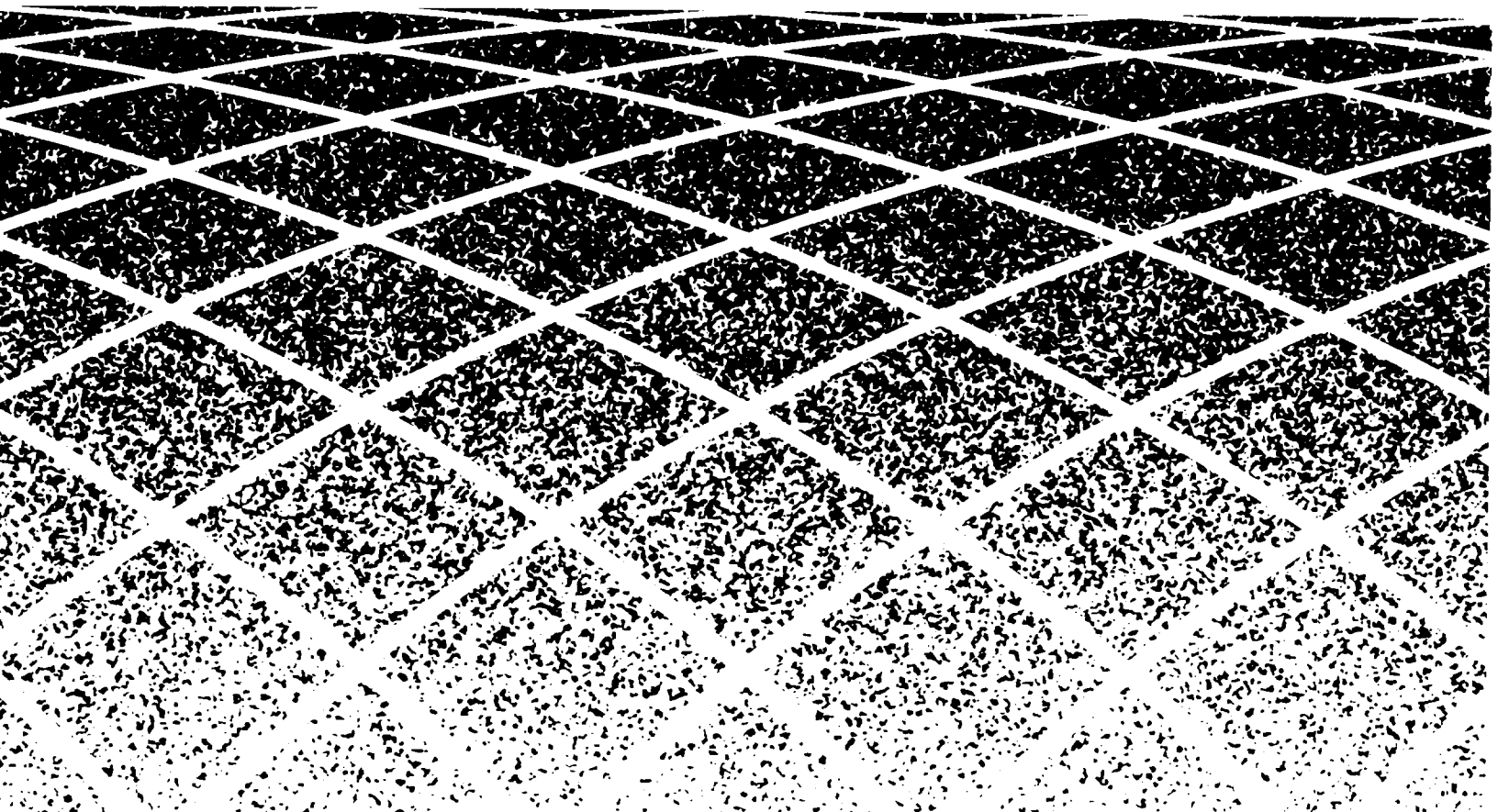
AT&T 363-205-600G
Issue 1 (FPI)
January 1993

SLC® Series 5 Carrier System Feature Packages G and I Acceptance, Turnup, and Conversion

Task Oriented Practice (TOP)



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Document Title: *SLC*® Series 5 Carrier System Feature Packages G and I Acceptance, Turnup, and Conversion Task Oriented Practice (TOP)

Document No.: AT&T 363-205-600G Issue 1 (FPI) Date: January 1993

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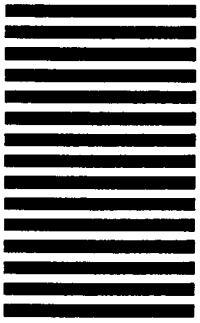

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About This Task Oriented Practice (TOP)

Overview

This TOP is used at the a Feature Package G (FPG) central office terminal (COT) and a FPG or Feature Package I (FPI) remote terminal (RT).

Purpose

This document provides task oriented procedures to accept, turn up, and perform end-to-end tests for the *SLC*® Series 5 Carrier System. It contains specific information for FPG and FPI. This document also provides procedures to convert an in-service system to FPG Mode 1, FPG Mode 2, FPI Mode 1, FPI Mode 2, or FPI Mode 4, and procedures to install a remote terminal local area network (RT LAN) to connect to an Operations Interface (OI) system. This document is designed to meet the following objectives:

- Provide all necessary procedures to accept, establish power, turn up, perform end-to-end tests, and convert a *SLC* Series 5 Carrier System to FPG or FPI* applications.
- Separate each specific activity required to support FPG or FPI into individual tab or subtab sections.

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* This document does not contain procedures used at the *GTD-5*† EAX switch for turn up, end-to-end, or conversions. Refer to the *GTD-5 EAX User Guide* set of documents for procedures used at the *GTD-5* EAX switch. Only procedures used at the remote terminal (RT) are included in this document for Feature Package I.

† *GTD-5* is a registered trademark used under license from the GTE Corporation.

- Provide all necessary procedures to perform a task in each tab or sub-tab section.

Scope

This document is divided into tabs and subtabs that are used to perform a specific task. The following is a summary of the tab procedures in this document:

COT Procedures — This set of subtabs is used at the central office terminal (COT).

- COT Acceptance — The acceptance procedures are used to verify that the COT dual channel bank is not damaged and that the necessary supporting equipment and apparatus are in place *before* the COT is turned up.
- COT Bank Turn Up — The bank turn up procedures are used to option and install common unit circuit packs in the COT channel bank. The COT system is equipped in a preservice state.
- COT Conversions — These procedures are used to change an in-service system feature package configuration. For example, to convert from Feature Package C (FPC) to FPG Mode 1, or FPG Mode 1 to FPG Mode 2.

RT Procedures — This set of subtabs is used at the RT site.

- RT Acceptance — The acceptance procedures are used to verify that the RT dual channel bank and cabinet/frame enclosure is not damaged. It also verifies that AC power is connected to the RT enclosure and that the necessary supporting equipment and apparatus are in place *before* the RT is turned up.
- RT Power Up — This tab is used to equip the various power shelves that provide ringing current, DC power, and battery reserve for the RT channel bank.
- RT Bank Turn Up — The bank turn up procedures are used to option and install common unit circuit packs in the RT channel bank. The RT system is equipped in a preservice state.
- RT Conversions — These procedures are used to change an in-service system feature package configuration. For example to convert from Feature Package C (FPC) to FPG Mode 1, or FPG Mode 1 to FPI Mode 1.
- RT LAN (SIU) Installation — This tab is used to install wiring and the site interface unit (SIU) when a remote terminal local area network (RT LAN) is connected to an Operations Interface (OI) system.

End-to-End Tests — This tab is used to establish an in-service system and test system functions.

After the system is in-service, AT&T 363-205-402, Channel Unit Installation TOP, is used to install channel units in a Feature Package G system when customer service is required.

AT&T 363-205-500G, Maintenance and Troubleclearing TOP, is used to clear in-service system troubles.

Intended Audience

This document is used at the central office terminal (COT) or remote terminal (RT) by craftspersons responsible for performing the necessary procedure to establish (or convert to) a *SLC* Series 5 Feature Package G (FPG) or Feature Package I (FPI) system.

This document assumes a background in telephony and an understanding of basic digital transmission principles. Knowledge of digital loop carrier systems may be assumed in some sections.

How to Use This Document

Find the tab section for performing COT Procedures, RT Procedures, or End-to-End Tests and read the introduction. Find the appropriate sub-tab section (COT or RT Procedures only) for the desired tasks and proceed as follows:

1. Read the **Introduction-000**, then find your task in the TASK INDEX LIST (**IXL-001**).
2. Turn to the desired director-level or detailed level procedure. All procedures in each section are in numerical order, regardless of type. Procedures in this TOP are of four types:
    a. Non Trouble-Clearing Procedure (**NTP**) - A director-level procedure that lists normal work items to perform other than trouble clearing.
    b. Trouble Analysis Procedure (**TAP**) - Detailed step-by-step instructions used to clear system troubles.
    c. Detailed Level Procedure (**DLP**) - Detailed step-by-step instructions that support **NTP**s or **TAP**s.
    d. Trouble Analysis Data (**TAD**) - The *TAD element* is used to provide supplemental information when performing a task. This *element* may include information about philosophies, diagrams, and supporting equipment used with or connected to this system.

3. Perform all the items in the director-level procedure in the indicated order unless it sends you to another director-level procedure. When you complete a director-level procedure, you have finished the task. Where more detailed information is required, you will be sent to a Detailed Level Procedure **DLP-( ).** You may also be sent to a DLP by another DLP.
4. **IMPORTANT:** When you complete a DLP, you **MUST** return to the same step in the procedure which sent you there.
5. **IMPORTANT:** In most cases, if one director-level procedure sends you to another director-level procedure, you should not return to the first director-level procedure after you complete the second.
6. Sometimes you will be asked to verify that things have occurred. This may take the form of a formal statement of the expected response. At other times, the instructions will merely state *verify that ...* .
   If the expected response is not observed and a specific trouble-clearing reference is not made, you should check to ensure that prior steps were performed correctly and that circuit pack options are correct.
   If the expected response is not observed and a specific trouble-clearing reference is made, you should perform the reference trouble-clearing procedure and then return to the point in the procedure that sent you there.
7. If you need assistance after completing all the applicable procedures in this section, call the AT&T Regional Technical Assistance Center (**1-800-225-RTAC**) for FPG. For FPI, customer assistance is provided by the AG Communication Systems (AGCS) Technical Assistance Center (**1-602-582-7805**).

Conventions Used

Trademarks

The trademarks used in this guide are identified on the back of the title page. Trademarks are used as follows: they stand out from the rest of the text by using a different font or capital letters, and they modify a noun. For example, with the trademark, the system name is *SLC* Series 5 Carrier System. Without the trademark, it is referred to as the Series 5 system. The trademark is never used by itself; it always modifies a noun (for example, *SPOTS*® channel units). Trademarks are identified on the first use in *each chapter* (in text and headings) with the register mark (®) or with a footnote. Also, they will be identified in each table and figure on the first occurrence.

Product Safety, *UL*® Listing, and EMC Compatibility

The Series 5 system is available in a *UL** Listed RT. The *UL* Listed RT is designed to help customers comply with The National Electric Code, state, and local code requirements. The *UL* Listed RT is a 7-foot frame equipped with any combination of *UL* Recognized equipment and apparatus. Nearly all RT equipment and apparatus is *UL* Recognized, and AT&T plans to obtain *UL* Recognition for all new RT equipment introduced in the future. For a list of *UL* Recognized equipment and apparatus, refer to AT&T 363-205-011 (*UL* Listed Remote Terminal Installation) or AT&T 363-205-000G (***SLC** Series 5 Information and Pricing Guide for GTE*).

The Series 5 system meets requirements for electromagnetic compliance (EMC) as defined in Federal Communications Commission (FCC) Part 15A and/or 15B.

Safety Labels

Safety labels in this document have the following definitions:

DANGER:
This indicates the presence of a hazard that will cause death or severe personal injury if the hazard is not avoided.

WARNING:
This indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.

CAUTION:
This indicates the presence of a hazard that *will* or can cause minor personal injury or property damage if the hazard is not avoided. This includes equipment damage, loss of software, or service interruption.

System Features Supported

This document supports a *SLC* Series 5 Carrier System configured for Feature Package G Mode 1 or Mode 2 (concentrated) and Feature Package I Mode 1, Mode 2, or Mode 4 (Mode 2 and Mode 4 provide concentration).

* Registered trademark of Underwriters Laboratories, Inc.

Feature Package G is a *universal* system configuration [a central office terminal (COT) connected to a remote terminal (RT)] while Feature Package I is an *integrated* system configuration (a *GTD-5* EAX digital switch connected to an RT).

Related Documentation/Training

The following is an abbreviated list of documents associated with the *SLC* Series 5 Carrier System. See AT&T 363-205-010, ***SLC** Series 5 Carrier System Applications and Planning Guide* for more information on documents, drawings, and training.

SLC Series 5 Documentation Plan

SLC Series 5 Carrier System Planning

363-205-010 ***SLC** Series 5 Carrier System Applications and Planning Guide*
363-205-100 ***SLC** Series 5 Carrier System General Description*
363-205-100G ***SLC** Series 5 Carrier System General Description Feature Package G and I*

SLC Series 5 Carrier System Engineering and Circuit Design

363-005-101 and higher
***SLC** Series 5 Carrier System Data Sheets*
915-710-115G ***SLC** Series 5 Carrier System Feature Package G and I Application Engineering*
915-710-116 ***SLC** Series 5 Carrier System Channel Unit Applications*
FPD 801-450-106-x ***SLC** Series 5 Carrier System Floor Plan Data Sheets*

SLC Series 5 Carrier System Ordering

363-205-000G ***SLC** Series 5 Carrier System Information and Pricing Guide for GTE*

SLC Series 5 Carrier System Remote Terminal (RT) Installation and Splicing

631-600-240 *80-Type Cabinets*
631-600-241 *80-Type Cabinet Feeder Distribution Interface (FDI)*
640-250-217 thru -327 Outside Plant Documentation

T1 Metallic Facility

363-200-001 *T-Carrier Digital Line and Support Pairs Preservice Testing*

Channel Testing

363-202-300 *Pair Gain Test Controller and Test Bust Control Unit Description and Installation*

363-205-300 *Extended Test Controller Description, Turnup, and Maintenance*

Channel Unit Installation

363-205-402 ***SLC*** *Series 5 Carrier System Channel Unit Installation Tests for Feature Package G*

System Maintenance

363-205-500G ***SLC*** *Series 5 Carrier System Maintenance*

GTD-5 **EAX Documentation for Feature Package I**

GTD-5 EAX User Guide

This document set provides all procedures used at the *GTD-5* EAX switch.

How to Order Documentation

To order additional copies of this document and/or to request placement on the standing order list, send or call in an order as follows:

Customer	Mail Order	Telephone Order *(Monday thru Friday)*
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RBOC/BOC	Process through your Company Documentation Coordinator	

* For commercial customers, a check, money order, purchase order number, or charge card number is required with all orders. Make checks payable to AT&T. AT&T entities should use Form IND 1-80.80 FA, available through the Customer Information Center.

One-time orders include a binder (if applicable) and the document contents for the current issue in effect at the time of order. Also, you may request placement on the standing order list for all later reissues of any document. The standing order list for each document provides automatic distribution for all reissues of the document. Operating Company customers should process document orders or standing order requests through their Company Documentation Coordinator.

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Winston-Salem, NC 27106

You may also report errors or request changes to this document by calling the toll-free number: **1-800-334-0404** and giving the document identifier number (**AT&T 363-205-600G**).

Customer Assistance and Technical Support

For FPG, AT&T will provide customer assistance on the *SLC* Series 5 Carrier System including, but not limited to, troubleshooting assistance, technical consultation, operational problem consultation, procedural advice, and emergency recovery assistance from a qualified system support professional from the Regional Technical Assistance Center (RTAC). For FPI, customer assistance is provided by the AG Communication Systems (AGCS) Technical Assistance Center (TAC).

Service is provided from the RTAC at 1-800-225-RTAC. This telephone number is monitored 24 hours a day, 7 days a week. During regular business hours your call will be answered by your local regional RTAC. Outside of normal business hours all calls will be answered at a centralized technical assistance center where service-affecting problems will be dispatched immediately to your local RTAC. All other problems will be referred to your local RTAC on the next regular business day.

Service is provided from the AGCS TAC at 1-602-582-7305. This telephone number is monitored 24 hours a day, 7 days a week. During regular business hours, your call will be answered by TAC personnel. Outside of normal hours, all calls will be answered at a centralized answering center. All calls will be dispatched immediately to TAC personnel.

RT Introduction
SLC® Series 5 Carrier System
Remote Terminal Tab

Overview

This tab section is used at the remote terminal (RT) to establish a *SLC*® Series 5 Carrier System RT channel bank in a *preservice* state. This requires accepting the RT enclosure, equipping the power shelf(ves), and installing the circuit packs in the RT channel bank. Procedures to convert an RT system from one feature package to another are also included in this section.

This section is divided into sub-tabs supporting the five basic types of procedures done at the RT. The document number and issue are on the inside top of each page, and the Tab Section: TOP Element and page count are on the outside top of each page.

Each sub-tab provides all the procedures necessary to perform the activities listed. These tabs are stand-alone and can be removed from the binder if desired.

The following is a summary of each sub-tab:

RT Acceptance

This section is used to verify that the RT enclosure has been properly placed, that it has not been damaged, and that all necessary splicing and power connections have been made before any of the electronic equipment is turned up. All standard RT equipment configurations are factory tested before being shipped so intershelf/bay wiring connections need not be inspected. AT&T splicing and installation practices can be used to verify intershelf wiring connections or to perform field modifications to the RT enclosure.

RT Power Up
This section is used to equip the various power shelves that provide DC power (and battery reserve) to the electronic equipment shelves in the RT enclosure. This section *must be completed before* the RT channel bank or other equipment shelves are turned up.

RT Turn Up
This section is used to install the circuit packs in the RT dual channel bank assembly. This section assumes the feature package equipage (configuration) is known before the circuit packs are optioned and installed.

RT Conversions
This section is used to convert an in-service RT system from one feature package configuration to another. This includes replacing circuit packs and setting options. This section does not include any preconversion activities (grooming special services, digital facility activities, office-to-office testing, etc.), and only provides the steps necessary to change the feature package equipage of the RT channel bank.

RT LAN (SIU) Installation
This section is used to install wiring and the site interface unit (**SIU**) to provide a remote terminal local area network (up to 20 systems per RT LAN) that connects to an Operations Interface (OI) system. The OI system software runs on the *UNIX** operating system and provides operations, administration, maintenance, and provisioning (OAM&P) capability for the Series 5 system.

This document does not provide procedures to turn up equipment shelves other than the RT channel bank (for example, DDM-1000 or DDM-2000 multiplexers, DDM-Plus, or T1 repeater shelves). Refer to the appropriate documentation to equip and turn up this equipment. The AT&T Numerical Index provides a listing of documents in a division. The division is the first three numbers of the document. The AT&T 363-000-000 Numerical Index lists the *SLC* Carrier System, DDM-1000, DDM-2000, DDM-Plus, and other documents concerning Loop Transmission Systems.

* Registered trademark of UNIX System Laboratories, Inc.

How to Use This Document

To find the instructions for performing RT acceptance, RT power up, RT turn up, RT conversion, or RT LAN tasks proceed as follows:

1. Go to the appropriate tab section and read the **Introduction-000**, then find your task in the TASK INDEX LIST (**IXL-001**).
2. Turn to the desired director-level or detailed level procedure. All procedures in each section are in numerical order, regardless of type. Procedures in this TOP are of four types:
   a. Non Trouble-Clearing Procedure (**NTP**) - A director-level procedure that lists normal work items to perform other than trouble clearing.
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7. If you need assistance after completing all the applicable procedures in this section, call the AT&T Regional Technical Assistance Center (**1-800-225-RTAC**) for FPG. For FPI, customer assistance is provided by the AG Communication Systems (AGCS) Technical Assistance Center (**1-602-582-7805**).

Circuit packs being returned for repair should be sent, along with your company's repair and return form, to the following address:

AT&T Network Systems
Carolinas Service Center
6701-A North Park Blvd.
Charlotte, NC 28216

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CAUTION:
This indicates the presence of a hazard that *will* or can cause minor personal injury or property damage if the hazard is not avoided. This includes equipment damage, loss of software, or service interruption.

Equipment and Craft Personnel Considerations

CAUTION:
An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to ***ESD GRD*** *jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.*

The Series 5 channel bank assembly and associated equipment provide high voltage ringing current and high amperage power distribution. You should remove any metal jewelry before working on this equipment, particularly around the backplane. *Follow local personnel safety procedures when working on any AT&T product.*

Checklist

The following Tab Index tables provide a means to verify that all elements are present. This information should not be used for direct access to a particular element because *most elements are not stand-alone procedures.*

RT Acceptance Tab Index	
Element	**Title**
Introduction-000	Accept Series 5 RT Cabinet or Frame Introduction
IXL-001	Acceptance Task Index List
NTP-002	Acceptance
NTP-003	Accept Remote Terminal Equipment
DLP-500	Open RT Cabinet Enclosure
DLP-501	Perform Overall Visual Inspection of Remote Terminal Equipment

RT Power Up Tab Index	
Element	**Title**
Introduction-000	Turn Up Power Plant for Series 5 RT Introduction
IXL-001	Power Up Cabinet or Frame Power Plant Task Index List
NTP-003	Turn Up J1C182BA Power Shelf and Supporting Equipment in Frame, 51-, 80-, or 90-Type Cabinet RT
NTP-004	Add Battery String Equipment to J1C182BA Power Shelf in Frame, 51-, 80-, or 90-Type Cabinet RT
NTP-005	Turn Up J1C182BB Bulk Power Shelf and Supporting Equipment in RT Frame
NTP-006	Turn Up ED-7C704-30 Bulk Power Plant in 80E or 80D Cabinet
DLP-500	Verify Cabinet AC Power Panel Connections
DLP-501	Install Load Distribution Unit (LDU) in Power Shelf
DLP-502	Perform Initial Installation and Tests of Batteries in Frame-Type or Cabinet-Type RT Enclosure
DLP-503	Perform Initial Installation and Tests of Batteries for 51-Type (ED-7C601-30) Cabinet RT
DLP-504	Perform Test of RT Batteries Using 197A Battery Load Test Set
DLP-505	Install 337A Battery Charger
DLP-506	Install 336A Rectifiers in J1C182BA Power Shelf
DLP-507	Perform Battery Charger Test
DLP-508	Install 3C Ringing Generators in Power Shelf
DLP-509	Install AUG1 Positive Ring Unit in J1C182BA Power Shelf
DLP-510	Install Bank Fuse Unit (BFU) in Power Shelf
DLP-511	Install and Test Power Converter Unit (PCU) in Facility Shelf
DLP-512	Perform Installation and Tests of Batteries in Existing Frame-Type or 80-Type (ED-7C621-30 or ED-97977-30) Cabinet RT

RT Power Up Tab Index (Continued)	
Element	**Title**
DLP-513	Perform Installation and Tests of Batteries for Existing 51-Type (ED-7C601-30) Cabinet RT
DLP-514	Add 337A Battery Chargers to an Existing Frame-Type or 80-Type Cabinet RT Battery Shelf
DLP-515	Add 336A Rectifiers to Existing J1C182BA Power Shelf
DLP-516	Install Ringing Switch Unit (RSU) in J1C182BB Bulk Power Shelf
DLP-517	Install 3C Ringing Generators in J1C182BB Bulk Power Shelf
DLP-518	Install AUG1 Positive Ring Unit in J1C182BB Bulk Power Shelf
DLP-519	Install 336A Rectifiers in J1C182BD Power Shelf
DLP-520	Install Ring Control Unit (RCU) in J1C182BD Power Shelf
DLP-521	Install 3H1 Ringing Generators in J1C182BD Power Shelf
DLP-522	Install *Chloride** Batteries in 80A Cabinet Battery Compartment
DLP-523	Install Lineage 2000 VR Series Batteries in 80A Cabinet Battery Compartment
DLP-524	Install *Chloride* Batteries in 80E Cabinet Battery Compartment
DLP-525	Install Lineage 2000 VR Series Batteries in 80E Cabinet Battery Compartment
DLP-526	Verify Connections to ED-83114-30 Control & Distribution Panel
DLP-527	Install and Test Power Units in Rectifier Shelf
DLP-528	Install 3C or 3A Ringing Generators in Ring Shelf
DLP-529	Install Ring Control Unit (RCU) in Ring Shelf
DLP-530	Check 197A Battery Load Test Set for Proper Operation
DLP-531	Install Lineage 2000 VR Series Batteries in 80D Cabinet Battery Compartment
DLP-532	Install *Chloride* Batteries in 80D Cabinet Battery Compartment
DLP-533	Check 4A Fan Unit Operation
* Registered trademark of Berlhest B.V. Corporation.	

RT Bank Turn Up Tab Index	
Element	**Title**
Introduction-000	Turn Up Series 5 RT Channel Bank Introduction
IXL-001	RT Channel Bank Turn Up Task Index List
NTP-003*	Turn Up Series 5 RT Equipped for Feature Package G Mode 1 or Mode 2 Capability or Add to Existing RT
NTP-004	Test Digital Line Connections to DDM-2000, DDM-1000, or DDM-Plus For Preservice RT (Optional)
NTP-005	Turn Up Series 5 RT Equipped for Feature Package I Mode 1, Mode 2, or Mode 4 Capability or Add to Existing RT
TAP-100	Clear FAIL LED Problems on a Unit During Turnup and Conversion
TAP-101	Clear CLF LED Problems on an LIU During Turnup
DLP-500	Verify That the Correct Complement of Circuit Packs is Available
DLP-501	Install and Test Power Converter Unit (PCU) in Facility Shelf
DLP-502	Install AUA114 Channel Fuse Unit (CFU)
DLP-503	Install AUA115 Line Fuse Unit (LFU) in RT Facility Shelf
DLP-504	Install Fan Control Unit (FCU)
DLP-505	Install Alarm Display Unit Optioned for Preservice and Unequipped
DLP-506	Install Bank Control Unit
DLP-507	Install and Test Power Converter Unit (PCU) in AB Shelf
DLP-508*	Set the Option Switches on an FPG LIU
DLP-509	Install PCU Unit in CD Shelf
DLP-510*	Install Line Switch Unit (LSU) in Facility Shelf
DLP-511	Perform RT Indicator Test
DLP-512	Install AUB101 Flash Memory Unit (FMU)
DLP-513	Set the Option Switches on an FPI LIU
* Note included in this issue. Will be included when features are available.	

RT Conversions Tab Index	
Element	**Title**
Introduction-000	RT Feature Package Conversions Introduction
IXL-001	Convert RT Channel Bank Feature Package Task Index List
NTP-003*	Convert Feature Package C with Special Services to Feature Package G Mode 1
NTP-004*	Convert Feature Package G Mode 1 to Feature Package G Mode 2
NTP-005*	Convert Feature Package G Mode 2 to Feature Package G Mode 1
NTP-006*	Convert Feature Package C with AutoCut to Feature Package G Mode 1
NTP-007*	Convert All-POTS Feature Package C to Feature Package G Mode 1
NTP-008*	Convert Feature Package G FPG System to Feature Package I
NTP-009	Convert Feature Package C FPC POTS System to Feature Package I
NTP-010	Convert Feature Package C with Special Services to Feature Package I
TAP-100	Clear FAIL LED Problems on a Unit During Turnup and Conversion
DLP-500*	Set the Option Switches on a FPG LIU
DLP-501*	Set Option Switches on AUB27 ADU for FPC with AutoCut
DLP-502	Set Options on AUB27 or AUB28 Alarm Display Unit (ADU) for FPG or FPI
DLP-503	Install AUB101 Flash Memory Unit (FMU)
DLP-504	Set the Option Switches on an FPI LIU
DLP-505	Install Flash Memory Unit (FMU) Line
* Not included in this issue. Will be included when features are available.	

RT LAN (SIU) Installation Tab Index	
Element	**Title**
Introduction-000	RT LAN (SIU) Installation Introduction
IXL-001	RT LAN (SIU) Installation Task Index List
NTP-003	Install and Test RT LAN in Feature Package G or I
DLP-500	Install the DCB-T Cable
DLP-501	Install the SIU Jumper Cable
DLP-502	Install the LAN Main Cable
DLP-503	Set Option Switches and Install the SIU
DLP-504	Perform a Test of the SIU and LAN

Accept Series 5 RT Cabinet or Frame Introduction

The purpose of acceptance procedures is to visually verify that the cabinet or frame has not been damaged while being installed and that power is supplied to the enclosure.

All intershelf and interframe/bay wiring is factory tested before the equipment is shipped from the factory. The need to verify cable connections (power, digital pairs, drop pairs, fan control leads, etc.) between the channel bank assembly and various apparatus shelves is not necessary. Often these connections are not easily accessible because they are tied down to the frame work behind the equipment shelves.

This document assumes splicing of the digital facility and derived pairs in the RT enclosure has been completed and the commercial AC power has been connected.

If you want to verify these connections, the installation and splicing documents provide detailed cabling drawings for specific remote terminal (RT) enclosure configurations. You can also use schematic drawings (SDs) and circuit description (CDs) for more detailed information. For cabinet enclosures, you can determine the equipment configuration from a label inside the side 1 right door of the cabinet. This label provides the cabinet ED number and the equipage group numbers. From this information you can find the appropriate installation and splicing documents. The following two sections provide a partial list of outside plant and drawings documentation associated with the *SLC* Series 5 Carrier System equipment and apparatus.

Outside Plant Documentation

Outside plant documentation on transmission apparatus, cables, and enclosures spans several divisions. Division 622 covers conduit, manholes, and cable vaults, including the concrete hut and controlled environment vaults used for Series 5 systems. Division 626 (cables, wire, and apparatus - general) documents the different kinds of cables and provides ordering information and

lettering guidelines for the 80-type outside plant cabinets. Division 631 (cable terminals) documents exchange cable identification, different types of connector blocks, and splicing information for pedestals and cabinets. Division 640 (outside plant - carrier apparatus) covers carrier apparatus cases (which house repeaters for digital lines), *SLC* Carrier System splicing in various cabinets and enclosures, and lightguide cable systems. Refer to AT&T 000-000-002, *AT&T 9-Digit Numbered Documents Master Index*, for other divisions of outside plant documentation.

Outside plant documentation (a partial list) on the Series 5 system includes the following:

- AT&T 622-506-052, *KS-23038 Controlled Environment Vault Description*
- AT&T 622-506-235, *Concrete Hut ED-7C285-30, Description and Installation*
- AT&T 622-506-236, *KS-23038 Controlled Environment Vault Installation*
- AT&T 622-506-237, *KS-23038 Controlled Environment Vault Operation and Maintenance*
- AT&T 626-500-105, *80-Type Cabinet, Coding Scheme, Ordering Information, and Lettering Guidelines*
- AT&T 631-600-240, *80 B, C, and D Size Cabinets, Installation*
- AT&T 631-600-241, *80 B, C, and D Size Cabinet, Splicing Information*
- AT&T 640-250-223, *80-Type Cabinet Remote Terminal, Installation and Splicing (Metallic Systems)*
- AT&T 640-250-224, *Remote Terminal Splicing, Precabled Structures Using Bulk Protection*
- AT&T 640-250-237, *51A RT Cabinet (ED-7C601-30) Placement*, SLC *Series 5 Carrier System*
- AT&T 640-250-247, SLC *Series 5 Carrier System Dual Channel Banks (Metallic), Field Installation of* SLC *Series 5 Carrier System Remote Terminal Into 80-Type Cabinets Precabled for the* SLC *Series 5 Carrier System*
- AT&T 640-250-248, *Precabled Structure Using Bulk Protection Metallic Remote Terminal Splicing* SLC *Series 5 Carrier System*

- AT&T 640-250-250, *Precabled Structures Using Bulk Power and Protection, Splicing, and Cabling Arrangements (Metallic and Fiber* SLC *Carrier Systems)*
- AT&T 640-250-251, *16-Foot and 24-Foot Platforms Description* SLC *Series 5 Carrier System*
- AT&T 640-250-252, *80D Cabinet (Fiber) Group 80 Description, Installation, and Splicing,* SLC *Series 5 Carrier System*
- AT&T 640-250-255, *80D Cabinet (Fiber) Group 90, 91, 92 Description, Installation, and Splicing,* SLC *Series 5 Carrier System*
- AT&T 640-250-256, *80E Cabinet (Fiber) Group 90 and 91, Description, Installation, and Splicing,* SLC *Series 5 Carrier System and SXSS Repeater Shelf*
- AT&T 640-250-325, *80 D Cabinet Description, Installation, and Splicing* SLC *Series 5 Carrier System*
- AT&T 640-250-327, *80E Cabinet Remote Terminal, Description, Installation, and Splicing*
- AT&T 640-252-310, *Concrete Hut (ED-7C285-30) Splicing (Metallic and Fiber Systems), Combined* SLC 96 *and* SLC *Series 5 Carrier Systems*
- AT&T 640-252-311, *C Equipment Platform Splicing (Metallic and Fiber Systems), Combined* SLC 96 *and* SLC *Series 5 Carrier Systems*
- AT&T 640-252-312, *80-Type Cabinets, Description, Installation, and Splicing, Combined* SLC 96 *and* SLC *Series 5 Carrier Systems*
- AT&T 644-203-155, *80-Type Cabinet, Repair and Replacement Parts*

Drawings

Equipment drawings (J drawings), apparatus drawings (A drawings), schematic drawings (SDs), and circuit descriptions (CDs) provide detailed wiring, cabling, schematic, and physical information. Circuit descriptions (when available) use the same number as the schematic drawing. There may be limited availability on some drawings. Refer to Division 801 for J drawings and other equipment specifications.

The following drawings contain detailed information on Series 5 equipment and related systems.

- SLC *Series 5 Carrier System Ordering Guide*, ED-7C628-10
- *Writing Shelf*, ED-30335-70
- *Central Office Terminal Channel Bank Schematic*, SD-/CD-7C115-01
- *Central Office Terminal Application and Bay Wiring Schematic*, SD-/CD-7C116-01
- *Remote Terminal Dual Channel Bank Schematic*, SD-/CD-7C117-01
- *Remote Terminal Application and Bay Wiring Schematic*, SD-/CD-7C118-01
- *Remote Terminal Power Shelf Schematic*, SD-/CD-7C119-01
- *Floor Plan Data Sheet*, SLC *Series 5 Carrier System Central Office, Terminal, 11-foot 6-inch Frame (Six Dual Channel Banks)*, FPD 801-450-106-1
- *Floor Plan Data Sheet*, SLC *Series 5 Carrier System Central Office Terminal, 11-foot 6-inch Frame (Five Dual Channel Banks)*, FPD 801-450-106-2
- *Floor Plan Data Sheet*, SLC *Series 5 Carrier System Central Office Terminal, 9-foot 0-inch Frame (Four Dual Channel Banks)*, FPD 801-450-106-3
- *Floor Plan Data Sheet*, SLC *Series 5 Carrier System Central Office Terminal, 7-foot 0-inch Frame (Three Dual Channel Banks)*, FPD 801-450-106-4
- *Floor Plan Data Sheet*, SLC *Series 5 Carrier System Remote Terminal, 7-foot 0-inch Frame (Two Dual Channel Banks)*, FPD 801-450-106-5
- *Floor Plan Data Sheet*, SLC *Series 5 Carrier System Remote Terminal, 7-foot 0-inch Frame [Three Dual Channel Banks (DC Bulk Power)]*, FPD 801-450-106-6
- *Extended Test Controller Control Shelf*, SD-/CD-7C127-01
- *Pair Gain Test Controller Control Shelf*, SD-/CD-97760-01
- *Patch and Cross-Connect Panel*, SD-/CD-99503-01
- *Data Link Interface*, SD-/CD-1P112
- *Metallic Interface Unit*, SD-/CD-1P113-01

SUMMARY

The basic acceptance procedures are listed below:

- Verify that the RT enclosure has been installed and spliced.
- Verify that all equipment shelves are mounted securely and are not damaged. Look for misaligned, dented, or twisted shelves and bent or broken slot connectors of front of equipment shelf.
- Look for bent, broken, or crossed terminals and pins if backplane is accessible.
- Verify that the circuit pack(s) can be installed in the shelf if plug-in circuit packs for the shelf equipment are available. Remove all circuit packs installed.
- Verify power panel circuit breaker (fuses in a 51-type cabinet) can be turned on without tripping the breakers. Verify proper AC voltage at each outlet jack on the power panel. Use an AC circuit tester at power panel outlet jacks and verify AC power has been spliced in correctly.
- Verify power cord connections to the power panel per label inside the side 1 door.

Acceptance
Task Index List

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO

Acceptance

GENERAL

Acceptance tests are performed on the remote terminal (RT) equipment.

The procedure for performing acceptance tests for the RT equipment is listed in NTP-003.

The acceptance tests generally assume the following:

- That accurate and concise system designations and office records are available to properly identify system and equipment
- That any trouble found and not corrected during testing is referred to the responsible installation group
- That the test equipment used is available, properly tested, and working properly.

Accept Remote Terminal Equipment

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. Get support apparatus listed:

   - 216-type tool (80-type cabinet only)
   - Special key (modified hex key) - COMCODE 846244168 (51A and 80-type cabinets only)
   - digital multimeter (DMM) with an accuracy of 0.02% and an AC/DC input impedance of ≥ 1 megohm.

2. ⚠ CAUTION:
   An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to ***ESD GRD*** *jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.*

   Open RT cabinet. — DLP-500

3. Perform overall visual inspection of remote terminal (RT) enclosure equipment. — DLP-501

4. Close and secure RT (if not performing power up procedures at this time).

Open RT Cabinet Enclosure

1. The cabinet is typically opened using a special key (allen-type wrench) and a 216-type tool as shown in Figure 1.

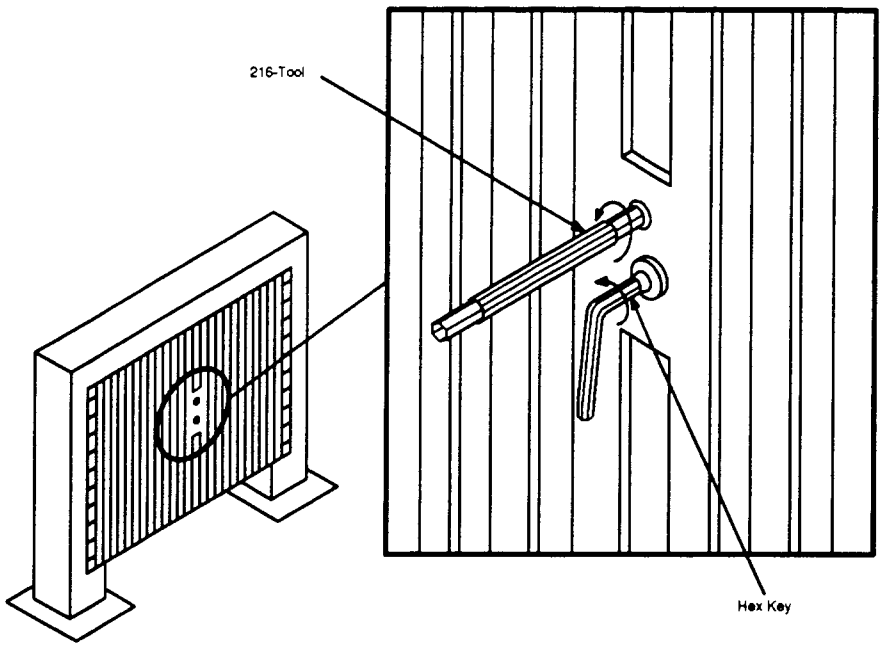

Figure 1 — Opening a Typical Cabinet with Hex Key and 216-Tool

2. On the inside of the side 1 left door there is an AC wiring diagram with a Table for circuit breaker code. On the inside of the side 1 right door there is a label listing the cabinet ED number and the equipage groups.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform Overall Visual Inspection of Remote Terminal Equipment

1. If remote terminal (RT) is frame mounted, proceed to Step **7**.

2. Turn **MAIN** circuit breaker **ON** and verify AC power at convenience outlet(s). If proper AC voltage is not present, resolve problem through local procedures.

3. Operate **MAIN** circuit breaker in transfer/breaker panel to **OFF**.

4. Verify that AC power into cabinet is correctly terminated on **MAIN** circuit breaker. This can be accomplished by ensuring that AC power is not present on the AC utility outlets in cabinet when the **MAIN** circuit breaker is in **OFF** position.

5. Is AC power present at utility outlets?

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

6. Resolve problem through local procedures.

7. For dual RT channel bank assembly, verify that no plug-in units are installed. (Remove any units that are installed.)

8. Verify that shelves are tightly secured and free of defects or damage. Resolve problems through local procedures.

9. Verify that all electrical connectors inside of shelves are properly secured and aligned with shelf slots. Resolve problems through local procedures.

10. Verify that there are no broken, bent, or misaligned contacts on front of connectors. Resolve problems through local procedures.

11. Is one channel unit plug-in of any type available?

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

12. ⇛ NOTE:
    Plug-in units are not inserted into connectors until all tests and verifications have been completed.

    At both white and blue banks, insert channel unit in slots labeled **1/2**, **23/24**, and **47/48** on shelf AB and slots **49/50**, **71/72**, and **95/96** on shelf CD to check for misaligned or bowed shelves. Remove unit and proceed to Step **14.**

13. Inspect for misaligned, dented, or twisted shelves.

14. Are there any misaligned, dented, or twisted shelves?

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

15. Resolve problems through local procedures.

16. Verify that 3-type protectors are installed in protector panel.

17. Use special key to open electronics section of cabinet (separate electronics section of cabinet from battery section of cabinet).

18. Verify that power and battery shelves are properly installed and tightly secured.

19. At front of battery section of cabinet, verify that battery shelves are free from defects (are not dented or twisted).

20. At rear of electronics section of cabinet, perform Steps **21** through **24**.

21. Verify that there is no broken or damaged equipment (connectors, wiring, backplane wiring board, etc). Resolve problems through local procedures.

22. Verify that there are no bent, broken, or crossed terminals on backplane. Resolve problems through local procedures.

23. Verify that all cabling and wiring are terminated and tied into forms. Resolve problems through local procedures.

24. Verify that plastic covers are placed behind dual bank assembly and power shelf. Resolve problems through local procedures.

25. Repeat these procedures from Step **8** for other equipment shelves [power shelf, battery shelves, multiplexer shelf, repeater shel(ves), etc.] in the RT enclosure. Keep in mind that you will need the appropriate plug-ins for the type of equipment shelf to check for misaligned shelf by installing a circuit pack (in an appropriate slot).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Turn Up Power Plant for Series 5 RT

Introduction

Introduction

This tab provides procedures to equip and power up the various types of power shelves used in *SLC*® Series 5 Carrier System remote terminal (RT) enclosures. The procedures include installation of batteries, rectifier units, battery charger units, and ringing generator units. The purpose of these procedures is to provide power and ringing current prior to the turnup of the *SLC* Series 5 Carrier System dual RT channel bank assembly. Procedures to add battery strings to an equipped RT enclosure are included.

The acceptance procedures found in the Acceptance tab of this document should be done before the power shelf equipment is turned up.

New bulk power cabinets may be equipped with 4A fan units. The 4A fan has a built-in control unit and does not require the AUA24 Fan Control Unit (FCU) in the RT channel bank. The 4A fan unit will be functional when the power shelf is equipped. This tab section provides procedures to test the 4A fan.

NOTE:
The discontinued availability 80C cabinet (Phase 0) used *SLC* 96 1B (1A) power and jack panel, 3B battery charger, and 128A apparatus mounting battery shelves. Refer to AT&T 363-202-401 to establish power for this equipment.

The following pages list currently available power and ringing equipment.

J1C182BA - Distributed Power Shelf

This power shelf can be in 51A cabinets, 80-type cabinets, 90-type cabinets, and frame RT enclosures.

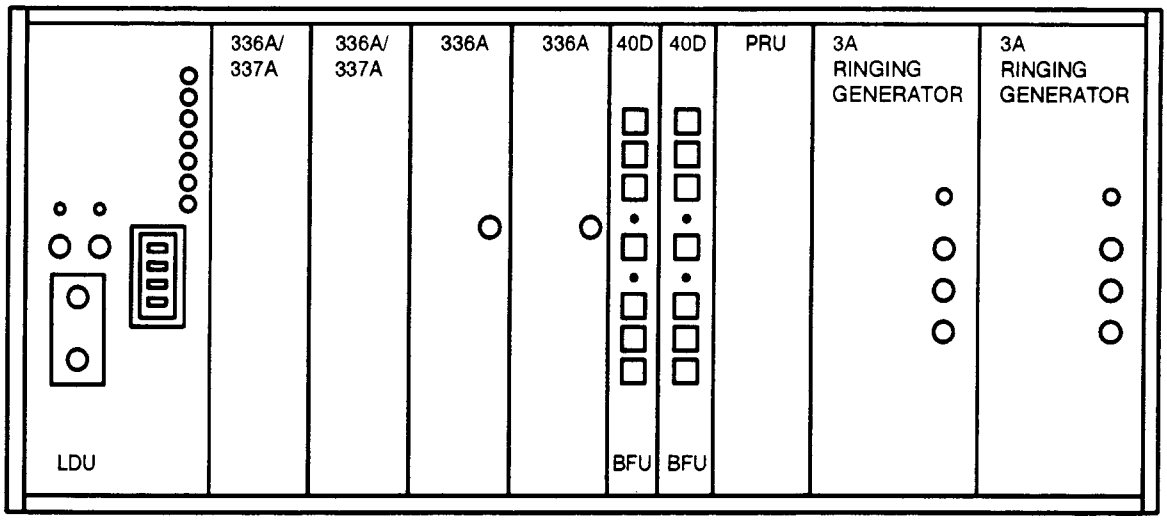

Figure 1 — J1C182BA Power Shelf

The J1C182BA power shelf (Figure 1) requires the following equipment:

- 181A or 181B apparatus mounting shelf equipped with 4 KS-21906, L4 battery strings (up to 6).
- 366A rectifier units (up to 4).
- 337A battery charger. The 377A is mounted in the J1C182BA power shelf only for 51A cabinets (up to 2). For all other applications the 337A battery charger is mounted in the 181A or 181B apparatus mounting shelf.
- ED-7C613-30 load distribution unit (LDU) (1 required).
- Bank fuse unit (AUG11 BFU or 40D BFU) (up to 2, 1 for each dual channel bank).
- 3A, 3B, 3C, or 3C1 ringing generator (up to 2).
- AUG1 positive ringing unit (PRU) (1 only if positive ringing current is required for multiparty service).

J1C182BB - Bulk Power Shelf

This power shelf can be in RT frame enclosures (such as a mini hut or CEV) with a -48 volt battery plant.

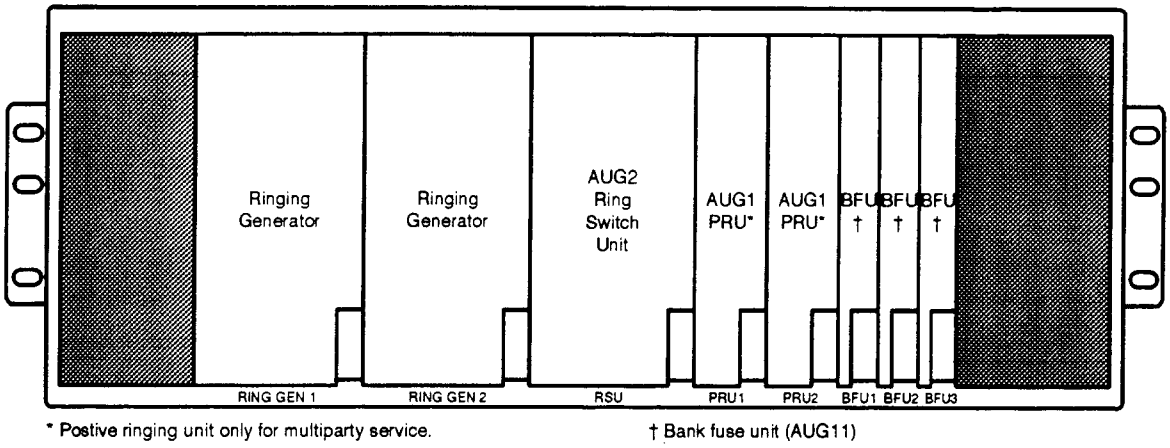

Figure 2 — J1C182BB Power Shelf

The J1C182BB power shelf (Figure 2) requires the following equipment:

- Bank fuse unit (AUG11 BFU or 40D BFU) (up to 3, 1 for each dual channel bank).
- 3A, 3B, 3C, or 3C1 Ringing Generator (up to 2).
- AUG2 ring switch unit (RSU) (1 required).
- AUG1 positive ringing unit (PRU) (up to 2 only if positive ringing current is required for multiparty service).

J1C182BD - Bulk Power Plant

This power shelf is used in 80A cabinets.

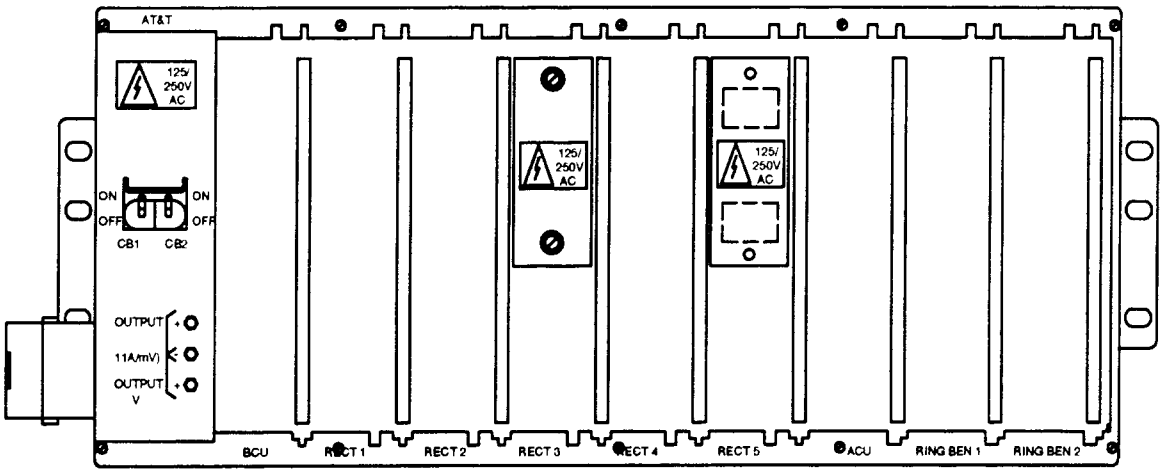

Figure 3 — J1C182BD Power Plant

The J1C182BD power shelf (Figure 3) requires the following equipment:

- Two battery strings mounted at the bottom of the 80A cabinet on battery heaters.
- Battery controller (1 required).
- 3H1 ringing generator (2 required) (functionally equivalent to the 3C1 Ringing Generator).
- Ring control unit (RCU) (1 required).
- 336A rectifier (5 required).

ED7C704-30 OLS Rectifier Shelf

This power shelf is used in 80E or 80D bulk power cabinets, along with the J1C182BC ring shelf and a central interconnect panel.

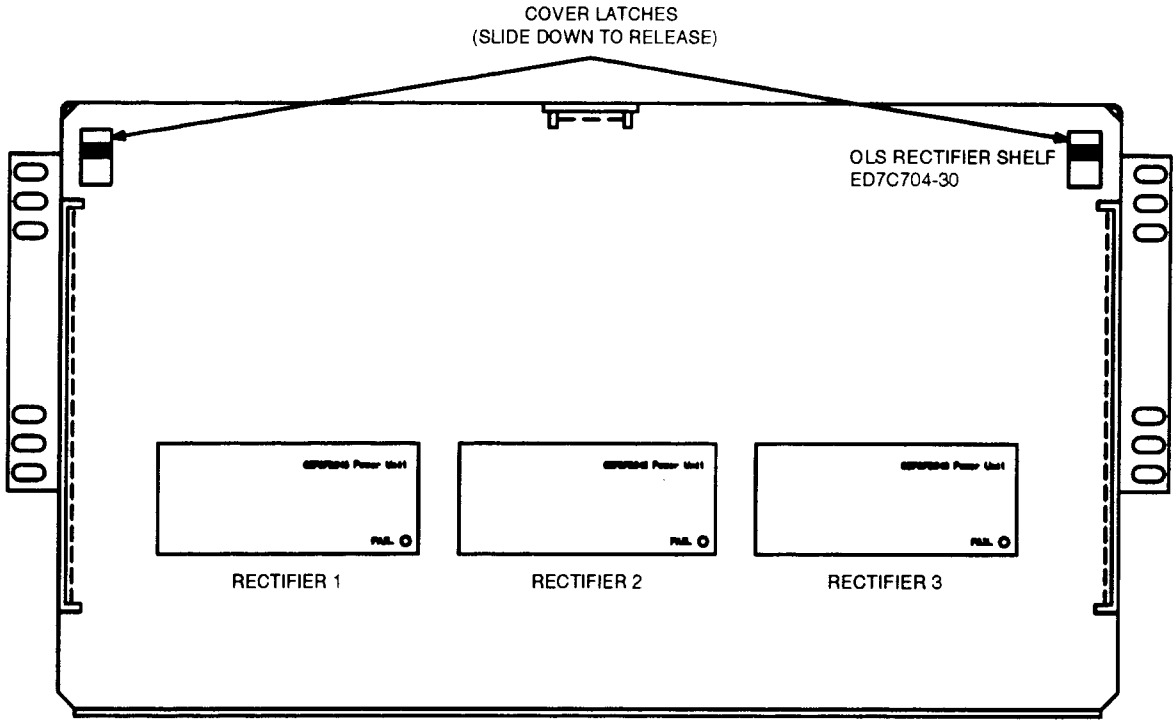

Figure 4 — ED-7C704-30 Rectifier Shelf (with Cover)

The ED7C704-30 OLS (Figure 4) requires the following equipment:

- 2 or 3 *Chloride** or Lineage VR Series Battery strings at the bottom of the cabinet mounted on heaters.
- 2 or 3 CS787B540 power units.

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* Registered trademark of Berlhest B.V. Corporation.

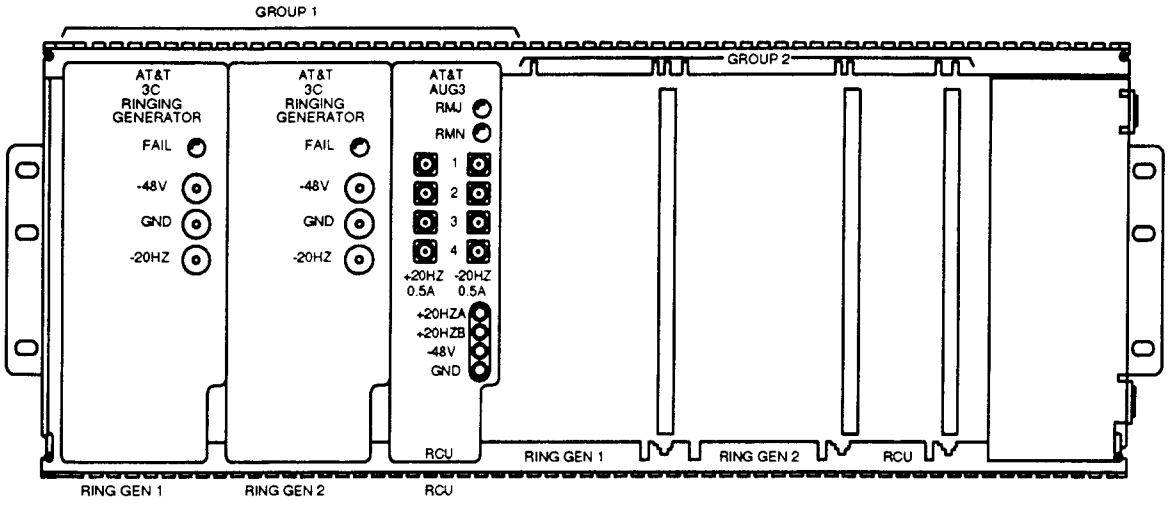


Figure 5 — Ringing Generator Installed in J1C182BC Ring Shelf

The J1C182BC (Figure 5) requires the following equipment:

- 2 3C1 Ringing Generators (3B or 3B1 for 30 Hz).
- 1 ring control unit (AUG3 RCU).
- a second compliment of 1 AUG3 RCU and 2 3C ringing generators for split shelf ring supply.

Power Up Cabinet or Frame Power Plant
Task Index List

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO

Note: When turning up a *SLC* Series 5 Carrier System RT power shelf you must initially accept the RT equipment as directed in Acceptance Tab procedures.

To turn up a J1C182BD power shelf in an 80A cabinet, refer to AT&T 640-250-296 *JC182BD 20-Amp Bulk Power Shelf Turnup Procedure.*

PRECAUTION

AT&T recommends that the RT cabinet be protected from dust if the cabinet is opened for an extended period.

Turn Up J1C182BA Power Shelf and Supporting Equipment in Frame, 51-, 80-, or 90-Type Cabinet RT

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. ⇒ NOTE:
This procedure provides steps for the initial installation of the J1C182BA power shelf and supporting equipment. This procedure assumes the following:

   - The outside cable pairs are not closed through to the remote terminal (RT) so that the RT is isolated from the digital and derived lines.
   - The frame, 51-, 80-, or 90-type cabinet housing the RT has been installed.
   - The J1C182AB, J1C182AE, J1C182AF, or J1C182AH dual channel bank assembly has been installed in the frame or cabinet enclosure.
   - The miscellaneous pair panel, protector connectors, power shelf, fan shelves, and battery shelves (if required) have been installed in the frame or cabinet enclosure.
   - The Acceptance Tab procedures in this volume have been performed.

   This procedure contains instructions concerning the installation of the various supporting units into the RT assembly shelves, battery shelves (if required), and power shelf, and for verifying that the units are operating properly.

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

2. Get support apparatus Listed:

   - 216-type tool (80-type cabinet only),
   - Special key (allen-type wrench) - COMCODE 846244168 (51-type and 80-type cabinets only),
   - DMM (digital multimeter) with an accuracy of 1.0% and an AC/DC input impedance of ≥ 1 megohm.
   - One **AUA11( ) PCU** (power converter unit).

3. ⚠ CAUTION:
   *An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to **ESD GRD** jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.*

   Verify that AC power panel connections for power shelf have been made and turn on circuit breaker(s). — DLP-500

4. Install **LDU** (load distribution unit) in power shelf. — DLP-501

5. If RT backup power is from **337A BATTERY CHARGER**(s)/KS-21906, L4 battery packs, continue with Step **6**. Otherwise, proceed to Step **9**.

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
6.	Perform initial installation tests of RT batteries:	
	A. in Frame-type RT, 80-type community service cabinet (CSC), or 90-type cabinet (ED-7C621-30, ED-97977-30, or ED-7C699-30) RT.	DLP-502
	B. in 51-type (ED-7C601-30) cabinet RT.	DLP-503
7.	⇛ NOTE: Batteries must have been on charge for at least 48 hours before testing with **197A BATTERY LOAD TEST SET**. If batteries have just been put on charge, the remainder of this procedure may be performed and batteries can be tested at a later date.	
	Perform test of RT batteries using **197A BATTERY LOAD TEST SET**.	DLP-504
8.	⇛ NOTE: One battery charger is required per battery string.	
	Install **337A BATTERY CHARGER**s; in Frame-type RT, 80-type CSC, 90-type cabinet (ED-7C621-30, ED-97977-30, or ED-7C699-30), or 51-type (ED-7C601-30) RT cabinet.	DLP-505
9.	Install **336A RECTIFIER**s in power shelf.	DLP-506
10.	Perform battery charger test (if battery chargers are utilized for backup power).	DLP-507
11.	Install **3C RINGING GENERATOR**s in power shelf.	DLP-508

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
12.	NOTE: The **AUG1 PRU** is required only if multiparty channel units that require positive ringing current are to be installed in the dual bank assemblies. Install **AUG1 PRU** in power shelf (if required).	DLP-509
13.	Install (if not previously installed) and check fuses in **BFU** (bank fuse unit) in power shelf.	DLP-510
14.	If powering a SLC Series 5 RT dual channel bank, continue with step **15**. Otherwise, proceed to Step **17**.	
15.	Install and test power converter unit (**PCU**) in facility shelf.	DLP-511
16.	Remove **PCU**. Repeat previous step for each new dual channel bank assembly.	
17.	Update records to indicate that RT supporting equipment has been installed. When required, perform RT Turn Up Tab procedures for the appropriate Feature Package.	

Add Battery String Equipment to J1C182BA Power Shelf in Frame, 51-, 80-, or 90-Type Cabinet RT

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. NOTE:
This procedure provides steps for adding supporting equipment (battery strings, rectifiers, battery chargers, and BFUs) to J1C182BA power shelf. This procedure assumes the following:

   - The procedures to initially equip the J1C182BA power shelf have been done.
   - The outside cable pairs are not closed through to the remote terminal (RT) so that the RT is isolated from the digital and derived lines.
   - The J1C182AB, J1C182AE, J1C182AF, or J1C182AH dual channel bank assembly has been installed in the frame or cabinet enclosure.
   - The miscellaneous pair panel, protector connectors, power shelf, fan shelves, and battery shelves (if required) have been installed in the frame or cabinet enclosure.
   - The acceptance Tab procedures in this volume have been performed.

   This procedure contains instructions concerning the installation of the various supporting units into the RT assembly shelves, battery shelves (if required), and power shelf, and for verifying that the units are operating properly.

2. Get support apparatus listed:

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

- 216-type tool (80-type cabinet only),
- Special key (allen-type wrench) - COMCODE 846244168 (51-type and 80-type cabinets only),
- DMM (digital multimeter) with an accuracy of 1.0% and an AC/DC input impedance of ≥ 1 megohm.
- One **AUA11( ) PCU** (power converter unit).

3.

⚠ CAUTION:
An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to ***ESD GRD*** *jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.*

Verify that AC power panel connections for power shelf have been made and turn on circuit breaker(s). — DLP-500

4. Perform RT battery installation:

A. in Frame-type RT, 80-type community service cabinet (CSC), or 90-type cabinet (ED-7C621-30, ED-97977-30, or ED-7C699-30) RT. — DLP-512

B. in 51-type (ED-7C601-30) cabinet RT. — DLP-513

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
5.	NOTE: Batteries must have been on charge for at least 48 hours before testing with **197A BATTERY LOAD TEST SET**. If batteries have just been put on charge, the remainder of this procedure may be performed and batteries can be tested at a later date. Perform test of RT batteries using **197A BATTERY LOAD TEST SET**.	DLP-504
6.	NOTE: One battery charger is required per battery string. Install **337A BATTERY CHARGER**s in frame-type RT, 80-type CSC, 90-type cabinet (ED-7C621-30, ED-97977-30, or ED-7C699-30), or 51-type (ED-7C601-30) cabinet RT.	DLP-514
7.	If adding AC rectifiers to an existing system, continue with Step **8**. Otherwise, proceed to Step **9**.	
8.	Install **336A RECTIFIER**s in power shelf.	DLP-515
9.	Install (if not previously installed) and check fuses in second **BFU** (bank fuse unit) in power shelf.	DLP-510
10.	If powering a *SLC* Series 5 RT dual channel bank, continue with Step **11**. Otherwise, proceed to Step **13**.	
11.	Install and test **PCU** (power converter unit) in facility shelf.	DLP-511
12.	Remove **PCU**. Repeat previous step for each new dual channel bank assembly.	
13.	Update records to indicate that RT supporting equipment has been installed. When required, perform RT Turn Up procedures for the appropriate Feature Package.	

Turn Up J1C182BB Bulk Power Shelf and Supporting Equipment in RT Frame

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. ⇒ NOTE:
   This procedure assumes the following:

   - The outside cable pairs are not closed through to the remote terminal (RT) so that the RT is isolated from the digital and derived lines.
   - The frame housing the RT has been installed.
   - The J1C182AB, J1C182AE, J1C182AF, or J1C182AH dual channel bank assembly has been installed in the frame.
   - The miscellaneous pair panel, protector connectors, power shelf, fan shelves, and battery shelves (if required) have been installed in the frame.
   - The acceptance procedures in this volume have been performed.

   This procedure contains instructions concerning the installation of the various supporting units into the RT assembly shelves, battery shelves (if required), and power shelf, and for verifying that the units are operating properly.

2. Get support apparatus listed:

   - DMM (digital multimeter) with an accuracy of 1.0% and an AC/DC input impedance of ≥ 1 megohm.

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

- One **AUA11( ) PCU** (power converter unit).

3.

⚠ CAUTION:
*An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to **ESD GRD** jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.*

NOTE:
The term "facility shelf" is used throughout this procedure to refer to the middle shelf of the Series 5 RT. The remaining shelves will be referenced according to digroup name (for example, AB shelf contains digroups A and B). White system refers to the two upper shelves of the Series 5 RT plus the right half of the facility shelf and blue system refers to the two lower shelves of the Series 5 RT plus the left half of the facility shelf.

Install (if not previously installed) **RSU** (ring switch unit) in bulk power shelf. DLP-516

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
4.	NOTE: One **BFU** is required for each partially or fully equipped dual bank assembly in the frame. If adding to an existing RT dual bank assembly, an additional **40D BFU** is not required. Install and check fuses in **BFU** (bank fuse unit) in bulk power shelf, if necessary.	DLP-510
5.	Install (if not previously installed) **3C RINGING GENERATOR** in bulk power shelf.	DLP-517
6.	NOTE: The **AUG1 PRU** is required only if multiparty channel units that require positive ringing current are to be installed in any of the dual bank assemblies served by the bulk power shelf. One **PRU** is required for one or two dual bank assemblies containing multiparty channel units. A second **PRU** is required when the bulk power shelf serves three dual bank assemblies containing multiparty channel units that require positive ringing current. Install (if not previously installed) **AUG1 PRU** in bulk power shelf (if required).	DLP-518
7.	Install and test **PCU** (power converter unit) in facility shelf.	DLP-511
8.	Remove **PCU**. Repeat previous step for each new dual channel bank assembly.	
9.	Update records to indicate that RT supporting equipment has been installed. When required, perform RT Turn Up procedures for the appropriate Feature Package.	

Turn Up ED-7C704-30 Bulk Power Plant in 80E or 80D Cabinet

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. This procedure provides steps for the initial installation of the battery strings, CS7787B540 power units in the rectifier shelf, and the ringing generator units in the J1C182BC ring shelf in an 80D or 80E-type cabinet equipped with the ED-7C704-30 bulk power plant.

   This procedure assumes the following;

   - The outside cable pairs are not connected through to the remote terminal (RT)_ (protectors not installed) so that the RT is isolated from the digital lines and derived pairs.
   - The cabinet housing the RT has been installed.
   - The J1C182AE, J1C182AF, or J1C182AH dual channel bank assemblies (up to 8) have been installed in the cabinet.
   - The miscellaneous pair panel, protector connectors, ring shelf, power unit (rectifier) shelf, control and distribution panel, and fan shelves have been installed in the cabinet.
   - The applicable Acceptance Tab procedures in this volume have been performed.

   This procedure contains instructions concerning the installation of batteries into the cabinet and the various units into the RT assembly shelves, ring shelf, rectifier shelf, verifying that the units are operating properly, and verify that power is fed to all equipment bays in the cabinet prior to turning up RT channel banks or other carrier facility shelf

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

equipment.

