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SLC® Series 5 Carrier System

Integrated Network Access-Remote Terminal

User's Manual

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1. INTRODUCTION

1.01 An INA-RT (integrated network access-remote terminal) is a remote channel bank that uses *SLC* Series 5 Carrier System technology to provide integrated network access based on a subset of D4 channel bank features. Applications for the INA-RT include termination on a D4, D5, a DCS (digital cross-connect system) such as a DACS II, or a *SLC* 96 Carrier COT (central office terminal) D4 emulator at the central office.

1.02 The D4 banks were designed to provide digital paths at DS1 and higher transmission rates for the interoffice and intertoll network. Five D4 operating modes exist; however, only D4 Mode III operates at the DS1 transmission rate used by the *SLC* Series 5 Carrier System.

1.03 The INA-RT uses the standard J1C182AE-1 or J1C182AF-1 DCB (dual channel bank). Earlier DCBs are not compatible. The E&M signaling leads on the RT backplane are available when using the J1C182AF-1 DCB. The INA-RT may occupy one or both banks in a DCB. The second bank may also be left unequipped or it may be equipped with *SLC* Series 5 Carrier System in any feature package.

1.04 Standard *SLC* Series 5 Carrier System plug-ins are used by the INA-RT with the exceptions of a new ADU (alarm display unit - AUB27) and a new BCU (bank control unit - MC97769A1). The LIUs (line interface units) for the INA-RT must be C-suffixed or later. Refer to Section 2 for more information concerning these units.

1.05 Special service channel units are electronically provisioned with the CIU (craft interface unit). Channel units are provisioned locally with the CIU because there is no data link. For the same reason, no PGTC (pair gain test controller) or XTC (extended test controller) access is provided. System alarms generated at the RT must be sent to maintenance locations through an independent telemetry system.

1.06 The INA-RT utilizes two operating modes to optimize physical space and transmission bandwidth. Neither mode offers DS1 protection.

1.07 In Mode I, four LIUs are used to access up to 96 subscriber circuits in one half of a DCB. In Mode III, two LIUs and two TCUs (transcoder units) are used to achieve facility savings for smaller line sizes.

1.08 Mode I operation provides 4:1 space savings compared to a D4 bank. Up to 96 subscriber circuits may be served by four unconcentrated DS1 paths. This operating mode is most efficient with 48 dual-channel 2-wire CUs (channel units). Single-channel special-service channel units may also be used. The 96-line Mode I INA-RT can be administered as one 96-line system or as two 48-line systems. See Section 3 for details on options and administrative rules.

1.09 Mode III operation provides 2:1 space savings compared to a D4 bank. Up to 48 subscriber circuits may be served by two unconcentrated DS1 paths. This operating mode more efficient for service with 48 single-channel special-service CUs since facilities are reduced. Dual-channel 2-wire channel units may also be used.

1.10 An incompatibility light is added that operates when the bank controller detects that incorrect common equipment or options exist or when channel units are placed in invalid locations in the system.

1.11 It may be assumed that INA-RT features which do not have specific requirements stated in this document have the same requirements as the corresponding feature in *SLC*® Series 5 Carrier System Feature Packages C and D.

2. DESCRIPTIONS

AUB27 ADU (Alarm Display Unit)

2.01 The new AUB27 ADU (Figure 1) is required for INA-RT operation. The backplane interface of this ADU resembles an RT unit but has provisioning memory similar to a COT unit. The AUB27 resembles the AUB26 in appearance and function. Differences between the AUB27 and the AUB26 include:

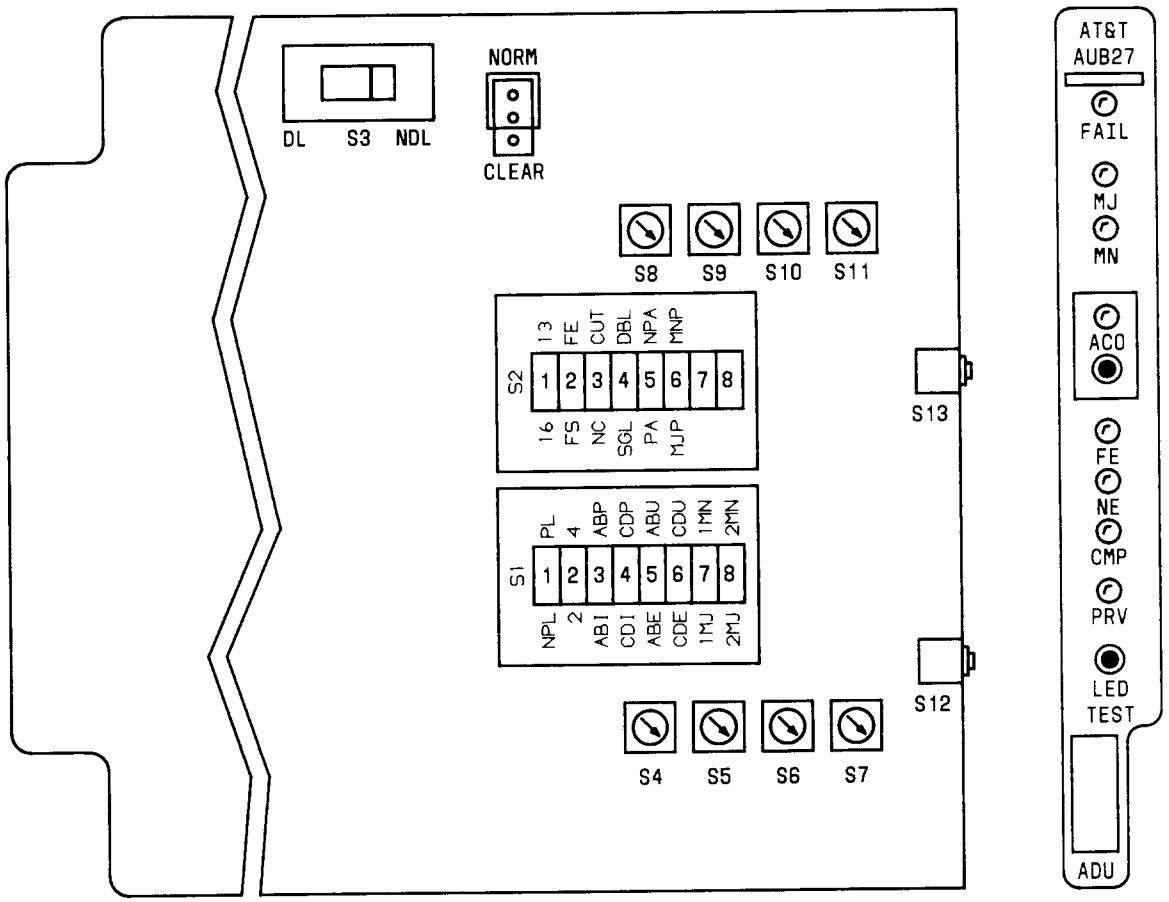


Figure 1 - AUB27 ADU (alarm display unit)

- An EEPROM (electrically erasable programmable read only memory) is added to store a second copy of channel provisioning data.
- Two contact closures operated by the BCU to be used as MAJOR and MINOR alarm lines to the maintenance (alarm) center. A third (new) contact closure, also operated by the BCU, to be used as a PMN (power minor) alarm to the maintenance center. These leads were originally used as MISC1 and MISC2 miscellaneous input alarms.
- An ACO (alarm cut-off) button to clear alarm conditions at the maintenance center.
- Three additional LEDs controlled by the BCU to be used as a PRV (provisioning memory alarm), a CMP (compatibility) alarm, and an ACO indicator.

- The CMP indicator lights when the bank controller detects an incompatible common plug-in installed for a specific system configuration or incorrectly set option switches for a specific configuration. It will also light if the bank controller determines that two channel units are contending for the same time slot (electronic channel).
- The LED TEST button indicator lights all LEDs controlled by the BCU for a functional lamp test (only the 48 or 96 LED on the BCU lights depending upon the line counting option selected). Also, at the time of a common unit incompatibility, it extinguishes the "fail" indicator on the incompatible unit, indicating its location.
- Two sets of four bank ID rotary switches to establish system identification numbers for each mode of operation.
- A CLEAR/NORM option plug that allows the EEPROM to be cleared without the use of a CIU. This can only occur if EEPROM copies are mismatched and no special service channel units are installed in the bank. This feature allows for clearing EEPROM memories during initial turnup so that a CIU is not required at that time.

2.02 Differences between the switch options on the AUB27 compared to the AUB26 are as follows:

- The NPL/PL option will always be set to NPL because no protection switching is available with the INA-RT.
- The 2/4 option enables operation of two (Mode III) or four (Mode I) DS1 lines. This switch is used to select the operating mode.
- The SGL/DBL option determines whether or not the even channels supply data to the digital bit stream in Mode III operation. In SGL, only the odd channel of a dual channel unit functions. In DBL, both channels of the dual channel unit are used but the slot to the immediate right of the dual channel unit must be unequipped. The SGL/DBL switch has no function in Mode I.
- The next two options work together to select a method of transmitting major, minor, and power minor alarms to a maintenance center. This will be described in greater detail in the engineering section.

  — The PA/NPA option activates the integrated power alarm function when set to PA. An integrated power alarm will also activate a MAJOR or MINOR alarm condition at the maintenance center. This switch operates in conjunction with the MJP/MNP.

  — The MJP/MNP option determines if an integrated power alarm activates a MAJOR (MJP) or a MINOR (MNP) alarm condition at the maintenance center.

- The DL/NDL option will always be set to NDL because no data link is available with the INA-RT which uses D4 format.
- The NC/CUT switch enables (CUT) or disables (NC) the hunting algorithm that automatically determines the correct DS1 framing pattern when cutting to an integrated digital switch. ***Note:*** *This function does not work in INA-RT.*

2.03 Similarities between the switches and indicators on the AUB27 compared to the AUB26 include:

- The FAIL LED indicates that a failure has been sectionalized to this AUB27 ADU.
- The MJ (major) LED indicates that at least one digroup is out of service.
- The MN (minor) LED indicates that, although no digroups are out of service, a subsequent failure may cause a loss of service if the minor alarm condition is not corrected.
- The NE (near end) LED indicates that the failure has been sectionalized to the INA-RT.
- The FE (far end) LED indicates that the failure is not in the INA-RT.
- The ABI/ABP switch places the AB shelf in the in-service (ABI) or pre-service (ABP) state.
- The CDI/CDP switch places the CD shelf in the in-service (CDI) or pre-service (CDP) state.
- The ABE/ABU switch marks the AB shelf equipped (ABE) or unequipped (ABU) with its common plug-ins.
- The CDE/CDU switch marks the CD shelf equipped (CDE) or unequipped (CDU) with its common plug-ins.
- The 16/13 switch determines the length of the bit field used for communicating with the terminal at the other end of the system.
- The FS/FE switch selects the framing format used, F_s (FS) or ESF [F_e (extended super frame)].

2.04 Usage of the eight bank ID switches (S4 through S11) depends on the operating mode of the bank. In INA-RT Mode I, if the two sets of switches agree, then the bank is assumed to be a single 96 channel bank. If the two sets of switches disagree, then the bank is assumed to be two distinct 48 channel banks. In INA-RT Mode III, the system can only be a 48 channel system. For Mode III (48), only the lower set of switches (S4 through S7) is used to identify the bank [the upper set of switches (S8 through S11) is ignored]. For Mode III (96), the two sets of switches must be set to the same number. The bank identification number should be entered from left to right as shown in Figure 1 (refer to the engineering section).

2.05 The CLEAR/NORM option plug is only effective if the memories on the ADU and BCU do not agree and no special service channel units are present. The option plug should be in the NORM position at the beginning and end of all procedures.

2.06 Refer to **AT&T 363-005-190, AUB27 (INA-RT) ALARM DISPLAY UNIT - 5SCSAA0BXX, DATA SHEET** for a detailed description of all switches and indicators for use with INA-RT and other applications.

MC97769A1 BCU (Bank Control Unit)

2.07 Together with the AUB27, the MC97769A1 BCU forms the INA-RT bank controller. The BCU contains a microcomputer that is the core of the bank controller. It also has a system program memory, electrically erasable memory for the semipermanent storage of channel unit provisioning coefficients, and a random-access memory.

2.08 The MC97769A1 BCU (Figure 2) has two new LEDs labeled 48 and 96.

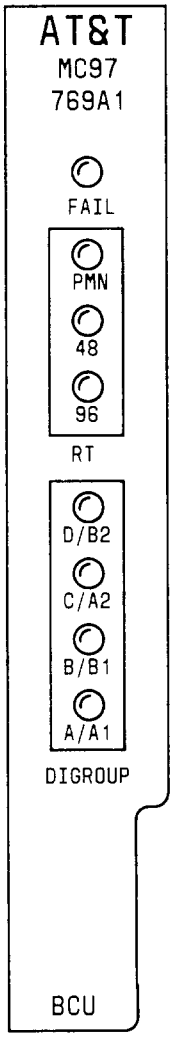


Figure 2 - MC97769A1 BCU (bank control unit)

- For Mode I, the 48 LED indicates that the RT bank is operating as two 48-line systems. The 96 LED indicates that the RT bank is operating as a single 96-line system.
- For Mode III, the 48 LED indicates that a line counting sequence of 1 to 48 has been chosen. The 96 LED indicates that a line counting sequence of 1 to 96 (odd channels only; 1, 3, 5, etc.) is used.

2.09 The 48 or 96 LED lights when the LED TEST button is depressed on the ADU or a provisioning session is established with the CIU. The administrative size of the system determines which LED lights.

2.10 The digroup indicator LEDs are labeled differently than the digroup indicators on traditional *SLC* Series 5 Carrier System BCUs. Each digroup indicator has two names. The first set of names (A, B, C, and D) indicate *SLC* Series 5 Carrier System digroup positions. The second set of names (A1, B1, A2, and B2) indicate the A and B digroups of two 48-line (2 digroup) D4 banks to which the INA-RT could be connected.

2.11 A set of adhesive designation strips to correctly label the DCB channel counting according to operating mode is included in the carton with the BCU. These strips can also be ordered using COMCODE 846309011. Refer to Figures 3 and 4 and the engineering section of this document for more details on proper usage of these strips.

2.12 Refer to **AT&T 363-005-182, MC97769A1 (INA-RT) BANK CONTROLLER UNIT - 5SXTA10BXX, DATA SHEET** for a detailed description of all indicators.

Memory

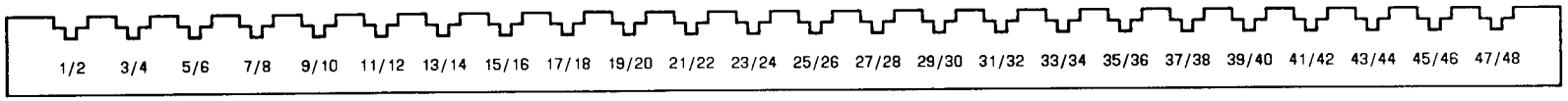
2.13 The INA-RT has EEPROM on both the BCU and ADU to provide nonvolatile provisioning data redundancy.

2.14 The provisioning data maintained by the BCU firmware is in a format compatible with a Series 5 RT. Since the INA-RT has one less nonvolatile provisioning memory than the Series 5 system, a coded form of the memory coefficient is stored in the LIU. This can be used to perform checks against the ADU and BCU memories. If these three sources do not agree, either because of failure or plug-in replacement, provisioning memory failures are declared for both BCU and ADU.

Alarms and Closures

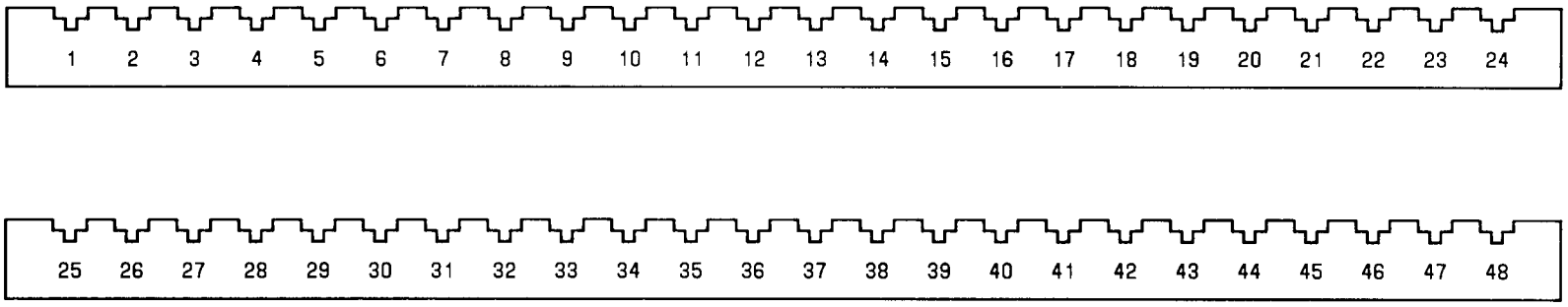
2.15 In addition to the current Series 5 visual alarms, the new ADU has a CMP (compatibility) alarm, a PRV (provisioning memory) alarm, and an ACO (alarm cut-off) indicator. The CMP alarm provides rapid, visible feedback to the craft personnel when common circuit packs or option switch settings comprise an incompatible configuration. The CMP LED also lights when a channel unit is installed in a non-valid slot where channel contention occurs. The PRV alarm indicates that provisioning memory is being updated (when no other alarms are lighted) or that provisioning has failed (when MN and FAIL indicators are also lighted). The ACO indicator indicates that the ACO button has been depressed but the alarm condition has not been cleared.

2.16 The new BCU LEDs are described under the BCU description.



NOTE: This strip is added to the B and/or D shelves.
The A and C shelves remain the same. Mode I (96)
uses the designation strips furnished with the DCB.

Figure 3 - Channel unit shelf add-on designation strip for Mode I (48) INA-RT



NOTE: Mode III (96) uses the designation strip furnished with the DCB.

Figure 4 - Channel unit shelf add-on designation strip for Mode III (48) INA-RT

3. APPLICATIONS

Compatibility

3.01 D4 Compatibility: The INA-RT provides compatible transmission and operations characteristics when interfaced to a Mode III D4 bank. In addition to compatibility with the usual F_s format used by a D4 LIU-3, it is compatible with ESF framing used by a D4 LIU3ESF-AHG8 LIU.

3.02 D5 Compatibility: The INA-RT provides compatible transmission and operations characteristics when interfaced to a D5 bank. This compatibility is limited to the same features provided by a Mode III D4 to D5 bank system.

3.03 DCS Compatibility: The INA-RT provides compatible transmission and operations characteristics when interfaced to a DCS operating at the DS1 line rate.

3.04 *SLC* 96 Carrier D4 Emulator Compatibility: The INA-RT provides compatible transmission and operations characteristics when interfaced to a *SLC* 96 carrier COT utilizing the *SLC* 96 Carrier DLU (data link unit) for D4 emulation.

DCBs (Dual Channel Bank Assemblies)

3.05 The INA-RT uses the standard J1C182AE-1 or J1C182AF-1 DCB. Earlier DCBs are not compatible. The E&M signaling leads on the J1C182AF-1 RT may be used if necessary. Because the two operating modes allow for different pair counting schemes, based on customer choice, adhesive labels, which provide proper slot numbering to the shelves, are provided. They are packaged in the BCU carton and should be applied prior to initial system turnup. Refer to Figures 3 and 4 and the engineering section for more detail.

CUs (Channel Units)

3.06 The INA-RT currently supports E *SPOTS*® channel units (AUA42, AUA43), DID (AUA56), 4-wire VF (voice-frequency) (AUA41, AUA44, AUA54), dataport (AUA52), ringing repeater (AUA45), and T-BRITE (T- basic rate interface transmission extension) (AUA90) channel units.

3.07 Most special service channel units must be provisioned via the CIU, entering the "RT" option. Whenever the CIU requests a COT session, an error message, "SYSTEM IS FAILED," is returned. The craft personnel can then return to a menu allowing data entry into RT channel units.

Mode I Operation

3.08 The INA-RT Mode I is recommended for banks with a large percentage of dual channel units, DDS (digital data service) channel units using SCEC (secondary channel error correction), or ISDN (integrated services digital network) T-BRITE channel units. Single-channel special-service channel units may also be used in this mode. Mode I operation offers a 4:1 space saving advantage as compared to D4 (see Figure 5).

3.09 The Mode I INA-RT may be administered as one 96-line system or as two 48-line systems per one half of a DCB.

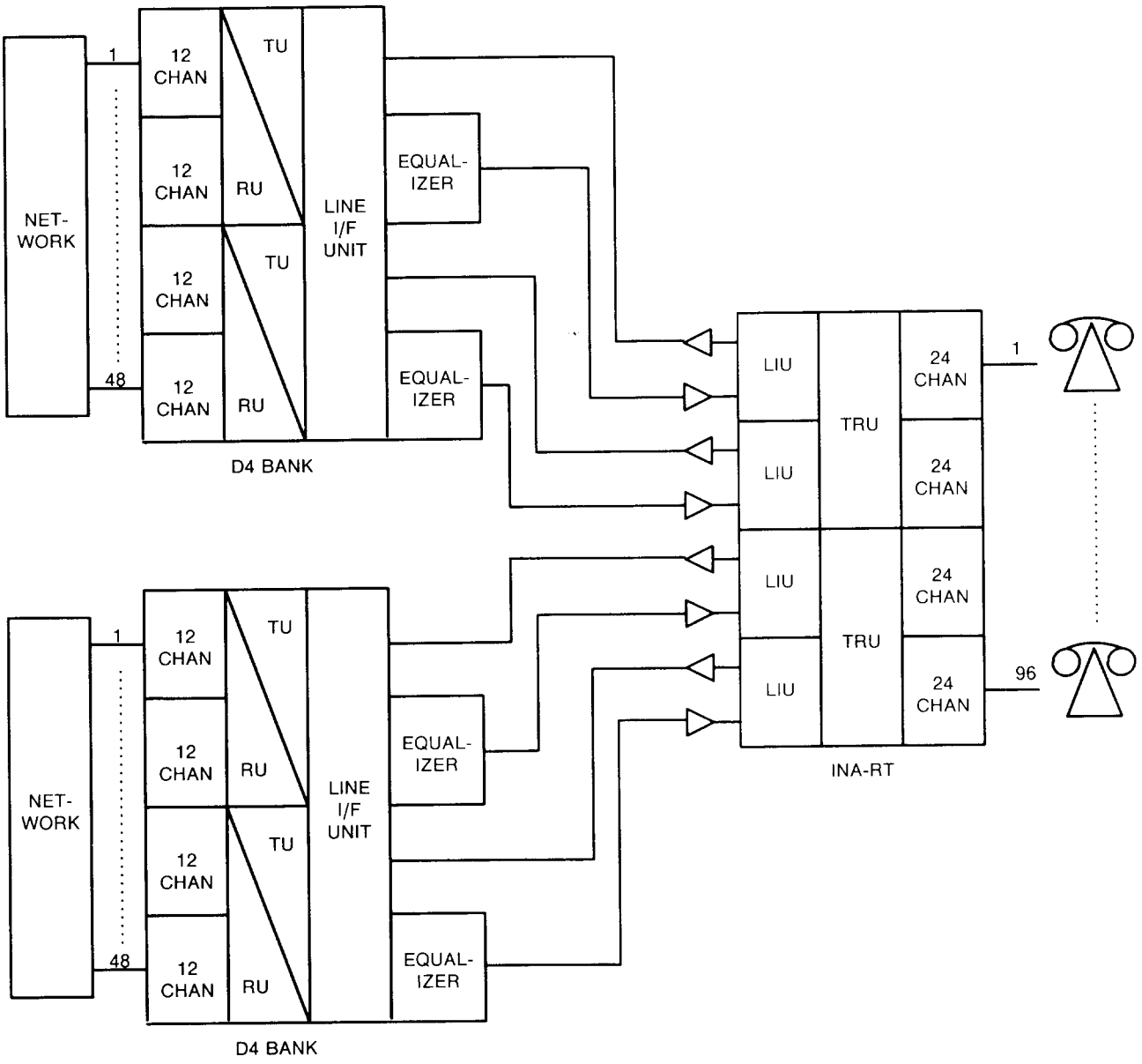


Figure 5 - Mode I INA-RT application

3.10 Four LIUs (line interface units) and four DS1 digital facilities serve up to 96 subscriber circuits or the equivalent of two D4 banks. The Mode I INA-RT may be optioned as two distinct systems (a maximum of four systems per dual RT channel bank) by assigning two bank identification numbers to the ADU. If the two system (bank) identification numbers are equal, the system is referred to as a "Mode I (96)" system. If the two system identification numbers are different, the systems are referred to as "Mode I (48)" systems.

3.11 When Mode I (48) is selected, the adhesive designation strip shown in Figure 3 should be placed on the B and/or D shelf as needed. The strips would cover the existing designation strips, marked 49/50 to 95/96.

Mode III Operation

3.12 The INA-RT Mode III is recommended for banks with a large percentage of single-channel special-service channel units. Dual channel 2-wire channel units may also be used (refer to Section 4). Mode III operation offers a 2:1 space saving advantage as compared to D4 (see Figure 6). This mode is optimized for single-channel channel units to save facility costs.

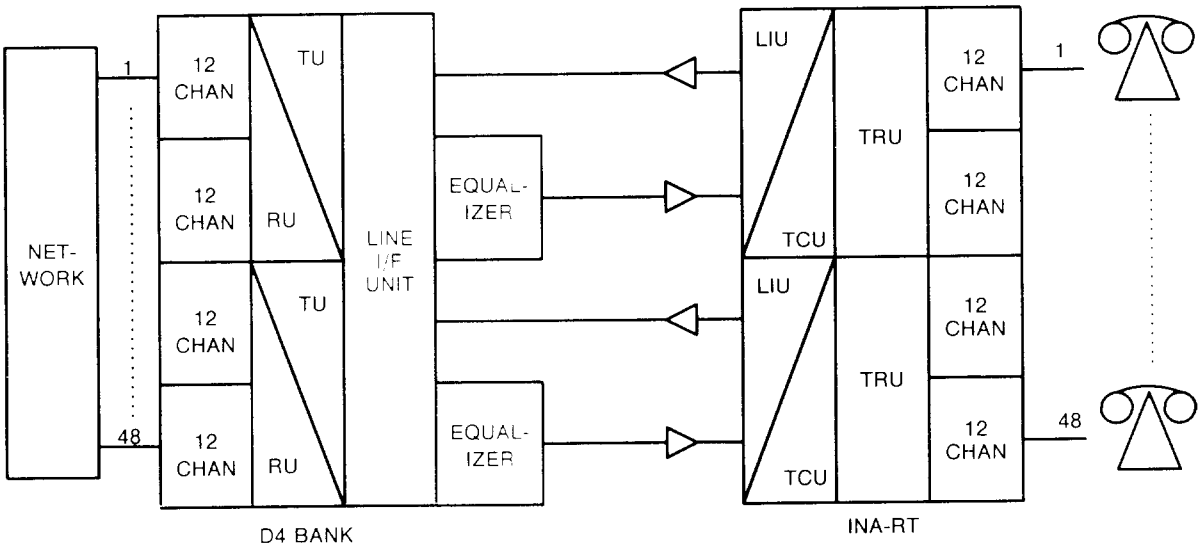


Figure 6 - Mode III INA-RT application

3.13 Two TCUs (transcoder units) are used to achieve the equivalent of *SLC* 96 Carrier Mode III operation. The TCUs are used only to rearrange time slots for maximum utilization of the DS1 bandwidth. No ADPCM (adaptive differential pulse modulation) is done. Two DS1 facilities are used to transmit 48 DS0 channels generated by up to 48 special-service channel units.

3.14 The Mode III INA-RT has two versions, Mode III (48) and Mode III (96). Both versions support only 48 channels over the two DS1 lines.

3.15 Mode III (48) counts each slot as one channel, and counts them sequentially, from 1 to 48. New designation strips (shown in Figure 4) are needed.

3.16 Mode III (96) counts each slot as one channel, and counts them sequentially, from 1 to 95 (that is, 1,3,5...93,95); the even numbers are not used. The designation strips furnished with the bank can be used. The craft personnel and the CPC (circuit provisioning center) ignores the even numbered channels.

3.17 Dual channel units are administered two ways in Mode III. The ADU has an option switch S2, position 4 that is labeled SGL/DBL. In SGL, only the odd half of the channel unit functions; it is equal to a single channel unit. In DBL, both halves of the channel unit function and the slot to the immediate right of a dual channel unit must be vacant. Although the "DBL" function uses the channel units more efficiently, there are administrative rules that must be understood by both circuit design and craft personnel. With the Mode III INA-RT system in "DBL," dual channel units require two operating channels corresponding to the number of the slot in which the CU is installed and the slot to the immediate right. The service order must note that the second channel's T&R (tip and ring) pair is connected to the channel in which the CU is inserted.

Testing

3.18 Because the D4 format has no data link, the INA-RT does not have PGTC or XTC capabilities. Local line testing is performed via the CIU and the 52A channel unit test extender. The CIU operations that reference the far end are not supported. The DS1 oriented testing is limited to automatic loopback testing when input fails to an LIU, and jack access with an AUA78 fault-locating test adapter.

3.19 In most cases, end-to-end testing will require craft personnel at both locations. The CIU channel test capability includes:

- Signaling monitoring (receive direction) and signaling injection (transmit direction) (A=C and B=D is required when injecting signaling).
- Digital bit stream connection for dataport tests through use of KS test sets (requires that the bank be equipped with digital test units AUA18 and AUA19).
- Digital bit stream access for VF channels at 0.0 dB or D4 transmission levels (requires that the bank be equipped with digital test units AUA18 and AUA19).
- Monitor mode in transmit and receive directions without customer channel disruption.
- Tip and ring access to the analog signal from the metallic drop.
- Jack access to test E/M signaling capabilities of an E&M/PLR-type channel unit (AUA54 or AUA44).

3.20 Channel unit test extender channel test capability includes:

- Monitor and splitting access to T/R and T1/R1 tip and ring.
- Monitor and splitting access to E/M and SG/SB signaling leads.
- Active circuitry for normal and reverse current limited battery feed and hold function to supply dc termination.

3.21 T-BRITE channel units are tested using the 950A test set (refer to **AT&T 363-005-238, 950A TEST SET - 5STEA00DAA, DATA SHEET** and **AT&T 363-205-106, T-BRITE CHANNEL UNIT INSTALLATION AND MAINTENANCE**).

3.22 The LT (manual terminal loopback) test switch on the D4 bank cannot be used in INA-RT applications. The Series 5 AUA78 FLTA (fault-locating test adapter) and a fault-locating test set are used to troubleshoot T1 digital lines using standard techniques. ***Note:*** *The "far end loop" switch on the AUA78 does function with the INA-RT system.*

4. ENGINEERING

Selecting Mode of Operation

4.01 The engineer must determine if the INA-RT will be used in the entire DCB or in one half of the dual bank [one half of a dual bank refers to either the blue system (shelves 1 and 2) or the white system (shelves 4 and 5)]. The options are as follows:

- Mode I in both halves.
- Mode III in both halves.
- Mode I in one half and Mode III in the other half.
- Either Mode I or Mode III in one half and any *SLC* Series 5 Carrier System feature package in the other half.

4.02 Each half of a DCB is engineered independently. Examples of possible arrangements are shown in Figures 7 and 8. When INA-RT is chosen, Mode choices are made as follows:

- Mode I has the potential to provide the most special services lines in the INA-RT dual channel bank. This provides the best space savings, which is often important at customer premises. It is also the most economic and efficient for 2-wire services. Mode I has two counting schemes:

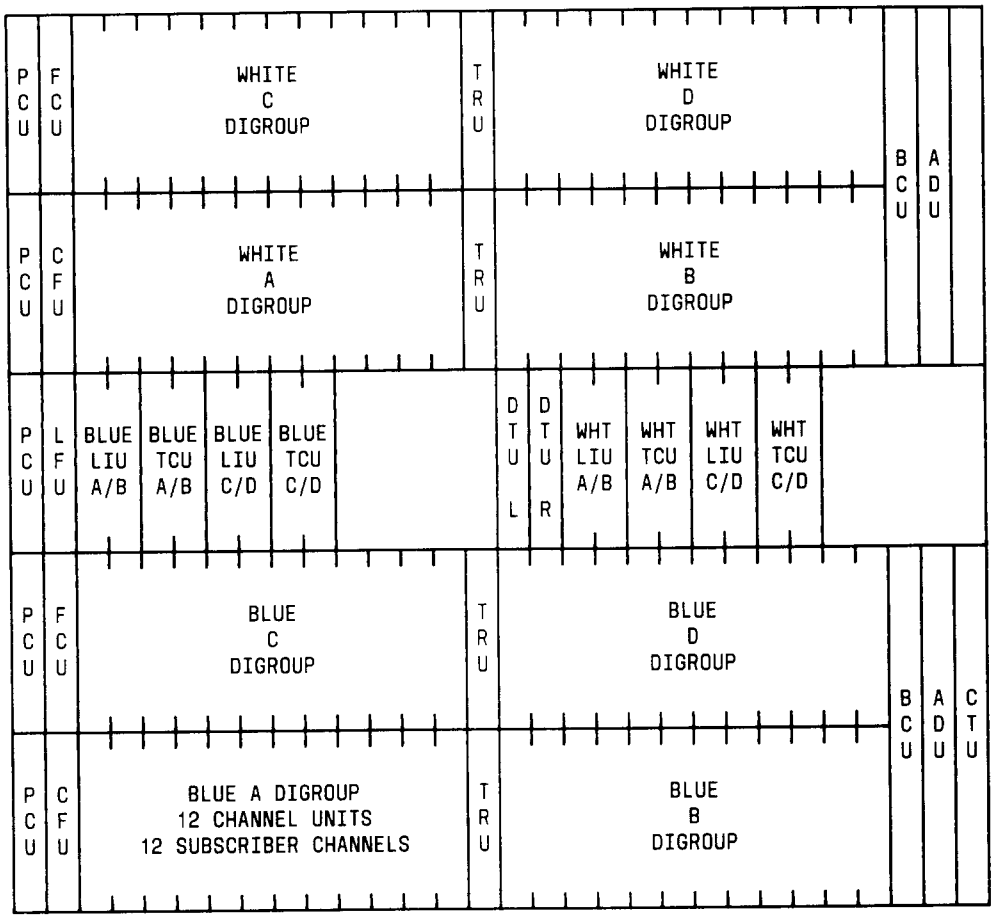
  1. Mode I (48)—Two 48-line systems in one half of a dual bank. New designation strips are required (Figure 3) and provided with the MC97769A1 BCU.
  2. Mode I (96)—One 96-line system in one half of a dual bank. No designation strips changes are required.

- Mode III is the least costly in terms of facility costs, when 48 or fewer circuits are needed per one half of a DCB. It is most efficient when single channel units are used. It provides a maximum of 48 lines per one half DCB. Mode III has two counting schemes:

  1. Mode III (48)—One 48-line system in one half of a dual bank. This counting scheme utilizes and counts each slot (that is, 1,2,3...47,48). New designation strips are required for all shelves in this mode (Figure 4) and provided with the MC97769A1 BCU.
  2. Mode III (96)—One 48-line system in one half of a dual bank. This counting scheme utilizes and counts only the odd channel number slots (that is, 1,3,5...93,95). The existing designation strip is used but the even numbers are ignored.

Framing Format

4.03 Either the F_s or ESF framing format can be selected by an ADU option switch. The BCU provisions all LIUs according to the framing format indicated by the option switch. For F_s framing, the BCU provisions the LIU for D4 counting. Neither framing format provides a data link so in F_s format, the signaling frame pattern is supplied in every superframe and in ESF format, the 4 kb/s data link bits are all ones (except when a yellow alarm is transmitted for the digroup).



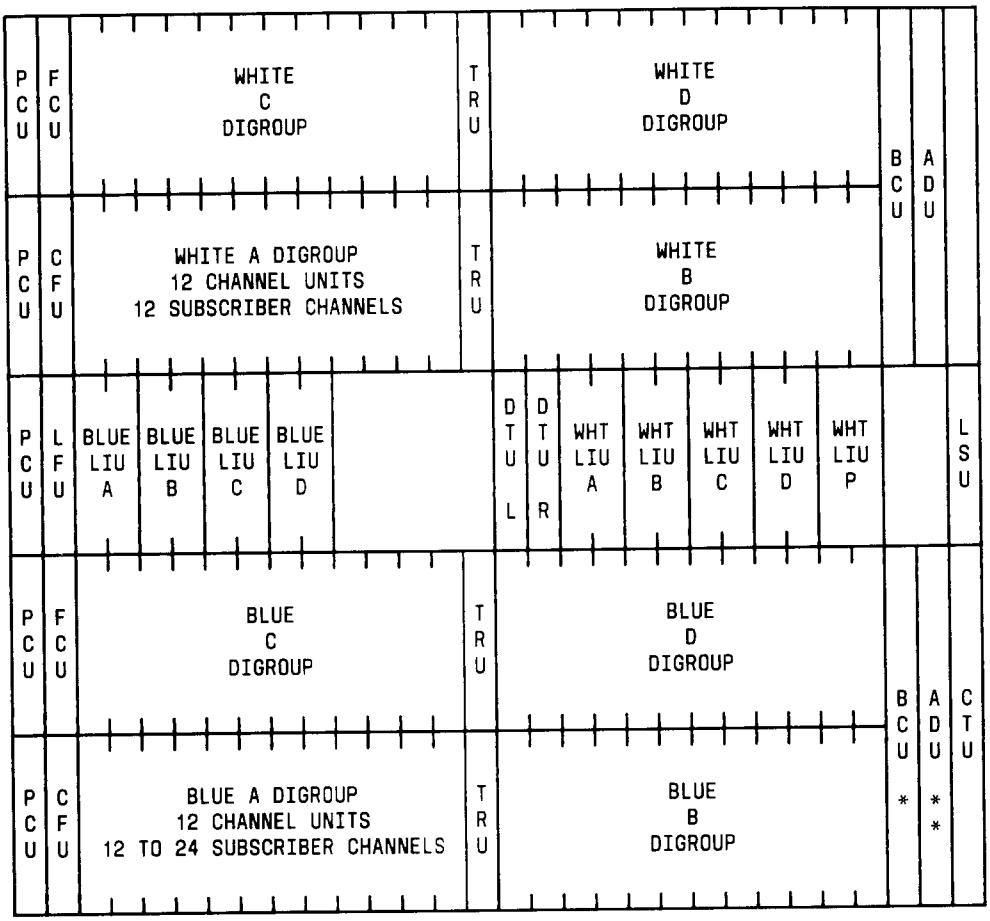
KEY:

ADU - ALARM DISPLAY UNIT (AUB27)
BCU - BANK CONTROLLER UNIT (MC97769)
CFU - CHANNEL FUSE UNIT
CTU - CHANNEL TEST UNIT (AUB22, AUB25)
DTU - DIGITAL TEST UNIT (AUA18, AUA19)
FCU - FAN CONTROL UNIT (AUA24)
LFU - LINE FUSE UNIT
LIU - LINE INTERFACE UNIT (AUA61C, AUA62C, AUA64C)
PCU - POWER CONVERTER UNIT (AUA11B)
TCU - TRANSCODER UNIT (AUA71)
TRU - TRANSMIT-RECEIVE UNIT (AUA21)

Figure 7 - Two Mode III INA-RTs in a dual RT channel bank

4.04 The INA-RT framing format should be set to match that of the CO equipment connected to the INA-RT. Allowable equipment includes:

- D4 Bank: Usually F_s, although the D4 bank may use ESF framing by using the LIU3ESF-AHG8 D4 LIU.
- D5 Bank: Usually ESF.



KEY FOR INA-RT:

ADU - ALARM DISPLAY UNIT (*AUB27)
BCU - BANK CONTROLLER UNIT (**MC97769)
CFU - CHANNEL FUSE UNIT
CTU - CHANNEL TEST UNIT (AUB22, AUB25)
DTU - DIGITAL TEST UNIT (AUA18, AUA19)
FCU - FAN CONTROL UNIT (AUA24)
LFU - LINE FUSE UNIT
LIU - LINE INTERFACE UNIT (AUA61C, AUA62C, AUA64C)
LSU - LINE SWITCH UNIT (AUA13, AUA73)
PCU - POWER CONVERTER UNIT (AUA11B)
TRU - TRANSMIT-RECEIVE UNIT (AUA21)

Figure 8 - Mode I INA-RT (blue) and Series 5 RT (white) in a dual RT channel bank

- DCS (including AT&T DACS products): Either F_s or ESF.
- *SLC* 96 Carrier D4 Emulator: F_s format. Requires a new *SLC* 96 Carrier data link unit, F-62115 CP (refer to CIR 363-099-066IR).

LIUs (Line Interface Units)

4.05 Series C and later series LIUs should be used. The LIU 32/64 rate switches must be set to 32 when operating in Mode III and 64 when operating in Mode I.

- AUA61C (and later): Terminates the INA-RT on a fiber multiplexer facility.
- AUA62C (and later): Provides T1 line powering toward the central office for long routes (see **AT&T 915-710-115, *SLC* SERIES 5 CARRIER SYSTEM - APPLICATION ENGINEERING - FACILITY DESIGN SYSTEMS** for design information).
- AUA64C (and later): Provides T1 power looping when the INA-RT T1 lines are powered from the central office.

4.06 The INA-RT does not support facility protection switching. The LIU options are described in **AT&T 915-710-115**.

CTUs (Channel Test Units) and DTUs (Digital Test Units)

4.07 A CTU should be used in INA-RT for CIU input. If both halves of the dual bank are INA-RT, the AUB22 should be used. If the other half of the bank is a Series 5 System, the type of testing used on the Series 5 system determines the CTU type as follows:

PGTC Testing — AUB22

XTC Testing — AUB25.

4.08 The DTU pair (AUB18 and AUB19) should be installed for local bit stream access during channel testing.

TCUs (Transcoder Units)

4.09 The TCU AUA71s are installed in the B and/or D digroup LIU slots as needed for Mode III operation only.

Remoted Alarms

4.10 The MISC1 and MISC2 terminals on connector J305 are used to provide a method of telemetering INA-RT alarms to a maintenance center. The DL/NDL switch on the AUB27 must be in the NDL position for the alarm telemetry connections to function. Two methods are possible:

1. MJ, MN, and PMN are available on J305. These signals appear on three leads with a common lead which is compatible with most telemetry systems. The ADU (AUB27) options are:

   — Switch S2, Position 5—NPA

   — Switch S2, Position 6—No function.

2. Only MJ and MN are available on J305. The power alarm (PMN) can be integrated into either the MJ or the MN alarm. The ADU (AUB27) options are:

   — Switch S2, Position 5—PA

   — Switch S2, Position 6—MJP (Integrates PMN into MJ)

   — Switch S2, Position 6—MNP (Integrates PMN into MN).

4.11 The attached Figures, 9, 10, 11, and 12, show various convenient ways to return INA-RT alarms to a maintenance center. See SD-7C118-01 for details on cabling harnesses and connections.

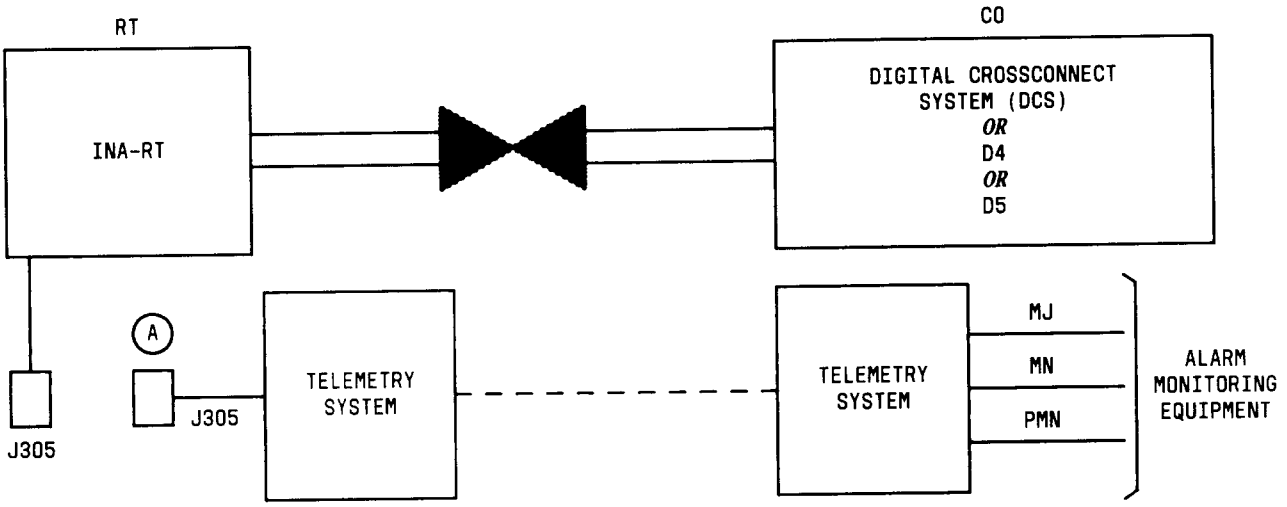


Figure 9 - Alarm telemetry hook-ups (example 1)

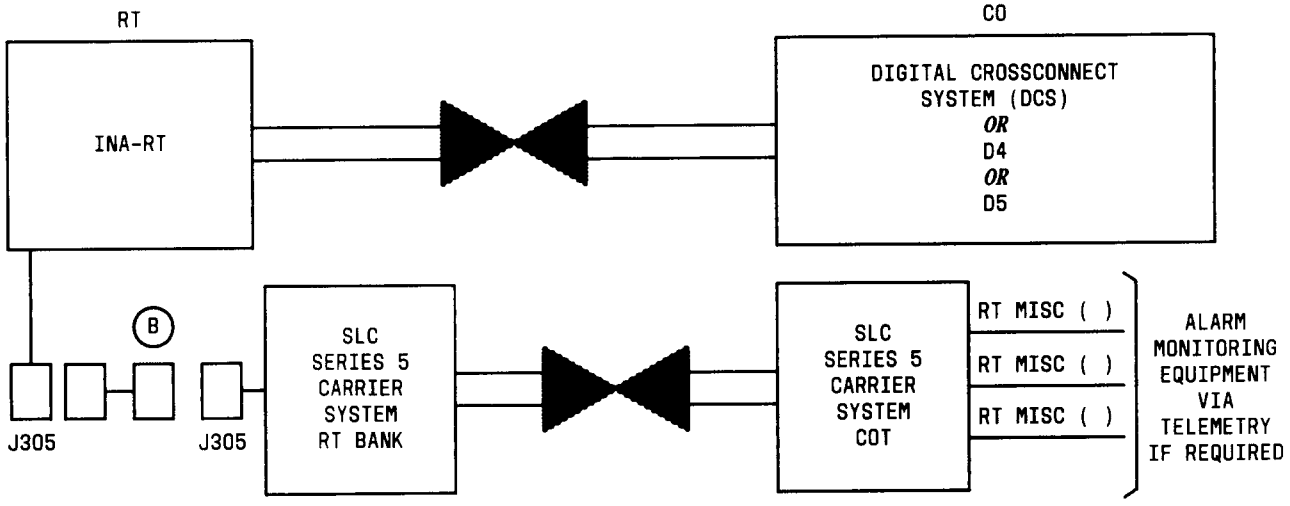


Figure 10 - Alarm telemetry hook-ups (example 2)

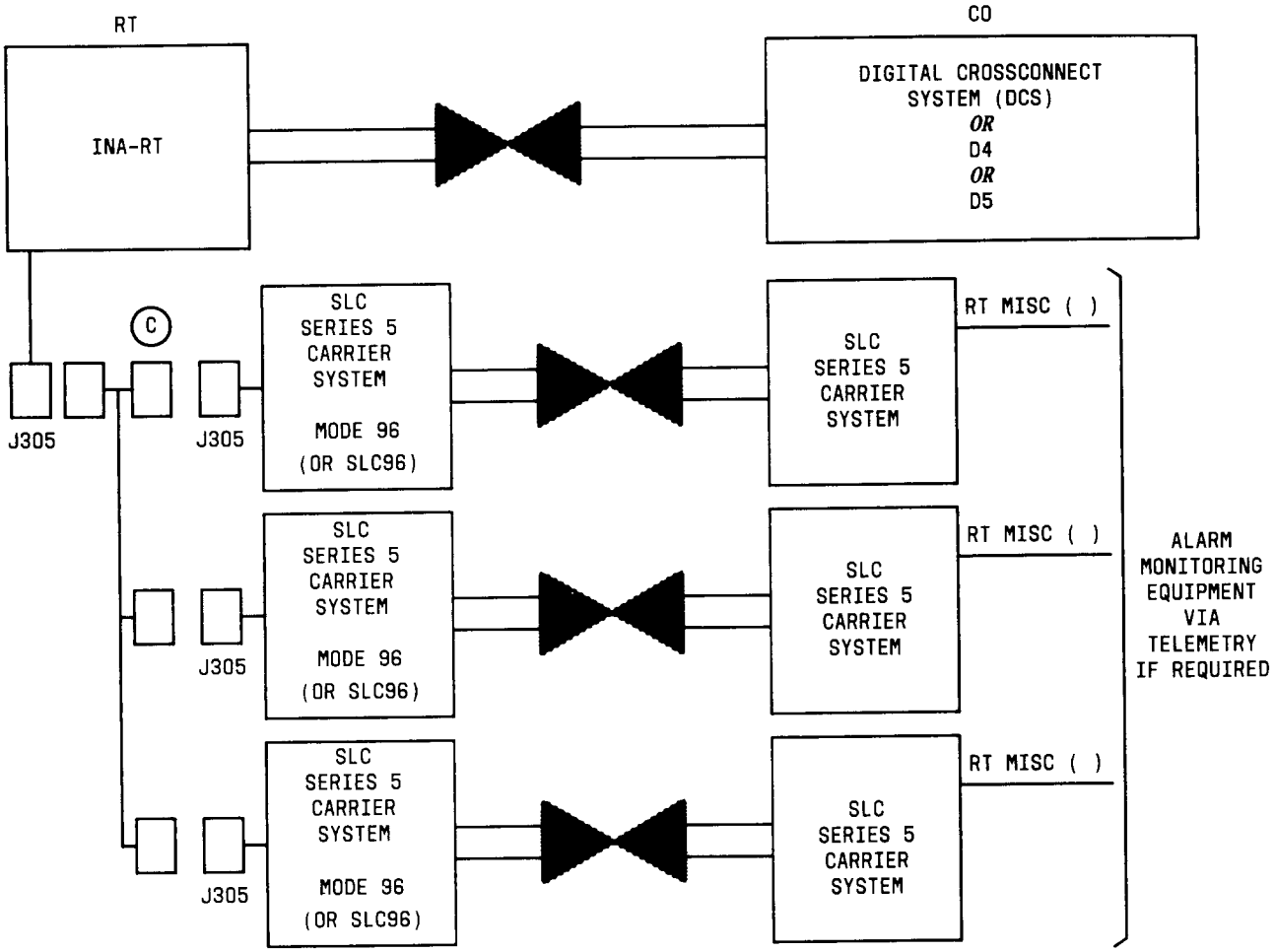


Figure 11 - Alarm telemetry hook-ups (example 3)

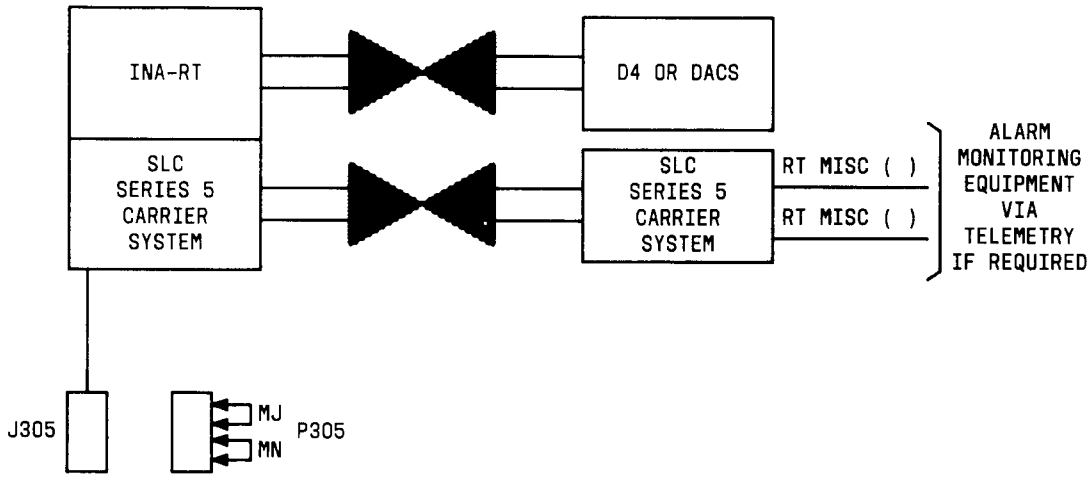


Figure 12 - Alarm telemetry hook-ups (example 4)

Optioning Details

4.12 TABLES A through D detail the options and equipment necessary for operating in each of the combinations modes per system size. TABLE E shows valid relationships of system numbers in the same DCB for different modes.

