DS-1 DIGITAL SERVICE MAINTENANCE SYSTEM

INSTALLATION AND MAINTENANCE

1.544 MB/S DIGITAL SERVICE

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1. GENERAL

1.01 This practice contains the installation and maintenance procedures for the SLIM (Subscriber Loop Interface Module)/DS-1 DSMS (Digital Service Maintenance System) used in the 1.544 Mb/s digital service.

1.02 This practice is reissued to include changes to installation and maintenance procedures for the SLIM/DS-1 DSMS. The specific reasons for reissue are listed below.

- To add procedures for installing and maintaining new or additional transmission lines
- To test switching of new or additional lines
- To change alarm and status interface circuit installation procedures
- To add procedure for setting interface conditioning options.

In addition to the above specific changes, this section has been completely reorganized and is considered a general revision; therefore, revision arrows are not used.

1.03 Because of the SLIM/DS-1 DSMS flexibility, two terms based on common reference terminology are used: the ***loop side*** and ***digital hierarchy side*** (DSX-1). The ***loop side*** is that part of the SLIM/DS-1 DSMS connected to the T1 carrier. The direction towards the ***digital hierarchy*** is called the DS-1 or DS-1 signal side.

1.04 The LIUs (line interface units) are used to interface digital signals to the SLIM/DS-1 DSMS. Two LIUs are necessary for each working T1 line—A, B, C, and D. One LIU is necessary for the protection line in slot P at each end. Figure 1 shows the COT (central office terminal) configuration. The loop facility side of the DS-1 DSMS interfaces up to five T1 lines. The DSX side faces up to four DSX cross-connect interfaces.

2. APPARATUS

2.01 The following apparatus is required for all procedures outlined in this practice:

1—KS-14510, LS VOM (Volt-Ohm-Milliammeter) or equivalent

1—KS-21838 extractor tool

1—ED-3C842-30, G1 power test cord

4—P3-type patch cords or dummy plugs

1—ED-3C841-20, G1 LIU test cord

4—KS-19531 pin plugs

1—KS-20775 error rate test set or equivalent

9—ED-3C842-30, G3 terminal looping card

1—KS-19088, List 18 RLT DSX test plug (wired per Fig. 2).

3. CENTRAL OFFICE TERMINAL INSTALLATION PROCEDURES

3.01 The following COT (central office terminal) installation procedures are provided for the SLIM/DS-1 DSMS. The installation procedures are divided into two parts, the COT and the RLT (remote location terminal). It is suggested that all COT installation procedures be performed before beginning the RLT installation.

Note: Disregard all lamps for the installation procedures until each has been specified in the requirements.

A. Overall Visual Inspection of SLIM/DS-1 DSMS

STEP	PROCEDURE
1	Verify all fuses are removed and no plug-in units are installed.
2	Verify the shelf is tightly secured and free of defects or damage.
3	Verify the electrical connectors inside the shelf are properly secured and aligned with shelf slots.
4	Inspect for misaligned, dented, or twisted shelf by installing the proper plug-in unit in each end and middle of the shelf.
5	At the rear of the shelf, verify there is no broken or damaged equipment (connectors, wiring, etc.).
6	Verify there are no bent, broken, or crossed terminals on the backplane.
7	Verify all cabling and wiring is terminated and tied into forms.
8	If all preceding steps have been verified, proceed to Procedure B (Alarm Connections).

B. Alarm Connections and Fuse Installation

STEP	PROCEDURE
1	Verify/connect the office alarms as required by the office alarm plan.
2	Verify the following alarms with associated returns are connected at terminal strip TB1 (Fig. 3 and Fig. 4). MJR — MAJOR (MJ) MNR — MINOR (MN) PMR — POWER MISCELLANEOUS (P/M) FAR — FUSE ALARM (FA)
3	Install the proper type fuse in each fuse block as shown in Table A (Fig. 1).

STEP	PROCEDURE
4	If the fuse operates, clear the trouble using SD-3C478-02 or refer trouble to the AT&T Technologies installation force.
5	Install an operated (blown) fuse into the PU-R and the PU-S fuse blocks separately to test the fuse alarm lamp. ***Requirement:*** The F ALM lamp lights.
6	Replace the operated (blown) fuse with a good 70A type fuse.
7	When the requirements of this procedure are met, proceed to Procedure C (Supply Voltage Checks).

C. Supply Voltage Checks

STEP	PROCEDURE
1	Verify and perform the following steps using a KS-14510 VOM or equivalent.
2	Set the meter to measure dc volts.
	SLIM/DS-1 DSMS SHELF (J1C141BB, L1)
3	Locate terminal strip TB3 at the right rear of the SLIM/DS-1 DSMS (Fig. 3 and 4).
4	Verify the incoming supply voltage leads are connected to TB3.
5	Test for GRD at terminal 1 and −48 V at terminal 3 on TB3. ***Requirement:*** VOM indicates between −48 and −52.5 V dc.
6	Use SD-3C478-02 to check wiring problems.
	JACK PANEL (ED-3C835-30, G1) (If Provided)
	Note: If the JACK PANEL is not provided, skip to step 17 (Fault Locate and Order Wire Panel).
7	Verify the 70B fuse is installed in the JK PNL fuse block on the SLIM/DS-1 DSMS.
8	Locate terminals E1 and E2 on the back of the JACK PANEL.
9	Verify the battery and ground leads are connected from terminal E1 and E2 to terminal block TB1, terminals −48JP and RTN JP of SLIM/DS-1 DSMS or nearest SLIM/DS-1 DSMS (Fig. 3 and 4).
10	Test for −48 V at terminal E1 and GRD at terminal E2. ***Requirement:*** VOM indicates between −48 and −52.5 V dc.

STEP	PROCEDURE
11	If requirement is not met, use SD-3C478-02 to check for wiring problems.
12	Get a 238A type repeater and ensure the repeater preinstallation tests have been performed (315B, 415A-2, or J98710H repeater test set).
13	On the 238A, locate the PWR OPT (power option) switch.
14	Use long nose pliers or similar tool to lift and rotate PWR OPT switch to the T (through) position.
15	Install the 238A-type repeater into the jack panel REP TST slot. Repeater must make proper contact in the REP TST slot.
16	If the JK PNL fuse operates (blows), replace the repeater and repeat procedure from Step 12. If the fuse blows again, use SD-3C422-01 to check the JACK PANEL wiring.
	FAULT LOCATE and ORDER WIRE PANEL (J1C141AC, L1 and L2) (If Provided)
	Note: If this panel is not provided, proceed to Procedure D (SLIM/DS-1 DSMS Status Alarm and Telemetry Connections).
17	Verify the 70B fuse is installed in the FL/OW fuse holder on the SLIM/DS-1 DSMS.
18	Locate terminal strip TS2 terminals 18 and 19 on the back of the FAULT LOCATE and ORDER WIRE PANEL.
19	Verify terminals 18 and 19 are connected to SLIM/DS-1 DSMS terminal block TB1 terminals −48 FLOW and RTN-FLOW (Fig. 3 and 4).
20	At the FAULT LOCATE and ORDER WIRE PANEL TS2, test for GRD at terminal 18 and BAT at terminal 19.
	Requirement: VOM indicates between −48 and −52.5 V dc.
21	If requirement is not met, use SD-7C385-01 to check wiring.

D. SLIM/DS-1 DSMS Status Alarm and Telemetry Connections

Note 1: If E2 status alarms are not provided, proceed to Procedure E (Line Alarm Monitoring Connections).

Note 2: If remote telemetry alarms are not provided, proceed to Procedure E (Line Alarm Monitoring Connections).

STEP	PROCEDURE
1	Verify E2 scan points as required by the maintenance plan, if provided. Status is provided at the dry contact closure pairs on terminal strip TB1 (Fig. 3 and 4).

STEP	PROCEDURE
2	Verify on terminal strip TB1 in column 12 that connections are made on pin positions A through D. These are control points for remote activation of the ACO (alarm cutoff) and remote activation of PBLB (pseudo bank loopback), also known as TLB (test loopback).

E. Line Alarm Monitoring Connections

Note: These alarms are associated with TCAS (T-Carrier Administration System). If these connections are not provided, proceed to Procedure F (Transmission Line Connections).

STEP	PROCEDURE
1	Verify that additional line failure indications are provided on terminal strip TB1 in columns 15 and 16 for service lines A, B, C, and D (Fig. 3 and 4).

F. Transmission Line Connections (DSX-1 and T1 Line)

Note: There is a maximum of 4 lines for DSX-1 and a maximum of 5 lines for the T1 system.

STEP	PROCEDURE
	DSX-1
1	Verify at terminal strip TB2 that tip and ring of DSX-RCVG and tip and ring of DSX-TRMTG are properly connected (Fig. 3 and 4). *Note:* Connection from the SLIM/DS-1 DSMS to the DSX-1 may be provided via two multipair shielded ABAM or 600-type cables.
	T1 Line
2	Verify at terminal strip TB2 that tip and ring of T1-RCVG and tip and ring of T1-TRMTG are properly connected. See Fig. 3 and 4, or refer to SD-3C478-02. *Note:* Connection from the SLIM/DS-1 DSMS to the T1 line outside plant is provided via two multipair shielded ABAM or 600-type cables.

G. Installation of Alarm and Status Interface Circuit

STEP	PROCEDURE
1	From the work order or office records, determine the option on the ALM & STATUS INFC unit (ED-3C866-G2) to classify the power/miscellaneous alarms (Table B).

STEP	PROCEDURE
2	On the ALM & STATUS INFC unit, locate the option switch OA/PA SYS located on the right center section of the circuit board.
3	From the work order, set option switch OA/PA SYS for proper operation.
4	From the work order, set option switch MJ/MN to the proper position. This switch has no effect if the OA/PA SYS switch is set to the OA position.
5	Install the ALM & STATUS INFC unit (Fig. 1).

H. COT OPTION Selection

STEP	PROCEDURE
	Caution: When the system is in service and OPTION switch 1 is in the closed position, inserting a pin plug in any in-service LIU-T1 jack will cause a service interruption and a MAJOR alarm because there is not a protection line.
1	Locate rocker-type switches OPTION 1, 2, 3, 4, and 5 located on the fuse and alarm section of the SLIM/DS-1 DSMS (Fig. 1).
2	From the work order or office records, set OPTION switches for the proper operation (Tables C and D).
3	When an option is not desired, set the switch in the OPEN position.

I. COT Isolation

STEP	PROCEDURE
	Note: The purpose of this procedure is to completely isolate the COT to prevent any signals entering it on the T1 side or the DSX side.
1	Isolate the COT on the DSX side by inserting one end of a P3-type patch cord into the IN jacks labeled A, B, C, and D on the DSX-1 panel for the COT. The other ends of the cords can be left unterminated. The IN jacks can also be opened by inserting dummy plugs in them.
2	The digital lines on the T1 side of the COT are being powered from the COT (LIU-T1P). Remove the T1 LINES fuse to disable the repeaters.

I. COT OPTION Selection

STEP	PROCEDURE
1	***Caution: When OPTION switch 1 is in the closed position, never insert a pin plug in any LIU-T1 jack because there is no protection line. This would cause a service interruption and a MAJOR alarm.***
2	Locate rocker-type switches OPTION 1, 2, 3, 4, and 5 located on the fuse and alarm section of the DS1-DSMS SHELF (Fig. 1).
3	From the work order or office records, set OPTION switches for the proper operation (Table B).
4	When an option is not desired, set the switch in the OPEN position.

J. Isolate COT

STEP	PROCEDURE
	Note: The purpose of this procedure is to completely isolate the COT from any signals entering it on the ***loop side*** or the ***digital hierarchy side.***
1	Isolate COT on the ***digital hierarchy side*** by inserting one end of a P3-type patch cord into the IN jacks on the DSX-1 panel for the COT labeled A, B, C, and D. The other ends of the cords can be left unterminated. The IN jacks can also be opened by inserting dummy plugs in them.
2	The digital lines on the ***loop side*** of the COT are being powered from the COT (LIU-T1P), remove the T1 LINES fuse to disable the repeaters.

K. Installation of Circuit Packs

STEP	PROCEDURE
1	From the work order, determine the COT configuration.
2	Get the proper code circuit packs, and ensure the circuit packs are free from damage (Table C and Fig. 1).

L. Install 295A POWER UNITS

STEP	PROCEDURE
1	Set the power units (PUs) ON/OFF switch to OFF, and install the PUs into slots PU-R and PU-S (optional) (Fig. 1). ***Requirement:*** The FAIL and ACO lamps light.
2	If the lamps do not light, replace the PU and repeat the above procedure. Check the PU-R fuse, replace if blown.
3	Set the ON/OFF switch to ON. ***Requirement:*** The FAIL and ACO lamps on the PU go out and MINOR lamp on the DS1-DSMS SHELF lights.
4	If the FAIL and ACO lamps do not go out, replace the PU and repeat the above procedures.
5	Get the VOM and set it to measure DC VOLTS -60.
6	On the PU, measure dc voltages at the test points per Table D.
7	If the voltage requirements of Table D are not met, replace the PU and repeat the above procedure.
8	Repeat the above procedure for the second PU.

