

# 272R 2Wire Loop-to-E&M Converter Assembly

FCC Registration No. BPX826-12981-WP-E

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## 1. general description

1.01 The 272R 2Wire Loop-to-E&M Converter Assembly is a 12-position, 8-circuit mounting shelf specifically prewired to interface a 2wire loop trunk circuit with a 2wire E&M trunk. The 272R is registered with the FCC as a Direct Inward Dialing (DID) interface. It serves PBXs with stations that can be called directly from a CO, in which case the attendant's console is bypassed. Calling out from those stations, however, is still treated as a normal PBX function. The 272R Assembly is rack mountable and is also available as part of two wall-mount packages, the 8-circuit 272R-8 and the 16-circuit 272R-16.

1.02 In the event that this practice section is reissued, the reason for reissue will be stated in this paragraph.

1.03 The 272R can accommodate up to eight DID circuits, each of which uses one 6113 or 6114 Loop-to-E&M DLL module and one of two repeat coils on a 4422 Dual Repeat Coil module. The 6113 module is used when interfacing a 2wire E&M PBX trunk circuit with a 2wire CO trunk, and the 6114 module is used for interfacing a 2wire E&M carrier circuit with a 2wire loop-start trunk PBX circuit.

1.04 The 272R, when equipped with the 6113 modules, performs the loop-to-E&M conversion necessary for direct inward dialing. Figure 2 shows the 272R in a typical DID application. The DID interface provides ground and battery on the tip and ring leads, respectively, to the CO. Upon distant-end seizure, the CO closes tip and ring, which provides M-lead battery to the PBX. The CO then transmits dialing information. The M lead pulses in response to dial pulses unless DTMF dialing is used, in which case multifrequency tones pass directly to the PBX. The PBX decodes the dialing information and rings the station. When the called party answers, the PBX grounds the 272R's E lead, providing reverse battery back to the CO. When the PBX station goes on hook, the ground to the E lead is removed and the tip and ring polarity returns to normal, causing the CO to open the tip and ring leads. If disconnect originates from the CO, the tip and ring leads are opened at the CO, thus removing the M-lead battery to the PBX. In either case, the circuit is returned to idle and is ready for the next DID call.

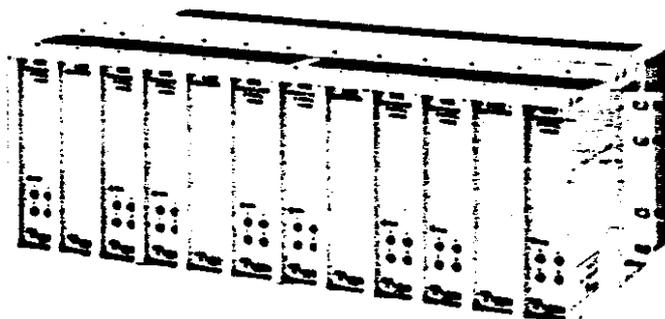


figure 1. 272R 2Wire Loop-to-E&M Converter Assembly

1.05 The 272R, when equipped with the 6114 module, performs loop-to-E&M conversion when DID is used with a 2wire carrier facility, as shown in figure 3 (far-end 272R). The near-end 272R interfaces a 2wire loop trunk from a CO to the originating 2wire E&M carrier channel circuit and provides M-lead battery to the originating carrier circuit in response to a loop closure from the CO. The terminating carrier circuit then provides an E-lead ground to the far-end 272R which, in turn, provides tip-and-ring closure to the PBX. The CO then sends dial pulses to the PBX via the 272R units and the carrier facility. The tip-and-ring loop to the PBX is pulsed by the far-end 272R unless DTMF dialing is used, in which case multifrequency tones are passed to the PBX, which then decodes the dialing information and rings the station. When the called party answers, the PBX provides reverse battery to the far-end 272R, which, in turn, provides M-lead battery to the terminating carrier circuit. The originating carrier circuit then provides E-lead ground to the near-end 272R, which reverses battery to the CO. If the calling party disconnects first, the CO opens the loop, causing the near-end 272R to send a ground on the M lead and also causing the far-end 272R to open the loop. If the called party disconnects first, the PBX returns the tip-and-ring polarity to normal causing the far-end 272R to remove the battery from the M lead and causing the near-end 272R to return the tip and ring leads to their non-reversed state. The CO recognizes this as called party disconnect and opens the loop. See table 1 for a complete summarization of this protocol.

