DIGITAL TRANSMISSION SYSTEMS

T1 DIGITAL LINE

INITIAL OVERALL LINE TESTS

CONTENTS PAGE

1. GENERAL

1.01 This section contains the initial tests of T1 digital lines. Separate procedures are provided for the initial checks of the office repeater bays (ORBs), transmission tests of span lines, and for establishing the fault locate circuit.

1.02 This section is reissued to include the T1C/T1 ORB, T1C/T1 test equipment, and to provide a procedure for establishing the fault locate circuit. Since this reissue is a general revision, arrows to denote changes have been omitted. This reissue does not affect the Equipment Test List.

1.03 The tests in this section should be conducted after Western Electric Company turns over the equipment and before the Telephone Company places the equipment in service. No span shall be placed in service until all tests specified have been made, including the maintenance line, the order wire, and the fault locating pairs. This may be difficult to accomplish if the Telephone Company requests advance turnover of a portion of the total job. In this case, the central office will have to regulate its testing schedule to comply with local conditions.

2. APPARATUS

2.01 The following (or equivalent) apparatus is required to perform the procedures in Tests B and C. This apparatus is required at each office performing the tests. Operation and maintenance instructions are contained in the sections listed after each test set.

1—J98725AF Quasi-Random Signal Source (QRSS)—Section 103-494-105 or J98710R Quasi-Random Signal Source (QRSS)—Section 103-493-104 (See Note)

1—J98725AC Office Bipolar Violation Detector (OBVD)—Section 103-494-100 or J98710G Error Detecting Set (EDS)—Section 103-490-100 or 103-490-101

1—J98725AD Fault Locate Test Set (FLTS)—Section 103-494-106 or J98710F Fault Locating Set (FLS)—Section 103-491-100

1—J94003-Type Noise Measuring Set (NMS)—Section 103-611-100 (3A NMS) or 103-611-101 (3C NMS).

1—KS-14510 Volt Ohm-Milliammeter (VOM)—Section 100-520-101

1—KS-19353, L4, Oscillator (OSC)—Section 103-302-106

1—HP-3555B Transmission and Noise Measuring Set (TNMS)

1—P3BH Cord

1—3W14A Cord

1—3P13A Cord for 3A NMS

1—3P17A Cord for 3C NMS

1—3P17B Cord for 3A NMS

Note: If a QRSS is not available, an FLTS or FLS may be used to supply a signal to the line under test.

3. TESTS

A. Initial Checks

3.01 The initial checks in this test must be completed after the ORBs are installed to check office and ORB wiring. Initial procedures are also provided for installing equalizers (T1C/T1 ORB only), establishing maintenance lines, and checking associated equipment. These checks are independent and may be made in any sequence.

STEP	PROCEDURE

Visual Inspection of ORB

All ORBs

1 Make overall visual inspection of the bay (front and back) for any physical damage, obvious arrangement disorders, and installation debris.

Note: On the T1C/T1 ORB, remove the protective plastic cover at the back of the repeater shelf if it is obstructing view.

2 On each shelf and panel, inspect connectors for damage, looseness, or other abnormal conditions.

3 Ensure that the frame ground bus (No. 6 wire) is connected to office ground.

4 Ensure that the ground bus is securely clipped to the side of the bay and that each ground wire attached to it from the bay shelf wiring is wrapped and soldered at the bus.

Repeater Bay Wiring

Note 1: Pairs in ABAM cable are often split due to improper splicing procedures. It is difficult to locate split pairs after the connections have been made; however, if it appears that poor splicing procedures have been followed, all pairs in the cable should be checked per Section 365-227-500.

Note 2: One example of normal pair arrangement and two of split pairs are given in Fig. 1. The first example (Fig. 1A) shows normal pair arrangement. The second example (Fig. 1B) shows that the white conductor of Pair 2 is incorrectly connected to terminal 2 at both ends, while the white conductor of Pair 1 is connected to terminal 4 at both ends. Even though normal continuity will be detected from the ORB to the main distributing frame (MDF), the two pairs are split. In the third example (Fig. 1C), the pairs are connected incorrectly, but this time a discontinuity will be detected between terminals 2. Likewise, a discontinuity will be detected at terminals 4. If only the wires connected to

STEP	PROCEDURE

terminals 2 and 4 at the ORB are reversed in order to correct the split, continuity will be measured. However, an undesirable split will still exist.

Note 3: New office cable coded 606B through 611B may be used for T1. These cables are available in 6- (606B), 11- (607B), 16- (608B), 25- (609B), 50- (610B), and 100- (611B) pair sizes. These cables are the same as standard ABAM cables except each conductor in the new cable is ink-marked with the color of its mate to prevent split pairs during installation. The 606B through 611B cables were previously designated as CA-6075 cable.

T1C/T1 and 206 ORB

5a Ensure that separate shielded (25-pair ABAM, 50-pair ABAM, 609B, or 610B) cables are used for opposite directions of transmission from the vertical side of the MDF to the distributing terminal strip (DTS) at the top of the repeater bay. See Fig. 2 (206 ORB) or Fig. 3 (T1C/T1 ORB).

Note: The stripped length and dress of leads from the ABAM, 609B, or 610B cable to the DTS at the top of the bay shall be as short as possible. The stripped portion of the transmit and receive pairs shall not be exposed to each other. At the MDF, the cable shall be butted immediately above the first breakout of leads to ensure minimum exposure of unshielded wire and to maintain normal twist requirements of paired wires.

6a Check that both cable sheaths have been cut back and taped per ED-97270-10 at the MDF and are grounded at the DTS according to Fig. 2 or 3.

7a If the office is equipped with a DSX-1 or central cross-connect cabinet, ensure that the entire span cross-connect is cross-wired to the bay cross-connect on 206 ORB.

Note: The T1C/T1 DSX dedicated ORB is not equipped with a span and bay cross-connect.

8a Ensure that shielded cable (ABAM, 609B, or 610B) is used to connect the bay cross-connect field (206 ORB) or jack field interface terminal strip (T1C/T1 ORB) to the DSX-1 or central cross-connect cabinet.

9a Check that the cable shield is connected to ground at the ORB end only and is cut back and taped per ED-97270-10 at the DSX-1 or cross-connect cabinet (see Fig. 2 or 3).

Note: All system cross-connections should be completed at the DSX-1 or central cross-connect cabinet regardless of the location of the equipment.

10a If the office is not equipped with a DSX-1 or central cross-connect cabinet, ensure that the bay cross-connect is connected to the data banks, D-type banks, or other repeater bays not in the same lineup.

Note: The span cross-connect is used for connecting to repeater bays in the same lineup.

STEP	PROCEDURE

201 ORB

5b If the cable from the ORB is terminated on the horizontal side of the MDF, check that cross-connections from the horizontal to the vertical side have been made with shielded jumpers (Fig. 4).

6b Ensure that the sheaths on the horizontal side are cut down to the sleeve punchings and that the sheaths on the vertical side of the MDF are cut back and taped per ED-97270-10 (see Fig. 4).

7b Ensure that separate shielded cables (ABAM, 609B, or 610B) are used for opposite directions of transmission from the MDF horizontal to the DTS at the top of the repeater bay.

8b Ensure that the sheaths have been cut down to the sleeve punchings at the MDF horizontal and grounded at the DTS per Fig. 4.

9b Check that connections from the DTS to terminal strip A (TS A) are made with shielded pairs in separate jacketed 753A cables (24 conductors). The cable sheaths should be grounded at both ends per Fig. 4.

10b If the office is equipped with a DSX-1 or central cross-connect cabinet, all span terminating assemblies (STAs) should have a corresponding bank terminating assembly (BTA).

Note: Connections from the BTA to the cross-connect cabinet should be made with shielded cable (ABAM) and should be grounded at the BTA per Fig. 4.

Equalizer Installation

Note: Equalizers are required in all T1C/T1 ORBs and on all 206 and 236 extended cross-connect package (EXCP) repeaters. In the T1C/T1 DSX dedicated ORB, one equalizer is required for each shelf and one for each bridging repeater (position 26). For the T1C/T1 DSX optional ORB, an equalizer is required for each repeater position.

T1C/T1 DSX Dedicated ORB

1a Install an ED-3C585-30, G1 equalizer into the connector in back of position 26 (bridging repeater position).

2a Determine from the following the group number of the ED-3C765 equalizer required for the remaining repeater positions.

CABLE LENGTH IN FEET TO DSX	ED-3C765 EQUALIZER
0 to 220	Group 1
221 to 440	Group 2
441 to 655	Group 3

STEP	PROCEDURE

3a Install one equalizer into the equalizer slot in each shelf of the ORB.

T1C/T1 DSX Optional ORB

1b Install an ED-3C585-30, G1 equalizer into the connector in back of position 26 (bridging repeater position).

2b Determine from the following the group number of the ED-3C585-30 equalizer required for the remaining repeater positions.

OFFICE ARRANGEMENT	CABLE LENGTH IN FEET	ED-3C585-30 EQUALIZER
Without DSX-1	0 to 220	Group 1*
With DSX-1	0 to 220	Group 1*
	221 to 440	Group 2
	441 to 655	Group 3

* Position 26 for bridging repeater is always equipped with a Group 1 equalizer for all cable lengths in applications with or without a DSX-1.

3b Install selected equalizers into the connectors in back of all repeater positions except position 26.

1c Refer to Section 365-222-200 for installation of equalizers in the 206 and 236 EXCP repeaters.

Office Repeater Assignments

Note 1: For bidirectional line repeater operation, T1 carrier spans are arranged in 25-system complements which are associated with one apparatus case. For unidirectional line repeater operation, the spans are arranged in 50-system complements and these systems are associated with two apparatus cases, one case for the transmit direction and one case for the receive direction. Typical system arrangements are shown in Fig. 5 (T1C/T1 DSX optional ORB), Fig. 6 (T1C/T1 DSX dedicated ORB), Fig. 7 (206 ORB), and Fig. 8 (201 STA).

Note 2: Whenever an office is equipped with both STAs and ORBs, care must be exercised in through systems to prevent the violation of the following basic assignment restrictions.

1 Ensure that apparatus case complements are not split between an STA and ORB.

2 Ensure that only one type of office repeater is associated with an apparatus case complement. For example, if the first system in an apparatus case complement is terminated in a 201B

STEP	PROCEDURE

repeater, all systems in that case must terminate in 201B repeaters or the electrically equivalent repeaters.

3 Ensure that all apparatus cases in the same route between two offices are terminated in the same type of office repeater.

Note: The only exception to this rule is the case where a change is made from STAs to ORBs. However, the above rules apply in this situation also, so that once a system is terminated in a T1C/T1 or 206 ORB, all subsequent systems from that apparatus case should be terminated by the same type repeater.

4 Check that the unused sides of all 201- and 208-type repeaters (201 STA) have a tip-to-ring short on the output.

Note: This can be accomplished with either a 349A shorting plug in the OUT jack or a strap between the T and R punchings of TS A on the STA.

Maintenance Lines

Note 1: The maintenance line provides a line on which an inoperative or noisy repeatered line can be made good. When not in use, it is imperative that the maintenance line be provided with a good pulse input from a QRSS, a working line (through a bridging repeater), or an unassigned terminal. This input signal will prevent the nonintegrated circuit 201- and 205-type repeaters from oscillating which can cause ***system interference.*** The incoming side of the maintenance line must be terminated to ensure that oscillations do not occur.

Note 2: Daily tests should be made on the maintenance line per Section 365-225-500 to ensure that it is in proper working condition so that it will be available when needed.

Note 3: A bridging repeater provides a bipolar pulse output by regenerating a signal applied to its input from a QRSS, an unassigned terminal, or a working system. Isolation is provided so that the output of the bridging repeater can serve as a legitimate source of pulses for any maintenance line. The proper use of bridging repeaters in preventing oscillations (in idle systems using nonintegrated circuit type repeaters which may cause errors on other systems) can never be over emphasized.

Note 4: The bridging repeater should be cross-wired to the maintenance line to provide the line with a permanent pulse input when not in use. This eliminates the need for using patch cords for this purpose and ensures that the nonintegrated repeaters in the maintenance line will not oscillate.

T1C/T1 ORB and 206 ORB

1a If a DSX is provided, check for the presence of a 100-ohm resistor on the OUT jack of position 25 on the DSX-1.

STEP	PROCEDURE

2a If a DSX-1 is not provided, check for the presence of a 100-ohm resistor on the R OUT side of the span cross-connect field (206 ORB SD-97080-02), or on the X IN side on the span cross-connect (T1C/T1 ORB SD-3C252-02) associated with the maintenance line.

3a Install the maintenance line repeater into position 25 and bridging repeater into position 26 (slot 13 and 14 of even-numbered shelves, Fig. 5, 6, or 7) per Section 365-222-200.

4a Perform the tests specified in Section 365-222-200, entitled Installation and Testing of Office and Bridging Repeaters.

Note 1: 206P and 206S bridging repeaters are used when the ORB is connected to a DSX-1 cross-connect. The 206C and 206R bridging repeaters are used for all other applications. The 221C and 231C bridging repeaters are used for all applications using the T1C/T1 ORB. The 236P bridging repeater is provided with a DSX/LOCAL option which must be selected depending on the application of the 206 ORB.

Note 2: The bridging repeater should be installed in the ORB in slot 13 of the even-numbered shelf associated with the span being established.

5a Ensure that the bridging repeater is wired to the maintenance line per SD-97080-02 (206 ORB) or SD-3C252-02 (T1C/T1 ORB).