M. Install Alarm Unit (AU WP60) and DAPU (WM12)

STEP	PROCEDURE
1	Install the AU in the AU slot (Fig. 1.) Disregard all lamps until specified in requirements.
2	Install the DAPU (WM12) in the DAPU slot. ***Requirement 1:*** The DL FAIL lamp lights. If the DL FAIL lamp does not light, replace the DAPU and retest. ***Requirement 2:*** The MJ and NE lamps on the AU and MAJOR lamp on the fuse and alarm panel light. If lamps do not light, replace the AU. ***Requirement 3:*** On the ALM & STATUS INFC unit, lamp A lights. If lamps do not light, replace the ALM & STATUS INFC unit.
3	If the ACO lamp on the AU is lighted, disengage the AU, then reinstall. ***Requirement 1:*** The ACO lamp extinguishes. It may require several attempts to extinguish the ACO lamp. If the ACO lamp remains lighted, replace the AU or check wiring to remote ACO contacts. ***Requirement 2:*** The MJ lamp on the AU and the MAJOR lamp on the fuse and alarm panel will be lighted. If lamps are not lighted, replace the AU. If lamps do not light, replace the DAPU and repeat above procedure.
4	When an audible alarm is provided, the audible alarm will be activated when the ACO lamp is off. If not activated, use SD-3C478-02 to check the shelf wiring.
5	On the AU, momentarily depress the ACO switch. ***Requirement:*** The ACO lamp lights, the MAJOR lamp goes out, and the audible alarm clears.
6	If the ACO lamp does not light and/or audible alarm does not clear, replace the AU and repeat the above procedure.
7	If the problem still exists, use SD-3C478-02 to check the wiring.

N. Install Equalizers in LIU-DSX (WP53B) and Set Keep-Alive Option W or V

STEP	PROCEDURE
1	From the work order and/or Table E, obtain the correct code of the equalizer cards and the number of LIUs to be installed.
2	Inspect the equalizer cards and the LIUs for possible physical damage. One LIU-DSX is required for each working line.
3	On each circuit board LIU, locate the slot for mounting the equalizer.
4	Grasp the equalizer card by the end opposite the four connector contacts.
5	Slide the equalizer card in each slot as far as it will go.
6	Set W or V option on TLB plug (Fig. 4) from work order and Table F.

O. Set Power Supply Option W or V LIU-T1P (WP51B)

STEP	PROCEDURE
	Note: LIU-DSX (WP53B) does not require a power supply setting.
1	From the facility record, obtain the correct code and the number of LIUs to be installed. One LIU-T1( ) is required for each working line and protection line.
2	Inspect the LIUs for possible physical damage.
3	On each LIU, locate socket plug assembly (J201) (Fig. 5).
4	Obtain a KS-21838 extractor tool or long nose pliers.
5	***Caution: Care should be taken when using KS-21838 tool or long nose pliers to position white plug for proper option setting. White plug must be inserted and removed carefully (in a straight line) to avoid damage to the socket plug assembly.*** From the facility record or Table G, determine and set the correct option setting on each LIU.

STEP	PROCEDURE
	Requirement 2: The DL FAIL lamp on the DAPU goes out.
	Requirement 3: If option 4 is "closed," the P/M and FE lamps on the alarm unit will light in less than 25 seconds.
	Requirement 4: The PWR/MISC lamp on the SLIM/DS-1 DSMS lights in less than 25 seconds.
13	If the RCV LINE FAIL lamp does not go out, replace the LIU-T1 and repeat procedure from Step 4.
14	Remove the looping card.
	Requirement 1: The RCV LINE FAIL lamp lights.
	Requirement 2: The DL FAIL lamp on the DAPU lights.
	Requirement 3: If option 4 is "closed," the P/M and FE lamps on the AU will go out.
	Requirement 4: The PWR/MISC lamp on the SLIM/DS-1 DSMS goes out.
	Requirement 5: The NE lamp on the alarm unit should light in less than 10 seconds.

R. Addition of Lines B through D at Time of System Installation

STEP	PROCEDURE
	Note: This procedure, steps 2 to 15, describes installation of line B. For installation of lines C and D, repeat steps 1 to 15, substituting line C or D for line B.
1	If lines B through D are not to be included at the time of system installation, skip this entire procedure.
2	Set options described in procedures H, N, and P for the LIU-DSX (WP53B) to be installed.
3	Install LIU-DSX in position DS-B on the SLIM/DS-1 DSMS.
	Requirement: The RCV DSX FAIL and OD FAIL lamps on the installed LIU-DSX light.
4	Set options described in procedures O and P for the LIU-T1 (WP51B) to be installed.
5	Install LIU-T1 in position T1-B on the SLIM/DS-1 DSMS.
	Requirement: The RCV LINE FAIL lamp on the newly installed LIU-T1 lights.
6	If the RCV LINE FAIL lamp is not lighted, replace the LIU-T1 and repeat Steps 4 and 5.
7	If the RCV LINE FAIL lamp is still not lighted, use SD3C478-02 to check wiring and troubleshoot the circuit.

STEP	PROCEDURE
8	Insert terminal looping card in the TST jack of LIU-DSX in position DS-B.
	Requirement: The RCV DSX FAIL and OD FAIL lamps go out in less than 10 seconds.
9	If the RCV DSX FAIL lamp does not go out, replace the installed LIU-DSX and repeat procedure from Step 2.
10	Remove terminal looping card.
	Requirement: The RCV DSX FAIL and OD FAIL lamps light.
11	If the RCV DSX FAIL and OD FAIL lamps do not light, replace the LIU-DSX and repeat procedure from Step 2.
12	Insert the terminal looping card in the TST jack of LIU-T1 in position T1-B.
	Requirement: The RCV LINE FAIL lamp goes out in less than 10 seconds.
13	If the RCV LINE FAIL lamp does not go out, replace the LIU-T1 and repeat procedure from Step 4.
14	Remove the looping card.
	Requirement: The RCV LINE FAIL lamp lights.
15	Repeat this procedure from Step 2 for lines C and D if either/each is to be installed at system installation time.

S. Installation of Protection Line

STEP	PROCEDURE
1	If the protection line is not equipped, omit this procedure.
2	Set options described in procedures O and P for the LIU-T1 (WP51B) to be installed.
3	Install LIU-T1 in the T1-P slot (Fig. 1).
	Requirement: The RCV LINE FAIL and LINE ON PROTN lamps light.
4	If the RCV LINE FAIL and/or LINE ON PROTN lamps do not light, replace the LIU-T1. Repeat Steps 2 and 3.
5	If the RCV LINE FAIL and/or LINE ON PROTN lamps do not light, use SD-3C478-02 to check the shelf wiring.
6	Insert a terminal looping card (ED-3C842-30, G2 or G3) in the LIU-T1 TST jack of the P slot.

STEP	PROCEDURE
	Requirement: The RCV LINE FAIL and LINE ON PROTN lamps on the LIU will remain lighted.
7	Depress the ACO switch on the AU momentarily to silence the office alarms.
8	Remove the terminal looping card.

T. Installation and Testing of the ASU (ED-7C396) or LSU (WN8C)

STEP	PROCEDURE
1	If the protection line is not equipped, install the ASU (ED-7C396) in the LSU position of the SLIM/DS-1 DSMS. Omit the rest of this procedure.
2	Insert a looping card in the TST Jack of LIU-T1 in position T1-P.
3	Install the LSU in the LSU position of SLIM/DS-1 DSMS.
	Requirement 1: The RCV LINE FAIL and LINE ON PROTN lamps on the LIU-T1 in position T1-P go out.
	Requirement 2: The DL FAIL lamp on the DAPU goes out.
	Requirement 3: The LINE ON PROTN lamp on the LIU-T1 in position T1-A lights.
	Requirement 4: If option 4 is "closed," the P/M and FE lamps on the AU light in less than 20 seconds.
	Requirement 5: The PWR/MISC lamp on the SLIM/DS-1 DSMS lights .
4	If the RCV LINE FAIL and LINE ON PROTN lamps in Step 3 do not go out, replace the LSU and repeat procedure from Step 2.
5	If the RCV LINE FAIL and LINE ON PROTN lamps in Step 3 still do not go out, remove the LSU, replace the LIU-T1 position T1-P and repeat procedure Q (Installation of Line A). Repeat this procedure from Step 1.
6	Install a pin plug in SWITCH DISABLE jack A of the LSU.
	Requirement 1: The LINE ON PROTN lamp on the LIU-T1 in position T1-A goes out.
	Requirement 2: The DL FAIL lamp on the DAPV lights.
7	If requirements of Step 6 are not met, replace the LSU and repeat this procedure from Step 2.

U. Switching Tests of Lines B Through D When Included with Initial System Installation

STEP	PROCEDURE
	Note 1: Omit this procedure if the protection line is not equipped.
	Note 2: This procedure describes testing of line B. For installation of lines C and D, repeat this procedure, substituting C or D for line B.
1	Insert terminal looping cards in the TST jacks of LIU-T1, position T1-P and T1-A.
2	Insert pin plugs in **all** SWITCH DISABLE jacks of the LSU except for line B.
	Requirement: The LINE ON PROTN lamp on LIU-T1 in position T1-B lights .
3	Insert a pin plug in SWITCH DISABLE jack B of the LSU.
	Requirement: The LINE ON PROTN lamp on LIU-T1 in position B goes out.
4	Repeat this procedure for lines C and D if they are being installed. Proceed to Step 5.
5	Remove all pin plugs and looping cards.

V. Installation of the LSG (WP61) (Optional on COT)

STEP	PROCEDURE
1	From the work order and/or Table G, obtain the correct code equalizer card.
2	Inspect the equalizer card and the LSG (Line Signal Generator) for possible physical damage.
3	On the LSG (WP61) circuit board, locate the slot for mounting the equalizer card.
4	Grasp the equalizer card by the end opposite the four connector contacts.
5	Insert the equalizer in the equalizer mounting slot.
6	Install the LSG WP61 in the LSG slot.
	Note: The LSG provides an all 1s bipolar signal that is used during maintenance procedures to isolate the channel bank problems. The signal is sent toward the DSX-1 during PBLB. The LSG WP61 unit is tested in the next procedure.

W. COT to DSX-1 Panel Test

STEP	PROCEDURE
1	Verify at terminal strip TB2 that the tip and ring of DSX-IN (RCVG) and tip and ring of DSX-OUT (TRMTG) for lines A, B, C, and D are connected (Fig. 3 and 4).

STEP	PROCEDURE
2	Obtain a P3-type patch cord. At the DSX-1, plug one end of the cord in the A line OUT (TRMTG) jack and the other end in the A line IN (RCVG) jack. ***Requirement:*** The RCV DSX FAIL and OD FAIL lamps on LIU-DSX go out in less than 10 seconds. If not, check wiring to the DSX-1 panel.
3	Repeat from Step 2 for lines B, C, and D. Proceed to Step 4.
4	For all four lines, remove end of patch cord from the OUT jack of the DSX-1. The other end of the cord remains plugged into the IN jack.
5	Install the terminal looping cards in each LIU-T1 A, B, C, D, and P (protection). ***Requirement:*** All lamps on the LIU-T1s and the DL FAIL lamp on the DAPU go out.
6	Obtain an Error Rate Test Set KS-20775, or equivalent, with a P3-type cord.
7	Plug cord from test set into the A line OUT jack of the DSX-1 to monitor the output signal. ***Requirement:*** Pulses are present and there are no bipolar violations.
8	If the requirement is not met, replace the LIU-DSX in DS-A slot and retest.
9	If the requirement is not met, replace the LIU-T1 in T1-A slot.
10	If the requirement is not met, check wiring to the DSX-1.
11	Observe position of OPTION switch 2 located on the DS-1 DSMS shelf. Operate OPTION switch 2 to the closed position.
12	If DSX LIU (WP54) is set for W option, continue with Step 13; if not, go to Step 19.
13	To verify the operation of the LSG (WP61), if used, insert a pin plug in the PBLB jack on the AU. ***Requirement 1:*** The RCV DSX FAIL lamp on the LIU-DSX A slot goes out. Disregard all other lamps. ***Requirement 2:*** Pulses are present and there are no bipolar violations.
14	If the requirements are not met, remove pin plug from the PBLB jack and replace the LSG unit, if used. ***Requirement:*** After 10 seconds, repeat Step 12 and retest.
15	Remove the LSG unit, if used. ***Requirement:*** No pulses indicated on Error Rate Test Set.
16	Remove the pin plug from the PBLB jack on the AU.

STEP	PROCEDURE
17	Remove the test cord from the A line OUT jack on the DSX-1.
18	Reinstall the LSG unit, if used.
19	Reset OPTION switch 2 to original position.
20	Remove all looping cards.
21	Install T1 line fuse.

