

**T1 REPEATERED LINE  
IDENTIFICATION PLAN AND  
LINE PATCHING PROCEDURES  
DIGITAL TRANSMISSION SYSTEMS**

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a failed span line to maintenance and backbone lines. These instructions are now contained in Section 365-800-003 (TOP). Change arrows are used to indicate significant changes. Equipment Test Lists are not affected.

**1.03** In the T1 Carrier System, span lines terminate in office repeater bays. Jacks are available for monitoring and testing span line signals and for patching service to another line. There are four basic office repeater bay (ORB) span terminating configurations:

- (1) 201 ORB J98710 using 201 or 208 repeaters with jacks located on span and bank terminating panels
- (2) 206 ORB J98710 using 206 or 236 repeaters with jacks located on the repeater
- (3) T1C/T1 ORB J98725 using 221 or 231 repeaters with jacks located on a jack panel in the ORB
- (4) 201 ORB, 206 ORB, or T1C/T1 ORB using jacks located on the DSX-1 cross-connect bay.

**1. GENERAL**

**1.01** This section describes how office repeaters and jack appearances associated with each T1 line are identified. It also describes patching procedures used to restore service when a span line fails.

**1.02** This section is reissued to incorporate corrections and to delete detailed step-by-step patchings instructions for transferring service from

**2. JACK ARRANGEMENTS**

**2.01** Jacks are provided for patching and testing on the office side of the office repeater for each receive line and each transmit line. Also, jacks are provided to measure the output from each bridging repeater associated with a maintenance line or backbone line. The T1 repeaters are described in detail in Section 365-200-101, T1 Digital Line Repeater Description, and in Section 365-200-100, T1 Digital Line General Description.

**NOTICE**

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Bell System except under written agreement

**A. 201 ORB Using 201 or 208 Repeaters Jack Arrangement**

2.02 The jacks for 201 ORB equipped with 201- or 208-type repeaters with jacks located on span and bank terminating assemblies are shown on Fig. 1 and 2. The jacks on the bank terminating assembly (BTA), Fig. 1, are used to connect the transmit line of channel banks to the outgoing side of span terminating assemblies at terminal offices. The jacks on the span terminating assembly (STA), Fig. 2, are associated with the output of each office repeater on the office side and are used in both terminal and intermediate offices. The jacks which supply the input to bridging repeaters are located on a miscellaneous jack panel.

**B. 206 ORB Using 206 or 236 Repeaters Jack Arrangement**

2.03 The jacks for the 206 ORB equipped with 206 or 236 repeaters are located on the repeater shown on Fig. 3. Some 206- and 236-type repeaters used with DSX-1 only do not have jacks. In terminal offices, the jacks are connected between office repeater circuits and the channel bank. In intermediate offices, the jacks on two associated repeaters are cross-connected X OUT to X IN. The bridging repeaters use a slightly different jack arrangement. The L IN jack becomes the B IN jack and the X OUT and its associated MON jack are not provided.

**C. T1C/T1 ORB Using 221 or 231 Repeaters and ORB Jack Panel Jack Arrangement**

2.04 The jacks for the T1C/T1 ORB equipped with 221- or 231-type office repeaters with jacks located on an ORB jack panel are shown on Fig. 4. The jacks are laid out and used the same as the jacks on the 206 and 236 repeaters described previously (paragraph 2.03).

**D. DSX-1 Jack Arrangement**

2.05 When an ORB has been connected to a DSX-1, the jacks on the DSX-1 are used for patching even if jacks are available on the ORB. Figure 5 shows the jacks on the DSX-1 patching and cross-connect panel. Each set of DSX-1 jacks is cross-connected to another set of DSX-1 jacks, OUT to IN. In terminal offices the receive side of the repeater is hard wired to an OUT jack at the DSX-1. The span line transmit

side is hard wired to an IN jack at the DSX-1. The DSX-1 jacks associated with the maintenance line are wired so that the maintenance repeater receive side is connected to the OUT jack. The bridging repeater input is wired to the IN jack. The bridging repeater output is wired to the maintenance repeater transmit side. A description of the DSX-1 is contained in Section 365-301-101.

**3. IDENTIFICATION PLAN**

3.01 The T1 identification plan identifies the span line number and route, whether the line uses unidirectional or bidirectional repeaters, and other information required for maintenance. The way the information is presented depends on the type of equipment.

