AT&T 363-205-500
Addendum
Issue 2, November 1990

SLC® SERIES 5 CARRIER SYSTEM
MAINTENANCE AND TROUBLE CLEARING
LOOP TRANSMISSION SYSTEMS
TASK ORIENTED PRACTICE (TOP)

1. GENERAL

1.001 This addendum supplements TOP 363-205-500, Issue 4 and replaces Addendum, Issue 1. The attached pages must be inserted in the practice in accordance with the following:

- Remove from the practice the pages numbered the same as those attached to this sheet.
- Insert the attached pages in the appropriate numerical order.
- Place this pink sheet in front of the addended practice and discard the pink sheet from Issue 1 of the addendum.

1.002 This addendum is reissued to add maintenance considerations for enhancement to Fiber to the Home system configurations. These enhancements provide extended channel test capabilities and a DC back powering arrangement for 900A2 or 900A3 DTs in a pedestal. The maintenance philosophy was updated to include trouble clearing information for systems using DDM-1000, DDM-2000, and DS1 extension shelves in an RT Hub configuration.

2. CHANGES

Issue 1 Changes

2.001 The revised TOP elements updated November 1990 are listed below:

- IXL-001 - revised, Two pages
- TAD-100 - revised, Five pages
- TAP-101 - revised, Six pages
- TAP-102 - revised, Two pages
- TAP-103 - revised, Two pages
- TAP-104 - revised, Two pages
- TAP-105 - revised, Two pages
- TAP-106 - revised, Four pages
- TAP-107 - revised, Three pages
- TAP-108 - revised, Five pages
- TAP-109 - revised, Five pages
- TAP-110 - revised, Two pages
- TAP-120 - revised, Four pages
- TAP-123 - revised, Ten pages
- TAP-124 - revised, Three pages
- TAD-127 - revised, Three pages
- DLP-516 - revised, Seven pages
- DLP-518 - revised, Six pages
- DLP-526 - revised, Two pages
- CKL-891 - revised, One page

Issue 2 Changes

2.002 The attached sheets replace the corresponding sheets in the TOP document. Remove the appropriate sheets in the TOP document and replace them with the attached sheets.

2.003 The revised TOP elements to be updated November 1990 are listed below:

- IXL-001 - revised, Two pages
- TAD-100 - revised, Six pages
- TAD-127 - revised, Three pages
- TAP-128 - revised, Seven pages
- TAP-131 - added, Three pages
- DLP-522 - revised, Eleven pages
- DLP-523 - revised, Four pages
- DLP-524 - revised, Two pages
- DLP-525 - revised, Eleven pages
- DLP-526 - revised, Three pages
- CKL-891 - revised, One page

TASK INDEX LIST

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO
Abbreviated System Maintenance	DLP-500
Channel Failure — Multiple Channels — Signaling Trouble — Clear	TAP-121
Channel Failure — Multiple Channels — Single Party, Multiparty — Clear	TAP-123
Channel Failure — Single Channel — Signaling Trouble — Clear	TAP-120
Channel Failure — Single Channel — Single Party, Multiparty — Clear	TAP-122
Fiber-To-The-Home Maintenance Philosophy	TAD-127
Fiber-To-The-Home Channel Trouble — Clear	TAP-128
Fiber-To-The-Home 900A2 DT DC Back Powering Trouble — Clear	TAP-131
Fiber-To-The-Home Circuit Arrangement — Check	DLP-522
Fiber-To-The-Home COT to RT Channel Test — Perform	DLP-523
Fiber-To-The-Home MLT Channel Test — Perform	DLP-526
Isolate Side 2 Digital Line Trouble Using Fault-Locating Procedures from RT	TAP-118
Maintenance Philosophy	TAD-100
Major Alarms — Clear	TAP-102
Minor Alarms — Clear	TAP-103
Power Minor Alarm at RT — Clear	TAP-110
System Alarm at COT or RT — Clear	TAP-101
T1 Digital Line Extensions — Connect Fault Locate Test Set	DLP-525
Test KS-21906, L4 RT Batteries Using 197A Battery Load Test Set	DLP-520

Figure 1 is a block diagram of *SLC* Series 5 carrier system feature packages.

CAUTION

In dusty areas (for example, near construction sites), AT&T recommends tenting the RT cabinet to protect electronic equipment whenever the cabinet doors are opened for extended periods.

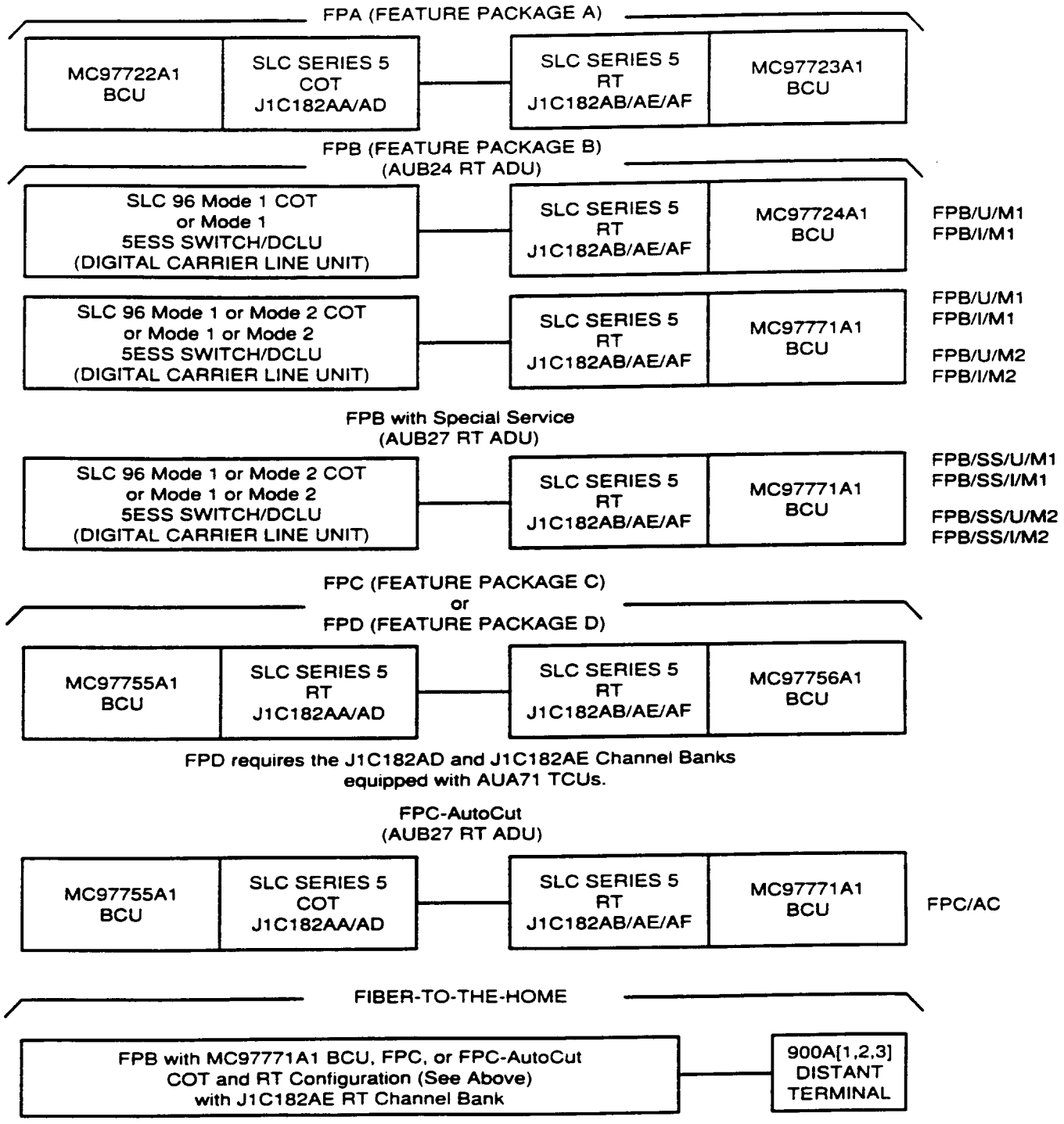


Figure 1—Feature Package Arrangements

MAINTENANCE PHILOSOPHY

GENERAL

The *SLC*® Series 5 Carrier System (Series 5) is composed of a Series 5 COT (central office terminal) with T1 carrier or optical fiber connection to a Series 5 RT (remote terminal). The basic building block for Series 5 is a 96-line system. Series 5 uses two independent 96-line systems that are physically packaged into one 5-shelf dual bank assembly. The COT is usually located in a telephone company office. A remote terminal may be located in the outside plant or inside a communication user's premises. A Series 5 RT equipped with FPB (Feature Package B Mode 1 or Mode 2, with or without special service services) can interface with a *SLC* 96 Carrier System COT, a SLIM (subscriber loop interface module), an LM12 Multiplex, or a *5ESS*® switch DCLU (digital carrier line unit). These configurations are designated as Mode 96 systems and may be referred to as FPB/M1/U, FPB/M2/U, FPB/M1/I, FPB/M2/I for Universal (connected to a *SLC* 96 COT) or Integrated systems, and FPB/SS/M1/U, FPB/SS/M2/U, FPB/SS/M1/I, FPB/SS/M2/I when special service capability is provided. The Series 5 System may be equipped for FPA (Feature Package A), FPB, FPC, FPC-AutoCut, or FPD operation. Refer to AT&T 363-205-100 for a description of these feature packages.

If trouble isolation is being performed on a Mode 96 system, the craft located at the CO terminal opposite the RT should use the maintenance document applicable for that equipment. This document should be used when the trouble has been isolated to the RT or when trouble clearing begins at the RT.

The **MC97771A1 BCU** provides FPB and FPC-AutoCut features. These features include *SLC* 96 (TR-08) Mode 1 and Mode 2 compatibility. The FPC-AutoCut provides compatibility with an FPC COT initially, and can be cut over to an integrated Mode 1 system without reconfiguring the RT equipment. The **AUB27 ADU, AUA105** and **AUA109 TRU,** and **AUA6( )D LIU** common units provide these features. Older version common units are compatible for FPB Mode 1 or Mode 2 configurations. FPB allows complex special service channel units in a Mode 1 or Mode 2 configuration which are not testable via the XTC (extended test controller). These complex special service channel units can be tested using the CIU (craft interface unit) at the RT. Refer to AT&T 363-205-402 TOP for testing procedures. If a circuit pack is replaced with an incompatible version, or options are wrong, the FAIL indicator will light, the AUB27 CMP or AUB24 NE indicator will light, and the affected BCU DIGROUP indicators will light. The circuit pack FAIL indicator will go off when the ADU LED TEST button is pressed to indicate incompatibility. The following Table summarizes FPB and FPC-AutoCut circuit pack requirements:

FPB AND FPC-AutoCut CIRCUIT PACK REQUIREMENTS

	FPB-NO SPECIAL SERVICES		WITH SPECIAL SERVICES		
UNIT	MODE 1	MODE 2	MODE 1	MODE 2	FPC-AutoCut
TRU	AUA22 AUA105 AUA109	AUA105	AUA22 AUA105 AUA109	AUA105	AUA109 AUA105
LIU	ANY VERSION	AUA6( )D	ANY VERSION	AUA6( )D	AUA6( )C/D
ADU	AUB24	AUB24	AUB27	AUB27	AUB27
BCU	MC97771A1	MC97771A1	MC97771A1	MC97771A1	MC97771A1

ALARMS

Together, the **BCU** (bank control unit) and **ADU** (alarm display unit) monitor failure modes within the system and monitor external conditions that may affect operation of the system. The **ADU** initiates alarm signals for office and remote alarms through the **AIU** (alarm interface unit). Office alarms guide repair technicians to the system in trouble. Some system troubles are not alarmed and are detected by customer trouble reports. When trouble has been determined to be with the Series 5 system, trouble analysis begins with an examination of alarm and status indicators on the system plug-ins or customer trouble reports. When depressed, the **ACO** switch on the **AIU** will turn off audible and visual office and remote (except ID) alarms and light the **ACO** LED on the **ADU**. The **ACO** LED will remain on until the trouble is cleared. Subsequent failures that cause new alarms automatically override the **ACO**.

CAUTION

Fan operation is essential to prevent system failures in those Series 5 RTs engineered and installed with fans. At the conclusion of all installation and maintenance activities, check that the FCUs (fan control units) for both systems in the dual channel bank are installed and that the fans operate properly. Press the FAN TEST pushbutton on each FCU to assure proper operation.

TROUBLE ANALYSIS PROCEDURES

A general knowledge of how the Series 5 system functions and what alarm LED indications mean will aid in performing TAPs (trouble analysis procedures). TAPs in this volume generally assume the following:

- The system is equipped with the plug-ins required to make an operating system
- There may be a single cause for multiple trouble indications
- Only a single trouble is assumed to exist.

In case of an alarmed system failure, the craft is first directed to the proper terminal (COT or RT) by an examination of **NE** (near end), **CLF** (carrier line failure), **FE** (far end), **PMN** (power minor), **MISC1**, and **MISC2** bank indicators. At the appropriate terminal the craft determines if the system alarm is **MJ** (major) or **MN** (minor) by examining **MJ** and **MN** indicators on the **ADU**. A further analysis of bank indicators results in the craft accessing a particular TAP to begin trouble clearing.

When maintenance for the system is the responsibility of a remote maintenance center, the center will respond to the initial system alarm and dispatch personnel to the appropriate location to clear trouble.

If an alarm indicates a specific trouble location such as minor, far end (**MN** and **FE** LEDs lighted), or minor, near end (**MN** and **NE** LEDs lighted), the remote maintenance center will dispatch personnel accordingly. At the trouble location, an analysis will be made of the trouble indicator LEDs. The IXL-001 will indicate the proper TAP for trouble clearing.

If an alarm at the RT indicates trouble on a digital line, personnel will be dispatched to the COT first to analyze alarm indicators and use trouble locating procedures to isolate the trouble.

If an alarm indication or trouble report at the remote center does not denote a specific trouble location, it is recommended that trouble analysis procedures begin at the COT.

Trouble clearing is based on replacement of plug-ins. Any options on replacement plug-ins must be set per the appropriate facility record. Whenever replacement of a plug-in does not cure the trouble, the original plug-in should be returned to operation.

The BCU and ADU make up the bank controller which influences the performance of other plug-ins. If replacement of an apparent faulty unit does not cure the symptom, try replacing the BCU; if the trouble persists, try replacing the ADU. Also, the ADU contains an LED TEST switch that causes illumination of the LEDs on all the bank plug-ins except channel units and the PCU; if the communication path between the ADU and the suspected unit is faulty, pressing this switch may expose the fault.

Some codes of *SLC* Series 5 Carrier System circuit packs have been discontinued and superseded by newer codes of circuit packs. Whenever a discontinued circuit pack that is installed in an RT or COT assembly must be replaced and an identical replacement circuit pack is not available, then the new circuit pack code should be used. The following list will assist in identifying the discontinued Series 5 circuit pack codes plus the circuit pack codes that supersede them:

- **AUA61, AUA62,** and **AUA64 LIUs** (line interface units) have been superseded by **AUA61B AUA61C** or**AUA61D, AUA62B AUA62C** or **AUA62D,** and **AUA64B AUA64C** or **AUA64D LIUs,** respectively.
- The **AUA13 LSU** (line switch unit) has been superseded by the **AUA73 LSU.**
- The **MC97725A1 BCU** has been superseded by the **MC97755A1 BCU.**
- The **MC97726A1 BCU** has been superseded by the **MC97756A1 BCU.**
- The **AUA11 PCU** (power converter unit) has been superseded by the **AUA11B PCU.**
- The **AUB2 CTU** (channel test unit) has been superseded by the **AUB2B CTU.**
- The **3A RINGING GENERATOR** has been superseded by the **3C RINGING GENERATOR.**

If a COT or RT bank assembly is equipped with the DCU (digital connectivity unit) feature, all channel unit circuit packs in a digroup are replaced with one **DCU-L (AUA16)** and one **DCU-R (AUA17)** circuit pack, providing a DS1 port on the Series 5 system. The DCU detects incoming loss of signal, loss of frame, and excess line errors (yellow alarm and blue signal) on its DS1 input and provides the ability to transmit these yellow alarms and blue signals either upstream or downstream to notify other equipment on the DS1 facility that an alarm condition exists. The **DCU-L** and **DCU-R** circuit packs also contain LED indicators (**FAIL, FAILED INPUT,** and **INC**) that indicate when an internal DCU failure exists or when an alarm condition exists due to a failure external to the bank assembly.

The time interval between when a trouble is cleared and when the alarm LEDs go off is usually less than 35 seconds. When any combination of the **BCU** and the **ADU** at the COT and the **BCU** at the RT is removed, the time interval may increase to 10 minutes on Series 5 systems equipped with FPC (Feature Package C) or FPD.

FIBER FACILITIES AND T1 EXTENSIONS

When a lightguide multiplexer, such as the DDM-1000 or DDM-2000, is used with a *SLC* carrier system, digital line trouble (CLF on Series 5 LIU circuit packs) may be caused by the carrier facility. When there are digital line failures, first check the multiplexer circuit packs for alarm conditions. A flashing LED on a low speed circuit pack (ALM on DDM-1000 or FAULT on DDM-2000) indicates a loss of received DS1 signal from connecting equipment. The LED will stay on if the circuit pack fails and MJ, MN, NE, FE, or ABN indicators will light. Trouble clearing the multiplexer equipment should begin at the end with the NE indicator. Series 5 LIU CLF alarms could be caused by a multiplexer loopback. This would light the ABN indicator. Use documentation for the type of multiplexer used to clear multiplexer system troubles.