2. Get support apparatus listed:

   - 216-type tool,
   - Special key (modified hex key) - COMCODE 846244168,
   - DMM (digital multimeter) with an accuracy of 0.02% and an AC/DC input impedance of ≥ 1 megohm,
   - Permanent marker or equivalent (for battery installation).
   - One **AUA11( ) PCU** (power converter unit, AUA11B or later version required for optics power shelf).

3. ⚠ CAUTION:
   An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to ***ESD GRD*** *jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.*

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
4.	NOTE: Batteries are shipped directly from manufacturer. Install and test RT batteries in 80D or 80E cabinet skirt:	
	A. *Chloride* batteries in 80E cabinet.	DLP-524
	B. Lineage 2000 VR Series batteries in 80E cabinet.	DLP-525
	C. Lineage 2000 VR Series batteries in 80D cabinet.	DLP-531
	D. *Chloride* batteries in 80D cabinet.	DLP-532
5.	Verify connections to ED-83114-30 control and distribution panel.	DLP-526
6.	Install power units in rectifier shelf.	DLP-527
7.	Install **3C RINGING GENERATOR**s in ring shelf. [Not required for Fiber to the Home (FTTH) arrangement]	DLP-528
8.	Install **RCU** (ring control unit) in ring shelf. (Not required for FTTH arrangement)	DLP-529
9.	NOTE: Each circuit breaker on control and distribution panel supplies an equipment bay according to the cabinet group arrangement. To identify circuit breakers, refer to the label located on the door opposite the control and distribution panel. Turn on one circuit breaker and verify that it does not trip. If the circuit breaker does trip, cabinet wiring trouble must be cleared before continuing.	
10.	If the circuit breaker powers RT dual channel bank(s) or J1C182PB-1 Optics Power shelf, continue with Step **11**. Otherwise, proceed to Step **12**.	

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
11.	Install and test **PCU**, then remove **PCU** in dual RT channel bank facility (middle) shelf.	DLP-511
12.	Turn circuit breaker off. Repeat Steps **9** through **11** for each circuit breaker. Then continue with Step **13**.	
13.	Update office records.	

Verify Cabinet AC Power Panel Connections

1. AC power panels are typically accessed from side 1 of the cabinet. The cabinet is typically opened using a special key (allen-type wrench) and a 216-type tool as shown in Figure 1.

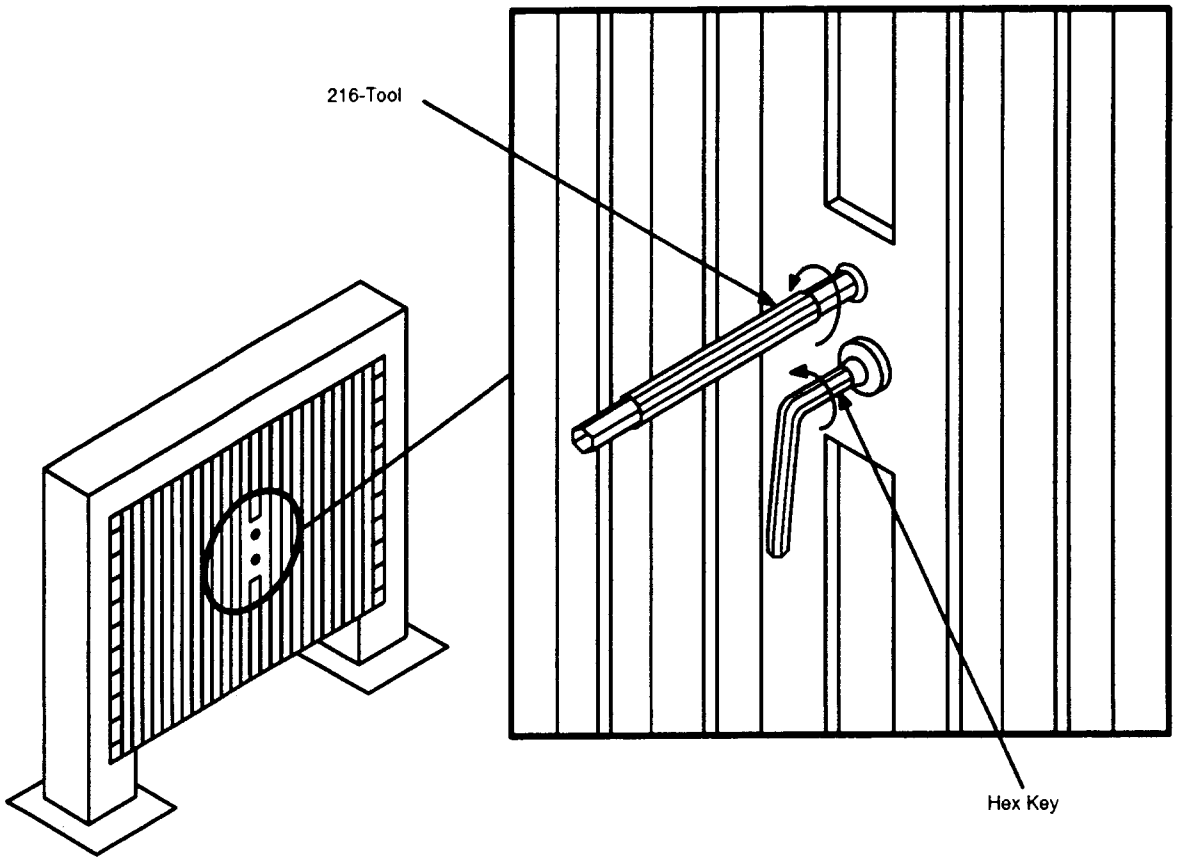


Figure 1 — Opening a Typical Cabinet with Hex Key and 216-Tool

2. On the inside of the door there is an AC wiring diagram and a Table for circuit breaker code. See Figure 2.

CIRCUIT BREAKER CODE		
CB1	UTILITY AC SUPPLY	60 AMP, 2 POLE
CB2	GENERATOR AC SUPPLY	40 AMP, 2 POLE
CB3	J7, J8 - MISCELLANEOUS	20 AMP
CB4	J9 - POWER SHELF	20 AMP, 2 POLE
CB5	J3, J4 - MISCELLANEOUS	20 AMP
CB6	J5, J6 - BATTERY HEATERS	20 AMP
CB7	J1, J2 - GFCI PROTECTED CONVENIENCE OUTLETS	20 AMP GFCI
CB11	TRANSFER SWITCH CURRENT LIMIT	60 AMP, 2 POLE

Figure 2 — Typical Circuit Breaker Code Table

3. ⚠ CAUTION:
Improper AC power connections to a power panel can cause damage to power shelf equipment.

Verify that the CB( ) circuit breakers can be turned on and that AC power is present at the associated J( ) outlet(s).

4. Verify that power shelf(ves), battery heaters, ... listed in the Table on the door are plugged into the proper outlet and not plugged into the GFCI outlet(s).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install Load Distribution Unit (LDU) in Power Shelf

SUMMARY: Insert **LDU** into power shelf. Measure 105-129 V AC on **LDU** faceplate. If required, install order wire build-out resistance module (ED7C613-30, G2) in **LDU** or miscellaneous pair panel assembly. Set order wire impedance switches.

1. Get one **LDU** and, if required, one ED7C613-30, G2 order wire build-out resistance module and inspect for possible physical damage.

2. Insert **LDU** into **LDU** slot in power shelf.

3. Condition DMM to measure AC volts.

4. At **LDU**, connect DMM test leads to **AC** and **GND** jacks.

5. Does DMM indicate between 105 and 129 volts?

   If **YES,** then proceed to Step **13.**
   If **NO,** then continue with Step **6.**

6. Check AC power cord connections at rear of power shelf and AC power connection to dual bank assembly.

7. Has AC power cord been properly connected and is AC connection to dual bank assembly present?

   If **YES,** then continue with Step **8.**
   If **NO,** then **refer trouble to installation group.**

8. Replace **LDU**.

9. At **LDU**, connect DMM test leads to **AC** and **GND** jacks.

10. Does DMM indicate between 105 and 129 volts?

    If **YES,** then proceed to Step **13.**
    If **NO,** then continue with Step **11.**

11. Replace **LDU** with **LDU** removed previously.

12. Check wiring on rear of power shelf using SD-7C119-01 and check AC power connections at dual bank assembly. Repeat procedure from Step **4** after locating and correcting trouble.

13. Remove DMM test leads from **LDU.**

14. Is ED7C613-30, G2 order wire build-out resistance module to be installed?

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

15. Is RT assembly installed in frame or cabinet?

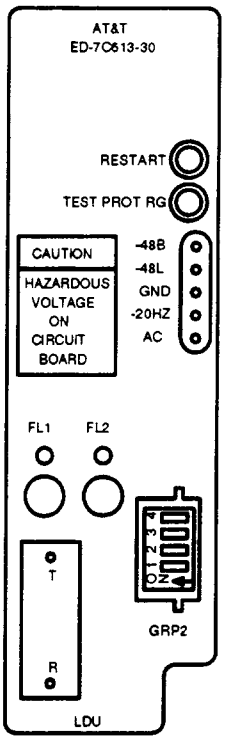
    If **FRAME,** then proceed to Step **17.**
    If **CABINET,** then continue with Step **16.**

16. Insert ED7C613-30, G2 order wire build-out resistance module into slot in **LDU** faceplate and proceed to Step **18.**

17. At miscellaneous pair panel, pull top of faceplate forward to expose top of unit and insert ED7C613-30, G2 order wire build-out resistance module into slot located in top of unit on left side.

18. Set switches on order wire build-out resistance module per engineering records (Figure 1).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.



SWITCH SETTINGS FOR ORDER WIRE BUILD-OUT
(LINE POWER, 48 VOLTS)

CO-RT CABLE DC RES ‡*	NET VALUE RES	SWITCH POSITIONS			
		1	2	3	4
0-250	1748	ON	OFF	OFF	OFF
251-500	1499	ON	OFF	OFF	ON
501-750	1249	ON	OFF	ON	OFF
751-1000	1000	ON	OFF	ON	ON
1001-1250	748	ON	ON	OFF	OFF
1251-1500	499	ON	ON	OFF	ON
1501-1750	249	ON	ON	ON	OFF
1751-2000	0	ON	ON	ON	ON

* CO OFFICE TO RT

Figure 1 — Load Distribution Unit

Perform Initial Installation and Tests of Batteries in Frame-Type or Cabinet-Type RT Enclosure

SUMMARY: Remove AC power from system. Install and connect four KS-21906, L4 battery packs on each battery shelf. Measure voltage greater than 45 V DC at front of battery shelf. Install fuses into battery shelves. Restore AC power to system.

NOTE:
This procedures does not support the installation and testing of batteries in a 51-type cabinet. Use DLP-503 for 51-type cabinets.

1. DANGER:
   High current flow will occur if short is placed across battery terminals. No attempt should be made to measure battery voltage across terminals.

   Get four KS-21906, L4 battery packs.

2. Ensure that AC power circuit breaker(s) is **off** for system(s) being installed or that AC power cord is disconnected from power shelf plug (**P112**).

3. Ensure that no circuit packs, except **LDU**, are installed in any shelf; unseat any circuit pack(s) that may be installed.

4. At front of battery shelf remove front cover by lifting cover up and out (Figure 1).

5. Place batteries on battery shelf and dress battery cables as each battery pack is placed on shelf (Figure 2).

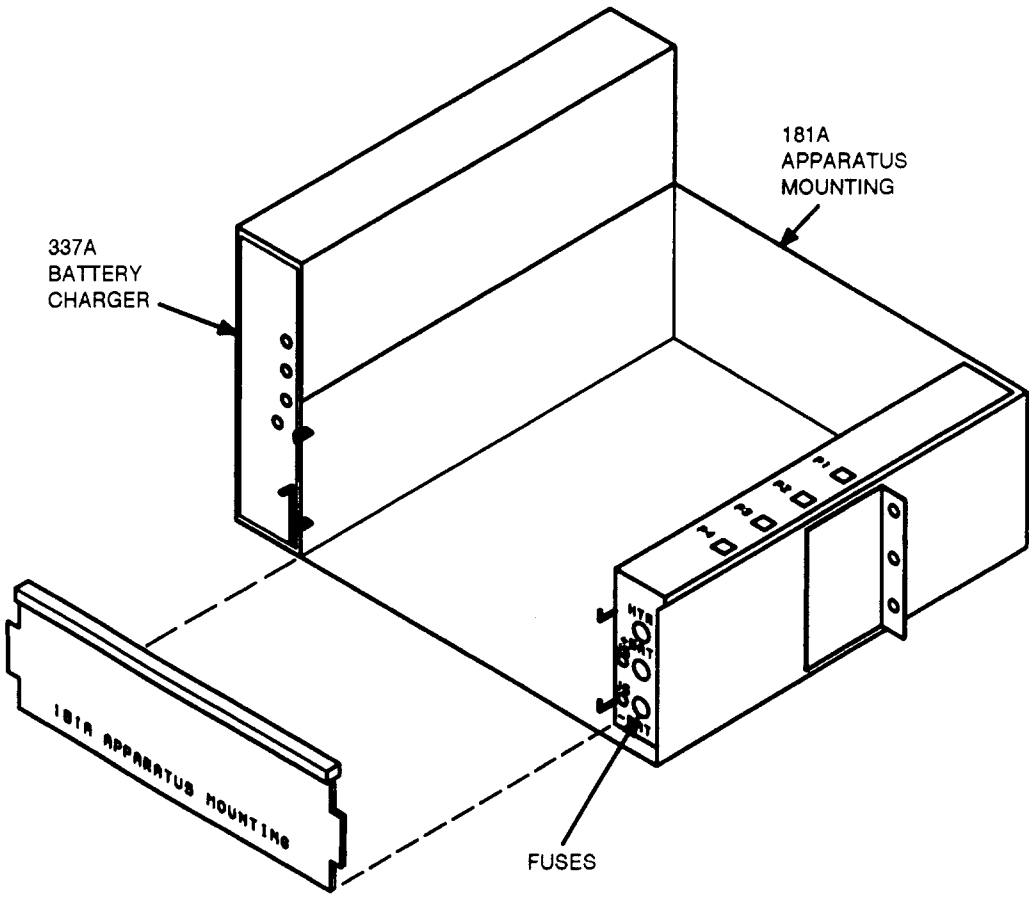


Figure 1 — Battery Shelf

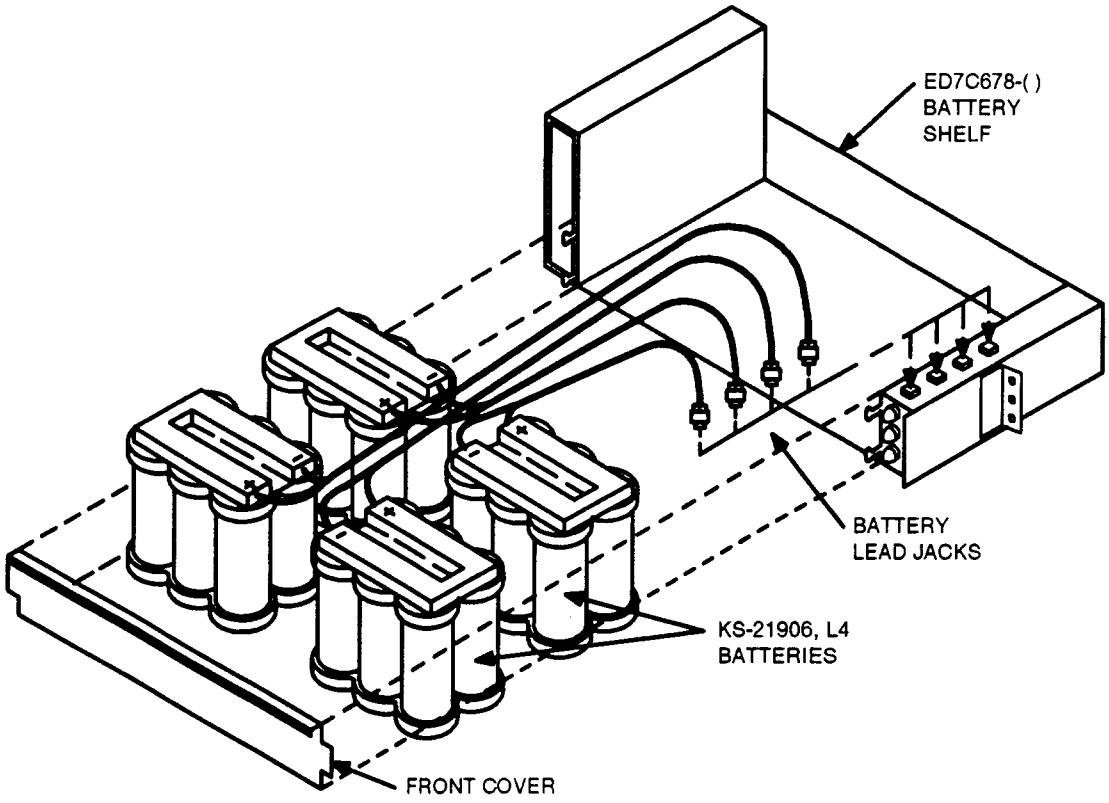


Figure 2 — Battery Placement and Connections

6.

NOTE:
Four battery lead jacks can be plugged into any of four plugs on battery shelf, in any order.

Connect four battery lead jacks to four plugs (**P1, P2, P3,** and **P4**) on battery shelf being equipped and dress battery cables.

7. Reinstall front cover on battery shelf.

8. Remove fuses, if present, from **+BAT** and **–BAT** fuse holders on battery shelf.

9. Condition DMM to measure DC volts.

10. On battery shelf, connect DMM test leads to **+BAT** jack (**J5**) and **–BAT** jack (**J6**).

11. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **12.**

12. Check battery lead connections at battery shelf.

13. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **14.**

14. ⇛ NOTE:
    If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

    Replace one of the battery packs.

15. On battery shelf, connect DMM test leads to **+BAT** jack (**J5**) and **–BAT** jack (**J6**).

16. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **17.**

17. Have all battery packs been replaced?

    If **YES,** then continue with Step **18.**
    If **NO,** then proceed to Step **19.**

18. Check battery lead connections at battery shelf. Repeat procedure from Step **10** after locating and correcting trouble.

19. NOTE:
    If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

    Select another battery pack on battery shelf and repeat from Step **14.**

20. Remove DMM test leads from battery shelf.

21. Have all battery shelves been equipped and tested?

    If **YES,** then proceed to Step **23.**
    If **NO,** then continue with Step **22.**

22. Go to next battery shelf and repeat from Step **4.**

23. Install good 25 amp fuses (Buss ABC or equivalent) into **+BAT** and **–BAT** fuse holders of all battery shelves equipped with batteries (Figure 1).

24. If required, install good 5 amp fuse into **HTR** (heater) fuse holder(s) of all battery shelves equipped with batteries (Figure 1).

25. Turn AC power circuit breaker on and ensure that AC power cord is connected to power shelf plug (**P112**).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform Initial Installation and Tests of Batteries for 51-Type (ED-7C601-30) Cabinet RT

SUMMARY: Remove AC power from system. Install and connect four KS-21906, L4 battery packs on each battery shelf. With battery string fuses removed, measure voltage greater than 45 V DC at power panel and/or at battery shelf. Install fuses into power panel (battery strings 1 and 2) and/or battery shelf housing battery string 3, if present. Restore AC power to system.

1. Ensure that AC power circuit breaker is **off** or that AC power cord is disconnected from power shelf plug (**P112**).

2. Ensure that no circuit packs except **LDU** are installed in any shelf; unseat any circuit pack(s) that may be installed.

3. In battery section of cabinet at power panel (Figure 1), refer to Table A and remove the fuses associated with battery string(s) being installed.

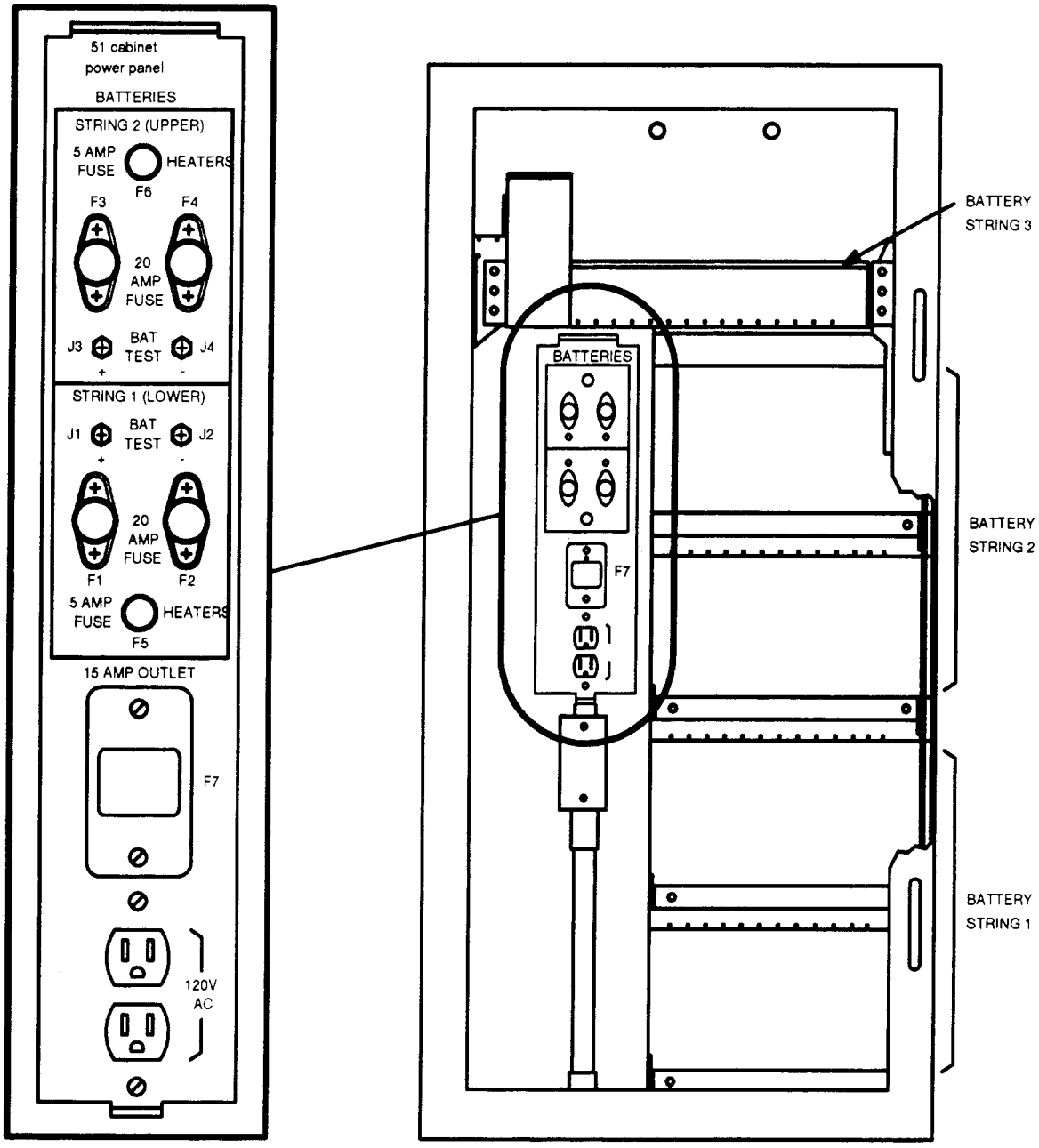


Figure 1 — Battery Section of 51A Cabinet Showing Power Panel

Table A 51A Power Panel				
Power Panel (Note)	**Battery String**	**Associated Fuses**	**Associated Jacks**	**Connector Plug**
Early Version	1 (Lower)	F3, F4, F5	J3, J4	P5, P6, P7, P8
	2 (Upper)	F1, F2, F6	J1, J2	P1, P2, P3, P4
Later Version	1 (Lower)	F1, F2, F5	J1, J2	P1, P2, P3, P4
	2 (Upper)	F3, F4, F6	J3, J4	P5, P6, P7, P8
Note: If the words **51 CABINET POWER PANEL** appear at the top of the power panel, then the power panel is a later version. Otherwise, the power panel is an early version.				

4. ⚠ DANGER:
High current flow will occur if short is placed across battery terminals. No attempt should be made to measure battery voltage across terminals.

NOTE:
Eight battery packs are needed if two battery strings are to be installed.

Get four KS-21906, L4 battery packs.

5. NOTE:
Lower two battery shelves house battery string 1 and upper two battery shelves house battery string 2 (when installed). If additional battery string (battery string 3) is required, a 181A apparatus mounting can be installed in top of battery section to house it.

Place batteries on battery shelves and dress battery cables as each battery pack is placed on shelf.

6. NOTE:
   Four plugs are supplied from the power panel to battery string 1 and four plugs are also supplied to battery string 2. These plugs are labeled **P1** through **P8** and are listed in Table A along with their associated battery strings.

   Connect each battery lead jack to one of two plugs supplied to each shelf.

7. At power panel, reinstall fuses associated with battery string being installed [either **F1** and **F2** or **F3** and **F4** (Table A)].

8. Get DMM and condition to measure DC volts.

9. On power panel, connect DMM test leads to **+ BAT TEST** jack (**J1** or **J3**) and **– BAT TEST** jack (**J2** or **J4**) of battery string being tested.

10. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **11.**

11. Check battery lead connections at battery shelf.

12. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **13.**

13. ⇛ NOTE:
If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

Replace one of the battery packs in battery shelf.

14. On power panel, connect DMM test leads to **+ BAT TEST** jack (**J1** or **J3**) and – **BAT TEST** jack (**J2** or **J4**) of battery string being tested.

15. Does meter indicate greater than 45.0 volts DC?

If **YES,** then proceed to Step **19.**
If **NO,** then continue with Step **16.**

16. Have all battery packs on shelf been replaced?

If **YES,** then proceed to Step **18.**
If **NO,** then continue with Step **17.**

17. Select another battery pack on battery shelf and repeat from Step **13.**

18. Check battery lead connections at battery shelf. Repeat procedure from Step **9** after locating and correcting trouble.

19. Is another battery string to be installed at this time?

If **YES,** then proceed to Step **21.**
If **NO,** then continue with Step **20.**

20. Remove DMM test leads and proceed to Step **42.**

21. Has battery string 2 been installed and tested?

    If **YES,** then continue with Step **22.**
    If **NO,** then proceed to Step **4.**

22. ⚠ DANGER:
    High current flow will occur if short is placed across battery terminals. No attempt should be made to measure battery voltage across terminals.

    Get four KS-21906, L4 battery packs.

23. At front of battery shelf, remove front cover by lifting cover up and out (Figure 2).

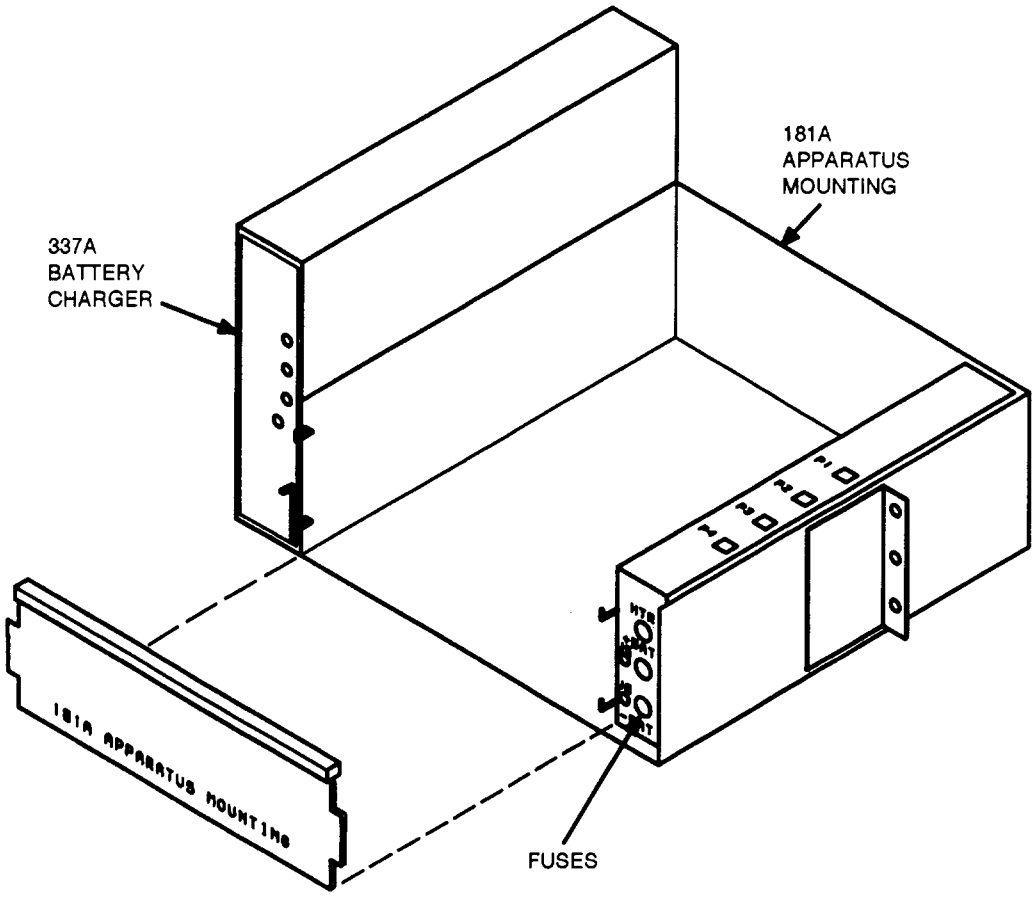


Figure 2 — Battery Shelf

24. Place batteries on battery shelf and dress battery cables as each battery pack is placed on shelf (Figure 3).

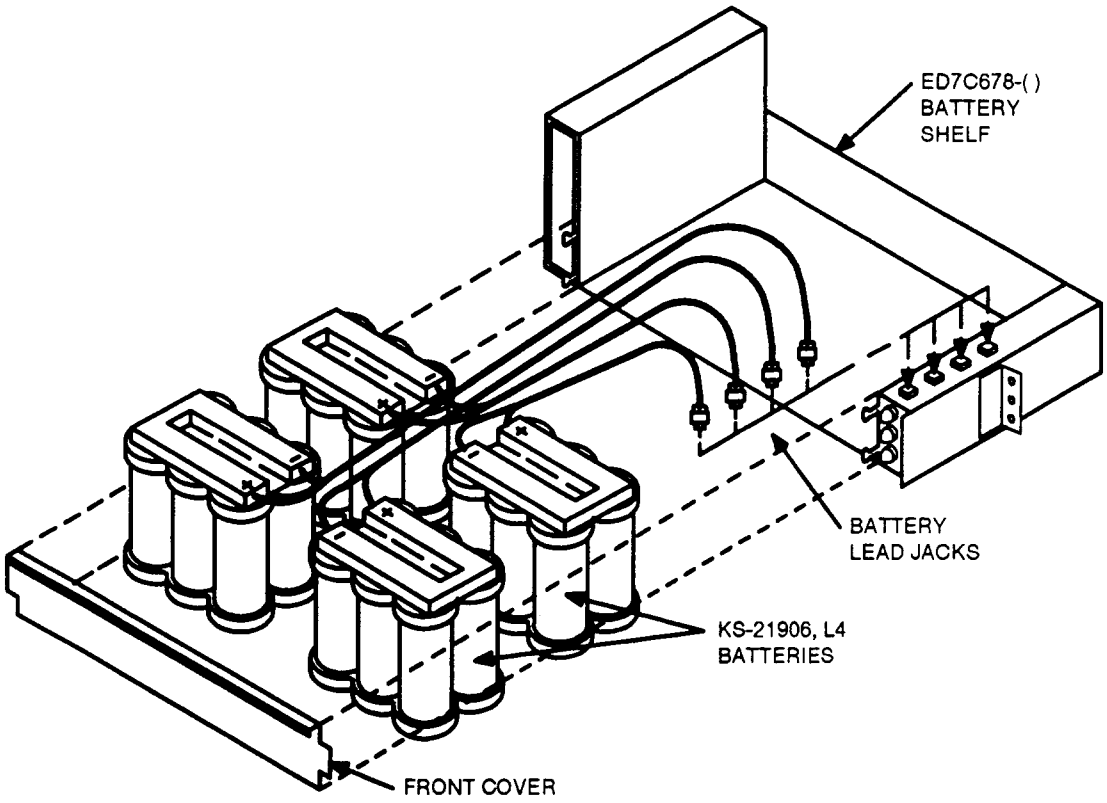


Figure 3 — Battery Placement and Connections

25. NOTE:
Four battery jacks can be plugged into any of four plugs on shelf, in any order.

Connect four battery lead jacks to four plugs (**P1, P2, P3,** and **P4**) on top of battery shelf.

26. Reinstall front cover on battery shelf.

27. Remove fuses, if present, from **+BAT** and **–BAT** fuse holders on battery shelf.

28. Condition DMM to measure DC volts.

29. On battery shelf, connect DMM test leads to **+BAT** jack (**J5**) and **–BAT** jack (**J6**).

30. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **39.**
    If **NO,** then continue with Step **31.**

31. Check battery lead connections at battery shelf.

32. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **39.**
    If **NO,** then continue with Step **33.**

33. NOTE:
    If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

    Replace one of the battery packs.

34. On battery shelf, connect DMM test leads to **+BAT** jack (**J5**) and **–BAT** jack (**J6**).

35. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **39.**
    If **NO,** then continue with Step **36.**

36. Have all battery packs been replaced?

    If **YES,** then continue with Step **37.**
    If **NO,** then proceed to Step **38.**

37. Check battery lead connections at battery shelf. Repeat procedure from Step **29** after locating and correcting trouble.

38. ⇛ NOTE:
    If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

    Select another battery pack on battery shelf and repeat from Step **33.**

39. Remove DMM test leads.

40. Install good 25 amp fuses (Buss ABC or equivalent) into **+BAT** and **–BAT** fuse holders on battery shelf.

41. Install good 5 amp fuse into **HTR** fuse holder on battery shelf.

42. At power panel, reinstall **HEATERS** fuse(s) **F5** and/or **F6** for battery string(s) installed.

43. Turn AC power circuit breaker on and ensure that AC power cord is connected to power shelf plug (**P112**).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform Test of RT Batteries Using 197A BATTERY LOAD TEST SET

1. ⚠ CAUTION:
Service interruption will occur if batteries are disconnected and AC power is not available.

Obtain **197A BATTERY LOAD TEST SET (197A)** and place near batteries to be tested (Figure 1).

2. ⇒ NOTE:
The 197A test set is intended to test batteries that are fully charged. A minimum of two days must be allowed between the time the batteries (new or replacement) are put on high rate charge and this test is made. After testing is completed, the batteries must be put on high rate charge using the **337A BATTERY CHARGER**.

Remove cover from **197A** test set.

3. Check **197A** test set for proper operation (if not already performed).

Reference: **DLP-530**

4. Ensure that system(s) associated with batteries to be tested has AC power available (**PMN** or **P/M** indicator on **BCU** circuit pack not lighted).

5. On **337A BATTERY CHARGER** associated with batteries to be tested, is **HIGH RATE CHG/ON** indicator lighted?

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

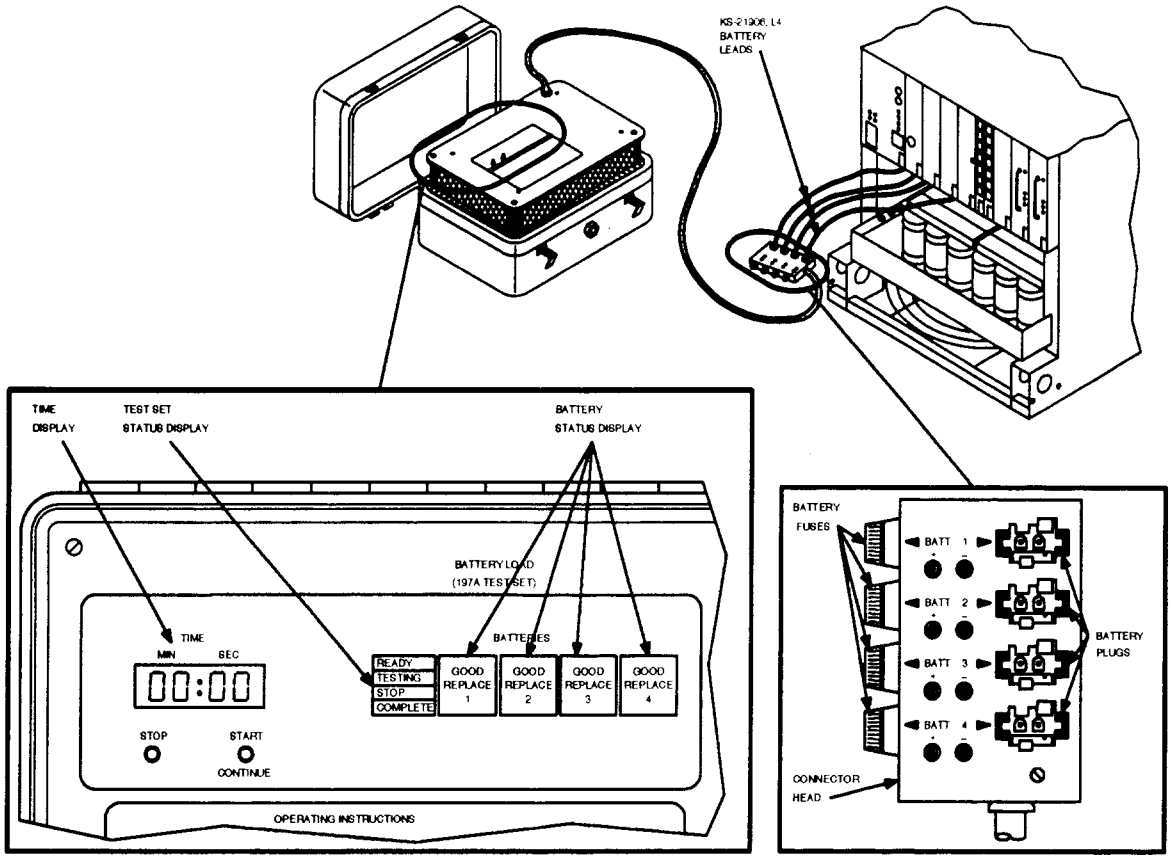


Figure 1 — 197A Battery Load Test Set Test Connections

6. Batteries are on high charge and may require up to 24 hours to charge. Do not perform this procedure until **HIGH RATE CHG/ON** indicator on **BATTERY CHARGER** goes off.

7. ⚠ CAUTION:
Service interruption will occur if batteries are disconnected and AC power is not available.

Disconnect battery leads of batteries to be tested from battery shelf.

8. ⇒ NOTE:
Under normal conditions, when the first battery is connected, the following occurs: (a) The test set **TIME** display indicates **00 MIN:00 SEC**; (b) The status display indicates which test set **BATT** plug the battery is connected to, status of the battery (**GOOD** or **REPLACE**), and the **READY** indicator lights; (c) Test set fan operates.

At test set connector head (Figure 1), connect battery leads (up to four) to **BATT 1, 2, 3,** and **4** plugs.

9. ⇒ NOTE:
If status display does not indicate battery number of battery status, **BATT** fuse may be blown, connector head or test set may be defective, or battery pack may be defective.

Does test set display indicate **REPLACE** for all batteries being tested?

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

10. Replace all batteries and connect good batteries to battery shelf.

11. Place batteries on high charge by depressing **HIGH RATE CHG/ACTIVATE** pushbutton on **BATTERY CHARGER** and repeat from Step **6.**

12. ⚠ DANGER:
A high discharge current is present at connector head if TESTING indicator is lighted. Batteries must not be connected or disconnected when TESTING indicator is lighted.

⇶ NOTE:
This test must run for a full 15 minutes to be valid or until all batteries indicate **REPLACE**. The **STOP** button should only be used if a problem occurs during the test, if the test is to be terminated early because of loss of AC power, or if all batteries indicate **REPLACE**. The **START/CONTINUE** button is used to continue the test if no problem is found.

Depress **197A** test set **START/CONTINUE** button.

Response: At **197A** test set, **TESTING** indicator is lighted, **READY** indicator is off, and **TIME** display is counting time.

13. NOTE:
If one, two, or three, but not all, batteries show **REPLACE** during the test period, the remaining batteries still must be tested for the full 15 minutes.

Does test set show **REPLACE** for all batteries within the 15-minute test period shown on **TIME** display?

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

14. DANGER:
A high discharge current is present at connector head if TESTING indicator is lighted. Batteries must not be connected or disconnected when TESTING indicator is lighted.

Depress test set **STOP** button.

Response: **STOP** indicator on test set lights

Proceed to Step **17.**

15. After 15 minutes, the test set **COMPLETE** indicator lights.

16. Is any **REPLACE** indicator on test set lighted?

If **YES,** then continue with Step **17.**
If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

17. Unplug and set aside all defective batteries.

18. Install and connect replacement batteries to battery shelf. Reconnect any remaining good batteries to battery shelf.

19. Place batteries on high charge by depressing **HIGH RATE CHG/ACTIVATE** pushbutton on **BATTERY CHARGER** and repeat from Step **6.**

Install 337A BATTERY CHARGER

SUMMARY: Insert **337A BATTERY CHARGER** into power shelf (battery string 1 and 2 in a 51-type cabinet) or slot on battery shelf (80-type, frame, or battery string 3 in a 51-type cabinet) and press **HIGH RATE CHG/ACTIVATE** button. Measure –42 to –56 volts at **LDU** (**–48B/GND**). Unseat **BATTERY CHARGER**. Repeat for additional **BATTERY CHARGER**s.

1. NOTE:
   In the 51-type cabinet, the **BATTERY CHARGER**s associated with battery string 1 (lower two battery shelves) and battery string 2 (upper two battery shelves) are to be installed in power shelf. **BATTERY CHARGER** for battery string 3 (located in 181A apparatus mounting.

   Get one **337A BATTERY CHARGER** and inspect it for possible damage.

2. Verify that fuses on **BATTERY CHARGER** are not blown (Figure 1).

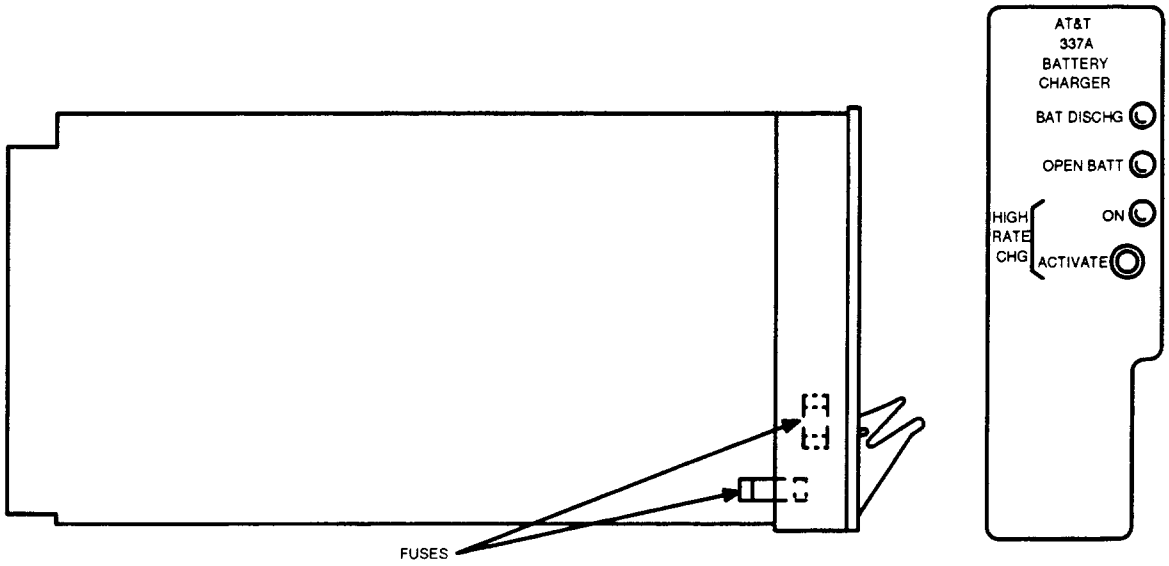


Figure 1 — Location of Fuses on 337A BATTERY CHARGER

3. Insert **337A BATTERY CHARGER** into slot as follows:

   51-Type Cabinet
   First 337A into the first (counting left to right) **RECT/BATCHG** slot in the power shelf (Figure 2).

   Other Type RT Enclosure
   Into the slot located on left side of battery shelf (Figure 3).

4. Press **HIGH RATE CHG/ACTIVATE** button on **BATTERY CHARGER**.

   Response: **BAT DISCHG** indicator on **337A BATTERY CHARGER** is lighted.

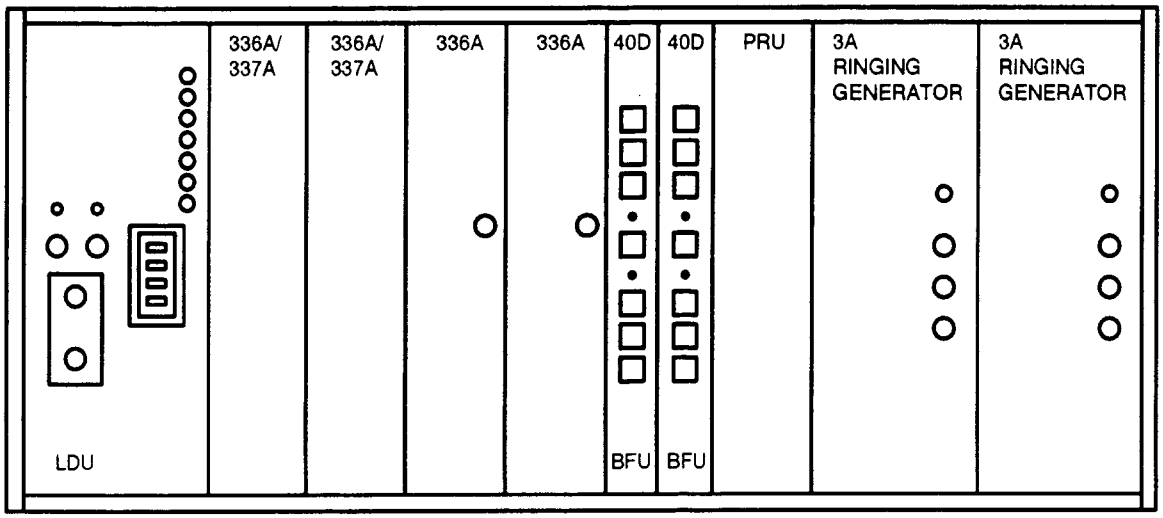


Figure 2 — J1C182BA Power Shelf

5. Condition DMM to measure DC volts.

6. Connect DMM test leads to **GND** jack and **–48B** jack on **LDU**.

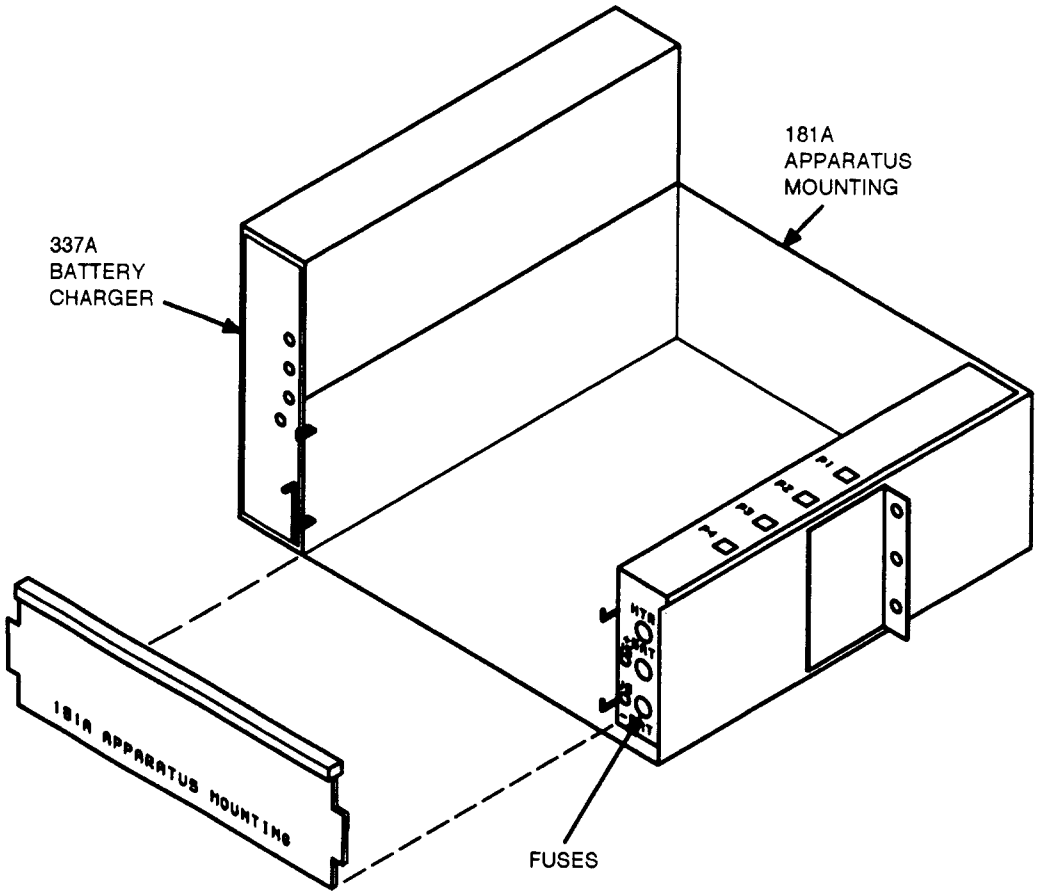


Figure 3 — Battery Shelf

7. Does DMM indicate between –42 and –56 volts?

   If **YES,** then proceed to Step **20.**

   If **NO,** then continue with Step **8.**

8. Check wiring between battery shelf being equipped with **BATTERY CHARGER** and the power shelf. (Refer to SD-7C119-01.)

9. Is wiring present and properly connected?

   If **YES,** then proceed to Step **11.**

   If **NO,** then continue with Step **10.**

10. Repair or replace wiring and repeat from Step **6.**

11. Replace **337A BATTERY CHARGER.**

12. Connect DMM test leads to **GND** jack and **–48B** jack on **LDU.**

13. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **20.**

    If **NO,** then continue with Step **14.**

14. Replace **337A BATTERY CHARGER** with **BATTERY CHARGER** unit removed previously.

15. Replace **LDU.**

16. Connect DMM test leads to **GND** jack and **–48B** jack on **LDU.**

17. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **20.**

    If **NO,** then continue with Step **18.**

18. Replace **LDU** with **LDU** removed previously.

19. Check wiring using SD-7C119-01. Repeat procedure from Step **6** after locating and correcting trouble.

20. Disconnect DMM test leads and unseat **337A BATTERY CHARGER.**

21. Are other **BATTERY CHARGER**s to be installed?

    If **YES,** then continue with Step **22.**

    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

22. Get another **337A BATTERY CHARGER** and inspect it for possible damage.

23. Verify that fuses on **BATTERY CHARGER** are not blown (Figure 1).

24. Insert **337A BATTERY CHARGER** into slot as follows:

    51-Type Cabinet

    - Second 337A into the second (counting left to right) **RECT/BATCHG** slot in the power shelf (Figure 2).
    - Third 337A into the slot located on left side of battery shelf (Figure 3).

    Other Type RT Enclosure

    Into the slot located on left side of battery shelf (Figure 3).

25. Press **HIGH RATE CHG/ACTIVATE** button on **BATTERY CHARGER.**

    Response: **BAT DISCHG** indicator on **337A BATTERY CHARGER** is lighted.

26. Connect DMM test leads to **GND** jack and **–48B** jack on **LDU.**

27. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **33.**

    If **NO,** then continue with Step **28.**

28. Replace **337A BATTERY CHARGER.**

29. Connect DMM test leads to **GND** jack and **–48B** jack on **LDU.**

30. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **33.**

    If **NO,** then continue with Step **31.**

31. Replace **337A BATTERY CHARGER** with **BATTERY CHARGER** removed previously.

32. Check wiring between battery shelf being equipped with **BATTERY CHARGER** and power shelf (refer to SD-7C119-01). Repeat procedure from Step **26** after locating and correcting trouble.

33. Disconnect DMM test leads.

34. Unseat all of the **BATTERY CHARGER**s.

35. Are other **BATTERY CHARGER**s to be installed?

    If **YES,** then repeat from Step **22.**

    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install 336A RECTIFIERs in J1C182BA Power Shelf

SUMMARY: Insert **336A RECTIFIER** into power shelf. Measure –42 to –56 V DC at **LDU** (**–48B/GND**). Unseat **336A RECTIFIER** and repeat for additional **336A RECTIFIER**s. Reseat all **336A RECTIFIER**s.

1. NOTE:
   Two **336A RECTIFIER**s are required for one dual bank assembly and an additional two **336A RECTIFIER**s (total of four) are required for a second dual bank assembly.

   Get required number of **336A RECTIFIER**s and inspect for possible physical damage.

2. NOTE:
   All **BATTERY CHARGER**s must be unseated throughout this procedure.

   Verify that fuse on **336A RECTIFIER**s (Figure 1) is not blown.

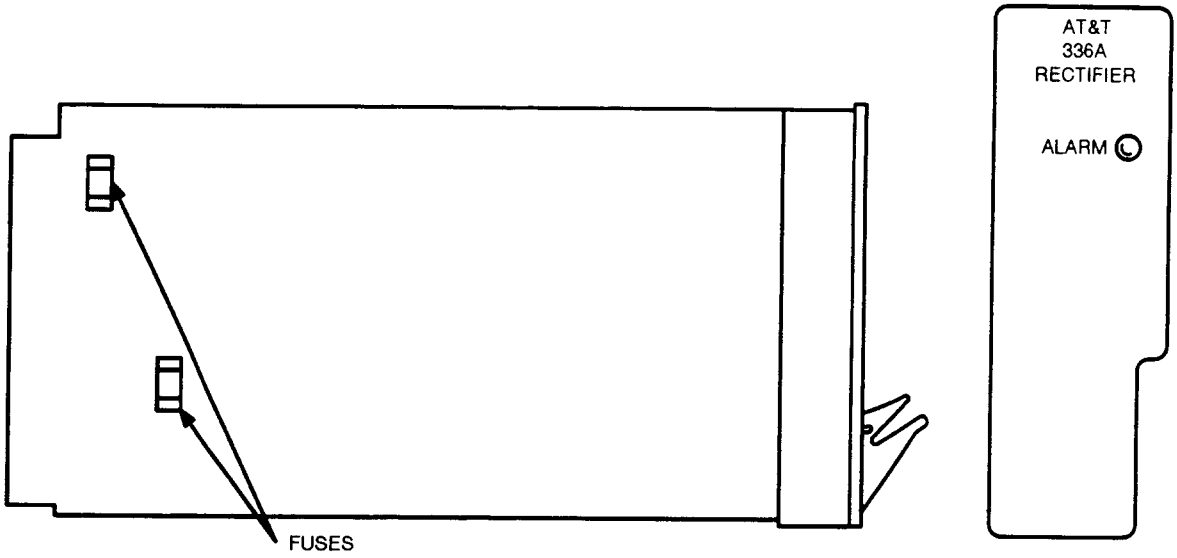


Figure 1 — Location of Fuse on 336A RECTIFIER

3. Insert one **336A RECTIFIER** into first vacant **RECT** slot (counting right to left) in power shelf (Figure 2).

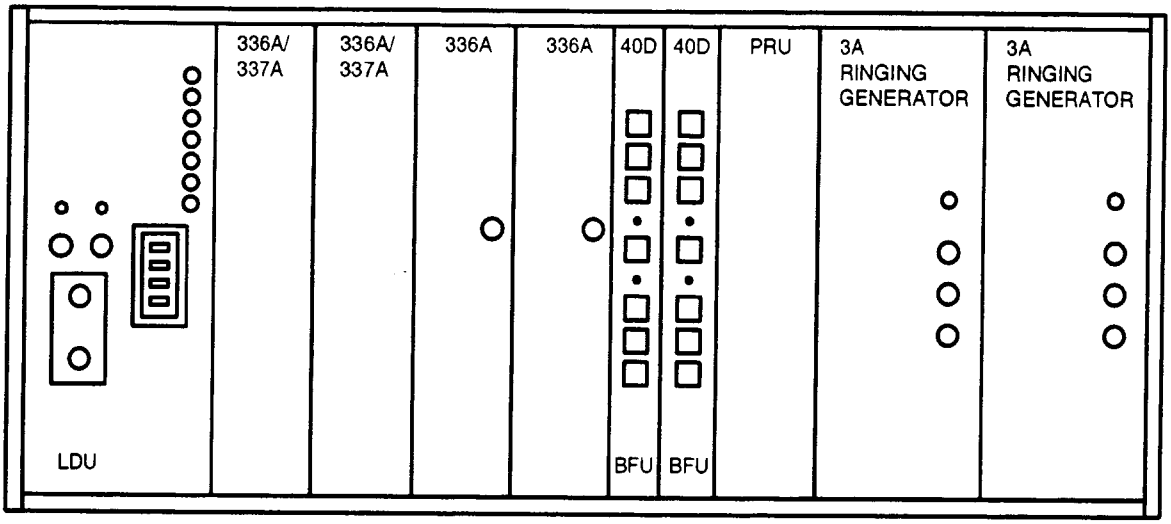


Figure 2 — Power Shelf

4. Condition DMM to measure DC volts.

5. Connect DMM test leads to **GND** jack and **–48B** jack on **LDU**.

6. Does DMM indicate between –42 and –56 volts?

   If **YES,** then proceed to Step **33.**
   If **NO,** then continue with Step **7.**

7. Condition DMM to measure AC volts.

8. Connect DMM test leads to **AC** jack and **GND** jack on **LDU**.

9. Does DMM indicate between 105 and 129 volts?

   If **YES,** then proceed to Step **27.**
   If **NO,** then continue with Step **10.**

10. Unseat **336A RECTIFIER.**

11. Connect DMM test leads to **AC** jack and **GND** jack on **LDU.**

12. Does DMM indicate between 105 and 129 volts?

   If **YES,** then continue with Step **13.**
   If **NO,** then proceed to Step **17.**

13. Replace **336A RECTIFIER.**

14. Connect DMM test leads to **AC** jack and **GND** jack on **LDU.**

15. Does DMM indicate between 105 and 129 volts?

   If **YES,** then proceed to Step **33.**
   If **NO,** then continue with Step **16.**

16. Replace **336A RECTIFIER** with original **336A RECTIFIER** removed previously and check wiring on power shelf using SD-7C119-01. Repeat procedure from Step **4** after locating and correcting trouble.

17. Check for presence of 105 to 129 volts AC at rear of power shelf.

18. Is correct voltage present?

   If **YES,** then continue with Step **19.**
   If **NO,** then proceed to Step **24.**

19. Replace **LDU.**

20. Connect DMM test leads to **AC** jack and **GND** jack on **LDU**.

21. Does DMM indicate between 105 and 129 volts?

    If **YES,** then proceed to Step **4.**
    If **NO,** then continue with Step **22.**

22. Replace **LDU** with original **LDU** removed previously.

23. Check wiring on power shelf using SD-7C119-01. Repeat procedure from Step **4** after trouble is found and corrected.

24. Operate AC power circuit breaker off and then back on.

25. Check for presence of 105 to 129 volts AC at rear of power shelf.

26. Is correct voltage present?

    If **YES,** then proceed to Step **4.**
    If **NO,** then **refer trouble to installation group.**

27. Replace **336A RECTIFIER.**

28. Condition DMM to measure DC volts.

29. Connect DMM test leads to **–48B** jack and **GND** jack on **LDU**.

30. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **33.**
    If **NO,** then continue with Step **31.**

31. Replace **336A RECTIFIER** with **336A RECTIFIER** removed previously.

32. Check wiring on rear of power shelf using SD-7C119-01. Repeat procedure from Step **5** after trouble is found and corrected.

33. Is another **336A RECTIFIER** to be installed?

    If **YES,** then continue with Step **34.**
    If **NO,** then proceed to Step **36.**

34. Unseat **336A RECTIFIER**(s) installed previously.

35. Get another **336A RECTIFIER** and repeat from Step **2.**

36. Remove DMM test leads and reseat all **336A RECTIFIER**s.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform BATTERY CHARGER Test

SUMMARY: Unseat all **BATTERY CHARGER**s. Reseat a **BATTERY CHARGER**. Verify that **BAT DISCHG** indicator goes off and remains off, **HIGH RATE CHG/ON** indicator lights, and **OPEN BAT** indicator is off. Unseat **BATTERY CHARGER** and repeat for additional **BATTERY CHARGER**s. Reseat all **BATTERY CHARGER**s. Remove AC power from system. Measure –42 to –56 V DC at **LDU** (**–48L/GND**). Restore AC power. Remove either **+BAT** or **–BAT** fuse on battery shelf. Verify that **OPEN BAT** indicator lights and **HIGH RATE CHG/ON** indicator is off. Replace **+BAT** or **–BAT** fuse. Verify that **OPEN BAT** indicator goes off. Repeat for other battery strings. Press **HIGH RATE CHG/ACTIVATE** button on **BATTERY CHARGER** and verify that **BAT DISCHG** indicator goes off and **HIGH RATE CHG/ON** indicator lights. Repeat for other **BATTERY CHARGER**s. Verify that **HIGH RATE CHG/ON** indicator(s) goes off within 24 hours.

1. NOTE:
   Throughout this procedure the **BAT DISCHG** and the **HIGH RATE CHG/ON** indicators on **BATTERY CHARGER** will light at steps indicated. The amount of time these indicators are lighted is a function of charge state of batteries. However, these indicators should at least light momentarily at appropriate steps.

   Verify that all **336A RECTIFIER**s are seated and all **BATTERY CHARGER**s are unseated. Reseat one of the **BATTERY CHARGER**s while observing indicators on **BATTERY CHARGER** faceplate.

   Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.

   If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.

   When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.

   The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

2. Does **BAT DISCHG** indicator on **BATTERY CHARGER** go off and remain off?

   If **YES,** then continue with Step **3.**
   If **NO,** then proceed to Step **4.**

3. Did **HIGH RATE CHG/ON** indicator come on?

   If **YES,** then proceed to Step **9.**
   If **NO,** then continue with Step **4.**

4. Replace **BATTERY CHARGER.**

   Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
   If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.
   When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
   The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

5. Is **BAT DISCHG** indicator on **BATTERY CHARGER** off?

   If **YES,** then proceed to Step **9.**
   If **NO,** then continue with Step **6.**

6. Did **HIGH RATE CHG/ON** indicator come on?

   If **YES,** then proceed to Step **9.**
   If **NO,** then continue with Step **7.**

7. Replace **BATTERY CHARGER** with **BATTERY CHARGER** removed previously.

8. Check wiring from **LDU** to **BATTERY CHARGER** and from **LDU** to **336A RECTIFIER**s using SD-7C119-01. Repeat procedure from Step **2** after locating and correcting trouble.

9. Is **OPEN BAT** indicator on **BATTERY CHARGER** off?

   If **YES,** then proceed to Step **17.**
   If **NO,** then continue with Step **10.**

10. Check wiring and connections between battery string and **BATTERY CHARGER.**

11. Is wiring and connections present and properly connected?

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

12. Repair wiring and/or connections and repeat from Step **9.**

13. Remove **BATTERY CHARGER** and examine charging fuse on unit.

14. Is fuse on **BATTERY CHARGER** blown?

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

15. Check wiring on power shelf and battery shelf using SD-7C119-01. Repeat procedure from Step **9** after locating and correcting trouble.

16. Replace **BATTERY CHARGER.**

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will

also light.
When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

Repeat from Step **2.**

17. Have all **BATTERY CHARGER**s been checked?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **18.**

18. Unseat all **BATTERY CHARGER**s.

19. Reseat another **BATTERY CHARGER** while observing indicators on **BATTERY CHARGER** faceplate.

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.
    When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
    The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

    Repeat from Step **2.**

20. Reseat all **BATTERY CHARGER**s.

21.

⚠ CAUTION:
Removing AC power from a working system will cause a transfer to battery supply, bring up a CO alarm, and eventually cause a service interruption.

Turn off circuit breaker providing AC power to system under test.

Response: **BAT DISCHG** indicators on all **BATTERY CHARGER**s are lighted. **ALARM** indicators on all **336A RECTIFIER**s are lighted.

22. Condition DMM to measure DC volts.

23. Connect DMM test leads to **GND** jack and **–48L** jack on **LDU**.

24. Does DMM indicate between –42 and –56 volts?

If **YES,** then proceed to Step **29.**
If **NO,** then continue with Step **25.**

25. Connect DMM test leads to **GND** jack and **–48B** jack on **LDU**.

26. Does DMM indicate between –42 and –56 volts?

If **YES,** then continue with Step **27.**
If **NO,** then proceed to Step **28.**

27. Replace **LDU** and repeat from Step **23.**

28. Check wiring between power shelf and battery shelf using SD-7C119-01. Repeat procedure from Step **23** after locating and correcting trouble.

29. Remove DMM test leads and turn on circuit breaker providing AC power

to system under test.

Response: **BAT DISCHG** indicators on all **BATTERY CHARGER**s and **ALARM** indicators on **336A RECTIFIER**s go off and **HIGH RATE CHG/ON** indicators on all **BATTERY CHARGER**s light. The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

30. Remove either **+BAT** or **–BAT** fuse from one of the battery shelves.

31. Does **OPEN BAT** indicator on associated **BATTERY CHARGER** light and **HIGH RATE CHG/ON** indicator go off?

    If **YES,** then proceed to Step **37.**
    If **NO,** then continue with Step **32.**

32. Replace **BATTERY CHARGER** being checked.

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.
    When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
    The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

33. Does **OPEN BAT** indicator on **BATTERY CHARGER** light and **HIGH RATE CHG/ON** indicator go off?

    If **YES,** then continue with Step **34.**
    If **NO,** then proceed to Step **35.**

34. Unseat all **BATTERY CHARGER**s except last one replaced and repeat from Step **2.**

35. Replace **BATTERY CHARGER** with **BATTERY CHARGER** removed previously.

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.
    When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN**(or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
    The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

36. Check wiring on power shelf using SD-7C119-01. Repeat procedure from Step **31** after locating and correcting trouble.

37. Install battery shelf **+BAT** or **–BAT** fuse removed previously.

    Response: All indicators on **BATTERY CHARGER** are off.

38. Does **OPEN BAT** indicator go off?

    If **YES,** then proceed to Step **44.**
    If **NO,** then continue with Step **39.**

39. Replace **BATTERY CHARGER.**

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will

also light.
When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

40. Is **OPEN BAT** indicator on **BATTERY CHARGER** off and **HIGH RATE CHG/ON** indicator off?

    If **YES,** then continue with Step **41.**
    If **NO,** then proceed to Step **42.**

41. Unseat all **BATTERY CHARGER**s except last one replaced and repeat from Step **2.**

42. Replace **BATTERY CHARGER** with **BATTERY CHARGER** removed previously.

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.
    When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
    The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

43. Check wiring on power shelf using SD-7C119-01. Repeat procedure from Step **38** after locating and correcting trouble.

