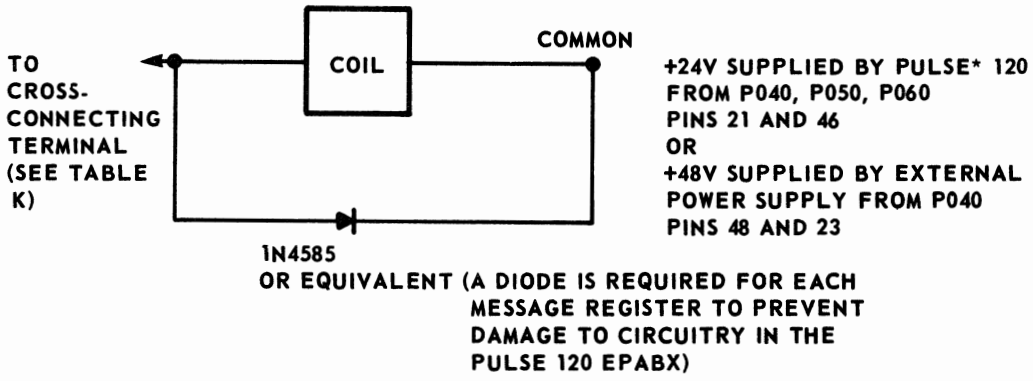
a) Alarm Lamp Positions on the Console



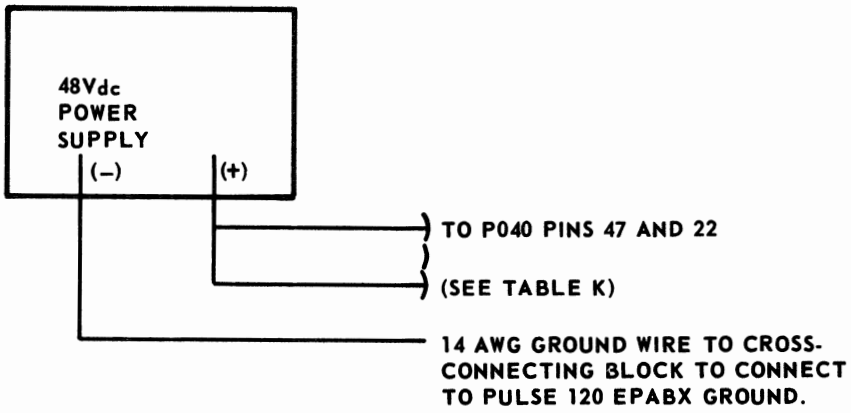
b) Alarm Connections

Fig. 8 – Reserve Power Supply – Alarm Lamp Connections and Connection on the Console

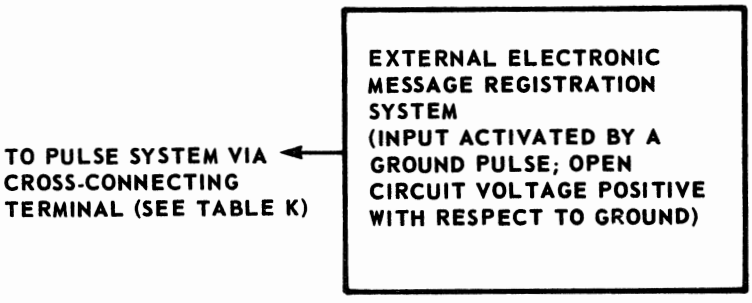
WARNING – WHEN 48V IS USED, THE CONNECTIONS TO THE EXTERNAL POWER SUPPLY MUST PROVIDE GROUND TO THE NEGATIVE TERMINAL OF THAT SUPPLY. FAILURE TO OBSERVE THIS MAY DAMAGE CIRCUITRY IN THE PULSE SYSTEM.