When T1 extension lines are used, the repeater shelf or the T1 extension line could cause digital line failures. If there is digital line trouble on a system with T1 extension lines first check the multiplexer low speed packs for flashing or steady LED indicators. If the indicator is flashing, trouble clearing should start at the repeater shelf as would be done at a central office repeater bay. First look for blown fuses on the power shelf or repeater shelf. Then measure simplex current (-V to -I) and voltage (-V to ground). If the current is present, fault locating can be done from the 800 or 900 series DSX, or protector blocks between the multiplexer and the repeater shelf when TIE BLOCK/307 DSX is used. DLP-525 gives procedures for connecting fault locate test equipment for an 80D or 80E cabinet with an SXSS repeater shelf and TIE BLOCK/307 DSX. If you have a different equipment arrangement, find the protectors for the transmit side of the digital line and Fault Locate pair and make test set connections as indicated in DLP-525 (See AT&T 640-250-XXX for the cabinet equipage group you have to locate these protectors).

For digital line troubles that come and go, typically during busy customer usage periods, verify that all DS1 interface circuit packs are optioned for the same Line Coding, B8ZS or ZCS (also called "AMI"). *A mix of Line Coding (B8ZS and ZCS) on a digital facility will cause unpredictable digital line failures.*

CAUTION:

Caution must be exercised in removal of plug-ins, initiation of loopbacks, and performance of other tests. Removal of a plug-in or activation of the wrong manual protection switch controls may cause service interruption.

With the introduction of additional features for the Series 5 system, it becomes imperative that maintenance personnel use care when making settings on replacement CPs (circuit packs) and ensure that the correct codes of replacement CPs are installed into the proper bay position at each end of the system. Failure to observe these cautions may result in immediate or future loss of service or may introduce errors into the digital bitstream. Accurate facility records should be used to determine correct CP code and bay position, and to make all CP option switch settings.

There are several indications that the craft may use to determine whether an error has been made during system maintenance:

- ***When a new CP is installed at turnup or during maintenance, the CP's FAIL indicator (LED) should be observed to insure that it comes on momentarily, then goes off. The absence of this JPU (just powered up) indication should cause the craft to check for proper CP type, option settings, and location.***

- ***A misplaced or misset CP should always cause the associated digroup indicator (on the BCU) to light.***

- ***If the FAIL LED stays on following the replacement of a common unit (including DCU), the CP is probably failed, is installed in the wrong position, or contains incorrectly set options. When the ADU LED TEST switch is depressed, if the FAIL LED on the unit goes off then the unit has been optioned incorrectly. If the FAIL LED on the unit does not go off then the unit is installed in the wrong position or is failed.***

The following procedure may be used when a problem is indicated (as above) following replacement of a unit. A simple verification of craft error may be made as follows: While observing the FAIL LED on the unit just replaced, depress the ADU LED TEST switch. With the exception of a CTU and DTU, if the FAIL LED on the replaced CP does not light, a craft error of the type listed above is indicated. With the exception of a CTU, DTU, and misset ADU option switch, the FAIL LED on the CP that is misset will be off.

If, however, the ADU has just been replaced and a switch is misset so that the COT and RT ADUs are not in agreement, the FAIL LED on CPs other than the ADU may go off when the ADU LED TEST switch is depressed. This is because the ADU establishes the configuration for the local controller, so the local bank controller must take the ADU setting as correct. In any event, an extinguished FAIL LED tells the craft to recheck the last CP replaced for CP code, option switch settings, and for location.

WARNING

An electrostatic discharge wrist strap, with a minimum resistance of 250 kilohms, should be worn and connected to a suitable ground when handling Series 5 circuit packs to prevent possible damage to the circuit packs. Before using the wrist strap, check it for opens, shorts, and minimum resistance value. If the strap does not pass these checks it should not be used. To avoid possible personal injury while using the wrist strap, do not connect it to the power shelf or adjacent portions of the RT frame. The RT fan unit has an ESD GRD jack for wrist strap connection.

CUSTOMER TROUBLE REPORTS

A customer trouble report is generally an unalarmed trouble and usually indicates a channel unit problem or distribution facility problem.

Single-party, multiparty, and coin service trouble reports are first received at the RSB (repair service bureau). The RSB uses MLT (mechanized loop testing) or a local test desk to test the circuit. The PGTC (pair gain test controller) can test channel unit pairs and report its results to the RSB while the MLT or local test desk provides access, via the dc test pair, to distribution cable for tests. If the PGTC reports a channel unit problem, a channel unit trouble report is initiated to the proper repair force and trouble analysis procedures begin at the COT. Unless further tests at the COT indicate otherwise, a replacement of the COT channel unit is performed first. Then if the trouble is still present, a replacement of the RT channel unit is made.

Special service trouble reports are received at the SSC (special services center). FPA and FPB provide 2-wire locally switched special services and coin service. In addition to FPA service features, FPB, FPC, and FPD provide 4-wire special services and data service. An FPC Series 5 bank may also be equipped for DCU (digital connectivity unit) capabilities. A Series 5 bank equipped with FPD provides LBRV (low bit rate voice) capabilities. The CIU (craft interface unit) is used to provision the special service channel units. The PGTC can be used for testing systems equipped with FPA, FPB, FPC, or FPD. In addition to the test features of the PGTC, the XTC (extended test controller) allows enhanced testing capabilities including remote testing of special service channels. Trouble reports on *SPOTS*® channel unit served circuits should be referred to the RSB for testing and dispatch. The SSC would retain responsibility for tracking and clearing the trouble.

When a *SPOTS* channel unit trouble is isolated by the PGTC to channel unit pairs, further testing is required from the COT. Further testing may indicate a dispatch to the RT is required. TAPs in this section detail tests required on *SPOTS* channel units.

The *SLC* Series 5 Carrier System Channel Unit Installation AT&T 363-205-402 TOP contains procedures to install and test channel units. These procedures can be used to clear in-service special service troubles by performing the tasks to add channel service for the type of channel unit that has trouble. These procedures will clear the trouble conditions if the *SLC* Series 5 Carrier System is causing the problem. Customer equipment, drop pairs, or central office (or network) equipment can also cause the trouble condition.

CONCLUSION

When procedures of this volume do not locate the trouble, an obscure trouble or multiple troubles are assumed to exist. The necessary SDs, CDs, etc., should be available to assist in locating an obscure wiring problem.

FIBER-TO-THE-HOME MAINTENANCE PHILOSOPHY

GENERAL

The FTTH (Fiber-To-The-Home) capability is provided by the *SLC*® Series 5 Carrier System (Series 5) configured with FPC (Feature Package C), FPB Mode 1 or Mode 2 with the **MC97771A1 BCU**, and FPC-Autocut. The Mode 1 and Mode 2 configuration can be *universal* or *integrated*. The basic system is composed of a Series 5 COT (central office terminal) connected via a fiber multiplex system or T1 carrier to a Series 5 RT (remote terminal). Additional RT equipment and apparatus provide the optical interface to the DT (Distant Terminal) located at or near the customer premises. Up to three DTs can be mounted in a low profile pedestal. These pedestals can be powered from commercial 120 volt AC power or DC back powered from the customer premises.

FTTH REMOTE TERMINAL DESCRIPTION

The FTTH equipment is mounted on 7-foot frames in an RT enclosure [e.g., CEV (controlled environmental vault)] or in a Bulk powered 80E cabinet. The frame can be equipped with 2 RT channel bank assemblies, 4 optical shelves, two 2A fan units, and an optics power shelf. This arrangement will support 4 *SLC* Series 5 carrier RT systems. Another 7-foot frame is used as an optical interconnect facility to make the interconnections from the optical shelf to the fiber distribution cable. The 80-E cabinet is very similar to the frame arrangement with the following differences. The cabinet has 6 frame type mounting positions (three on each side). Side 1 position 1 contains the bulk power equipment and a DDM-1000 multiplexer (optional). Position 2 is equipped with 2 RT channel bank assemblies and a fan unit and an optional RMU (remote measurement unit). The RMU requires an **AUA57 FSR** channel unit (optioned for 20 Hz) to be installed in slot **1/2** of the BLUE system in the lower channel bank assembly mounted in frame position 2. Position 3 is equipped with the 4 optical shelves, two fan units, the optical power shelf, and room for 2 T1 repeater shelves. Side 2 position 4 has the HDIC (high density interconnect) for the distribution fibers, 307 protector blocks, and a miscellaneous pair termination block. Position 5 is equipped with 2 RT channel bank assemblies and a fan unit. Position 6 is equipped with the 4 optical shelves, two fan units, the optical power shelf, and tie-block or 800 series DSX cross-connect. The cabinet also has an AC circuit breaker panel (on side 1) and a splicing area (on side 2).

Five new channel units are used in an FTTH RT channel bank. The **AUA400, AUA401, AUA404,** and **AUA405** CUs provide the electrical interface to the optical shelf **AYB1(B)** plug-in for 2 or 4 single-party channels, respectively. The **AUA403** test CU is used only for system testing purposes.

WARNING

The use of any RT channel unit except the AUA400, AUA401, AUA404, AUA405 or AUA403 CUs will result in permanent damage to the AYB1(B) OU in the optical shelf.

DISTANT TERMINAL DESCRIPTION

A single fiber carries up to four VF channels from the AYB1(B) optical unit in the RT optical shelf to an AYB1(B) in the DT. The AYB1(B) splits the transmit and receive optical signals and performs the electrical to optical conversion. The electrical signal from the DT AYB1(B) is passed to the ASJ1 channel unit which provides up to four VF lines depending on which channel unit is used at the RT. The ASJ1 or ASJ2 channel unit provides the BORSCH (battery feed; overvoltage protection; ringing; supervision; CODEC; hybrid) functions for the four POTS lines. The ASJ2 along with the EAF1 drop test module provide enhanced MLT-2 test capabilities when the AUA404 or AUA405 RT channel unit are used.

The DT is powered from customer premises AC or DC power. The ASH1 power converter unit maintains backup battery power, provides DT circuit pack power, and ringing current.

There are three codes of DTs available. The 900A1 DT is AC powered and has an insulation displacement (push on) connector for the drop pairs. The 900A1 DT can be individually mounted on the customer's residence or can be clustered together and share a common AC power source. The 900A2 and 900A3 DTs are DC powered and are typically collocated two or three to a pedestal. The 900A2 has binding post connectors for the drop pairs while the 900A3 has an insulation displacement connector. DC power for these DTs come from up to eight 48-volt DC power supplies at various customer premises.

SYSTEM MAINTENANCE

Trouble clearing for FTTH is based on LED alarm indicators and circuit pack replacement. Basic *SLC* Series 5 Carrier System trouble clearing activities, as described in TAD-100, is the same for a FTTH system with one main difference. The alarms that indicate failed RT ringing generators (non-FTTH) are used to report failed optical shelf or optics power shelf troubles (***ADU*** and ***BCU*** indicators light for the digroups).

FTTH CUSTOMER TROUBLE REPORTS

An FTTH customer trouble report is generally an unalarmed trouble (that is, not a system trouble) that can be caused by failed COT or RT channel units, failed AYB1(B) optical unit, failed DT equipment, or bad fiber distribution cable.

When a customer reports a trouble to the RSA (repair service administrator), the RSA can perform MLT (generic 5 issue 6 or later) tests, via XTC or PGTC, that will return a DC signature from the RT channel unit. If FPC and the XTC are used, a good/bad COT channel unit indication is also returned. If enhanced channel testing circuit packs are deployed (AUA404 or AUA405 RT channel units, the ASJ2 DT channel unit and the optional EAF1 drop test module), other MLT test DC signature results are available. If the COT channel unit is good and the RT to DT fiber link DC signature is good, a craftsperson should be dispatched to the DT.

A J99407TA-1,L1 analyzer (a self-contained portable DT) can be used at the RT or DT to sectionalize troubles to RT equipment, fiber distribution cable, or DT equipment (See FIG. 1). The RT channel units AUA400 and AUA401 have an OOS (out of service) indicator that lights when the signal from the DT is lost. The analyzer can be connected at the optical interconnect shelf to verify RT equipment. An AUA403 channel unit, included with the analyzer, can be used to isolate trouble between the COT and RT by replacing the AUA400, AUA401, AUA404 or AUA405 channel unit.

When trouble clearing at the DT, first verify AC or DC power and ASH1 power converter voltages are present. Then observe ASJ1 channel unit alarm indicators to determine the cause of the trouble. The analyzer can be used to quickly identify if trouble is associated with the fiber distribution cable or DT equipment.

TAPs in this section provide detailed procedures required to clear Fiber-To-The-Home customer trouble reports.

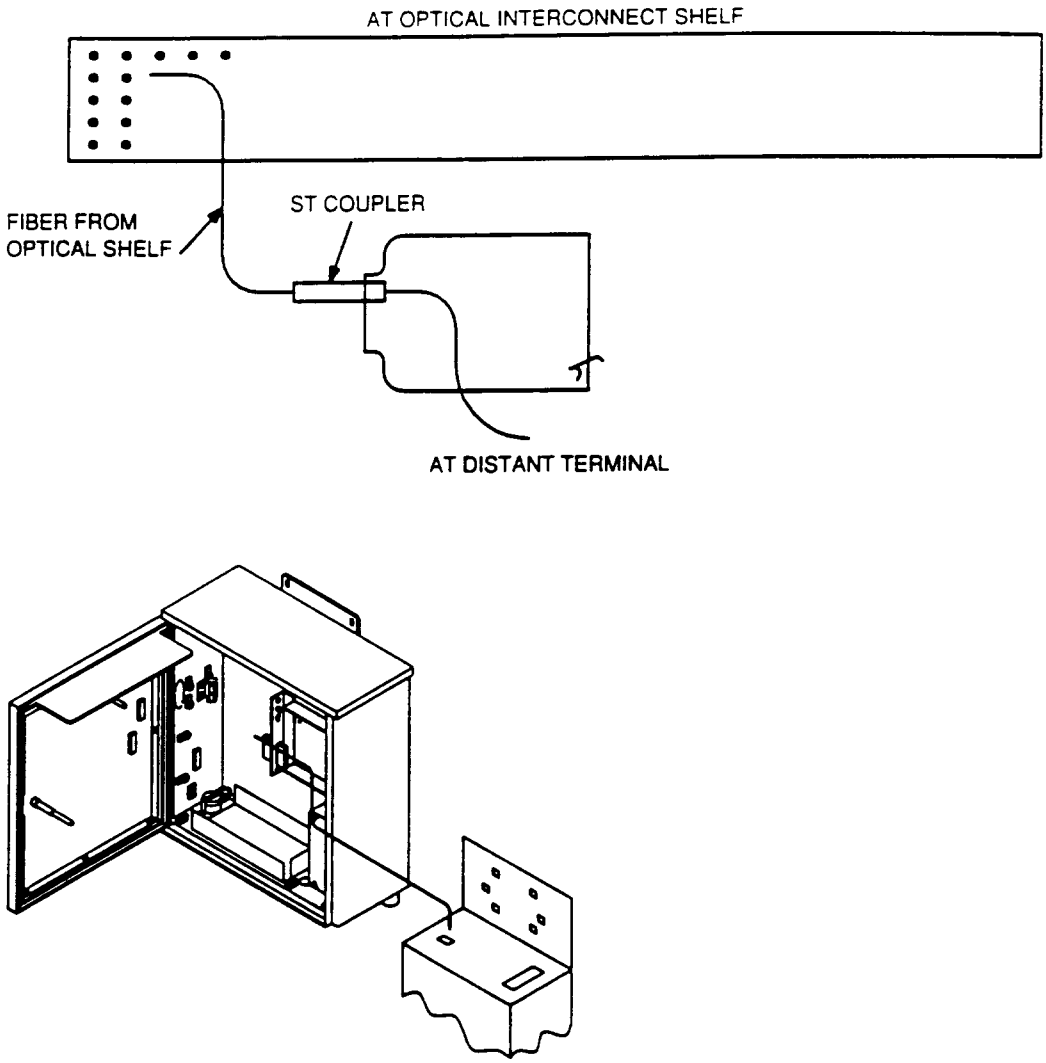


Figure 1—Fiber Connections With J99407TA Analyzer

CLEAR FIBER-TO-THE-HOME CHANNEL TROUBLE

General This procedure is used to clear customer trouble reports when the *SLC* series 5 system is unalarmed. Customer trouble conditions can be caused by system failures or RT optical power failures. These troubles will activate system alarms. If the *SLC* system is alarmed, refer to **IXL-001** to clear trouble condition.

Multiple channel troubles can be caused by faulty common units (TRUs or LIUs), or a faulty channel unit (killer channel unit) at the COT or RT channel bank. These types of failures generally cause trouble on all channels associated with the digroup(s).

This procedure is intended to clear channel trouble reports for customers served by a single DT. Each DT can provide four POTS channels. If more than one channel is used and only one has trouble, customer premises wiring, MDF-to-COT wiring, COT, RT, or DT channel units is a likely cause of trouble. Channel tests via the MLT can give a GOOD/BAD dc signature that indicates if the RT channel unit is out of frame (OOF). MLT testing (generic 5 issue 6 or later) via the XTC can give a PASS/FAIL indication for COT channel units. The RT channel will always fail but the GOOD/BAD dc signature will indicate an OOF condition.