1.06 The 272R Assembly is available in three different configurations. Their differences are indicated in table 2. The 272R consists of a Tellabs 1012 Mounting Shelf with a connectorized backplane. The 272R-8 and 272R-16 are Tellabs 1922 (16C-equivalent) Apparatus Cases containing one and two 272R's, respectively.

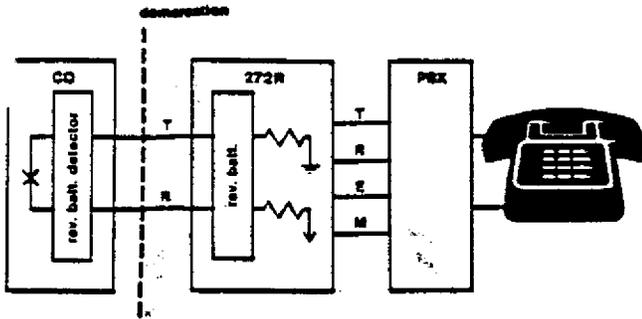


figure 2. 272R in local CO DID application

1.07 The connectorized backplate (see figure 2) of the 272R Assembly is equipped with four 25-pair connectors: P1 and P2, which interface the loop-signaling side, and P3 and P4, which interface the E&M-signaling side. A twelve-position barrier-type terminal block on the backplate is used for input power and ring generator connections. Each circuit can be powered individually, and each power connection should be fused.

1.08 The 272R Assembly is equipped with side-mounting ears for 19-inch relay-rack installation. Mounting ears for 23-inch relay-rack installation are available from Tellabs. The part number is 10-0799 for one mounting ear (two are required).

**FCC registration**

2.01 The Federal Communications Commission (FCC) has established through Part 68 of its Rules and Regulations that FCC-registered terminal equipment may be directly connected to the telephone network through standard plugs and jacks. This section documents the customer's responsibility to the

serving telephone company when a Tellabs 272R 2Wire Loop-to-E&M Converter Assembly is connected to the public switched network or to a private network.

**connection arrangements**

2.02 Registered terminal equipment may not be connected to coin lines or party lines.

2.03 Customers directly connecting this equipment to the telephone network shall, before such connection is made, give notice to the telephone company of the particular CO/PBX lines to which such connection is to be made, and shall provide to the telephone company the FCC registration number of this equipment. The customer shall also give notice to the telephone company upon final disconnection of this equipment from a particular line.

2.04 Customers directly connecting this equipment to CO facilities shall, before such connection is made, give notice to the telephone company of the type of service for which the equipment is registered and the particular lines to which connection is desired. In addition, when connected to the telephone network, the following information shall be provided to the telephone company:

- A. The FCC registration numbers of the equipment to be used.
- B. The quantities and Universal Service Order Code (USOC) numbers of the required standard jacks.
- E. For each jack, a listing of the sequence in which lines are to be connected, and technical description and service codes by position.

