tellabs
technical manual
76-81273AR
rev A

practice section 81273AR

273AR Power Failure Transfer Assembly

FCC Registration No. BPX826-64761-TP-N

contents

1. description and application

1.01 The Tellabs 273AR Power Failure Transfer Assembly (figure 1) is designed for use in power-failure-transfer applications for PBX's not equipped with battery backup. This package includes the following components: from one to five 9001 Relay Modules, from one to four 9005M3 Loop Current Detector Modules, one 8001 24/48Vdc Power Supply, and one 273AR Assembly. When fully equipped with the maximum numbers of modules, the 273AR Assembly can serve 20 circuits in power-failure-transfer applications.

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

1.03 When the transfer circuits are idle, the 9001 modules' relays are energized, which provide transmission paths from the central office trunks to the PBX and from the PBX to the individual stations (via 2wire lines). The 9001 modules' relays remain energized via a ground supplied by the 9005M3 modules through their normally closed relay contacts.

1.04 If a power failure occurs, the 9001 modules' relays de-energize, and a cut-through path is established from the central office trunks through the 9001 and 9005M3 modules to designated PBX stations. This allows the stations to bypass the PBX and be connected directly to the serving CO, and thereby provide normal telephone service during a power failure. Figure 2 shows a typical application of this type. (If the PBX-to-CO trunk is a ground-start trunk, the PBX stations must be equipped with a pushbutton to simulate a ring ground access of the trunk.) When power is restored, the 9001 modules' relays re-energize and restore normal telephone service.

1.05 If power is restored while a "power failure" call is in progress, the 9005M3 modules prevent the 9001 modules' relays from re-energizing, which, if it occurred, would drop the call without warning. Upon completion of the call, the 9005M3 modules enable the 9001 modules' relays, which then re-energize and restore normal telephone service.

1.06 The 273AR Assembly is a nine-position mounting assembly with a connectorized backplate.

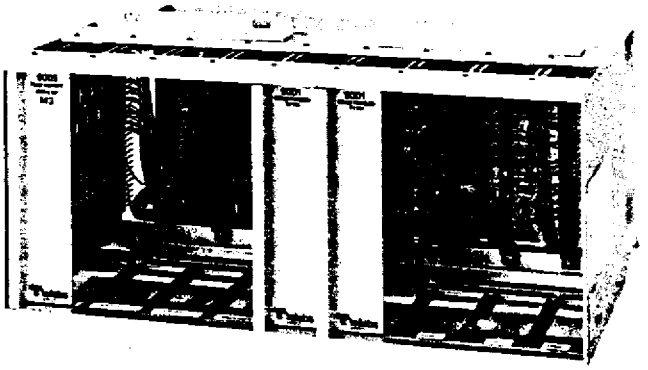


figure 1. 273AR Power Failure Transfer Assembly

The backplate contains four connectors, one each for the network RJ21X interface connections, and for customer connections: the PBX trunk circuits, the PBX line circuits, and the station equipment. There is also a two-position barrier-type terminal block for the power connections (−24Vdc and ground).

1.07 The 273AR Assembly requires a nominal 24Vdc power source. The Tellabs 8001 24/48Vdc Power Supply is normally used to power the 273AR. (The 8001 must be optioned for 24Vdc operation.)

1.08 The 273AR Assembly is normally mounted in a standard 19-inch relay rack. The Tellabs 14-9002 Mounting Bars are used to mount the 273AR Assembly and the 8001 Power Supply side-by-side on a 19-inch relay rack.

2. FCC registration information

introduction

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 273AR Power Failure Transfer Assembly is connected to the public switched network or private line service.

2.02 The 273AR Power Failure Transfer Assembly combines two modules, the 9001 and 9005M3, for transfer of CO trunks around a PBX directly to the PBX station telephones during power failure. In-process calls are not dropped when power is restored. The 273AR Assembly uses a Tellabs 1009 Mounting Shelf with a connectorized backplate and a Tellabs 8001 Power Supply. This arrangement accommodates up to 20 transfer circuits.