(a) ELECTRO-MECHANICAL MESSAGE REGISTRATION



(b) CONNECTIONS TO EXTERNAL 48Vdc POWER SUPPLY



(c) ELECTRONIC MESSAGE REGISTRATION

Fig. 9 – Connections to Message Registration Equipment

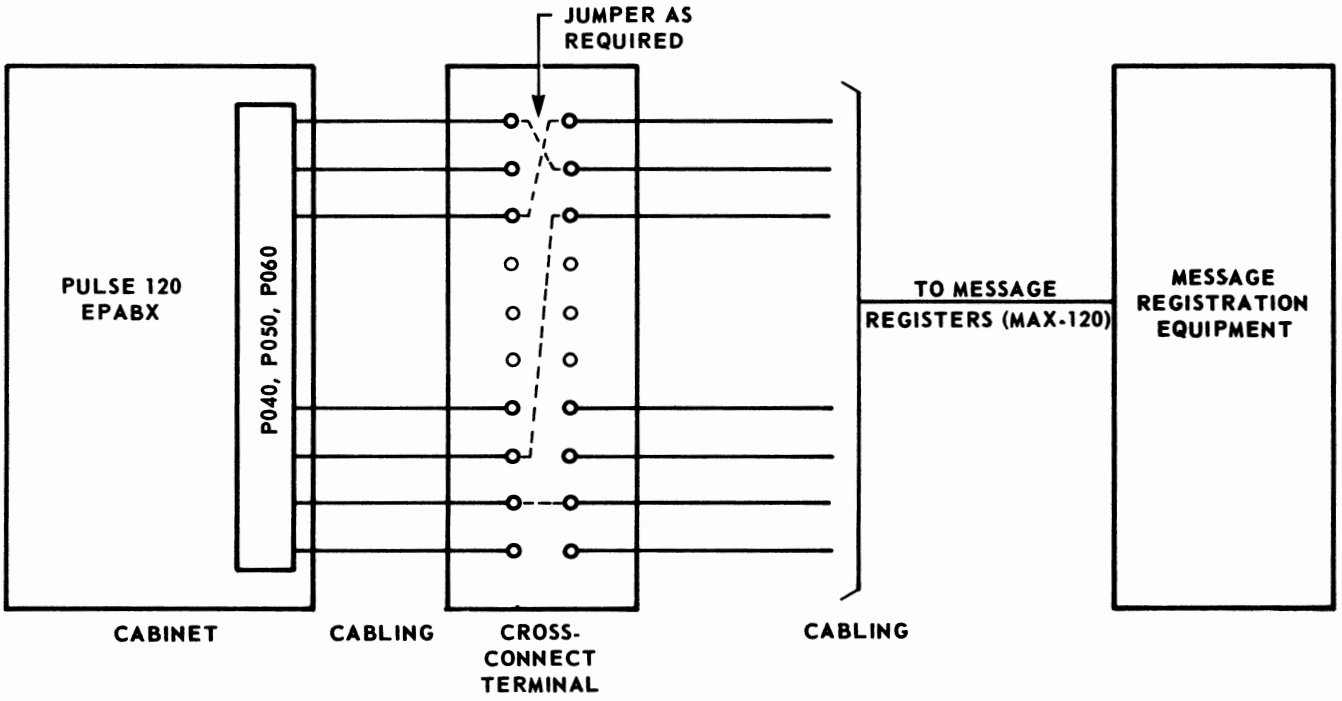


Fig. 10 – Typical Message Register Cross-Connections

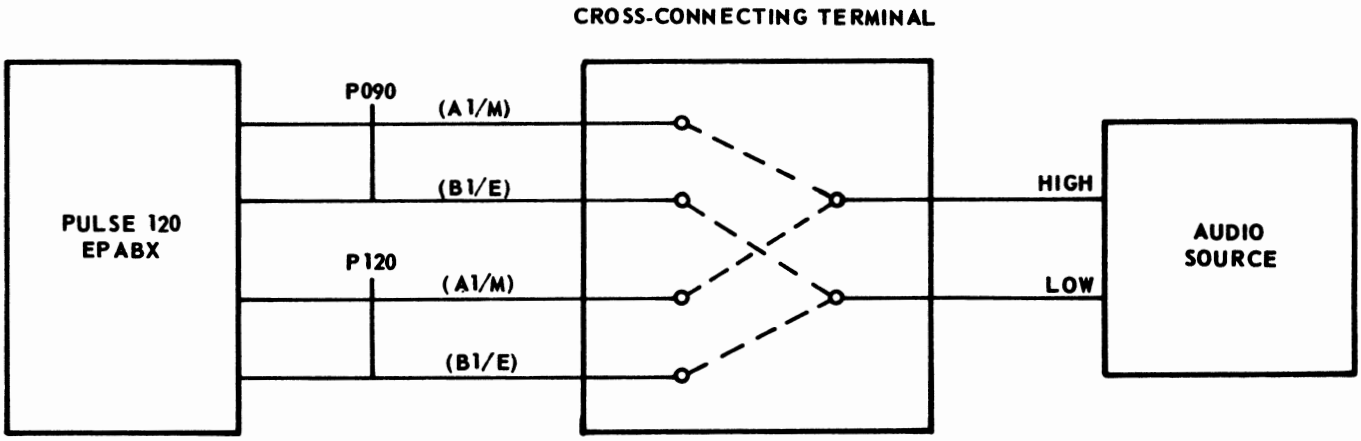


Fig. 11 – Connection Arrangement for the Audio Source for the Music-On-Hold Trunk (QPJ181-type circuit pack)

TABLE K
TERMINATING SEQUENCE OF P040
AT THE CROSS-CONNECTING TERMINAL
OPTION SHELF – HOTEL/MOTEL MESSAGE REGISTRATION

BLUE BINDER OF A75A FROM CONNECTOR P040 TERMINATED ON CONNECTING BLOCK P040

PAIR	PIN	PAIR COLOR	SYSTEM NO.	DIALED NO BY PLAN A	B	C	OTHER	FUNCTION
1T	26	W-BL	210	750	750	750		
R	1	BL-W	211	751	751	751		
2T	27	W-O	212	752	752	752		
R	2	O-W	213	753	753	753		
3T	28	W-G	214	754	754	754		
R	3	G-W	215	755	755	755		
4T	29	W-BR	216	756	756	756		
R	4	BR-W	217	757	757	757		
5T	30	W-S	218	758	758	758		
R	5	S-W	219	759	759	759		
6T	31	R-BL	220	1	1	1		
R	6	BL-R	221	2	2	2		
7T	32	R-O	222	3	3	3		
R	7	O-R	223	4	4	4		
8T	33	R-G	224	5	5	5		
R	8	G-R	225	6	6	6		