44. Has **OPEN BAT** indicator on all **BATTERY CHARGER**s been checked?

    If **YES,** then proceed to Step **46.**
    If **NO,** then continue with Step **45.**

45. Go to next battery shelf, remove either **+BAT** or **–BAT** fuse and repeat from Step **31.**

46. Press **HIGH RATE CHG/ACTIVATE** pushbutton on one of the **BATTERY CHARGER**s.

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.
    When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
    The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

47. Does **BAT DISCHG** indicator go off and **HIGH RATE CHG/ON** indicator light on **BATTERY CHARGER**?

    If **YES,** then proceed to Step **53.**
    If **NO,** then continue with Step **48.**

48. Replace **BATTERY CHARGER.**

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.
    When **BAT DISCHG** indicator goes off, the **HIGH RATE**

CHG/ON indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

49. Press **HIGH RATE CHG/ACTIVATE** pushbutton on **BATTERY CHARGER** after **BAT DISCHG** indicator goes off.

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.
    When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4 minutes.
    The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

50. Does **BAT DISCHG** indicator go off and **HIGH RATE CHG/ON** indicator light on **BATTERY CHARGER**?

    If **YES,** then proceed to Step **53.**
    If **NO,** then continue with Step **51.**

51. Replace **BATTERY CHARGER** with **BATTERY CHARGER** removed previously.

    Response: **BAT DISCHG** indicator will light and remain lighted for a period of time determined by charge state of batteries.
    If **BAT DISCHG** indicator remains lighted for more than 4 minutes, **BCU PMN** (or **P/M**) and **ADU NE** indicators will also light.
    When **BAT DISCHG** indicator goes off, the **HIGH RATE CHG/ON** indicator will light and, if **BCU PMN** (or **P/M**) and **ADU NE** indicators are lighted, they will go off after 4

minutes.
The **HIGH RATE CHG/ON** indicator will go off after a period of time determined by charge state of batteries.

52. Check wiring on power shelf using SD-7C119-01. Repeat procedure from Step **46** after locating and correcting trouble.

53. Has **HIGH RATE CHG/ACTIVATE** pushbutton been pressed on all **BATTERY CHARGER**s?

    If **YES,** then proceed to Step **55.**
    If **NO,** then continue with Step **54.**

54. Go to next **BATTERY CHARGER** and repeat from Step **46.**

55. ⇛ NOTE:
    Performance of this step is optional because of the possibility of having to return to remote terminal site the following day to complete test. The **HIGH RATE CHG/ON** indicator on **BATTERY CHARGER** may only be lighted momentarily.

    Does **HIGH RATE CHG/ON** indicator on **BATTERY CHARGER** go off within 24 hours?

    If **YES,** then proceed to Step **57.**
    If **NO,** then continue with Step **56.**

56. Replace **BATTERY CHARGER** and repeat from Step **1.**

57. Have **LDU, BATTERY CHARGER**(s), **336A RECTIFIER**s, and all available batteries been inserted into their respective slots?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **58.**

58. Insert **LDU, BATTERY CHARGER**(s), **336A RECTIFIER**s, and batteries into their respective slots.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install 3C RINGING GENERATORs in Power Shelf

SUMMARY: Insert Main **3C RINGING GENERATOR** into left **RING GEN** slot in power shelf. Measure 90 to 110 V AC and –50 to –60 V DC at **LDU** (**–20HZ/GND**). Unseat main **RINGING GENERATOR**, install spare **RINGING GENERATOR** and repeat. Reseat main **RINGING GENERATOR** and press and hold **TEST PROT RG** button on **LDU**. Verify that **FAIL** indicator on spare **RINGING GENERATOR** is off and **FAIL** indicator on main **RINGING GENERATOR** is lighted.

1. Get two **3C RINGING GENERATOR**s and inspect for possible physical damage.

2. ⚠ CAUTION:
   Damage to 3C RINGING GENERATOR and shelf connector may occur if 3C RINGING GENERATOR is forced into position.

   Insert one **3C RINGING GENERATOR** into main (left) **RING GEN** slot in power shelf.

3. Condition DMM to measure AC volts.

4. On **LDU**, connect DMM test leads to **–20 HZ** jack and **GND** jack.

5. Does DMM indicate between 90 and 110 volts?

   If **YES,** then continue with Step **6.**
   If **NO,** then proceed to Step **8.**

6. Condition DMM to measure DC volts.

7. Does DMM indicate between –50 and –60 volts?

   If **YES,** then proceed to Step **23.**
   If **NO,** then continue with Step **8.**

8. Is **FAIL** indicator on **RINGING GENERATOR** off?

   If **YES,** then proceed to Step **10.**
   If **NO,** then continue with Step **9.**

9. Replace **RINGING GENERATOR** and repeat from Step **3.**

10. Condition DMM to measure DC volts.

11. On **RINGING GENERATOR**, connect DMM test leads to **–48V** jack and **GND** jack.

12. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **14.**
    If **NO,** then continue with Step **13.**

13. Check wiring on power shelf connecting to **RINGING GENERATOR.** Repeat procedure from Step **3** after locating and correcting trouble.

14. Condition DMM to measure AC volts.

15. On **LDU**, connect DMM test leads to **–20 HZ** jack and **GND** jack.

16. Does DMM indicate between 90 and 110 volts?

    If **YES,** then continue with Step **17.**
    If **NO,** then proceed to Step **20.**

17. Condition DMM to measure DC volts.

18. On **LDU**, connect DMM test leads to **–20 HZ** jack and **GND** jack.

19. Does DMM indicate between –50 and –60 volts?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **20.**

20. Replace **RINGING GENERATOR** and repeat from Step **3.**

21. Is **FAIL** indicator on **RINGING GENERATOR** off?

    If **YES,** then proceed to Step **23.**
    If **NO,** then continue with Step **22.**

22. Replace **RINGING GENERATOR** and repeat from Step **3.**

23. Disconnect DMM test leads.

24. Have both **RINGING GENERATOR**s been tested?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **25.**

25. Unseat main **RINGING GENERATOR.**

26. Insert remaining **RINGING GENERATOR** into spare (vacant) **RING GEN** slot in power shelf and repeat from Step **3.**

27. Reseat main **RINGING GENERATOR.**

28. NOTE:
The **TEST PROT RG** pushbutton on **LDU** must be pressed while viewing indicators during this procedure in order to obtain correct results.

Press and hold down **TEST PROT RG** pushbutton on **LDU**.

29. Is **FAIL** indicator on protection (right) **RINGING GENERATOR** off and **FAIL** indicator on main (left) **RINGING GENERATOR** lighted?

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

30. Release **TEST PROT RG** pushbutton on **LDU.**

31. Replace protection **RINGING GENERATOR.**

32. Unseat main **RINGING GENERATOR** and repeat from Step **3.**

33. Release **TEST PROT RG** pushbutton.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install AUG1 Positive Ring Unit in J1C182BA Power Shelf

SUMMARY: ***Verify presence of correct fuses and insert*** **AUG1 PRU** into **PRU** slot in power shelf. Measure 90 to 110 V AC and –50 to –60 V DC at **–20HZ** jack, 90 to 110 V AC and 50 to 60 V DC at **+20HZ** jack, and –42 to –56 V DC at **–48V** jack.

1. Get one **AUG1 PRU** (Figure 1) and inspect for possible physical damage.

2. Verify that each fuse holder on faceplate of **PRU** contains an 80G (0.5A) fuse (red bead) and that fuses are not blown (fuse is blown when bead protrudes from hole in faceplate). If a fuse is blown, use **WECO 553A** Extractor Tool (Techni-Tool No. 594TE170) or **WECO 319B** (KS-6305) Extractor Tool (Techni-Tool No. 490PL020) to remove it.

3. Insert **AUG1 PRU** into **PRU** slot in power shelf.

4. Do any fuses on **PRU** blow?

   If **YES,** then continue with Step **5.**
   If **NO,** then proceed to Step **10.**

5. Replace blown fuse(s) on **PRU** using **WECO 553A** Extractor Tool (Techni-Tool No. 594TE170) or **WECO 319B** (KS-6305) Extractor Tool (Techni-Tool No. 490PL020).

6. Do any fuses on **PRU** blow?

   If **YES,** then continue with Step **7.**
   If **NO,** then proceed to Step **10.**

7. Check wiring using SD-7C119-01.

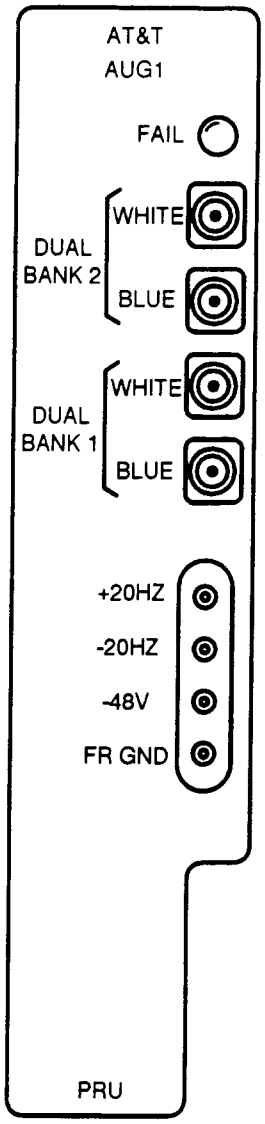


Figure 1 — AUG1 Positive Ring Unit

8. Is wiring correct?

   If **YES,** then get another **PRU** and repeat from Step **2.**
   If **NO,** then continue with Step **9.**

9. Repair wiring and replace blown fuses in **PRU.**

10. Condition digital multimeter (DMM) to measure DC volts.

11. On **PRU**, connect DMM test leads to **–48** jack and **FR GND** jack.

12. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **14.**
    If **NO,** then continue with Step **13.**

13. Check wiring on power shelf between **336A RECTIFIER** and **PRU** using SD-7C119-01. Repeat procedure from Step **11** after locating and correcting trouble.

14. On **PRU**, connect DMM test leads to **–20HZ** jack and **FR GND** jack.

    Response: DMM indicates between –50 and –60 volts.

15. Leave DMM test leads connected to **–20HZ** and **FR GND** jacks and condition DMM to measure AC volts.

    Response: DMM indicates between 90 and 110 volts.

16. Is AC/DC ringing voltages present at **–20HZ** jack on the **PRU**?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **17.**

17. Check wiring on power shelf between **3C RINGING GENERATOR** and **PRU** using SD-7C119-01. Repeat procedure from Step **14** after locating and correcting trouble.

18. Condition DMM to measure DC volts.

19. On **PRU**, connect DMM test leads to **+20HZ** jack and **FR GND** jack.

    Response: DMM indicates between 50 and 60 volts.

20. Leave DMM test leads connected to **+20HZ** and **FR GND** jacks and condition DMM to measure AC volts.

    Response: DMM indicates between 90 and 110 volts.

21. Is AC/DC ringing voltages present at **+20HZ** jack on the **PRU**?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **22.**

22. Replace **PRU** and repeat procedure from Step **2.**

Install Bank Fuse Unit (BFU) in Power Shelf

SUMMARY: The **AUG11** or **40D BFU** is used in the J1C182BA or J1C182BB power shelf. The BFU (without fuses) should be installed with the power shelf equipped. The fuses are installed to verify that they do not blow.

1. Verify –48 volts DC (–42 to –56) on one of the following units installed in the power shelf;
   - **GND** to **-48L** on **LDU**,
   - **GND** to **-48L** on **RCU**,
   - **GND** to **-48L** (1) (2) (3) on **RSU**,

2. Get required number of **BFU**s (refer to Figure 1 and Table A) to be inserted into remote terminal (RT) power shelf.

Table A

BFU Locations

BFU	Associated Equipment	
Slot	J1C182BA	J1C182BB
BFU1	Lower DCBA	Lower DCBA
BFU2	Upper * DCBA	Middle DCBA
BFU3	NA	Upper DCBA

DCBA = Dual Channel Bank Assembly
* Not used in a 51-type cabinet, used for a DDM-1000 or DDM-2000 (if equipped) in other type cabinets.

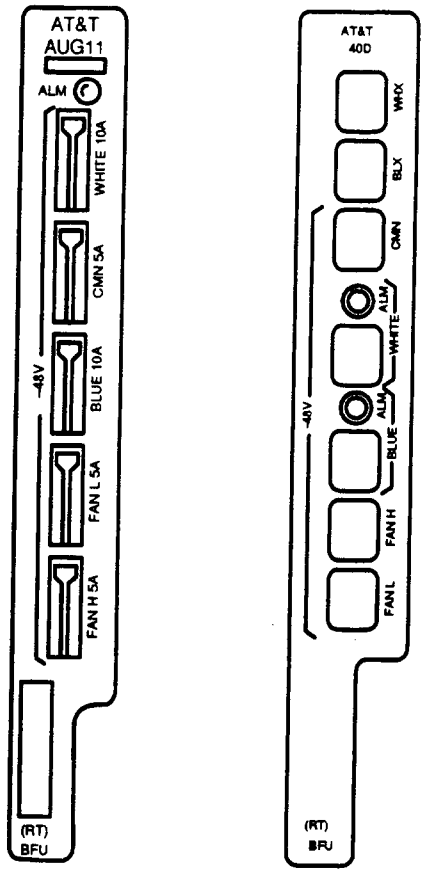


Figure 1 — AUG11 and 40D Bank Fuse Unit

3. Remove any fuses installed in the **BFU** before inserting this unit.

4. Insert one of the **BFU**s into the appropriate **BFU( )** slot in the RT power shelf (Table A).

Table B

AUG11 BFU Fuses

Fuse Designation	Size	Code
WHITE	10A	WP90247 L115
CMN*	5A	WP90247 L113
BLUE	10A	WP90247 L115
FAN L	5A	WP90247 L113
FAN H	5A	WP90247 L113

* Not required in BFUs feeding a DDM-1000 or DDM-2000 Multiplexer.

Table C

40D BFU Fuses

Fuse Designation	Bead Color	Size	Code
WHX*	Blue	3A	80C
BLX*	Blue	3A	80C
CMN*	Green	5A	80D
WHITE	Yellow	10A	81A
BLUE	Yellow	10A	81A
FAN L	Green	5A	80D
FAN H	Green	5A	80D

* Not required in BFUs feeding a DDM-1000 or DDM-2000 Multiplexer.

5.

NOTE:
The faceplate mounted fuses on the AUG11 may make a popping sound when installed.

Install the correct value fuses (Table B or Table C) in fuse holders on faceplate of **AUG11** or **40D BFU**.

6. NOTE:
Each 40D BFU fuse bead, except the yellow fuse beads, will pop out when the fuse blows. The AUG11 ALM indicator light and the fuse flag pops out when the fuse blows.

Do any fuses on **BFU** blow?

If **YES,** then continue with Step **7.**

If **NO,** then proceed to Step **10.**

7. Replace blown fuse(s) on **AUG11 BFU** using **WP90247 L201** Insertion/Extraction tool; or **WECO 553A** Extractor Tool (Techni-Tool No. 594TE170) or **WECO 319B** (KS-6305) Extractor Tool (Techni-Tool No. 490PL020) for the **40D BFU.**

8. Do any fuses on **BFU** blow?

If **YES,** then continue with Step **9.**

If **NO,** then proceed to Step **10.**

9. Check wiring using SD-7C130-01 or SD-7C119-01.

10. Is another **BFU** to be installed at this time?

If **YES,** then continue with Step **11.**

If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

11. Repeat the procedure from Step **3** for next **BFU** to be installed.

Install and Test Power Converter Unit (PCU) in Facility Shelf

SUMMARY: Install **PCU** in facility shelf and verify that **FAIL** indicator goes off and remains off. Measure –42 to –56 V DC at **PCU** faceplate.

1. Get one **AUA11( ) PCU** and inspect for possible damage.

2. Insert **PCU** into **PCU** slot in facility (middle) shelf.

3. NOTE:
   FAIL indicator on **PCU** may light momentarily when inserted into RT.

   Does **FAIL** indicator on **PCU** go off and remain off?

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

4. Replace **PCU.**

5. NOTE:
   FAIL indicator on **PCU** may light momentarily when inserted into RT.

   Does **FAIL** indicator on **PCU** go off and remain off?

   If **YES,** then proceed to Step **8.**
   If **NO,** then continue with Step **6.**

6. Replace **PCU** with **PCU** removed previously.

7. Use SD-7C117-01 or SD-7C117-02 to check bank wiring. Repeat procedure from Step **3** after locating and correcting trouble.

8. Condition DMM to measure volts DC.

9. On **PCU**, connect DMM test leads to **GND** jack and **–48** jack.

10. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **31.**
    If **NO,** then continue with Step **11.**

11. Verify that wiring from power shelf to **PCU** in facility shelf is present and connected properly.

12. Is wiring present and connected properly?

    If **YES,** then proceed to Step **14.**
    If **NO,** then continue with Step **13.**

13. Resolve problem through local procedures. Repeat procedure from Step **3** after locating and correcting trouble.

14. Is system being equipped with Fiber to the Home (FTTH) feature?

    If **YES,** then continue with Step **15.**
    If **NO,** then proceed to Step **18.**

15. At **BFU3** or **BFU4** in optics power shelf, is fuse **–48 WHITE**, **–48 BLUE**, or **–48 CMN** blown?

    If **YES,** then continue with Step **16.**
    If **NO,** then proceed to Step **18.**

16. Replace blown fuse(s).

17. Does fuse(s) blown again?

    If **YES,** then continue with Step **29.**
    If **NO,** then proceed to Step **8.**

18. Replace **PCU** in facility shelf.

19. Is **FAIL** indicator on **PCU** off?

    If **YES,** then continue with Step **20.**
    If **NO,** then proceed to Step **4.**

20. On **PCU**, connect DMM test leads to **GND** jack and **–48** jack.

21. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **31.**
    If **NO,** then continue with Step **22.**

22. Replace **PCU** with **PCU** removed previously.

23. Is **PCU** being installed in a frame-type RT with bulk powering (J1C182BB bulk power shelf)?

    If **YES,** then proceed to Step **30.**
    If **NO,** then continue with Step **24.**

24. ⇒ NOTE:
Two dual bank assemblies share a common power shelf.

Is **PCU** being installed in second dual bank assembly?

If **YES,** then continue with Step **25.**
If **NO,** then proceed to Step **29.**

25. Replace associated **336A RECTIFIER** located in power shelf.

26. On **PCU**, connect DMM test leads to **GND** jack and **–48** jack.

27. Does DMM indicate between –42 and –56 volts?

If **YES,** then proceed to Step **31.**
If **NO,** then continue with Step **28.**

28. Replace **336A RECTIFIER** with **336A RECTIFIER** removed previously.

29. Check wiring using SD-7C117-01 or SD-7C117-02 and, if system is being equipped with FTTH feature, also use SD-7C118-02 and SD-7C150-01. Repeat procedure from Step **3** after locating and correcting trouble.

30. Check fuses in RT dual bank assembly **LFU** and bulk power shelf **BFU**. If trouble is not found, check wiring at RT dual bank assembly and bulk power shelf using SD-7C117-01 or SD-7C117-02 and SD-7C130-01, respectively. Repeat procedure from Step **3** after locating and correcting trouble.

31. Disconnect DMM test leads.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform Installation and Tests of Batteries in Existing Frame-Type or 80-Type (ED-7C621-30 or ED-97977-30) Cabinet RT

SUMMARY: Install and connect four KS-21906, L4 battery packs on battery shelf. Measure voltage greater than 45 V DC at battery shelf. Repeat for additional battery shelves. Install fuses in battery shelves. Connect **J113** to **P113** on battery shelves.

1. ⚠ DANGER:
   High current flow will occur if short is placed across battery terminals. No attempt should be made to measure battery voltage across terminals.

   Get four KS-21906, L4 battery packs for each battery shelf to be equipped.

2. Ensure that connectors **J113** and **P113** on rear of battery shelves being equipped are not connected.

3. On front of battery shelves, remove front covers by lifting covers up and out (Figure 1).

4. Place batteries on battery shelves and dress battery cables as each battery pack is placed on shelf (Figure 2).

5. ⇒ NOTE:
   The four battery lead jacks can be plugged into any four plugs on shelf, in any order.

   Connect four battery lead jacks to four plugs (**P1, P2, P3,** and **P4**) on each battery shelf being equipped.

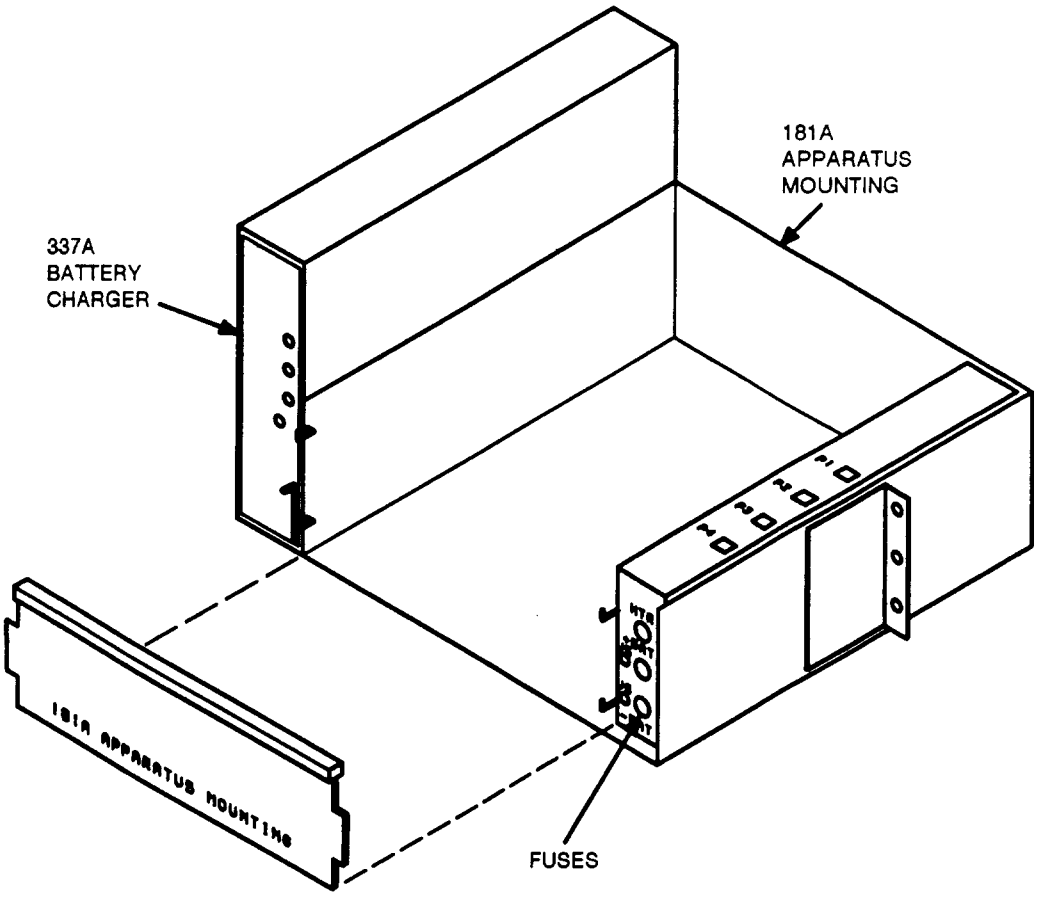


Figure 1 — Battery Shelf

6. Reinstall front covers on battery shelves by pushing the bottom of the cover into the bottom slots at the ends of the panel and then pushing the rolled-over lip, at the top of the cover, over the top two nubs.

7. Condition DMM to measure DC volts.

8. On battery shelf, connect DMM test leads to **+BAT** jack (**J5**) and **–BAT** jack (**J6**).

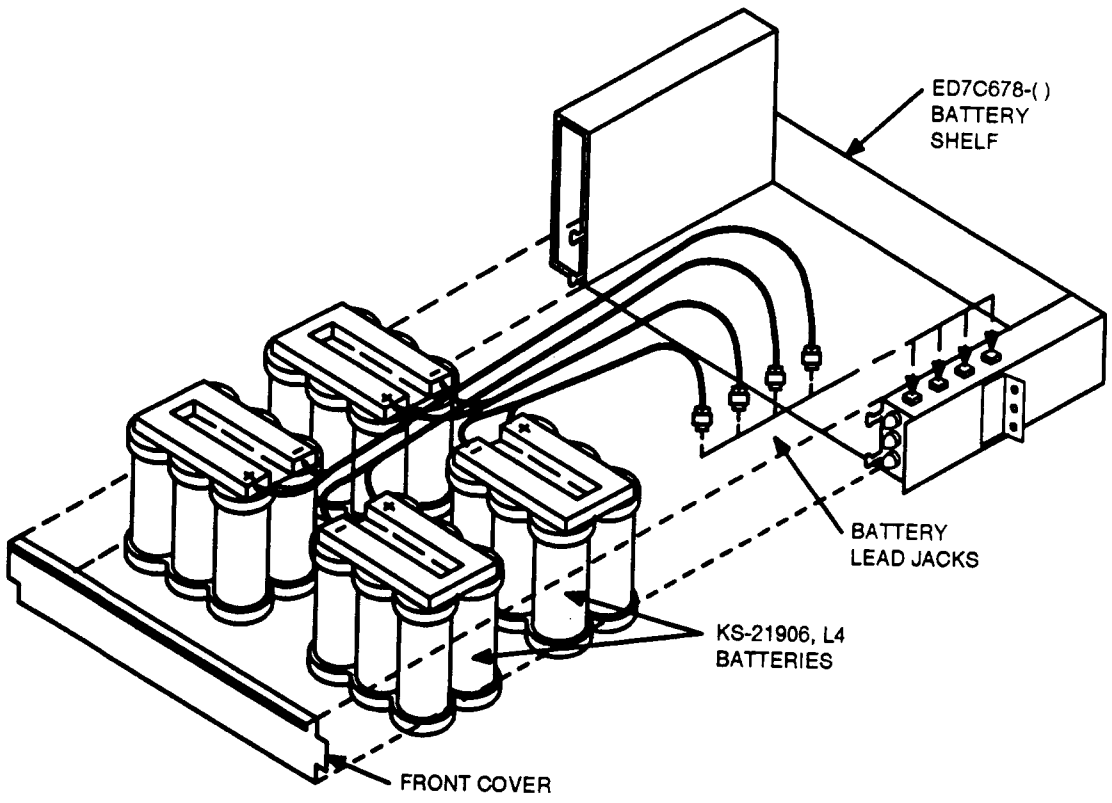


Figure 2 — Battery Placement and Connections

9. Does meter indicate greater than 45.0 volts DC?

   If **YES,** then proceed to Step **18.**
   If **NO,** then continue with Step **10.**

10. Check battery lead connections at battery shelf.

11. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **12.**

12. ⇛ NOTE:
    If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

    Replace one battery pack.

13. On battery shelf, connect DMM test leads to **+BAT** jack (**J5**) and **–BAT** jack (**J6**).

14. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **15.**

15. Have all battery packs been replaced?

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

16. Check wiring and connectors on battery shelf. Repeat procedure from Step **8** after locating and correcting trouble.

17. ⇛ NOTE:
    If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

    Replace another battery pack and repeat from Step **13.**

18. Have all equipped battery shelves been tested?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **19.**

19. Go to next battery shelf and repeat from Step **8.**

20. Remove DMM. Install good fuses (15-amp) into **+BAT** and **–BAT** fuse holders of all battery shelves equipped with batteries.

21. Insert connector **J113** into connector **P113** on battery shelf.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform Installation and Tests of Batteries for Existing 51-Type (ED-7C601-30) Cabinet RT

SUMMARY: Install and connect four KS-21906, L4 battery packs in each battery shelf. With fuses removed, measure voltage greater than 45 V DC at power panel (string 2) or at battery shelf (string 3). Install battery and heater fuses. Connect **J113** to **P113** on battery shelf.

1. Ensure that connector **J113** from power shelf is not connected to connector **P113** on battery shelf.

2. ⚠ DANGER:
   High current flow will occur if short is placed across battery terminals. No attempt should be made to measure battery voltage across terminals.

   ⇒ NOTE:
   Lower two battery shelves house battery string 1 and upper two battery shelves house battery string 2 (when installed). If additional battery string (battery string 3) is required, a 181A apparatus mounting can be installed in top of battery section to house it.

   Get four KS-21906, L4 battery packs.

3. Is battery string 2 being installed?

   If **YES,** then continue with Step **4.**
   If **NO,** then proceed to Step **20.**

4. Place batteries on battery shelves and dress battery cables as each battery pack is placed on shelf.

5. In battery section of cabinet at power panel (Figure 1), refer to Table A and remove the fuses associated with battery string 2 (either **F1**, **F2**, and **F6** or **F3**, **F4**, and **F6**).

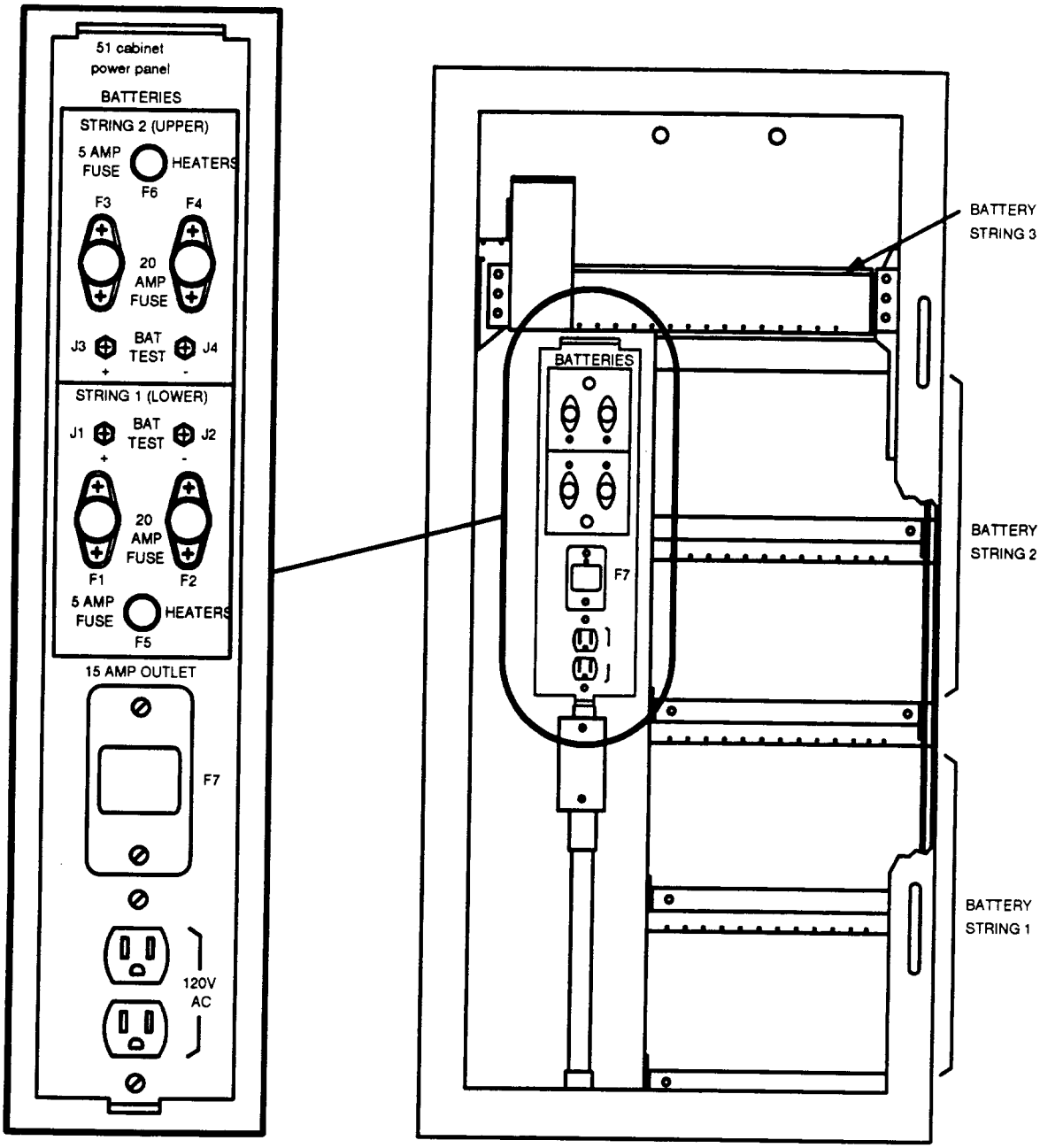


Figure 1 — Battery Section of 51A Cabinet Showing Power Panel

6. ⇒ NOTE:
The four plugs supplied to upper two battery shelves (battery string 2) are labeled **P5, P6, P7,** and **P8**.

Connect each battery lead jack to one of two plugs supplied to each shelf.

7. Get DMM and condition to measure DC volts.

8. In battery section of cabinet at power panel, refer to Table A and connect DMM test leads to **+BAT TEST** jack **J1** or **J3** and – **BAT TEST** jack **J2** or **J4** of battery string 2.

9. Does meter indicate greater than 45.0 volts DC?

   If **YES,** then proceed to Step **18.**
   If **NO,** then continue with Step **10.**

10. Check battery lead connections at battery shelf.

11. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **12.**

12. ⇒ NOTE:
If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

Replace one of the battery packs in battery shelf.

13. In battery section of cabinet at power panel, refer to Table A and connect DMM test leads to **+BAT TEST** jack **J1** or **J3** and – **BAT TEST** jack **J2** or **J4** of battery string 2.

Table A

51A Power Panel

Power Panel (Note)	Battery String	Associated Fuses	Associated Jacks	Connector Plug
Early Version	1 (Lower)	F3, F4, F5	J3, J4	P5, P6, P7, P8
	2 (Upper)	F1, F2, F6	J1, J2	P1, P2, P3, P4
Later Version	1 (Lower)	F1, F2, F5	J1, J2	P1, P2, P3, P4
	2 (Upper)	F3, F4, F6	J3, J4	P5, P6, P7, P8

Note: If the words **51 CABINET POWER PANEL** appear at the top of the power panel, then the power panel is a later version. Otherwise, the power panel is an early version.

14. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **15.**

15. Have all battery packs on shelf been replaced?

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

16. Select another battery pack on battery shelf and repeat from Step **12.**

17. Check wiring and connectors on battery shelf. Repeat the procedure from Step **13** after locating and correcting trouble.

18. Remove DMM test leads and reinstall fuses in power panel that were removed previously.

19. Is battery string 3 to be installed?

    If **YES,** then continue with Step **20.**
    If **NO,** then proceed to Step **40.**

20. ⚠ DANGER:
    High current flow will occur if short is placed across battery terminals. No attempt should be made to measure battery voltage across terminals.

    Get four KS-21906, L4 battery packs.

21. Remove fuses, if present, from **+BAT** and **–BAT** fuse holders on battery shelf.

22. At front of battery shelf, remove front cover by lifting cover up and out (Figure 2).

23. Place batteries on battery shelf and dress battery cables as each battery pack is placed on shelf (Figure 3).

24. ⇶ NOTE:
    Four battery jacks can be plugged into any four plugs on shelf, in any order.

    Connect four battery lead jacks to four plugs (**P1**, **P2**, **P3**, and **P4**) on top of battery shelf.

25. Reinstall front cover on battery shelf.

26. Condition DMM to measure DC volts.

27. On battery shelf, connect DMM test leads to **+BAT** jack (**J5**) and **–BAT** jack (**J6**).

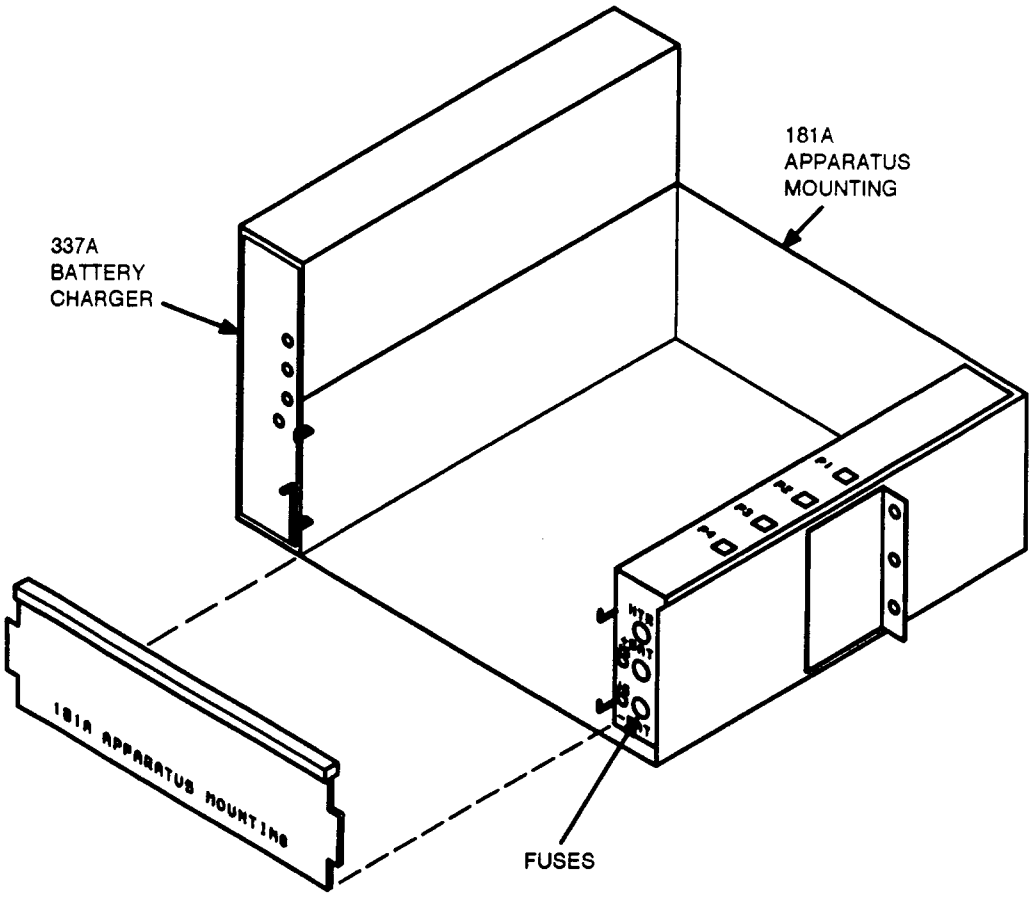


Figure 2 — Battery Shelf

28. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **37.**
    If **NO,** then continue with Step **29.**

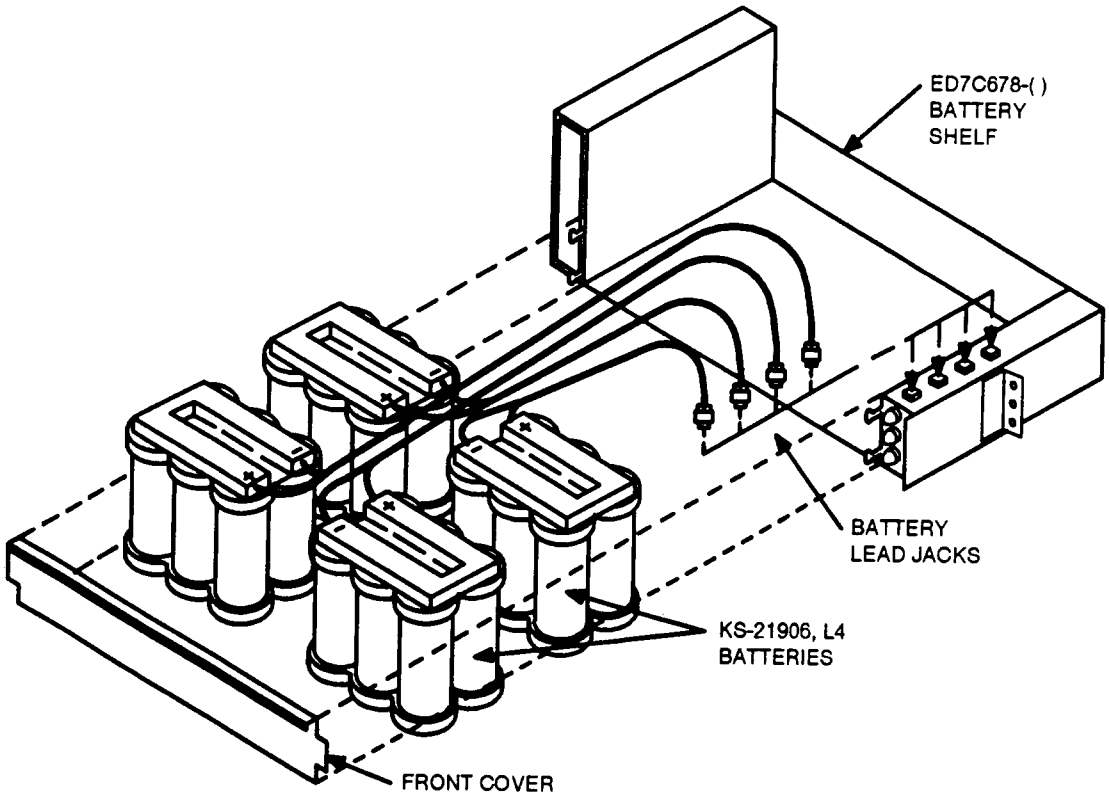


Figure 3 — Battery Placement and Connections

29. Check battery lead connections at battery shelf.

30. Does meter indicate greater than 45.0 volts DC?

    If **YES,** then proceed to Step **37.**
    If **NO,** then continue with Step **31.**

31. NOTE:
If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

Replace one of the battery packs.

32. On battery shelf, connect DMM test leads to **+BAT** jack (**J5**) and **–BAT** jack (**J6**).

33. Does meter indicate greater than 45.0 volts DC?

If **YES,** then proceed to Step **37.**
If **NO,** then continue with Step **34.**

34. Have all battery packs been replaced?

If **YES,** then continue with Step **35.**
If **NO,** then proceed to Step **36.**

35. Check battery lead connections at battery shelf. Repeat procedure from Step **27** after locating and correcting trouble.

36. NOTE:
If voltage requirements are not met after replacement battery pack is installed, original battery pack should be reinstalled in battery shelf.

Select another battery pack on battery shelf and repeat from Step **31.**

37. Remove DMM test leads.

38. Install good 25 amp fuses (Buss ABC or equivalent) into **+BAT** and **–BAT** fuse holders on battery shelf.

39. Install good 5 amp fuse into **HTR** fuse holder on battery shelf.

40. Insert connector **J113** into connector **P113** on battery shelf.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Add 337A BATTERY CHARGERs to an Existing Frame-Type or 80-Type Cabinet RT Battery Shelf

1. Get one **337A BATTERY CHARGER** (Figure 1) and inspect it for possible damage.

2. Verify that fuses on **BATTERY CHARGER** are not blown (Figure 1).

3. Insert the **337A BATTERY CHARGER** into the slot located on the left side of the battery shelf (Figure 2) and press the **HIGH RATE CHG/ACTIVATE** button on the **BATTERY CHARGER.**

   Response: **BAT DISCHG** indicator on **337A BATTERY CHARGER** is lighted.

4. Are other **BATTERY CHARGER**s to be installed?

   If **YES,** then proceed to Step **1.**
   If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

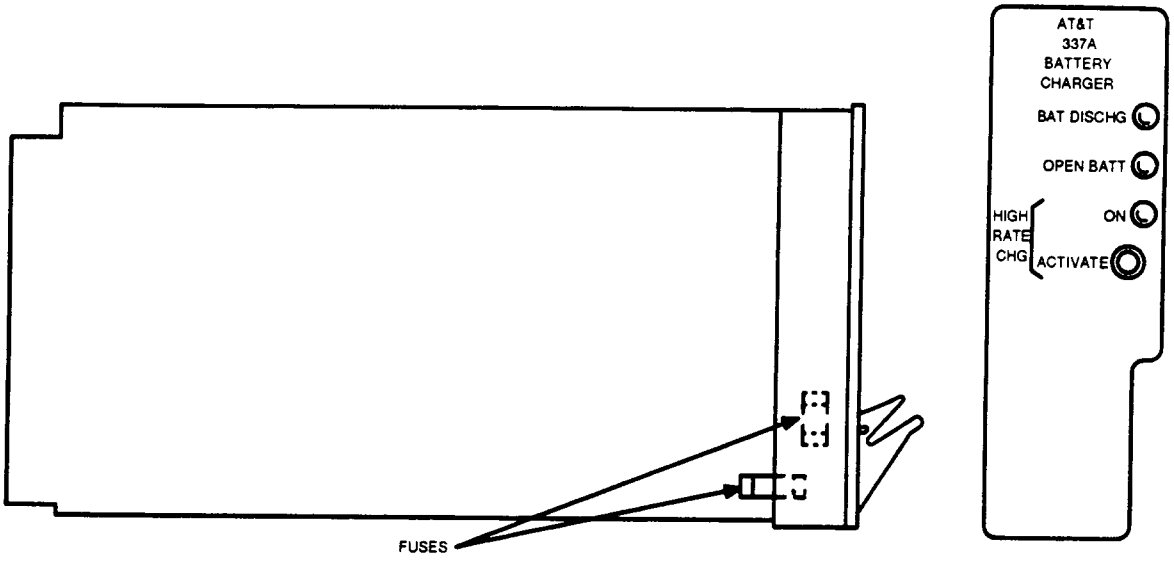


Figure 1 — Location of Fuses on 337A BATTERY CHARGER

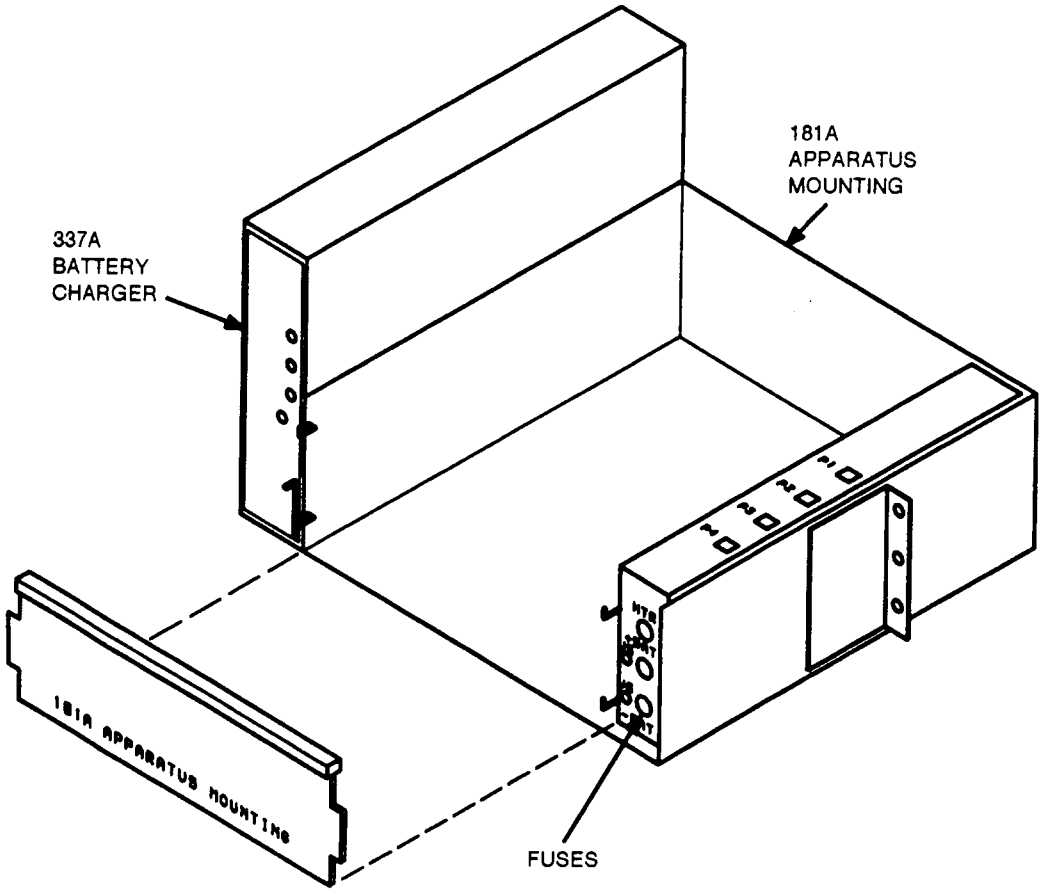


Figure 2 — Battery Shelf

Add 336A RECTIFIERs to Existing J1C182BA Power Shelf

1. Get required number of **336A RECTIFIER**s and inspect for possible physical damage.

2. Verify that fuse on **336A RECTIFIER**(s) (Figure 1) is not blown.

3. Insert one **336A RECTIFIER** into first vacant **RECT** slot (counting right to left) in power shelf.

4. Is another **336A RECTIFIER** to be installed?

   If **YES,** then repeat from Step **2.**
   If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

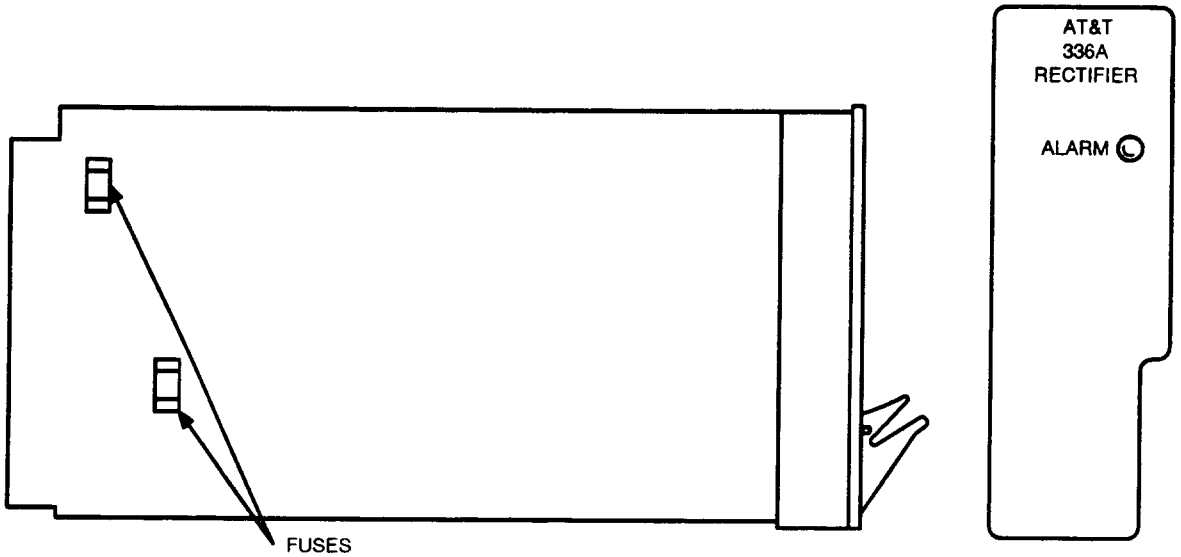


Figure 1 — Location of Fuse on 336A RECTIFIER

Install Ringing Switch Unit (RSU) in J1C182BB Bulk Power Shelf

SUMMARY: Insert **RSU** into power shelf. Measure –42 to –56 V DC on **RSU** faceplate.

1. Get one **AUG2 RSU** (Figure 1) and inspect for possible physical damage.

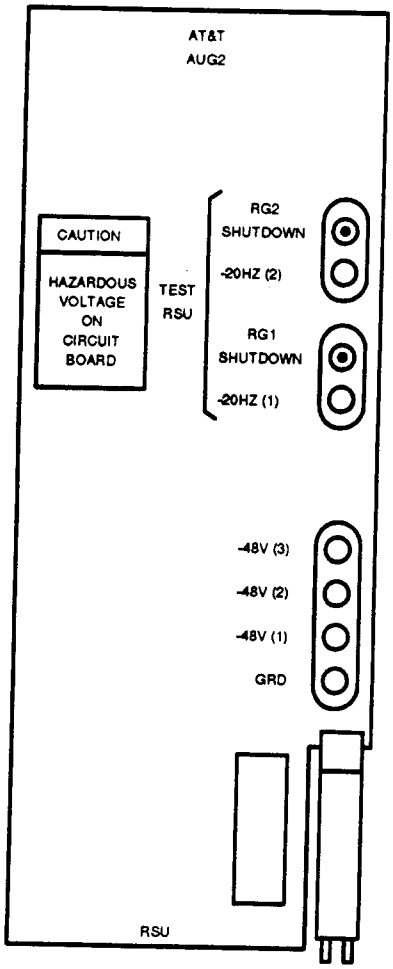


Figure 1 — Ringing Switch Unit (AUG2) Faceplate

2. Insert **RSU** into **RSU** slot in power shelf.

3. Get DMM and condition it to measure DC volts.

4. Connect DMM test leads to **GRD** jack and **–48V (1)** jack on **RSU**.

5. Is –42 to –56 volts present?

   If **YES,** then proceed to Step **14.**
   If **NO,** then continue with Step **6.**

6. Check –48V (1) feeder and –48V (1) RTN feeder connection from bulk power plant to power shelf.

7. Have feeders been properly connected?

   If **YES,** then proceed to Step **9.**
   If **NO,** then continue with Step **8.**

8. Refer trouble to installation group.

9. Replace **RSU**.

10. Connect DMM test leads to **GRD** jack and **–48V (1)** jack on **RSU**.

11. Is –42 to –56 volts present?

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

12. Replace **RSU** with **RSU** removed previously.

13. Check wiring on rear of power shelf using SD-7C130-01. Repeat procedure from Step **4** after locating and correcting trouble.

14. Remove DMM test leads from **RSU**.

15. Repeat the procedure from Step **4** using **–48V (2)** jack on **RSU** and checking for –48V (2) and –48V (2) RTN feeders and proceed to Step **16.**

16. Repeat the procedure from Step **4** using **–48V (3)** jack on **RSU** and checking for –48V (3) and –48V (3) RTN feeders.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install 3C RINGING GENERATORs in J1C182BB Bulk Power Shelf

SUMMARY: Insert **3C RINGING GENERATOR** into **RING GEN1** slot in power shelf. Measure 90 to 110 V AC and –50 to –60 V DC at **RSU** [**–20HZ (1), (2)/GRD**]. Unseat **RING GEN1**, install **RING GEN2**, and repeat. Reseat **RING GEN1**, and press, and hold **RG1 SHUTDOWN** button on **RSU**. Verify that **FAIL** indicator on **RING GEN1** is lighted and that **FAIL** indicator on **RING GEN2** is off. Release **RG1 SHUTDOWN** button, press, and hold **RG2 SHUTDOWN** button on **RSU**. Verify that **FAIL** indicator on **RING GEN1** is off and that **FAIL** indicator on **RING GEN2** is lighted.

1. Get two **3C RINGING GENERATOR**s and inspect for possible physical damage.

2. Insert one **3C RINGING GENERATOR** into **RING GEN1** slot in power shelf.

3. Condition digital multimeter (DMM) to measure AC volts.

4. On **RSU**, connect DMM test leads to **–20HZ (1)** jack and **GRD** jack.

   Response: DMM indicates between 90 and 110 volts.

5. Condition DMM to measure DC volts.

   Response: DMM indicates between –50 and –60 volts.

6. Repeat Steps **3** through **5** with the DMM test leads connected to **–20HZ (2)** jack and **GRD** jack on **RSU**.

7. Is AC/DC ringing present at both –**20HZ** jacks on the **RSU**?

   If **YES,** then proceed to Step **24.**
   If **NO,** then continue with Step **8.**

8. Is AC/DC ringing present at one –**20HZ** jack on the **RSU**?

   If **YES,** then continue with Step **9.**
   If **NO,** then proceed to Step **12.**

9. Replace **RSU** and repeat Steps **3** through **6.**

10. Is AC/DC ringing present at both –**20HZ** jacks on the **RSU**?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **11.**

11. Check wiring at bulk power shelf using SD-7C130-01. Repeat procedure from Step **3** after locating and correcting trouble.

12. Is **FAIL** indicator on **RING GEN1** lighted?

    If **YES,** then continue with Step **13.**
    If **NO,** then proceed to Step **14.**

13. Replace **RING GEN1** and repeat the procedure from Step **3.**

14. Condition DMM to measure AC volts.

15. On **RING GEN1**, connect DMM test leads to **–20HZ** jack and **GND** jack.

    Response: DMM indicates between 90 and 110 volts.

16. Condition DMM to measure DC volts.

    Response: DMM indicates between –50 and –60 volts.

17. Is AC/DC ringing present on **RING GEN1**?

    If **YES,** then continue with Step **18.**
    If **NO,** then proceed to Step **19.**

18. Check wiring on bulk power shelf connecting to **RING GEN1** using SD-7C130-01. Repeat procedure from Step **3** after locating and correcting trouble.

19. Condition DMM to measure DC volts.

20. On **RING GEN1**, connect DMM test leads to **–48V** jack and **GND** jack.

21. Does DMM indicate between –42 and –56 volts?

    If **YES,** then continue with Step **22.**
    If **NO,** then proceed to Step **23.**

22. Replace **RING GEN1** and repeat the procedure from Step **3.**

23. Check wiring on bulk power shelf to **RING GEN1** using SD-7C130-01. Repeat procedure from Step **3** after locating and correcting trouble.

24. Have both **3C RINGING GENERATOR**s been tested?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **25.**

25. Unseat **RING GEN1.**

26. Insert second **3C RINGING GENERATOR** into **RING GEN2** slot in power shelf and repeat from Step **3.**

27. Reseat **RING GEN2** and press and hold **RG1 SHUTDOWN** button on **RSU.**

28. Is **FAIL** indicator on **RING GEN1** lighted and **FAIL** indicator on **RING GEN2** off?

    If **YES,** then proceed to Step **31.**
    If **NO,** then continue with Step **29.**

29. Release **RG1 SHUTDOWN** button and replace **RING GEN1.**

30. Unseat **RING GEN2** and repeat from Step **3.**

31. Release **RG1 SHUTDOWN** button.

32. Press and hold **RG2 SHUTDOWN** button on **RSU.**

33. Is **FAIL** indicator on **RING GEN1** off and **FAIL** indicator on **RING GEN2** lighted?

    If **YES,** then proceed to Step **36.**
    If **NO,** then continue with Step **34.**

34. Release **RG2 SHUTDOWN** button and replace **RING GEN2.**

35. Unseat **RING GEN1** and repeat from Step **3.**

36. Release **RG2 SHUTDOWN** button.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install AUG1 Positive Ring Unit in J1C182BB Bulk Power Shelf

SUMMARY: Verify presence of correct fuses and insert **AUG1 PRU** into **PRU1** slot in bulk power shelf. Measure 90 to 110 V AC and –50 to –60 V DC at **–20HZ** jack, 90 to 110 V AC and 50 to 60 V DC at **+20HZ** jack, and –42 to –56 V DC at **–48V** jack. If second **PRU** is required, repeat procedure installing **PRU** into **PRU2** slot in bulk power shelf.

1. Get one **AUG1 PRU** (Figure 1) and inspect for possible physical damage.

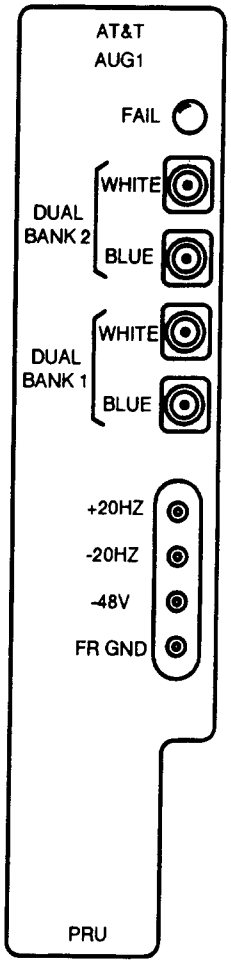


Figure 1 — AUG1 Positive Ring Unit

2. Verify that each fuse holder on faceplate of **PRU** contains an 80G (0.5A) fuse (red bead) and that fuses are not blown (fuse is blown when bead protrudes from hole in faceplate). If a fuse is blown, use **WECO 553A** Extractor Tool (Techni-Tool No. 594TE170) or **WECO 319B** (KS-6305) Extractor Tool (Techni-Tool No. 490PL020) to remove it.

3. Is a **PRU** present in **PRU1** slot in bulk power shelf?

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

4. Insert **AUG1 PRU** into **PRU1** slot in bulk power shelf and proceed to Step **6.**

5. Insert **AUG1 PRU** into **PRU2** slot in bulk power shelf.

6. Do any fuses on **PRU** blow?

   If **YES,** then continue with Step **7.**
   If **NO,** then proceed to Step **12.**

7. Replace blown fuse(s) on **PRU** using **WECO 553A** Extractor Tool (Techni-Tool No. 594TE170) or **WECO 319B** (KS-6305) Extractor Tool (Techni-Tool No. 490PL020).

8. Do any fuses on **PRU** blow?

   If **YES,** then continue with Step **9.**
   If **NO,** then proceed to Step **12.**

9. Check wiring using SD-7C119-01.

10. Is wiring correct?

    If **YES,** then get another **PRU** and proceed to Step **2.**
    If **NO,** then continue with Step **11.**

11. Repair wiring and replace blown fuses in **PRU.**

12. Condition digital multimeter (DMM) to measure DC volts.

13. On **PRU**, connect DMM test leads to **–48** jack and **FR GND** jack.

14. Does DMM indicate between –42 and –56 volts?

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

15. Check wiring on power shelf between **336A RECTIFIER** and **PRU** using SD-7C119-01. Repeat procedure from Step **13** after locating and correcting trouble.

16. On **PRU**, connect DMM test leads to **–20HZ** jack and **FR GND** jack.

    Response: DMM indicates between –50 and –60 volts.

17. Leave DMM test leads connected to **–20HZ** and **FR GND** jacks and condition DMM to measure AC volts.

    Response: DMM indicates between 90 and 110 volts.

18. Are AC/DC ringing voltages present at **–20HZ** jack on the **PRU**?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **19.**

19. Check wiring on power shelf between **3C RINGING GENERATOR** and **PRU** using SD-7C119-01. Repeat procedure from Step **16** after locating and correcting trouble.

20. Condition DMM to measure DC volts.

21. On **PRU**, connect DMM test leads to **+20HZ** jack and **FR GND** jack.

    Response: DMM indicates between 50 and 60 volts.

22. Leave DMM test leads connected to **+20HZ** and **FR GND** jacks and condition DMM to measure AC volts.

    Response: DMM indicates between 90 and 110 volts.

23. Are AC/DC ringing voltages present at **+20HZ** jack on the **PRU**?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Replace **PRU** and repeat procedure from Step **2.**

25. Is another **PRU** to be installed at this time?

    If **YES,** then proceed to Step **1.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install 336A RECTIFIERs in J1C182BD Power Shelf

SUMMARY: Insert **336A RECTIFIER** into power shelf. Measure –42 to –56 V DC between **- (1A/mV)** and **+ (CURRENT V)** on the power shelf (bottom 2 jacks). Unseat **336A RECTIFIER** and repeat for additional **336A RECTIFIER**s. Reseat all **336A RECTIFIER**s.

1. NOTE:
   Three **336A RECTIFIER**s are suggested for one string of batteries and an additional two **336A RECTIFIER**s (total of five) are required for a second string of batteries.

   Get required number of **336A RECTIFIER**s and inspect for possible physical damage.

2. All **BATTERY CHARGER**s must be unseated throughout this procedure.

   Verify that fuse on **336A RECTIFIER**s (Figure 1) is not blown.

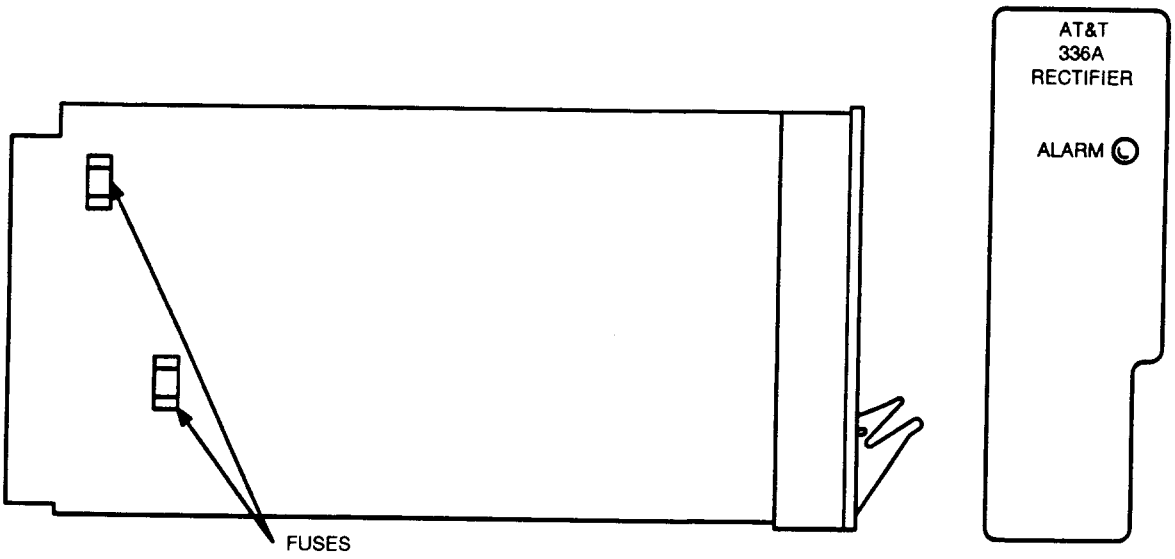


Figure 1 — Location of Fuse on 336A RECTIFIER

3. Insert one **336A RECTIFIER** into first vacant **RECT** slot (counting left to right) in power shelf (Figure 2).

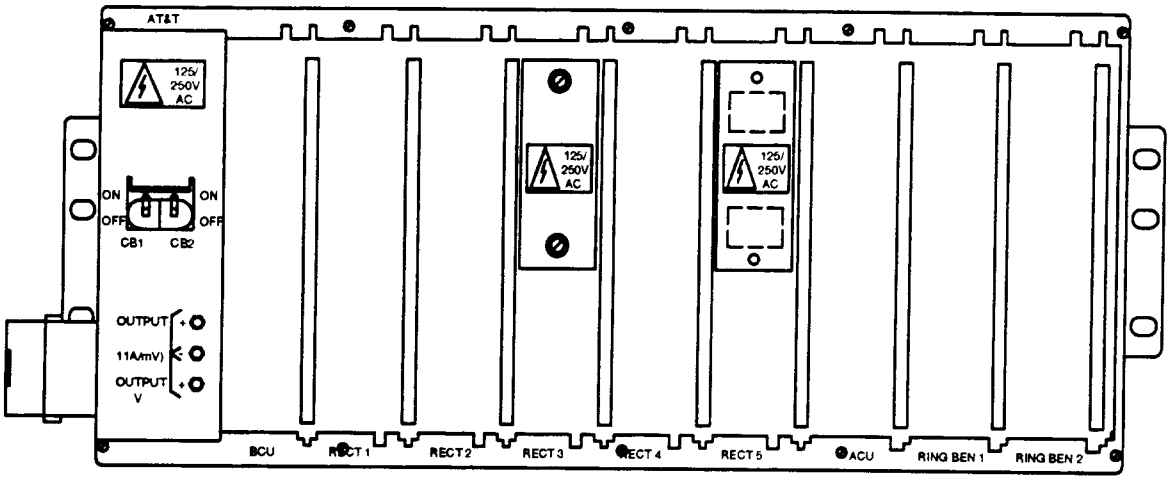


Figure 2 — J1C182BD Power Shelf

4. Condition DMM to measure DC volts.

5. Connect DMM test leads to **- (1A/mV)** and **+ (CURRENT V)** on the power shelf (bottom 2 jacks).

6. Does DMM indicate between –42 and –56 volts?

   If **YES,** then proceed to Step **12.**
   If **NO,** then continue with Step **7.**

7. Condition DMM to measure AC volts.

8. Operate AC power circuit breaker off and then back on.

9. Verify AC power is connected to **P112** on the side of the power shelf. Check for presence of 105 to 129 volts AC at TB1 rear of power shelf (pin3 neutral; pin1 θ1 RECTs 1, 2, 3; pin4 θ2 RECTs 4 and 5).

