

---

## DSX-1 AND DSX-1C PATCH AND CROSS-CONNECT BAY RETROFITTING PROCEDURES DIGITAL TRANSMISSION SYSTEMS

---

This section provides the retrofitting procedures for installing DSX-1 and DSX-1C cross-connect bays in existing digital systems. When a DSX is added in a central office (CO), consideration should be given to all equipment planned for the office. Figure 1 illustrates possible combinations to be included. A general description of the DSX equipment can be obtained from Section 365-301-101. DSX, as used in this section, refers *only* to DSX-1 and DSX-1C. T digital system, as used in this section, refers *only* to T1, T1C, and T1D.

This section is issued to update information originally contained in Section 365-301-102.

The task of retrofitting DSX into a T digital office involves connecting the digital cross-connect bays in an office where digital equipment has been directly cabled. All wiring and cutover steps for the DSX bays and intraoffice connections are part of the retrofitting activity. The retrofit operation in this section consists of preparatory and cutover procedures. Table A provides an index to the procedures.

There are two preparatory procedures to be completed prior to the cutover procedures. Chart 1 changes the first line repeater. This procedure may not be required. Chart 2 is basically an acceptance test of the DSX prior to placing it into the system. In Chart 1, the first line repeater is to be changed from a fixed line buildout (LBO) type to an automatic line buildout (ALBO) type. All integrated circuit repeaters are ALBO equipped.

The preferred retrofit procedure at cutover is to remove all affected equipment from service while changing the signal path. However, in cases where service must be maintained a parallel route must be established. Figure 2 is an example of this type of retrofitting. Two procedures must be followed concurrently, one for each end of the parallel route.

In Fig. 2, the equipment at the right is shown equipped with jacks like a 206 office repeater, but the equipment at the left is similar to a channel bank in that it requires the use of portable jacks. In an actual situation, the type of equipment at each end of the direct cable would have to be determined and Table A referred to for the appropriate chart to follow. The equipment at each end has its own procedure. But before cutover, both procedures must be completed.

The in-service bypass is accomplished by using Chart 3 or 4. Chart 3 is performed when the portable retrofit jack circuit (Fig. 3) is required for patching access. Chart 4 uses only jacks that are normally provided on the equipment for patching access. When retrofitting T1C/T1 ORBs, Chart 4 is used unless new equalizers are required; then Chart 3 is used. When retrofitting 201 ORBs, Chart 4 is used only when the channel bank is to be cabled directly to the DSX. When these conditions cannot be met, Chart 3 is used.

\*\*Reprinted to comply with modified final judgment.

AT&T TECHNOLOGIES, INC. - PROPRIETARY

Section 365-226-500 (T1) and Section 365-200-410 (T1/OS) provide span line patching procedures that are used to substitute a maintenance line for a service carrying line. A modification of these procedures to include the retrofit bypass is obtained by patching to the maintenance line in Chart 4 and following the patching procedures in Sections 365-226-500 and 365-271-000 (TOP) at the remote end of the span. When new equalizers are required, the maintenance line must be used when retrofitting at a 206. When the retrofit includes the replacement of standard 206/236 office repeaters (3-volt) with the 206/236 extended cross-connect package (EXCP) (6-volt), this procedure should also be used, but not without reference to Sections 365-222-200 and 365-223-500.

Completion of a procedure in Chart 3 or 4 for the last circuit leaves the transfer of the order wire and the fault locating lines to the DSX as the final task in retrofitting. Fault locating may be performed from the office repeaters during the interim of retrofitting.

The maximum length for the ABAM or 600-type cable between the equipment bays and the DSX and for the Y1 wire cross-connections at the DSX is specified in Table B. Table C lists the equalizers required for use with the ABAM or 606B through 611B cable installed. In all cases where a different type of cable is used between the equipment and the DSX, the cable limits for each equalizer will have to be adjusted. These adjustments are made by engineering.

CHART	PAGE
1—Replacement of T1 Line Repeater . . . . .	4
2—Preparation of DSX . . . . .	5
3—Patching for Cable Bypass at Cutover Using Portable Jacks . . . . .	6
4—Patching for Cable Bypass at Cutover Using Available Jacks . . . . .	22

**APPARATUS:**

The DSX-1 retrofit kit contains the equipment required to retrofit a DSX-1 patch and cross-connect bay into an office containing any D type channel banks, T1 data multiplexers, T1 automatic standby units, 206- or 236-type office repeaters and T1 Outstate span terminating modules. Additional equipment as listed separately may be required when the office contains other DS1/T1 terminals or facilities.

The retrofit kit (Fig. 4) and any additional kit materials required can be ordered from Western Electric Company, Inc., St. Louis Service Center, Plant Service Department, 1111 Woods Mill Road, Ballwin, Missouri.

**Note:** The T1C/T1 bridging repeater assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater for retrofitting a DSX-1. This assembly must be used when retrofitting a DSX-1C.

When the office contains M1C, M12A, or M12B multiplexers or 201-, 221-, or 231-type office repeaters, the following equipment may be required, depending upon the connections before and after retrofitting.

- 1—DSX-1 Retrofit Kit

**APPARATUS (Contd)**

- 1—Retrofit Jack Box Assembly equipped with 10 ft. bay access cables

When the office contains WB-1 or WB-2 wide band banks or WM-1 wide band modems, the following equipment is required:

- 1—DSX-1 Retrofit Kit

- 1—26-dB Attenuator equipped with 6-inch leads terminated with 360 tools and 624B tools

When the office contains WB-3 or WB-3D wide band banks, the following equipment is required:

- 1—DSX-1 Retrofit Kit

- 2—26-dB Attenuators equipped with 6-inch leads terminated with 360 tools and 624B tools

When the office contains WB-4 or WB-5 wide band banks, the following equipment is required:

- 1—DSX-1 Retrofit Kit

- 1—Retrofit Repeater Case equipped with -48V jack to access external power (repeater circuit pack is not included)

- 1—Power Cord (modified P3BH cord) equipped with 360 tools and 624B tools on one end

When the office contains WM-4 wide band modems, the following equipment is required:

- 1—DSX-1 Retrofit Kit

- 1—26-dB Attenuator equipped with 6-inch leads terminated with 360 tools and 624B tools

- 1—J87241A,L1 Power Supply (AC Rectifier)

In addition to the equipment listed above, the following locally supplied equipment is required:

- 1—Bowmar Error Rate Test Set (ERTS) 271-type (If a substitute is used, it must be capable of making terminating measurements.)

As Req'd—386B Terminating Plugs

As Req'd—KS-6278 Clips for 360 tools

As Req'd—206C, 206P, 206R, or 236P (with local option selected) Bridging Repeater

**Note:** When using T1C/T1 bridging repeater assembly, ED-2C497-30, substitute bridging repeater 220C or 221C as required.

---

CHART 1

REPLACEMENT OF T1 LINE REPEATER

---

The procedure that follows is performed when the first line repeater is the fixed LBO type (nonintegrated circuit repeater) and is to be replaced with the ALBO type (integrated circuit repeater). Refer to Section 365-200-101 for a description of line repeaters.

---

STEP	PROCEDURE
1	Establish communication between the first apparatus case and the CO at each end of the maintenance span.
2	At the CO, transfer service from the span line that is to be interrupted to maintenance or unassigned lines as described in Section 365-226-500.
3	Terminate with a 386B plug the OUT jack on the span terminating assembly (STA) of a 201 office repeater bay (ORB) or the R OUT jack on a 206 or 236 office repeater for the idled lines when the maintenance line output is patched to the IN jack on the service line.  <i>Note:</i> Use of the 386B plugs in Step 3 is in addition to the 386B plug terminations shown for patching a line out of service in Section 365-226-500.
4	Terminate driving sources as though preparing to test an out-of-service line by inserting 386B plugs in the appropriate OUT or R OUT jacks.
5	At the apparatus case, remove the repeater.
6	Verify that the required power option has been exercised; then insert the new repeater.  <i>Note:</i> The power option required can be obtained from the T Carrier span line record card, form E-4941, or from the repeater replaced.
7	Remove the 386B terminating plugs inserted in Step 4.
8	Check the performance of both restored lines for signal presence and bipolar violations (see Section 365-224-500).
9	Remove the 386B terminating plugs inserted in Step 3.
10	Restore normal service by removing the patch cords as described in Section 365-226-500.
11	Update all records.

## CHART 2

## PREPARATION OF DSX

The procedure that follows is an acceptance test of the installation of the cross-connect bays for the circuits to be retrofitted. It also checks the installation of the connecting cables.

STEP	PROCEDURE
1	At the DSX, verify that central office (CO) power and alarm circuits are connected to the fuse and alarm panel.
2	Verify that the DSX alarm circuit is operational by inserting a blown fuse into one of the fuse holders.
3	Verify that the QRSS output is at a MON jack on the maintenance panel with an ERTS and on the maintenance line (ML) interface circuits.
4	Verify the bridging repeater operation by patching a signal from the QRSS MON jack into the bridging repeater IN jack and testing the output at the MON jack of the bridging repeater. Test the signal through each IN jack.
5	Verify tracer lamp (TL) operation by inserting a 258-type dummy plug in one MON jack on each panel and observing that the TL associated with the MON jack lights.
6	Verify that ABAM or 600-type cables from equipment bays have been connected to jack panels.
7	At the equipment bays, verify that the cables referred to in Step 6 have been connected to an added 234B terminal strip or identified for termination at cutover.
8	At the DSX, prepare E-6489 (DSX-1C) or E-6490 (DSX-1) designation cards and install them in 8BD designation strips on the front and rear of the jack panels.
9	Prepare E-6457 record cards and install them in 91K designation strips on the framework uprights. Ensure that information on record cards agrees with office records.
10	Insert 258-type dummy plugs in the MON Jacks for TL identification of the two circuits to be cross-connected (see Fig. 2).

**Note:** The lighted TL lamps which can be seen from the rear aid in determining the cross-connect path.

---

CHART 2 (Contd)

---

STEP	PROCEDURE
11	Install the 3-pair Y1 wire (see Section 365-301-101).  <i>Note:</i> If insertion of a plug in a MON jack lights all the lamps on the panel at either end of a cross-connection, the fuse for that panel is either blown or removed.
12	Remove dummy plugs one at a time. Connection is verified by both lamps remaining lighted until removal of the second plug.

---

CHART 3

PATCHING FOR CABLE BYPASS AT CUTOVER  
USING PORTABLE JACKS

---

*Note:* Refer to Table A for the chart to use in conjunction with the following procedures for patching to the equipment at the other end of the office.

The following procedures in this chart are used to provide an in-service bypass for the equipment indicated. Procedures A, B, and C are performed only if the existing equalizer can be used with the altered cable distance. Procedures D, E, F, G, H, and I are permitted in all cases, including when equalizers are changed.

- A. Data Multiplexer
- B. Single Shelf M1C
- C. D4 Channel Bank
- D. M12A or M12B Multiplexer
- E. 201 Office Repeater Bay (Bank connection to DSX from ORB)
- F. T1D/T1C/T1 Office Repeater Bay (with new equalizer)
- G. WB-4 or WB-5 Data Voice Multiplexer
- H. D1, D2, or D3 Channel Bank
- I. WB-1, WB-2, WB-3, or WB-3D Wideband Bank and WM1 or WM4 Wideband Modem

## CHART 3 (Contd)

STEP	PROCEDURE
<b>A. Data Multiplexer</b>	
<i>Caution: If the existing equalizer has to be changed, service must be removed from these units to change the equalizer.</i>	
1	Connect the portable retrofit jack circuit (Fig. 3) as shown in Fig. 5.
2	Refer to Fig. 6 for line 1 or 2 or refer to Fig. 7 for line 3 or greater and patch (1) between the -48V jack on the portable retrofit jack circuit and the -48V jack on the portable bridging repeater (Fig. 8).  <i>Note:</i> The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals of the DSX-1/DSX-1C bridging repeater and the other end is patched into the -48V jacks on the portable retrofit jack circuit.
3	Patch (2) between the MON jack on the portable retrofit jack circuit and the B IN or BR IN 2 jack on the portable bridging repeater.
4	Use the ERTS and verify that there is a violation-free output at the MON jack of the bridging repeater patched in Step 3.
5	Patch (3) between the R OUT or OUT jack of the portable bridging repeaters and the patch extension.
6	Verify the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
7	Refer to Fig. 5 and carefully open the connections on TS2 at terminals 14 and 15.
8	If the DM is equipped with a local timing supply, disconnect at TSD the 17.8 ohm resistors from terminals 3 and 4 (span line 2) or 5 and 6 (span line 1).
9	If the DM is equipped with a nodal timing supply, disconnect at TSA the 17.8 ohm resistors from terminals A1 and B1 (bank line 1) or C1 and D1 (bank line 2).
10	Insert (5) (386B terminating plug) into the TRMT jack of the portable retrofit jack circuit.
11	Refer to Fig. 6 or 7 and insert one end of patch (4) into the patch extension, and verify the presence of a violation-free output before inserting the other end into the RCV jack of the portable retrofit jack circuit.
12	Verify that all connections have been properly made at both ends of the cable before proceeding to Step 13.

## CHART 3 (Contd)

STEP	PROCEDURE
13	Identify both ends of the pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
14	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
15	Insert 386B terminating plugs (two places) into the DSX OUT jacks.
16	Refer to Fig. 6 or 7 and remove (5) (386B terminating plug) from the TRMT jack of the portable retrofit jack circuit.
17	Use the ERTS and verify the signal in both directions at the DSX MON jacks.
18	Remove plugs from the DSX OUT jacks inserted in Step 15.
19	Remove patch (4) from between the RCV jack on the portable retrofit jack circuit and the patch extension.
20	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
21	Reconnect the leads opened in Step 7 (Fig. 5).
22	Remove patches (1), (2), and (3).
23	Remove the portable retrofit jack circuit (Fig. 5).
24	Repeat Steps 1 through 23 for the next data multiplexer line until the transition of cable pairs is completed.

**B. Single Shelf M1C Multiplexer**

**Caution:** *If the existing equalizer has to be changed, service must be removed from these units to change the equalizer.*

- 1 Connect the portable retrofit jack circuit (Fig. 3) as shown in Fig. 9.
- 2 Refer to Fig. 10 and patch (1) between the -48V jack on the portable retrofit jack circuit and the -48V jack on the portable bridging repeater (Fig. 8).

**Note:** The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals of the DSX-1/DSX-1C bridging repeater, and the other end is patched into the -48V jack on the portable bridging repeater.

## CHART 3 (Contd)

STEP	PROCEDURE
3	Patch (2) between the MON jack on the portable retrofit jack circuit and the B IN or BR IN 2 jack on the portable bridging repeater.
4	Use the ERTS and verify that there is a violation-free output at the MON jack of the bridging repeaters patched in Step 3.
5	Patch (3) between the R OUT or OUT jack of the bridging repeater and the patch extension.
6	Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
7	Insert (4) (386B terminating plug) into the TRMT jack of the portable retrofit jack circuit.
8	Refer to Fig. 9 in conjunction with Fig. 10 and carefully open the connections as shown.
9	Insert one end of patch (5) into the patch extension and verify the presence of a violation-free output before inserting the other end into the RCV jack on the portable retrofit jack circuit.
10	Verify all connections have been properly made at both ends of the cable before proceeding to Step 11.
11	Identify both ends of the pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
12	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
13	Insert 386B terminating plugs (two places) into the DSX OUT jacks.
14	Refer to Fig. 9 and carefully reconnect the transmit leads that were opened in Step 8.  <i>Note:</i> Do not connect the receive leads.
15	Refer to Fig. 10 and remove (4) (386B terminating plug) from the TRMT jack on the portable retrofit jack circuit.
16	Use the ERTS and verify the signal in both directions at the DSX MON jacks.
17	Remove plugs from the DSX OUT jacks inserted in Step 13.
18	Remove patch (5) from the RCV jack on the portable jack circuit and the patch extension.
19	Reconnect the receive leads opened in Step 8 (Fig. 9).

## CHART 3 (Contd)

STEP	PROCEDURE
20	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
21	Remove patches (1), (2), and (3).
22	Remove the portable retrofit jack circuit.
23	Repeat Steps 1 through 22 for the next M1C line until the transition of cable pairs is completed.

**C. D4 Channel Bank**

**Caution:** *If the existing equalizer has to be changed, service must be removed from these units to change the equalizer.*

**Note:** The steps that follow are performed for Line A and, if retrofitting a DSX-1, they are repeated for Line B.

- 1 Connect the portable retrofit jack circuit as shown in Fig. 11 and 12.
- 2 Refer to Fig. 12 and patch (1) between the -48V jack on the portable retrofit jack circuit and the -48V jack on the portable bridging repeater.  
**Note:** The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals of the DSX-1/DSX-1C bridging repeater and the other end is patched into the -48V jack on the portable retrofit jack circuit.
- 3 Patch (2) between the MON jack on the portable retrofit jack circuit and the B IN or BR IN 2 jack on the portable bridging repeater.
- 4 Use the ERTS and verify that there is a violation-free output at the MON jack on the bridging repeater patched in Step 3.
- 5 Patch (3) between the R OUT or OUT jack on the portable bridging repeater and the patch extension.
- 6 Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
- 7 Insert (4) (386B terminating plug) into the TRMT jack of the portable retrofit jack circuit.
- 8 Refer to Fig. 11 in conjunction with Fig. 12 and carefully open the connections as shown.

---

**CHART 3 (Contd)**


---

STEP	PROCEDURE
9	Insert one end of patch (5) into the patch extension and verify the presence of a violation-free output before inserting the other end into the RCV jack on the portable retrofit jack circuit.
10	Verify all connections have been properly made at both ends of the cable before proceeding to Step 11.
11	Identify both ends of the pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
12	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
13	Insert 386B terminating plugs (two places) in the DSX OUT jacks.
14	Refer to Fig. 11 and carefully reconnect the transmit leads that were opened in Step 8.  <b>Note:</b> Do not reconnect the receive leads.
15	Refer to Fig. 12 and remove (4) (386B terminating plug) from the TRMT jack on the portable retrofit jack circuit.
16	Use the ERTS and verify the signal in both directions at the DSX MON jacks.
17	Remove plugs from the DSX OUT jacks inserted in Step 13.
18	Remove patch (5) from the RCV jack on the portable retrofit jack circuit and the patch extension.
19	Reconnect the receive leads opened in Step 8 (Fig. 11).
20	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
21	Remove patches (1), (2), and (3).
22	Remove the portable retrofit jack circuit (Fig. 13).
23	Repeat Steps 1 through 22 for Line B or the next D4 channel bank until the transition of cable pairs is completed.

**D. M12A or M12B Multiplexer****Note:** This procedure is permitted in all cases, including when equalizers are changed.

- 1 Connect the portable retrofit jack circuit (Fig. 3) as shown in Fig. 13.

## CHART 3 (Contd)

STEP	PROCEDURE
2	Refer to Fig. 14 and patch (1) between the -48V jack on the portable bridging repeater and the -48V jack on the portable retrofit jack circuit.  <b>Note:</b> The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals of the DSX-1/DSX-1C bridging repeater and the other end is patched into the -48V jack on the portable retrofit jack circuit.
3	Patch (2) between the B IN jack or the BR IN 2 jack on the portable bridging repeater and the MON jack on the portable retrofit jack circuit.
4	Use an ERTS and verify that there is a violation-free output at the MON jack of the portable bridging repeater.
5	Patch (3) between the OUT or R OUT jack on the portable bridging repeater and the patch extension.  <b>Note:</b> Simultaneously perform Steps 6 and 7.
6	Insert one end of patch (4) into the patch extension and verify the presence of a violation-free output before inserting the other end into the EQPT IN jack on the DS1 L ACC unit.
7	Insert (5) (386B terminating plug) into the EQPT OUT jack on the DS1 L ACC unit.
8	Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
9	If the equalizer is to be changed, insert (6) (a 386B plug) into the TRMT jack on the portable retrofit jack circuit.
10	Verify that all connections have been properly made at both ends of the cable, then proceed to Step 11.
11	Identify both ends of the pairs to be connected, and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
12	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
13	Carefully replace equalizers as required (Table B).
14	Refer to Fig. 14 and remove (6) (386B terminating plug) from the TRMT jack on the portable retrofit jack circuit if installed in Step 9.
15	Insert 386B terminating plugs (two places) into the DSX OUT jacks.