6a Test the maintenance line for errors (Test B).

201 ORB

1b Check for the presence of a 100-ohm resistor connected between T and R or T1 and R1 of TS B of the STA associated with the maintenance line, per SD-97080-01, Note 142.

Note: If this resistor is not connected, a 386B plug (135-ohms) must be inserted into the repeater OUT jack when the maintenance line is not in use.

2b Select a 201L, 201C, or 201F bridging repeater and install it in the proper STA, as determined from the office assignment.

Note 1: The 201L is an integrated-circuit type bridging repeater whereas the 201C and 201F are nonintegrated-circuit types. The 201C and 201F bridging repeaters are electrically identical; they differ only in mechanical design.

Note 2: The slot for the bridging repeater will usually be the last slot on the last available STA at the time of installation of the bridging repeater (Fig. 8).

3b Ensure that the control unit associated with the bridging repeater (located directly below the repeater) is provided with the power option of SD-97080-01-6, Fig. 112 (B), Sketch B.

4b Insert a 0.15 amp slow-blow (70R) fuse in the OFFICE REPEATER fuse socket on the control unit.

STEP	PROCEDURE
5b	Perform the tests specified in Section 365-222-200, entitled Installation and Testing of 201-Type Bridging Repeaters.
6b	Ensure that the bridging repeater is wired to the maintenance line per SD-97080-01, Fig. 19, 20, and 21.
7b	Test the maintenance line for errors (Test B).
	Associated Equipment
	Order Wire For Each New Span
1	Ensure that operation of order-wire circuitry is verified, including the ability of personnel at repeater locations to get a dial tone and to signal the office (J98710E—Section 365-320-500 or J98725H—Section 365-325-100). ***Note:*** A class AC change in the J98710E order-wire circuit is available for units manufactured before the second quarter of 1972 and which experience excessive hum. This modification is standard with List 6 and C of the J98710E-1 order-wire circuit.
2	Ensure that all jacks for the order wire are properly labeled.
	MDF Visual Checks
3	Check that carbons are not pitted.
4	Ensure that red protectors are installed for systems being turned up for service.

B. Initial Line Transmission Test

3.02 T1 digital lines should always be supplied with a bipolar signal to maintain stable line operation. This signal can be supplied by a QRSS, a working line through a bridging repeater, or an unassigned terminal. The QRSS generates a stringent repetitive word that may cause a marginal digital line to transmit errors. Thus, lines which are found to have acceptable error rates while transmitting a quasi-random signal have been tested more rigorously than lines transmitting other signals.

3.03 Depending on the system layout, digital lines can consist of a single span or several spans connected through intermediate offices. Accordingly, overall line tests may be conducted on a single- or multiple-span basis.

3.04 The initial overall line transmission test is performed after repeaters and control units have been installed and the line is fully powered. This test is performed once in each direction of transmission for one-cable (bidirectional) operation and twice in each direction for two-cable (unidirectional) operation.

3.05 For the purpose of this test only, designate one end of the line under test as the transmitting end and the other as the receiving end.

STEP	PROCEDURE

Transmitting End

1 Ensure that a bipolar signal is being supplied to the line under test (see 3.02).

Note: If a signal is not being supplied to the line, proceed to Step 2; otherwise, proceed to Step 5.

2 If the FLTS or FLS is to be used to supply a signal to the line, plug the -48V cord of the FLTS or FLS into a -48V TST jack on the jack mounting panel or DSX-1 maintenance panel.

3a If the office is equipped with a DSX-1, patch the output of the QRSS, FLTS, or FLS to the IN jack of the line under test on the DSX-1.

Note: The connections of Steps 3b and 3c supply a signal to the line in one direction of transmission. To supply a signal in the other direction at an intermediate office where a T1C/T1 or 206 ORB is tied to one span and a 201 ORB is on the other span and a BTA is not available, patch the output of a QRSS, FLTS, or FLS to the X IN jack at the T1C/T1 or 206 ORB.

3b If the office is not equipped with DSX and the ORB is a 201-type, patch the output of a QRSS, FLTS, or FLS to the SPAN IN jack on the BTA of the line under test.

Note: At some intermediate offices, the line appears at the IN jack on the STA.

3c If the office is not equipped with DSX and the ORB is a T1C/T1 or 206-type, patch the output of a QRSS, FLTS, or FLS to the L IN jack on the jack field (T1C/T1 ORB) or on the repeater (206 ORB) of the line under test.

4 On the FLTS or FLS (if being used to supply a signal), set the switches as follows:

SWITCH DESIGNATION	SWITCH POSITION
J98725AD	
PULSE DENSITY	11 REF
FUNCTION	BI-POLAR SIGNAL
CLOCKRATE	T1
J98710F	
PULSE PERIOD	REF
FUNCTION	BI-POLAR SIGNAL

STEP	PROCEDURE
5	Notify the receiving end to proceed with Step 6.
	Receiving End
6	Connect the -48V cord of the OBVD or EDS to a -48V TST jack on the jack panel or DSX-1 maintenance panel.
7	Connect one end of a P3BH cord to the SIG IN jack (OBVD) or IN jack on the EDS.
8a	If the office is equipped with a DSX-1, connect the free end of the P3BH cord to the MON jack of the line under test.
8b	If testing at a 201 ORB without a DSX, connect the free end of the P3BH cord to the MON jack on the side of the associated BTA or STA assigned to the receiving direction.
8c	If testing a 206 ORB without a DSX, connect the free end of the P3BH cord to the MON jack located below the X IN jack on the repeater.
8d	If testing at a T1C/T1 ORB without a DSX, connect the free end of the P3BH cord to the MON jack located below the X IN jack on the jack field. ***Note:*** The receiving side of the repeater should be terminated by a 386B plug or cross-connected to another line or a terminating resistance.
9a	If an OBVD is used, observe the SIGNAL LOSS and BIPOLAR VIOLATIONS lamps for 1 or 2 minutes; then proceed to Step 11. ***Requirement:*** SIGNAL LOSS and BIPOLAR VIOLATIONS lamps are extinguished. ***Note:*** These lamps must ***not*** light or flash. A single flash indicates an error or a short burst of errors on the line.
9b	If an EDS is used, set the PULSES-ERRORS switch to PULSES and observe the indicating lamp. ***Requirement:*** The lamp is either lighted continuously or with a slight flicker. ***Note:*** Failure of the indicating lamp to light indicates the absence of pulses on the line.
10	Set the PULSES-ERRORS switch to ERRORS and observe the lamp for a period of 1 to 2 minutes. ***Requirement:*** The lamp is extinguished. ***Note:*** The lamp must ***not*** flash. A single flash indicates an error or a short burst of errors on the line, and a flickering lamp indicates a larger burst of errors.

STEP	PROCEDURE
11	If the requirements of Steps 9 and 10 are not met, locate the malfunctioning span line by repeating Steps 6 through 10 at the receiving end of each span. Locate the trouble within the span according to Section 365-227-500.
12	If the requirements of Steps 9 and 10 are met, remove the cord from the MON jack.
13	Record the test results on T Carrier Span Profile Form E-6900 (front), Fig. 9. ***Note:*** A blank Form E-6900 (front), Fig. 10, may be used for local reproduction.
14	Repeat Steps 1 through 13 for the other direction of transmission.
15	If the line under test is to be used in the Digital Data System (DDS), perform the tests specified in Section 365-228-500.

C. Establish Passive Fault-Locate Line

3.06 To establish a fault-locate line, the fault-locate filters are installed in the ORB, line measurements are made, and the test results are recorded on Form E-6900 (back), Fig. 11, and on the Initial Fault Line Tests Form E-6988 (Fig. 12).

> ***Note:*** A blank Form E-6900 (back), Fig. 13, and Form E-6988, Fig. 14, may be used for local reproduction.

3.07 The fault-locate circuit tests are used to record levels for future reference and to check the operation of the fault locating system only. For locating troubles in a T1 digital line, refer to Section 365-227-500. The fault-locate circuit may include one or more spans up to the full length of a line, depending on the system layout. In general, each span has its own fault-locate circuit. These circuits are normally through unattended offices where short spans are involved.

> ***Note:*** If a line repeater is replaced, the recorded levels could change as much as ±5 dB. Therefore, these tests should be made when establishing a fault-locate line and any time that a line repeater is replaced.

3.08 This test is performed once in each direction of transmission; therefore, measurements must be made from both ends of the line. If the line includes more than 12 repeaters, two fault-locate circuits are used, both of which are terminated on the same jack mounting at each end of the lines.

3.09 The fault-locate circuit test is begun with the section (cable section plus the repeater following it) closest to the central office. The sequence of the 598-type filters (466- or 468-type apparatus cases) or the 1068-type filters (475A or 475B apparatus cases) assigned to each section and their assignment to the fault-locate circuit must be obtained from Form E-1900 or E-6988.

3.10 When testing the fault-locate circuit, it is imperative that all lines sharing a fault-locate pair be provided with a good bipolar signal from a QRSS, a working line through a bridging repeater, an unassigned terminal, or an extra FLS. This input signal will prevent nonintegrated circuit 201- and 205-type line repeaters from oscillating, which makes testing of the fault-locate circuit difficult, if not impossible.

STEP	PROCEDURE

Office Fault-Locate Filters

T1C/T1 ORB

1a Check the span line record card (SLRC), Form E-4941, to determine if the ORB is to be equipped with a 1068-type plug-in fault-locate filter.

Note 1: If an office fault-locate filter is not required (ORB is not included in the fault-locate plan), no action is required. Proceed to Step 3a. If an office fault-locate filter is required (ORB is included in the fault-locate plan), proceed to Step 2a.

Note 2: Switches S1 through S4 (DSX optional ORB, Fig. 15) or S1 through S6 (DSX-dedicated ORB, Fig. 16) provide a low impedance termination for the fault-locate output of the office repeater when fault-locate filters are not installed.

2a Install a 1068-type filter for shelf being equipped.

3a From Form 4941, determine if the line repeaters are bidirectional or unidirectional in operation.

4a If the line repeaters are unidirectional, ensure that option Y (Fig. 15 or 16) is provided and that option Z is not provided.

5a If the line repeaters are bidirectional, ensure that option Z (Fig. 15 or 16) is provided and that option Y is not provided.

Note: Option Y (for unidirectional operation) is provided at the factory.

6a Ensure that no fault-locate filter is multipled to more than 25 repeaters with one- or two-cable/bidirectional line repeater operation or to more than 50 repeaters with one- or two-cable/unidirectional line repeater operation.

Note: A complement of 25 repeaters for bidirectional operation or 50 repeaters for unidirectional operation corresponds to one full-line apparatus case.

7a On multiple case routes, ensure that the fault-locate pair for each case is connected only to the filter associated with that case and not multipled to any other filter.

Caution: Improperly terminated or open fault-locate circuits will result in noise and/or failures of working systems.

8a Check for correct labeling associated with the fault-locate circuit.

206 ORB

1b Check Form E-4941 to determine if the ORB is to be equipped with a 598-type fault-locate filter.

STEP	PROCEDURE

2b If an office fault-locate filter is not required (ORB is not included in the fault-locate plan), ensure that punchings 9 and 10 associated with the first repeater on each shelf have been strapped together on Jack J1 (located behind each repeater). See Fig. 17.

Note: These straps are initially provided when the ORB is shipped and are known as the W option on SD-97080-02.

3b If an office fault-locate filter is required (ORB is included in the fault-locate plan), ensure that the straps have been removed from punchings 9 and 10 on the first repeater of each shelf associated with a fault-locate filter (see Fig. 17).

4b Ensure that all punchings 9 and 10 are multipled together on each shelf.

5b Ensure that punchings 9 and 10 of jack J1 are wired to pins 4 and 3, respectively, of the 598-type fault-locate filter.

6b Check that no fault-locate filter is multipled to more than 25 repeaters with one- or two-cable/bidirectional line repeater operation or to more than 50 repeaters with one- or two-cable/unidirectional line repeater operation.

Note: A complement of 25 repeaters for bidirectional operation or 50 repeaters for unidirectional operation corresponds to one full-line apparatus case.

7b On multiple case routes, ensure that the fault-locate pair for each case is connected only to the filter associated with that case and not multipled to any other filter.

Caution: Improperly terminated or open fault-locate circuits will result in noise and/or failures of working systems.

8b Check for correct labeling associated with the fault-locate circuit.

201 ORB

1c Check Form E-4941 to determine if the ORB is to be equipped with a 598-type fault-locate filter.

2c If an office fault-locate filter is not required (ORB is not included in the fault-locate plan), ensure that punchings 7 and 13 are strapped together on all TS As of STAs not associated with filter (see Fig. 18).

3c If office fault locating filters are required (ORB is included in the fault locating plan), ensure that punchings 7 and 13 of TS As of the STAs associated with filters are ***not*** strapped together.

4c Ensure that punchings 7 and 13 of TS As of the STAs associated with filters are wired to punchings 3 and 4 of the 598-type fault-locate filter (Fig. 17).

5c Ensure that no fault-locate filter is multipled to more than 25 systems with one- or two-cable/bidirectional line repeater operation or to more than 50 systems with one- or

STEP	PROCEDURE

two-cable/unidirectional line repeater operation, corresponding to one full-line apparatus case.

6c On multiple case routes, ensure that the fault-locate pair for each case is connected only to the filter associated with that case and is not multipled to any other filter.