10. Is correct voltage present?

    If **YES,** then proceed to Step **11.**
    If **NO,** then **refer trouble to installation group.**

11. Check wiring on power shelf using SD-7C163-01. Repeat procedure from Step **4** after trouble is found and corrected.

12. Is another **336A RECTIFIER** to be installed?

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

13. Unseat **336A RECTIFIER**(s) installed previously.

14. Get another **336A RECTIFIER** and repeat from Step **2.**

15. Remove DMM test leads and reseat all **336A RECTIFIER**s.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install Ring Control Unit (RCU) in J1C182BD Power Shelf

SUMMARY: Install **RCU** into power shelf. Verify no fuses blown and no indicators lighted on **RCU**. Measure voltage at **–48V** and **GND**. Requirement: –43 to –56 V DC. Measure voltage at **+20HZA** and **GND**. Requirement: 50 to 60 V DC and 90 to 110 V AC. Measure voltage at **+20HZB** and **GND**. Requirement: 50 to 60 V DC and 90 to 110 V AC.

1. Get one **AUG3 RCU** (Figure 1) and inspect for possible physical damage.

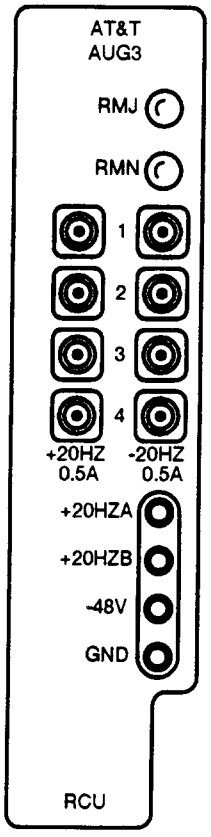


Figure 1 — Ring Control Unit (AUG3) Faceplate

2. Verify that each fuse holder on **RCU** faceplate contains an 80G (0.5A) fuse and that no fuses are blown. (Fuse bead will pop out when fuse is blown.)

3. Are any fuses blown?

   If **YES,** then continue with Step **4.**
   If **NO,** then proceed to Step **6.**

4. Use 553A extractor tool (COMCODE 997991575) (Techni-tool No. 594TE170) or 319B (KS-6305) extractor tool (COMCODE 100753904) (Techni-tool No. 490PL020) to remove blown fuses.

5. Install good 80G (0.5A) fuse in each empty fuse holder.

6. Install **RCU** into **RCU** slot in power shelf.

7. Do any fuses blow on **RCU**?

   If **YES,** then continue with Step **8.**
   If **NO,** then proceed to Step **14.**

8. Replace **RCU**. Do any fuses blow on **RCU**?

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

9. On power shelf on right-hand side, disconnect P140 output connector, then replace blown fuses on **RCU**.

10. Do any fuses blow on **RCU**?

    If **YES,** then proceed to Step **12.**
    If **NO,** then continue with Step **11.**

11. Refer to SD-7C158-01 to check connectors on 80A bulk-power cabinet and correct wiring problem. Repeat from Step **7.**

12. Use SD-7C163-01 to correct wiring problem in power shelf.

13. Reconnect J140 connectors and replace blown fuses on **RCU**. Repeat from Step **7.**

14. Is any indicator lighted on **RCU**?

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

15. Replace **RCU** and repeat from Step **7.**

16. Get DMM and condition it to measure DC volts.

17. Connect DMM test leads to **–48V** jack and **GND** jack on **RCU**.

18. Does meter indicate –43 to –56 volts?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **19.**

19. Replace **RCU** and repeat from Step **7.**

20. On **RCU** at **+20HZA** jack and **GND** jack (Figure 1), measure DC positive ringing.

    Requirement: Meter indicates between 50 and 60 volts.

21. Condition DMM to measure AC volts. Measure AC positive ringing at same jacks (**+20HZA** and **GND**).

    Requirement: Meter indicates between 90 and 110 volts.

22. Did meter indicate as required in Step **20** and Step **21**?

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

23. Replace **RCU** and repeat from Step **7.**

24. Have both **+20HZA** and **+20HZB** jacks been tested?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**
    If **NO,** then continue with Step **25.**

25. Condition DMM to measure DC volts and repeat from Step **20** for **+20HZB** jack.

Install 3H1 RINGING GENERATORs in J1C182BD Power Shelf

SUMMARY: Insert **3H1 RINGING GENERATOR** into **RING GEN1** slot in power shelf. Measure 90 to 110 V AC and –50 to –60 V DC at [**–20HZ (1), GRD**]. Unseat **RING GEN1**, install **RING GEN2** and repeat. Reseat **RING GEN1**. Verify that no **-20HZ RCU** fuses blow.

1. Get two **3H1 RINGING GENERATOR**s and inspect for possible physical damage.

2. Insert one **3H1 RINGING GENERATOR** into **RING GEN1** slot in power shelf.

3. Is **FAIL** indicator on **RING GEN1** lighted?

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

4. Replace **RING GEN1** and repeat the procedure from Step **3.** If replacement **FAIL** indicator lights, proceed to Step **9.**

5. Condition DMM to measure AC volts.

6. On **RING GEN1**, connect DMM test leads to **–20HZ** jack and **GND** jack.

   Response: DMM indicates between 90 and 110 volts.

7. Condition DMM to measure DC volts.

   Response: DMM indicates between –50 and –60 volts.

8. Is AC/DC ringing present on **RING GEN1**?

   If **NO,** then continue with Step **9.**
   If **YES,** then proceed to Step **10.**

9. Check wiring on power shelf connecting to **RING GEN1** using SD-7C163-01. Repeat procedure from Step **3** after locating and correcting trouble.

10. Condition DMM to measure DC volts.

11. On **RING GEN1**, connect DMM test leads to **–48V** jack and **GND** jack.

12. Does DMM indicate between –42 and –56 volts?

    If **NO,** then continue with Step **13.**
    If **YES,** then proceed to Step **14.**

13. Replace **RING GEN1** and repeat the procedure from Step **3**. If replacement **RING GEN1 –48V** voltage requirements are not met, proceed to Step **9.**

14. Did any **–20HZ** fuses blow on **RCU**?

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

15. Replace **RCU –20HZ** fuse. If replacement fuse blows, replace **RCU**.

    Reference: DLP-520

16. Have both **3H1 RINGING GENERATOR**s been tested?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **17.**

17. Unseat **RING GEN1**.

18. Insert second **3H1 RINGING GENERATOR** into **RING GEN2** slot in power shelf and repeat from Step **3.**

19. Reseat **RING GEN1**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install *Chloride* Batteries in 80A Cabinet Battery Compartment

SUMMARY: Inspect *Chloride* 3VB11 batteries for damage. Measure battery voltage (Requirement: minimum 6.2 V DC). Remove covers and connect cable assemblies to batteries. Replace covers. Put batteries in position and connect batteries together. Connect battery string cable to batteries **1** and **8**. Check battery string voltage (Requirement: minimum 49.5 V DC). Connect cable from battery string to power shelf. Repeat for second battery string to be installed.

1.

⚠ DANGER:
Batteries are electrically live (that is, have voltage on them) at all times and are capable of supplying high short circuit currents. Each battery comes with a plastic cover. Do not remove the cover until access to the terminals is required.

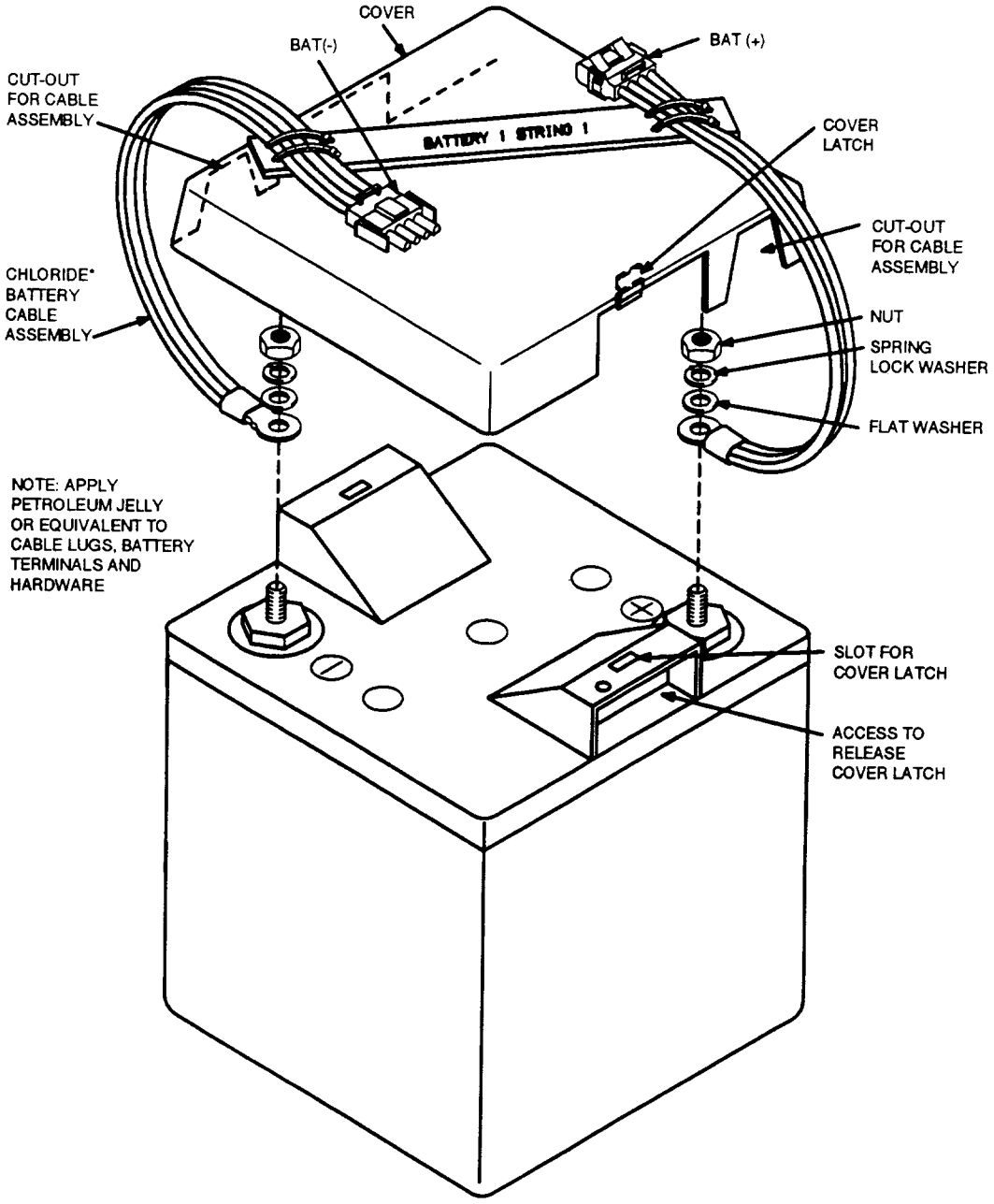
⚠ CAUTION:
Batteries should be handled carefully; the plastic container can be damaged if dropped. Never lift batteries by holding terminal posts.

Get eight *Chloride* 3VB11 (COMCODE 405890336) batteries (Figure 1) and hardware (but discard connecting straps). Get cable assemblies (shipped with cabinet as Group 62) for connecting batteries:

8 — *Chloride* battery cable assemblies (COMCODE 846279149) [includes positive battery cable **BAT (+),** negative battery cable **BAT (–),** and cable separator]

1 — patch cord **JMP(+)/JMP(–)** (COMCODE 846279107)

1 — battery string cable **STR1/BAT1(+)/BAT8(–)** (COMCODE 846279115).



*Registered trademark of Berlhert B.V. Corporation.

Figure 1 — Detail of *Chloride* Batteries and Cable Assembly

2. Visually inspect batteries for cracks, leakage, or other damage. Inspect cable assemblies for damage. Replace batteries or cables that appear damaged or defective.

3. Condition DMM to measure DC volts.

4. Measure terminal voltage of each battery. Does meter indicate 6.2 V DC or higher for each battery?

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

5. Replace any battery that measures less than 6.2 V DC.

6. ⚠ DANGER:
   Insulated tools must be used, and any rings, watches, bracelets, etc. must be removed when working on batteries.

⚠ CAUTION 1:
Do not loosen large hexagonal nut at bottom of each terminal. Doing so will release terminal seal and may cause permanent damage to battery.

⚠ CAUTION 2:
Battery covers have 2 latches, one on each side (in the handle) of the battery, accessed through battery handle opening. These latches must be depressed to remove cover, otherwise latches will break.

Remove battery covers and retain for fitting after battery cables are terminated. With permanent marker, mark each cable separator label with battery string identification.

7. Wipe battery terminals until clean and dry.

8. ⚠ CAUTION:
For proper connection, make sure flat side of cable lug is installed **first** *on battery post!*

   On cable assembly (Figure 1), connect **BAT (+)** cable to + (positive) terminal of battery by installing cable lug, flat washer, spring lock washer, and nut on battery post. **Use only open-end wrench supplied with battery to tighten nut** (which prevents overtightening). If no wrench is supplied, torque wrench may be used to tighten nut (8mm) to recommended fastening torque value of 4 foot-pounds (48 inch-pounds). Do not overtighten.

9. On cable assembly (Figure 1), connect **BAT (–)** cable to – (negative) terminal of battery by installing cable lug, plain washer, spring lock washer, and nut on battery post. **Use only open-end wrench supplied with battery to tighten nut** (which prevents overtightening). If no wrench is supplied, torque wrench may be used to tighten nut (8mm) to recommended fastening torque value of 4 foot-pounds (48 inch-pounds). Do not overtighten.

10. Double check connections to make sure they are correct.

11. Apply petroleum jelly or equivalent on terminal connections as needed to prevent corrosion.

12. Install plastic cover (removed in Step **6**) on battery. Remove cutouts in side wall of cover (Figure 1) as needed to fit over cable assembly.

13. Repeat from Step **7** for remaining batteries in battery string.

14. Use special key (modified hex key) and 216-tool to open doors to battery compartment (in cabinet skirt).

15. NOTE:
Connectors are "keyed" and must be properly oriented to be connected.

Connect patch cord (Figure 2) to **BAT (–)** connector of battery **5**.

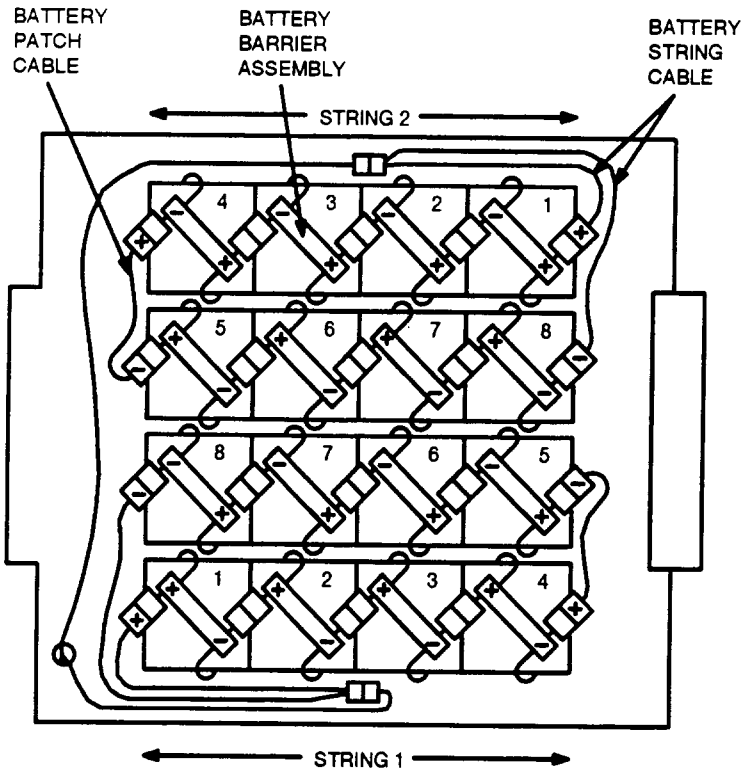


Figure 2 — *Chloride* Battery String Connections and Position in 80A Cabinet

16. As shown in Figure 2, place batteries **5** through **8** (with cable assemblies) in battery compartment in position for battery string 1 or 2.

17. ⚠ DANGER:
When connecting batteries together, be careful **not** *to connect together the positive and negative terminals of the* **same** *battery.*

Connect batteries together by plugging **BAT (–)** connector from one battery into **BAT (+)** connector from next battery (Figure 2).

18. Place batteries **1** through **4** in positions shown in Figure 2.

19. Connect other end of patch cord (Figure 2) to **BAT (+)** connector of battery **4**.

20. ⚠ DANGER:
When connecting batteries together, be careful **not** *to connect together the positive and negative terminals of the* **same** *battery.*

Connect batteries together by plugging **BAT (–)** connector from one battery into **BAT (+)** connector from next battery (Figure 2). Repeat for remaining batteries in battery string.

21. Connect battery string cable to battery string: plug **BAT1 (+)** (female) connector to **BAT (+)** connector from battery **1** and **BAT8 (–)** (male) connector to **BAT (–)** connector from battery **8**.

22. Condition DMM to measure DC volts. Measure battery string voltage at gray **STR( )** connector (across clips) of battery string cable.

23. Does meter indicate battery string voltage of 49.5 V DC (absolute) or higher?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Recheck battery connections for proper (positive to negative) sequence. Correct if necessary. If connections are correct, check individual battery voltage (can be measured through cover). Any battery that indicates less than 6.2 V DC should be replaced. If all batteries indicate less than 6.2 V DC, refresher charge may be necessary. Refer to manufacturer's instructions for refresher charge operation.

25. Connect together gray connectors on **STR( )** (1 or 2) battery string cable and **STR( )** (1 or 2) cable from the power shelf. Verify that battery cable **J140** is plugged in **P140** on the side of the power shelf.

26. Dress and secure cables to the top of the battery compartment as necessary to keep them above batteries (in case of flood).

27. ⇛ NOTE:
    To measure battery string voltage accurately, disconnect any battery strings other than battery string being measured. [To disconnect other battery strings, unplug **STR( )** battery string cable connector (gray) from **STR( )** battery cable connector (gray) from power shelf.]

    On power shelf connect DMM to **1A/mV** and **OUTPUT V +** (bottom 2 jacks). Turn AC circuit breaker off.

28. Does meter indicate battery string voltage of 49.5 V DC or higher?

    If **YES,** then proceed to Step **30.**
    If **NO,** then continue with Step **29.**

29. Check the four 30 amp fuses on the **AUG4 BIU**. Visually inspect cable assembly between power shelf and battery string. Replace cable assembly fuse and/or cable assembly and **AUG4 BIU** until meter indicates correct voltage.

30. Is this the last battery string to be installed?

    If **YES,** then proceed to Step **31.**
    If **NO,** then repeat from Step **1** for next battery string.

31. Reconnect any battery strings disconnected for battery string voltage measurement. Turn AC circuit breaker on. Close and secure doors to battery compartment.

    Comment: Battery current can be measured on the **AUG4 BIU** by measuring millivolts DC between + and - for battery string 1 or 2. One millivolt DC corresponds to 1 amp DC. A positive reading (+ to - with the common meter lead in -) indicates the batteries are being charged.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Install Lineage 2000 VR Series Batteries in 80A Cabinet Battery Compartment

SUMMARY: Unpack and visually inspect the batteries for damage. Measure the voltage of each battery. Requirement: 4.20 V DC or higher. Place batteries in the battery compartment (Figure 1). Coat interbattery bus bars with NO-OXid grease. Connect the batteries together with the bus bar as shown in Figure 2. Connect battery string cable to batteries 1 and 12. Check the battery string voltage, note polarity and voltage (Requirement: minimum 50.4 V DC). Connect cable from power shelf to battery string cable. Repeat for second battery string to be installed.

1.

⚠ DANGER 1:
Batteries are electrically live (that is, have voltage on them) at all times and are able to supply several thousand amperes short circuit current. Great care should be exercised to avoid short circuiting the battery terminals. Insulated tools must be used; any rings, watches, bracelets, etc. must be removed when working on batteries.

⚠ DANGER 2:
Any contact of electrolyte with skin or clothing should be avoided. If contact occurs, the electrolyte can be neutralized by flushing with plenty of water. If electrolyte enters the eye, immediately flush the eye with water and seek medical help. If the batteries appear damaged in shipping, protective rubber apron, rubber gloves and goggles should be worn by persons handling the batteries.

⚠ CAUTION:
The Lineage 2000 VR Series battery is valve regulated, starved electrolyte lead acid cell. Should the case crack, it is possible that small amount of electrolyte (one ounce) could leak out. The electrolyte is sulfuric acid and should be handled as highly corrosive material. No battery installation should be attempted unless the installer has ready access to several gallons of water and a package of baking soda. Baking soda or solution of baking soda and water

may be used to neutralize small amounts of electrolyte.

Get equipment for installation:

- (1) ED-83242-30, G3 which consists of 12 Lineage 2000 VR series batteries, 11 interbattery bus bars, twenty-four 1/4-inch lock washers, twenty-four 1/4-inch nuts, a container of the NO-OXid grease and a form 1285 (all these items are supplied with the batteries).
- (1) battery string cable (COMCODE 846278224, one for each battery string) (shipped with the cabinet as Group 63).
- torque wrench (range between 30 inch-pound and 200 inch-pound) with insulated handle (or insulate the handle with electrical tape).
- 7/16-inch socket (for the 1/4-20 nut).

2. Unpack the batteries and inspect for physical damage. Do not install any cell that appears to be damaged. Any cell that has leaked electrolyte should be considered defective.

3. Condition DMM to measure DC volts.

4. Measure the terminal voltage of each battery. Does meter indicate 4.20 V DC or higher for each battery?

   If **YES**, then proceed to Step **6.**

   If **NO**, then continue with Step **5.**

5. Replace any battery that measures less than 4.20 V DC.

6. Wipe battery terminals until clean and dry.

7. Use special hex key (modified hex key) and 216-tool to open the battery compartment doors.

8. Place all 12 batteries in the battery compartment as shown in Figure 1.

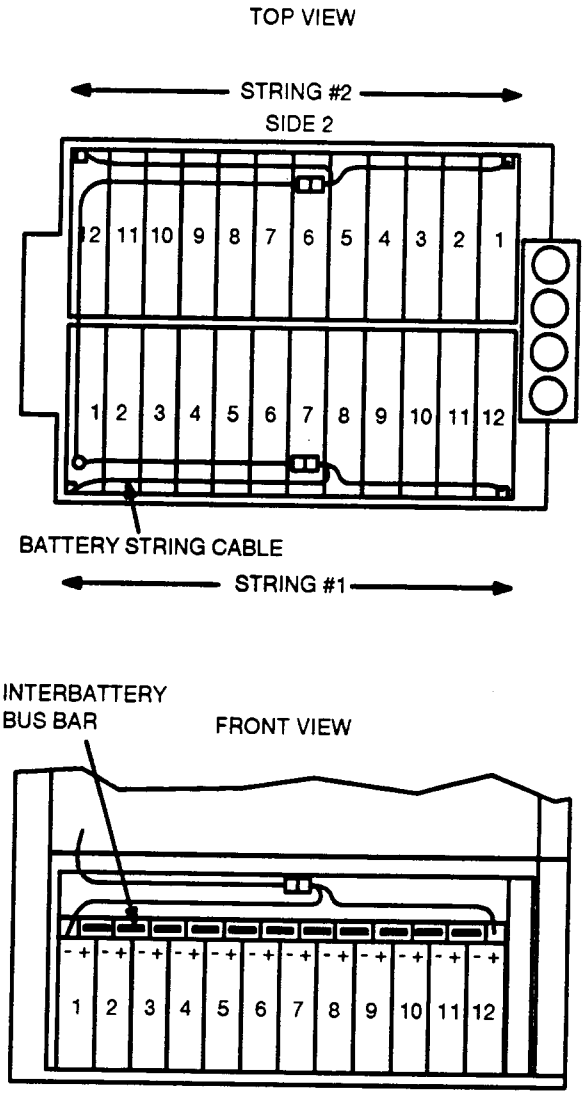


Figure 1 — Layout of Lineage 2000 VR Series Batteries in 80A Cabinet

9. Coat interbattery bus bars with NO-OXid grease and install on the batteries as shown in Figure 2. Install 1/4 inch lock washer and nut on battery post. Using insulated torque wrench with the socket, tighten nut to 55 inch-pounds torque. Repeat for each battery post until all 12 batteries are connected together.

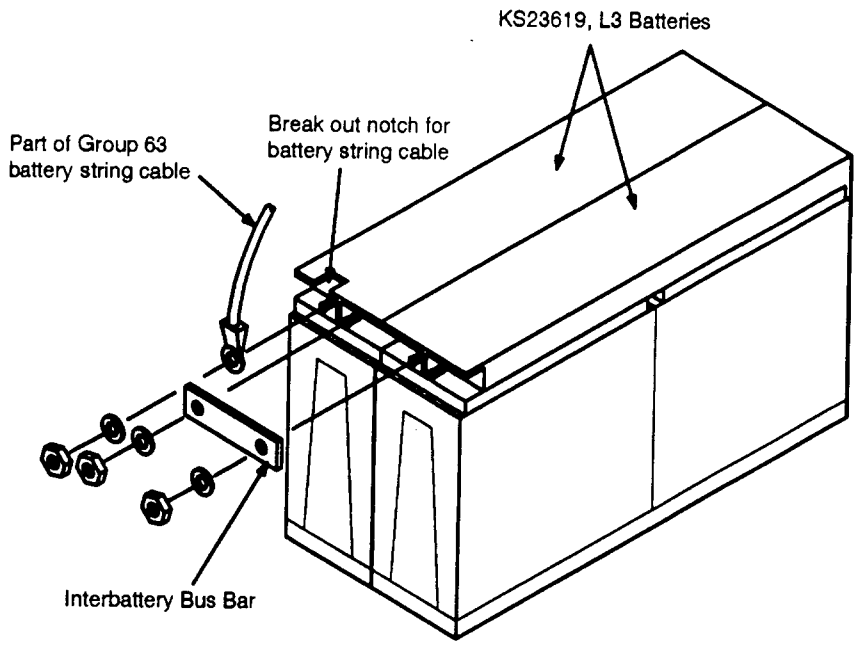


Figure 2 — Battery String Connections for Lineage 2000 VR Series Batteries

10. Cut a notch in the cover of the battery No. 1 (above "–" battery post) and battery No. 12 (above "+" battery post) (see Figure 2). This is required to install the battery string cable.

11. Connect the battery string cable to battery No. 1 by terminating the lug marked **BAT 1 (–)** to the "–" (negative) battery post of the first battery in the string (Figure 2). Connect the battery string cable to battery No. 12 by terminating the lug marked **BAT 12 (+)** to the "+" (positive) battery post of the 12th battery as shown in Figure 2. Install the lock washer and nut on the battery posts. Use insulated torque wrench to tighten the nuts to 55 inch-pounds torque.

12. Coat each battery connection with NO-OXid grease.

13. Condition DMM to measure DC volts. Measure battery string voltage at the connector (marked **STR** "+" and "–") at the end of the battery string cable. Make sure measured polarity corresponds with polarity indicated on connector.

14. Does meter indicate battery string voltage –50.4 V DC or higher?

    If **YES**, then proceed to Step **16.**

    If **NO**, then continue with Step **15.**

15. Make sure that there are 12 batteries in the string. Recheck battery connections and correct if necessary. If connections are correct, check individual battery voltage. Any battery that indicates less than 4.20 V DC should be replaced.

16. Connect the battery string cable **STR** connector to the connector designated **STR( )** (1 or 2) on the end of the battery cable located in the battery compartment. Verify battery cable **J140** is plugged in **P140** on the side of the power shelf.

17. Dress cables in the battery compartment.

18. NOTE:
    To measure the battery string voltage accurately, disconnect any battery strings other than battery string being measured. [To disconnect other battery strings, unplug the battery string cable connector marked ***STR*** from the battery cable connector marked ***STR( ).***]

On power shelf connect DMM to **1A/mV** and **OUTPUT V +** (bottom 2 jacks). Turn AC circuit breaker off.

19. Does meter indicate battery string voltage of 50.4 V DC or higher?

    If **YES**, then proceed to Step **21.**

    If **NO**, then continue with Step **20.**

20. Check the four 30 Amp fuses on the **AUG4 BIU**. Visually inspect cable assembly between power shelf and battery string. Replace cable assembly fuse and/or cable assembly and **AUG4 BIU** until meter indicates correct voltage.

21. Is this the last battery string to be installed?

    If **YES**, then proceed to Step **22.**

    If **NO**, then repeat from Step **1** for next battery string to be installed.

22. Disconnect test equipment. Reconnect any battery strings disconnected for voltage measurement. Turn AC breaker on. Close and lock battery compartment door.

    Comment: Battery current can be measured on the **AUG4 BIU** by measuring millivolts DC between + and - for battery string 1 or 2. One millivolt DC corresponds to 1 amp DC. A positive reading (+ to - with the common meter lead in -) indicates the batteries are being charged.

23. Between one and three hours after the rectifiers are installed, measure the voltage of each battery in the string and record on form 1285 supplied with the batteries. Meter should indicate between 4.44 V DC and 4.64 V DC for each battery. Any battery outside this limit should be measured again within one week. If it is still outside the limit, replace battery.

STOP YOU HAVE COMPLETED THIS PROCEDURE.

Install *Chloride* Batteries in 80E Cabinet Battery Compartment

SUMMARY: Inspect *Chloride* 3VB11 batteries for damage. Measure battery voltage (Requirement: minimum 6.2 V DC). Remove covers and connect cable assemblies to batteries. Replace covers. Put batteries in position and connect batteries together. Connect battery string cable to batteries **1** and **8**. Check battery string voltage (Requirement: minimum 49.5 V DC). Connect cable from control and distribution panel to battery string cable. Repeat for each battery string to be installed.

1.

⚠ DANGER:
Batteries are electrically live (that is, have voltage on them) at all times and are capable of supplying high short circuit currents. Each battery comes with a plastic cover. Do not remove the cover until access to the terminals is required.

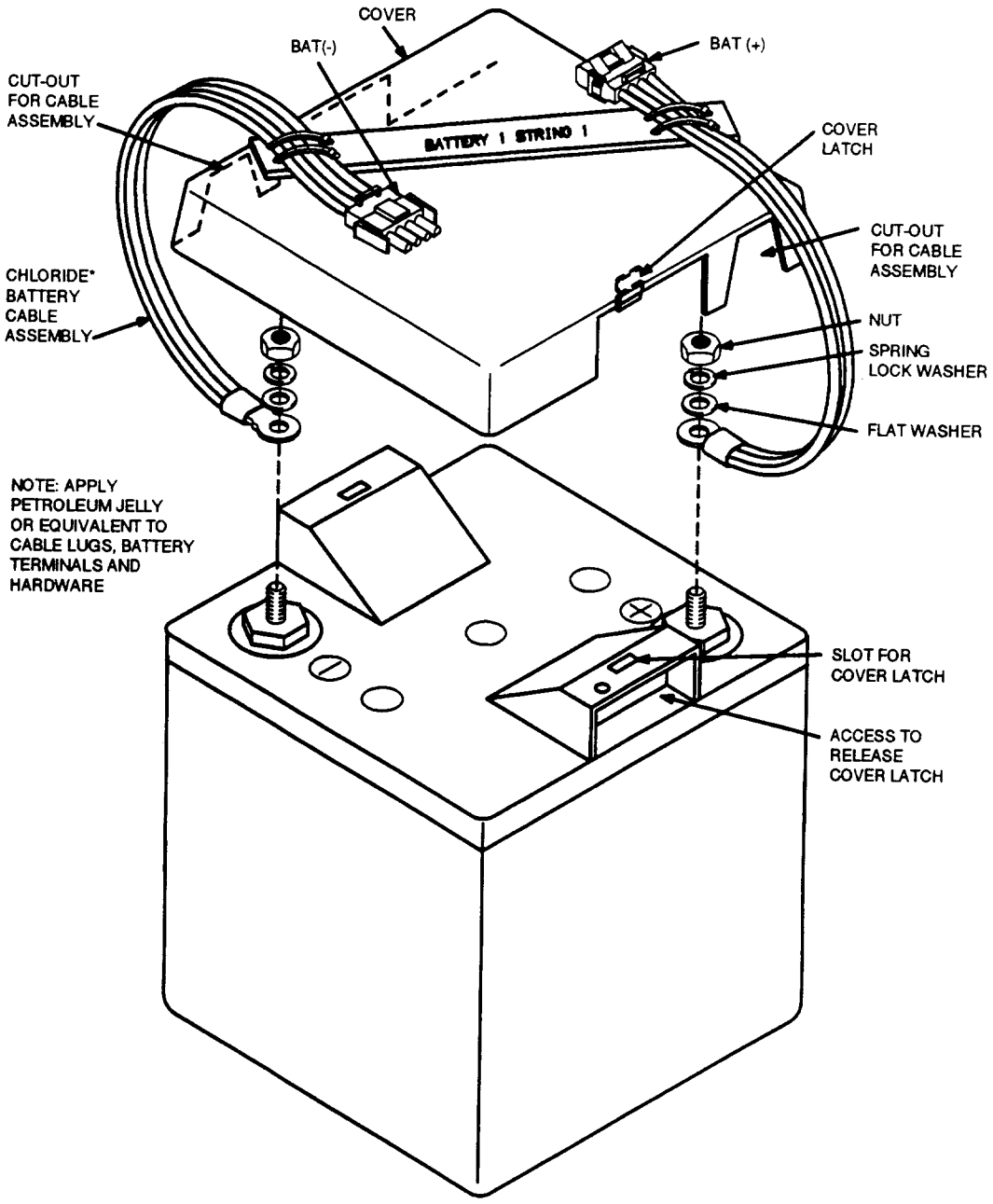
⚠ CAUTION:
Batteries should be handled carefully; the plastic container can be damaged if dropped. Never lift batteries by holding terminal posts.

Get eight *Chloride* 3VB11 (COMCODE 405890336) batteries (Figure 1) and hardware (but discard connecting straps). Get cable assemblies (shipped with cabinet as Group 62) for connecting batteries:

8 — *Chloride* battery cable assemblies (COMCODE 846279149) [includes positive battery cable **BAT (+),** negative battery cable **BAT (–),** and cable separator]

1 — patch cord **JMP(+)/JMP(–)** (COMCODE 846279107)

1 — battery string cable **STR1/BAT1(+)/BAT8(–)** (COMCODE 846279115).



*Registered trademark of Berlhert B.V. Corporation.

Figure 1 — Detail of *Chloride* Batteries and Cable Assembly

2. Visually inspect batteries for cracks, leakage, or other damage. Inspect cable assemblies for damage. Replace batteries or cables that appear damaged or defective.

3. Condition DMM to measure DC volts.

4. Measure terminal voltage of each battery. Does meter indicate 6.2 V DC or higher for each battery?

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

5. Replace any battery that measures less than 6.2 V DC.

6. ⚠ DANGER:
   Insulated tools must be used, and any rings, watches, bracelets, etc. must be removed when working on batteries.

⚠ CAUTION 1:
Do not loosen large hexagonal nut at bottom of each terminal. Doing so will release terminal seal and may cause permanent damage to battery.

⚠ CAUTION 2:
Battery covers have 2 latches, one on each side (in the handle) of the battery, accessed through battery handle opening. These latches must be depressed to remove cover, otherwise latches will break.

Remove battery covers and retain for fitting after battery cables are terminated. With permanent marker, mark each cable separator label with battery string identification.

7. Wipe battery terminals until clean and dry.

8. ⚠ CAUTION:
For proper connection, make sure flat side of cable lug is installed **first** *on battery post!*

   On cable assembly (Figure 1), connect **BAT (+)** cable to + (positive) terminal of battery by installing cable lug, flat washer, spring lock washer, and nut on battery post. **Use only open-end wrench supplied with battery to tighten nut** (which prevents overtightening). If no wrench is supplied, torque wrench may be used to tighten nut (8mm) to recommended fastening torque value of 4 foot-pounds (48 inch-pounds). Do not overtighten.

9. On cable assembly (Figure 1), connect **BAT (–)** cable to – (negative) terminal of battery by installing cable lug, plain washer, spring lock washer, and nut on battery post. **Use only open-end wrench supplied with battery to tighten nut** (which prevents overtightening). If no wrench is supplied, torque wrench may be used to tighten nut (8mm) to recommended fastening torque value of 4 foot-pounds (48 inch-pounds). Do not overtighten.

10. Double check connections to make sure they are correct.

11. Apply petroleum jelly or equivalent on terminal connections as needed to prevent corrosion.

12. Install plastic cover (removed in Step **6**) on battery. Remove cutouts in side wall of cover (Figure 1) as needed to fit over cable assembly.

13. Repeat from Step **7** for remaining batteries in battery string.

14. Use special key (modified hex key) and 216-tool to open doors to battery compartment (in cabinet skirt).

15. NOTE:
Connectors are "keyed" and must be properly oriented to be connected.

Connect patch cord (Figure 2) to **BAT (–)** connector of battery **3** (or battery **2** for string 2 or 4).

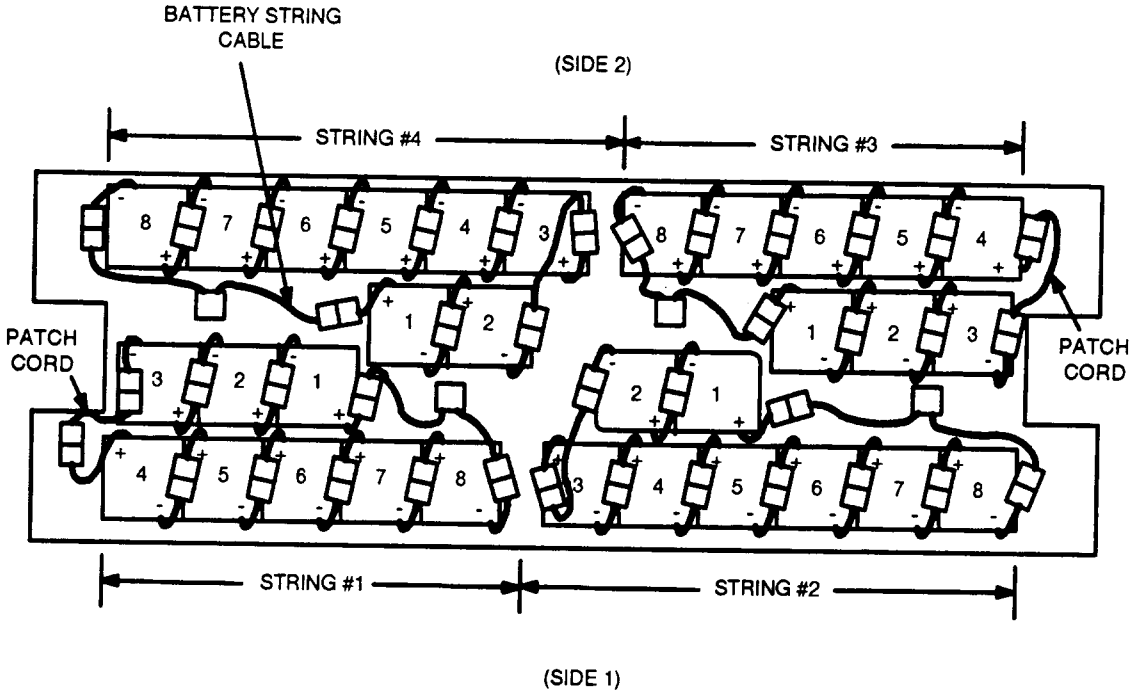
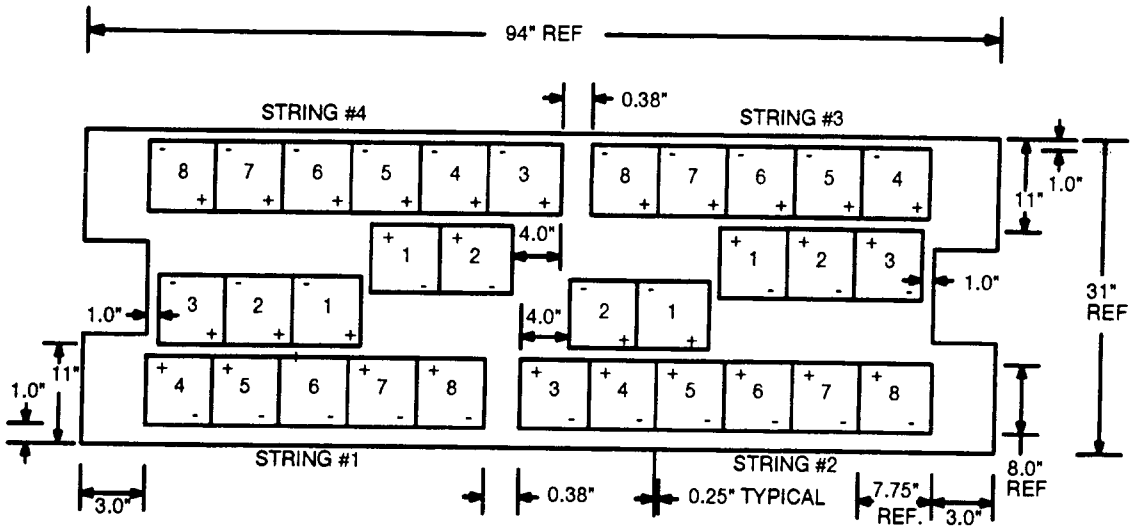


Figure 2 — RT Battery Strings and Connections

16. As shown in Figure 3, place batteries **1**, **2**, and **3** (with cable assemblies) in battery compartment in position for battery string 1 or 3. For battery string 2 or 4, place only batteries **1** and **2** in position (Figure 3). Place batteries as close as possible to reference measurements.



NOTE: DETAILS NOT SHOWN FOR CLARITY.

Figure 3 — Positions of RT Batteries in 80E Cabinet Battery Compartment

17. ⚠ DANGER:
When connecting batteries together, be careful **not** *to connect together the positive and negative terminals of the* **same** *battery.*

Connect batteries together by plugging **BAT (–)** connector from one battery into **BAT (+)** connector from next battery (Figure 2).

18. For battery string 1 or 3, place batteries **4** through **8** in positions shown in Figure 3. For battery string 2 or 4, place batteries **3** through **8** in position.

19. Connect other end of patch cord (Figure 2) to **BAT (+)** connector of battery **4** (or battery **3** for string 2 or 4).

20.

⚠ DANGER:
When connecting batteries together, be careful **not** *to connect together the positive and negative terminals of the* **same** *battery.*

Connect batteries together by plugging **BAT (–)** connector from one battery into **BAT (+)** connector from next battery (Figure 2). Repeat for remaining batteries in battery string.

21. Connect battery string cable to battery string: plug **BAT1 (+)** (female) connector to **BAT (+)** connector from battery **1** and **BAT8 (–)** (male) connector to **BAT (–)** connector from battery **8**.

22. Condition DMM to measure DC volts. Measure battery string voltage at gray **STR( )** connector (across clips) of battery string cable.

23. Does meter indicate battery string voltage of 49.5 V DC (absolute) or higher?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Recheck battery connections for proper (positive to negative) sequence. Correct if necessary. If connections are correct, check individual battery voltage (can be measured through cover). Any battery that indicates less than 6.2 V DC should be replaced. If all batteries indicate less than 6.2 V DC, refresher charge may be necessary. Refer to manufacturer's instructions for refresher charge operation.

25.

⚠ DANGER:
After connectors are mated, power bus will be "live" (that is, have voltage on it).

Connect together gray connectors on **STR( )** (1, 2, 3, or 4) battery string cable and **STR( )** (1, 2, 3, or 4) cable from control and distribution panel.

26. Dress and secure cables to the top of the battery compartment as necessary to keep them above batteries (in case of flood).

27.

NOTE:
To measure battery string voltage accurately, disconnect any battery strings other than battery string being measured. [To disconnect other battery strings, unplug **STR( )** battery string cable connector (gray) from **STR( )** battery cable connector (gray) from control and distribution panel.]

On control and distribution panel (Figure 4), connect DMM to **BAT( )** (1, 2, 3, or 4) test point and **PVR** test point for battery string being installed.

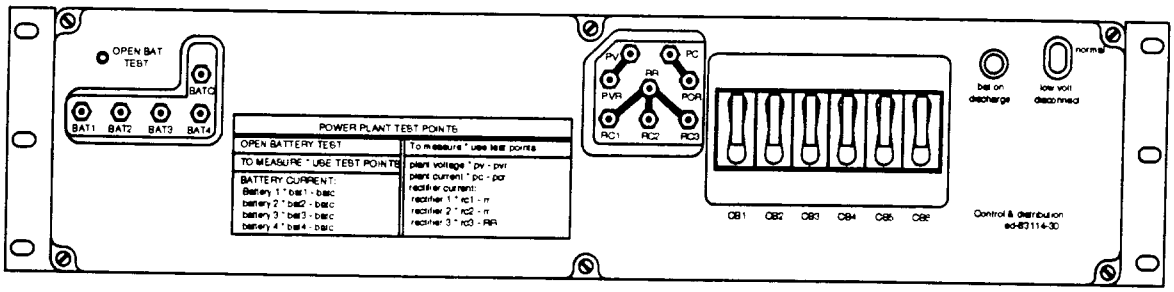


Figure 4 — Control and Distribution Panel

28. Does meter indicate battery string voltage of 49.5 V DC or higher?

    If **YES,** then proceed to Step **30.**
    If **NO,** then continue with Step **29.**

29. Visually inspect cable assembly between control and distribution panel and battery string. Replace cable assembly fuse and/or cable assembly until meter indicates correct voltage.

30. Is this the last battery string to be installed?

    If **YES,** then proceed to Step **31.**
    If **NO,** then repeat from Step **1** for next battery string.

31. Reconnect any battery strings disconnected for battery string voltage measurement. Close and secure doors to battery compartment.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Install Lineage 2000 VR Series Batteries in 80E Cabinet Battery Compartment

SUMMARY: Unpack and visually inspect the batteries for damage. Measure the voltage of each battery. Requirement: 4.20 V DC or higher. Place batteries in the battery compartment (Figure 1). Coat inter-battery bus bars with NO-OXid grease. Connect the batteries together with the bus bar as shown in Figure 2. Connect battery string cable to batteries 1 and 12. Check the battery string voltage, note polarity and voltage (Requirement: minimum 50.4 V DC). Connect cable from control and distribution panel to battery string cable. Repeat for each battery string to be installed.

1.

⚠ DANGER 1:
Batteries are electrically live (that is, have voltage on them) at all times and are able to supply several thousand amperes short circuit current. Great care should be exercised to avoid short circuiting the battery terminals. Insulated tools must be used; any rings, watches, bracelets, etc. must be removed when working on batteries.

⚠ DANGER 2:
Any contact of electrolyte with skin or clothing should be avoided. If contact occurs, the electrolyte can be neutralized by flushing with plenty of water. If electrolyte enters the eye, immediately flush the eye with water and seek medical help. If the batteries appear damaged in shipping, protective rubber apron, rubber gloves and goggles should be worn by persons handling the batteries.

⚠ CAUTION:
The Lineage 2000 VR Series battery is valve regulated, starved electrolyte lead acid cell. Should the case crack, it is possible that small amount of electrolyte (one ounce) could leak out. The electrolyte is sulfuric acid and should be handled as highly corrosive material. No battery installation should be attempted unless the

installer has ready access to several gallons of water and a package of baking soda. Baking soda or solution of baking soda and water may be used to neutralize small amounts of electrolyte.

Get equipment for installation:

- (1) ED-83242-30, G3 which consists of 12 Lineage 2000 VR series batteries, 11 interbattery bus bars, twenty-four 1/4-inch lock washers, twenty-four 1/4-inch nuts, a container of the NO-OXid grease and a form 1285 (all these items are supplied with the batteries).
- (1) battery string cable (COMCODE 846278224, one for each battery string) (shipped with the cabinet as Group 63).
- torque wrench (range between 30 inch-pounds and 200 inch-pounds) with insulated handle (or insulate the handle with electrical tape).
- 7/16-inch socket (for the 1/4-20 nut).

2. Unpack the batteries and inspect for physical damage. Do not install any cell that appears to be damaged. Any cell that has leaked electrolyte should be considered defective.

3. Condition DMM to measure DC volts.

4. Measure the terminal voltage of each battery. Does meter indicate 4.20 V DC or higher for each battery?

   If **YES**, then proceed to Step **6.**

   If **NO**, then continue with Step **5.**

5. Replace any battery that measures less than 4.20 V DC.

6. Wipe battery terminals until clean and dry.

7. Use special hex key (modified hex key) and 216-tool to open the battery compartment doors.

8. Place all 12 batteries in the battery compartment as shown in Figure 1.

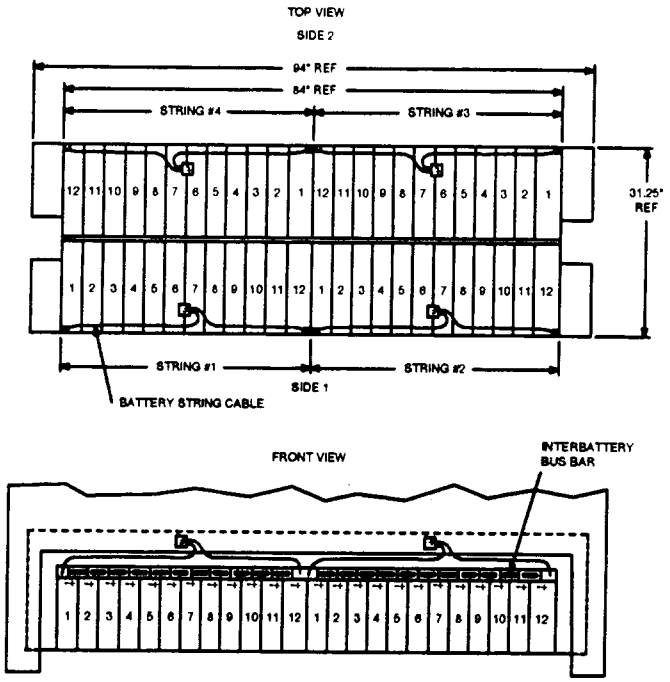


Figure 1 — Layout of Lineage 2000 VR Series Batteries in 80E Cabinet

9. Coat inter-battery bus bars with NO-OXid grease and install on the batteries as shown in Figure 2. Install 1/4 inch lock washer and nut on battery post. Using insulated torque wrench with the socket, tighten nut to 55 inch-pounds torque. Repeat for each battery post until all 12 batteries are connected together.

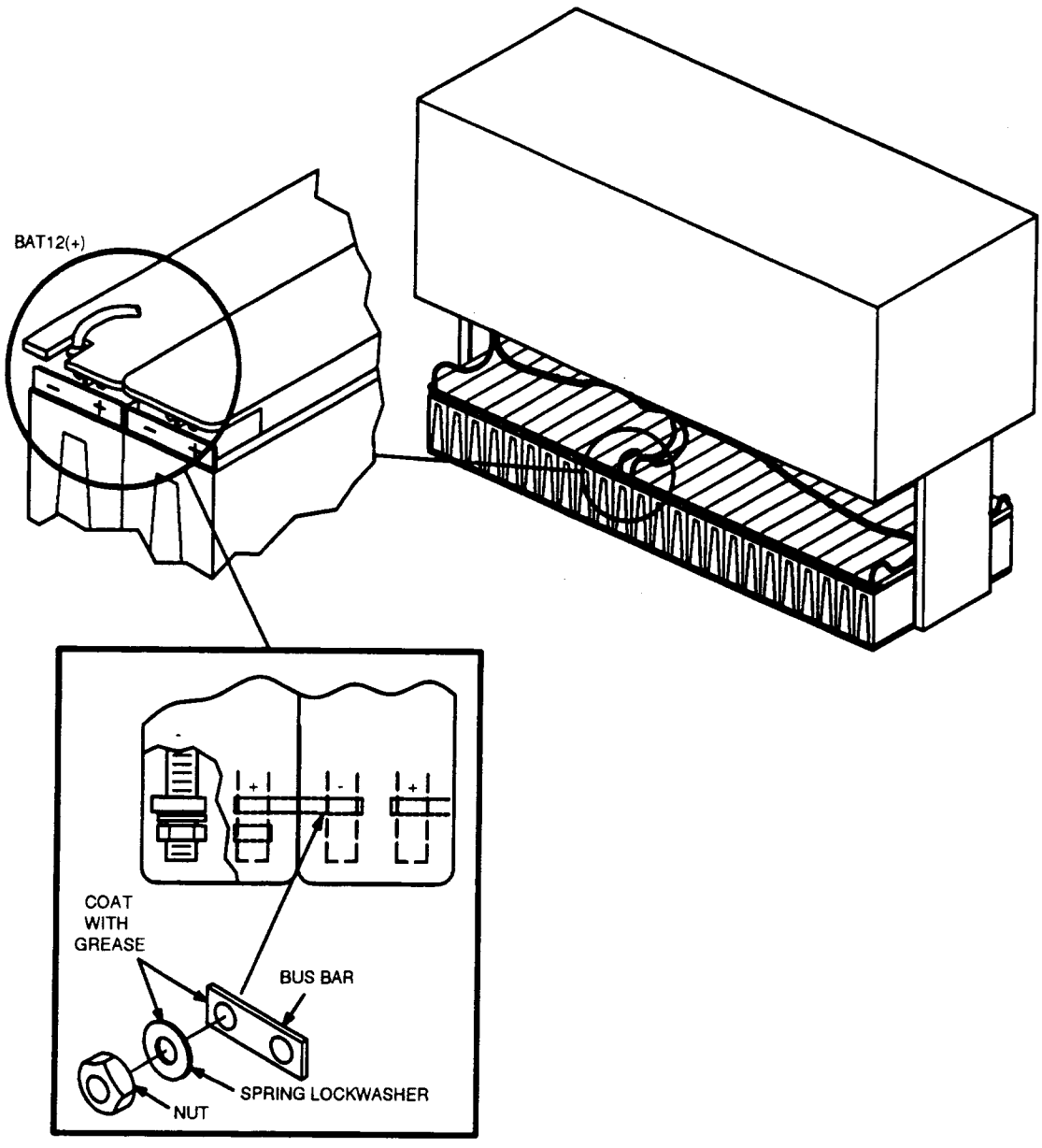


Figure 2 — Battery String Connections for Lineage 2000 VR Series Batteries

10. Cut a notch in the cover of the battery No. 1 (above "–" battery post) and battery No. 12 (above "+" battery post) (see Figure 2). This is required to install the battery string cable.

11. Connect the battery string cable to battery No. 1 by terminating the lug marked **BAT 1 (–)** to the "–" (negative) battery post of the first battery in the string (Figure 2). Connect the battery string cable to battery No. 12 by terminating the lug marked **BAT 12 (+)** to the "+" (positive) battery post of the 12th battery as shown in Figure 2. Install the lock washer and nut on the battery posts. Use insulated torque wrench to tighten the nuts to 55 inch-pounds torque.

12. Coat each battery connection with NO-OXid grease.

13. Condition DMM to measure DC volts. Measure battery string voltage at the connector (marked **STR** "+" and "–") at the end of the battery string cable. Make sure measured polarity corresponds with polarity indicated on connector.

14. Does meter indicate battery string voltage between –50.4 V DC and –51.4 V DC?

    If **YES**, then proceed to Step **16.**

    If **NO**, then continue with Step **15.**

15. Make sure that there are 12 batteries in the string. Recheck battery connections and correct if necessary. If connections are correct, check individual battery voltage. Any battery that indicates less than 4.20 V DC should be replaced.

16.

⚠ DANGER:
After the connector from the control and distribution panel is mated with the connector from the battery string cable, the power bus on the control and distribution panel will be "live" (that is, have voltage on it).

Connect the battery string cable **STR** connector to the connector designated **STR( )** (1, 2, 3 or 4) on the end of the battery cable located in the battery compartment.

17. Dress cables in the battery compartment.

18.

⇒ NOTE:
To measure the battery string voltage accurately, disconnect any battery strings other than battery string being measured. [To disconnect other battery strings, unplug the battery string cable connector marked **STR** from the battery cable connector marked **STR( ).**]

On control and distribution panel, connect DMM to **BAT( )** (1, 2, 3 or 4) test point and **PVR** test point for battery string being installed.

19. Does meter indicate battery string voltage of 50.4 V DC or higher?

If **YES**, then proceed to Step **21.**

If **NO**, then continue with Step **20.**

20. Visually inspect cable assembly between control and distribution panel and battery string. Replace cable assembly fuse and/or cable assembly until meter indicates correct voltage.

21. Is this the last battery string to be installed?

    If **YES**, then proceed to Step **22.**

    If **NO**, then repeat from Step **1** for next battery string to be installed.

22. Disconnect test equipment. Reconnect any battery strings disconnected for voltage measurement. Close and lock battery compartment door.

23. Between one and three hours after the rectifiers are installed, measure the voltage of each battery in the string and record on form 1285 supplied with the batteries. Meter should indicate between 4.44 V DC and 4.64 V DC for each battery. Any battery outside this limit should be measured again within one week. If it is still outside the limit, replace battery.

STOP YOU HAVE COMPLETED THIS PROCEDURE.

Verify Connections to ED-83114-30 Control and Distribution Panel

SUMMARY: Verify that AC power is off. Verify that power and ground cables are connected. Verify that connections on AYK1 and AYK2 circuit packs. Verify rectifier control cable connections to control and distribution panel. Verify battery installation.

1. On AC power panel, verify that AC power (utility) **CB1** circuit breaker is off and **CB6** (R1), **CB7** (R2), and **CB8** (R3), circuit breakers (for AC feeders to rectifier shelf) are also off (Figure 1).

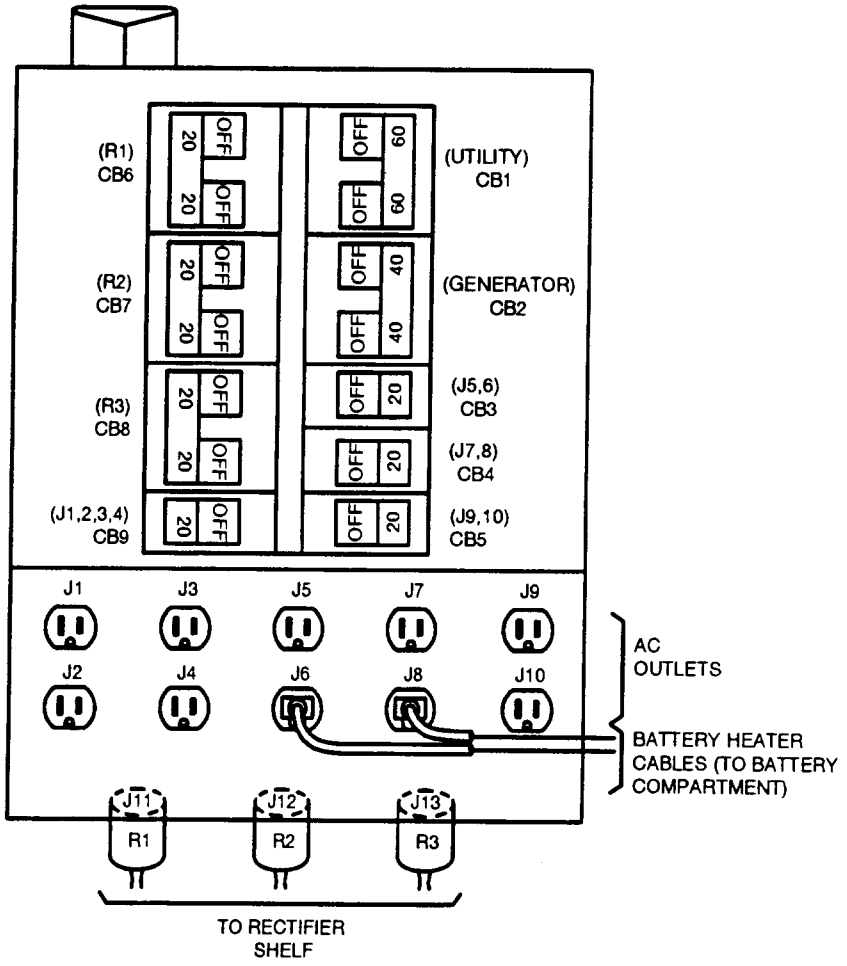


Figure 1 — AC Power Panel in ED-7C703-30 80E Cabinet

2. Verify that no power units are installed.

3. Remove cover from control and distribution panel (Figure 2).

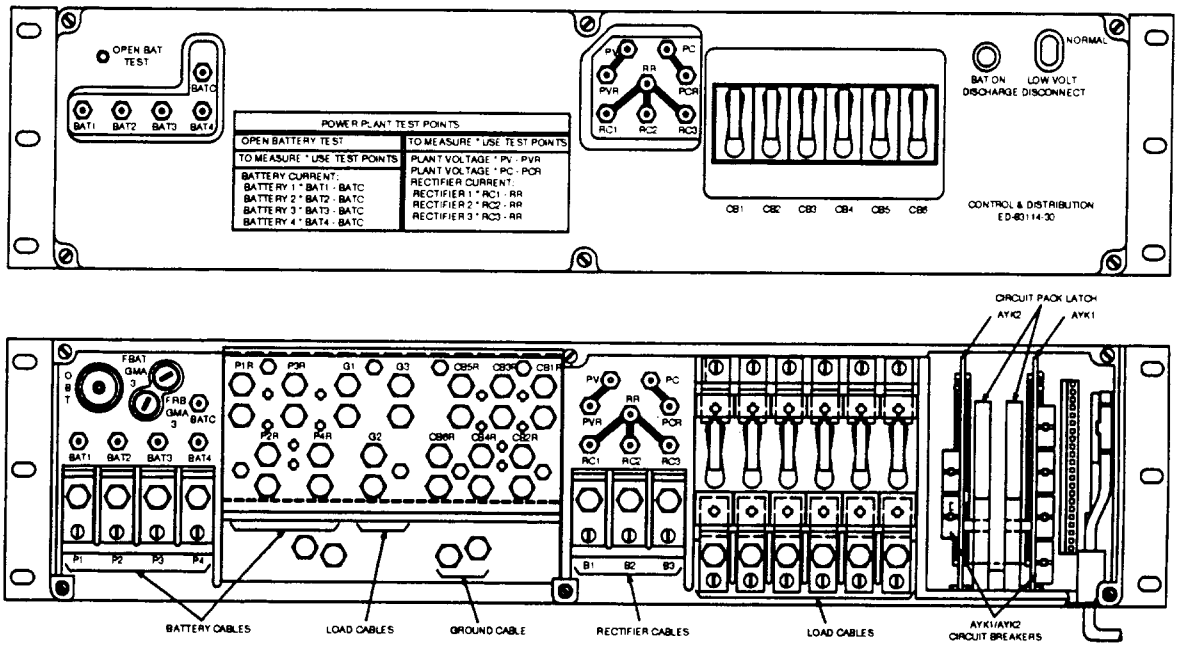


Figure 2 — Connections to Control and Distribution Panel

4. Verify that rectifier cables are connected to **B1**, **B2**, and **B3** terminals (Figure 2). Verify that rectifier return ground cables are connected to **G1**, **G2**, and **G3** terminals (Figure 2).

5. Verify that at least one battery string is connected to control and distribution panel [in battery compartment, make sure **STR( )** connector is connected to battery string]. Condition DMM to measure DC volts. Measure battery string voltage at **BAT( )** test point and **PVR** test point: meter will indicate 50.00 V DC or more if battery string is connected.

6. Unseat (but do not remove) AYK1 circuit pack (Figure 3). Verify that rectifier control cables are connected with connectors firmly seated in **J3**, **J2**, and **J1** sockets (Figure 3).

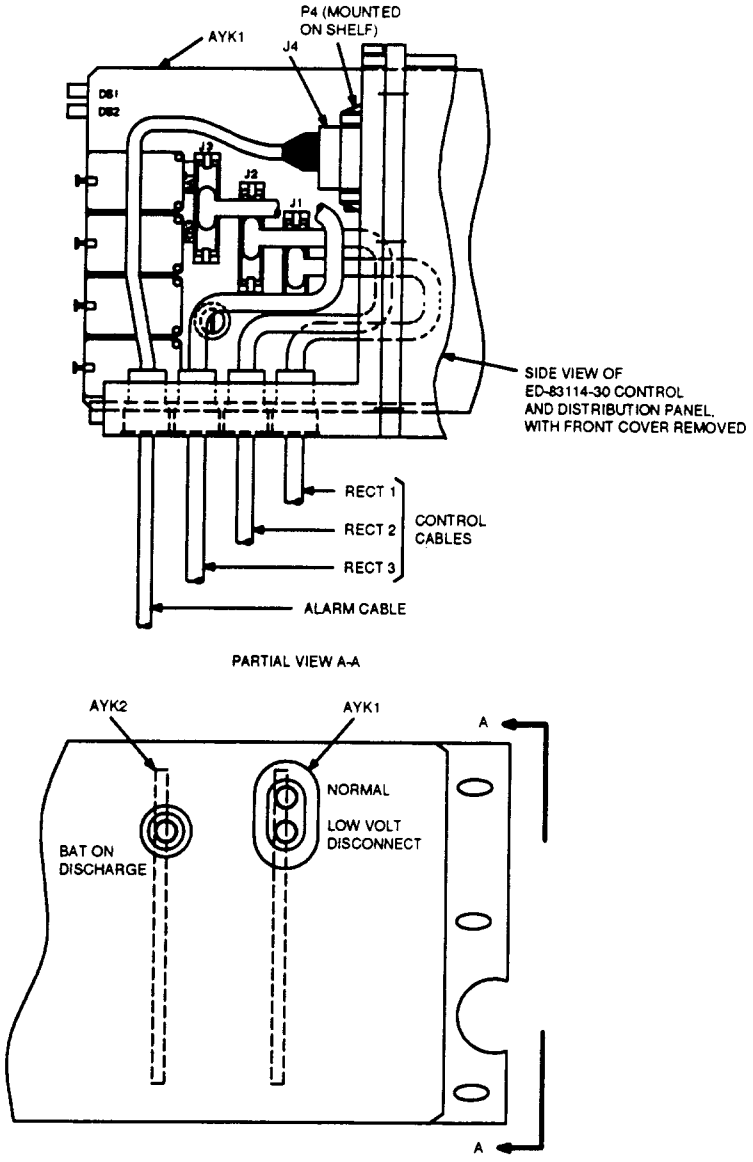


Figure 3 — AYK1 Circuit Pack Mounted in Control and Distribution Panel

7. Reseat AYK1 circuit pack. Verify that AYK1 and AYK2 circuit packs are fully seated. On AYK1 and AYK2, verify that all circuit breakers are set (pins pushed in).

8. On right-hand side of shelf (Figure 3), verify that alarm cable is connected with **J4** connector firmly seated in **P4** socket (Figure 3).

9. ⇛ NOTE:
   The **FBAT** and **FRB** fuses are factory installed and should not be removed.

   On control and distribution panel, verify that **FBAT** and **FRB** fuse holders are installed. On inside of panel cover, verify spare fuses are present and properly installed in fuse holders.