TABLE A
REQUIRED SETTINGS FOR INA-RT MODE I (48)

ADU AUB27 SWITCH S1

POSITION	SETTING	MEANING
1	NPL	No Protection Line
2	4	Four DS1s per system
3	ABI/ABP	AB shelf In-service/Pre-service
4	CDI/CDP	CD shelf In-service/Pre-service
5	ABE/ABU	AB shelf Equipped/Unequipped
6	CDE/CDU	CD shelf Equipped/Unequipped
7	—	Not applicable for INA-RT
8	—	Not applicable for INA-RT

ADU AUB27 SWITCH S2

POSITION	SETTING	MEANING
1	13	13 bit alarm field
2	FS/FE	F_s or ESF framing format*
3	—	Not applicable in INA-RT
4	—	Not applicable in Mode I INA-RT
5	PA/NPA	Power Alarm integration/ No Power Alarm integration
6	MJP/MNP	Major/Minor Power alarm
7	—	Not applicable in INA-RT
8	—	Not applicable in INA-RT

ADU AUB27 SWITCH S3

POSITION	SETTING	MEANING
1	NDL	No Data Link

ADU AUB27 SWITCHES S4, S5, S6 and S7

System Identification number (0001-9999)† for shelves 1 or 4.

ADU AUB27 SWITCHES S8, S9, S10 and S11

System Identification number (0001-9999)† for shelves 2 or 5.

LIU (C Series or Later)

POSITION	SETTING	MEANING
64/32	64	Transmission rate
B/Z	Z	Bipolar eight zero suppression
"Trans/Rec"	( )	Refer to AT&T 915-710-115
"Equalization"	( )	Refer to AT&T 915-710-115

CTUs and DTUs

Refer to text.

Alarms

Refer to text.

* Determined by framing format of CO equipment.

† System numbers for all shelves on a DCB must be different in this configuration.

TABLE B
REQUIRED SETTINGS FOR INA-RT MODE I (96)

ADU AUB27 SWITCH S1

POSITION	SETTING	MEANING
1	NPL	No Protection Line
2	4	Four DS1s per system
3	ABI/ABP	AB shelf In-service/Pre-service
4	CDI/CDP	CD shelf In-service/Pre-service
5	ABE/ABU	AB shelf Equipped/Unequipped
6	CDE/CDU	CD shelf Equipped/Unequipped
7	—	Not applicable for INA-RT
8	—	Not applicable for INA-RT

ADU AUB27 SWITCH S2

POSITION	SETTING	MEANING
1	13	13 bit alarm field
2	FS/FE	F_s or ESF framing format*
3	—	Not applicable in INA-RT
4	—	Not applicable in Mode I INA-RT
5	PA/NPA	Power Alarm integration/ No Power Alarm integration
6	MJP/MNP	Major/Minor Power alarm
7	—	Not applicable in INA-RT
8	—	Not applicable in INA-RT

ADU AUB27 SWITCH S3

POSITION	SETTING	MEANING
1	NDL	No Data Link

ADU AUB27 SWITCHES S4, S5, S6 and S7

System Identification number (0001-9999)† for shelves 1 or 4.

ADU AUB27 SWITCHES S8, S9, S10 and S11

System Identification number (0001-9999)† for shelves 2 or 5.

LIU (C Series or Later)

POSITION	SETTING	MEANING
64/32	64	Transmission rate
B/Z	Z	Bipolar eight zero suppression
"Trans/Rec"	( )	Refer to AT&T 915-710-115
"Equalization"	( )	Refer to AT&T 915-710-115

CTUs and DTUs

Refer to text.

Alarms

Refer to text.

* Determined by framing format of CO equipment.

† System numbers for shelves 1 and 2 must be the same. System numbers for shelves 4 and 5 must be the same. System numbers for shelves 1 and 2 must be different from system numbers for shelves 4 and 5.

TABLE C
REQUIRED SETTINGS FOR INA-RT MODE III (48)

ADU AUB27 SWITCH S1

POSITION	SETTING	MEANING
1	NPL	No Protection Line
2	2	Two DS1s per system
3	ABI/ABP	AB shelf In-service/Pre-service
4	CDI/CDP	CD shelf In-service/Pre-service
5	ABE/ABU	AB shelf Equipped/Unequipped
6	CDE/CDU	CD shelf Equipped/Unequipped
7	—	Not applicable for INA-RT
8	—	Not applicable for INA-RT

ADU AUB27 SWITCH S2

POSITION	SETTING	MEANING
1	13	13 bit alarm field
2	FS/FE	F_s or ESF framing format*
3	—	Not applicable in INA-RT
4	SGL/DBL	Refer to text.
5	PA/NPA	Power Alarm integration/ No Power Alarm integration
6	MJP/MNP	Major/Minor Power alarm
7	—	Not applicable in INA-RT
8	—	Not applicable in INA-RT

ADU AUB27 SWITCH S3

POSITION	SETTING	MEANING
1	NDL	No Data Link

ADU AUB27 SWITCHES S4, S5, S6 and S7

System Identification number (0001-9999)† for shelves 1 or 4.

ADU AUB27 SWITCHES S8, S9, S10 and S11

Set to 0000

LIU (C Series or Later)

POSITION	SETTING	MEANING
64/32	32	Transmission rate
B/Z	Z	Bipolar eight zero suppression
"Trans/Rec"	( )	Refer to AT&T 915-710-115
"Equalization"	( )	Refer to AT&T 915-710-115

CTUs and DTUs

Refer to text.

Alarms

Refer to text.

* Determined by framing format of CO equipment.

† System numbers for shelves 1 and 4 must be different in this configuration.

TABLE D
REQUIRED SETTINGS FOR INA-RT MODE III (96)

ADU AUB27 SWITCH S1

POSITION	SETTING	MEANING
1	NPL	No Protection Line
2	2	Two DS1s per system
3	ABI/ABP	AB shelf In-service/Pre-service
4	CDI/CDP	CD shelf In-service/Pre-service
5	ABE/ABU	AB shelf Equipped/Unequipped
6	CDE/CDU	CD shelf Equipped/Unequipped
7	—	Not applicable for INA-RT
8	—	Not applicable for INA-RT

ADU AUB27 SWITCH S2

POSITION	SETTING	MEANING
1	13	13 bit alarm field
2	FS/FE	F_s or ESF framing format*
3	—	Not applicable in INA-RT
4	SGL/DBL	Refer to text.
5	PA/NPA	Power Alarm integration/ No Power Alarm integration
6	MJP/MNP	Major/Minor Power alarm
7	—	Not applicable in INA-RT
8	—	Not applicable in INA-RT

ADU AUB27 SWITCH S3

POSITION	SETTING	MEANING
1	NDL	No Data Link

ADU AUB27 SWITCHES S4, S5, S6 and S7

System Identification number (0001-9999)† for shelves 1 or 4.

ADU AUB27 SWITCHES S8, S9, S10 and S11

System Identification number (0001-9999)† for shelves 2 or 5.

LIU (C Series or Later)

POSITION	SETTING	MEANING
64/32	32	Transmission rate
B/Z	Z	Bipolar eight zero suppression
"Trans/Rec"	( )	Refer to AT&T 915-710-115
"Equalization"	( )	Refer to AT&T 915-710-115

CTUs and DTUs

Refer to text.

Alarms

Refer to text.

* Determined by framing format of CO equipment.

† System numbers for shelves 1 and 2 must be the same. System numbers for shelves 4 and 5 must be the same. System numbers for shelves 1 and 2 must be different from system numbers for shelves 4 and 5.

TABLE E
SAMPLE SYSTEM IDENTIFICATION NUMBERS WITHIN A DCB (NOTE)

	SHELF	SWITCHES	MODE I (48)	MODE I (96)	MODE III (48)	MODE III (96)
WHITE BANK	5	S8,S9,S10,S11	1 2 3 7	1 2 3 5	0 0 0 0	1 2 3 5
ADU	4	S4,S5,S6,S7	1 2 3 6	1 2 3 5	1 2 3 5	1 2 3 5
BLUE BANK	2	S8,S9,S10,S11	1 2 3 5	1 2 3 4	0 0 0 0	1 2 3 4
ADU	1	S4,S5,S6,S7	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
			Four 48-line systems	Two 96-line systems	Two 48-line systems	Two 48-line systems

Note: This is an example of valid system number options for the possible modes in the same DCB. Where two system identification numbers are the same in this table, the actual numbers may be the same in the DCB. Where numbers are different, they must be different between the corresponding locations in the DCB.

Channel Unit Design and Turnup

4.13 The design of circuits to be used in INA-RT is described in **AT&T 915-710-116**. The turnup of the circuits (provisioning and testing) is contained in **AT&T 363-205-402**. The T-BRITE installation and maintenance is contained in **AT&T 363-205-106**. The circuit designer must be sensitive to the restrictions and incompatibilities associated with INA-RT, as described below.

INA-RT Assignment Restrictions

Mode I

4.14 All channel units listed in Section 3.3 may be used without restriction except T-BRITE CUs (AUA90). The T-BRITE should be assigned in trislot groups; the trislot is defined as the following groups of slots in a digroup: 1,2,3; 4,5,6; 7,8,9; and 10,11,12. Refer to Figure 13 for allowable arrangements.

Mode III—"SGL"

4.15 The Mode III—SGL has the following assignment restrictions:

1. Any single-channel channel unit may be assigned to any slot except T-BRITE (as indicated in Item 5).
2. Any dual-channel CU may be assigned to any slot since the even half is not operational (except as indicated in Item 5).
3. Dataport (AUA52) without SCEC (second channel error correction) may be assigned to any slot (except as indicated in Item 5).
4. Dataport (AUA52) with SCEC may be assigned to any slot (except as noted in Item 5); however, the slot to the immediate right of the dataport CU must be left empty. The last slot in a digroup cannot be used for dataport.
5. T-BRITE CUs may be placed only in the first slot of a trislot group. The remaining slots of the trislot group must be left empty.

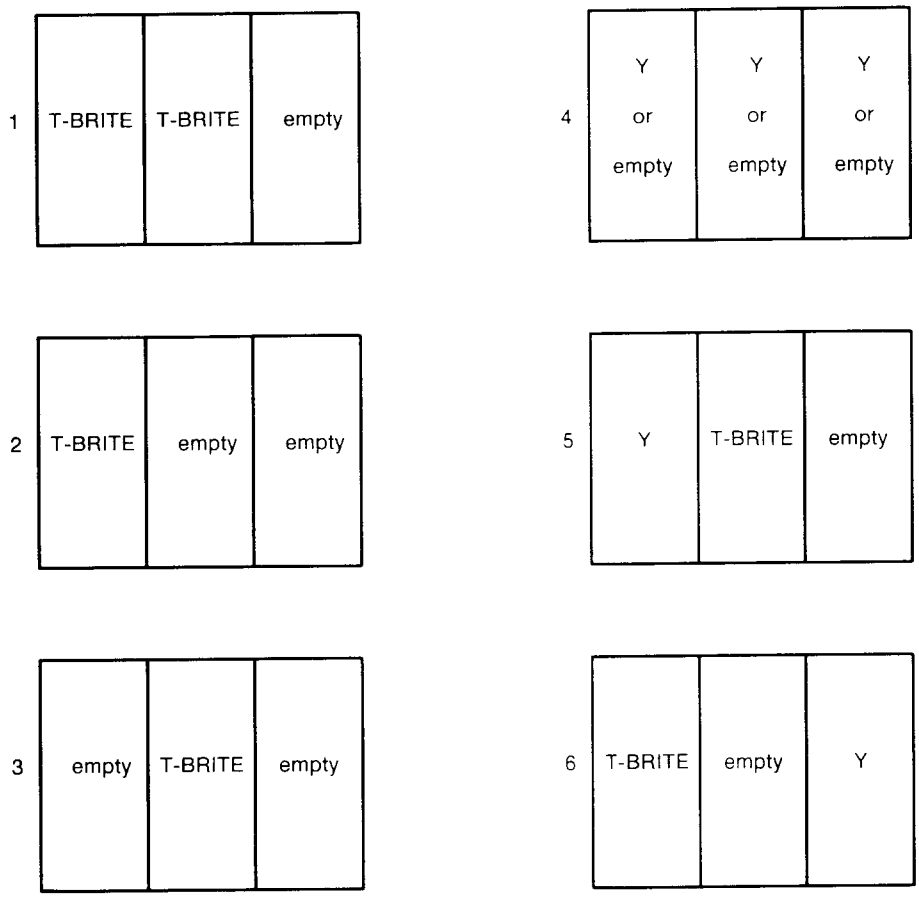


Figure 13 - Valid placement configurations for T-BRITE in Mode I INA-RT

Mode III—"DBL"

4.16 The Mode III—DBL has the following assignment restrictions. Caution should be used in choosing this mode because of its complexity.

1. Any single-channel CU may be assigned to any slot except as indicated in Items 2, 4, and 5.
2. Any dual-channel CU may be assigned to any slot except slot 12 of a digroup except as noted in Items 4 and 5. The slot to the immediate right of the equipped slot must remain empty.
3. Dataport without SCEC may be assigned to any slot except as noted in Items 4 and 5.
4. Dataport with SCEC may be assigned to any slot except as noted in Items 2 and 5. The slot to the immediate right of the CU must be left empty.
5. T-BRITE CUs may be placed only in the first slot of a trislot group. The remaining slots of a trigroup must remain empty.

Caution: Dual-channel channel unit numbering must be carefully thought through by the circuit designer so that the service order or WORD (work order record detail) is accurate. For example, consider an INA-RT configured as a Mode III (48)—DBL. Place a dual circuit pack, AUA43, in slot 1. The odd channel is numbered 1 and the even channel is numbered 2 for CIU access. However, T&R access for both channels 1 and 2 are associated with slot 1 pairs. If the channel unit was placed in slot 2, its odd channel would be channel 2 and its even channel would be channel 3. In this case, channel 2 T&R would be associated with slot 2. Therefore, the circuit designers must accurately identify the T&R location, as well as the channel number.

Channel Unit Incompatibility

4.17 The T-BRITE CUs activate a "CMP" alarm if they are placed in a nonvalid slot (as previously described). Any channel unit placed in a slot required to be left empty activates the "CMP" alarm. The INA-RT system believes that the channel unit already installed and in service is the correct circuit, and the new circuit pack is creating the incompatibility. The INA-RT will attempt to retain the working services but this is not always possible. Therefore, the craft personnel should be instructed to immediately remove a circuit pack which caused the "CMP" alarm to light when inserted. This minimizes service outage on the working circuit if it occurs. The craft personnel should check the order to assure that the correct pack and placement are being used. If an error was made in installation, the craft personnel should correct the error at that time. If the craft personnel is correctly following the work order, but the CMP condition continues, the craft personnel should inform the circuit designer who should determine if the compatibility rules have been followed. A new, correct service order may be needed.

TASK INDEX LIST

FIND YOUR JOB IN THE LIST BELOW . . . . THEN GO TO

ACCEPT REMOTE TERMINAL

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

1 Get support apparatus listed:

- 216-type tool (80-type cabinet only),
- Special key (allen-type wrench) - COMCODE 840841324 (51A and 80-type cabinets only),
- DMM (digital multimeter) with an accuracy of 1.0% and an ac/dc input impedance of ≥ 1 megohm.

2 ***Warning: 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.***

Perform overall visual inspection of RT (remote terminal) for type RT installed.

A. Frame RT:	DLP-500
B. ED-7C601-30 (51-Type) cabinet RT:	DLP-501
C. ED-7C621-30 or ED-97977-30 CSC (community service cabinet) (80-type) RT:	DLP-502

3 Visually inspect shelf connections, ac and dc powering, and miscellaneous alarm wiring for type RT installed.

A. Frame RT:	
1. With J1C182BA power shelf	DLP-503
2. With J1C182BB bulk power shelf	DLP-504
B. ED-7C601-30 (51-type) cabinet RT:	DLP-505
C. ED-97977-30 CSC 80C RT:	DLP-506
D. ED-7C621-30 CSC 80D RT:	DLP-507

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

4 Check RT frame and equipment ground for type RT installed.

A. Frame RT:	DLP-508
B. ED-7C601-30 (51-type) cabinet RT:	DLP-509
C. ED-7C621-30 or ED-97977-30 CSC (80-type) RT:	DLP-510

5 Close and secure RT (if not performing turn up procedures at this time).

TURN UP SERIES 5 RT EQUIPPED FOR INTEGRATED NETWORK ACCESS CAPABILITY (MODE I) OR ADD TO EXISTING RT

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

1 ***Note:*** This procedure assumes that (1) the outside cable pairs are not closed through to the RT so that the RT is isolated from the digital and derived lines, (2) the frame or cabinet (51- or 80-type) housing the RT has been installed, (3) the J1C182AE or J1C182AF assembly has been installed in the frame or cabinet enclosure, (4) the miscellaneous pair panel, protector connectors, power shelf, fan shelves, and battery shelves (if required) have been installed in the frame or cabinet enclosure, and (5) the acceptance procedures in this volume have been performed. This procedure contains instructions concerning the installation of the various units into the RT assembly shelves, battery shelves (if required), and power shelf, and for verifying that the units are operating properly.

2 ***Note:*** This procedure allows equipping and testing of a dual bank assembly during initial installation or when adding to an existing dual bank assembly. Both banks in a dual bank assembly may be equipped for INA capability or one bank may be equipped for FPA (Feature Package A), FPB (Feature Package B), FPC (Feature Package C), or FPD (Feature Package D) capability. Mode I and Mode III capabilities may not be combined within the blue or white bank, however, Mode I may be equipped in one bank and Mode III in the other.

Get support apparatus listed:

- 216-type tool (80-type cabinet only),
- Special key (allen-type wrench)-COMCODE 840841324 (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.

3 ***Warning: 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.***

Note: White bank refers to the two upper shelves plus the right half of the middle shelf and blue shelf refers to the two lower shelves plus the left half of the middle shelf.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

	If equipping and testing a dual bank assembly located in a frame-type RT with bulk powering (J1C182BB bulk power shelf), continue with Item **4**. Otherwise, proceed to Item **8**.	
4	Install (if not previously installed) **RSU** (ring switch unit) in bulk power shelf.	DLP-511
5	***Note:*** One **40D** BFU (bank fuse unit) 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 **40D BFU** in bulk power shelf, if necessary.	DLP-512
6	Install (if not previously installed) **3A** or **3C RINGING GENERATOR** in bulk power shelf.	DLP-513
7	Go to Item **28**.	
8	If adding to existing RT dual bank assembly, proceed to Item **19**. Otherwise, continue with Item **9**.	
9	Install **LDU** (load distribution unit) in power shelf.	DLP-514
10	If RT backup power is from **337A BATTERY CHARGER**(s)/KS-21906, L4 battery packs, continue with Item **11**. Otherwise, proceed to Item **14**.	
11	Perform initial installation tests of RT batteries for type RT installed.	
	A. Frame-type RT or 80-type (ED-7C621-30 or ED-97977-30) CSC (community service cabinet) RT:	DLP-515
	B. 51-type (ED-7C601-30) cabinet RT:	DLP-516
12	***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-517
13	***Note:*** One battery charger is required per battery string.	
	Install **337A BATTERY CHARGER**s.	
	A. Frame-type RT or 80-type (ED-7C621-30 or ED-97977-30) CSC RT:	DLP-518
	B. 51-type (ED-7C601-30) cabinet RT:	DLP-519
14	Install **336A RECTIFIER**s in power shelf.	DLP-520
15	Perform battery charger test (if battery chargers are utilized for backup power).	DLP-521
16	Install **3A** or **3C RINGING GENERATOR**s in power shelf.	DLP-522
17	Install (if not previously installed) and check fuses in **40D BFU** (bank fuse unit) in power shelf.	DLP-523
18	Go to Item **28**.	
19	If adding battery shelves to an existing RT, continue with Item **20**. Otherwise, proceed to Item **23**.	

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

20	Perform RT battery installation for type RT installed.	
	A. Frame-type RT or 80-type (ED-7C621-30 or ED-97977-30) CSC (community service cabinet) RT:	DLP-524
	B. 51-type (ED-7C601-30) cabinet RT:	DLP-525
21	***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-517
22	***Note:*** One battery charger is required per battery string.	
	Install **337A BATTERY CHARGER**s.	
	A. Frame-type RT or 80-type (ED-7C621-30 or ED-97977-30) CSC RT:	DLP-526
	B. 51-type (ED-7C601-30) cabinet RT:	DLP-527
23	If adding ac rectifiers to an existing system, continue with Item **24**. Otherwise, proceed to Item **25**.	
24	Install **336A RECTIFIER**s in power shelf.	DLP-528
25	If equipping an RT in a 51-type cabinet, proceed to Item **28**. Otherwise, continue with item **26**.	
26	If shelves in second dual bank assembly are to be equipped at this time, continue with Item **27**. Otherwise, proceed to Item **28**.	
27	Install (if not previously installed) and check fuses in second **40D BFU** (bank fuse unit) in power shelf.	DLP-529
28	Install 3-type protectors in protector panel for shelf group(s) being equipped.	
29	If AB shelf (lower) in channel bank being equipped has been previously equipped, proceed to Item **43**, otherwise continue with Item **30**.	
30	Verify, per work order, that the correct complement of circuit packs is available.	DLP-530
31	Install (if not previously installed) and check fuses in **39E CFU** (channel fuse unit).	DLP-531
32	***Note:*** The **LFU** is not required in an RT bank being connected to a multiplexer if the multiplexer is not a DDM-1000 Multiplexer.	
	Install (if not previously installed and if required) and check fuses in **39F LFU** (line fuse unit) in facility (middle) shelf.	DLP-532
33	Install (if not previously installed) and test **PCU** (power converter unit) in facility shelf.	DLP-533
34	***Note:*** One **ADU** is required for each channel bank.	
	Install **ADU** (alarm display unit) if not previously installed.	DLP-534

DO ITEMS BELOW IN ORDER LISTED . . .	FOR DETAILS, GO TO
35 *Note:* One **BCU** is required for each channel bank.	
Install **BCU** (bank control unit) if not previously installed.	DLP-535
36 Install equipped option in **ADU** [for shelf group(s) being equipped].	DLP-536
37 If CD shelf (upper) in channel bank is being equipped before AB shelf (lower) proceed to Item **46**, otherwise continue wiht Item **38**.	
38 Install and test **PCU** in AB shelf.	DLP-537
39 Install **TRU** (transmit/receive unit) in AB shelf.	DLP-538
40 *Note:* All **LIU**s in the same bank should have identical option switch settings.	
Install DS1 **LIU** (line interface unit) in **LIU-A** slot in facility shelf after making option, equalizer, and transmit pad settings.	DLP-540
41 *Note:* All **LIU**s in the same bank should have identical option switch settings.	
Install DS1 **LIU** in **LIU-B** slot in facility shelf after making option, equalizer, and transmit pad settings.	DLP-541
42 If equipping additional shelves in the dual bank assembly, continue with Item **43**. Otherwise, proceed to Item **50**.	
43 Install (if not previously installed) 3-type protectors in protector panel for shelf group(s) being equipped.	
44 Install (if not previously installed) equipped option in **ADU** for CD shelf.	DLP-542
45 Verify, per work order, that the correct complement of circuit packs is available.	DLP-530
46 Install **PCU** in CD shelf.	DLP-543
47 Install **TRU** in CD shelf.	DLP-544
48 *Note:* All **LIU**s in the same bank should have identical option switch settings.	
Install DS1 **LIU** in **LIU-C** slot in facility shelf after making option, equalizer, and transmit pad settings.	DLP-546
49 *Note:* All **LIU**s in the same bank should have identical option switch settings.	
Install DS1 **LIU** in **LIU-D** slot in facility shelf after making option, equalizer, and transmit pad settings.	DLP-547
50 Install **FCU** (fan control unit) (if fan unit is installed).	DLP-548
51 Install **CTU** (channel test unit) (if **CTU** has not been previously installed).	DLP-549
52 Install **DTU** (digital test unit) if not previously installed.	DLP-550
53 Perform RT indicator test.	DLP-551

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

54	If equipping additional shelves in dual bank assembly, proceed to Item 28. Otherwise, continue with item 55.	
55	Perform check of ACO button.	DLP-552
56	Perform check of power minor alarms.	DLP-553
57	Update office records.	

TURN UP SERIES 5 RT EQUIPPED FOR INTEGRATED NETWORK ACCESS CAPABILITY (MODE III) OR ADD TO EXISTING RT

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

1 ***Note:*** This procedure assumes that (1) the outside cable pairs are not closed through to the RT so that the RT is isolated from the digital and derived lines, (2) the frame or cabinet (51- or 80-type) housing the RT has been installed, (3) the J1C182AE or J1C182AF assembly has been installed in the frame or cabinet enclosure, (4) the miscellaneous pair panel, protector connectors, power shelf, fan shelves, and battery shelves (if required) have been installed in the frame or cabinet enclosure, and (5) the acceptance procedures in this volume have been performed. This procedure contains instructions concerning the installation of the various units into the RT assembly shelves, battery shelves (if required), and power shelf, and for verifying that the units are operating properly.

2 ***Note:*** This procedure allows equipping and testing of a dual bank assembly during initial installation or when adding to an existing dual bank assembly. Both banks in a dual bank assembly may be equipped for INA capability or one bank may be equipped for FPA (Feature Package A), FPB (Feature Package B), FPC (Feature Package C), or FPD (Feature Package D) capability. Mode I and Mode III capabilities may not be combined within the blue or white banks, however, Mode I may be equipped in one bank and Mode III in the other.

Get support apparatus listed:

- 216-type tool (80-type cabinet only),
- Special key (allen-type wrench)-COMCODE 840841324 (51-type and 80-type cabinet only),
- DMM (digital multimeter) with an accuracy of 1.0% and an ac/dc input impedance of $\geq$ 1 megohm.

3 ***Warning: 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.***

Note: White bank refers to the two upper shelves plus the right half of the middle shelf and blue shelf refers to the two lower shelves plus the left half of the middle shelf.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

	If equipping and testing a dual bank assembly located in a frame-type RT with bulk powering (J1C182BB bulk power shelf), continue with Item **4**. Otherwise, proceed to Item **8**.	
4	Install (if not previously installed) **RSU** (ring switch unit) in bulk power shelf.	DLP-511
5	***Note:*** One **40D** BFU (bank fuse unit) 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 **40D BFU** in bulk power shelf, if necessary.	DLP-512
6	Install (if not previously installed) **3A** or **3C RINGING GENERATOR** in bulk power shelf.	DLP-513
7	Go to Item **28**.	
8	If adding to existing RT dual bank assembly, proceed to Item **19**. Otherwise, continue with Item **9**.	
9	Install **LDU** (load distribution unit) in power shelf.	DLP-514
10	If RT backup power is from **337A BATTERY CHARGER**(s)/KS-21906, L4 battery packs, continue with Item **11**. Otherwise, proceed to Item **14**.	
11	Perform initial installation tests of RT batteries for type RT installed.	
	A. Frame-type RT or 80-type (ED-7C621-30 or ED-97977-30) CSC (community service cabinet) RT:	DLP-515
	B. 51-type (ED-7C601-30) cabinet RT:	DLP-516
12	***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-517
13	***Note:*** One battery charger is required per battery string.	
	Install **337A BATTERY CHARGER**s.	
	A. Frame-type RT or 80-type (ED-7C621-30 or ED-97977-30) CSC RT:	DLP-518
	B. 51-type (ED-7C601-30) cabinet RT:	DLP-519
14	Install **336A RECTIFIER**s in power shelf.	DLP-520
15	Perform battery charger test (if battery chargers are utilized for backup power).	DLP-521
16	Install **3A** or **3C RINGING GENERATOR**s in power shelf.	DLP-522
17	Install (if not previously installed) and check fuses in **40D BFU** (bank fuse unit) in power shelf.	DLP-523
18	Go to Item **28**.	
19	If adding battery shelves to an existing RT, continue with Item **20**. Otherwise, proceed to Item **23**.	

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

20	Perform RT battery installation for type RT installed.	
	A. Frame-type RT or 80-type (ED-7C621-30 or ED-97977-30) CSC (community service cabinet) RT:	DLP-524
	B. 51-type (ED-7C601-30) cabinet RT:	DLP-525
21	***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-517
22	***Note:*** One battery charger is required per battery string.	
	Install **337A BATTERY CHARGER**s.	
	A. Frame-type RT or 80-type (ED-7C621-30 or ED-97977-30) CSC RT:	DLP-526
	B. 51-type (ED-7C601-30) cabinet RT:	DLP-527
23	If adding ac rectifiers to an existing system, continue with Item **24**. Otherwise, proceed to Item **25**.	
24	Install **336A RECTIFIER**s in power shelf.	DLP-528
25	If equipping an RT in a 51-type cabinet, proceed to Item **28**. Otherwise, continue with Item **26**.	
26	If shelves in second dual bank assembly are to be equipped at this time, continue with Item **27**. Otherwise, proceed to Item **28**.	
27	Install (if not previously installed) and check fuses in second **40D BFU** (bank fuse unit) in power shelf.	DLP-529
28	Install 3-type protectors in protector panel for shelf group(s) being equipped.	
29	If AB shelf (lower) in channel bank being equipped has been previously equipped, proceed to Item **43**. Otherwise, continue with Item **30**.	
30	Verify, per work order, that the correct complement of circuit packs is available.	DLP-530
31	Install (if not previously installed) and check fuses in **39E CFU** (channel fuse unit).	DLP-531
32	***Note:*** The **LFU** is not required in an RT bank being connected to a multiplexer if the multiplexer is not a DDM-1000 Multiplexer.	
	Install (if not previously installed and if required) and check fuses in **39F LFU** (line fuse unit) in facility (middle) shelf.	DLP-532
33	Install (if not previously installed) and test **PCU** (power converter unit) in facility shelf.	DLP-533
34	***Note:*** One **ADU** is required for each channel bank.	
	Install **ADU** (alarm display unit) if not previously installed.	DLP-534

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

35	***Note:*** One **BCU** is required for each channel bank.	
	Install **BCU** (bank control unit) if not previously installed.	DLP-535
36	Install equipped option in **ADU** [for shelf group(s) being equipped].	DLP-536
37	If CD shelf (upper) in channel bank is being equipped before AB shelf (lower), proceed to Item **46**, otherwise continue with Item **38**.	
38	Install and test **PCU** in AB shelf.	DLP-537
39	Install **TRU** (transmit/receive unit) in AB shelf.	DLP-538
40	Install **TCU** (transcoder unit) in **LIU-B** slot in facility shelf.	DLP-539
41	***Note:*** All **LIU**s in the same bank should have identical option switch settings.	
	Install DS1 **LIU** (line interface unit) in **LIU-A** slot in facility shelf after making option, equalizer, and transmit pad settings.	DLP-540
42	If equipping additional shelves in the dual bank assembly, continue with Item **43**. Otherwise, proceed to Item **50**.	
43	Install (if not previously installed) 3-type protectors in protector panel for shelf group(s) being equipped.	
44	Install (if not previously installed) equipped option in **ADU** for CD shelf.	DLP-542
45	Verify, per work order, that the correct complement of circuit packs is available.	DLP-530
46	Install **PCU** in CD shelf.	DLP-543
47	Install **TRU** in CD shelf.	DLP-544
48	Install **TCU** in **LIU-D** slot in facility shelf.	DLP-545
49	***Note:*** All **LIU**s in the same bank should have identical option switch settings.	
	Install DS1 **LIU** in **LIU-C** slot in facility shelf after making option, equalizer, and transmit pad settings.	DLP-546
50	Install **FCU** (fan control unit) if fan unit is installed.	DLP-548
51	Install **CTU** (channel test unit) if **CTU** has not been previously installed.	DLP-549
52	Install **DTU** (digital test unit) if not previously installed.	DLP-550
53	Perform RT indicator test.	DLP-551
54	If equipping additional shelves in dual bank assembly, proceed to Item **28**. Otherwise, continue with Item **55**.	
55	Perform check of ACO button.	DLP-552
56	Perform check of power minor alarms.	DLP-553
57	Update office records.	

PERFORM ABBREVIATED END-TO-END SYSTEM TESTS

DO ITEMS BELOW IN ORDER LISTED . . .	FOR DETAILS, GO TO
1	***Note:*** This procedure assumes that: (1) System test personnel are familiar with AT&T Practice 363-205-104 End-To-End System Tests, and (2) The CO equipment and the RT have been installed and tested.
2	Test Apparatus Required: • VOM (Volt-Ohm-Milliammeter) • CIU (J99404TA) • Telephone Set.
3	Verify the Following: (1) That Proper Connections Have Been Made to Outside Cable Pairs at the CO, (2) That Heat Coils and Carbon Blocks Have Been Installed in Connectors at the CO MDF, and (3) That Digital Line Connections Have Been Made at RT.
4	Ensure That Digital Line Repeaters Have Been Installed and That Line Installation Is Complete.
5	Ensure That **ADU** Options Are Set To In-Service, Then Wait 5 Minutes Before Continuing.
6	***DANGER: If line powering LIUs are installed at RT, 130V may be present on connection to outside cable pairs.*** At RT, Perform Power Loop Test (**V** to **I** = 0.6 Vdc; **V** to **V** = Less Than 138 Vdc) on Line Powering **AUA62C LIUs**. Set Up Communications Between *5ESS*® switch DCLU and RT if necessary. Personnel at *5ESS* switch DCLU Will Direct When to Begin Testing.
7	Perform System Turnup Procedure Using CIU.
8	Test RT Alarms and Remote Alarms (if Provided).
9	Using a Telephone Set, Perform CO-to-RT Channel Tests on The Right Most Slot in Each Digroup if Equipped (Install POTS Channel Units as Necessary).
10	At RT, Depress **FAN TEST** Pushbutton on **FCU** to Verify That Fans Operate.
11	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.

PERFORM END-TO-END SYSTEM TESTS

DO ITEMS BELOW IN ORDER LISTED . . .	FOR DETAILS, GO TO
1	**OVERVIEW:** This procedure assumes that the central office terminating equipment and RT have been installed and acceptance tested and are connected end to end. This procedure also assumes that the CO terminating equipment is equipped and connected to the digital carrier line. This procedure covers testing at the RT end of the loop transmission facility. The tests require cooperation between personnel at the CO and RT. To verify proper connections, operation, and powering of the transmission line, refer to the TOP volume for the facility being used.
2	Obtain Support Apparatus for CO terminating equipment and RT as Listed: • VOM (Volt-Ohm-Milliammeter) • 500-Type Telephone Set • *SLC* SERIES 5 CARRIER SYSTEM CRAFT INTERFACE UNIT (**J99404TA**).
3	***Note:*** TOP Volume 363-202-400 contains procedures for installing and testing the *SLC* 96 Carrier COT. TOP Volume 365-301-501 contains procedures for installing and testing the DACS I. TOP Volume 365-170-000 contains procedures for installing and testing the D4 channel bank. TOP Volume 365-190-000 contains procedures for installing and testing the D5 channel bank. Verify That the Central Office Terminating Equipment Has Been Properly Installed and Tested.
4	Verify That the RT Has Been Properly Installed and Tested.
5	***Warning: 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 at an RT location, do not connect it to the power shelf or adjacent portions of the RT frame.*** If Using T1 Digital Facility, Go to Item 7; Otherwise, Continue With Item 6.
6	***Note:*** Refer to TOP Volume for transmission facility. Verify That CO Terminating Equipment and RT Are Connected to Transmission Facility and That Transmission Facility Is Operating Properly, Then Go to Item **14**.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

7	***DANGER: DC voltage to −130 Volts may be present on connections to outside cable pairs if line powering LIU is installed at CO.*** From Work Order, Verify That Proper Connections Have Been Made to Outside Cable Pairs at CO Terminating Equipment.	
8	At CO Location MDF (Main Distributing Frame), Verify That Heat Coils and Carbon Blocks Are Installed Into T1 Line Connectors Associated With Line Being Placed Into Service.	
9	***DANGER: DC voltage to −130 Volts may be present on connections to outside cable pairs if line powering LIU is installed at RT.*** Verify That Proper Digital Line Connections Have Been Made at RT (Remote Terminal).	
10	***Note:*** TOP Volume 363-200-001 contains procedures for T1 line repeater and digital line installation (preservice tests). If an RPFT (remote power feed terminal) is used to power part of the digital lines, refer to AT&T Practice 363-202-525 for additional preservice tests. Consult Office Records to Verify That All Digital Line Repeaters Have Been Installed and That Digital Line Installation Is Complete.	
11	If System Is Equipped With Line Powering **LIU** at One or Both Ends, (AUA62C in RT) Continue With Item 12; Otherwise Go to Item 14.	
12	***Note:*** If at any time during this procedure, an alarm condition is detected at the maintenance center, use the **ACO** button on the **ADU** to clear the alarm before actually correcting the problem. Ensure that Power Loop Test has been performed at CO equipment.	
13	Perform Power Loop Tests on Line Powering **LIU AUA62C** at RT, if installed.	DLP-570
14	Set up Communication Between CO Terminating Equipment and RT. Procedures Start With CO Terminating Equipment Tests and Proceed to RT Tests. RT Should Wait for CO Terminating Equipment to Finish; CO Terminating Equipment Will Direct RT When to Begin Testing.	
15	Set CO Equipment to In-Service Using the Appropriate Documentation as Necessary.	
16	Set **ADU** Option to In-Service at the RT.	DLP-571
17	Perform System Turn-Up Procedure.	DLP-572
18	***Note:*** This procedure requires coordination between alarm center and RT. Test Remote Alarm System if Provided.	DLP-573

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

19	***Note:*** It is recommended that the following test be performed if a single-party channel unit (**AUA43**) is available. This test checks one particular channel unit slot in each digroup to verify that the banks at both ends of the system and the connecting facility are operating properly. Perform Terminal-to-Terminal (CO-to-RT) Channel Test on The Right Most Slot in Each Digroup Using a Single-Party Channel Unit in each slot. A D4 2FX0 or Equivalent Should Be Used in the CO Terminating Equipment.	DLP-574
20	***Note:*** Channel unit installation procedures are covered in AT&T Practice 363-205-402. When Required, Install Channel Units.	
21	***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** Pushbutton on **FCU** and Verify that Fans Operate.	
22	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.	

MAINTENANCE PHILOSOPHY

GENERAL

The Integrated Network Access Remote Terminal (INA-RT) is a remote channel bank that uses *SLC* Series 5 carrier system technology to provide integrated network access based on a subset of D4 channel bank features. Potential applications for the INA-RT include termination on a DACS (digital access cross-connect), D4, D5, or *SLC* 96 central office (CO) terminal.

The craft located at the CO terminal opposite the INA-RT should use the maintenance document applicable for that equipment. This document should be used when the trouble has been isolated to the RT.

ALARMS

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

FAN OPERATION

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

TROUBLE ANALYSIS PROCEDURES

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

- The system is equipped with the plug-ins required to make an operating system.
- No compatibility alarms exist (**CMP LED on ADU** not lighted).
- There may be a single cause for multiple trouble indications.
- Only a single trouble is assumed to exist.

In case of an alarmed system failure, the craft is first directed to the proper terminal (CO or RT) by the Alarm Center. If the alarm condition is a **MN** (minor) or **PMN** (power minor) alarm, the craft is dispatched to the RT. If the alarm condition is a **MJ** (major) alarm, the craft is first dispatched to the CO. Using the appropriate maintenance documents for the CO terminating equipment, the craft determines if the trouble is at the CO and if so, corrects it. If the trouble is determined to be at the RT (or on the line), the craft continues to the RT where a further analysis of bank indicators isolates the trouble and determines the proper TAP in this document to clear the trouble.

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

The time interval between when a trouble is cleared and when the alarm LEDs go off is usually less than 35 seconds. When the **BCU** or **ADU** at the RT is replaced, the time interval may increase to 5 minutes.

SAFETY PRECAUTIONS

Caution must be exercised in removal of plug-ins, initiation of loopbacks, and performance of other tests. Removal of a plug-in may cause service interruption.

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 any portions of the RT frame.

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

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

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

Anytime a replacement unit causes the **ADU CMP** (compatibility) LED to light, check to insure the replacement unit is the right one, that it is optioned correctly per facility records, and is being installed in the correct slot. If the **FAIL LED** on the replacement unit lights because the unit was improperly installed, pressing the **LED TEST** button on the ADU causes the **FAIL LED** to go out. If the **FAIL LED** does not go out when the **LED TEST** button is pressed, the replacement unit is bad.

If the **FAIL** LED stays on following the replacement of a common unit, the CP is probably failed, in the wrong position, or contains incorrectly set options.

CUSTOMER TROUBLE REPORTS

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

Single-party, multiparty, and coin service trouble reports are first received at the RSB (repair service bureau). A channel unit trouble report is initiated to the proper repair force and trouble analysis procedures begin at the CO. Unless further tests at the CO indicate otherwise, a replacement of the CO channel unit is performed first. Then if the trouble is still present, a replacement of the RT channel unit is made.

Special service trouble reports are received at the SSC (special services center). Trouble reports on 4-wire data (E *SPOTS*®) channel unit served circuits should be referred to the RSB for testing and dispatch. The SSC would retain responsibility for tracking and clearing the trouble. A CIU (craft interface unit) is used to provision and test special service channel units in the INA-RT.

CONCLUSION

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

ISOLATING THE TROUBLE

1. These procedures assume that the alarm condition was first detected at the alarm (maintenance) center.

   Is the alarm condition **MJ** (major), **MN** (minor), or **PMN** (power minor)?

   If **MJ**, then continue with Step **2**.
   If **MN** and/or **PMN**, then use **TAP-103** to clear minor alarm at INA-RT.

2. Dispatch craft to the CO terminating equipment.

3. Use the CO terminating equipment troubleshooting documentation to locate and clear alarm conditions at the CO.

   Does the alarm clear at the maintenance center?

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

4. The cause of the alarm condition is not in the CO terminating equipment.

   Use **TAP-102** to clear the Major Alarm at the INA-RT.

CLEAR MAJOR ALARM AT INA-RT

1. Momentarily depress **ACO** pushbutton on **ADU**. The **ACO LED** lights and remains lighted until the failure is cleared.

2. When replacing a unit during this procedure, check to ensure that the **CMP LED** on the **ADU** does not light. If this compatibility indicator lights, ensure that the replacement unit is the correct unit, that it has been optioned correctly per facility records, and that it is being installed in the correct slot. Refer to TABLE A for potential causes of this alarm condition.

TABLE A
INCOMPATIBILITY RESPONSE FOR COMMON EQUIPMENT

CONDITION	ALARMS	CLOSURE	SIGNAL
LIU in TCU slot (Mode III)	MJ, DGP(2), CMP, LIU-FAIL, NE	MAJOR	YELLOW
TCU installed (Mode I)*	MJ, DGP(2), CMP, TCU-FAIL, NE	MAJOR	YELLOW
LIU 32/64 switch wrong (Mode III)	MJ, DGP(2), CMP, LIU-FAIL, NE	MAJOR	YELLOW
LIU 32/64 switch wrong (Mode I)	MJ, DGP, CMP, LIU-FAIL, NE	MAJOR	YELLOW
Not a "C" LIU	MJ, DGP, CMP, LIU-FAIL, NE	MAJOR	YELLOW
Conflict in ADU options (e.g. in-serv, unequip.)	MN, CMP, ADU-FAIL, NE	MINOR	
P-LIU installed	MN, CMP, LIU-FAIL, NE	MINOR	
LSU installed	MN, CMP, LSU-FAIL, NE	MINOR	

* Series 5 channel banks are keyed to prevent installation of the TCU in LIU slots A and C. A TCU in slot B (D) will cause Yellow Alarm to be transmitted on LIU-A (C).

Occasionally, R&R (removal and replacement) of the **PCU** causes the **CMP LED** to light. If this occurs, before checking for the common equipment CMP situation listed below, or the channel unit CMP situation, R&R the **ADU**. This should extinguish the **CMP**.

3. Is **FAIL** LED on any unit lighted?

   If **YES,** then continue with Step **4.**
   If **NO,** then proceed to Step **6.**

4. ***Caution 1: Before removing a PCU from an RT shelf, locate the CFU that is housed in the same bank as the PCU to be replaced and remove either the –20 HZ/AB (if PCU is in AB shelf) or the –20 HZ/CD (if PCU is in CD shelf) fuse. Replace the fuse after the PCU has been replaced.***

Caution 2: ***On this TAP and all subsequent TAPs, insure that any option switches are set identical to the data on the facility record. Incorrectly set LIU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

Note: Replacement of failed **BCU** or **ADU** may require up to 5 minutes for alarms to clear. During this time, the **PRV LED** (provisioning) on the **ADU** will be lighted.

Replace the unit with lighted **FAIL LED**, observing the JPU ("just powered-up") blink of the **FAIL LED** when the new unit is installed.

5. Did alarms clear?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, then multiple trouble exists and trouble analysis must be repeated. Use SD-7C117 and SD-7C118 if necessary to locate trouble.

6. Is **NE LED** lighted on the **ADU**?

   If **YES**, then proceed to **TAP-104**.
   If **NO**, then continue with Step **7**.

7. Is **FE LED** lighted on the **ADU**?

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

8. Clear trouble on-line using appropriate documentation.

   STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9. Is **CLF LED** lighted on any **LIU**?

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

10. Replace **LIU** with lighted **CLF LED**, properly setting options per facility records.

11. Did alarms clear?

    If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, then continue with Step **12**.

12. Clear trouble in associated digital line facility using appropriate documentation. For T1 digital lines, use appropriate fault-locating procedures in AT&T 363-205-500 (TOP) Practice.

    STOP. YOU HAVE COMPLETED THIS PROCEDURE.

13. Depress and hold the **LED TEST** pushbutton on the **ADU** and check to ensure that all LEDs listed in TABLE B light. It is especially important to note that the **NE** indicator lights.

TABLE B
LEDs LIGHTED BY LED TEST BUTTON

UNIT	LEDs
ADU	FAIL, MJ, MN, ACO, FE, NE, CMP, PRV
BCU	FAIL, PMN, 48 *or* 96*, A/A1, B/B1, C/A2, C/B2
CFU	—
CTU	FAIL
DTU	—
FCU	—
LFU	—
LIU	FAIL, CLF
PCU	—
TCU	FAIL
TRU	FAIL, ON, PRT(2)

* Either the **48 LED** or the **96 LED** depending on the settings of the bank ID switches on the **ADU**.

14. Did all LEDs listed in TABLE B light?

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

15. No logical trouble found in INA-RT. Use SD-7C117 and SD-7C118 if necessary to locate trouble.

16. ***Caution: On this TAP and all subsequent TAPs, insure that any option switches are set identical to the data on the facility record. Incorrectly set LIU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace unit with faulty LED, setting any options per facility records.

17. Did alarms clear?

    If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO**, then multiple trouble exists and trouble analysis must be repeated. Use SD-7C117 and SD-7C118 if necessary to locate trouble.

CLEAR MINOR OR POWER ALARM AT INA-RT

1. Momentarily depress **ACO** pushbutton on **ADU**. The **ACO LED** lights and remains lighted until the failure is cleared.

2. When replacing a unit during this procedure, check to ensure that the **CMP LED** on the **ADU** does not light. If this compatibility indicator lights, ensure that the replacement unit is the correct unit, that it has been optioned correctly per facility records, and that it is being installed in the correct slot. Refer to TABLE A for potential causes of this alarm condition.

   Occasionally, R&R (removal and replacement) of the **PCU** causes the **CMP LED** to light. If this occurs, before checking for the common equipment CMP situation listed below, or the channel unit CMP situation, R&R the **ADU**. This should extinguish the CMP.

TABLE A
INCOMPATIBILITY RESPONSE FOR COMMON EQUIPMENT

CONDITION	ALARMS	CLOSURE	SIGNAL
LIU in TCU slot (Mode III)	MJ, DGP(2), CMP, LIU-FAIL, NE	MAJOR	YELLOW
TCU installed (Mode I)*	MJ, DGP, CMP, TCU-FAIL, NE	MAJOR	YELLOW
LIU 32/64 switch wrong (Mode III)	MJ, DGP(2), CMP, LIU-FAIL, NE	MAJOR	YELLOW
LIU 32/64 switch wrong (Mode I)	MJ, DGP, CMP, LIU-FAIL, NE	MAJOR	YELLOW
Not a "C" LIU	MJ, DGP, CMP, LIU-FAIL, NE	MAJOR	YELLOW
Conflict in ADU options (e.g. in-serv, unequip.)	MN, CMP, ADU-FAIL	MINOR	
P-LIU installed	MN, CMP, LIU-FAIL	MINOR	
LSU installed	MN, CMP, LSU-FAIL	MINOR	

* Series 5 channel banks are keyed to prevent installation of the TCU in LIU slots A and C. A TCU in slot B (D) will cause Yellow Alarm to be transmitted on LIU-A (C).

3. Is **PMN LED** lighted on **BCU**?

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

4. Clear trouble in RT bulk or distributed power plant per appropriate procedure for equipment installed, using AT&T 363-205-500 (TOP) Practice, TAP-110.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

5. Is **FAIL** LED on any unit lighted?

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

6. ***Caution 1: Before removing a PCU from an RT shelf, locate the CFU that is housed in the same bank as the PCU to be replaced and remove either the –20 HZ/AB (if PCU is in AB shelf) or the –20 HZ/CD (if PCU is in CD shelf) fuse. Replace the fuse after the PCU has been replaced.***

   Caution 2: On this TAP and all subsequent TAPs, insure that any option switches are set identical to the data on the facility record. Incorrectly set LIU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.