1. Is trouble on a single DT, or associated with a shelf (AB or CD) or single digroup?

   If **DT**, then continue with Step **2.**
   If **SHELF or DIGROUP**, then do **TAP-123.**

2. ***Note:*** If Maintenance Center or Test Desk cannot access failed channel via PGTC (pair gain test controller) or XTC (extended test controller), check to ensure that no fuses are blown in lower (blue) bank **CFU** (channel fuse unit). The results will be a GOOD/BAD RT channel unit dc signature and possibly a PASS/FAIL COT channel unit result (if MLT with generic 5.1 or later and the XTC is used). If the channel is busy test access will be denied. See Maintenance and Testing section in AT&T 363-205-002 for more details on channel testing.

   Request Maintenance Center to perform tests on failed CUs.

   Reference: **DLP-526**

3. What were the test results?

   Comment: MLT-2 test may return a **VER** code and report Tip-to-Ring resistance. Refer to TABLE A for a summary of channel test DC signatures.

   If **GOOD dc signature for RT CU**, proceed to DT and continue with Step **15.**
   If **BAD dc signature for RT CU**, proceed to RT and continue with Step **7.**
   If **BAD COT CU** or no test done, proceed to COT and continue with Step **4.**

TABLE A

FTTH TEST CAPABILITY DC SIGNATURES

DC SIGNATURE (OHMS T-R)	INDICATION	DISPATCH TO	ACTION	SAM REQ:DVER / INPUT VER:	MLT-2 TV MASK VER
86K-98K	Fiber link good, basic FTTH RT, no enhanced test capability	DT	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -1 / —	1X
>2500K	Fiber link bad	RT	Perform DT Analyzer Test at RT If OK, proceed to DT else Clear RT or COT CU trouble	N -2 / —	2X
15K-24K	Fiber link good, basic FTTH DT, no enhanced test capability	DT	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -8 / —	8X
24K-34K	Bad or missing EAF1 DTM no drop test results	To DT if customer reports trouble	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -3 or N -10 / VER 95 or VER 99	3X or 3C
34K-44K	Drop test OK	To DT if customer reports trouble	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -4 or N -11 / VER 95 or VER 99	4X or 4C
44K-54K	No ringer on drop	DT	Perform Talk Test From NIU If OK, premise wiring/phone else Clear trouble at DT	N -5 or N -12 / VER 95 or VER 99	5X or 5C
54K-64K	FEMF/Leakage on drop DANGER: Possible hazardous voltage on drop.	DT	Clear AC power on drop per local procedures	N -6 or N -13 / VER 95 or VER 99	6X or 6C
64K-74K	Receiver off hook	DT	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -7 or N -14 / VER 95 or VER 99	7X or 7C
15K-96K	Fiber link good to DT no line record	Retest with T1 overide	—	N -9 / VER 25	9X
74K-86K	[Not used]				

4. Replace COT channel unit.

5. Request Maintenance Center to perform tests on new CUs.

   Comment: If testing is not available, call customer and verify normal talk and dialing capabilities.

6. Did trouble clear?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, then proceed to RT and continue with Step 7.

7. At RT, determine **AYB1B** and optical interconnect fiber associated with the trouble.

   Reference: **DLP-522**

8. Connect **J990407TA** analyzer to fiber appearance at the optical interconnect bay and perform normal talk tests.

   Reference: **DLP-523**

   Comment: The analyzer must be replaced if **FAIL or BUSY** indicators remain on after fiber connection is made.

9. Was call completed with normal transmission quality in both directions?

   If **YES**, then proceed to Step **11.**
   If **NO**, then continue with Step **10.**

10. Check COT and RT wiring for tip and ring reversals. Use COT and RT schematic drawings to check wiring.

    STOP. YOU HAVE COMPLETED THIS PROCEDURE.

11. Disconnect analyzer test connections. Clean and reconnect fiber distribution cable at optical interconnect bay.

12. Is **OOS** indicator light on **AUA400, AUA401, AUA404** or **AUA405** RT channel unit?

    If **YES**, then proceed to DT and continue with Step **15.**
    If **NO**, then continue with Step **13.**

13. Call customer and verify normal talk and dialing capabilities.

14. Did trouble clear?

    If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, then proceed to DT and continue with Step **15.**

15. At DT site, disconnect customer line from NIU or protector panel and connect a test set to the RJ11 jack or protector panel. Perform normal talk tests.

16. Was call completed with normal transmission quality in both directions?

    If YES, then **STOP. Trouble is with customer premises wiring or drop wire. If you are at a cluster DT site, reconnect drop wires, proceed to customer premises and perform talk test at the NIU. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, then continue with Step 17.

17. If DC back powering is used in a pedestal configuration, measure DC power module input (V+IN and V-IN 30—60 volts DC) and output (V+OUT and V-OUT 22—26 volts DC) voltages. If voltages are not present, clear DC back power trouble.

    Reference: **TAP-131**

18. ***Note:*** The **ASH1 PCU** has two **GND** jacks. One is used with **BAT** and **20HZ** on one side of the board, and **+5, -5,** and **-37** Vdc on the other side of the board.

    A quick DT power test is to turn off the AC or DC power and verify the ON BAT indicator lights.

    At DT site, open cabinet and measure **ASH1 PCU** faceplate test jack voltages.

Requirements:
BAT and **GND** -10 to -15 Vdc
20HZ and **GND** -18.4 to -21.6 Vdc
20HZ and **GND** 69 to 81 Vac
+5 and **GND** +4.6 to +5.4 Vdc
-5 and **GND** -4.6 to -5.4 Vdc
-37 and **GND** -34 to -40 Vdc.

Comment: The **20HZ and GND** voltages will not be present if **OOF** indicator is lighted or the ASJ1 is failed.

19. ***Note:*** The DT power will shut down if ac power is lost and the battery voltage drops below 10 Vdc. Ac power must be restored before the DT will be powered.

    If **ASH1 PCU** voltage requirements were not present, replace ASH1 PCU. If voltage requirements are still not present, proceed to Step **30.**

    Reference: **DLP-524**

20. At DT observe any LED indicators on **ASJ1** or **ASJ2** channel unit.

    - **FAIL**: Power down (turn off ac power and disconnect battery power cable J104-P104) and restore DT power. If FAIL is still on, replace **ASJ1** or **ASJ2** and repeat this procedure if necessary.

      Reference: **DLP-524**

    - **OOF**: Likely cause is in DT electronics, proceed to Step **31.**

    - **BUSY**: Likely cause is a short in **NIU** wiring, proceed to Step **21.**

- **ON BAT**: Likely cause is a loss of ac power. Verify ac power is present at ac outlet and circuit breaker is on. If ON BAT is still on proceed to Step **28.**

- **No LED Lighted and No Dial Tone**: Replace DT (See AT&T 363-205-002).

21. For **BUSY** indicator, verify no channels are in use and remove connections at the NIU. At 108 connect block (Fig. 1) remove Tip-Ring pairs to NIU and observe **BUSY** indicator.

    Comment: The insulation displacement 108 connector block (900A1 or 900A3 DTs) may be replaced by a 76-type binding post block (900A2 DT).

22. Did **BUSY** indicator go off?

    If **YES**, then continue with Step **23.**
    If **NO**, then proceed to Step **24.**

23. Trouble is in voice-frequency pairs. Use SD drawing to correct wiring trouble. Clear customer premises wiring trouble and reconnect VF pairs to 108 block. For cluster DT sites check drop wire protector panel. Check NIU protectors. If dial tone cannot be established at the NIU, replace DT.

    STOP. YOU HAVE COMPLETED THIS PROCEDURE.

24. Replace **ASJ1** or **ASJ2** channel unit.

    Reference: **DLP-524**

25. On replacement **ASJ1** or **ASJ2**, is **BUSY** indicator off?

    If **NO**, then continue with Step **26.**
    If **YES**, then proceed to Step **27.**

26. Trouble is in DT wiring. Use SD drawing to correct wiring trouble. Replace DT if trouble is not found (See AT&T 363-205-002).

    STOP. YOU HAVE COMPLETED THIS PROCEDURE.

27. Connect NIU Tip-Ring pairs on 108 connector block. Perform normal transmission tests from customer premises NIU RJ11 jack and proceed to Step **29.**

28. ***Note:*** If **ON BAT** indicator is lighted, verify AC or DC power is present before continuing.

    For **power trouble**, replace **ASH1 PCU** and perform normal transmission tests.

    Reference: **DLP-524**

29. Is normal transmission quality good in both directions?

    If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, then proceed to Step **30.**

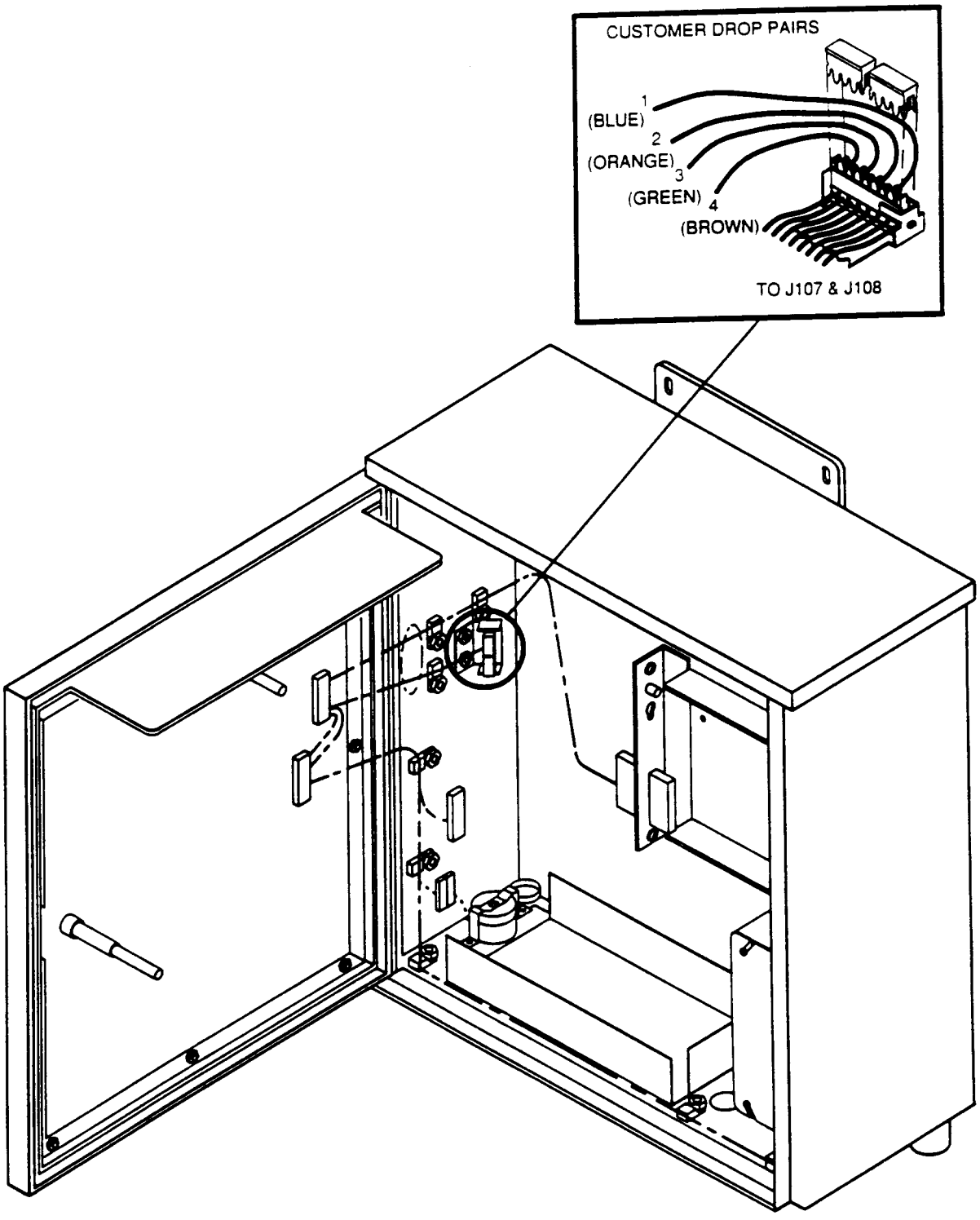


Figure 1—Customer Drop Pairs Access in DT Cabinet

30. Trouble is in DT circuitry. Use SD drawing to correct wiring trouble. Check secondary AC power to ASH1 PCU at J101 (17 volts AC between brown and brown wires or 24 volts DC for DC power 900A2 DT). Replace DT if power trouble is not cleared (See AT&T 363-205-002).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

31. For **OOF**, unplug **AYB1B** optical unit and connect J99407TA test card into AYB1B slot. You must remove *ST*® lightguide cable connector cover and clean the *ST* connectors before inserting the test card. Perform normal transmission tests from J99407TA Analyzer channel jacks.

32. Is normal transmission quality good in both directions?

    If **YES**, then proceed to Step **34.**
    If **OOF** is lighted on Analyzer, then continue with Step **33.**

33. If RT equipment has not been checked out, proceed to RT site and continue with **Step 7.** If trouble is not found at RT, dispatch craftsperson responsible for locating and repairing optical distribution cable troubles.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

34. Replace **AYB1B** optical unit in DT and remove Analyzer connections.

35. Perform normal transmission tests from NIU.

36. Is normal transmission quality good in both directions?

    If YES, THEN STOP. YOU HAVE COMPLETED THIS PROCEDURE.
    If **NO**, then continue with Step **37.**

37. Trouble is in wiring between **AYB1B** and **ASJ1**. Use SD drawing to correct wiring trouble. Replace DT if trouble is not cleared (See AT&T 363-205-002).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

CLEAR POWER MINOR ALARM AT 80E CABINET (BULK POWER PLANT) RT - PMN LED LIGHTED

1. At control and distribution panel, is **BAT2** or **VS** circuit breaker on AYK2 circuit pack tripped or is **FRB** fuse blown?

   If **YES**, then continue with Step **2**.
   If **NO**, then proceed to Step **8**.

2. Reset tripped circuit breaker or replace blown fuse.

3. Does circuit breaker trip or fuse blow again?

   If **YES**, then continue with Step **4**.
   If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4. If **FRB** fuse blown?

   If **YES**, then continue with Step **5**.
   If **NO**, then proceed to Step **6**.

5. Wiring problem present on control and distribution panel. Use SD-83109-01 to locate and clear trouble.

6. Replace AYK2 circuit pack.

7. Does circuit breaker trip again?

   If **YES**, then proceed to Step **5**.
   If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8. On OLS rectifier shelf, is **FAIL** indicator on either CS787B540 power unit (rectifier) lighted?

   If **YES**, then continue with Step **9**.
   If **NO**, then proceed to Step **14**.

9. At ac power panel, locate circuit breaker (**CB6**, **CB7**, or **CB8**) providing ac power to rectifier with **FAIL** indicator lighted.

10. Operate circuit breaker **OFF** and then back **ON**.

11. Does **FAIL** indicator on rectifier remain lighted?

    If **YES**, then continue with Step **12**.
    If **NO**, then proceed to Step **13**.

12. Replace CS787B540 rectifier.

13. After 5 minutes, is **PMN** or **P/M** indicator on **BCU** lighted?

CLEAR FIBER-TO-THE-HOME DT DC BACK POWERING TROUBLE

General This procedure is used to clear DC back power supply for 900A2 DTs mounted in a pedestal. The power is fed from a power source on the customer premises to the pedestal DC power interface. The DC power interface has DC protector cards that protect DC power feed from two customers. The DC power interface convert –48 volts DC from the customer to +24 volts for the DTs. A power trouble can be caused by fault customer power feed (bad power converter or DC power drop), faulty DC protector card, or faulty DC power interface.

1. Measure 48-volt DC drop power feed voltage at DC feed terminal block for each customer [FIG. 1].

   Comment: Each customer power feed should provide 38 to 63 volts DC. Zero voltage indicates customer premise power converter or power feed drop trouble. If some of the power feeds are not supplying power, other power feed voltages may be reduced below 38 volts DC. The trouble with the feeds with zero volts DC should be cleared and voltage measurements made again. If the customer power converter is supply 38 to 63 volts DC but the voltage at the DC feed terminal block is low, the DC power drop wires may need to be replaced.

2. ***Note:*** With maximum DT traffic and video equipment connected the power feed should provide 30 to 63 volts.

   Were any DC power feed voltages out of spec (42 to 54 volts DC)?

   If **NO**, then proceed to Step **8**.
   If **YES**, then continue with Step **4**.

3. Proceed to customer premises and measure the output of the DC power source.

   Comment: Verify customer has AC power and check to see if any circuit breakers are tripped.

4. Was DC power converter voltage out of spec (38 to 63 volts DC)?

   If **NO**, then proceed to Step **7**.
   If **YES**, then continue with Step **6**.

5. Replace customer premise DC power converter (See AT&T 363-205-002 *SLC* Series 5 Fiber-To-The-Home User's Manual for details if necessary). Then repeat this procedure from the DT pedestal.

6. When the customer premises DC power converter voltages are between 38 and 63 volts DC and the voltage at the pedestal is bad, the trouble is in the DC power feed drop wires. Repair DC drop wire trouble. Then repeat this procedure.