7c Straps are provided on punchings 7 through 12 and 13 through 18 on TS A of each STA (SD-97080-01) for the six repeaters of the STA. When an STA must be split to complete a 25-system complement, ensure that the proper straps have been removed to obtain correct association of office repeaters with fault-locate lines.

Note: A typical arrangement when an STA must be split is shown in Fig. 8.

Caution: Improperly terminated or open fault-locate circuits will result in noise and/or failures of working systems.

8c Check for correct labeling associated with the fault-locate circuit.

Initial Fault-Locate Line Test

1 Ensure that all lines sharing the fault-locate pair have a proper signal .

2 Check that all lines sharing the fault-locate pair are properly terminated at both ends for one-cable (bidirectional) operation and at the far end for two-cable (unidirectional) operation.

Note: Proper terminations can be provided by a digital line, D-type bank, or 386B plug (or equivalent 100 ohms) in the OUT jack of 201 STA or the R OUT jack of 206 or 236 repeaters or T1C/T1 ORB.

3 Ensure that all unassigned office repeaters sharing the fault-locate pair have an input signal from a QRSS.

DC Tests

4 Insert the 310 plug of the 3W14A cord into the jack of fault-locate line to be tested.

5 Connect the red (+) VOM test lead to the white lead of the 3W14A cord and the black (-) VOM lead to ground, and read the meter.

Requirement: Less than 5 ohms

6 If the requirement of Step 5 is met, proceed to Step 7. If not, check the fault-locate line for proper ground per SD-97080-01 (201 ORB), SD-97080-02 (206 ORB), SD-3C771-01 (T1C/T1 DSX dedicated ORB), or SD-3C252-02 (T1C/T1 DSX optional ORB).

7 Set the VOM to the highest DC VOLTS scale.

8 Connect the red VOM lead to the red lead (tip) of the 3W14A cord and the black VOM lead to the black lead (ring) of the 3W14A cord.

STEP	PROCEDURE
9	Decrease the VOM setting step-by-step until an on-scale reading is obtained. ***Requirement:*** Voltage reading is less than 10 volts.
10	If the requirement of Step 9 is met, record T-R foreign voltage in block 3 of Form E-6988 (Fig. 12); if the requirement is not met, refer to Section 365-227-500.
11	Set the VOM to the highest DC VOLTS scale.
12	Connect the black VOM lead to the white lead (grd) of the 3W14A cord.
13	Decrease the VOM switch setting step-by-step until an on-scale reading is obtained. ***Requirement:*** Voltage reading is less than 10 volts
14	If the requirement of Step 13 is met, record T-GRD foreign voltage in block 3 on Form E-6988. If the requirement is not met, refer to Section 365-227-500.
15	Set the VOM to the highest DC VOLTS scale.
16	Connect the red VOM lead to the black lead (ring) of the 3W14A cord.
17	Decrease the VOM switch setting step-by-step until an on-scale reading is obtained. ***Requirement:*** Voltage reading is less than 10 volts
18	If the requirement of Step 17 is met, record R-GRD foreign voltage on Form E-6988. If not, refer to Section 365-227-500.
19	Connect the black VOM lead to the red lead (tip) of the 3W14A cord.
20	Set the VOM switch to the OHM scale and obtain an on-scale reading.
21	Have the far-end office insert a 258G dummy plug into the fault-locate line jack and read the VOM meter scale. ***Requirement:*** T-R leakage resistance is greater than 1 megohm
22	If the requirement of Step 21 is met, record the T-R leakage resistance in block 3 of Form E-6988; if not, refer to Section 365-227-500.
23	Connect the red VOM lead to the white lead (grd) of the 3W14A cord and read the meter scale. ***Requirement:*** T-GRD leakage resistance is greater than 0.5 megohm
24	If the requirement of Step 23 is met, record T-GRD leakage resistance on block 3 of Form E-6988; if not, refer to Section 365-227-500.

STEP	PROCEDURE

25 Connect the black VOM lead to the black lead (ring) of the 3W14A cord.

Requirement: R-GRD leakage resistance is greater than 0.5 megohm

26 If the requirement of Step 25 is met, record R-GRD leakage resistance in block 3 of Form E-6988; if not refer to Section 365-227-500.

27 Have the far-end office remove 258G dummy plug from the fault-locate line jack.

28 Connect the red VOM lead to the red lead (tip) of the 3W14A cord and read the meter scale.

Requirement: Terminated loop resistance is within limits specified by engineering in block 3 on Form E-6988.

29 If the requirement of Step 28 is met, record the measured value on Form E-6988 in the area labeled TERM LOOP RES-MEAS and on Form E-6900 (Fig. 11) in area labeled LOOP RESISTANCE.

30 Have the far-end office insert a 386B plug into the fault-locate line jack of the line under test.

31 Read the VOM scale.

Requirement: 840 to 890 ohms less than that recorded in Step 29.

32 If the requirement of Step 31 is met, record the measured value in the block 3 area labeled LOOP RES—386B-MEAS.

33 If the requirement of Step 31 is not met, have the far-end office check the fault-locate line for the correct termination.

34 Remove all test connections and plugs.

Transmission Loss Test

Note: For the purpose of this test only, designate one end of the FL line under test as the transmitting end and the other as the receiving end.

Transmitting End

1 Using a P3BH cord, connect a KS-19353, L4 OSC to the FL jack of the line under test.

2 Set the slide switch on the left side of the OSC to AC and connect the power cord to 115V AC.

STEP	PROCEDURE

3 Set the OSC controls as follows:

CONTROL		POSITION
POWER	to	ON
OUTPUT LEVEL	to	0 DBM
FUNCTION	to	900
FREQ RANGE	to	X 100
FREQUENCY/CPS	to	8.32

Receiving End

4 Using a P3BH cord, connect a HP-3555B TNMS to the FL jack of the line under test.

5 Connect the power cord of the TNMS to 115V AC.

6 Set the controls on TNMS as follows:

CONTROL		POSITION
POWER	to	ON
RESPONSE	to	NORM
NOISE WTG	to	TMS/TERM
FUNCTION/VF	to	900 BAL
RANGE	to	Midscale

7 Read the TNMS meter and record the indication of Form E-6988 in block 6 under POLARITY I in MEAS dB column.

Requirement: Within the value recorded in ENGR dB column for 832 Hz.

Transmitting End

8 Set the FREQUENCY/CPS control on the OSC to 24.13.

Receiving End

9 Record the TMNS meter indication on Form E-6988.

Requirement: Within value recorded in ENGR dB column for 2413 Hz.

STEP	PROCEDURE

Transmitting End

10 Set the FREQUENCY/CPS control on the OSC to 30.17.

Receiving End

11 Record the TMNS meter indication on Form E-6988.

Requirement: Within value recorded in ENGR dB column for 3017 Hz.

12 If the requirements of Steps 7 through 11 are not met, consult with engineering for possible changes in furnished values. If values have been verified, refer to Section 365-227-500. If the requirement is met, proceed to Step 13.

Note: Polarity 2 of block 6 is used for active FL lines only.

13 Disconnect all test equipment.

Noise and Tone Level Tests

Note: All data obtained in this test must be recorded on Form E-6900 (Fig. 11) and on Form E-6988 (Fig. 12).

Broadband Noise Measurement

1 Using a 3P17B cord (3A NMS) or a 3P7C cord (3C NMS), connect the NMS to the FL jack for the line under test.

2 Measure the noise with C-MESSAGE weighting.

Requirement: 14 dBrnc or less.

Note: A widely varying reading indicates an oscillating idle line or a noisy fault-locate pair.

3 If the requirement of Step 2 is met, record the level measured on Form E-6988 (Fig. 11) in area labeled (BROADBAND NOISE) NOISE MEASUREMENT and on Form E-6988 (Fig. 12) in block 7.

4 If the requirement of Step 2 is not met, refer to Section 365-227-500.

5 Remove the connections between the FL jack and the NMS.

Narrowband Noise and Tone Level Measurement

6 Plug the -48V cord of the FLTS or FLS into a -48V TST jack on the jack mounting panel or into a -48V TST jack on the maintenance panel of the DSX-1.

STEP	PROCEDURE

Note: The connections of Steps 7 and 8 supply a signal to the line in one direction of transmission. To supply a signal in the other direction at an intermediate office where a 206 ORB is tied to one span and a 201 ORB is on the other span, patch the FLTS or FLS to the X IN jack of the 206 ORB.

7 If testing at a 201 ORB, using a P3BH cord, patch the GEN SPAN LINE jack (FLTS) or GEN OUT jack (FLS) to the SPAN IN jack of the line on the BTA or the STA.

Note: At some intermediate offices the line appears at the IN jack on the STA.

8 If testing at a T1C/T1 or a 206 ORB, using a P3BH cord, patch the GEN SPAN LINE jack (FLTS) or GEN OUT jack (FLS) to the L IN jack field (T1C/T1 ORB) or on the repeater (206 ORB).

9 If testing at a DSX-1, using a P3BH cord, patch the GEN SPAN LINE jack (FLTS) or GEN OUT jack (FLS) to the appropriate IN jack of line being used for test.

Note: If the maintenance line is being used for test, connect the GEN MON jack (FLTS) or TEST jack (FLS) to the appropriate B IN or BR IN jack. These jacks must be used to provide the proper level to the maintenance line.

10 Using a P3BH cord, patch the RCV FL LINE jack (FLTS) or the FAULT LOC LINE jack (FLS) to the FL jack of the fault-locate line assigned to the first section and filter.

Note: For long span lines where more than one fault-locate pair is involved, patch the FLTS or FLS to the other fault-locate line at the appropriate point in the test and use additional Forms E-6900 and E-6988.

11 If using an FLS, connect the DET jack of the FLS to the IN jack of the NMS with a 3P13A cord (3ANMS) or a 3P17A cord (3CNMS).

12 If using a J98725AD FLTS, proceed to Step 13; if using a J98710F FLS, proceed to Step 39.

Narrowband Noise Measurement Using J98725AD FLTS

13 Set the switches on the FLTS as follows:

SWITCH		POSITION
CLOCK RATE	to	T1
FUNCTION	to	BI-POLAR SIGNAL
PULSE DENSITY	to	11 REF
RECEIVER SENSITIVITY	to	−80

STEP	PROCEDURE

14 Set the FILTER switch to the letter corresponding to the first filter code listed in block 7 of Form E-6988 (Fig. 12).

15 Read the FLTS meter indication on the DBM scale and add to RECEIVER SENSITIVITY setting.

Requirement: -90 dBm or less

Note: -92 dBm is less than -90 dBm

16 If the requirement of Step 15 is not met, refer to Section 365-227-500. If the requirement is met, record the meter indication on Form E-6900 (Fig. 11) in the area labeled TRANSMISSION TEST—BIPOLAR and on Form E-6988 (Fig. 12), block 7, under NOISE BIPOLAR (NARROW BAND).

17 Rotate the FILTER switch to succeeding positions and record the meter indicaion at each position that has a filter installed as in Step 16.

Tone Level Measurement Using J98725AD FLTS

18 Set the FILTER switch to first filter code listed on Form E-6988 for the fault-line to be recorded.

19 Set the RECEIVER SENSITIVITY switch to -60 and FUNCTION switch to MEAS 1 SIGNAL.

20 Add the meter indication on the DBM scale to the RECEIVER SENSITIVITY setting.

Requirement: Within ±6 dB of value provided by engineering on Form E-6988

21 If the requirement of Step 20 is not met, consult with engineering for possible changes in furnished values. If values have been verified, refer to Section 365-227-500. If the requirement is met, record value on Form E-6900 in area labeled FAULT LOCATING RECORD—TRANSMISSION TEST MEASURE 1 and on Form E-6988 in column headed TONE LEVEL, POLARITY 1, MEAS in block 7.

22 Set the FUNCTION switch to MEAS 2 SIGNAL.

23 Add the meter indication on DBM scale to the RECEIVER SENSITIVITY setting.

Requirement: ±2 dB of value recorded in Step 21.

24 If the requirement of Step 23 is not met, refer to Section 365-227-500. If the requirement is met, record value on Form E-6900 in area labeled TRANSMISSION TEST—MEASURE-2.

25 Set the FUNCTION switch to MEAS 3 SIGNAL.

STEP	PROCEDURE
26	Add the meter indication on DBM scale to the RECEIVER SENSITIVITY setting. ***Requirement:*** ±1 dB of value recorded for Step 24.
27	If the requirement of Step 26 is not met, refer to Section 365-227-500. If the requirement is met, record the value on Form E-6900 in area labeled TRANSMISSION TEST—MEASURE-3.
28	Set the FUNCTION switch to MEAS 1 SIGNAL and set the RECEIVER SENSITIVITY switch to obtain on-scale reading.
29	Set PULSE DENSITY switch to 10.
30	Add the meter indication on DBM scale to the RECEIVER SENSITIVITY switch setting.
31	Record value on Form E-6900 in area labeled OBSCURE TROUBLE TEST—PULSE PERIOD 10.
32	Repeat Step 30 and record as in Step 31 for PULSE DENSITY switch setting 9 through 4 if lines are equipped with integrated circuit repeaters or 9 through 6 if lines are equipped with nonintegrated circuit repeaters.
33	Calculate and record the maximum shift from pulse density 10 through 6 or 10 through 4. ***Requirement:*** 1 dB or less for integrated circuit repeaters or 2 dB or less for nonintegrated circuit repeaters.
34	If the requirement of Step 33 is not met, refer to Section 365-227-500.
35	Set FILTER switch to next filter code listed on Form E-6988 and repeat Steps 19 through 34.
36	Repeat Step 35 until all filter locations have been checked.
37	Test all other repeatered lines associated with the fault-locate line under test by repeating Steps 18 through 36. ***Note:*** It is necessary to record data on Form E-6900 for only one service line and the maintenance line.
38	Proceed to Step 64.