   Note: Replacement of failed **BCU** or **ADU** may require up to 5 minutes for alarms to clear. During this time, the **PRV LED** (provisioning) on the **ADU** will be lighted.

   Replace the unit with lighted **FAIL LED**, observing the JPU ("Just Powered-Up") blink of the **FAIL LED** when the new unit is installed.

7. Did alarms clear?

   If **YES**, then **STOP, YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, then multiple trouble exists and trouble analysis must be repeated. Use SD-7C117 and SD-7C118 if necessary to locate trouble.

8. Is **NE LED** lighted on the **ADU**?

   If **YES**, then proceed to **TAP-104.**
   If **NO**, then continue with Step **9.**

9. Depress and hold the **LED TEST** pushbutton on the **ADU** and check to ensure that all LEDs listed in TABLE B light. It is especially important to note that the **NE** indicator lights.

10. Did all LEDs listed in TABLE B light?

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

TABLE B

LEDs LIGHTED BY LED TEST BUTTON

UNIT	LEDs
ADU	FAIL, MJ, MN, ACO, FE, NE, CMP, PRV
BCU	FAIL, PMN, 48 *or* 96*, A/A1, B/B1, C/A2, C/B2
CFU	—
CTU	FAIL
DTU	—
FCU	—
LFU	—
LIU	FAIL, CLF
PCU	—
TCU	FAIL
TRU	FAIL, ON, PRT(2)

* Either the **48 LED** or the **96 LED** depending on the settings of the bank ID switches on the **ADU**.

11. No logical trouble found in INA-RT. Use SD-7C117 and SD-7C118 if necessary to locate trouble.

12. ***Caution: On this TAP and all subsequent TAPs, insure that any option switches are set identical to the data on the facility record. Incorrectly set LIU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace unit with faulty LED, setting any options per facility records.

13. Did alarms clear?

    If **YES**, then **STOP. You have completed this procedure.**
    If **NO**, then multiple trouble exists and trouble analysis must be repeated. Use SD-7C117 and SD-7C118 if necessary to locate trouble.

CLEAR NE ALARM AT INA-RT WITH NO FAILED UNITS

1. Is fuse blown on **CFU** or **LFU**?

   If **YES**, then continue with Step **2**.
   If **NO**, then proceed to Step **6**.

2. ***Caution: Removal of* CFU *or* LFU *can cause loss of service. When the blown fuse is removed, replace with a good fuse within 20 seconds or alarms will be indicated again.***

   Replace blown fuse.

3. Did fuse blow again?

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

4. Isolate trouble to circuit pack associated with blown fuse or to bank wiring using SD-7C117 and SD-7C118.

   STOP. YOU HAVE COMPLETED THIS PROCEDURE.

5. Did alarm clear within 20 seconds?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then return to **TAP-102** or **TAP-103** to clear a second trouble.

6. Check for failure indication in RT power plant. Potential causes of **NE, MN** alarm without other bank failure indications include Battery Charger failure (**OPEN BATT LED**), Ringing Generator failure (**FAIL LED**), and Fan Assembly failure (**FAN ALARM LED**). Refer to appropriate procedures in AT&T 363-205-500 (TOP) Practice to clear failure in the particular power plant used with INA-RT.

   STOP. YOU HAVE COMPLETED THIS PROCEDURE.

CLEAR CHANNEL FAILURE

1. Customer reported channel failures require that craft be dispatched to both ends for INA-RT.

   Does an alarm condition exist at either end?

   If **YES**, then correct the condition as instructed in **TAP-102** and **TAP-103**.
   If **NO**, then continue with Step **2**.

2. Replace the channel unit at the CO that, according to facility records, corresponds to the reported failure. Provision and test as necessary (Refer to **AT&T 363-205-402, Channel Unit Installation**).

3. Does the trouble clear?

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

4. Return the original CU to the CO equipment.

5. Replace the CU at the INA-RT that, according to facility records, corresponds to the reported failure. Provision and test as necessary (Refer to **AT&T 363-205-402, Channel Unit Installation**).

6. Does the trouble clear?

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

7. Return the original CU to the INA-RT equipment.

8. Is a DCS (digital cross-connect) in the circuit?

   If **YES**, then check the cross-connect according to the facility records.
   If **NO**, then proceed to Step **10**.

9. Does the trouble clear?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, then continue with Step **10**.

10. No logical trouble found in CO or INA-RT. Use SD-7C117 and SD-7C118 to locate trouble.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

PERFORM OVERALL VISUAL INSPECTION OF REMOTE TERMINAL FRAME

1. Verify that no plug-in units are installed (remove any that are installed).

2. At front of RT (remote terminal) frame, verify that shelves are tightly secured and free of defects or damage. Resolve problems through local procedures.

3. At front of RT frame, verify that all electrical connectors inside shelves are properly secured and aligned with shelf slots. Resolve problems through local procedures.

4. At front of RT frame, verify that there are no broken, bent, or misaligned contacts on front of connectors. Resolve problems through local procedures.

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

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

6. ***Note:*** Do not seat channel unit into connectors.

   At both white and blue banks, try 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 misalignment or bowed shelves. Remove unit and proceed to Step **8.**

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

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

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

9. Resolve problems through local procedures.

10. ***Note:*** When RT is mounted on customer premises, protectors may not be required.

    Verify that 3-type protectors are installed in protector panel (if required).

11. Verify that power and battery shelves (as required) are properly installed and tightly secured and free from defects (are not dented or twisted).

12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

PERFORM OVERALL VISUAL INSPECTION OF REMOTE TERMINAL FOR ED-7C601-30 (51-TYPE) CABINET RT

1. Use special key (allen-type wrench) to open front door of cabinet (Figure 1).
2. Verify that no plug-in units are installed. (Remove any units that are installed.)
3. Verify that shelves are tightly secured and free of defects or damage. Resolve problems through local procedures.

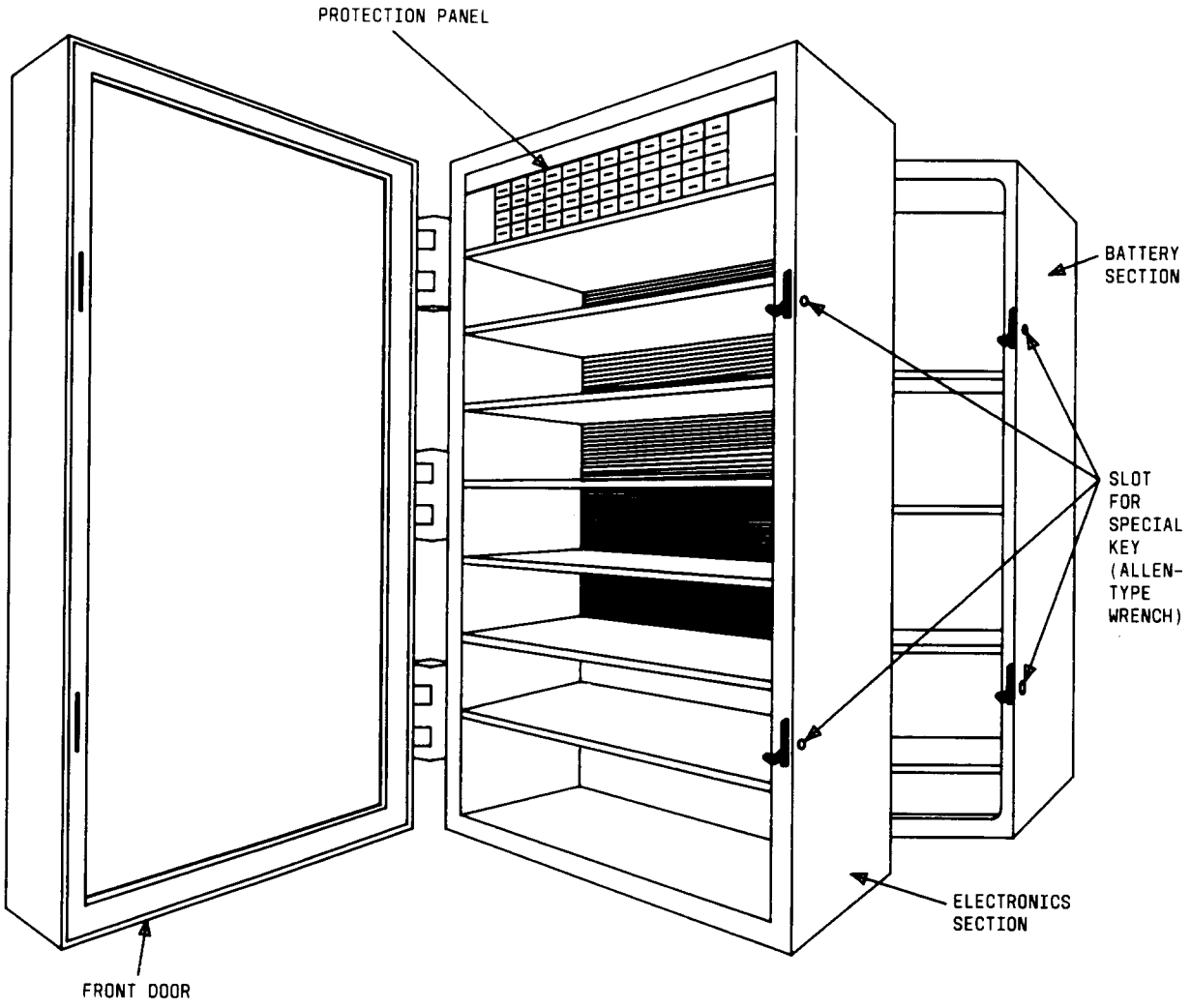


Fig. 1—51-Type Cabinet

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

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

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

   If **YES,** then continue with Step **7.**
   If **NO,** then proceed to Step **8.**

7. ***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 **9.**

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

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

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

10. Resolve problems through local procedures.

11. Verify that 3-type protectors are installed in protector panel (Figure 1).

12. Use special key to open electronics section of cabinet (separate electronics section of cabinet from battery section of cabinet) (Figure 1).

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

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

15. At rear of electronics section of cabinet, do Steps **16** through **19**.

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

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

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

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

STOP. YOU HAVE COMPLETED THIS PROCEDURE

PERFORM OVERALL VISUAL INSPECTION OF ED-7C621-30 OR ED-97977-30 CSC (COMMUNITY SERVICE CABINET) (80-TYPE) RT

1. Use special hex key (allen-type wrench) and 216-tool to open door on system side of cabinet (Figure 1).

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

3. 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.

4. Is ac power present at utility outlets?

   If **YES,** then continue with Step **5.**

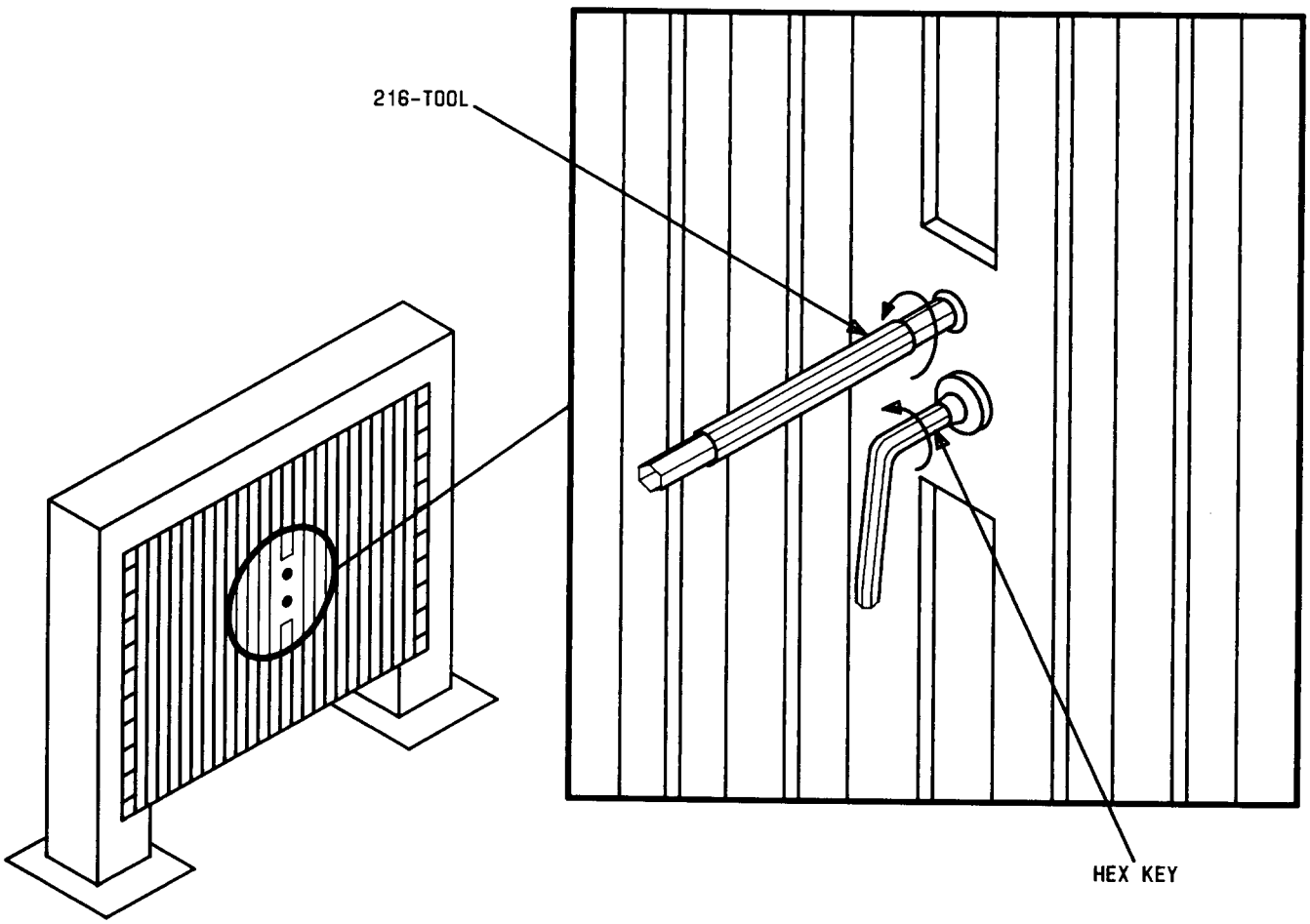


Fig. 1—Opening System Side of Cabinet With Hex Key and 216-Tool

If **NO,** then proceed to Step **6.**

5. Resolve problem through local procedures.

6. Is dual bank assembly being installed in 80C cabinet (Phase 0)?

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

7. Is dual bank assembly being installed in position 3 or 4 (No. 2 side) of 80D cabinet (Phase 1)?

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

8. Verify that no plug-in units are installed in dual bank assembly being equipped (Figure 2). Remove any units that are installed and proceed to Step **10.**

9. Verify that no *SLC* Series 5 carrier system plug-in units are installed in dual bank assembly being equipped (Figure 3). Remove any units that are installed.

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

11. Verify that all electrical connectors inside the shelves are properly secured and aligned with shelf slots.

12. Verify that there are no broken, bent, or misaligned contacts on front of connectors.

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

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

14. ***Note:*** The 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 **16.**

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

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

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

17. Resolve problems through local procedure.

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

19. Verify that power shelf is properly installed and tightly secured.

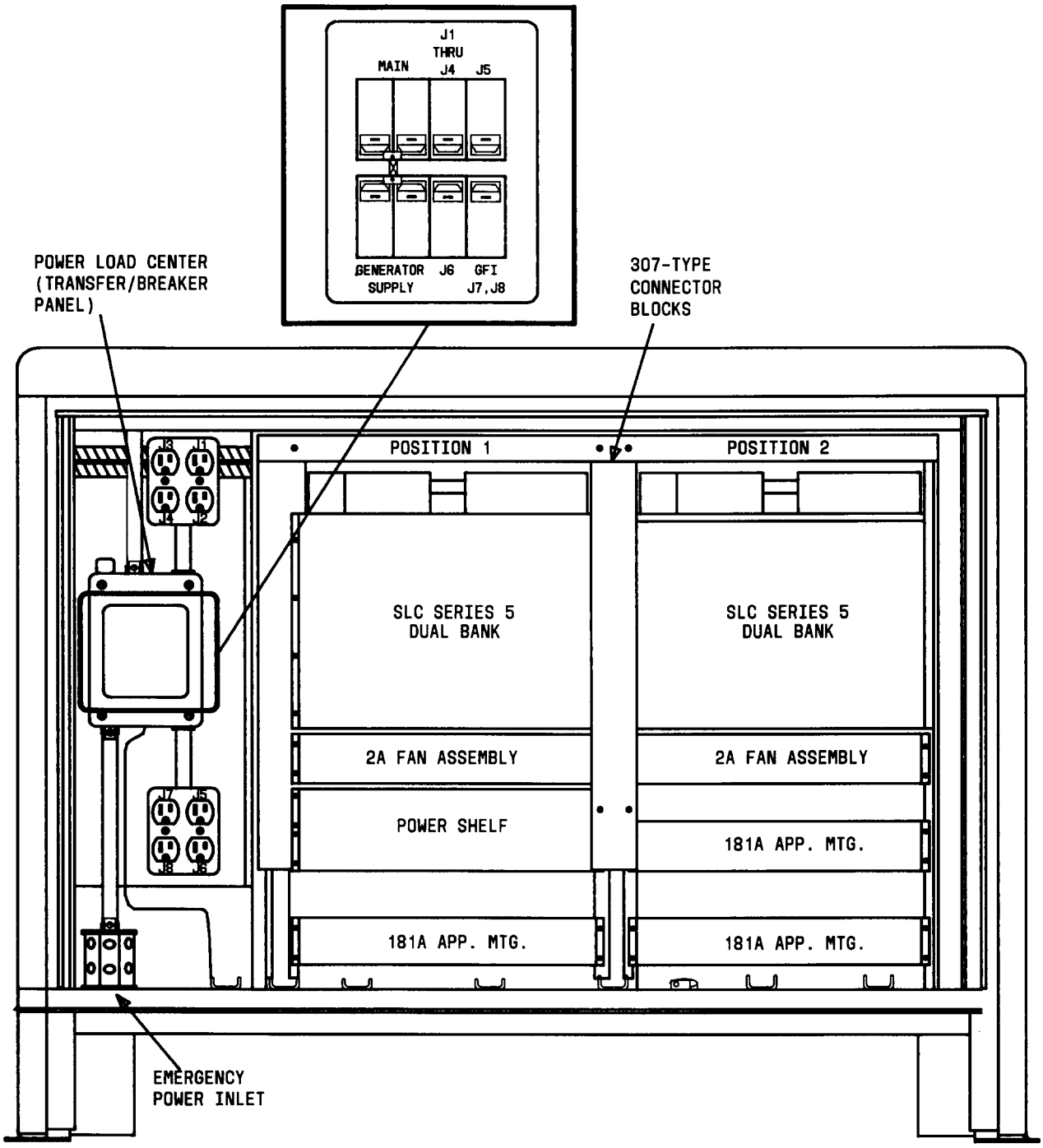


Fig. 2—No. 1 Side, Phase 1 80D Cabinet

20. Verify that battery shelves are free from defects (are not dented or twisted), properly installed, and tightly secured.

21. At rear of cabinet, do Steps **22** through **25**.

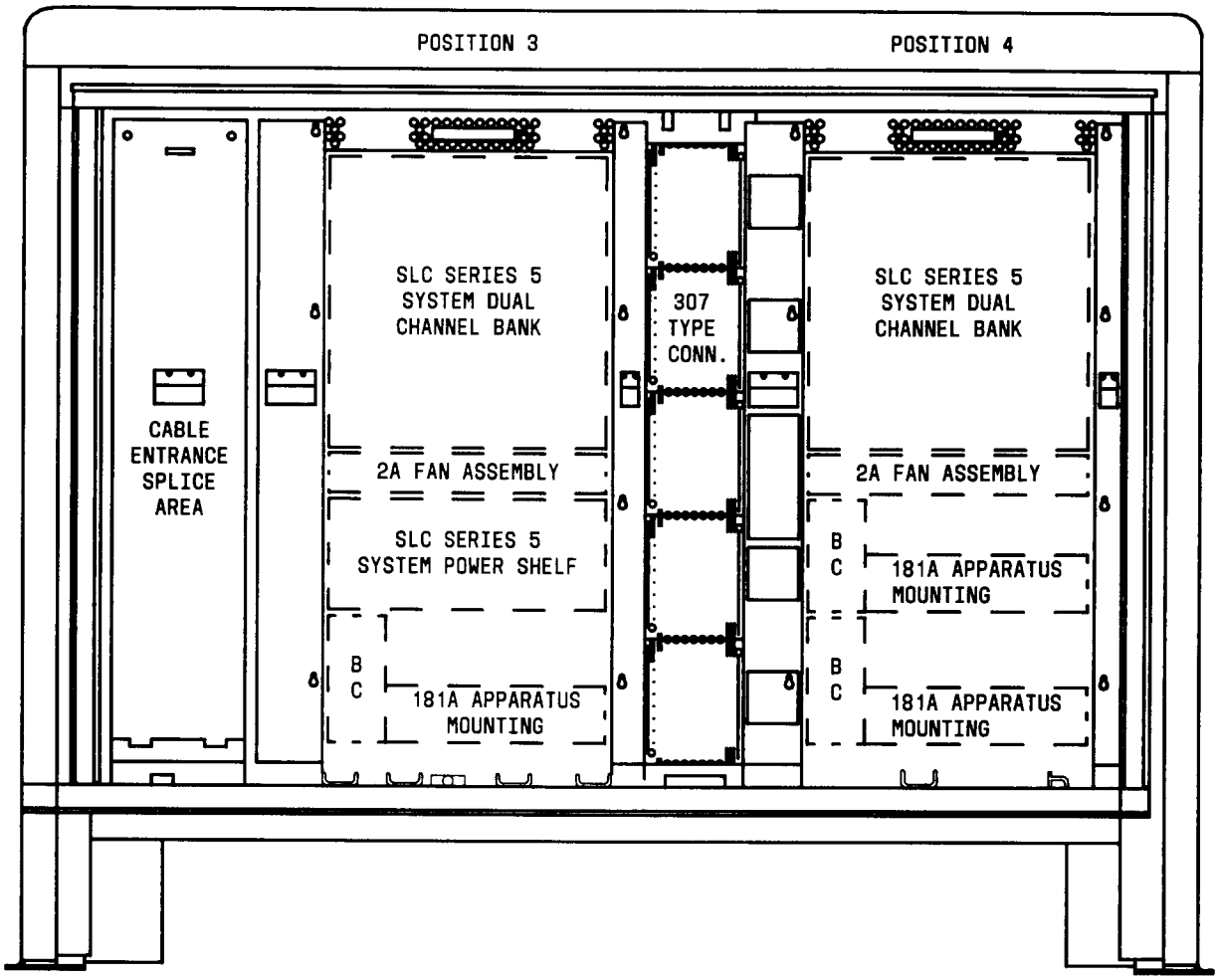


Fig. 3—No. 2 Side, Phase 0 80C Cabinet and Phase 1 80D Cabinet

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

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

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

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

26. Verify that **MAIN** circuit breaker is still in **OFF** position.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

VISUALLY INSPECT SHELF CONNECTIONS, AC POWERING, AND MISCELLANEOUS ALARM WIRING FOR FRAME RT WITH J1C182BA POWER SHELF

1. ***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.***

   Note: AC power will be supplied to bay during installation and testing of first dual bank assembly.

   At ac power panel, verify that circuit breaker is turned off for bay being checked.

2. Verify that ac power cords (extension cords) have been provided for each bay.

3. Verify that each power cord is connected to a separate circuit breaker.

4. Verify that no other equipment is connected to any of separate circuits.

5. Verify that power shelf power cord plug (P112) is connected to ac power cord jack (Figure 1).

6. Verify that connectors on power shelf are connected to appropriate battery shelf lead connectors (as required) per Figure 1.

7. Ensure that power shelf connectors are not connected to battery shelf lead connectors for battery shelves not equipped (Figure 1).

8. Verify that connectors **J108A-1** and **J108B-1** on power shelf are connected to **P108A** and **P108B**, respectively on lower dual channel bank.

9. Verify that connectors **J108A-2** and **J108B-2** on power shelf are connected to **P108A** and **P108B**, respectively on upper dual channel bank (if required).

10. Verify that connector **J114-1** on power shelf is connected to **P114** on fan shelf 1.

11. Verify that connector **P115** on lower dual bank assembly is connected to **J115-1** on fan shelf 1.

12. Verify that connector **J114-2** on power shelf is connected to **P114** on fan shelf 2 (if required).

13. Verify that connector **P115** on upper dual bank assembly is connected to **J115-2** on fan shelf 2 (if required).

14. Verify that connector **J107** on power shelf is connected to **P107** on miscellaneous pair panel.

15. Verify that RT MISC1 and MISC2 alarm leads are connected to **MJ**, **MN**, and **PMN** indicators at the maintenance center if applicable.

16. ***Note:*** Splicing procedures should have already been performed using procedures in AT&T Practice 640-250-250.

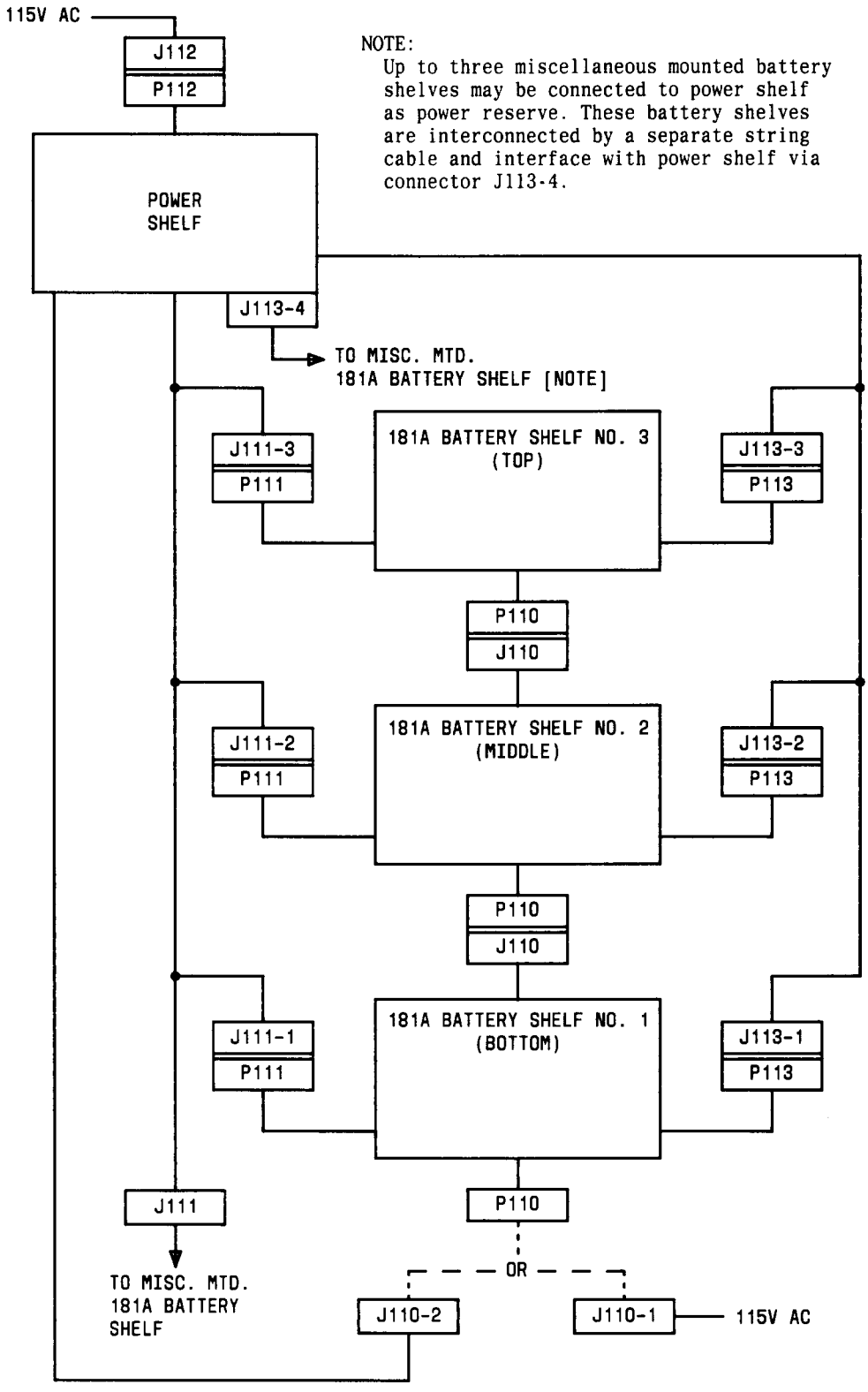


Fig. 1—Power and Battery Shelf Connectors

From work order, visually verify that digital line pairs, derived pairs, and miscellaneous pairs have been properly connected to outside plant cables and/or cross-connect field.

17. ***Note:*** Door alarm switch is located at top of mini-hut door frame and may be retired by pulling plunger fully out past detent.

    From work order or facility record, determine if this dual bank assembly is designated to carry door alarm.

18. If dual bank assembly is designated to carry door alarm, make connections using local procedures.

19. Verify that protector panel connectors **P101, P102, P103, P104, P105**, and **P106** are connected to system 1 (lower) blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105**, and **J106**, respectively.

20. Is system 2 (upper) dual bank assembly (shelves) installed?

    If **YES,** then continue with Step **21.**
    If **NO,** then proceed to Step **22.**

21. Verify that second (upper) dual bank protector panel connectors **P101, P102, P103, P104, P105**, and **P106** are connected to system 2 (upper) blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105**, and **J106**, respectively.

22. From work order or facility record, are other miscellaneous-type alarms to be connected to miscellaneous pair panel?

    If **YES,** then continue with Step **23.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

23. Are alarm pairs present and properly connected to miscellaneous pair panel?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then **resolve problems through local procedures.**

VISUALLY INSPECT SHELF CONNECTIONS, DC POWERING, AND MISCELLANEOUS ALARM WIRING FOR FRAME RT WITH J1C182BB BULK POWER SHELF

1. On bulk power shelf terminal board **TB1**, verify that **-48V1**, **-48RTN1**, **-48V2**, **-48RTN2**, **-48V3**, and **-48RTN3** terminals are connected to bulk power plant.

2. Verify that connectors **J108A-1** and **J108B-1** on power shelf are connected to **P108A** and **P108B**, respectively on lower dual bank assembly.

3. Verify that connectors **J108A-2** and **J108B-2** on power shelf are connected to **P108A** and **P108B**, respectively on middle dual bank assembly (if required).

4. Verify that connectors **J108A-3** and **J108B-3** on power shelf are connected to **P108A** and **P108B**, respectively on upper dual bank assembly (if required).

5. Verify that connector **J114-1** on power shelf is connected to **P114** on fan shelf 1.

6. Verify that connector **J114-2** on power shelf is connected to **P114** on fan shelf 2 (if required).

7. Verify that connector **J114-3** on power shelf is connected to **P114** on fan shelf 3 (if required).

8. Verify that connector **J115-1** on fan shelf 1 is connected to **P115** on lower dual bank assembly.

9. Verify that connector **J115-2** on fan shelf 2 is connected to **P115** on middle dual bank assembly (if required).

10. Verify that connector **J115-2** on fan shelf 3 is connected to **P115** on upper dual bank assembly (if required).

11. Verify that connector **J107** on power shelf is connected to **P107** on miscellaneous pair panel.

12. Verify that RT MISC1 and MISC2 alarm leads are connected to **MJ**, **MN**, and **PMN** indicators at the maintenance center if applicable.

13. ***Note:*** Splicing procedures should have already been performed using procedures in AT&T Practice 640-250-250.

    From work order, visually verify that digital line pairs, derived pairs, and miscellaneous pairs have been properly connected to outside plant cables and/or cross-connect field.

14. ***Note:*** Door alarm switch is located at top of mini-hut door frame and may be retired by pulling plunger fully out past detent.

    From work order or Facility Record, determine if this dual bank assembly is designated to carry door alarm.

15. If the dual bank assembly is designated to carry door alarm, make connections according to local procedures.

16. Verify that protector panel connectors **P101, P102, P103, P104, P105,** and **P106** are connected to system 1 (lower) blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105,** and **J106,** respectively.

17. Is system 2 (middle) dual bank assembly (shelves) installed?

    If **YES,** then continue with Step **18.**
    If **NO,** then proceed to Step **21.**

18. Verify that second (middle) dual bank protector panel connectors **P101, P102, P103, P104, P105,** and **P106** are connected to system 2 (middle) blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105,** and **J106,** respectively.

19. Is system 3 (upper) dual bank assembly (shelves) installed?

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

20. Verify that third (upper) dual bank protector panel connectors **P101, P102, P103, P104, P105,** and **P106** are connected to system 3 (upper) blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105,** and **J106,** respectively.

21. From work order or Facility Record, are other miscellaneous-type alarms to be connected to miscellaneous pair panel?

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

22. Are alarm pairs present and properly connected to miscellaneous pair panel?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then **resolve problems through local procedures.**

VISUALLY INSPECT SHELF CONNECTIONS, AC POWERING, AND MISCELLANEOUS ALARM WIRING FOR 51-TYPE CABINET RT

1. ***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.***

   Note: AC power will be supplied to RT during installation and tests.

   At ac breaker box, verify that circuit breaker is turned off for system.

2. Visually inspect and verify that ac power has been provided for cabinet.

3. Verify that ac power cord jack (**J112**) is connected to power shelf ac power plug (**P112**) (Figure 1).

4. If battery string 3 (181A battery shelf) (Figure 2) is provided, verify that connectors **J110** and **J111-1** on power shelf are connected to **P110** and **P111**, respectively, on battery shelf.

5. Verify that power shelf connectors **J113-1**, **J113-2**, and **J113-3** are connected to appropriate **P113** connectors on available battery shelves containing battery string 1, battery string 2, and battery string 3, respectively (as required) (Figure 3).

6. ***Note:*** If second (upper) string of batteries (Figure 2) will not be installed, fuse **F6** is not required.

   Verify that heater fuses **F5** and **F6** are installed in control box assembly fuse holders.

7. Locate fan assembly shelf between power shelf and dual bank assembly.

8. Verify that connector **J114-1** on power shelf is connected to **P114** on fan assembly shelf.

9. Verify that connectors **J108A-1** and **J108B-1** on power shelf are connected to **P108A** and **P108B**, respectively, on dual bank assembly.

10. Verify that connector **J115-1** on fan assembly shelf is connected to **P115** on dual bank assembly.

11. Verify that protector panel connector **P107** is connected to **J107** on power shelf.

12. ***Note:*** Door alarms may be retired by pulling plungers fully out past detent.

    From work order, visually verify that digital line pairs, derived pairs, and miscellaneous pairs have been properly connected to outside plant cables and/or cross-connect field.

13. Verify that protector panel lead connectors **P101, P102, P103, P104, P105**, and **P106** are connected to blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105**, and **J106**, respectively.

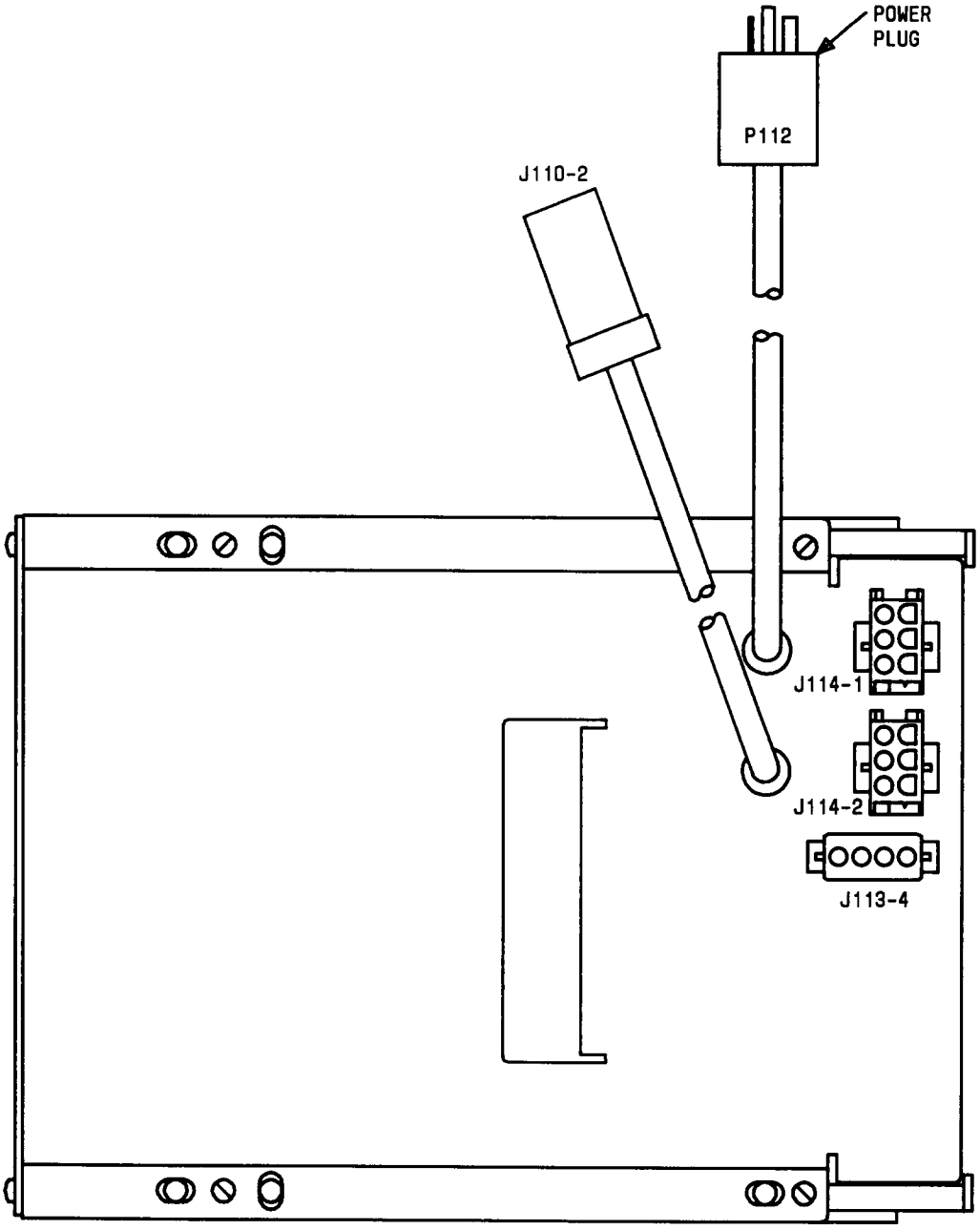


Fig. 1—Power Shelf AC Power Plug

14. ***Note:*** Door alarms may be retired by pulling plungers fully out past detent.

    Locate door alarm switches on front and rear of electronics section.

15. Is door alarm pair connected to miscellaneous pair panel?

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

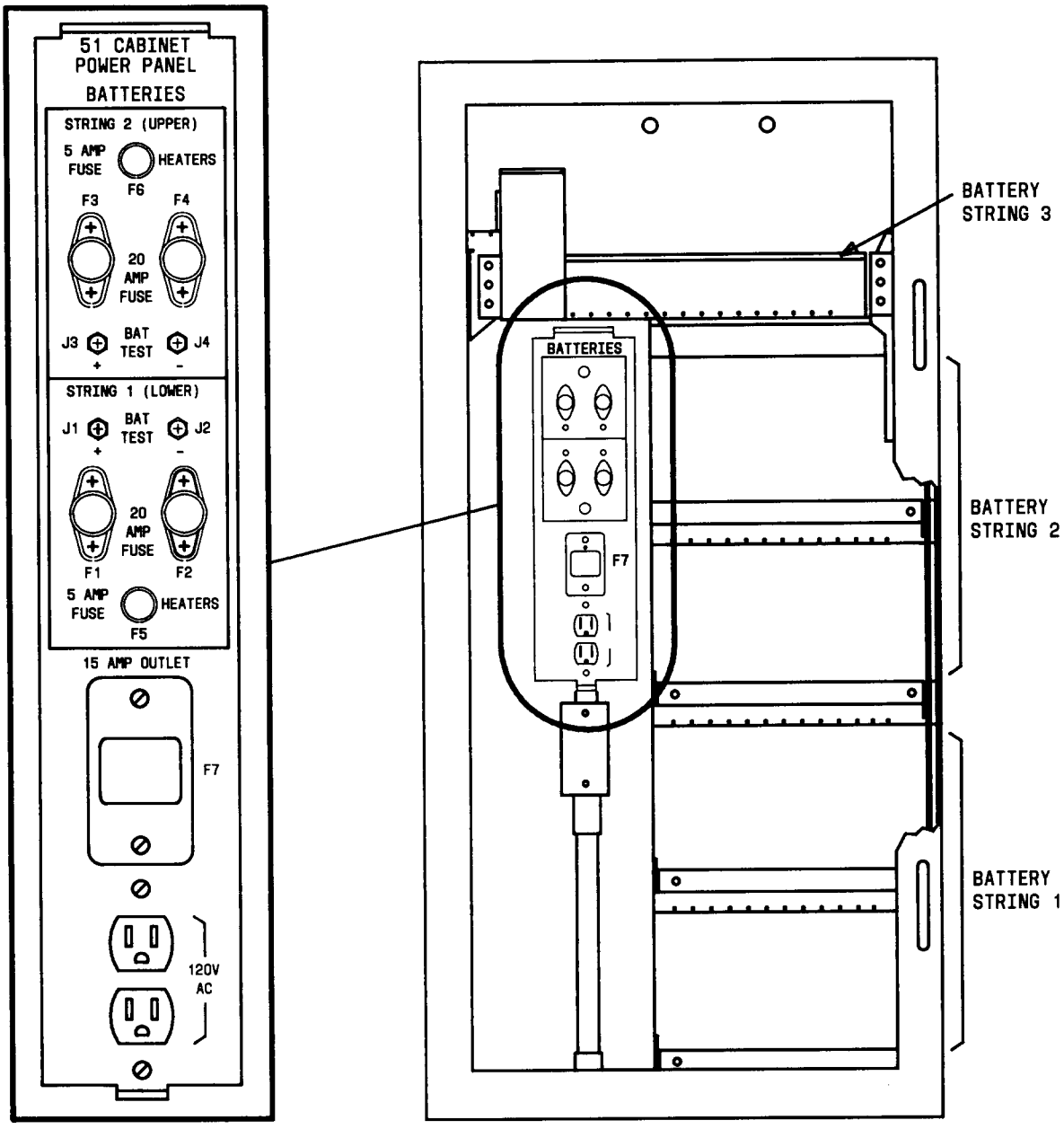


Fig. 2—Battery Section of 51A Cabinet Showing Control Box Assembly

16. Resolve problems through local procedures.

17. From work order or facility record, are other miscellaneous-type alarms to be connected to miscellaneous pair panel?

    If **YES**, then continue with Step **18.**
    If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

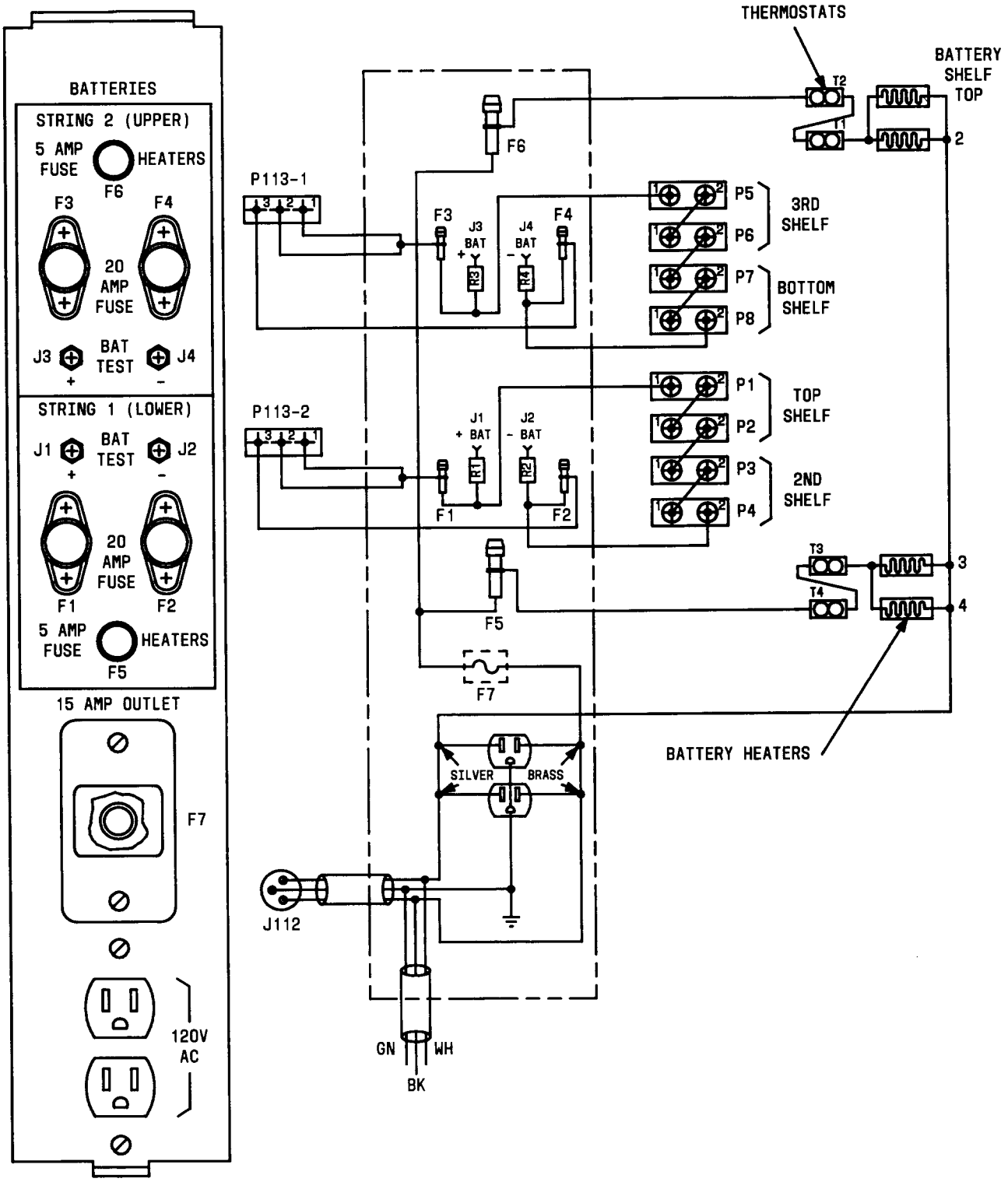


Fig. 3—Power and Battery Shelf Connectors

18. Are alarm pairs present and properly connected to the miscellaneous alarm panel?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **19.**

19. Resolve problems through local procedures.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

VISUALLY INSPECT SHELF CONNECTIONS, AC POWERING, AND MISCELLANEOUS ALARM WIRING FOR 80C CABINET RT

1. ***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.***

   Note: AC power will be supplied to RT during installation and tests.

   At 80C cabinet power panel, verify that circuit breaker(s) (TABLE A)(Figure 1) is turned off for system(s) being checked.

2. Visually verify that ac power cable has been provided and connected to power panel in cabinet.

3. Remove top, center, and side coverplates (Figure 2).

4. Verify that ac power cord from power panel is connected to power shelf ac power plug (**P112**) (Figure 3).

TABLE A

ED-97977-30, G1-G11 80-TYPE CABINET

CIRCUIT BREAKER	OUTLET	ED-97977-30 G1-9, G11 FRAME NO. 1	ED-97977-30, G10	
			FRAME NO. 1	FRAME NO.2
CB4	J1	—	—	—
CB4	J2	—	—	—
CB4	J3	POWER SHELF	POWER SHELF	—
CB3	J4	CONVENIENCE OUTLET	CONVENIENCE OUTLET	—
CB5	J5	NOT USED	NOT USED	—
CB5	J6	NOT USED	—	—
CB5	J7	NOT USED	—	POWER SHELF
CB5	J8	NOT USED	—	—

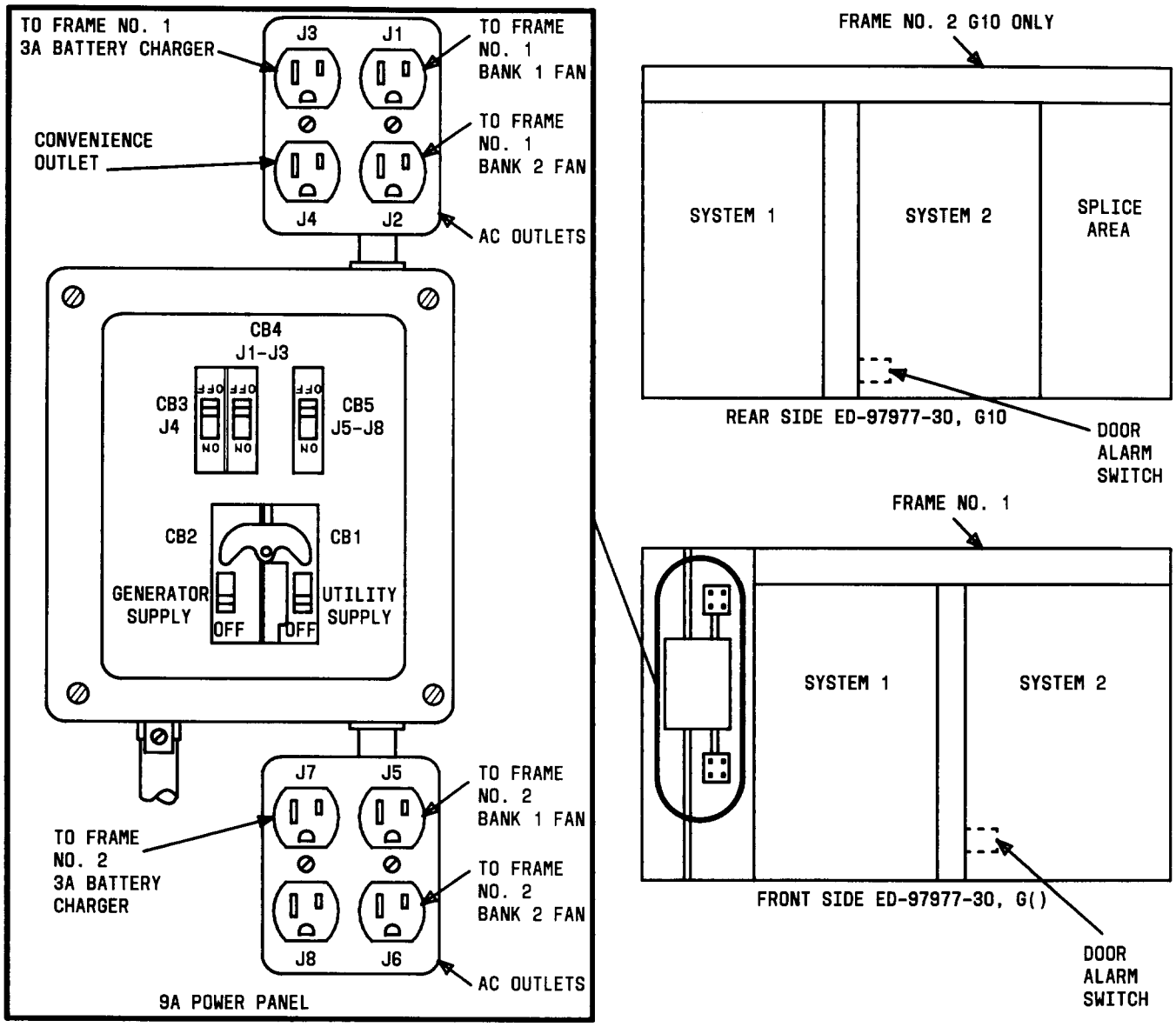


Fig. 1—ED-97977-30 Cabinet Showing Front and Rear Side and 9A Power Panel (Phase 0)

5. Verify that protector panel connectors **P101, P102, P103, P104, P105**, and **P106** are connected to position 1 (left) blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105**, and **J106**, respectively.