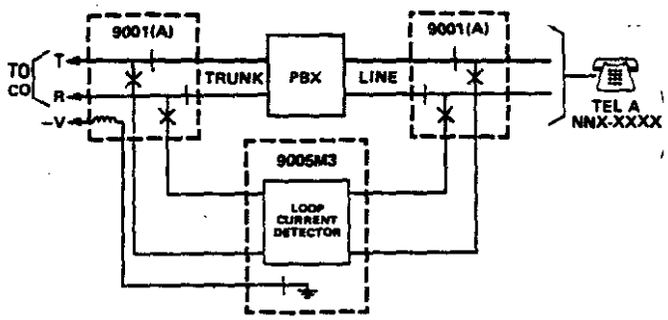


figure 2. Typical power-failure-transfer application

2.03 Paragraph 2.16 of this section contains a sample table that gives examples of the type of data that the customer must supply to the serving telephone company regarding installation of the 273AR Assembly. Figure 2 shows the typical 273AR application from which this table was compiled.

connection arrangements

2.04 Registered terminal equipment cannot be connected to coin lines or party lines.

2.05 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 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.

2.06 Customers directly connecting systems consisting of combinations of individually registered terminal equipment (e.g., a PBX, a 273AR, and telephone sets) shall, before such connection is made, provide to the telephone company the following information:

a. For each line, the FCC Registration Numbers for all equipment dedicated to that line, the largest ringer equivalence to be presented to that line, and any information required for the compatible operation of this equipment with telephone company communications facilities (e.g., type of service required).
b. The quantities and Universal Service Order Code (USOC) numbers of the required standard jacks for connection to the network.
c. For each jack, the sequence in which the lines are to be connected, technical description codes by position, and service code by position. (See the sample table in paragraph 2.16.)

2.07 The following information is provided for the 273AR Assembly:

A. Required network interface jack: USOC RJ21X.
B. Ringer equivalence number (REN): 0.0B.

installation requirements

2.08 The registered Tellabs 273AR Assembly is typically connected to the serving telephone company interface by means of a cable less than 25 feet in length and terminated in a USOC RJ21X plug. Cables do not require registration and may be purchased from Tellabs or another manufacturer. The only requirement for cables is that they meet the industry-standard 1000Vac dielectric rating and that those cables used to derive the network interface be terminated in USOC RJ21X plugs.

2.09 The 273AR Assembly provides a connectorized rear panel (backplate) with a 25-pair male connector for the network connection and three 25-pair female connectors for customer connections: the PBX trunk circuits, the PBX line circuits, and the station equipment.

2.10 All connections from the 273AR Assembly to the network connection (CO trunks) are made at the cable stubs, which are terminated in a standard 25-pair male connector. All 273AR connections to customer equipment are similarly made via cable stubs terminated in standard 25-pin female connectors. (See the cable assignment chart, which is part of the wiring diagram.)

2.11 Normally, the Tellabs 8001 24/48Vdc Power Supply is used to energize the 273AR Assembly. If a different power supply is used, it should be FCC-approved or UL-listed.

2.12 The 273AR Assembly is not a protective circuit and is to be used in conjunction only with other FCC-registered equipment.

incidence of harm

2.13 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.

2.14 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 has been corrected. No repair work (other than those routine troubleshooting procedures prescribed in section 6 of this Practice) is authorized to be performed by the user. Part 68 of the FCC Rules prescribes that all repairs of registered equipment be made by the manufacturer or his authorized agent.

2.15 The telephone company may make changes to its communications facilities, equipment, operations or procedures, where 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 require modification or alteration of such terminal equipment, or otherwise materially affect its use or performance, the customer shall be given adequate notice in writing, to allow the customer an opportunity to maintain uninterrupted service.

typical configuration and sample information table

2.16 Figure 2 in section 2 shows a typical 273AR Assembly application; table 1 is a sample information table corresponding to that figure. This sample table is representative of the information that the customer must supply to the serving telephone company in regard to installation of a registered 273AR Assembly. Be aware that it is the responsibility of the customer at the time USOC's 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.

3. installation

inspection

3.01 The 273AR Assembly and its component modules and power supply should be visually inspected upon arrival to find possible damage incurred during shipment. If damage is noted, a claim should immediately be filed with the carrier. If stored, the equipment should be visually inspected again prior to installation.