STEP	PROCEDURE

Narrowband Noise Measurement Using J98710F FLS

39 Set the controls on the FLS as follows:

CONTROL		POSITION
FUNCTION	to	MEAS 1
REF ADJ	to	1/3 clockwise rotation (Note 1)
MEAS ADJ	to	Fully clockwise
PULSE PERIOD	to	REF
598 FILTER	to	(Note 2)
PATTERN	to	Same as 598-type filter (Note 3)

Note 1: Setting the REJ ADJ to 1/3 rotation instead of fully clockwise will eliminate the need to increase the dBrn setting on the NMS when switching between MEAS and REF during tests.

Note 2: Set the 598 FILTER switch to the letter corresponding to the first filter code listed in block 7, Form E-6988 (Fig. 12).

Note 3: The 1068A through 1068M filters correspond to 598A through 598M filters.

40 Set the controls on the NMS as follows:

CONTROL		POSITION
FUNCTION	to	BRDG
WTG UNIT	to	3 KC FLAT
DBRN	to	On scale reading

41 Turn the DBRN switch on the NMS for an on-scale reading.

Note: A widely varying reading indicates an oscillating idle line or a noisy fault-locate line.

42 Turn the PATTERN dial on the FLS for a peak response on the NMS. Use the monitoring headphone to listen for the fault-locate tones.

Note: To ensure that the set is tuned for peak response, tune the PATTERN dial for a peak indication of the NMS while the FUNCTION switch is set to REF and the 598 FILTER switch is set to agree with the code of the first filter indicated on Form E-6988 (Fig. 12). Repeaking the FLS may be necessary when reading the actual repeater location.

STEP	PROCEDURE

43 Set the FUNCTION switch on the FLS to BIPOLAR SIGNAL and read the meter indication.

Requirement: 0 dBrn or less.

Note: -2 dBrn is less than 0 dBrn.

44 If the requirement of Step 43 is not met, refer to Section 365-227-500. If the requirement is met, record the meter indication on Form E-6900 (Fig. 11) in the area labeled TRANSMISSION TEST—(NB NOISE) BIPOLAR and on Form E-6988 (Fig. 12) in block 7 in the column headed NOISE (NARROW BAND).

45 Rotate the FILTER switch to succeeding filter positions and record the narrowband noise as in Step 44.

Tone Level Measurement Using J98710F FLS

46 Set the FUNCTION switch on the FLS to MEAS 1 position and set the FILTER switch to the letter corresponding to the first filter listed on Form E-6988.

Requirement: Within ±6 dB of value provided by engineering on Form E-6988

47 If the requirement of Step 46 is not met, consult with engineering for possible changes in furnished values. If values have been verified refer to Section 365-227-500. If the requirement is met, record the value on Form E-6900 in area labeled TRANSMISSION TEST MEASURE-1.

48 Set the FUNCTION switch on the FLS to MEAS 2.

Requirement: The meter reading should drop 4 to 8 dB below the value recorded in Step 47.

49 If the requirement of Step 48 is not met, refer to Section 365-227-500. If the requirement is met, record the value on Form E-6900 in the area labeled TRANSMISSION TEST—MEASURE-2.

50 Set the FUNCTION switch on the FLS to MEAS 3.

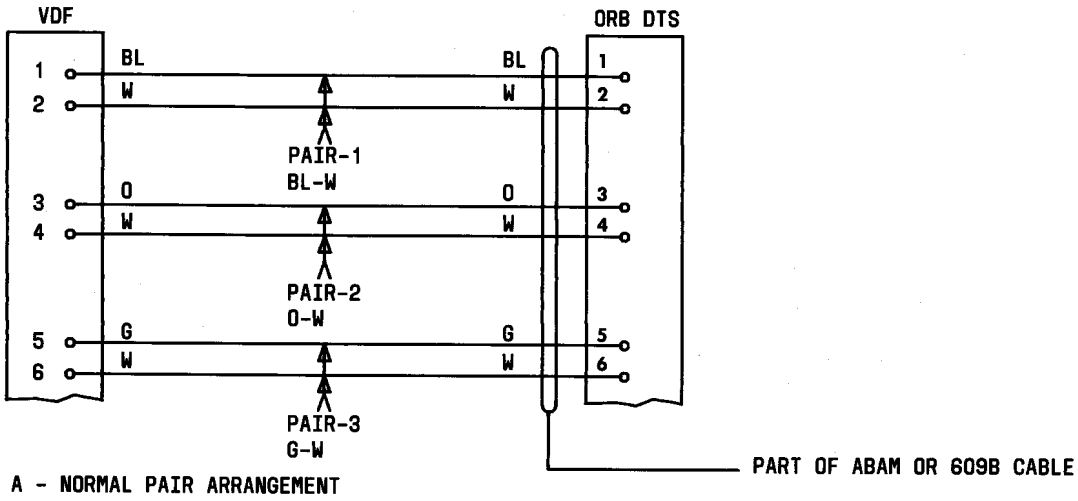
Requirement: The meter reading should not change more than 1 dB from the value recorded in Step 49.

51 If the requirement of Step 50 is not met, refer to Section 365-227-500. If the requirement is met, record value on Form E-6900 in area labeled TRANSMISSION TEST—MEASURE-3.

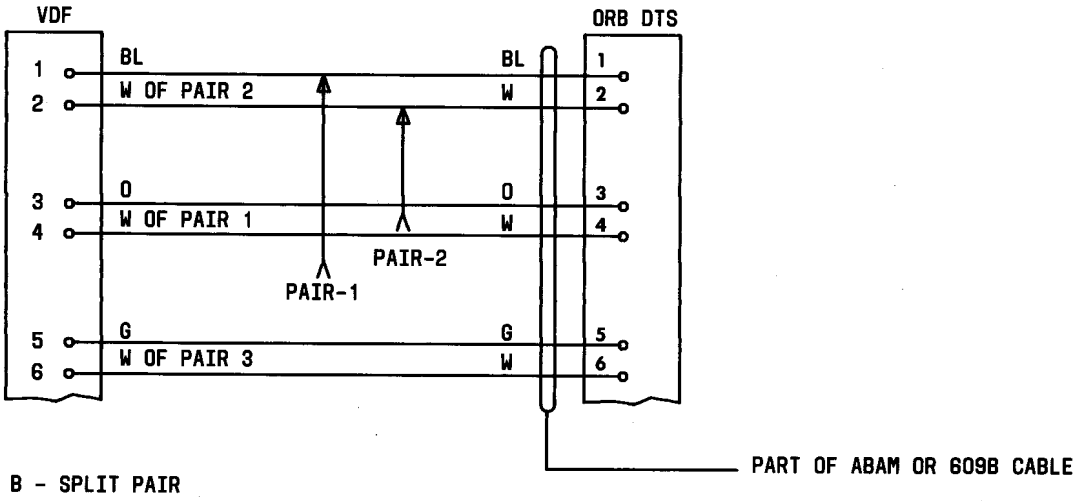
52 Set the FUNCTION switch on the FLS to MEAS 1.

53 Set the 598 FILTER switch and PATTERN dial on the FLS to agree with the filter code in the first section and carefully tune the PATTERN dial for peak response on the NMS meter.

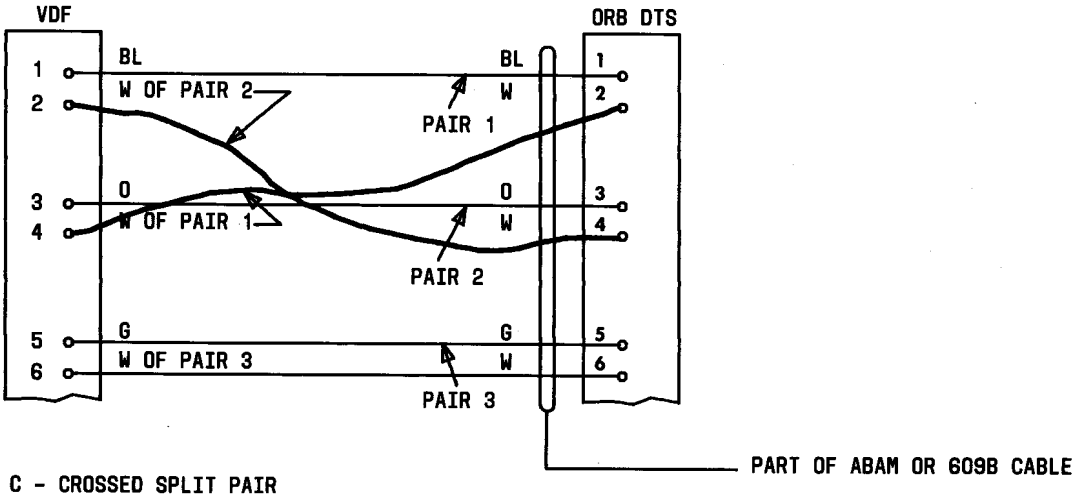
STEP	PROCEDURE
54	Adjust the MEAS ADJ control on the FLS until the meter of the NMS indicates 9 on the scale with the DBRN switch in the highest possible position.
55	Set the FUNCTION switch on the FLS to REF.
56	Adjust the REF ADJ control on the FLS until the NMS meter again indicates a scale reading of 9.
57	Alternate the FUNCTION switch on the FLS between the MEAS 1 and REF positions, noting if the meter indication on the NMS is the same in both positions. If it is not the same, use the REF ADJ control on the FLS to eliminate the difference.
58	Set the PULSE PERIOD switch on the FLS to the next position (from REF to 10 or from 10 to 9, etc).
59	With the FUNCTION switch in the REF position, adjust the MEAS ADJ control for a meter indication of 9. Do ***not*** adjust the REF ADJ control on the FLS. Always use the highest possible MEAS ADJ and DBRN switch positions for this adjustment.
60	Set the FUNCTION switch on the FLS to MEAS 1 and note the deviation, if any, from the reference 9 on the NMS.
61	Record the deviation noted in Step 60 on Form E-6900 (Fig. 11) in area labeled OBSCURE TROUBLE TEST—PULSE PERIOD 10, 9, etc.
62	Repeat Steps 58 through 61 for PULSE PERIOD settings 9 through 4 if line is equipped with integrated circuit repeaters or 9 through 6 if line is equipped with nonintegrated circuit repeaters.
63	Test all other repeatered lines associated with the fault-locate line under test by repeating Steps 46 through 62. ***Note:*** It is necessary to record data on Form E-6900 for only one service line and the maintenance line.
64	Disconnect all test equipment.