X. Addition of Lines B Through D to a Working System

STEP	PROCEDURE
	Note: This procedure describes installation testing of line B. For installation of lines C and D, repeat this procedure, substituting C or D for line B.
1	If the system has never been put in service, omit this procedure. This procedure is for a system that is already in service.
2	Isolate the COT on the digital hierarchy side by inserting one end of a P3-type patch cord into the COT IN jack labeled B on the DSX-1 panel. The IN jacks can also be opened by inserting dummy plugs into them.
3	Isolate the COT on the loop side by removing heat coils or protector units for line B located at the MDF (main distributing frame) or bulk protector location.
4	Insert pin plugs in all SWITCH DISABLE jacks of the LSU except B of unequipped lines.
	Requirement: MINOR lamp on SLIM/DS-1 DSMS lights in less than 20 seconds.
5	Depress the ACO switch on the AU.
	Requirement: MINOR lamp goes out.
6	Set options described in procedures N and P for the LIU-DSX (WP53B) to be installed.
7	Install LIU-DSX in position DS-B on the SLIM/DS-1 DSMS.
	Requirement 1: The RCV DSX FAIL and OD FAIL lamps on the installed LIU-DSX light.
	Requirement 2: The MAJOR lamp on the SLIM/DS-1 DSMS lights in less than 20 seconds.
	Requirement 3: The B lamp on the ALM & STATUS INFC unit lights in less than 20 seconds.
8	Depress the ACO switch on the AU.

STEP	PROCEDURE
	Requirement: The MAJOR lamp on the SLIM/DS-1 DSMS goes out.
9	Set options described in procedures O and P for the LIU-T1 (WP51B) to be installed.
10	Install LIU-T1 in position T1-B on the SLIM/DS-1 DSMS.
	Requirement 1: The RCV LINE FAIL and LINE ON PROTN lamps on the installed LIU-T1 light.
	Requirement 2: The MINOR lamp on the SLIM/DS-1 DSMS lights in less than 20 seconds.
11	Depress the ACO switch on the AU.
	Requirement: The MINOR lamp on the SLIM/DS-1 DSMS goes out.
12	Insert a pin plug in SWITCH DISABLE jack B on the LSU.
	Requirement: The LINE ON PROTN lamp on LIU-T1 in position T1-B goes out.
13	Remove the pin plug in SWITCH DISABLE jack B on LSU.
	Requirement: The MINOR lamp on the SLIM/DS-1 DSMS lights in less than 20 seconds.
14	Depress the ACO switch on the AU.
15	Insert a terminal looping card in the TST jack of LIU-DSX in position DS-B.
	Requirement 1: The RCV DSX FAIL and OD FAIL lamps on the LIU-DSX in position DS-B go out in less than 10 seconds.
	Requirement 2: The B lamp on the ALM & STATUS INFC unit goes out in less than 10 seconds.
	Note: Contact bounce on inserting the looping card may cause another MINOR alarm. If so, depress the ACO switch on the AU.
16	Remove the terminal looping card in the TST jack of LIU-DSX in position DS-B.
17	If a major or minor alarm occurs in less than 20 seconds, depress the ACO switch.
18	Insert a terminal looping card in the TST jack in LIU-T1, position T1-B, on the SLIM/DS-1 DSMS.
	Requirement: The RCV LINE FAIL and LINE ON PROTN lamps on the LIU-T1 in position T1-B go out in less than 10 seconds.
19	Remove the terminal looping card in the TST jack in the LIU-T1, position T1-B.
20	Remove all pin jacks in the SWITCH DISABLE jack on the LSU.
21	If a major or minor alarm occurs in less than 20 seconds, depress the ACO switch.

STEP	PROCEDURE
22	If line C is to be added along with line B, unplug the LIU-DSX and LIU-T1 in positions DS-B and T1-B and repeat Steps 2 through 21 for line C.
23	If line D is to be added along with lines B or C, unplug the LIUs in the B and/or C lines and repeat Steps 2 through 21 for line D.
24	Reinstall all LIUs unplugged in Steps 22 and 23 in order to complete the procedure.
25	If a major or minor alarm occurs in less than 20 seconds, depress the ACO switch.
26	At the DSX-1-1 cross-connect panel, connect the IN jacks of the newly installed lines to the DS-1 OUTPUT of the Error Rate Test Set.
27	Go to the Remote Location Terminal Installation Procedures (part 4) and perform Procedure R (Addition of Lines B through D to a Working System Without Protection).

4. REMOTE LOCATION TERMINAL INSTALLATION PROCEDURES

4.01 The following RLT (remote location terminal) installation procedures are provided for the SLIM/DS-1 DSMS. The installation procedures are divided into two parts, the COT and the RLT. It is suggested that all COT installation procedures be performed before beginning the RLT installation.

Note: Disregard all lamps for the installation procedures until each has been specified in the requirements.

A. Overall Visual Inspection of SLIM/DS-1 DSMS Shelf

STEP	PROCEDURE
1	Verify all fuses are removed and no plug-in units are installed.
2	Verify the shelf is tightly secured and free of defects or damage.
3	Verify the electrical connectors inside the shelf are properly secured and aligned with shelf slots.
4	Inspect for misaligned, dented, or twisted shelf by installing the proper plug-in unit in each end and middle of the shelf.
5	At the rear of the shelf, verify there is no broken or damaged equipment (connectors, wiring, etc.).
6	Verify there are no bent, broken, or crossed terminals on the backplane.
7	Verify all cabling and wiring is terminated and tied into forms.
8	If all preceding steps have been verified, proceed to Procedure B (Supply Voltage Checks).

B. Supply Voltage Checks

STEP	PROCEDURE
1	Ensure that external −48 V power is connected to TS1 on SLIM/DS-1 DSMS via customer supplied power or power supply.
2	Verify and perform the following steps using a KS-14510 VOM, or equivalent.
3	Set the meter to measure dc volts.
4	Turn switch to ON position and measure voltage at test jacks on panel.
	Requirement: VOM indicates between −48 and −52.5 V dc.
	SLIM/DS-1 DSMS (J1C141BB, L1)
5	Locate terminal strip TB3 at the right rear of the SLIM/DS-1 DSMS (Fig. 2 and 3).
6	Verify the incoming supply voltage leads are connected to TB3.
7	Test for GRD at terminal 1 and −48 V at terminal 3 on TB3.
	Requirement: VOM indicates between −48 and −52.5 V dc.
8	Use SD-3C478-02 to check wiring problems of SLIM/DS-1 DSMS.
9	Use SD-7C385-01 to check wiring problems of PWR, LBO, and MTCE PNL shelf.
10	Install the proper type of fuse in each fuse block as shown in Table A and Fig. 7.
	JACK PANEL (ED-3C835-30, G1)
11	Verify the 70B fuse is installed in the JK PNL fuse holder on the SLIM/DS-1 DSMS.
12	Obtain a 238A type repeater and ensure the repeater preinstallation tests have been performed (315B, 415A-2, or J98710H repeater test set).
13	On the 238A-type repeater, locate the PWR OPT (power option) switch.
14	Use long nose pliers or similar tool to lift and rotate PWR OPT switch to the T (through) position.
15	Install the 238A-type repeater into the jack panel REP TST slot. Repeater must make proper contact in the REP TST slot.
16	If the JK PNL fuse operates (blows), replace the repeater and repeat procedure from Step 13. If the fuse blows again, use SD-7C385-01 to check the JACK PANEL wiring.

C. Transmission Line Connections (DSX-1 and T1 Line)

STEP	PROCEDURE
	DSX-1
1	Verify at terminal strip TB2 that tip and ring of DSX-RCVG and tip and ring of DSX-TRMTG are properly connected (Fig. 2 and 3).
	Note: Connection from the SLIM/DS-1 DSMS to the DSX-1 is provided via two multipair shielded ABAM cables.
	T1 Line
2	Verify at terminal strip TB2 that tip and ring of T1-RCVG and tip and ring of T1-TRMTG are properly connected. See Fig. 3 and 4, or refer to SD-3C478-02 or SD-7C385-01.
	Note: Connection from the SLIM/DS-1 DSMS to the T1 line outside plant is provided via two multipair shielded ABAM cables.
3	Select a Line Build Out (LBO) or LBO Bypass from the work order and Table K.
4	Install an LBO or LBO Bypass in the PWR, LBO, and MTCE PNL.

D. RLT Option Selection

STEP	PROCEDURE
	CAUTION: **When the system is in service and OPTION switch 1 is in the closed position, inserting a pin plug in any in-service LIU-T1 jack will cause a service interruption and a MAJOR alarm because there is not a protection line.**
1	Locate rocker-type switches OPTION 1, 2, 3, 4, and 5 on the fuse and alarm section of the SLIM/DS-1 DSMS (Fig. 8).
2	From the work order or office records, set OPTION switches for the proper operation (Tables C and D).
3	When an option is not desired, the switch is set in the OPEN position.

E. Installation of Circuit Packs

STEP	PROCEDURE
1	From the work order, determine the RLT configuration.
2	Obtain the proper code circuit packs and ensure the circuit packs are free from damage (Table E and Fig. 8).

STEP	PROCEDURE
3	Set the power switch on the PWR, LBO, and MTCE panel to the ON position.

F. Installation of 295A POWER UNITS

STEP	PROCEDURE
1	Set the ON/OFF switch to OFF on the PUs, and install the PUs into slots PU-R and PU-S (Fig. 8) (PU-S is optional).
	Requirement: The FAIL and ACO lamps light.
2	If the lamps do not light, replace the PU and repeat Step 1.
3	Set the ON/OFF switch to ON.
	Requirement: The FAIL and ACO lamps go out.
4	If the FAIL and ACO lamps do not go out, replace the PU and repeat Steps 1, 2, and 3.
5	Set the VOM to measure DC VOLTS −60.
6	On the PU, measure dc voltages at the test points per Table F.
7	If the voltage requirements of Table F are not met, replace the PU and repeat Steps 1 through 6.
8	Repeat this procedure for the optional PUs if indicated on work order.

G. Installation of AU (Alarm Unit) (WP60) and DAPU (WM12)

STEP	PROCEDURE
1	Install the AU in the AU slot (Fig. 8). Disregard all lamps until specified in requirements.
2	Install the DAPU (WM12) in the DAPU slot.
	Requirement 1: The DL FAIL lamp lights. If the DL FAIL lamp does not light, replace the DAPU and retest.
	Requirement 2: The MJ and NE lamps on the AU light. If lamps do not light replace the AU.
3	If the ACO lamp on the AU is lighted, disengage the AU, then reinstall.
	Requirement 1: The ACO lamp goes out. It may require several attempts to extinguish the ACO lamp. If the ACO lamp remains lighted, replace the AU, check wiring to remote ACO contacts, or flip the ON/OFF power switch on the PU-R.

STEP	PROCEDURE
	Requirement 2: The MJ lamp on the AU will be lighted. If lamps are not lighted, replace the AU. If lamps do not light, replace the DAPU and repeat above procedure.

H. Installation of Equalizers in LIU-DSX (WP53B)

STEP	PROCEDURE
1	From the work order and/or Table G, obtain the correct code of the equalizer cards.
2	Inspect the equalizer cards and the LIUs for possible physical damage. One equalizer is required for each LIU-DSX.
3	On each circuit board LIU, locate the slot for mounting the equalizer.
4	Grasp the equalizer card by the end opposite the four connector contacts.
5	Insert the equalizer into the equalizer mounting slot.

I. Interface Conditioning Option Settings for LIU-DSX (WP53B)

STEP	PROCEDURE
1	On each LIU, locate the TLB plug (Fig. 5).
2	Obtain a KS-21838 extractor tool or long nose pliers.
3	From the facility record and Table H, determine the correct option setting.
4	Set interface conditioning option to W or V.

J. Set Error Rate Option on All LIUs (WP53B, WP54)

STEP	PROCEDURE
1	From the facility record, determine the error rate threshold setting (if provided) for each LIU to be installed. For DDS service, option Y (10^{-5}) will be used for the protection line LIU and will also be used for the other LIUs (Table J).
2	On each LIU, locate the error rate socket assembly (Fig. 7).
3	Obtain a KS-21838 extractor tool or long nose pliers.

STEP	PROCEDURE
4	**Warning: Care should be taken when using KS-21838 tool or long nose pliers to position white plug for proper option setting. White plug must be inserted and removed carefully (in a straight line) to avoid damage to the socket plug assembly.** Set error rate option on each LIU to Y or Z. ***Note:*** The setting of this option will have a noticeable effect on lamp requirements throughout the remaining tests. In general, lamps will take 0.9 seconds to go out if option Y (protection line) is selected, and 9 seconds to go out if option Z is selected.

K. Power Looping Tests

STEP	PROCEDURE
	Note: This test can only be performed if the T1 lines and the COT have been turned up.
1	Insert one WP54 CP in the T1 slot of the A line.
2	At WP54 in the RLT, use KS-14510 VOM, or equivalent, to measure +5 V and +12 V at respective test points. ***Requirement:*** Voltages at +5 V and +12 V test points measure +4.5 V to +5.5 V and +11 V to +13 V, respectively.
3	If voltage is too low (3 to 4.5 V), the line power option in WP51B at the COT may be set for too low voltage (option W). Change WP51B to option V.
4	On WP54 LIU insert ED-3C842-30, G1 power test cord or test cord ED-3C841 (G1) in TST jack (Fig. 9).
5	Insert +lead of VOM into −V test point and −lead of VOM into +V test point. ***Requirement:*** VOM indicates 58 ±3 volts.
6	If requirement in Step 5 is not met, replace WP54 and repeat from Step 4.
7	Remove WP54 from slot and insert it in next T1 slot.
8	Repeat Steps 2 through 7 until all equipped T1 lines have been checked (P, A, B, C, and D). Proceed to Step 9.
9	If requirements in Steps 2 through 6 **are** met, omit the remainder of this procedure and proceed to the next. If requirements **are not** met, continue with Steps 10 through 31 for each LIU-T1P (P through D).
10	If the JACK PANEL is used, an LIU test cord must be connected first to the JACK PANEL LIU plug and then to the TST jack on the LIU.