7. Remove cover to DC power interface.

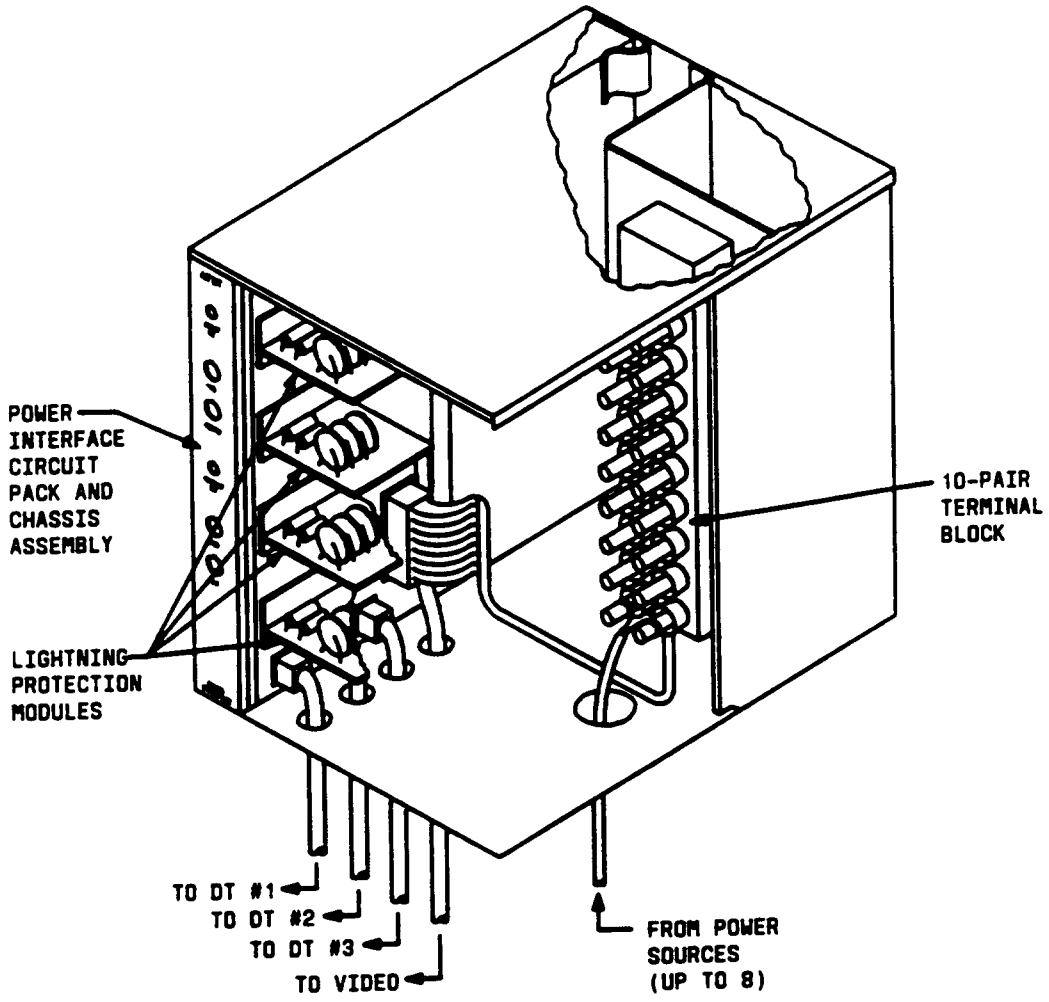


Figure 1—DT 900A2 DC Back Powering Equipment

8. Measure DC power interface input voltage (V+IN to V-IN 38 to 63 volts DC).

   Comment: If input voltage is not present, check the P1 J1 connection from the DC drop terminal to the DC power interface.

9. Were DC power interface input voltages present (38 to 63 volts DC)?

   If **YES**, then proceed to Step **12**.
   If **NO**, then continue with Step **10**.

10. Replace DC protector module(s) on DC power interface circuit pack.

11. Were DC power interface input voltages present (38 to 63 volts DC)?

    If **YES**, then continue with Step **12**.
    If **NO**, then proceed to Step **14**.

12. Measure DC power interface output voltage (V+OUT to V-OUT 24 volts DC).

13. Were DC power interface output voltages present (22 to 26 volts DC)?

    If **YES**, then proceed to Step **15**.
    If **NO**, then continue with Step **14**.

14. Replace DC power interface circuit pack as follows:

    - Remove DC terminal block jack J1.
    - Remove all power cords (DT1, DT2, DT3, VIDEO, and AUX) as required.
    - Remove DC protector Modules (1, 2, 3, and 4) as required.
    - Replace DC power interface circuit pack.
    - Install DC protector Modules (1, 2, 3, and 4) as required.
    - Connect all power cords (DT1, DT2, DT3, VIDEO, and AUX) as required.
    - Connect DC terminal block jack J1.
    - Verify DC power interface input and output voltages.

15. At this point, you have cleared any trouble with the DC back powering equipment. If you still do not have power at the 900A2 DT, check power cord connections (DT1, DT2, DT3). Trouble may be in the DT. Replace cover to DC power interface.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

CHECK FIBER-TO-THE-HOME CIRCUIT ARRANGEMENT

SUMMARY: These Steps can be used to find the relationships between RT digroup channel positions and the associated Fiber-to-the-Home equipment. Powering arrangements and circuit pack locations are also covered. All this information should be available in the word order, but is included here for convenience. Use TABLE A to find the RT circuit of interest, then see the figures to find the location of these circuit packs in the shelf assemblies. If the FTTH equiment is mounted in an 80E cabinet the shelf interconnection cabling is the same. But the 7-foot frame is divided into two bays. One bay houses the dual channel banks and the other bay houses the optical equipment (See AT&T 363-205-401 RT TOP acceptance procedures for more 80E FTTH cabling details).

1. Use TABLE A to find RT and digroups of interest, then see FIG. 1 through 6 for more details about the individual equipment shelves.

2. See TABLE B for bay fusing arrangements.

3. See TABLE C and FIG. 2 for bay connections from the Power Shelf Assembly.

4. See TABLE D and FIG. 2 for intershelf cabling arrangements.

5. Figure 1 shows the Fiber-to-the-Home 7-foot frame equipment bay arrangement. Note that the connections between the dual channel bank 1 and optical shelves 1 and 2 are not shown, but are connected in a similar arrangement as the connections for the dual channel bank 2. Figure 2 shows all the required connections for the 7-foot Fiber-to-the-Home equipment frame. Each optical shelf serves one of the RT systems in the dual RT channel bank assembly.

6. The optical shelf provides slots for 48 AYB1B optical units, one for each channel unit slot in the RT. Each RT digroup has 12 channel unit slots and each channel unit slot is labeled with the channel count served by the slot (e.g., 43/44). To find the AYB1B slot associated with a channel unit slot, simply find the AYB1B slot with the same channel count number. The **AUA401** channel unit occupies two channel unit slots in the RT, but requires only one AYB1B optical unit to be installed in the optical shelf. The AYB1B position corresponds with the RT channel unit slot of the first two channels. To find the AYB1B slot associated with an AUA401 channel unit, use the same method as above with the lower channel count slot (e.g., an AUA401 occupying RT slots 43/44 and 45/46 is AYB1B slot 43/44; AYB1B slot 45/46 is not used).

7. When a trouble condition is present, use TABLEs B and C to trace fusing and power cable connections troubles. Use TABLE D to trace intershelf cabling trouble.

8. The appearance of an optical fiber associated with a channel unit slot should be supplied with the work order. The fiber cables are connected from the optical shelf to the optical interconnect frame in bundles of 12 fibers. These bundles are identified by the RT SID (system identification number) and the odd numbered channels (P number) of the digroup. For example, an AUA400 or AUA404 in channel slot 21/22 of RT system 1234 would have an optical interconnect frame appearance *1234 P21*. An AUA401 or AUA405 in channel slots 33/34 and 35/36 of the same RT system would have a fiber interconnect appearance *1234 P33*.

9. When the J99407TA Analyzer is connected to the optical cable (FIG. 7), the *ST*-type connectors should be cleaned using reagent grade isopropyl alcohol and blown dry with canned air. The same should be done when connections to the distribution cables are made. See *"Instruction Manual" "1032A TOOL KIT With D-181610 KIT" "ST CONNECTORS" "SINGLE MODE LIGHTGUIDE CABLE"* for procedures to make cable splice and clean *ST* connectors.

10. The Analyzer has an optical cable attached to a blank card that is used to replace the AYB1B in the DT cabinet. This connection can only be used at the DT cabinet. When the Analyzer is used at the RT location, an *ST* coupler is connected to the Analyzer cable end *ST* connector. Then the optical cable from the RT optical shelf AYB1B circuit pack can be coupled at the fiber interconnect to the Analyzer.

11. When the **AYB1B** is removed at the RT optical shelf, the backplane connector must be cleaned before the circuit pack is replaced. The following step outlines this cleaning procedure.

12. Using a J99409OB, L1 OBMK (optical backplane maintenance kit) clean the optical shelf backplane couplings for **AYB1B** slot before installing the **AYB1B** as follows:

    - Insert miniswab into chuck of OBMK extension handle and tighten chuck into extension handle.
    - Insert extension handle, with miniswab, into tube of OBMK basic unit.
    - Moisten tip of miniswab by dipping it into alcohol.
    - Dab tip of miniswab with an alcohol moistened Kimwipe wiper or equivalent.
    - Insert basic unit into slot of optical shelf while keeping extension handle inside guide tube. Latch basic unit into place.
    - Push extension handle with miniswab into guide tube until knob of extension handle contacts guide tube.
    - Rotate knob of extension handle three turns clockwise then three turns counterclockwise.
    - Remove extension handle with miniswab from guide tube.
    - Assemble air director tube from OBMK over nozzle on can of compressed air.
    - Insert air director tube, attached to can of compressed air, into guide tube of basic unit until tube stops forward progress.
    - Using can of compressed air, blow three short blasts of air into coupling.
    - Remove air director tube with canned air from guide tube.
    - Remove basic unit.
    - Remove air director tube from can of compressed air and store tube in J99409OB case.

- Store basic unit in J99409OB case.
- Remove miniswab from extension handle and store handle in J99409OB case.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

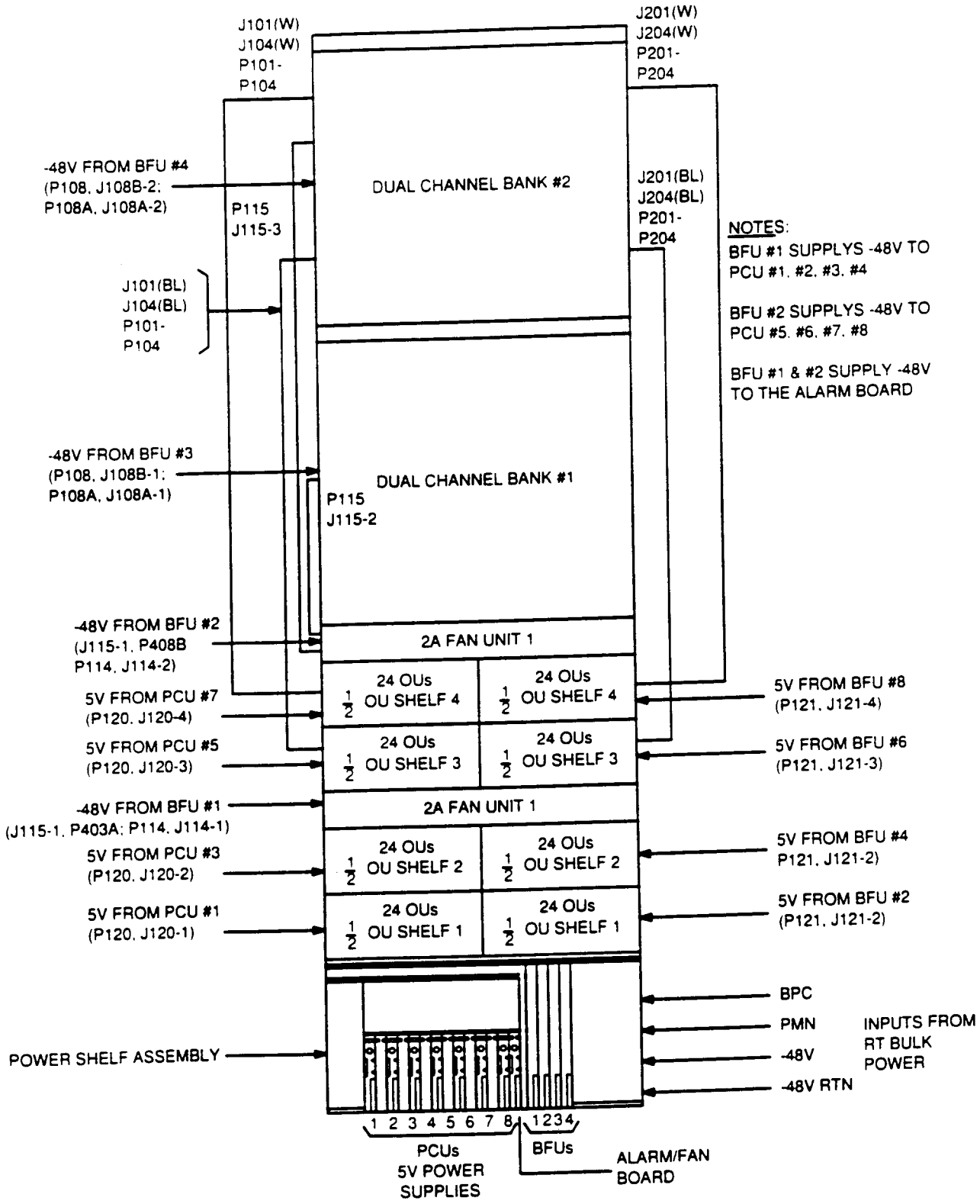


Figure 1—Fiber-To-The-Home 7-Foot Bay Arrangement

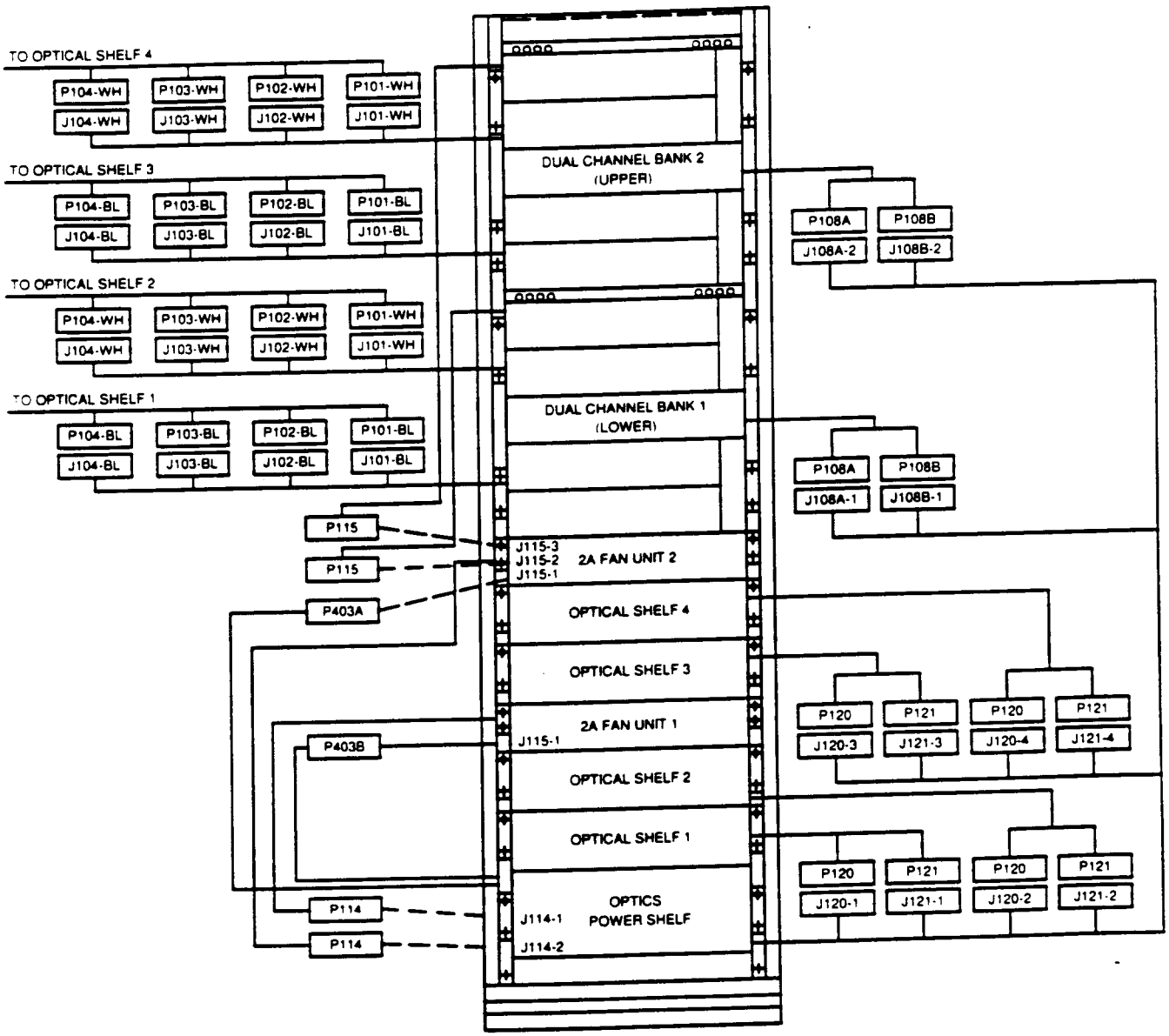


Figure 2—Fiber-To-The-Home 7-Foot Bay Cabling Connections

TABLE A

FIBER TO THE HOME EQUIPMENT OVERVIEW

RT	Digroup	RT Power	Optical Shelf	OS Power	AYB1 OUs	Optical Interconnect (Note)
Lower Blue	A	BFU #3	1	BFU #1,PCU-1	1/2—23/24	SID#, Fibers 1-12
	B	BFU #3	1	BFU #1,PCU-1	25/26—47/48	SID#, Fibers 13-24
	C	BFU #3	1	BFU #1,PCU-2	49/50—71/72	SID#, Fibers 25-36
	D	BFU #3	1	BFU #1,PCU-2	73/74—95/96	SID#, Fibers 37-48
Lower White	A	BFU #3	2	BFU #1,PCU-3	1/2—23/24	SID#, Fibers 1-12
	B	BFU #3	2	BFU #1,PCU-3	25/26—47/48	SID#, Fibers 13-24
	C	BFU #3	2	BFU #1,PCU-4	49/50—71/72	SID#, Fibers 25-36
	D	BFU #3	2	BFU #1,PCU-4	73/74—95/96	SID#, Fibers 37-48
Upper Blue	A	BFU #4	3	BFU #2,PCU-5	1/2—23/24	SID#, Fibers 1-12
	B	BFU #4	3	BFU #2,PCU-5	25/26—47/48	SID#, Fibers 13-24
	C	BFU #4	3	BFU #2,PCU-6	49/50—71/72	SID#, Fibers 25-36
	D	BFU #4	3	BFU #2,PCU-6	73/74—95/96	SID#, Fibers 37-48
Upper White	A	BFU #4	4	BFU #2,PCU-7	1/2—23/24	SID#, Fibers 1-12
	B	BFU #4	4	BFU #2,PCU-7	25/26—47/48	SID#, Fibers 13-24
	C	BFU #4	4	BFU #2,PCU-8	49/50—71/72	SID#, Fibers 25-36
	D	BFU #4	4	BFU #2,PCU-8	73/74—95/96	SID#, Fibers 37-48

Note: The fibers at the optical interconnect are labeled with the system identification number (SID) and the letter P followed by the odd channel number of the RT channel unit slot. For example, the fiber for RT **1234**, channel unit slot **23/24**, should be labeled **1234, P23**.