A - NORMAL PAIR ARRANGEMENT

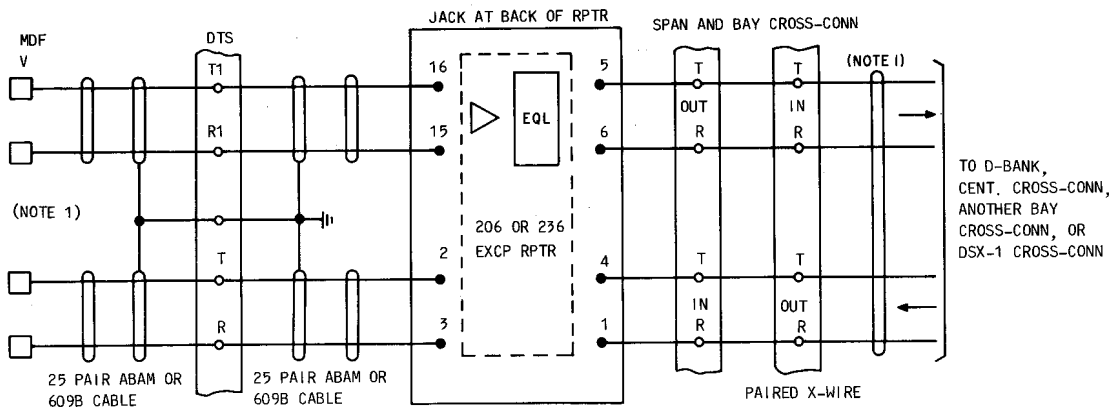


B - SPLIT PAIR

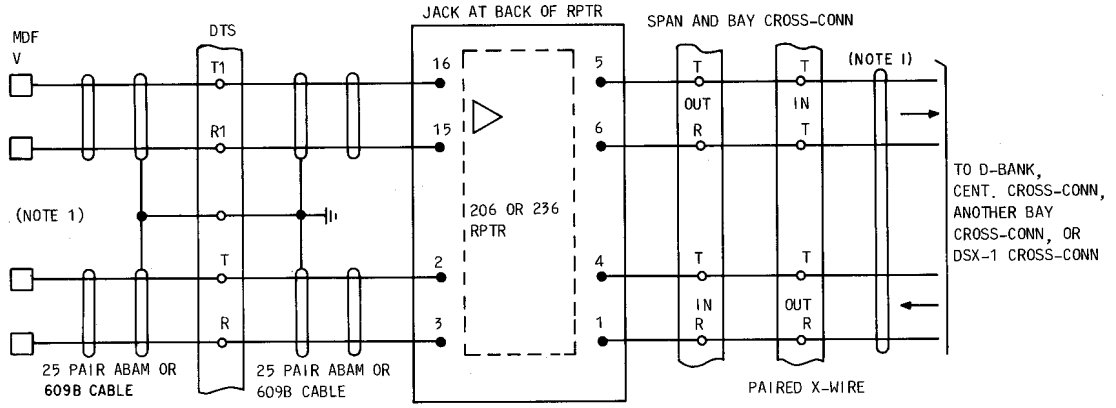


C - CROSSED SPLIT PAIR

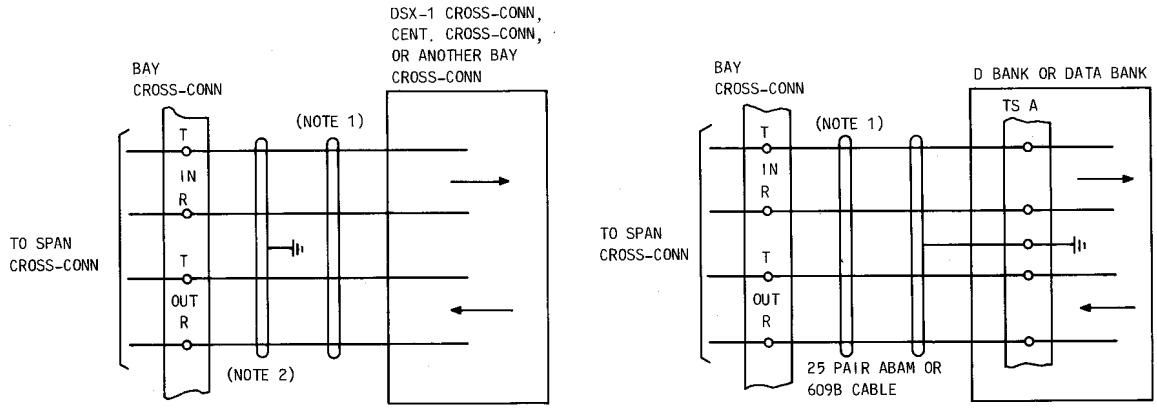
Fig. 1—Split Pairs in ABAM Cable



A. 206 AND 236 EXCP REPEATERS



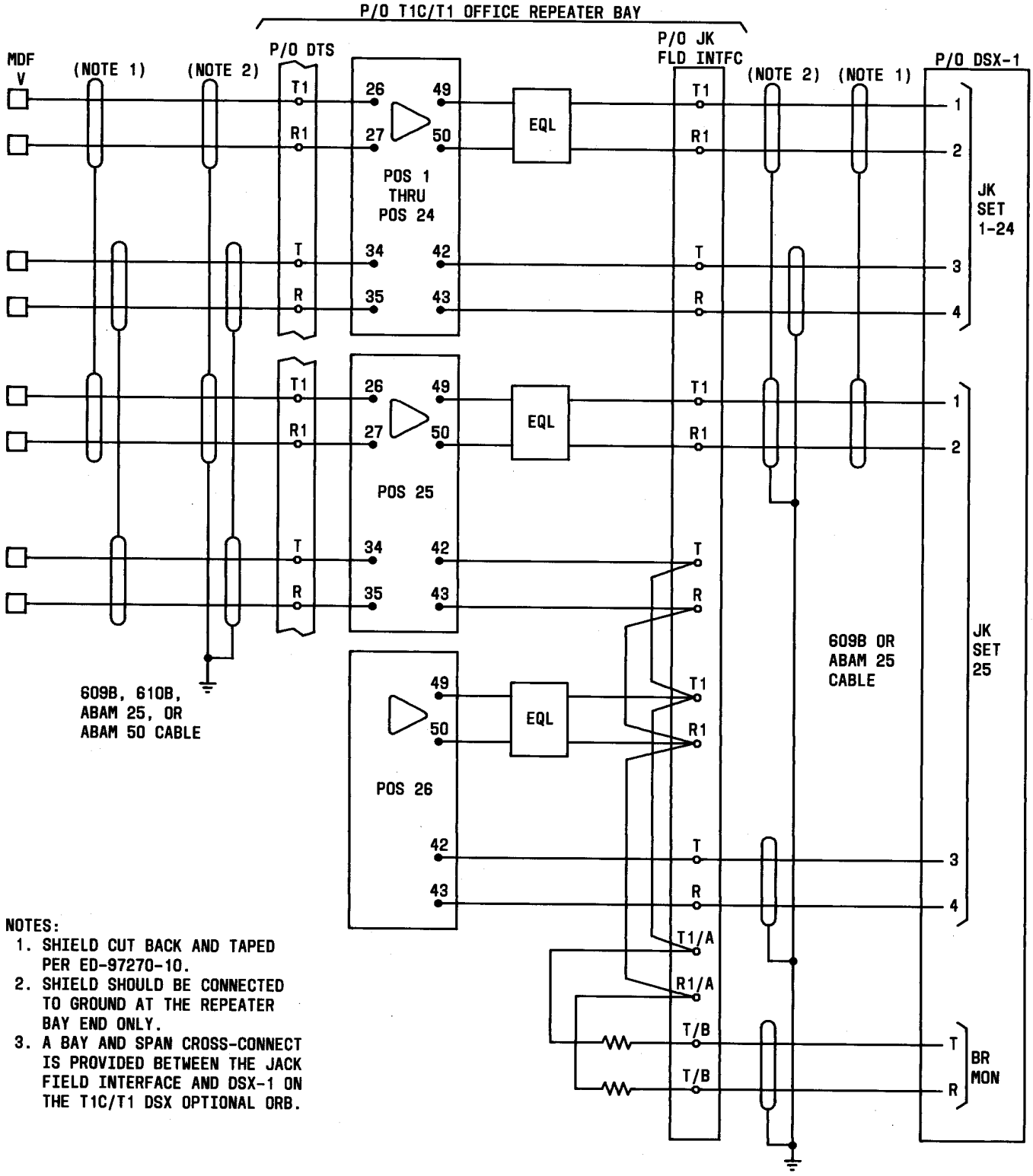
B. 206 AND 236 REPEATERS



C. BAY CROSS-CONNECT WIRING

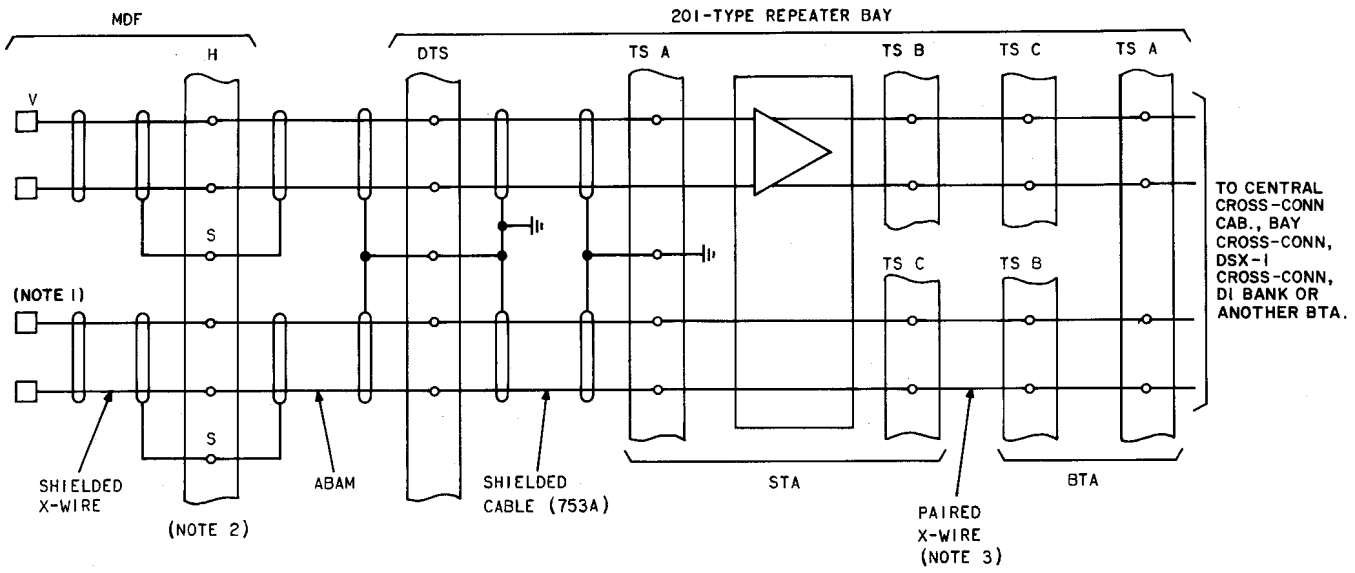
NOTES:
1. SHIELD CUT BACK AND TAPED PER ED-97270-10
2. FOR THIS ARRANGEMENT THE SHIELD SHOULD BE CONNECTED TO GROUND AT THE REPEATER BAY END ONLY.

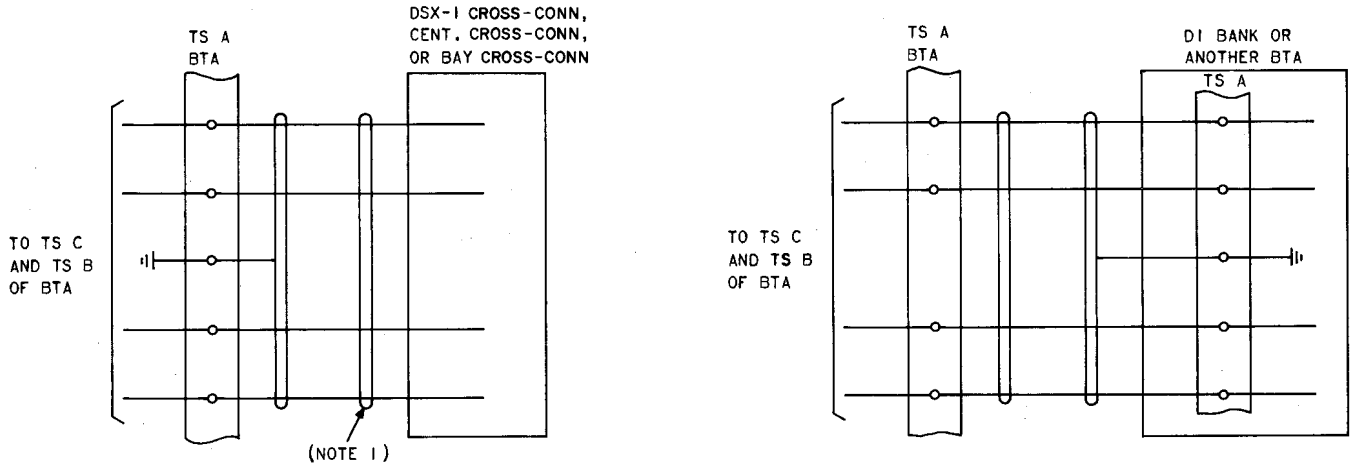
Fig. 2—206 ORB Wiring



NOTES:
1. SHIELD CUT BACK AND TAPED PER ED-97270-10.
2. SHIELD SHOULD BE CONNECTED TO GROUND AT THE REPEATER BAY END ONLY.
3. A BAY AND SPAN CROSS-CONNECT IS PROVIDED BETWEEN THE JACK FIELD INTERFACE AND DSX-1 ON THE T1C/T1 DSX OPTIONAL ORB.

Fig. 3—T1C/T1 ORB Wiring





NOTES:
1. SHEATH CUT BACK AND TAPED PER ED-97270-10.
2. SHIELD OF X-WIRE AND ABAM SHOULD BE CUT DOWN TO SLEEVE PUNCHING.
3. IF BTA IS NOT PROVIDED ON THROUGH SYSTEMS, CONNECTIONS FROM STA TO STA CAN BE CROSS-WIRED.