6. Verify that power shelf connectors **J108A-1** and **J108B-1** are connected to channel bank connectors **P108A** and **P108B**, respectively.

7. Verify that connectors on power shelf are connected to appropriate battery shelf lead connectors (as required) (Figure 3).

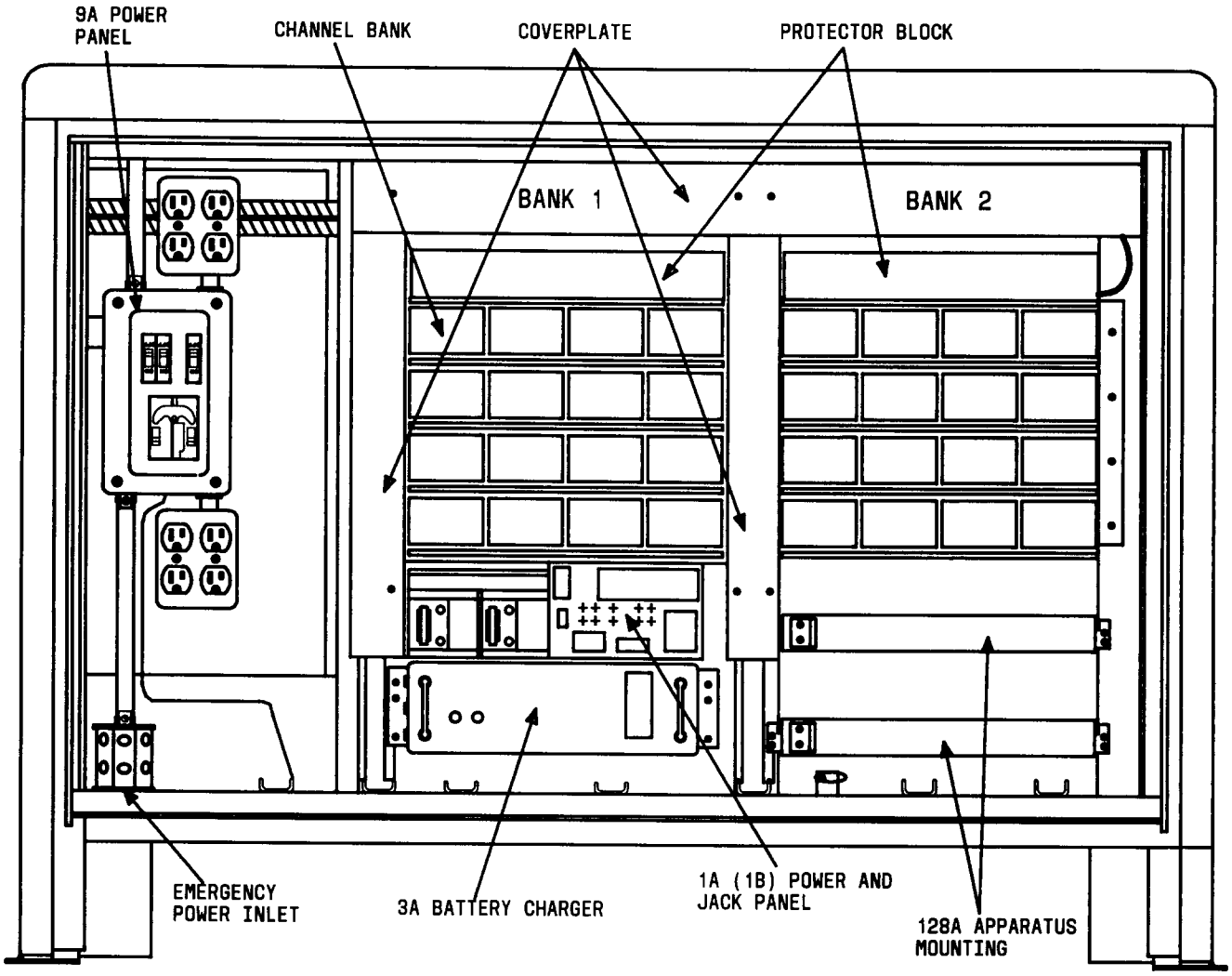


Fig. 2—ED-97977-30 80C Cabinet (Phase 0)

8. Is position 2 (right) dual bank assembly (shelves) installed?

   If **YES,** then continue with Step **9.**
   If **NO,** then proceed to Step **11.**

9. Verify that second dual bank protector panel connectors **P101, P102, P103, P104, P105,** and **P106** are connected to position 2 (right) blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105,** and **J106,** respectively.

10. Verify that power shelf connectors **J108A-2** and **J108B-2** are connected to channel bank connectors **P108A** and **P108B,** respectively and proceed to Step **12.**

11. Verify that power shelf connectors are not connected to battery shelf lead connectors for battery shelves not equipped (Figure 3).

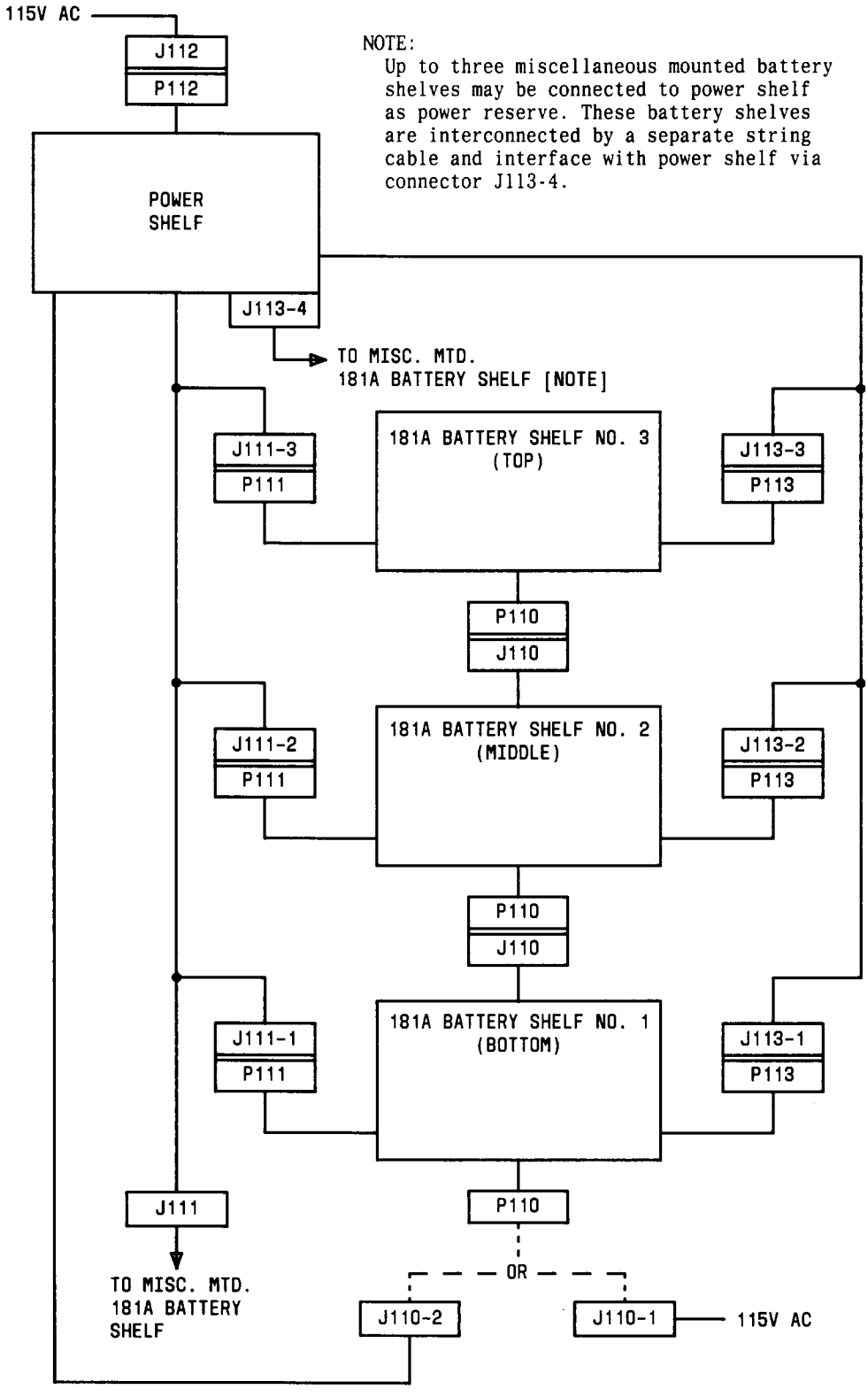


Fig. 3—Power and Battery Shelf Connectors

12. Verify that connector **J114-1** on power shelf is connected to **P114** on fan shelf 1.

13. Verify that connector **J115-1** on fan shelf 1 is connected to **P115** on dual bank assembly.

14. Verify that connector **J114-2** on power shelf is connected to **P114** on fan shelf 2 (if required).

15. Verify that connector **J115-2** on fan shelf 2 is connected to P115 on dual bank assembly (if required).

16. From work order, verify that digital line pairs, derived pairs, and miscellaneous pairs have been properly connected to outside plant cables and/or cross-connect field (Figure 4).

17. ***Note:*** Door alarm switch is located at bottom of door frame and may be retired by pulling plunger fully out past detent.

    Locate door alarm and fan alarm wiring (Figure 5).

18. If door and fan alarm pairs are to be connected to miscellaneous pair panel, make connections according to local procedures.

19. From work order or facility record, are other miscellaneous-type alarms to be connected to miscellaneous pair panel?

    If **YES,** then continue with Step **20.**
    If **NO,** then proceed to Step **22.**

20. Are alarm pairs present and properly connected to miscellaneous pair panel?

    If **YES,** then proceed to Step **22.**
    If **NO,** then continue with Step **21.**

21. Resolve problems through local procedures.

22. Reinstall top, center, and side coverplates.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

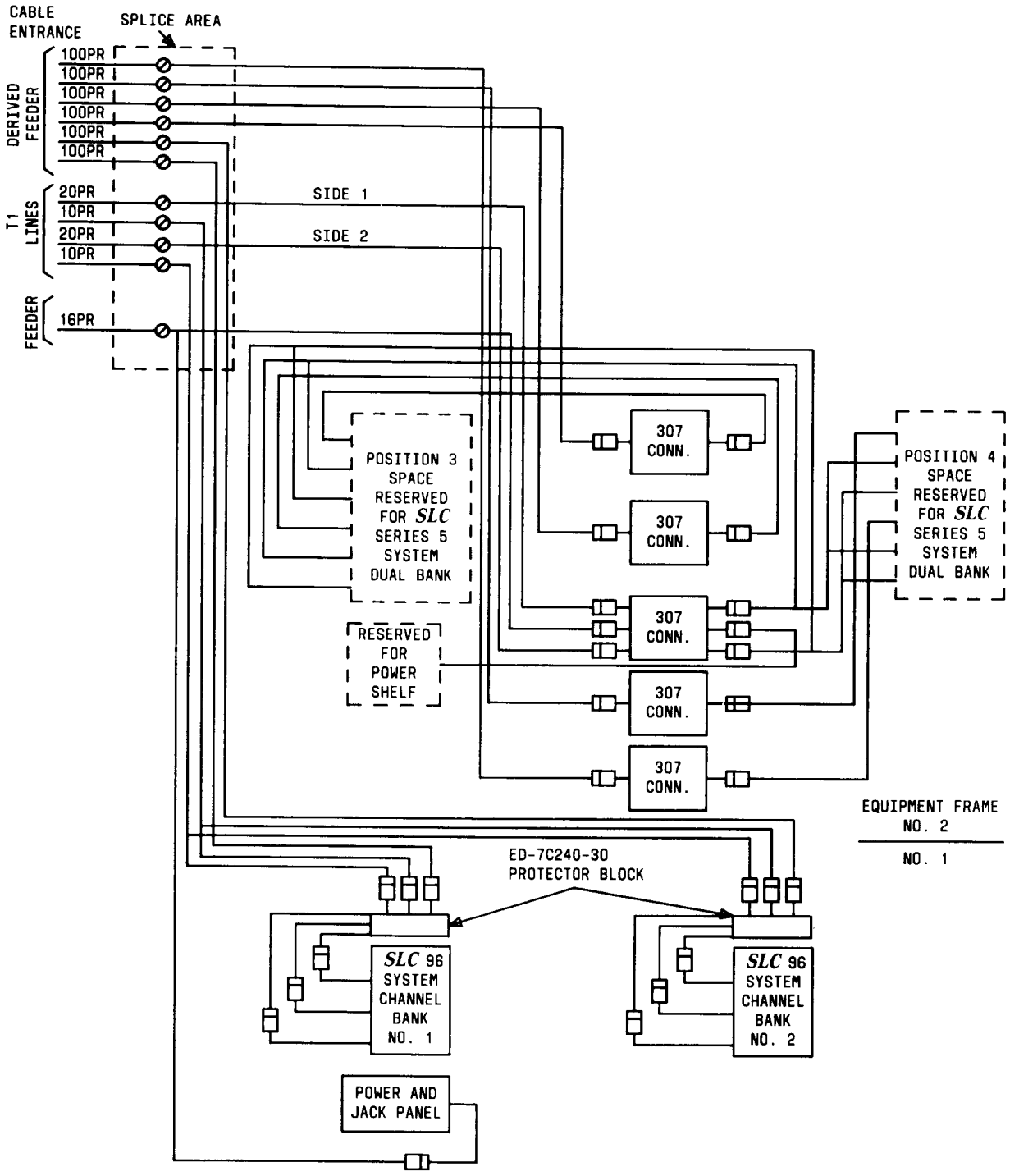


Fig. 4—Intermediate Cabling and Interconnection, 80C Cabinet (Phase 0)

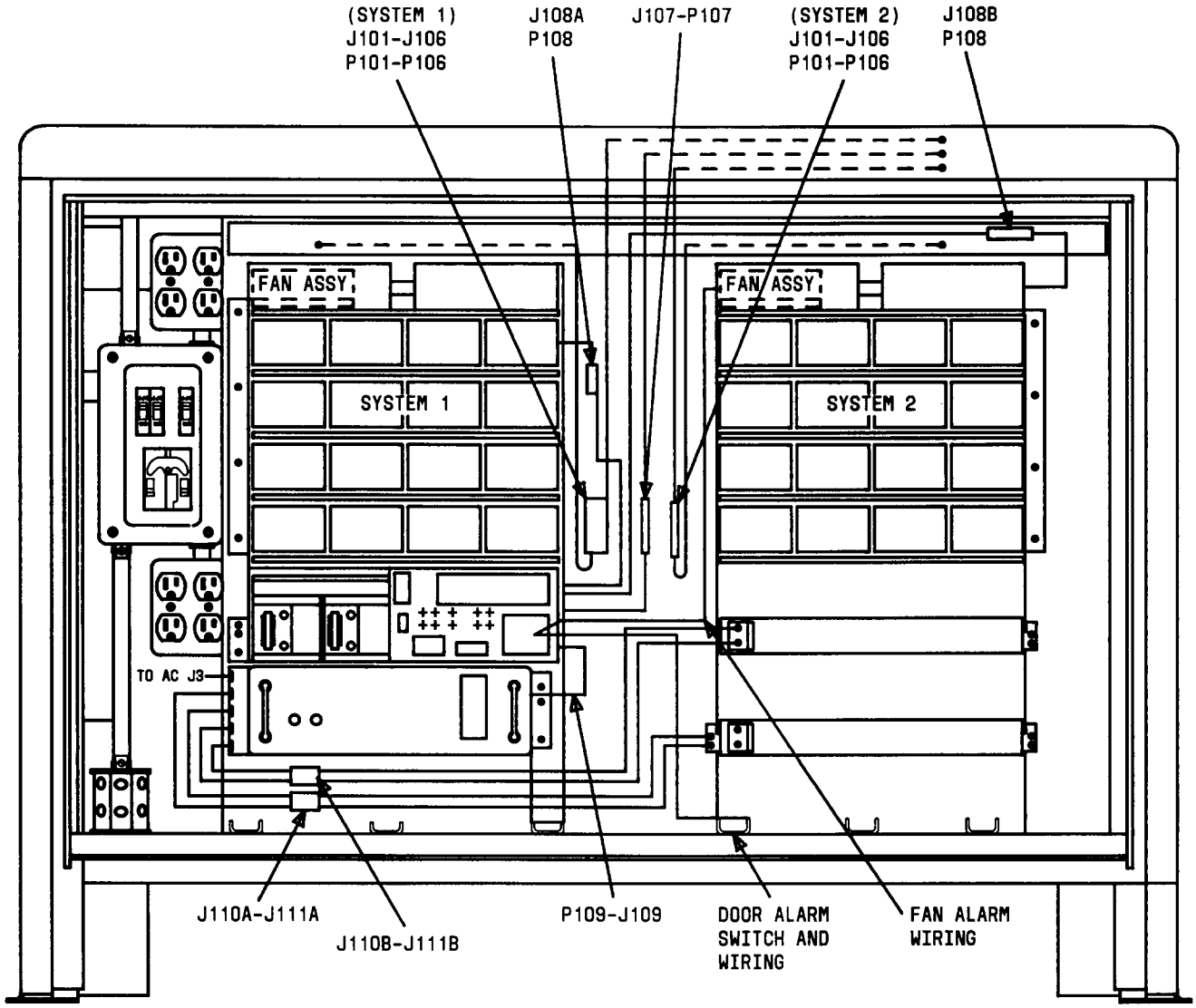


Fig. 5—ED-97977-30, 80C Cabinet (Phase 0) Wiring Harness and Connectors

VISUALLY INSPECT SHELF CONNECTIONS, AC POWERING, AND MISCELLANEOUS ALARM WIRING FOR 80D CABINET RT

1. ***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.***

   Note: AC power will be supplied to RT during installation and tests.

   At 80D cabinet power panel, verify that circuit breaker(s) is turned off for system(s) being checked.

2. Remove top, center, and side coverplates (Figure 1).

3. Verify that ac power cord from power panel is connected to power shelf ac power plug (**P112**) (Figure 2).

4. Is position 1 or 3 (left) dual bank assembly (shelves) installed?

   If **YES,** then continue with Step **5.**
   If **NO,** then proceed to Step **7.**

5. Verify that protector panel connectors **P101, P102, P103, P104, P105,** and **P106** are connected to position 1 (left) blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105,** and **J106,** respectively.

6. Verify that power shelf connectors **J108A-1** and **J108B-1** are connected to channel bank connectors **P108A** and **P108B,** respectively.

7. Verify that connectors on power shelf are connected to appropriate battery shelf lead connectors (as required) (Figure 2).

8. Is position 4 equipped with a DDM-1000 Multiplexer?

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

9. Verify that power shelf connector **J108A-2** is connected to ED-2C833, G13 cable assembly on DDM-1000 Multiplexer and proceed to Step **11.**

10. Is position 2 or 4 (right) dual bank assembly (shelves) installed?

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

11. Verify that second dual bank protector panel connectors **P101, P102, P103, P104, P105,** and **P106** are connected to position 2 (right) blue (lower) and white (upper) channel bank connectors **J101, J102, J103, J104, J105,** and **J106,** respectively.

12. Verify that power shelf connectors **J108A-2** and **J108B-2** are connected to channel bank connectors **P108A** and **P108B,** respectively and proceed to Step **14.**

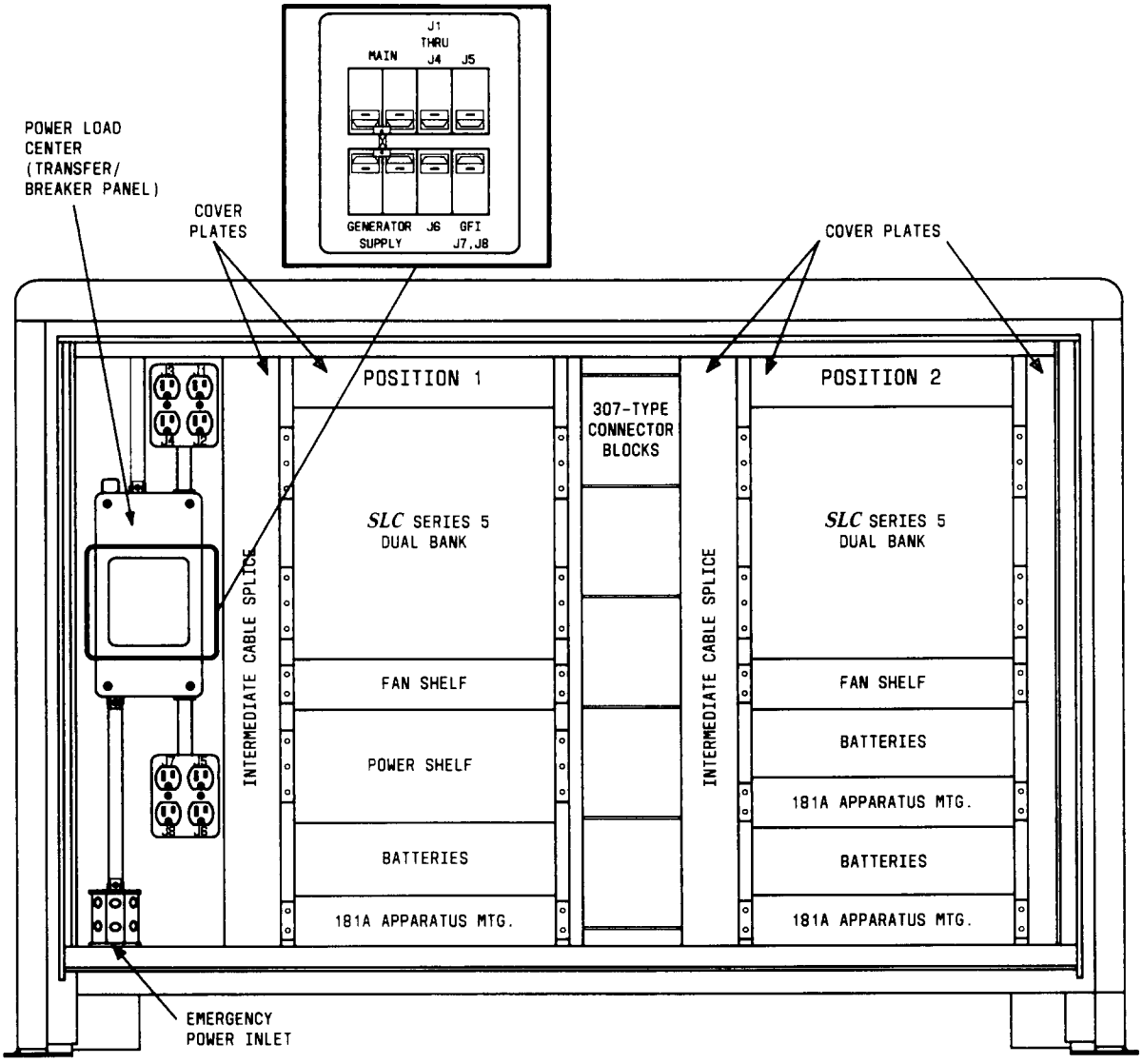


Fig. 1—ED-7C621-30 80D Cabinet (Phase 1)

13. Verify that power shelf connectors are not connected to battery shelf lead connectors for battery shelves not equipped (Figure 2).

14. Verify that protector panel connector **P107** is connected to **J107** on power shelf.

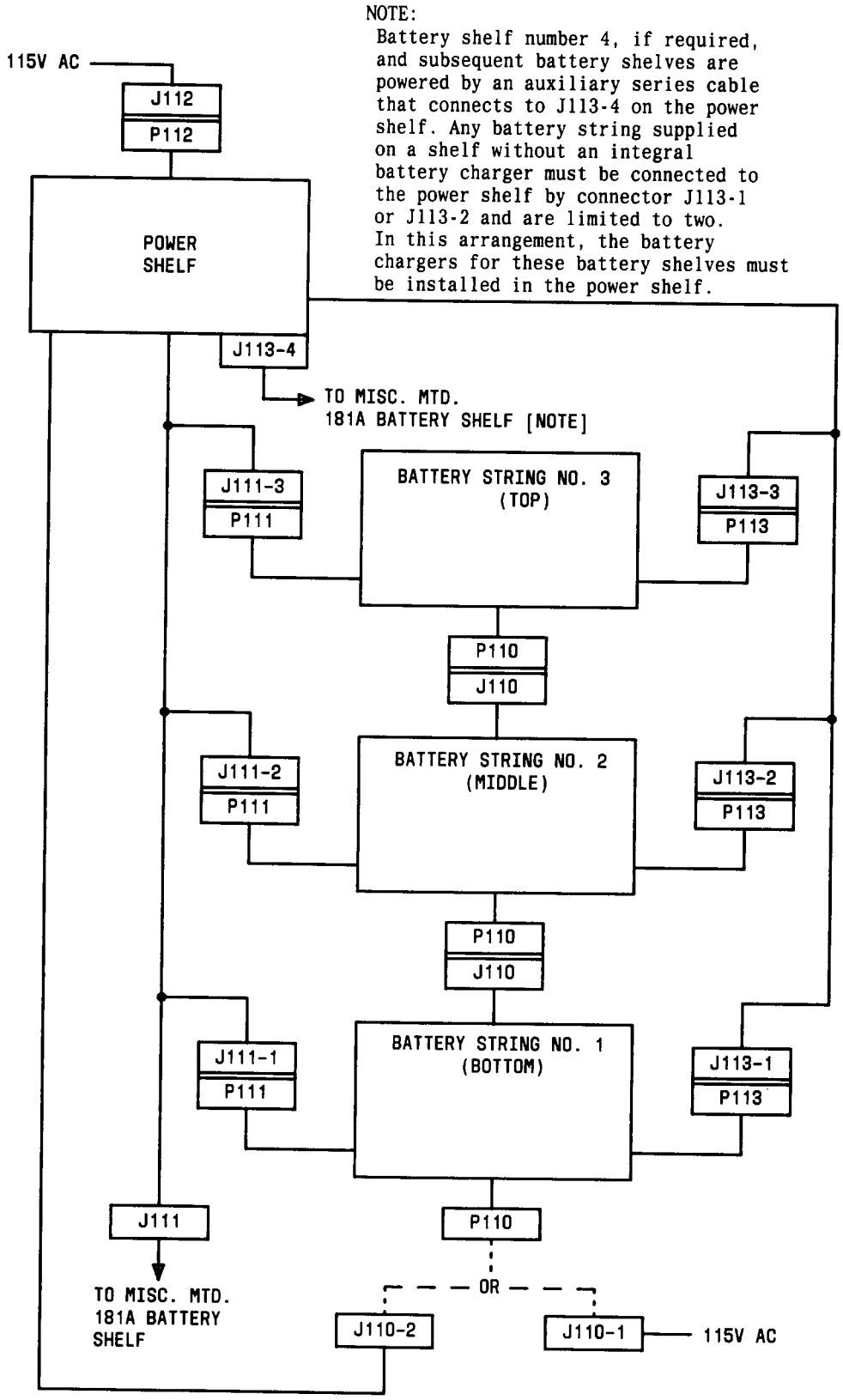


Fig. 2—Power and Battery Shelf Connectors

15. Verify that connector **J114-1** on power shelf is connected to **P114** on fan shelf 1.

16. Verify that connector **J115-1** on fan shelf 1 is connected to **P115** on dual bank assembly.

17. Verify that connector **J114-2** on power shelf is connected to **P114** on fan shelf 2 (if required).

18. Verify that connector **J115-2** on fan shelf 2 is connected to **P115** on dual bank assembly.

19. From work order, verify that digital line pairs, derived pairs, and miscellaneous pairs have been properly connected to outside plant cables and/or cross-connect field (Figure 3).

20. ***Note:*** Door alarm switch is located at bottom of door frame and may be retired by pulling plunger fully out past detent.

    Locate door alarm and fan alarm wiring.

21. If door and fan alarm pairs connected to miscellaneous pair panel, make connections according to local procedures.

22. From work order or facility record, are other miscellaneous-type alarms to be connected to miscellaneous pair panel?

    If **YES,** then continue with Step **23.**
    If **NO,** then proceed to Step **25.**

23. Are alarm pairs present and properly connected to miscellaneous pair panel?

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

24. Resolve problems through local procedures.

25. Reinstall top, center, and side coverplates.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

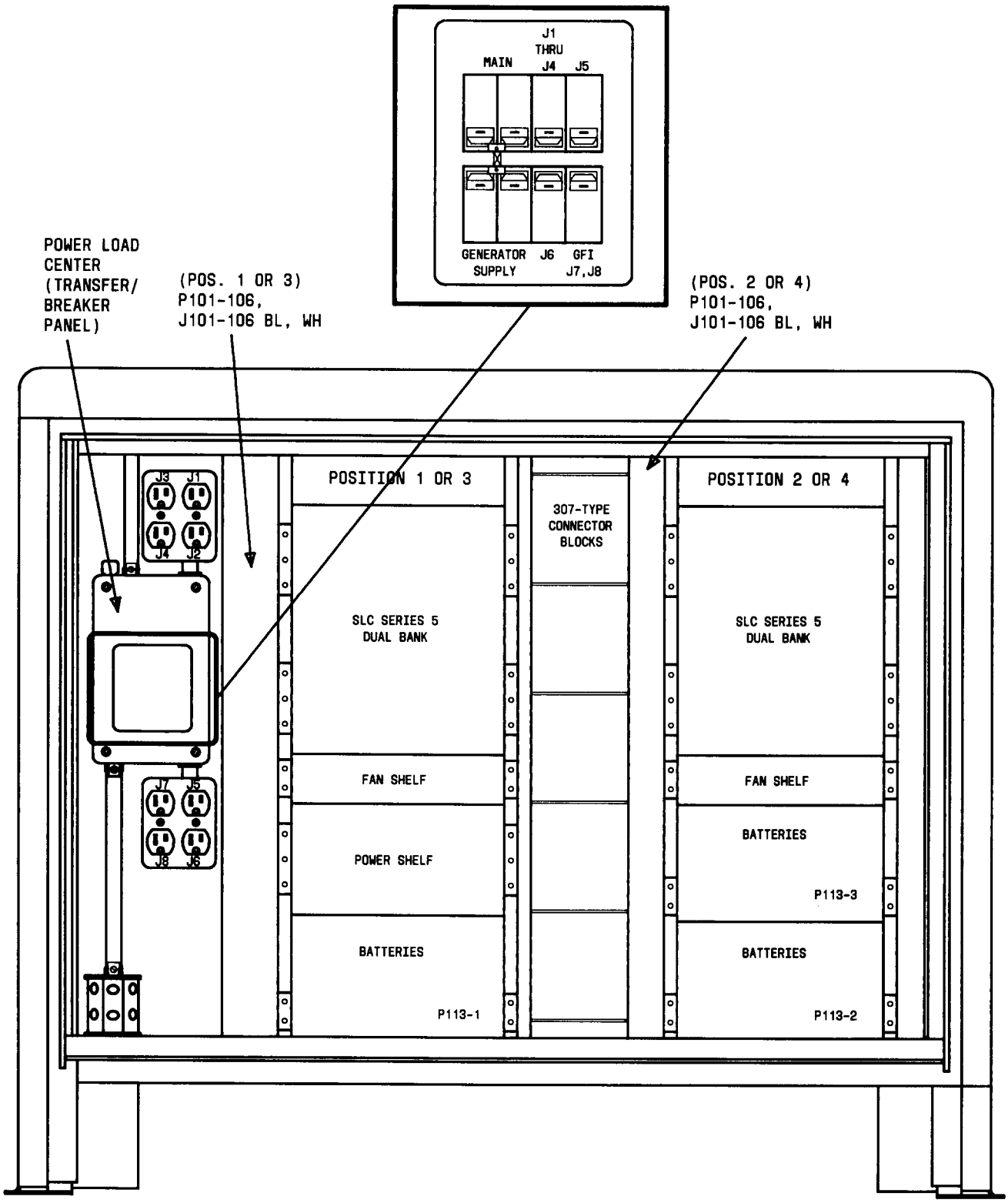


Fig. 3—Intermediate Cabling and Interconnection, 80D Cabinet (Phase 1)

CHECK RT FRAME AND EQUIPMENT GROUND FOR FRAME RT

1. If RT frame contains a J1C182BA power shelf, verify that circuit breaker is still turned off for bay being checked.

2. Verify that frame ground wire has been securely attached to ground ring at top of bay and to mounting flange on frame (Figure 1).

3. ***Note:*** Protector panels are not required for frame RT equipped with the Fiber-To-The-Home feature.

   Verify that each protector panel ground wire has been securely attached to protector panel and to mounting flange on frame.

4. Verify that power shelf ground wire terminals are securely attached to bay frame ground drop wire and that channel bank frame ground leads are attached to same drop wire on frame.

5. Verify that good ground connection has been made and that all ground connectors, clamps, and screws are tight.

6. If RT frame contains a J1C182BA power shelf, turn circuit breaker on for bay being checked.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

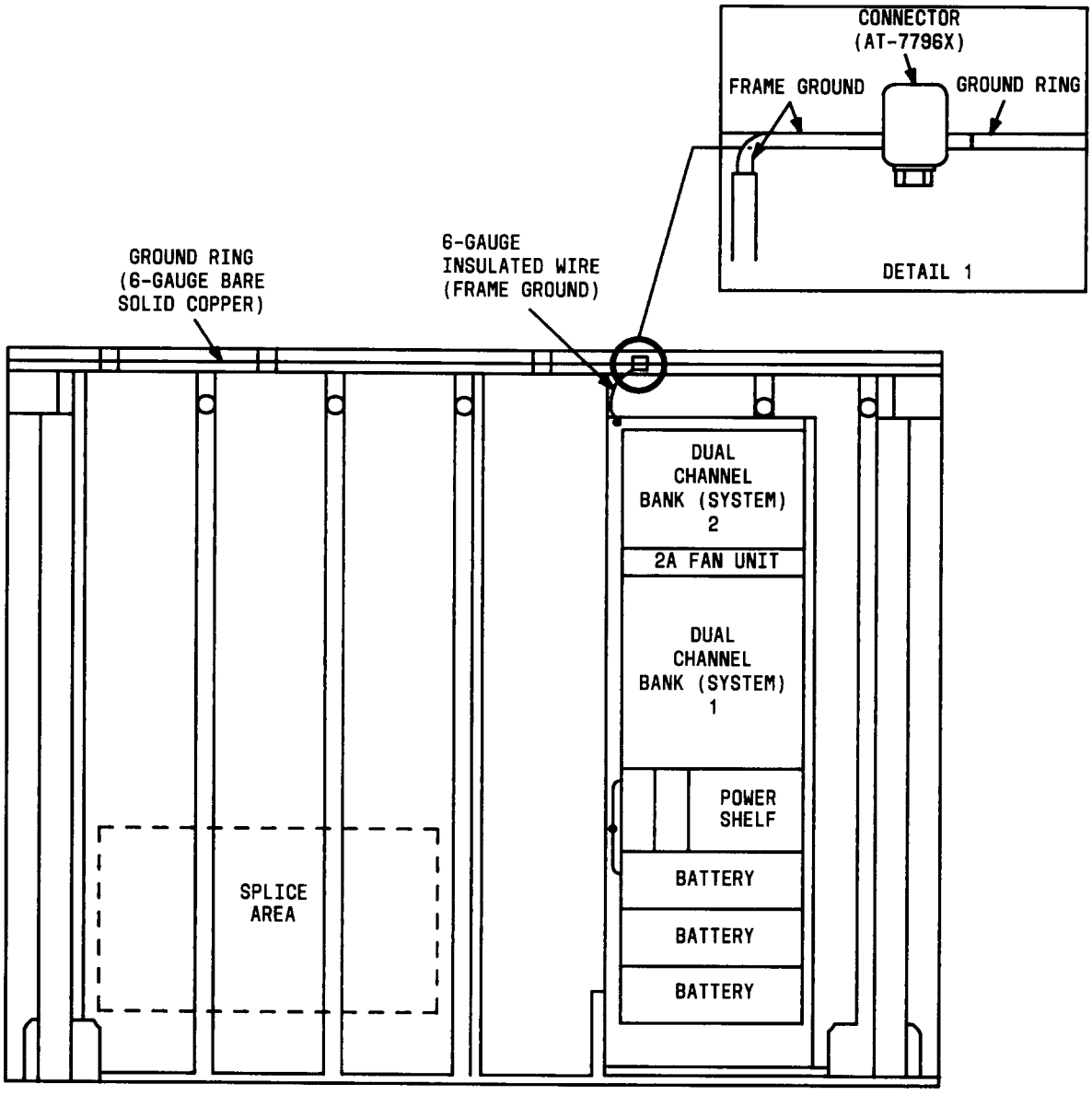


Fig. 1—J1C182AB RT Dual Channel Banks

CHECK RT FRAME AND EQUIPMENT GROUND FOR ED-7C601-30 (51-TYPE) CABINET RT

1. Verify that circuit breaker or power transfer switch is turned off for system being checked. The circuit breaker or power transfer switch is located outside of cabinet.

2. Verify that 6-gauge solid wire is properly attached to outside ground rod and to connector inside cabinet (Figure 1).

3. Verify that bond clamp is attached firmly to sheath of 300 pair cable (Figure 1).

4. From protector panel, verify that ground wire has been properly attached at ground lug area (Figure 2).

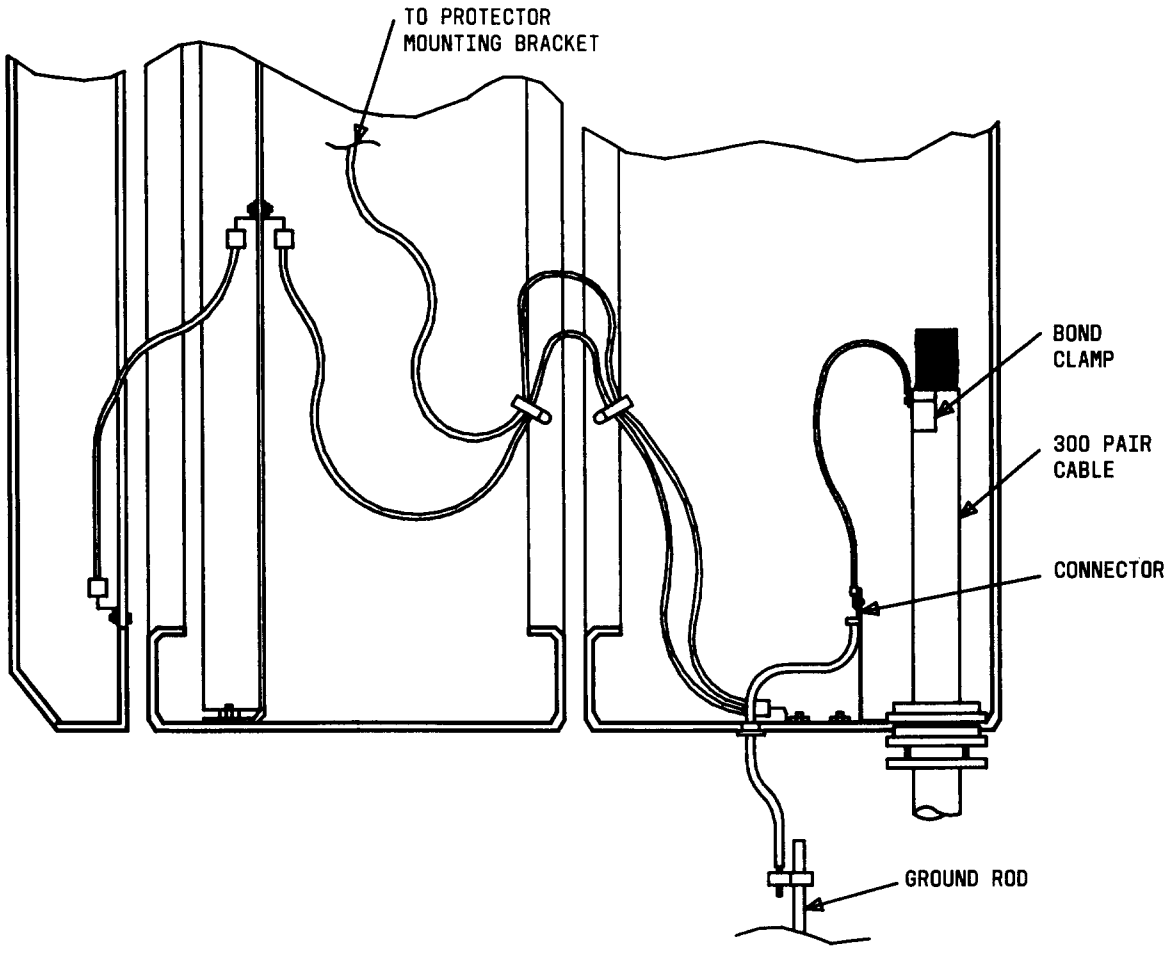


Fig. 1—Equipment Grounding for 51-Type Cabinet

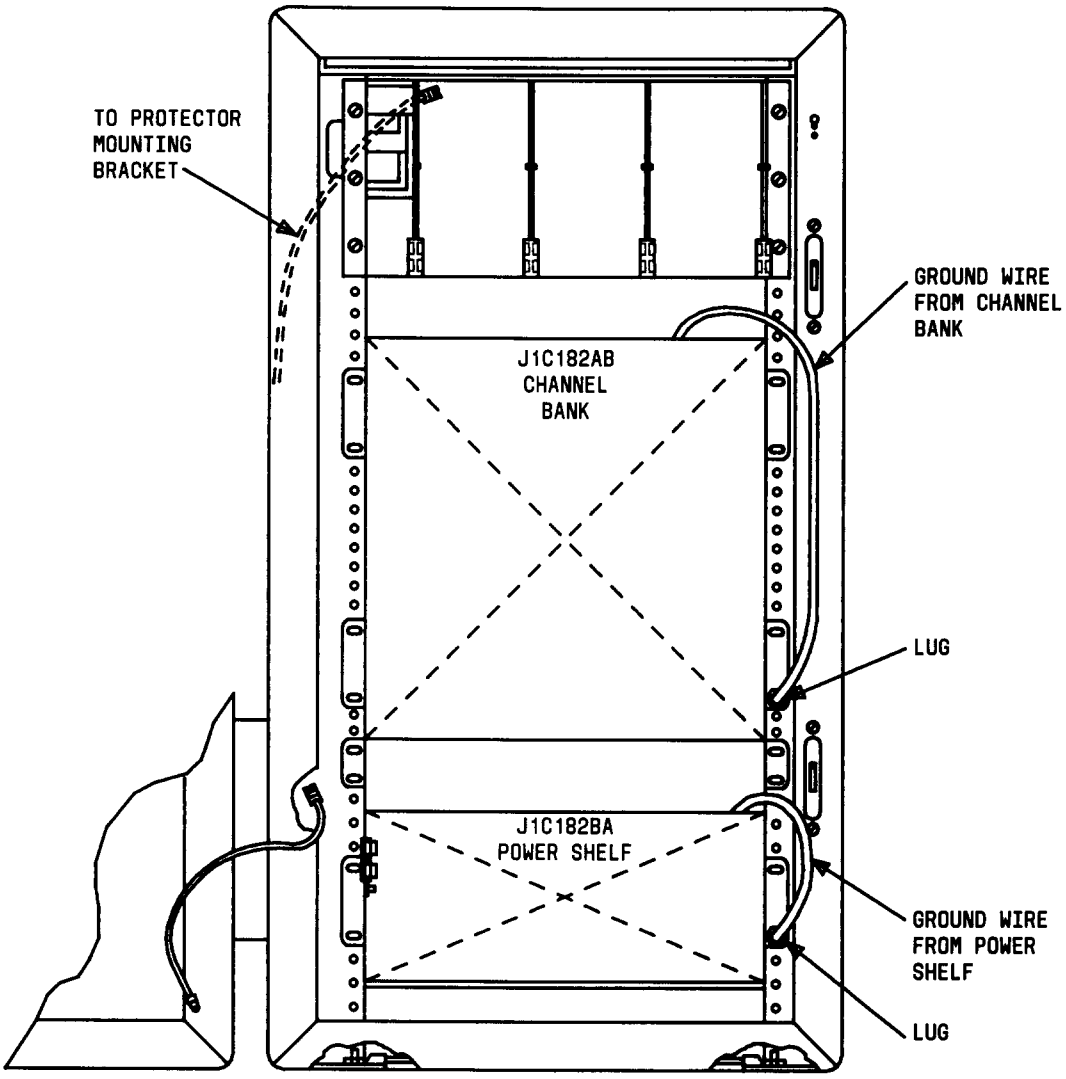


Fig. 2—Equipment Grounding for 51-Type Cabinet

5. Verify that power shelf and channel bank ground wire terminals have been connected (Figure 2).

6. Verify that good ground connection has been made and that all ground connectors, clamps, and screws have been tightened.

7. At protector panel, verify that ground lead is properly connected and tight.

8. Turn circuit breaker or power transfer switch on for system being checked.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

CHECK RT FRAME AND EQUIPMENT GROUND FOR ED-7C621-30 OR ED-97977-30 CSC (COMMUNITY SERVICE CABINET) (80-TYPE) RT

1. Verify that circuit breaker(s) at power panel is still off for system being checked.

2. From protector panel(s), verify that ground lead is properly connected and tight and has been attached properly at ground lug area (Figure 1).

3. At mounting flange on frame, verify that power shelf and battery shelf ground wire terminals have been connected (see detail 1 in Figure 1).

4. ***Note:*** The 307A protector panels must be released and lowered to check channel bank ground strap connections.

   Verify that channel bank ground straps are properly connected and tight (see detail 2 in Figure 1).

5. Verify ground wire from power panel is properly connected to ground lug.

6. Verify that good ground connection has been made and that all ground connectors, clamps, and screws are tight.

7. Turn circuit breaker(s) on for system being checked.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

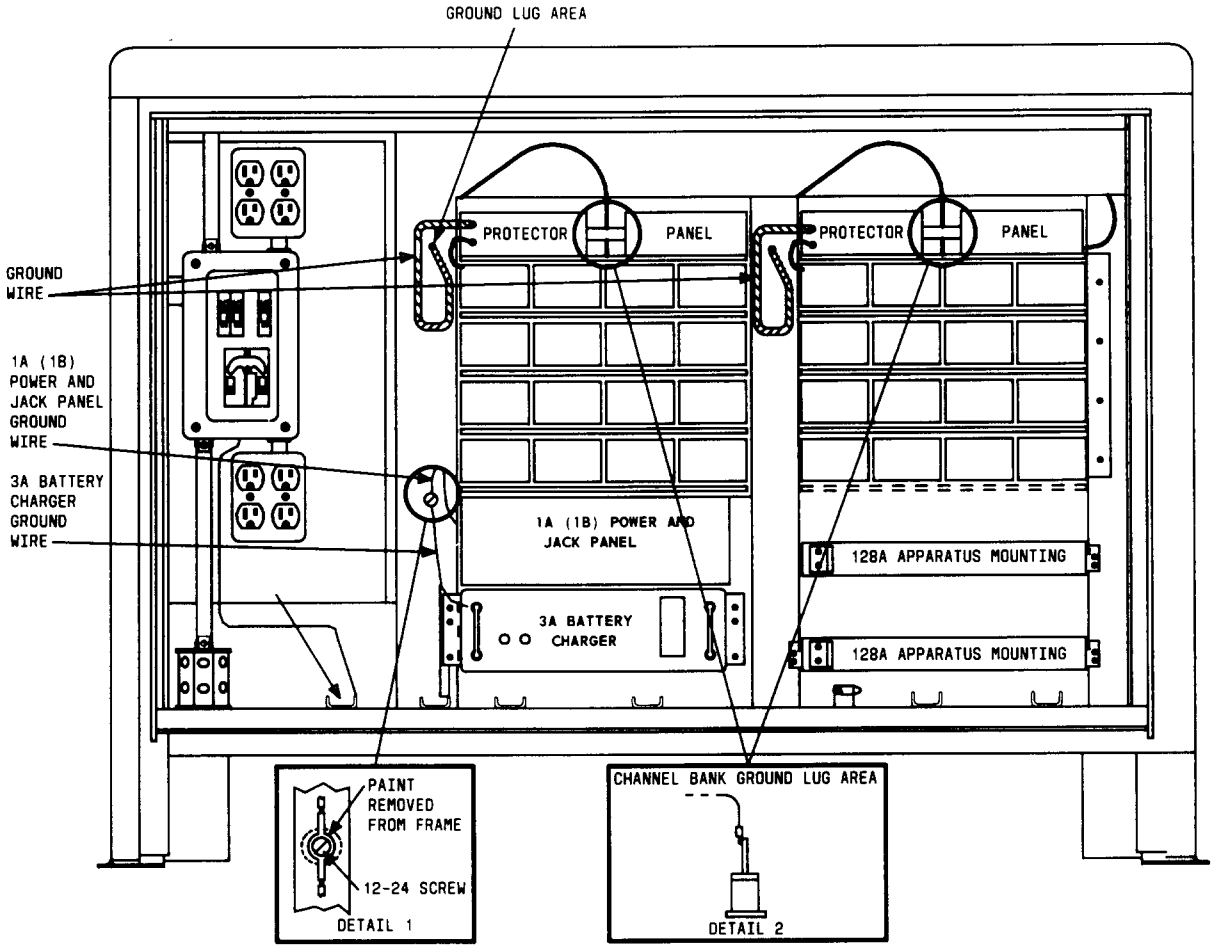


Fig. 1—Equipment Grounding for 80C Cabinet (Phase 0)

INSTALL RSU (RINGING SWITCH UNIT) IN BULK POWER SHELF

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

1. Get one **AUG2 RSU** (Figure 1) and inspect for possible physical damage.
2. Insert **RSU** into **RSU** slot in power shelf.
3. Get DMM and condition it to measure dc volts.