2.05 The following information is provided for the 272R Assembly:

- A. FCC registration number: BPX826-12981-WP-E
- B. USOC jack number: RJ21X

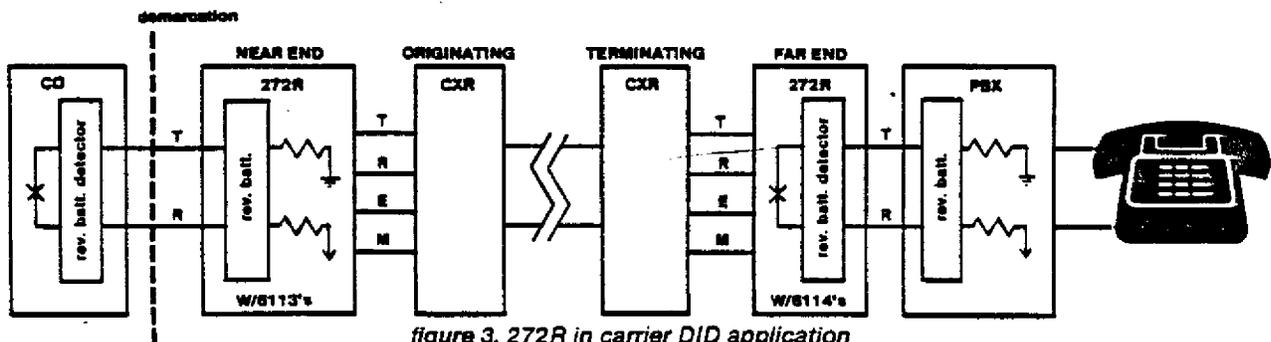


figure 3. 272R in carrier DID application

station condition	status of indicated portion of circuit					
	CO loop	near end		far end		PBX loop
		E lead	M lead	E lead	M lead	
idle	open	open	gnd	open	gnd	open
seizure	closed	open	batt	gnd	gnd	closed
dialing	op-close-op	open	gnd-batt-gnd	op-gnd-op	gnd	op-close-op
busy	closed (w/ reverse batt)	gnd	batt	gnd	batt	closed (w/ reverse batt)

table 1. 272R signaling-lead conditions

model number	no. of circuits	mounting
272R	8	19-inch relay rack*
272R-8	8	wall
272R-16	16	wall
* 23-inch mounting ears can also be used		

table 2. 272R Mounting Assemblies

2.06 Table 3 provides an example of sequential listings of USOC jack circuits of the 272R System and of other required information. Be aware that it is the responsibility of the customer at the time USOC jacks are ordered to specify the sequence in which CO lines are to be connected. The serving telephone company will consecutively wire these lines without skipping any jack positions.

**installation requirements**

2.07 The registered Tellabs 272R Assembly is typically connected to the serving-telephone-company interface via a cable terminated in a USOC RJ21X plug. Cables do not require registration and may be purchased from Tellabs or another manufacturer. The only requirements for cables are that they meet the industry-standard 1000Vac dielectric rating and that those cables used to derive the network interface be terminated in the aforementioned USOC connector.

**incidence of harm**

2.08 Should the registered equipment cause harm to the telephone network, the telephone company shall, where practicable, notify the customer that a temporary discontinuance of service may be required. However, where prior notice is not practicable, the telephone company may temporarily discontinue service forthwith, if such action is reasonable under the circumstances. If the telephone company temporarily discontinues service, the customer must be promptly notified of the discontinuance. The customer must also be provided with an opportunity to correct the problem that caused the discontinuance, and the customer must be informed of the right to bring a complaint to the FCC.

2.09 When trouble is experienced, the customer shall disconnect the registered equipment from the telephone line to determine if the registered equipment is malfunctioning. If the registered equipment is malfunctioning, the use of such equipment shall be discontinued until the problem is corrected. No repair work (other than those routine troubleshooting procedures prescribed in this practice) is authorized to be performed by the user. Part 68 of the FCC Rules and Regulations prescribes that all repairs of

registered equipment are to be made by the manufacturer or his authorized agent.

2.09 The telephone company may make changes to its communications facilities, equipment, operations, or procedures when such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of Part 68. If such changes can be reasonably expected to render any customer's terminal equipment incompatible with telephone company communications facilities, or to require modification or alteration of such terminal equipment, or to otherwise materially affect its use or performance, the customer shall be given adequate notice, in writing, to give the customer an opportunity to maintain uninterrupted service.

**3. installation**

3.01 The 272R 2Wire Loop-to-E&M Converter Assembly should be inspected upon arrival to find visible damage incurred during shipment. If damage is noted, a claim should immediately be filed with the carrier. If stored, the equipment should be inspected again prior to installation.

**mounting**

3.02 The 272R Assembly mounts in a standard 19-inch relay rack (or in a 23-inch rack via optional mounting ears). The 272R-8 and 272R-16 Assemblies are designed for wall mounting in an indoor environment. The 272R-8 and 272R-16 are wall-mounted by means of four screws (not provided) through four keyhole slots in the backplate. Take special care to use the proper size and type of screws (and wall plugs as well, if the mounting screws cannot be driven into studs).

**installer connections: power and ringing generator**

3.03 Power and ringing generator connections are made with 18AWG wire to 12-position barrier-type terminal block TB1 located on the rear of the 272R Assembly. Power must be applied only after all wiring is completed and all modules are properly optioned. Reference to figure 4 will aid in completing this procedure.