TABLE B

FIBER TO THE HOME BAY FUSING

	BFU Slot in Power Shelf Assembly				
40D BFU	1	2	3	4	Fuse Type
WHX	Not Used	Not Used	Not Used	Not Used	Dummy
BLX	Not Used	Not Used	Not Used	Not Used	Dummy
CMN	A/FCU	A/FCU	Lower RT Common	Upper RT Common	80D
WHITE	PCUs 3, 4	PCU 7, 8	Lower RT White	Upper RT White	81D
BLUE	PCUs 1, 2	PCU 5, 6	Lower RT Blue	Upper RT Blue	81D
FAN H	Lower 2A Fan	Upper 2A Fan	Not Used	Not Used	80D
FAN L	Lower 2A Fan	Upper 2A Fan	Not Used	Not Used	80D

TABLE C
CONNECTIONS FROM THE POWER SHELF ASSEMBLY

Power Shelf Assembly Connector Cable	J107	J114-1	P403A	J114-2	P403B	J108B-1	J108A-1	J108B-2	J108A-2
MISC Pair Panel	P107								
2A Fan Unit 1		P114							
2A Fan Unit 1			J115-1						
2A Fan Unit 2				P114					
2A Fan Unit 2					J115-1				
Lower RT Channel Bank						P108B			
Lower RT Channel Bank							P108A		
Upper RT Channel Bank								P108B	
Upper RT Channel Bank									P108A

CONNECTIONS FROM THE POWER SHELF ASSEMBLY

Power Shelf Assembly Connector Cable	J120-4	J121-4	J120-3	J121-3	J120-2	J121-2	J120-1	J121-1	
Optical Unit 4	P120								
Optical Unit 4		P121							
Optical Unit 3			P120						
Optical Unit 3				P121					
Optical Unit 2					P120				
Optical Unit 2						P121			
Optical Unit 1							P120		
Optical Unit 1								P121	

TABLE D
INTER SHELF CABLING

	2A Fan Unit 1 J115-2	Optical Shelf 1 P201-P204	Optical Shelf 1 P101-P104	Optical Shelf 2 P201-P204	Optical Shelf 2 P101-P104
Lower RT Channel Bank	P115	J201(W)-J204(W)	J101(W)-J104(W)	J201(BL)-J204(BL)	J101(BL)-J104(BL)

INTER SHELF CABLING

	2A Fan Unit 2 J115-3	Optical Shelf 3 P201-P204	Optical Shelf 3 P101-P104	Optical Shelf 4 P201-P204	Optical Shelf 4 P101-P104
Upper RT channel Bank	P115 *	J201(W)-J204(W)	J101(W)-J104(W)	J201(BL)-J204(BL)	J101(BL)-J104(BL)

* Requires a patch cord with J115 and P115 ends

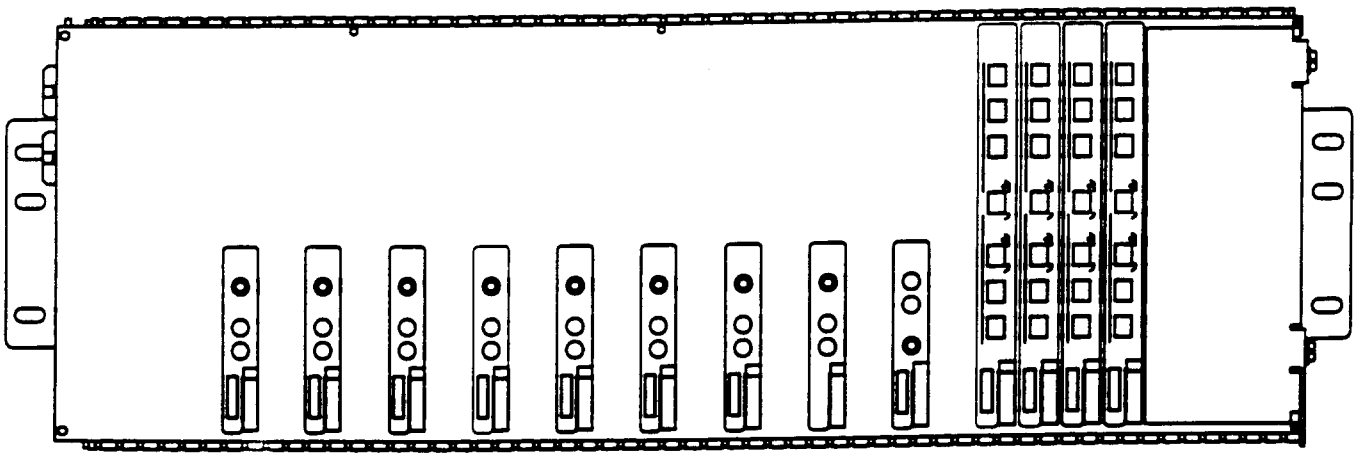


Figure 3—J1C182PB-1 Optics Power Shelf

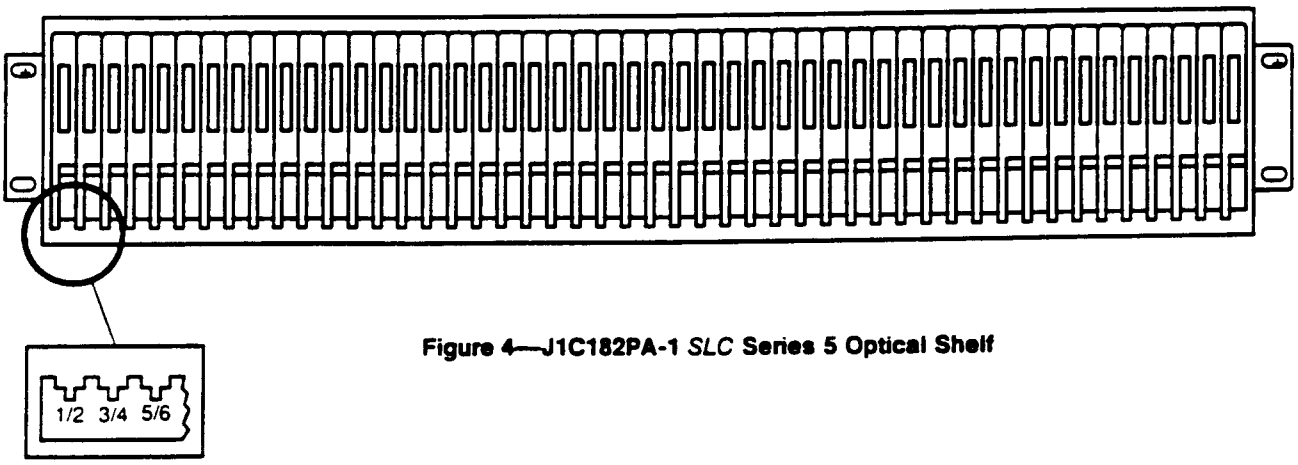


Figure 4—J1C182PA-1 *SLC* Series 5 Optical Shelf

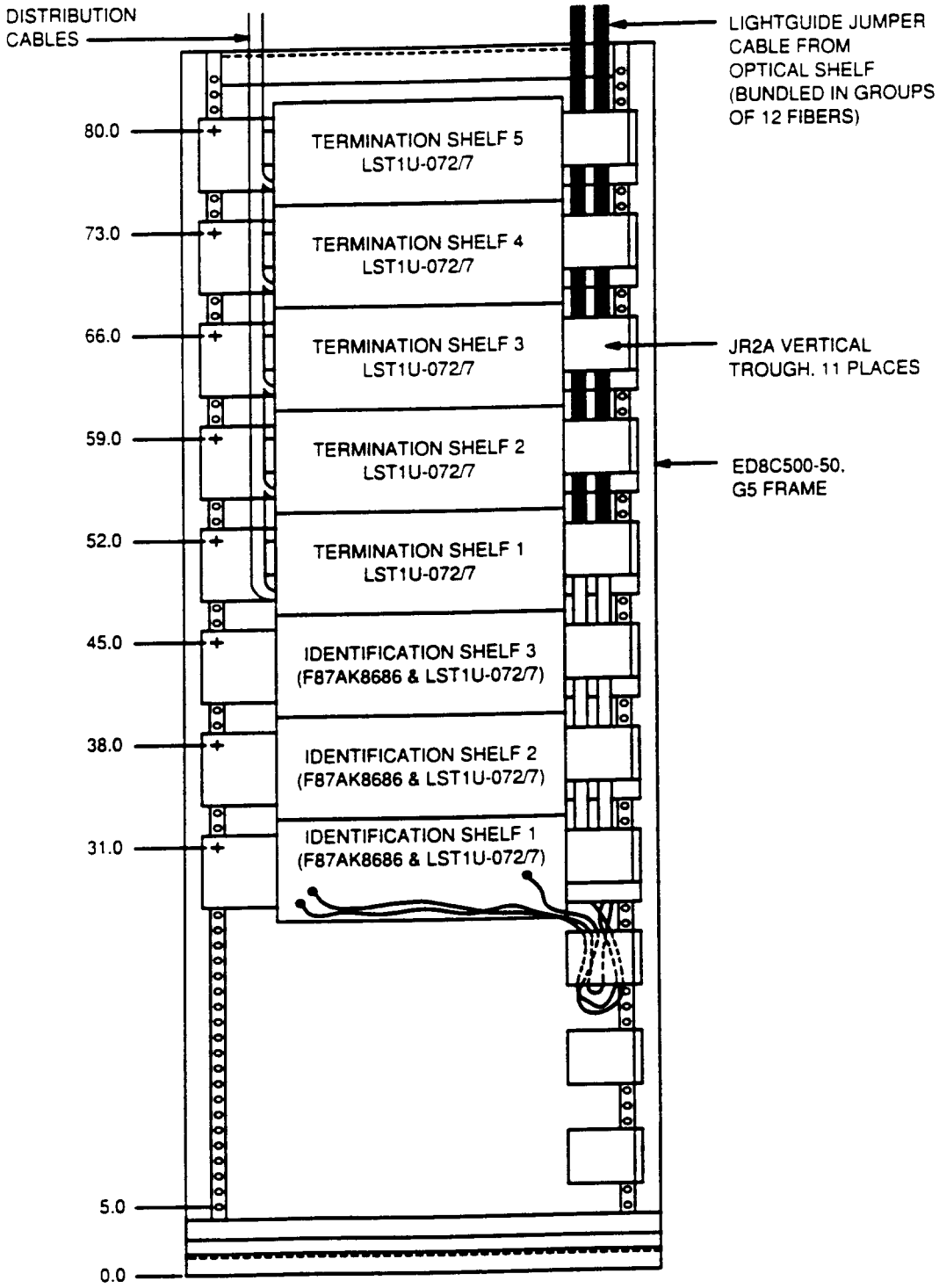


Figure 5—LGX Optical Interconnect Bay

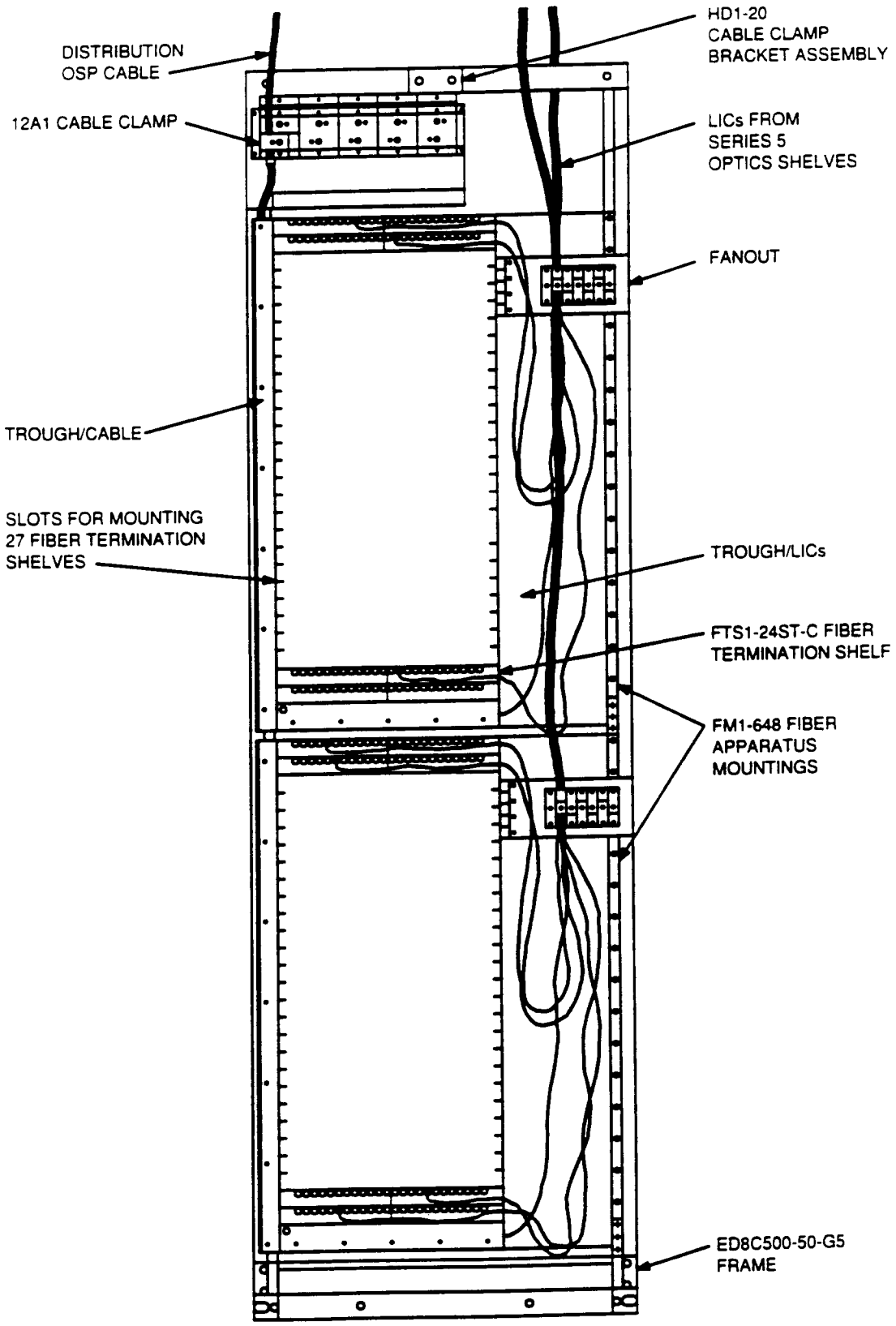
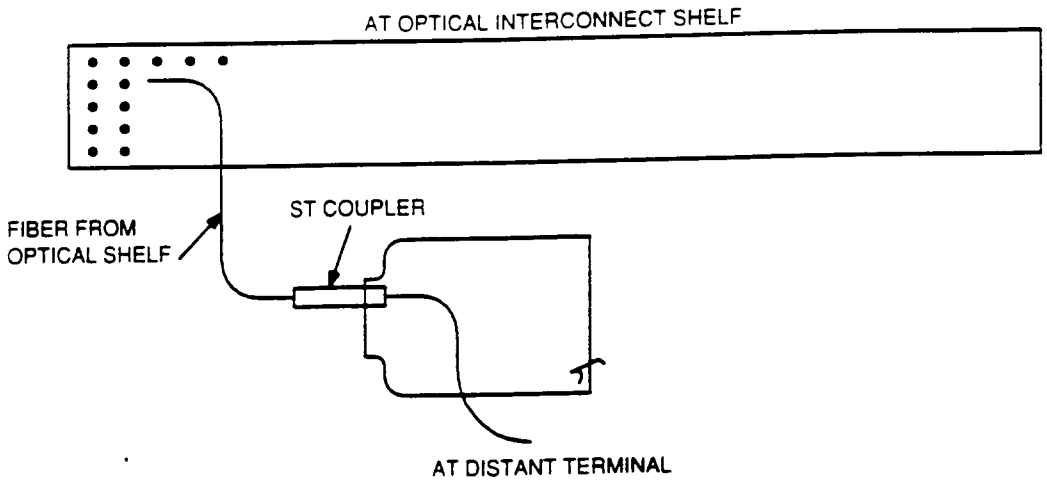


Figure 6—FIC (Fiber Interconnect) With FM1-600 Fiber Apparatus Mounting



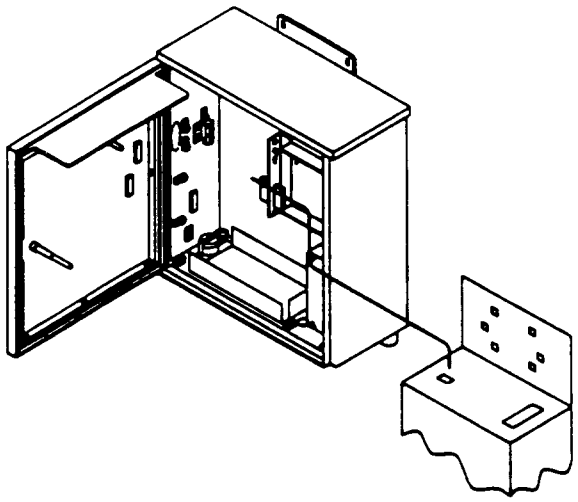


Figure 7—Fiber Connections With J99407TA Analyzer

AT&T 363-205-500
Issue 4, Revised November 1990

PERFORM SINGLE-PARTY POTS CHANNEL TEST FIBER-TO-THE-HOME COT-TO-RT

SUMMARY: At RT, determine optical interconnect fiber appearance for channel being tested. Connect analyzer to jumper fiber from AYB1B in optical shelf. Replace AYB1B and RT channel unit if DT has an OOF alarm. Clean optical connection and then use AUA403 to perform system test if replacement does not clear alarm. Make talking, dialing, ringing, and ring-trip tests for each channel from analyzer RJ11 jacks.