## CHART 3 (Contd)

STEP	PROCEDURE
16	Remove (5) (386B terminating plug) from the EQPT OUT jack on the DS1 L ACC unit.
17	Use the ERTS and verify the signal in both directions at the DSX MON jacks.
18	Remove plugs from the DSX OUT jacks inserted in Step 15.
19	Remove patch (4) from between the EQPT IN jack on the DS1 L ACC unit and the patch extension.
20	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
21	Remove patches (1), (2), and (3).
22	Remove the portable retrofit jack circuit.
23	Repeat Steps 1 through 22 until the transition of cable pairs is completed.
<b>E. 201 ORB (Bank Connection to DSX from ORB)</b>	
<i>Note 1:</i> The steps that follow are performed for regenerator A and then repeated for regenerator B.	
<i>Note 2:</i> This procedure is permitted in all cases, including when channel bank equalizers are changed.	
1	Connect the portable retrofit jack circuit (Fig. 3) as shown in Fig. 15.
<i>Note:</i> Fig. 16 is applicable to a 201 ORB with connecting bank equalizers on the bank, and Fig. 17 is applicable to a 201 ORB with connecting bank equalizers on the ORB.	
2	Carefully open the T1 and R1 leads at TSC as shown in Fig. 15 and 16 or 17.
3	Connect 48V power to the portable bridging repeater (Fig. 8) by patching into a -48V TST jack on the ORB.
<i>Note:</i> The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals on the DSX-1/DSX-1C bridging repeater and the other end is patched into the -48V TST jack on the ORB.	
4	Refer to Fig. 16 or 17 and patch (1) between the B IN jack or the BR IN 2 jack on the portable bridging repeater and the MON Jack of the circuit being retrofitted on the STA.

## CHART 3 (Contd)

STEP	PROCEDURE
5	Use the ERTS and verify that there is a violation-free output at the bridging repeater MON jack.
6	Patch (2) between OUT or R OUT of the bridging repeater and the patch extension.
7	Insert one end of patch (3) into the patch extension and verify the presence of a violation-free output before inserting the other end into the RCV jack on the portable retrofit jack circuit.
8	Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
9	Insert (4) (386B terminating plug) into the OUT jack on the STA.
10	Verify all connections have been properly made at both ends of the cable, then proceed to Step 11.
11	Identify both ends of the cable pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
12	Remove the TSB to TSC pairs between the STA and the BTA. Connect the Y cable pairs (Fig. 2) to TSB and TSC on the STA and BTA.  <i>Note:</i> Connect the Y cable pairs from the ORB jacks on the DSX to the STA terminals. Connect the Y cable pairs from the channel bank jacks on the DSX to the BTA terminals.
13	Insert 386B terminating plugs (two places) into the DSX OUT jacks.
14	Refer to Fig. 16 or 17 and remove (4) (386B terminating plug) from the OUT jack on the STA.
15	Use the ERTS and verify the signal in both directions at the DSX MON jacks.
16	Remove plugs from the DSX OUT jacks inserted in Step 13.
17	Remove patch (3) from between the RCV jack on the portable retrofit jack circuit and the patch extension.
18	Carefully reconnect the leads opened in Step 2 (Fig. 15).
19	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
20	Remove patches (1), (2), and (3).
21	Remove the portable retrofit jack circuit (Fig. 15).

---

**CHART 3 (Contd)**


---

<b>STEP</b>	<b>PROCEDURE</b>
22	Repeat Steps 1 through 21 for regenerator A or regenerator B until the transition of cable pairs is completed.
<b>F. T1D/T1C/T1 ORB</b>	
<i>Note:</i> This procedure is permitted in all cases, including when equalizers are changed.	
1	Connect the portable retrofit jack circuit (Fig. 3) as shown in Fig. 18.
2	Connect 48V power to the portable bridging repeater (Fig. 8) by patching into a -48V TST jack on the ORB.
<i>Note:</i> The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals on the DSX-1/DSX-1C bridging repeater and the other end is patched into the -48V TST jack on the ORB.	
3	Refer to Fig. 18 and patch (1) between the B IN jack or the BR IN 2 jack on the portable bridging repeater and the MON jack on the portable retrofit jack circuit.
4	Use the ERTS and verify that there is a violation-free output at the portable bridging repeater MON jack.
5	Patch (2) between the OUT or R OUT jack of the portable bridging repeaters and the patch extension.
<i>Note:</i> A modified P3BH cord (supplied with the retrofit kit) equipped with a modified 338B plug is preferred for use in Steps 6 and 7. If the modified cord is used, verify the signal with a standard P3BH cord first. If the modified cord is not used, simultaneously perform Steps 6 and 7.	
6	Insert one end of patch (3) into the patch extension and verify the presence of a violation-free output before inserting the other end into the L IN jack on the ORB.
7	Insert (4) (386B terminating plug) into the OUT jack on the jack field if this termination is not part of Step 6.
8	Verify that a patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
9	Insert (5) (386B terminating plug) into the TRMT jack on the portable retrofit jack circuit.
10	Insert (6) (386B terminating plug) into the appropriate X IN jack on the jack field of the ORB.

## CHART 3 (Contd)

STEP	PROCEDURE
11	Verify that all connections have been properly made at both ends of the cable, then proceed to Step 11.
12	Identify both ends of the pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
13	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
14	Replace equalizers as required (Table B).
15	Insert 386B terminating plugs (two places) into the DSX OUT jacks (Fig. 2).
16	Refer to Fig. 18 and remove (6) (386B terminating plug) from the X IN jack on the jack field.
17	Remove (5) (386B terminating plug) from the TRMT jack on the portable retrofit jack circuit.
18	Use the ERTS and verify the signal in both directions at the DSX MON jacks.
19	Remove plugs from the DSX OUT jacks inserted in Step 15.
	<b>Note:</b> Steps 20 and 21 should be performed simultaneously.
20	Remove (4) from the X OUT jack on the jack field if this termination is not part of patch (3).
21	Remove patch (3) from between the L IN jack on the jack field and the patch extension.
22	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
23	Remove patches (1) and (2).
24	Remove the portable retrofit jack circuit.
25	Repeat Steps 1 through 24 until the transition of cable pairs is completed.

**G. WB-4 or WB-5 Data Voice Multiplexer**

**Note 1:** The steps that follow are performed for the line side and then repeated for the bank side.

**Note 2:** This procedure is permitted in all cases, including when equalizers are changed.

- 1 Connect the portable retrofit jack circuit (Fig. 3) as shown in Fig. 19.

## CHART 3 (Contd)

STEP	PROCEDURE
2	<p>Refer to Fig. 20 and connect power to the portable bridging repeaters (Fig. 8) by patching (1) between the -48V jack on the portable bridging repeater and the -48V jack on the portable retrofit jack circuit or by patching a modified P3BH cord directly to the power unit.</p> <p><b>Note 1:</b> The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals of the DSX-1/DSX-1C bridging repeater and the other end is patched into the -48V jack on the portable retrofit jack circuit.</p> <p><b>Note 2:</b> Power for each bridging repeater will have to come from a separate power unit.</p>
3	<p>Refer to Fig. 20 and patch 2 between the MON jack on the portable retrofit jack circuit and the B IN or BR IN 2 jack on portable bridging repeater (A).</p>
4	<p>Use an ERTS and verify that there is a violation-free output at the MON jack of portable bridging repeater (A), patched in Step 3.</p>
5	<p>Patch (3) between the OUT or R OUT jack on portable bridging repeater (A) and the patch extension.</p>
6	<p>Patch (4) between the B IN or BR IN 2 jack on portable bridging repeater (B) and the patch extension.</p> <p><b>Note:</b> Portable bridging repeater (B) appears on the opposite side of the patch extension in the procedure for the terminal at the other end of the cable. That procedure is to be modified to agree with Fig. 20.</p>
7	<p>Patch (5) between the MON jack on portable bridging repeater (B) and the B IN or BR IN 2 jack on portable bridging repeater (C).</p>
8	<p>Insert one end of patch (6) into the OUT or R OUT jack on portable bridging repeater (B) and verify the presence of a violation-free output before inserting the other end into the REG IN jack on the TEST CKT CP.</p>
9	<p>Insert one end of patch (7) into the OUT or R OUT jack of portable bridging repeater (C) and verify the presence of a violation-free signal before inserting the other end into the SPARE IN jack on the TEST CKT CP.</p>
10	<p>Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.</p>
11	<p>Insert (8) (386B terminating plug) into the TRMT jack on the portable retrofit jack circuit.</p>

---

**CHART 3 (Contd)**


---

STEP	PROCEDURE
12	Carefully open the connections as shown in Fig. 19.
13	Verify all connections have been properly made at both ends of the cable, then proceed to Step 14.
14	Identify both ends of the cable pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
15	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
16	Replace equalizers as required (Table B).
17	Insert 386B terminating plugs (two places) into the DSX OUT jacks (Fig. 2).
18	Refer to Fig. 19 and carefully reconnect the leads that were opened in Step 12.
19	Refer to Fig. 20 and remove (8) (386B terminating plug) from the TRMT jack on the portable retrofit jack circuit.
20	Use the ERTS and verify the signal in both directions at the DSX MON jacks.
21	Remove plugs from the DSX OUT jacks inserted in Step 17.
22	Remove patches (7) and (6) from between the TEST CKT CP and portable bridging repeaters (B) and (C).
23	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
24	Remove patches (5), (4), (3), (2), and (1).
25	Remove the portable retrofit jack circuit (Fig. 19).
26	Repeat Steps 1 through 25 for the next line side or bank side until the transition of cable pairs is completed.

**H. D1, D2, or D3 Channel Bank**

**Note:** This procedure is permitted in all cases including when equalizers are changed.

- 1 Connect the portable retrofit jack circuit (Fig. 3) to the CP connector as shown in Fig. 21.
- 2 If retrofitting a D1 or D3 channel bank, connect jumpers as shown in Fig. 21 as follows:
  - (a) At a D1 channel bank, connect jumpers between terminals 7 and 9 and between terminals 12 and 14 on the top connector BR.

## CHART 3 (Contd)

STEP	PROCEDURE
	(b) At a D3 channel bank, connect a jumper between terminals 34 and 36 and a jumper with a 1.2K ohm resistor in the middle between terminals 6 and 11 on the J103 connector.
	<i>Note:</i> The jumpers for Step 2 are supplied as part of the retrofit kit.
3	Remove the circuit pack from the connector slot to which the portable retrofit jack circuit was connected in Step 1.
4	If retrofitting a D2 channel bank, insert a DM53 blank CP in the slot which was vacated in Step 3.
	<i>Note:</i> Insertion of the DM53 into the vacated slot opens the shunting contacts in the connector.
5	Refer to Fig. 22 and patch (1) between the -48V jack on the portable retrofit jack circuit and the -48V jack on the portable bridging repeater.
	<i>Note:</i> The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals on the DSX-1/DSX-1C bridging repeater and the other end is patched into the portable retrofit jack circuit.
6	Refer to Fig. 22 and patch (2) between the MON jack on the portable jack circuit and the B IN or the BR IN 2 jack on the portable bridging repeater.
7	Use the ERTS and verify that there is a violation-free output at the MON jack of the bridging repeaters patched in Step 6.
8	Patch (3) between the R OUT or OUT jack on the portable bridging repeater and the patch extension.
9	Insert one end of patch (4) into the patch extension and verify the presence of a violation-free signal before inserting the other end into the RCV jack on the portable retrofit jack circuit.
10	Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
11	Insert (5) (386B terminating plug) into the TRMT jack of the portable retrofit jack circuit.
12	Verify that all connections have been properly made at both ends of the cable before proceeding to Step 13.
13	Identify both ends of the pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.

## CHART 3 (Contd)

STEP	PROCEDURE
14	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
15	Replace equalizers as required (Table B).
16	Insert 386B terminating plugs (two places) into the DSX OUT jacks (Fig. 2).
17	Refer to Fig. 22 and remove (5) 386B terminating plug from the TRMT jack on the portable retrofit jack circuit.
18	Use the ERTS and verify the signal in both directions at the DSX MON jacks.
19	Remove plugs from the DSX OUT jacks inserted in Step 16.
20	Refer to Fig. 22 and remove patch (4) from between the RCV jack on the portable retrofit jack circuit and the patch extension.
21	Verify that the patch between the patch extension and the terminal at the other end has been removed.
22	Remove patches (1), (2), and (3).
23	If retrofitting a D3 channel bank, remove the -48V ABS fuse from the power distribution panel.
24	If retrofitting a D2 channel bank, remove the DM53 blank CP inserted in Step 4.
25	Install the circuit pack removed in Step 3 (Fig. 21).
26	Remove the portable retrofit jack circuit and jumpers connected in Steps 1 and 2.
27	If retrofitting a D3 channel bank, install the fuse removed in Step 23.
28	Repeat Steps 1 through 27 until the transition of cable pairs is completed.

**I. WB-1, WB-2, WB-3, or WB-3D Wideband Bank and WM-1 or WM-4 Wideband Modem**

**Note:** This procedure is permitted in all cases including when equalizers are changed.

- 1 Connect the portable retrofit jack circuit (Fig. 3) as shown in Fig. 23 and 24.

**Note:** When retrofitting a WM-4 wideband modem, the -48 Vdc power is obtained from a nearby bay or a portable ac rectifier connected to the portable retrofit jack circuit power leads.

- 2 Connect the jumpers and 26-dB attenuator (Fig. 25) as shown in Fig. 23.

## CHART 3 (Contd)

STEP	PROCEDURE
	<i>Note:</i> Materials required for Step 2 are supplied as part of the retrofit kit.
3	Remove the circuit pack (CP) from the slot of the connectors that the jumpers and portable retrofit jack circuit were connected to in Steps 1 and 2.
4	Refer to Fig. 24 and patch (1) between the -48V jack on the portable retrofit jack circuit and the portable bridging repeater.
	<i>Note:</i> The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals on the DSX-1/DSX-1C bridging repeater and the other end is patched into the portable retrofit jack circuit.
5	Patch (2) between the MON jack on the portable retrofit jack circuit and the B IN or IN 2 jack on the portable bridging repeater.
6	Use the ERTS and verify that there is a violation-free output at the MON jack of the bridging repeaters patched in Step 5.
7	Patch (3) between the R OUT or OUT jack on the portable bridging repeater and the patch extension.
8	Insert one end of patch (4) into the patch extension and verify the presence of a violation-free signal before inserting the other end into the RCV jack on the portable retrofit jack circuit.
9	Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
10	Insert (5) (386B terminating plug) into the TRMT jack on the portable jack circuit.
11	Verify that all connections have been properly made at both ends of the cable before proceeding to Step 12.
12	Identify both ends of the cable pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
13	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
14	Replace equalizers as required (Table B).
15	Insert 386B terminating plugs (two places) in the DSX OUT jacks (Fig. 2).
16	Refer to Fig. 24 and remove (5) (386B terminating plug) from the TRMT jack on the portable retrofit jack circuit.

---

CHART 3 (Contd)

---

STEP	PROCEDURE
17	Use the ERTS and verify the signal in both directions at the DSX MON jack.
18	Remove plugs inserted in Step 15.
19	Remove patch (4) from between the RCV jack on the portable retrofit jack circuit and the patch extension.
20	Verify that the patch between the patch extension and the IN jack on the terminal at the other end of the cable has been removed.
21	Remove patches (1), (2), and (3).
22	Install circuit pack removed in Step 3 (Fig. 23).
23	Remove the portable retrofit jack circuit, jumpers, and attenuators (Fig. 23).
24	Repeat Steps 1 through 23 until the transition of cable pairs is completed.

---

CHART 4

PATCHING FOR CABLE BYPASS AT  
CUTOVER USING AVAILABLE JACKS

---

**Note:** Refer to Table A for the chart procedure to use in conjunction with the following procedures for patching to the equipment at the other end of the office.

The following procedures in this chart are used to provide an in-service bypass for the equipment listed. These procedures are performed by using the jacks provided on the equipment for patching access.

- A. 201 ORB
- B. 206 ORB
- C. T1D/T1C/T1 ORB
- D. T1/OS STM
- E. T1 ASU

## CHART 4 (Contd)

## STEP

## PROCEDURE

## A. 201 ORB (Bank Connection Directly to DSX)

1. Connect -48 Vdc power to the portable bridging repeater (Fig. 8) by patching into the -48V TST jack on the ORB.

**Note:** The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect the -48V and GRD terminals on the DSX-1/DSX-1C bridging repeater and the other end is patched into the -48V TST jack on the ORB.

2. Refer to Fig. 26 and patch (1) between the MON jack (for the circuit being retrofitted) on the STA and the B IN or BR IN 2 jack on the portable bridging repeater.
3. Use the ERTS and verify that there is a violation-free output at the MON jack on the portable bridging repeater.
4. Patch (2) between the R OUT or OUT jack on the portable bridging repeater and the patch extension.

**Note:** A modified P3BH cord (supplied with the retrofit kit) equipped with a modified 338B plug is preferred for use in Steps 5 and 6. If the modified cord is used, verify the signal with a standard P3BH cord first. If the modified cord is not used, simultaneously perform Steps 5 and 6.

5. Insert one end of patch (3) into the patch extension and verify the presence of a violation-free signal before inserting the other end into the SPAN IN jack on the bank terminating assembly.
6. Insert (4) (386B terminating plug) into the D1 BK OUT jack on the bank terminating assembly if this termination is not part of the plug in Step 5.
7. Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
8. Insert (5) (386B terminating plug) into the OUT jack on the span terminating assembly.
9. Verify all connections have been properly made at both ends of the cable before proceeding to Step 10.
10. Identify both ends of the cable pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
11. Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs. Connect the Y cable pairs for the office repeater to TSA on the bank terminating assembly.

## CHART 4 (Contd)

STEP	PROCEDURE
12	Insert 386B terminating plugs (two places) in the DSX OUT jacks (Fig. 2).
13	Refer to Fig. 26 and remove (5) (386B terminating plug) from the OUT jack on the span terminating assembly.
14	Use an ERTS and verify the signal in both directions at the DSX MON jack.
15	Remove plugs inserted in Step 12.
	<b>Note:</b> Steps 16 and 17 should be performed simultaneously.
16	Remove (4) (386B terminating plug) from the D1 BK OUT jack on the bank terminating assembly if it is not an integral part of patch (3).
17	Remove patch (3) from between the SPAN IN jack on the bank terminating assembly and the patch extension.
18	Verify that the patch between the patch extension and the terminal at the other end of the cable has been removed.
19	Remove patches (1) and (2).
20	Repeat Steps 1 through 19 until the transition of cable pairs is completed.

**B. 206 ORB**

- 1 Connect -48 Vdc power to the portable bridging repeater (Fig. 8) by patching into the -48V TST jack on the ORB.  
**Note:** The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals on the DSX-1/DSX-1C bridging repeater, and the other end is patched into the -48V TST jack on the ORB.
- 2 Refer to Fig. 27 and patch (1) between the MON jack on the office repeater (for the circuit being retrofitted) to the B IN or BR IN 2 jack on the portable bridging repeater.  
**Note:** If office repeaters and/or equalizers are to be changed in Step 12, service must be routed over the maintenance line.
- 3 Use the ERTS and verify that there is a violation-free output at the MON jack on the portable bridging repeater.
- 4 Patch (2) between the R OUT or the OUT jack on the portable bridging repeater and the patch extension.