**Note:** Ringing generator connections are not required in DID applications.

**installer connections: cabling**

3.04 Using connectorized cables (not included with 272R), make the following connections to the appropriate connectors on the 272R Assembly's backplate (see figure 4):

information supplied to the telephone company for 272R equipment					
circuit i.d.	service type	service code	private-line facility interface code	REN	circuit number and cable leads
tel A NNX-XXXX	MTS 2w loop	9.0F	N/A	N/A	1 (26.1)
etc.	etc.	etc.	N/A	N/A	2 (27.2)
USOC jack: RJ21X 272R FCC registration number: BPX826-12981-WP-E.					

table 3. Sample information sheet

practice section 81272R

- A. Connect a standard 25-pair female connectorized cable to P1 when 6114 modules are used, or to P2 when 6113 modules are used with the reverse-battery option, as in DID applications. This is the loop-signaling side of the circuit.
- B. Connect a standard 25-pair female connectorized cable for the E&M-signaling side to P3.
- C. If A&B leads are to be accessed on the E&M signaling side, P4 provides this.

**option selection**

3.05 No optioning is required for the 272R Assembly itself. However, several option switches on each module must be set. Table 4 shows how the system modules are to be optioned.

**module installation**

3.06 After the modules are properly ~~connected~~, install them in their proper positions in the 272R Assembly as shown in figure 5.

**applying power**

3.07 When all wiring is completed and all cables and modules are installed, apply power to the assembly. If any difficulties are encountered, please refer to the *testing guide checklist* in section 6 of this practice.

**4. wiring diagrams**

4.01 Wiring diagrams for the 272R 2Wire Loop-to-E&M Converter Assembly are included at the back of this practice.

module	option switch	switch setting
4422	S3	AB
	S6	AB
	S7	AB
	S8	AB
6113	S1	LS
	S2	REV B
	S3	INV
	S4	*
6114	S1	LS
	S2	M NORM
	S3	REV B
	S4	OFF
	S5	*
	S6	*

\* The setting of this switch is immaterial.

table 4. 6113, 6114, and 4422 module optioning

**5. specifications**

**power requirements**

-42 to -56Vdc, filtered, regulated, ground-referenced

**operating environment**

20° to 130°F (-7° to 54°C), humidity to 95% (no condensation)

**weight**

272R: 8 pounds 2 ounces (3.69kg)  
 272R-8: 68 pounds 12 ounces (31.25kg)  
 272R-16: 76 pounds 14 ounces (34.95kg)