3.02 At the ORB equipped with 201- or 208-type repeaters with jacks located on STAs and BTAs, tags which fit into slots on the STA (Fig. 2) identify the span number, route, and how the repeater is used. The color of the tag indicates how the type repeater is used as follows:

Blue—Office repeater connected to unidirectional line repeater

White—Office repeater connected to bidirectional line repeater

Green—Bridging repeater

Yellow—Maintenance repeater

Red—Office repeater connected to traffic service position system (TSPS) line

The TSPS line connects the toll operator line to a remote position. The red tag acts as a warning to prevent erroneous patching to the TSPS jacks.

3.03 The ORB with 206- or 236-type repeaters with jacks located on the repeater (Fig. 3) uses identifying cards which fit into a card holder slot mounted on top of the repeater. Newer repeaters also have a jack cover assembly which consists of the card holder at the top of the repeater and a card holder bracket which covers the jacks (Fig. 3). In either case, the identification system is the same as that used for 201 and 208 repeaters (paragraph 3.02). When a card holder bracket is available, the system number and identification may be written directly on the bracket.

When a repeater serves a TSPS line, a hinged card holder should be employed to protect the jacks. Older repeaters may employ a hinged cover, KS-20924, L1. A KS-20924, L2 should be placed in the card holder bracket. Because the KS-20924, L1 covers will not lie flat against the repeater, they should be replaced with the card holder hinge and bracket assembly and a KS-20924, L2 card.

**Caution:** Before removing or patching into a repeater associated with D1C/TSPS System, contact TSPS personnel.

**3.04** At the ORB equipped with 221 and 231 repeaters, line and repeater identification is provided at both the repeater and jack field. A color coded stick on the tag is affixed to the top of each repeater. The tag provides the same information as the tags on the 201 or 208 repeaters (paragraph 3.02). The top four jacks in each jack group on the jack panel (Fig. 4) are protected by a hinged plastic cover. Yellow covers identify maintenance line jacks and green covers identify bridging repeater jacks. All other covers are white. Line number and route information are written on the tags. A row of jacks is provided for each shelf of repeaters, with the row of jacks corresponding to the shelf position. For example, the bottom row of jacks is for shelf 1 which is the bottom shelf of repeaters.

**3.05** At the ORB connected to a DSX-1, the identification at the repeater remains the same as described in paragraphs 3.02, 3.03, and 3.04. At the DSX (Fig. 5), record card E-6457, which mounts on the frame beside each DSX-1 jack panel, identifies line number and route for each set of jacks on the panel. A designation strip, which is mounted below each row of jacks, is used to identify the relay rack and repeater shelf associated with the jack set. Jack numbers are stenciled on the jack panel, which normally identify corresponding repeater shelf and apparatus case slot numbers. If the repeater shelf number and apparatus case slot numbers are not the same, the jack numbers should correspond with the line repeater apparatus case slot number. The color of the relay rack and shelf identification strip indicates the type of DSX panel as follows:

COLOR	TYPE	FORM NO.
White	DSX-1	E-6490
Orange	DSX-1C	E-6489
Pink	DSX-2	E-6488

#### 4. GENERAL SERVICE RESTORATION PATCHING INFORMATION

**4.01** Patching is directed by the control office designated on the system layout record card E-4940 or span line record card E-4942. The allocation of responsibilities and maintenance aids used in the restoration of a failed T carrier span line are described in Section 365-020-301. Step-by-step patching procedures and isolation of span line faults are provided in Section 365-800-003 (TOP). Tests for foreign voltage and split pairs are provided in Section 365-227-500.

**4.02** The patching sequence (Fig. 6) for restoring service depends whether a backbone line is available or a maintenance line will have to be used when a fault is detected. Assignment of backbone and maintenance lines are controlled by the T Carrier Restoration Control Center (TRCC). TRCC is called for an assignment when a span line fault is initially detected.

**4.03** Patching service to a backbone line is accomplished through the use of a DSX-1/DSX-1C bridging repeater panel. The panel was developed to allow service to be transferred from a backbone line to a maintenance line in the same office. This transfer is required if the fault occurred in a span line terminating in the same office as the backbone line. Each panel contains two bridging repeaters. Two IN jacks are connected to the input of each repeater, and an OUT and two MON jacks are connected to the output of each repeater. The jacks allow service to be switched from the backbone line to a maintenance line without an interruption in service.

**4.04** Because a backbone line patch is made before the failed span line is located, all backbone patches should be made through the DSX-1/DSX-1C bridging repeater panel when one is available. Although the panel was designed for use on the DSX patching and cross-connect bay, the panel may be miscellaneously mounted for use with the office repeater bay.