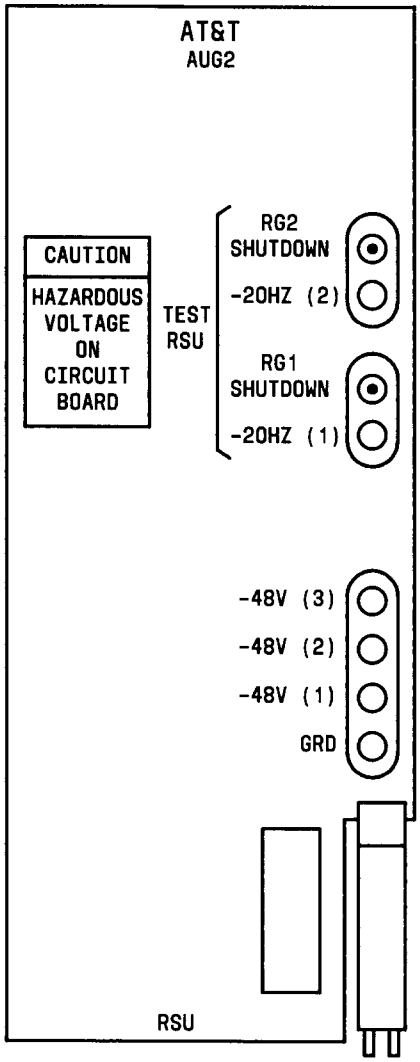


Fig. 1—Ringing Switch Unit (AUG2) Faceplate

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 40D BFU (BANK FUSE UNIT) IN BULK POWER SHELF

SUMMARY: Measure –42 to –56 Vdc at **RSU –48V (1), –48V (2), –48V (3)** and **GRD**). Verify presence of fuses in **BFU**(s) and install **BFU**(s) into power shelf.

1. Condition DMM to measure dc volts.

2. ***Note:*** Test jacks **–48V (1), (2),** and **(3)** on **RSU** provide the means to check voltage from the bulk power supply to the left **BFU** (powering for lower dual bank assembly), middle **BFU** (powering for middle dual bank assembly), and right **BFU** (powering for upper dual bank assembly), respectively.

   On **RSU**, connect DMM test leads to **GRD** jack and either **–48V (1), (2),** or **(3)** jack that is associated with **BFU** being installed.

3. Is –42 to –56 volts present?

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

4. Verify that appropriate –48V feeder and –48V RTN feeder from bulk power plant are connected to power shelf. Repeat the procedure from Step **2** after locating and correcting the trouble.

5. Get one **40D BFU** (Figure 1).

6. ***Note:*** If fuse holder does not contain a fuse or contains incorrect value fuse, install fuse of correct value.

   Verify that fuse holders on faceplate of **40D BFU** contain correct value fuses (TABLE A).

7. Remove DMM test leads and insert **40D BFU** into first vacant **BFU** slot from left in power shelf.

8. ***Note:*** Each fuse bead, except the yellow fuse beads, will pop out when the fuse blows.

   Do any fuses on **BFU** blow?

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

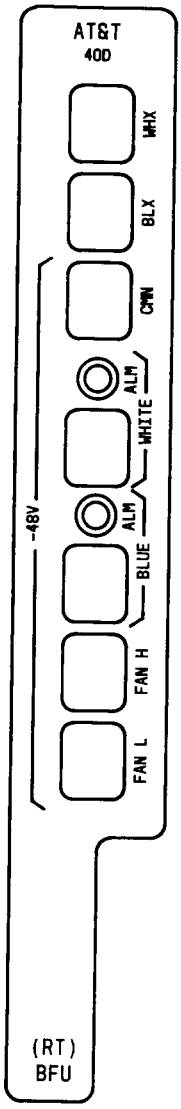


Fig. 1—40D Bank Fuse Unit

TABLE A
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 Multiplexer.

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

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

    If **YES,** then continue with Step **11.**
    If **NO,** then proceed to Step **12.**

11. Check wiring using SD-7C130-01. Repeat procedure from Step **9** after locating and correcting trouble.

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

    If **YES,** then continue with Step **13.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

13. Repeat the procedure from Step **2** for next **BFU** to be installed.

INSTALL 3C RINGING GENERATORS IN BULK POWER SHELF

SUMMARY: Insert 3C **RINGING GENERATOR** into **RING GEN1** slot in power shelf. Measure 90 to 110 Vac and –50 to –60 Vdc 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 **FAIL** indicator on **RING GEN2** is off. Release **RG1 SHUTDOWN** button and press and hold **RG2 SHUTDOWN** button on **RSU**. Verify that **FAIL** indicator on **RING GEN1** is off and **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 LDU (LOAD DISTRIBUTION UNIT) IN POWER SHELF

SUMMARY: Insert **LDU** into power shelf. Measure 105-129 Vac 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?

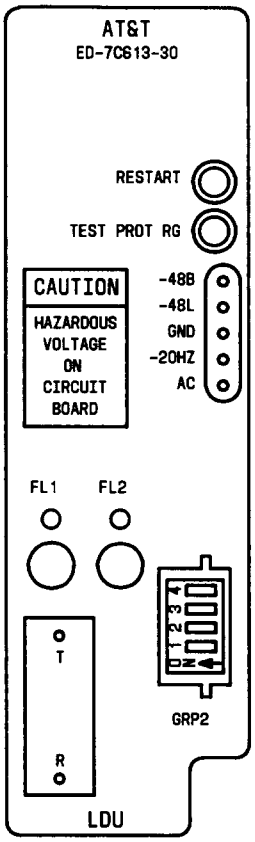
    If **FRAME,** then proceed to Step **17.**
    If **CABINET,** then continue with Step **16.**

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 Ω*	NET VALUE RES Ω	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

Fig. 1—Load Distribution Unit

PERFORM INITIAL INSTALLATION AND TESTS OF BATTERIES IN FRAME-TYPE OR 80-TYPE (ED-97977-30 OR ED-7C621-30) CABINET RT

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

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).

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 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.

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**).

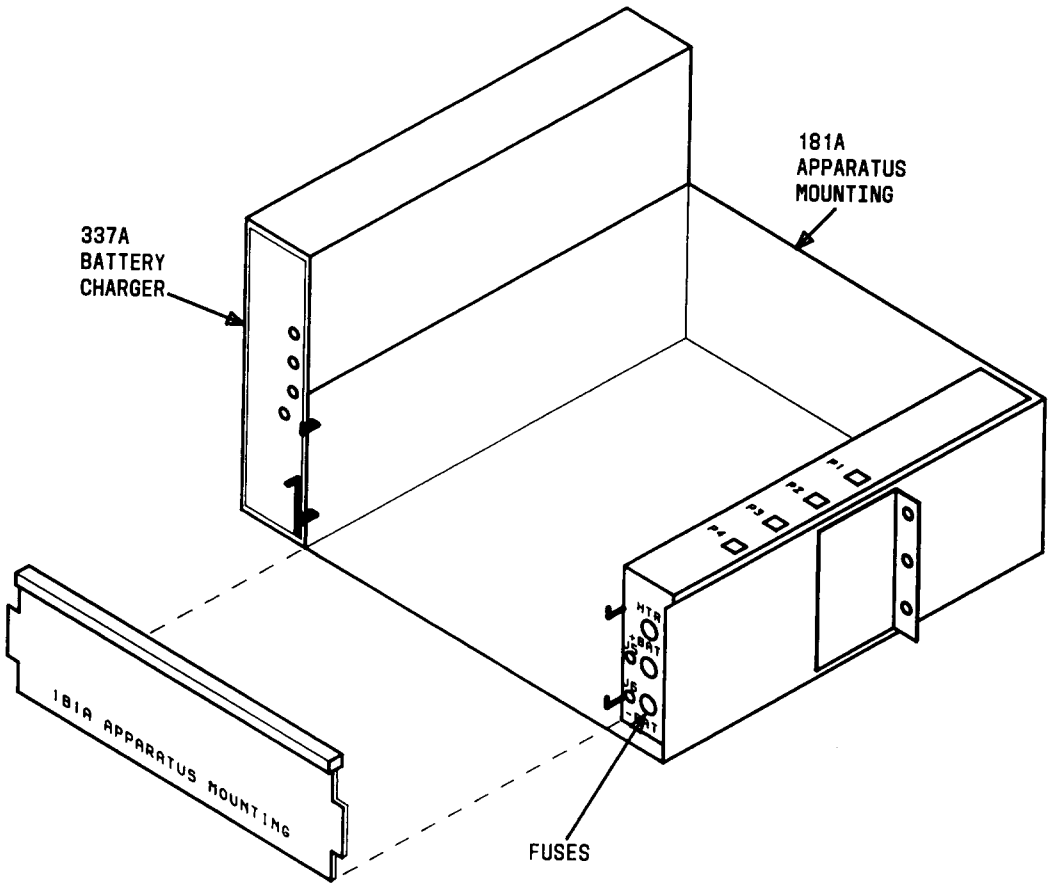


Fig. 1—Battery Shelf

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).**

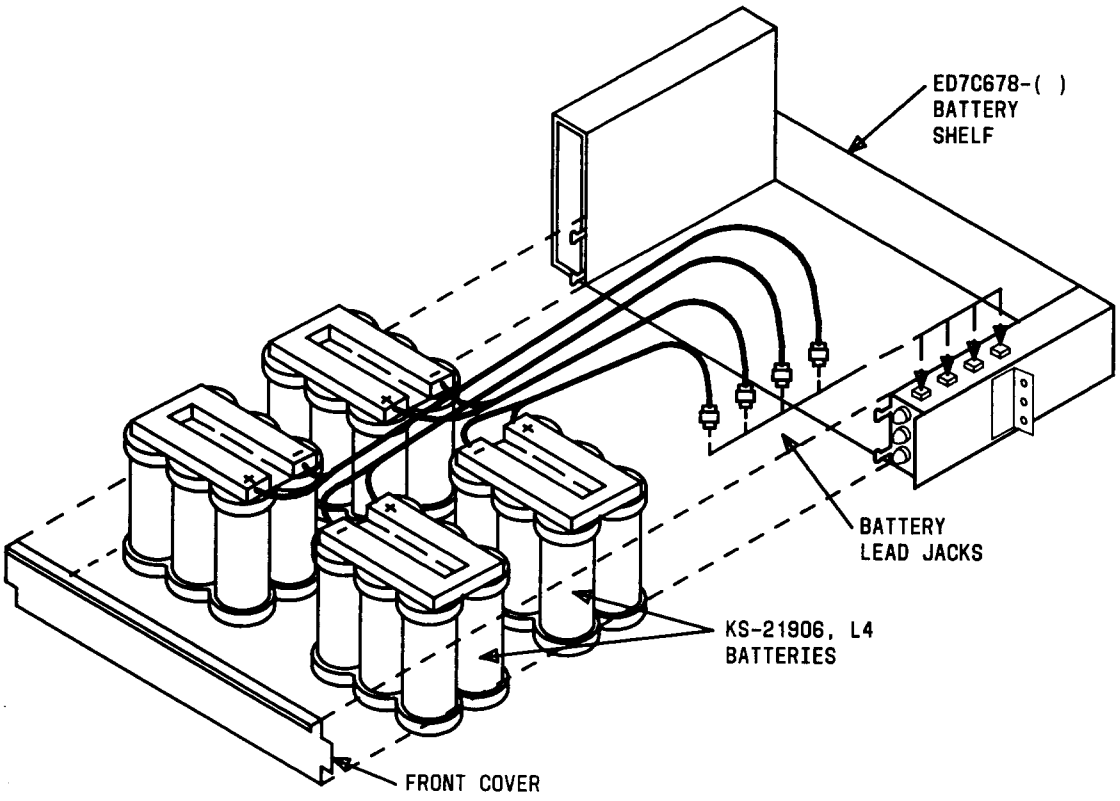


Fig. 2—Battery Placement and Connections

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. 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 Vdc at control box assembly and/or at battery shelf. Install fuses into control box assembly (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 control box assembly (Figure 1), remove following fuses for battery string(s) being installed: battery string 1 (lower) - fuses **F3**, **F4**, and **F6**; battery string 2 (upper) - fuses **F1**, **F2**, and **F5**.

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 supplied to upper two battery shelves (battery string 2) are labeled **P1, P2, P3,** and **P4**. The four plugs supplied to lower two battery shelves (battery string 1) are labeled **P5, P6, P7,** and **P8**.

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

7. At control box assembly, reinstall fuses associated with battery string being installed [**F1** and **F2** (upper) or **F3** and **F4** (lower)].

8. Get DMM or equivalent and condition to measure dc volts.

9. On control box assembly, connect DMM test leads to + **BAT TEST** jack (**J1** or **J3**) and - **BAT TEST** jack (**J2** or **J4**) of battery string being tested.

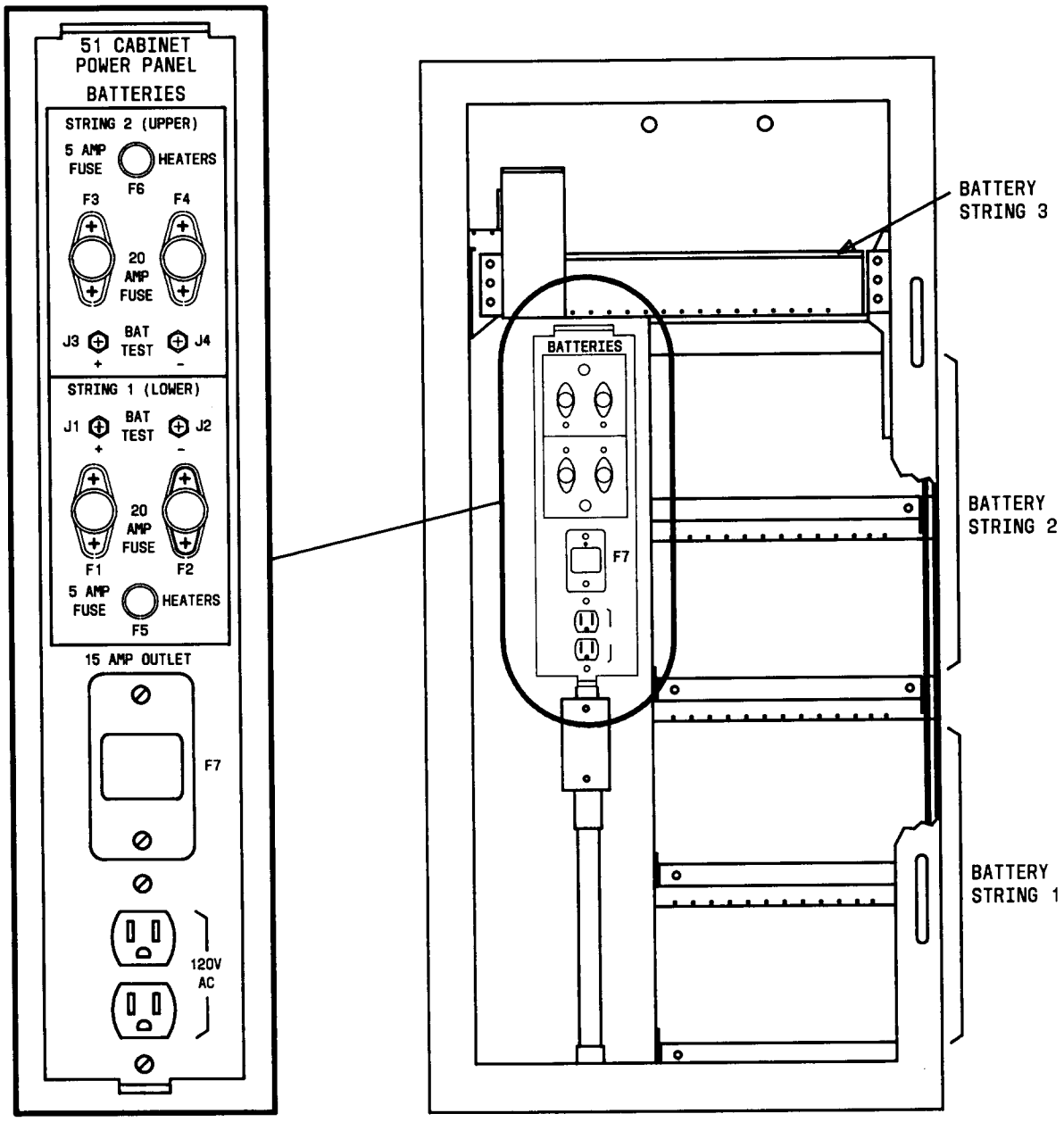


Fig. 1—Battery Section of 51A Cabinet Showing Control Box Assembly

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 control box assembly, 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 return 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).

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

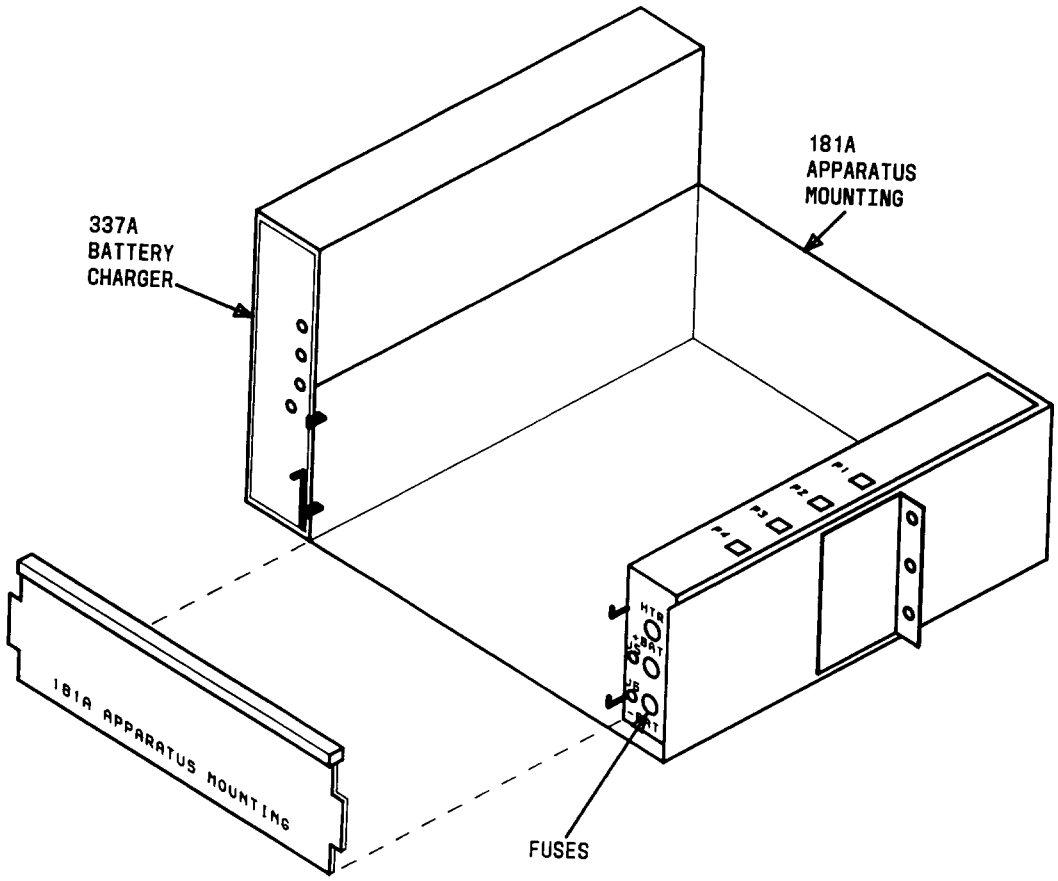


Fig. 2—Battery Shelf

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 battery shelf.

26. 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.

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.

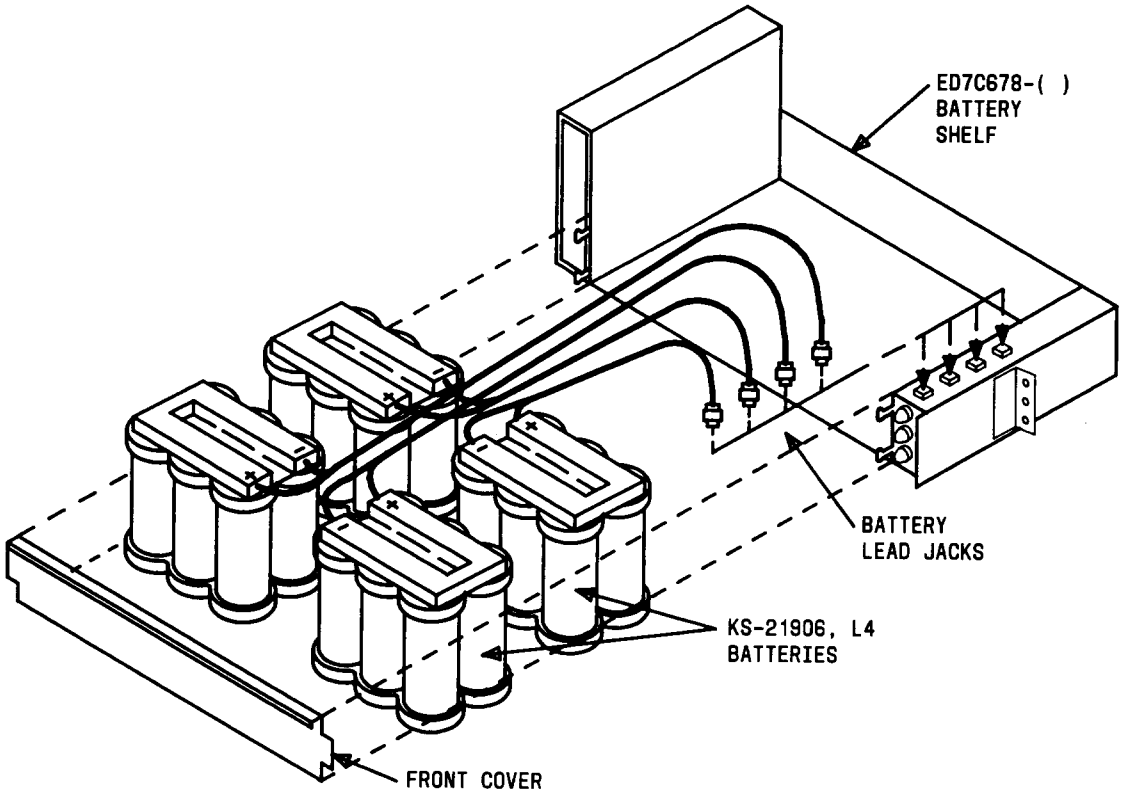


Fig. 3—Battery Placement and Connections

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 control box assembly, 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-554**

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.**

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.

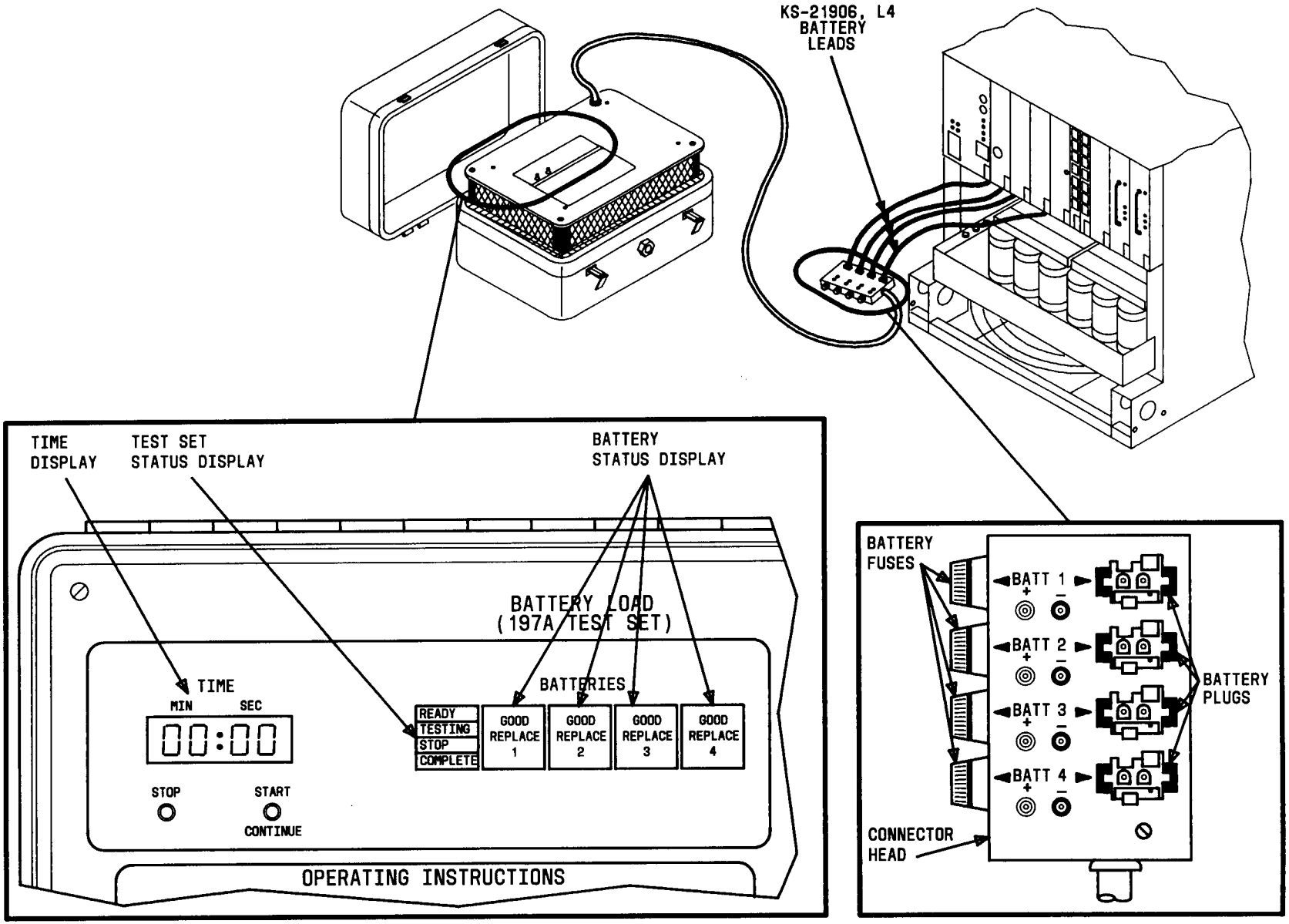


Fig. 1—197A Battery Load Test Set Test Connections

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 IN BATTERY SHELF OF FRAME-TYPE OR 80-TYPE CABINET RT

SUMMARY: Insert **337A BATTERY CHARGER** into slot on battery shelf and press **HIGH RATE CHG/ACTIVATE** button. Measure –42 to –56 Vdc at **LDU (-48B/GND)**. Unseat **BATTERY CHARGER**. Repeat for additional **BATTERY CHARGERs**.

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

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

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

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

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 **19.**
   If **NO,** then continue with Step **7.**

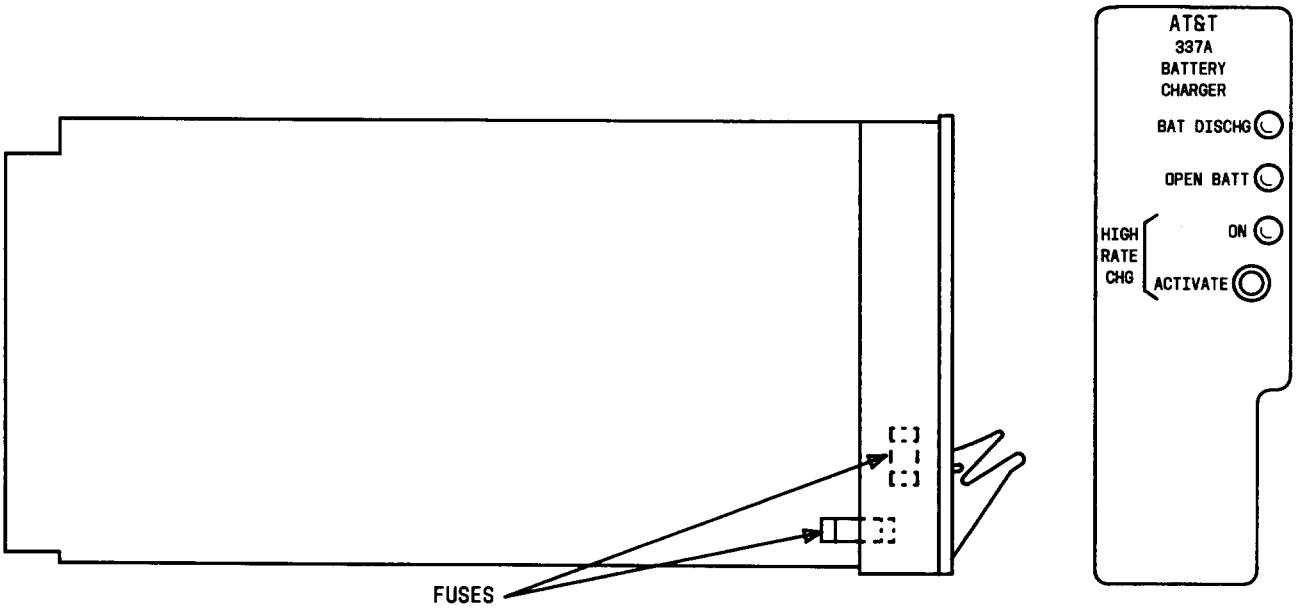


Fig. 1—Location of Fuses on 337A BATTERY CHARGER

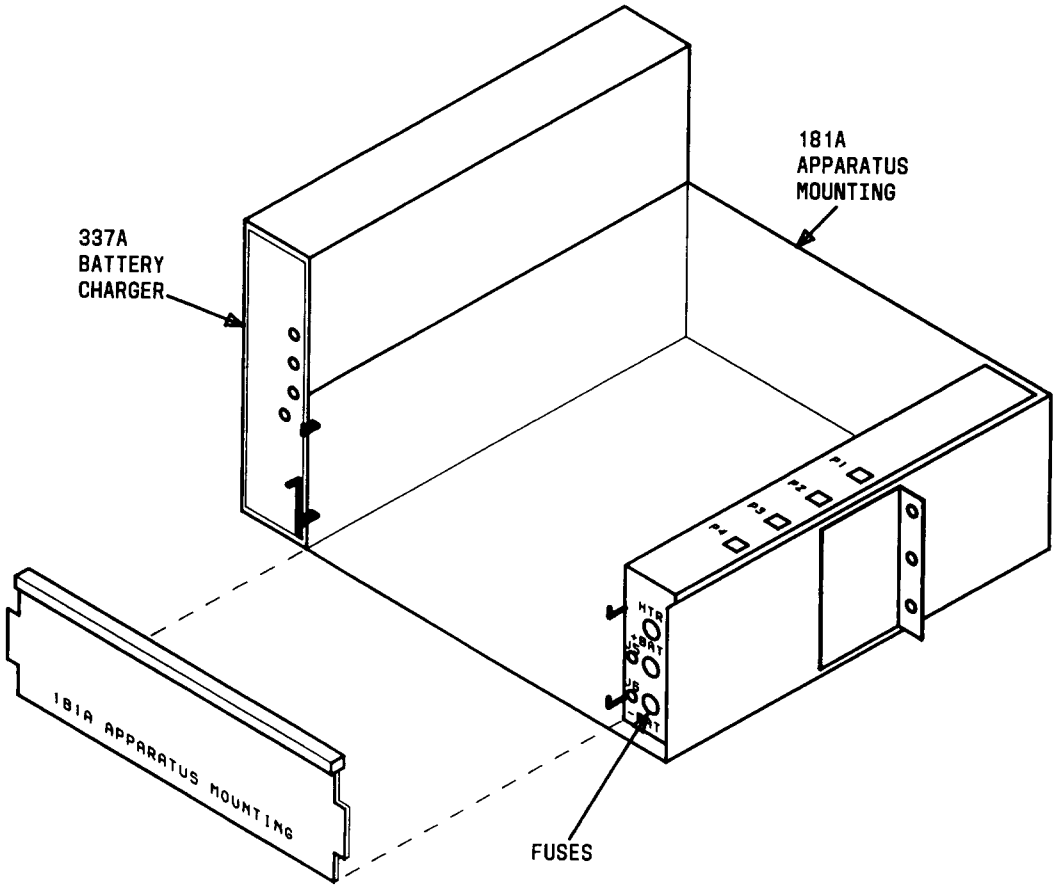


Fig. 2—Battery Shelf

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

8. Is wiring present and properly connected?

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

9. Repair or replace wiring and repeat from Step **5.**

10. Replace **337A BATTERY CHARGER.**

11. Connect DMM test leads to **GND** jack and **-48B** jack on **LDU.**

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

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

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

14. Replace **LDU**.

15. Connect DMM test leads to **GND** jack and **-48B** jack on **LDU**.

16. Does DMM indicate between -42 and -56 volts?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **17.**

17. Replace **LDU** with **LDU** removed previously.

18. Check wiring using SD-7C119-01. Repeat procedure from Step **5** after locating and correcting trouble.

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

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

    If **YES,** then continue with Step **21.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

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

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

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

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

24. Connect DMM test leads to **GND** jack and **-48B** jack on **LDU**.

25. Does DMM indicate between -42 and -56 volts?

    If **YES,** then proceed to Step **31.**
    If **NO,** then continue with Step **26.**

26. Replace **337A BATTERY CHARGER**.

27. Connect DMM test leads to **GND** jack and **-48B** jack on **LDU**.

28. Does DMM indicate between -42 and -56 volts?

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

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

30. Check wiring between battery shelf being equipped with **BATTERY CHARGER** and power shelf (refer to SD-7C119-01). Repeat procedure from Step **24** after locating and correcting trouble.

31. Disconnect DMM test leads.

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

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

If **YES,** then return to Step **21.**
If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

INSTALL 337A BATTERY CHARGER IN 51-TYPE (ED-7C601-30) CABINET RT

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

1. ***Note:*** The **BATTERY CHARGERs** 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) is to be installed in slot on left side of 181A apparatus mounting.

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

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

3. Is **BATTERY CHARGER** to be installed associated with battery string 1, 2, or 3?

   If **1,** then continue with Step **4.**
   If **2,** then proceed to Step **23.**
   If **3,** then proceed to Step **22.**

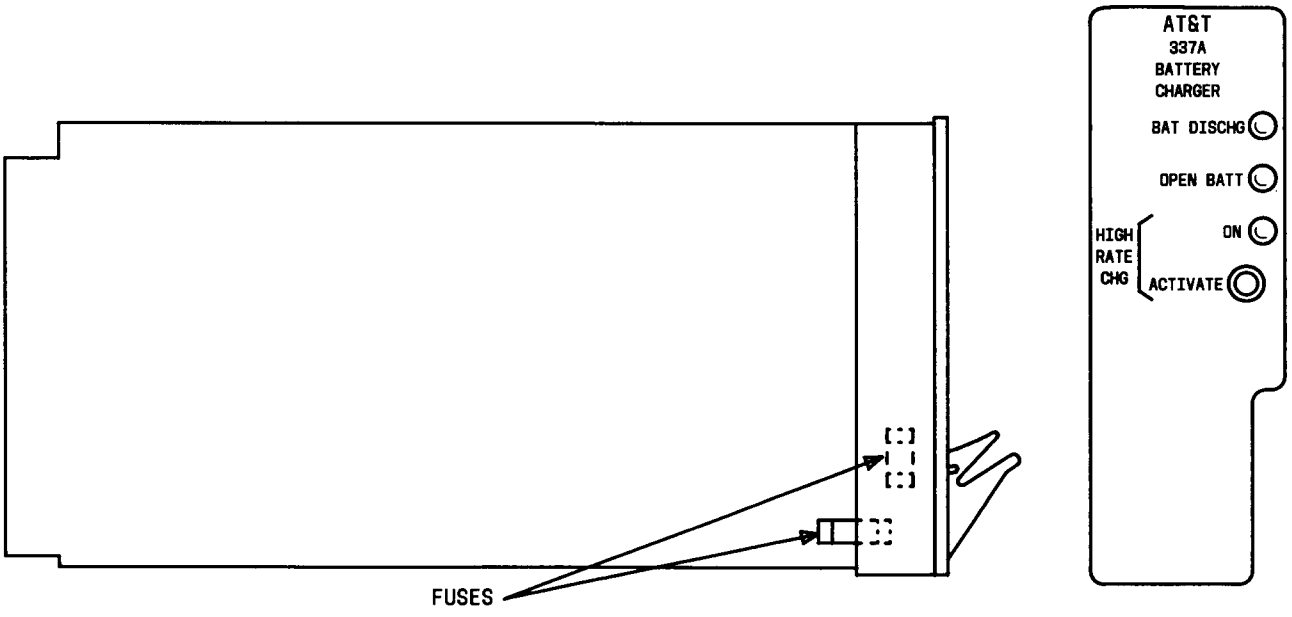


Fig. 1—Location of Fuses on 337A BATTERY CHARGER

4. Insert **BATTERY CHARGER** into first (counting left to right) **RECT/BATCHG** slot in power shelf and press **HIGH RATE CHG/ACTIVATE** button on **BATTERY CHARGER**.

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

5. Condition DMM to measure dc volts.

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

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 CHARGER** and **LDU** on power shelf using SD-7C119-01.

9. Is wiring connected properly?

   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 **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 **BATTERY CHARGER** with **BATTERY CHARGER** 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 on power shelf using SD-7C119-01. Repeat procedure from Step **6** after locating and correcting trouble.

20. Unseat **BATTERY CHARGER**.

21. Is another **BATTERY CHARGER** to be installed?

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

22. Insert **BATTERY CHARGER** into slot located on left side of battery shelf and press **HIGH RATE CHG/ACTIVATE** button on **BATTERY CHARGER**.

    Response: **BAT DISCHG** indicator on **BATTERY CHARGER** is lighted

    Proceed to Step **24.**

23. Insert **BATTERY CHARGER** into second (counting left to right) **RECT/BATCHG** slot in power shelf and press **HIGH RATE CHG/ACTIVATE** button on **BATTERY CHARGER**.

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

24. Connect DMM test leads to **GND** jack and **-48B** jack on **LDU**.

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

    If **YES,** then proceed to Step **31.**
    If **NO,** then continue with Step **26.**

26. Replace **BATTERY CHARGER**.

27. Connect DMM test leads to **GND** jack and **-48B** jack on **LDU**.

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

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

29. Replace **BATTERY CHARGER** with **BATTERY CHARGER** unit removed previously.

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

31. Unseat **BATTERY CHARGER**.

32. Is another **BATTERY CHARGER** to be installed?

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

INSTALL 336A RECTIFIERS IN POWER SHELF

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

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

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

2. ***Note:*** All **BATTERY CHARGERs** must be unseated throughout this procedure.

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

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

4. Condition DMM to measure dc volts.

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

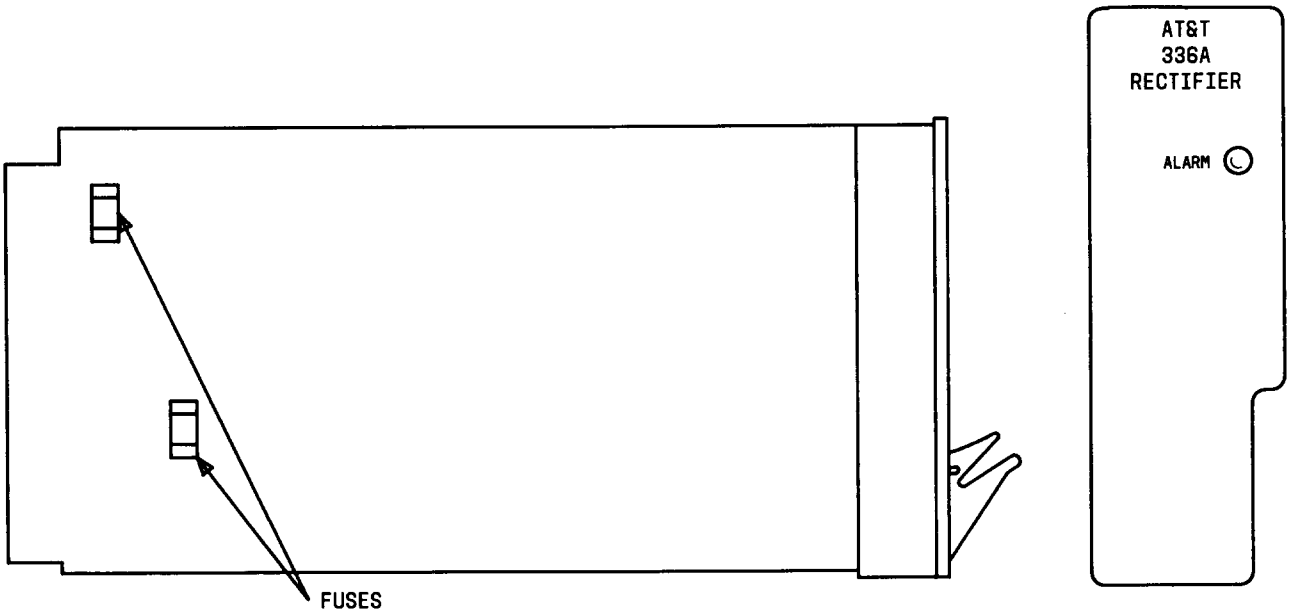


Fig. 1—Location of Fuse on 336A RECTIFIER

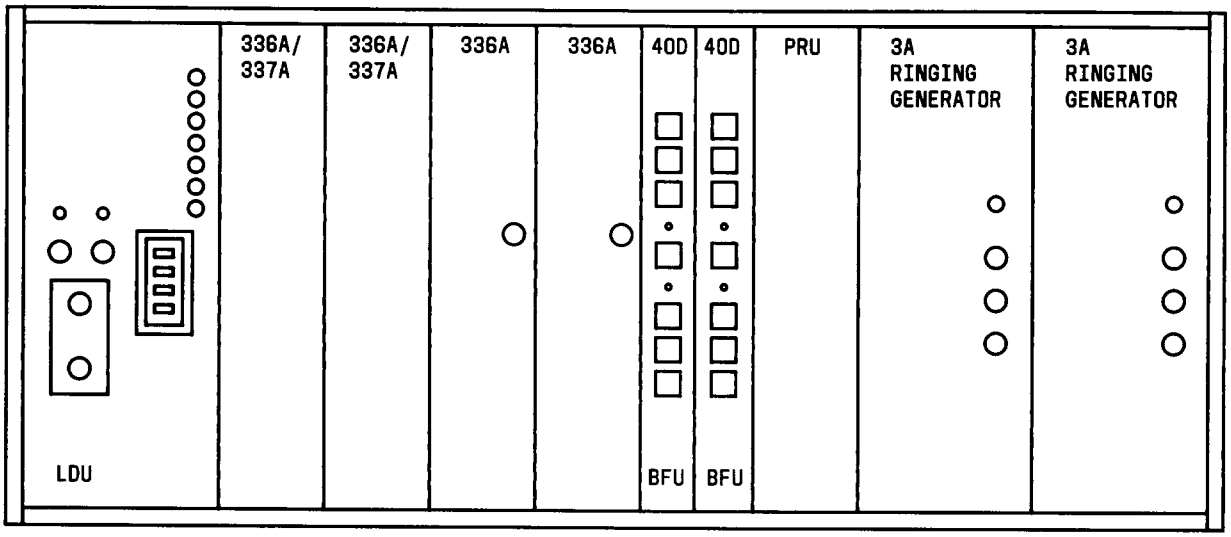


Fig. 2—Power Shelf

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 Vdc 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 RECTIFIERs** 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 CHARGERs** and **ALARM** indicators on **336A RECTIFIERs** go off and **HIGH RATE CHG/ON** indicators on all **BATTERY CHARGERs** 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 CHARGERs** 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 3A OR 3C RINGING GENERATORS IN POWER SHELF

SUMMARY: Insert Main **RINGING GENERATOR** into left **RING GEN** slot in power shelf. Measure 90 to 110 Vac and -50 to -60 Vdc 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 **3A or 3C RINGING GENERATOR**s and inspect for possible physical damage.

2. ***Warning: Damage to RINGING GENERATOR and shelf connector may occur if RINGING GENERATOR is forced into position.***

   Insert one **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 40D BFU (BANK FUSE UNIT) IN POWER SHELF

SUMMARY: Measure –42 to –56 Vdc at **LDU** (**-48L/GND**). Verify presence of fuses in **BFU**(s) and install **BFU**(s) into power shelf.

1. Condition DMM (digital multimeter) to measure dc volts.

2. Connect DMM test leads to **GND** jack and **-48L** jack on **LDU**.

3. Is –42 to –56 volts present?

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

4. Connect DMM test leads to **GND** jack and **-48B** jack on **LDU**.

5. Is –42 to –56 volts present?

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

6. Replace **LDU** and repeat from Step **2.**

7. Verify that ac power circuit breaker is on and check ac wiring using SD-7C119-01. Repeat procedure from Step **2** after locating and correcting trouble.

8. Is power shelf located in ED-7C601-30 (51-Type) cabinet?

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

9. Is power shelf supplying power to two dual bank assemblies or one dual bank assembly and a DDM-1000 Multiplexer (80D cabinet)?

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

10. Get one **40D BFU** (Figure 1) and proceed to Step **12.**

11. Get two **40D BFU**s (Figure 1).

12. ***Note:*** If fuse holder does not contain a fuse or contains incorrect value fuse, install fuse of correct value.

    Verify that fuse holders on faceplate of **40D BFU**(s) contain correct value fuses (TABLE A).

TABLE A 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 Multiplexer.			

13. Remove DMM test leads and insert **40D BFU** into left **BFU** slot in power shelf.

14. ***Note:*** Each fuse bead except the yellow fuse beads will pop out when the fuse blows.

    Do any fuses on **BFU** blow?

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

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

16. ***Note:*** Each fuse bead except the yellow fuse beads will pop out when the fuse blows.

    Do any fuses on **BFU** blow?

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

17. Check wiring using SD-7C119-01. Repeat procedure from Step **15** after locating and correcting trouble.

18. Is a second **BFU** to be installed at this time?

    If **YES,** then continue with Step **19.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

19. Insert second **BFU** into vacant **BFU** slot in power shelf.

20. ***Note:*** Each fuse bead except the yellow fuse beads will pop out when the fuse blows.

    Do any fuses on **BFU** blow?

    If **YES,** then continue with Step **21.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

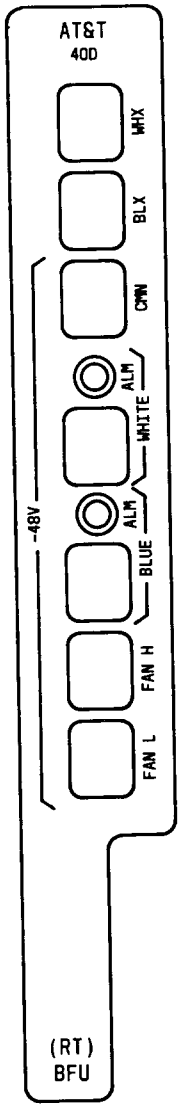


Fig. 1—40D Bank Fuse Unit

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

22. ***Note:*** Each fuse bead except the yellow fuse beads will pop out when the fuse blows.

    Do any fuses on **BFU** blow?

    If **YES,** then continue with Step **23.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

23. Check wiring using SD-7C119-01. Repeat procedure from Step **21** after locating and correcting trouble.

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 Vdc 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.

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

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

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.

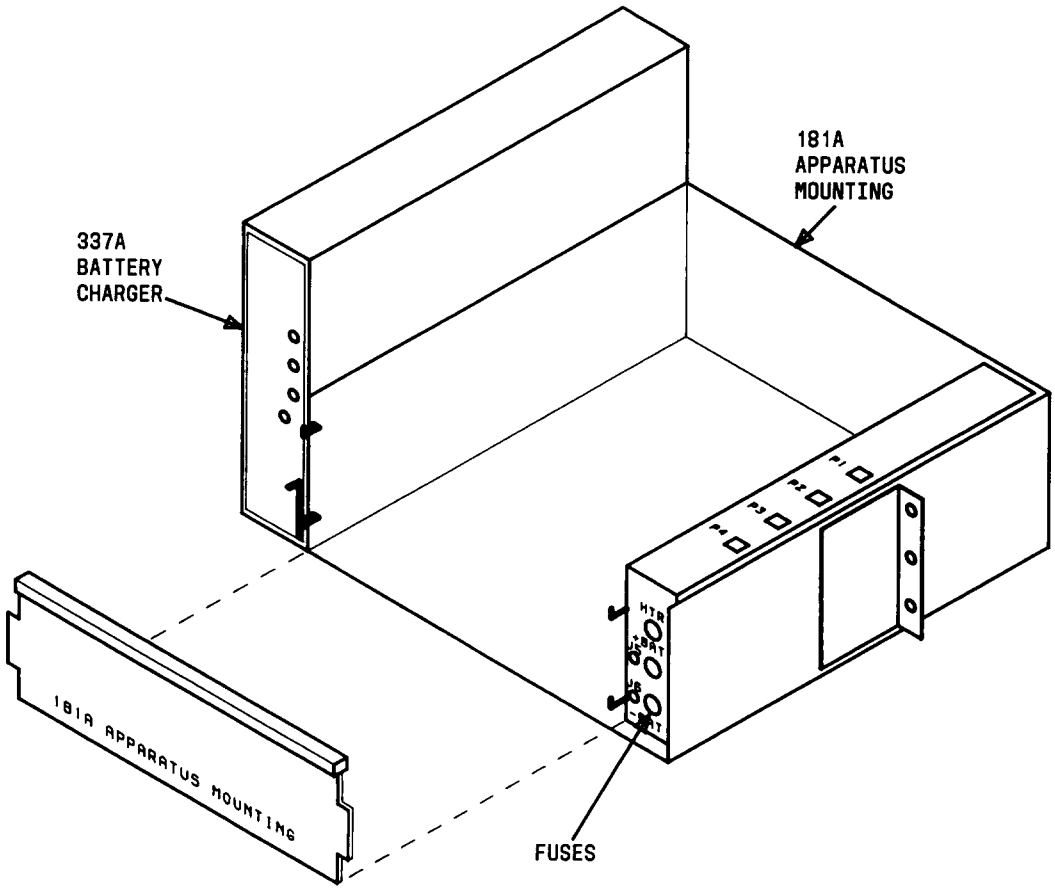


Fig. 1—Battery Shelf

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 battery pack.

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

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 been replaced?