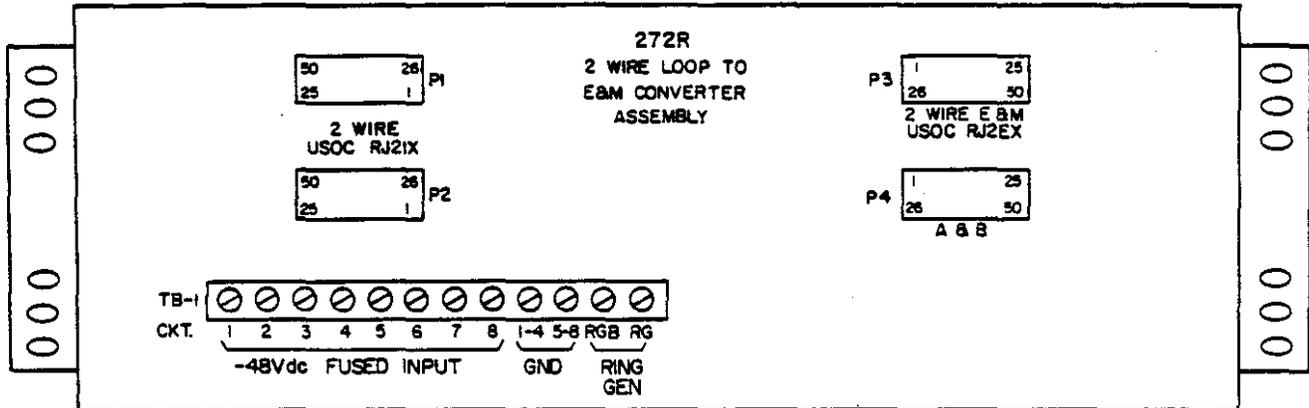


figure 4. 272R Assembly backplate

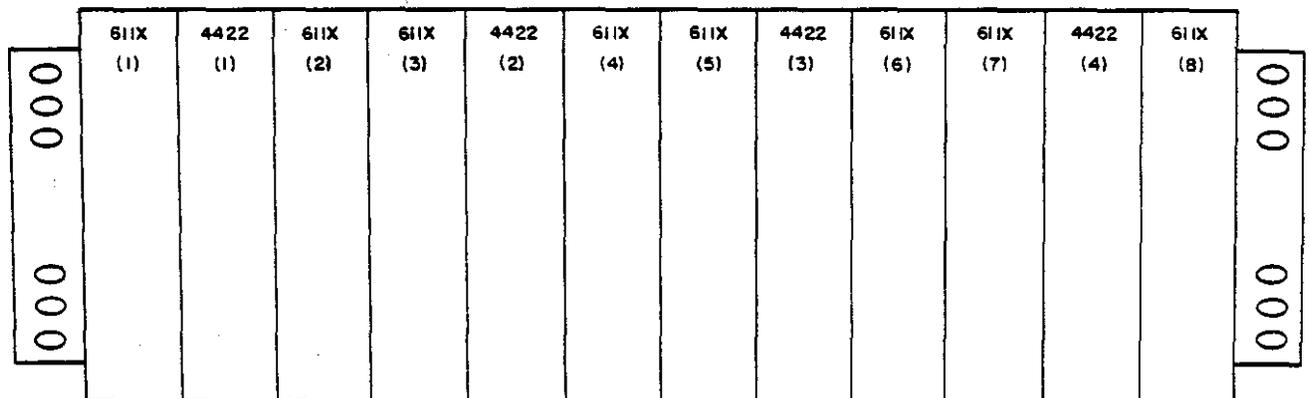


figure 5. 272R module positions

*dimensions (272R)*

**5.92 inches (15.04cm) high**  
**17.50 inches (44.45cm) wide**  
**9.75 inches (24.76cm) deep**

*dimensions (272R-8 and 272R-16)*

**16.75 inches (42.22cm) high**  
**26.00 inches (66.04cm) wide**  
**11.13 inches (28.27 cm) deep**

*mounting (272R)*

**mounts in 19-inch relay rack; can also be mounted in 23-inch relay rack via two Tellabs 10-0799 Mounting Ears (ordered separately)**

*mounting (272R-8 and 272R-16)*  
**wall mounted**

International customers: Contact your Tellabs distributor.

US Atlantic region: (203) 798-0506  
 US central region: (312) 969-8800  
 US northeast region: (412) 787-7860  
 US southeast region: (305) 645-5888  
 US western region: (702) 827-3400  
 Canada: (416) 624-0052

6.03 If a 272R is diagnosed as defective, follow the *replacement* procedure in paragraph 6.04 when a critical service outage exists (e.g., when a system or a critical circuit is down and no spares are available). If the situation is not critical, follow the *repair and return* procedure in paragraph 6.05.

**replacement**

6.04 To obtain a replacement 272R Assembly, notify Tellabs via letter or telephone (see addresses and numbers below), or via TWX (910-695-3530 in the USA, 610-492-4387 in Canada). Be sure to provide all relevant information, including the 8X272R part number that indicates the issue of the assembly in question. Upon notification, we shall ship a replacement assembly to you. If the assembly in question is in warranty, the replacement will be shipped at no charge. Pack the defective 272R in the replacement assembly's carton, sign the packing slip included with the replacement, and enclose it with the defective assembly (this is your return authorization). Affix the preaddressed label provided with the replacement assembly to the carton being returned, and ship the assembly prepaid to Tellabs.

**repair and return**

6.05 Return the defective 272R Assembly, shipment prepaid, to Tellabs (attn: repair and return).

in the USA: Tellabs Incorporated  
 4951 Indiana Avenue  
 Lisle, Illinois 60532  
 telephone (312) 969-8800

in Canada: Tellabs Communications Canada, Ltd.  
 1200 Aerowood Drive, Unit 39  
 Mississauga, Ontario, Canada L4W 2S7  
 telephone (416) 624-0052

Enclose an explanation of the assembly's malfunction. Follow your company's standard procedure with regard to administrative paperwork. Tellabs will repair the assembly and ship it back to you. If the assembly is in warranty, no invoice will be issued.