**SECTION 365-226-500**

**4.05** When restoring service via a backbone line using the DSX-1/DSX-1C bridging repeater panel, the patching procedure involves patching service to the backbone line, patching the failed span line to the maintenance line, and releasing the backbone line. And later after repairs have been completed, the patches are removed, thereby restoring service to normal lines. When the terminal office does not have the panel, the backbone line is patched into service the same as the maintenance line. In this case if a terminal span (end section) has failed, service cannot be transferred from the backbone line to a maintenance line without interruption.

**4.06** When restoring service via a maintenance line and the office is without a DSX-1/DSX-1C bridging repeater panel, the patching procedure involves transferring both directions of transmission and, if required, the associated power mate service from the failed span line to the maintenance line. And later after repairs have been completed, the patches are removed, thereby restoring service to normal lines. The other direction of transmission and power mate service is patched to prevent service loss when replacing a repeater. It is only necessary to patch power mate service when unidirectional line repeaters are used.♦

**5. CONNECTING SIGNAL SOURCE TO FAILED SYSTEM OR SPAN LINE**

**5.01** After a failed *system* is patched to the backbone line, a bipolar signal is connected to the transmit end of the failed system for troubleshooting purposes. After a fault is isolated to a failed *span line* and service has been patched to the maintenance line, the signal source is connected to the transmit end of the failed span line. Following is a list of equipment which can be used to provide the bipolar signal. The section in which each piece of equipment is described is also listed. When a quasi-random signal source (QRSS) is available, it should be used as the bipolar signal source.

<b>SECTION</b>	<b>EQUIPMENT</b>
103-494-105	J98725AF T1C/T1 QRSS
103-493-104	J98710R T1 Carrier QRSS

103-494-106	J98725AD T1C/T1 Fault-Locating Test Set
103-491-100	J98710F List 1 and List 2 Fault Locating Sets
103-493-109	KS-20775 List 1 and List 2 Error Rate Test Set

**6. TAGGING PATCH CORDS**

**6.01** Patch cords when used for patching should be tagged for identification. The standard patch tag (Form E-5132, Fig. 6) should indicate how, when, and why patch was made. The tag is installed by placing it around the cords and pressing the adhesive surfaces together. The recommended color for tag use is listed below.

<b>FORM NO.</b>	<b>COLOR</b>	<b>USE</b>
E-5132-W	White	Service restoration and trouble investigation
E-5132-Y	Yellow	Circuit order work
E-5132-G	Green	Temporary trunk (Note 1)
E-5132-R	Red	Special purpose circuits (Note 2)
E-5132-B	Blue	As determined locally

**Note 1:** Examples of such temporary message trunks are those established for Christmas or Mother's Day.

**Note 2:** It is recommended that red tags be used to mark patch cords on any circuit (regardless of the reason for the patch) that requires unusual precautions against service interruption. Example of such circuits are those requiring Special Service Protection (SSP), Special Safeguarding Measures (SSM), or Traffic Service Switching Position (TSPS).