9T	34	R-BR	226	764	764	764		Message Register Leads to Message Register, or
R	9	BR-R	227	100	100	100		
10T	35	R-S	228	101	101	101		Electronic Message Registration System
R	10	S-R	229	102	102	102		
11T	36	BK-BL	230	103	103	103		
R	11	BL-BK	231	104	104	104		
12T	37	BK-O	232	105	105	105		
R	12	O-BK	233	106	106	106		
13T	38	BK-G	234	107	107	107		
R	13	G-BK	235	108	108	108		
14T	39	BK-BR	236	109	109	109		
R	14	BR-BK	237	110	110	110		
15T	40	BK-S	238	111	111	111		
R	15	S-BK	239	761	761	761		
16T	41	Y-BL	240	112	112	112		
R	16	BL-Y	241	113	113	113		
17T	42	Y-O	242	114	114	114		
R	17	O-Y	243	115	115	115		
18T	43	Y-G	244	116	116	116		
R	18	G-Y	245	117	117	117		
19T	44	Y-BR	246	762	762	762		
R	19	BR-Y	247	118	118	118		
20T	45	Y-S	248	119	119	119		
R	20	S-Y	249	120	120	120		
21T	46	V-BL	+24 V					Power Supply for 24 V Registers
R	21	BL-V	+24 V					
22T	47	V-O	48 IN					External +48 V Power Supply input
R	22	O-V	48 IN					
23T	48	V-G	48 OUT					+48 V Output for Message Registers
R	23	G-V	48 OUT					
24T	49	V-BR						
R	24	BR-V	Spare					Spares
25T	50	V-S						
R	25	S-V						

Note: Station System No. 239 does not have message registration capability.