10. Replace cover on control and distribution panel.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Install and Test Power Units in Rectifier Shelf

SUMMARY: Install CS787B540 power units. Connect AC input and turn on AC power. On power units, measure float voltage. Requirement: between –54.3 V DC and –54.7 V DC. Connect output and control cables to power units. Requirement: **NORMAL** indicator lighted on control and distribution panel. Measure power unit output voltage. Requirement: between –54.3 V DC and –54.7 V DC. On control and distribution panel, turn on **CB( )** circuit breaker(s) for systems to be installed.

1. On AC power panel, verify that AC power **CB1** (utility) circuit breaker is off and **CB6**, **CB7**, and **CB8** circuit breakers for R1, R2, and R3 feeders to rectifier shelf are also off (Figure 1).

2. Release cover from front of rectifier shelf.

3. Get **CS787B540** power unit (48 V DC, 25A OLS rectifier) and inspect for damage.

4. On rectifier shelf, set power unit in **RECTIFIER 1**, **RECTIFIER 2**, or **RECTIFIER 3**, position for power unit being installed (Figure 2). Connect **P905-( )** (P905-1, P905-2, or P905-3) AC input cable to **J905/V IN** connector on power unit (Figure 3).

   Comment: These power units have no backplane connector. Power and control cables plug into connectors on right-hand side of power unit.

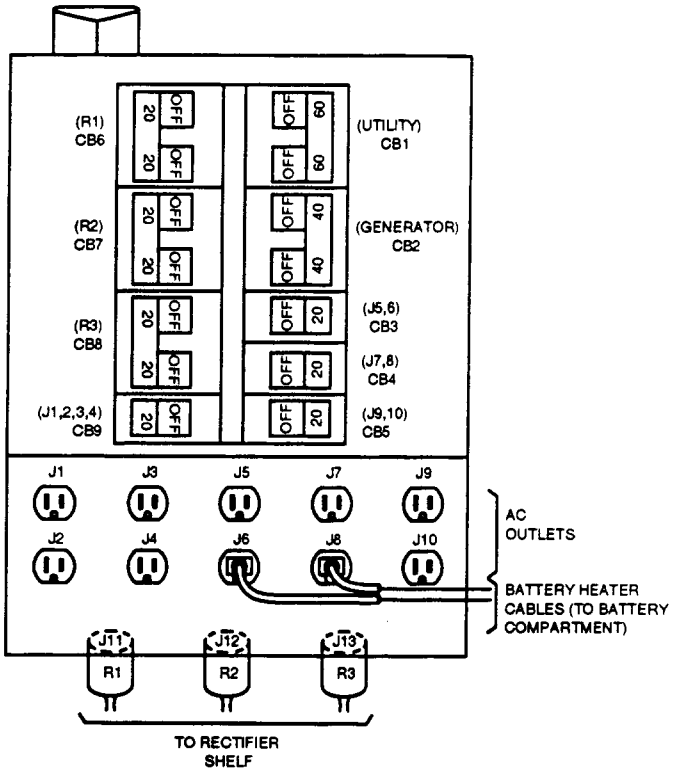


Figure 1 — Ac Power Panel in ED-7C703-30 80E Cabinet

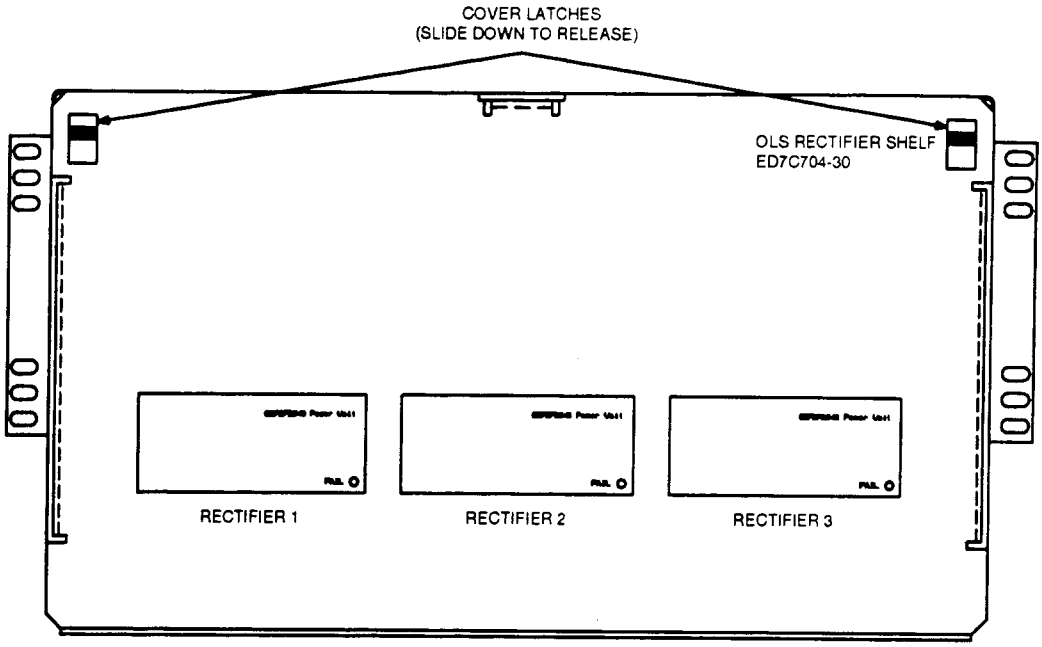


Figure 2 — ED-7C704-30 Rectifier Shelf (with Cover)

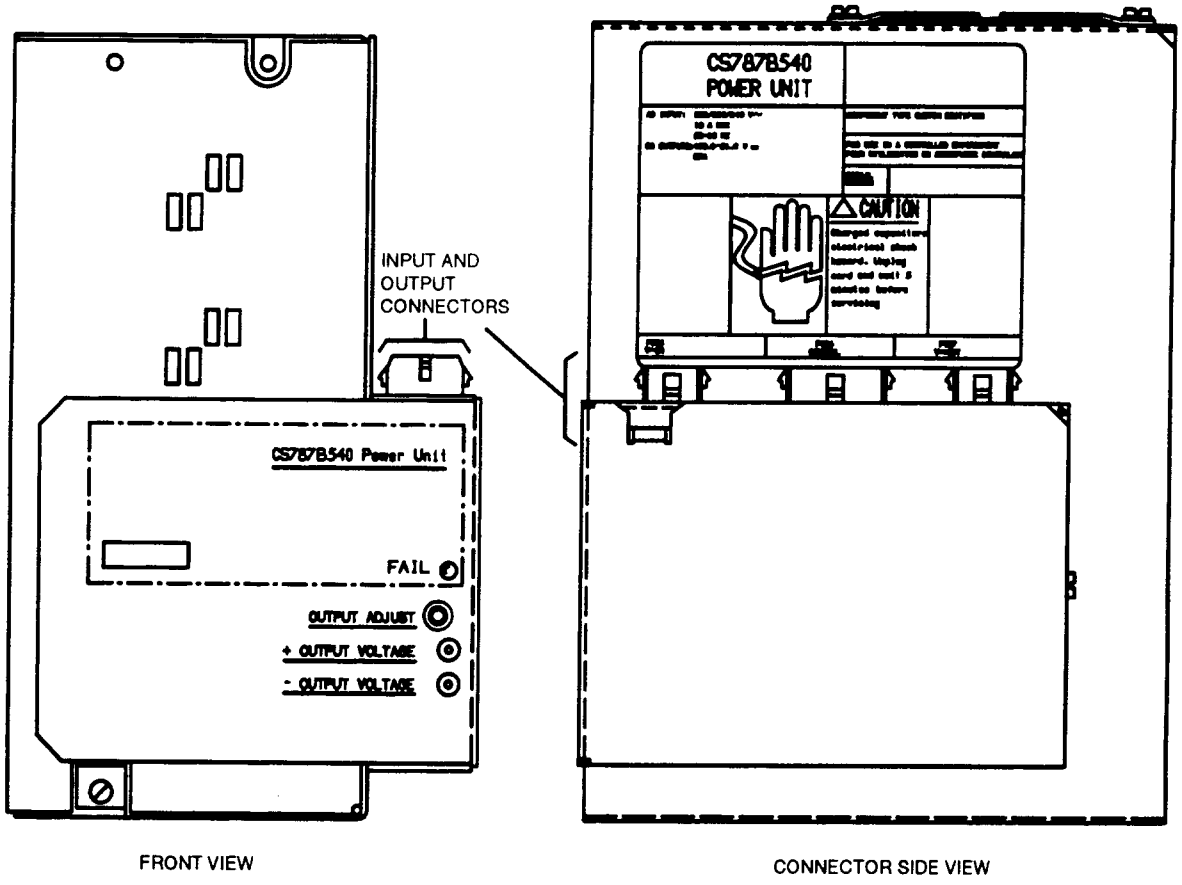


Figure 3 — Front and Top View of CS787B540 Power Unit

5. On AC power panel, turn on **CB1** (utility) circuit breaker.

6. On AC power panel for power unit being installed, verify that **R( )** (R1, R2, R3) AC power cord from rectifier shelf is plugged into correct AC outlet (Figure 1). Turn on **CB( )** (CB6, CB7, or CB8) circuit breaker to this feeder.

7. On power unit, is **FAIL** indicator off?

   If **YES,** then proceed to Step **11.**
   If **NO,** then continue with Step **8.**

8. On AC power panel for power unit being installed, turn off circuit breaker to **R( )** feeder to power unit.

9. On rectifier shelf, unplug P905 connector and replace power unit.

10. Repeat from Step **4.**

11. Condition DMM to measure DC volts. Meter accuracy must be ±0.3% or better.

12. On power unit, connect DMM to **+ OUTPUT VOLTAGE** and **– OUTPUT VOLTAGE** test points. Measure DC output voltage (power unit float voltage).

13. Does meter indicate between –54.3 V DC and –54.7 V DC?

    If **YES,** then proceed to Step **17.**
    If **NO,** then continue with Step **14.**

14. On AC power panel for power unit being installed, turn off circuit breaker to **R( )** feeder to power unit.

15. On rectifier shelf, unplug P905-( ) connector and replace power unit.

16. Repeat from Step **4.**

17. Is this the last power unit to be installed?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **18.**

18. On AC power panel for *installed* power unit, turn off circuit breaker to **R( )** feeder and repeat from Step **3** for next power unit.

19. On AC power panel, verify that **CB( )** circuit breaker(s) are off for **R( )** feeder to power unit(s) being installed.

20. On control and distribution panel, verify that **CB( )** circuit breakers are off.

21. On rectifier shelf, connect **P906** (P906-1, P906-2, or P906-3) cable to **J906/CONTROL** connector and **P907** (P907-1, P907-2, or P907-3) cable to **J907/V–OUT** connector on each power unit being installed (Figure 3).

22. On AC power panel, turn on circuit breaker(s) for **R( )** feeder to power unit(s).

23. On control and distribution panel, is **NORMAL** indicator lighted?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Check circuit breakers on AYK1 and AYK2 circuit packs. Reset any breaker that has tripped (pin popped out). If breaker trips again, replace circuit pack. If **NORMAL** indicator remains off, reinstall original circuit pack. Trouble may be in P906-( ) rectifier control cables, P907-( ) rectifier output cables, or J4 alarm cable between control and distribution panel and rectifier shelf. To check wiring on control and distribution panel, refer to SD-83109-01. To check 80E cabinet cabling, refer to SD-7C158-01 application schematic. Correct wiring problem until **NORMAL** indicator is lighted.

25. Connect DMM to **PV** and **PVR** test points.

26. Does meter indicate between –54.3 V DC and –54.7 V DC?

    If **YES,** then proceed to Step **28.**
    If **NO,** then continue with Step **27.**

27. Refer to SD-83109-01 to check wiring on control and distribution panel. Correct wiring problem until meter indicates correctly.

28. NOTE:
    Each circuit breaker on control and distribution panel supplies an equipment bay according to the cabinet group arrangement. To identify circuit breakers, refer to the label located on the door opposite the control and distribution panel.

    On control and distribution panel, turn on **CB( )** circuit breaker to equipment bay for system(s) being installed.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Install 3C or 3A RINGING GENERATORs in Ring Shelf

SUMMARY: Install **3C or 3A RINGING GENERATOR** into **GROUP 1** side - **RING GEN1** slot in ring shelf. Verify that **FAIL** indicator is off. Measure –43 to –56 V DC at **–48V/GND**, and 90 to 110 V AC and –50 to –60 V DC at **–20HZ/GND**. Install **RING GEN2** and repeat. For full shelf operation (Bellcore mode), move **P116B**, cut straps at central interconnection panel, and install and test ringing generators in **GROUP 2** side of shelf.

1. ⇛ NOTE:
   The **CB1** circuit breaker on the control and distribution panel provides power to ring shelf and other equipment mounted in **POSITION 1** of the cabinet.

   On control and distribution panel, verify that **CB1** circuit breaker is on and **NORMAL** indicator is lighted.

2. Get two **3C or 3A RINGING GENERATOR**s and inspect for possible physical damage.

3. Install one **3C or 3A RINGING GENERATOR** into **GROUP 1** side - **RING GEN1** slot in ringing shelf (Figure 1).

4. Is **FAIL** indicator lighted on **RINGING GENERATOR**?

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

5. Replace **RINGING GENERATOR** and repeat from Step **3.**

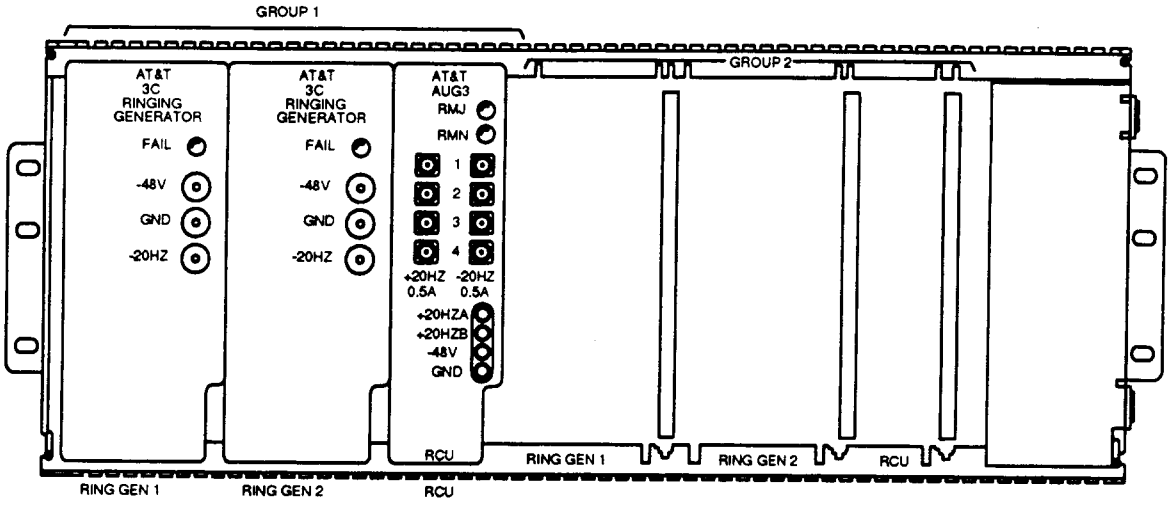


Figure 1 — Ringing Generator Installed in Ring Shelf

6. Condition DMM to measure DC volts.

7. On **RING GEN1**, connect DMM test leads to **–48V** jack and **GND** jack (Figure 1).

8. Does DMM indicate between –43 and –56 volts?

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

9. Replace **RINGING GENERATOR**. Does DMM indicate between –43 and –56 volts?

   If **YES,** then proceed to Step **14.**
   If **NO,** then continue with Step **10.**

10. On right-hand side of ring shelf, disconnect **P117** connector. Connect DMM test leads to pin 8 (–48V) and pin 9 (–48V RTN) (Figure 2).

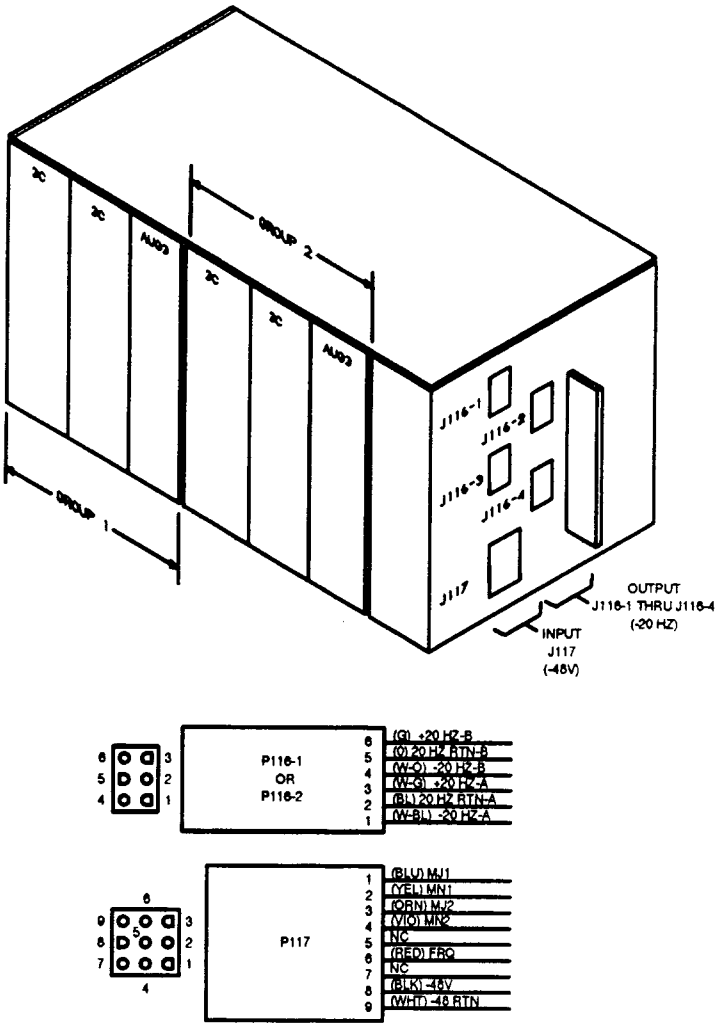


Figure 2 — Connections to Ring Shelf

11. Does DMM indicate between –43 and –56 volts?

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

12. Refer to SD-7C158-01 to check connectors on 80E bulk power cabinet and correct wiring problem. Repeat from Step **7.**

13. Use SD-7C155-01 to correct problem in ring shelf wiring and repeat from Step **7.**

14. On **RING GEN1** at **–20HZ** jack and **GND** jack (Figure 1), measure DC negative ringing.

    Requirement: Meter indicates between –50 and –60 volts

15. Condition DMM to measure AC volts. Measure AC negative ringing at same jacks (**–20HZ** and **GND**).

    Requirement: Meter indicates between 90 and 110 volts.

16. Did meter indicate as required in Step **14** and Step **15**?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **17.**

17. Replace **RINGING GENERATOR** and repeat from Step **4.**

18. Has **RING GEN2** been installed and tested?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **19.**

19. Install second **RINGING GENERATOR** in **GROUP 1** side - **RING GEN2** slot in ringing shelf and repeat from Step **4** for **RING GEN2.**

20. Is group 2 side of shelf being equipped at this time (full shelf operation)?

    If **YES,** then continue with Step **21.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

21. At ring shelf, disconnect **P116B** connector from **J116-2** and reconnect it to **J116-3.**

22. ⇛ NOTE:
    The straps are cut to isolate alarms on **GROUP 1** side of ring shelf from alarms on **GROUP 2** side of ring shelf.

    At central interconnect panel on TS1, cut RGMJ strap between pins 21T2 and 21R2 and cut RGMN strap between pins 24T2 and 24R2.

23. Repeat from Step **2** for **GROUP 2** side of shelf.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Install Ring Control Unit (RCU) in Ring Shelf

SUMMARY: Install **RCU** into ring shelf. Verify no fuses blown and no indicators lighted on **RCU**. Measure voltage at **–48V** and **GND**. Requirement: –43 to –56 V DC. Measure voltage at **+20HZA** and **GND**. Requirement: 50 to 60 V DC and 90 to 110 V AC. Measure voltage at **+20HZB** and **GND**. Requirement: 50 to 60 V DC and 90 to 110 V AC. Repeat as required for **RCU** in **GROUP 2**.

1. Get one **AUG3 RCU** (Figure 1) and inspect for possible physical damage.

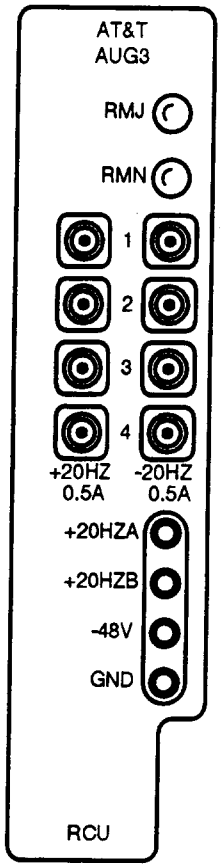


Figure 1 — Ring Control Unit (AUG3) Faceplate

2. Verify that each fuse holder on **RCU** faceplate contains an 80G (0.5A) fuse and that no fuses are blown. (Fuse bead will pop out when fuse is blown.)

3. Are any fuses blown?

   If **YES,** then continue with Step **4.**
   If **NO,** then proceed to Step **6.**

4. Use 553A extractor tool (COMCODE 997991575) (Techni-tool No. 594TE170) or 319B (KS-6305) extractor tool (COMCODE 100753904) (Techni-tool No. 490PL020) to remove blown fuses.

5. Install good 80G (0.5A) fuse in each empty fuse holder.

6. Verify that both 3C or 3A ringing generators are installed in **GROUP 1** side - **RING GEN 1** and **RING GEN 2** slots.

   Reference: DLP-528

7. On **GROUP 1** side, install **RCU** into **RCU** slot in ring shelf.

8. Do any fuses blow on **RCU**?

   If **YES,** then continue with Step **9.**
   If **NO,** then proceed to Step **15.**

9. Replace **RCU**. Do any fuses blow on **RCU**?

   If **YES,** then continue with Step **10.**
   If **NO,** then proceed to Step **15.**

10. On ring shelf on right-hand side, disconnect P116 ringing output connectors, then replace blown fuses on **RCU**.

11. Do any fuses blow on **RCU**?

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

12. Refer to SD-7C158-01 to check connectors on 80E bulk-power cabinet and correct wiring problem. Repeat from Step **8.**

13. Use SD-7C155-01 to correct wiring problem in ring shelf.

14. Reconnect J116 connectors and replace blown fuses on **RCU**. Repeat from Step **8.**

15. Is any indicator lighted on **RCU**?

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

16. Replace **RCU** and repeat from Step **8.**

17. Get DMM and condition it to measure DC volts.

18. Connect DMM test leads to **–48V** jack and **GND** jack on **RCU**.

19. Does meter indicate –43 to –56 volts?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **20.**

20. Replace **RCU** and repeat from Step **8.**

21. On **RCU** at **+20HZA** jack and **GND** jack (Figure 1), measure DC positive ringing.

    Requirement: Meter indicates between 50 and 60 volts

22. Condition DMM to measure AC volts. Measure AC positive ringing at same jacks (**+20HZA** and **GND**).

    Requirement: Meter indicates between 90 and 110 volts.

23. Did meter indicate as required in Step **21** and Step **22**?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Replace **RCU** and repeat from Step **8.**

25. Have both **+20HZA** and **+20HZB** jacks been tested?

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

26. Condition DMM to measure DC volts and repeat from Step **21** for **+20HZB** jack.

27. Is group 2 being equipped at this time (full shelf operation)?

    If **YES,** then repeat from Step **1** for **GROUP 2** side of shelf.
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

Check 197A Battery Load Test Set for Proper Operation

1. Obtain **197A BATTERY LOAD TEST SET** (Figure 1).

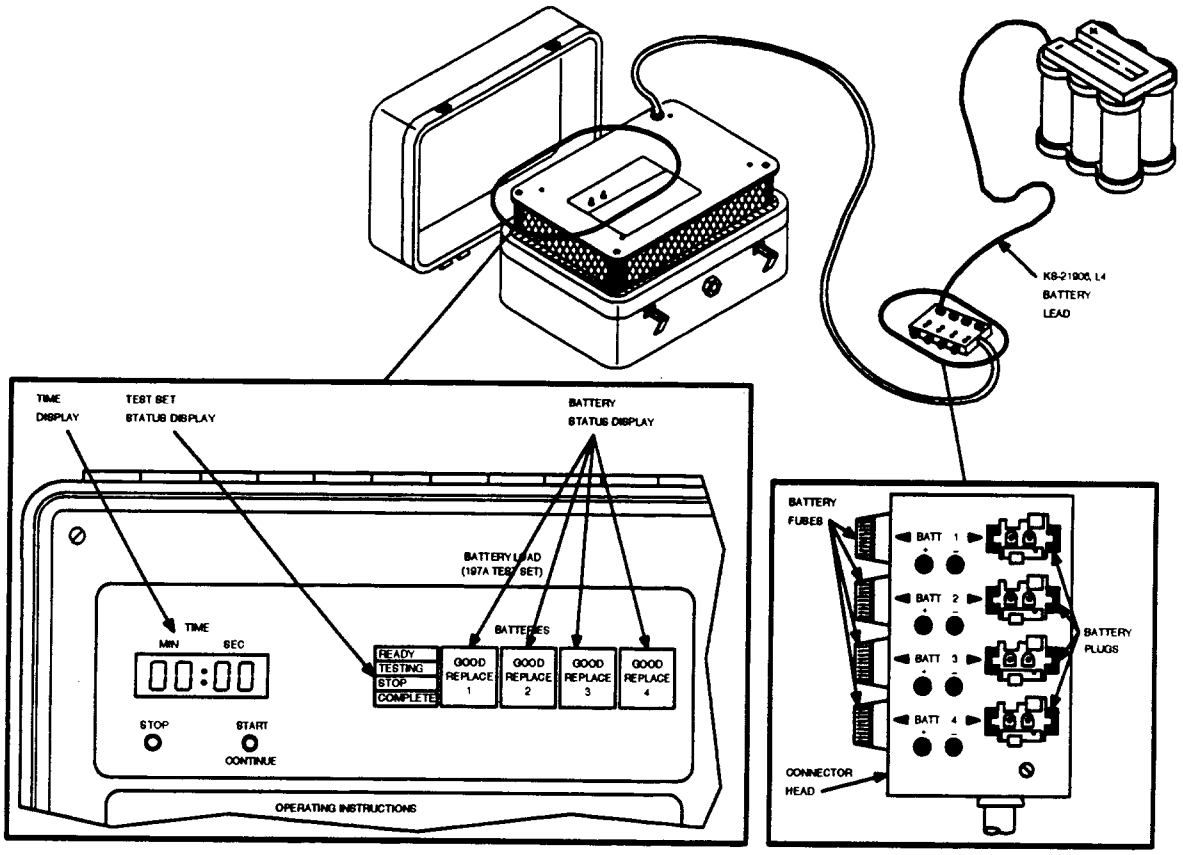


Figure 1 — 197A Battery Load Test Set Arrangement

2. Remove cover from test set.

3. At test connector head, verify that battery fuse holders each contain a 20 amp fast-blow fuse.

4. Obtain one KS-21906, L4 battery.

5. ⇛ NOTE:
Under normal conditions, when the first battery is connected, the following occurs: (a) Test set **TIME** display indicates **00 MIN: 00 SEC**; (b) Status display indicates which test set **BATT** plug that battery is connected to, status of the battery (**GOOD** or **REPLACE**), and the **READY** indicator lights; (c) Test set fan operates.

At test set connector head, connect battery lead to **BATT 1, 2, 3**, or **4** plug being tested.

6. ⚠ CAUTION:
Damage will occur if test set is operated without fan operating.

Does test set fan operate?

If **YES,** then proceed to Step **15.**
If **NO,** then continue with Step **7.**

7. Connect battery lead to remaining **BATT** plugs, one at a time, and note if fan operates.

8. Did test set fan operate for any **BATT** plug connection?

If **YES,** then proceed to Step **11.**
If **NO,** then continue with Step **9.**

9. NOTE:
The test set is intended to test fully charged batteries. Before new batteries or replacement batteries are tested, a minimum of two days must have passed between the time the batteries are put on high rate charge and this test is made.

Disconnect lead. Using a different battery pack, connect battery lead to any **BATT** plug.

10. Does test set fan operate?

If **YES,** then proceed to Step **15.**
If **NO,** then proceed to Step **35.**

11. On test set connector head, remove battery lead and check for blown fuse(s).

12. Is fuse(s) blown?

If **YES,** then continue with Step **13.**
If **NO,** then proceed to Step **14.**

13. Replace fuse(s) and repeat from Step **5.**

14. NOTE:
Test set may be used for testing using one, two, three or all four **BATT** plug positions.

Defective test set or connector head. Note defective **BATT** plug position(s). Continue with test procedures using remaining **BATT** plugs.

15. Does test set **TIME** display indicate **00 MIN:00 SEC** without blinking?

    If **YES,** then continue with Step **16.**
    If **NO,** then proceed to Step **35.**

16. Does status display indicate which battery was connected, status (**GOOD** or **REPLACE**) of the battery, and is **READY** indicator lighted?

    If **YES,** then continue with Step **17.**
    If **NO,** then proceed to Step **35.**

17. Does status display indicate **GOOD** or **REPLACE**?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **18.**

18. ⚠ DANGER:
    A high discharge current is present at connector head if TESTING indicator is lighted. Batteries must not be connected or disconnected when TESTING indicator is lighted.

    Battery pack is defective. Ensure that **TESTING** indicator is not lighted (**READY** indicator lighted), unplug and set aside defective battery pack, and repeat from Step **5.**

19. Have **TIME** display and **STATUS** indicators been tested for each good **BATT** plug position?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **20.**

20.

⚠ DANGER:
A high discharge current is present at connector head if TESTING indicator is lighted. Batteries must not be connected or disconnected when TESTING indicator is lighted.

Ensure that **TESTING** indicator is not lighted (**READY** indicator lighted). Unplug battery pack and repeat from Step **5.**

21.

⚠ DANGER:
A high discharge current is present at connector head if TESTING indicator is lighted. Batteries must not be connected or disconnected when TESTING indicator is lighted.

Depress test set **START/CONTINUE** button.

22. Does test set **TESTING** indicator light, **READY** indicator go off, and **TIME** display start counting time?

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

23.

⚠ DANGER:
A high discharge current is present at connector head if TESTING indicator is lighted. Batteries must not be connected or disconnected when TESTING indicator is lighted.

Defective test set. Depress **STOP** button, unplug battery. Return test set for repair.

24. Depress test set **STOP** button.

25. Does test set **STOP** indicator light and **TIME** display stop counting time?

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

26. ⚠ DANGER:
    A high discharge current is present at connector head if TESTING indicator is lighted. Batteries must not be connected or disconnected when TESTING indicator is lighted.

    Defective test set. Allow test to run for 15 minutes as shown on **TIME** display. When **COMPLETE** indicator lights, unplug battery. Return test set for repair.

27. ⚠ DANGER:
    A high discharge current is present at connector head if TESTING indicator is lighted. Batteries must not be connected or disconnected when TESTING indicator is lighted.

    Depress test set **START/CONTINUE** button.

28. Does test set **TESTING** indicator light, **STOP** indicator go off, and **TIME** display start counting time?

    If **YES,** then continue with Step **29.**
    If **NO,** then proceed to Step **34.**

29. Allow test set to run for 15 minutes as shown on **TIME** display.

30. During 15-minute test period, does test set show **REPLACE**?

    If **YES,** then continue with Step **31.**
    If **NO,** then proceed to Step **32.**

31. Note that battery being used is defective.

32. After 15 minutes, does **COMPLETE** indicator light?

    If **YES,** then continue with Step **33.**
    If **NO,** then proceed to Step **34.**

33. Unplug battery. Store connector head in test set cover. Reinstall cover.

    STOP. YOU HAVE COMPLETED THIS PROCEDURE.

34. ⚠ DANGER:
    A high discharge current is present at connector head if TESTING indicator is lighted. Batteries must not be connected or disconnected when TESTING indicator is lighted.

    Defective test set. Depress **STOP** button, unplug battery. Return test set for repair.

35. Defective test set. Return for repair.

    STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install Lineage 2000 VR Series Batteries in 80D Cabinet Battery Compartment

SUMMARY: Unpack and visually inspect the batteries for damage. Measure the voltage of each battery. Requirement: 4.20 V DC or higher. Place batteries in the battery compartment (Figure 1). Coat interbattery bus bars with NO-OXid grease. Connect the batteries together with the bus bar as shown in Figure 2. Connect battery string cable to batteries 1 and 12. Check the battery string voltage, note polarity and voltage (Requirement: minimum 50.4 V DC). Connect cable from control and distribution panel to battery string cable. Repeat for each battery string to be installed.

1.

⚠ DANGER 1:
Batteries are electrically live (that is, have voltage on them) at all times and are able to supply several thousand amperes short circuit current. Great care should be exercised to avoid short circuiting the battery terminals. Insulated tools must be used; any rings, watches, bracelets, etc. must be removed when working on batteries.

⚠ DANGER 2:
Any contact of electrolyte with skin or clothing should be avoided. If contact occurs, the electrolyte can be neutralized by flushing with plenty of water. If electrolyte enters the eye, immediately flush the eye with water and seek medical help. If the batteries appear damaged in shipping, protective rubber apron, rubber gloves and goggles should be worn by persons handling the batteries.

⚠ CAUTION:
The Lineage 2000 VR Series battery is valve regulated, starved electrolyte lead acid cell. Should the case crack, it is possible that small amount of electrolyte (one ounce) could leak out. The electrolyte is sulfuric acid and should be handled as highly corrosive material. No battery installation should be attempted unless the installer has ready access to several gallons of water and a package of baking soda. Baking soda or solution of baking soda and water

may be used to neutralize small amounts of electrolyte.

Get equipment for installation:

- (1) ED-83242-30, G3 which consists of 12 Lineage 2000 VR series batteries, 11 interbattery bus bars, tewnty-four 1/4-inch lock washers, tewnty-four 1/4-inch nuts, a container of the NO-OXid grease and a form 1285 (all these items are supplied with the batteries).

  Comment: Battery string 3 requires a cable between batteries 6 and 7. This cable is used to replace interbattery bus bar for the split battery string 3.

- (1) battery string cable (comcode 846278224, one for each battery string) (shipped with the cabinet as Group 63).
- torque wrench (range between 30 inch-pounds and 200 inch-pounds) with insulated handle (or insulate the handle with electrical tape).
- 7/16-inch socket (for the 1/4-20 nut).

2. Unpack the batteries and inspect for physical damage. Do not install any cell that appears to be damaged. Any cell that has leaked electrolyte should be considered defective.

3. Condition DMM to measure DC volts.

4. Measure the terminal voltage of each battery. Does meter indicate 4.20 V DC or higher for each battery?

   If **YES**, then proceed to Step **6.**

   If **NO**, then continue with Step **5.**

5. Replace any battery that measures less than 4.20 V DC.

6. Wipe battery terminals until clean and dry.

7. Use special hex key (modified hex key) and 216-tool to open the battery compartment doors.

8. Place all 12 batteries in the battery compartment as shown in Figure 1.

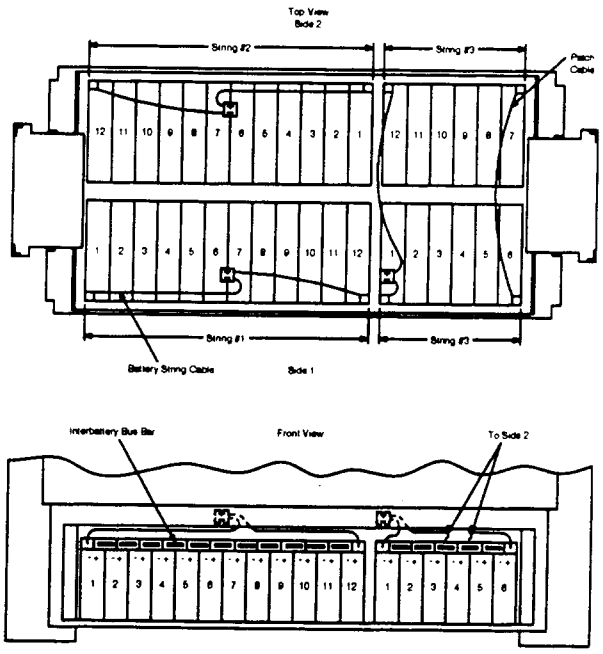


Figure 1 — Layout of Lineage 2000 VR Series Batteries in 80D Cabinet

9. Coat interbattery bus bars with NO-OXid grease and install on the batteries as shown in Figure 2. Install 1/4-inch lock washer and nut on battery post. Using insulated torque wrench with the socket, tighten nut to 55 inch-pounds torque. Repeat for each battery post until all 12 batteries are connected together.

   Comment: For battery string 3 the 12 batteries are connected in 2 groups of 6 batteries. A cable connects + of battery 6 to - of battery 7 using the hardware to connect the interbattery bus bar.

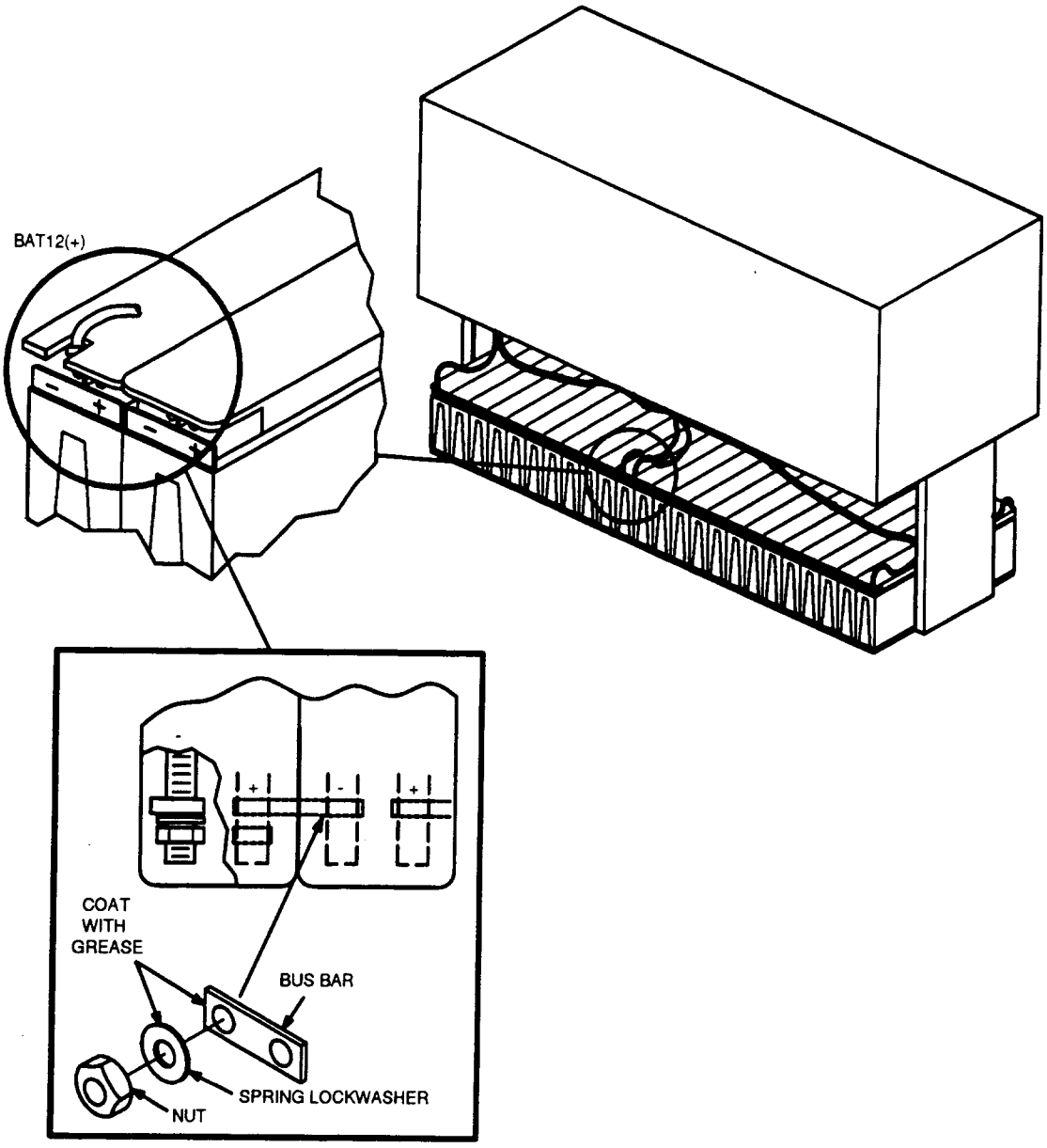


Figure 2 — Battery String Connections for Lineage 2000 VR Series Batteries

10. Cut a notch in the cover of the battery No. 1 (above "–" battery post) and battery No. 12 (above "+" battery post) (see Figure 2). This is required to install the battery string cable.

11. Connect the battery string cable to battery No. 1 by terminating the lug marked **BAT 1 (–)** to the "–" (negative) battery post of the first battery in the string (Figure 2). Connect the battery string cable to battery No. 12 by terminating the lug marked **BAT 12 (+)** to the "+" (positive) battery post of the 12th battery as shown in Figure 2. Install the lock washer and nut on the battery posts. Use insulated torque wrench to tighten the nuts to 55 inch-pounds torque.

12. Coat each battery connection with NO-OXid grease.

13. Condition DMM to measure DC volts. Measure battery string voltage at the connector (marked **STR** "+" and "–") at the end of the battery string cable. Make sure measured polarity corresponds with polarity indicated on connector.

14. Does meter indicate battery string voltage between –50.4 V DC and –51.4 V DC?

    If **YES**, then proceed to Step **16.**

    If **NO**, then continue with Step **15.**

15. Make sure that there are 12 batteries in the string. Recheck battery connections and correct if necessary. If connections are correct, check individual battery voltage. Any battery that indicates less than 4.20 V DC should be replaced.

16. ⚠ DANGER:
After the connector from the control and distribution panel is mated with the connector from the battery string cable, the power bus on the control and distribution panel will be "live" (that is, have voltage on it).

Connect the battery string cable **STR** connector to the connector designated **STR( )** (1, 2 or 3) on the end of the battery cable located in the battery compartment.

17. Dress cables in the battery compartment.

18. ⇛ NOTE:
To measure the battery string voltage accurately, disconnect any battery strings other than battery string being measured. [To disconnect other battery strings, unplug the battery string cable connector marked **STR** from the battery cable connector marked **STR( ).**]

On control and distribution panel, connect DMM to **BAT( )** (1, 2 or 3) test point and **PVR** test point for battery string being installed.

19. Does meter indicate battery string voltage of 50.4 V DC or higher?

If **YES**, then proceed to Step **21.**

If **NO**, then continue with Step **20.**

20. Visually inspect cable assembly between control and distribution panel and battery string. Replace cable assembly fuse and/or cable assembly until meter indicates correct voltage.

21. Is this the last battery string to be installed?

    If **YES**, then proceed to Step **22.**

    If **NO**, then repeat from Step **1** for next battery string to be installed.

22. Disconnect test equipment. Reconnect any battery strings disconnected for voltage measurement. Close and lock battery compartment door.

23. Between 1 and 3 hours after the rectifiers are installed, measure the voltage of each battery in the string and record on form 1285 supplied with the batteries. Meter should indicate between 4.44 V DC and 4.64 V DC for each battery. Any battery outside this limit should be measured again within one week. If it is still outside the limit, replace battery.

STOP YOU HAVE COMPLETED THIS PROCEDURE.

Install *Chloride* Batteries in 80D Cabinet Battery Compartment

SUMMARY: Inspect *Chloride* 3VB11 batteries for damage. Measure battery voltage (Requirement: minimum 6.2 V DC). Remove covers and connect cable assemblies to batteries. Replace covers. Put batteries in position and connect batteries together. Connect battery string cable to batteries **1** and **8**. Check battery string voltage (Requirement: minimum 49.5 V DC). Connect cable from control and distribution panel to battery string cable. Repeat for each battery string to be installed.

1.

⚠ DANGER:
Batteries are electrically live at all times and are capable of supplying high short circuit currents. Each battery comes with a plastic cover. Do not remove the cover until access to the terminals is required.

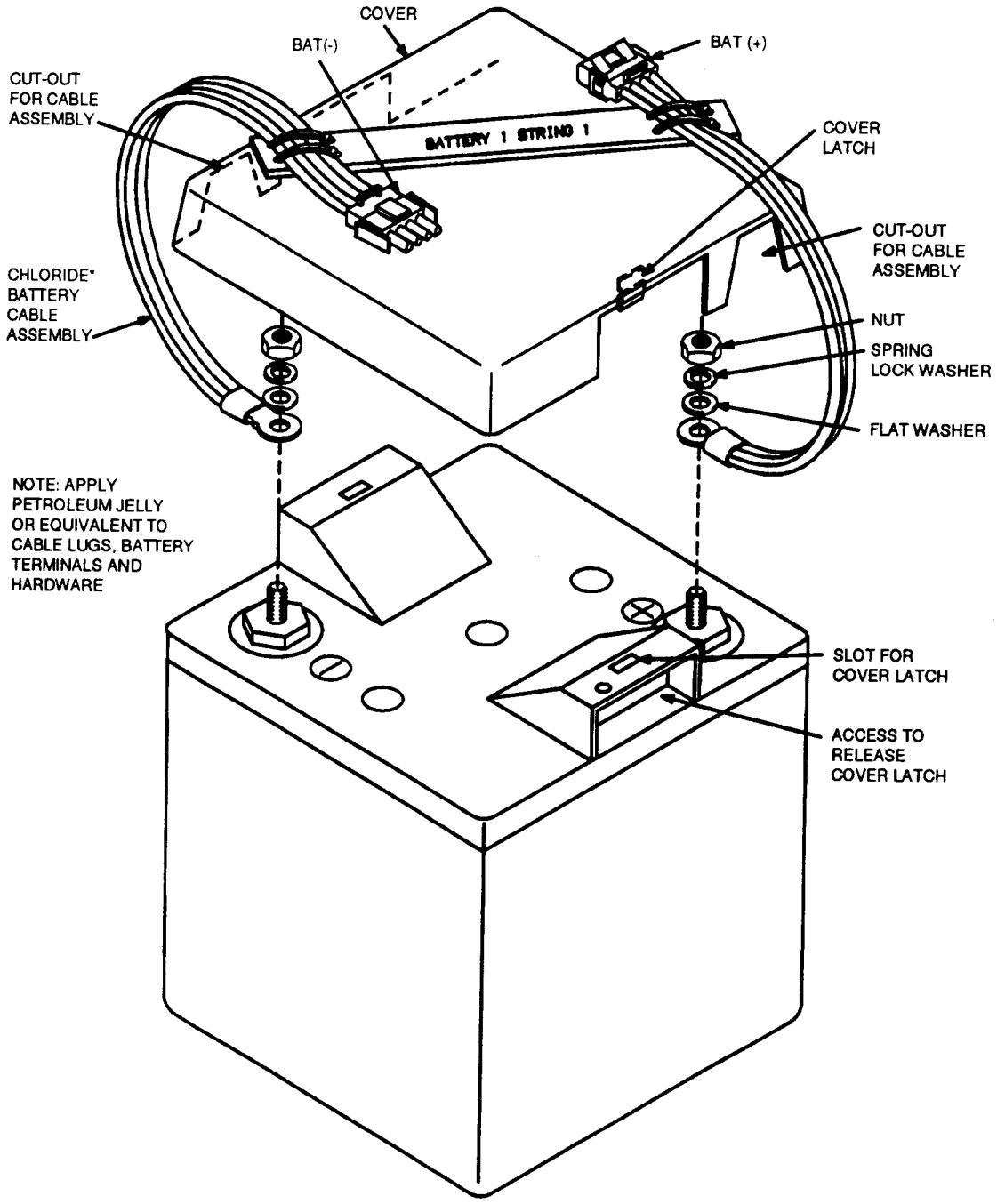
⚠ CAUTION:
Batteries should be handled carefully; the plastic container can be damaged if dropped. Never lift batteries by holding terminal posts.

Get eight *Chloride* 3VB11 (COMCODE 405890336) batteries (Figure 1) and hardware (but discard connecting straps). Get cable assemblies (shipped with cabinet as Group 62) for connecting batteries:

8 — *Chloride* battery cable assemblies (COMCODE 846279149) [includes positive battery cable **BAT (+)**, negative battery cable **BAT (–)**, and cable separator]

1 — patch cord **JMP(+)/JMP(–)** (COMCODE 846279107)

1 — battery string cable **STR1/BAT1(+)/BAT8(–)** (COMCODE 846279115).



*Registered trademark of Berlhert B.V. Corperation.

Figure 1 — Detail of *Chloride* Batteries and Cable Assembly

2. Visually inspect batteries for cracks, leakage, or other damage. Inspect cable assemblies for damage. Replace batteries or cables that appear damaged or defective.

3. Condition DMM to measure DC volts.

4. Measure terminal voltage of each battery. Does meter indicate 6.2 V DC or higher for each battery?

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

5. Replace any battery that measures less than 6.2 V DC.

6. ⚠ DANGER:
   Insulated tools must be used, and any rings, watches, bracelets, etc. must be removed when working on batteries.

⚠ CAUTION 1:
Do not loosen large hexagonal nut at bottom of each terminal. Doing so will release terminal seal and may cause permanent damage to battery.

⚠ CAUTION 2:
Battery covers have two latches, one on each side (in the handle) of the battery, accessed through battery handle opening. These latches must be depressed to remove cover, otherwise latches will break.

Remove battery covers and retain for fitting after battery cables are terminated. With permanent marker, mark each cable separator label with battery string identification.

7. Wipe battery terminals until clean and dry.

8. ⚠ CAUTION:
For proper connection, make sure flat side of cable lug is installed **first** *on battery post!*

On cable assembly (Figure 1), connect **BAT (+)** cable to + (positive) terminal of battery by installing cable lug, flat washer, spring lock washer, and nut on battery post. **Use only open-end wrench supplied with battery to tighten nut** (which prevents overtightening). If no wrench is supplied, torque wrench may be used to tighten nut (8mm) to recommended fastening torque value of 4 foot-pounds (48 inch-pounds). Do not overtighten.

9. On cable assembly (Figure 1), connect **BAT (–)** cable to – (negative) terminal of battery by installing cable lug, plain washer, spring lock washer, and nut on battery post. **Use only open-end wrench supplied with battery to tighten nut** (which prevents overtightening). If no wrench is supplied, torque wrench may be used to tighten nut (8mm) to recommended fastening torque value of 4 foot-pounds (48 inch-pounds). Do not overtighten.

10. Double check connections to make sure they are correct.

11. Apply petroleum jelly or equivalent on terminal connections as needed to prevent corrosion.

12. Install plastic cover (removed in Step **6**) on battery. Remove cut-outs in side wall of cover (Figure 1) as needed to fit over cable assembly.

13. Repeat from Step **7** for remaining batteries in battery string.

14. Use special key (modified hex key) and 216-tool to open doors to battery compartment (in cabinet skirt).

15.

NOTE 1:
Connectors are "keyed" and must be properly oriented to be connected.

NOTE 2:
Batteries are counted clockwise from the left row (battery 1) around to the right front (battery 8). Battery string 2 is rotated 180° with respect to battery stings 1 and 3.

16. As shown in Figure 2, place the left 4 batteries (batteries **1** through **4** with cable assemblies) in battery compartment in position for battery string 1. Ensure the first and fourth batteries are 1 inch away from the battery compartment doors.

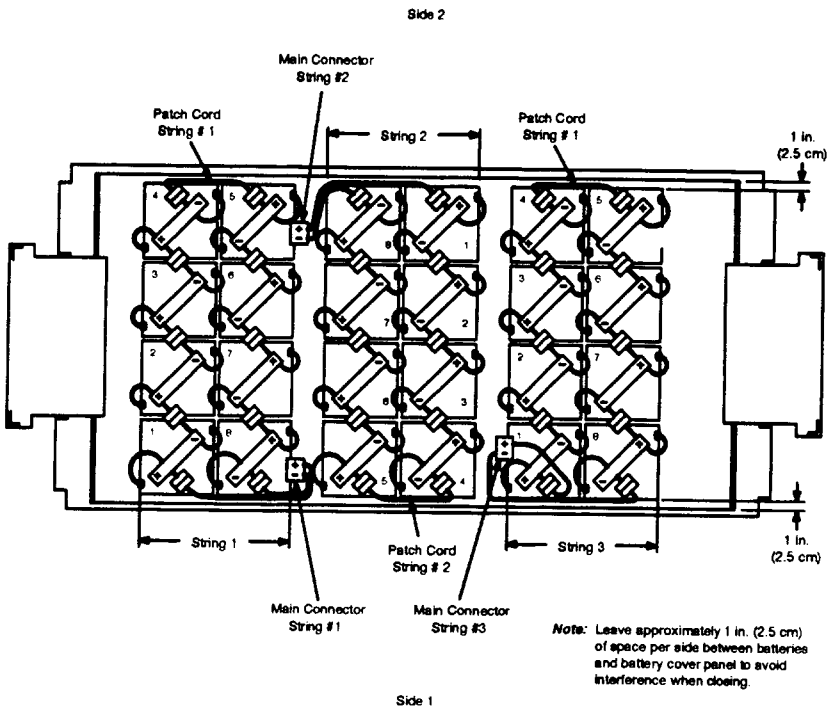


Figure 2 — RT Battery Strings and Connections

17.

⚠ DANGER:
When connecting batteries together, be careful **not** *to connect together the positive and negative terminals of the* **same** *battery.*

Connect batteries **1** through **4** together by plugging **BAT (–)** connector from one battery into **BAT (+)** connector from next battery (Figure 2).

18. Place the right 4 batteries (batteries **5** through **8** with cable assemblies) for battery string 1 (rotated 180° with respect to the first four batteries). Ensure the fifth and eighth batteries are 1 inch away from the battery compartment doors.

19. Connect patch cord (Figure 2) to **BAT (–)** connector of battery **4**. Connect other end of patch cord (Figure 2) to **BAT (+)** of battery **5**.

20.

⚠ DANGER:
When connecting batteries together, be careful **not** *to connect together the positive and negative terminals of the* **same** *battery.*

Connect batteries **5** through **8** together by plugging **BAT (–)** connector from one battery into **BAT (+)** connector from next battery (Figure 2).

21. Connect battery string cable to battery string: plug **BAT1 (+)** (female) connector to **BAT (+)** connector from battery **1** and **BAT8 (–)** (male) connector to **BAT (–)** connector from battery **8**.

22. Condition DMM to measure DC volts. Measure battery string voltage at gray **STR( )** connector (across clips) of battery string cable.

23. Does meter indicate battery string voltage of 49.5 V DC (absolute) or higher?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Recheck battery connections for proper (positive to negative) sequence. Correct if necessary. If connections are correct, check individual battery voltage (can be measured through cover). Any battery that indicates less than 6.2 V DC should be replaced. If all batteries indicate less than 6.2 V DC, refresher charge may be necessary. Refer to manufacturer's instructions for refresher charge operation.

25. ⚠ DANGER:
    After connectors are mated, power bus will be "live" (for example, have voltage on it).

    Connect together gray connectors on **STR( )** (1, 2, or 3) battery string cable and **STR( )** (1, 2, or 3) cable from control and distribution panel.

26. Dress and secure cables to the top of the battery compartment as necessary to keep them above batteries (in case of flood).

27. ⇒ NOTE:
    To measure battery string voltage accurately, disconnect any battery strings other than battery string being measured. [To disconnect other battery strings, unplug **STR( )** battery string cable connector (gray) from **STR( )** battery cable connector (gray) from control and distribution panel.]

    On control and distribution panel (Figure 3), connect DMM to **BAT( )** (1, 2, or 3) test point and **PVR** test point for battery string being installed.

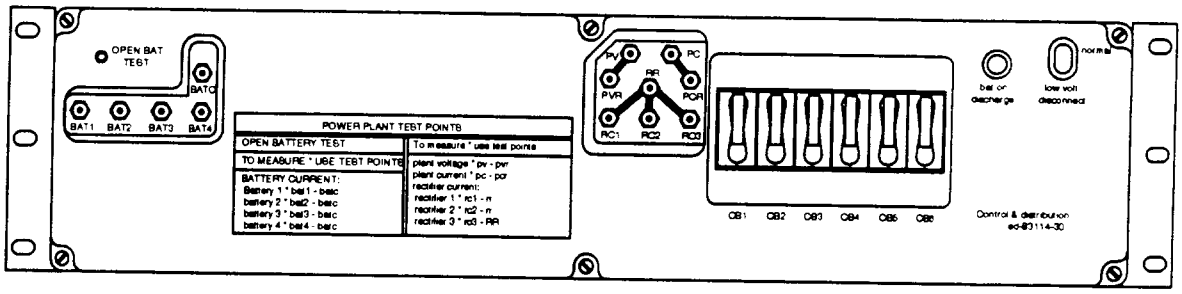


Figure 3 — Control and Distribution Panel

28. Does meter indicate battery string voltage of 49.5 V DC or higher?

    If **YES,** then proceed to Step **30.**
    If **NO,** then continue with Step **29.**

29. Visually inspect cable assembly between control and distribution panel and battery string. Replace cable assembly fuse and/or cable assembly until meter indicates correct voltage.

30. Is this the last battery string to be installed?

    If **YES,** then proceed to Step **31.**
    If **NO,** then repeat from Step **1** for next battery string.

31. Reconnect any battery strings disconnected for battery string voltage measurement. Close and secure doors to battery compartment.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Check 4A Fan Unit Operation

Summary: The 4A fan unit is used in bulk powered cabinets equipped with door ducts. This fan unit differs from the 2A, 2B, and 2C fan units by not requiring an external controller such as the AUA24, 111A or 112A control units. The 4A has a built-in controller circuit pack. The 4A fans will start running at +10°C (+50°F) and run at 2 speeds depending on temperature and a third speed, the lowest, if the RT is on batteries. The 4A fans will begin to operate when the power shelf is equipped and the power shelf circuit breakers are turned on. To check the 4A fans press the CHANGE FAN SPEED button at least 3 times to verify high, medium, and shut off speeds. The CHANGE FAN SPEED button also functions as a LED TEST for the 4A fan FAULT indicator.

1. Verify that the power shelf has been turned up and batteries have been installed. Verify that the power shelf DC circuit breakers are turned on.

2. NOTE:
   The fans will start operating if the temperature is +10°C (+50°F) or higher and if power is supplied. The fans will not turn off until the temperature is -10°C (+14°F) or less. The 4A provides TEMP voltage test jacks that can be used to determine the temperature of the fan controller (1 volt DC per 10°C above 0°C).

   If the 4A FAULT indicator is on (see Figure 1), proceed to Step **6**.

3. Press and hold down the CHANGE FAN SPEED button and verify that the FAULT indicator lights. Press and release the CHANGE FAN SPEED button at least 3 times and verify that the fans run at high speed, medium speed, and then off. Leave the fans in the off mode.

4. Did the fans step through 3 speeds and did the FAULT indicator light for the CHANGE FAN SPEED test?

   If **YES, THEN STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, then continue with Step **5**.

5. If FAULT indicator is not lighted, check **P114/J114** connection and verify that the power shelf DC circuit breaker is not tripped. Refer to appropriate SD drawings to clear power trouble. Replace the control circuit pack in the 4A fan unit if no power troubles are found. Then repeat this procedure.

6. When the FAULT indicator is lighted, look through the front grille at the control circuit pack. If the control circuit pack RED or YELLOW indicator is lighted, or if the GREEN indicator is off, replace the control circuit pack in the 4A fan unit. If the GREEN indicator is flashing, one or both fans is obstructed or defective (for example, rotates at less than 900 RPM). Clear obstruction and/or replace defective fan.

7. Repeat this procedure after correcting trouble.

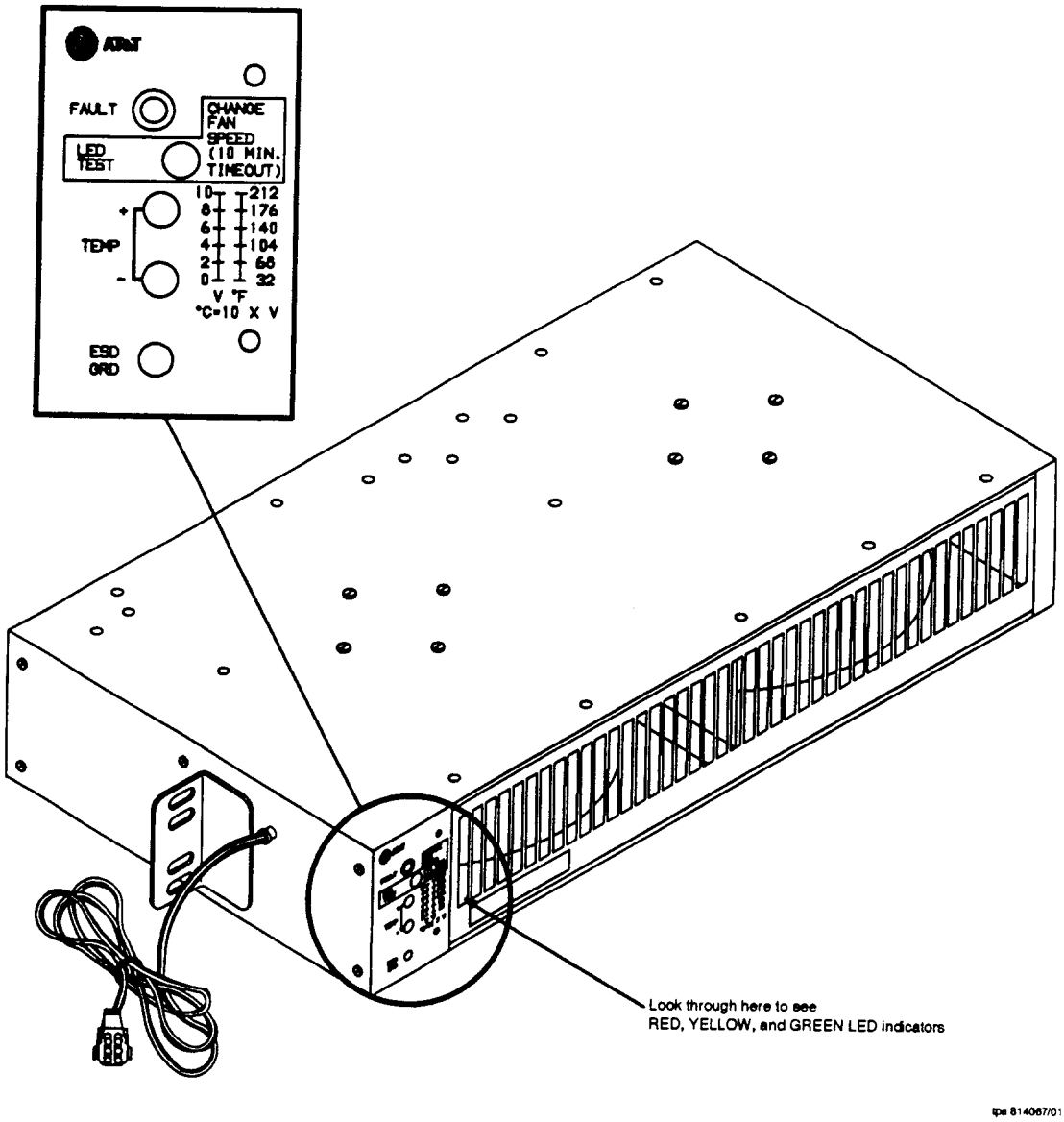


Figure 1 — 4A Fan Unit and Control Circuit Pack

Turn Up Series 5 RT Channel Bank

Introduction

This tab provides procedures to equip and turn up the blue, white, or both systems of the *SLC*® Series 5 Carrier System remote terminal (RT) dual channel bank assembly (see Figure 1 or 2). The procedures include installation of common circuit packs optioned for preservice. These procedures assume the *Acceptance* Tab procedures have been done, and the *Power Up* Tab procedures have been done to turn up the power plant and ringing generators.

This tab also provides procedures to add digroups C and D to an in-service Feature Package G (FPG) system. When adding digroups C and D to a system, you may have **MN** (minor) and **NE/FE** (near-end/far-end) alarms until both central office (CO) and RT ends of the system have been equipped and optioned for digroups C and D.

Feature Packages

The *SLC* Series 5 Carrier System offers a variety of system configurations offering POTS only, special services, concentration, and integration. These configurations are called feature packages. The feature package is selected by the choice of bank control unit (**BCU**), alarm display unit (**ADU**), and option settings on the **ADU**. The choice of supporting common units [transmit/receive unit (**TRU**), line interface unit (**LIU**), channel test unit (**CTU**), automatic channel test unit (**ACTU**), digital test units (**DTU-L, DTU-R**), line switch unit (**LSU**), and system display unit (**SDU**)] is determined by the feature package configuration.

These procedures assume the feature package configuration is known before circuit packs are installed. Figure 1 shows a typical FPG RT dual channel bank. Figure 2 shows a typical FPI RT dual channel bank.