Fig. 4—201 ORB Wiring

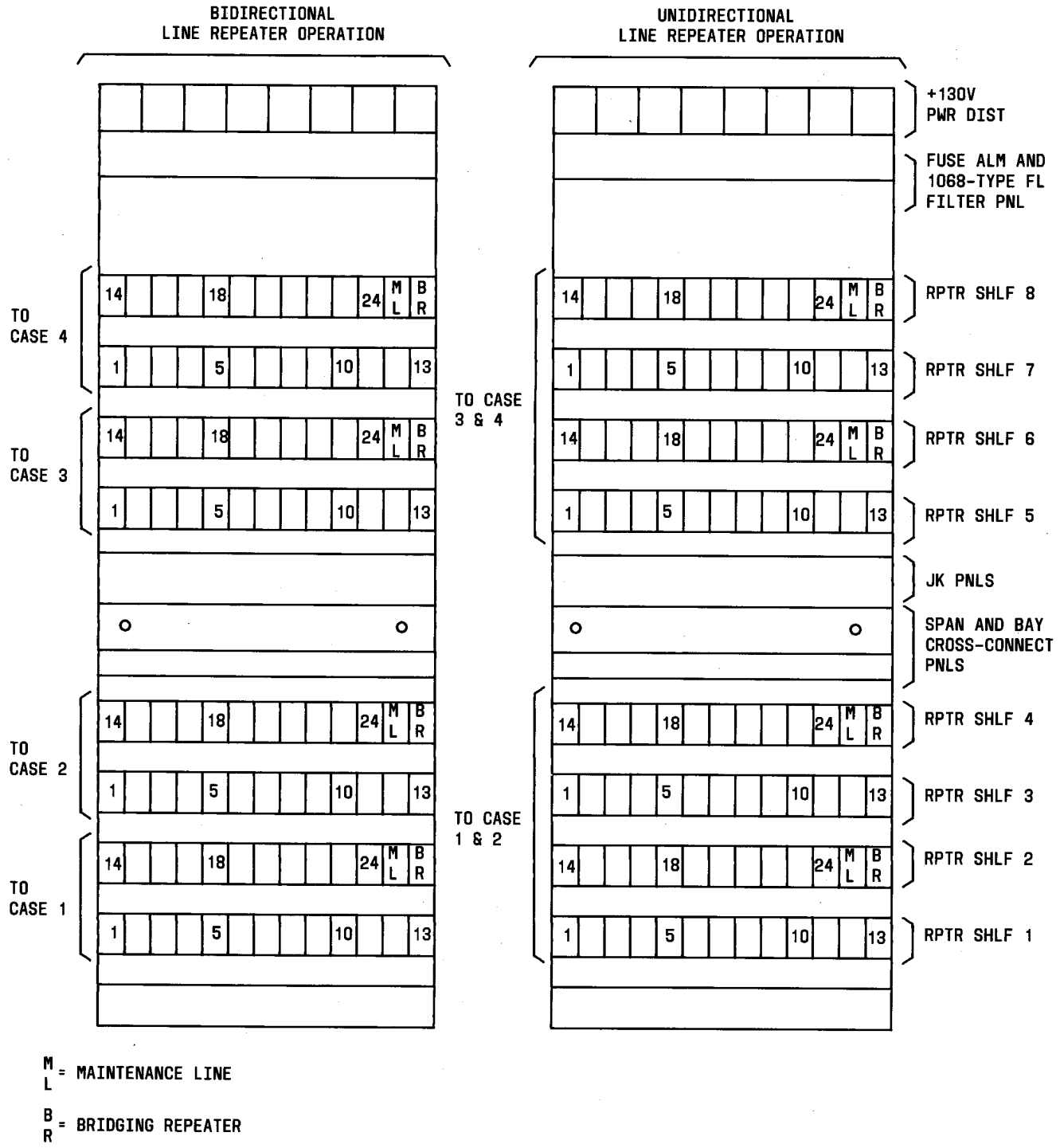


Fig. 5—Typical System Arrangement for T1C/T1 DSX Optional ORB

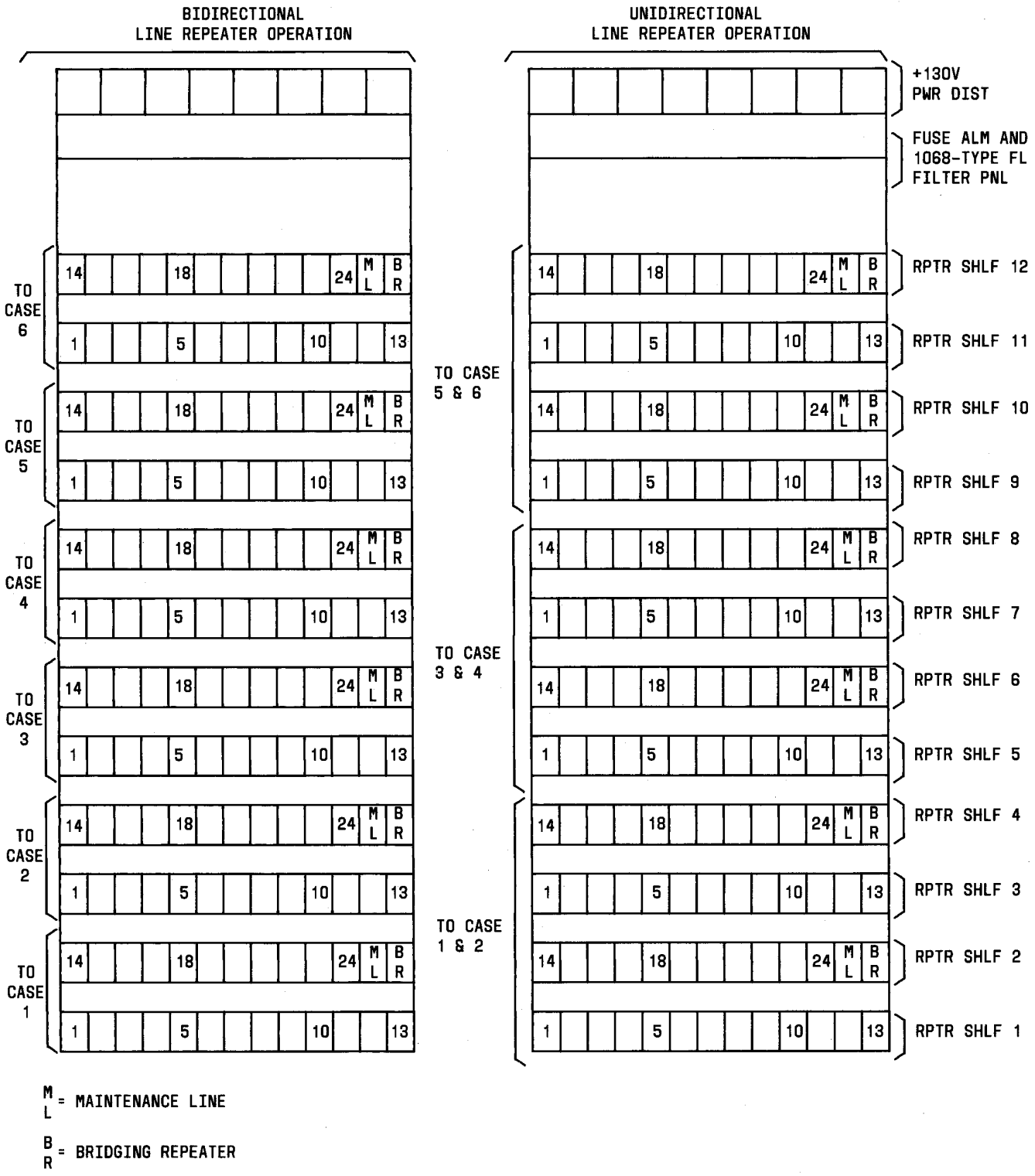


Fig. 6—Typical System Arrangement for T1C/T1 DSX Dedicated ORB

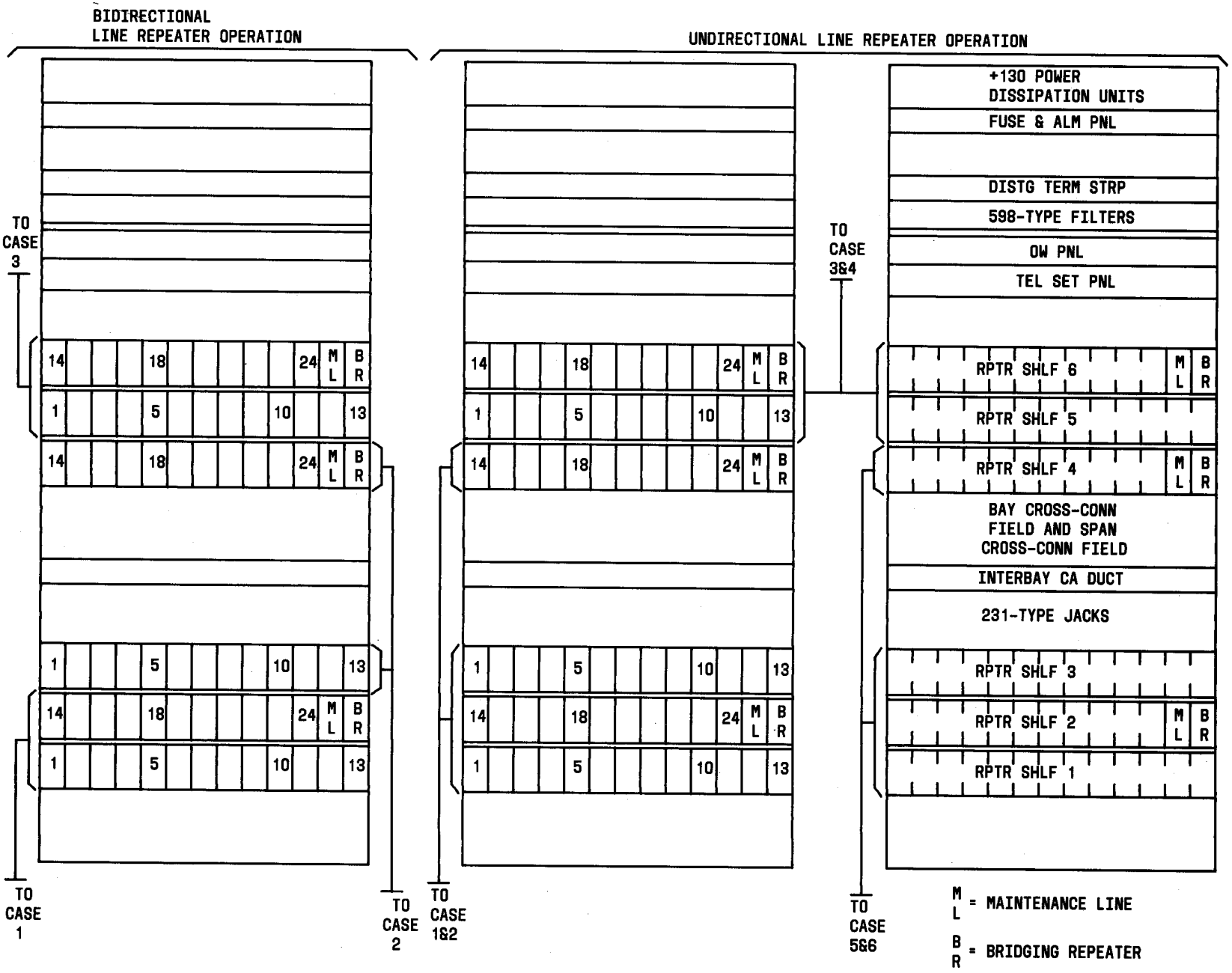


Fig. 7—Typical System Arrangement for 206 ORB

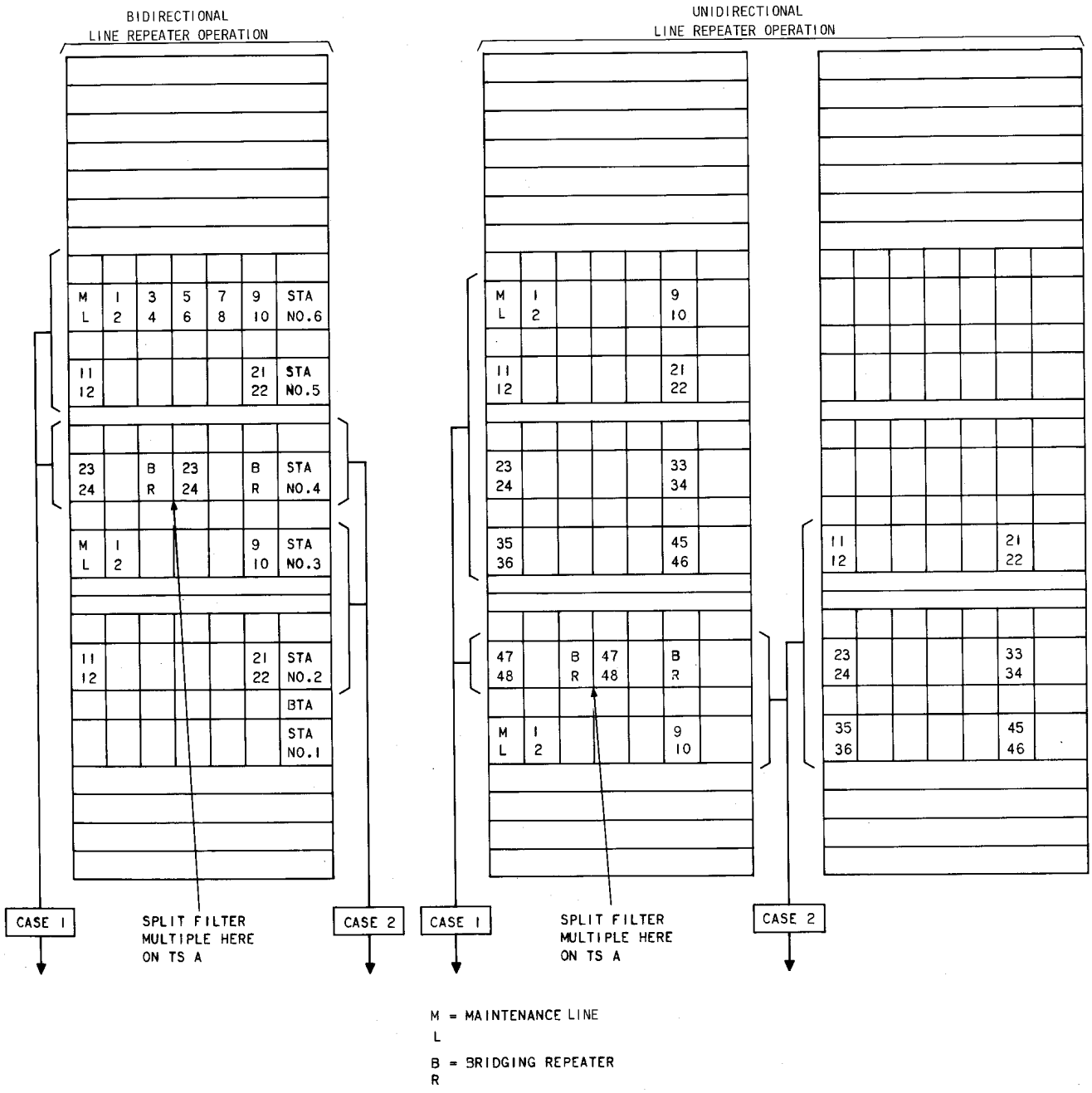


Fig. 8—Typical System Arrangement for 201 ORB

T CARRIER SPAN PROFILE

E-6900
(11-76)