STEP	PROCEDURE
11	On the LIU associated with the line being tested, insert ED-3C842-30, G1 power test cord or test cord ED-3C841(G1) in the TST jack (Fig. 9).
12	Verify the digital line is ready for use.
13	Obtain the KS-14510 VOM, or equivalent, and set to measure dc volts on 3-VOLT-DC scale.
14	On the JACK PANEL or power test cord, connect positive (+) red lead of VOM to +V and negative (−) black lead to −I (I). Note the voltage. ***Requirement:*** The meter indicates between 0.57 and 0.65 volts dc on 3.0 VOLTS DC scale.
15	If the correct voltage cannot be obtained, replace the LIU associated with the line being tested. Options must be set the same as on the original LIU. Repeat from Step 14.
16	If the requirement is met, go to Step 22.
17	If the correct voltage cannot be obtained, obtain the office and/or cable records to determine the cable pair designations and voltage readings.
18	Disconnect (unplug) the LBO to open the digital line cable pairs.
19	On the line side of the cable pairs, use the VOM to measure the voltage on each conductor (tip and ring) of the cable pairs (transmit and receive) to ground. ***Requirement 1:*** W option—transmit pair (tip and ring) measures GRD (0 V dc). ***Requirement 2:*** W option—receive pair (tip and ring) measures −95 to −115 V dc. ***Requirement 3:*** V option—transmit pair (tip and ring) measures +89 to +109 V dc. ***Requirement 4:*** V option—receive pair (tip and ring) measures −95 to −115 V dc.
20	If improper voltage readings are obtained, verify the LIU line power options are set correctly according to the cable and/or office records. Use SD-3C478-02 to check the SLIM/DS-1 DSMS wiring. Check the wiring to the MDF and check the protector units or heat coils. Repeat from Step 15.
21	Reinstall the LBO or bypass LBO to close the digital line pairs.
22	Using the VOM on 300-VOLTS-DC scale, connect the VOM leads according to Table L. Note the voltage.
23	If the proper voltage readings cannot be obtained, replace the LIU associated with the line being tested. Options must be set the same as on the original LIU.
24	Repeat from Step 21.
25	Using the VOM on 300 VOLTS DC scale, connect the positive (+) VOM lead to +V jack and the negative (−) lead to −V jack. Note the readings.

STEP	PROCEDURE
	Requirement: If the acceptable voltage range is provided on the work print by engineering, compare the readings.
26	If this is the first line being tested, record the meter indication.
	Note: The first line measured cannot be evaluated for the correct voltage requirements unless engineering provides acceptable ranges. All lines within the system, terminating at the same location, must measure within 10 percent of each other.
27	If this is not the first line being tested, record the meter indication and compare with the previously recorded meter indications.
	Requirement: The meter indications measure within 10 percent of the previously recorded values.
28	If the meter indication does not measure within 10 percent of the previously recorded values, replace the LIU associated with the line being tested. Options must be set the same as on the original LIU.
29	Compare the new readings with previously recorded values.
30	Repeat this procedure from Step 10 for the next digital line to be tested.
31	Verify if there is an RPFT (remote power feed terminal) used to supply power to the digital line that powering tests have been performed on.
32	Delay the terminal-to-terminal tests on the digital lines in trouble until the trouble is corrected. Refer the trouble to the appropriate repair force.

L. Installation of Lines A Through D

Note: This procedure assumes that the A through D LIUs have been installed at the COT and a carrier signal containing a good bipolar signal is present.

STEP	PROCEDURE
1	Isolate the RLT on the DSX side by disconnecting the plugs from jacks-DS-1-1 through DS-1-4 on the DS-1 DSMS panel.
2	Set options described in Procedures H, I, and J for the LIU-DSX (WP53B) to be installed.
3	Install LIU-DSX in position DS-A on the SLIM/DS-1 DSMS.
	Requirement: The RCV DSX FAIL and OD FAIL lamps on the installed LIU-DSX light.
4	Set options described in Procedure J for the LIU-T1 (WP54) to be installed.
5	Install LIU-T1 in position T1-A on the SLIM/DS-1 DSMS.

STEP	PROCEDURE
	Requirement: The RCV LINE FAIL lamp on the installed LIU temporarily lights, then goes out in less than 10 seconds.
6	Insert a looping card in the TST jack of LIU-DSX in position DS-A.
	Requirement: The RCV DSX FAIL and OD FAIL lamps go out in less than 10 seconds.
7	If the RCV DSX FAIL and OD FAIL lamps do not go out, replace the LIU-DSX and repeat the entire procedure.
8	Remove the looping card in the LIU-DSX, position DS-A.
	Requirement: The RCV DSX FAIL and OD FAIL lamps on the LIU-DSX light.
	Note: The terminal looping cards must be inserted slowly because rapid insertions can cause false results.
9	Insert a looping card in the TST jack of LIU-T1 in position T1-A.
	Requirement: The RCV LINE FAIL lamp temporarily lights, then goes out in less than 10 seconds.
10	If the RCV LINE FAIL lamp does not go out, replace the LIU-T1 and repeat the entire procedure.
11	Remove the looping card from the LIU-T1 in position T1-A.
	Requirement: The RCV LINE FAIL lamp temporarily lights, then goes out in less than 10 seconds.
12	If lines B through D are being installed for initial system turn-up, repeat the entire procedure for each line, substituting B through D for line A.
13	Replace plugs on jacks DS-1-1 through DS-1-4.

M. Installation of the Protection Line

Note: This procedure assumes that there are no troubles on lines that have already been installed.

STEP	PROCEDURE
1	Set options described in procedure J for the LIU-T1 (WP54) to be installed.
2	Install LIU-T1 in position T1-P on the SLIM/DS-1 DSMS.
	Requirement: The RCV LINE FAIL and LINE ON PROTN lamps temporarily light, then go out in less than 10 seconds.
3	Insert a looping card in the TST jack of LIU-DSX in position T1-P.

STEP	PROCEDURE
	Requirement: The RCV LINE FAIL and LINE ON PROTN lamps on the LIU-T1 in position T1-P light.
4	Remove the looping card in the LIU-T1 in position T1-P.

N. Installation and Test of ASU (ED-7C396) or LSU (WN8C)

Note: This entire procedure requires cooperation at the COT for the LSU installation.

STEP	PROCEDURE
1	If the protection line is not equipped, install ASU in the LSU position of SLIM/DS-1 DSMS and omit the remainder of this procedure.
2	Insert pin plugs in SWITCH DISABLE jacks B, C, and D on the LSU at the RLT.
3	Insert a terminal looping card in the TST jack of LIU-T1 in position T1-A at the COT.
	Requirement: The RCV LINE FAIL and LINE ON PROTN lamps on the LIU-T1 in position T1-A at the RLT light.
4	Insert a pin plug in SWITCH DISABLE jack A on the LSU.
	Requirement: The LINE ON PROTN lamp on the LIU-T1 in position T1-A goes out.

O. Switching Test for Lines B Through D When Included With Initial System Installation

Note: Omit this procedure if the protection line is not equipped.

STEP	PROCEDURE
1	Insert pin plugs in the SWITCH DISABLE jacks on the LSU for all except line B.
2	Insert a terminal looping card in the TST jack of LIU-T1 in position T1-B at the COT.
	Requirement: The RCV LINE FAIL and LINE ON PROTN lamps on the LIU-T1 in position T1-B at the RLT light.
3	Insert a pin plug in SWITCH DISABLE jack B on the LSU.
	Requirement: The LINE ON PROTN lamp on the LIU-T1 in position T1-B goes out.
4	Remove the pin plug in SWITCH DISABLE jack B on the LSU.
	Requirement: The LINE ON PROTN lamp on the LIU-T1 in position T1-B lights.

STEP	PROCEDURE
5	Remove the pin plug in SWITCH DISABLE jack A on the LSU.
6	Insert a pin plug in the SW TO PROTN jack on the LIU-T1 in position T1-A.
	Requirement 1: The LINE ON PROTN lamp on the LIU-T1, position T1-B goes out.
	Requirement 2: The LINE ON PROTN lamp on the LIU-T1, position T1-A lights.
7	Remove all looping cards and pin plugs.
8	Repeat Steps 1 through 7, for lines C and D if they are being installed, substituting C for B or D for B.

P. RLT to COT Tests

Note: Ignore all lamps not specifically mentioned.

STEP	PROCEDURE
1	At the RLT, install terminal looping cards into TST jack of each LIU in the T1 slot and install pin plugs in SWITCH DISABLE jacks A, B, C, and D on the LSU.
2	Establish communication with personnel at the COT, and verify P3-type patch cords are installed in the IN jacks of the DSX-1 panel for the COT and that the other end of these cords are unterminated. Dummy plugs can also be used to open the IN jacks.
3	Verify the digital lines have been tested and are working properly.
4	At the COT, install terminal looping cards in the TST jack of each LIU in the T1 slot.
	Requirement: At the COT, the MJ, P/M, and FE lamps on the AU panel and MAJOR and PWR/MISC lamps on the SLIM/DS-1 DSMS will be lighted.
5	Request personnel at the COT to remove the terminal looping card from the TST jack of the protection line LIU.
	Requirement: At the COT, the LINE ON PROTN and RCV LINE FAIL lamps on the protection LIU will light.
6	At the RLT, remove the terminal looping card from the TST jack of the protection line LIU.
	Requirement: At the COT, the LINE ON PROTN and RCV LINE FAIL lamps go out.
7	If lamps do not go out, the trouble is on the protection digital line. Verify that the digital line pairs have been connected to the proper cable pairs.

STEP	PROCEDURE
8	Request personnel at the COT to remove the terminal looping card from the TST jack of the LIU-T1 for line A. ***Requirement 1:*** At the COT, the RCV LINE FAIL and LINE ON PROTN lamps on the LIU will be lighted, the MINOR lamp on the SLIM/DS-1 DSMS will light (within 20 seconds) and the MN lamp on the AU will also light. ***Requirement 2:*** The P/M, FE, AU, and PWR/MISC lamps on SLIM/DS-1 DSMS will go out.
9	At the RLT, remove the terminal looping card from the TST jack of the LIU-T1 for line A. ***Note:*** At the RLT, the RCV LINE FAIL lamp may flash momentarily. ***Requirement:*** At the COT, the LINE ON PROTN and RCV LINE FAIL lamps on LIU go out (in less than 10 seconds), the MINOR lamp on the SLIM/DS-1 DSMS goes out and the MN lamp on the AU goes out.
10	At the RLT, install the terminal looping card in the TST jack of the LIU-DSX for line A. ***Requirement:*** At the RLT, the RCV DSX FAIL and OD FAIL lamps on the LIU-DSX will go out in less than 10 seconds.
11	If lamps do not go out, trouble is on the digital line associated with line A. Verify the digital line pairs have been connected to the proper outside cable pairs.
12	Perform the following steps in this procedure for the remaining lines.
13	At the COT, remove the looping card from the LIU of the applicable line. At the RLT, remove the pin plug from the SWITCH DISABLE jack on the LSU for the applicable shelf. ***Requirement 1:*** At the COT, the RCV LINE FAIL and LINE ON PROTN lamps on the applicable LIU will light, the MINOR lamp on the SLIM/DS-1 DSMS will light, and the MN lamp on the AU will light. ***Requirement 2:*** At the RLT, the LINE ON PROTN lamp of the applicable LIU-T1 will light. The MN lamp on the AU will light.
14	If the LINE ON PROTN lamp blinks, replace the LSU at the COT and RLT and retest.
15	At the RLT, remove the looping card from the LIU-T1 for the applicable line. ***Requirement 1:*** At the RLT, the LINE ON PROTN lamp and the MN lamp go out in less than 10 seconds. ***Requirement 2:*** At the COT, the MINOR and MN lamps go out.
16	At the RLT, install a looping card in the applicable LIU-DSX.

STEP	PROCEDURE
	Requirement: At the RLT, the RCV DSX FAIL and OD FAIL lamps on the applicable LIU-DSX go out.
17	If the lamps do not go out, the trouble is on the applicable digital line. Verify connections and possibly fault locate.
18	Remove pin plug from SWITCH DISABLE jack A on the LSU.
19	Repeat from Step 13 for other lines.
20	Remove all terminal looping cards from the RLT LIUs.
21	Install terminal looping cards in all LIU-DSXs for all lines at the COT.
22	Install RLT DSX test plug in DS-1-1.
	Requirement: The RCV DSX FAIL and OD FAIL lamps go out in less than 10 seconds.
23	Remove the test plug.
24	Repeat steps 22 and 23 for jacks DS-1-2 through DS-1-4 of equipped lines.
25	Reinstall customer plugs to jacks DS-1-1 through DS-1-4, if provided.
	Note: This completes all loop tests toward the ***loop side.***

Q. Addition of Lines B Through D to a Working System With Protection

Note: This procedure assumes the DSX and T1 LIUs have been installed at the COT for each line being added. It also assumes carrier signal is present on these lines at the COT. If audible alarms are active, activate the ACO switch.