3.02 The 273AR Assembly can vary in configuration, depending upon the number of lines served. From one to five 9001 Relay Modules and from one to four 9005M3 Loop Current Detector Modules can be used. With a full complement of modules, the 273AR serves 20 lines. The following list will assist in verifying that all necessary equipment for your particular installation is provided, and will familiarize you with the mounting assembly, modules, and hardware.

equipment list

- ☐ 273AR Assembly (Tellabs 1009 Shelf with a prewired, connectorized backplate).
- ☐ One to five 9001 Relay Modules (24Vdc).
- ☐ One to four 9005M3 Loop Current Detector Modules.
- ☐ One 8001 24/48Vdc Power Supply.
- ☐ One pair 14-9002 (19-inch) mounting bars (for 273AR Assembly and 8001 Power Supply).

mounting

3.03 The 273AR Assembly (with 8001 Power Supply) is designed to be mounted in a standard 19-inch equipment rack. The 273AR and Power Supply mount side-by-side using one pair of 14-9002 (19-inch) mounting bars. The required mounting arrangement for the 273AR Assembly, 8001 Power Supply, and associated modules is shown in figure 3. However, do not install the modules until they are properly optioned (see paragraph 3.06).

information supplied to telephone company for 273AR Assembly (FCC Registration Number BPX826-64761-TP-N)

circuit ID	type of service	application	service code	private line facility code	REN (ringer equivalence number)	USOC	circuit number cable pair (T, R)	required FCC registration numbers
tel A NNX-XXXX	2wire loop (voice)	power failure transfer	not applicable	not applicable	273AR Assembly: 0.0B PBX: (supply applicable REN) tel set: (supply applicable REN)	RJ21X	1(26, 1)	273AR Assembly, PBX, and tel set

table 1. Sample information table for 273AR Assembly configured as shown in figure 2

9005M3	9005M3	9005M3	9005M3	9001	9001	9001	9001	9001	8001
(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(5)	

figure 3. Required equipment mounting arrangement

installer connections

power wiring

3.04 Before beginning the power wiring procedure, ensure that input power is not applied to the 8001 Power Supply. 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 wiring procedure. Wire the Assembly's power connections according to the following list:

A. Assembly power connections (ground return):
- ☐ Use 18AWG wire for the ground-return power connection.
- ☐ Connect the positive (+) terminal of the 8001 Power Supply to the common (com) terminal on the 8001 and also to the ground (GND) terminal on the backplate of the 273AR Assembly.

B. Assembly power connections (−24Vdc):
- ☐ Use 18AWG wire for the −24Vdc power connection.
- ☐ Connect the negative (−) terminal of the 8001 Power Supply to the −24V terminal on the backplate of the 273AR Assembly.

cabling

3.05 Make the following connections via connectorized cables to the corresponding connectors (reference to figure 4 will aid in completing this procedure):
- ☐ Connect a standard 25-pair female-connectorized cable to P1, the RJ21X network-interface connector.
- ☐ Connect the three standard 25-pair male connectorized cables for the customer connections, i.e., the station equipment, the PBX line circuits, and the PBX trunk circuits to J1, the station connector, to J2, the PBX line connector, and to J3, the PBX trunk connector, respectively.
- ☐ Connect the other ends of these four cables to the cross-connect field or to the main-distributing frame, as required for your particular installation.

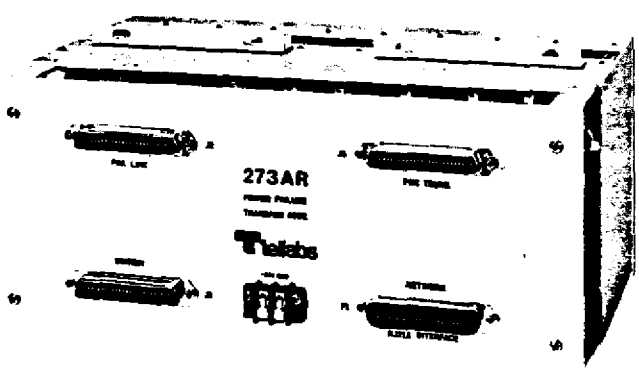


figure 4. Connectorized backplate of 273AR Assembly

switch options

3.06 The only optioning required for the 273AR Assembly is the setting of one slide switch on the 9005M3 module's printed circuit board and the setting of one slide switch on the back of the 8001 Power Supply. Locations of these option switches are shown in figure 5. The 9001 module has no options. For all 273AR Assembly applications, set the option switches in accordance with the following checklist:
- ☐ Set the 24V/OFF/48V switch on the 8001 Power Supply to the 24V position.
- ☐ Set switch S2 on the 9005M3 module to the CONTACT GROUND position.