---

**CHART 4 (Contd)**


---

**STEP****PROCEDURE**

**Note:** A modified P3BH cord (supplied with the retrofit kit) equipped with a modified 338B plug is preferred for use in Step 5. If the modified cord is used, verify the signal with a standard P3BH cord first. If the modified cord is not used, simultaneously perform Steps 5 and 6.

- 5 Insert one end of patch (3) into the patch extension and verify the presence of a violation-free signal before patching the other end into the L IN jack on the office repeater.
  - 6 Insert (4) (386B terminating plug) into the X OUT jack on the office repeater if this termination is not part of Step 5.
  - 7 Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
  - 8 Insert (5) (386B terminating plug) into the R OUT jack on the office repeater.
  - 9 Verify that all connections have been properly made at both ends of the cable before proceeding to Step 10.
  - 10 Identify both ends of the cable pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
  - 11 Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
  - 12 Replace office repeater and/or equalizers as required (Table B).
  - 13 Insert 386B terminating plugs (two places) into the DSX OUT jacks (Fig. 2).
  - 14 Refer to Fig. 27 and remove (5) (386B terminating plug) from the R OUT jack on the office repeater.
  - 15 Use the ERTS and verify the signal in both directions at the DSX MON jack.
  - 16 Remove plugs inserted in Step 13.
- Note:** Steps 17 and 18 should be performed simultaneously.
- 17 Remove (4) (386B terminating plug) from the X OUT jack on the office repeater if (4) is not an integral part of patch (3).
  - 18 Remove patch (3) from between the L IN jack on the office repeater and the patch extension.
  - 19 Verify that the patch between the patch extension and the terminal at the other end has been removed.

## CHART 4 (Contd)

STEP	PROCEDURE
20	Remove patches (1) and (2).
21	Repeat Steps 1 through 20 until the transition of cable pairs is completed.
<b>C. T1D/T1C/T1 ORB</b>	
1	Connect 48 Vdc power to the portable bridging repeater (Fig. 8) by patching into the -48V TST jack on the ORB.  <i>Note:</i> The T1C/T1 bridging repeater shelf assembly may be removed from the DSX and used in lieu of the portable bridging repeater. In this case, one end of the modified P3BH cord (supplied with the retrofit kit) is used to connect to the -48V and GRD terminals on the DSX-1/DSX-1C bridging repeater, and the other end is patched into the -48V TST jack on the ORB.
2	Refer to Fig. 28 and patch (1) between the MON jack (for the circuit being retrofitted) on the jack field and the B IN or BR IN 2 jack on the portable bridging repeater.  <i>Note:</i> If office repeaters are to be changed in Step 12, service must be routed over the maintenance line. If equalizers are to be changed, chart 3, procedure F may be used or service may be routed over the maintenance line using this procedure.
3	Use the ERTS or EDS and verify that there is a violation-free output at the MON jack on the bridging repeater patched in Step 2.
4	Patch (2) between the R OUT or the OUT jack of the bridging repeater and the patch extension.  <i>Note:</i> A modified P3BH cord equipped with a modified 338B plug is preferred for use in Step 5. If the modified cord is used, verify the signal with a standard P3BH cord first. If the modified cord is not used, simultaneously perform Steps 5 and 6.
5	Insert one end of patch (3) into the patch extension and verify the presence of a violation-free signal before inserting the other end into the L IN jack on the jack field.
6	Insert (4) (386B terminating plug) into the X OUT jack on the jack field if this termination is not part of patch (3) in Step 5.
7	Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
8	Insert (5) (386B terminating plug) into the R OUT jack on the jack field.
9	Verify all connections have been properly made at both ends of the cable before proceeding to Step 10.

## CHART 4 (Contd)

STEP	PROCEDURE
10	Identify both ends of the cable pairs to be connected and verify connections through the DSX by continuity test with ohmmeter or buzzer.
11	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.
12	Replace office repeaters and equalizers as required (Table B).
13	Insert 386B terminating plugs (two places) into the DSX OUT jacks (Fig. 2).
14	Refer to Fig. 28 and remove (5) (386B terminating plug) from the OUT jack on the jack field.
15	Use the ERTS and verify the signal in both directions at the DSX MON jack.
16	Remove plugs inserted in Step 13.
	<b>Note:</b> Steps 17 and 18 should be performed simultaneously.
17	Remove (4) (386B terminating plug) from the X OUT jack if it is not an integral part of patch (3).
18	Remove patch (3) from between the L IN jack on the jack field and the patch extension.
19	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
20	Remove patches (1) and (2).
21	Repeat Steps 1 through 20 until the transition of cable pairs is completed.
	<b>D. T1/OS STM</b>
1	Connect 48 Vdc power to the portable bridging repeater (Fig. 8) by patching one end of the modified P3BH cord (supplied with the retrofit kit) into the bridging repeater and connecting the other end to TSG as shown in Fig. 29.
	<b>Note:</b> The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater for this application.
2	Refer to Fig. 20 and patch (1) between the B IN or the BR IN 2 jack on the portable bridging repeater and the MON jack (for the circuit being retrofitted) on the protection switch.
3	Use the ERTS and verify that there is a violation-free output at the MON jack on the portable bridging repeater patched in Step 2.

## CHART 4 (Contd)

STEP	PROCEDURE
4	Patch (2) between the R OUT or the OUT jack on the portable bridging repeater and the patch extension.  <i>Note:</i> Steps 5 and 6 should be performed simultaneously.
5	Insert one end of patch (3) into the patch extension and verify a violation-free output before inserting the other end into the IN jack on the protection switch.
6	Insert (4) (386B terminating plug) into the appropriate OUT jack on the DS1 jack panel.
7	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been made.
8	Insert (5) (386B terminating plug) into the OUT jack on the protection switch.
9	Verify that all connections at both ends of the cable have been properly terminated before proceeding to Step 10.
10	Identify both ends of the cable pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
11	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs.  <i>Note:</i> The terminal strip in Fig. 2 represents the jack terminals on the DS1 jack panel in Fig. 29.
12	Insert 386B terminating plug (two places) into the DSX OUT jacks (Fig. 2).
13	Refer to Fig. 29 and remove (5) (386B terminating plug) from the OUT jack on the protection switch.
14	Use an ERTS and verify the signal in both directions at the DSX MON jacks.
15	Remove plugs inserted in Step 12.  <i>Note:</i> Steps 16 and 17 should be performed simultaneously.
16	Remove (4) (386B terminating plug) from the OUT jack on the DS1 jack panel.
17	Remove patch (3) from between the IN jack on the protection switch and the patch extension.
18	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
19	Remove patches (1) and (2).

## CHART 4 (Contd)

STEP	PROCEDURE
20	Repeat Steps 1 through 19 until the transition of cable pairs is completed.
<b>E. T1 ASU</b>	
1	Connect 48 Vdc power to the portable bridging repeater (Fig. 8) by patching one end of the modified P3BH cord (supplied with the retrofit kit) into the bridging repeater and connecting the other end to TSA as shown on Fig. 30 (regular T1 line) or Fig. 31 (standby T1 line).
<i>Note:</i> The T1C/T1 bridging repeater shelf assembly, ED-2C497-30, may be removed from the DSX and used in lieu of the portable bridging repeater for this application.	
2	Refer to Fig. 30 or 31 and patch (1) between the B IN or the BR IN 2 jack on the portable bridging repeater and the MON jack (for the circuit being retrofitted) on the jack mounting.
3	Use an ERTS and verify that there is a violation-free output at the MON jack on the portable bridging repeater patched in Step 2.
4	Patch (2) between the R OUT or the OUT jack on the portable bridging repeater and the patch extension.
<i>Note:</i> A modified P3BH cord equipped with a modified 338B plug is preferred for use in Step 5. If the modified cord is used, verify the signal with a standard P3BH cord first. If the modified cord is not used, simultaneously perform Steps 5 and 6.	
5	Insert one end of patch (3) into the patch extension and verify the presence of a violation-free signal with an ERTS before inserting the other end as follows:
(a) For the regular T1 line, into the regular IN jack on the jack mounting.	
(b) For the standby T1 line, into the B IN jack on the 206 IN LTU.	
6	Insert (4) (386B terminating plug) into the REGULAR OUT jack on the jack mounting (regular T1 line) or R OUT jack on the 206 IN LTU (standby T1 line) if this termination is not part of Step 5.
7	Verify that the patch between the patch extension and the appropriate IN jack on the terminal at the other end has been made.
8	Insert (5) (a 386B terminating plug) into the TRMT OUT jack (regular T1 line) or STANDBY OUT (standby T1 line).
9	Verify all connections have been properly made at both ends of the cable before proceeding to Step 10.

## CHART 4 (Contd)

---

STEP	PROCEDURE
10	Identify both ends of the cable pairs to be connected and verify the connections through the DSX by continuity test with ohmmeter or buzzer.
11	Refer to Fig. 2 and replace the X cable pairs with the Y cable pairs. <i>Note:</i> The terminal strip in Fig. 2 represents the jack terminals in Fig. 30 or 31.
12	Insert 386B terminating plugs (two places) into the DSX OUT jacks (Fig. 2).
13	Refer to Fig. 30 (regular T1 line) or Fig. 31 (standby T1 line) and remove (5) (386B terminating plug) from the TRMT OUT or STBY OUT jack on the jack mounting.
14	Use the ERTS and verify the signal in both directions at the DSX MON jacks.
15	Remove plugs inserted in Step 12. <i>Note:</i> Steps 16 and 17 should be performed simultaneously.
16	Remove (4) (386B terminating plug) from the REGULAR OUT jack on the jack mounting (Fig. 30) or from the R OUT jack on the 206 IN LTU (Fig. 31) if (4) is not an integral part of patch (3).
17	Remove patch (3) from between the REGULAR IN jack on the jack mounting and the patch extension (Fig. 30) or from between the B IN jack on the 206 IN LTU and the patch extension (Fig. 31).
18	Verify that the patch between the patch extension and the IN jack on the terminal at the other end has been removed.
19	Remove patches (1) and (2).
20	Repeat Steps 1 through 19 until the transition of cable pairs is completed.

---

TABLE A

EQUIPMENT BAY	CONDITION	CHART
First line repeater	Change to ALBO unit	1
DSX	Precutover preparation	2
T1-201 type repeater	Bank connection direct to DSX	4
T1-201 type repeater	With bank connection on ORB	3
T1, T1/OS-206 or 236 type repeater	*With same repeater and equalizer	4
T1D/T1C/T1-220, 221, 231, 250, or 260 type repeater	*With same repeater and equalizer	4
T1D/T1C/T1-220, 221, 231, 250, or 260 type repeater	*With new equalizer	3
M12A or M12B multiplexer	With same equalizer or new equalizer	3
M1C multiplexer	Single shelf unit with same equalizer	3
D1-A, B, C; D2 or D3 UTE channel bank	With same or with new equalizer	3
D4 channel bank	With same equalizer	3
WB1, WB2, WB3, WB4, or WB5 wideband banks	With same or with new equalizer	3
WM1 or WM4 wideband modem	With same or with new equalizer	3
Automatic standby unit	Regular or standby T1 line	4
Data multiplexer	With same equalizer	3

\* The office repeater must be bypassed to change the repeater or equalizer. To bypass the office repeater, refer to Section 365-226-500 (T1) or Section 365-200-410 (T1/OS), Section 365-222-200 (replacement of office repeater), and Section 365-223-500 (powering option).

TABLE B

**CONNECTION RULES (MAXIMUM LENGTH FOR CABLE BETWEEN EQUIPMENT BAYS  
AND DSX FOR CROSS-CONNECTIONS AT DSX)**

TYPE OF EQUIPMENT	MAXIMUM LENGTH INTERCONNECTING CABLE (FEET)	MAXIMUM LENGTH (Y1 WIRE) CROSS-CONNECTIONS (FEET)	
		AT DSX-1	AT DSX-1C
A 3-Volt DS1 terminal	85	15 to B, 85 to A, C, D, or E	
B 3-Volt T1 office repeater with fixed line buildout at first line repeater	85	15 to A, B, or C, 85 to D or E	
C 3-Volt T1 office repeater with automatic line buildout at first line repeater	85	15 to B, 85 to A, C, D, or E	
D 6-Volt T1 office repeater with automatic line buildout at first line repeater	655	85 to A, B, C, D, or E	
E 6-Volt DS1 terminal	655	85 to A, B, C, D, or E	
F 4-Volt DS1 C terminal	400		50 to F, G, H, or I
G 4-Volt T1C office repeater	400		50 to F, G, H, or I
H 6-Volt T1C office repeater	655		50 to F, G, H, or I
I 6-Volt DS1 C terminal	655		50 to F, G, H, or I

TABLE C  
EQUALIZERS FOR CABLES TO DSX-1  
AND DSX-1C (T1, T1/OS, OR T1C)

EQUIPMENT BAYS		CABLE LENGTH IN FEET TO DSX- ( )*		EQUALIZER*
206 ORB	206, 236 RPTR	0 to 220		983A
		220 to 440		983B
		440 to 665		983C
T1C/T1 ORB (DSX optional)	(T1C only) 220 RPTR	0 to 133		ED-3C655-30, G1
	(T1 only) 221, 231 RPTR	133 to 267		ED-3C655-30, G2
		267 to 400		ED-3C655-30, G3
(T1C) 250 RPTR (T1D) 260 RPTR		0 to 220		ED-3C585-30, G1
		220 to 440		ED-3C585-30, G2
		440 to 655		ED-3C585-30, G3
M12, M12A, M12B		0 to 133		ED-3C655-30, G1
		133 to 267		ED-3C655-30, G2
		267 to 400		ED-3C655-30, G3
M13		400 to 533		ED-3C655-30, G4
		533 to 655		ED-3C655-30, G5
M1C		DSX-1	DSX-1C	1012AA 1012AB 1012AC 1012BA 1012BB 1012BC 1012CA 1012CB 1012CC
		0 to 150 150 to 450 450 to 655	0 to 133 0 to 133 0 to 133 133 to 267 133 to 267 133 to 267 267 to 400 267 to 400 267 to 400	
D1A, D1B, D1C, or D1D channel bank		0 to 150		ED-97079-30, G6
		150 to 450		358A
		450 to 655		358B
D2 channel bank		0 to 150		ED-1C318-30, G1
		150 to 450		ED-1C318-30, G2
		450 to 655		ED-1C318-30, G3
D3 UTE channel bank		0 to 150		ED-97079-30, G6
		150 to 450		358D
		450 to 655		358E

TABLE C (Contd)  
EQUALIZERS FOR CABLES TO DSX-1  
AND DSX-1C (T1, T1/OS, OR T1C)

EQUIPMENT BAYS	CABLE LENGTH IN FEET TO DSX- ( )*	EQUALIZER*
D3 channel bank	0 to 150	ED-97079-30, G6
	150 to 450	358D
	450 to 655	358E
	0 to 220	988A (option A)
	220 to 440	988A (option B)
D4 channel bank (T1 line only)	440 to 655	988A (option C)
	0 to 220	ED-3C585-30, G1
	220 to 440	ED-3C585-30, G2
D4 channel bank (T1C or T1 line)	440 to 655	ED-3C585-30, G3
	0 to 133	ED-3C655-30, G1
	133 to 267	ED-3C655-30, G2
WB1 or WB2	267 to 400	ED-3C655-30, G3
	400 to 533	ED-3C655-30, G4
	533 to 655	ED-3C655-30, G5
WB3 or WB3D	0 to 150	ED-97079-30, G6
	150 to 450	358A
	450 to 655	358B
WB4 or WB5	0 to 85	None
	0 to 150	ED-97079-30, G6
	150 to 450	358D
WM-1	450 to 655	358E
	0 to 150	ED-97079-30, G6
	150 to 450	358A
WM-4	450 to 655	358B
	0 to 150	ED-3C299-30, G3
	150 to 450	ED-3C299-30, G1
ASU	450 to 655	ED-3C299-30, G2
	0 to 85	None
	Data multiplexer	0 to 150
150 to 450		
450 to 655		
0 to 150		S1A & B, S2A & B S3B, S4A & B S5A & B, S6A S3A, S6B } CP HL90
150 to 450		
450 to 655	Standby	

\* At cable length transition point, use equalizer for the shorter length. (Do not over-equalize.)