STEP	PROCEDURE
	Note 1: Inserting terminal looping cards must be done slowly for this procedure. Rapid card insertions can cause false results.
	Note 2: This procedure describes installation of Line B. For installation of lines C and D, repeat procedure, substituting C or D for line B.
1	Isolate line B of RLT on the DSX side by disconnecting the plug from jack DS-1-2.
	Note: The DS-1-3 is for line C and DS-1-4 is for line D.
2	If more than one line is being added to the system, insert a pin plug in the SWITCH DISABLE jacks of the LSU at the COT for all **but** the line being added.

STEP	PROCEDURE
3	Verify that any alarms at the COT are disabled by depressing the ACO switch.
4	Set options described in procedures H, I, and J for the LIU-DSX (WP53B) to be installed.
5	Install LIU-DSX in position DS-B on the SLIM/DS-1 DSMS.
	Requirement: The RCV DSX FAIL and OD FAIL lamps on the installed LIU-DSX light.
6	Set options described in procedure J for the LIU-T1 (WP54) to be installed.
7	Install LIU-T1 in position T1-B on the SLIM/DS-1 DSMS.
	Requirement: The RCV LINE FAIL lamp on the installed LIU temporarily lights, then goes out in less than 10 seconds.
	Note: A minor alarm may occur for a short time (less than 10 seconds), but no action has to be taken.
8	Insert a looping card in the TST jack of the LIU-DSX in position DS-B.
	Requirement: The RCV DSX FAIL and OD FAIL lamps go out in less than 10 seconds.
9	If the RCV DSX FAIL and OD FAIL lamps do not go out, replace the LIU-DSX and repeat Steps 5 through 8.
10	Remove the looping card in the LIU-DSX in position DS-B.
	Requirement: The RCV DSX FAIL and OD FAIL lamps on the LIU-DSX light.
11	Insert a looping card in the TST jack of the LIU-T1 in position T1-B.
	Requirement: The LINE ON PROTN lamp lights. The RCV LINE FAIL lamp temporarily lights, then goes out in less than 10 seconds.
12	If the RCV LINE FAIL lamp does not go out, replace the LIU-T1 and repeat this procedure starting at Step 5.
13	Insert a pin plug in SWITCH DISABLE jack B of the LSU at the RLT.
	Requirement: The LINE ON PROTN lamp goes out.
14	Remove the pin plug in SWITCH DISABLE jack B of the LSU.
15	Remove the looping card from the LIU-T1 in position T1-B.
	Requirement: The RCV LINE FAIL lamp goes out in less than 10 seconds.

R. Addition of Lines B Through D to a Working System Without Protection

Note: This procedure assumes the DSX and T1 LIUs have been installed at the COT for each line being added. It also assumes carrier signal is present on these lines at the COT.

STEP	PROCEDURE
	Note 1: Inserting terminal looping cards must be done slowly for this procedure. Rapid card insertions can cause false results.
	Note 2: This procedure describes installation of Line B. For installation of lines C and D, repeat procedure, substituting C or D for line B.
1	Isolate line B of RLT on the DSX side by disconnecting the plug from jack DS-1-2.
	Note: The DS-1-3 is for line C and DS-1-4 is for line D.
2	Verify that any alarms at the COT are disabled by depressing the ACO switch.
3	Set options described in procedures H, I, and J for the LIU-DSX (WP53B) to be installed.
4	Install LIU-DSX in position DS-B on the SLIM/DS-1 DSMS.
	Requirement: The RCV DSX FAIL and OD FAIL lamps on the installed LIU-DSX light.
5	Set options described in procedure J for the LIU-T1 (WP54) to be installed.
6	Install LIU-T1 in position T1-B on the SLIM/DS-1 DSMS.
	Requirement: The RCV LINE FAIL lamp on the installed LIU temporarily lights, then goes out in less than 10 seconds.
	Note: A minor alarm may occur for a short time (less than 10 seconds), but no action has to be taken.
7	Insert a looping card in the TST jack of the LIU-DSX in position DS-B.
	Requirement: The RCV DSX FAIL and OD FAIL lamps go out in less than 10 seconds.
8	If the RCV DSX FAIL and OD FAIL lamps do not go out, replace the LIU-DSX and repeat this procedure from Step 4.
9	Remove the looping card in the LIU-DSX in position DS-B.
	Requirement: The RCV DSX FAIL and OD FAIL lamps on the LIU-DSX light.
10	Insert a looping card in the TST jack of the LIU-T1 in position T1-B.
	Requirement: The RCV LINE FAIL lamp temporarily lights, then goes out in less than 10 seconds.
11	Remove the looping card from the LIU-T1 in position T1-B.

STEP	PROCEDURE
	Requirement: The RCV LINE FAIL lamp goes out in less than 10 seconds.
12	Reinstall the customer plugs, DS-1-1 through DS-1-4, at the RLT, if provided.

5. TROUBLE ANALYSIS PROCEDURES

A. Clearing Fuse Alarms

STEP	PROCEDURE
1	On the fuse and alarm panel section of the SLIM/DS-1 DSMS, identify the blown fuse (Fig. 1 and 8).
2	Replace the blown fuse with one of the same size and type (Table A).
3	If the replacement fuse blows, use SD-3C478-02 to check the wiring. Remove the circuit pack(s) associated with the blown fuse.
4	Replace the blown fuse and reinstall the circuit packs one at a time.

B. Clearing Digital Line Powering Test Troubles

STEP	PROCEDURE
1	Replace the LIU-T1P associated with the line being tested. Options must be set the same as on the original LIU.
	Requirement: The alarms clear.
2	If the trouble did not clear, remove the heat coils or protector units to open the digital line cable pairs.
3	On the office side of cable pairs, use the VOM to measure the voltage on each conductor (tip and ring) of the cable pairs (transmit and receive) to ground.
4	Use the office and/ or cable records to determine the cable pair designations and voltage measurements.
	Requirement: The voltage readings for each cable pair must measure according to Table M.
5	If the voltage range is unsatisfactory, check the LIU line powering options per the cable and/or office records.
6	Use SD-3C478-02 to check the SLIM/DS-1 DSMS wiring. Check the wiring to the MDF and check the protector units or heat coils at the MDF.

STEP	PROCEDURE
7	If the power is looped in the digital line at an RPFT or at the RLT, refer trouble to appropriate repair forces.

C. Clearing AU Major With NE Alarm Lamps

STEP	PROCEDURE
1	On the AU, momentarily depress the ACO switch.
	Requirement: The ACO lamp lights.
2	On the LIUs in T1 position, note the status of the RCV LINE FAIL and LINE ON PROTN lamps.
3	Replace the T1-LIUs with the RCV LINE FAIL lamps on and the LINE ON PROTN lamps out.
	Requirement: The MJ and NE lamps go out.
4	Replace the LIU which has the RCV LINE FAIL and LINE ON PROTN lamps on.
	Requirement 1: On the LIU, the RCV LINE FAIL and LINE ON PROTN lamps go out.
	Requirement 2: The MN lamp on the AU goes out.

D. Clearing PU ( ) Fuse Alarm

STEP	PROCEDURE
1	Remove the 295A POWER UNIT associated with the blown fuse (PU-R or PU-S).
2	On the fuse and alarm panel section of the SLIM/DS-1 DSMS, replace the blown fuse.
	Requirement: The F ALM and MINOR lamps go out.
3	If the fuse holds, install the replacement 295A POWER UNIT and set the ON/OFF switch to ON.
4	If the fuse does not hold, replace the power unit and repeat steps 1 through 4.
	Note: If the unit fails the retest sequence, use SD-3C478-02 to check the shelf wiring.

E. Clearing JACK PANEL Fuse Alarm (COT)

STEP	PROCEDURE
1	At the JACK PANEL, remove the 238A repeater from the REP TST slot.
2	On the fuse and alarm panel section of the SLIM/DS-1 DSMS, replace the JK PNL fuse.
	Requirement: The F ALM and MINOR lamps go out.
3	If the fuse holds, get the replacement 238A repeater and locate the power option (PWR OPT) switch.
4	Use long nose pliers or similar tool to lift and rotate the PWR OPT switch to the T (through) position.
5	Perform the repeater preinstallation tests on the replacement 238A repeater. See the installation procedures.
6	Install the 238A repeater into the REP TST slot.
7	If the fuse does not hold, use SD-3C422-01 (JACK PANEL) and SD-3C478-02 (SLIM/DS-1 DSMS) to check wiring for shorts or grounds.

F. Clearing FAULT LOCATE/ORDER WIRE Fuse Alarm (COT)

STEP	PROCEDURE
1	At the FL/OW PANEL (J1C141AC, L1 and L2), remove the order wire plug-in unit and fault locate the FLCU (FLT LOC CONT UN).
2	At the fuse and alarm panel section of the SLIM/DS-1 DSMS, replace the blown FL/OW fuse.
	Requirement: The F ALM and MINOR lamps go out.
3	If the fuse does not hold, use SD-3C423-01 and SD-3C478-02 to clear wiring trouble.
4	If the fuse holds, reinstall the order wire plug-in unit.
5	If the fuse does not hold, proceed to Step 8.
6	If the fuse holds, replace the FLCU.
7	Ensure the option clips on the replacement FLCU are installed the same as on the original. Perform the necessary tests on the replacement. Practice 363-202-216 contains FLCU turn-up tests.
8	Replace the order wire plug-in unit.
9	At the fuse and alarm panel, replace the FL/OW fuse.
	Requirement: The F ALM and MINOR lamps go out.

STEP	PROCEDURE
10	If the fuse holds, reinstall the FLCU. Perform order wire tests on the replacement order wire unit. Practice 363-202-216 contains order wire turn-up and system tests.
11	If the fuse does not hold, have the order wire pair opened.
12	At the fuse and alarm panel, replace the blown FL/OW fuse. ***Requirement:*** The F ALM and MINOR lamps go out.
13	If the fuse holds, report outside cable pair trouble to the appropriate repair force.
14	If the fuse does not hold, check for wiring trouble between the FL/OW panel and outside cable pair.

G. Clearing AU MINOR Alarm Lamp

STEP	PROCEDURE
1	On the AU, momentarily depress the ACO switch. ***Requirement:*** The ACO lamp lights.
2	Observe lamps on all LIU-T1s( ). If neither the RCV LINE FAIL nor the LINE ON PROTN lamps are lighted, dispatch personnel to the RLT.
3	If the LIUs with lighted lamps are associated with the protection line, refer to Procedure H (Clearing AU Minor and Trouble Locate NEAR END or FAR END Alarm Lamps) to clear the trouble.
4	If the lighted lamp on the LIU is other than protection line LIU, obtain a replacement LIU.
5	On the replacement LIU, set the power supply option and error rate option the same as on the original. ***Requirement:*** On the AU, the MN alarm lamp goes out.
6	If the MN alarm lamp does not go out, have associated LIU at the RLT replaced. Ensure the error rate option is set the same as on the original. ***Requirement:*** On the AU, the MN alarm lamp goes out.
7	If the MN alarm lamp does not go out, refer to Procedure H (Clearing AU Minor and Trouble Locate NEAR END or FAR END Alarm Lamps) to clear the trouble.

H. Clearing AU Minor and Trouble Locate NEAR END or FAR END Alarm Lamps

STEP	PROCEDURE
	Note: If trouble locate FAR END lamp is on, send the repair person to the RLT.
1	On the LSU, determine the reason for the pin plug being installed; then remove the pin plug.
	Requirement: On the AU, the MN and NE lamps go out.
2	On the AU, determine the reason for the pin plug being installed; then remove the pin plug.
	Requirement: On the AU, the MN and NE lamps go out.
3	**Caution: Removal of the AU from a working SLIM/DS-1 DSMS will cause a service interruption.**
	If alarms remain, replace the AU unit.
4	If other alarms remain, use the appropriate trouble-clearing procedures.
	Note: When the pin plugs are installed in the SWITCH DISABLE jacks, the protection line is not available for use in case of a main digital line trouble.

I. Clearing Main Digital Line Trouble

STEP	PROCEDURE
1	Determine the LIU associated with the digital line to be tested.
2	At the LIU, insert an ED-3C842-30, G1 power test cord into the TST jack or connect an LIU test cord first to the JACK PANEL LIU plug, then to the TST jack on the LIU (Fig. 9).
3	Obtain the KS-14510 VOM, or equivalent, and condition to measure dc volts on 3-VOLT-DC scale.
4	On the power test cord **or** JACK PANEL, connect the positive (+) red lead of VOM to +V and the negative (−) black lead to −I (I).
	Requirement: Meter indicates between 0.57 and 0.65 volts dc on 3.0 VOLTS DC scale. Note value of the meter reading.
5	Using the VOM on 300 VOLTS DC scale, connect the positive (+) red lead of VOM to +V and the negative (−) black lead to (REG).
	Requirement: Meter indicates from 32.0 to 221.0 V dc for power option V and from 0 to 116.0 V dc for power option W.
6	Note value of the meter reading.
7	Compare the value of the meter reading with previously recorded values for the line being tested.
	Requirement: Reading indicates within 10 percent of previously recorded values.