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

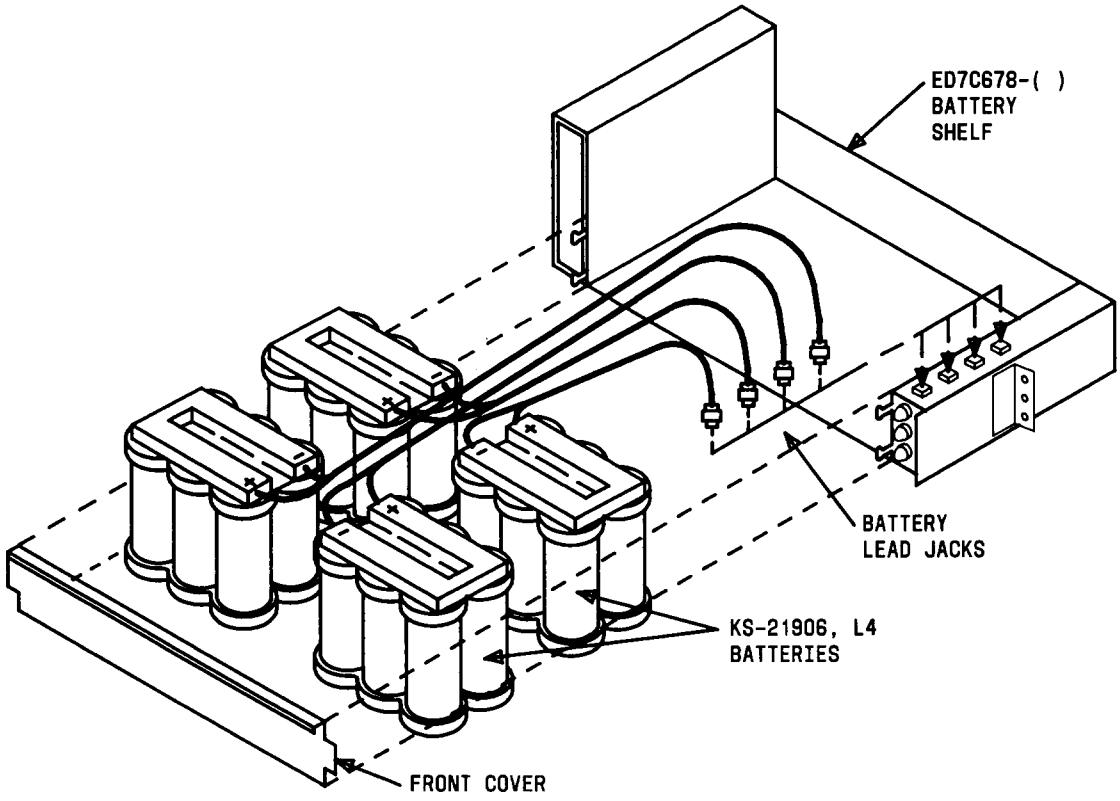


Fig. 2—Battery Placement and Connections

17. Check wiring and connectors on battery shelf. Repeat procedure from Step **9** after locating and correcting trouble.

18. ***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 **14.**

19. Have all equipped battery shelves been tested?

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

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

21. Remove DMM. Install good fuses (25-Amp) into **+BAT** and **-BAT** fuse holders of all battery shelves equipped with batteries.

22. Install good 5-Amp fuse into **HTR** (heater) fuse holder(s) of all battery shelves equipped with batteries (Figure 1).

23. 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 Vdc at control box assembly (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 control box assembly (Figure 1), remove fuses **F3, F4,** and **F6.**

6. ***Note:*** The four plugs supplied to upper two battery shelves 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. On control box assembly connect DMM test leads to + **BAT TEST** jack **J3** and - **BAT TEST** jack **J4** of **UPPER** battery string.

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.

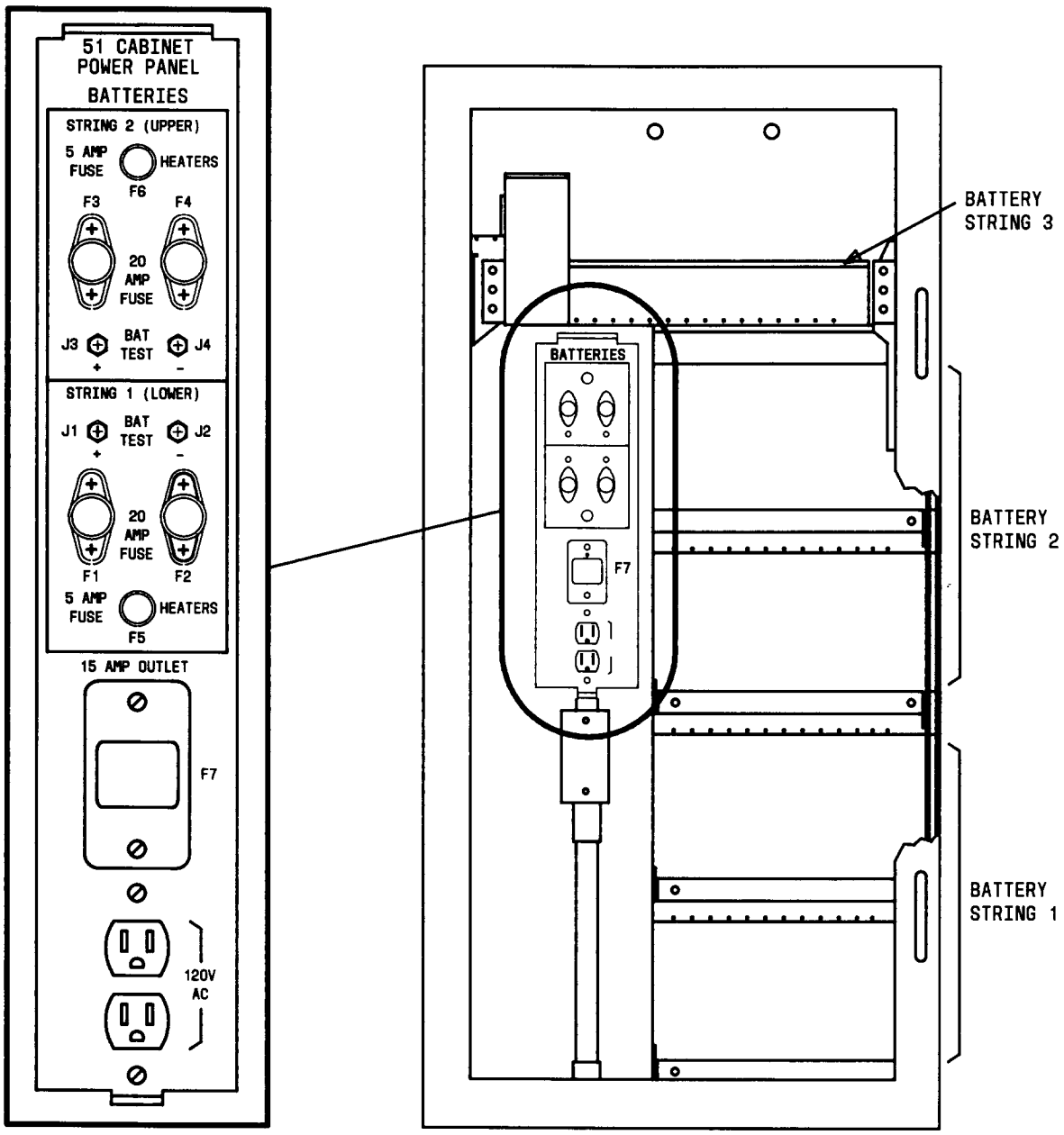


Fig. 1—Battery Section of 51A Cabinet Showing Control Box Assembly

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. On control box assembly connect DMM test leads to **+BAT TEST** jack **J3** and **-BAT TEST** jack **J4** of **UPPER** battery string.

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 **F3**, **F4**, and **F6** in control box assembly.

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

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

23. ***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.

24. Reinstall front cover on battery shelf.

25. Remove fuses, if present, from **+BAT** and **-BAT** fuse holders 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**).

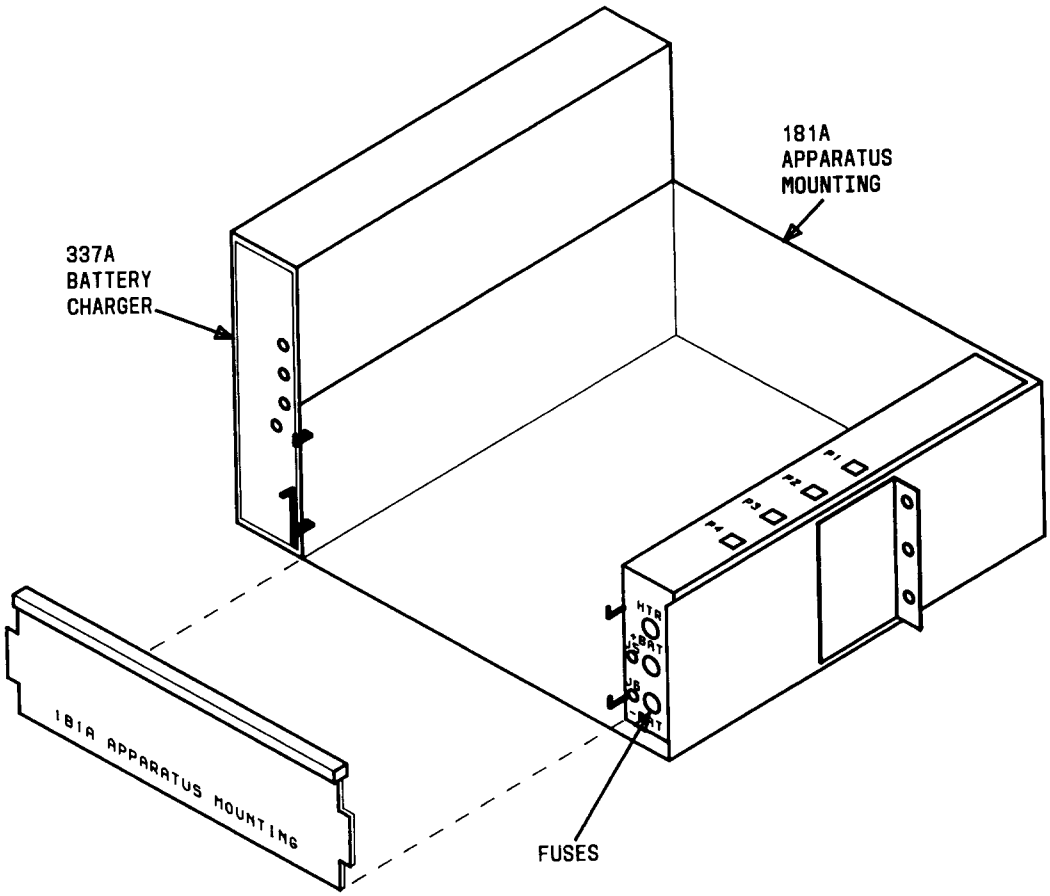


Fig. 2—Battery Shelf

28. Does meter indicate greater than 45.0 volts dc?

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

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.**

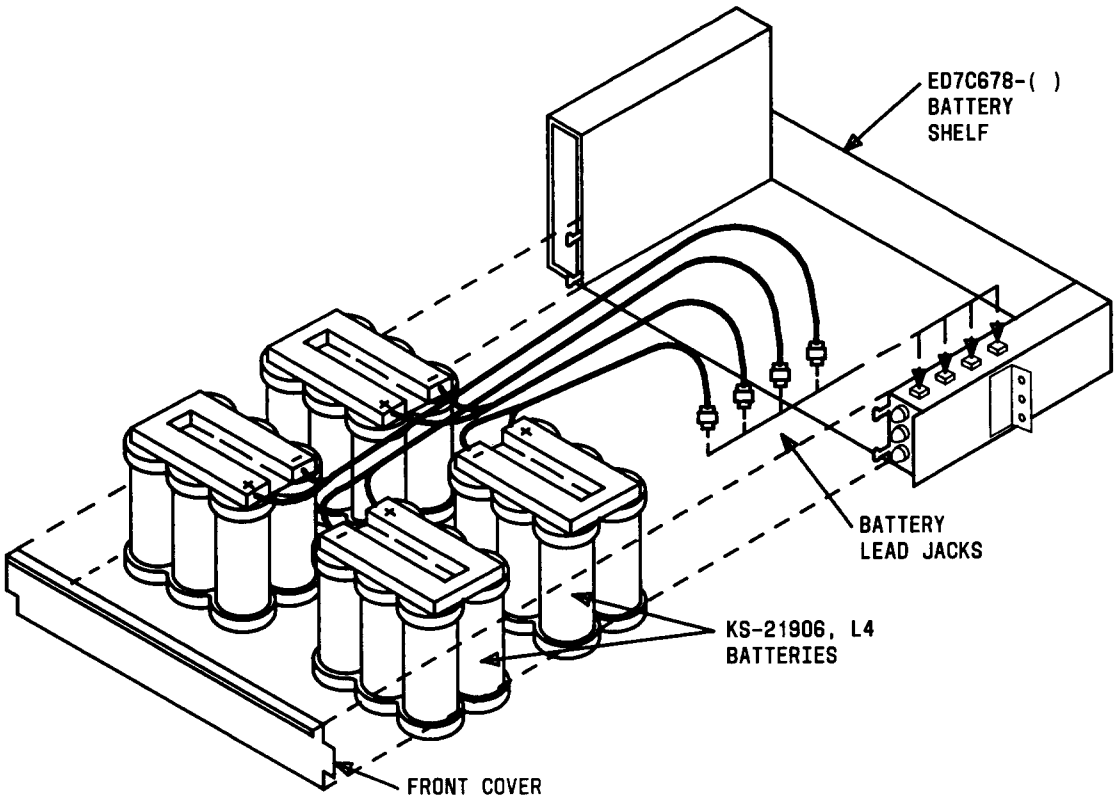


Fig. 3—Battery Placement and Connections

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

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

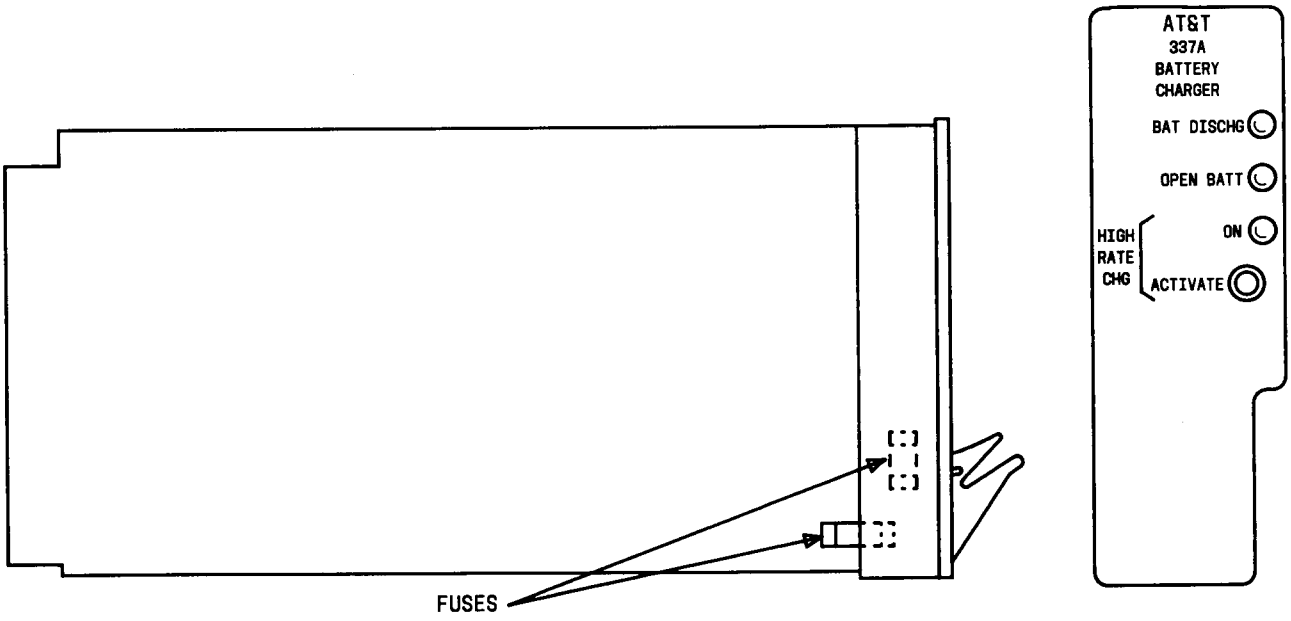


Fig. 1—Location of Fuses on 337A BATTERY CHARGER

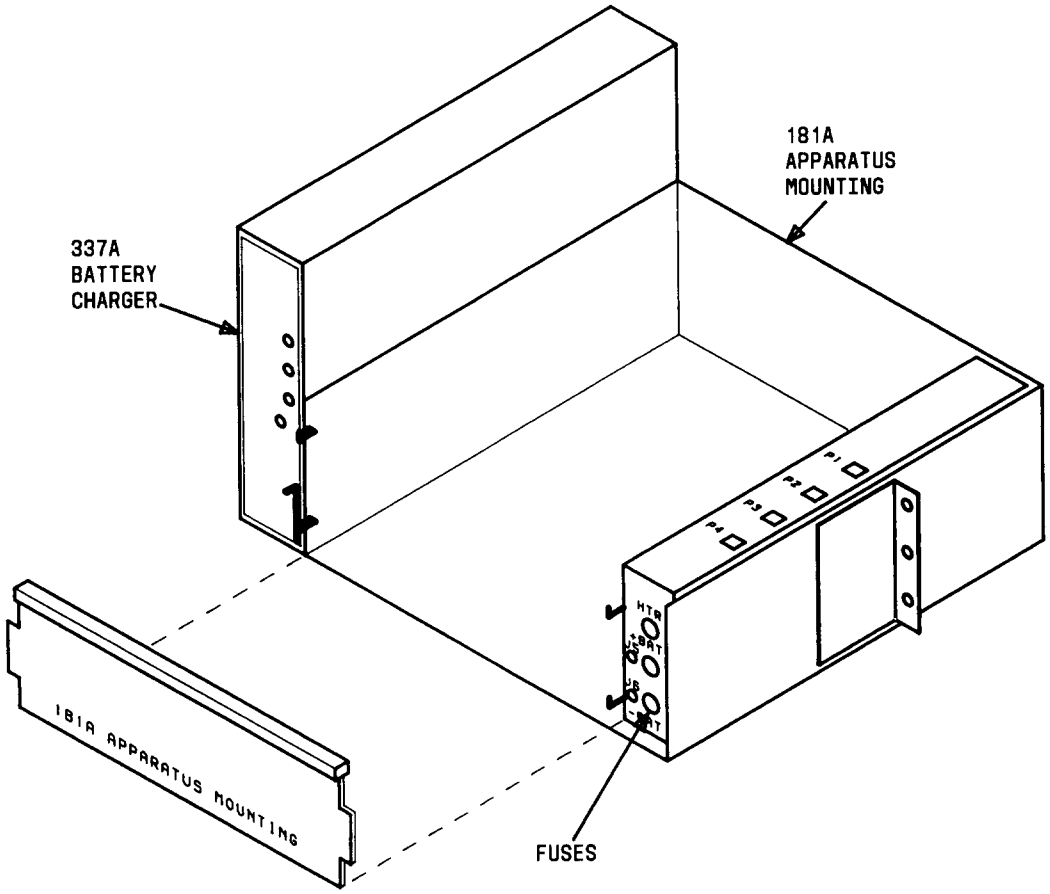


Fig. 2—Battery Shelf

ADD 337A BATTERY CHARGERS TO EXISTING 51-TYPE CABINET

1. *Note:* 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) is to be installed in slot on left side of 181A apparatus mounting.

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

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

3. Is **BATTERY CHARGER** to be installed associated with battery string 2?

   If **YES,** then continue with Step **4.**
   If **NO,** then proceed to Step **6.**

4. Insert **BATTERY CHARGER** into first (counting left to right) vacant **RECT/BATCHG** slot in power shelf and press **HIGH RATE CHG/ACTIVATE** button on **BATTERY CHARGER.**

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

5. Is another **BATTERY CHARGER** to be installed?

   If **YES,** then continue with Step **6.**
   If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

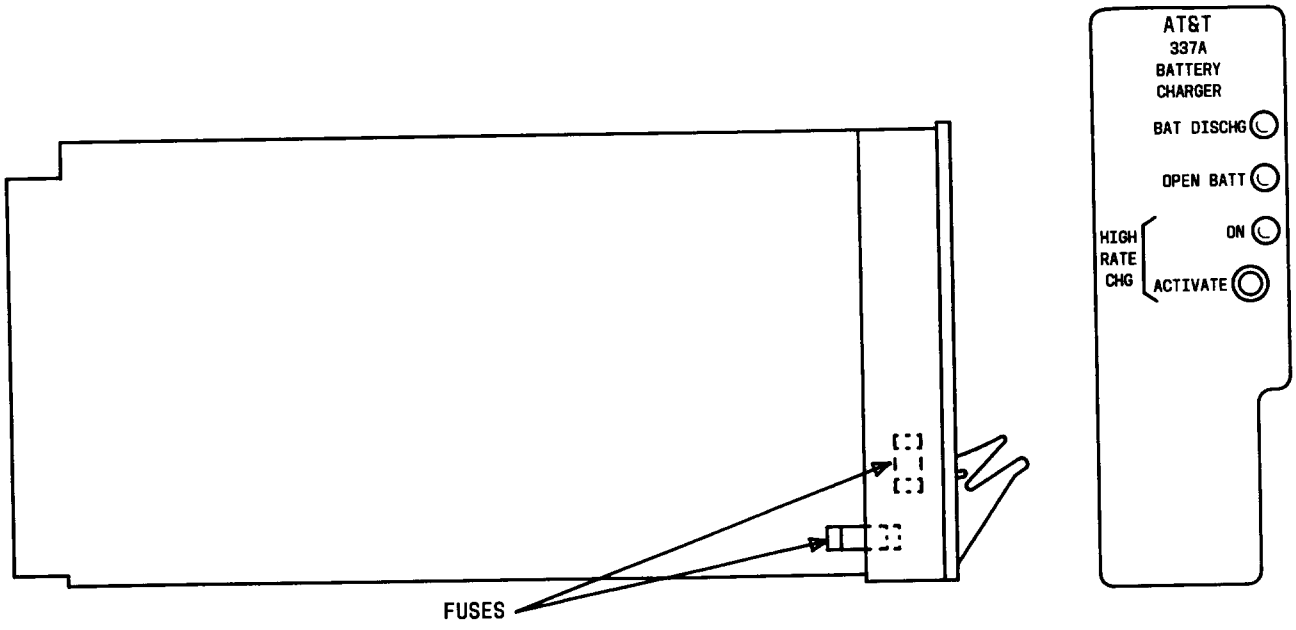


Fig. 1—Location of Fuses on 337A BATTERY CHARGER

6. Insert **BATTERY CHARGER** into slot located on left side of battery shelf and press **HIGH RATE CHG/ACTIVATE** button on **BATTERY CHARGER**.

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

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

ADD 336A POWER UNITS (RECTIFIERS) TO EXISTING SYSTEM

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 return to Step **3.**
   If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

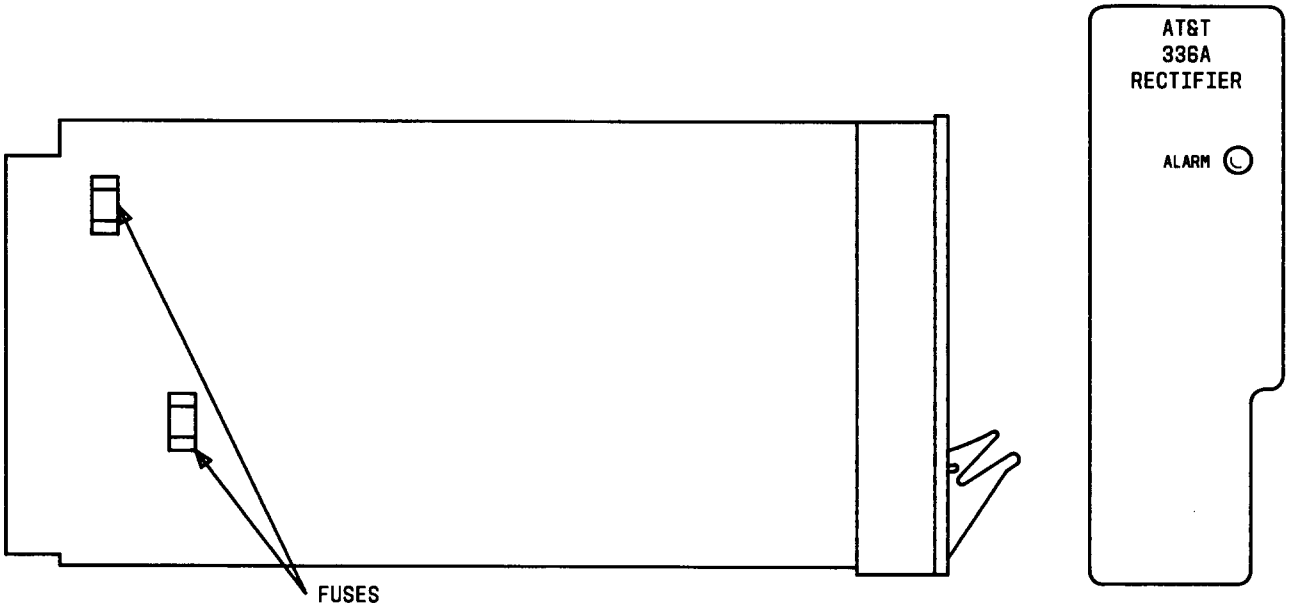


Fig. 1—Location of Fuse on 336A RECTIFIER

INSTALL SECOND 40D BFU (BANK FUSE UNIT) IN POWER SHELF

1. Get one **40D BFU** (Figure 1).

2. Verify that fuse holders on faceplate of **40D BFU** contain correct value fuses (Table A) and that fuses are not blown.

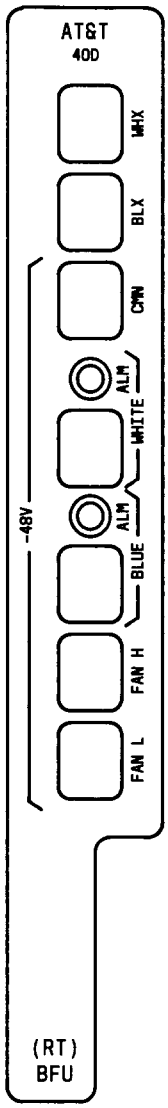


Fig. 1—40D Bank Fuse Unit

TABLE A
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 Multiplexer.

3. Insert **40D BFU** into vacant **BFU** slot in power shelf.

4. Do any fuses in **BFU** blow?

   If **YES,** then continue with Step **5.**
   If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5. Replace blown fuse(s) in **BFU.**

6. Do any fuses in **BFU** blow again?

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

7. Check wiring using SD-7C119-01. Repeat procedure from Step **3** after locating and correcting trouble.

VERIFY THAT CORRECT COMPLEMENT OF CIRCUIT PACKS IS AVAILABLE

1. ***Note:*** If an INA-RT bank is being installed in a dual channel bank assembly with another bank that has been installed with Feature Package C or D, obtain only the packs needed for the "second" bank (AB and CD shelves).

   Refer to TABLE A to determine the required number of circuit packs required for the shelves or banks to be equipped.

2. Are all required circuit packs available?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then continue with Step 3.

3. Obtain missing circuit packs through appropriate channels.

TABLE A
***SLC* SERIES 5 CARRIER SYSTEM RT CIRCUIT PACKS FOR INA-RT**

CIRCUIT PACKS	QUANTITY FOR SHELF BEING EQUIPPED				
	ALL SHELVES	FIRST A-B SHELF	EITHER C-D SHELF	SECOND A-B SHELF	MODE
PCU (AUA11B)	5	2	1	1	Mode I and Mode III
FCU (AUA24)	2	1	—	1	
CFU (39E)	2	1	—	1	
LFU (39F)*	1	1	—	—	
DTU (AUA18, AUA19)†	1	1	—	—	
TRU (AUA21)	4	1	1	1	
CTU (AUB22, AUB25)‡	1	1	—	—	
ADU (AUB27)	2	1	—	1	
BCU (MC97769A1)	2	1	—	1	
3A/(3C) Ringing Generator	2	2	—	—	
336A Power Unit§	2	2	—	—	
337A Battery Charger§	¶	¶	¶	¶	
LDU (ED7C613-30)§	1	1	—	—	
RSU (AUG2)**	1	1	—	—	
LIU (AUA61C, AUA62C AUA64C)	8	2	2	2	Mode I
LIU (AUA61C, AUA62C AUA64C)	4	1	1	1	Mode III
TCU (AUA71)	4	1	1	1	

* The LFU is not required when the RT is used with a multiplexer other than a DDM-1000 multiplexer.

† Required for digital testing of special services.

‡ The AUB22 should be used unless the INA-RT shares a dual channel bank with a second bank equipped with FPC or FPD. The AUB25 is used in split bank configurations.

§ Required when J1C182BA power shelf is used.

¶ Requires one per battery shelf.

**Required when J1C182BB power shelf is used.

INSTALL 39E CFU (CHANNEL FUSE UNIT)

1. Get **39E CFU** (Figure 1) and inspect for possible damage.

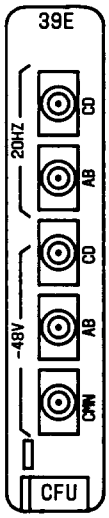


Fig. 1—Channel Fuse Unit

2. Verify per TABLE A that fuse holders on faceplate of **CFU** contain correct value fuses (e.g., fuse bead color should match color dot located above fuse holder) 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.

TABLE A
CFU FUSES

FUSE DESIGNATION	BEAD COLOR	SIZE	CODE
20 HZ - A/B	RED	½A	80B
20 HZ - C/D	RED	½A	80B
–48V - A/B	BLUE	3A	80C
–48V - C/D	BLUE	3A	80C
–48V - CMN	BLUE	3A	80C

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 or SD-7C117-02 and SD-7C118-01.

6. Is wiring correct?

   If **YES,** then get another **CFU** and return to Step **2.**
   If **NO,** then continue with Step **7.**

7. Repair wiring and use **WECO 553A** Extractor Tool (Techni-Tool No. 594TE170) or **WECO 319B** (KS-6305) Extractor Tool (Techni-Tool No. 490PL020) to remove blown fuse(s).

INSTALL 39F LFU (LINE FUSE UNIT) IN RT FACILITY SHELF

1. Get one **39F LFU** (Figure 1) and inspect for possible damage.

2. Verify that each fuse holder on faceplate of **LFU** contains 80C (3.0A) fuse (blue bead on fuse should match color dot located above fuse holder) 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. 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 or SD-7C117-02 and SD-7C118-01.

6. Is wiring correct?

   If **YES,** then get another **LFU** and return to Step **2.**
   If **NO,** then continue with Step **7.**

7. Repair wiring and replace blown fuses in **LFU.**

STOP. YOU HAVE COMPLETED THIS PROCEDURE

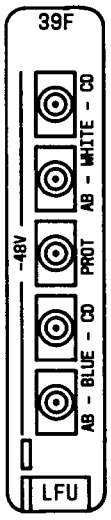


Fig. 1—Line Fuse Unit

INSTALL AND TEST PCU (POWER CONVERTER UNIT) IN FACILITY SHELF

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

1. Get one **PCU** (**AUA11** or **AUA11B**) 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 **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 return 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 or SD-7C117-02. 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 or SD-7C117-02 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 ADU (ALARM DISPLAY UNIT)

1. Get one **AUB27 ADU** and inspect for possible damage.

2. On **ADU** option switch **S1** (Figure 1), use an orange stick (KS-6320, L1) or equivalent and depress switch position **1** toward **NPL**, switch position **3** toward **ABP**, switch position **4** toward **CDP**, switch position **5** toward **ABU**, and switch position **6** toward **CDU**.

3. On **ADU** option switch **S3** (Figure 1), depress the switch position toward **NDL**.

4. On the **ADU CLEAR/NORM** option plug, verify that the jumper connection is in the **NORM** position (top and center holes).

5. ***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.

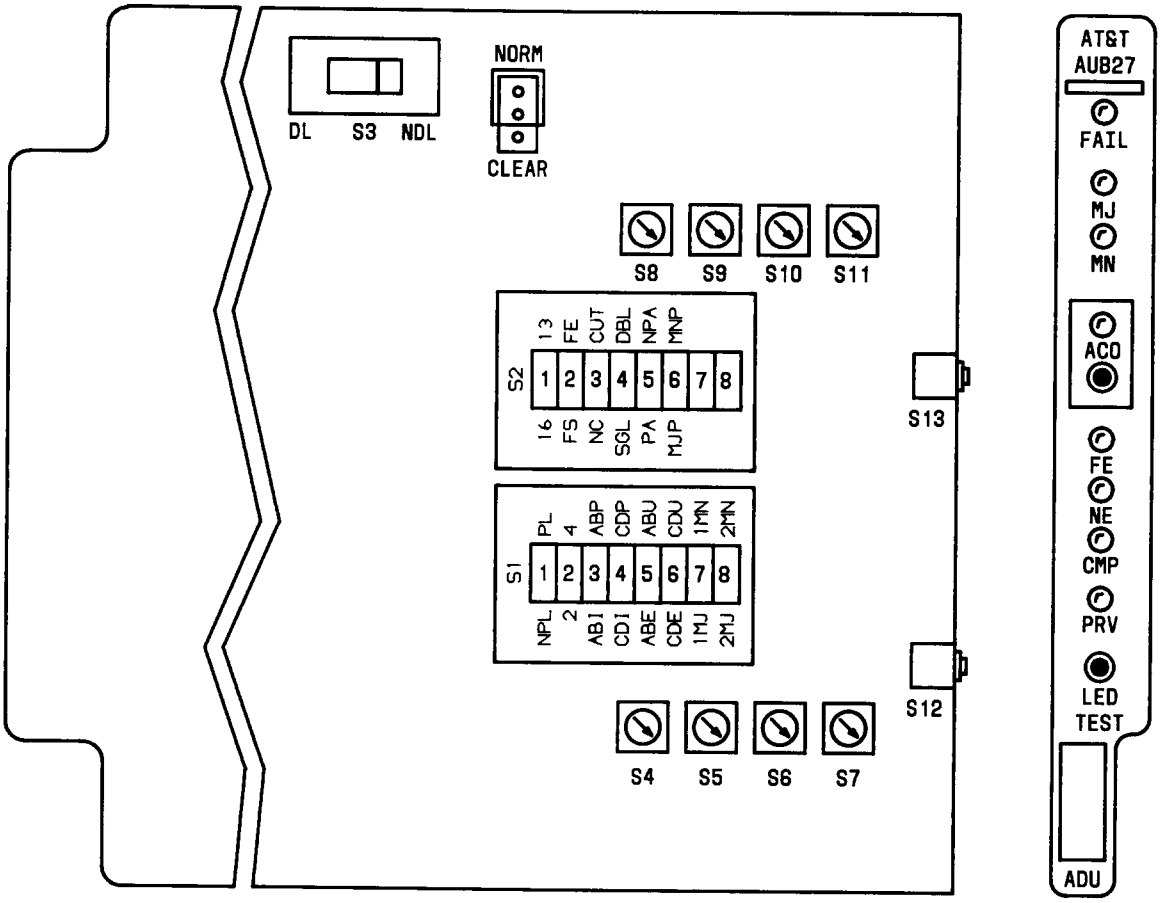


Fig. 1—AUB27 RT ADU Option Switch Settings

INSTALL BCU (BANK CONTROL UNIT)

1. Get one **MC97769A1** (Figure 1) and inspect for possible damage.

2. Insert **BCU** into lower **BCU** slot if equipping blue bank or upper **BCU** slot if equipping white bank.

   Response: **FAIL** indicator on **BCU** and **FAIL**, **MN**, and **NE** indicators on **ADU** light momentarily and then go out. **FAIL** indicator on **CTU** and **DTU** will light momentarily if installed.

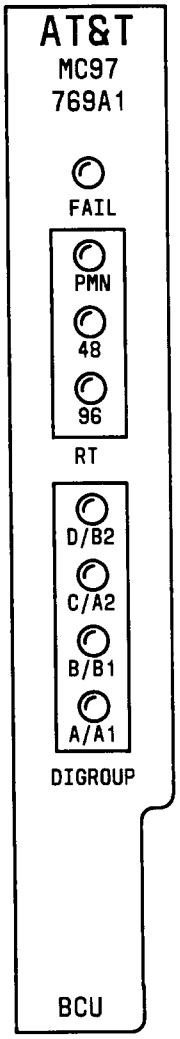


Fig. 1—INA-RT BCU Faceplate

3. Do **FAIL** indicators on **BCU** and **ADU** go off after approximately 15 seconds?

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

4. Clear the provisioning memory.

   Are any special service channel units installed?

   If **YES**, then proceed to **DLP-556**.
   If **NO**, then proceed to **DLP-555**.

5. Is **BCU FAIL** indicator off?

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

6. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

   Replace **ADU.**

   Reference: **DLP-534**

7. Does **FAIL** indicators on **BCU** and **ADU** go off after approximately 15 seconds?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then continue with Step **8.**

8. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

   Replace **ADU** with **ADU** removed previously.

9. Replace **BCU.**

10. Does **FAIL** indicator on **BCU** and **ADU** go off after approximately 15 seconds?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **11.**

11. Replace **BCU** with **BCU** removed previously.

12. Check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **2** after locating and correcting trouble.

13. Replace **BCU.**

14. Does **FAIL** indicators on **BCU** and **ADU** go off after approximately 15 seconds?

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

15. Replace **BCU** with one removed previously.

16. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU**.

    Reference: **DLP-534**

17. Does **FAIL** indicators on **BCU** and **ADU** go off after approximately 15 seconds?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **18.**

18. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously and check wiring using SD-7C117-01 or SD-7C117-02. If the **CMP** alarm is lighted at this time, options switches are improperly set on the **ADU**. Repeat procedure from Step **2** after locating and correcting trouble.

INSTALL EQUIPPED OPTION IN ADU

SUMMARY: Remove **ADU** and enable shelf groups AB and/or CD. Reinstall **ADU** and verify that correct indicators are lighted.

1. ***Caution: Incorrect ADU option switch settings can cause service interruptions.***

   Remove **ADU AUB27** from bank being equipped.

2. Are both AB and CD shelf groups being equipped?

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

3. ***Note:*** Switch **S1** position **1** (NPL/PL) and switch **S3** (NDL/DL) on **ADU** should not be changed from current settings during this procedure.

   On **ADU (AUB27)** option switch **S1** (Figure 1), use an orange stick (KS-6320, L1) or equivalent to depress switch position **5** toward **ABE** and switch position **6** toward **CDE** and proceed to Step **5.**

4. ***Note:*** Switch **S1** position **1** and switch **S3** on **ADU** should not be moved during this procedure.

   On **ADU** option switch **S1** (Figure 1), use an orange stick (KS-6320,L1) or equivalent to set appropriate switch position (either **5** to **ABE** for AB digroups or **6** to **CDE** for CD digroups) to place shelf group being equipped in equipped state and proceed to Step **5.**

5. On **ADU** option switch **S2** (Figure 1), use an orange stick (KS-6320,L1) or equivalent to set switch position **2** to **FS** or **FE** according to the digital framing format to be used.

6. On **ADU** option switch **S2** (Figure 1), use an orange stick (KS-6320,L1) or equivalent to set switch position **4** to **DBL** (Double) if both even and odd channels of dual channel units are used or **SGL** (Single) if only the odd channels of dual channel units are used.

   Note: This applies to Mode III INA-RT, only.

7. On **ADU** option switch **S2** (Figure 1), use an orange stick (KS-6320,L1) or equivalent to set switch position **5** to **NPA** for power-minor backplane alarm only or **PA** for an integrated power alarm ("Integrated" meaning that the power minor alarm is transferred into either the major or minor alarm closure).

8. Was the integrated power alarm mode activated in Step **7** (Switch **S2** position **5** to **PA**)?

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

9. On **ADU** option switch **S2** (Figure 1), use an orange stick (KS-6320,L1) or equivalent to set switch position **6** to **MJP** if the power alarm will activate a major alarm closure or **MNP** if the power alarm will activate a minor alarm closure.

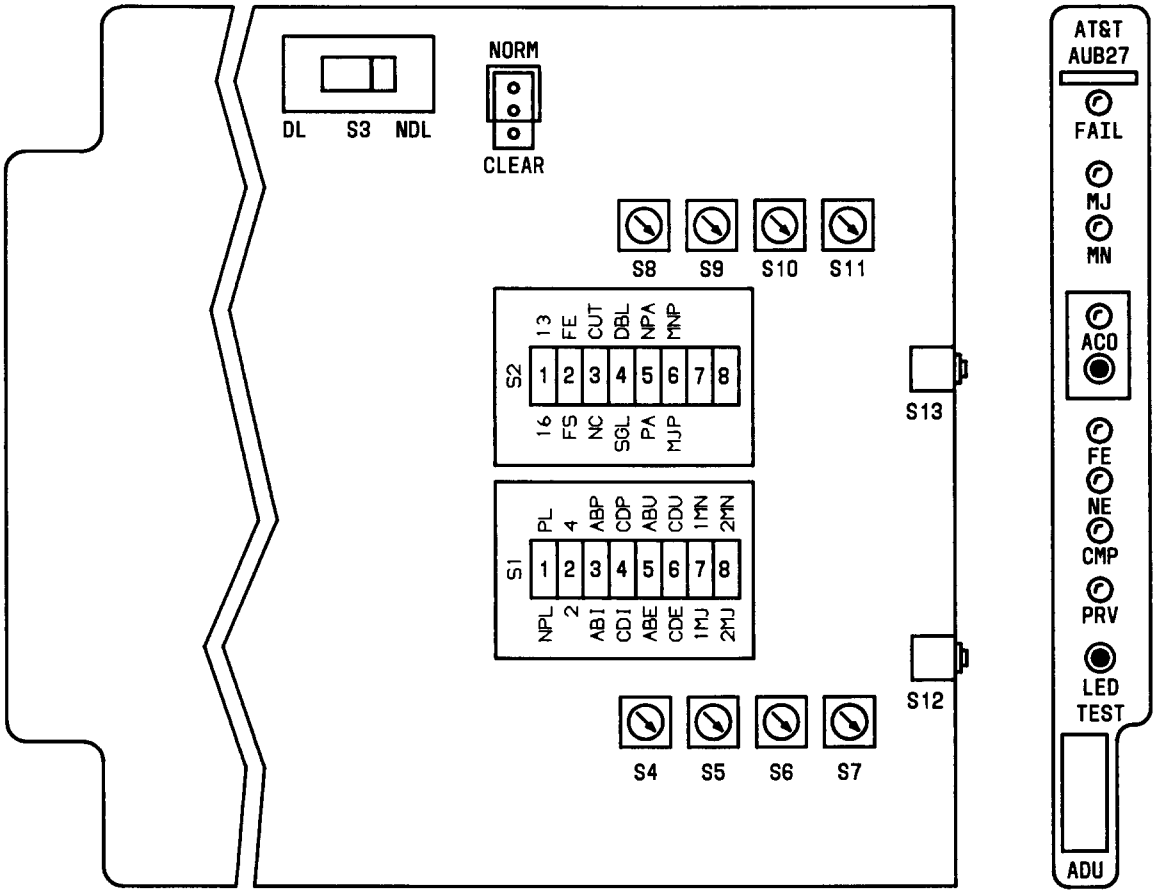


Fig. 1—AUB27 RT ADU Option Switch Settings

10. On **ADU** option switch **S1** (Figure 1), use an orange stick (KS-6320,L1) or equivalent to set switch position **2** to **4** for Mode I INA-RT operation or to **2** for Mode III INA-RT operation.

11. ***Note:*** The usage of the bank identification switches (**S4** through **S11**) depends on the operating mode of the bank. In INA-RT Mode I, if the two sets of switches agree, then the bank is assumed to be a single 96 channel bank. If the two sets of switches disagree, then the bank is assumed to be two distinct 48 channel banks (**S4** through **S7** identify the ABshelf, **S8** through **S11** identify the CD shelf). In INA-RT Mode III, the system can only be a 48 channel system, therefore, only the lower set of switches (**S4** through **S7**) is used to identify the bank (**S8** through **S11** are ignored).

    Set the Bank ID switches (**S4** through **S11**). The bank identification number should be entered from left (*S4* and **S8**) to right (**S7** and **S11**).

12. Has a **CTU** and/or **DTU** already been installed in the dual bank assembly?

    If **YES**, then continue with Step **13**.
    If **NO**, then proceed to Step **22**.

13. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Reinstall **ADU** into **ADU** slot.

14. After approximately 15 seconds, are **MJ** and **NE** indicators on the ADU lighted? Are **A/A1 - B/B1** and/or **C/A2 - D/B2** DIGROUP indicators on the BCU lighted?

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

15. Replace **BCU**. After approximately 15 seconds, are **MJ** and **NE** indicators on the ADU lighted? Are **A/A1 - B/B1** and/or **C/A2 - D/B2 DIGROUP** indicators on the BCU lighted (depending on which digroups are in the preservice and equipped state)?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **16.**

16. Replace **BCU** with **BCU** removed previously.

17. Remove **ADU** and check settings of switches per work order and Steps **2** through **11**.

18. Are switch settings on option switch correct?

    If **YES,** then continue with Step **19**.
    If **NO,** then proceed to Step **21**.

19. Get another **ADU** and use an orange stick (KS-6320, L1) or equivalent to set option switches according to **DLP-534** and Steps **2 - 11** in this procedure.

20. ***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 **ADU** slot in bank being equipped.

    Response: After approximately 15 seconds, **MJ** and **NE** indicators on the ADU are lighted? Are **A/A1 - B/B1** and/or **C/A2 - D/B2 DIGROUP** indicators on the BCU lighted (depending on which digroups are in the preservice and equipped state).

    STOP. YOU HAVE COMPLETED THIS PROCEDURE.

21. Set switches on option switch to correct position and repeat from Step **13.**

22. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Reinstall **ADU** into **ADU** slot.

23. After approximately 15 seconds, are **FAIL, MN,** and **NE** indicators on **ADU** lighted?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **24.**

24. Replace **BCU.**

25. After approximately 15 seconds, are **FAIL, MN,** and **NE** indicators on **ADU** lighted?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **26.**

26. Replace **BCU** with **BCU** removed previously.

27. Remove **ADU** and check settings of option switches per work order and Steps **2 - 11.**

28. Are switch settings on option switch correct?

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

29. Get another **ADU** and set switches according to **DLP-534** and Steps **2 - 11** in this procedure.

30. ***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 **ADU** slot in bank being equipped.

    Response: After approximately 15 seconds, **FAIL, MN,** and **NE** indicators on **ADU** are lighted.

    STOP. YOU HAVE COMPLETED THIS PROCEDURE.

31. Correct setting of switches on option switch and repeat from Step **22.**

INSTALL AND TEST PCU (POWER CONVERTER UNIT) IN AB SHELF

SUMMARY: Install **PCU** into first shelf and verify that **FAIL** indicator is off. Measure –42 to –56 Vdc at **PCU** faceplate.

1. Get one **PCU** (**AUA11** or **AUA11B**) and inspect for possible damage.

2. Has a **CTU** 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 DIGROUP** indicators, **A/A1** and **B/B1**, are lighted and **PCU FAIL** indicator is off. **BCU DIGROUP** indicators, **C/A2** and **D/B2**, will also be lighted if those digroups are in the preservice and equipped state.

   Proceed to Step **5.**

4. Insert **PCU** into AB (lower shelf) **PCU** slot.

   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 **7.**
   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 or SD-7C117-02 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 first 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 return 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 or SD-7C117-02. Repeat procedure from Step **2** after locating and correcting trouble.

22. Disconnect DMM test leads.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

INSTALL TRU (TRANSMIT/RECEIVE UNIT) IN AB SHELF

1. Get one **AUA21 TRU** and inspect for possible damage.

2. Insert **TRU** into **TRU** slot located in AB (lower) shelf of channel bank while observing indicators on **TRU** faceplate.

   Response: **TRU FAIL** indicator lights momentarily, **ADU MJ** and **NE** indicators are lighted and **DIGROUP** indicators **A/A1** and **B/B1** on **BCU** are lighted. **DIGROUP** indicators **C/A2** and **D/B2** on **BCU** will also be lighted if CD digroups are in pre-service/equipped state.

3. Did **FAIL** indicator on **TRU** light momentarily?

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

4. Replace **TRU.**

5. Did **FAIL** indicator on **TRU** light momentarily?

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

6. Replace **TRU** with **TRU** removed previously.

7. Check wiring between **PCU** and **TRU** using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **2** after locating and correcting trouble.

8. Did **FAIL** indicator on **TRU** go off and remain off?

   If **YES,** then proceed to Step **20.**
   If **NO,** then continue with Step **9.**

9. Replace **TRU** in AB shelf.

10. Insert **TRU** into **TRU** slot located in first shelf of channel bank while observing indicators on **TRU** faceplate.

    Response: **TRU FAIL** indicator lights momentarily, **ADU MJ** and **NE** indicators are lighted and **DIGROUP** indicators **A/A1** and **B/B1** on **BCU** are lighted. **DIGROUP** indicators **C/A2** and **D/B2** on **BCU** will also be lighted if CD digroups are in pre-service/equipped state.

11. Does **FAIL** indicator on **TRU** go off and remain off?

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

12. Remove **ADU** and check option switches for correct settings.

    Reference: **DLP-534** and **DLP-536**

13. Are option switch settings on **ADU** correct?

    If **YES,** then proceed to Step **16.**
    If **NO,** then continue with Step **14.**

14. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Change **ADU** option switch(es) to correct position and reinsert **ADU** into **ADU** slot.

15. Replace **TRU** with **TRU** removed previously and repeat from Step **2.**

16. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with correctly optioned **ADU.**

    Reference: **DLP-534** and **DLP-536**

17. Replace **TRU** with **TRU** removed previously while observing indicators on **TRU** faceplate.

18. Does **FAIL** indicator on **TRU** go off and remain off?

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

19. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously and check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **2** after locating and correcting trouble.

20. Is **FAIL** indicator on **BCU** off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **21.**

21. Replace **BCU.**

22. After approximately 15 seconds, is **FAIL** indicator on **BCU** off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **23.**

23. Replace **BCU** with **BCU** removed previously.

24. Replace **TRU** in first shelf and repeat from Step **2.**

INSTALL TCU (TRANSCODER UNIT) FOR DIGROUPS AB

1. Get one TCU (**AUA71**) and inspect for possible damage.

2. Insert **TCU** into appropriate **LIU-B** slot (left side for blue bank or right side for white bank) in facility shelf while observing **FAIL** indicator on **TCU** faceplate.

   Response: **TCU FAIL** indicator lights momentarily. **MJ** and **NE** indicators on **ADU** and **DIGROUP A/A1** and **B/B1** indicators on **BCU** are lighted. **BCU DIGROUP C/A2** and **D/B2** indicators will also light if CD digroups are in pre-service/equipped state.

3. Did **FAIL** indicator on **TCU** light momentarily?

   If **YES,** then proceed to Step **16.**
   If **NO,** then continue with Step **4.**

4. Replace **TCU** while observing **FAIL** indicator on **TCU** faceplate.

5. Did **FAIL** indicator on **TCU** light momentarily?

   If **YES,** then proceed to Step **16.**
   If **NO,** then continue with Step **6.**

6. Replace **TRU** in AB shelf.

7. Replace **TCU** with **TCU** removed previously while observing **FAIL** indicator on **TCU** faceplate.

8. Did **FAIL** indicator on **TCU** light momentarily?

   If **YES,** then proceed to Step **16.**
   If **NO,** then continue with Step **9.**

9. Unseat **TCU.**

10. Replace **TRU** in AB shelf with **TRU** removed previously.

11. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with a correctly optioned **ADU.**

    Reference: **DLP-534** and **DLP-536**

12. Wait 20 seconds and then reseat **TCU** while observing **FAIL** indicator on **TCU** faceplate.

13. Did **FAIL** indicator on **TCU** light momentarily?

    If **YES,** then proceed to Step **16.**
    If **NO,** then continue with Step **14.**

14. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

15. Check wiring between **PCU** in AB shelf and **TCU** using SD-7C117-02. Repeat procedure from Step **2** after locating and correcting trouble.