**6. testing and troubleshooting**

6.01 The *testing guide checklist* in this section may be used to assist in the installation, testing, or troubleshooting of the 272R 2Wire Loop-to-E&M Converter Assembly. The checklist is intended as an aid in the localization of trouble to a specific assembly. If an assembly is suspected of being defective, a new one should be substituted and the test conducted again. If the substitute assembly operates correctly, the original assembly should be considered defective and returned to Tellabs for repair or replacement as directed below. We strongly recommend that no internal (component-level) testing or repairs be attempted on the 272R Assembly. Unauthorized testing or repairs may void the 272R's warranty. Also, if the assembly is part of a registered system, unauthorized repairs will result in noncompliance with Part 68 of the FCC Rules and Regulations.

**Note:** *Warranty service does not include removal of permanent customer markings on the front of Tellabs Assemblies, although an attempt will be made to do so. If an assembly must be marked defective, we recommend that it be done on a piece of tape or on a removable stick-on label.*

6.02 If a situation arises that is not covered in the checklist, contact Tellabs Customer Service as follows (telephone numbers are given below):

USA customers: Contact Tellabs Customer Service at your Tellabs Regional Office.

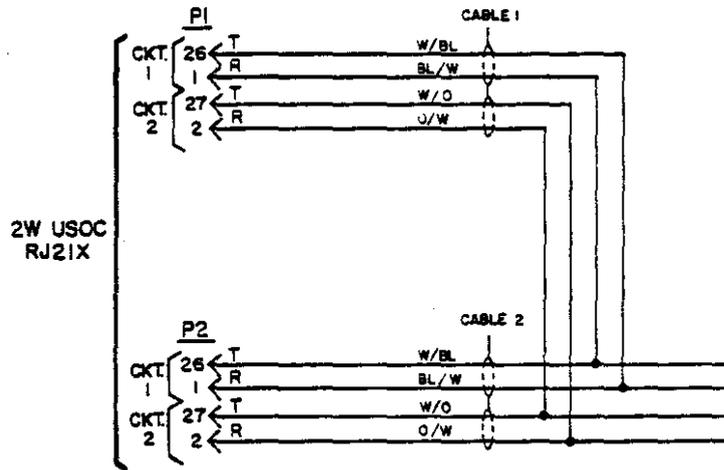
Canadian customers: Contact Tellabs Customer Service at our Canadian headquarters in Mississauga, Ontario.

**testing guide checklist**

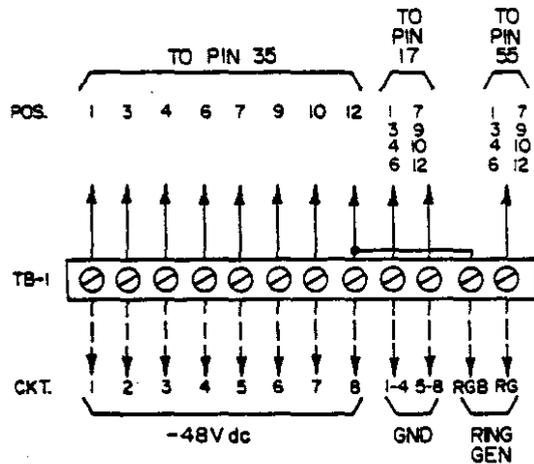
problem area	if normal conditions are not met,
all	Check wiring and cabling for proper connections <input type="checkbox"/> Check for power at TB1 <input type="checkbox"/> .
signaling	Check optioning of 6113/14 <input type="checkbox"/> . Replace 6113/14 and retest <input type="checkbox"/> . Check connectors <input type="checkbox"/> .
voice path	Check optioning of both modules for that circuit <input type="checkbox"/> . Replace suspect modules and retest <input type="checkbox"/> . Check connectors <input type="checkbox"/> .