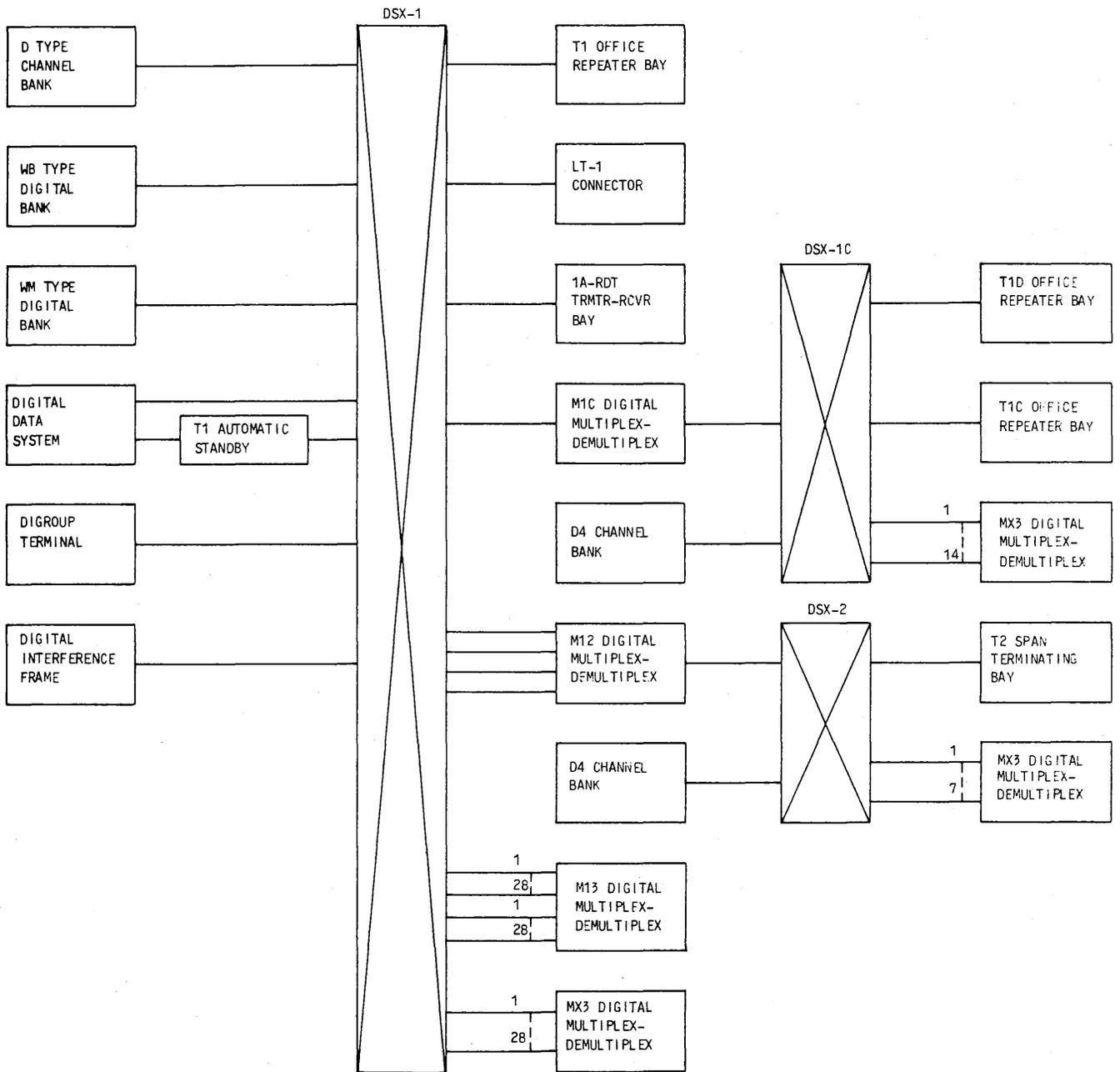
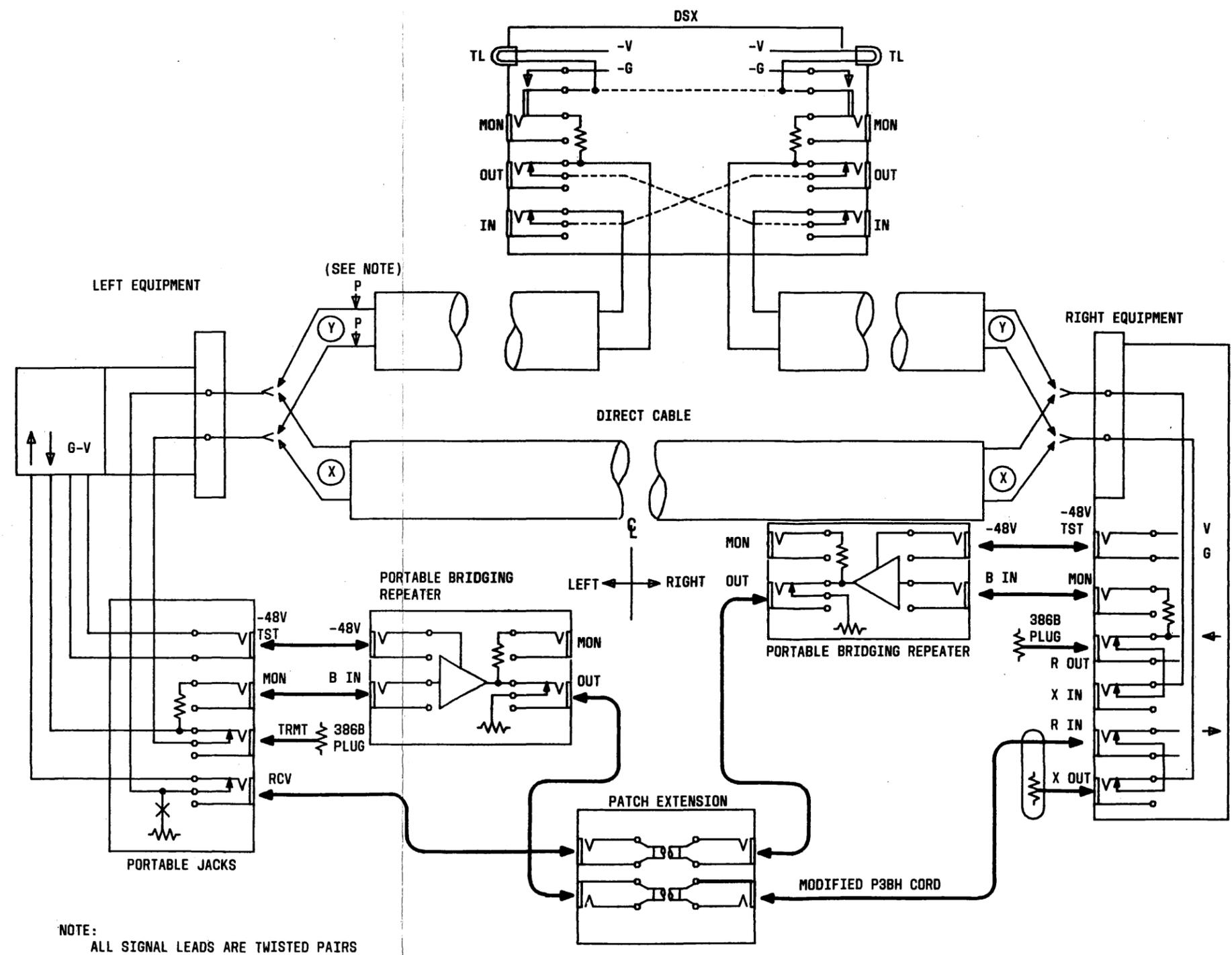


Fig. 1—DSX-1 and DSX-1C Hierarchy



NOTE:  
ALL SIGNAL LEADS ARE TWISTED PAIRS

Fig. 2—In-Service DSX Retrofitting

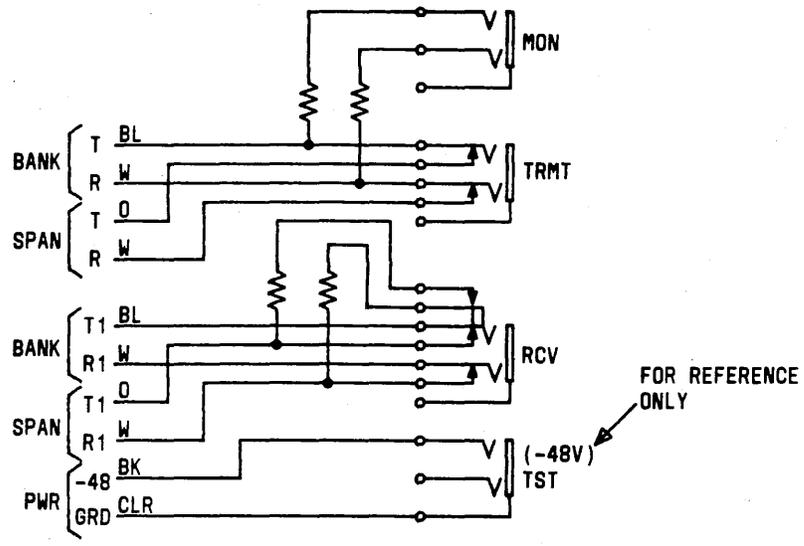


Fig. 3—Portable Retrofit Jack Circuit

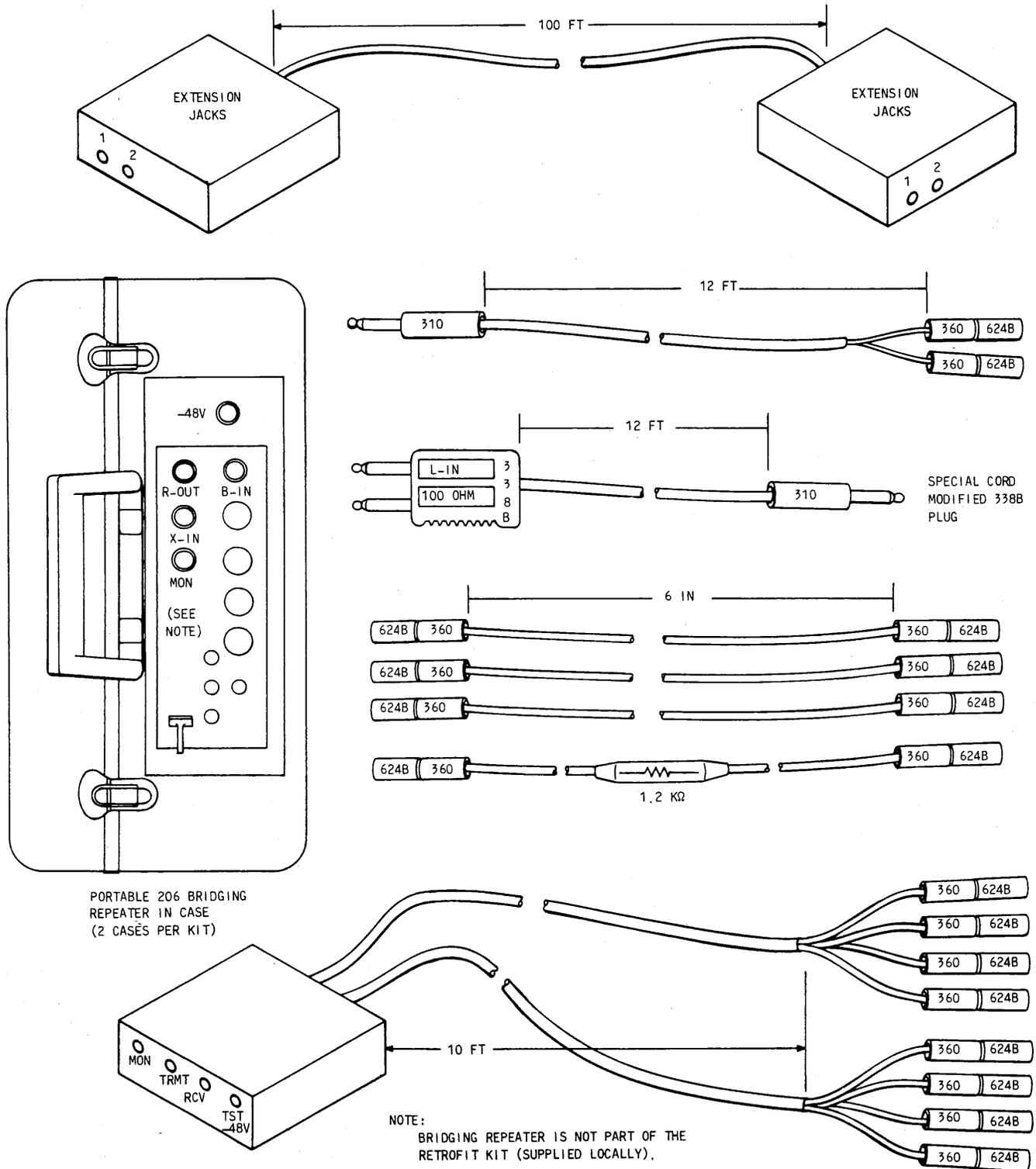
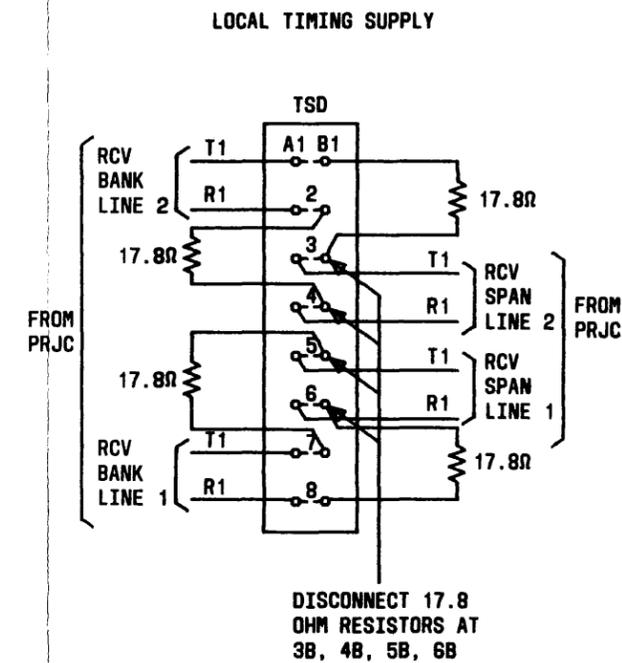
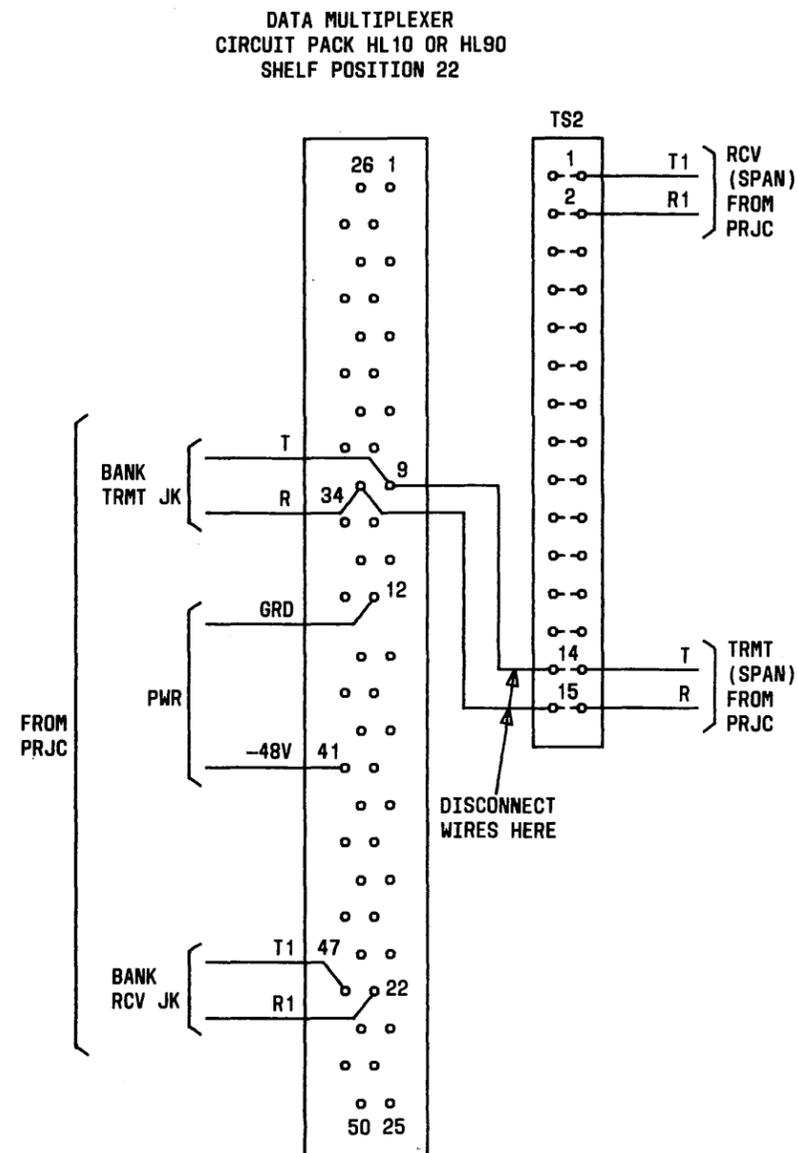