OFFICE Elmhurst
SPAN 7 Bensenville
R.R. 216.08 SHELVES 5 and 6
OFFICE REPEATER TYPE 206J
DATE 2-1-77 OUTSIDE TEMPERATURE 31°F

POWER FEED VOLTAGE							
-48V GRD		+130V GRD		+130V -48V		+130V -130V	
		✓					

60MA ☐ 120MA ☐ 140MA ☑

	LINE CURRENT	REGULATOR VOLTAGE	LINE VOLTAGE	NOTES	INITIAL ERROR RATE TEST			
	TEST POINTS				RECEIVE PULSES?	BPV		ERROR COUNT
	+ TO-I	+ TO REG	+ TO-V			YES	NO	10 ___
1	1.38	9.5	112		YES		✓	
2	1.41	8.8	115		"		✓	
3	1.40	9.4	114		"		✓	
4	1.41	9.4	114		"		✓	
5	1.42	9.3	115		"		✓	
6	1.40	9.4	114		"		✓	
7	1.39	9.7	113		"		✓	
8	1.41	9.4	114		"		✓	
9	1.41	9.4	114		"		✓	
10	1.38	9.9	112		YES		✓	
11				Not Assigned				
12	1.39	9.5	114		YES		✓	
13	1.41	9.4	115		"		✓	
14	1.43	9.1	116		"		✓	
15	1.41	9.4	114		YES		✓	
16				Not Assigned				
17	1.41	9.4	114		YES		✓	
18	1.40	9.4	114		"		✓	
19	1.41	9.2	115		"		✓	
20	1.40	9.3	114		"		✓	
21	1.39	9.9	111		"		✓	
22	1.41	9.4	114		"		✓	
23	1.42	9.9	114		"		✓	
24	1.41	9.6	113		"		✓	
25	1.40	9.4	114		YES		✓	
		9.4	114					
	*NORM READINGS							

TESTER Jim Daniels
APPROVED BY SUPERVISOR Scarlet Scales

* THE NORM IS THE MOST FREQUENTLY OBSERVED VALUE IN EACH COLUMN.

Fig. 9—Example—T Carrier Span Profile Form E-6900 (Front)

T CARRIER SPAN PROFILE

E-6900
(11-76)

OFFICE _____

SPAN _____

R.R. _____ SHELVES _____

OFFICE REPEATER TYPE _____

DATE _____ OUTSIDE TEMPERATURE _____

POWER FEED VOLTAGE							
-48V GRD		+130V GRD		+130V -48V		+130V -130V	
60MA ☐		120MA ☐		140MA ☐			

	LINE CURRENT	REGULATOR VOLTAGE	LINE VOLTAGE	NOTES	INITIAL ERROR RATE TEST			
	TEST POINTS				RECEIVE PULSES?	BPV		ERROR COUNT 10____
						YES	NO	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
	*NORM READINGS							

TESTER _____

APPROVED BY SUPERVISOR _____

* THE NORM IS THE MOST FREQUENTLY OBSERVED VALUE IN EACH COLUMN.

Fig. 10—Blank T Carrier Span Profile Form E-6900 (Front)

FAULT LOCATING RECORD

E-6900
(11-76)

# 1	FAULT LOCATING LINE		
207 PR 5811 CBL	FAULT LOCATING PAIR	(PASSIVE SYSTEM) LOOP RESISTANCE (OHMS)	1350
8dBRNC	(BROADBAND NOISE) NOISE MEASUREMENT	(ACTIVE SYSTEM) LINE CURRENT	—

TEST SET USED J98725AD

REPEATER OR SOCKET # 24

FILTER CODE	RPTR. CODE	TRANSMISSION TEST MEASURE 1	2	3	(NB NOISE)* BIPOLAR	OBSCURE TROUBLE TEST-PULSE PERIOD 10	9	8	7	6	5	4	MAX SHIFT	REMARKS
B	208A	57	56.5	56.5	-120	57	57	57	57	57	57	57	0	
C	208A	57	56.5	56.5	-120	57	57	57	57	57	57	57	0	
D	208A	57	57	57	-120	57	57	57	57	57.2	57	56.5	.7	
E	208A	57	56.5	57	-120	57	57	57	57	57	57.5	57.5	.5	
F	208A	59.5	59	59	-120	59.5	59.5	60	60	60	59.5	59.5	.5	

REPEATER OR SOCKET # 25 (MAINTENANCE OR PROTECTION LINE)

FILTER CODE	RPTR. CODE	TRANSMISSION TEST MEASURE 1	2	3	(NB NOISE)* BIPOLAR	OBSCURE TROUBLE TEST-PULSE PERIOD 10	9	8	7	6	5	4	MAX SHIFT	REMARKS
B	208A	56.8	56.8	56.5	-120	56.8	56.8	56.5	56.5	56.5	56.7	56.7	.3	
C	208A	57.2	57.2	57.2	-120	57.2	57.2	57.2	57.2	57.2	57.2	57.2	.0	
D	208A	56.5	56.5	56.7	-120	56.5	56.5	56.4	56.4	56.5	56.5	56.7	.3	
E	208A	55.7	56	55.7	-120	55.7	55.7	55.7	55.7	55.7	55.8	56	.2	
F	208A	56.5	56.5	56.5	-120	56.6	56.6	56.6	56.5	56.5	56.5	56.7	.6	

NOTE: USE ADDITIONAL FORMS IF MORE THAN ONE FAULT LINE IS ASSIGNED.
*NARROW BAND

Fig. 11—Example—T Carrier Span Profile Form E-6900 (Back)

INITIAL FAULT LINE TESTS

E6988

1

ORDER NO.	T 1/05 SPAN	OFC A	OFC Z
B-12345A		HOF	ROF

ENGINEERED BY	TELEPHONE NO.	DATE ISSUED	NEW ☒ CHANGE ☐
JOHN DOE	2314000	10-1-77	

BAY NO.	FL LINE NO.	ACTIVE SW POS	CASE NO.	FAULT PAIR ASSIGNMENT
123	1		1	CABLE 1A250 PAIR 75

TESTER / SUPERVISOR	TELEPHONE NO.	DATE TESTED	INITIAL ☐ RETEST ☐

PAIR MAKE-UP

2

GA	KFT	LOOP. RESΩ
17		
19		
20		
22	63	2159
24	33	1762
25		
26		
TOTAL UNTERMD		3921

DC TESTS FOR ACTIVE AND PASSIVE FL LINE

3

FOREIGN VOLTAGE	T-R	V	
	T-GRD	V	
	R-GRD	V	
LEAKAGE RES	T-R	MΩ	
	T-GRD	MΩ	
	R-GRD	MΩ	
	ENGR.	MEAS.	
TERMD LOOP RESΩ	5905 / 3937		
LOOP RESΩ (1) 386B			
(2) STRAP	4705 / 3137		

(1) PASSIVE LINE
(2) ACTIVE LINE

DC TESTS FOR ACTIVE FL LINE

4

FAULT LINE CURRENT (NO FRONT I_L PINS) mA			
POLARITY 1		POLARITY 2	
ENGR	MEAS	ENGR	MEAS
11.24 / 7.46			

5

VOLTAGE (PINS I_L + TO -1) mV			
V1, NO PLUG IN FL LINE OUT JACK			mV
V2 POLARITY 1		V2 POLARITY 2	
ENGR	MEAS	ENGR	MEAS
116 / 71 V1+		V1-	

TRANSMISSION LOSS TESTS

6

FREQ H	POLARITY 1		POLARITY 2	
	ENGR dB	MEAS dB	ENGR dB	MEAS dB
832	8 / -4			
2413	14.6 / 2.6			
3017	20.6 / 8.6			

NOISE AND TONE LEVEL TESTS

7

MEASUREMENT AT OFC HOF

	NOISE		TONE LEVEL							
	BROAD BAND	BIPOLAR (NARROW BAND)								
		POLARITY 1 OR 2	POLARITY 1		POLARITY 1		POLARITY 2		POLARITY 2	
FL FILTER SEQ	MEAS		ENGR		MEAS		ENGR		MEAS	
	dBm	dBrn*	dBm	dBrn*	dBm	dBrn*	dBm	dBrn*	dBm	dBrn*
A(-A)			-35	55						
B(-B)			-35.5	54.5						
C(-C)			-36.4	53.6						
D(-D)			-37.4	52.6						
E(-E)			-38.4	51.6						
F(-F)			-39.3	50.7						
G			-40.3	49.7						
H			-41.2	48.8						
J			-42.7	47.3						
K			-43.7	46.3						
L			-45.8	44.2						
M			-47.6	42.4						

* 10F + 3A/3C READ 4dB HIGHER THAN TRUE dB
SUBTRACT 4dB FROM 3A/3C READING AND RECORD

8

OUTSIDE TEMPERATURE
75 F

APPROVAL

9

CRAFT TESTS RESULTS
PASS
FAIL

ENGR JD

Fig. 12—Example—Initial Fault Line Tests Form E-6988

FAULT LOCATING RECORD

E-6900
(11-76)

# _____	FAULT LOCATING LINE		
	FAULT LOCATING PAIR	(PASSIVE SYSTEM) LOOP RESISTANCE (OHMS)	
	(BROADBAND NOISE) NOISE MEASUREMENT	(ACTIVE SYSTEM) LINE CURRENT	

TEST SET USED _____

REPEATER OR SOCKET # _____

FILTER CODE	RPTR. CODE	TRANSMISSION TEST				OBSCURE TROUBLE TEST-PULSE PERIOD								
		MEASURE			(NB NOISE)* BIPOLAR	10	9	8	7	6	5	4	MAX. SHIFT	REMARKS
		1	2	3										

REPEATER OR SOCKET # _____ (MAINTENANCE OR PROTECTION LINE)

FILTER CODE	RPTR. CODE	TRANSMISSION TEST				OBSCURE TROUBLE TEST-PULSE PERIOD								
		MEASURE			(NB NOISE)* BIPOLAR	10	9	8	7	6	5	4	MAX. SHIFT	REMARKS
		1	2	3										

NOTE: USE ADDITIONAL FORMS IF MORE THAN ONE FAULT LINE IS ASSIGNED.
* NARROWBAND NOISE

Fig. 13—Blank T Carrier Span Profile Form E-6900 (Back)

INITIAL FAULT LINE TESTS

E6988

1

ORDER NO.	T____ SPAN	OFC A	OFC Z
ENGINEERED BY	TELEPHONE NO.	DATE ISSUED	NEW ☐ CHANGE ☐
BAY NO.	FL LINE NO.	ACTIVE SW POS / CASE NO.	FAULT PAIR ASSIGNMENT CABLE PAIR
TESTER _____ SUPERVISOR _____	TELEPHONE NO.	DATE TESTED	INITIAL ☐ RETEST ☐

PAIR MAKE-UP

2

GA	KFT	LOOP. RESΩ
17		
19		
20		
22		
24		
25		
26		
TOTAL UNTERMD		

DC TESTS FOR ACTIVE AND PASSIVE FL LINE

3

FOREIGN VOLTAGE	T-R	V
	T-GRD	V
	R-GRD	V
LEAKAGE RES	T-R	MΩ
	T-GRD	MΩ
	R-GRD	MΩ
	ENGR.	MEAS.
TERMD LOOP RESΩ		
LOOP RESΩ ①386B		
②STRAP		

DC TESTS FOR ACTIVE FL LINE

4

FAULT LINE CURRENT (NO FRONT I_L PINS)mA			
POLARITY 1		POLARITY 2	
ENGR	MEAS	ENGR	MEAS

5

VOLTAGE (PINS I_L + TO -1) mV			
V1, NO PLUG IN FL LINE OUT JACK			mV
V2 POLARITY 1		V2 POLARITY 2	
ENGR	MEAS	ENGR	MEAS
V1+		V1+	

① PASSIVE LINE
② ACTIVE LINE

TRANSMISSION LOSS TESTS

6

FREQ H	POLARITY 1		POLARITY 2	
	ENGR dB	MEAS dB	ENGR dB	MEAS dB
832				
2413				
3017				

NOISE AND TONE LEVEL TESTS

7

MEASUREMENT AT OFC_____									
NOISE		TONE LEVEL							
BROAD BAND	BIPOLAR (NARROW BAND)								
	POLARITY 1 OR 2	POLARITY 1		POLARITY 1		POLARITY 2		POLARITY 2	
FL FILTER SEQ	MEAS	ENGR		MEAS		ENGR		MEAS	
	dBm dBrn*	dBm	dBrn*	dBm	dBrn*	dBm	dBrn*	dBm	dBrn*