TABLE K (cont)
TERMINATING SEQUENCE OF
P050 AT THE CROSS-CONNECTING TERMINAL
OPTION SHELF – HOTEL/MOTEL MESSAGE REGISTRATION

ORANGE BINDER OF A75A FROM CONNECTOR P050 TERMINATED ON CONNECTING BLOCK P050

PAIR	PIN	PAIR COLOR	SYSTEM NO.	DIALED NO. BY PLAN				FUNCTION
				A	B	C	OTHER	
1T	26	W-BL	250	121	121	121		
R	1	BL-W	251	122	122	122		
2T	27	W-O	252	123	123	123		
R	2	O-W	253	124	124	124		
3T	28	W-G	254	125	125	125		
R	3	G-W	255	126	126	126		
4T	29	W-BR	256	127	127	127		
R	4	BR-W	257	128	128	128		
5T	30	W-S	258	129	129	129		
R	5	S-W	259	130	130	200		
6T	31	R-BL	260	131	131	201		
R	6	BL-R	261	132	132	202		
7T	32	R-O	262	133	133	203		
R	7	O-R	263	134	134	204		
8T	33	R-G	264	135	135	205		
R	8	G-R	265	136	136	206		
9T	34	R-BR	266	137	137	207		Message Register Leads
R	9	BR-R	267	138	138	208		to Message Register
10T	35	R-S	268	139	139	209		or Electronic Message
R	10	S-R	269	140	140	210		Registration System
11T	36	BK-BL	270	141	141	211		
R	11	BL-BK	271	142	142	212		
12T	37	BK-O	272	143	143	213		
R	12	O-BK	273	144	144	214		
13T	38	BK-G	274	145	145	215		
R	13	G-BK	275	146	146	216		
14T	39	BK-BR	276	147	147	217		
R	14	BR-BK	277	148	148	218		
15T	40	BK-S	278	149	149	219		
R	15	S-BK	279	150	200	220		
16T	41	Y-BL	280	151	201	221		
R	16	BL-Y	281	152	202	222		
17T	42	Y-O	282	153	203	223		
R	17	O-Y	283	154	204	224		
18T	43	Y-G	284	155	205	225		
R	18	G-Y	285	156	206	226		
19T	44	Y-BR	286	157	207	227		
R	19	BR-Y	287	158	208	228		
20T	45	Y-S	288	159	209	229		
R	20	S-Y	289	160	210	130		
21T	46	V-BL	+24 V					Message Register Supply
R	21	BL-V	+24 V					
22T	47	V-O						
R	22	O-V						
23T	48	V-G						
R	23	G-V						
24T	49	V-BR	Spare					Spare
R	24	BR-V						
25T	50	V-S						
R	25	S-V						

TABLE K (cont)
TERMINATING SEQUENCE OF
PO6O AT THE CROSS-CONNECTING TERMINAL
OPTION SHELF – HOTEL/MOTEL MESSAGE REGISTRATION

