

**J98710U EXPRESS OFFICE REPEATER PANEL**  
**GENERAL DESCRIPTION, INITIAL LINEUP, TESTS, AND MAINTENANCE**  
**T1 AND T1/OS DIGITAL LINE**  
**DIGITAL TRANSMISSION SYSTEMS**

	CONTENTS	PAGE
1.	<b>GENERAL</b> . . . . .	1
2.	<b>EQUIPMENT DESCRIPTION</b> . . . . .	1
3.	<b>FUNCTIONAL DESCRIPTION</b> . . . . .	2
4.	<b>INITIAL LINEUP</b> . . . . .	3
5.	<b>TEST AND MAINTENANCE</b> . . . . .	3
6.	<b>REFERENCES</b> . . . . .	3

**1. GENERAL**

**1.01** This section describes the J98710U Express Office Repeater Panel (EORP) (Fig. 1) and its initial lineup, testing, and maintenance. The J98710U EORP is a panel of line repeaters which are used for through-connections at an intermediate central office (CO) in T1 or T1 Outstate (T1/OS) systems.

**1.02** This section is being reissued to consolidate its descriptive information with the lineup, testing, and maintenance information from Section 365-200-301. Since this reissue is a general revision no revision arrows have been used to denote significant changes.

**1.03** The EORP contains up to 25 208- or 238-type repeaters with their associated office build-out networks and either one 1068-, 1114-, or 1115-type fault-locating filter. The 23-inch panel can be mounted in a 7-foot, 9-foot, or 11-foot 6-inch bay for through-connections of T1 or T1/OS systems at intermediate offices. Twenty-five repeaters of the same type, bidirectional or unidirectional, are placed in a panel to match the cable-repeater operation of the

adjacent span lines. Repeaters are selected to pass (through) or loop the power received from the cable pairs. Thus, the repeaters in an EORP are functionally like those in apparatus cases.

**1.04** This section assumes that the T1 digital line and associated repeaters have been tested in accordance with Section 365-800-002 (TOP). If it should become necessary to recheck any of the lines, it must be remembered that the 3-dB pads or the 100-ohm artificial line networks are separate from the repeater and must be removed before any tests are made.

**2. EQUIPMENT DESCRIPTION**

**2.01** The EORP is 7-7/8 inches high, 23 inches wide, and 10 inches deep. It mounts in a 23-inch unequal flange bay. Maximum capacities for the 7-foot, 9-foot, and 11-foot 6-inch bays are shown in Table A.

**2.02** All options on the EORP are factory-wired and must be ordered by the appropriate list number.

**2.03** The EORP contains a hinged door to permit installation and maintenance from the front of the panel. The repeaters and/or through connection board and/or voice frequency coil, fault-locating filters, 939A connector, and the 3-dB flat loss pad or the 7.5-dB artificial line network plug into slots provided in the panel.

**2.04** The EORP provides slots for up to 25 208- or 238-type repeaters. For a complete description of the repeaters, see Section 365-200-101. A mixture of repeater types is not permissible in a J98710U EORP; that is, all repeaters must be bidirectional or unidirectional, through powered or loop powered, and operate at 60 mA (low power) or at 140 mA (standard power).

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**2.05** In order to provide for proper level coordination and end section buildout, the following types of printed wiring boards (PWB) are available:

(a) **3-dB Flat Loss Pad:** This PWB provides four balanced 3-dB flat loss pads, one in series with each input and output of the repeater. The 3-dB pad should be chosen when systems terminating on other pairs in the cable use 3-dB type office repeaters (see Section 365-200-101), or when cable sections adjacent to the EORP do not allow the use of the 7.5-dB artificial line. The resistive elements of the pad also provide protection for its associated repeater from both longitudinal current and metallic current surges on the cable. If cables feeding the EORP are to be subjected to possible surges (lightning, etc) in the Outside Plant, then the 3-dB pad PWB should be ordered with Option X which provides 106B varistors shunting each input and output of the repeater.