1. Establish communication between RT and COT.

2. Connect J99407TA Analyzer to jumper fiber from the appropiate optical shelf AYB1B (for channel unit being tested) at optical interconnect frame.

   Reference: **DLP-522**

   Response: When channel unit is installed, **OOS** indicator lights.
   When **J99407TA Analyzer** is connected, channel unit **OOS** indicator and the Analyzer **OOF** indicators goes off.

   Comment: **The analyzer must be replaced if the FAIL or BUSY** indicators remain lighted after the fiber connection is made.

3. Were the above responses noted and **OOS** and **OOF** indicators off?

   If **YES,** then continue with Step **7.**
   If **NO,** then proceed to Step **4.**

4. Verify the proper test connections have been made (check that channel unit has an associated AYB1B circuit pack in the optical shelf) and J99407TA Analyzer has power (the batteries must be charged).

   Reference: **DLP-522**

5. Did correcting test connections clear trouble?

   If **YES,** then continue with Step **7.**
   If **NO,** then proceed to Step **6.**

6. Replace, one at a time, **AUA400, AUA401, AUA404,** or **AUA405** channel unit and check access. Then if necessary replace **AYB1B** optical unit. If trouble is still present check optical shelf power and cabling between RT and optical shelf. Then clean and check fiber optical cable between the optical shelf, the optical interconnect frame, and the J99407TA. If system tests using **AUA403** have not been done proceed to Step **20.** Else if trouble is still present use office drawings and RT schematic drawing to clear wiring trouble. Check for tip-ring reversal between RT and optical shelf.

   Reference: **DLP-522**

7. Connect the test telephone into #1 RJ11 modular jack of the J99407TA Analyzer (Use the modular jack adaptor, provided with the Analyzer, to connect a butt set).

8. At J99407TA, lift handset and check for dial tone.

9. Is dial tone present at J99407TA test telephone?

   If **YES,** then proceed to Step **11.**
   If **NO,** then continue with Step **10.**

10. Replace, one at a time, **AUA400** (or AUA401, AUA404, AUA405) and **AYB1B** as needed and check for dial tone. If dial tone is not present after the AYB1B was replaced, repeat from Step **4.**

11. At J99407TA, dial the local MDF or CO number and make normal talk tests and monitor the call progress.

12. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **13.**
    If **NO,** then continue with Step **10.**

13. At COT dial the test line to ring the telephone at jack 1 of J99407TA. At the RT, if a test telephone is used the phone will ring normally. If the 1015B Butt Set is employed, use the **TEST** mode switch position and monitor the polarity indicators and/or earpiece to evaluate ringing.

14. At J99407TA, does the test phone ring normally?

    If **YES,** then continue with Step **15.**
    If **NO,** then proceed to Step **16.**

15. At J99407TA, does the test phone trip ringing when hand set is lifted?

    If **YES,** then proceed to Step **17.**
    If **NO,** then continue with Step **16.**

16. Change RT channel unit and repeat this procedure from Step **2.**

17. Is this the last channel unit slot (digroup) to be tested?

    If **YES,** then continue with Step **18.**
    If **NO,** then repeat this procedure from Step **2** for next channel unit slot.

18. Repeat this procedure from Step **8** for other RJ11 modular jacks of the J99407TA analyzer (#2; and #3 and #4 for AUA401 or AUA405) as required. Then continue with Step **19.**

19. Remove channel test equipment and reconnect jumper fiber to distribution fiber at optical interconnect frame.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

20. ***Warning: Installing any channel unit besides the test channel unit AUA403, AUA400, AUA401, AUA404, or AUA405 will result in permanent damage to the optical shelf AYB1B optical unit.***

    Note: Test telephone set should be connected for bridged ringing. Test telephone is connected to the faceplate jack of the AUA403 test channel unit using the WP91067-L6 test cable provided in the J99407TA Analyzer.

    At RT, install a single-party test **AUA403** channel unit into the channel unit slot that coincides with the channel being tested and temporarily connect a test telephone set to the channel via the faceplate jack.

21. At RT, lift handset and check for dial tone.

22. Is dial tone present at RT?

    If **YES,** then proceed to Step **26.**
    If **NO,** then continue with Step **23.**

23. Check test connections and correct if needed. Replace COT channel unit and check for dial tone. If still not present, replace RT channel unit (**AUA403**) and check for dial tone.

24. Is dial tone present at RT?

    If **YES,** then proceed to Step **26.**
    If **NO,** then continue with Step **25.**

25. Use COT schematic drawings to check channel bank wiring. Use office drawings to check central office wiring. Look for tip and ring reversal between COT channel appearance and office equipment. Correct wiring until dial tone is present at RT and proceed to Step **26.**

26. At RT, dial local MDF or CO number and make normal talk tests.

27. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **33.**
    If **NO,** then continue with Step **28.**

28. Replace COT channel unit and repeat normal talk tests.

29. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **33.**
    If **NO,** then continue with Step **30.**

30. Replace RT channel unit and repeat normal talk tests.

31. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **33.**
    If **NO,** then continue with Step **32.**

32. Use COT and RT schematic drawings to check wiring. Check for tip and ring reversal between COT channel appearance and office equipment. Correct wiring and repeat from Step 32 until talk quality is good in both directions.

33. *Note:* The RT test channel unit **AUA403** does not supply ringing to the test telephone. COT personnel must verify audible ringing tones after the test line has been dialed and request RT personnel to lift handset after ringing tones are present.

    At COT, dial test line number to ring telephone at RT.

34. At COT do you hear audible ringing tones after dialing?

    If **YES,** then proceed to Step **38.**
    If **NO,** then continue with Step **35.**

35. At COT, has tip and ring reversal been checked?

    If **YES,** then continue with Step **36.**
    If **NO,** then proceed to Step **37.**

36. Replace, one at a time; COT channel unit first and then RT channel unit. Repeat this procedure from Step **20** after each replacement.

37. Look for tip and ring reversal at COT and repeat from Step **33.**

38. At RT, lift telephone handset when requested by COT personnel (during ringing).

39. At RT, does ringing trip normally and is normal transmission established?

    If **YES,** then proceed to Step **41.**
    If **NO,** then continue with Step **40.**

40. Replace, one at a time; COT channel unit first and then RT channel unit. Repeat this procedure from Step **20** after each replacement.

41. Is this the last designated channel unit slot to be tested?

    If **YES,** then continue with Step **42.**
    If **NO,** then repeat from Step **20.**

42. Remove **AUA403** and install **AUA400, AUA401, AUA404,** or **AUA405** channel unit. Then repeat from Step **2.**

AT&T 363-205-500
Issue 4, Revised November 1990

REPLACE DISTANT TERMINAL CIRCUIT PACK

SUMMARY: To replace DT circuit packs, turn off the AC or DC power circuit breaker. Then remove battery power by disconnecting P104-J104 power lead. To replace the ASJ1 or ASJ2 channel unit or ASH1 power converter unit, remove the two cotter pins on the side of the channel unit and power unit. Slide the channel unit and PCU out. The ASJ2 may have an EAF1 drop test module inserted on the side of the circuit pack. The EAF1 simply mounts in a plug on the side of the ASJ2 channel unit. At the back of circuit pack being replaced, disconnect backplane cable (ASJ1 or ASJ2 channel unit, J107 and J103 assembly; ASH1 PCU, J101 and J102 assembly). Slide the PCU and channel unit back in place and replace the two cotter pins on the side of the channel unit. Make backplane cable connections on replacement circuit pack. The AYB1B optical circuit pack can be replaced without removing the cotter pins simply by unlatching the circuit back and carefully removing the board. Turn AC or DC power circuit breaker on and reconnect battery lead P104 to J104.

1. See FIG 1. Turn off AC or DC power circuit breaker and unplug J104-P104 battery power cable connection.

2. Is AYB1B circuit pack being replaced?

   If **YES**, then continue with Step **3.**
   If **NO**, then proceed to Step **6.**

3. Unlatch and remove AYB1B optical unit.

4. On replacement AYB1B remove *ST* connector cover and clean *ST* connector with reagent grade isopropyl alcohol and blow dry with canned air.

5. Install and latch replacement AYB1B and place *ST* cover over old AYB1B *ST* connector. Then proceed to Step **11.**

6. ***Note 1:*** If only the EAF1 drop test module needs to be replaced, unplug the EAF1 from the side of the ASJ2 and insert the replacement. Then proceed to Step **11.**

   Note 2: If an ASJ2 is being replaced and an EAF1 is mounted on the ASJ2, move the EAF1 to the replacement ASJ2.

   At back of circuit pack being replaced (**ASH1**, **ASJ1**, or **ASJ2**), unplug cable jack assembly.

7. Remove cotter pins on circuit board standoff at side of ASJ1 or ASJ2 channel unit and slide both circuit packs out.

8. Slide ASH1 (first) and ASJ1 or ASJ2 circuit packs onto circuit board standoff.

9. Replace cotter pins on circuit board standoff at side of ASJ1 or ASJ2 channel unit.

10. Connect cable just unplugged to replacement circuit pack.

11. Turn AC or DC power circuit breaker on. Then reconnect J104-P104 battery power cable.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

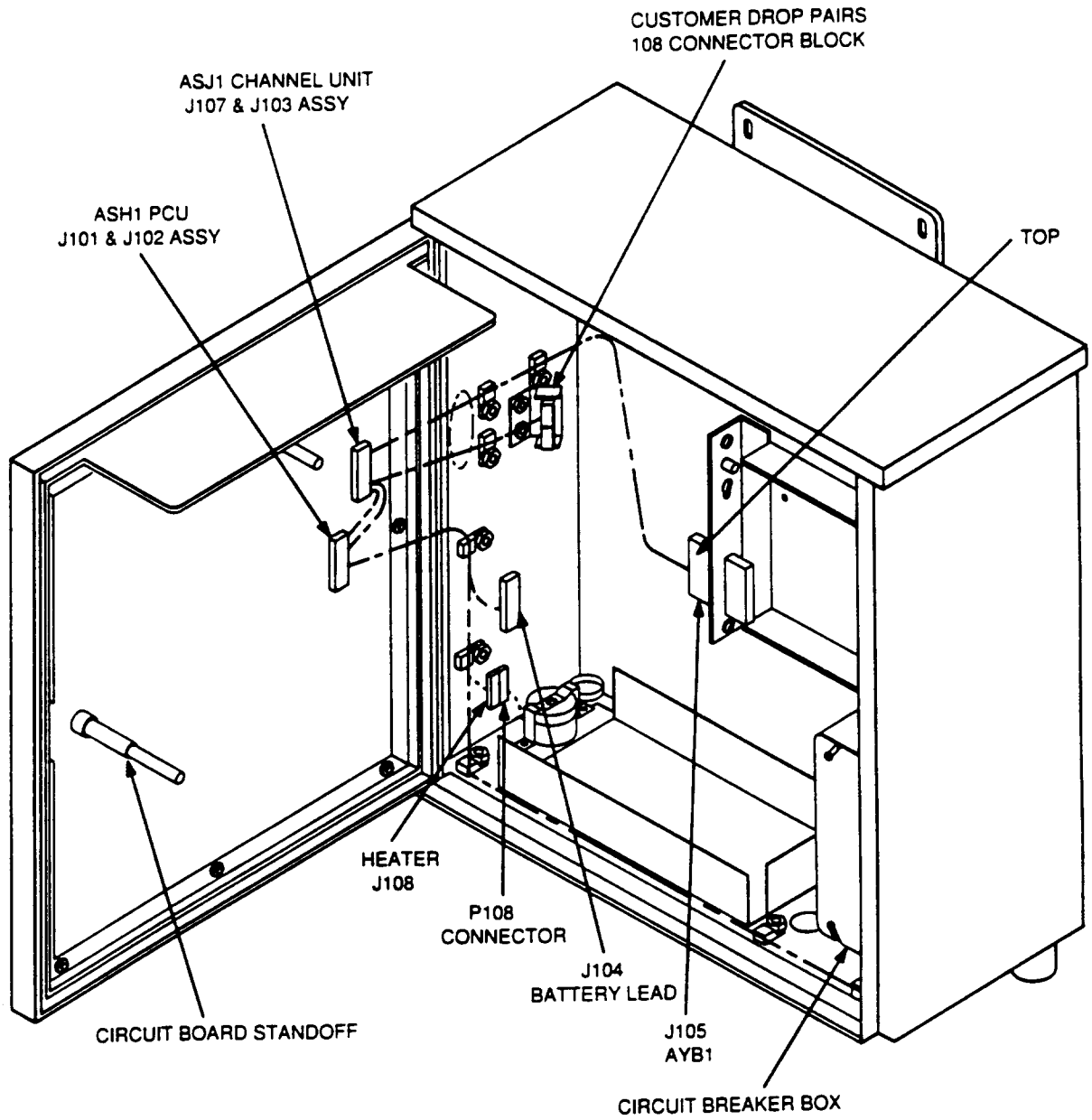


Figure 1—DT Circuit Pack Wiring Diagram

AT&T 363-205-500
Issue 4, Revised November 1990

CONNECT FAULT LOCATING TEST SETS FOR 80D OR 80E CABINET T1 EXTENSIONS

SUMMARY: Access to the T1 extension digital lines in 80-type cabinets are provided at 307-type protector block connectors, or 800 and 900 series DSX-1 cross-connect shelves. For 800 or 900 series DSX-1, the fault locate test set GEN signal is patched to the IN jack on the span side (repeater shelf side) of the cross-connect, and the test set REC FAULT LINE is patched to the FL pair (through a fault line powering module if required).

For 307-type protector block cross-connect, each T1 extension line has protector appearances on the DDM-1000 side of the repeater shelf (4C12C protectors) and the T1 side of the repeater shelf (3C3C protectors) for side 1 (transmit) and side 2 (receive). Access to the Fault Locate line and miscellaneous pairs are provided at the 3B1E protectors. These protectors are located at the frame side 2 (back side) of the 80-type cabinet in 307-type blocks located between the two equipment frames.

Three test cords are supplied with the cabinet. The W2HR bridging test access cord connects to the protectors and allows bridging or monitoring of the pair. This cord cannot be used to monitor DS1 signals unless the test set has built-in monitor level input impedance (440 ohms on both tip and ring plus 110 ohm test set impedance). The T-Berd 209A test set can be used to monitor DS1 signals with the W2HR cord. The W4DE test cord replaces the 3C3E or 4C12C (DDM-1000 side) protector. These cords have two 310-type jacks for access to the facility or DDM-1000 directions of the digital line (one side only, e.g., transmit or receive side). The 6W3A cord has a protector block on one end and a plug that replaces a protector and another plug that bridges onto a protector. The optional W4DF test cord (Comcode 105414973) can be used to loop the line by replacing the digital line transmit and receive side protectors.