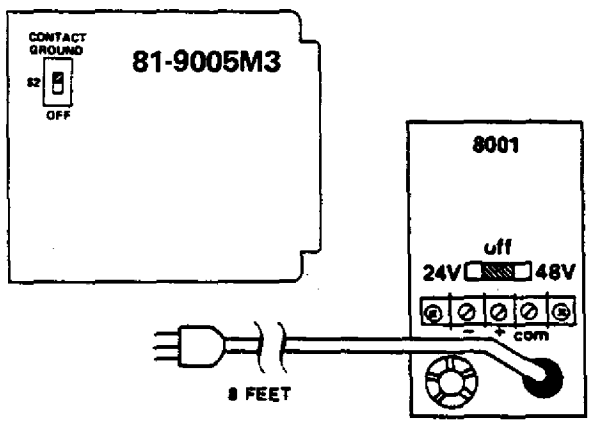


figure 5. Option switch locations

module mounting

3.07 After the 8001 Power Supply and the 9005M3 module(s) are properly optioned, install all modules in their proper positions in the 273AR Assembly, as shown in figure 3. No alignment of the 273AR Assembly is required.

applying power

3.08 When all wiring is completed and all cables and modules are installed, apply power to the Assembly by plugging the line cord of the Power Supply into a conventional 117Vac, earth-grounded power receptacle. If any difficulties are encountered, please refer to the Testing Guide Checklist in section 6 of this Practice.

4. circuit description

4.01 This circuit description is intended to familiarize you with the 273AR Power Failure Transfer Assembly for engineering and application purposes only. Attempts to troubleshoot the 273AR internally are not recommended and may void your warranty. Procedures for recommended testing and troubleshooting should be limited to those prescribed in section 6 of this Practice. Please refer to the 273AR wiring diagram, section 7 of this Practice, as an aid in understanding this circuit description.

4.02 In the idle condition, all relays on the 9001 Relay Modules are energized and provide a transmission path from the network to the PBX trunk circuit. The relays remain in the operated state via a ground supplied by the 9005M3 Loop Current Detector Module through each of its modified normally closed relay contacts.

4.03 When a power failure occurs, the 9001 modules' relays de-energize and a cut-through path

is established from the network, through the 9005M3 modules, to designated PBX stations. This allows the PBX stations to bypass the PBX and be connected directly to the serving CO, so that telephone service can be maintained during a power failure. (If the normal PBX-to-CO trunk is a ground-start trunk, the PBX station telsets must be equipped with a pushbutton to simulate a ring-ground access of the ground-start trunk.). When power is restored, the 9001 modules' relays re-energize and normal service is restored.

4.04 If power is restored while a "power failure" call is in progress, circuitry on the 9005M3 modules inhibits re-energization of the 9001 modules' relays, which would drop the call without warning. The loop current detector circuitry on the 9005M3 modules detects loop current on the CO-to-station connection when power is restored. The modules' loop current detectors are modified to be fast acting, which causes the 9005M3 modules' relays to operate and remove ground to the 9001 modules' relays if a power-failure call is in progress. Without this ground, the 9001 modules' relays cannot operate, and, therefore, they cannot break off the call in progress. When the call is completed, the loop current detectors sense the loss of loop current and then release their associated relays (on the 9005M3 modules). When these relays release, ground is provided to the 9001 modules' relays. These relays then re-energize and normal service is restored.

5. specifications

power requirements
input voltage source: commercial 117Vac from conventional earth-grounded (3-prong) wall outlet
input current: 0.4A maximum

power supplied to modules
power source: regulated −24Vdc, positive-ground-referenced (8001 Power Supply must be optioned for −24Vdc operation)
current to modules: 750mA maximum

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

dimensions (mounting shelf only)
5.92 inches (15.04cm) high
13.9 inches (35.30cm) wide
7.31 inches (18.57cm) deep

weight
16.5 pounds (7.5 kg) without modules and power supply

mounting
19-inch relay rack via Tellabs 14-9002 Mounting Bars

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 273AR Assembly. The Checklist is intended as an aid in the localization of trouble within the 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. We strongly recommend that no internal (component-level) testing or repairs be attempted on the 273AR Assembly. Unauthorized testing or repairs may void the Assembly's warranty.