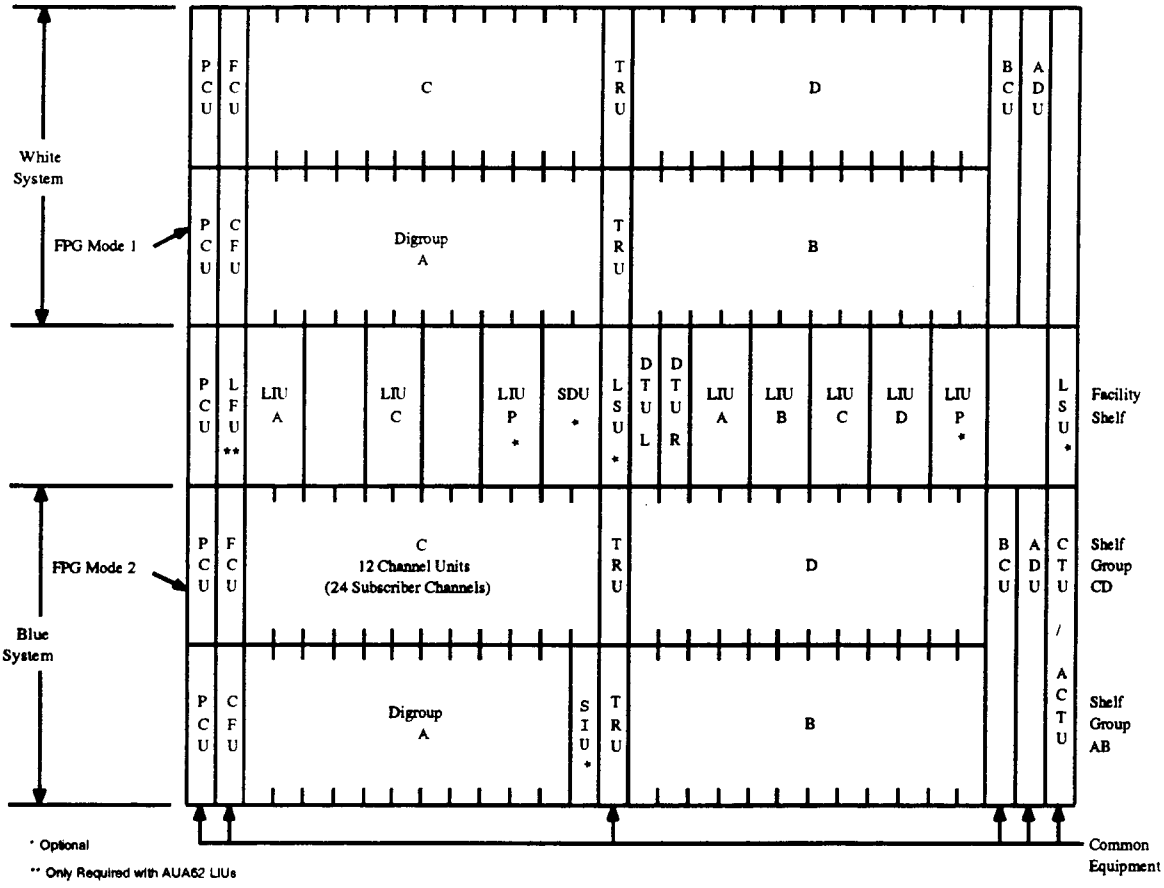


Figure 1 — Feature Package G Mode 1 (White) and Mode 2 (Blue) RT Channel Bank

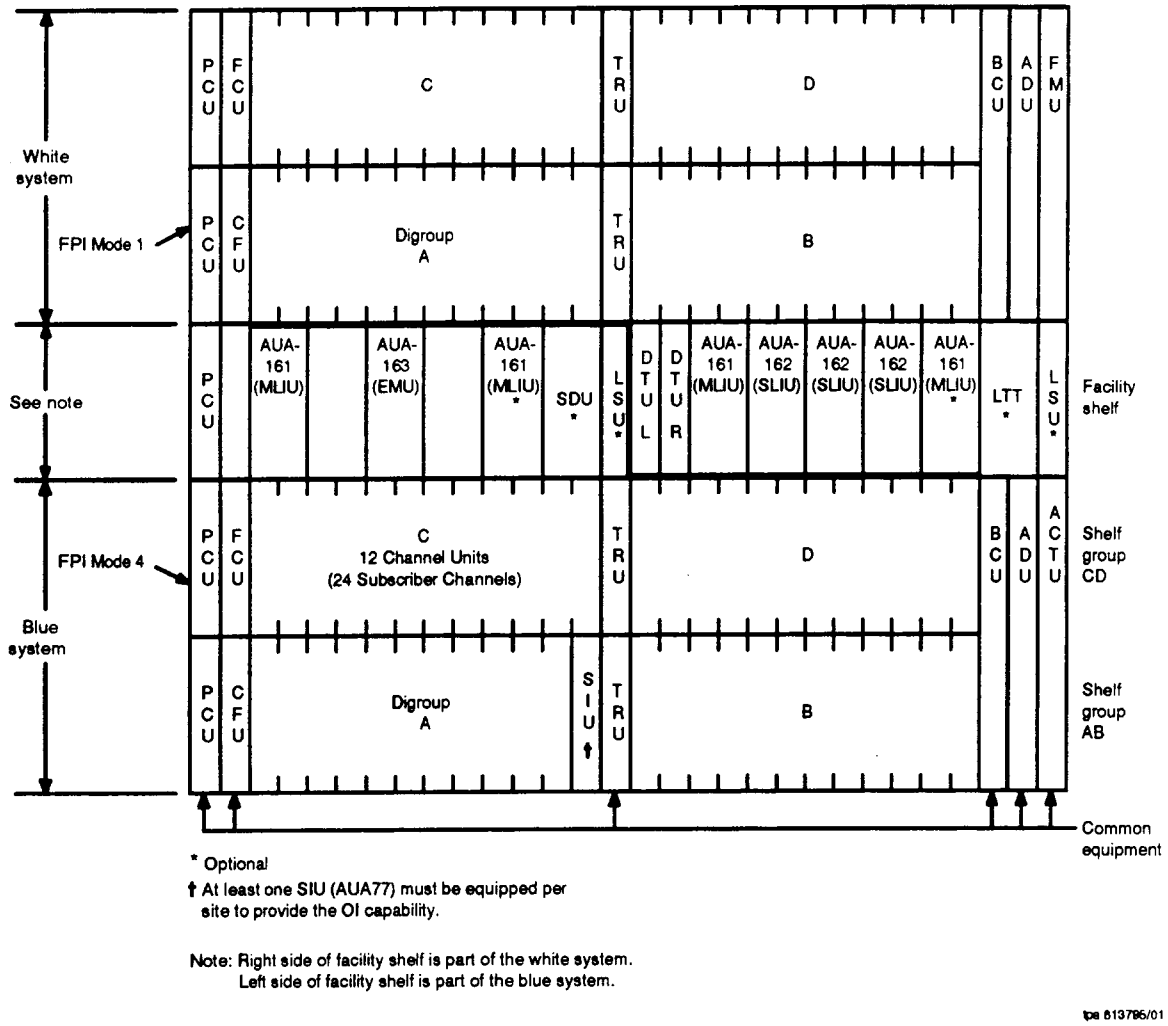


Figure 2 — Feature Package I Mode 1 (White) and Mode 4 (Blue) RT Channel Bank

RT Channel Bank Turn Up
Task Index List

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO

NOTE 1:
When establishing a *SLC*® Series 5 Carrier System remote terminal (RT) you must initially accept the RT equipment as directed in the Acceptance Tab procedures. Then you must Turn Up the RT frame/cabinet supporting equipment so that power is established using procedures in the Power Up Tab. After the RT power (rectifiers, batteries, and ringing) has been established, the channel bank can be Turned Up for the required Feature Package configuration.

NOTE 2:
If the turnup procedures are not followed in the order specified in the NTP, unpredictable results may occur and LED indications may not be as described. ***The order circuit packs are installed is significant.***

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO

⚠ CAUTION:
With the introduction of additional features for the Series 5 system, it becomes imperative that personnel turning up an RT bank assembly use care when making settings on circuit packs (CPs) being installed and ensure that the correct codes of CPs are installed into the proper slots in the RT bank assembly. 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, bank slot position, and to make all CP option switch settings. Listed below are several indications that the craft personnel may use to determine whether an error has been made during RT bank turnup:

- When a CP is installed, the craftsperson should observe that the CP FAIL indicator lights momentarily and then goes off. The absence of this just powered up (JPU) signal indicates that the CP is faulty, or that it is incompatible with the feature package configuration being installed.
- If both the CP FAIL LED and the ADU CMP LED are lighted following installation of a common unit CP, then a compatibility error is indicated. The compatibility error can be caused by an incorrect type CP, incorrect CP location, or improper CP option setting. If the ADU CMP LED is lighted, then the craftsperson can verify whether the newly installed CP is causing the compatibility error as follows: While observing the FAIL LED of the CP, depress the ADU LED TEST button. With the exception of the ADU CP, the FAIL LED of the CP will not light if the CP is of the wrong type, in the wrong location, or optioned incorrectly.

NOTE:
There are certain configurations where the EMU FAIL LED and/or the ADU CMP LED will not light when the EMU is installed in the wrong slot.

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

Test Digital Line Connections to DDM-2000, DDM-1000, or DDM-Plus for Preservice RT (Optional)

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

Overview:

This procedure is used to verify that the connection between the RT channel back LIUs and the DDM-2000, DDM-1000, or DDM-Plus multiplexer low speed interface packs. A DDM-Plus or T1 repeater shelf may be used to provide a T1 extension facility between the multiplexer and the RT channel bank. The RT must be equipped and the ADU optioned for preservice before doing this procedure. When the RT is in preservice, the LIUs will transmit a DS1/T1 signal toward the connecting equipment, but will ignore the received DS1/T1 signal from the connecting equipment. When the protectors for the DS1/T1 facility are installed and all facility interface are optioned for the same line coding (B8ZS or AMI/ZCS), the RT-to-multiplexer connection can be verified by removing the RT LIU and checking for loss of DS1 signal at the multiplexer. The DDM-2000, DDM-1000, and DDM-Plus can be optioned NOT to activate alarms when an incoming signal is bad.

1.	Verify that the RT channel bank has been turned up in a preservice state.
2.	Install digital line protectors as required (at RT, Multiplexer, T1 repeater shelf,...).
3.	Verify that the multiplexer (DDM-2000, DDM-1000, or DDM-Plus optical mode) and T1 extension facility (DDM-Plus repeater mode or T1 repeater shelf, if used) have been turned up and tested end-to-end using the documentation for the type of equipment used.
4.	Add DS1 ports to the multiplexer (option switch settings or SET-STATE-T1 and SET-T1 command for the DDM-2000

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
multiplexer; SET-DSX-CODE command for the DDM-1000 multiplexer) with the line coding optioned the same as the RT LIUs.	
5. If the DDM-Plus optical mode is used, set line coding option on the OLIU and activate the DS1 ports by pressing **NE/ENABLE** and **DS1 SEL** push buttons at the same time. Then press **FE/ENABLE** and **DS1 SEL** push buttons at the same time.	
6. Verify that the multiplexer low speed interface loss of signal alarm is not active (flashing ALM for DDM-1000, flashing FAULT for DDM-2000, or flashing DS1 on DDM-Plus optical mode).	
7. At the RT channel bank, remove LIU A and verify loss of signal alarm at the multiplexer low speed interface circuit pack (flashing ALM for DDM-1000, flashing FAULT for DDM-2000, or flashing DS1 on DDM-Plus optical mode). Reinstall LIU A and repeat for LIUs B, C, and D as required. Comment: If a T1 extension facility is used, these procedures require a craft person at the multiplexer Hub to verify alarm responses. Comment: If you do not note the proper alarm responses, verify that cross-connections, protectors are installed, and the multiplexer is functioning properly using appropriate documentation for the type of equipment installed.	
8. To test the DS1 signal path for back-to-back multiplexers (DDM-2000/1000 to DDM-Plus optical mode), loopback the DDM-Plus toward the central office (at the RT site back to the Hub). Then connect a DS1 test set to the appropriate DSX Jacks at the central office. Verify that a test signal transmitted toward the RT is looped back to the receive side of the DS1 facility.	

Turn Up Series 5 RT Equipped for Feature Package I Mode 1, Mode 2, or Mode 4 Capability or Add to Existing RT

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. NOTE:
   This procedure assumes the following:

   - The DS1 spans are established in the *GTD*-5 EAX data base and are physically installed.
   - The outside cable pairs are not connected through to the remote terminal (RT) so that the RT is isolated from the digital and derived lines.
   - The frame or cabinet housing the RT has been installed.
   - The J1C182AH-1 dual channel bank assembly has been installed in the frame or cabinet enclosure.
   - The miscellaneous pair panel, protector connectors, power shelf, fan shelves, and battery shelves (if required) have been installed in the frame or cabinet enclosure.
   - The acceptance procedures in this volume have been performed.
   - The cabinet or frame supporting equipment has been turned up using procedures in this volume.
   - No RT channel units are installed in the system.

DO ITEMS BELOW IN ORDER LISTED **FOR DETAILS, GO TO**

This procedure contains instructions concerning the installation of the various units into the RT assembly shelves, and for verifying that the units are operating properly.

2.

NOTE:
This procedure equips and tests one or both systems (banks) of a dual bank assembly. Always equip the blue system first. When equipping either system, equip the AB shelf (lower) first.

Get support apparatus listed:

- 216-type tool (80-type cabinet only)
- Special key (allen-type wrench) - COMCODE 846244168 (51- and 80-type cabinet only)
- DMM (digital multimeter) with an accuracy of 1.0% and an AC/DC input impedance of ≥ 1 megohm
- One IBM-compatible PC
- Full Null modem cable (ED-7C730-30, G1 or equivalent).

ED-7C730-30, G1 EIA-232 Cable Wiring (Comcode 601382419)	
9-Pin Male Connector Pins	**9-Pin Female Connector Pins**
2	3
3	2
4	6
5	5
6	4
7	8
8	7

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
3.	⚠ CAUTION: *An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to **ESD GRD** jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.* NOTE: The term "facility shelf" is used throughout this procedure to refer to the middle shelf of the Series 5 RT. The remaining shelves will be referenced according to digroup name (for example, the shelf containing digroups A and B is referred to as the AB shelf). The white system refers to the two upper shelves of the Series 5 RT plus the right half of the facility shelf; the blue system refers to the two lower shelves of the Series 5 RT plus the left half of the facility shelf. Install 3-type protectors in protector panel for the shelf groups being equipped.	
4.	Verify, per work order, that the correct complement of circuit packs is available.	DLP-500
5.	If equipping the blue system, continue with Step **6**. If equipping the white system, go to Step **7**.	
6.	Install and test the power converter unit (**PCU**) in the facility shelf. Verify that the **PCU FAIL** LED lights and goes off. Verify -42 to -56 V DC between **GND** and **-48** jacks.	DLP-501

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
7. NOTE: Each system in a dual bank assembly requires a channel fuse unit (**CFU**). Install and check fuses in the channel fuse unit (**CFU**).	DLP-502
8. Install the fan control unit (**FCU**), if the 2( ) Fan Unit is installed.	DLP-504
9. NOTE: One alarm display unit (**ADU**) is required for each system. Set option switches for preservice and unequipped. Install the **ADU** and ignore alarms.	DLP-505
10. NOTE: One bank control unit (**BCU**) is required for each system. Install the **BCU**.	DLP-506
11. CAUTION: *Provisioning data will be corrupted (not cleared) if the ADU is removed while the PRV LED is lighted. Wait for the PRV indicator to go off before removing the ADU.* Remove the **ADU**. Change switch S1-5 from **ABU** to **ABE**. Change switch S1-6 from **CDU** to **CDE**. Set the **NORM/CLEAR** option plug for **NORM**. Reinstall the **ADU**. Ignore any alarms present on the **ADU** and **BCU**.	
12. Install and test the **PCU** in AB shelf. Verify that the **PCU FAIL** LED lights and goes off. Verify -42 to -56 V DC between **GND** and **-48** jacks.	DLP-507
13. Install an **AUA111** transmit/receive unit (**TRU**) in AB shelf. Verify that the **TRU FAIL** LED lights when the card is first installed, and then goes off within two minutes. If the **TRU**	

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
FAIL LED does not light or remains permanently lighted, then do **TAP–100** before continuing. Verify that the **ADU MJ**, **NE**, and **BCU A**, **B**, **C**, and **D** LEDs light and that all other **ADU/BCU** alarms are off. If not then do **TAP–102** before continuing.	
14. NOTE: The flash memory unit (**FMU**) contains the generic load for the **AUA161** master line interface unit (**MLIU**). The **FMU** must be loaded on initial installation through an off-line process. If the **FMU** already contains a generic load, the **MLIU** will be automatically loaded when installed. Install **FMU** (if not previously installed).	DLP-512
15. Set options and install an **AUA161 MLIU** in the **LIU-A** slot in the facility shelf. The **FAIL** LED on the **LIU** remains lighted steady and the **FMU BUSY** LED flashes to indicate that the **MLIU** is loading. If the **CLF** LED does not begin to flash after 2 minutes, do **TAP-101** before continuing. For a Mode 1 system, the digroup **A** LED on the **BCU** goes off within 30 seconds and the digroups **B**, **C**, and **D** remain lighted. For Mode 2 or Mode 4 systems, all digroup LEDs remain lighted.	DLP-513
16. CAUTION: *When installing a circuit pack in the Series 5 system, verify that the card type and location are correct. Failure to follow the specified procedures will result in loss of service.* If installing a FPI Mode 2 or 4 system continue with Step **17**. If installing a FPI Mode 1 system then set options and install an **AUA162 LIU** in the **LIU-B** slot in the facility shelf. The **FAIL** LED on the **LIU** lights while it is initializing. The **FAIL** LED goes off and the **CLF** LED begins to flash. If the **CLF** LED on the **LIU** does not begin to flash after 30 seconds, do **TAP-101** before continuing.	DLP-513

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	Within 30 seconds, the digroup **B** LED on the **BCU** goes off.	
17.	Install the **PCU** in CD shelf. Verify that the **PCU FAIL** LED lights and goes off. Verify -42 to -56 V DC between **GND** and **-48** jacks.	DLP-509
18.	Install an **AUA111 TRU** in CD shelf. Verify that the **TRU FAIL** LED lights and goes off. If not, do **TAP–100** before continuing.	
19.	Install **AUA162** or **AUA163** circuit pack in the **LIU-C** slot based on the mode of operation:	
	A. **Mode 1/Mode 2:** Set options and install an **AUA162 LIU** in the **LIU-C** slot in the facility shelf. The **FAIL** LED on the **LIU** lights while it is initializing and then goes off. The **CLF** LED on the **LIU** then flashes if the **LIU-C** is not groomed to the digital network. If the **CLF** LED on the **LIU** does not begin to flash after 30 seconds, do **TAP-101** before continuing. Groomed **LIU**s do not flash the **CLF** LED because they do not require initialization from the *GTD-5* switch.	DLP-513
	B. **Mode 4:** Install an **AUA163 EMU** (elastic memory unit) in the **LIU-C** the slot in the facility shelf. The **FAIL** LED on the **EMU** lights while it is initializing and then goes off. The **CLF** LED then flashes. If the **CLF** LED does not begin to flash after 30 seconds, do **TAP-101** before continuing.	
	For a Mode 1 system, the digroup **C** LED on the **BCU** goes off within 30 seconds and the digroup **D** LED remains lighted. For Mode 2 or Mode 4 systems, all digroup LEDs on the **BCU** go off within 30 seconds.	
20.	⚠ CAUTION: *When installing a circuit pack in the Series 5 system, verify that the card type and location are correct. Failure to follow the specified procedures will result in loss of service.*	

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
If installing a FPI Mode 2 or 4 system continue with Step **22.** If installing a FPI Mode 1 system then set options and install an **AUA162 LIU** in the **LIU-D** slot in the facility shelf. The **FAIL** LED on the **LIU** lights while it is initializing and then goes off. The **CLF** LED then flashes if the **LIU-D** is not groomed to the digital network. If the **CLF** LED does not begin to flash after 30 seconds, do **TAP-101** before continuing. Groomed **LIU**s do not flash the **CLF** LED because they do not require initialization from the *GTD-5* switch. Within 30 seconds, the digroup **D** LED on the **BCU** goes off. If equipping the system for **LIU-A** protection switching, the **MN** and **NE** LEDs remain lighted. Otherwise, all alarms, except **CLF** LED on the **LIU**s, clear.	DLP-513
21. NOTE: The system display unit (**SDU**) displays data [for example, automated channel test unit (**ACTU**) power-up and routine test results] stored in the bank controller memory. If required and not previously installed, install the **SDU** in the blue system between the **LIU-P** and **LSU** slot. Verify that the **FAIL** LED and all display segments on the **SDU** light for approximately 7 seconds and then go off. If not, do **TAP–100** before continuing.	
22. NOTE: The automatic channel test unit (**ACTU**) enables remote testing of channel units and subscriber lines beyond the remote terminal and also stores the results of channel unit type testing for display by the operations interface (OI). If required and not previously installed, install the **ACTU**. Verify that the **FAIL** LED on the **ACTU** lights and goes off. If	

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	not, check fuses on the **CFU** then do **TAP–100** before continuing.	
23.	If required and not previously installed, install the digital test unit-left (**DTU-L**) and then digital test unit-right (**DTU-R**). Verify that the **FAIL** LED on the **DTU-R** lights and goes off. If not, check fuses on the **CFU** then do **TAP–100** before continuing.	
24.	Perform RT LED test.	DLP-511
25.	If equipping additional shelves in dual bank assembly, go to Step **4**. Otherwise, continue with Step **26**.	
26.	NOTE: The RT is ready to be started by the *GTD-5* EAX as outlined in the End-to-End Tab section. Perform End-to-End Tab section procedures to complete the installation and turnup of the RT.	

Update office records.

Clear FAIL LED Problems on a Unit During Turnup and Conversion

Use this procedure when installing a unit, the unit's **FAIL** LED remains lighted or fails to light momentarily and go off. This procedure assumes there are no blown fuses on the **BFU**, **CFU**, or **LFU** fuse units and each **PIU** voltage (-42 to -56 V DC) is present. FPG and FPI cannot determine if a wrong version TRU (requires **AUA111 TRU**s) is installed using the LED TEST.

1. Press and hold **LED TEST** button on the **ADU**.

2. Do the LEDs on the common units light?

   If **YES**, proceed to Step **12**.
   If **NO**, continue with Step **3**.

3. Replace the bank control unit (**BCU**).

4. Press and hold **LED TEST** button on the **ADU**.

5. Do the LEDs on the common units light?

   If **YES**, proceed to Step **12**.
   If **NO**, continue with Step **6**.

6. Replace the **BCU** with the **BCU** removed previously.

7. Replace the alarm display unit (**ADU**).

8. Press and hold **LED TEST** button on the **ADU**.

9. Do the LEDs on the common units light?

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

10. Replace the **ADU** with the **ADU** removed previously.

11. Check the wiring using SD-7C117-01, SD-7C117-02, or SD-7C117-03. After locating and correcting the wiring trouble, go back to the NTP and reinstall the unit with the **FAIL** LED problem.

12. Is the **FAIL** LED on the suspect unit lighted?

    If **YES**, continue with Step **13**.
    If **NO**, proceed to Step **14**.

13. With the **LED TEST** button held, does the **FAIL** LED on the suspect unit go off?

    If **YES**, proceed to Step **24**.
    If **NO**, continue with Step **14**.

14. Replace the suspect unit with another unit of the same type.

15. Did the **FAIL** LED on the suspect unit light momentarily and then go off?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **16**.

16. Replace the unit with the unit removed previously.

17. Replace the **BCU**.

18. Did the **FAIL** LED on the suspect unit go off?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **19**.

19. Replace the **BCU** with the **BCU** removed previously.

20. Replace the **ADU**.

21. Did the **FAIL** LED on the suspect unit go off?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **22**.

22. Replace the **ADU** with the **ADU** removed previously.

23. Check the wiring using SD-7C117-01, SD-7C117-02, or SD-7C117-03. After locating and correcting the wiring trouble, go back to the NTP and reinstall the unit with the FAIL LED problem.

24. Release the **LED TEST** button. Is the **CMP** LED on the **ADU** lighted?

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

25. There is either a common unit or option switch incompatibility within the system. Either replace the incompatible unit with a compatible unit, or correct the option switch setting on the ADU or suspect unit itself.

    References: **DLP-505 (ADU), DLP-508 (FPG LIU), DLP-513 (FPI LIU)**

26. After correcting the incompatibility problem, did the **FAIL** LED on the suspect unit go off?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **27.**

27. Check the wiring using SD-7C117-01, SD-7C117-02, or SD-7C117-03. After locating and correcting the wiring trouble, go back to the NTP and reinstall the unit with the **FAIL** LED problem. If this fails to fix the **FAIL** LED problem, for FPG consult the AT&T Regional Technical Assistance Center (RTAC) by calling 1-800-225-RTAC or the local technical support group. For FPI consult the Technical Assistance Center (TAC) by calling 602-582-7305 or the local technical support group.

Clear CLF LED Problems on an LIU During Turn Up

General: Use this procedure when installing a *nongroomed* **LIU** with the **FMU** installed and loaded, the **CLF** indicator does not flash.

1. Is the **FAIL** LED on steady and **CLF** LED off?

   If **YES**, continue with Step **2**.
   If **NO**, proceed to Step **10**.

2. Remove the suspect **LIU** and check position of option switches.

   Reference: **DLP-513**

3. Reinstall the **LIU**.

4. Does the **CLF** indicator flash within two minutes?

   If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, continue with Step **5**.

5. Remove the **ADU** and ensure mode switch settings are set correctly.

6. Reinstall the **ADU**.

7. Is the **FAIL** LED on steady and **CLF** LED off?

   If **YES**, continue with Step **8**.
   If **NO**, proceed to Step **9**.

8. Replace **LIU** with another correctly optioned **LIU**.

9. Does the **CLF** indicator flash within two minutes?

   If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, continue with Step **10**.

10. Check the wiring using SD-7C118-01. Locate and correct problems.

11. Does the **CLF** indicator flash within two minutes?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **12**.

12. Are you installing **LIU-A**?

    If **YES**, continue with Step **13**.
    If **NO**, proceed to Step **18**.

13. Did **FMU BUSY** LED flash to indicate uploading?

    If **YES**, proceed to Step **16**.
    If **NO**, continue with Step **14**.

14. Replace **FMU** and follow procedures in **DLP-512** to install and load the new **FMU**. When properly installed, all diagnostics should pass.

15. Does the **CLF** indicator flash within two minutes?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **16**.

16. Check backplane wiring between **FMU** and suspect **LIU**. Isolate and correct any problems.

17. Does the **CLF** indicator flash within two minutes?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **18**.

18. Consult the Technical Assistance Center (TAC) by calling 602-582-7305 or the local technical support group.

Clear ADU Fail LED During Turn Up

General: Following the installation of **TRU** AB, the only **ADU/BCU** LEDs which should be lighted are:

- **ADU MJ,NE**
- **BCU A,B,C,D**

This procedure is used to clear any other **ADU/BCU** lamps which may be lighted.

1. Compare the **ADU** option switches with the switch settings specified in Table B of **DLP-505**.

   Are all **ADU** option switches set as specified in the table?

   If **YES** then go to Step **3.**
   If **NO** then continue with Step **2.**

   Comment: Some examples of ADU LEDs which could be lighted due to incorrect ADU switch settings are shown as follows:

   - ADU S1-8 set to LAN: ADU FAIL, MN, NE, LAN
   - ADU S2-4 set to DG and S2-5 set to DC: ADU FAIL, MN, NE
   - ADU S2-4 set to DG and S1-2 set to 2: ADU FAIL, MN, NE
   - ADU S1-3 set to ABI and S1-5 set to ABU: ADU FAIL, MN, NE
   - ADU S1-4 set to CDI and S1-6 set to CDU: ADU FAIL, MN, NE
   - ADU S2-3 set to CUT and NORM/CLEAR set to CLEAR: ADU FAIL, MN, NE

2. Set **ADU** option switches to correct settings and reinstall **ADU**.

   After about 45 seconds, are the **ADU MJ,NE** and **BCU A,B,C,D** LEDs on, and all other **ADU/BCU** LEDs off?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO** then continue with Step **3**.

3. Replace the **ADU**. Ensure that the option switch settings of the new **ADU** are correct.

   After about 45 seconds, are the **ADU MJ,NE** and **BCU A,B,C,D** LEDs on, and all other **ADU/BCU** LEDs off?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO** then continue with Step **4**.

4. Reinstall the original **ADU**. Replace the **BCU**.

   After about 45 seconds, are the **ADU MJ,NE** and **BCU A,B,C,D** LEDs on, and all other **ADU/BCU** LEDs off?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO** then go to Step **5**.

5. Consult either the local technical support group, or call the Technical Assistance Center (TAC) at 602-582-7305.

Verify That the Correct Complement of Circuit Packs is Available

1. Refer to Table A (FPG) or Table B (FPI) and determine circuit pack codes required for the Feature Package arrangement.

Table A
***SLC*® Series 5 FPG RT Common Unit Compatibility**

	No Operations Interface		With Operations Interface	
Circuit Pack	**M1**	**M2**	**M1**	**M2**
BCU	1 BCU is required for each system (blue and white).			
MC97775A1	R	R	R	R
ADU	1 ADU is required for each system (blue and white).			
AUB27	X	X		
AUB26	X	X	R	R
TRU	1 TRU is required for each equipped dual-digroup shelf.			
AUA111	R	R	R	R
LIU	1 LIU is required for each equipped digroup; except for Mode 2, where only LIU slots A and C need LIUs. Systems using protection switching require 1 additional LIU.			
AUA61D	X	X	X	X
AUA62D	X	X	X	X
AUA64D	X	X	X	X
CTU	1 CTU or ACTU for each RT dual-channel bank.			
AUB22	X	X	X	X
AUB25	X	X	X	X
or				
ACTU				
AUB30	X	X	X	X
DTU	1 DTU (1 of each code) for each RT dual-channel bank.			
AUA18	X	X	X	X
AUA19	X	X	X	X
SDU	1 SDU for each RT dual-channel bank.			
AUA8	X	X	X	X
SIU	1 SIU for up to 18 systems (9 RT dual-channel banks).			
AUA77			R *	R *
LSU	1 LSU for each system (blue and white) using protection switching.			
AUA73B	X	X	X	X

R = Required
X = Compatible
* Only required at one RT per site.

NOTE:
FPG specific cards AUA61D, AUA62D, and AUA64D are not compatible with and should not be installed in FPI systems.

Table B
***SLC*® Series 5 FPI RT Common Unit Compatibility**

	No Operations Interface			With Operations Interface		
Circuit Pack	**M1**	**M2**	**M4**	**M1**	**M2**	**M4**
BCU	1 BCU is required for each system (blue and white).					
MC97775A1	R	R	R	R	R	R
ADU	1 ADU is required for each system (blue and white).					
AUB28	R	R	R	R	R	R
TRU	1 TRU is required for each equipped dual-digroup shelf.					
AUA111	R	R	R	R	R	R
MLIU	1 MLIU is required for each system. Systems using protection switching require 1 additional MLIU.					
AUA161	R	R	R	R	R	R
LIU	The number of LIUs required for each configuration is listed below.					
AUA162	3	1	0	3	1	0
EMU	1 EMU is required for Mode 4 system configurations.					
AUA163			R			R
ACTU	1 ACTU for each RT dual-channel bank.					
AUB30	R	R	R	R	R	R
DTU	1 DTU (1 of each code) for each RT dual-channel bank.					
AUA18	X	X	X	X	X	X
AUA19	X	X	X	X	X	X
SDU	1 SDU for each RT dual-channel bank.					
AUA8	X	X	X	X	X	X
SIU	1 SIU is required to suport OI for up to 18 collocated systems (9 RT dual-channel banks).					
AUA77				X*	X*	X*
LSU	1 LSU for each system (blue and white) using protection switching.					
FMU	1 FMU is required for each RT dual-channel bank.					
AUB101	R	R	R	R	R	R

R = Required
X = Compatible
* Only required at one RT per site.

Install and Test Power Converter Unit (PCU) in Facility Shelf

SUMMARY: Install power converter unit (**PCU**) in facility shelf and verify that **FAIL** indicator goes off and remains off. Measure –42 to –56 V DC at **PCU** faceplate.

1. Get one **AUA11C PCU** and inspect for possible damage.

2. Insert **PCU** into **PCU** slot in facility (middle) shelf.

3. ⇛ NOTE:
   FAIL indicator on **PCU** may light momentarily when inserted into RT.

   Does **FAIL** indicator on **PCU** go off and remain off?

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

4. Remove **PCU** and install another **PCU.**

5. ⇛ NOTE:
   FAIL indicator on **PCU** may light momentarily when inserted into RT.

   Does **FAIL** indicator on **PCU** go off and remain off?

   If **YES,** then proceed to Step **8.**
   If **NO,** then continue with Step **6.**

6. Replace **PCU** with **PCU** removed previously.

7. Use SD-7C117-01, SD-7C117-02, or SD-7C117-03 to check bank wiring. Repeat procedure from Step **3** after locating and correcting trouble.

8. Condition DMM to measure volts DC.

9. On **PCU**, connect DMM test leads to **GND** jack and **–48** jack.

10. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **11.**

11. Verify that wiring from power shelf to **PCU** in facility shelf is present and connected properly.

12. Is wiring present and connected properly?

    If **YES,** then proceed to Step **14.**
    If **NO,** then continue with Step **13.**

13. Resolve problem through local procedures. Repeat procedure from Step **3** after locating and correcting trouble.

14. Replace **PCU** in facility shelf.

15. Is **FAIL** indicator on **PCU** off?

    If **YES,** then continue with Step **16.**
    If **NO,** then proceed to Step **4.**

16. On **PCU**, connect DMM test leads to **GND** jack and **–48** jack.

17. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **18.**

18. Replace **PCU** with **PCU** removed previously.

19. Is **PCU** being installed in a frame-type RT with bulk powering (J1C182BB bulk power shelf)?

    If **YES,** then proceed to Step **26.**
    If **NO,** then continue with Step **20.**

20. NOTE:
    Two dual bank assemblies share a common power shelf.

    Is **PCU** being installed in second dual bank assembly?

    If **YES,** then continue with Step **21.**
    If **NO,** then proceed to Step **25.**

21. Replace associated **336A RECTIFIER** located in power shelf.

22. On **PCU**, connect DMM test leads to **GND** jack and **–48** jack.

23. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **24.**

24. Replace **336A RECTIFIER** with **336A RECTIFIER** removed previously.

25. Check wiring using SD-7C117-01, SD-7C117-02, or SD-7C117-03. Repeat procedure from Step **3** after locating and correcting trouble.

26. Check fuses in RT dual bank assembly **LFU** and bulk power shelf **BFU.** If trouble is not found, check wiring at RT dual bank assembly and bulk power shelf using SD-7C117-01, SD-7C117-02, or SD-7C117-03 and SD-7C130-01, respectively. Repeat procedure from Step **3** after locating and correcting trouble.

27. Disconnect DMM test leads.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install AUA114 Channel Fuse Unit (CFU)

1. Get **AUA114** channel fuse unit (**CFU**) (Figure 1) and inspect for possible damage.

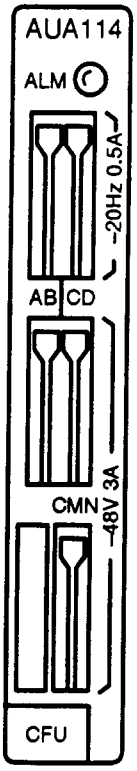


Figure 1 — AUA114 Channel Fuse Unit

2. Verify per Table A that fuse holders on faceplate of **CFU** contain correct value fuses and that fuses are not blown (fuse is blown when flag protrudes on faceplate). If a fuse is blown, use appropriate extractor tool (see Step 7) to replace fuse.

Table A AUA114 CFU Fuses		
Fuse Designation	**Size**	**Code**
20 HZ - AB	½A	WP90247 L103
20 HZ - CD	½A	WP90247 L103
–48V - AB	3A	WP90247 L110
–48V - CD	3A	WP90247 L110
–48V - CMN	3A	WP90247 L110

3. Install **CFU** into vacant **CFU** slot in upper or lower bank.

4. Does any fuse(s) in **CFU** blow?

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

5. Check wiring on dual bank assembly using SD-7C117-01, SD-7C117-02 or SD-7C117-03.

6. Is wiring correct?

   If **YES,** then get another **CFU** and proceed to Step **2.**
   If **NO,** then continue with Step **7.**

7. Repair wiring and use **WP0247 L201** insertion/extraction tool for **AUA114 CFU** to replace blown fuse(s).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Install AUA115 Line Fuse Unit (LFU) in RT Facility Shelf

1. Get one **AUA115** line fuse unit (**LFU**) (Figure 1) and inspect for possible damage.

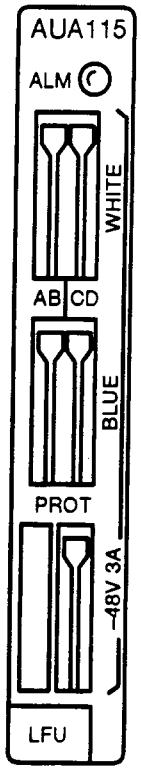


Figure 1 — AUA115 Line Fuse Unit

2. Verify that each fuse holder on faceplate of **LFU** contains 3.0A fuse (**WP90247 L110**) and that fuses are not blown (fuse is blown when flag protrudes on faceplate). If a fuse is blown, use appropriate extractor tool (see Step **7**) to replace fuse.

3. Install **LFU** into **LFU** slot in facility (middle) shelf.

4. Does any fuse(s) in **LFU** blow?

   If **YES,** then continue with Step **5.**
   If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5. Check wiring on dual bank assembly using SD-7C117-01, SD-7C117-02, or SD-7C117-03.

6. Is wiring correct?

   If **YES,** then get another **LFU** and proceed to Step **2.**
   If **NO,** then continue with Step **7.**

7. Repair wiring and use **WP0247 L201** insertion/extraction tool for **AUA115 LFU** to replace blown fuse(s).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Install Fan Control Unit (FCU)

1. ⚠ CAUTION:
Fan operation is essential to prevent system failures in the Series 5 RTs engineered and installed with fans.

Get one fan control unit (**AUA24 FCU** f1) and inspect for possible damage.

Comment: The **FCU** is not required if the 4A Fan Unit is used.

2. Insert **FCU** into **FCU** slot in upper shelf of system being equipped.

3. Press **FAN TEST** button on **FCU**.

Response: Fans should operate while button is pressed.

4. Do fans operate while **FAN TEST** button is pressed?

If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO,** then continue with Step **5.**

5. Is **–48V FAN H** or **–48V FAN L** fuse on **BFU** blown?

If **YES,** then continue with Step **6.**
If **NO,** then proceed to Step **11.**

6. Replace blown fuse(s) on **BFU**.

7. Press **FAN TEST** button on **FCU**.

Response: Fans should operate while button is pressed.

8. Do fans operate while **FAN TEST** button is pressed?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then continue with Step **9.**

9. Does **–48V FAN H** or **–48V FAN L** fuse on **BFU** blow again?

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

10. Check wiring using SD-7C118-01. Repeat procedure from Step **3** after locating and correcting trouble.

11. Replace **FCU.**

12. Press **FAN TEST** button on **FCU.**

    Response: Fans should operate while button is pressed.

13. Do fans operate while **FAN TEST** button is pressed?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **14.**

14. Replace **FCU** with **FCU** removed previously.

15. Is **FAN ALARM** indicator on fan shelf lighted?

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

16. Replace fan shelf and repeat from Step **3.**

17. Check wiring to fan shelf per SD-7C118-01. Repeat procedure from Step **3** after locating and correcting trouble.

Install Alarm Display Unit Optioned for Preservice and Unequipped

1. Get one alarm display unit (**ADU**), as required, and inspect for possible damage.

2. What version **ADU** do you have?

   If an **AUB27**, then proceed to Step **3**.
   If an **AUB28**, then proceed to Step **9**.

3. On **AUB27 ADU** option switch **S1** (Table A and Figure 1), use an orange stick (KS-6320, L1) or equivalent and set switch positions as follows:

   - **1** - Toward **NPL** for no protection switching.
   - **2** - Toward **2** for a Mode 2 system. Otherwise, toward **4**.
   - **3** - Toward **ABP**.
   - **4** - Toward **CDP**.
   - **5** - Toward **ABU**.
   - **6** - Toward **CDU**.
   - **7** - Toward **1MJ** if **MISC1** is to report a major alarm or toward **1MN** if **MISC1** is to report a minor alarm.
   - **8** - Toward **2MJ** if **MISC2** is to report a major alarm or toward **2MN** if **MISC2** is to report a minor alarm.

Table A
AUB27 Switch Setting

S1 Switch		
No Protection Line (***NPL***)	1	Protection Line (***PL***)
Mode 2 Operation (***2***)	2	Mode 1 Operation (***4***)
AB In-Service (***ABI***)	3	AB Preservice (***ABP***)
CD In-Service (***CDI***)	4	CD Preservice (***CDP***)
AB Equipped (***ABE***)	5	AB Unequipped (***ABU***)
CD Equipped (***CDE***)	6	CD Unequipped (***CDU***)
Major Alarm for MISC1 (***1MJ***)	7	Minor Alarm for MISC1 (***1MN***)
Major Alarm for MISC2 (***2MJ***)	8	Minor Alarm for MISC2 (***2MN***)
S2 Switch		
Use ***16***	1	13
FS Framing (***FS***) (Use ***FS.***)	2	ESF Framing (***FE***)
No Cutover Hunting (***NC***) (Use ***NC.***)	3	Cutover Hunting Enabled (***CUT***)
Use ***SGL***	4	***DBL***
Use ***PA*** to Enable the supplemental Data Link for FPG System with a Series 5 COT	5	Otherwise, Use ***NPA***
Use ***MJP*** to Enable Automated Channel Unit Testing	6	Otherwise, Use ***MNP***
S3 Switch		
Data Link (***DL***) (Always Use ***DL***)		No Data Link (***NDL***)
CLEAR/NORM Plug		
Clear Provisioning (Use ***CLEAR*** When ADU is First Installed in a New System)		Do Not Clear Provisioning (Use ***NORM*** for In-Service System)
S4, S5, S6, and S7 Rotary Switches		
System ID Number		
S8, S9, S10, and S11 Rotary Switches		
Unused (Set to 0)		

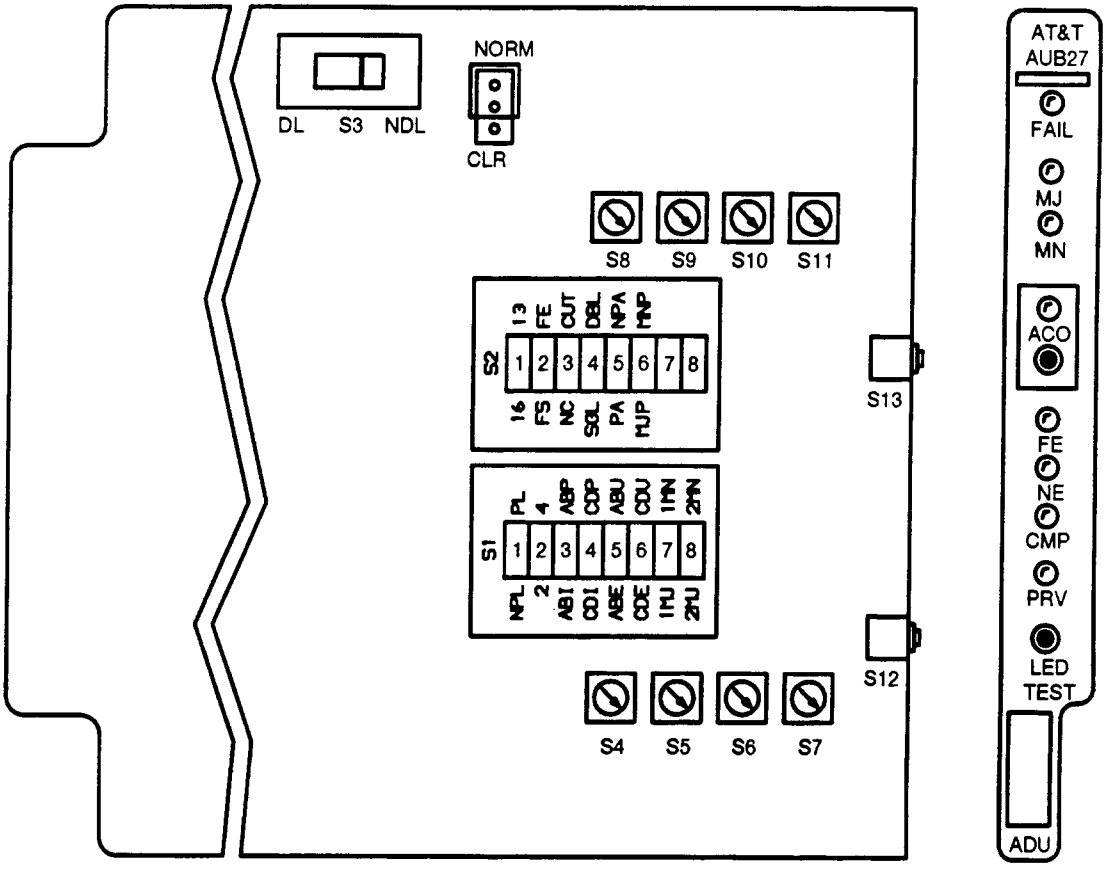


Figure 1 — AUB27 RT ADU Option Switch Settings

4. On **AUB27 ADU** option switch **S2** (Table A and Figure 1), use an orange stick (KS-6320) or equivalent and set switches as follows:

   - **1** - Toward **16**.
   - **2** - Toward **FS**.
   - **3** - Toward **NC**.
   - **4** - Toward **SGL**.
   - **5** - Toward **PA** to enable the supplemental data link for an FPG system with a Series 5 COT. Otherwise, toward **NPA**.

- **6** - Toward **MJP** to enable automated channel unit testing. Otherwise, toward **MNP**.
- **7** and **8** - Unused.

5. Set switch **S3** toward **DL**.

6. Set system identification rotary switches **S4** (most significant digit) through **S7** (least significant digit) to bank ID number.

7. Rotary switches **S8** through **S11** are unused (set to 0).

8. NOTE:
   The **NORM/CLEAR** switch option is used to automatically clear random channel provisioning data stored in the **ADU** and **BCU**.

   Set **NORM/CLEAR** option plug for **CLEAR** option (AUB27 center and bottom pins).

   Proceed to Step **13**.

9. On **AUB28 ADU** option switch S1 (Table B and Figure 2), use an orange stick (KS-6320, L1) or equivalent and set switch positions as follows:
   - **1** - Toward **NPL** for no protection switching.
   - **2** - Toward **2** for a Mode 2 or Mode 4 system. Otherwise, toward **4**.
   - **3** - Toward **ABP**.
   - **4** - Toward **CDP**.
   - **5** - Toward **ABU**.
   - **6** - Toward **CDU**.

- **7** - Toward **1MJ** if MISC1 is to report a major alarm or toward **1MN** if MISC1 is to report a minor alarm.
- **8** - Toward **NLAN**.

10. On **AUB28 ADU** option switch **S2** (Table B and Figure 2), use an orange stick (KS-6320, L1) or equivalent and set switch positions as follows:
    - **1** - Toward **PHY**.
    - **2** - Toward **FS**.
    - **3** - Toward **NC**.
    - **4** - Toward **NDG** for everything except D-Digroup grooming. For FPI with D-Digroup grooming select **DG**.
    - **5** - Toward **DC** to enable the supplemental data link for an FPG system with a Series 5 COT. Otherwise, toward **NDC**.
    - **6** - Toward **NAT**.
    - **7** - Toward **BU**.
    - **8** - Toward **DU**.
    - **9** - Toward **CA** to enable channel unit alarms. Otherwise, toward **NCA**.
    - **10** - Toward **C**.

11. Set system identification rotary switches **S3** (most significant digit) through **S6** (least significant digit) to bank ID number.

Table B
AUB28 Switch Setting

S1 Switch			**Required for FPI**
No Protection Line (***NPL***)	1	Protection Line (***PL***)	*
Mode 2 or Mode 4 Operation (***2***)	2	Mode 1 Operation (***4***)	*
AB In-Service (***ABI***)	3	AB Preservice (***ABP***)	ABP
CD In-Service (***CDI***)	4	CD Preservice (***CDP***)	CDP
AB Equipped (***ABE***)	5	AB Unequipped (***ABU***)	ABE
CD Equipped (***CDE***)	6	CD Unequipped (***CDU***)	CDE
Major Alarm for MISC1 (***1MJ***)	7	Minor Alarm for MISC1 (***1MN***)	*
No LAN (***NLAN***)	8	LAN (***LAN***)	** NLAN
S2 Switch			
Use ***PHY***	1	***TSI***	PHY
FS Framing (***FS***) (Use ***FS***)	2	ESF Framing (***FE***)	FS
No Cutover Hunting (***NC***) (Use ***NC***)	3	Cutover Hunting Enabled (***CUT***)	NC
Use ***NDG*** for everything except digroup D grooming	4	Use ***DG*** only for FPI with D-Digroup grooming	*
Use ***DC*** to Enable the supplemental Data Link for FPG System with a Series 5 COT	5	Otherwise, Use ***NDC***	NDC
Automated Testing (***AT***) (Use ***AT*** to Enable Automated Channel Unit Testing)	6	No Automated Testing (***NAT***)	** NAT
B DS1 Equipped (***BE***) (Use ***BE***)	7	B DS1 Unequipped (***BU***)	BU
D DS1 Equipped (***DE***) (Use ***DE***)	8	D DS1 Unequipped (***DU***)	DU
Channel Unit Alarm (***CA***) (Use CA to Enable Channel Unit Alarms)	9	**NCA** No Channel Unit Alarms	CA
Closed (***C***) - Unused	10	Open (***O***) - Unused	C
CLEAR/NORM Plug			
Clear Provisioning (Use ***CLEAR*** When ADU is First Installed In a New System)		Do Not Clear Provisioning (Use ***NORM*** for In-Service System)	
S3, S4, S5, and S6 Rotary Switches			
System ID Number			

* Options switch settings to be set based on system records.

** LAN and Automatic Channel Unit Testing option switches should be set to NO LAN and NAT, respectively, for the initial turn-up of the system. If required, these options can be enabled once the turn-up procedure has been completed.

12.

NOTE:
The **NORM/CLEAR** switch option is used to automatically clear random channel provisioning data stored in the **ADU** and **BCU** when the **BCU** is installed by selecting **CLEAR**. After the **BCU** has been installed, the **NORM** position is used.

Set **NORM/CLEAR** option plug for **CLEAR** option (AUB28 center and right pins).

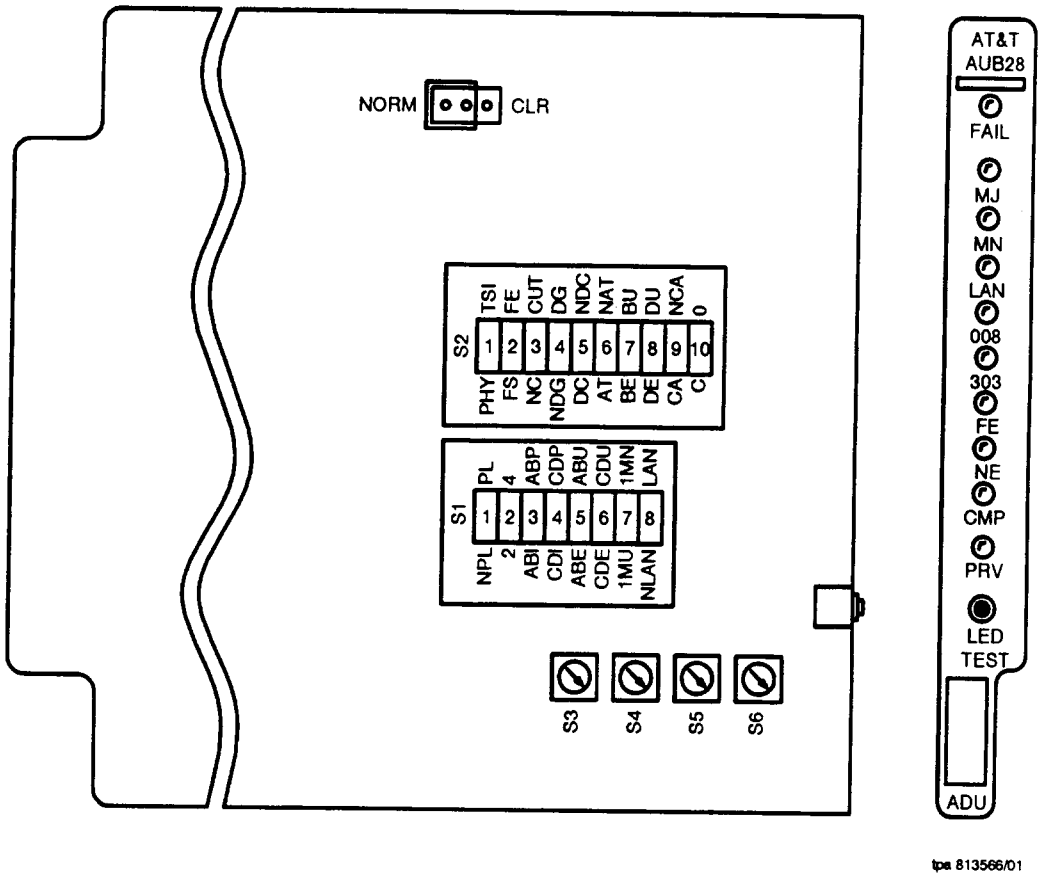


Figure 2 — AUB28 RT ADU Option Switch Settings

13.

⚠ CAUTION:
Incorrectly set **ADU** *option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.*

Insert **ADU** into lower **ADU** slot if equipping blue bank or upper **ADU** slot if equipping white bank.

Response: Disregard all indicators that may be lighted.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install Bank Control Unit

1. Get one bank control unit (**MC97775A1 BCU**), as required, and inspect for possible damage.

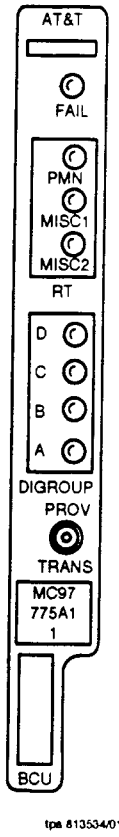


Figure 1 — MC97775A1 BCU Faceplate

2. NOTE 1:
MISC1 or **MISC2** LED may light if either is connected to an open door closure alarm. Deactivate miscellaneous alarm.

NOTE 2:
ADU LAN will light if the LAN cabling and SIU have not been installed and the **AUB28 ADU** is optioned for a LAN. You can change **AUB28 ADU (S1-8)** to **NLAN** to clear the **LAN** alarm.

Insert **BCU** into lower **BCU** slot if equipping blue bank or upper **BCU** slot if equipping white bank. After approximately 1 minute, all indicators except **PRV** LED (and possible **LAN**) on the **ADU** will go off.

Comment: Do not remove either the **ADU** or **BCU** while the **ADU PRV** indicator is lighted. It may take 2 or 3 minutes for provisioning data to transfer before the **PRV** LED goes off.

3. Are **FAIL** indicators on **BCU** and **ADU** off after 1 minute?

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

Comment: Clear power shelf trouble if you have alarm indicators other than **FAIL** or **LAN** (use AT&T 363-205-500G Maintenance TOP) before continuing with turn up procedures.

4. Replace **BCU**.

5. Are **FAIL** indicators on **BCU** and **ADU** off after 1 minute?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, then continue with Step **6**.

6. Replace **BCU** with **BCU** removed previously.

7. Replace **ADU**.

   ⚠ CAUTION:
   Incorrectly set **ADU** option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.

   Reference: **DLP-505**

8. Are **FAIL** indicators on **BCU** and **ADU** off after the appropriate time interval?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, then continue with Step **9**.

9. Replace **ADU** with **ADU** removed previously.

10. Check wiring using SD-7C117-01, SD-7C117-02, or SD-7C117-03. Repeat procedure from Step **2** after locating and correcting trouble.

Install and Test Power Converter Unit (PCU) in AB Shelf

SUMMARY: Install power converter unit (**PCU**) into AB shelf and verify that **FAIL** indicator is off. Measure –42 to –56 V DC at **PCU** faceplate.

1. Get one **AUA11C PCU** and inspect for possible damage.

2. Have a **CTU**, **ACTU**, and/or a **DTU** already been installed in the dual bank assembly?

   If **YES,** then continue with Step **3.**
   If **NO,** then proceed to Step **4.**

3. Insert **PCU** into AB (lower) shelf **PCU** slot of channel bank.

   Response: **ADU MJ** and **NE** and **BCU A, B DIGROUP** indicators are lighted and **PCU FAIL** indicator is off. **BCU C, D DIGROUP** indicators will also be lighted if C and D digroups are in the preservice and equipped state.

   Proceed to Step **5.**

4. Insert **PCU** into AB (lower) shelf **PCU** slot of channel bank.

   Response: **MN**, **NE**, and **FAIL** indicators on **ADU** are lighted and **FAIL** indicator on **PCU** is off.

5. Is **PCU FAIL** indicator off?

   If **YES,** then proceed to Step **10.**
   If **NO,** then continue with Step **6.**

6. Replace **PCU.**

7. Does **FAIL** indicator on **PCU** light and remain lighted?

   If **YES,** then continue with Step **8.**
   If **NO,** then proceed to Step **10.**

8. Replace **PCU** with **PCU** removed previously.

9. Use SD-7C117-01, SD-7C117-02, or SD-7C117-03 to check wiring. Repeat procedure from Step **2** after locating and correcting trouble.

10. Condition DMM to measure volts DC.

11. On **PCU** faceplate, connect DMM test leads to **GND** jack and **–48** jack.

12. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **22.**
    If **NO,** then continue with Step **13.**

13. Verify that wiring from power shelf to **PCU** in AB shelf is present and connected properly.

14. Is wiring present and connected properly?

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

15. Resolve problems through local procedures. Repeat procedure from Step **2** after locating and correcting trouble.

16. Replace **PCU**.

17. Is **FAIL** indicator on **PCU** off?

    If **YES,** then continue with Step **18.**
    If **NO,** then proceed to Step **6.**

18. On **PCU** faceplate, connect DMM test leads to **GND** jack and **–48** jack.

19. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **22.**
    If **NO,** then continue with Step **20.**

20. Replace **PCU** with **PCU** removed previously.

21. Check wiring using SD-7C117-01, SD-7C117-02, or SD-7C117-03. Repeat procedure from Step **2** after locating and correcting trouble.

22. Disconnect DMM test leads.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install PCU Unit in CD Shelf

SUMMARY: Install power converter unit (**PCU**) into CD shelf and verify that **FAIL** indicator is off. Measure –42 to –56 V DC at **PCU** faceplate.

1. Get one **AUA11C PCU** and inspect for possible damage.

2. Insert **PCU** into **PCU** slot in CD (upper) shelf of channel bank.

   Response: **MJ** and **NE** indicators on **ADU** and **DIGROUP C, D** indicators on **BCU** are lighted. **FAIL** indicator on **PCU** should be off.

3. Does **FAIL** indicator on **PCU** go off and remain off?

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

4. Replace **PCU.**

5. Does **FAIL** indicator on **PCU** go off and remain off?

   If **YES,** then proceed to Step **8.**
   If **NO,** then continue with Step **6.**

6. Replace **PCU** with **PCU** removed previously.

7. Use SD-7C117-01, SD-7C117-02, or SD-7C117-03 to check wiring. Repeat procedure from Step **2** after locating and correcting trouble.

8. Condition DMM to measure volts DC.

9. On **PCU** faceplate, connect DMM test leads to **GND** jack and **–48** jack.

10. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **11.**

11. Verify that wiring from power shelf to **PCU** in facility shelf is present and connected properly.

12. Is wiring present and properly connected?

    If **YES,** then proceed to Step **14.**
    If **NO,** then continue with Step **13.**

13. Resolve problem through local procedures. Repeat procedure from Step **2** after trouble is located and corrected.

14. Replace **PCU.**

15. Does **FAIL** indicator on **PCU** go off and remain off?

    If **YES,** then continue with Step **16.**
    If **NO,** then proceed to Step **4.**

16. On **PCU** faceplate, connect DMM test leads to **GND** jack and **–48** jack.

17. Does DMM indicate between –42 and –56 volts?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **18.**

18. Replace **PCU** with **PCU** removed previously.

19. Check wiring using SD-7C117-01, SD-7C117-02, or SD-7C117-03. Repeat procedure from Step **3** after locating and correcting trouble.

20. Disconnect DMM test leads.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform RT Indicator Test

1. Is **ADU CMP** LED lighted?

   If **YES**, then continue with Step **2**.
   If **NO**, then proceed to Step **6**.

2. Are any circuit pack **FAIL** LEDs lighted?

   If **YES**, then continue with Step **3**.
   If **NO**, then proceed to Step **5**.

3. Press and hold the **ADU LED TEST** button while observing the **FAIL** LED which was lighted in Step 2.

   Did the circuit pack **FAIL** LED go off?

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

4. Resolve the compatibility problem associated with the circuit pack whose **FAIL** LED went off in Step 3.

   Some common causes of compatibility errors are:

   - Incorrect circuit pack type. Refer to **DLP-500** for a list of the card types required by each feature package configuration.
   - Incorrect circuit pack location (wrong slot).
   - Incorrect option switch settings. Refer to DLP-503 for procedures to set ADU options. If installing FPI system, refer to **DLP-513** for the verification procedure of the **MLIU** (**AUA161**) or **SLIU** (**AUA162**) option switched.
   - Mode or grooming switches do not match the *GTD-5 EAX* data base (FPI only). Refer to Part 13 of the *GTD-5 EAX Users Guide for Series 5 FPI*, for a list of commands required to examine the *GTD-5 EAX* data base.

   After the compatibility error has been resolved, repeat the procedure from the beginning.

5. ⇛ NOTE:
This case implies the **FAIL** LED of the circuit pack causing the compatibility error is stuck on or off (for example, double fault). Also, there are certain configurations where the **EMU FAIL** LED and/or the **ADU CMP** LED will not light when the **EMU** is installed in the wrong slot.

   Release the **ADU LED TEST** button. Replace any circuit pack with the **FAIL** LED lighted. If the **EMU** is installed, verify that it is located in the correct slot. If the compatibility problem cannot be resolved, call 1-602-582-7305 for technical assistance.

   After the compatibility error has been resolved, repeat the procedure from the beginning.

6. Press and hold the **LED TEST** button on the alarm display unit (**ADU**).

7. Do all the LEDs listed in Table A light?

   If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO**, continue with Step **8**.

Table A
***SLC*® Series 5 RT LED Test**

Unit	LED(s) Lighted
AUB27 ADU	All LEDs while PRV flashes.
AUB28 ADU	All LEDs while 008 flashes.
BCU	All LEDs.
TRU	All LEDs.
LIU	All LEDs.
CTU or ACTU	FAIL FAIL and BLUE or WHITE
DTU-R	FAIL
FMU	No LED (FPI only)

8. Do any of the LEDs light?

   If **YES**, replace those units with LEDs that do not light and repeat from Step **1**.

   If **NO**, continue with Step **9**.

9. Replace the bank control unit (**BCU**).

10. Press and hold the **LED TEST** button on the **ADU**.

11. Do all the LEDs listed in Table A light?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

    If **NO**, continue with Step **12**.

12. Do any of the LEDs light?

    If **YES**, replace those units with LEDs that do not light and repeat from Step **1**.

    If **NO**, continue with Step **13**.

13. Replace the **BCU** with the **BCU** removed previously.

14. Replace the alarm display unit (**ADU**).

15. Press and hold the **LED TEST** button on the **ADU**.

16. Do all the LEDs listed in Table A light?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

    If **NO**, continue with Step **17.**

17. Do any of the LEDs light?

    If **YES**, replace those units with LEDs that do not light and repeat from Step **1.**

    If **NO**, continue with Step **18.**

18. Replace the **ADU** with the **ADU** removed previously.

19. Check the wiring using SD-7C117-01, SD-7C117-02, or SD-7C117-03. Repeat the procedure from Step **1** after locating and correcting the trouble.

Install AUB101 Flash Memory Unit (FMU)

1. Get one **AUB101 FMU** (Figure 1) and inspect for possible damage.

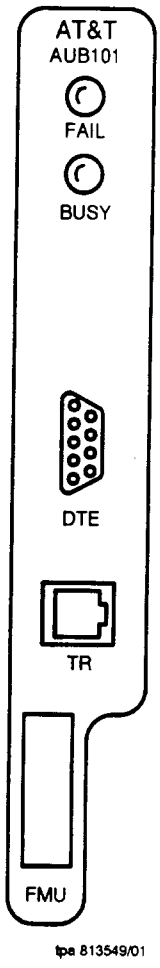


Figure 1. — AUB101 Faceplate Layout and Board Outline

2. Install **FMU** into the upper rightmost double slot of the white system.

3. Does **FAIL** indicator on the **FMU** light steady and then go out after 5 seconds?

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

4. Replace **FMU**.

5. Does **FAIL** indicator on the **FMU** light steady and then go out after 5 seconds?

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

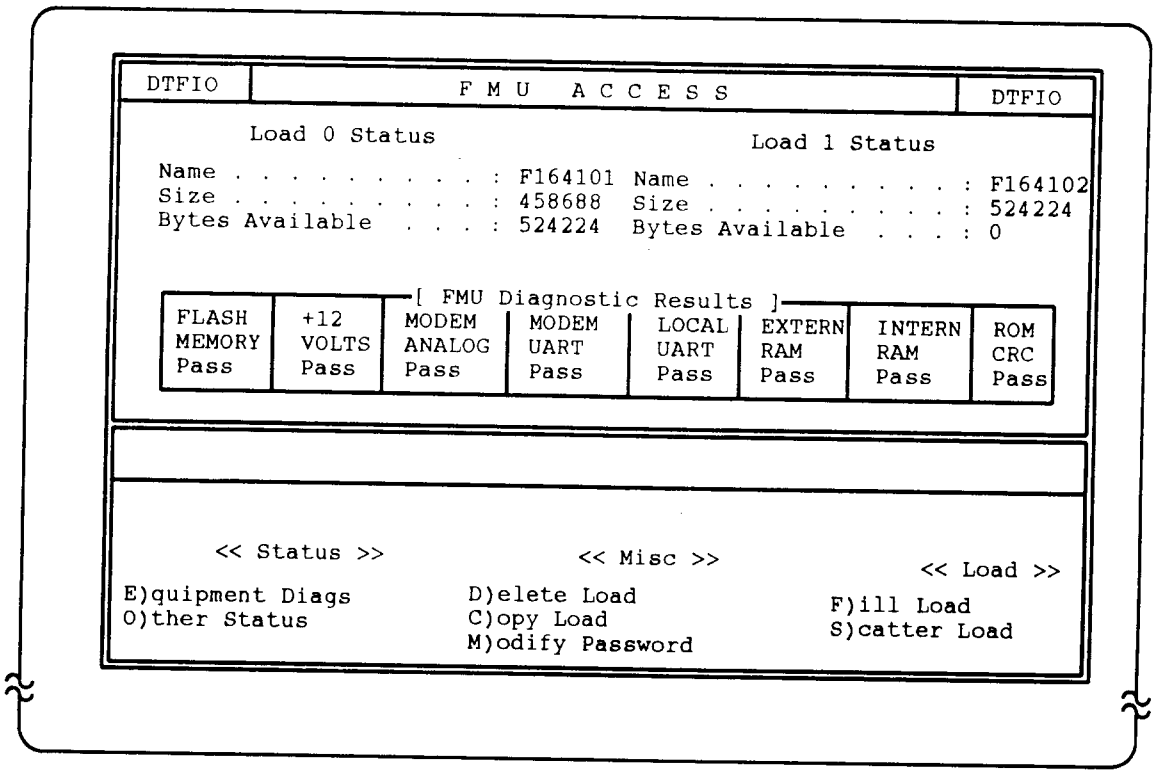
6. Consult the Technical Assistance Center (TAC) by calling 602-582-7305 or the local technical support group.

   Repeat procedure from Step **2** after locating and correcting trouble.

7. Connect a 9 pin FULL NULL MODEM (ED-7C730-30, G1 or equivalent cable) to the **DTE** connector on the faceplate of the **FMU**.

8. Connect the FULL NULL MODEM from the **FMU** faceplate to an IBM compatible PC and start the DTFIO software package on the PC (refer to DTFIO User Guide for bringup sequence).

9. From the DTFIO PC, set up a direct connection to the **FMU**. Once the **FMU** establishes connection with the DTFIO, it will transmit its load status and diagnostics results. The following is a typical *FMU ACCESS* DTFIO PC display screen (with sample load status information):



If the **FMU** load information and diagnostic results are displayed, go to Step **15**. Otherwise, continue with Step **10**.

10. Disconnect FULL NULL MODEM connector from **FMU** faceplate. Connect a different FULL NULL MODEM to the **DTE** connector on the **FMU** faceplate.

11. From the DTFIO PC, set up a direct connection to the **FMU**. Does **FMU** load information display on the DTFIO PC screen?

    If **YES**, then go to Step **15**.
    If **NO**, then continue with Step **12**.

12. Disconnect FULL NULL MODEM connector from **FMU** faceplate. Replace **FMU**. Reconnect FULL NULL MODEM to the **DTE** connector on the **FMU** faceplate.

13. From the DTFIO PC, set up a direct connection to the **FMU**. Does **FMU** load information display on the DTFIO PC screen?