Fig. 4—Special Apparatus In-Service Retrofit Kit



LEGEND: PRJC = PORTABLE RETROFIT JACK CIRCUIT

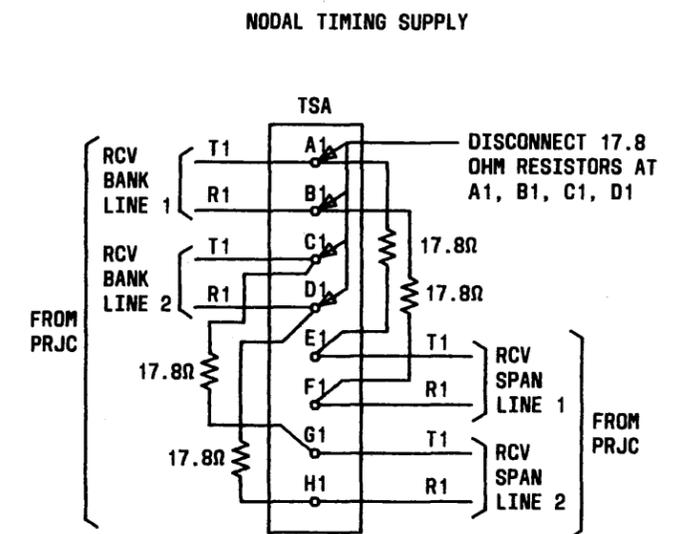


Fig. 5—Data Multiplexer—Portable Retrofit Jack Connection



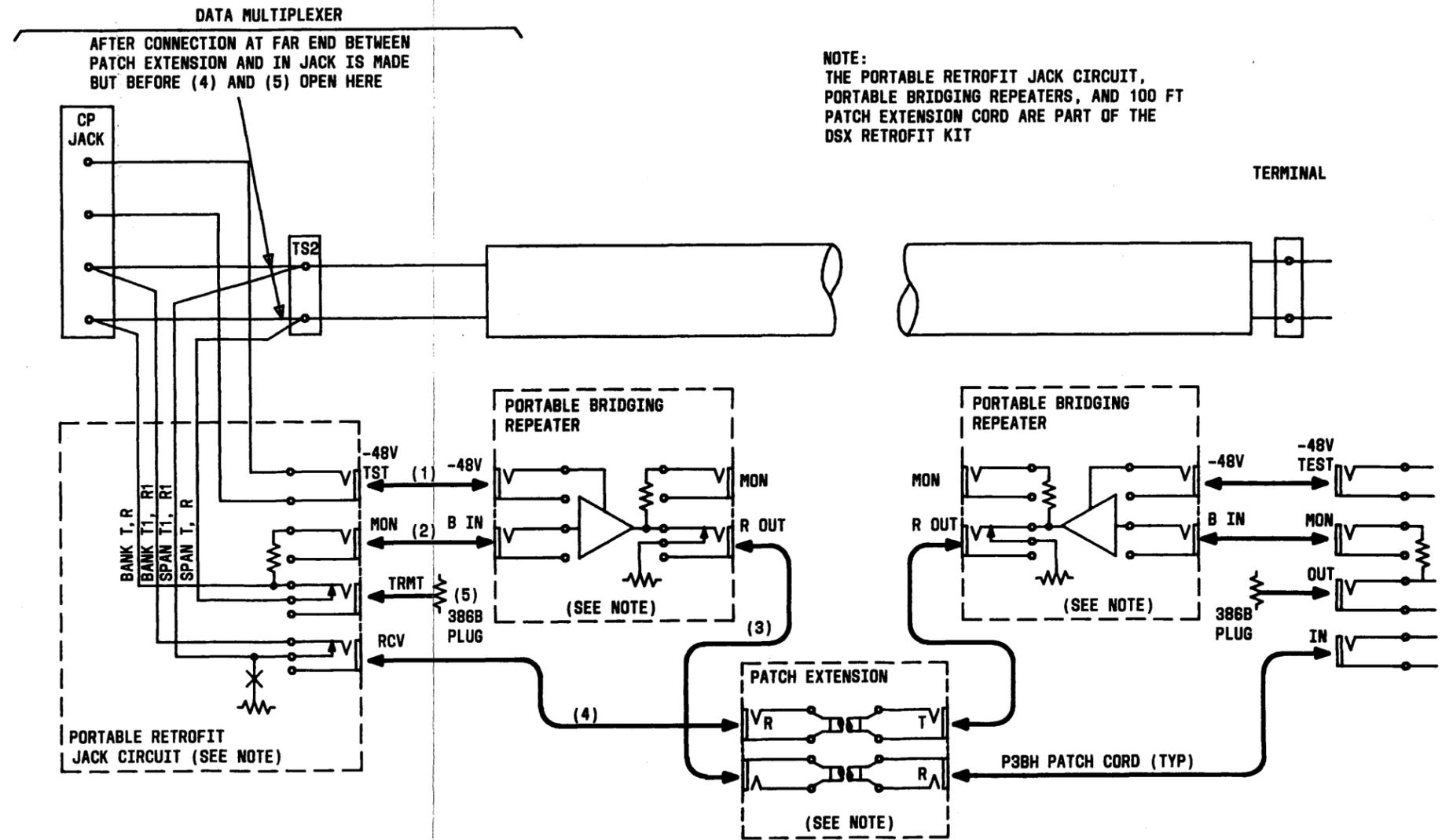


Fig. 7—Data Multiplexer—Line 3 or Greater

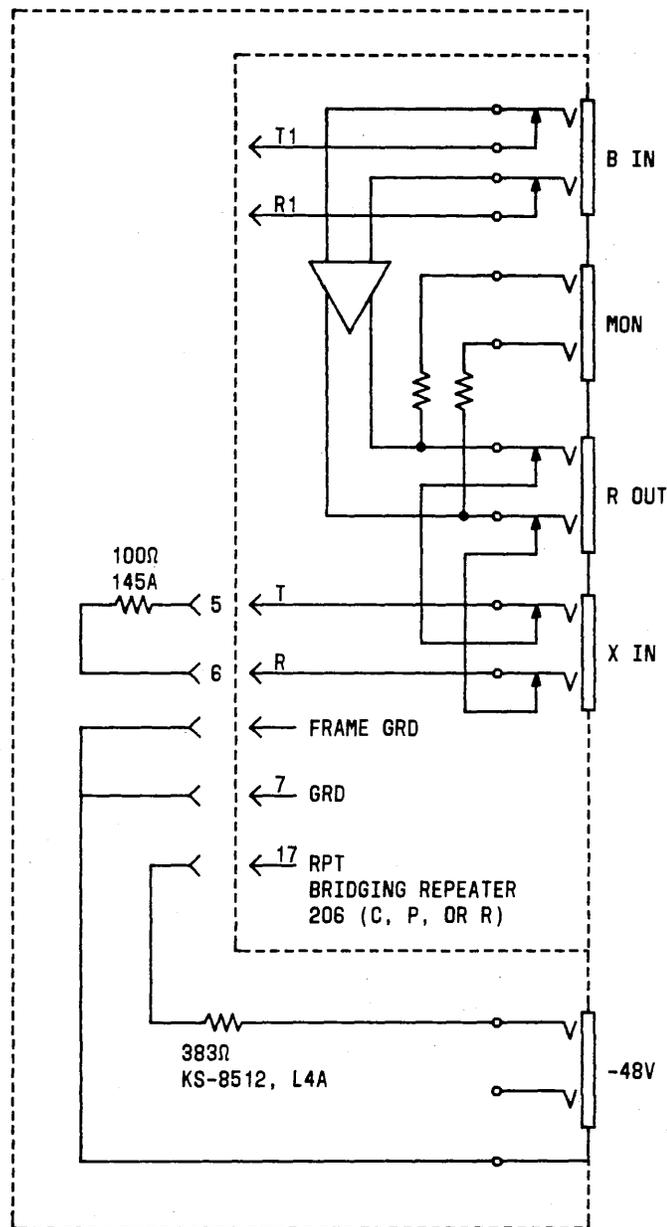


Fig. 8—Portable Bridging Repeater

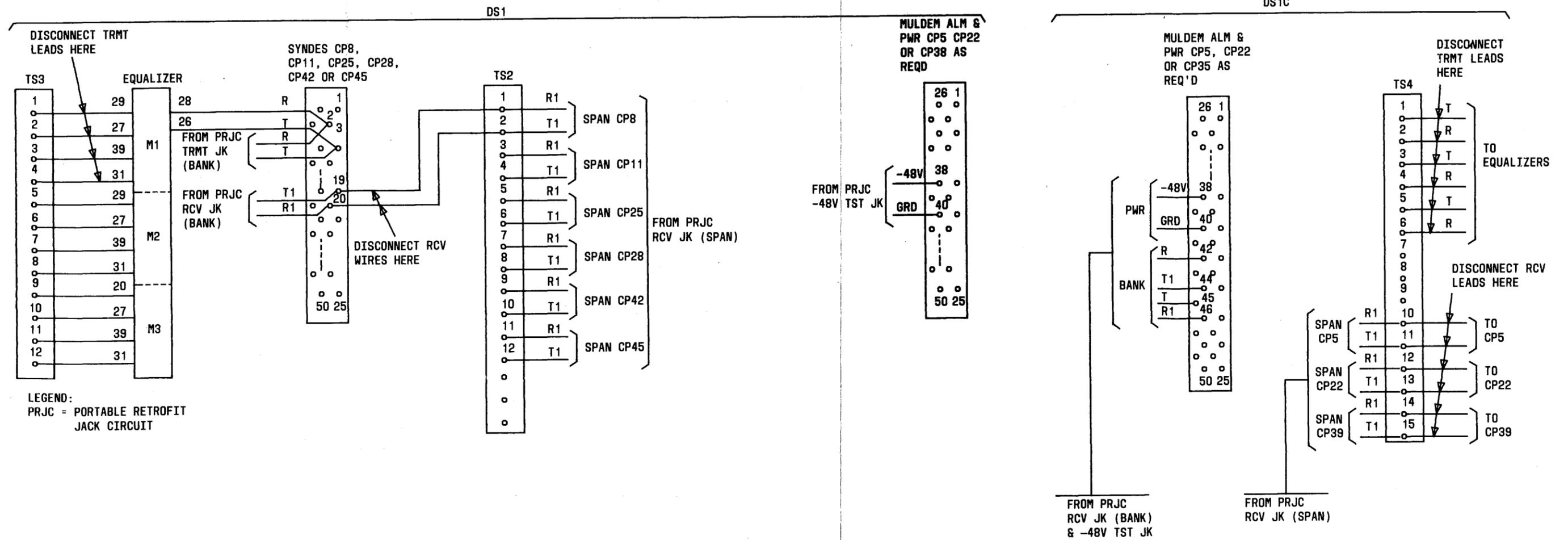


Fig. 9—Single Shelf MIC—Portable Retrofit Jack Connection

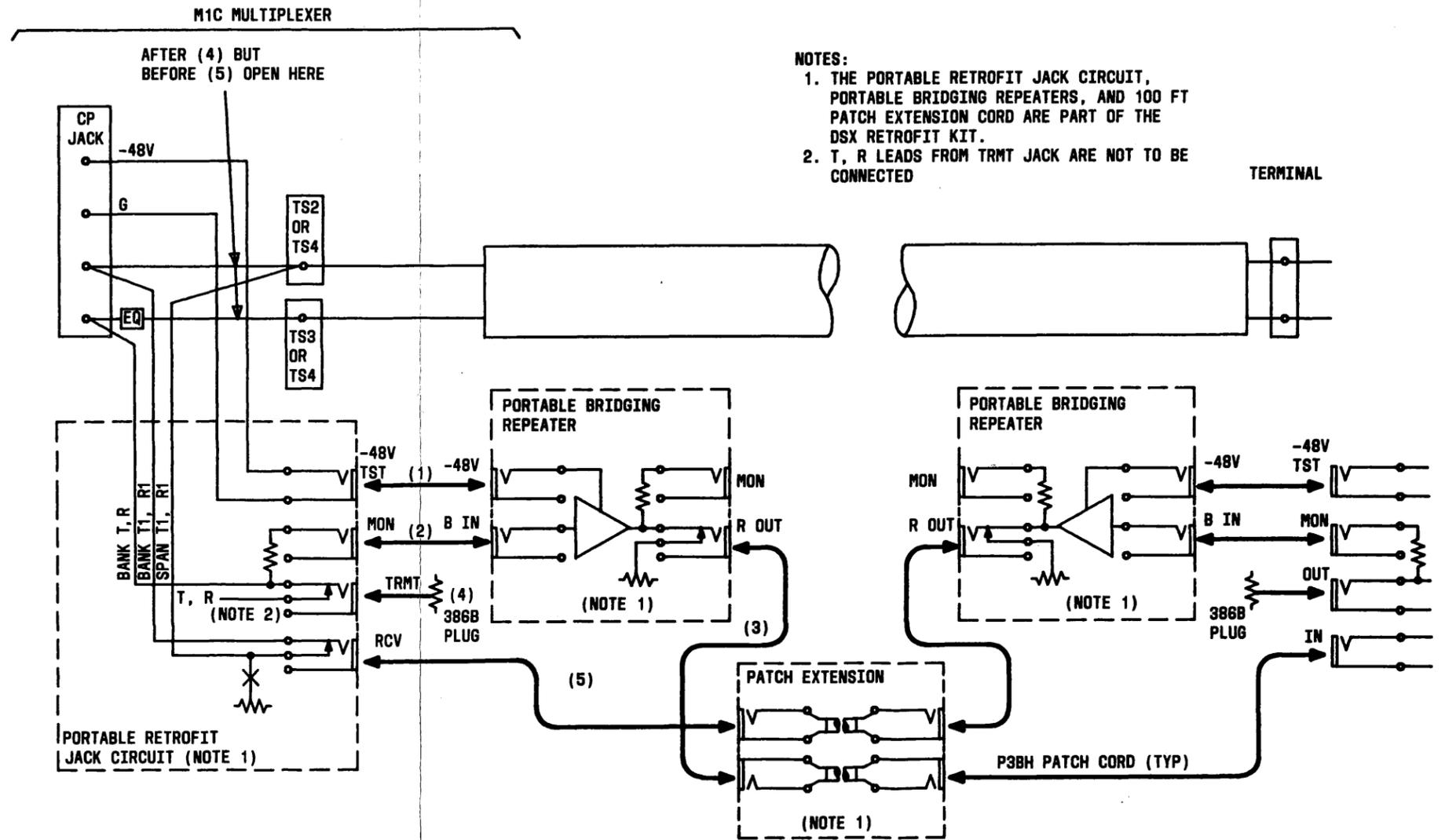


Fig. 10—Single Shelf M1C Multiplexer

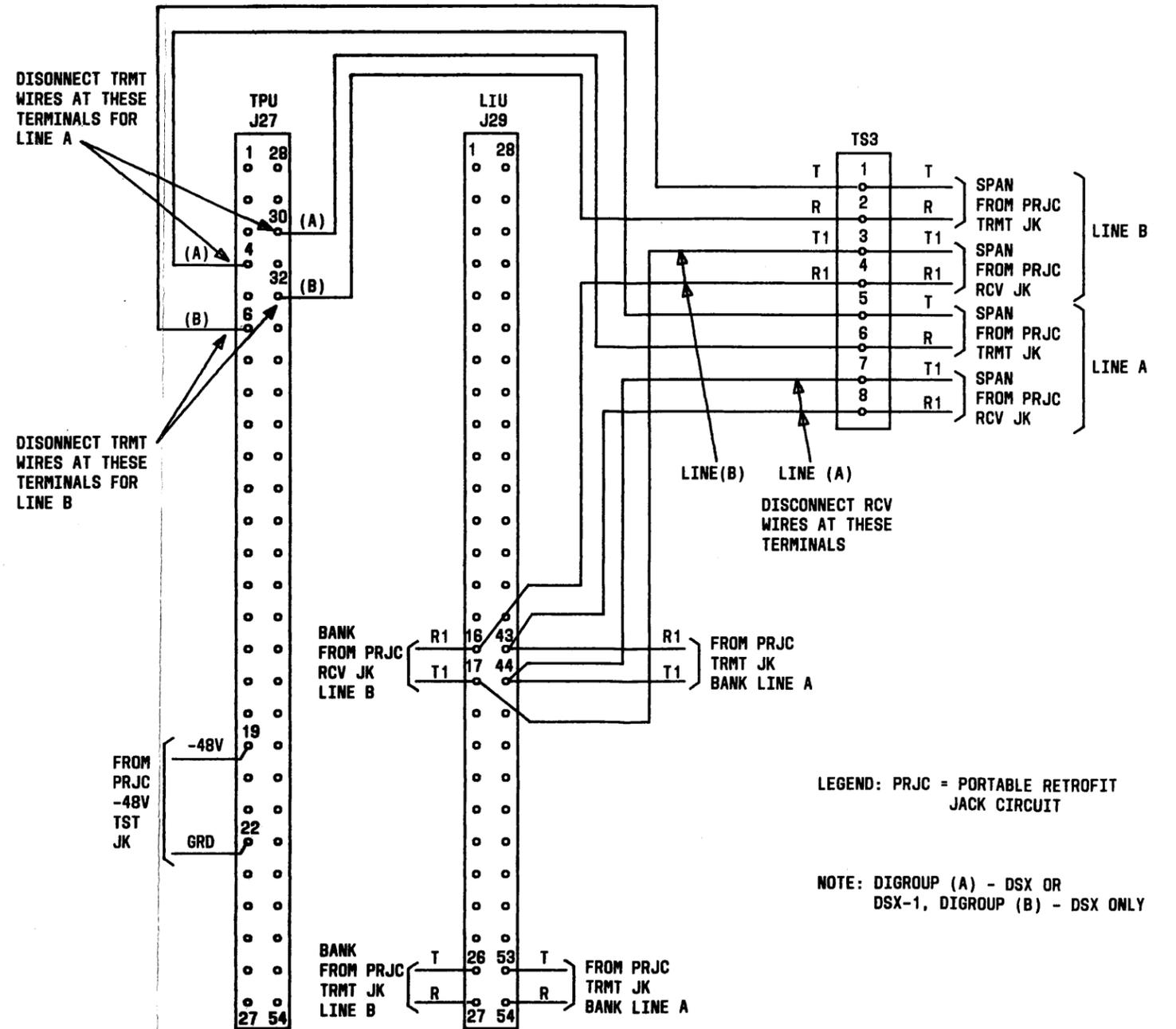


Fig. 11—D4 Channel Bank—Portable Retrofit Jack Connection

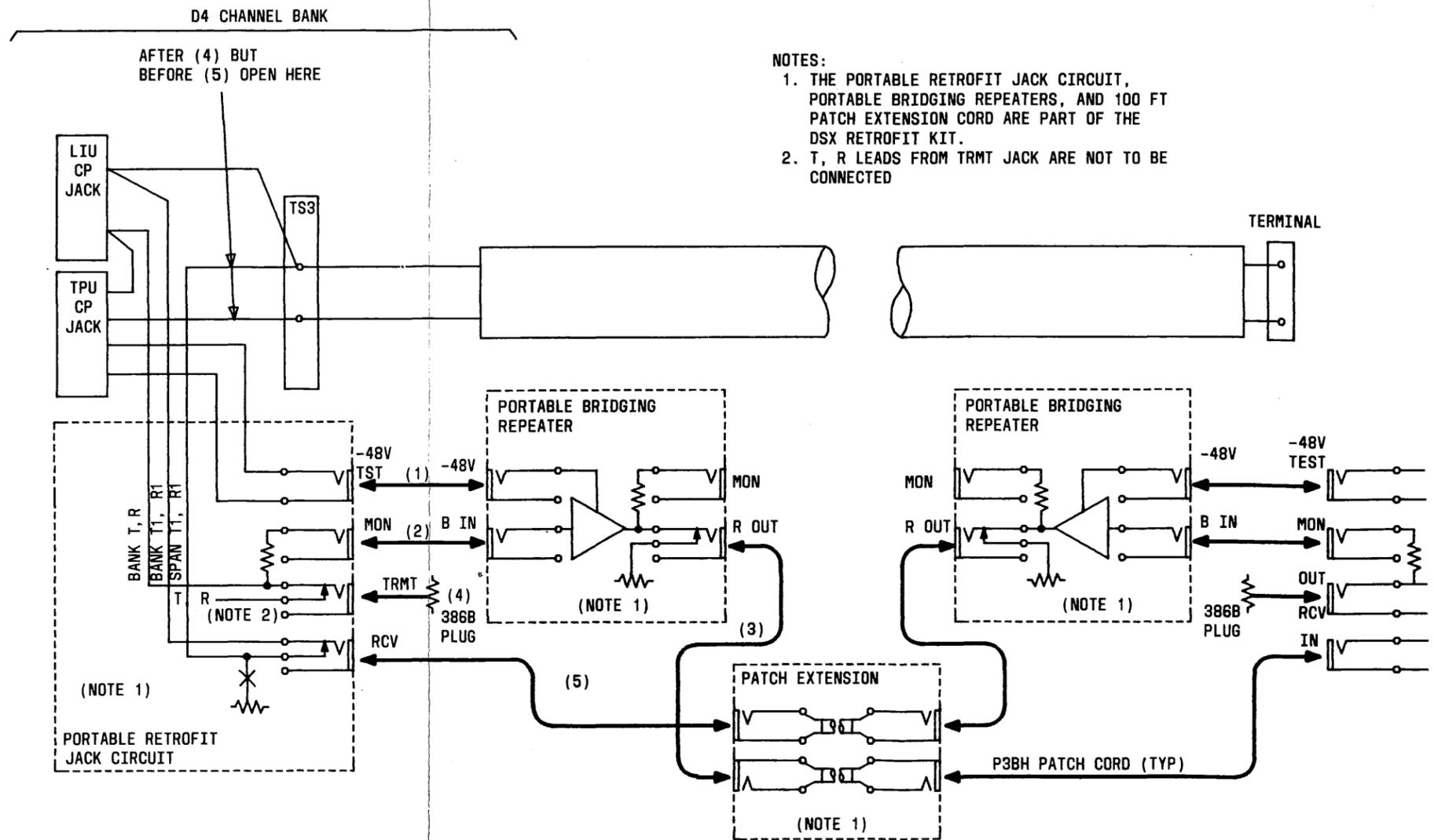


Fig. 12—D4 Channel Bank

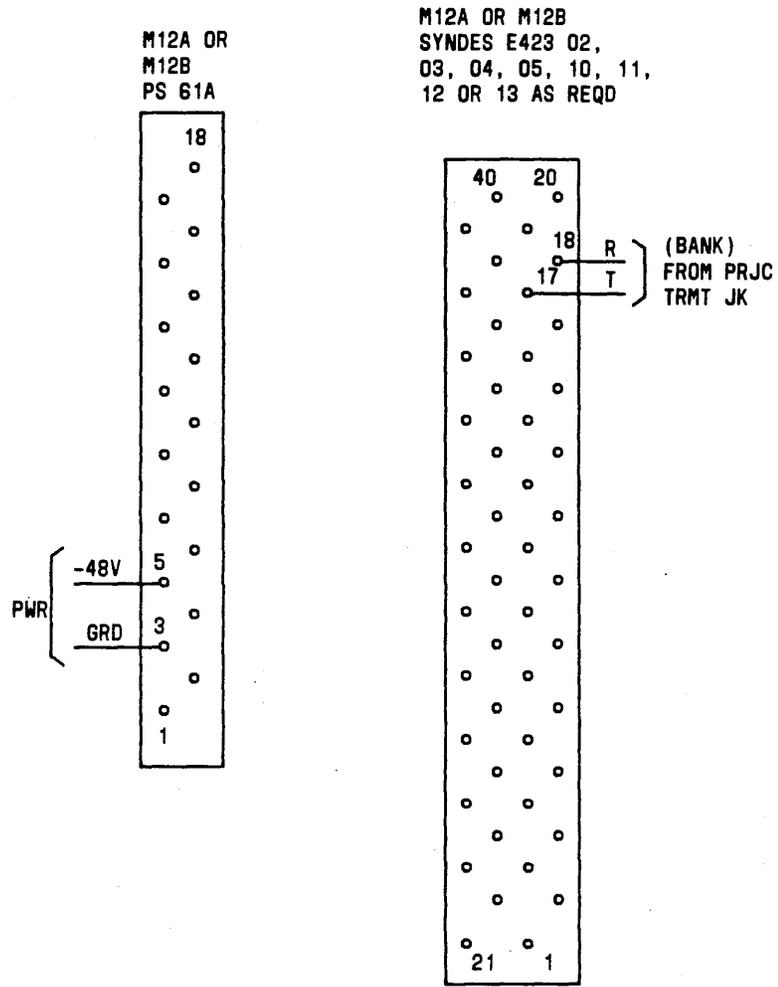
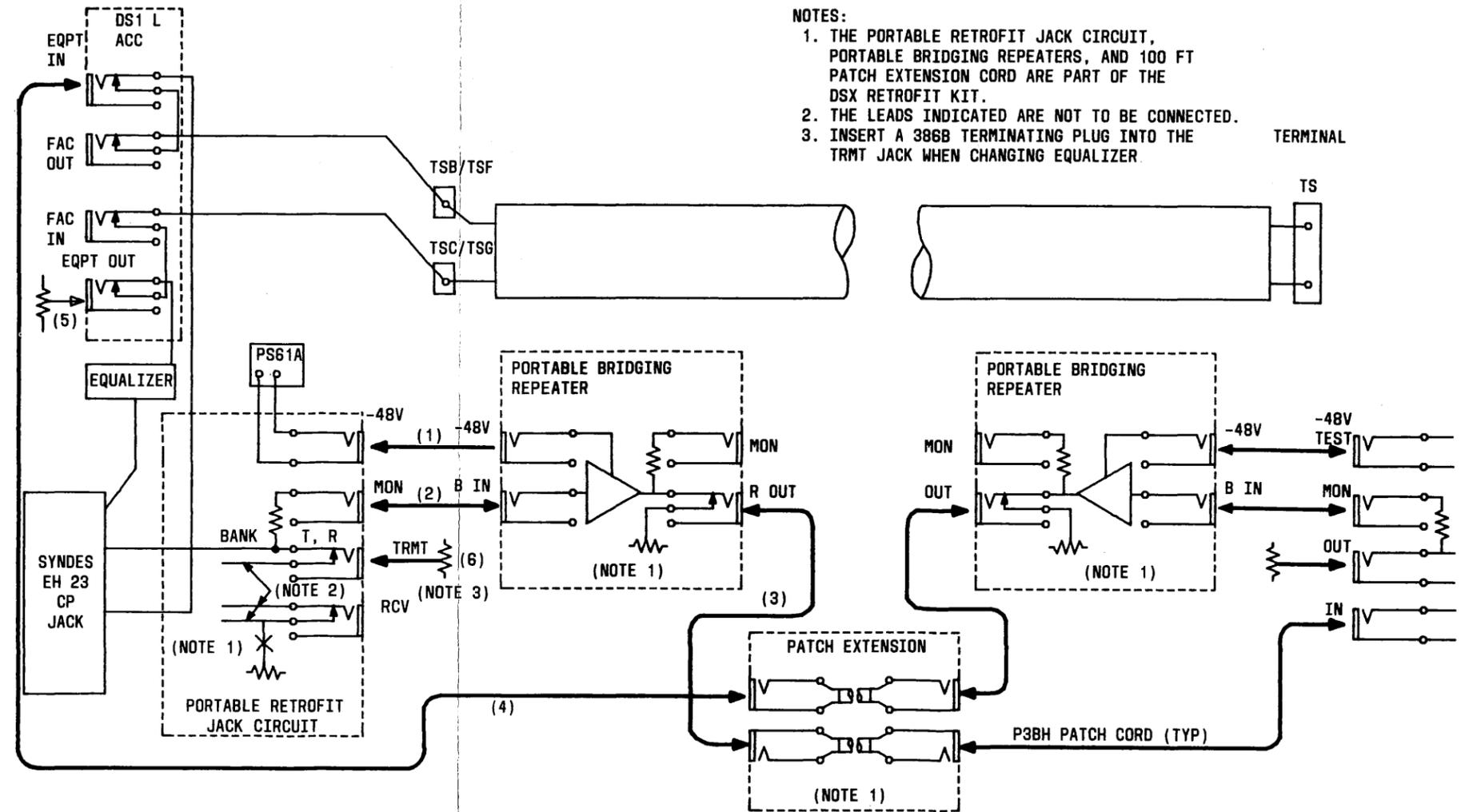
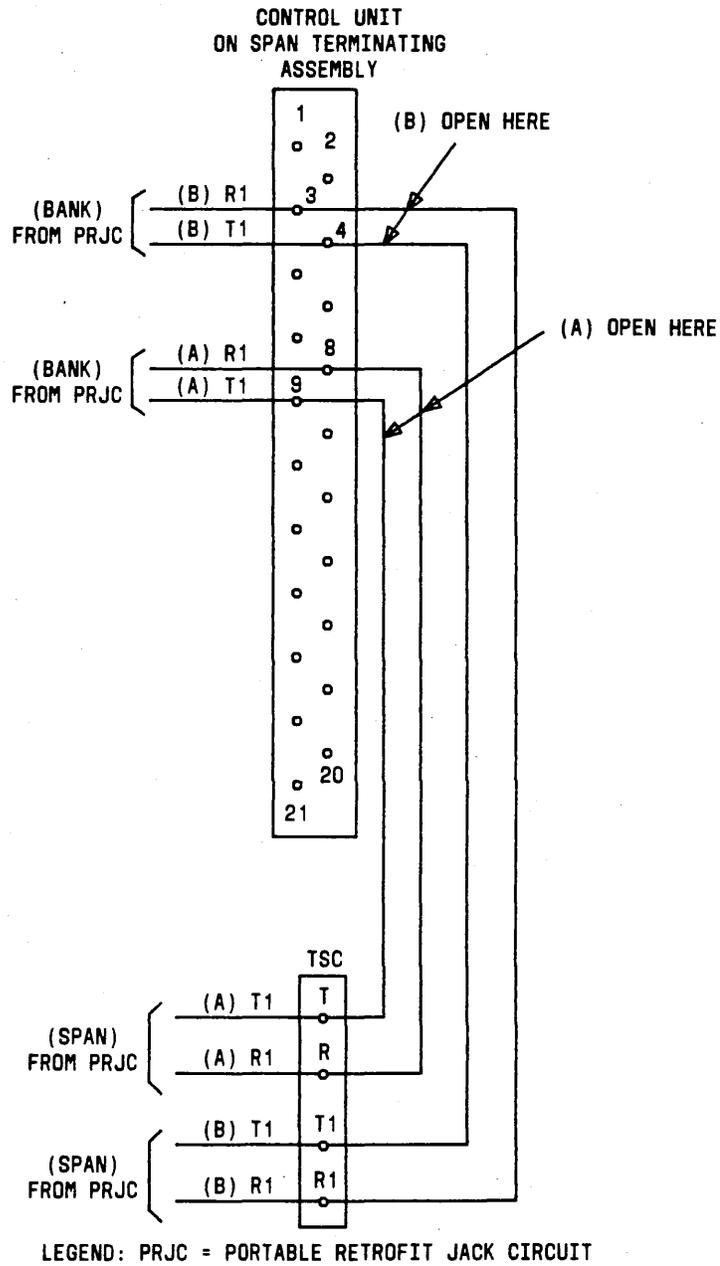


Fig. 13—M12A and M12B Multiplexers—Portable Retrofit Jack Connection



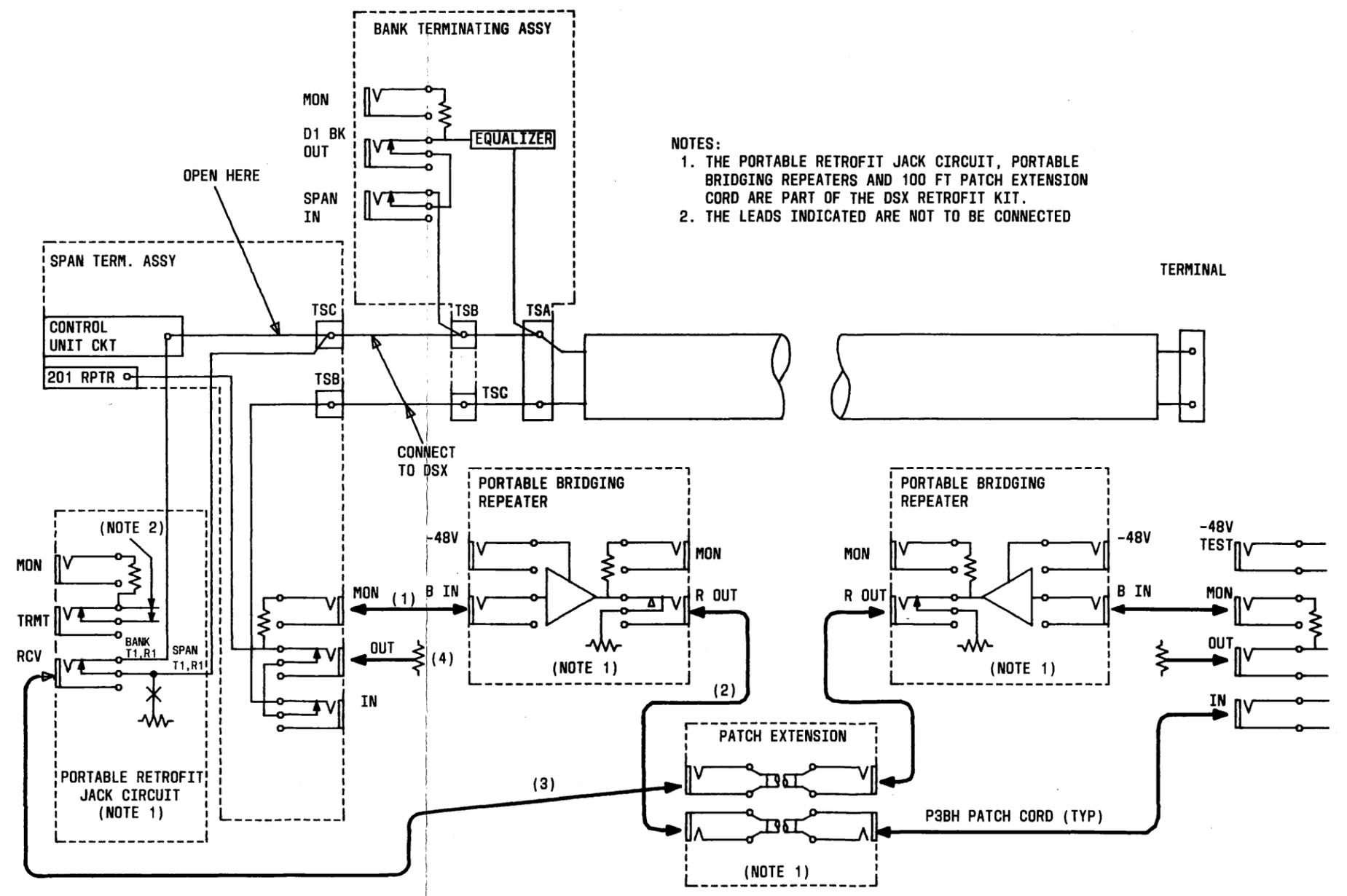
- NOTES:
1. THE PORTABLE RETROFIT JACK CIRCUIT, PORTABLE BRIDGING REPEATERS, AND 100 FT PATCH EXTENSION CORD ARE PART OF THE DSX RETROFIT KIT.
  2. THE LEADS INDICATED ARE NOT TO BE CONNECTED.
  3. INSERT A 386B TERMINATING PLUG INTO THE TRMT JACK WHEN CHANGING EQUALIZER.

Fig. 14—M12A or M12B Multiplexer



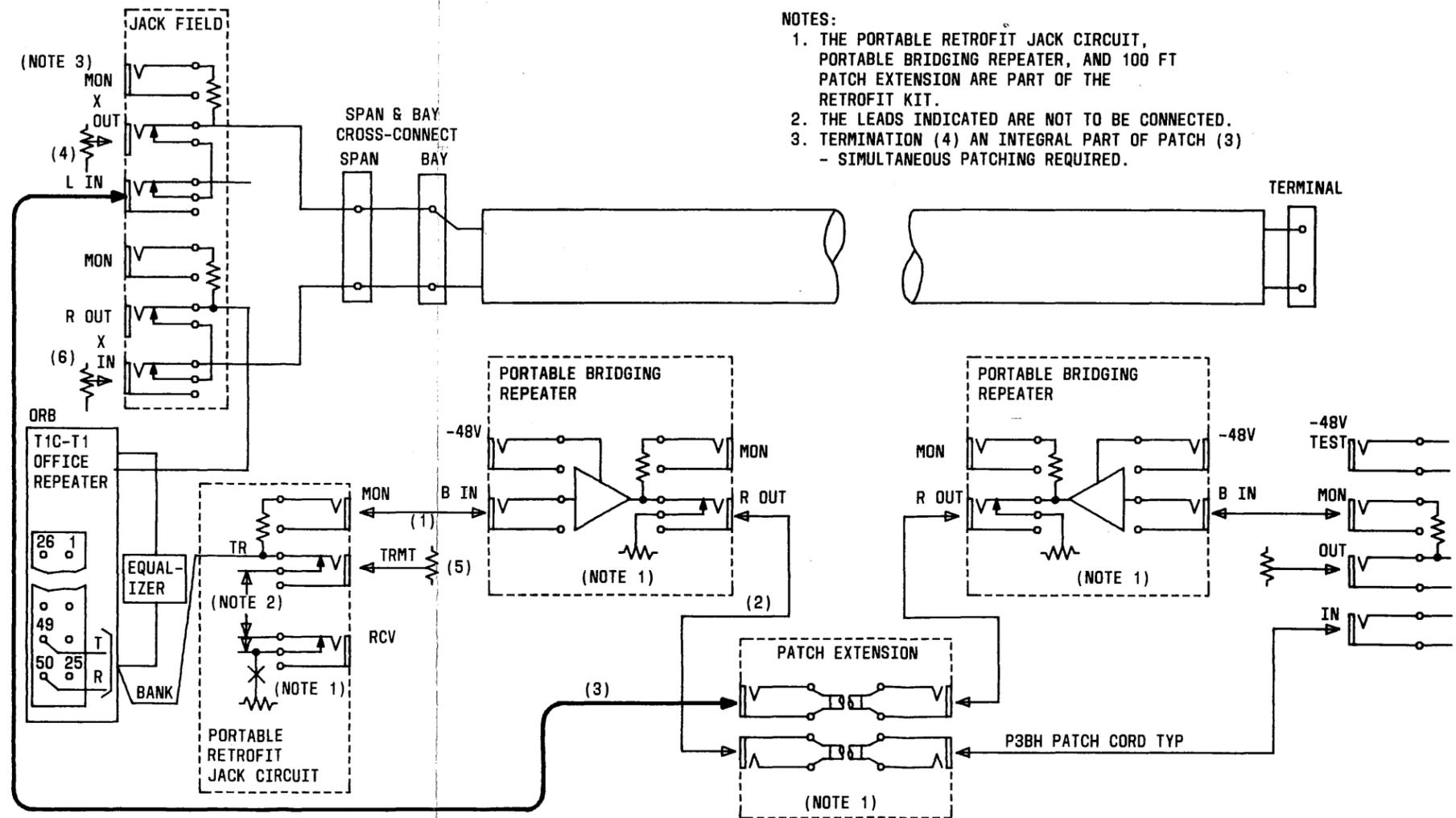
**Fig. 15—201 ORB—Retrofit Jack Circuit Connections**





- NOTES:
1. THE PORTABLE RETROFIT JACK CIRCUIT, PORTABLE BRIDGING REPEATERS AND 100 FT PATCH EXTENSION CORD ARE PART OF THE DSX RETROFIT KIT.
  2. THE LEADS INDICATED ARE NOT TO BE CONNECTED

Fig. 17—201 Office Repeater Bay With DSX Bank Connection and Bank Jacks and/or Equalizer



NOTES:

1. THE PORTABLE RETROFIT JACK CIRCUIT, PORTABLE BRIDGING REPEATER, AND 100 FT PATCH EXTENSION ARE PART OF THE RETROFIT KIT.
2. THE LEADS INDICATED ARE NOT TO BE CONNECTED.
3. TERMINATION (4) AN INTEGRAL PART OF PATCH (3) - SIMULTANEOUS PATCHING REQUIRED.

Fig. 18—T1C/T1 Office Repeater Bay (When Changing Equalizer)