Note: Warranty service does not include removal of permanent customer markings on 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 at your Tellabs Regional Office or at our Lisle, Illinois, or Mississauga, Ontario, Headquarters. Telephone numbers are as follows:

US central region: (312) 969-8800
US northeast region: (412) 787-7860
US southeast region: (305) 645-5888
US western region: (702) 827-3400
Lisle Headquarters: (312) 969-8800
Mississauga Headquarters: (416) 624-0052

6.03 If a 273AR is diagnosed as defective, the situation may be remedied by either replacement or repair and return. Because it is more expedient, the replacement procedure should be followed whenever time is a critical factor (e.g., service outages, etc.).

replacement

6.04 To obtain a replacement 273AR Assembly, notify Tellabs via letter (see addresses below), telephone (see numbers above), or twx (910-695-3530 in the USA, 610-492-4387 in Canada). Be sure to provide all relevant information, including the 8X273AR 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 273AR 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 pre-addressed 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 273AR Assembly, shipment prepaid, to Tellabs (attn: repair and return).

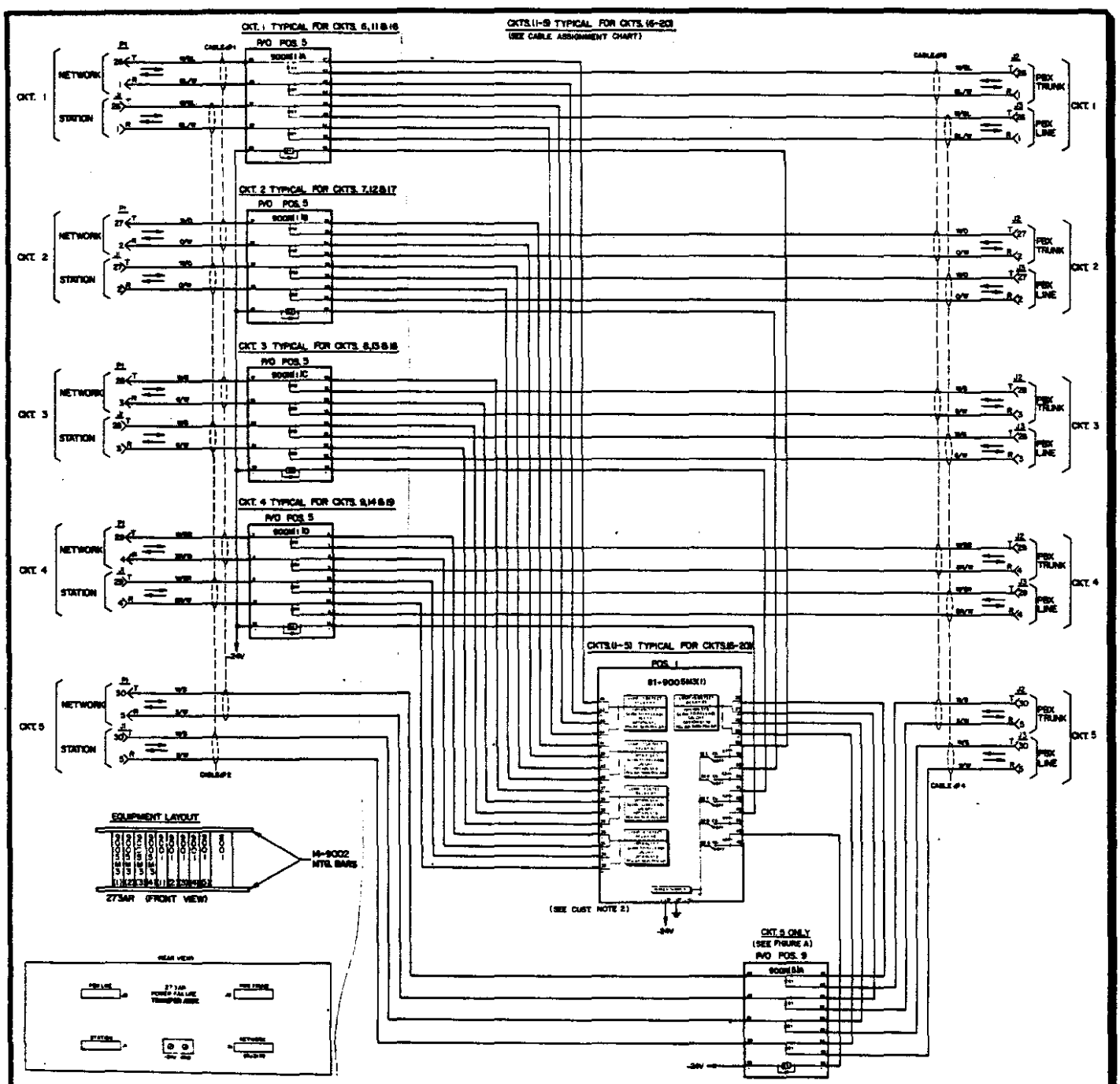
in the USA: Tellabs Incorporated
4951 Indiana Avenue
Lisle, Illinois 60532