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

14. Refer to DTFIO User Guide for trouble shooting procedures for the DTFIO and/or its PC. Repeat procedure from Step **9** after locating and correcting trouble.

15. NOTE:
    The **FMU** has no load stored in its memory as delivered from the factory. However, if the **FMU** has a load residing in its memory from a previous installation, it will be used to load the MLIUs installed in the dual bank assembly. If this is the incorrect load, it can be replaced by loading the **FMU** through the DTFIO.

    Follow local procedures for determining the correct **FMU** load identities.

16. Does the DTFIO PC screen display the correct **FMU** load identities?

    If **YES**, proceed to Step **26**.
    If **NO**, continue with Step **17**.

17. From the DTFIO PC, initiate a fill load of one of the copies of the **FMU** (refer to DTFIO User Guide for DTFIO operation). Using a 9600 bps local connection, the load of the **FMU** should take approximately 5-10 minutes.

18. Does the DTFIO PC screen indicate that the load transfer was successful?

    If **YES**, proceed to Step **26**.
    If **NO**, continue with Step **19**.

19. Does the DTFIO PC screen display that the load failed?

    If **YES**, go to Step **4**.
    If **NO**, continue with Step **20**.

20. From the DTFIO PC, attempt to load the **FMU** again.

21. Does the DTFIO PC screen indicate that the load transfer was successful?

    If **YES**, proceed to Step **26**.
    If **NO**, continue with Step **22**.

22. Replace the FULL NULL MODEM connector connecting the **FMU** to the DTFIO PC.

23. From the DTFIO PC, attempt to load the **FMU** again.

24. Does the DTFIO PC screen indicate that the load transfer was successful?

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

25. Refer to DTFIO User Guide for trouble shooting procedures for the DTFIO and/or its PC. Repeat procedure from Step **17** after locating and correcting trouble.

26. NOTE:
The **FMU** has no password stored in its memory as delivered from the factory. Additionally, the **FMU** could have a password in its memory from a previous installation. If no password is established or if an unknown password is present, dial-up connection will not be possible. Also, the password installed at the **FMU** must also be input at the central DTFIO location that will be remotely accessing this **FMU**.

Select "**M**odify Password" command from DTFIO menu and establish **FMU** password.

27. Disconnect the FULL NULL MODEM and DTFIO PC from the **FMU** faceplate and store appropriately.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Set the Option Switches on an FPI LIU

1. ⚠ CAUTION:
Incorrectly set **LIU** *option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream. All* **LIU**s *in the same bank should have identical option switch settings.*

Get desired version line interface unit (**AUA161** or **AUA162 LIU**) (Figure 1) and inspect for possible damage.

2. NOTE:
Equalizer switch settings should be identical for all **LIU**s that terminate to the same bank.

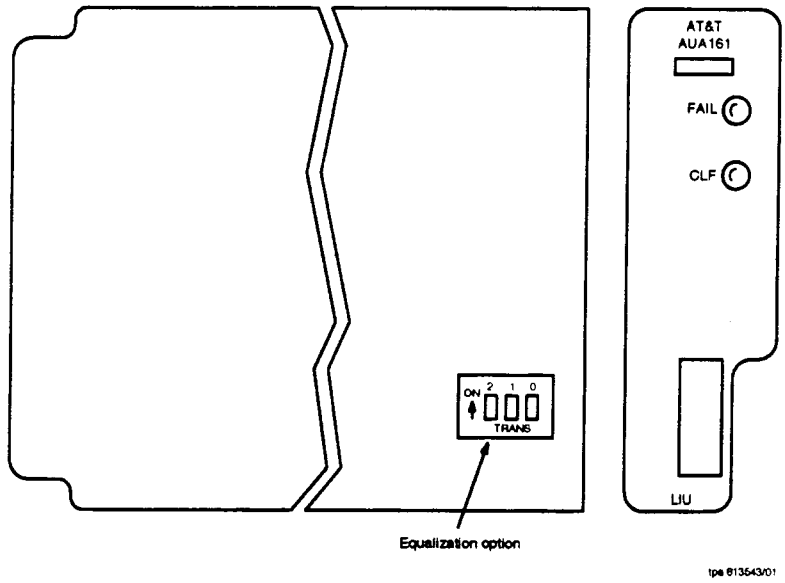
Using an orange stick (KS-6320, L1) or equivalent, set the equalizer switches (**S2**) per work order (Table A).

3. Is an **AUA162 LIU** being optioned?

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

4. Set the grooming switch to **G** if the **LIU** is inserted in **LIU-D** (Mode 1) or **LIU-C** (Mode 2) and the circuits in the corresponding digroups are to be groomed to the digital network (D type bank, DACS, ...).
Otherwise, set the switch to **N**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.



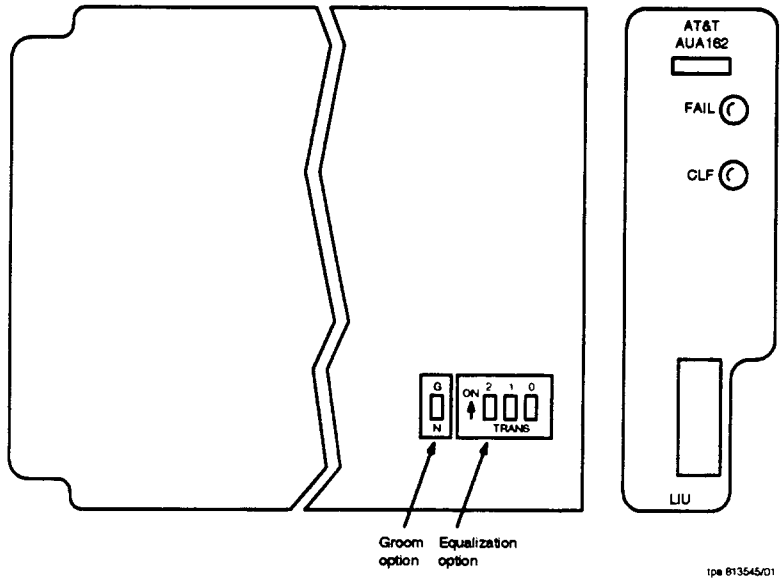


Figure 1 — AUA161 and AUA162 LIUs

Table A
AUA161 or AUA162
LIU Equalizer Settings

Distance to DSX-1 (Note 1)	Equalizer Switch (S2) Setting (Note 2)		
(Feet)	2	1	0
0-132	OFF	OFF	ON
133-265	OFF	ON	OFF
266-398	OFF	ON	ON
399-532	ON	OFF	OFF
533-655	ON	OFF	ON

Note 1: These distances are for ABAM cable used in central office. Refer to AT&T 915-710-115G for calculations for other types of cables used at collocated RT and T1 extension applications.

Note 2: Invalid setting of the equalization option will be shown by the **FAIL** LED lighting after the **LIU** is loaded.

RT Feature Package Conversions

Introduction

This tab provides procedures for converting a remote terminal (RT) system (blue or white) from a Feature Package C (FPC) or FPC-AutoCut system to Feature Package G (FPG) Mode 1, and converting FPG Mode 1 to FPG Mode 2, and FPG Mode 2 to FPG Mode 1. These conversions require craft personnel at both the central office terminal (COT) and the RT to minimize service interruption. This tab also provides procedures for converting a remote terminal (RT) system (blue or white) from a Feature Package C (FPC), FPC-AutoCut, or a Feature Package G (FPC) to Feature Package I (FPI).

Verify there are no system alarms on the alarm display unit (**ADU**) and bank control unit (**BCU**) before performing conversion procedures.

Preparation

Preparing for a conversion may involve adding or rearranging digital facilities, grooming special service circuits, and reassigning customer service in the CO switching equipment. The reason a system is converted from one feature package to another varies, but is usually done because of changes in customer service requirements or enhancements to central office switching equipment. The amount of preconversion testing and preparation depends mostly on why the conversion is necessary.

Grooming of special service circuits may be required when converting to a FPG Mode 1 to FPG Mode 2 system or when converting to a FPI Mode 2 or Mode 4 system. A Mode 2 or Mode 4 RT has channel slot (right 4 slots per digroup) restrictions. For special service circuits, grooming of special service circuits should be done before converting the feature package. FPI allows digroup D (Mode 1) or digroups C and D (Mode 2) to be groomed to a D-type bank at the central office DSX-1 cross-connect bay.

These procedures will maintain the channel unit provisioning data except when converting FPC to FPI.

Conversions

The FPG RT (see Figure 1) is supported with the **AUB27** or **AUB28** alarm display unit (**ADU**), the **MC97775A1** bank control unit (**BCU**), the **AUA111** version transmit/receive units (**TRU**s), and the **AUA6[ ]D** version line interface units (**LIU**s). The **AUB28 ADU** supports operations interface remote terminal local area network (RT LAN) applications.

The FPI RT (see Figure 2) is supported with the **AUB28** alarm display unit (**ADU**), the **MC97775A1** bank control unit (**BCU**), the **AUA111** version transmit/receive units (**TRU**s), the **AUB101** flash memory unit (**FMU**), and the **AUA161** (master LIU), **AUA162** (slave LIU), and **AUA163** (elastic memory unit) version line interface units (**LIU**s). The **AUB28 ADU** supports operations interface.

When changing the feature package configuration, the above circuit packs must be available. The conversion activities involve setting options and installing the appropriate circuit packs. Service interruption is unavoidable and conversion procedures should be performed when there are few or no active channels.

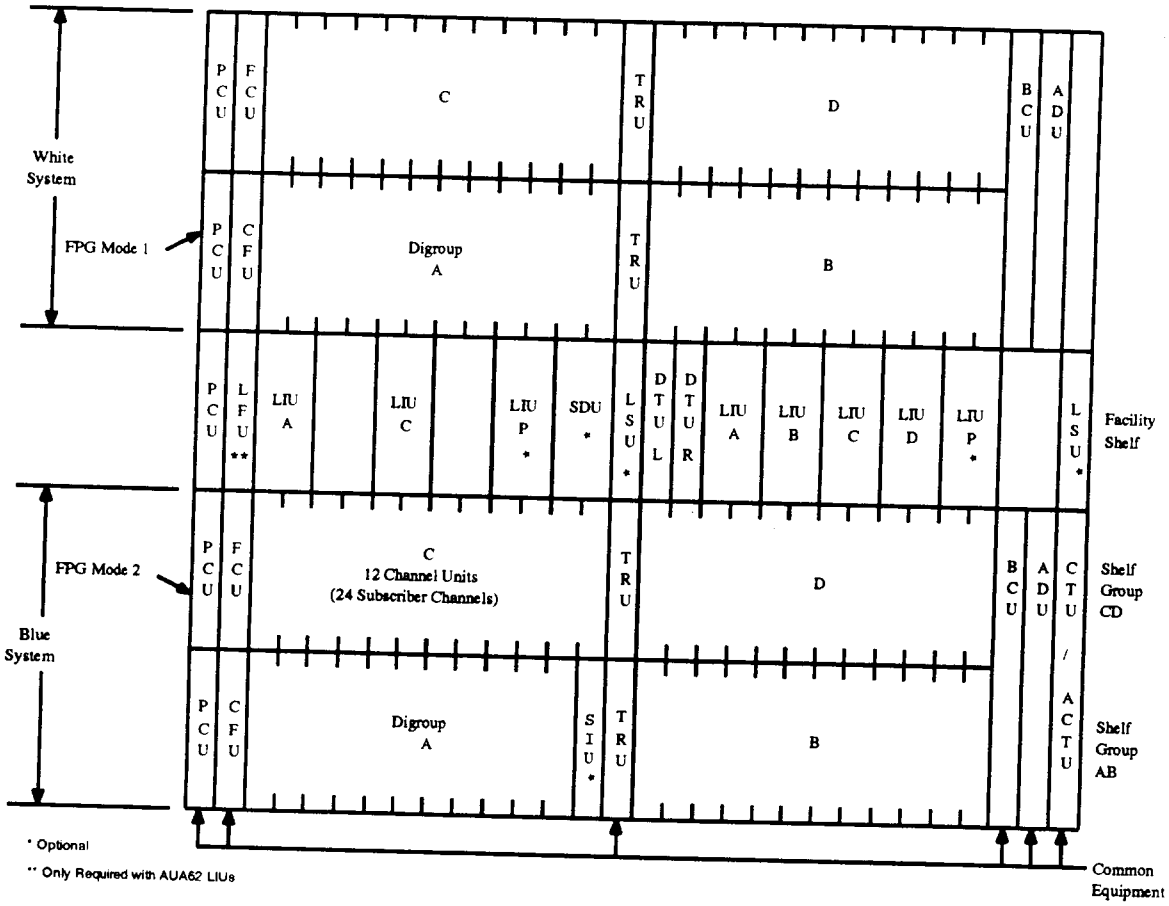


Figure 1 — Feature Package G Mode 1 (White) and Mode 2 (Blue) RT Channel Bank

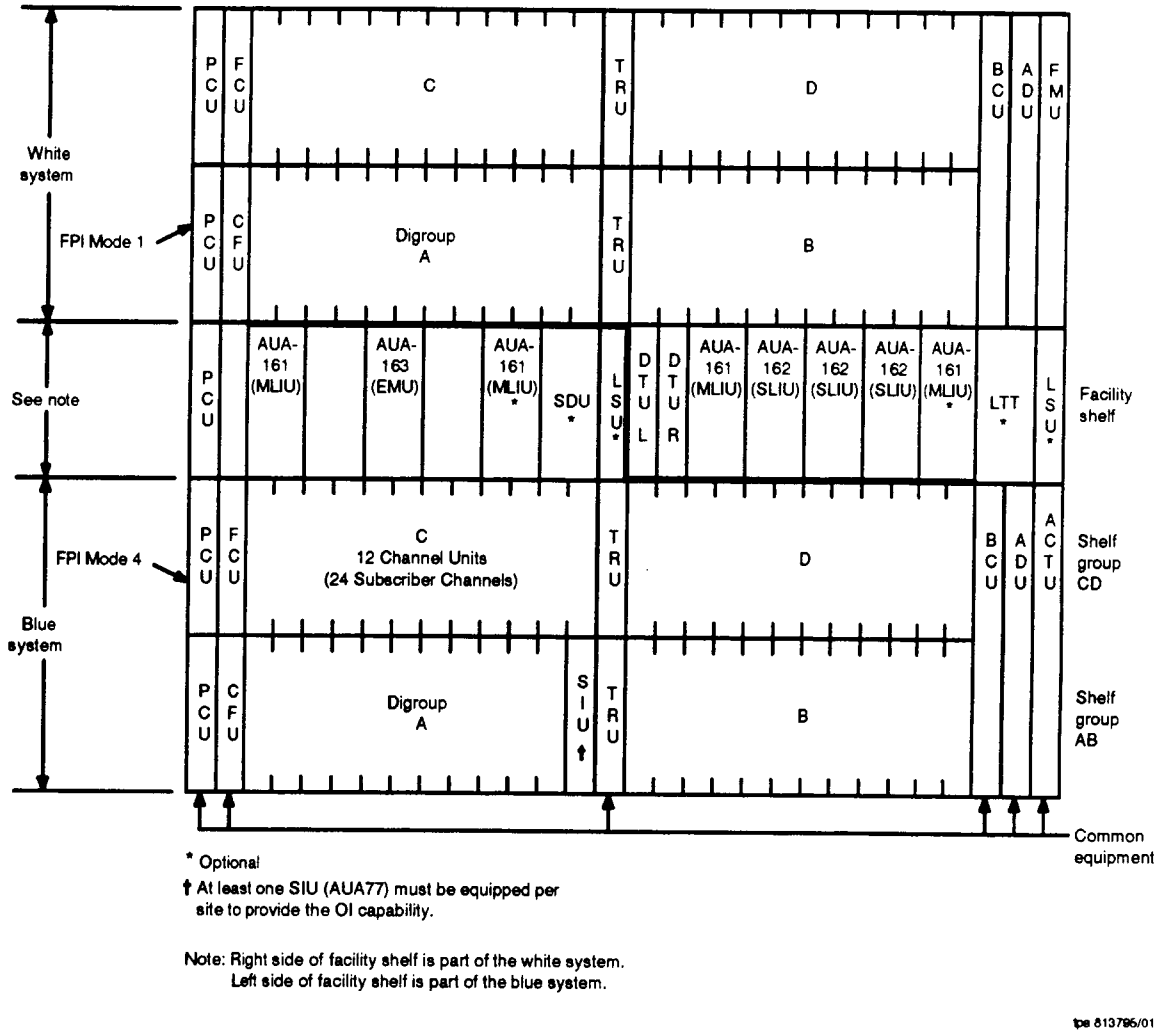


Figure 2 — Feature Package I Mode 1 (White) and Mode 4 (Blue) RT Channel Bank

Convert RT Channel Bank Feature Package
Task Index List

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO

FIND YOUR JOB IN THE LIST BELOW **THEN GO TO**

⚠ CAUTION:
With the introduction of additional features for the Series 5 system, it becomes imperative that personnel turning up an RT bank assembly use care when making settings on circuit packs (CPs) being installed and ensure that the correct codes of CPs are installed into the proper slots in the RT bank assembly. 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, bank slot position, and to make all CP option switch settings. Listed below are several indications that the craft personnel may use to determine whether an error has been made during RT bank conversions:

- When a CP is installed, the craftsperson should observe that the CP FAIL indicator lights momentarily and then goes off. The absence of this just powered up (JPU) signal indicates that the CP is faulty, or that it is incompatible with the feature package configuration being installed.
- If both the CP FAIL LED and the ADU CMP LED are lighted following installation of a common unit CP, then a compatibility error is indicated. The compatibility error can be caused by an incorrect type CP, incorrect CP location, or improper CP option setting. If the ADU CMP LED is lighted, then the craftsperson can verify whether the newly installed CP is causing the compatibility error as follows: While observing the FAIL LED of the CP, depress the ADU LED TEST button. With the exception of the ADU CP, the FAIL LED of the CP will not light if the CP is of the wrong type, in the wrong location, or optioned incorrectly.

NOTE:
There are certain configurations where the EMU FAIL LED and/or the ADU CMP LED will not light when the EMU is installed in the wrong slot.

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

Convert Feature Package C FPC POTS System to Feature Package I

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. ⇒ NOTE:
This procedure assumes the following:

   - The Digital Trunk Unit (DTU) from which this MXU will subtend at the *GTD-5* EAX is installed and operational.
   - The MXU identity has been added to the *GTD-5* EAX data base.
   - If the Directory Numbers assigned to the COT are to be reused on the Integrated RT, then an ODDC tape with the Delete DN and Add DN commands is available at the base unit.
   - Pair 1, used for Mode 1 data link, and Pair 2, used for remote FMU access, of the blue system are not assigned.

   This procedure contains instructions concerning the conversion of a Series 5 FPC all POTS system to the Integrated Mode of operation subtending from a *GTD-5* EAX Base Unit or RSU. The procedure requires a craftsperson at the RT and at the Base Unit. A craftsperson is also required at the RSU if the RT subtends from an RSU.

2. Get support apparatus listed:

   - 216-type tool (80-type cabinet only),

DO ITEMS BELOW IN ORDER LISTED **FOR DETAILS, GO TO**

- Special key (allen-type wrench) - COMCODE 846244168 (51-type and 80-type cabinet only),
- DMM (digital multimeter) with an accuracy of 1.0% and an AC/DC input impedance of >= 1 megohm.
- IBM-PC with DTFIO Capabilities plus Full Null Modem connector (ED-7C730-30 cable assembly or equivalent).

ED-7C730-30, G1 EIA-232 Cable Wiring (Comcode 601382419)	
9-Pin Male Connector Pins	**9-Pin Female Connector Pins**
2	3
3	2
4	6
5	5
6	4
7	8
8	7

3.

⚠ CAUTION:
An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to ***ESD GRD*** *jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.*

DO ITEMS BELOW IN ORDER LISTED | **FOR DETAILS, GO TO**

NOTE:
The term "facility shelf" is used throughout this procedure to refer to the middle shelf in the Series 5 RT. The remaining shelves will be referenced according to digroup name (for example, AB shelf contains digroups A and B). White system refers to the two upper shelves of the Series 5 RT plus the right half of the facility shelf and blue system refers to the two lower shelves of the Series 5 RT plus the left half of the facility shelf.

Verify, per work order, that the following complement of circuit packs are available.

- **MC97775A1 BCU** (1 per system)
- **AUB28 ADU** (1 per system)
- **AUB101 FMU** (1 per RT dual channel bank assembly)
- **AUA111 TRUs** (2, 1 for each dual digroup shelf)
- **AUA161 MLIU** (1 for digroup A, 1 for optional digroup P)
- **AUA162 SLIU** (3 for Mode 1, 1 for Mode 2, none for Mode 4)
- **AUA163 EMU** (1 for Mode 4 only)
- **AUB30 ACTU** (1 per RT dual channel bank assembly)

4. The following steps describe the method by which a COT/RT configuration is converted to an Integrated Remote Terminal configuration. Note that a Series 5 system consists of a Dual Channel Bank where each Channel Bank is a separate system sharing the same frame, power supplies etc. This procedure describes the steps necessary to create one MXU which will be one half of a dual channel bank. When converting a Dual Channel Bank with both channel banks equipped, the procedure needs to be repeated for the

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	second channel bank.	
5.	At central office, verify DSX Connections at the host site (Base or RSU). In order to minimize disruption to circuits served by the COT/RT, ensure that the DSX positions for the spans connecting the COT and RT are known. Also the DTU span connections to the DSX must be known. Install patch cords across the DSX-1 bay for the COT bank to RT bank digroups [**IN** (office side) to **OUT** (span side) and **OUT** to **IN**]. This patch around the DSX will interrupt service (if protection line is not available) while one end of the patch cord is inserted and the other end is not. Cut out cross-connect wiring associated with the COT to RT and install cross-connect wiring for Digital Trunk Unit to RT digital pairs.	
6.	Verify that the backplane has been upgraded to J1C182AH-1, which is the required version for Feature Package I.	
7.	If not previously installed, install a Flash Memory Unit (**AUB101**) into the upper rightmost double slot of the white system. This is an unused slot in the RT. The **FAIL** indicator should light and go off after about 30 seconds. If it does not go off, remove and reseat the **FMU**. If the problem persists, replace the **FMU**. The **FMU** is supplied from the factory with unprogrammed memories. The **FMU** will require loading using the DTFIO Package at this point.	DLP-503
8.	⚠ CAUTION: *The following Steps will put all customers of the channel bank into outage.* At the host DSX-1 bay for the COT, loop the RT Transmit and Receive span pairs back to the RT (change the DSX-1 patch made in Step 5 from across the DSX-1 to OUT to IN on the span side only). The **CLF** LED on all RT **LIU**s should light then go off, and digroup alarms on the **BCU**, and **ADU MJ** and **FE** LEDs will light. The COT alarms will light	

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	indicating loss of communication to the RT.	
9.	At central office, remove DSX-patch cords associated with the system being converted. This Step isolates the COT from the RT.	
10.	At RT, remove all **LIU**s from the Remote Channel Bank being converted. Do not disturb the **LIU**s in the other half of the Dual Channel Bank if this is not being upgraded at this time.	
11.	At RT remove the **AUB22 CTU** if installed. Install the **AUB30 ACTU**.	
12.	At RT, remove the **ADU**, **BCU**, and if installed, the **LSU**.	
13.	Option **AUB28 ADU**. Set the **NORM/CLEAR** plug to **CLEAR**. Install the **ADU** and ignore alarms.	DLP-502
14.	Install the **MC97775A1 BCU**. Verify that the **BCU** and **ADU fail** lamps light and then go out. If not, replace the **BCU** and/or **ADU**. Response: **ADU: MJ, NE, CMP** **BCU:** Digroup **A, B, C, D** **TRU: FAIL**	
15.	Replace the **TRU** in the AB and CD shelves with a **AUA111 TRU**. Verify that the **FAIL** LED on both **TRU**s light and go out.	
16.	Set the DS1 equalization switches on the **MLIU-A** and **SLIU**(s). These switches should be set to the same as those as Switch S2 of the **LIU AUA61D** just removed. Set the Grooming Switch to **G** for **SLIU-D** (Mode 1) or **SLIU-C** (Mode 2) if the corresponding digroups are to be groomed directly to a D4 Channel Bank. Set the grooming switch to **OFF** in all other cases.	DLP-504
17.	⚠ CAUTION: *Improper settings of the switches can lead to outages or service degradations*	

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	Install **MLIU** (**AUA161**) in the **LIU-A** slot. The **MLIU** will automatically request a download from the **FMU**. The **MLIU FAIL** LED will light and the **FMU BUSY** LED will begin to flash during the download. This process should take less than two minutes. The **CLF** lamp on the **MLIU** will start to flash when the load is complete and the **MLIU FAIL** LED goes off. If this does not occur, check the **FAIL** light on the **FMU**. If it is lighted, replace the **FMU**. If it is extinguished, replace the **MLIU**.	DLP-504
18.	Install **AUA162** or **AUA163** in place of **LIU-B**, **LIU-C**, and **LIU-D** according to required Mode: • Mode 1: equip **SLIU AUA162** in **LIU-B**, **LIU-C** and **LIU-D** slots. • Mode 2: equip **SLIU AUA162** in **LIU-C** slot only. • Mode 4: equip **EMU AUA163** in **LIU-C** slot only. As each **SLIU/EMU** is inserted, the **FAIL** LED will light and then go off after 30 seconds. The **CLF** LED should begin to flash on the **EMU** and *nongroomed* **SLIU**s, indicating that the **SLIU/EMU** is in communication with the **MLIU** and waiting for initialization from the *GTD-5* EAX switch. If the **CLF** does not begin to flash on the **EMU** or *nongroomed* **SLIU**s, replace the **SLIU/EMU**.	DLP-504
19.	Remove the loopback connections from the host DSX-1 bay. This should establish a connection from the RT to the *GTD-5* EAX DTU through the previously installed DSX cross connects (Step 5). The **CLF** lamps on all RT **LIU**s should light then continue to flash after a few seconds. If any **CLF** lamp becomes permanently lighted, the connection from that **LIU** to the *GTD-5* EAX is faulty. Check the span connections and correct the fault.	
20.	Remove the **ADU** and set the **NORM/CLEAR** plug to **NORM**. Reinstall the **ADU**.	
21.	At the *GTD-5* EAX ACDC terminal, enter Menu 8 and CONFIGURE the MXU.	

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

Comment: This step will be the first communication between the *GTD-5* EAX and the RT. A message is passed from the Remote Data Link Controller (RDLC) over the digital Link to the **MLIU** which then sends a response. The ACDC terminal should respond with "Successful Configuration". If this message is not displayed, a problem may exist in the MLIU, the Digital Trunk Unit (DTU) or the Digital Facility. Check that the Host Remote Link is configured as a DLINK and that the RDLC card is operational.

22. At the *GTD-5* EAX ACDC terminal, enter Menu 6 and LOAD the MXU.

Comment: The *GTD-5* EAX will send a LOAD message to the RT. This message indicates the load version that is required. The **MLIU**(s) will request the **FMU** to reload the correct load. The **FMU BUSY** LED flashes and the **MLIU FAIL** LED momentarily lights. When the **MLIU** has been loaded, it will send a Load Complete message to the *GTD-5* EAX. This will be indicated as a "Successful Load" message on the ACDC. If the **FMU** does not have the correct load, the **MLIU** will report this to the *GTD-5* EAX. A "Load Failure" message will be displayed and an SMA indicating that the load version is incorrect will be output to an I/O terminal. If this occurs, consult local procedures to reload the **FMU** with the correct load version. Repeat the LOAD command from the ACDC.

23. At the*GTD-5* EAX ACDC terminal, enter Menu 4 and START the MXU.

Comment: A "Successful Start" message should be displayed on the ACDC terminal. The I/O terminal will also output a message to indicate that the MXU has started. The **CLF** lamp on the **LIU**s should cease to

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
flash and all alarms should clear. It is very unlikely that the MXU will not start at this point as the previous steps have verified all connections and hardware integrity. If the MXU does not start, check to see if power has been cycled at the RT or some other change has occurred since the LOAD.	
24. If communications between the *GTD-5* EAX and the Remote Terminal fails to be established, check all DSX and span connections. Execute diagnostics on the DTU and associated equipment. Correct any failures according to the *GTD-5* EAX User Guide part 15. If communications still cannot be established and reversion to FPC POTS system is required, then perform the following backout procedures and terminate the conversion process: — Remove **FMU** — Remove **ED-7C717-30 Y** cable — Replace **ACTU** with **CTU** — Replace **AUB28 ADU** with original **ADU** — Replace **MC97775A1 BCU** with original **BCU** — Replace **AUA111 TRU**s with original **TRU**s — Replace **AUA161 LIU** with original **LIU** — Replace **SLIU/EMU**s with original **LIU**s — Replace **LSU**s if it was removed — Reconnect the spans back to the COT by replacing the DSX patch cords.	
25. At the *GTD-5* EAX switch host site, mount the ODDC tape and add the Directory Numbers to the MXU.	
26. At the RT, install the **FMU** line.	DLP-505
27. The Automatic Channel Unit Testing, and LAN options are currently disabled on the **ADU**. If either of these options are required, then remove the **ADU** and set the option switches as follows:	

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
— Set **S2-6** to **AT** to enable Automatic Channel Unit Testing, — Set **S1-8** to **LAN** to enable LAN. Reinstall the ADU and verify that the ADU FAIL LED goes off after a 45 second delay.	
28. This completes the conversion of the COT/RT to *GTD-5* EAX/RT Integrated operation. Ensure that dial tone can be obtained at a channel unit installed in the converted channel bank.	

Convert Feature Package C With Special Services to Feature Package I

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. ⇒ NOTE:
This procedure assumes the following:

- The Digital Trunk Unit (DTU) from which this MXU will subtend at the *GTD-5* EAX is installed and operational.
- The MXU identity has been added to the *GTD-5* EAX data base.
- If the Directory Numbers assigned to the COT are to be reused on the Integrated RT, then an ODDC tape with the Delete DN and Add DN commands is available at the base unit.
- Pair 1, used for Mode 1 data link, and Pair 2, used for remote FMU access, of the blue system are not assigned.

This procedure contains instructions concerning the conversion of a Series 5 FPC system with special services to the Integrated Mode of operation subtending from a *GTD-5* EAX Base Unit or RSU. The procedure requires a craftsperson at the RT and at the Base Unit. A craftsperson is also required at the RSU if the RT subtends from an RSU.

⇒ NOTE:
During this conversion, Provisioning Data for the Special Service circuits will be lost. It will be necessary to reprovision all special service channel units after the conversion is completed.

DO ITEMS BELOW IN ORDER LISTED | **FOR DETAILS, GO TO**

2. Get support apparatus listed:

   - 216-type tool (80-type cabinet only),
   - Special key (allen-type wrench) - COMCODE 846244168 (51-type and 80-type cabinet only),
   - DMM (digital multimeter) with an accuracy of 1.0% and an AC/DC input impedance of >= 1 megohm.
   - IBM-PC with DTFIO Capabilities plus Full Null Modem connector (ED-7C730-30 cable assembly or equivalent).

ED-7C730-30, G1 EIA-232 Cable Wiring (Comcode 601382419)	
9-Pin Male Connector Pins	**9-Pin Female Connector Pins**
2	3
3	2
4	6
5	5
6	4
7	8
8	7

   - Craft Interface Unit (CIU).

3. ⚠ CAUTION:
An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to ***ESD GRD*** *jack on*

DO ITEMS BELOW IN ORDER LISTED | **FOR DETAILS, GO TO**

the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.

NOTE:
The term "facility shelf" is used throughout this procedure to refer to the middle shelf in the Series 5 RT. The remaining shelves will be referenced according to digroup name (for example, AB shelf contains digroups A and B). White system refers to the two upper shelves of the Series 5 RT plus the right half of the facility shelf and blue system refers to the two lower shelves of the Series 5 RT plus the left half of the facility shelf.

Verify, per work order, that the following complement of circuit packs are available.

- **MC97775A1 BCU** (1 per system)
- **AUB28 ADU** (1 per system)
- **AUB101 FMU** (1 per RT dual channel bank assembly)
- **AUA111 TRUs** (2, 1 for each dual digroup shelf)
- **AUA161 MLIU** (1 for digroup A, 1 for optional digroup P)
- **AUA162 SLIU** (3 for Mode 1, 1 for Mode 2, none for Mode 4)
- **AUA163 EMU** (1 for Mode 4 only)
- **AUB30 ACTU** (1 per RT dual channel bank assembly)

4. The following steps describe the method by which a COT/RT configuration is converted to an Integrated Remote Terminal configuration. Note that a Series 5 system consists of a Dual Channel Bank where each Channel Bank is a separate system sharing the same frame, power supplies etc. This procedure describes the steps necessary to create

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	one MXU which will be one half of a dual channel bank. When converting a Dual Channel Bank with both channel banks equipped, the procedure needs to be repeated for the second channel bank.	
5.	At central office, verify DSX Connections at the host site (Base or RSU). In order to minimize disruption to circuits served by the COT/RT, ensure that the DSX positions for the spans connecting the COT and RT are known. Also the DTU span connections to the DSX must be known. Install patch cords across the DSX-1 bay for the COT bank digroups [**IN** (office side) to **OUT** (span side) and **OUT** to **IN**]. This patch around will interrupt service (if protection line is not available) while one end of the patch cord is inserted and the other end is not. Cut out cross-connect wiring associated with the COT to RT and install cross-connect wiring for Digital Trunk Unit to RT digital pairs.	
6.	Verify that the backplane has been upgraded to J1C182AH-1, which is the required version for Feature Package I.	
7.	If not previously installed, install a Flash Memory Unit (**AUB101**) into the upper rightmost double slot of the white system. This is an unused slot in the RT. The **FAIL** indicator should light and go off after about 30 seconds. If it does not go off, remove and reseat the **FMU**. If the problem persists, replace the **FMU**. The **FMU** is supplied from the factory with unprogrammed memories. The **FMU** will require loading using the DTFIO Package at this point.	DLP-503
8.	Connect the Craft Interface Unit to the **CTU**. For each Special Service Channel Unit, validate the provisioning data against office records. Invoke local procedures to resolve any discrepancies.	
9.	⚠ CAUTION: *The following Steps will put all customers of the channel bank into outage.*	

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
At the host DSX-1 bay for the COT, loop the RT Transmit and Receive span pairs back to the RT (change the DSX-1 patch made in Step 5 from across the DSX-1 to OUT to IN on the span side only). The **CLF** LED on all RT **LIU**s should light then go off, and digroup alarms on the **BCU**, and **ADU MJ** and **FE** LEDs will light. The COT alarms will light indicating loss of communication to the RT.	
10. At central office, remove DSX-patch cords associated with the system being converted. This Step isolates the COT from the RT.	
11. At RT, remove all **LIU**s from the Remote Channel Bank being converted. Do not disturb the **LIU**s in the other half of the Dual Channel Bank if this is not being upgraded at this time.	
12. At RT remove the **AUB22 CTU** if installed. Install the **AUB30 ACTU**.	
13. At RT, remove the **ADU**, **BCU**, and if installed, the **LSU**.	
14. Option **AUB28 ADU**. Set the **NORM/CLEAR** plug to **CLEAR**. Install the **ADU** and ignore alarms.	DLP-502
15. Install the **MC97775A1 BCU**. Verify that the **BCU** and **ADU fail** lamps light and then go out. If not, replace the **BCU** and/or **ADU**. Response: **ADU: MJ, NE, CMP** **BCU:** Digroup **A, B, C, D** **TRU: FAIL**	
16. Replace the **TRU** in the AB and CD shelves with a **AUA111 TRU**. Verify that the **FAIL** LED on both **TRU**s light and go out.	
17. Set the DS1 equalization switches on the **MLIU-A** and **SLIU**(s). These switches should be set to the same as those as Switch S2 of the **LIU AUA61D** just removed. Set the Grooming Switch to **G** for **SLIU-D** (Mode 1) or **SLIU-C** (Mode 2) if the corresponding digroups are to be groomed directly to a D4 Channel Bank. Set the grooming switch to	DLP-504

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
OFF in all other cases.	
18. ⚠ CAUTION: *Improper settings of the switches can lead to outages or service degradations* Install **MLIU** (**AUA161**) in the **LIU-A** slot. The **MLIU** will automatically request a download from the **FMU**. The **MLIU FAIL** LED will light and the **FMU BUSY** LED will begin to flash during the download. This process should take less than two minutes. The **CLF** lamp on the **MLIU** will start to flash when the load is complete and the **MLIU FAIL** LED goes off. If this does not occur, check the **FAIL** light on the **FMU**. If it is lighted, replace the **FMU**. If it is extinguished, replace the **MLIU**.	DLP-504
19. Install **AUA162** or **AUA163** in place of **LIU-B**, **LIU-C**, and **LIU-D** according to required Mode: • Mode 1: equip **SLIU AUA162** in **LIU-B**, **LIU-C** and **LIU-D** slots. • Mode 2: equip **SLIU AUA162** in **LIU-C** slot only. • Mode 4: equip **EMU AUA163** in **LIU-C** slot only. As each **SLIU/EMU** is inserted, the **FAIL** LED will light and then go off after 30 seconds. The **CLF** LED should begin to flash on the **EMU** and *non-groomed* **SLIU**s, indicating that the **SLIU/EMU** is in communication with the **MLIU** and waiting for initialization from the *GTD-5* EAX switch. If the **CLF** does not begin to flash on the **EMU** or *non-groomed* **SLIU**s, replace the **SLIU/EMU**.	DLP-504
20. Remove the loop back connections from the host DSX-1 bay. This should establish a connection from the RT to the *GTD-5* EAX DTU through the previously installed DSX cross connects (Step 5). The **CLF** lamps on all RT **LIU**s should light then continue to flash after a few seconds. If any **CLF** lamp becomes permanently lighted, the connection from that **LIU** to the *GTD-5* EAX is faulty. Check the span connections	

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

and correct the fault.

21. Remove the **ADU** and set the **NORM/CLEAR** plug to **NORM**. Reinstall the **ADU**.

22. At the *GTD-5* EAX ACDC terminal, enter Menu 8 and CONFIGURE the MXU.

    Comment: This step will be the first communication between the *GTD-5* EAX and the RT. A message is passed from the Remote Data Link Controller (RDLC) over the digital Link to the **MLIU** which then sends a response. The ACDC terminal should respond with "Successful Configuration". If this message is not displayed, a problem may exist in the MLIU, the Digital Trunk Unit (DTU) or the Digital Facility. Check that the Host Remote Link is configured as a DLINK and that the RDLC card is operational.

23. At the *GTD-5* EAX ACDC terminal, enter Menu 6 and LOAD the MXU.

    Comment: The *GTD-5* EAX will send a LOAD message to the RT. This message indicates the load version that is required. The **MLIU**(s) will request the **FMU** to reload the correct load. The **FMU BUSY** LED flashes and the **MLIU FAIL** LED momentarily lights. When the **MLIU** has been loaded, it will send a Load Complete message to the *GTD-5* EAX. This will be indicated as a "Successful Load" message on the ACDC. If the **FMU** does not have the correct load, the **MLIU** will report this to the *GTD-5* EAX. A "Load Failure" message will be displayed and an SMA indicating that the load version is incorrect will be output to an I/O terminal. If this occurs, consult local

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

procedures to reload the **FMU** with the correct load version. Repeat the LOAD command from the ACDC.

24. At the *GTD-5* EAX ACDC terminal, enter Menu 4 and START the MXU.

    Comment: A "Successful Start" message should be displayed on the ACDC terminal. The I/O terminal will also output a message to indicate that the MXU has started. The **CLF** lamp on the **LIU**s should cease to flash and all alarms should clear. It is very unlikely that the MXU will not start at this point as the previous steps have verified all connections and hardware integrity. If the MXU does not start, check to see if power has been cycled at the RT or some other change has occurred since the LOAD.

25. If communications between the *GTD-5* EAX and the Remote Terminal fails to be established, check all DSX and span connections. Execute diagnostics on the DTU and associated equipment. Correct any failures according to the *GTD-5* EAX User Guide part 15. If communications still cannot be established and reversion to FPC POTS system is required, then perform the following backout procedures and terminate the conversion process:

    — Remove **FMU**

    — Remove **ED-7C717-30 Y** cable

    — Replace **ACTU** with **CTU**

    — Replace **AUB28 ADU** with original **ADU**

    — Replace **MC97775A1 BCU** with original **BCU**

    — Replace **AUA111 TRU**s with original **TRU**s

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
— Replace **AUA161 LIU** with original **LIU** — Replace **SLIU/EMU**s with original **LIU**s — Replace **LSU**s if it was removed — Reconnect the spans back to the COT by replacing the DSX patch cords.	
26. At the *GTD-5* EAX switch host site, mount the ODDC tape and add the Directory Numbers to the MXU.	
27. Connect the Craft Interface Unit to the **CTU** or **ACTU**. Reprovision all Special Service Channel Units per office records.	
28. At the RT, install the **FMU** line.	DLP-505
29. The Automatic Channel Unit Testing, and LAN options are currently disabled on the **ADU**. If either of these options are required, then remove the **ADU** and set the option switches as follows: — Set **S2-6** to **AT** to enable Automatic Channel Unit Testing, — Set **S1-8** to **LAN** to enable LAN. Reinstall the ADU and verify that the ADU FAIL LED goes off after a 45 second delay.	
30. This completes the conversion of the COT/RT to *GTD-5* EAX/RT integrated operation. Ensure that dial tone can be obtained at a channel unit installed in the converted channel bank.	

Clear FAIL LED Problems on a Unit During Turnup and Conversion

Use this procedure when installing a unit, the unit's **FAIL** LED remains lighted or fails to light momentarily and go off. This procedure assumes there are no blown fuses on the **BFU**, **CFU**, or **LFU** fuse units and each **PIU** voltage (-42 to -56 V DC) is present.

1. Press and hold **LED TEST** button on the **ADU**.

2. Do the LEDs on the common units light?

   If **YES**, proceed to Step **12**.
   If **NO**, continue with Step **3**.

3. Replace the bank control unit (**BCU**).

4. Press and hold **LED TEST** button on the **ADU**.

5. Do the LEDs on the common units light?

   If **YES**, proceed to Step **12**.
   If **NO**, continue with Step **6**.

6. Replace the **BCU** with the **BCU** removed previously.

7. Replace the alarm display unit (**ADU**).

8. Press and hold **LED TEST** button on the **ADU**.

9. Do the LEDs on the common units light?

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

10. Replace the **ADU** with the **ADU** removed previously.

11. Check the wiring using SD-7C117-01 or SD-7C117-02. After locating and correcting the wiring trouble, go back to the NTP and reinstall the unit with the **FAIL** LED problem.

12. Is the **FAIL** LED on the suspect unit lighted?

    If **YES**, continue with Step **13**.
    If **NO**, proceed to Step **14**.

13. With the **LED TEST** button held, does the **FAIL** LED on the suspect unit go off?

    If **YES**, proceed to Step **24**.
    If **NO**, continue with Step **14**.

14. Replace the suspect unit with another unit of the same type.

15. Did the **FAIL** LED on the suspect unit light momentarily and then go off?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **16**.

16. Replace the unit with the unit removed previously.

17. Replace the **BCU**.

18. Did the **FAIL** LED on the suspect unit go off?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **19**.

19. Replace the **BCU** with the **BCU** removed previously.

20. Replace the **ADU**.

21. Did the **FAIL** LED on the suspect unit go off?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **22**.

22. Replace the **ADU** with the **ADU** removed previously.

23. Check the wiring using SD-7C117-01 or SD-7C117-02. After locating and correcting the wiring trouble, go back to the NTP and reinstall the unit with the FAIL LED problem.

24. Release the **LED TEST** button. Is the **CMP** LED on the **ADU** lighted?

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

25. There is either a common unit or option switch incompatibility within the system. Either replace the incompatible unit with a compatible unit, or correct the option switch setting on the ADU or suspect unit itself.

    References: **DLP-501 (ADU)**

26. After correcting the incompatibility problem, did the **FAIL** LED on the suspect unit go off?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **27.**

27. Check the wiring using SD-7C117-01 or SD-7C117-02. After locating and correcting the wiring trouble, go back to the NTP and reinstall the unit with the **FAIL** LED problem. If this fails to fix the **FAIL** LED problem, for FPG consult the AT&T Regional Technical Assistance Center (RTAC) by calling 1-800-225-RTAC or the local technical support group. For FPI consult the Technical Assistance Center (TAC) by calling 1-602-582-7305 or the local technical support group.

Set Options on AUB27 or AUB28 Alarm Display Unit (ADU) for FPG or FPI

1. Inspect the **ADU** for possible damage.

2. Which **ADU** do you have?

   If **AUB27**, then continue with Step **3**.
   If **AUB28**, then go to Step **9**.

3. On **AUB27 ADU** option switch **S1** (Figure 1), use an orange stick (KS-6320, L1) or equivalent and set switch positions as follows:

   - **1** - Toward **PL** for protection switching or toward **NPL** for no protection switching.
   - **2** - Toward **2** for Mode 2 operation. Otherwise, toward **4**.
   - **3** - Toward **ABI**.
   - **4** - Toward **CDI**.
   - **5** - Toward **ABE**.
   - **6** - Toward **CDE**.
   - **7** - Toward **MJ** if **MISC1** is to report a major alarm or toward **1MN** if **MISC1** is to report a minor alarm.
   - **8** - Toward **2MJ** if **MISC2** is to report a major alarm or toward **2MN** if **MISC2** is to report a minor alarm.

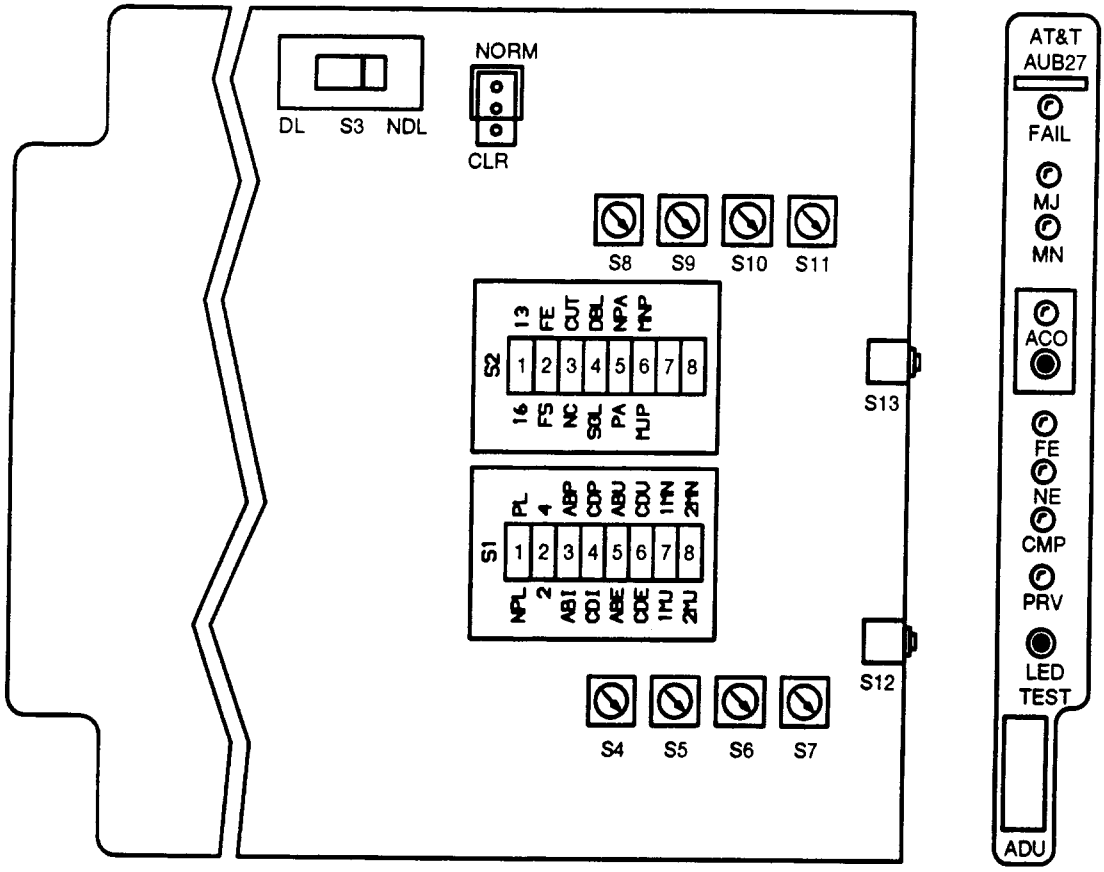


Figure 1 — AUB27 RT ADU Option Switch Settings

4. On **AUB27 ADU** option switch **S2** (Figure 1), use an orange stick (KS-6320) or equivalent and set switches as follows:

   - **1** - Toward **16**.
   - **2** - Toward **FS**.
   - **3** - Toward **NC**.
   - **4** - Toward **SGL**.
   - **5** - Toward **PA** to enable the supplemental data link. Otherwise, toward **NPA**.

- **6** - Toward **MJP** to enable automated channel unit testing. Otherwise, toward **MNP**.
- **7** and **8** - Unused.

5. Set switch **S3** toward **DL**.

6. Set system identification rotary switches **S4** (most significant digit) through **S7** (least significant digit) to bank ID number.

7. Rotary switches **S8** through **S11** are unused.

8. ⇒ NOTE:
   The **NORM/CLEAR** switch option is used to automatically clear random channel provisioning data stored in the **ADU** and **BCU** by selecting **CLEAR**. The **CLEAR** position destroys provisioning data only if provisionable channel units are absent from the bank, and the provisioning data in the **ADU** and **BCU** EEPROMS differ.

   See the **NTP** step referencing this **DLP** for the **NORM/CLEAR** option plug setting.

   STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9. On **AUB28 ADU** option switch **S1** (Figure 2), use an orange stick (KS-6320, L1) or equivalent and set switch positions as follows:
   - **1** - Toward **PL** for protection switching or toward **NPL** for no protection switching.
   - **2** - Toward **2** for mode **2** or mode **4** operation. Otherwise, toward **4**.
   - **3** - Toward **ABI**.
   - **4** - Toward **CDI**.

- **5** - Toward **ABE**.
- **6** - Toward **CDE**.
- **7** - Toward **1MJ** if **MISC1** is to report a major alarm or toward **1MN** if **MISC1** is to report a minor alarm.
- **8** - Toward **NLAN**. LAN should be disabled when converting to FPI. If required, LAN will be enabled after the conversion process has been completed.

10. On **AUB28 ADU** option switch **S2** (Figure 2), use an orange stick (KS-6320, L1) or equivalent and set switch positions as follows:
    - **1** - Toward **PHY**.
    - **2** - Toward **FS**.
    - **3** - Toward **NC**.
    - **4** - Toward **DG** to groom the D DS1 line. Otherwise, toward **NDG**.
    - **5** - Toward **DC** to enable the supplemental data link. Otherwise, toward **NDC**.
    - **6** - Toward **NAT**. The Automatic Channel Unit Testing option should be disabled when converting to FPI. If required, this option will be enabled after the conversion process has been completed.
    - **7** - Toward **BU**.
    - **8** - Toward **DU**.
    - **9** - Toward **CA** to enable channel unit alarms. Otherwise, toward **NCA**.
    - **10** - Toward **C**.

11. Set system identification rotary switches **S3** (most significant digit) through **S6** (least significant digit) to bank ID number.

12.

NOTE:
The **NORM/CLEAR** switch option is used to automatically clear random channel provisioning data stored in the **ADU** and **BCU** by selecting **CLEAR**. The **CLEAR** position destroys provisioning data only if provisionable channel units are absent from the bank, and the provisioning data in the **ADU** and **BCU** EEPROMS differ.

See the **NTP** step referencing this **DLP** for the **NORM/CLEAR** option plug setting.

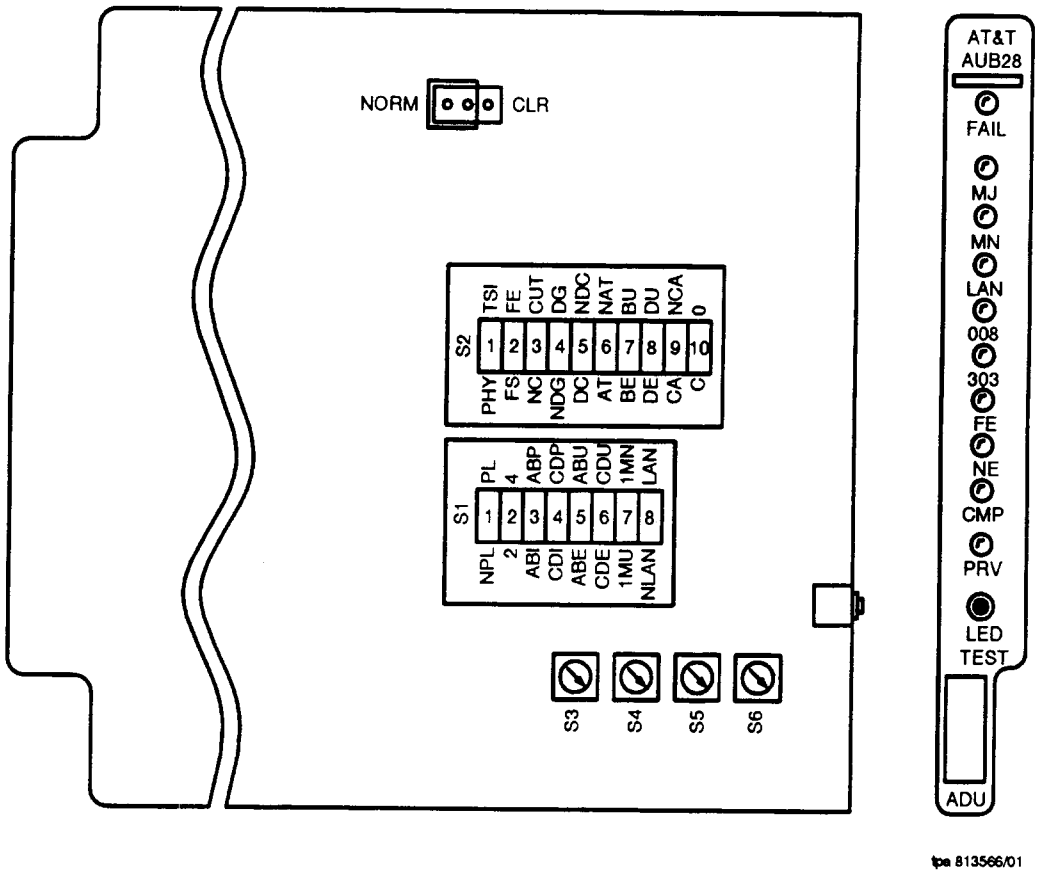


Figure 2 — AUB28 RT ADU Option Switch Settings

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install AUB101 Flash Memory Unit (FMU)

1. Get one **AUB101 FMU** (Figure 1) and inspect for possible damage.

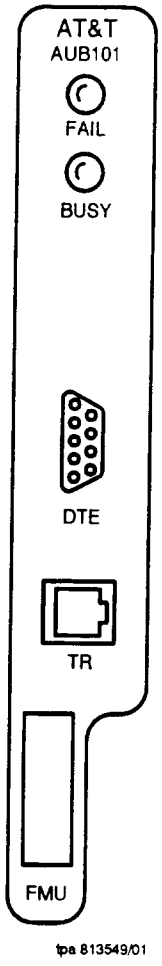


Figure 1 — AUB101 Faceplate Layout and Board Outline

2. Install **FMU** into the upper rightmost double slot of the white system.

3. Does **FAIL** indicator on the **FMU** light steady and then go out after 5 seconds?

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

4. Replace **FMU**.

5. Does **FAIL** indicator on the **FMU** light steady and then go out after 5 seconds?

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

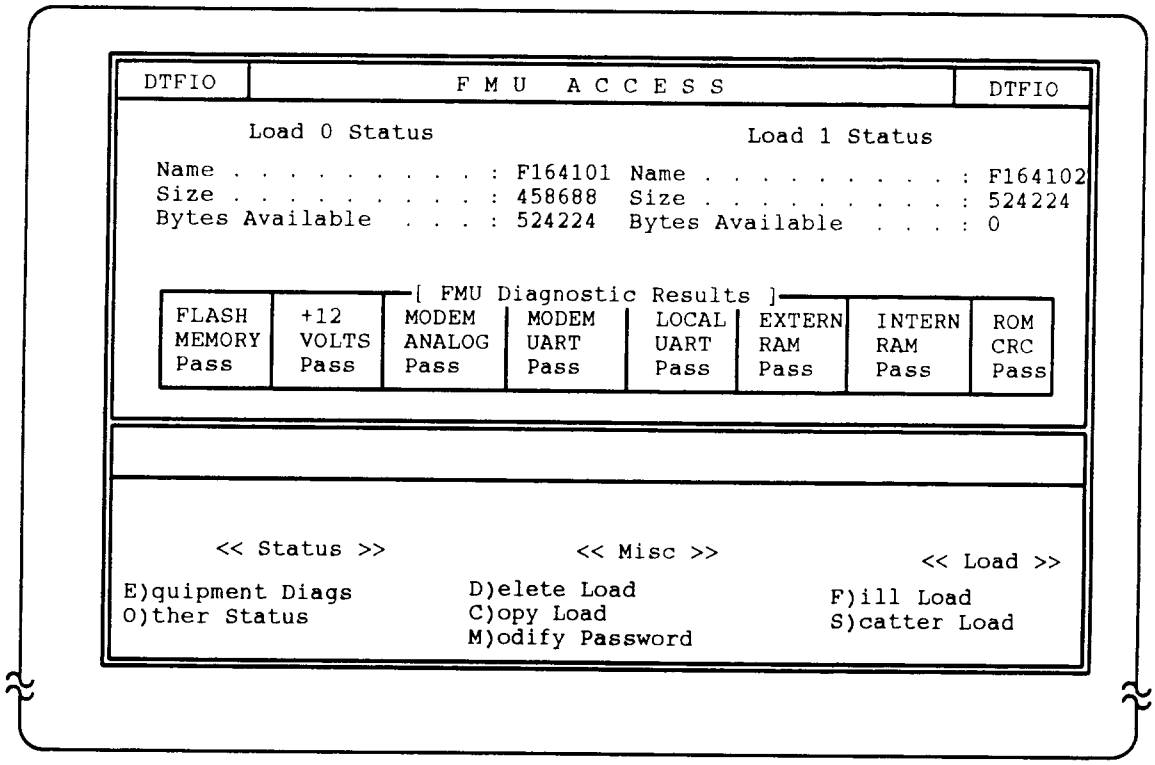
6. Consult the Technical Assistance Center (TAC) by calling 602-582-7305 or the local technical support group.

   Repeat procedure from Step **2** after locating and correcting trouble.

7. Connect a 9 pin FULL NULL MODEM (ED-7C730-30, G1 or equivalent cable) to the **DTE** connector on the faceplate of the **FMU**.

8. Connect the FULL NULL MODEM from the **FMU** faceplate to an IBM compatible PC and start the DTFIO software package on the PC (refer to DTFIO User Guide for bringup sequence).

9. From the DTFIO PC, set up a direct connection to the **FMU**. Once the **FMU** establishes connection with the DTFIO, it will transmit its load status and diagnostics results. The following is a typical *FMU ACCESS* DTFIO PC display screen (with sample load status information):



If the **FMU** load information and diagnostic results are displayed, go to Step **15**. Otherwise, continue with Step **10**.

10. Disconnect FULL NULL MODEM connector from **FMU** faceplate. Connect a different FULL NULL MODEM to the **DTE** connector on the **FMU** faceplate.

11. From the DTFIO PC, set up a direct connection to the **FMU**. Does **FMU** load information display on the DTFIO PC screen?

    If **YES**, then go to Step **15**.
    If **NO**, then continue with Step **12**.

12. Disconnect FULL NULL MODEM connector from **FMU** faceplate. Replace **FMU**. Reconnect FULL NULL MODEM to the **DTE** connector on the **FMU** faceplate.

13. From the DTFIO PC, set up a direct connection to the **FMU**. Does **FMU** load information display on the DTFIO PC screen?

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

14. Refer to DTFIO User Guide for trouble shooting procedures for the DTFIO and/or its PC. Repeat procedure from Step **9** after locating and correcting trouble.

15. ⇛ NOTE:
    The **FMU** has no load stored in its memory as delivered from the factory. However, if the **FMU** has a load residing in its memory from a previous installation, it will be used to load the MLIUs installed in the dual bank assembly. If this is the incorrect load, it can be replaced by loading the **FMU** through the DTFIO.

    Follow local procedures for determining the correct **FMU** load identities.

16. Does the DTFIO PC screen display the correct **FMU** load identities?

    If **YES**, proceed to Step **26**.
    If **NO**, continue with Step **17**.

17. From the DTFIO PC, initiate a fill load of one of the copies of the **FMU** (refer to DTFIO User Guide for DTFIO operation). Using a 9600 bps local connection, the load of the **FMU** should take approximately 5-10 minutes.

18. Does the DTFIO PC screen indicate that the load transfer was successful?

    If **YES**, proceed to Step **26**.
    If **NO**, continue with Step **19**.

19. Does the DTFIO PC screen display that the load failed?

    If **YES**, go to Step **4**.
    If **NO**, continue with Step **20**.

20. From the DTFIO PC, attempt to load the **FMU** again.

21. Does the DTFIO PC screen indicate that the load transfer was successful?

    If **YES**, proceed to Step **26**.
    If **NO**, continue with Step **22**.

22. Replace the FULL NULL MODEM connector connecting the **FMU** to the DTFIO PC.

23. From the DTFIO PC, attempt to load the **FMU** again.

24. Does the DTFIO PC screen indicate that the load transfer was successful?

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

25. Refer to DTFIO User Guide for trouble shooting procedures for the DTFIO and/or its PC. Repeat procedure from Step **17** after locating and correcting trouble.

26. ⇒ NOTE:
The **FMU** has no password stored in its memory as delivered from the factory. Additionally, the **FMU** could have a password in its memory from a previous installation. If no password is established or if an unknown password is present, dial-up connection will not be possible. Also, the password installed at the **FMU** must also be input at the central DTFIO location that will be remotely accessing this **FMU**.

Select "**M**odify Password" command from DTFIO menu and establish **FMU** password.

27. Disconnect the FULL NULL MODEM and DTFIO PC from the **FMU** faceplate and store appropriately.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Set the Option Switches on an FPI LIU

1.

⚠ CAUTION:
Incorrectly set **LIU** *option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream. All* **LIU**s *in the same bank should have identical option switch settings.*

Get desired version line interface unit (**AUA161** or **AUA162 LIU**) (Figure 1) and inspect for possible damage.

2.

NOTE:
Equalizer switch settings should be identical for all **LIU**s that terminate to the same bank.

Using an orange stick (KS-6320, L1) or equivalent, set the equalizer switches per work order (Table A).

3. Is an **AUA162 LIU** being optioned?

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

4. Set the grooming switch to **G** if the **LIU** is inserted in **LIU-D** (Mode 1) or **LIU-C** (Mode 2) and the circuits in the corresponding digroups are to be groomed to the digital network (D type bank, DACS, ...).
Otherwise, set the switch to **N.**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

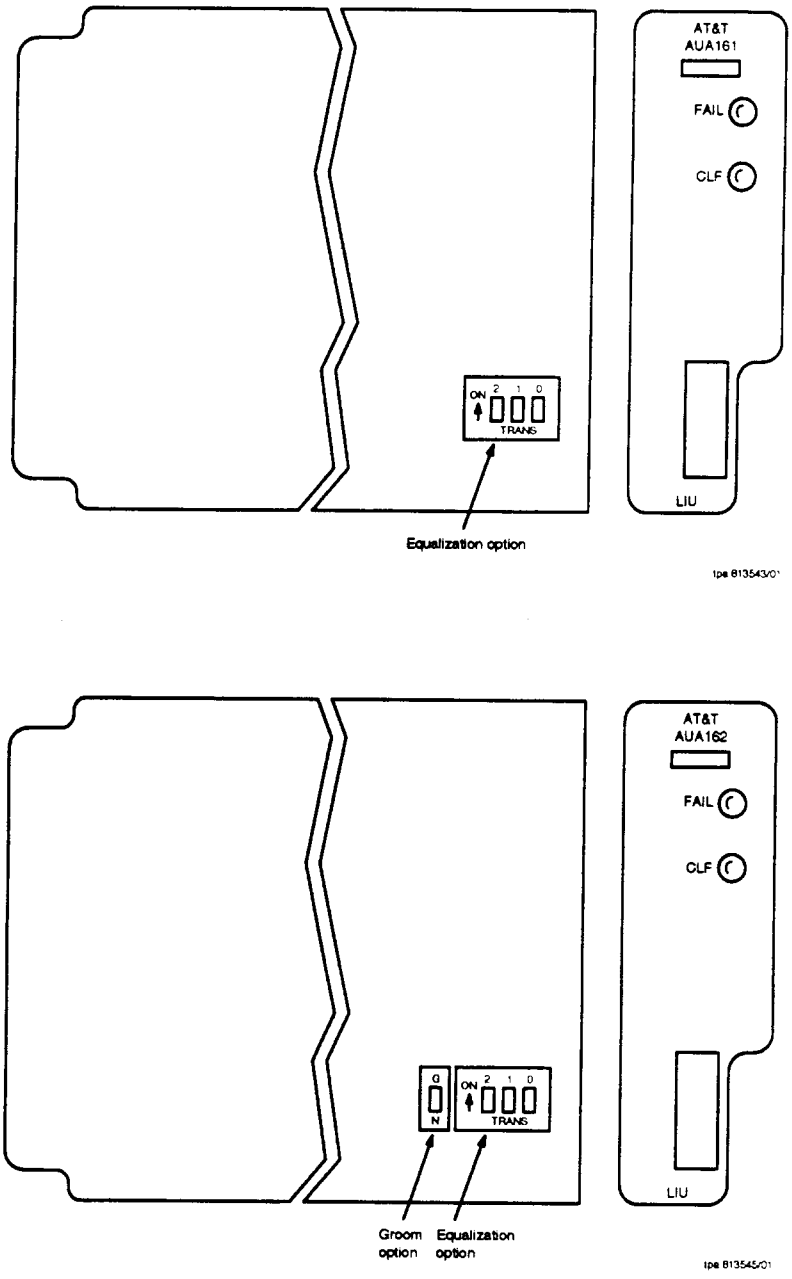


Figure 1 — AUA161 and AUA162 LIUs

Table A
AUA161 or AUA162
LIU Equalizer Settings

Distance to DSX-1 (Note 1)	Equalizer Switch (S2) Setting (Note 2)		
(Feet)	2	1	0
0-132	OFF	OFF	ON
133-265	OFF	ON	OFF
266-398	OFF	ON	ON
399-532	ON	OFF	OFF
533-655	ON	OFF	ON

Note 1: These distances are for ABAM cable used in central office. Refer to AT&T 915-710-115G for calculations for other types of cables used at collocated RT and T1 extension applications.

Note 2: Invalid setting of the equalization option will be shown by the **FAIL** LED lighting after the **LIU** is loaded.

Install Flash Memory Unit (FMU) Line

SUMMARY: Install flash memory unit (**FMU**) line and determine that the line connection to the **FMU** is operational for remote connection to the **FMU**. This test uses a PC equipped with a modem interface and the DTFIO software package. Refer to the DTFIO User Guide for detailed procedures.