**6.02** The entries on the patch tag are self-explanatory. The tag should be filled out completely.

**6.03** Patch tags (Form E-5132) can be ordered in multiples of 50 as follows:

Quantity            Form E-5132-W

Quantity            Form E-5132-Y

Quantity

Quantity

Quantity

Form E-5132-G

Form E-5132-R

Form E-5132-B

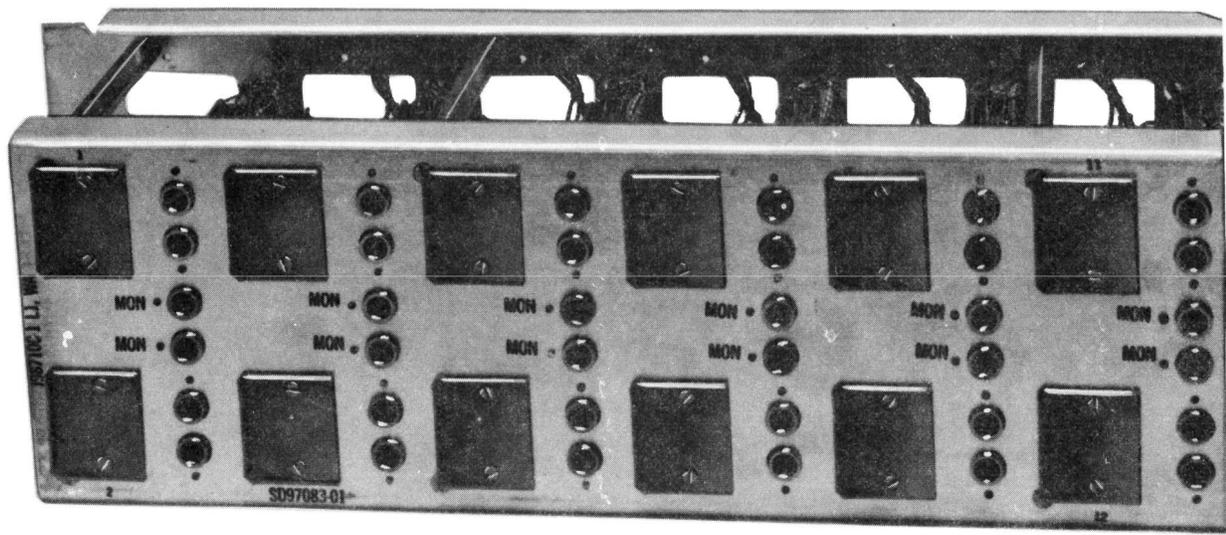
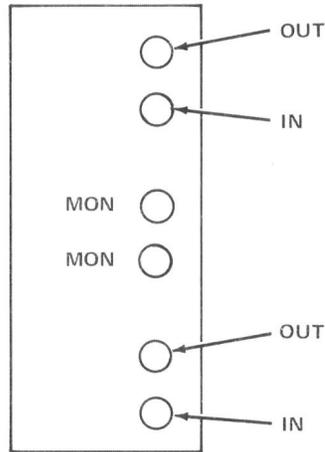
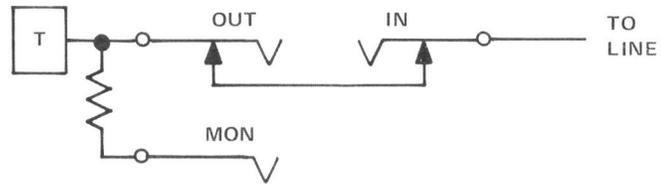