16. Did **FAIL** indicator on **TCU** go off and remain off?

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

17. Replace **TCU** while observing **FAIL** indicator on **TCU** faceplate.

18. Did **FAIL** indicator on **TCU** go off and remain off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **19.**

19. Replace **TCU** with **TCU** removed previously.

20. Check wiring using SD-7C117-02. Repeat procedure from Step **2** after locating and correcting trouble.

INSTALL LIU (LINE INTERFACE UNIT) FOR DIGROUP A

SUMMARY: Set option switches located on side of **LIU** circuit board. Insert **LIU** into facility shelf in appropriate **LIU** slot. Verify that **FAIL** indicator on **LIU** lights momentarily and then goes off and remains off.

1. ***Warning:*** ***An* AUA62C *(line powering)* LIU *should not be installed in any* SLC *Series 5 Carrier System dual bank assembly that is used in conjunction with a lightwave multiplexer.***

   Caution: ***Incorrectly set LIU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream. All LIUs in the same bank should have identical option switch settings.***

   Get one **LIU** (Figure 1) and inspect for possible damage.

2. Is an **LIU AUA61C** being installed in RT?

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

3. Using orange stick (KS-6320, L1) or equivalent, set equalizer switch **S2** on **LIU AUA61C** per work order (TABLE A). Proceed to Step **5.**

4. Using orange stick (KS-6320, L1) or equivalent, set transmit and receive pad switches on **LIU** per work order (TABLE B).

5. Using orange stick (KS-6320, L1) or equivalent, set the **B/Z** Line Coding Switch to **Z** for Zero Code Suppression. If Bipolar Eight Zero Suppression is used, set the switch to **B.**

6. Is **LIU** being installed in RT channel bank assembly equipped for Mode I capability?

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

7. Set switch **S4** to **64.**

8. ***Note 1:*** After installing **LIU,** if corresponding DIGROUP indicator on **BCU** does not go out, verify that option switch settings on **LIU** are correct.

   Note 2: After installing **LIU,** if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

   Insert **LIU** into **LIU-A** slot in facility shelf while observing indicators on **LIU** faceplate.

   Response: **LIU FAIL** indicator lights momentarily and goes out, **MJ** and **NE** indicators on **ADU** and the **BCU** indicator, **B/B1** shelf are lighted. The **C/A2** and **D/B2** digroup indicators also light if CD digroups are in preserviced/equipped state.

   Proceed to Step **11.**

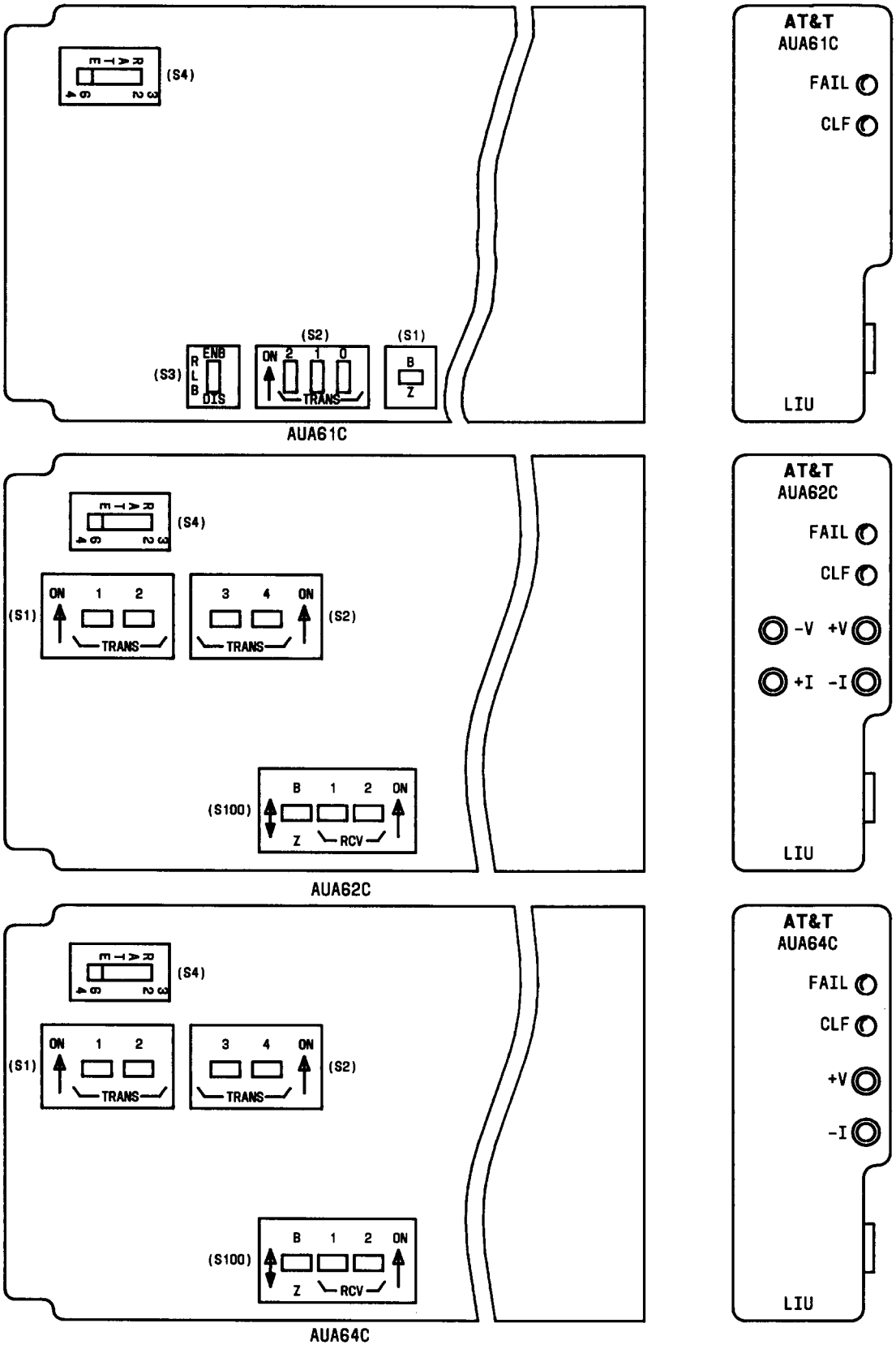


Fig. 1—AUA61C, AUA62C, and AUA64C LIU Option Switches

TABLE A
AUA61C
LIU EQUALIZER SETTINGS

DISTANCE TO DSX-1 (FEET)	EQUALIZER SWITCH (S400/S2) SETTINGS		
	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

TABLE B
AUA62C AND AUA64C TRANSMIT/RECEIVE PAD SETTINGS

INSERTED LOSS (dB)	TRANSMIT PAD (S400/S1, S2) SWITCH SETTINGS				RECEIVE PAD (S100) SWITCH SETTINGS	
	1	2	3	4	1	2
22.5	OFF	OFF	OFF	ON	—	—
15.0	OFF	OFF	ON	OFF	—	—
7.5	OFF	ON	OFF	OFF	OFF	ON*
0	ON	OFF	OFF	OFF	ON*	OFF

* ON when depressed toward the numbers.

9. Set switch **S4** to **32**.

10. ***Note 1:*** After installing **LIU**, if **BCU** DIGROUP indicators **A/A1** and **B/B1** do not go out, verify that option switch settings on **LIU** are correct.

    Note 2: After installing **LIU**, if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

    Insert **LIU** into **LIU-A** slot in facility shelf while observing indicators on **LIU** faceplate.

    Response: **LIU FAIL** indicator lights momentarily and all alarms clear if AB digroups are being put into service. Otherwise, **ADU MJ** and **NE** indicators and **BCU C/A2** and **D/B2** DIGROUP indicators will light if the CD shelf digroups are in pre-service/equipped state.

11. Did **FAIL** indicator on **LIU-A** light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **12.**

12. ***Note:*** After installing **LIU**, if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

    Replace **LIU** with a new **LIU** optioned according to Steps **2** through **10.**

13. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **14.**

14. Replace **TRU** in AB shelf.

15. Replace **LIU-A** with **LIU** removed previously while observing **FAIL** indicator on **LIU** faceplate.

16. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **17.**

17. Unseat **LIU-A**.

18. Replace **TRU** in AB shelf with **TRU** removed previously.

19. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with a correctly optioned **ADU**.

    Reference: **DLP-534** and **DLP-536**

20. Reseat **LIU** while observing **FAIL** indicator on **LIU** faceplate.

21. After approximately 20 seconds, did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **22.**

22. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

23. Check wiring between **PCU** in first shelf and **LIU** using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **11** after locating and correcting trouble.

24. Did **FAIL** indicator on **LIU** go off and remain off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **25.**

25. Remove and reinsert **ADU.**

26. Did **FAIL** indicator on **LIU-A** go off and remain off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **27.**

27. Replace **LIU** in first slot with correctly optioned **LIU** while observing **FAIL** indicator on **LIU** faceplate.

28. Did **FAIL** indicator on **LIU** go off and remain off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **29.**

29. Replace **LIU** with **LIU** removed previously.

30. Check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **10** after locating and correcting trouble.

INSTALL LIU FOR B DIGROUP (MODE I ONLY)

SUMMARY: Set option switches located on side of **LIU** circuit board. Insert **LIU** into facility shelf in appropriate **LIU** slot. Verify that **FAIL** indicator on **LIU** lights momentarily and then goes off and remains off.

1. ***Warning:*** ***An* AUA62C *(line powering)* LIU *should not be installed in any* SLC *Series 5 Carrier System dual bank assembly that is used in conjunction with a lightwave multiplexer.***

   Caution: ***Incorrectly set LIU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream. All LIUs in the same bank should have identical option switch settings.***

   Get one **LIU** (Figure 1) and inspect for possible damage.

2. Is **AUA61C** being installed in RT?

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

3. Using orange stick (KS-6320, L1) or equivalent, set equalizer switch **S2** on **LIU AUA61C** per work order (TABLE A). Proceed to Step **5**.

4. Using orange stick (KS-6320, L1) or equivalent, set transmit and receive pad switches on **LIU** per work order (TABLE B).

5. Using orange stick (KS-6320, L1) or equivalent, set the **B/Z** Line Coding Switch to **Z** for Zero Code Suppression. If Bipolar Eight Zero Suppression is used, set the switch to **B**.

6. Set switch **S4** to **64**.

7. ***Note 1:*** After installing **LIU** if **B** DIGROUP indicator on **BCU** does not go out, verify that option switch settings on **LIU** are correct.

   Note 2: After installing **LIU**, if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

   Insert **LIU** into **LIU-B** slot in facility shelf while observing indicators on **LIU** faceplate.

   Response: **LIU FAIL** indicator lights momentarily and all alarms clear if AB digroups are being put into service. Otherwise, ADU **MJ** and **NE** indicators and BCU **C/A2** and **D/B2** Digroup indicators will light if the CD shelf is in pre-service/equipped state.

   Proceed to Step **10**.

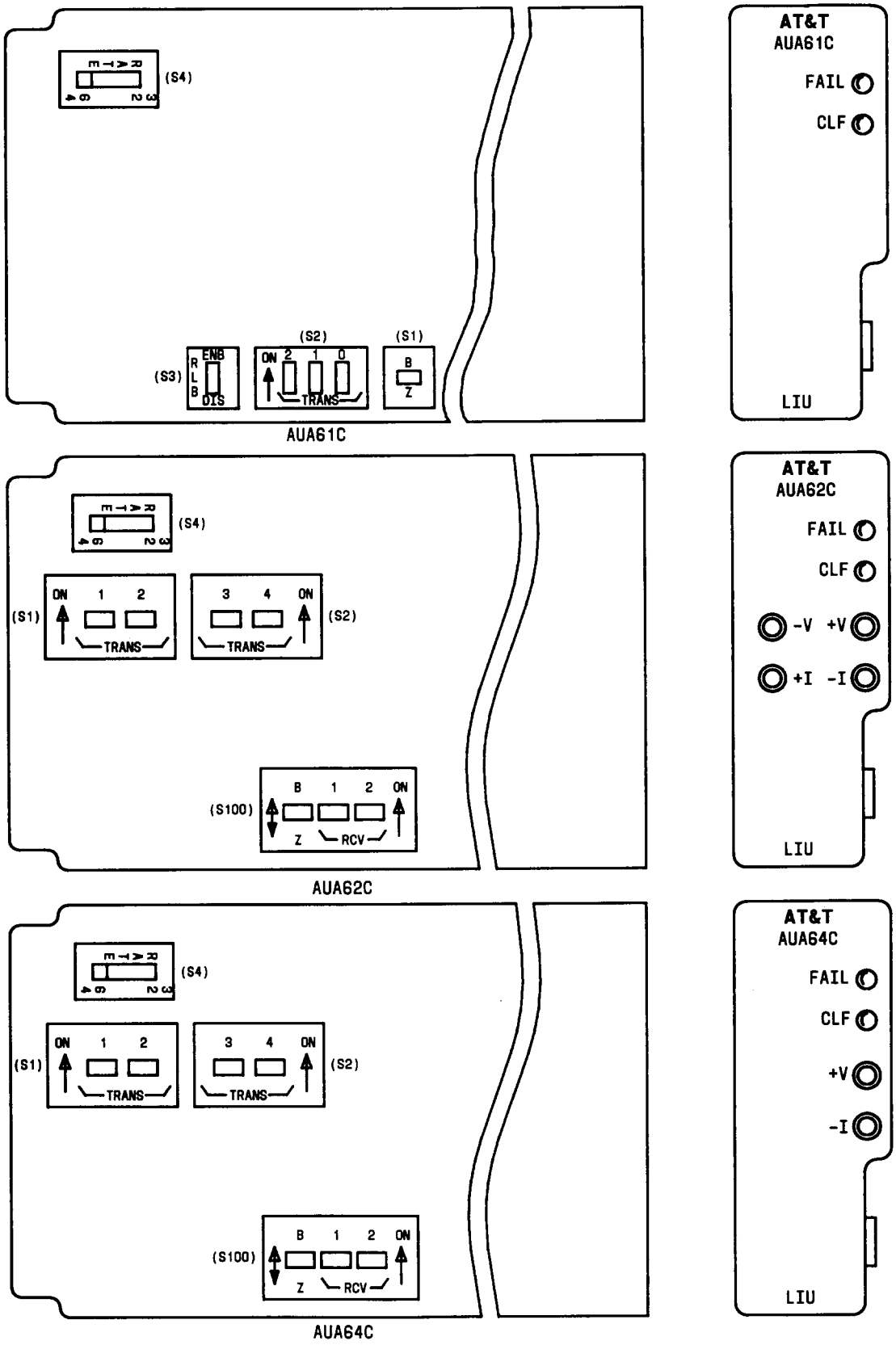


Fig. 1—AUA61C, AUA62C, and AUA64C LIU Option Switches

TABLE A
AUA61C
LIU EQUALIZER SETTINGS

DISTANCE TO DSX-1 (FEET)	EQUALIZER SWITCH (S400/S2) SETTINGS		
	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

TABLE B
AUA62C AND AUA64C TRANSMIT/RECEIVE PAD SETTINGS

INSERTED LOSS (dB)	TRANSMIT PAD (S400/S1, S2) SWITCH SETTINGS				RECEIVE PAD (S100) SWITCH SETTINGS	
	1	2	3	4	1	2
22.5	OFF	OFF	OFF	ON	—	—
15.0	OFF	OFF	ON	OFF	—	—
7.5	OFF	ON	OFF	OFF	OFF	ON*
0	ON	OFF	OFF	OFF	ON*	OFF

* ON when depressed toward the numbers.

8. Did **FAIL** indicator on **LIU** light momentarily?

   If **YES,** then proceed to Step **21.**
   If **NO,** then continue with Step **9.**

9. ***Note:*** After installing **LIU**, if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

   Replace **LIU-B** with correctly optioned **LIU** while observing **FAIL** indicator on **LIU** faceplate.

10. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **11.**

11. Replace **TRU** in AB shelf.

12. Replace **LIU-B** with **LIU** removed previously while observing **FAIL** indicator on **LIU** faceplate.

13. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **14.**

14. Unseat **LIU-B**.

15. Replace **TRU** in this shelf with **TRU** removed previously.

16. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with a new correctly optioned **ADU**.

    Reference: **DLP-534** and **DLP-536**

17. Wait 20 seconds and then reseat **LIU** while observing **FAIL** indicator on **LIU** faceplate.

18. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **19.**

19. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

20. Check wiring between **PCU** in AB shelf and **LIU-B** using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **8** after locating and correcting trouble.

21. Did **FAIL** indicator on **LIU** go off and remain off?

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

22. Replace **LIU** with correctly optioned **LIU** while observing **FAIL** indicator on **LIU** faceplate.

23. Did **FAIL** indicator on **LIU** go off and remain off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **24.**

24. Replace **LIU** with **LIU** removed previously.

25. Check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **8** after locating and correcting trouble.

INSTALL EQUIPPED OPTION IN ADU FOR AB OR CD SHELF

SUMMARY: Remove **ADU** and enable second shelf group. Reinstall **ADU** and verify that correct indicators are lighted.

1. ***Caution:*** ***Incorrect ADU option switch settings can cause service interruptions.***

   Note: This DLP assumes that all system options have already been selected and will not be changed. If changes are desired, refer to **DLP-536**.

   Remove **ADU AUB27** from bank being equipped.

2. ***Note:*** Switch **S1** position **1** and switch **S3** on **ADU** should not be moved during this procedure.

   On **ADU (AUB27)** option switch **S1** (Figure 1), use an orange stick (KS-6320, L1) or equivalent to depress switch position **5** toward **ABE** or **6** toward **CDE**.

3. ***Caution:*** ***Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

   Reinstall **ADU** into **ADU** slot.

4. After approximately 20 seconds, are **MJ** and **NE** indicators on the ADU lighted? Are **A/A1** and **B/B1** DIGROUP indicators or **C/A2** and **D/B2** DIGROUP indicators on the BCU lighted?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then continue with Step **5**.

5. Replace **BCU**.

6. After approximately 20 seconds, are **MJ** and **NE** indicators on the ADU lighted? Are **A/A1** and **B/B1** DIGROUP indicators or **C/A2** and **D/B2** DIGROUP indicators on the BCU lighted?

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

7. Replace **BCU** with **BCU** removed previously.

8. Remove **ADU** and check settings of option switches per facility records.

9. Are switch settings on option switch correct?

   If **YES,** then continue with Step **10**.
   If **NO,** then repeat **DLP-534** and **DLP-536**.

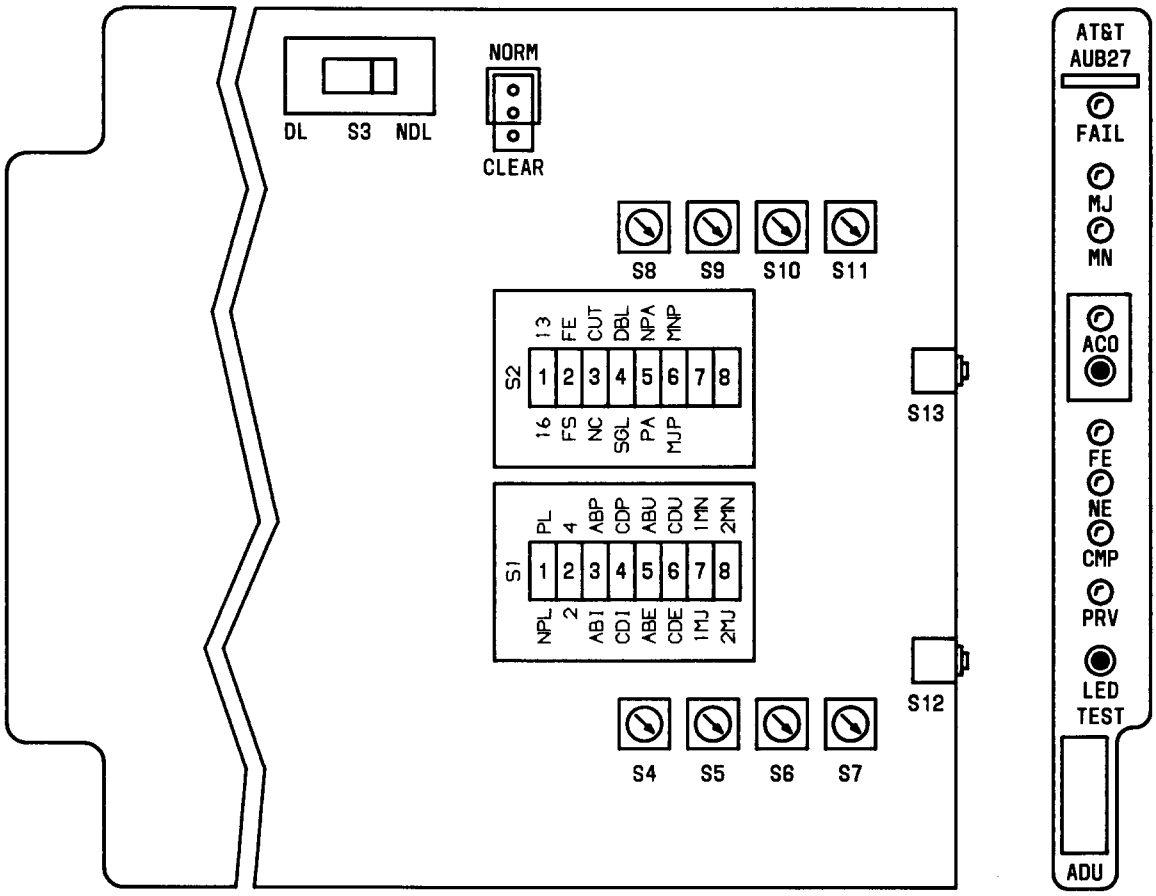


Fig. 1—AUB27 RT ADU Option Switch Settings

10. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with another correctly optioned **ADU** and repeat from Step **4.**

INSTALL PCU UNIT IN CD SHELF

SUMMARY: Install **PCU** into CD shelf and verify that **FAIL** indicator is off. Measure –42 to –56 Vdc at **PCU** faceplate.

1. Get one **PCU** (**AUA11B**) and inspect for possible damage.

2. Has a **CTU** and/or **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 **PCU** slot in CD (upper) shelf of channel bank.

   Response: **MJ** and **NE** indicators on **ADU** and **C/A2** and **D/B2 DIGROUP** indicators on **BCU** are lighted. **FAIL** indicator on **PCU** should be off.

4. Insert **PCU** into CD (upper) shelf **PCU** slot of blue channel bank.

   Response: **MN**, **NE**, and **FAIL** indicators on **ADU** are lighted and **FAIL** indicator on **PCU** is off.

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

   If **YES,** then proceed to Step **10.**
   If **NO,** then continue with Step **6.**

6. Replace **PCU**.

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

   If **YES,** then proceed to Step **10.**
   If **NO,** then continue with Step **8.**

8. Replace **PCU** with **PCU** removed previously.

9. Use SD-7C117-01 or SD-7C117-02 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 facility shelf is present and connected properly.

14. Is wiring present and properly connected?

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

15. Resolve problem through local procedures. Repeat procedure from Step **2** after trouble is located and corrected.

16. Replace **PCU**.

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

    If **YES,** then continue with Step **18.**
    If **NO,** then return 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 or SD-7C117-02. Repeat procedure from Step **2** after locating and correcting trouble.

22. Disconnect DMM test leads.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

INSTALL TRU (TRANSMIT/RECEIVE UNIT) IN CD SHELF

1. Get one **AUA21 TRU** and inspect for possible damage.

2. Insert **TRU** into **TRU** slot located in CD shelf of channel bank while observing indicators on **TRU** faceplate.

   Response: **TRU FAIL** indicator lights momentarily; **MJ** and **NE** indicators on **ADU** and **C/A2** and **D/B2 DIGROUP** indicators for the CD shelf on **BCU** are lighted.

3. Does **FAIL** indicator on **TRU** go off and remain off?

   If **YES,** then proceed to Step **17.**
   If **NO,** then continue with Step **4.**

4. Remove and then reinsert channel bank **ADU** circuit pack.

5. After approximately 15 seconds, does **FAIL** indicator on **TRU** go off and remain off?

   If **YES,** then proceed to Step **17.**
   If **NO,** then continue with Step **6.**

6. Replace **TRU** in CD shelf while observing indicators on **TRU** faceplate.

7. Does **FAIL** indicator on **TRU** go off and remain off?

   If **YES,** then proceed to Step **17.**
   If **NO,** then continue with Step **8.**

8. Remove **ADU** and verify that option switches are set correctly.

   References: **DLP-534** and **DLP-536**

9. Are option switches on **ADU** set correctly?

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

10. Change option switches on **ADU** to correct settings.

11. Wait 20 seconds and then replace **TRU** with **TRU** removed previously and repeat from Step **3.**

12. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with correctly optioned **ADU.**

13. Replace **TRU** with **TRU** removed previously while observing indicators on **TRU** faceplate.

14. Does **FAIL** indicator on **TRU** go off and remain off?

    If **YES,** then proceed to Step **17.**
    If **NO,** then continue with Step **15.**

15. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

16. Check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **3** after locating and correcting trouble.

17. Did **FAIL** indicator on **TRU** light momentarily?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **18.**

18. Replace **TRU** in CD shelf while observing indicators on **TRU** faceplate.

19. Did **FAIL** indicator on **TRU** light momentarily?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **20.**

20. Replace **TRU** with **TRU** removed previously.

21. Check wiring between **PCU** and **TRU** on second shelf using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **3** after locating and correcting trouble.

INSTALL TCU (TRANSCODER UNIT) FOR CD DIGROUPS

1. Get one **TCU (AUA71)** and inspect for possible damage.

2. Insert **TCU** into appropriate **LIU-D** slot (left side for blue bank or right side for white bank) in facility shelf while observing **FAIL** indicator on **TCU** faceplate.

   Response: **TCU FAIL** indicator lights momentarily. **ADU MJ** and **NE** indicators and **BCU DIGROUP C/A2** and **D/B2** indicators are lighted.

3. Did **FAIL** indicator on **TCU** light momentarily?

   If **YES,** then proceed to Step **16.**
   If **NO,** then continue with Step **4.**

4. Replace **TCU** while observing **FAIL** indicator on **TCU** faceplate.

5. Did **FAIL** indicator on **TCU** light momentarily?

   If **YES,** then proceed to Step **16.**
   If **NO,** then continue with Step **6.**

6. Replace **TRU** in CD shelf.

7. Replace **TCU** with **TCU** removed previously while observing **FAIL** indicator on **TCU** faceplate.

8. Did **FAIL** indicator on **TCU** light momentarily?

   If **YES,** then proceed to Step **16.**
   If **NO,** then continue with Step **9.**

9. Unseat **TCU.**

10. Replace **TRU** in CD shelf with **TRU** removed previously.

11. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with a correctly optioned **ADU.**

    Reference: **DLP-534** and **DLP-542**

12. Wait 20 seconds and then reseat **TCU** while observing **FAIL** indicator on **TCU** faceplate.

13. Did **FAIL** indicator on **TCU** light momentarily?

    If **YES,** then proceed to Step **16.**
    If **NO,** then continue with Step **14.**

14. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

15. Check wiring between **PCU** in CD shelf and **TCU** using SD-7C117-02. Repeat procedure from Step **2** after locating and correcting trouble.

16. Did **FAIL** indicator on **TCU** go off and remain off?

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

17. Replace **TCU** while observing **FAIL** indicator on **TCU** faceplate.

18. Did **FAIL** indicator on **TCU** go off and remain off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **19.**

19. Replace **TCU** with **TCU** removed previously.

20. Check wiring using SD-7C117-02. Repeat procedure from Step **2** after locating and correcting trouble.

INSTALL LIU (LINE INTERFACE UNIT) FOR DIGROUP C

SUMMARY: Set option switches located on side of **LIU** circuit board. Insert **LIU** into facility shelf in appropriate **LIU** slot. Verify that **FAIL** indicator on **LIU** lights momentarily and then goes off and remains off.

1. ***Warning:*** ***An* AUA62C *(line powering)* LIU *should not be installed in any* SLC *Series 5 Carrier System dual bank assembly that is used in conjunction with a lightwave multiplexer.***

   Caution: ***Incorrectly set LIU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream. All LIUs in the same bank should have identical option switch settings.***

   Get one **LIU** (Figure 1) and inspect for possible damage.

2. Is an **AUA61C** being installed in RT?

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

3. Using orange stick (KS-6320, L1) or equivalent, set equalizer switch **S2** on **LIU AUA61C** per work order (TABLE A). Proceed to Step **5.**

4. Using orange stick (KS-6320, L1) or equivalent, set transmit and receive pad switches on **LIU** per work order (TABLE B).

5. Using orange stick (KS-6320, L1) or equivalent, set the **B/Z** Line Coding Switch to **Z** for Zero Code Suppression. If Bipolar Eight Zero Suppression is used, set the switch to **B.**

6. Is **LIU** being installed in RT channel bank assembly equipped for Mode I capability?

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

7. Set switch **S4** to **64.**

8. ***Note 1:*** After installing **LIU,** if **C/A2 DIGROUP** indicator on **BCU** does not go out, verify that option switch settings on **ADU** are correct.

   Note 2: After installing **LIU,** if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

   Insert **LIU** into **LIU-C** slot in facility shelf while observing indicators on **LIU** faceplate.

   Response: **LIU FAIL** indicator lights momentarily and goes out; **MJ** and **NE** indicators on **ADU** and **D/B2 DIGROUP** indicators on **BCU** are lighted.

   Proceed to Step **11.**

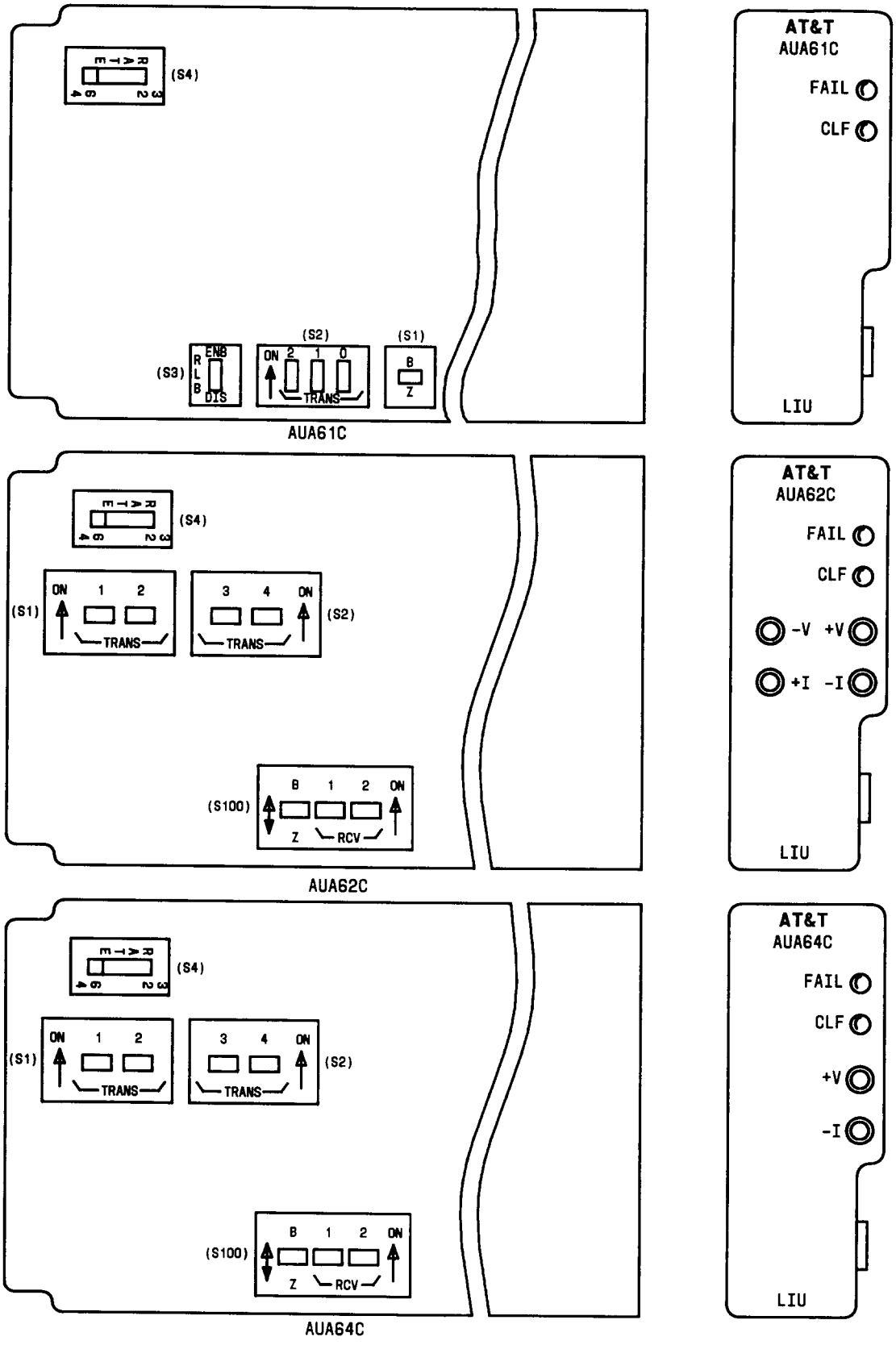


Fig. 1—AUA61C, AUA62C, and AUA64C LIU Option Switches

TABLE A
AUA61C
LIU EQUALIZER SETTINGS

DISTANCE TO DSX-1 (FEET)	EQUALIZER SWITCH (S400/S2) SETTINGS		
	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

TABLE B
AUA62C AND AUA64C TRANSMIT/RECEIVE PAD SETTINGS

INSERTED LOSS (dB)	TRANSMIT PAD (S400/S1, S2) SWITCH SETTINGS				RECEIVE PAD (S100) SWITCH SETTINGS	
	1	2	3	4	1	2
22.5	OFF	OFF	OFF	ON	—	—
15.0	OFF	OFF	ON	OFF	—	—
7.5	OFF	ON	OFF	OFF	OFF	ON*
0	ON	OFF	OFF	OFF	ON*	OFF

* ON when depressed toward the numbers.

9. Set **S4** to **33**.

10. ***Note:*** After installing **LIU** if **C/A2** and **D/B2 DIGROUP** indicators on **BCU** do not go out, verify that option switch settings on **LIU** are correct.

    Insert **LIU** into appropriate **LIU-C** slot in facility shelf (left side for blue bank or right side for white bank) while observing indicators on **LIU** faceplate.

    Response: **LIU FAIL** indicator lights momentarily and all alarms clear.

11. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **24**.
    If **NO,** then continue with Step **12**.

12. ***Note:*** After installing **LIU**, if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

    Replace **LIU-C** with a new correctly optioned **LIU**.

13. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **14.**

14. Replace corresponding **TRU**.

15. Replace **LIU-C** with **LIU** removed previously while observing **FAIL** indicator on **LIU** faceplate.

16. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **17.**

17. Unseat **LIU-C**.

18. Replace **TRU** in CD shelf with **TRU** removed previously.

19. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with a correctly optioned **ADU**.

    Reference: **DLP-534** and **DLP-536**

20. Wait 20 seconds and then reseat **LIU-C** while observing **FAIL** indicator on **LIU** faceplate.

21. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **22.**

22. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

23. Check wiring between **PCU** in CD shelf and **LIU-C** using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **11** after locating and correcting trouble.

24. Did **FAIL** indicator on **LIU** go off and remain off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **25.**

25. ***Note:*** After installing **LIU**, if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

    Replace **LIU-C** with correctly optioned **LIU** while observing **FAIL** indicator on **LIU** faceplate.

26. Did **FAIL** indicator on **LIU** go off and remain off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **27.**

27. Replace **LIU-C** with **LIU** removed previously.

28. Check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **10** after locating and correcting trouble.

INSTALL LIU FOR D DIGROUP (MODE I ONLY)

SUMMARY: Set option switches located on side of **LIU** circuit board. Insert **LIU** into facility shelf in **LIU-D** slot. Verify that **FAIL** indicator on **LIU** lights momentarily and then goes off and remains off.

1. ***Warning:*** ***An* AUA62C *(line powering)* LIU *should not be installed in any* SLC *Series 5 Carrier System dual bank assembly that is used in conjunction with a lightwave multiplexer.***

   Caution: ***Incorrectly set LIU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream. All LIUs in the same bank should have identical option switch settings.***

   Get one **LIU** (Figure 1) and inspect for possible damage.

2. Is **AUA61C** being installed in RT?

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

3. Using orange stick (KS-6320, L1) or equivalent, set equalizer switch **S2** on **LIU AUA61C** per work order (TABLE A). Proceed to Step **5.**

4. Using orange stick (KS-6320, L1) or equivalent, set transmit and receive pad switches on **LIU** per work order (TABLE B).

5. Using orange stick (KS-6320, L1) or equivalent, set the **B/Z** Line Coding Switch to **Z** for Zero Code Suppression. If Bipolar Eight Zero Suppression is used, set the switch to **B.**

6. Set switch **S4** to **64.**

7. ***Note 1:*** After installing **LIU** if corresponding DIGROUP indicator on **BCU** does not go out, verify that option switch settings on **LIU** are correct.

   Note 2: After installing **LIU,** if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

   Insert **LIU** into **LIU-D** slot in facility shelf while observing indicators on **LIU** faceplate.

   Response: **LIU FAIL** indicator lights momentarily and all alarms clear.

   Proceed to Step **10.**

8. Did **FAIL** indicator on **LIU** light momentarily?

   If **YES,** then proceed to Step **21.**
   If **NO,** then continue with Step **9.**

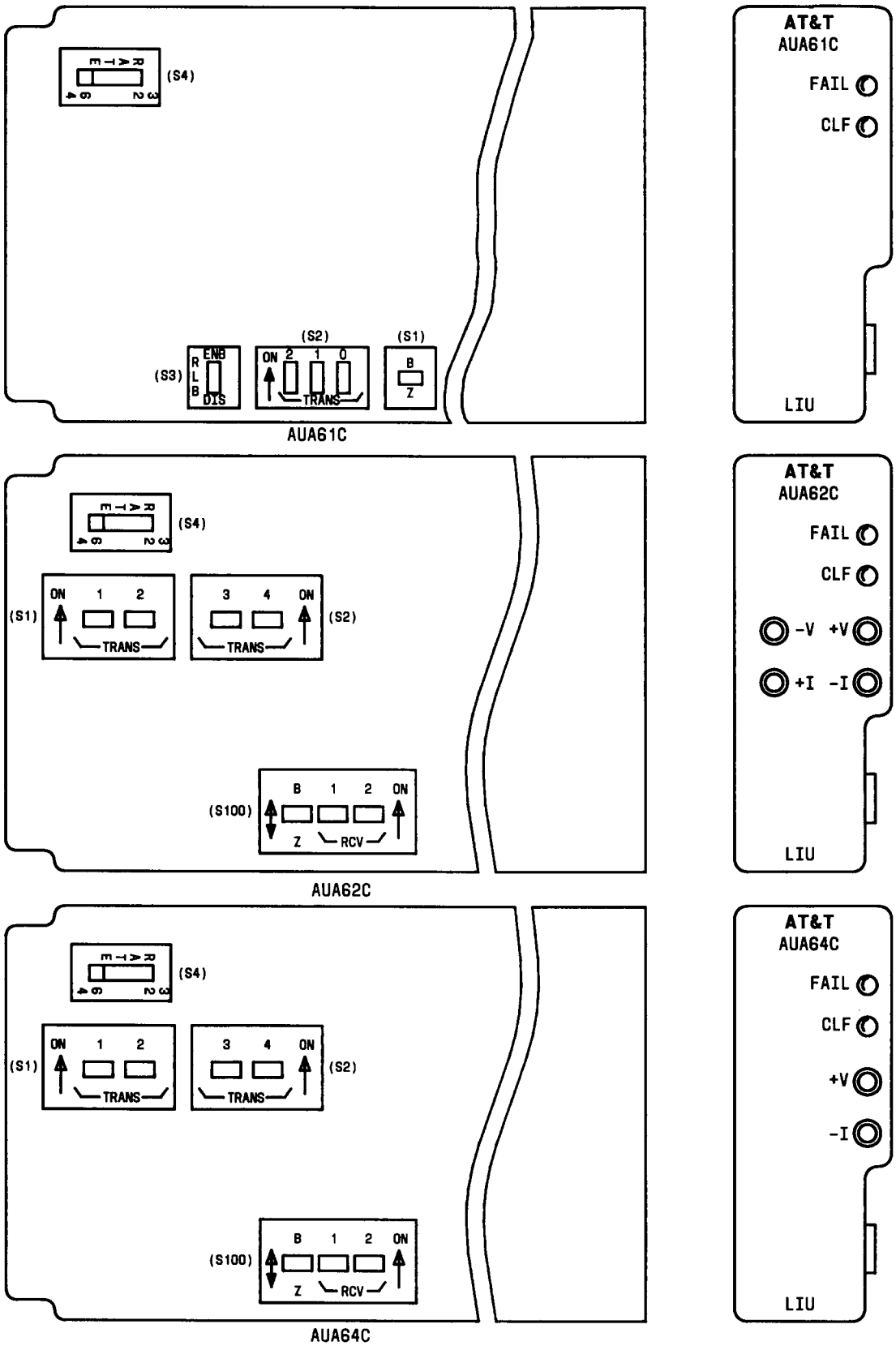


Fig. 1—AUA61C, AUA62C, and AUA64C LIU Option Switches

TABLE A
AUA61C
LIU EQUALIZER SETTINGS

DISTANCE TO DSX-1 (FEET)	EQUALIZER SWITCH (S400/S2) SETTINGS		
	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

TABLE B
AUA62C AND AUA64C TRANSMIT/RECEIVE PAD SETTINGS

INSERTED LOSS (dB)	TRANSMIT PAD (S400/S1, S2) SWITCH SETTINGS				RECEIVE PAD (S100) SWITCH SETTINGS	
	1	2	3	4	1	2
22.5	OFF	OFF	OFF	ON	—	—
15.0	OFF	OFF	ON	OFF	—	—
7.5	OFF	ON	OFF	OFF	OFF	ON*
0	ON	OFF	OFF	OFF	ON*	OFF

* ON when depressed toward the numbers.

9. ***Note:*** After installing **LIU**, if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

   Replace **LIU-D** with correctly optioned **LIU** while observing **FAIL** indicator on **LIU** faceplate.

10. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **11.**

11. Replace **TRU** in CD shelf.

12. Replace **LIU-D** with **LIU** removed previously while observing **FAIL** indicator on **LIU** faceplate.

13. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **14.**

14. Unseat **LIU-D**.

15. Replace **TRU** in CD shelf with **TRU** removed previously.

16. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with a correctly optioned **ADU**.

    Reference: **DLP-534** and **DLP-536**

17. Wait 20 seconds and then reseat **LIU-D** while observing **FAIL** indicator on **LIU** faceplate.

18. Did **FAIL** indicator on **LIU** light momentarily?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **19.**

19. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

20. Check wiring between **PCU** in CD shelf and **LIU-D** using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **8** after locating and correcting trouble.

21. Did **FAIL** indicator on **LIU** go off and remain off?

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

22. ***Note:*** After installing **LIU,** if **CMP** indicator lights, option switch settings on the **LIU** are probably set incorrectly. Remove the unit, correct the options, and reinsert the unit.

    Replace **LIU-D** with correctly optioned **LIU** while observing **FAIL** indicator on **LIU** faceplate.

23. Did **FAIL** indicator on **LIU** go off and remain off?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **24.**

24. Replace **LIU-D** with **LIU** removed previously.

25. Check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **8** after locating and correcting trouble.

INSTALL FCU (FAN CONTROL UNIT)

1. ***Caution: Fan operation is essential to prevent system failures in those Series 5 RTs engineered and installed with fans.***

   Get one **FCU** (**AUA24**) and inspect for possible damage.

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 CTU (CHANNEL TEST UNIT)

1. Get one **AUB22** or **AUB25** (Feature Package C or D) **CTU** and inspect for possible damage.

2. Insert **CTU** into **CTU** slot in blue (lower) channel bank while observing indicators on **CTU** faceplate.

   Response: **CTU FAIL** indicator is lighted. The **BUSY** indicator flashes on the AUB25 only.

3. Does **FAIL** indicator on **CTU** go off and remain off?

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

4. Replace **CTU.**

5. While observing **FAIL** indicator on CTU faceplate, insert **CTU** into **CTU** slot in blue (lower) channel bank shelf.

   Response: **CTU FAIL** indicator lights momentarily. The **BUSY** indicator flashes on the AUB25 only.

6. Does **FAIL** indicator on **CTU** go off and remain off?

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

7. Replace **CTU** with **CTU** removed previously while observing **FAIL** indicator on **CTU** faceplate.

8. Check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **3** after locating and correcting trouble.

9. Did **FAIL** indicator on **CTU** light momentarily?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then continue with Step **10.**

10. Replace **CTU** while observing **FAIL** indicator on **CTU** faceplate.

11. Did **FAIL** indicator on **CTU** light momentarily?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **12.**

12. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with another correctly optioned **ADU**.

    Reference: **DLP-534** and **DLP-536**.

13. Wait 20 seconds and then replace **CTU** with **CTU** removed previously while observing **FAIL** indicator on **CTU** faceplate.

14. Did **FAIL** indicator on **CTU** light momentarily?

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

15. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

16. Are any fuses on **CFU** in blue (lower) bank blown?

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

17. Replace blown fuse(s) on **CFU**.

18. Unseat, then reseat **CTU** while observing **FAIL** indicator on **CTU** faceplate.

19. Does **FAIL** indicator on **CTU** light momentarily?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **20.**

20. Replace **CFU** in blue bank.

21. Unseat, then reseat **CTU** while observing **FAIL** indicator on **CTU** faceplate.

22. Does **FAIL** indicator on **CTU** light momentarily?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **23.**

23. Check wiring between **PCU** in facility shelf and **CFU** in blue bank and between **CFU** and **CTU** using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **11** after locating and correcting trouble.

INSTALL DTU (DIGITAL TEST UNIT)

1. ***Note:*** The DTU consists of two units designated **DTU-L** (DTU-left) and **DTU-R** (DTU-right).

   Get one **DTU-L (AUA18)** and one **DTU-R (AUA19)** and inspect for possible physical damage.

2. Insert **DTU-L** into left-hand side of **DTU** slot in facility shelf.

   Response: All bank indicators are off and no office alarms are active.

3. While observing **FAIL** indicator on **DTU-R** faceplate, insert **DTU-R** into right-hand side of **DTU** slot in facility shelf.

   Response: **DTU-R FAIL** indicator lights momentarily. All bank indicators are off and no office alarms are active.

4. Does **FAIL** indicator on **DTU-R** go off and remain off?

   If **YES,** then proceed to Step **9.**
   If **NO,** then continue with Step **5.**

5. Replace both **DTU-L** and **DTU-R** while observing **FAIL** indicator on **DTU-R** faceplate.

   Response: **DTU-R FAIL** indicator lights momentarily.

6. Does **FAIL** indicator on **DTU-R** go off and remain off?

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

7. Replace **DTU-L** and **DTU-R** with units removed previously.

8. Check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **4** after locating and correcting trouble.

9. Did **DTU-R FAIL** indicator light momentarily?

   If **YES,** then proceed to Step **24.**
   If **NO,** then continue with Step **10.**

10. Replace both **DTU-L** and **DTU-R** while observing **FAIL** indicator on **DTU-R** faceplate.

    Response: **DTU-R FAIL** indicator lights momentarily.

11. Did **DTU-R FAIL** indicator light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **12.**

12. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with another correctly optioned **ADU**.

13. Wait 20 seconds then replace **DTU-L** and **DTU-R** with units removed previously while observing **FAIL** indicator on **DTU-R** faceplate.

14. Did **FAIL** indicator on **DTU-R** light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **15.**

15. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

16. Are any fuses on **CFU** in blue (lower) bank blown?

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

17. Replace blown fuse(s) on **CFU**.

18. While observing **FAIL** indicator on **DTU-R** faceplate, unseat then reseat **DTU-R**.

19. Does **FAIL** indicator on **DTU-R** light momentarily?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **20.**

20. Replace **CFU** in blue bank.

21. While observing **FAIL** indicator on **DTU-R** faceplate, unseat then reseat **DTU-R**.

22. Does **FAIL** indicator on **DTU-R** light momentarily?

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

23. Check wiring between **PCU** in facility shelf and **CFU** in blue bank and between **CFU** and **DTU-R/DTU-L** using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **9** after locating and correcting trouble.

24. Is **BUSY** indicator on **DTU-R** lighted?

    If **YES,** then continue with Step **25.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

25. Replace both **DTU-L** and **DTU-R**.

26. Is **BUSY** indicator on **DTU-R** lighted?

    If **YES,** then continue with Step **27.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

27. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with another correctly optioned **ADU.**

28. Wait 20 seconds then replace **DTU-L** and **DTU-R** with units removed previously.

29. Is **BUSY** indicator on **DTU-R** lighted?

    If **YES,** then continue with Step **30.**
    If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

30. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

31. Check wiring using SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **4** after locating and correcting trouble.

PERFORM RT INDICATOR TEST

1. ***Note:*** Pressing the **LED TEST** button on the **ADU** requests activation of all LEDs over which the **BCU** has direct control.

   Press and hold the **LED TEST** button on the **ADU** and observe which LEDs are lighted.

2. Are all indicators listed in TABLE A lighted?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then continue with Step **3.**

TABLE A

UNIT	INDICATOR LIGHTED
LIU	ALL INDICATORS
TRU	ALL INDICATORS
BCU	ALL INDICATORS*
ADU	ALL INDICATORS
CTU	FAIL
TCU†	FAIL

* Either the 48 or the 96 indicator will not be lighted depending on the bank ID settings.
† TCUs are not used in Mode I.

3. Are any of the indicators lighted?

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

4. ***Caution: Any time a circuit pack containing option switches is replaced in an RT assembly, insure that any option switches are set per the work order or engineering records. Incorrectly set LIU or ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

   Replace unit(s) that contain indicators that do not light and repeat from Step **1.**

5. Replace **BCU.**

6. Press and hold **LED TEST** pushbutton on **ADU.**

7. Are all indicators listed in TABLE A lighted?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then continue with Step **8.**

8. Are any of the indicators lighted?

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

9. Replace **BCU** with **BCU** removed previously.

10. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU**. Verify that option switch settings on replacement **ADU** agree with option switch settings on **ADU** being replaced.