CABLE ASSIGNMENT CHART

PIN NO	COLOR	P1		P4	CKT.	P5		CKT.
		DESIG.	DESIG.	DESIG.		DESIG.	DESIG.	
26	W/BL	T	A		1	T	I	1
1	BL/W	R	B			R	I	
27	W/O	T	A		2	E		2
2	O/W	R	B			M		
28	W/G	T	A		3	T	I	2
3	G/W	R	B			R	I	
29	W/BR	T	A		4	E		3
4	BR/W	R	B			M		
30	W/S	T	A		5	T	I	4
5	S/W	R	B			R	I	
31	R/BL	T	A		6	E		5
6	BL/R	R	B			M		
32	R/O	T	A		7	T	I	6
7	O/R	R	B			R	I	
33	R/G	T	A		8	E		7
8	G/R	R	B			M		
34	R/BR	SPARE	SPARE	SPARE		T	I	8
9	BR/R					R	I	
35	R/S					E		9
10	S/R					M		
36	BK/BL					T	I	10
11	BL/BK					R	I	
37	BK/O					E		11
12	O/BK					M		
38	BK/G					T	I	12
13	G/BK					R	I	
39	BK/BR					E		13
14	BR/BK					M		
40	BK/S					T	I	14
15	S/BK					R	I	
41	Y/BL					E		15
16	BL/Y					M		
42	Y/O					SPARE	SPARE	16
17	O/Y							
43	Y/G							17
18	G/Y							
44	Y/BR							18
19	BR/Y							
45	Y/S							19
20	S/Y							
46	V/BL							20
21	BL/V							
47	V/O							21
22	O/V							
48	V/G							22
23	G/V							
49	V/BR							23
24	BR/V							
50	V/S							24
25	S/V							



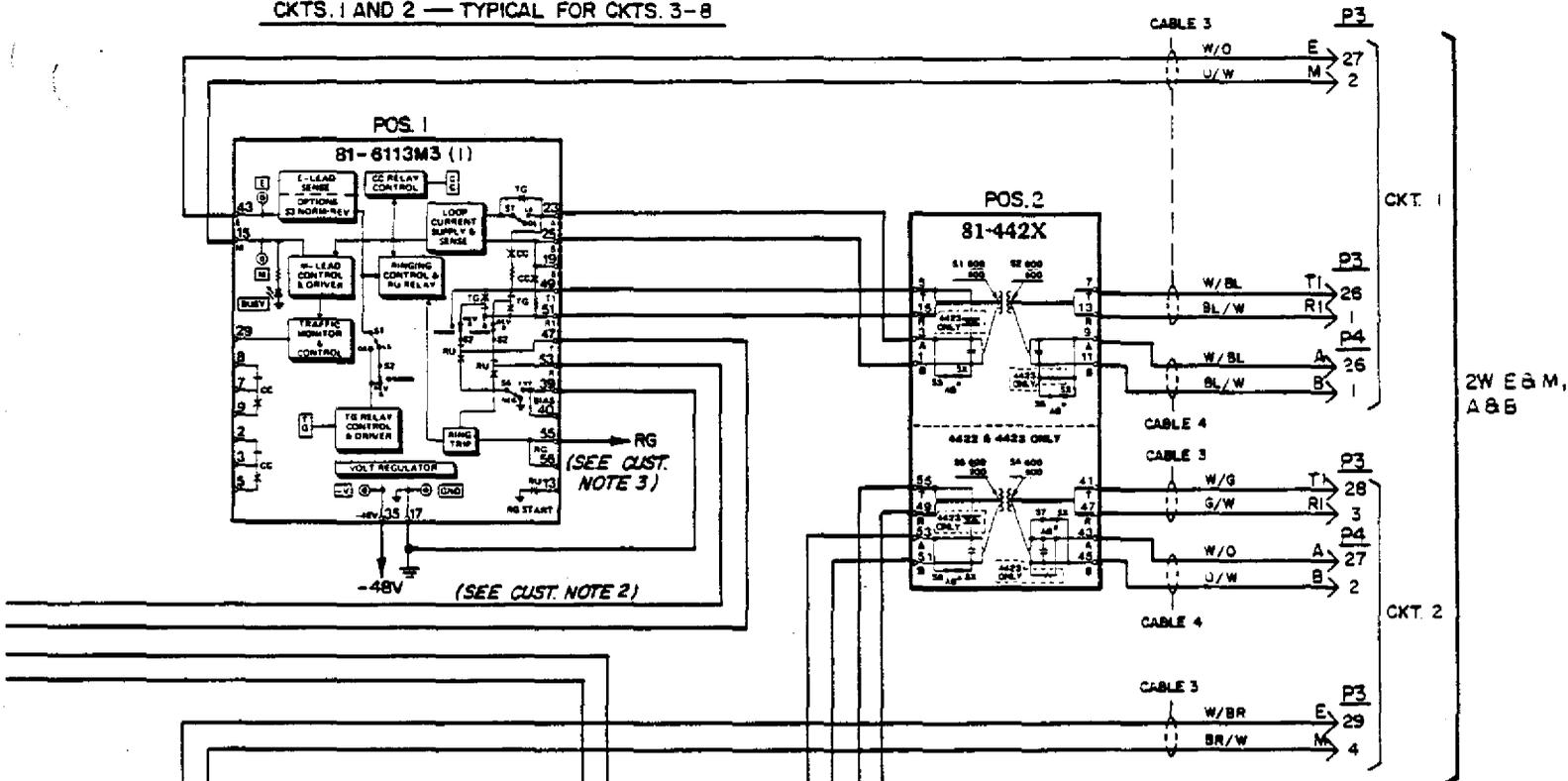
(SEE CUST. NOTE 2)