Fig. 1—J98710C Bank Terminating Assembly

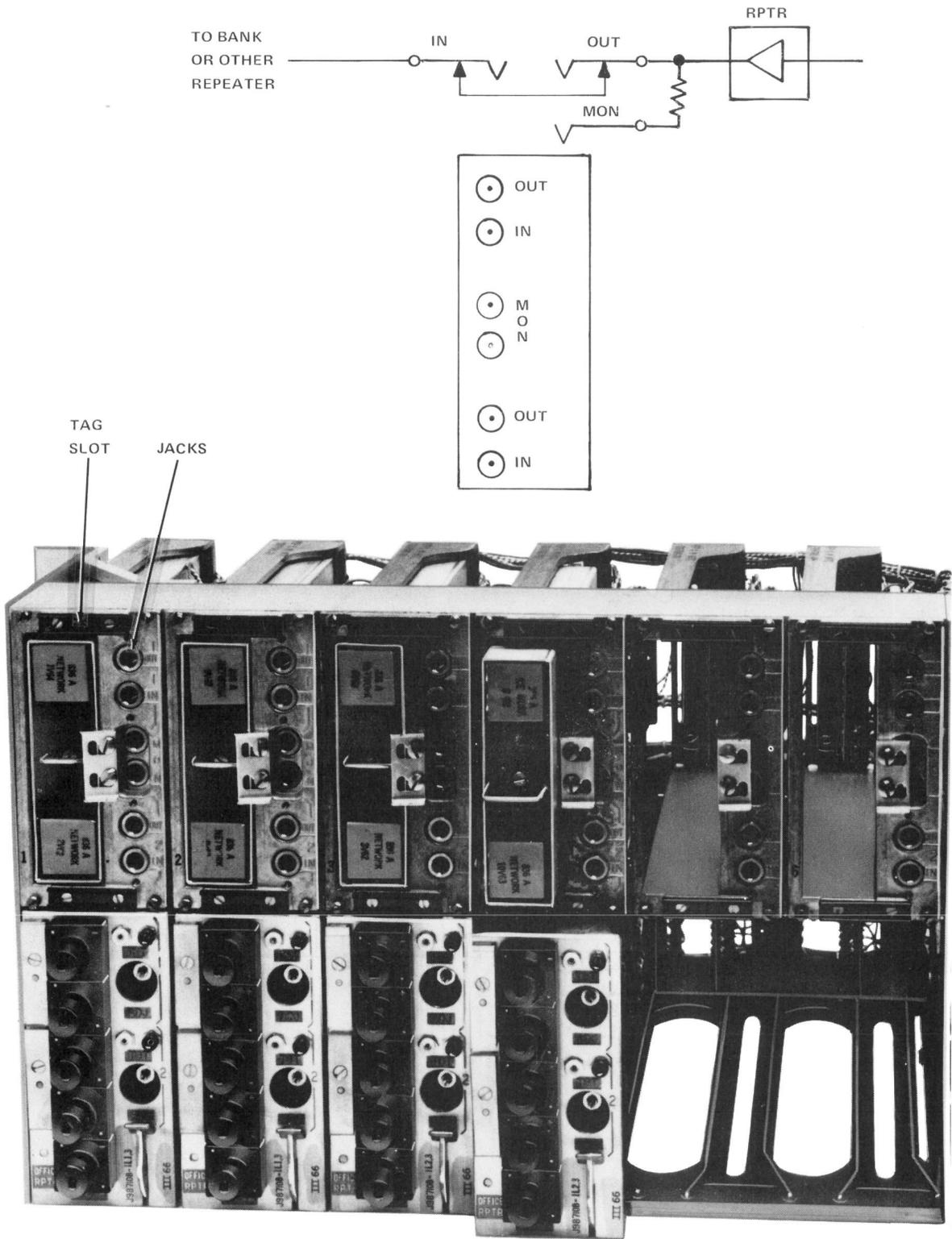


Fig. 2—J98710A Span Terminating Assembly

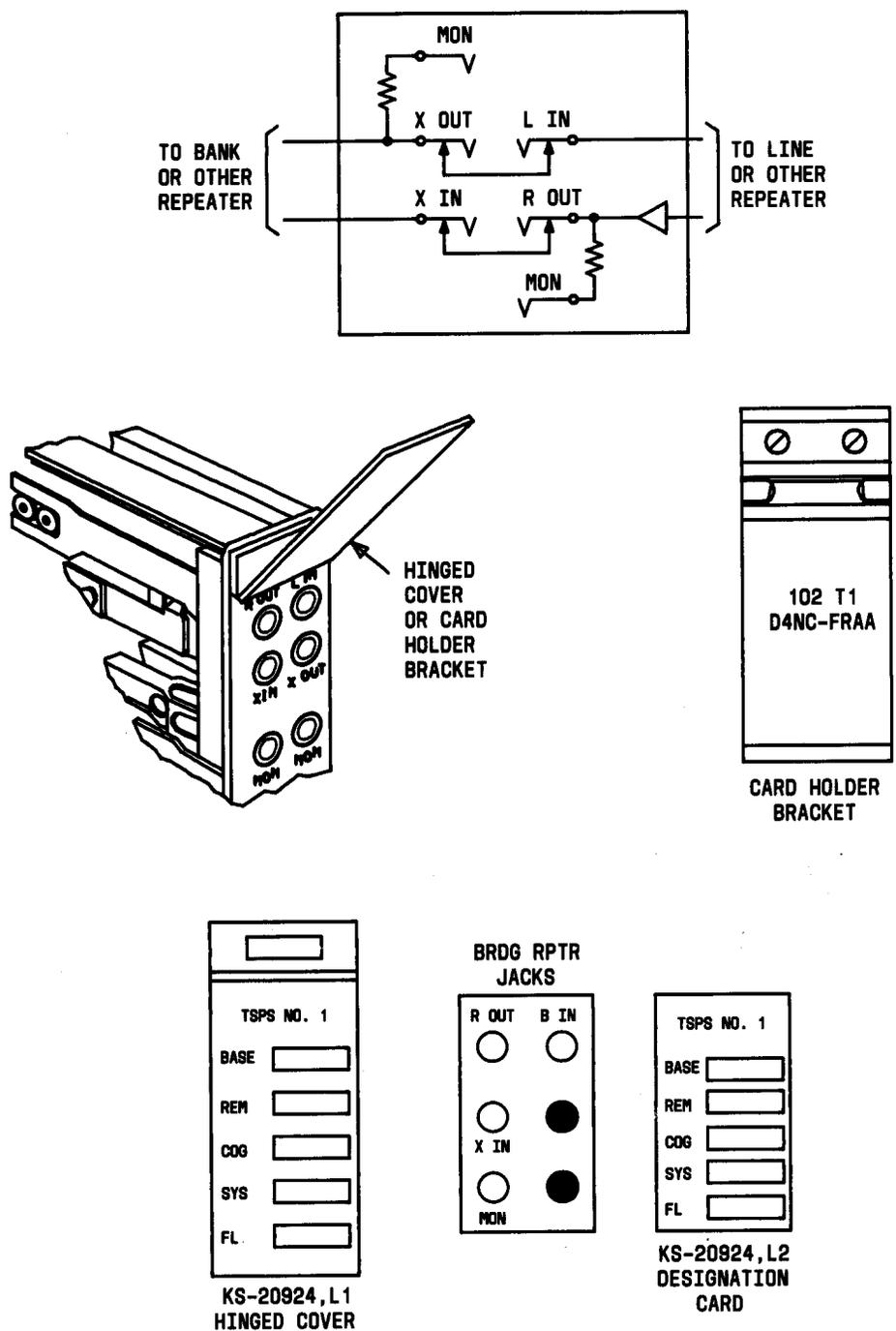
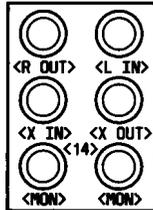