Fault locating T1 extensions from an 80-type cabinet requires both the 6W3A and W4DE test cords, a J98725AJ Fault Line Powering Module (if your fault locate test set cannot provide fault line power) and a 3W14A test cord (310 jack on one end and alligator clips on the other end), a fault locate test set (315B, 415A-2, 25AD, or equivalent), and a 107B digital line powering module if connecting to the T1 side (a second W4DE test cord is needed if the 107B is used). The W4DE cord connects between the signal generator jack of the fault locate test set and the 4C12C protector position. The 6W3A replaces the 3B1E protector for the fault locate pair and the 3W14A cord connects the 6W3A protector block to the fault line powering module to power the fault locate pair.

A simple method would be to do single ended fault locating from the equipment at the other end of the T1 line. The W4DF test cord is used at the 4C12C protectors to loop back the digital line and a 262C terminating plug is inserted in the appropriate FL jack on the LDU.

This procedure provides steps that should be taken to connect fault locating test equipment at an 80D type cabinet for groups 90 and 91 or group 92 equipment arrangement, or an 80E group 91 cabinet. If you have another equipment arrangement, find the protectors for the Transmit Side of the digital line and Fault Locate pair and make test set connections as indicated in the following procedure (See AT&T 640-250-XXX for the cabinet equipage group you have to locate these protectors).

1. Before connecting fault locating test equipment, replace blown fuse; measure line voltage (+V and -V) and current (I and +V) and compare with records; and replace repeater in SXSS (small cross-section office repeater shelf) if trouble is found.

Comment: 0 current reading indicates bad T1 line power loop. To find trouble loop digital line at apparatus cases, one at a time until, bad section is found.

Comment: High voltage reading indicates an open on TIP or RING of T1 pairs.

Comment: Low voltage reading indicates short between TIP and RING of T1 pairs.

2. At frame side-2 of the 80-type cabinet, find the protectors associated with the digital line. See TABLE A for 80D group 90 or 91 equipment arrangement. See TABLE B for 80D group 92 equipment arrangement. See TABLE C for 80E group 91 equipment arrangement.

3. Fault locating can be done single ended from far end connecting equipment, from the 3C3E protectors for T1 line access using the 107B digital line powering set, or from the 4C12C protectors for DS1 level (through the repeater) access. See FIG. 1 for a block diagram of T1 line arrangement. What type of fault locating do you want?

   If **DS1 LINE ACCESS** , then continue with Step **4.**
   If **T1 LINE ACCESS**, then proceed to Step **7.**
   If **FAR ENDED**, then proceed to Step **10.**

4. Make connection from J98725AJ fault line powering module to 6W3A and 3W14A test cords. (See FIG. 2.)

5. Make connections from fault locate test set (315D, 415A-2, 25AD) to W4DE test cord. (See FIG. 3.)

6. Make fault locating test equipment connections to protectors positions of 307 block on 80-type cabinet frame side 2 as shown in FIG. 4. Refer to TABLE A, B, or C for protector appearances. Replace fault locate pair 3B1E protector with 6W3A test cord and connect 3W14A cord to FLPM. Remove transmit pair 4C12C protector and connect output of fault locate test set. Then continue with Step **11.**

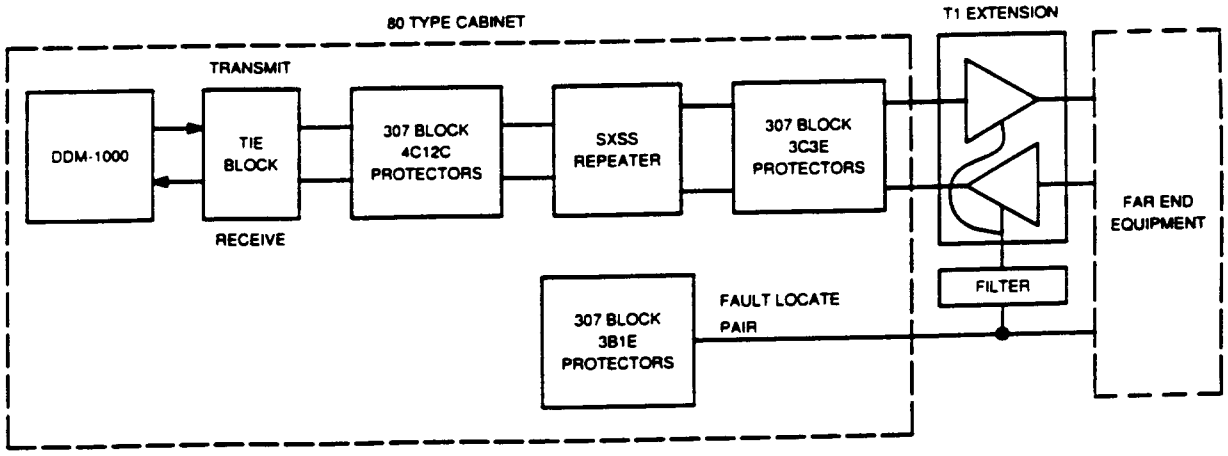


Figure 1—80-type Cabinet T1 Extension Digital Line Configuration

TABLE A
T1 EXTENSION LINE PROTECTOR POSITIONS FOR GROUP 90/91 80D CABINET FOR 307 BLOCKS ON FRAME SIDE 2

SXSS REPEATER SLOT	Protector Type and Positions			
	3rd 307 Block DS1 Access		4th 307 Block T1 Line Access	
	Transmit 4C12C	Receive 4C12C	Transmit 3C3E	Receive 3C3E
1	81	11	51	1
2	82	12	52	2
3	83	13	53	3
4	84	14	54	4
5	85	15	55	5
6	86	16	56	6
7	87	17	57	7
8	88	18	58	8
9	89	19	59	9
10	90	20	60	10
11	91	21	61	11
12	92	22	62	12
13	93	23	63	13

MISCELLANEOUS PAIRS ON 3rd 307 BLOCK	
FUNCTION	3B1E PROTECTOR POSITION
DC Test	51
Order Wire	52
Fault Locate In 1	53
Fault Locate In 2	54

7. Make connection from J98725AJ fault line powering module to 6W3A and 3W14A test cords. (See FIG. 2.)

8. Make connections from 107B test set (315D, 415A-2, 25AD) to W4DE test cords. (See FIG. 5.)

9. Make fault locating test equipment connections to protectors positions of 307 block on 80-type cabinet frame side 2 as shown in FIG. 6. Refer to TABLE A, B, or C for protector appearances. Replace fault locate pair 3B1E protector with 6W3A test cord and connect 3W14A cord to FLPM. Remove 3C3E transmit pair protector and connect output of the 107B test set. Remove 3C3E receive pair protector and connect input of the 107B test set. Then continue with Step 11.

10. Use TABLE A, B, or C to find 4C12C (DSX-1 level) protectors for digital line to be looped. Replace 4C12C protectors with W4DF looping test cord (See FIG. 7). Insert 262C fault line terminating plug into appropriate FL jack on LDU unit.

TABLE B
T1 EXTENSION LINE PROTECTOR
POSITIONS FOR GROUP 92 80D CABINET
FOR 307 BLOCKS ON FRAME SIDE 2

SXSS SHELF NUMBER	REPEATER SLOTS	Protector Type and Positions			
		DS1 Access		T1 Line Access	
		4th 307 Block Transmit 4C12C	3rd 307 Block Receive 4C12C	2nd 307 Block Transmit 3C3E	1st 307 Block Receive 3C3E
1	1-5	1-5	1-5	1-5	1-5
	6-10	6-10	6-10	6-10	6-10
	11-13	11-13	11-13	11-13	11-13
2	1-5	26-30	26-30	26-30	26-30
	6-10	31-35	31-35	31-35	31-35
	11-13	36-38	36-38	36-38	36-38
3	1-5	51-55	51-55	51-55	51-55
	6-10	56-60	56-60	56-60	56-60
	11-13	61-63	61-63	61-63	61-63
4	1-5	76-80	76-80	76-80	76-80
	6-10	81-85	81-85	81-85	81-85
	11-13	86-88	86-88	86-88	86-88

MISCELLANEOUS PAIRS ON 5th 307 BLOCK

FUNCTION	3B1E PROTECTOR POSITION
Order Wire	2
Fault Locate In 1	3
Fault Locate In 2	4

11. Perform fault locating procedures after test set connections have been made (use local procedure or TAP-115 for guideline noting test connections have already been made). After clearing T1 extension line trouble, remove test connections and replace protectors in 307 block.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

TABLE C
T1 EXTENSION LINE PROTECTOR
POSITIONS FOR GROUP 91 80E CABINET
FOR 307 BLOCKS ON FRAME SIDE 2

SXSS SHELF NUMBER	REPEATER SLOTS	Protector Type and Positions			
		DS1 Access		T1 Line Access	
		DS1-A 307 Block Transmit 4C12C	DS1-B 307 Block Receive 4C12C	T1 307 Block Transmit 3C3E	T1 307 Block Receive 3C3E
1	1-5	51-55	51-55	51-55	1-5
	6-10	56-60	56-60	56-60	6-10
	11-13	61-63	61-63	61-63	11-13
2	14-15	64-65	64-65	64-65	14-15
	16-20	66-70	66-70	66-70	16-20
	21-25	71-75	71-75	71-75	21-25

MISCELLANEOUS PAIRS ON DS1-A 307 BLOCK	
FUNCTION	3B1E PROTECTOR POSITION
Order Wire	81
Fault Locate In 1	82
Fault Locate In 2	83

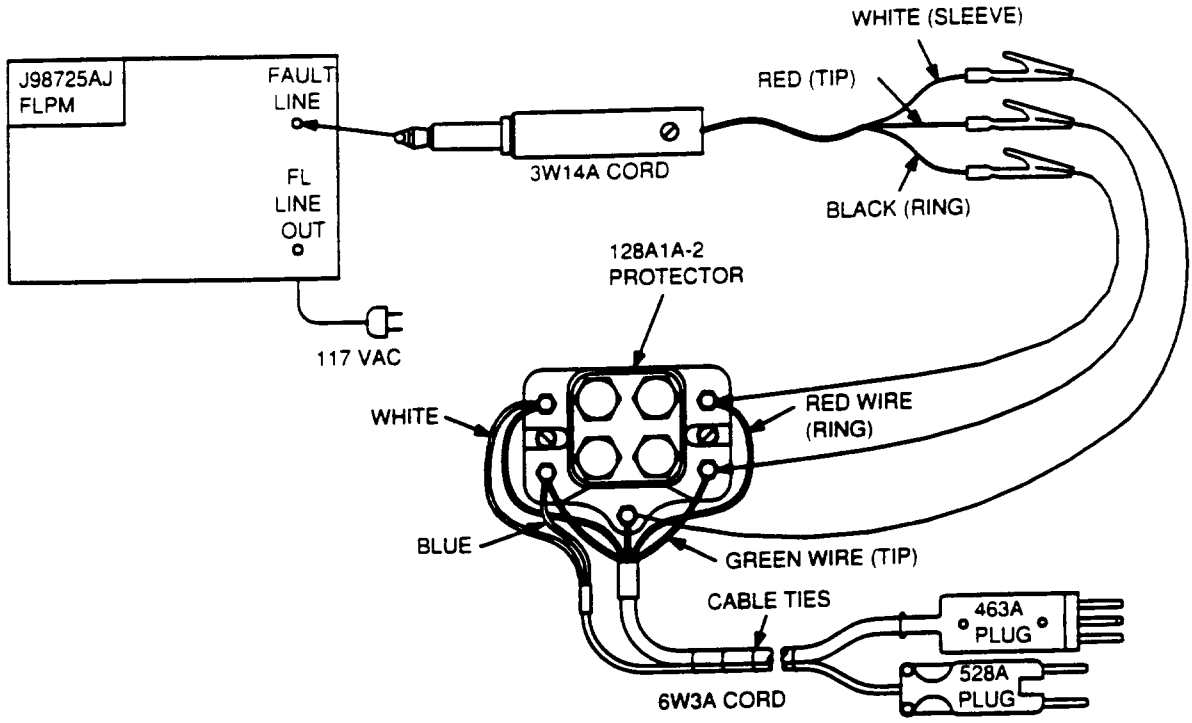


Figure 2—Fault Line Powering Module Connections to 6W3A and 3W14A Test Cords

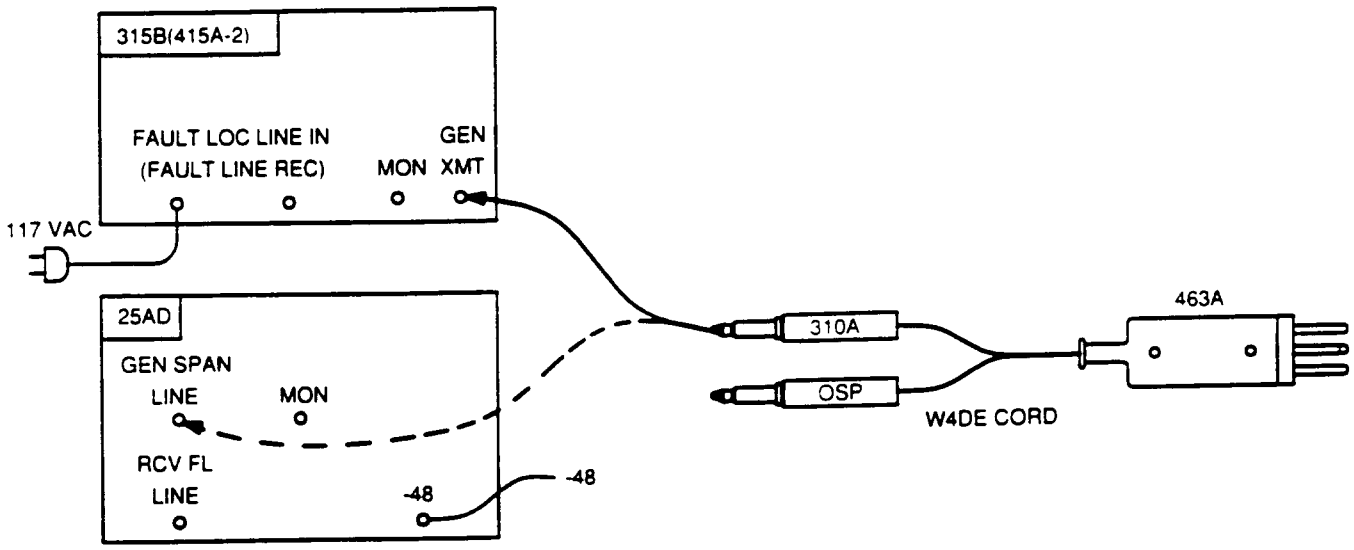


Figure 3—Fault Locating Equipment Connections to W4DE Test Cord For DSX-1 Level Access

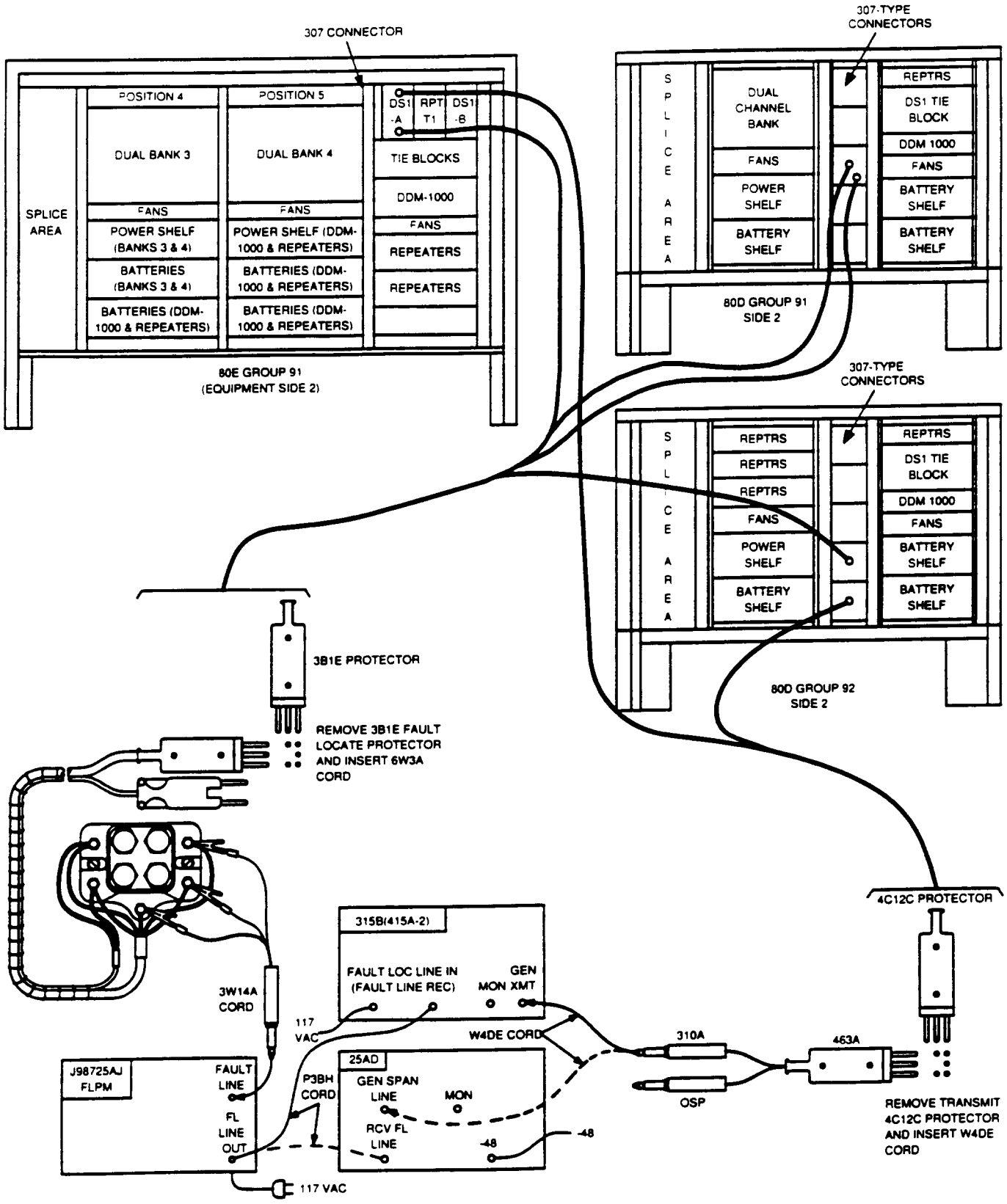


Figure 4—Typical Fault Locating Equipment Test Connections For DSX-1 Level Access