(b) **7.5-dB (100-ohm) Artificial Line Network:** This PWB provides four balanced 7.5-dB artificial line networks, one in series with each input and output of the repeater. The 7.5-dB artificial line should be chosen when systems terminating on other pairs in the cable use 7.5-dB type office repeaters (see Section 365-200-101) or when end section lengths require them per the engineering requirements of Section 855-351-101. The resistive elements of the pad provide protection for its associated repeater from both longitudinal and metallic surges on the cable. If cables feeding the EORP are to be subjected to possible surges in the Outside Plant (lightning, etc) then the 7.5-dB artificial line card should be ordered with Option X which provides 106B varistors shunting each input output of the repeater.

(c) **Through Connections:** This PWB is used to provide continuity in the cable when the repeater slot is equipped with a 939A connector shorting device or a 184A1 voice frequency loading coil instead of a 208-type repeater.

Only one type of PWB, either the 3-dB flat loss pad or the 7.5-dB artificial line network, can be used for repeater equipped slots on an EORP. The through-connection PWB may be used for all unequipped repeater slots on the EORP. The connectors, which the PWBs plug into, are keyed so that they accept either a 3-dB flat loss pad or a 7.5-dB artificial line network.

**2.06** The EORP may be ordered with Option R which provides factory-wired, order-wire ap-

pearance. The order wire will appear on the panel as either a 239A jack for use by central office personnel or a feed-through binding post for use by outside plant personnel. If ordered, a 622-type loading coil (Option V) will be included in the panel. If the loading coil is not ordered, Option U strapping will be wired into the panel. DC blocking capacitors (Option Z) will be factory-wired into the panel, if required. If the capacitors are not required, Option Y strapping will be wired into the panel.

**2.07** A fault-locating filter slot is provided for a 1068-, 1114-, or 1115-type filter. Option T is available and provides a 622-type loading coil in the through fault-wire path. If the loading coil is not required, strapping is used instead and is designated Option S. A normally closed pushbutton switch is provided in the fault-locating filter slot on the EORP. When the filter is inserted in the slot, the switch is open and the repeater fault-locating outputs are bridged to filter input. When the filter is removed, the switch is closed and the fault-locating outputs of the bridged repeaters are shorted.

**2.08** Optional primary lightning protection is provided as needed. This protection consists of four 467A electron (dual) tubes per repeater, two 467A electron (dual) tubes for the fault-locating filter, and two 467A electron (dual) tubes for the order-wire appearance. (The 467A electron tubes are located behind the hinged door of the panel.) Option W is the terminal strip strapping which is required when primary lightning protection is required.

### 3. FUNCTIONAL DESCRIPTION

**3.01** The EORP is functionally similar to an apparatus case and is considered to be part of the span line. Each EORP is designed to house 25 repeaters, a fault-locating filter, and provide an optional order-wire appearance with provision for loading coils for both the fault-locating and order-wire pairs. The EORP can be cabled directly to the cable vault, a splice box, the office distributing frame, or a protector frame.

**3.02** The EORP has optional primary lightning protection and the 3-dB flat loss pad or 7.5-dB artificial line network PWBs have provision for optional secondary lightning protection.

**3.03** Since the EORP uses line repeaters in a CO environment it is necessary to compensate for

the short end sections of cable between the CO and the first manhole. Either 3-dB flat loss pads or 7.5-dB, 100-ohm artificial line networks are connected to the inputs and outputs of the repeater for this purpose.

**3.04** Repeaters in an EORP are powered from the span end office over a simplex powering path. There are no power connections to an EORP.

#### 4. INITIAL LINEUP

**4.01** After the lines have been tested, each J98710U EORP must be inspected to ensure that:

- (a) All repeaters on each panel are of the same type.
- (b) The proper type fault-locate filter is used.
- (c) All unequipped repeater slots have one of the following, if the line is to be functional:
  - (1) 1841 coil case
  - (2) 939A connector.
- (d) ED-3C809-30 (3 dB pads) or ED-3C808-30 (100-ohm artificial line) PWBs are installed for each repeater in the panel. Only one of the above mentioned PWBs can be used in any given panel.
- (e) ED-3C-810-30 through connector PWBs are installed for each 1841 coil case or 939A connector plug-ins in the panel.
- (f) If lightning protection is required (NJ-01218B-1 lists 3, 8), check for 104 - 467A electron tubes.