STEP	PROCEDURE
	Note: Zero or low current and high line voltage indicates an open line. Normal current and low line voltage indicates short or ground on line.
8	If the test requirements were met at the RLT, have RLT personnel perform the digital line powering test from the RLT.
9	If the digital line powering requirements were satisfactory at the RLT, perform the digital line fault-locating procedure.
	Requirement: Test requirements are acceptable.
10	If the test requirements were not met at the RLT, replace the LIU associated with the line being tested. Options must be set the same as on the original LIU.
	Requirement: Trouble alarms clear.
11	**DANGER: Voltage of 270 V dc may be present on the digital line pairs.**
	If the trouble did not clear, remove the heat coils or protector units to open the digital line cable pairs.
12	On the office side of the cable pairs, use the VOM to measure voltage on each conductor (tip and ring) of cable pairs (transmit and receive) to ground.
13	Use the office and/or cable records to determine the cable pair designations and voltage, or compare the voltage readings with Table M for each cable pair.
	Requirement: Voltage readings are acceptable.
14	If the voltage readings are not acceptable, check the T1 LINES fuse. Use SD-3C478-02 to check the bay wiring. Check the protector units or heat coils at the MDF.

J. Clearing 295A POWER UNIT Trouble

STEP	PROCEDURE
1	**Caution: On a working SLIM/DS-1 DSMS, do not disengage the PU or operate ON/OFF switch to the OFF position, as this may cause a temporary service interruption.**
2	If the FAIL lamp on the PU is lighted, set the ON/OFF switch to OFF and then back to ON.
	Requirement: The FAIL lamp goes out.
3	If the FAIL lamp on the PU goes out, replace the LIU and set the options the same as on the original LIU.
4	If the FAIL lamp on the PU is lighted with no other plug-in unit FAIL lamp lighted, install the replacement PU and set the ON/OFF switch to ON.

STEP	PROCEDURE
	Requirement: The FAIL lamp on the PU goes out.
5	If the FAIL lamp on the PU remains lighted, remove the LIU with the FAIL lamp lighted.
	Requirement: The FAIL lamp on the PU goes out.
6	If the FAIL lamp on the PU remains lighted, use SD-3C478-02 to check the wiring.

K. Clearing Protection Digital Line Trouble

STEP	PROCEDURE
1	Remove the protection line LIU from the P slot. Install the replacement LIU with options set the same as on the original LIU.
	Requirement: On the AU and ALM & STATUS INFC unit, alarm lamps go out.
2	If alarm lamp(s) on the AU did not go out, replace the LSU.
	Requirement: On the AU and ALM & STATUS INFC unit, alarm lamps go out.
3	If alarm lamp(s) on the AU remain lighted, have personnel at the RLT replace protection line LIU with options set the same as on the original LIU.
	Requirement: On the AU and ALM & STATUS INFC unit, alarm lamps go out.
4	If alarm lamp(s) on the AU remain lighted, have personnel at the RLT replace the LSU.
	Requirement: On the AU and ALM & STATUS INFC unit, alarm lamps go out.
5	If alarm lamp(s) on the AU remain lighted, check the digital line power loop. See Procedure I (Clearing Main Digital Line Trouble).

TABLE A

FUSE INSTALLATION

FUSE BLOCK DESIGNATION	FUSE TYPE
PU-R (295A PU)	70A (1.33A) (White)
PU-S (295A PU)	70A (1.33A) (White)
T1 Lines	70C (3A) (Blue)
JK PNL	70B (2A) (Orange)
FL/OW	70B (2A) (Orange)
ALM LPS	70F (0.25A) (Violet)

TABLE B

ALM & STATUS INFC OPTION SETTING

SWITCH SETTING		FUNCTION
OA/PA SYS	MJ/MN	
PA SYS	Note 1	Functions according to standard office alarm practices
OA	MJ	ac failures, battery charge failures, and miscellaneous alarms at the RLT are displayed as PWR/MISC and MAJOR at the COT
OA	MN	ac failures, battery charge failures, and miscellaneous alarms at the RLT are displayed as PWR/MISC and MINOR at the COT

Note 1: If the OA/PA SYS switch is set to the OA position, the MJ/MN switch has no effect.

TABLE C

SLIM/DS-1 DSMS OPTION SWITCH SETTING (NOTE 1)

OPTION SWITCH	SWITCH POSITION FUNCTIONS	
	OPEN	CLOSED
1	Protection switching enabled	Protection switching disabled
2	Derived data link to connecting space	Standard D4 format to connecting span
3	Terminal used for an application other than DS-1 DSMS	Terminal used for DS-1 DSMS application
4	Identifies remote location terminal (Facilitates trouble sectionalization)	Identifies central office terminal (permits identification of loss of power at remote location)
5	No alarm suppression (at central office)	Suppress alarms at central office due to failure of signals incoming to the DS-1 DSMS remote location (i.e., customer signal failure)

Note 1: The DIP switch has the open position labeled; the closed position is not labeled.

TABLE D

NORMAL SWITCH SETTINGS

OPTION SWITCH	WITH PROTECTION LINE		WITHOUT PROTECTION LINE	
	COT	RLT	COT	RLT
1	Open	Open	Closed	Closed
2	Closed	Closed	Closed	Closed
3	Closed	Closed	Closed	Closed
4	Closed	Open	Closed	Open
5	Closed	Open	Closed	Open

TABLE E

CIRCUIT PACK CODE

CODE	NAME	DESCRIPTION	QUANTITY NEEDED		REMARKS
			COT	RLT	
J1C141BB-(), L1	SLIM/DS-1 DSMS	8-inch high shelf for plug-ins	1		Handles up to four service lines; includes Fuse and Alarm Panel
ED3C866-30, G1	ALM & STATUS INFC	Alarm and status interface	1		Not needed at RLT
ED7C511-(), G1	LBO PNL	Line build-out panel			Not typically used in normal applications
ED7C400-(), G1	PWR, LBO & MTCE PNL	Power, line build-out and maintenance panel			Integrated panel which is part of DS-1 DSMS terminal (See next item)
J1C141BC-(), L1	DS-1 DSMS RLT	IM shelf and power, line build-out, and maintenance panel on mounting bars		1	Rack mounting of DS-1 DSMS shelf and ED7C400-() ,G1 pnl
39A	39A CAB	Equipment cabinet for RLT		1	Housing for one DS-1 DSMS remote location terminal
ED7C398-(), G1	7.5 LBO	7.5 dB line build-out		a*	Ten LBOs, two per each of five T1 lines
ED7C399-(), G1	LBO BYPASS	Line build-out bypass		b*	Used to achieve 0 dB LBO
ED7C512-(), G1	15.0 LBO	15.0 dB line build-out		c*	Ten LBOs
295A	PU	Power unit	1	1	No optional spare provided at RLT
WM12	DAPU	Data alarm processing unit	1	1	
WP60	AU	Alarm unit	1	1	
WP61	LSG	Line signal generator	1		RLT does not use all 1s keep-alive

* See footnotes at end of table.

TABLE E (Contd)

CIRCUIT PACK CODE

CODE	NAME	DESCRIPTION	QUANTITY NEEDED		REMARKS
			COT	RLT	
WN8C	LSU	Line switch unit	1	1	Optional, not used if T1 line protection is not selected
ED7C396-30, G1	ASU	Alarm suppressor unit			Only needed if automatic protection switching is not used
WP53B	DSXUN	DSX universal line interface unit	4	4	One per service line
WP51B	T1PH	T1 power hardened line interface unit	5		One per T1 line
WP54	T1LCP	T1 looping customer prem. (hardened) line		5	Contains power circuitry for critical circuits of RLT
WP55 (SPECIAL)	DSXL	DSX line side line interface unit			Behaves like a T1 LIU, but interfaces through a standard T1 office repeater

*a, b, or c selected as function of T1 end section cable loss

TABLE F

TEST POINT VOLTAGES

PU TEST POINTS	VOM CONNECTIONS		NO LOAD VOLTAGE REQUIREMENTS (V dc)
	+RED LEAD	-BLACK LEAD	
+12	+12	GRD	11.0 to 13.0
-12	GRD	-12	11.0 to 13.0
+5	+5	GRD	4.6 to 5.5

TABLE G

EQUALIZER SELECTIONS

EQUALIZER CARD CODE	CABLE LENGTH (FEET) TO BE EQUALIZED (NOTE 1)
ED-3C655-31, G17 (6 dB pad)	0-67
ED-3C655-31, G6	0-133
ED-3C655-30, G2	133-267
ED-3C655-30, G3	267-400
ED-3C655-30, G4	400-533
ED-3C655-30, G5	533-655

Note 1: The code of equalizer is selected to compensate for the length of cabling from the SLIM to DSX cross-connect or to office repeater bay (if DSX is not used).

TABLE H

LIU-DSX (WP53B) INTERFACE CONDITIONING OPTION

OPTION (NOTE 1)	TYPE OF DSX SIGNAL DURING TLB
V	Looped signal
W	All 1s

Note 1: Option V always used at customer premises. Option W usually used at the COT.

TABLE I

LIU-T1 (WP51B) POWER SUPPLY OPTION

BATTERY VOLTAGE	LINE VOLTAGE	J201 OPTION
–48 V	–135 V and GRD	W
–48 V	–135 V and + 135 V	V

TABLE J

LIU ERROR RATE OPTIONS SWITCH SETTING

ERROR RATE THRESHOLD	OPTION	TYPICAL SETTINGS (NOTE 1)	
		MESSAGE SERVICE	DDS SERVICE
10^{-4}	X	Protection Line	
10^{-5}	Y	Working Lines	Protection Line
10^{-6}	Z		Working Lines

Note 1: Option setting should be specified on the Facility Record.

TABLE K

LBO SELECTIONS

LBO	END SECTION CABLE LOSS (NOTE 1)
15 dB LBO (ED7C512)	0.0 to 7.5 dB
7.5 dB LBO (ED7C398)	7.5 dB to 15 dB
LBO Bypass (ED7C399)	Greater than 15 dB

Note 1: The end section cable loss refers to the T1 loss from the RLT to the first T1 repeater.

TABLE L

VOM LEAD CONNECTIONS

VOM CONNECTIONS		REQUIREMENTS (VOLTS dc)	
+RED LEAD	-BLACK LEAD	WP51	
+V	(REG)	OPTION V	OPTION W
		32 to 221	0 to 116

TABLE M

CABLE PAIR VOLTAGE

LIU TYPE	LIU OPTION SETTING	CABLE PAIR VOLTAGE PER OFFICE RECORDS		ACCEPTABLE VOLTAGE RANGE (V dc)
		TRANSMIT	RECEIVE	
WP51B	W	GRD		0
			-130	-95 to -115
WP51B	V	+130		+89 to +109
			-130	-95 to -115

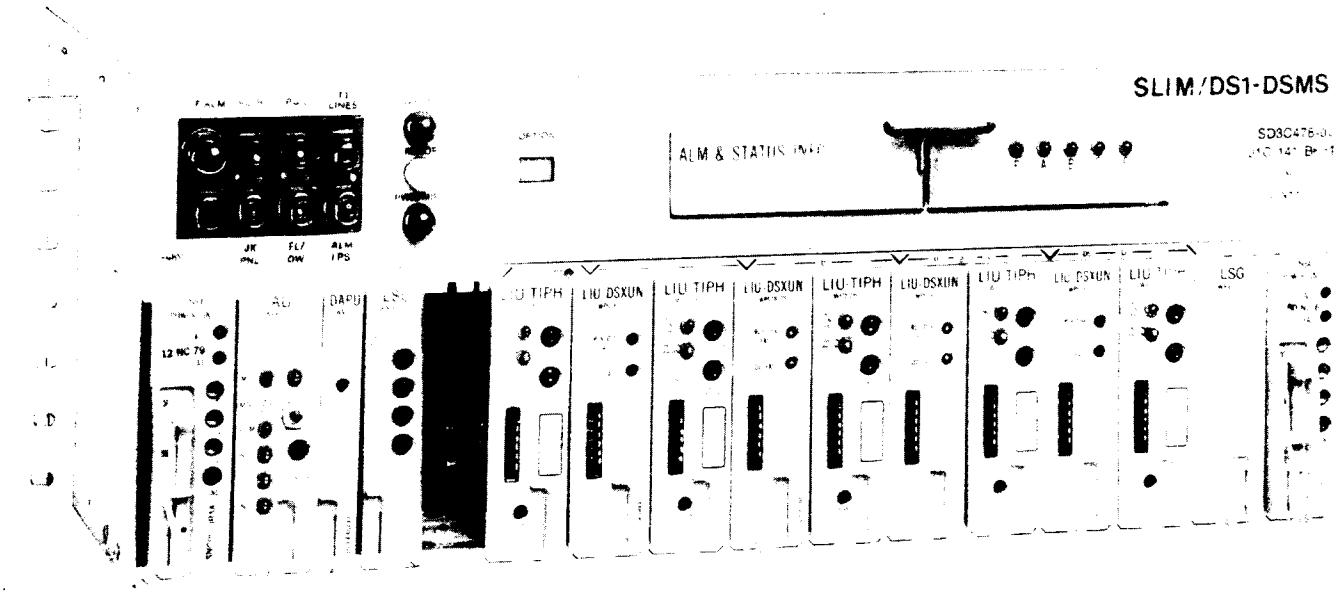


Fig. 1—SLIM/DS-1 DSMS Central Office Terminal (J1C141BB)