	PAIR	PIN	PAIR COLOR	SYSTEM NO.	DIALED NO. BY PLAN A	B	C	OTHER	FUNCTION
GREEN BINDER OF A75A FROM CONNECTOR P060 TERMINATED ON CONNECTING BLOCK P060	1T	26	W-BL	310	161	211	131		
	R	1	BL-W	311	162	212	132		
	2T	27	W-O	312	163	213	230		
	R	2	O-W	313	164	214	231		
	3T	28	W-G	314	165	215	232		
	R	3	G-W	315	166	216	300		
	4T	29	W-BR	316	167	217	301		
	R	4	BR-W	317	168	218	302		
	5T	30	W-S	318	169	219	303		
	R	5	S-W	319	170	220	304		
	6T	31	R-BL	320	171	221	305		
	R	6	BL-R	321	172	222	306		
	7T	32	R-O	322	173	223	307		
	R	7	O-R	323	174	224	308		
	8T	33	R-G	324	175	225	309		
	R	8	G-R	325	176	226	310		
	9T	34	R-BR	326	177	227	311		Message Register Leads to Message Register
	R	9	BR-R	327	178	228	312		
	10T	35	R-S	328	179	229	313		or Electronic Message Registration System
	R	10	S-R	329	180	230	314		
	11T	36	BK-BL	330	181	231	315		
	R	11	BL-BK	331	182	232	316		
	12T	37	BK-O	331	183	233	317		
	R	12	O-BK	233	184	234	318		
	13T	38	BK-G	334	185	235	319		
	R	13	G-BK	335	186	236	320		
	14T	39	BK-BR	336	187	237	321		
	R	14	BR-BK	337	188	238	322		
	15T	40	BK-S	338	189	239	323		
	R	15	S-BK	339	190	240	324		
	16T	41	Y-BL	340	191	241	325		
	R	16	BL-Y	341	192	242	326		
	17T	42	Y-O	342	193	243	327		
	R	17	O-Y	343	194	244	328		
	18T	43	Y-G	344	195	245	329		
	R	18	G-Y	345	196	246	330		
	19T	44	Y-BR	346	763	763	763		
	R	19	BR-Y	347	197	247	331		
	20T	45	Y-S	348	198	248	332		
	R	20	S-Y	349	199	249	7		
	21T	46	V-BL	+24 V					Message Register Supply
	R	21	BL-V	+24 V					
	22T	47	V-O						
	R	22	O-V						
	23T	48	V-G						
	R	23	G-V	Spare					Spare
	24T	49	V-BR						
	R	24	BR-V						
	25T	50	V-S						
	R	25	S-V						

Note: Station System No. 346 does not have message registration capability.

TABLE L
TERMINATING SEQUENCE OF
P131 AT THE CROSS-CONNECTING TERMINAL
OPTION SHELF – MESSAGE REGISTRATION CONTROL

	PAIR	PIN	PAIR COLOR	LEAD DESIGNATION Trunk 3rd Wire for Trunk	FUNCTION
A25B CONNECTOR CABLE FROM CONNECTOR P131 TERMINATED ON CONNECTING BLOCK P131	1T	26	W-BL	16	Message Registration Control Leads
	R	1	BL-W	1	
	2T	27	W-O	17	
	R	2	O-W	2	
	3T	28	W-G	18	
	R	3	G-W	3	
	4T	29	W-BR	19	
	R	4	BR-W	4	
	5T	30	W-S	20	
	R	5	S-W	5	
	6T	31	R-BL	21	
	R	6	BL-R	6	
	7T	32	R-O	22	
	R	7	O-R	7	
	8T	33	R-G	23	
	R	8	G-R	8	
	9T	34	R-BR	24	
	R	9	BR-R	9	
	10T	35	R-S	25	
	R	10	S-R	10	
	11T	36	BK-BL	26	
	R	11	BL-BK	11	
	12T	37	BK-O	27	
	R	12	O-BK	12	
	13T	38	BK-G	28	
	R	13	G-BK	13	
	14T	39	BK-BR	29	
	R	14	BR-BK	14	
	15T	40	BK-S	30	
	R	15	S-BK	15	
	16T	41	Y-BL		Spare
	R	16	BL-Y		
	17T	42	Y-O		
	R	17	O-Y		
	18T	43	Y-G		
	R	18	G-Y		
	19T	44	Y-BR		
	R	19	BR-Y		
	20T	45	Y-S		
	R	20	S-Y	Spare	
	21T	46	V-BL		
	R	21	BL-V		
	22T	47	V-O		
	R	22	O-V		
	23T	48	V-G		
	R	23	G-V		
	24T	49	V-BR		
	R	24	BR-V		
	25T	50	V-S		
	R	25	S-V		