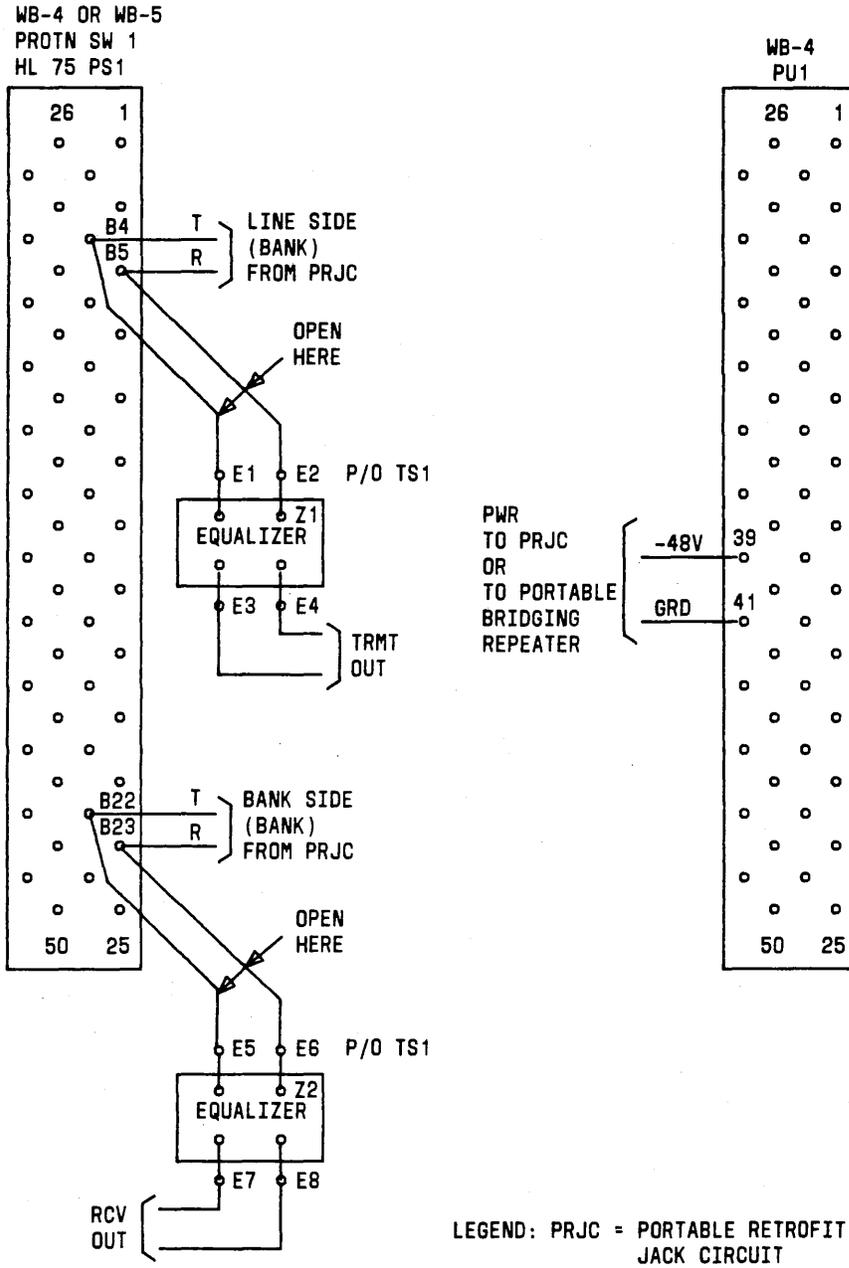


Fig. 19—WB-4 and WB-5—Portable Retrofit Jack Connections

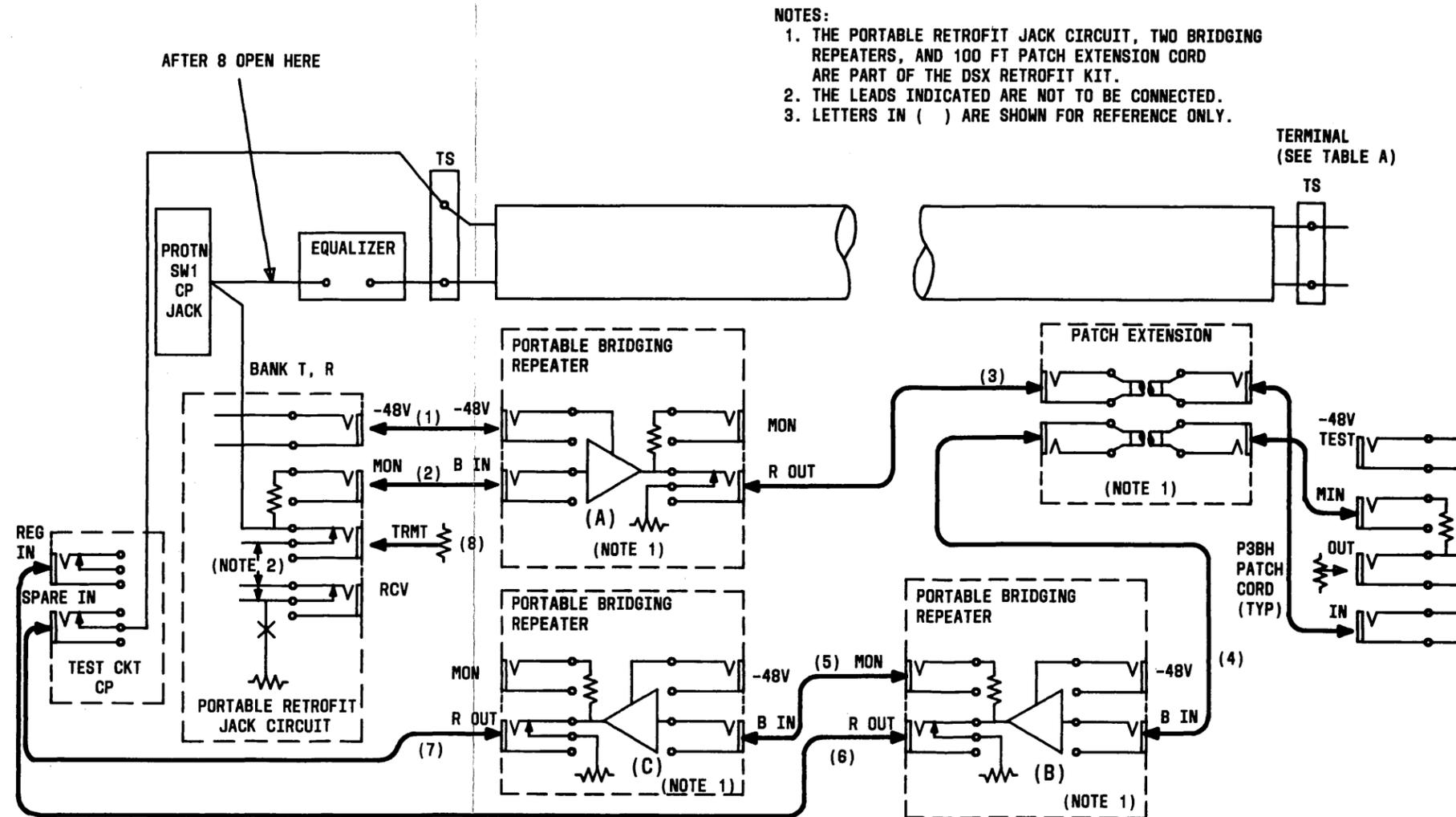


Fig. 20—WB-4 and WB-5 Data—Voice Multiplexer

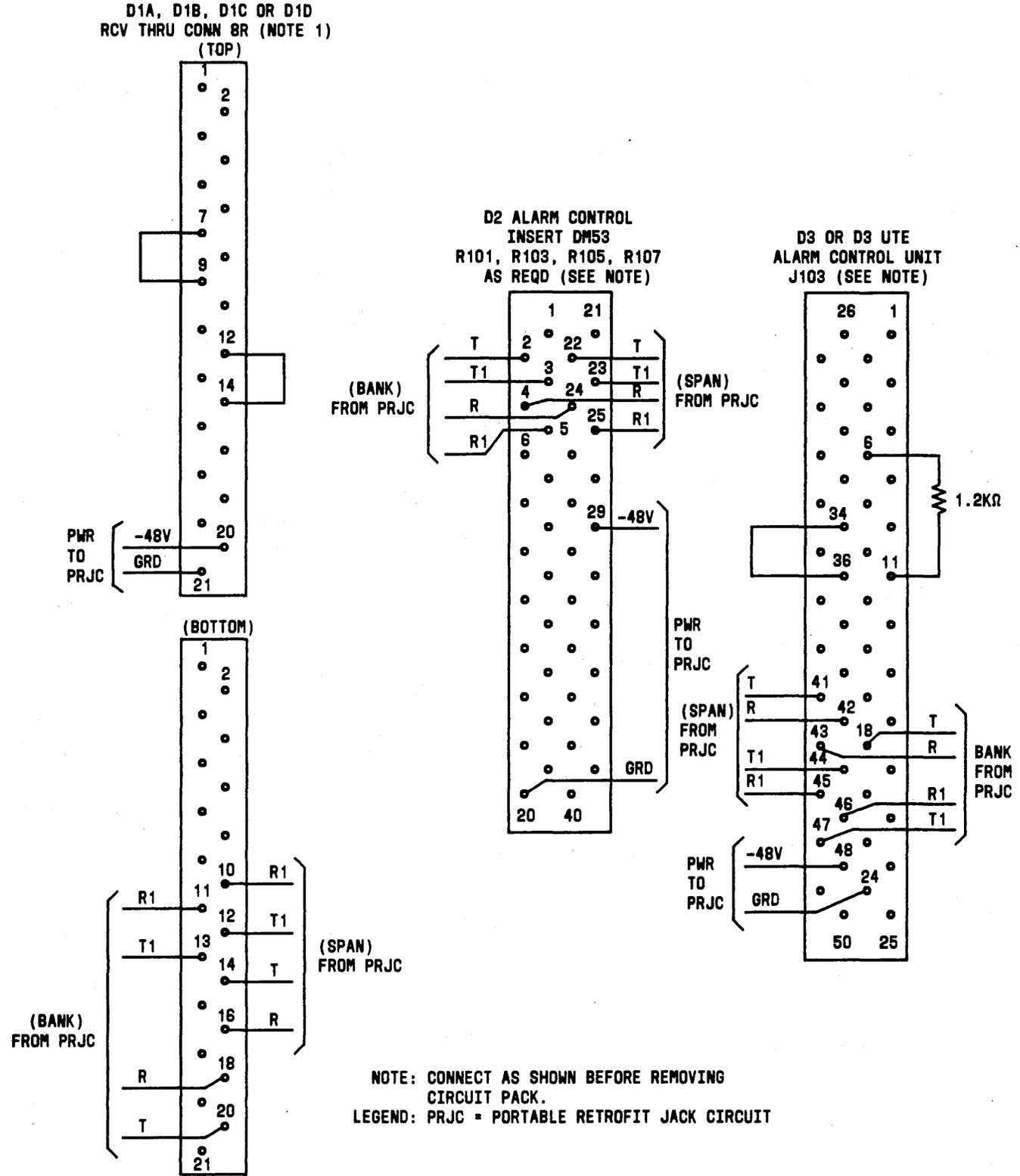


Fig. 21—D1, D2, and D3 Channel Banks—Portable Retrofit Jack Connections

NOTE:  
THE PORTABLE RETROFIT JACK CIRCUIT, BRIDGING REPEATERS, AND 100 FT PATCH EXTENSION CORD ARE PART OF THE DSX RETROFIT KIT

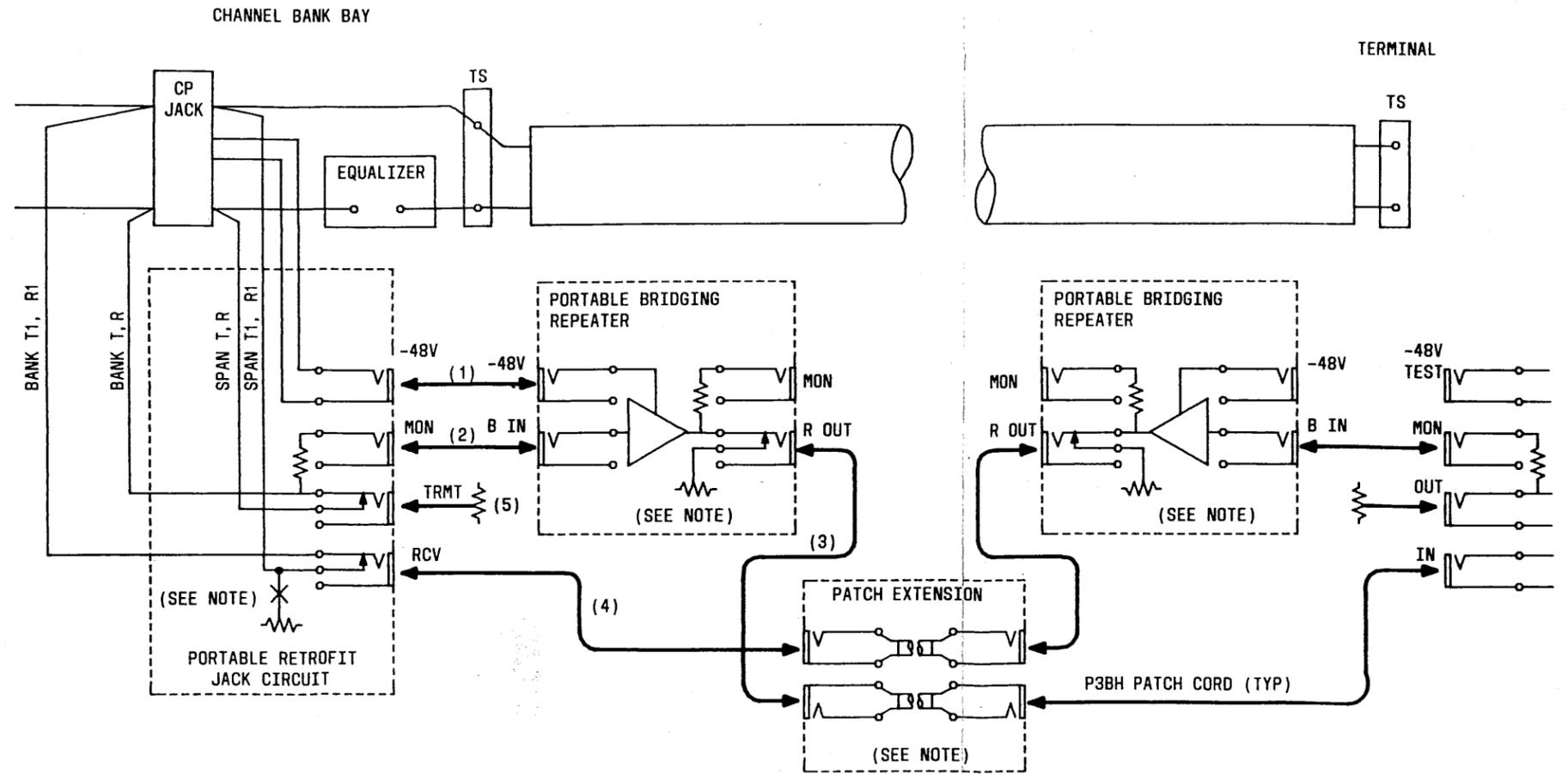


Fig. 22—D1, D2, and D3—Channel Bank

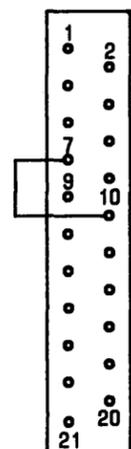
WB-1, WB-2, WM-1 OR WM-4  
ALARM CONTROL  
12M OR 18-D AS REQUIRED

WB-3 OR WB-3D  
MULTIPLEX  
ALARM CONTROL  
12M

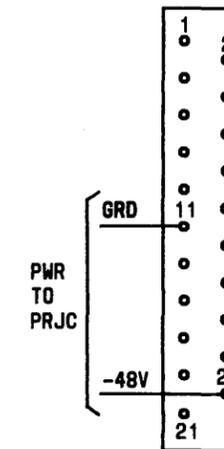
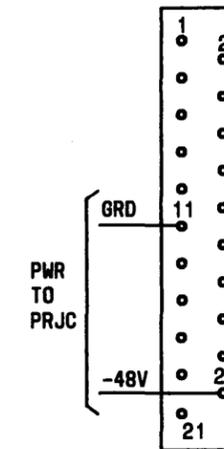
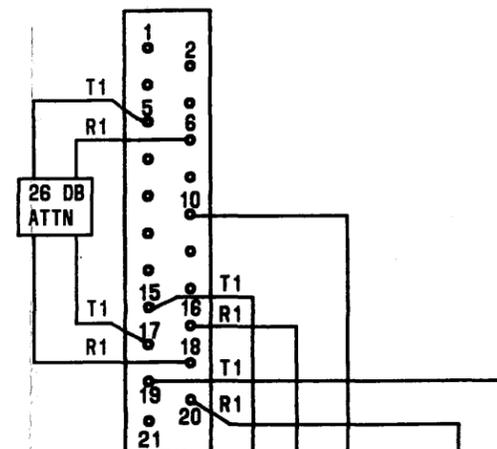
WB-1, WB-2, WB-3 OR WB-3D  
RATIO VOLT COMP  
9M  
(TOP)

WM-1  
RATIO VOLT COMP  
6P  
(TOP)

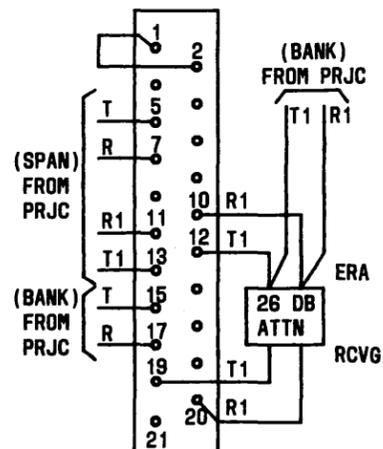
(TOP) (SEE NOTE)



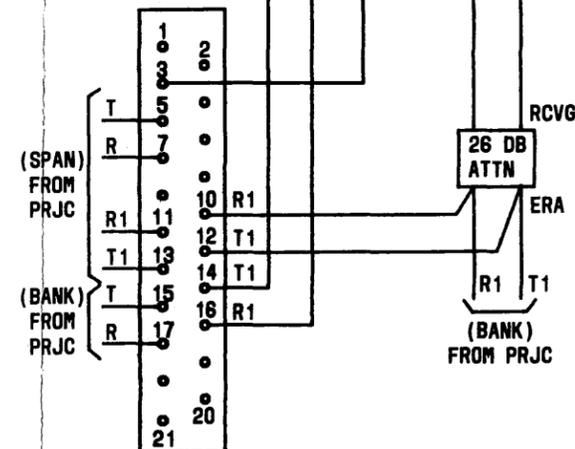
(TOP) (SEE NOTE)



(BOTTOM)



(BOTTOM)



LEGEND: PRJC = PORTABLE RETROFIT JACK CIRCUIT  
ERA = ERROR RATE ALARM

NOTE: CONNECT AS SHOWN BEFORE  
REMOVING CIRCUIT PACK.

Fig. 23—WB-1, WB-2, and WB-3 Wideband Bank;  
WM-1 and WM-4 Wideband Modems—Portable  
Retrofit Jack Connections