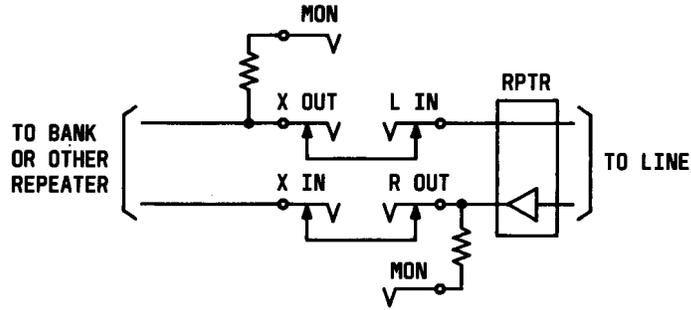
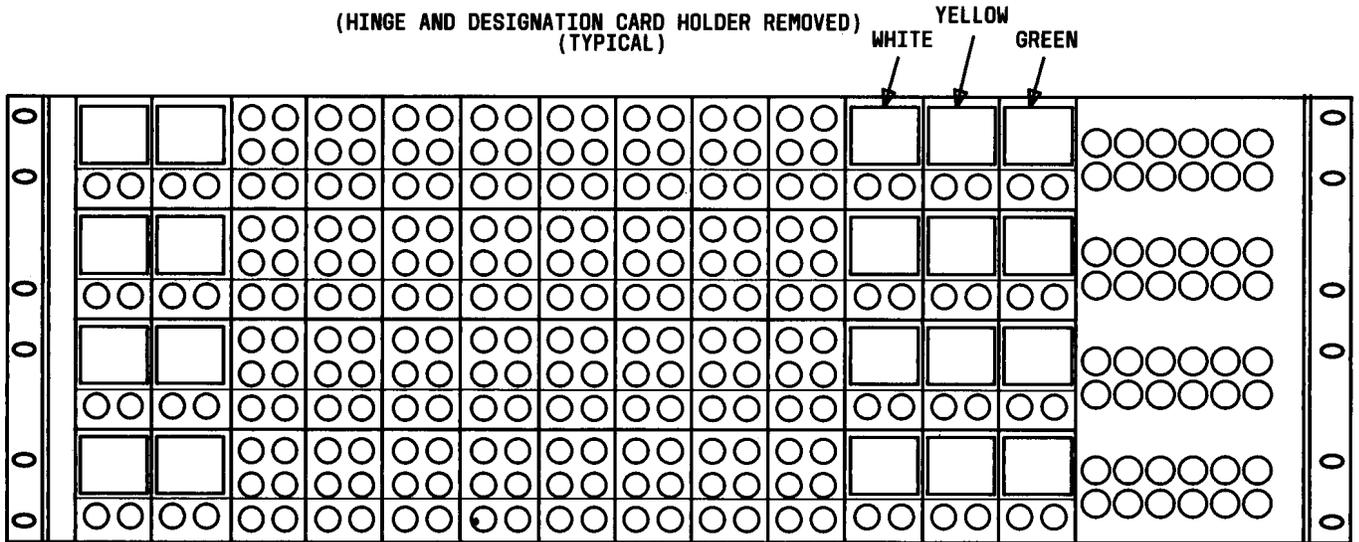


Fig. 3—Jacks and Identification for 206- and 236-Type Repeaters



(HINGE AND DESIGNATION CARD HOLDER REMOVED)  
(TYPICAL)