1. Install an AUA58 POTS (or equivalent) channel unit in the first slot (channel 1/2) of the blue system.

2. Find the J101BL connector on the dual channel bank (DCB).

3. Find the orange/white pair (the second VF pair) between P101BL and the protector block.

4. Use *Scotchloks* * to connect the ED-7C728-30 cable for the FMU to orange/white pair between P101BL and the protector block (see Figure 1). Maintain the Tip/Ring polarity.

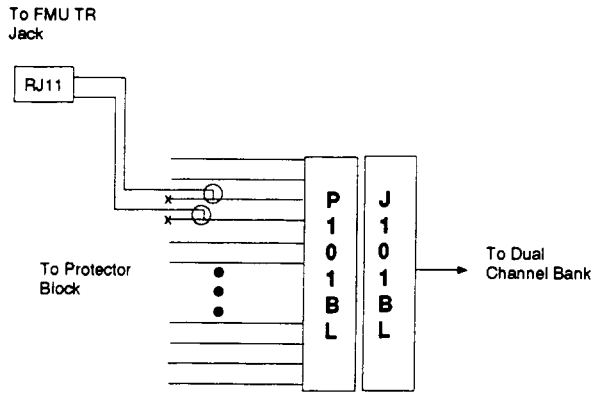


Figure 1 — ED-7C728-30 FMU Line Cable Connections

* *Scotchloks* is a registered trademark of Minnesota Mining and Manufacturing Company.

5. Cut and remove the orange/white pair between the *Scotchlok* connectors and the protector block.

6. Dress the cord with the RJ-11 plug up the left side over the top and down the right side of the DCB to the **FMU**. Use cable ties to fasten the cable to the DCB.

7. Install the RJ11 plug into the TR jack on the **FMU** faceplate. A click, indicating that the plug is fully seated and locked into the faceplate, should be heard when the RJ-11 plug is installed into the jack.

8. NOTE:
   Channel 2 of the blue system is assigned to the **FMU** and must be engineered as a nondial line in the *GTD-5* EAX data base and set up to recall the DTFIO PC used to remotely update the **FMU**. Refer to *Part 12* of the *GTD-5 EAX User Guide* for Recent Change instruction for the *CHAN DN* and *SET CCF* command if the FMU lines need to be engineered.

   Have the craftsperson at the remote DTFIO PC access the FMU.

9. Was the **FMU** access attempt successful?

   If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE**
   If **NO**, continue with Step **10**.

10. Connect the male connector of the FULL NULL MODEM cable to the DTE connector on the faceplate of the **FMU**.

11. Connect the female connector of the FULL NULL MODEM cable to the EIA-232 (RS-232) serial interface of the local PC.

12. From the local DTFIO PC, setup a direct connection to the **FMU**. Wait for the DTFIO to display the **FMU** diagnostic results.

13. Do the **FMU** diagnostics indicate a modem problem on the **FMU**?

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

14. Replace **FMU** and install and load the new **FMU**. When properly installed, all diagnostics should pass. Repeat procedure from Step **8**.

    Reference: **DLP-503**

15. Check and correct connection between **FMU** and POTS channel unit.

16. Have the craftsperson at the remote DTFIO PC access the FMU.

17. Was the **FMU** access attempt successful?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE**
    If **NO**, continue with Step **18**.

18. Contact the AGCS Technical Assistance Center (TAC) at 602-582-7305 to resolve the problem. Repeat procedure from Step **8** when problem is resolved.

RT LAN (SIU) Installation

Introduction

For Feature Package G (FPG) or Feature Package I, the Operations Interface (OI) can remotely test, provision, and retrieve information from systems (channel banks) at a remote terminal (RT) site (see AT&T 363-205-111). A site interface unit (**SIU**) serves as the interface between the OI and the RT site. In addition, a single **SIU** serves as a local area network (LAN) interface for up to 18 nodes (systems). This tab section covers the installation of the LAN controller (the **SIU**) and the cabling of the LAN to provide the interface with the Operations Interface system. RT channel banks connecting to the LAN must be configured for FPG or FPI with an **AUB28 ADU**.

Before performing the RT LAN installation procedures, verify there are no system alarms on the alarm display unit (**ADU**) and bank control unit (**BCU**). Also verify the RT is equipped with the **AUB28 ADU** and the **MC97775A1 BCU**. *RT Turn Up* or *RT Conversion* Tab procedures must be completed before the RT LAN is installed.

Once the RT LAN is wired, a single party line must be assigned to channel 23 of the A digroup to allow remote dial up access to the SIU. For FPG a *POTS* or *SPOTS*® channel unit installed in the central office terminal (COT) slot 12 (channel **23/24**) of the A digroup provides dial up access to the SIU. For FPI, channel 23 (22 in the data base) must be assigned as a single party channel in the *GTD-5* EAX switch data base.

RT LAN (SIU) Installation
Task Index List

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO

⚠ CAUTION:
With the introduction of additional features for the Series 5 system, it becomes imperative that personnel turning up an RT bank assembly use care when making settings on circuit packs (CPs) being installed and ensure that the correct codes of CPs are installed into the proper slots in the RT bank assembly. 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, bank slot position, and to make all CP option switch settings. Listed below are several indications that the craft personnel may use to determine whether an error has been made during RT bank turnup:

- When a CP is installed, the CP FAIL indicator (LED) should be observed to ensure that it comes on momentarily, then goes off. The absence of this just powered up (JPU) indication should cause the craft personnel to check for proper CP type, option settings, and location.
- If the FAIL LED stays on following the installation of a common unit, the CP is probably failed or in the wrong position. This indication does not always occur due to system design.
- The following procedure may be used when a problem is indicated (as above) following installation of a CP. A simple verification of craft personnel error may be made as follows: While observing the FAIL LED on the CP just installed, depress the ADU LED TEST switch. With the exception of an ADU CP, if option switches on the CP just installed are set incorrectly, the FAIL LED on the CP will not light. The FAIL LED will go off if the circuit pack is not compatible with the feature package configuration.

  AT&T recommends that the RT cabinet be protected from dust if the cabinet is opened for an extended period.

Install and Test RT LAN in Feature Package G or I

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. **OVERVIEW:** In Feature Package G and I (FPG and FPI), the Operations Interface (OI) can remotely test, provision, and retrieve information from systems (channel banks) at a remote terminal (RT) site (see AT&T 363-205-111). A site interface unit (**SIU**) serves as the interface between the OI and the RT site. In addition, a single **SIU** serves as a local area network (LAN) interface for up to 18 nodes (systems). The **MISC2** leads of an **AUB28** alarm display unit (**ADU**) provide the interconnection for each node in the LAN. This procedure covers the installation of the LAN controller (the **SIU**) and the cabling of the LAN. Systems connecting to the LAN must be equipped with an **AUB28 ADU**.

   The required equipment includes:

   - **AUA77 SIU**
   - **SIU** jumper cable
   - LAN main cables (up to 3)
   - **DCB-T** cables (up to 9)
   - **J605** terminating resistor.

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
2.	⚠ CAUTION: *An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to **ESD GRD** jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.*	
	Install the dual channel bank-T (**DCB-T**) cable(s).	DLP-500
3.	Install the **SIU** jumper cable.	DLP-501
4.	Install the LAN main cable(s).	DLP-502
5.	NOTE: If **ADU** option switch **S1-8** is set toward **NLAN** in a system with an **SIU** installed, the **FAIL** LED on the **SIU** lights to show the incompatibility. Simply correcting the switch setting and reinstalling the **ADU** does not clear the **FAIL** LED. The **SIU** must also be reset. Verify that the **AUB28 ADU LAN** option is selected (switch **S1-8** is set toward **LAN**).	
6.	Set option switches and install the **AUA77 SIU**.	DLP-503
7.	Test the **SIU** and LAN.	DLP-504
8.	Update office records.	

Install the DCB-T Cable

SUMMARY: This procedure installs the dual channel bank-T (**DCB-T**) cable that separates the two **MISC2** leads located on the **J305** connector for use by the RT local area network (LAN).

1. Locate the **J305** connector in the wire duct area of the dual channel bank.

2. Remove the **P305** connector, if present, from **J305**.

3. Connect the **P505** connector on the **DCB-T** cable to **J305** (see Figure 1).

4. Connect **P305** previously connected to **J305** to the **J505** connector of the **DCB-T** cable.

5. Is there another dual channel bank that will connect to the LAN?

   If **YES**, repeat the above steps for the next dual channel bank.
   If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

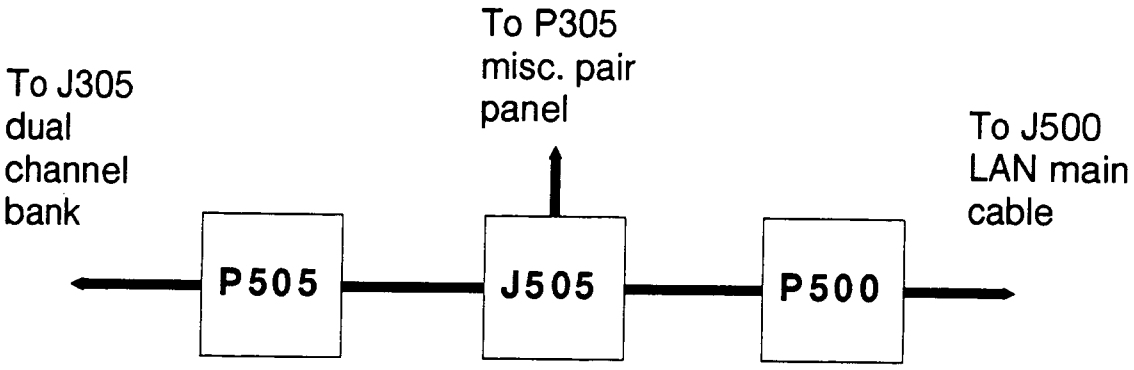


Figure 1 — DCB-T Cable Connections

Install the SIU Jumper Cable

SUMMARY: This procedure installs the site interface unit (**SIU**) jumper cable that separates voice-frequency pair 23 on the J101 connector for use by the RT local area network (LAN).

⚠ CAUTION:
If channels 1 through 25 of the system are in service, this procedure will interrupt service on these channels.

1. Locate the dual channel bank that will house the **SIU**.

2. Find the **J101** connector corresponding to the channel occupied by the **SIU**.

3. Disconnect **J101** from the **P101** connector.

4. Connect the **P710** connector of the **SIU** jumper cable to **J101** (see Figure 1).

5. Connect the **J710** connector of the **SIU** jumper cable to **P101**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

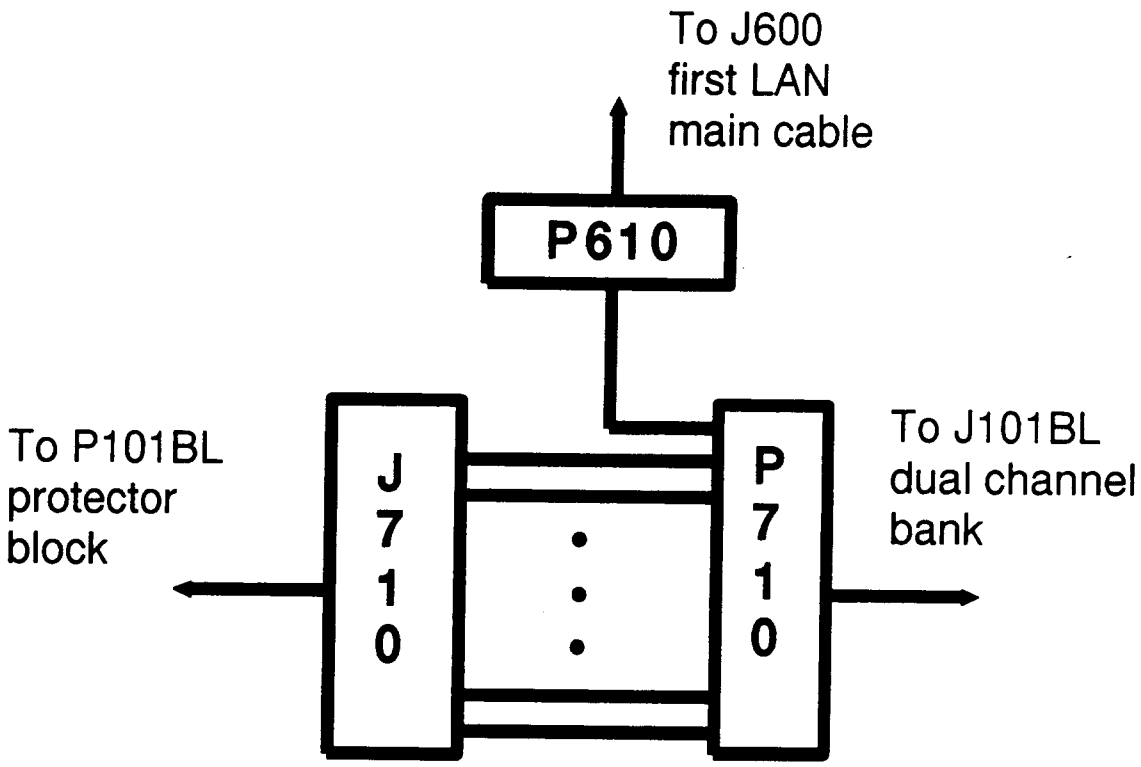


Figure 1 — SIU Jumper Cable Connections

Install the LAN Main Cable

SUMMARY: This procedure installs the local area network (LAN) main cable that connects the dual channel banks and the site interface unit (**SIU**) to the LAN. One LAN main cable connects up to three dual channel banks per bay frame; three LAN main cables can be connected together to serve up to nine dual channel banks (18 systems).

1. Begin installing the LAN main cable from the bay frame housing the **SIU**.

2. Dress the LAN main cable in the cable duct area located directly above and to the right of the bay frame. Use cable ties to firmly secure the cable in place.

3. Connect **J500** connectors on the LAN main cable to the **P500** connector on the associated **DCB-T** cable (See Figure 1).

4. Is this LAN main cable in the bay frame with the **SIU**?

   If **YES**, then connect the **J600** connector on the LAN main cable to the **P610** connector on the **SIU** jumper cable.
   If **NO**, then connect **J600** to the **P600** connector of the adjacent LAN main cable.

5. Is this the last LAN main cable to install?

   If **YES**, then proceed to Step **6**.
   If **NO**, then proceed to Step **2**.

6. Connect the **J605** terminating resistor to **P600** of the last LAN main cable.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

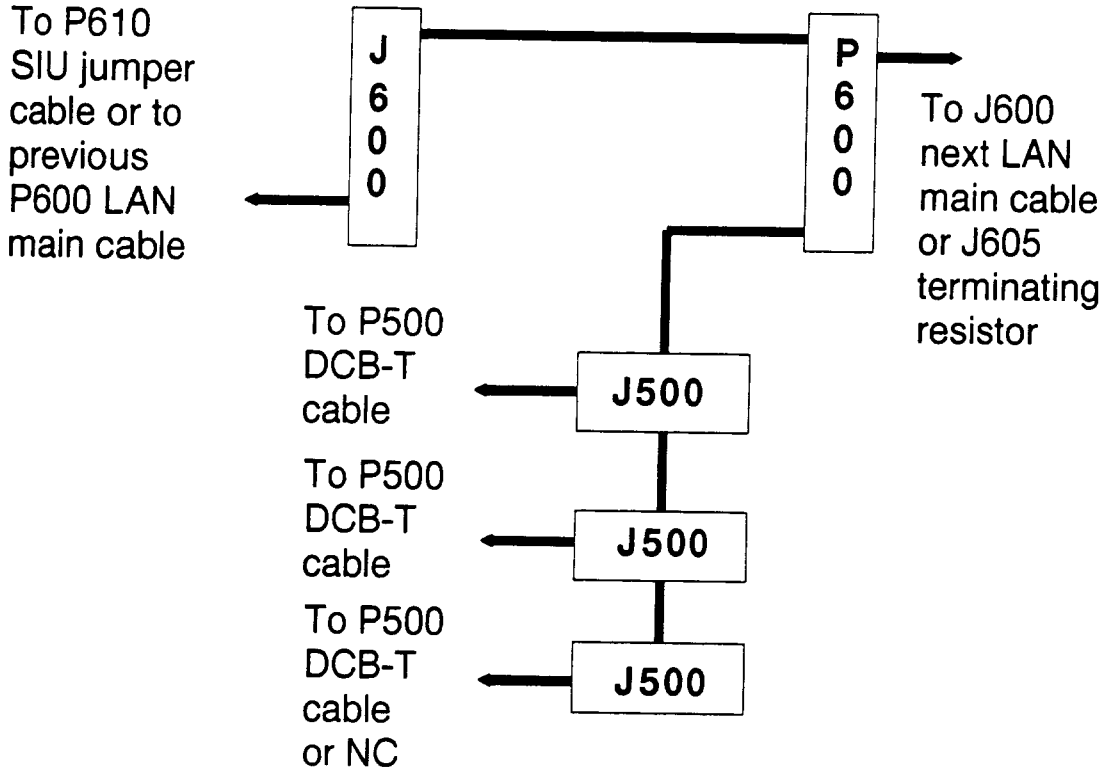


Figure 1 — LAN Main Cable Connections

Set Option Switches and Install the SIU

1. Get one **AUA77** site interface unit (**SIU**) and inspect for possible damage (see Figure 1).

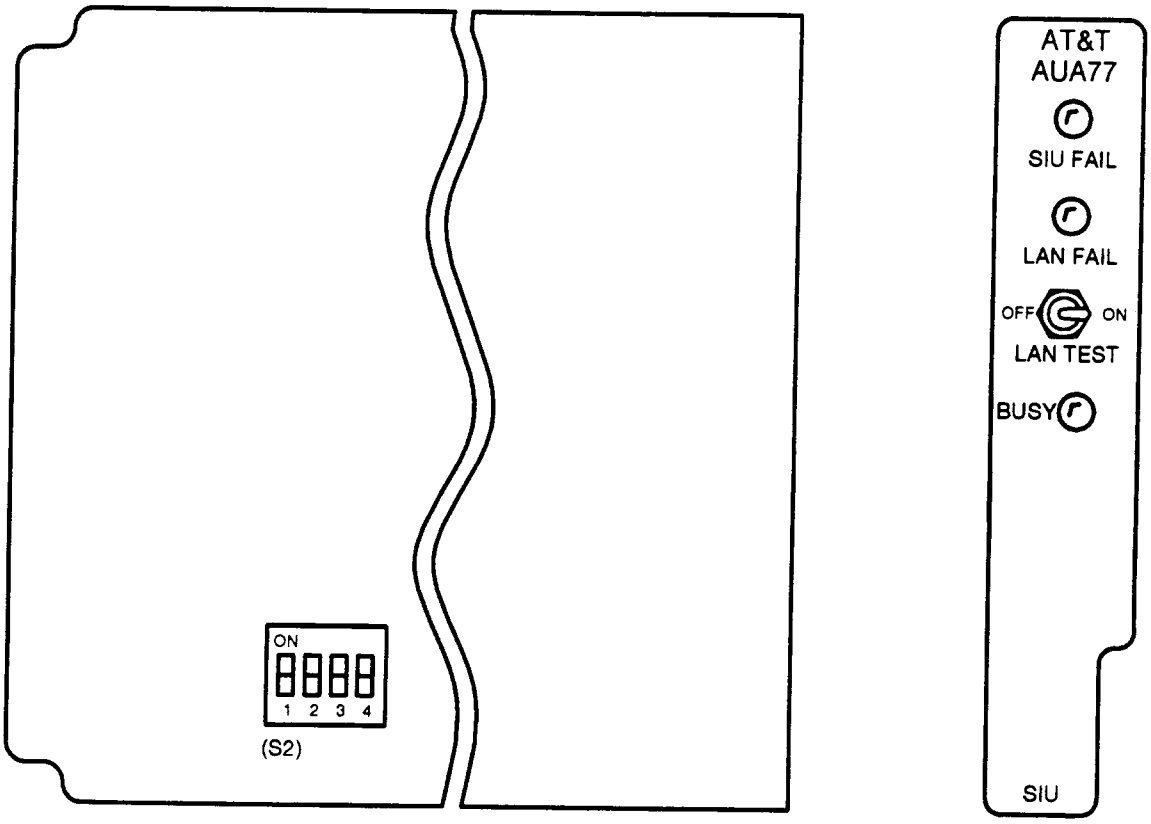


Figure 1 — SIU Switch Location and Faceplate Diagram

2. On **SIU** switch **S2** set switch positions as follows:

   - **1** - Down (away from number).
   - **2** - Down (away from number).
   - **3** - Unused.
   - **4** - Down to reset the **SIU** and write a default login and password to the **SIU** EEPROM (for initial OI contact).

3. NOTE:
   When the **SIU** is inserted with **S2-4** in the down position (reset position), then the login and password stored in the **SIU** EEPROM is overwritten with the defaults. All **SIU** LEDs will remain lighted while the reset operation is in progress. After completion of the operation, all **SIU** LEDs should flash continuously.

   Insert the **SIU** in slot 12 (channel **23/24**) of the A digroup. Set the faceplate **LAN TEST** toggle switch **OFF**.

4. Does the **SIU FAIL** LED remain lighted (ignore the **BUSY** and **LAN FAIL** LEDs)?

   If **YES**, then proceed to Step **8**.

   If **NO**, then continue with Step **5**.

5. After the LEDs start flashing, remove the **SIU** and set **S2-4** to the up position.

6. Reinsert the **SIU** in slot 12 (channel **23/24**) of the A digroup.

7. Does the **SIU FAIL** LED light momentarily (ignore the **BUSY** and **LAN FAIL** LEDs) and then go off?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

   If **NO**, then continue with Step **8**.

8. Repeat the above steps with another **SIU**. If the **SIU FAIL** LED remains lighted after completing the optioning and installation of the second **SIU**, replace the **SIU** with the one removed previously and check the wiring using SD-7C117-01 and SD-7C117-02.

Perform a Test of the SIU and LAN

SUMMARY: This procedure initiates a self test of the site interface unit (**SIU**) and a test of the remote terminal local area network (RT LAN) by the **SIU**. This procedure requires all nodes to have **S1-8** on the **AUB28** alarm display unit (**ADU**) in the LAN ALARM (**LAN**) position.

Watch the **SIU FAIL** and **LAN FAIL** indicators on the **SIU** and turn the **LAN TEST** toggle switch **ON** then **OFF**. Wait for the **SIU FAIL** and **LAN FAIL** indicators to stop flashing. After a successful LAN test no indicators on the **SIU** will be lighted. Look at each RT **ADU LAN** alarm after the test. If any are flashing the LAN test has found 2 or more systems with the same ID number. You must change the system ID switches to correct this trouble.

1. Set the **LAN TEST** switch on the faceplate of the **SIU** to the **ON** position and after the **SIU FAIL** LED starts flashing, back to the **OFF** position. Wait while the **SIU** performs diagnostic and LAN tests (LEDs flashing).

   Comment: The **SIU** will perform a self diagnostic test (**SIU FAIL** flashing), then a first phase LAN test (**SIU LAN** flashing). When the first phase LAN test is finished, **SIU FAIL, LAN,** and each **ADU LAN** will flash for about 3 seconds. During the second phase LAN test the **SIU LAN** LED will be flashing. If the **SIU FAIL** remains lighted the diagnostic test failed. If the **SIU LAN** remains lighted one or more LAN Nodes failed.

2. Do the **SIU FAIL** the and the **LAN FAIL** LED go off after flashing?

   If **YES**, but 2 or more **ADU LAN** LEDs are flashing on systems connected to the LAN, then continue with Step **3.**

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO** and **SIU FAIL** is lighted, then proceed to Step **4.**

   If **NO** and **SIU LAN** is lighted, then proceed to Step **5.**

3. If **SIU LAN** is flashing, two or more systems connected to the LAN have the same node ID. To correct this all **ADU** system ID switches must be set to a unique number. Turn off LAN TEST, resolve system ID conflict and then repeat this procedure. This condition could also be caused by an **ADU** that would not stop flashing the **LAN** indicator during phase two of the LAN test.

4. Replace **SIU** and repeat from Step **1.**

   Reference: DLP-503

5. If any **ADU LAN** remains lighted, replace the **ADU** and/or **BCU** in the system with the **ADU LAN** lighted.

6. Set the **LAN TEST** switch on the faceplate of the **SIU** to the **ON** position and leave it on. Wait for **SIU FAIL** to stop and then start flashing again.

7. With **SIU FAIL** flashing, which alarms are active?

   If **SIU LAN** is lighted and no **ADU LAN** is flashing on any **ADU** connected to the LAN, turn **OFF** the **LAN TEST**. Check and/or replace the **SIU** jumper cable and LAN main cable connected to it. Repeat this procedure.

   Reference: DLP-501 (jumper), DLP-502 (main)

   If **SIU LAN** is lighted and **ADU LAN** is not flashing on one or more **ADU**s connected to the LAN, turn **OFF** the **LAN TEST.** Verify that **S1-8** option on the **AUB28 ADU** is set to the **LAN** position. Check and/or replace the **DCB-T** cable and LAN main cable connected to it. Repeat this procedure.

   Reference: DLP-500 (DCB-T), DLP-502 (main)

   If **SIU LAN** is flashing and **ADU LAN** LEDs are flashing on all **ADU**s connected to the LAN, continue with Step **8.**

8. Set the **LAN TEST** switch on the faceplate of the **SIU** to the **OFF** position and leave it off. Wait for **SIU LAN** to stop flashing.

9. Are any indicators lighted on the **SIU**?

   If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **YES**, then continue with Step **10**.

10. Replace **SIU**. Verify that the supporting cables have been properly installed per procedures in this Tab section. Verify that **S1-8** option on all **AUB28 ADU** is set to the **LAN** position on all **ADU**s. If the **SIU LAN FAIL** indicator is still lighted, refer to SD drawing and call RTAC (1-800-225-7822) for technical assistance.

End-to-End Introduction
SLC® Series 5 Carrier End-to-End Procedures Tab

Overview

This tab section is used at the Feature Package G (FPG) central office terminal (COT) and a FPG or Feature Package I (FPI) remote terminal (RT) to establish a *SLC*® Series 5 Carrier System in an *in-service* state. This requires that the appropriate *COT Acceptance, COT Bank Turn Up, RT Acceptance, RT Power Up,* and *RT Bank Turn Up* Tab procedures in this document have been completed.

At the top of each page the document number and issue information are on the inside of the page, and the Tab Section: TOP Element and page count are on the outside top of the page.

This tab provides all the procedures necessary to perform the type of activity being done. This tab is stand-alone and can be removed from the binder if desired.

How to Use This Document

To find the instructions for performing End-to-End Test tasks proceed as follows:

1. Read the **Introduction-000**, then find your task in the TASK INDEX LIST (**IXL-001**).
2. Turn to the desired director-level or detailed level procedure. All procedures in each section are in numerical order, regardless of type. Procedures in this TOP are of four types:
    a. Non Trouble-Clearing Procedure (**NTP**) - A director-level procedure that lists normal work items to perform other than trouble clearing.

b. Trouble Analysis Procedure (**TAP**) - Detailed step-by-step instructions used to clear system troubles.

c. Detailed Level Procedure (**DLP**) - Detailed step-by-step instructions that support **NTPs** or **TAPs**.

d. Trouble Analysis Data (**TAD**) - The *TAD element* is used to provide supplemental information when performing a task. This *element* may include information about philosophies, diagrams, and supporting equipment used with or connected to this system.

3. Perform all the items in the director-level procedure in the indicated order unless it sends you to another director-level procedure. When you complete a director-level procedure, you have finished the task. Where more detailed information is required, you will be sent to a Detailed Level Procedure **DLP-( )**. You may also be sent to a DLP by another DLP.

4. **IMPORTANT:** When you complete a DLP, you **MUST** return to the same step in the procedure which sent you there.

5. **IMPORTANT:** In most cases, if one director-level procedure sends you to another director-level procedure, you should not return to the first director-level procedure after you complete the second.

6. Sometimes you will be asked to verify that things have occurred. This may take the form of a formal statement of the expected response. At other times, the instructions will merely state *verify that ... .*
If the expected response is not observed and a specific trouble-clearing reference is not made, you should check to ensure that prior steps were performed correctly and that circuit pack options are correct.
If the expected response is not observed and a specific trouble-clearing reference is made, you should perform the reference trouble-clearing procedure and then return to the point in the procedure that sent you there.

7. If you need assistance after completing all the applicable procedures in this section, call the AT&T Regional Technical Assistance Center (**1-800-225-RTAC**) for FPG. For FPI, customer assistance is provided by the AG Communication Systems (AGCS) Technical Assistance Center (**1-602-582-7805**).

Circuit packs being returned for repair should be sent, along with your company's repair and return form, to the following address:

AT&T Network Systems
Carolinas Service Center
6701-A North Park Blvd.
Charlotte, NC 28216

Safety Labels

Safety labels in this document have the following definitions:

DANGER:
This indicates the presence of a hazard that will cause death or severe personal injury if the hazard is not avoided.

WARNING:
This indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.

CAUTION:
This indicates the presence of a hazard that *will* or can cause minor personal injury or property damage if the hazard is not avoided. This includes equipment damage, loss of software, or service interruption.

Equipment and Craft Personnel Considerations

CAUTION:
An electrostatic discharge wrist strap with a minimum resistance of 250K Ohms should be worn 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. Connect the wrist strap to ***ESD GRD*** *jack on the fan unit, if present. If grounding jack is not present, connect wrist strap to bare-metal section of the frame well away from the power shelf.*

The Series 5 channel bank assembly and associated equipment provide high voltage ringing current and high amperage power distribution. You should remove any metal jewelry before working on this equipment, particularly around the backplane. *Follow local personnel safety procedures when working on any AT&T product.*

Check List

The following Tab Index table provides a means to verify that all elements are present. This information should not be used for direct access to a particular element because *most elements are not stand-alone procedures.*

End-To-End Tests Tab Index

* Note included in this issue. Will be included when features are available.

End-to-End Tests
Introduction

This section provides procedures for end-to-end testing of the blue, white, or both systems of the *SLC*® Series 5 Carrier System. The procedures include changing circuit pack option switch settings from the preservice mode to the in-service mode, making channel tests, and exercising system alarms. These procedures assume that both the Acceptance and Turn Up procedures have been done and that the central office terminal (COT) or central office (CO) switch (*GTD-5* EAX) and remote terminal (RT) are connected end to end by a functioning transmission facility.

Feature Packages

The *SLC* Series 5 Carrier System offers a variety of system configurations offering POTS only, special services, concentration, and integration. These configurations are called feature packages. The feature package is selected by the choice of bank control unit (**BCU**), alarm display unit (**ADU**), and option settings on the **ADU**. The choice of supporting common units [transmit/receive unit (**TRU**), line interface unit (**LIU**), channel test unit (**CTU**), automatic channel test unit (**ACTU**), digital test units (**DTU-L, DTU-R**), line switch unit (**LSU**), and system display unit (**SDU**)] is determined by the feature package configuration.

These procedures assume the feature package configuration is known before attempting to turn the system up end-to-end. These procedures require coordination between personnel at both ends of the system.

Task Index List

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO

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

Acceptance

General

Acceptance tasks for the ***SLC***® Series 5 central office terminal (COT) and remote terminal (RT) are provided in the related section of this document. Acceptance tasks for the T1 digital facility and support pairs are provided in AT&T 363-200-001 (TOP).

Perform FPI End-to-End System Tests

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. **OVERVIEW:** This procedure covers testing at the *GTD-5* EAX, its digital trunk unit (DTU), and the *SLC* Series 5 Carrier System remote terminal (RT) ends of the loop transmission facility. This procedure assumes that the DTU and the RT have been installed, acceptance tested, and are connected end to end. It further assumes that all four digroups (A, B, C, and D) in the system are equipped and are in the preservice state. These tests require coordination between personnel at the *GTD-5 EAX* location using procedures contained in the ***GTD-5** EAX User's Guide* and personnel at the *SLC* Series 5 RT location using procedures contained in this practice. To verify proper connections, operation, and powering of the transmission line, refer to the TOP volume for the facility being used.

2. At RT, obtain support apparatus as listed:

   - Volt-ohm-milliammeter (VOM)
   - 500-type telephone set.

3. ⇛ NOTE:
   Part 2 of the ***GTD-5** EAX User's Guide* contains procedures for installing and testing the *GTD-5* EAX DTU.

   Verify that *GTD-5* EAX DTU has been properly installed and tested.

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

4.

NOTE:
The RT Bank Turn Up Tab contains procedures for installing and testing RT.

Verify that RT has been properly installed and tested.

5.

CAUTION:
*An electrostatic discharge wrist strap, with a minimum resistance of 250K Ohms, should be worn when handling **SLC** Series 5 Carrier System 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. Connect the wrist strap to the **ESD GRD** jack on the fan unit, if present. If the grounding jack is not present, connect the wrist strap to a bare-metal section of the frame well away from the power shelf.*

If using T1 digital facility, proceed to Step 7; otherwise, continue with Step 6

6.

NOTE:
Refer to appropriate document for transmission facility.

Verify that the DTU and RT are properly connected to transmission facility and that transmission facility is operating properly, then go to Step 10.

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
7. ⚠ DANGER: *DC voltage to +130 and –130 volts may be present on connections to outside cable pairs if line is powered from an office repeater bay (ORB) at the **GTD-5** EAX DTU location.* From work order, verify that proper connections have been made to outside cable pairs at *GTD-5* EAX DTU.	
8. Verify that proper digital line connections have been made at RT.	
9. Consult office records to verify that all digital line repeaters have been installed and that digital line installation is complete.	
10. Set up communication between *GTD-5* EAX DTU and RT. Personnel at the *GTD-5* EAX will direct RT when to begin testing.	
11. At RT, set **ADU** option switches to in-service.	DLP-514
12. Verify that **CLF** LEDs on installed **LIU**s still flash. If not perform **TAP-103**.	
13. At CO, bring up the RT.	DLP-507
14. Test RT to *GTD-5* EAX alarms	DLP-510
15. ⇛ NOTE: It is recommended that the following test be performed if a single-party POTS channel unit (**AUA150** or **AUA58B**) is available. This test checks one particular channel in each digroup to verify that equipment at both ends of the system and the connecting facility are operating properly. Perform terminal-to-terminal (DTU-to-RT) channel test on channels 22, 48, 72, and 96 using a single-party POTS channel unit (**AUA150** or **AUA58B**) in channel unit slots	DLP-511

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
21/22, 47/48, 71/72, and **95/96**, respectively.	
16. When required, install channel units.	
17. ⚠ CAUTION: *Fan operation is essential in the **SLC** Series 5 Carrier System to prevent system failures. Make sure **AUA24 FCU** is installed in each system and that fans operate properly.* At RT, press **FAN TEST** push button on **FCU** and verify that fans operate.	
18. The Automatic Channel Unit Testing, and LAN options are currently disabled on the **ADU**. If either of these options are required, then remove the **ADU** and set the option switches as follows: — Set **S2-6** to **AT** to enable Automatic Channel Unit Testing. — Set **S1-8** to **LAN** to enable LAN. Reinstall the **ADU** and verify that the **ADU FAIL** LED goes off after a 45 second delay.	
19. At RT, install and test flash memory unit (FMU) line.	DLP-512
20. Update office records for job completed on assigned system for installed digital line and channels and specify task(s) completed, according to local office procedures.	

Fiber Facility/T1 Hub Turn Up Considerations

Introduction

A ***SLC***® Series 5 Carrier System remote terminal (RT) channel bank can use a DDM-1000, DDM-2000, or other lightguide digital multiplexer facility (MUX) between the central office (CO) equipment and the RT location. The CO equipment can be a Series 5 central office terminal (COT) channel bank, or integrated into a *GTD-5* EAX. The basic communication rate between the central office equipment and the RT channel bank is a DS1 (1.544 Mb/s) digital signal. The MUX accepts many DS1 signals, multiplexes them into a higher rate signal and transmits this information as light pulses over a fiber optic cable.

DS1 Signals

The basic DS1 signal carries 24 voice-frequency channels, framing information and end-to-end equipment (data link) information. There are 2 types of line framing used by the Series 5 Carrier System; FE (extended super frame) and FS (super frame). The framing information is used to synchronize the system timing and provide system data links. The two types of framing are incompatible and *MUST NOT BE MIXED* in a ***SLC*** Carrier System. Line framing passes through a multiplexer facility unchanged.

The DS1 signal can have two line coding formats (to handle excessive all zero information on the DS1 signal), zero code suppression (ZCS also called "AMI") or bipolar 8 zero substitution (B8ZS). These line coding schemes handle excessive zeros differently and *WILL CAUSE DIGITAL LINE FAILURES IF MIXED ON THE DS1 FACILITY.* AT&T recommends using ZCS line coding for all DS1 interface circuits on a fiber facility to reduce the chance of a mismatch. A line coding mismatch will cause unpredictable digital line failures when the voice channels are active and clear when idle. Line coding is passed through a multiplexer facility if both ends match, but will change the bit patterns if there is a mismatch.

Signal Flow

Figure 1 shows a typical signal flow for a lightguide facility. The DS1 signals originating at the central office equipment are as follows:

- Cross-connected to the multiplexer
- Transported over the optical cable to the far-end multiplexer

- Cross-connected at the far end (often through protectors) using a 800 or 900 Series DSX or Tie Block/307 DSX to either an RT channel bank or a T1 extension shelf.

If a T1 extension shelf is used, the signals are passed through protector blocks before exiting the enclosure.

Before Establishing an End-to-End System

Before attempting to establish an end-to-end carrier system you must verify that the following steps have been completed:

(1) The multiplexer facility must be turned up as listed below and tested end-to-end using the documentation for the type of multiplexer used.

- Make powering, cabling, and alarm connections as required
- Option and install the circuit packs
- Perform loopback tests
- Perform end-to-end tests on the fiber facility.

(2) The CO equipment must be cross-connected to the multiplexer low-speed interface packs.

(3) ***The CO end low-speed interface cards must be optioned for the line coding (ZCS or B8ZS) used by the carrier system.***

(4) The remote end equipment must be cross-connected to the multiplexer.

(5) ***The remote end low-speed interface cards must be optioned for the line coding (ZCS or B8ZS) used by the carrier system.***

(6) The DS1 protectors must be installed if required.

(7) Turn up the T1 extension shelf (if used) as follows:

- Make powering, cabling, and alarm connections as required

- Install repeaters and protectors
- Perform preservice tests on the digital lines.

(8) Just before performing end-to-end carrier system tests, the multiplexer equipment loopbacks should be removed and the low-speed interface packs put in service.

(9) When the Series 5 channel bank is in preservice, the line interface units (**LIU**s) put out good DS1 signals toward the multiplexer. You can verify the digital signal path between the channel bank and the multiplexer by removing *preservice* **LIU**s, one at a time, and by verifying that the multiplexer low-speed interface loss of signal alarm indication is present (flashing **ALM** for DDM-1000 or flashing **FAULT** for DDM-2000) and clearing when the **LIU** is reinstalled.

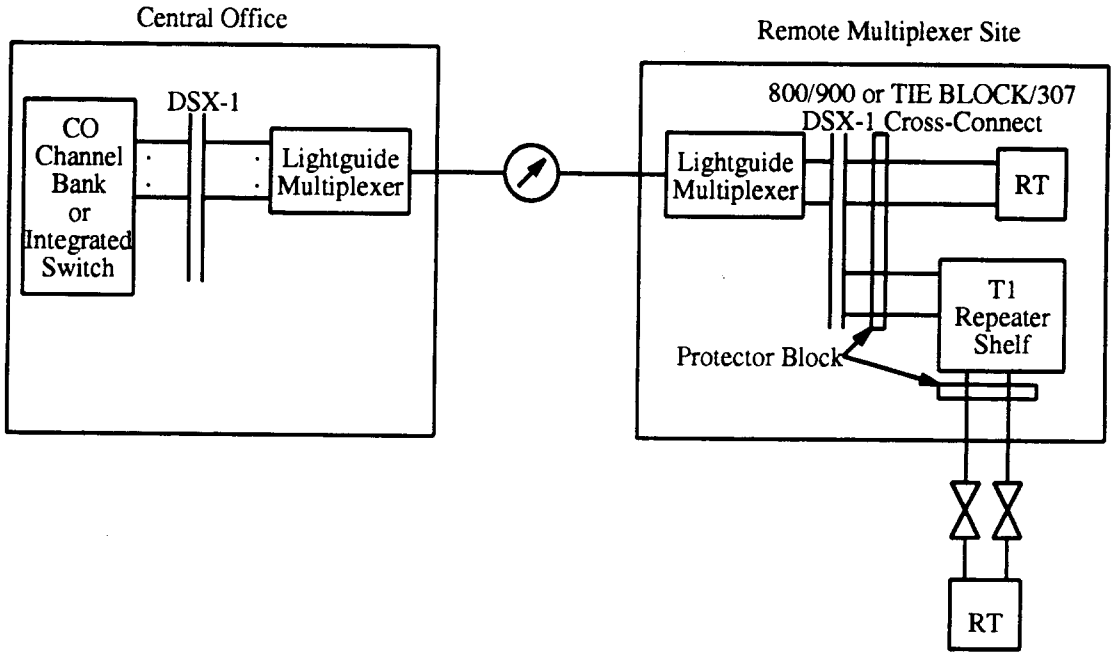


Figure 1 — Block Diagram of a Typical *SLC*® Carrier System Fiber Facility

Clear CLF LED Problems on an LIU During Testing

General: Use this procedure when **CLF** indicators do not flash when the RT is placed in-service.

1. Is the **CLF** LED on the suspect **LIU** lighted steady?

   If **YES**, continue with Step **2.**
   If **NO**, proceed to Step **5.**

2. Is the DS1 span connected properly between the installed **LIU** and the *GTD-5* EAX?

   If **YES**, proceed to Step **5.**
   If **NO**, continue with Step **3.**

3. Properly connect the DS1 span between the suspect **LIU** and the GTD-5 EAX.

4. Does the **CLF** indicator flash within two minutes?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, continue with Step **5.**

5. Replace the suspect LIU with another unit of the same type.

6. Does the CLF indicator flash within two minutes?

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

7. Check the wiring using SD-7C118-01. Locate and correct problems.

   Contact the Technical Assistance Center (TAC) by calling 602-582-7305 or the local technical support group if problems cannot be resolved.

Perform FPI RT Bring Up Sequence

1. NOTE:
These procedures must be performed in coordination with procedures performed by *GTD-5* EAX switch personnel using the *GTD-5* EAX User Guide. These procedures should be performed when requested by *GTD-5* EAX switch personnel.

Establish communications with personnel at the *GTD-5* EAX switch and personnel at the RT.

2. At RT, remove protector for digital line associated with digroup A.

   Response: Ignore **LIU-A CLF** indicator.

3. Does *GTD-5* EAX IOM terminal display SMA "Local Alarm Detected" for the span associated with digroup A?

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

4. Does *GTD-5* EAX IOM indicate any alarm?

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

5. Verify that the span for digroup A is configured correctly in the *GTD-5* EAX data base and in a cutover state. Once configured correctly and alarm condition is displayed, proceed to Step **7**.

6. Verify that the span for digroup A is connected to the correct location at the DTU. Once correctly installed and alarm condition is displayed, continue with Step **7**.

7. Reinstall the protector associated with digital line A.

8. Repeat Steps 2 through 7 for each digroup in the system. Then continue with Step **9**.

   Comment: Digroups B, C, and D for Mode 1.
   Digroups C for Mode 2.

9. Inform the *GTD-5* EAX personnel that all alarms are clear and the RT system can be configured. Wait for CO personnel to configure the RT from the ACDC terminal.

10. Was "Successful Configuration" displayed at the ACDC terminal?

    If **YES**, proceed to Step **12**.
    If **NO**, continue with Step **11**.

11. Clear any RT alarms. Wait for CO personnel to verify that the Host Remote Link is configured as a DLINK and that the RDLC card is operational. Wait for CO personnel to configure the RT. If the RT is still not successfully configured, follow local escalation procedures to resolve problem. When problem is resolved, repeat procedure from Step **9**.

12. Wait for CO personnel to load the RT from the ACDC terminal.

    Response: At the RT, the **FMU BUSY LED flashes while the load is being transferred.**

13. Was "Load Successful" displayed at the ACDC terminal?

    If **YES**, proceed to Step **19**.
    If **NO**, continue with Step **14**.

14. Did load fail due to proper load not resident in the RT **FMU**?

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

15. Follow procedure in the DTFIO User Guide to place the proper load in the RT **FMU**. Clarify with the CO personnel the correct identity of the load. If this load is not available, notify the Technical Assistance Center (TAC) at (602) 582-7305. When the proper load is installed, repeat procedure from Step **12**.

16. Did load fail due to **FMU** failure?

    If **YES**, continue with Step **17**.
    If **NO**, proceed to Step **18**.

17. Replace **FMU** and install load in the new **FMU**. When proper load is installed, repeat from Step **12**.

    Reference: **DLP-513**

18. Attempt to load the RT again. If RT is still not successfully loaded, follow local escalation procedures to resolve problem. When problem is resolved, repeat procedure from Step **9**.

19. Wait for CO personnel to START the RT.

20. Are **CLF** indicators on all **LIU**s off?

    If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, continue with Step **21**.

21. Have CO personnel configure, load, and start the RT again. If **CLF** indicators on all **LIU**s do not go off, follow local escalation procedures to determine problem. When problem is resolved, repeat procedure from Step **9**.

    Comment: If troubles cannot be cleared, call the Technical Assistance Center (TAC) at (602) 583-7305.

Test Central Office and Remote Alarm System at *GTD-5* EAX Switch and FPI RT

1. Which system is being tested?

   If **BLUE**, then continue with Step **2**.
   If **WHITE**, then proceed to Step **5**.

2. ⚠ CAUTION:
   If dual channel bank is already providing service, RT batteries must be fully charged before test is started; otherwise, service may be interrupted on the working bank while alarms are being tested.

   At RT, verify battery power to dual channel bank (**BATTERY CHARGER** indicator **HIGH RATE CHG/ON** not lighted).

3. Disconnect power from RT (to test power alarms).

   Response: Switching personnel will note **PWR/MISC** and **MXU MINOR** alarms after approximately 4 minutes.

   At RT, **ALARM** indicator(s) on **RECTIFIER**(s) and **BAT DISCHG** indicator(s) on **BATTERY CHARGER**(s) are lighted. **ADU** indicator **NE** and **BCU** indicator **P/M** are lighted after approximately 4 minutes (Blue bank).

4. At RT, reapply power.

   Response: Switching personnel will see **PWR/MISC** and **MXU MINOR** alarms cleared after approximately 4 minutes.

   At RT, **RECTIFIER** indicator **ALARM** and **BATTERY CHARGER HIGH RATE CHG/ON** will go off after a period of time determined by charge state of batteries. All other indicators go out after approximately 4 minutes.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

5. Activate alarm associated with the WHITE system **MISC 1**.

   Response: Switching personnel will note see **PWR/MISC** and **MXU MINOR** after approximately 4 minutes.

6. Did **MISC1** indicator on **BCU light?**

   If **NO**, then continue with Step **7**.
   If **YES**, then proceed to Step **8**.

7. Check wiring using SD-7C118-01 or SD-7C118-02. Repeat procedure from Step **5** after locating and correcting trouble (check J305 wiring).

8. Deactivate **MISC 1** alarm.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Test Single Party POTS Channel End to End (*GTD-5* DTU to Series 5 RT)

SUMMARY: At *GTD-5* EAX DTU determine channel and directory number of channel being tested. At RT, determine corresponding channel and install single-party channel unit. At RT, connect a test telephone set with ringer connected for bridged ringing to channel being tested. Make talking, dialing, ringing, and ring-trip tests on channels 22, 48, 72, and 96.

NOTE:
Channel unit numbers at the *GTD-5* EAX start with channel 0 and at the RT start with channel 1. Therefore, the channel count at the RT is one greater than the number assigned at the *GTD-5* EAX switch (for example channel 22 at the RT is channel 21 at the *GTD-5* EAX switch).

1. Establish communication between RT and DTU.

2. NOTE:
   These test procedures are to be performed on channels 22, 48, 72, and 96.

   At DTU, select channel to be tested and determine directory number of channel. Inform RT of channel selected.

3. NOTE:
   Test telephone set should be connected for bridged ringing. Test telephone may be connected at cross-connect. Test calls should be made from cross-connect field to verify correct wiring from RT to cross-connect field.

   At RT, install single-party channel unit into channel unit slot (**21/22**, **47/48**, **71/72**, or **95/96**) associated with channel selected for testing and temporarily connect a test telephone set to the channel.

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

5. Is dial tone present at RT?

   If **YES**, then proceed to Step **9**.
   If **NO**, then continue with Step **6**.

6. Request CO personnel review line assignment to ensure correct test number. If line assignment is correct, check test connections at RT and correct if needed. If dial tone is still not present, replace RT channel unit and check for dial tone.

7. Is dial tone present at RT?

   If **YES**, then proceed to Step **9**.
   If **NO**, then continue with Step **8**.

8. At RT, use SD-7C118-01 to check channel bank wiring. Look for tip and ring reversal between RT and cross-connect terminal. Correct wiring until dial tone is present at RT and proceed to Step **9**.

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

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

    If **YES**, then proceed to Step **14**.
    If **NO**, then continue with Step **11**.

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

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

    If **YES**, then proceed to Step **14**.
    If **NO**, then continue with Step **13**.

13. At RT, use SD-7C118-01 to check wiring. Check for tip and ring reversal between RT and cross-connect terminal. Correct wiring and repeat Step **10** until talk quality is good in both directions.

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

15. At RT does test telephone ring normally?

    If **YES**, then proceed to Step **19**.
    If **NO**, then continue with Step **16**.

16. Has tip and ring reversal been checked?

    If **YES**, then continue with Step **17**.
    If **NO**, then proceed to Step **18**.

17. Replace RT channel unit and repeat this procedure from Step **4**.

18. At RT, look for tip and ring reversal and repeat from Step **14**.

19. At RT, lift telephone handset during ringing.

20. At RT, does ringing trip normally?

    If **YES**, then proceed to Step **22**.
    If **NO**, then continue with Step **21**.

21. Replace RT channel unit and repeat this procedure from Step **4**.

22. At RT, get VOM and condition to measure DC volts.

23. Make sure test call is established and held between CO and RT.

24. At RT, connect (+) red lead of VOM to tip terminal and (-) black lead to ring terminal of RT test telephone.

25. At RT, does meter indicate between 4 V and 15 V DC?

    If **YES**, then proceed to Step **31**.
    If **NO**, then continue with Step **26**.

26. Check RT test connections and correct if needed.

27. At RT, does meter now indicate between 4 V and 15 V DC?

    If **YES**, then proceed to Step **31**.
    If **NO**, then continue with Step **28**.

28. Replace RT channel unit for channel being tested and repeat Steps **4** through **24** and proceed to Step **29**.

29. At RT, does meter now indicate between 4 V and 15 V DC?

    If **YES**, then proceed to Step **31**.
    If **NO**, then continue with Step **30**.

30. Use RT schematic drawing SD-7C118-01 to check wiring. Repeat procedure from Step **24** after locating and correcting the trouble.

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

    If **YES**, then continue with Step **32**.
    If **NO**, then proceed to Step **2**.

32. Is **ACTU** (Automatic Channel Test Unit) available for use in testing channels?

    If **NO**, then proceed to Step **41**.
    If **YES**, then continue with Step **33**.

33. Request that the CO personnel run *GTD-5* EAX diagnostic tests on selected channel (SACT and RART tests).

34. Did tests pass?

    If **YES**, then proceed to Step **40**.
    If **NO**, then continue with Step **35**.

35. Check test connections and correct if needed. If connections are correct, replace RT channel unit. Repeat Step **33** and proceed to Step **36**.

36. Did tests pass?

    If **YES**, then proceed to Step **40**.
    If **NO**, then continue with Step **37**.

37. Make sure **ACTU** is working properly and that you are using proper procedures. Repeat Step **33** and proceed to Step **38**.

38. Did tests pass?

    If **YES**, then proceed to Step **40**.
    If **NO**, then continue with Step **39**.

39. Use RT schematic drawing SD-7C118-01 to check wiring. Check for tip and ring reversal between RT and cross-connect terminal. Correct wiring problem and repeat Step **33** until tests pass and proceed to Step **40**.

40. Is this the last designated channel unit slot to be tested with **ACTU**?

    If **YES**, then continue with Step **41**.
    If **NO**, then proceed to Step **33**.

41. At RT, remove test telephone.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install and Test FMU Line

SUMMARY: Install flash memory unit (**FMU**) line and determine that the line connection to the **FMU** is operational for remote connection to the **FMU**. This test uses a PC equipped with a modem interface and the DTFIO software package. Refer to the DTFIO User Guide for detailed procedures.

1. Install an AUA58 POTS (or equivalent) channel unit in the first slot (channel 1/2) of the blue system.

2. Find the J101BL connector on the dual channel bank (DCB).

3. Find the orange/white pair (the second VF pair) between P101BL and the protector block.

4. Use *Scotchloks* to connect the ED-7C728-30 cable for the FMU to orange/white pair between P101BL and the protector block (see Figure 1). Maintain the Tip/Ring polarity.

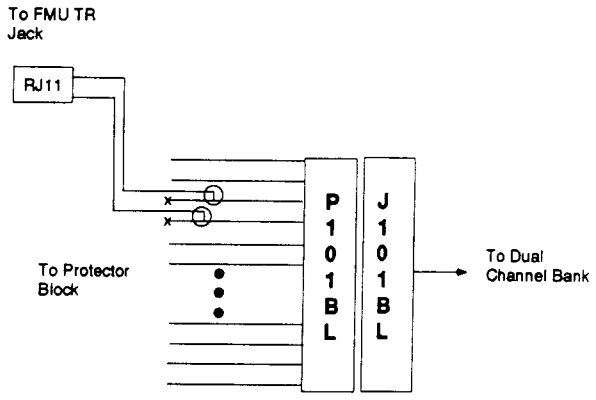


Figure 1 — ED-7C728-30 FMU Line Cable Connections

5. Cut and remove the orange/white pair between the *Scotchlok* connectors and the protector block.

6. Dress the cord with the RJ-11 plug up the left side over the top and down the right side of the DCB to the **FMU**. Use cable ties to fasten the cable to the DCB.

7. Install the RJ11 plug into the TR jack on the **FMU** faceplate. A click, indicating that the plug is fully seated and locked into the faceplate, should be heard when the RJ-11 plug is installed into the jack.

8. Have the craftsperson at the remote DTFIO PC access the FMU.

NOTE:
Channel 2 of the blue system is assigned to the **FMU** and must be engineered as a nondial line in the *GTD-5* EAX data base and set up to recall the DTFIO PC used to remotely update the **FMU**. Refer to *Part 12* of the *GTD-5 EAX User Guide* for Recent Change instruction for the *CHAN DN* and *SET CCF* command if the FMU lines need to be engineered.

9. Was the **FMU** access attempt successful?

If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE**
If **NO**, continue with Step **10**.

10. Connect the male connector of the Full Null Modem (ED-7C730-30 or equivalent cable) to the DTE connector on the faceplate of the **FMU**.

ED-7C730-30, G1 EIA-232 Cable Wiring (Comcode 601382419)	
9-Pin Male Connector Pins	**9-Pin Female Connector Pins**
2	3
3	2
4	6
5	5
6	4
7	8
8	7

11. Connect the female connector of the Full Null Modem (ED-7C730-30) cable to the EIA-232 (RS-232) serial interface of the local PC.

12. From the local DTFIO PC, setup a direct connection to the **FMU**. Wait for the DTFIO to display the **FMU** diagnostic results.

13. Do the **FMU** diagnostics indicate a modem problem on the **FMU**?

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

14. Replace **FMU** and install and load the new **FMU**. When properly installed, all diagnostics should pass. Repeat procedure from Step **8**.

    Reference: **DLP-513**

15. Check and correct connection between **FMU** and POTS channel unit.

16. Have the craftsperson at the remote DTFIO PC access the FMU.

17. Was the **FMU** access attempt successful?

    If **YES, STOP. YOU HAVE COMPLETED THIS PROCEDURE**
    If **NO**, continue with Step **18.**

18. Contact the AGCS Technical Assistance Center (TAC) at 602-582-7305 to resolve the problem. Repeat procedure from Step **8** when problem is resolved.

Install AUB101 Flash Memory Unit (FMU)

1. Get one **AUB101 FMU** (Figure 1) and inspect for possible damage.

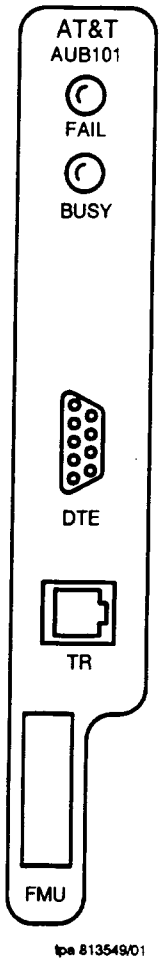


Figure 1 — AUB101 Faceplate Layout and Board Outline

2. Install **FMU** into the upper rightmost double slot of the white system.

3. Does **FAIL** indicator on the **FMU** light steady and then go out after 5 seconds?

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

4. Replace **FMU**.

5. Does **FAIL** indicator on the **FMU** light steady and then go out after 5 seconds?

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

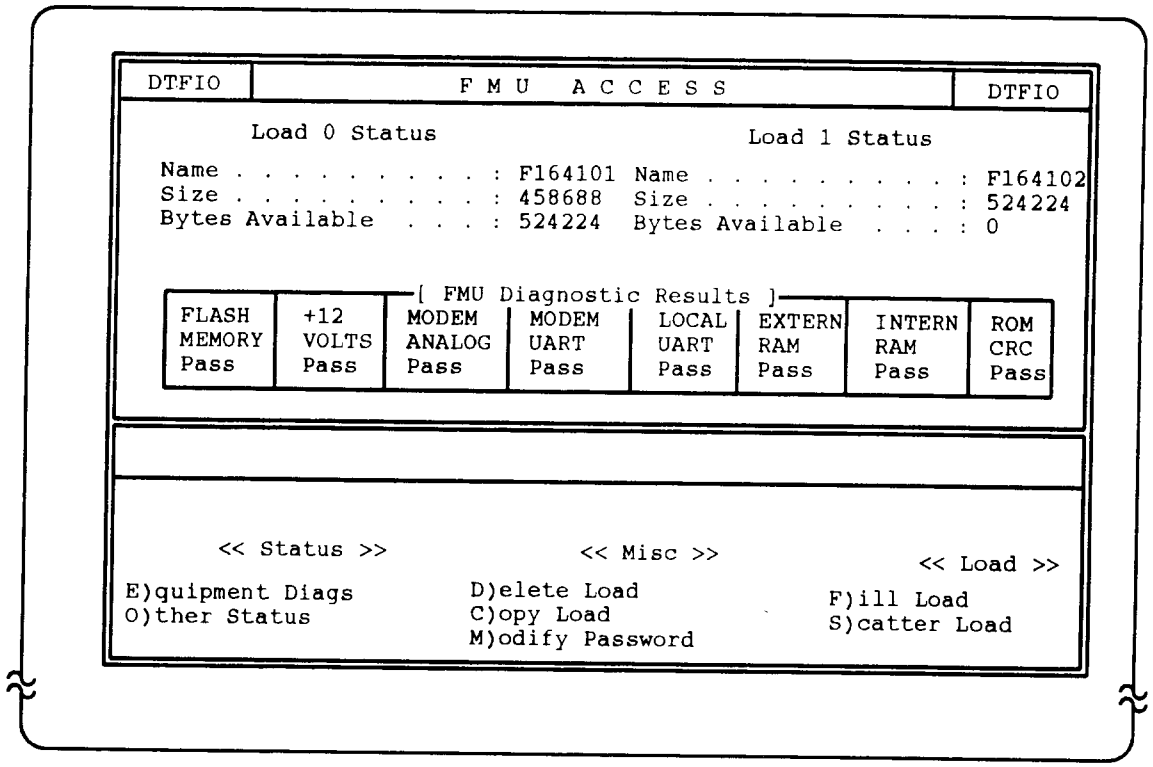
6. Consult the Technical Assistance Center (TAC) by calling 602-582-7305 or the local technical support group.

   Repeat procedure from Step **2** after locating and correcting trouble.

7. Connect a 9 pin FULL NULL MODEM (ED-7C730-30, G1 or equivalent cable) to the **DTE** connector on the faceplate of the **FMU**.

8. Connect the FULL NULL MODEM from the **FMU** faceplate to an IBM compatible PC and start the DTFIO software package on the PC (refer to DTFIO User Guide for bringup sequence).

9. From the DTFIO PC, set up a direct connection to the **FMU**. Once the **FMU** establishes connection with the DTFIO, it will transmit its load status and diagnostics results. The following is a typical *FMU ACCESS* DTFIO PC display screen (with sample load status information):



If the **FMU** load information and diagnostic results are displayed, go to Step **15**. Otherwise, continue with Step **10**.

10. Disconnect FULL NULL MODEM connector from **FMU** faceplate. Connect a different FULL NULL MODEM to the **DTE** connector on the **FMU** faceplate.

11. From the DTFIO PC, set up a direct connection to the **FMU**. Does **FMU** load information display on the DTFIO PC screen?

    If **YES**, then go to Step **15**.
    If **NO**, then continue with Step **12**.

12. Disconnect FULL NULL MODEM connector from **FMU** faceplate. Replace **FMU**. Reconnect FULL NULL MODEM to the **DTE** connector on the **FMU** faceplate.

13. From the DTFIO PC, set up a direct connection to the **FMU**. Does **FMU** load information display on the DTFIO PC screen?

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

14. Refer to DTFIO User Guide for trouble shooting procedures for the DTFIO and/or its PC. Repeat procedure from Step **9** after locating and correcting trouble.

15. NOTE:
    The **FMU** has no load stored in its memory as delivered from the factory. However, if the **FMU** has a load residing in its memory from a previous installation, it will be used to load the MLIUs installed in the dual bank assembly. If this is the incorrect load, it can be replaced by loading the **FMU** through the DTFIO.

    Follow local procedures for determining the correct **FMU** load identities.

16. Does the DTFIO PC screen display the correct **FMU** load identities?

    If **YES**, proceed to Step **26**.
    If **NO**, continue with Step **17**.

17. From the DTFIO PC, initiate a fill load of one of the copies of the **FMU** (refer to DTFIO User Guide for DTFIO operation). Using a 9600 bps local connection, the load of the **FMU** should take approximately 5-10 minutes.

18. Does the DTFIO PC screen indicate that the load transfer was successful?

    If **YES**, proceed to Step **26**.
    If **NO**, continue with Step **19**.

19. Does the DTFIO PC screen display that the load failed?

    If **YES**, go to Step **4**.
    If **NO**, continue with Step **20**.

20. From the DTFIO PC, attempt to load the **FMU** again.

21. Does the DTFIO PC screen indicate that the load transfer was successful?

    If **YES**, proceed to Step **26**.
    If **NO**, continue with Step **22**.

22. Replace the FULL NULL MODEM connector connecting the **FMU** to the DTFIO PC.

23. From the DTFIO PC, attempt to load the **FMU** again.

24. Does the DTFIO PC screen indicate that the load transfer was successful?

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

25. Refer to DTFIO User Guide for trouble shooting procedures for the DTFIO and/or its PC. Repeat procedure from Step **17** after locating and correcting trouble.

26. NOTE:
The **FMU** has no password stored in its memory as delivered from the factory. Additionally, the **FMU** could have a password in its memory from a previous installation. If no password is established or if an unknown password is present, dial-up connection will not be possible. Also, the password installed at the **FMU** must also be input at the central DTFIO location that will be remotely accessing this **FMU**.

Select "**M**odify Password" command from DTFIO menu and establish **FMU** password.

27. Disconnect the FULL NULL MODEM and DTFIO PC from the **FMU** faceplate and store appropriately.

STOP. YOU HAVE COMPLETED THIS PROCEDURE. c

Set Alarm Display Unit (ADU) Option to In-Service [Feature Package I (FPI) System]

NOTE:
This procedure assumes that the system to be tested is equipped in the preservice state.

1. Remove **AUB28 ADU** (Figure 1) circuit pack from bank being tested.

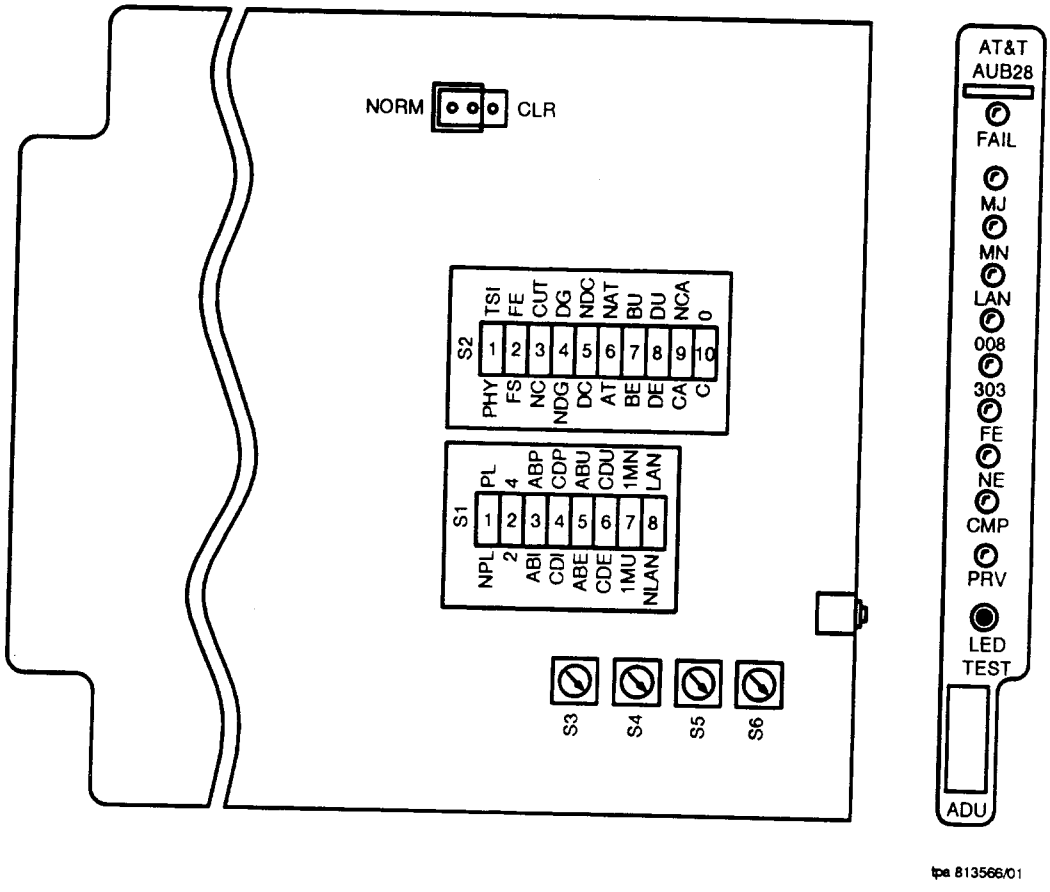


Figure 1 — AUB28 RT ADU Option Switch Settings

2. Set switch **S1-3** toward **ABI** (for AB shelf in service), and switch **S1-4** toward **CDI** (for CD shelf in service).

3. Plug **ADU** circuit pack back into its slot.

   Response: Within 90 seconds, alarms clear and **LIU**s return to their previous state (**CLF** LEDs continue to flash if the RT MXU has not been started by the ACDC or ASR, off if the RT MXU has been started).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.