**4.02** There must be one 217A adapter available to permit insertion of the 113-type test set or the 162A adapter or the J98710P line error detector into the repeater slot as required. If the J98725AA T1C/T1 pair loss test set is used no adapter is necessary.

**4.03** Check to determine that the input cable pairs are run in the left bay cable duct and terminate at the TS1 terminal strip.

**4.04** The 22-gauge ABAM cables shall be grounded at the J98710U EORP in accordance with ED-97270-10.

#### 5. TEST AND MAINTENANCE

**5.01** Testing and maintenance of the T1 digital line are covered in Section 365-800-002 (TOP). Span turnup and initial tests are covered in the same section.

**5.02** The various type line repeaters can be tested from the CO at either end of the span, or for trouble isolation the J98710P line error detector or J98725AB bipolar violation detector may be used.

#### 6. REFERENCES

**6.01** For additional information pertaining to the EORP or to the PWBs, refer to the following drawings:

DRAWING	TITLE
ED-3C808	7.5 dB 100-Ohm Artificial Line Network Printed Wiring Board
ED-3C809	3-dB Flat Loss Pads and Through Connection Printed Wiring Board
ED-3C810-30	Thru Connection Printed Wiring Board Assembly
ED-97270-10	Grounding ABAM Cable
J98710P-1	Line Error Detector
J98710U	T1 Carrier Express Office Repeater Panel
J98725AA-1	T1C/T1 Pair Loss Test Set
J98725AB-1	T1C/T1 Manhole Bipolar Violation Detector
SD-3C390-01	T1 Digital Line Express Office Repeater Application Schematic
CD-3C390-01	T1 Digital Line Express Office Repeater Circuit Description

**6.02** Bell System Practices referenced in this section are as follows:

SECTION	TITLE
365-200-101	Repeater Description T1 and T1 Outstate (T1/OS) Digital Lines

SECTION	TITLE	SECTION	TITLE
365-800-002	T1 Line—Maintenance Tasks (TOP)	855-351-101	Transmission and Outside Plant Design Procedures—T1 Digital Line—Carrier Engineering

TABLE A

BAY SIZE	EORP	REPEATER CAPACITY
7-Foot	9	225
9-Foot	12	300
11-Foot 6-Inch	16	400

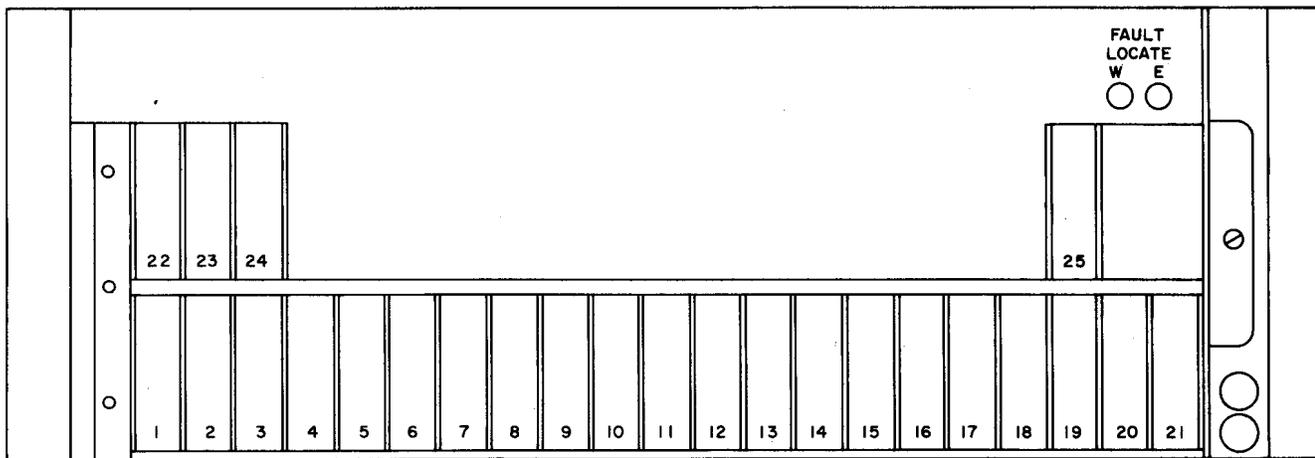


Fig. 1—J98710U Express Office Repeater Panel (EORP)