JACK FIELD

Fig. 4—ORB Jack Panel

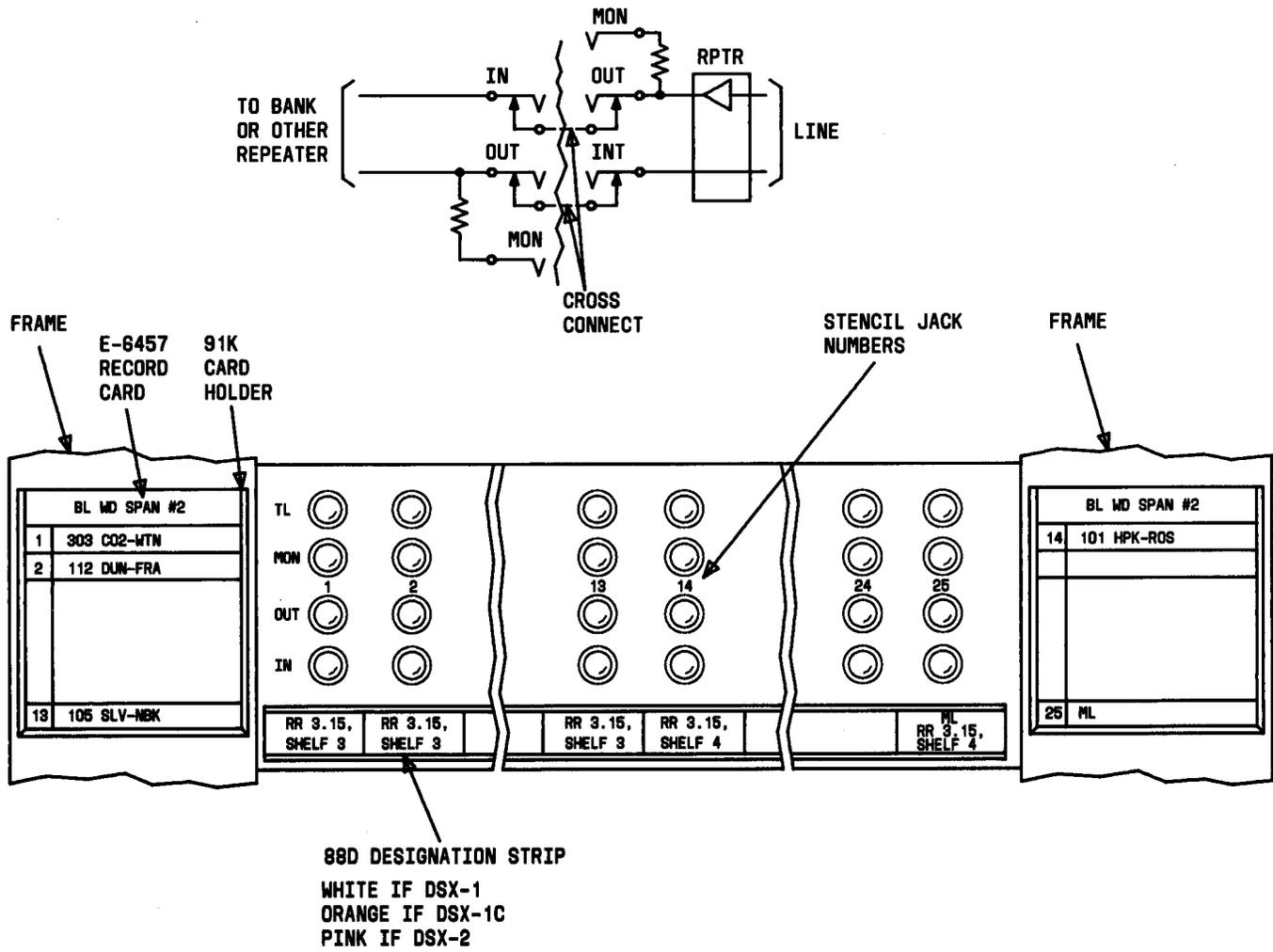


Fig. 5—DSX Cross Connect, Jacks and Identification

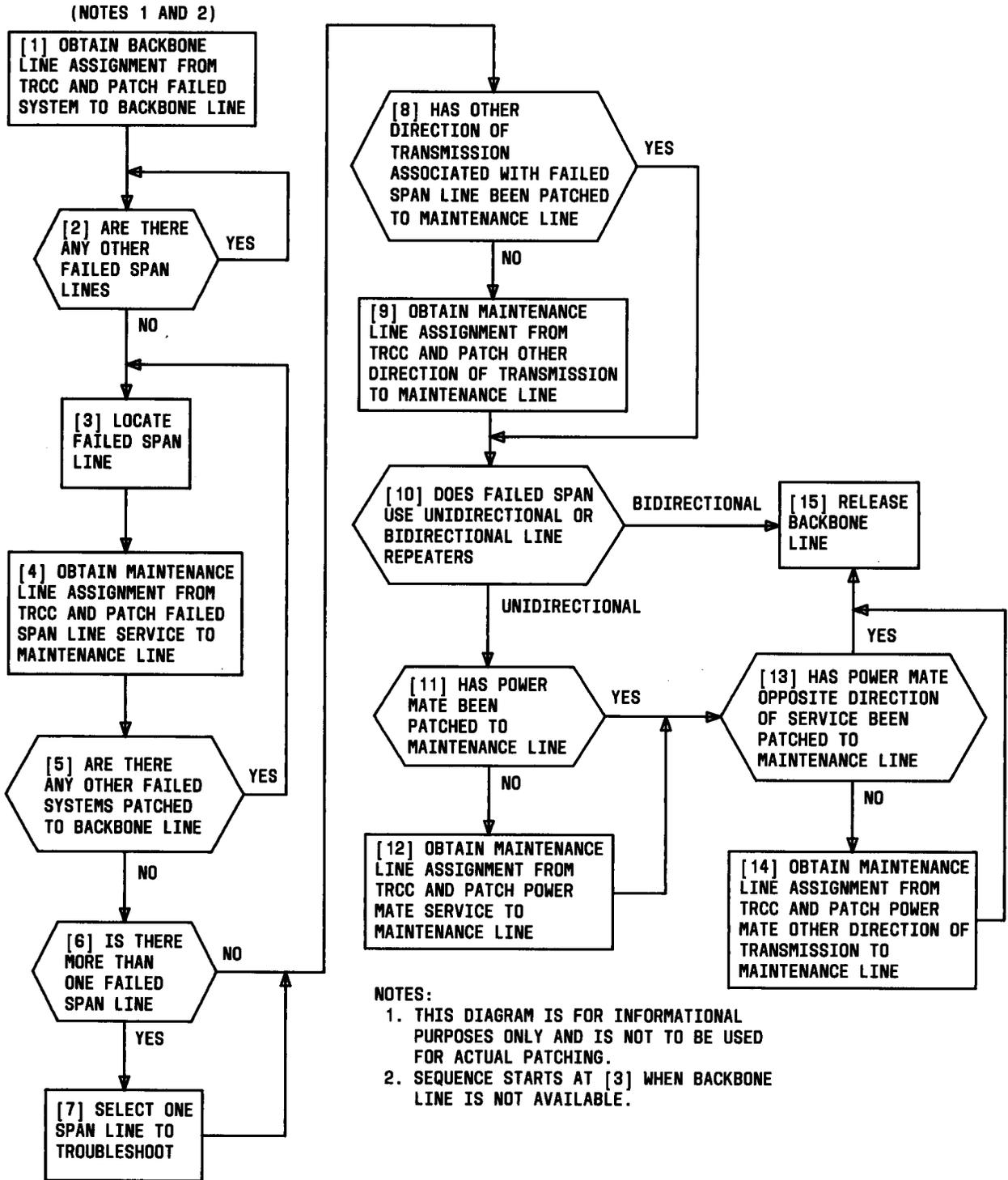


Fig. 6—Patching Sequence Diagram (Example)

FACSIMILE

1-3/4"

○  
REASON

FORM  
E5132-W

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DATE \_\_\_\_\_

PATCHED  
BY \_\_\_\_\_

REQUESTED  
BY \_\_\_\_\_

CKT  
MADE GOOD  
ON \_\_\_\_\_

FROM \_\_\_\_\_

BAY \_\_\_\_\_

JACK  
\_\_\_\_\_

TO \_\_\_\_\_

BAY \_\_\_\_\_

JACK  
\_\_\_\_\_

7-1/4"

The diagram shows a vertical rectangular form with a width of 1-3/4 inches and a height of 7-1/4 inches. At the top left, there is a circle with the word "REASON" below it. To the right of the circle, the text "FORM E5132-W" is printed. Below the "REASON" section are ten horizontal lines for writing. The bottom section of the form contains several fields: "DATE", "PATCHED BY", "REQUESTED BY", "CKT MADE GOOD ON", "FROM", "BAY", "JACK", "TO", "BAY", and "JACK", each followed by a horizontal line for input.

Fig. 7—Form E-5132-W Patch Tag for Designating How, When, and Why Patch Was Made