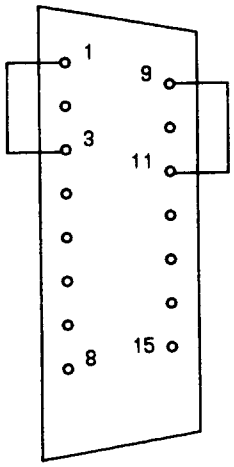


Fig. 2—KS19088, L18- RLT DSX Test Plug

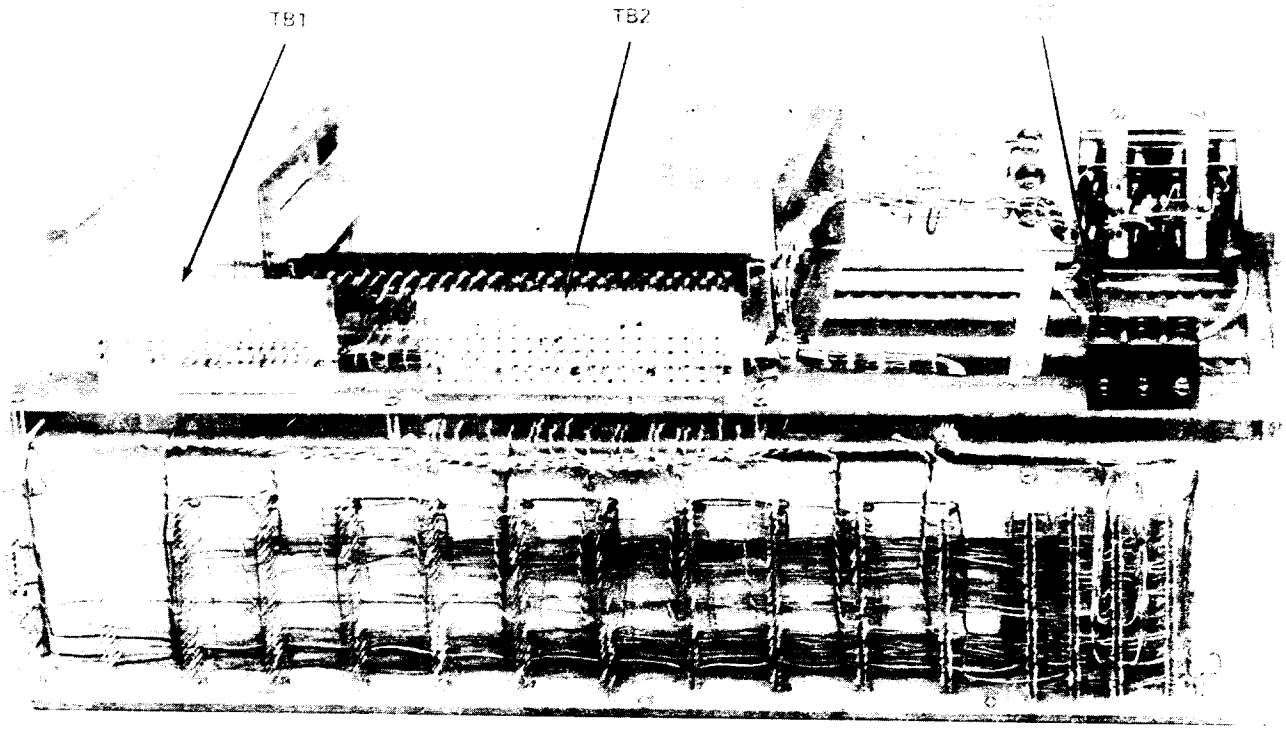


Fig. 3—SLIM/DS-1 DSMS SHELF Backplane

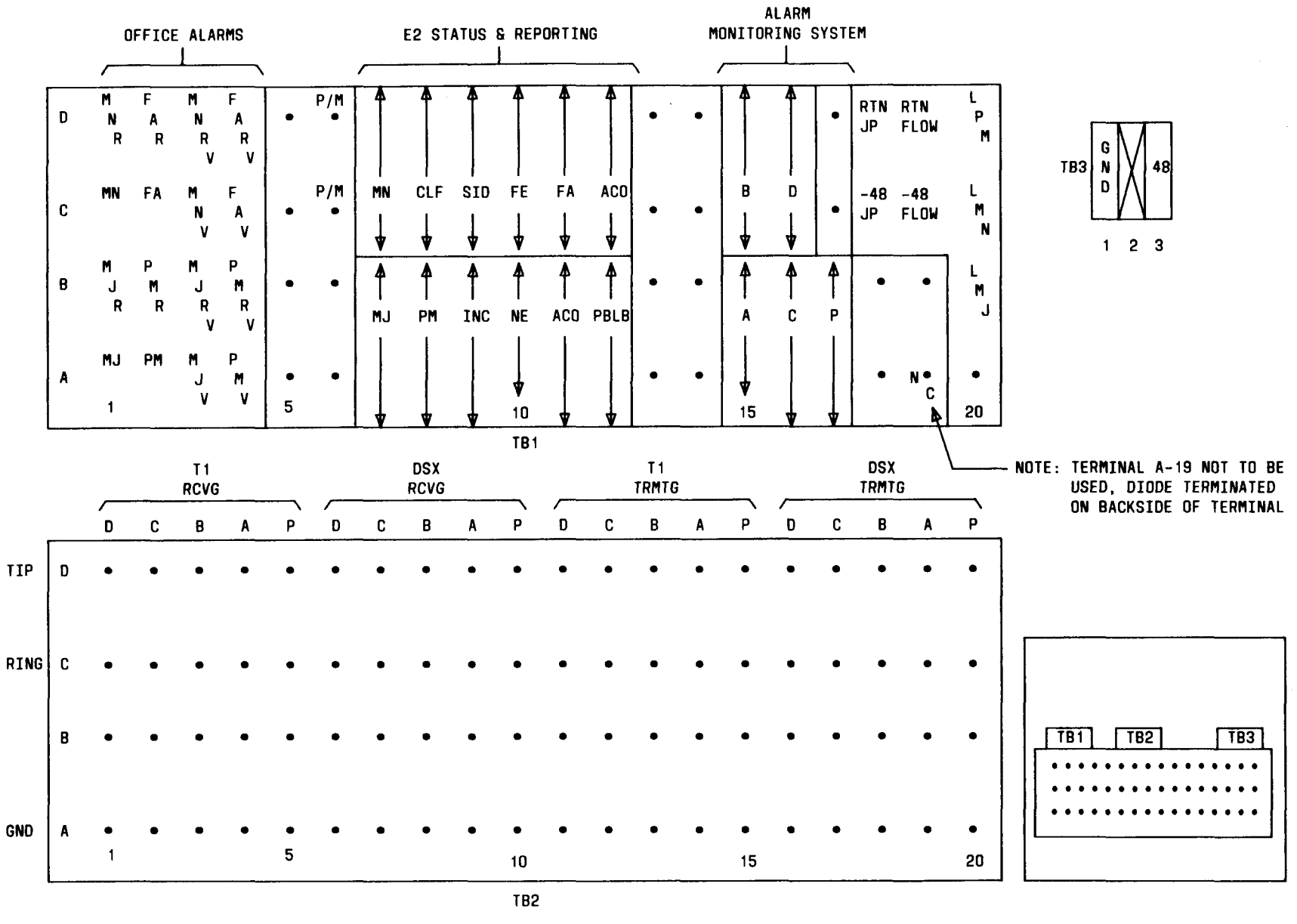
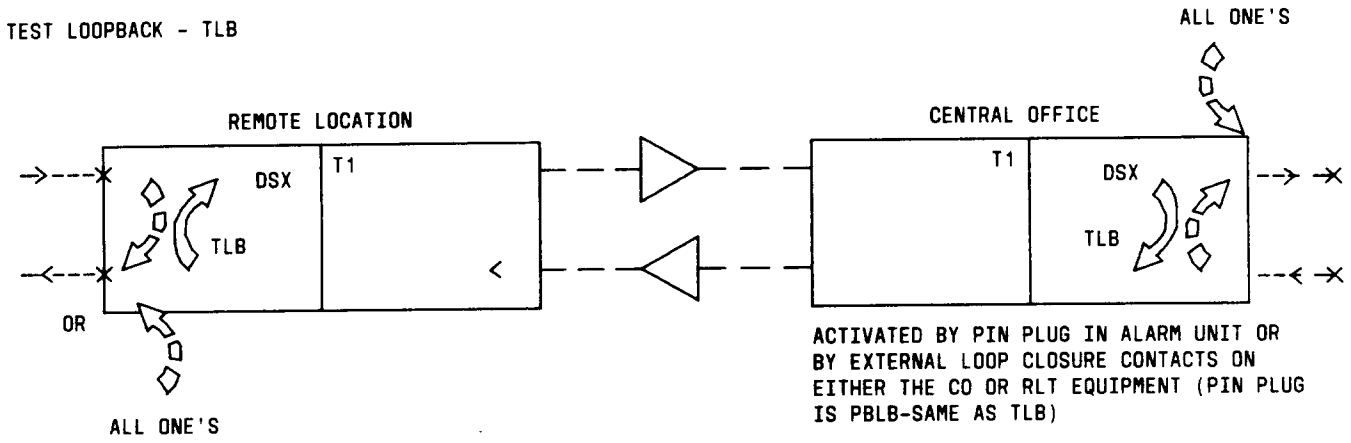


Fig. 4—Terminal Strip Detail



NOTE:
Associated with the TLB there is a simultaneous DSX side loopback as indicated by the dotted lines. This DSX side loopback may be replaced by an all 1's keep-alive signal by selecting the appropriate option on the DSX LIU (WP53B).