* 10F + 3A/3C READ 4dB HIGHER THAN TRUE dB
SUBTRACT 4dB FROM 3A/3C READING AND RECORD

8

OUTSIDE TEMPERATURE
F

APPROVAL

9

CRAFT TESTS RESULTS
PASS
FAIL

ENGR _____

Fig. 14—Blank Initial Fault Line Tests Form E-6988

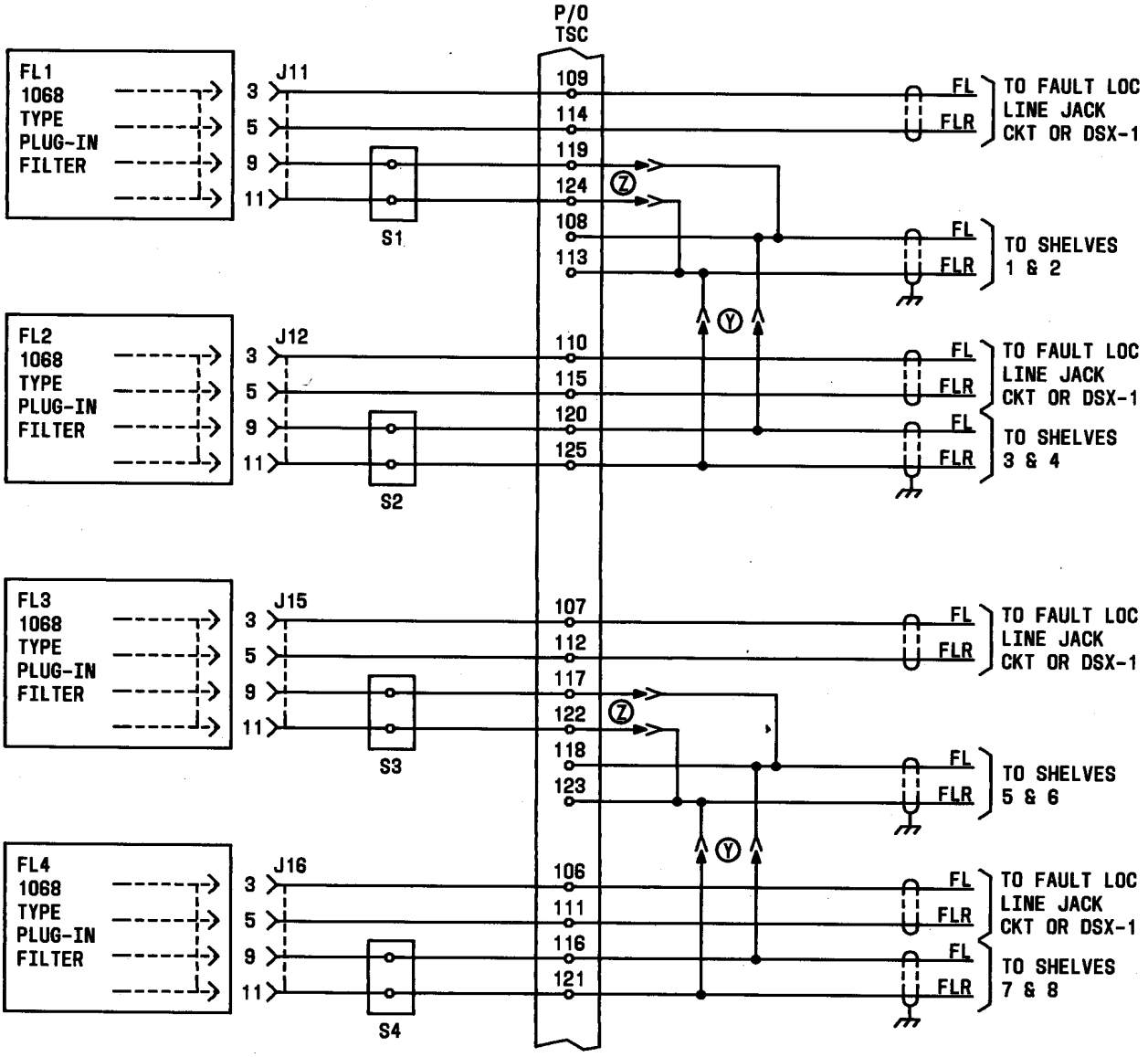


Fig. 15—T1C/T1 DSX Optional ORB-Fault Locate Filters

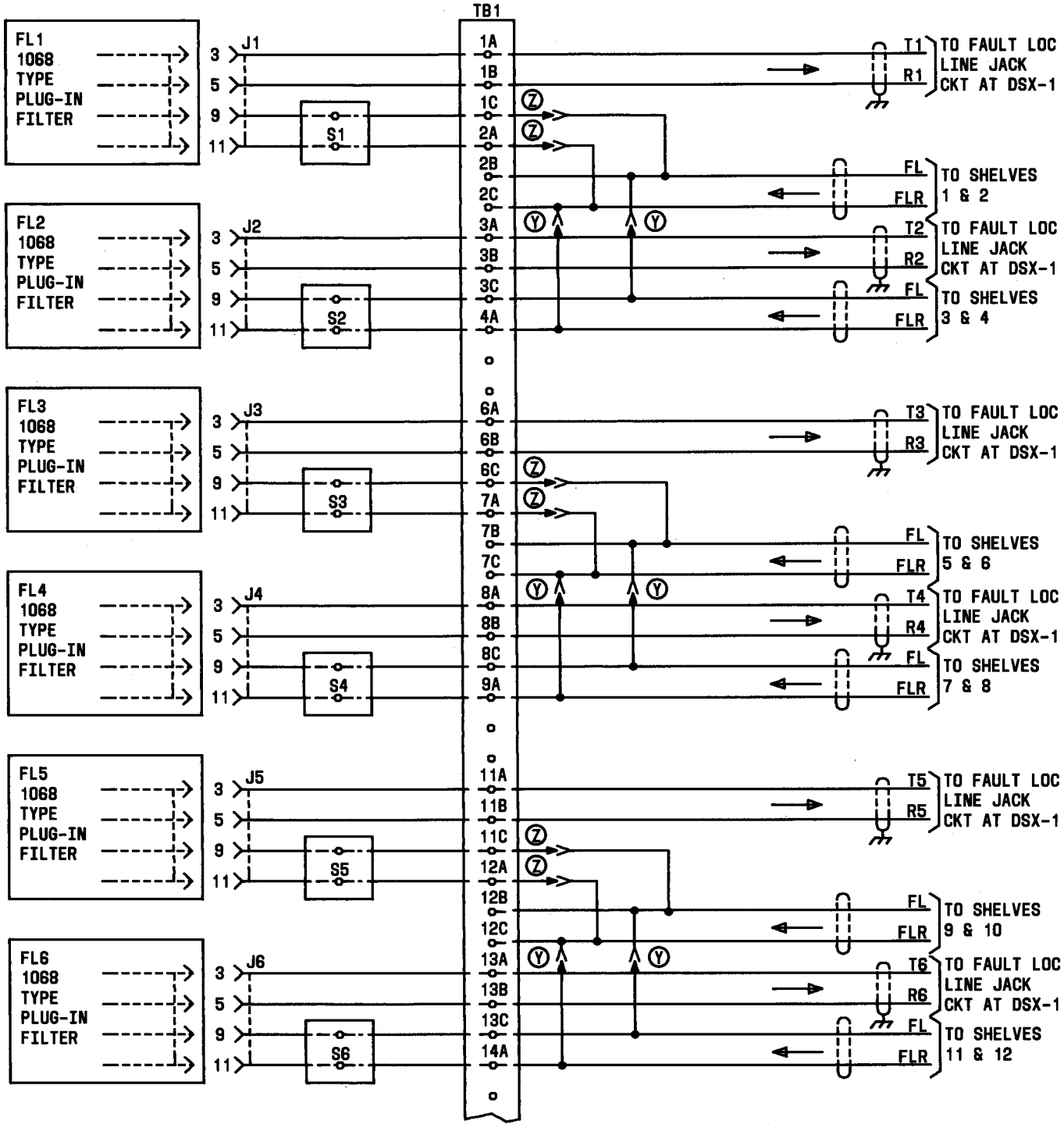


Fig. 16—T1C/T1 DSX Dedicated ORB Fault Locate Filters

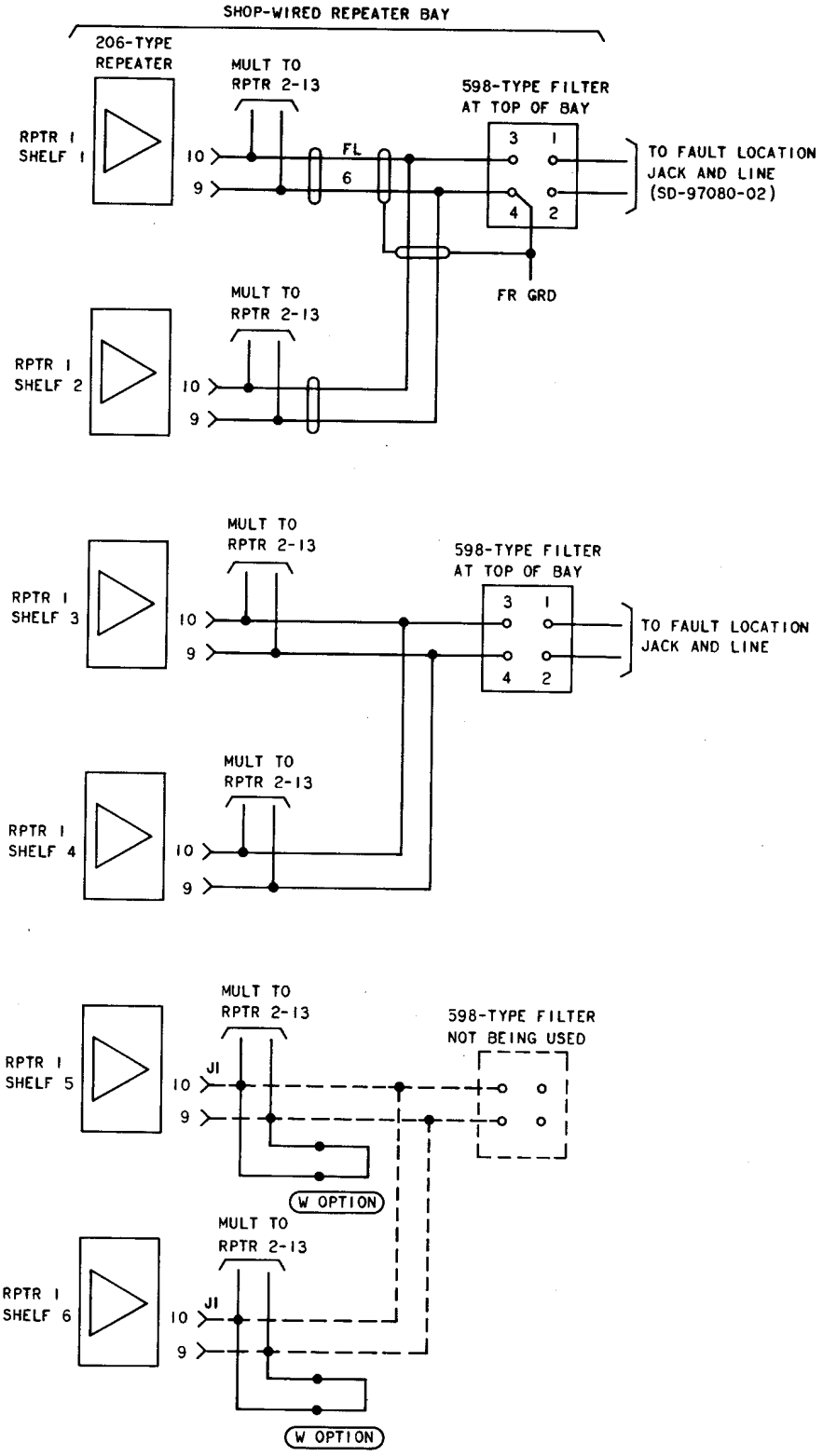


Fig. 17—206 ORB Fault Locate Filters

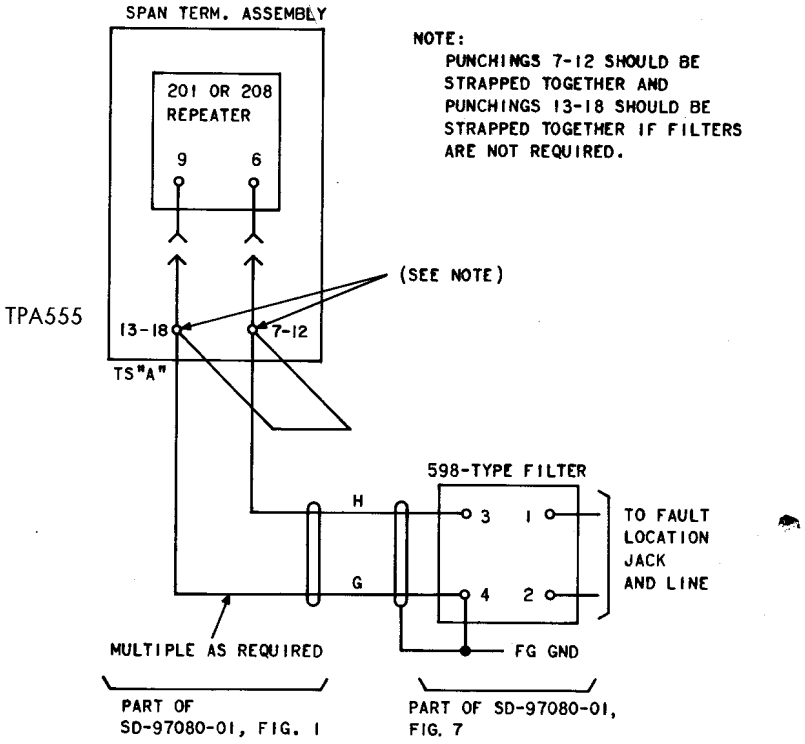


Fig. 18—201 ORB Fault Locate Filters