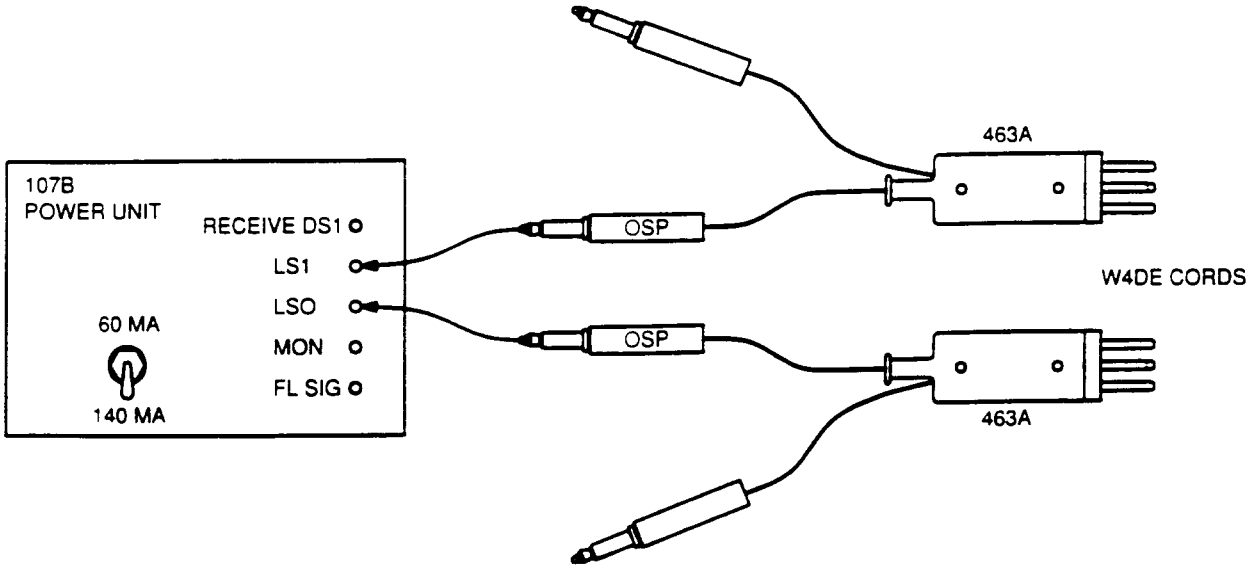


Figure 5—Fault Locating Equipment Connections to Test W4DE Cords For T1 Line Access

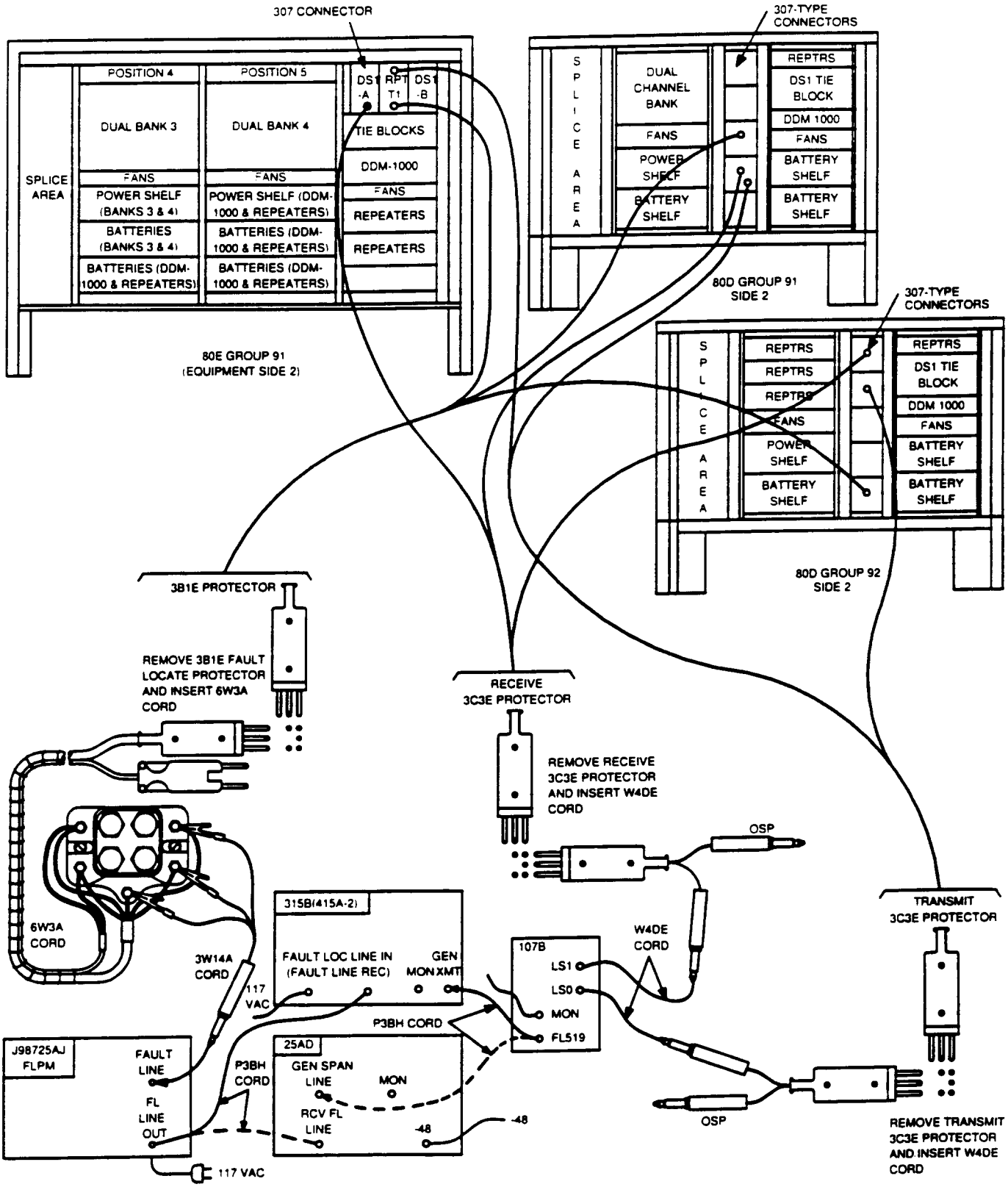


Figure 6—Typical Fault Locating Equipment Test Connections For T1 Line Access

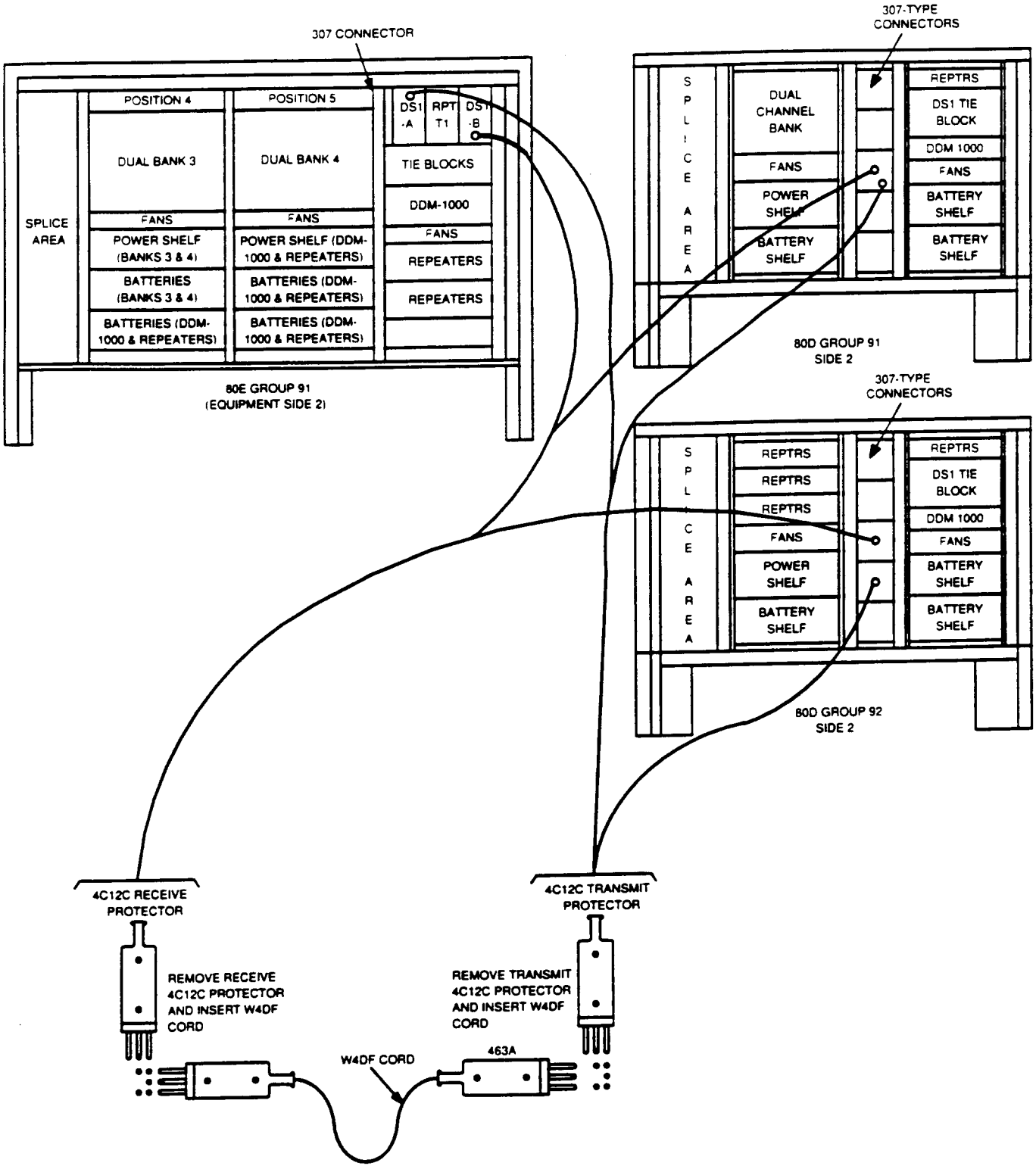


Figure 7—DSX-1 Level Access T1 Line Loopback For Far Ended Fault Locating

PERFORM FIBER-TO-THE-HOME MLT CHANNEL TEST

SUMMARY: Channel testing for FTTH circuits is supported by MLT via PGTC or XTC interface to the *SLC* Series 5 Carrier System. The XTC must use MLT-2 LTS generic 5 issue 6 or later to support channel unit isolation tests.

When a channel test is performed, the MLT identifies the circuit as being served by a *SLC* Carrier System. Then two tests are initiated. The first test performs channel unit functional tests and the second test bypasses the carrier system (via a DC test pair or RMU) and performs drop tests for the pairs extending from the RT. For FTTH circuits, the RT channel unit will always fail the channel unit functional test because these channel units do not contain the proper VF interface required to pass the test. If MLT-2 LTS (with generic 5 issue 6 or later) is used, further tests can determine if the COT channel unit is functioning properly. This additional test is not available with the PGTC.

Then the second *loop test* is performed. But since a copper loop does not exist, the RT channel unit returns a *DC signatures* (TABLE A) to the MLT via the DC test pair. DC signatures (85 to 95 kilohms or less Tip-to-Ring) indicates a good fiber. DC signature with 2500 kilohms Tip-to-Ring indicates a failure condition associated with the fiber loop. A failed DC signature indicates the RT unit has failed or the signal between the RT and DT is bad.

If the RT is equipped with **AUA400** or **AUA401** channel units, only the first two DC signatures in TABLE A are returned during MLT tests. If the RT uses **AUA404** or **AUA405** channel units and the DT has the **ASJ2** with the **EMF1** drop test module, additional test results are available to test the drop pair from the DT to the customer. Regardless of the type of channel units used, a DC signature of 2500 kilohms Tip-to-Ring requires trouble clearing to begin at the RT site; A DC signature less than 95 kilohms indicates a trouble condition at the DT or customer equipment/wiring.

1. ***Note:*** ***After a full or loop test a channel test from STV should be performed.***

   Perform MLT test on FTTH circuit reported to have trouble ***but do not perform the tone test.***

   Comment: The channel unit test will indicate different results depending on the MLT generic version and whether the XTC or PGTC is used. The RT channel unit will always fail and both COT and RT channel unit will fail if the PGTC is used.

   Comment: You should note the results of the *DC tests* during the loop test phase of the channel test.

   Comment: If you perform the tone test the results will be intermittent return tones.

2. What was the result of the DC signature (See TABLE A)?

   Comment: A good RT to DT fiber link DC signature will have less than 95 kilohms between tip-ring, tip-ground, and ring-ground.
   A bad RT to DT fiber link DC signature will have more than 2500 kilohms between tip and ring.

   Comment: MLT test may give a SAM or TV mask with a *VER* code for a passed or failed DC test and indicate where to dispatch craft personnel (RT or DT) if the COT channel unit functional test passed.

   If **GOOD FIBER LINK DC SIGNATURE**, then proceed to **Step 7.**
   If **BAD FIBER LINK DC SIGNATURE**, then continue with **Step 3.**

3. Do you have MLT generic 5 issue 6 or later and XTC?

   If **YES**, then continue with **Step 4.**
   If **NO**, then proceed to **Step 5.**

4. Did COT channel unit pass channel test?

   If **YES**, then proceed to **Step 6.**
   If **NO**, then continue with **Step 5.**

5. Dispatch craft to COT.

   STOP. YOU HAVE COMPLETED THIS PROCEDURE.

6. Dispatch craft to RT.

   STOP. YOU HAVE COMPLETED THIS PROCEDURE.

7. Dispatch craft to DT.

   STOP. YOU HAVE COMPLETED THIS PROCEDURE.

TABLE A

FTTH TEST CAPABILITY DC SIGNATURES

DC SIGNATURE (OHMS T-R)	INDICATION	DISPATCH TO	ACTION	SAM REQ:DVER / INPUT VER:	MLT-2 TV MASK VER
86K-98K	Fiber link good, basic FTTH RT, no enhanced test capability	DT	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -1 / —	1X
>2500K	Fiber link bad	RT	Perform DT Analyzer Test at RT If OK, proceed to DT else Clear RT or COT CU trouble	N -2 / —	2X
15K-24K	Fiber link good, basic FTTH DT, no enhanced test capability	DT	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -8 / —	8X
24K-34K	Bad or missing EAF1 DTM no drop test results	To DT if customer reports trouble	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -3 or N -10 / VER 95 or VER 99	3X or 3C
34K-44K	Drop test OK	To DT if customer reports trouble	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -4 or N -11 / VER 95 or VER 99	4X or 4C
44K-54K	No ringer on drop	DT	Perform Talk Test From NIU If OK, premise wiring/phone else Clear trouble at DT	N -5 or N -12 / VER 95 or VER 99	5X or 5C
54K-64K	FEMF/Leakage on drop DANGER: Possible hazardous voltage on drop.	DT	Clear AC power on drop per local procedures	N -6 or N -13 / VER 95 or VER 99	6X or 6C
64K-74K	Receiver off hook	DT	Perform Talk Test From NIU If OK, premise wiring else Clear trouble at DT	N -7 or N -14 / VER 95 or VER 99	7X or 7C
15K-96K	Fiber link good to DT no line record	Retest with T1 overide	—	N -9 / VER 25	9X
74K-86K	[Not used]				

CHECKLIST

ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE
TPG-000		DLP-506					
• IXL-001		DLP-507					
• TAD-100		DLP-508					
TAP-101		DLP-509					
TAP-102		DLP-510					
TAP-103		DLP-511					
TAP-104		DLP-512					
TAP-105		DLP-513					
TAP-106		DLP-514					
TAP-107		DLP-515					
TAP-108		DLP-516					
TAP-109		DLP-517					
TAP-110		DLP-518					
TAP-111		DLP-519					
TAP-112		DLP-520					
TAP-113		DLP-521					
TAP-114		• DLP-522					
TAP-115		• DLP-523					
TAP-116		• DLP-524					
TAP-117		• DLP-525					
TAP-118		• DLP-526					
TAP-119		• CLK-891					
TAP-120		TNG-893					
TAP-121		DPL-895					
TAP-122							
TAP-123							
TAP-124							
TAP-125							
TAP-126							
• TAD-127							
• TAP-128							
TAP-129							
TAP-130							
• TAP-131							
DLP-500							
DLP-501							
DLP-502							
DLP-503							
DLP-504							
DLP-505							

• Revised or added item
□ Canceled item