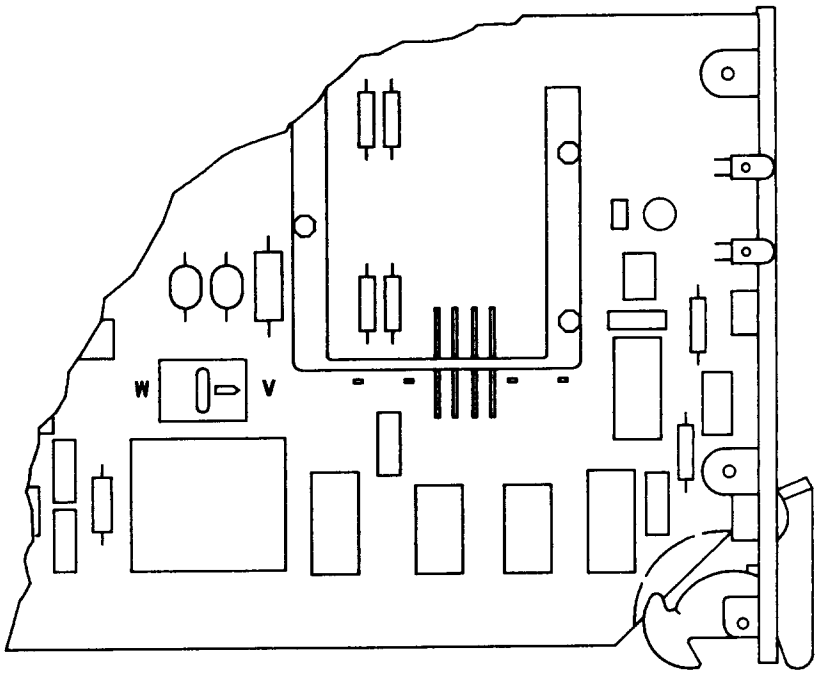


Fig. 5—DSX LIU Test Loopback Plug

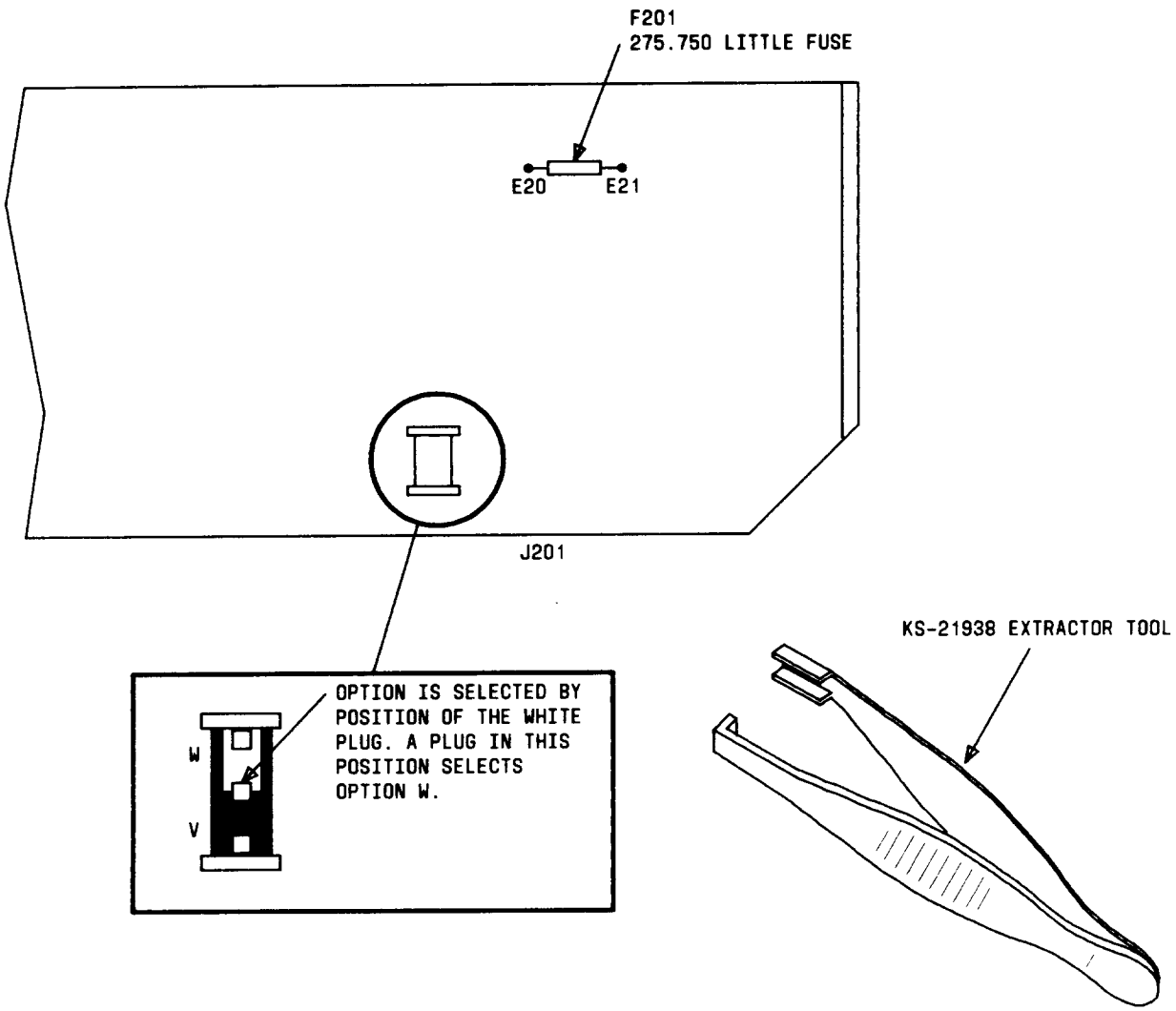


Fig. 6—Set LIU-T1P Power Supply Option

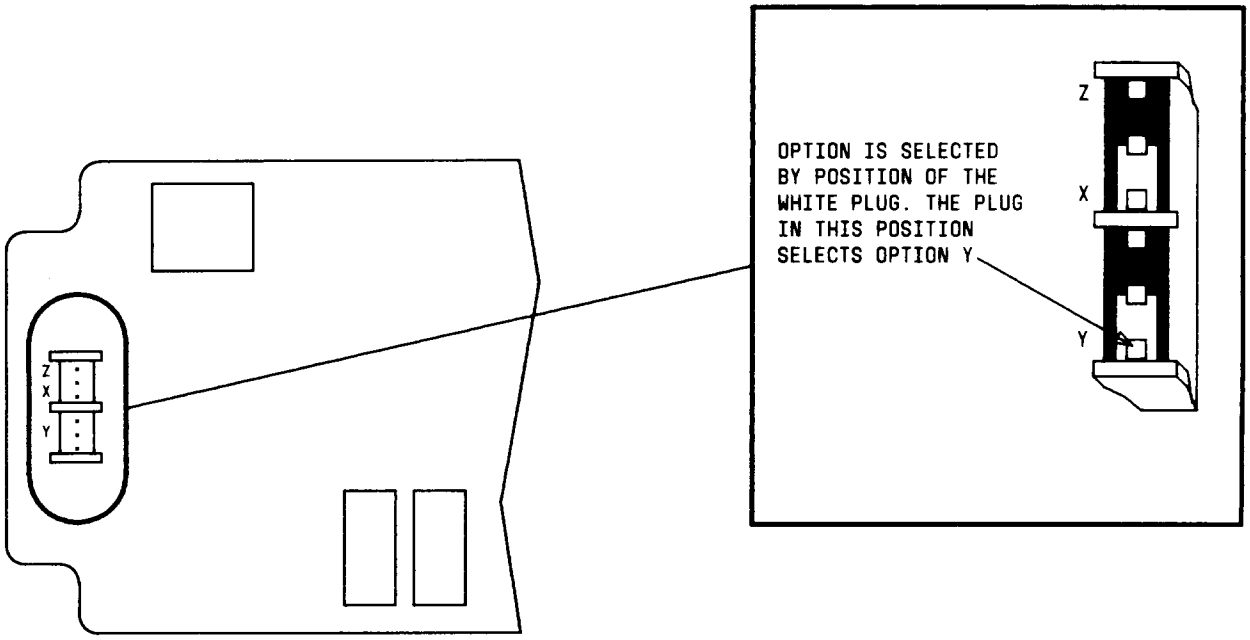


Fig. 7—Set LIU Error Rate Option

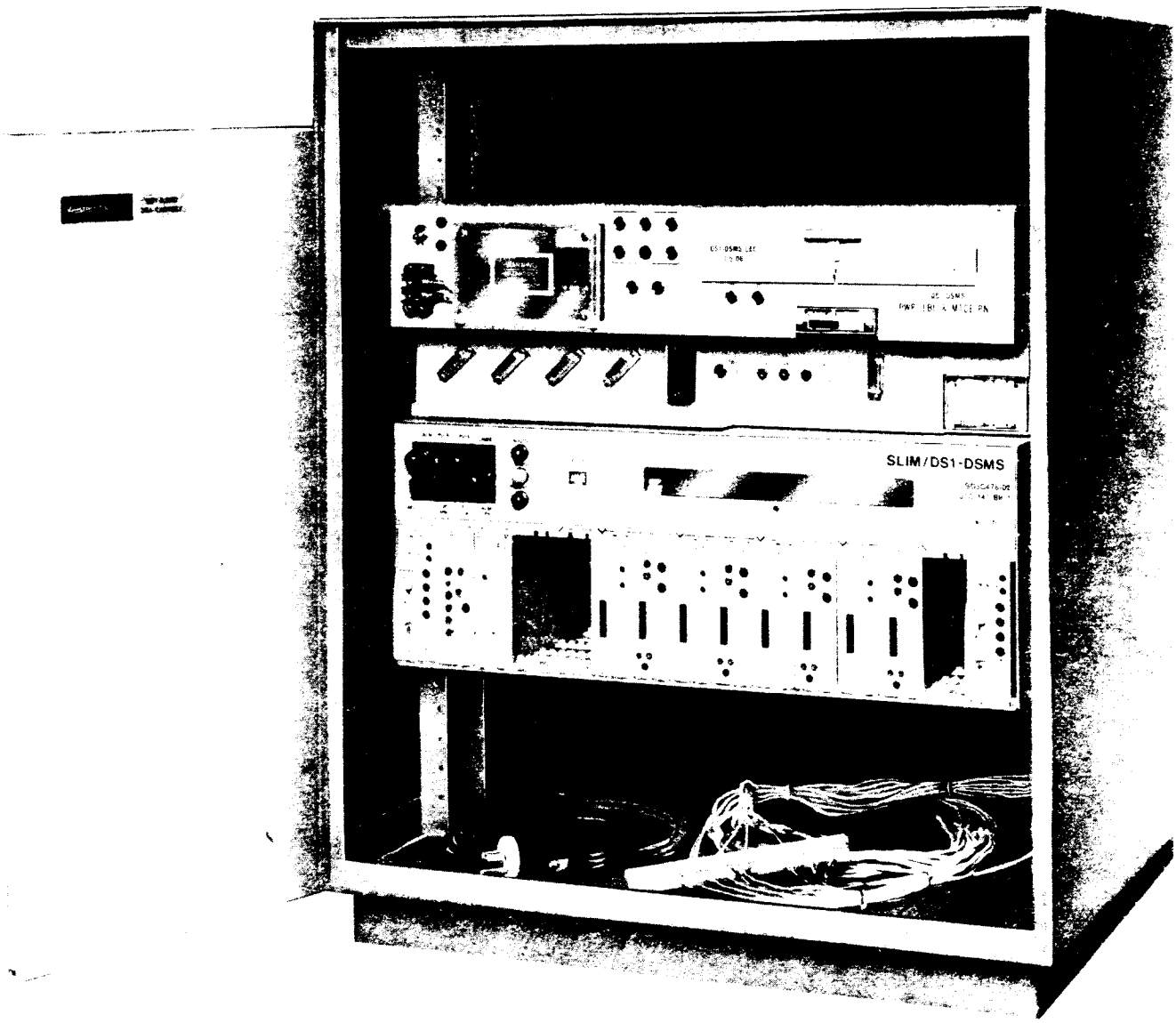


Fig. 8—SLIM/DS-1 DSMS Remote Terminal Mounted in 39A Cabinet (J1C141BC)

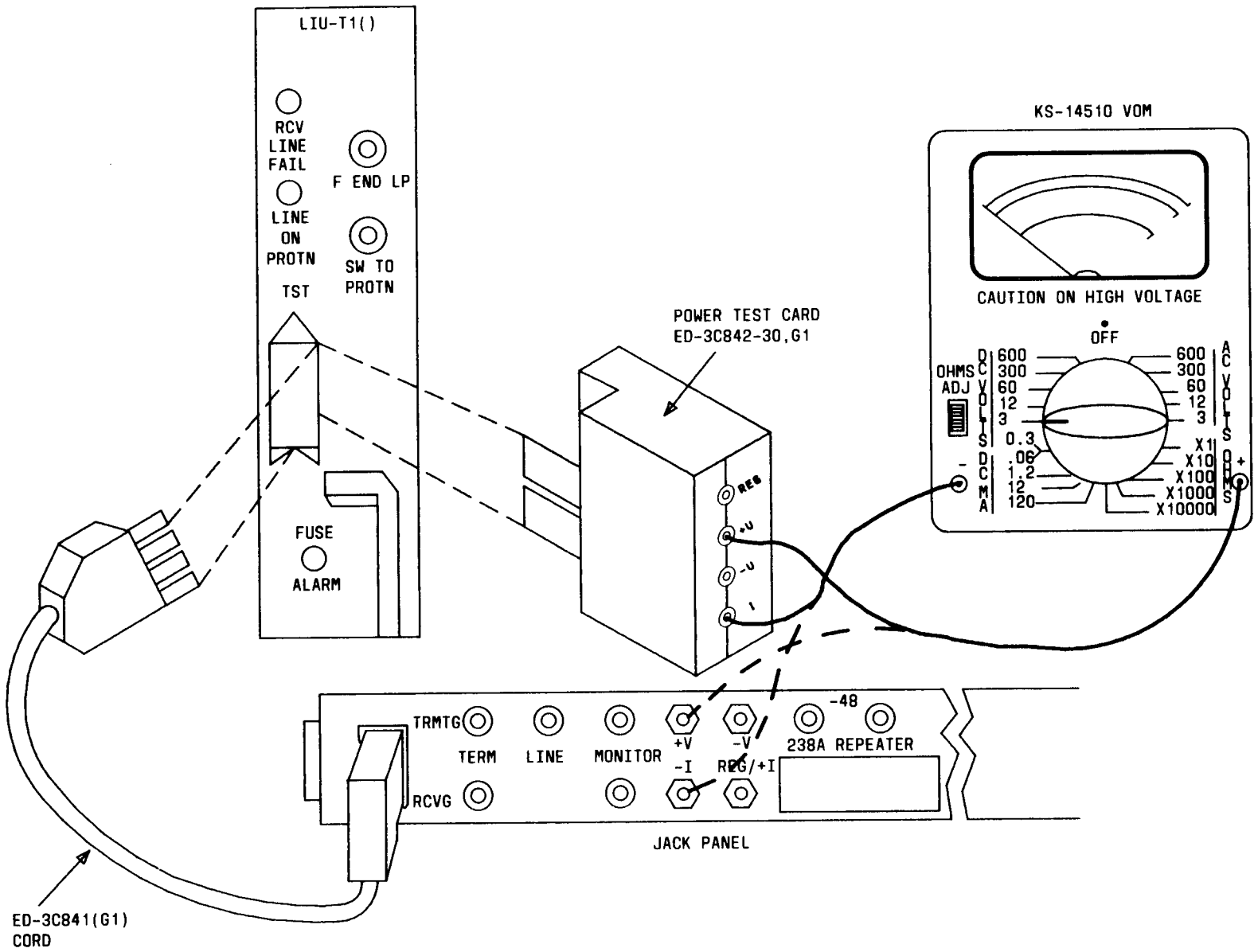


Fig. 9—Perform SLIM/DS-1 DSMS Digital Line Powering Preservice Tests