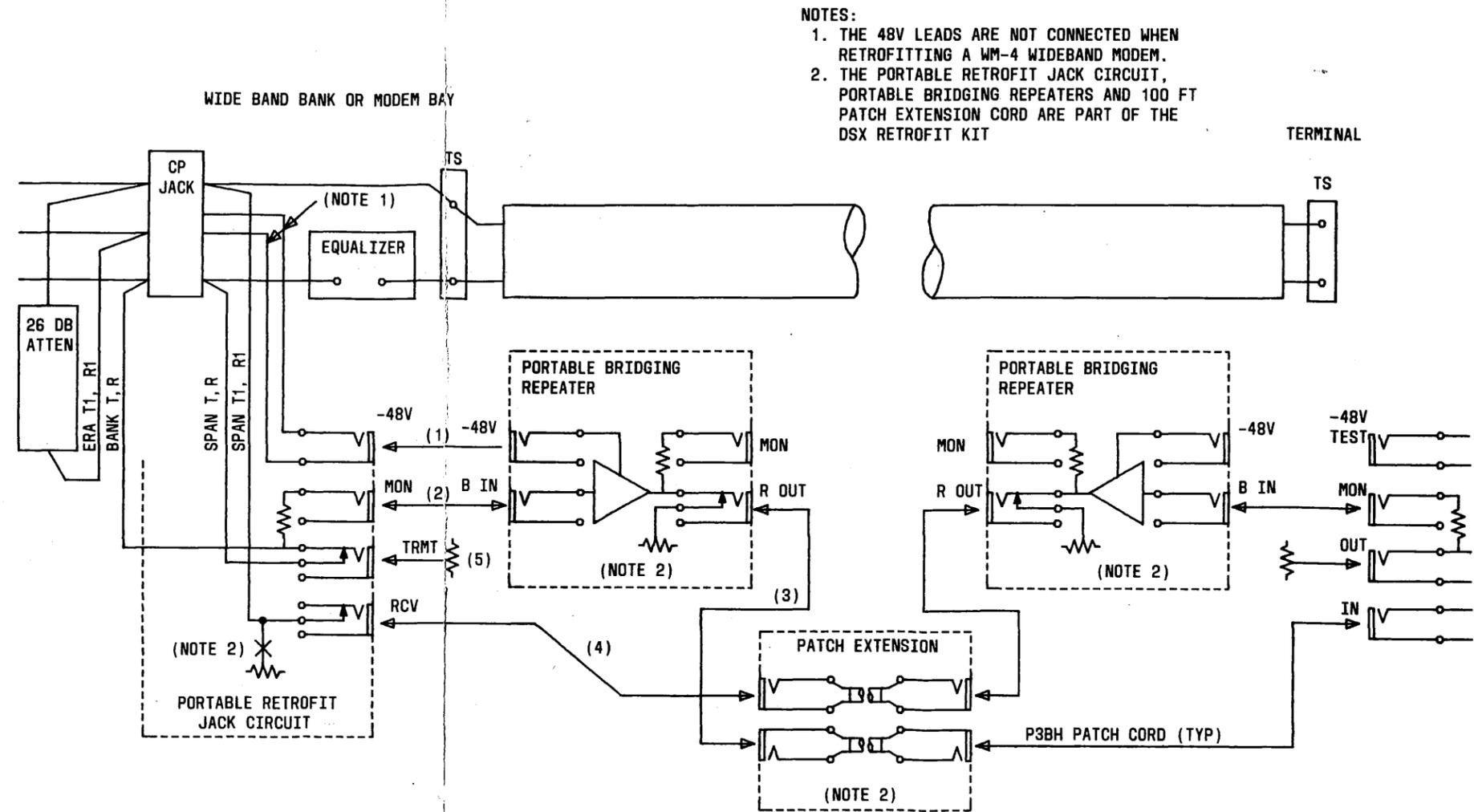


Fig. 24—WB-1, WB-2, WB-3, and WB-3D Wideband Bank; WM-1 and WM-4 Wideband Modems

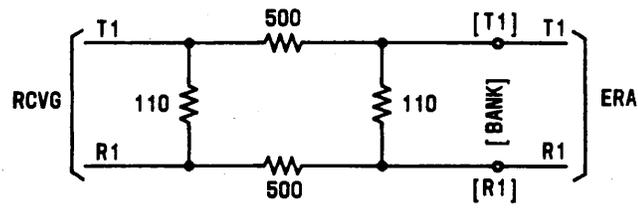


Fig. 25—Retrofit 26 dB Attenuator

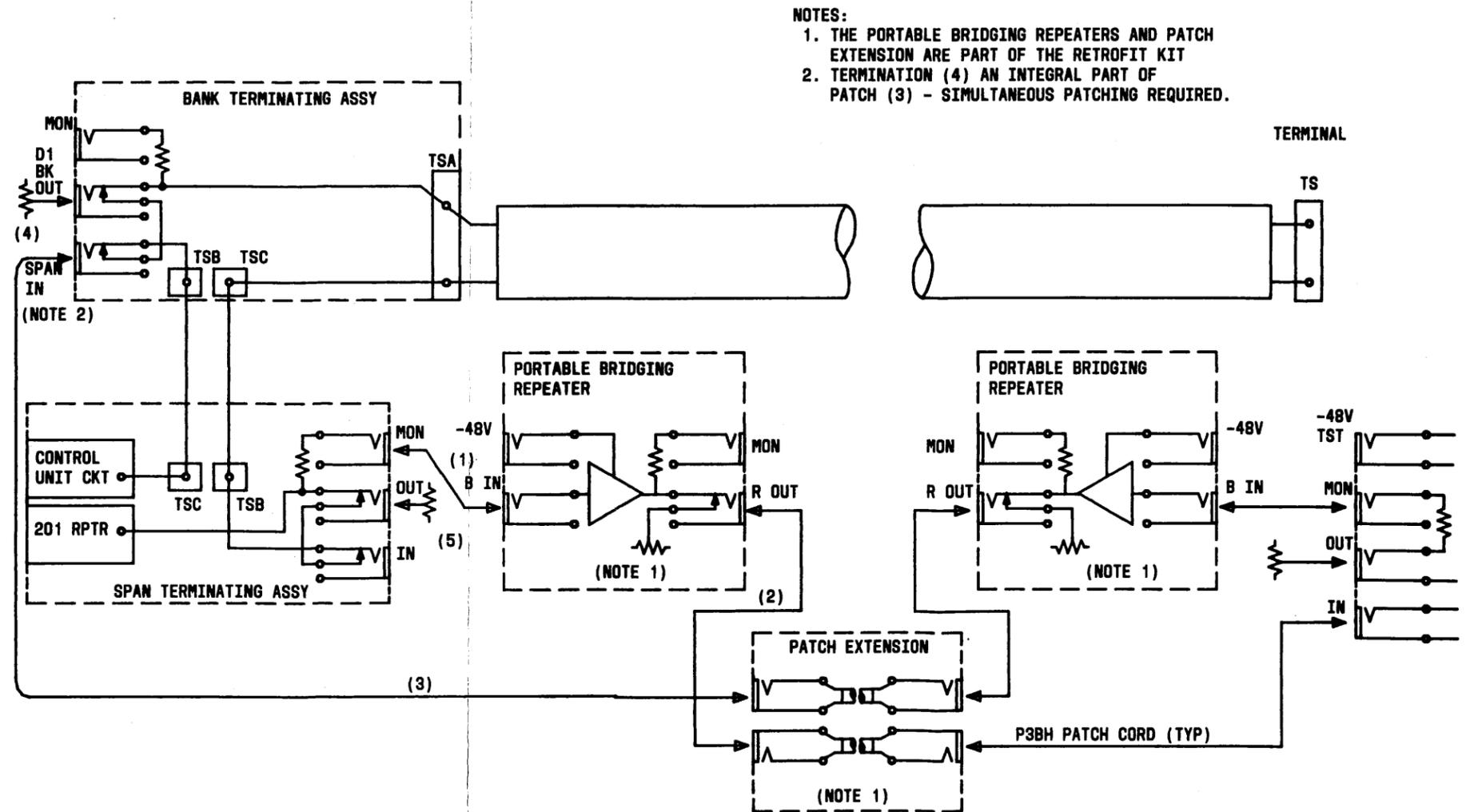


Fig. 26—201 Office Repeater Bay

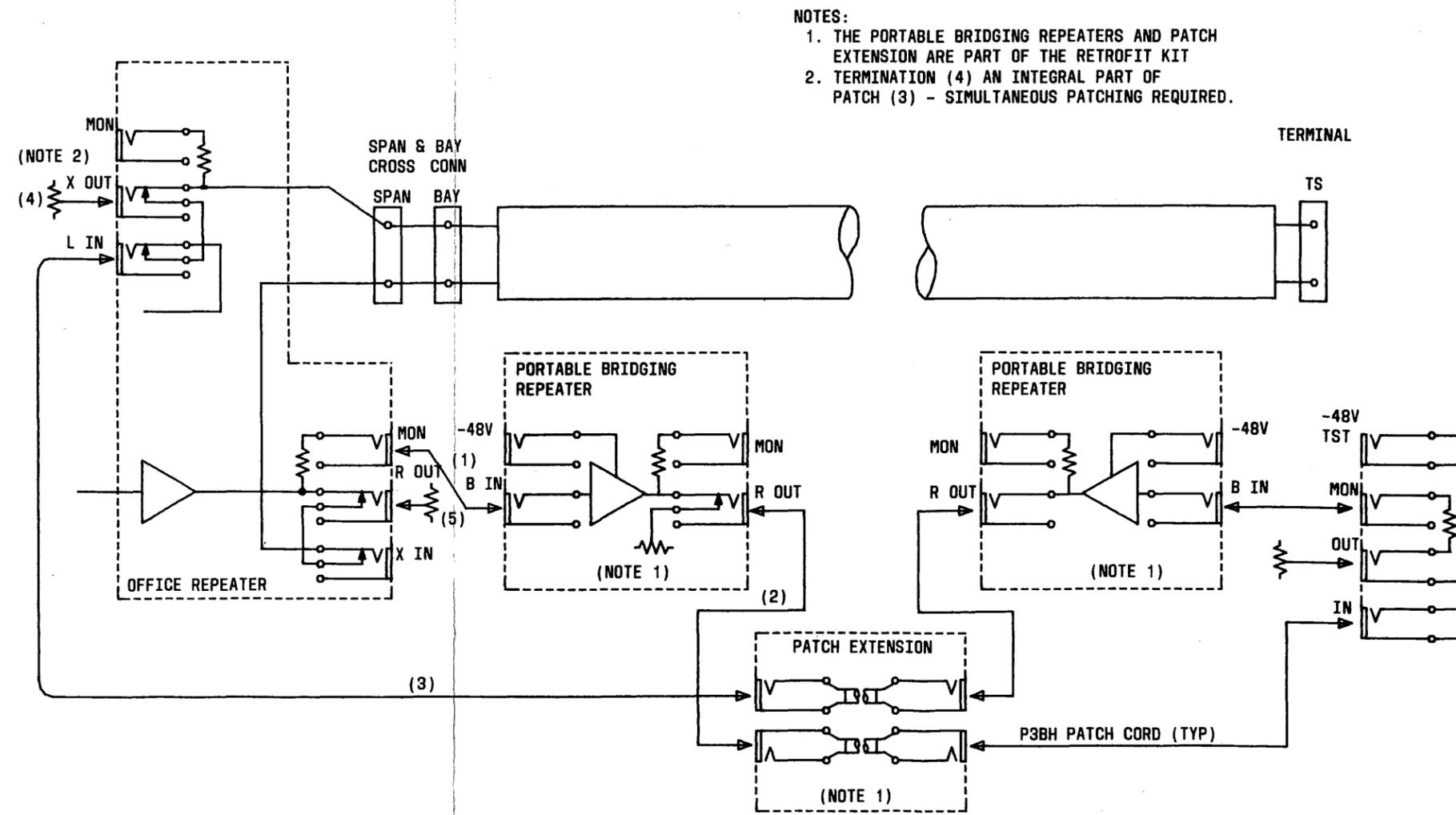
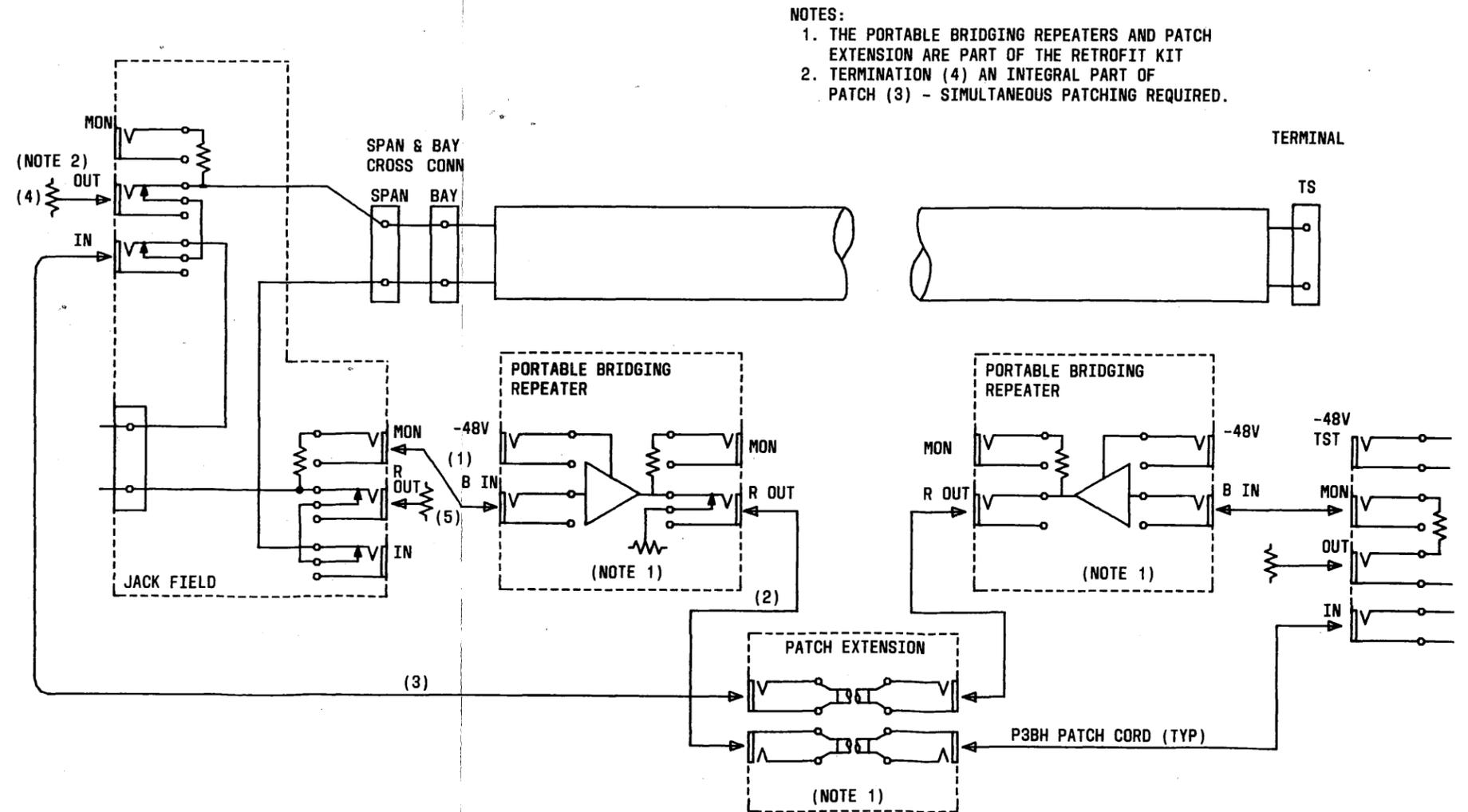
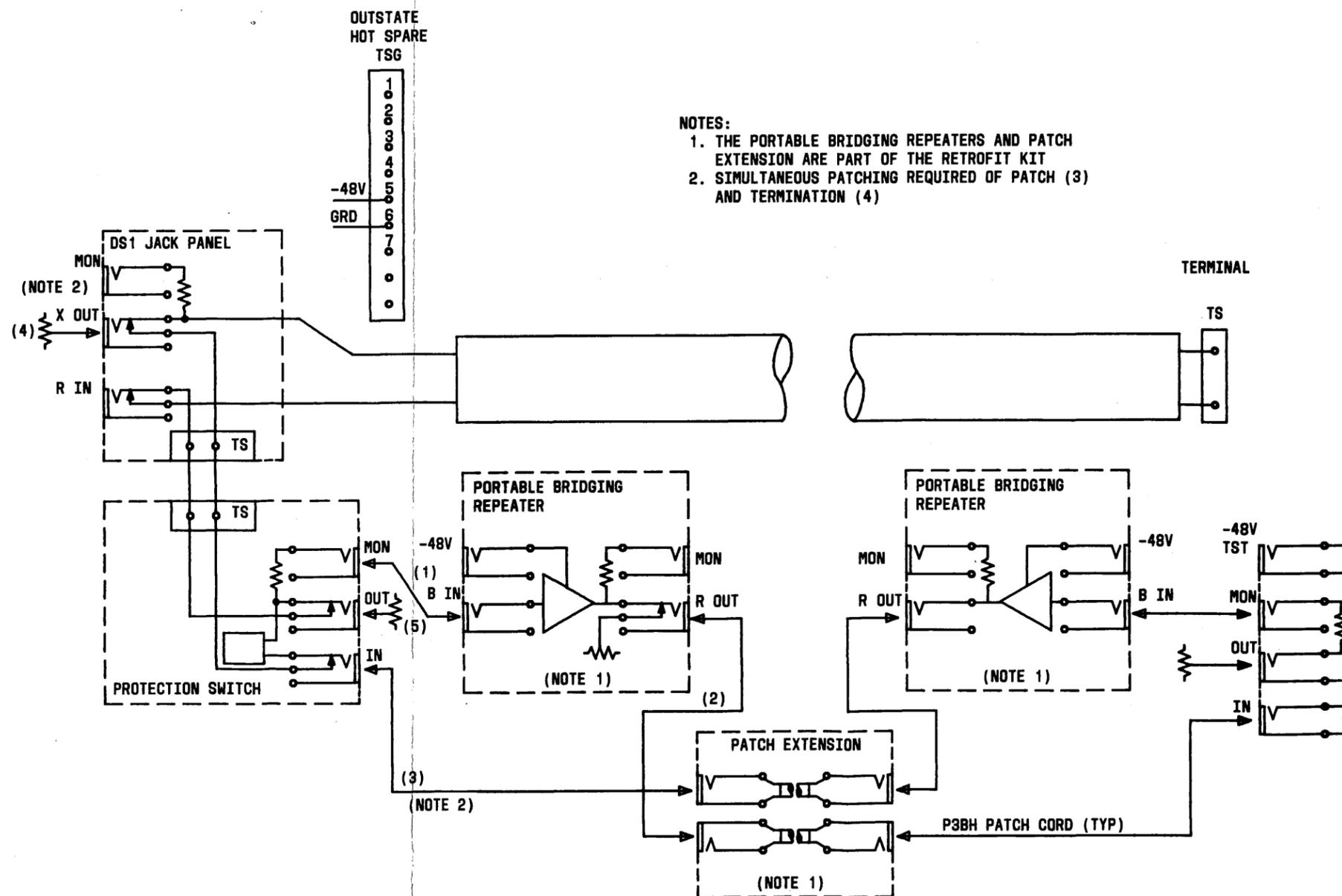


Fig. 27—206 Office Repeater Bay



- NOTES:
1. THE PORTABLE BRIDGING REPEATERS AND PATCH EXTENSION ARE PART OF THE RETROFIT KIT
  2. TERMINATION (4) AN INTEGRAL PART OF PATCH (3) - SIMULTANEOUS PATCHING REQUIRED.

Fig. 28—T1C/T1 Office Repeater Bay



- NOTES:
1. THE PORTABLE BRIDGING REPEATERS AND PATCH EXTENSION ARE PART OF THE RETROFIT KIT
  2. SIMULTANEOUS PATCHING REQUIRED OF PATCH (3) AND TERMINATION (4)

Fig. 29—T1 Outstate Span Terminating Module



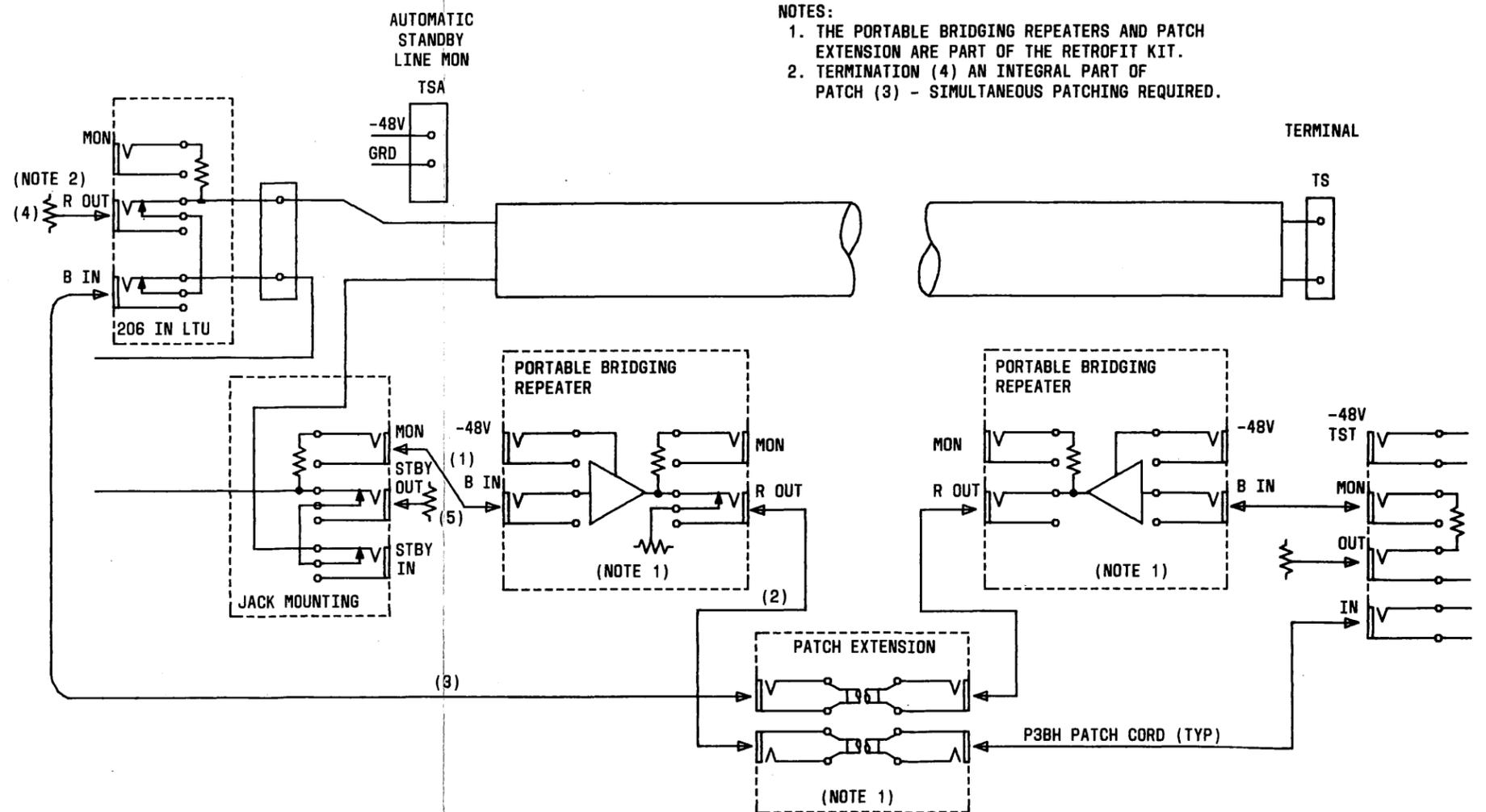


Fig. 31—Automatic Standby Unit (Standby T1 Line)