CUSTOMER NOTES:

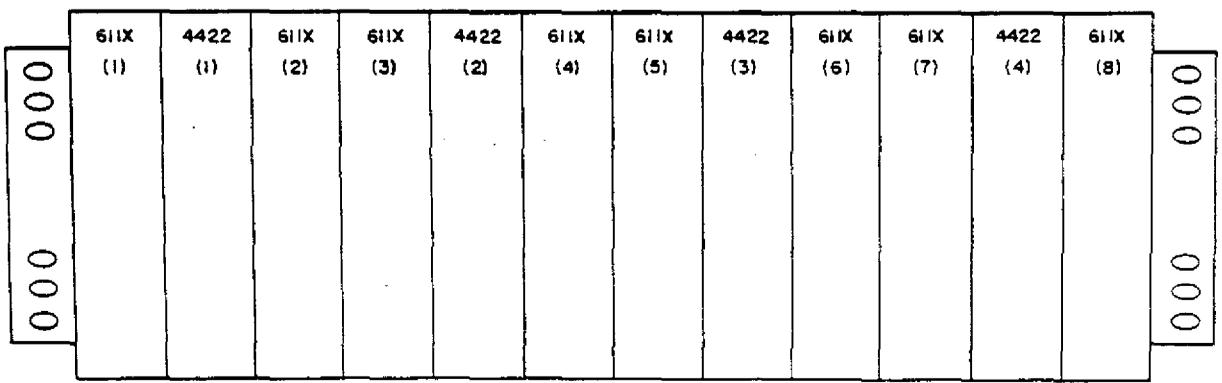
1. CUSTOMER PROVIDED POWER MUST BE -48VDC.
2. THE TIP & RING LEADS OF THE 6113 MODULE HAS BEEN WIRED TO ENSURE PROPER REVERSE BATTERY OPERATION, WHEN 6113 MODULES ARE USED WITH THE REVERSE BATTERY OPTION, CONNECTOR P2 AT THE REAR OF THE 272R SHELF MUST BE USED. CONNECTOR P1 IS TO BE USED WITH 6113 OR 6114 MODULES USING THE NORMAL BATTERY OPTION.
3. RING GENERATOR IS TO BE USED WITH THE 6113 MODULE ONLY, AND ONLY IN APPLICATIONS REQUIRING THAT RINGING BE ORIGINATED BY THE 6113 MODULE.

CKTS. 1 AND 2 — TYPICAL FOR CKTS. 3-8



**SYMBOLS:**

- 1. DENOTES WIRE-WRAPPING TERMINAL ON 56 PIN CONNECTOR MOUNTED ON REAR OF ENCLOSURE.
- 2. DENOTES PIN NUMBER FOR 50 PIN MALE AMPHENOL CONNECTOR.
- 3. DENOTES TWISTED PAIR
- 4. DENOTES CUSTOMER WIRING.
- 5. DENOTES SCREW TERMINAL.



FRONT VIEW