in Canada: Tellabs Communications Canada, Ltd.
1200 Aerowood Drive, Unit 39
Mississauga, Ontario, Canada L4W 2S7

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.

testing guide checklist

test	test procedure	normal result	if normal conditions are not met, verify:
8001 Power Supply output	Use VOM (set to appropriate dc voltage scale) to measure voltage across positive (+) and negative (—) terminals of 8001 Power Supply.	Measured voltage is nominal −24Vdc ☐.	*24V/off/48V* option switch set to *24V* ☐. Faulty connection to 117Vac wall outlet ☐. Replace 8001 Power Supply and retest ☐.
power input to 273AR Assembly	Use VOM (set to appropriate dc voltage scale) to measure voltage across −24V and *GND* terminals on backplate of Assembly.	Measured voltage is nominal −24 Vdc ☐.	Broken wires or faulty connections between power supply and Assembly ☐. Power supply not providing proper output (See 8001 Power Supply output procedure above.) ☐



7. wiring diagram (page 1 of 2)

SYMBOLS:

1. ○ DENOTES WIRE-WRAP TERMINAL ON 56 PIN CONNECTOR MOUNTED ON REAR OF ENCLOSURE.
2. ⬭ DENOTES TWISTED PAIR.
3. ⊘ DENOTES SCREW TERMINAL.
4. ——— DENOTES DIRECTION OF TRANSMISSION.
5. ——→ X DENOTES PIN NUMBER FOR 50 PIN MALE AMPHENOL CONNECTOR.
6. ——≺ X DENOTES PIN NUMBER FOR 50 PIN FEMALE AMPHENOL CONNECTOR.
7. ⓧ DENOTES SCREW TERMINAL ON TB-1 MOUNTED ON REAR OF 1009 SHELF. "X" INDICATES TERMINAL NO.

CUSTOMER NOTES:

1. 8001 POWER SUPPLY SHOULD BE SET TO 24V POSITION.
2. 9005 M3 IS MODIFIED FOR QUICK ACTING LOOP DETECTOR RELAY & INVERTED RELAY OPERATION. FUNCTIONAL OVERLAY SHOWS PROPER RELAY CONTACTS. FOR PROPER CIRCUIT OPERATION S2 MUST BE IN THE C.G. POSITION.

POWER SUPPLY (SEE CUST. NOTE 1)

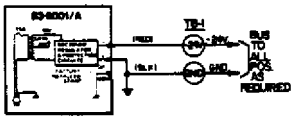
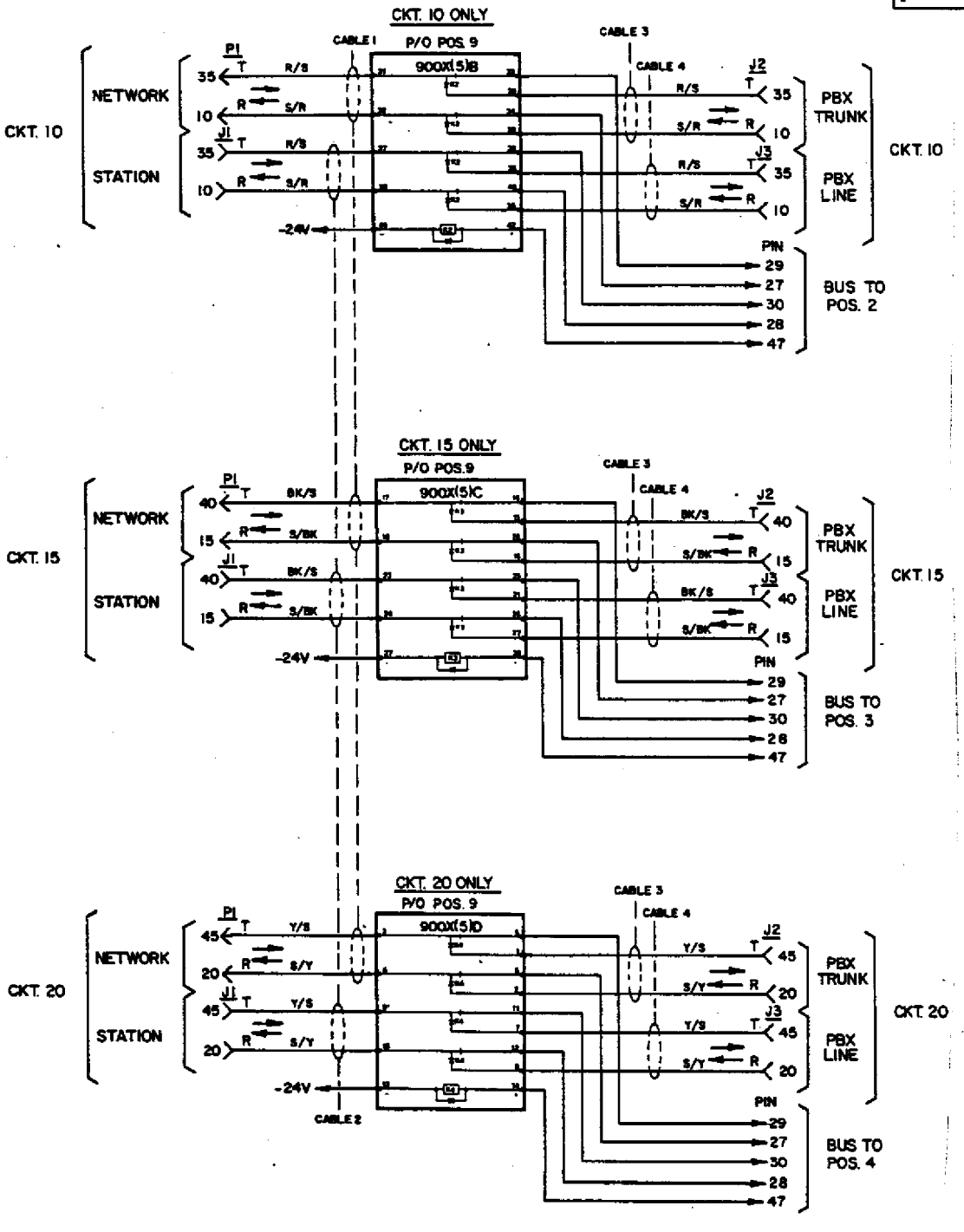
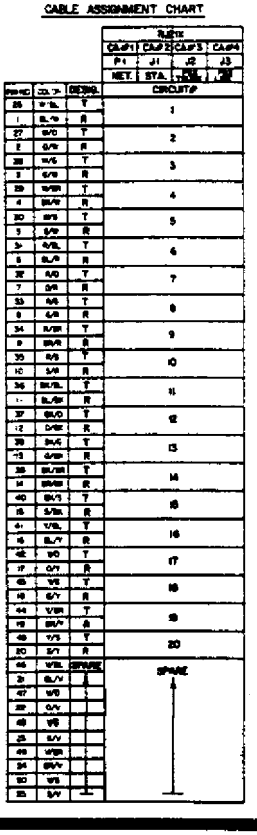


FIGURE A



CABLE ASSIGNMENT CHART



7. wiring diagram (page 2 of 2)