11. Press and hold **LED TEST** pushbutton on **ADU**.

12. Are all indicators listed in TABLE A lighted?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then continue with Step **13.**

13. Are any of the indicators lighted?

    If **YES,** then proceed to Step **4.**
    If **NO,** then continue with Step **14.**

14. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Replace **ADU** with **ADU** removed previously.

15. Refer to SD-7C117-01 or SD-7C117-02. Repeat procedure from Step **1** after locating and correcting trouble.

PERFORM CHECK OF ACO BUTTON

1. ***Note 1:*** This procedure assumes that outside wiring to the maintenance center has been completed.

   Note 2: This procedure assumes that no alarm conditions are currently present.

   Note 3: This procedure requires communication between the RT and maintenance center.

   Unseat any functioning **TRU** that is not providing service.

2. Verify that a major alarm condition has been received at the maintenance center. If not, check the wiring between the RT and the maintenance center.

3. When the alarm condition exists at the maintenance center, press the **ACO** button on the **ADU**.

   Response: The alarm clears at the maintenance center but not at the RT. The LED associated with the **ACO** button is lighted.

4. Reseat the **TRU**.

   Response: The **ACO LED** goes out.

5. If any part of this test fails, replace the **ADU** and repeat this procedure from Step **1**.

6. Unseat one **RINGING GENERATOR**.

7. Verify that a minor alarm condition has been received at the maintenance center. If not, check the wiring between the RT and the maintenance center.

8. When the alarm condition exists at the maintenance center, press the **ACO** button on the **ADU**.

   Response: The alarm clears at the maintenance center but not at the RT. The LED associated with the **ACO** button is lighted.

9. Reseat the **RINGING GENERATOR**.

   Response: The **ACO LED** goes out.

10. If any part of this test fails, replace the **ADU** and repeat this procedure from Step **1**.

PERFORM CHECK OF POWER MINOR ALARMS

1. ***Note 1:*** This procedure should only be performed if system is equipped with working batteries and battery charger(s).

   Note 2: Two **ADU** option switches (**PA/NPA** and **MJP/MNP**) control whether or not a Power Minor alarm condition also activates a Major or Minor alarm closure.

   Reference: **DLP-536** and **DLP-542**

   Determine the settings of the **PA/NPA** and **MJP/MNP** switches on the **ADU**.

2. Unseat all **336A RECTIFIERs** from power shelf.

3. According to the settings of the **PA/NPA** and **MJP/MNP** switches on the **ADU**, the following responses should occur:

OPTIONS	RESPONSES
NPA (**MJP/MNP** is ignored)	INA-RT: **PMN** and **NE** Maintenance Center: **PMN**
PA **MJP**	INA-RT: **PMN** and **NE** Maintenance Center: **MJ** and **PMN**
PA **MNP**	INA-RT: **PMN** and **NE** Maintenance Center: **MN** and **PMN**

   Did the appropriate closures occur?

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

4. Check wiring using SD-7C118-01. Repeat procedure from Step **3** after locating and correcting trouble.

5. Reseat all **336A RECTIFIERs** into power shelf.

6. Do **PMN** indicators on **BCUs** and **NE** indicators on **ADUs** go off after approximately 4 minutes?

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

7. Check wiring using SD-7C118-01. Repeat procedure from Step **2** after locating and correcting trouble.

CHECK 197A BATTERY LOAD TEST SET FOR PROPER OPERATION

1. Obtain **197A BATTERY LOAD TEST SET** (Figure 1).

2. Remove cover from test set.

3. At test connector head, verify 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. ***Warning: 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.**

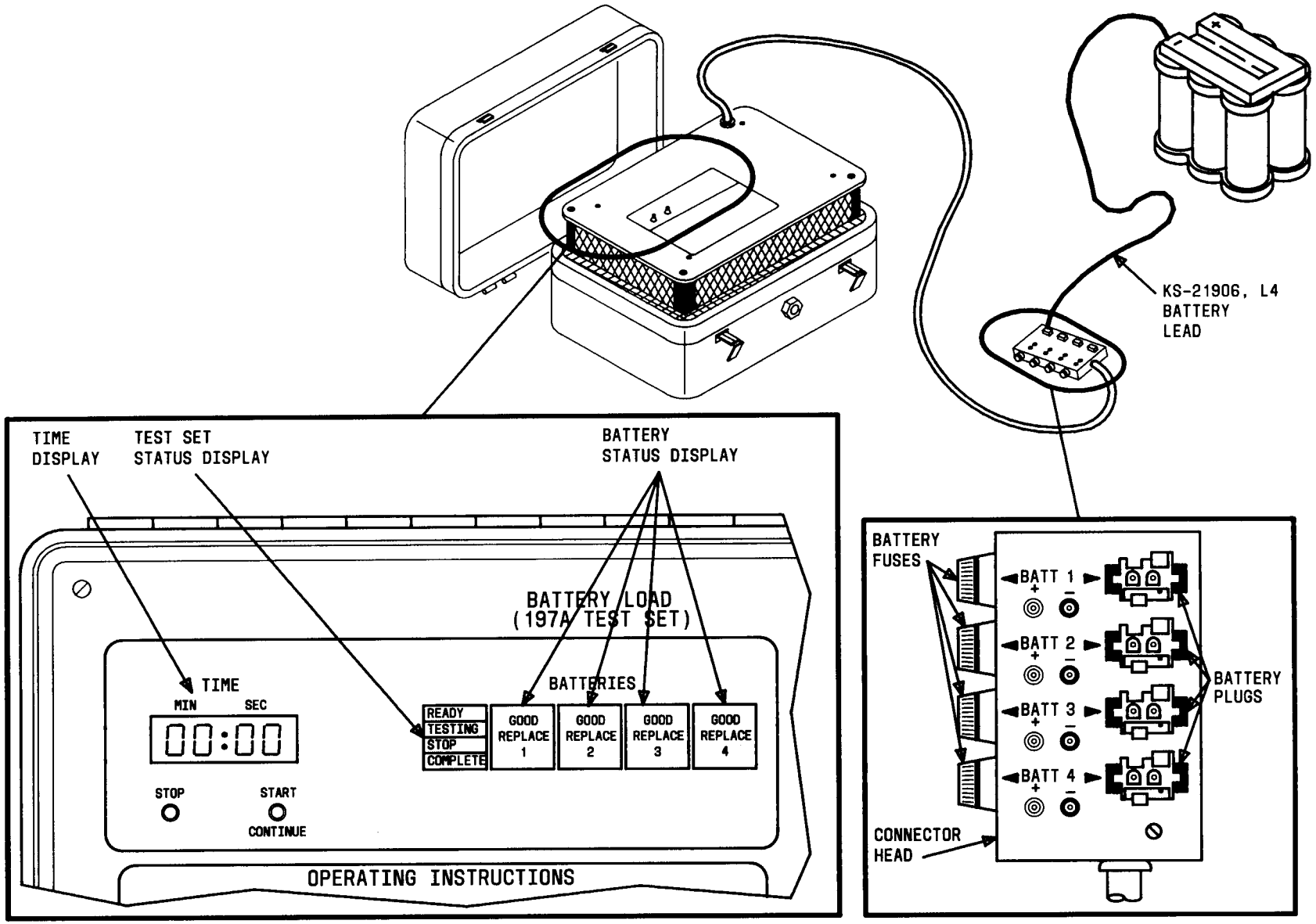


Fig. 1—197A Battery Load Test Set Arrangement

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

CLEAR PROVISIONING MEMORY USING THE ADU CLEAR/NORM OPTION PLUG

1. Remove the **ADU** and locate the **NORM/CLEAR** option plug (Figure 1).

2. Position the patch connector in the **CLEAR** position (middle and lower holes).

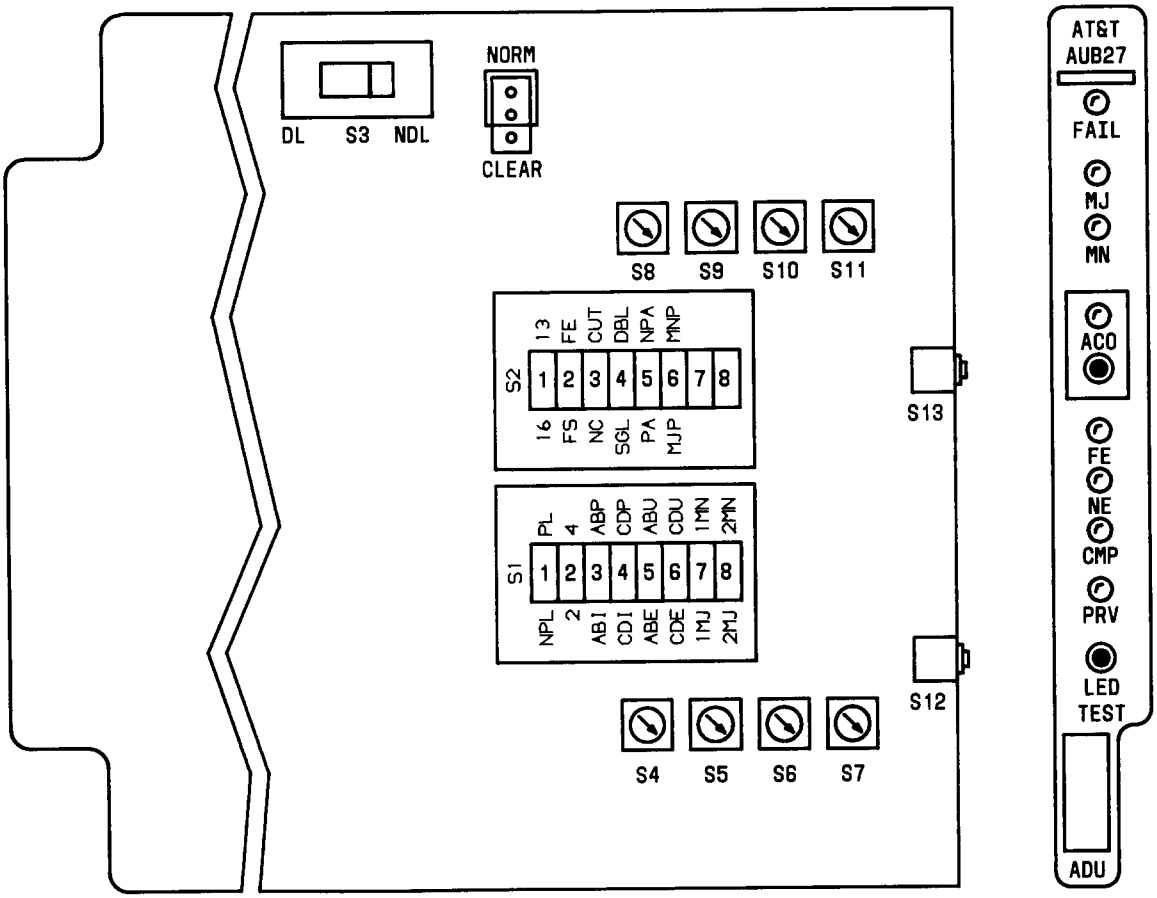


Fig. 1—INA-RT Alarm Display Unit

3. Replace the **ADU**.

   Response: If no special service channel units are installed and a memory inconsistency exists, the provisionable data on the **BCU** and **ADU** is cleared and the **ADU FAIL** and **BCU FAIL** indicators should go out (assuming no other problems exist).

   Wait 5 minutes before continuing to ensure ample time for memory to be updated.

4. Remove the **ADU** and position the patch connector in the **NORM** position (top and middle holes).

5. Replace the **ADU**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

CLEAR PROVISIONING MEMORY USING THE CIU

1. ***Note:*** After the **ADU** has been installed, at least 5 minutes must have elapsed before continuing with any procedure.

   Obtain a SLC Series 5 carrier CIU (craft interface unit).

2. Condition CIU for testing. Refer to CIU Users Guide if necessary.

3. Insert connector on end of CIU cable into **TEST ACCESS** jack on channel test unit **CTU**.

4. The CIU will perform a 15-second self-test when first powered up and then will display the following OPERATIONS MENU: **1. CKT ACTIVITIES 2. SYSTEM TURN-UP 3. TEST BUS ACCESS COMMAND [CKT ACTIVITIES] =**

5. At the CIU keyboard, enter **2** or **S**.

6. The CIU display will show: **/* THIS OPERATION SHOULD ONLY BE USED WHEN TURNING UP A NEW SYSTEM. HIT BREAK KEY TO STOP SYSTEM TURN-UP */ SYSTEM ID =**

7. Enter system identification (SYSTEM ID) number for system being turned up.

8. Does CIU display show: **/* EXECUTION ON AN OPERATING SYSTEM WILL INTERRUPT SERVICE ON ANY CU WITH SETTINGS AND DESTROY ALL SETTINGS. TYPE 'CLEAR SETTINGS' FOR SYSTEM TURN-UP, OR 'QUIT' TO STOP */ CLEAR SETTINGS OR QUIT =**

   If **YES,** then proceed to Step **15.**
   If **NO,** then continue with Step **9.**

9. Wait 5 minutes and then re-enter SYSTEM ID number.

10. Does CIU display show: **/* EXECUTION ON AN OPERATING SYSTEM WILL INTERRUPT SERVICE ON ANY CU WITH SETTINGS AND DESTROY ALL SETTINGS. TYPE 'CLEAR SETTINGS' FOR SYSTEM TURN-UP, OR 'QUIT' TO STOP */ CLEAR SETTINGS OR QUIT =**

    If **YES,** then proceed to Step **15.**
    If **NO,** then continue with Step **11.**

11. Wait 5 minutes and then re-enter SYSTEM ID number again.

12. Does CIU display show: **/* EXECUTION ON AN OPERATING SYSTEM WILL INTERRUPT SERVICE ON ANY CU WITH SETTINGS AND DESTROY ALL SETTINGS. TYPE 'CLEAR SETTINGS' FOR SYSTEM TURN-UP, OR 'QUIT' TO STOP */ CLEAR SETTINGS OR QUIT =**

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

13. Press CIU **BREAK** key and the CIU display will show the OPERATIONS MENU.

14. Verify that CIU cable to CTU is properly seated. Wait 5 minutes and then repeat procedure from Step **5.**

15. Enter **CLEAR SETTINGS** and CIU display will show: **/* COMMAND IS EXECUTING AND COULD TAKE SEVERAL MINUTES TO COMPLETE, PLEASE STAND BY...*/**

16. When system turnup is completed, CIU display will show: **/* SYSTEM TURN-UP PROCESS IS COMPLETED */ [HIT SPACE BAR TO CONTINUE]**

17. Press space bar and CIU display will show the OPERATIONS MENU.

18. Power down CIU and remove connector from **CTU.**

STOP. YOU HAVE COMPLETED THIS PROCEDURE

PERFORM POWER LOOP TESTS ON INSTALLED LINE POWERING AUA62( ) LIUS

SUMMARY: With VOM, measure Side 1 line current between +V and -I jacks on installed **LIU** (Figure 1). Meter should indicate between 0.57 and 0.63 volts. Measure Side 2 line current between the +I and -V jacks; meter should indicate between 0.57 and 0.63 volts. Measure line voltage between +V and -V jacks and record measurement. Meter should read less than 138 volts. Repeat each measurement on all line-powering **LIU**s installed in system under test at RT.

1. Condition VOM to measure dc volts.

2. On **LIU** being tested, connect negative (–) black lead to **-I** and positive (+) red lead of VOM to **+V** (Figure 1.).

3. Does VOM indicate between 0.57 and 0.63 volts dc?

   If **YES,** then continue with Step **4.**
   If **NO,** then do **TAP-100.**

4. Repeat Step **2** and Step **3** on each line-powering **LIU** in system under test, and proceed to Step **5.**

5. Change connections: red lead to **+I**, black lead to **-V**.

6. Does VOM indicate between 0.57 and 0.63 volts dc?

   If **YES,** then continue with Step **7.**
   If **NO,** then do **TAP-100.**

7. Repeat Step **5** and Step **6** on each line-powering **LIU** in system under test, and proceed to Step **8.**

8. Change VOM connections: positive (+) red lead to **+V** jack and negative (–) lead to **-V** jack.

9. ***Note:*** Line voltage measurement will vary with length of power loop. On short power loops, meter indication may be much less than 138 volts.

   Is voltage less than 138 volts?

   If **YES,** then record measurement and continue with Step **10.**
   If **NO,** then do **TAP-100.**

10. Repeat Step **8** and Step **9** on each line-powering **LIU** in system under test, and proceed to Step **11.**

11. Disconnect VOM.

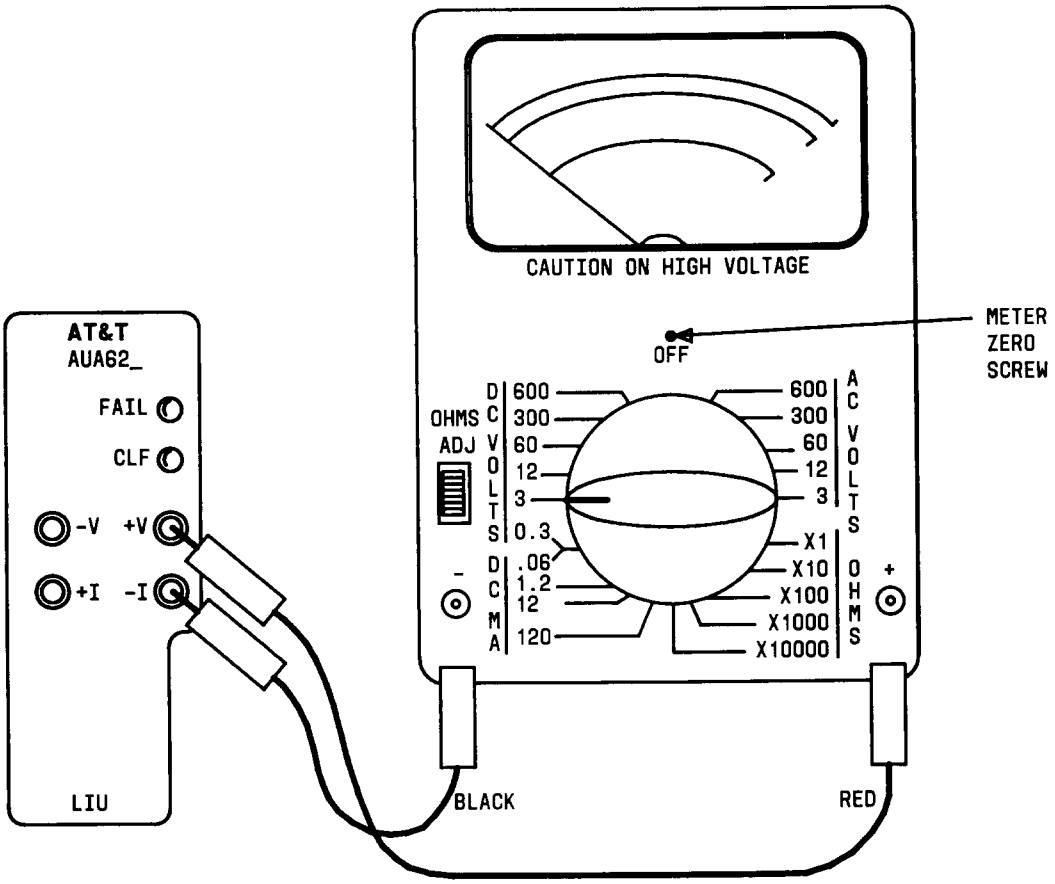


Fig. 1—Test Connections for Side 1 Line Current Measurement on AUA62( )

12. On office records for system, does engineering provide acceptable voltage range?

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

13. ***Note:*** First line measured cannot be evaluated for correct voltage requirements unless engineering provides acceptable range. All lines within system terminating at same location must measure within 10 percent of each other.

    Are recorded voltage measurements within acceptable range?

    If **YES,** then continue with Step **14.**
    If **NO,** then do **TAP-100.**

14. Are recorded values within 10 percent of each other for all lines in this system terminating at the same location?

    If **YES,** then continue with Step **15.**
    If **NO,** then do **TAP-100.**

15. Have all lines (installed line-powering **LIUs**) in this system been tested at RT?

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

SET RT ADU OPTION TO IN-SERVICE

1. *Note:* This procedure assumes that the system to be tested is equipped in the pre-service state.

   At RT on system being tested, remove **ADU** circuit pack. Verify that the **CLEAR/NORM** option plug is in the **NORM** (top and middle holes) position.

2. Are both AB and CD shelf groups being put into service?

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

3. At RT on **ADU** circuit pack, set switches on option switch **S1** (Figure 1) as follows: On option switch **S1**, press switch position **3** toward **ABI**, switch position **4** toward **CDI**, switch position **5** toward **ABE**, and switch position **6** toward **CDE**. Proceed to Step **5.**

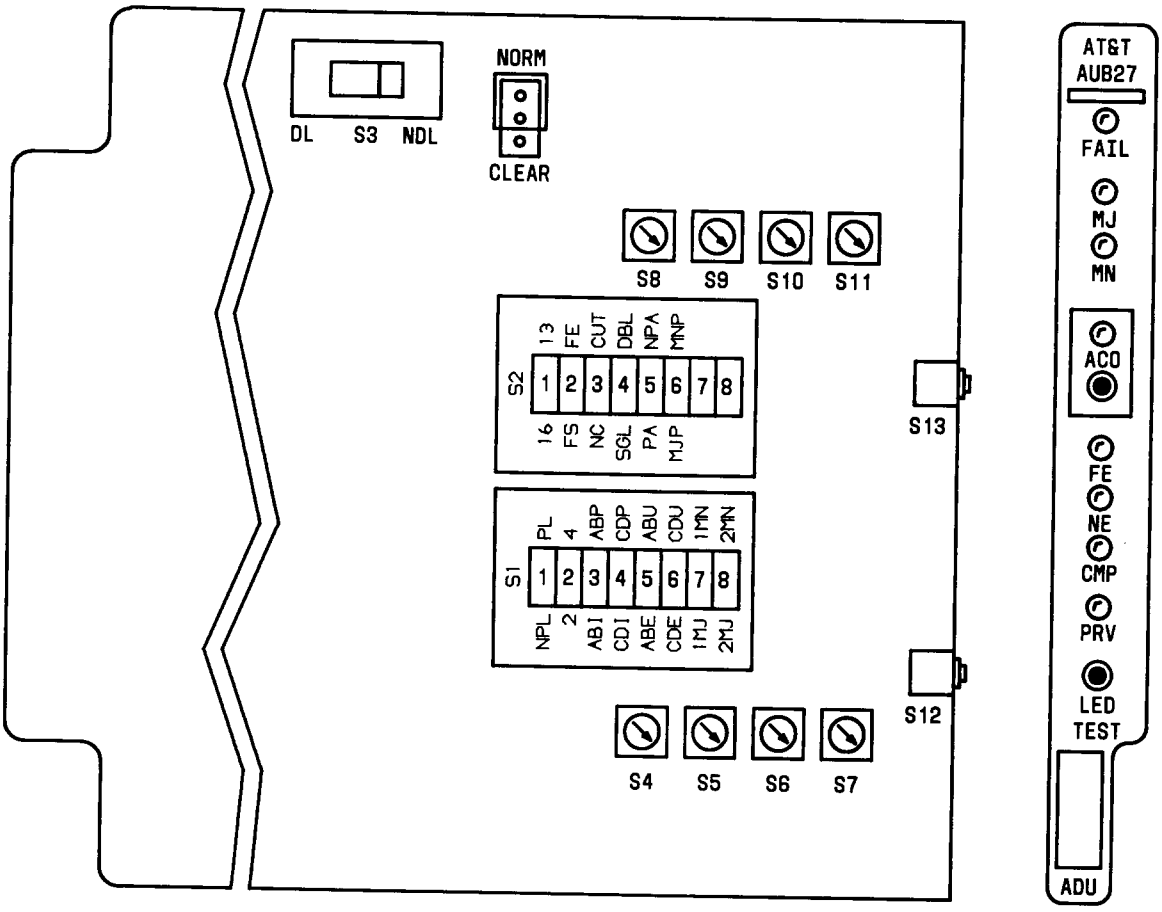


Fig. 1—AUB27 RT ADU Option Switch Settings

4. At RT on **ADU** circuit pack, set switches on option switch **S1** (Figure 1) as follows:

   If the AB shelf is being put into service, press switch position **3** toward **ABI** and switch position **5** toward **ABE**.

   If the CD shelf is being put into service, press switch position **4** toward **CDI** and switch position **6** toward **CDE**.

5. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

   Plug **ADU** circuit pack back into its slot.

   Response: **ADU FAIL**, **MN**, and **NE** indicators and **BCU FAIL** indicator light. **CTU FAIL** and **DTU FAIL** indicators light momentarily (if installed). All indicators should go out within 30 seconds.

6. Are all indicators cleared?

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

7. ***Caution: Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

   Recheck **ADU** option settings for in-service operation.

8. Are all indicators cleared?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then perform memory clear procedures.

   Reference: **DLP-572**

PERFORM SYSTEM TURNUP FOR SYSTEM EQUIPPED FOR INTEGRATED NETWORK ACCESS CAPABILITY

1. ***Note 1:*** After the **ADU** has been installed, at least 5 minutes must have elapsed before continuing with any procedure.

   Note 2: Depending upon the mode and system size selected, these procedures may need to be performed 1 to 4 times. Mode I requires two system turn-ups per one half dual bank or 4 system turn-ups per complete system. Mode III requires 1 turn-up per one half dual bank or 2 turn-ups for a complete bank.

   Verify that communication between CO terminating equipment and RT personnel has been established.

2. Is **FAIL** indicator on RT **BCU** lighted?

   If **YES,** then continue with Step **3.**
   If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

3. Replace the BCU. Wait 5 minutes before continuing.

4. Is **FAIL** indicator on **BCU** off?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO,** then continue with Step **5.**

5. Use schematic drawing (SD-7C117-01/SD-7C117-02) to check and correct wiring.

6. Is **FAIL** indicator on **BCU** off?

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

7. Obtain a SLC Series 5 Carrier CIU (craft interface unit).

8. Condition CIU for testing. Refer to CIU Users Guide if necessary.

9. Insert connector on end of CIU cable into **TEST ACCESS** jack on channel test unit **CTU.**

10. The CIU will perform a 15-second self-test when first powered up and then will display the following OPERATIONS MENU: **1. CKT ACTIVITIES 2. SYSTEM TURN-UP 3. TEST BUS ACCESS COMMAND [CKT ACTIVITIES] =**

11. At the CIU keyboard, enter **2** or **S.**

12. The CIU display will show: **/* THIS OPERATION SHOULD ONLY BE USED WHEN TURNING UP A NEW SYSTEM. HIT BREAK KEY TO STOP SYSTEM TURN-UP */ SYSTEM ID =**

13. Enter system identification (SYSTEM ID) number for system being turned up.

14. Does CIU display show: **/* EXECUTION ON AN OPERATING SYSTEM WILL INTERRUPT SERVICE ON ANY CU WITH SETTINGS AND DESTROY ALL SETTINGS. TYPE 'CLEAR SETTINGS' FOR SYSTEM TURN-UP, OR 'QUIT' TO STOP */ CLEAR SETTINGS OR QUIT =**

    If **YES,** then proceed to Step **26.**
    If **NO,** then continue with Step **15.**

15. Wait 5 minutes and then re-enter SYSTEM ID number.

16. Does CIU display show: **/* EXECUTION ON AN OPERATING SYSTEM WILL INTERRUPT SERVICE ON ANY CU WITH SETTINGS AND DESTROY ALL SETTINGS. TYPE 'CLEAR SETTINGS' FOR SYSTEM TURN-UP, OR 'QUIT' TO STOP */ CLEAR SETTINGS OR QUIT =**

    If **YES,** then proceed to Step **26.**
    If **NO,** then continue with Step **17.**

17. Wait 5 minutes and then re-enter SYSTEM ID number again.

18. Does CIU display show: **/* EXECUTION ON AN OPERATING SYSTEM WILL INTERRUPT SERVICE ON ANY CU WITH SETTINGS AND DESTROY ALL SETTINGS. TYPE 'CLEAR SETTINGS' FOR SYSTEM TURN-UP, OR 'QUIT' TO STOP */ CLEAR SETTINGS OR QUIT =**

    If **YES,** then proceed to Step **26.**
    If **NO,** then continue with Step **19.**

19. Press CIU **BREAK** key and the CIU display will show the OPERATIONS MENU.

20. Verify that CIU cable to CTU is properly seated. Wait 5 minutes and then repeat procedure from Step **11.** If CIU display is still not as indicated, then proceed to Step **21.**

21. Remove and then reinsert **ADU.** Wait 5 minutes and repeat procedure from Step **11.** If necessary, repeat this step once. If CIU display is still not as indicated, proceed to Step **22.**

22. Is **BCU FAIL** indicator lighted?

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

23. Replace **BCU** with lighted **FAIL** indicator. Wait 5 minutes and repeat procedure from Step **11.** If CIU display is still not as indicated, proceed to Step **25.**

24. Replace RT **BCU** for system under test. Wait 5 minutes and then repeat procedure from Step **11.** If CIU display is still not as indicated, proceed to Step **25.**

25. System turnup has failed. Report system trouble condition to appropriate group and proceed to Step **34.**

26. Do you wish to continue system turnup?

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

27. Enter **QUIT** and the CIU display will show: **/* SYSTEM TURN UP NOT PERFORMED */ [HIT SPACE BAR TO CONTINUE]**. If space bar is pressed, CIU will display the OPERATIONS MENU. If system turn up is to be restarted, return to Step **11**.

28. Enter **CLEAR SETTINGS** and CIU display will show: **/* COMMAND IS EXECUTING AND COULD TAKE SEVERAL MINUTES TO COMPLETE, PLEASE STAND BY...*/**

29. When system turnup is completed, CIU display will show: **/* SYSTEM TURN-UP PROCESS IS COMPLETED */ [HIT SPACE BAR TO CONTINUE]**

30. Press space bar and CIU display will show the OPERATIONS MENU.

31. Is **FAIL** indicator on RT **BCU** off?

    If **YES,** then proceed to Step **34.**
    If **NO,** then continue with Step **32.**

32. ***Caution: When replacing ADU, verify that option switch settings on replacement unit are set according to engineering or facility records. Incorrectly set ADU option switches may result in immediate or future loss of service or may introduce errors into the digital bitstream.***

    Note: If any unit must be replaced more than two times, report system trouble condition to appropriate group and proceed to Step **34**.

    Replace all units with **FAIL** indicator lighted. Wait 5 minutes before continuing.

33. Was more than one unit replaced?

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

34. Power down CIU and remove connector from **CTU**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

TEST REMOTE ALARM SYSTEM

OVERVIEW: This procedure requires coordination between the alarm center and remote terminal. This procedure tests connections to remote alarms. The steps below include tests for both types of alarms.

1. ***Caution: System must be out of service to perform test; otherwise, service will be interrupted. 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.***

   Check office records for system under test. If it is connected to provide remote alarms, follow remote alarm tests; otherwise, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

2. Consult office records and verify that needed jumpers for remote alarm points have been made at main distributing frame.

3. What type of RT powering do you have?

   Distributed Powering: If RT frame or cabinet uses the J1C182BA power shelf and 181A apparatus mounting (battery shelf), continue with Step **4.**

   Bulk Powering: If RT frame uses the J1C182BB bulk power shelf and -48 Vdc power plant, continue with Step **7.**

4. At RT, verify battery power to dual channel bank (**BATTERY CHARGER** indicator **HIGH RATE CHG/ON** not lighted).

5. Unplug ac power cord plug from outlet or turn breaker off (to test PMN and closures to the maintenance center).

   Response: After approximately 4 minutes, **PMN** (Power Minor) is lighted at the maintenance center. Also, the **MJ** or **MN** alarm may be active depending upon the settings of the Integrated Power Alarm.

   Response: The **ADU NE** indicator and the **BCU PMN** indicator is lighted. The **BAT DISCHG** indicator on the **BATTERY CHARGER** and the **ALARM** indicator on the **RECTIFIER** is lighted.

6. At RT, reinsert ac power cord plug into ac outlet or turn circuit breaker on. Then proceed to Step **9.**

   Response: After approximately 4 minutes, **PMN** (Power Minor) goes out at the maintenance center. Also, the **MJ** or **MN** alarm goes out if the Integrated Power Alarm is active.

   Response: The **ADU NE** indicator and the **BCU PMN** indicator goes out.

Response: The **BAT DISCHG** indicator on all **BATTERY CHARGERs** and the **ALARM** indicators on the **RECTIFIERs** go out and **HIGH RATE CHG/ON** indicators on all **BATTERY CHARGERSs** light. The **HIGH RATE CHG/ON** indicators go out after a period of time determined by the charge state of the batteries.

7. At RT with bulk powering arrangement go to the main circuit breaker box, remove ac power cord plug for the -48 Vdc power plant by turning circuit breaker(s) off (to test PMN closures).

Response: After approximately 4 minutes, **PMN** (Power Minor) is lighted at the maintenance center. Also, the **MJ** or **MN** alarm may be active depending upon the settings of the Integrated Power Alarm.

Response: The **ADU NE** indicator and the **BCU PMN** indicator is lighted. The **BAT DISCHG** indicator on the **BATTERY CHARGER** and the **ALARM** indicator on the **RECTIFIER** is lighted.

8. At RT, restore ac power by turning circuit breaker(s) on.

Response: After approximately 4 minutes, **PMN** (Power Minor) goes out at the maintenance center. Also, the **MJ** or **MN** alarm goes dark if the Integrated Power Alarm is active.

Response: The **ADU NE** indicator and the **BCU PMN** indicator goes out.

Response: The **BAT DISCHG** indicator on all **BATTERY CHARGERs** and the **ALARM** indicators on the **RECTIFIERs** go out and **HIGH RATE CHG/ON** indicators on all **BATTERY CHARGERSs** light. The **HIGH RATE CHG/ON** indicators go out after a period of time determined by the charge state of the batteries.

9. Is one shelf group already providing service?

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

10. ***Caution: Performing this test on working shelf group will cause service interruption.***

Note: When **MJ** result is expected, request alarm center to stand by to verify closures as quickly as possible so **MJ** can be cleared.

At RT for system under test, unseat **TRU** for the shelf group being tested.

Response: **ADU MJ** and **NE** indicators are lighted. **BCU** Digroup indicators light for the shelf currently being tested. **MJ** closure is sent to the maintenance (alarm) center.

11. At RT, reinsert **TRU.**

Response: **MJ, NE,** and Digroup indicators go out within 20 seconds. MJ closure is cancelled at the alarm center.

12. Is second shelf group to be tested (test digroup closures)?

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

13. ***Note:*** This test brings up **MJ** alarm. Request alarm center to stand by.

    At RT for system under test, unseat second shelf group **TRU.**

    Response: **ADU MJ** and **NE** indicators are lighted. **BCU** Digroup indicators light for the shelf being tested. MJ closure is sent to the maintenance (alarm) center.

14. At RT, reinsert shelf group **TRU.**

    Response: **ADU MJ** and **NE** indicators go out within 20 seconds. MJ closure is cancelled at the alarm center.

15. At RT for system under test, unseat **BCU.**

    Response: **ADU MN** and **NE** indicators are lighted. MN closure is sent to the alarm center.

16. At RT, reinsert **BCU.**

    Response: **MN** and **NE** indicators go out within 20 seconds. MN closure is cancelled at the alarm center.

17. **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

PERFORM END-TO-END TALK TEST FOR INA

SUMMARY: At CO, use test line to connect unassigned subscriber line and call number to channel being tested. At RT, determine corresponding channel. 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 each digroup.

1. Establish communication between RT and CO.

2. ***Note:*** These test procedures are to be performed on the last (right) slot in each digroup.

   At CO, select a single-party channel for testing and inform RT of channel selected.

3. At selected channel appearance on MDF (main distributing frame), connect a temporary call number and subscriber line circuit test line.

4. ***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 a single-party channel unit into the last channel unit slot of the digroup that coincides with the channel being tested and temporarily connect a test telephone set to the channel. Provision the channel unit if necessary.

   Reference: **DLP-575**

   Response: Central office test line and RT telephone are connected.

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

6. Is dial tone present at RT?

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

7. Check test connections and correct if needed. Replace RT channel unit and check for dial tone. If still not present, inform central office.

8. Is dial tone present at RT?

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

9. Use CO terminating equipment schematic drawings to check channel bank wiring. Use office drawings to check central office wiring. Look for tip and ring reversal between CO terminating equipment channel appearance and office equipment; also between RT and cross-connect terminal. Correct wiring until dial tone is present at RT and proceed to Step **10.**

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

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

    If **YES,** then proceed to Step **17.**
    If **NO,** then continue with Step **12.**

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

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

    If **YES,** then proceed to Step **17.**
    If **NO,** then continue with Step **14.**

14. Replace CO terminating equipment channel unit if applicable and repeat normal talk tests.

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

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

16. Use CO terminating equipment and RT schematic drawings to check wiring. Check for tip and ring reversal between CO terminating equipment channel appearance and office equipment and between RT and cross-connect terminal. Correct wiring and repeat Step 11 until talk quality is good in both directions.

17. At CO terminating equipment, dial test line number to ring telephone at RT.

18. At RT does test telephone ring normally?

    If **YES,** then proceed to Step **22.**
    If **NO,** then continue with Step **19.**

19. Has tip and ring reversal been checked?

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

20. Replace RT channel unit first and then COT channel unit if applicable. Repeat this procedure from Step **4** after each replacement.

21. Look for tip and ring reversal at CO and RT and repeat from Step **17.**

22. At RT, lift telephone handset during ringing.

23. At RT, does ringing trip normally?

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

24. Replace RT channel unit first and then COT channel unit if applicable. Repeat this procedure from Step **4** after each replacement.

25. At RT, get VOM and condition to measure dc volts.

26. Make sure test call is established and held between CO and RT.

27. At RT, connect (+) red lead of VOM to tip terminal and (–) black lead to ring terminal of RT test telephone.

28. At RT, does meter indicate between 4V and 15V dc?

    If **YES,** then proceed to Step **34.**
    If **NO,** then continue with Step **29.**

29. Check RT test connections and correct if needed.

30. At RT, does meter now indicate between 4V and 15V dc?

    If **YES,** then proceed to Step **34.**
    If **NO,** then continue with Step **31.**

31. Replace RT channel unit for channel being tested. If meter still does not indicate between 4V and 15V, replace CO channel unit if applicable.

32. At RT, does meter now indicate between 4V and 15V dc?

    If **YES,** then proceed to Step **34.**
    If **NO,** then continue with Step **33.**

33. Use CO terminating equipment and RT schematic drawings to check wiring. Check central office wiring.

34. At RT, observe VOM meter.

35. ***Note:*** A VOM should be used to observe results at RT because results may be difficult to see if a digital voltmeter is used.

    At CO, momentarily (1-2 seconds) break tip or ring connection for channel being tested.

36. At RT, does meter indicate 0 volts for approximately 1 second, then return to previous level (4 to 15 volts)?

    If **YES,** then proceed to Step **40.**
    If **NO,** then continue with Step **37.**

37. Replace RT channel unit and then CO terminating equipment channel unit for channel being tested. Repeat this procedure from Step **4,** after each replacement, and proceed to Step **38.**

38. At RT, does meter indicate 0 volts for approximately 1 second, then return to previous level (4 to 15 volts)?

    If **YES,** then proceed to Step **40.**
    If **NO,** then continue with Step **39.**

39. Use CO terminating equipment and RT schematic drawings to check wiring. Check central office wiring.

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

If **YES,** then continue with Step **41.**
If **NO,** then proceed to Step **2.**

41. At RT, remove test telephone. At CO, remove test line connection.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

PROVISION 2-WIRE SPECIAL SERVICES CHANNEL (AUA42 AND AUA43 CHANNEL UNITS)

1. Obtain a SLC Series 5 carrier CIU (craft interface unit).

2. Connect the CIU to the **AUB25** or **AUB22** to provision. Refer to the CIU Users Guide if necessary.

3. ***Note 1:*** The CIU will perform a 15-second self-test when first powered up.

   Note 2: Either the **48** or **96** System Size Indicator on the **BCU** will be lit when a session is running.

   Select CKT ACTIVITIES from operations menu.

4. At prompt SYSTEM ID = enter system number (0000 - 9999).

5. At prompt CHANNEL = enter channel number (1-48) or (1-96).

6. Enter location of channel unit to be provisioned; from menu for CU LOCATION= enter RT-END.

7. At prompt CU CLEI = enter *CLEI** code (from WORD) for channel unit [5SCU690 (AUA42) or 5SCU6A0A (AUA43)].

8. From circuit activities menu, select PROVISION.

9. ***Caution 1: If function code is FXS or FXO with toll diversion or DPO/DPT, verify correct Series 5 channel unit and provisioning at the other end before provisioning this unit. Incorrect provisioning or incorrect channel unit at the far end can cause continuous ringing on the circuit.***

   Caution 2: If function code is TO, verify that cable has been cross-connected or that channel unit has not ***been installed before proceeding.***

   At prompt FUNCTION CODE = enter channel unit function code (given on WORD). The function codes are: DPT, TO, FXO, DPO, and FXS.

10. At prompt IMPEDANCE = enter 600 or 900 from IMP= on WORD.

11. At prompt BALANCE = enter value from BAL= on WORD.

12. At prompt TRANSMIT GAIN = enter value from TRMT(GN)= on WORD.

13. At prompt RECEIVE GAIN = enter value from RCV(GN)= on WORD.

* COMMON LANGUAGE is a registered trademark and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.

14. At prompt SLOPE = enter value from SL= on WORD.

15. Which function code are you using?

    If **DPO/DPT/TO,** then proceed to Step **19.**
    If **FXO,** then continue with Step **16.**
    If **FXS,** then proceed to Step **18.**

16. At prompt TOLL DIVERSION? enter [YES] or [NO] from TD= on WORD.

17. At prompt SIGNALING TYPE = enter LS or GS from LS-GS= on WORD.

18. At prompt ON-HOOK TRANSMISSION? enter [YES] or [NO] from OHT= on WORD.

19. At prompt REDLINE-SSP? enter :

    [YES] if WORD header has **PRQ SSP**
    [NO] if WORD header has **PRQ**.

20. At prompt DO YOU WANT TO MAKE CHANGES? enter [YES] (to review) or [NO] (to go to the EXIT MENU).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

SETTING LIU (LINE INTERFACE UNIT) OPTION SWITCHES

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 LIUs in the same bank should have identical option switch settings.***

   Get one **LIU** (Figure 1) and inspect for possible damage.

2. Is **LIU AUA61C** being installed in bank assembly?

   If **YES,** then continue with Step **3.**
   If **NO,** then proceed to Step **5.**

3. Set equalizer switch **S2** on **LIU AUA61C** per facility record (TABLE A).

4. Set loopback enable/disable switch **S3** on **AUA61C** to **ENB** if the bank assembly is connected to a DDM-1000 Multiplexer. Otherwise, set it to the **DIS** position and proceed to Step **6.**

5. Set transmit and receive pad switches on **LIU** per facility record (TABLE B).

6. Set line coding and framing format switches on **LIU** per work order or engineering records (TABLE C).

TABLE A
AUA61C
LIU EQUALIZER SETTINGS

DISTANCE TO DSX-1 (FEET)	EQUALIZER SWITCH (S400/S2) SETTINGS		
	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

TABLE B
AUA62C AND AUA64C TRANSMIT/RECEIVE PAD SETTINGS

INSERTED LOSS (dB)	TRANSMIT PAD (S400/S1, S2) SWITCH SETTINGS				RECEIVE PAD (S100) SWITCH SETTINGS	
	1	2	3	4	1	2
22.5	OFF	OFF	OFF	ON	—	—
15.0	OFF	OFF	ON	OFF	—	—
7.5	OFF	ON	OFF	OFF	OFF	ON*
0	ON	OFF	OFF	OFF	ON*	OFF

* ON when depressed toward the numbers.

TABLE C
LIU LINE CODING AND FRAMING FORMAT SWITCH SETTINGS

OPTION DESCRIPTION	LIU SWITCH (S100) SETTINGS
B8ZS CODING ZCS CODING	B Z
ESF (Fe) FRAMING FORMAT Fs FRAMING FORMAT	F D*

* *SLC* Series 5 Carrier System Mode 96 use only.

7. Set channel PCM-rate switch (**S4**) to **32** for Mode III operation or to **64** for Mode I operation.

8. Insert **LIU** into appropriate **LIU** slot in facility shelf.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

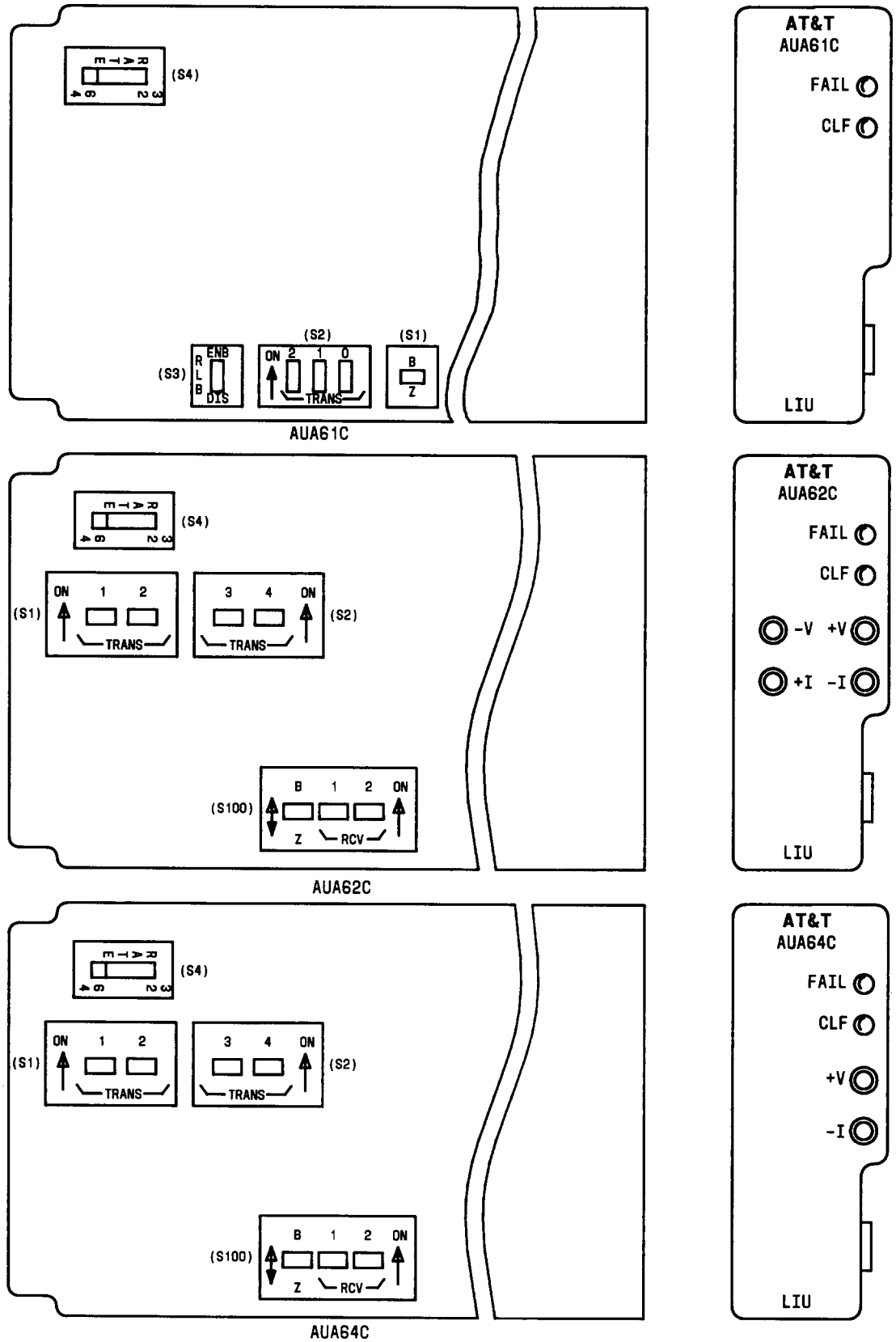


Fig. 1—AUA61C, AUA62C, and AUA64C LIU Option Switches

CHECKLIST

ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE
		DLP-527					
IXL-001		DLP-528					
NTP-002		DLP-529					
NTP-003		DLP-530					
NTP-004		DLP-531					
NTP-006		DLP-532					
NTP-010		DLP-533					
TAD-100		DLP-534					
TAP-101		DLP-535					
TAP-102		DLP-536					
TAP-103		DLP-537					
TAP-104		DLP-538					
TAP-110		DLP-539					
DLP-500		DLP-540					
DLP-501		DLP-541					
DLP-502		DLP-542					
DLP-503		DLP-543					
DLP-504		DLP-544					
DLP-505		DLP-545					
DLP-506		DLP-546					
DLP-507		DLP-547					
DLP-508		DLP-548					
DLP-509		DLP-549					
DLP-510		DLP-550					
DLP-511		DLP-551					
DLP-512		DLP-552					
DLP-513		DLP-553					
DLP-514		DLP-554					
DLP-515		DLP-555					
DLP-516		DLP-556					
DLP-517		DLP-570					
DLP-518		DLP-571					
DLP-519		DLP-572					
DLP-520		DLP-573					
DLP-521		DLP-574					
DLP-522		DLP-575					
DLP-523		DLP-580					
DLP-524		CKL-891					
DLP-525		TNG-893					
DLP-526							

• Revised or added item
☐ Canceled item

HOW TO USE TOP

This book is a Task Oriented Practice which is called a "TOP". It gives you all the step-by-step instructions you need to do your job (task). These instructions are given in the order that they ***must*** be done. Failure to follow the instructions in the order given may cause service interruptions.

Regardless of your work experience, TOP can be a useful tool in doing your job. If you have done a particular job many times, or if you do it frequently, TOP gives you "memory joggers" for those instructions you cannot recall. If you have never done a particular job, or if you do it infrequently, TOP gives you the detailed step-by-step instructions you need to do the job.

The work that you do can be divided into two broad job functions – work to clear troubles and work other than to clear troubles.

Work to Clear Troubles: This is the work you do to fix troubles in the equipment. You may be doing this work in response to a customer's complaint, an office alarm, a trouble report, an abnormal printout, or any other equipment fault indication.

Work Other Than to Clear Troubles: This is the work you do to install equipment, to test equipment after it is installed, to place equipment in service, to operate and maintain equipment, or anything else required to establish, to change, or to discontinue service to the customer.

Now, look at the front cover of this book. In the upper right corner is the 9-digit volume number. Near the center is the title, which tells you something about the contents such as the name of the equipment and maybe what types of jobs are included. Below the title is a flow diagram which uses logic symbols to direct you either to 893 or to 001 depending on your understanding of how to use TOP. Do you wonder what those numbers mean? Okay, a TOP is divided into parts called procedures. Each procedure is given a 3-digit number. These numbers range from 001 through 899. Procedures are arranged in this book in numerical order beginning with 001.

TASK INDEX LIST

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO
Alert; External – Horn, Ringer, Etc. – Remove	NTP-028
Amplifiers; Channel – Recorded Announcement Frame – Test	NTP-009
BRDG LED – Does Not Light – Correct	TAP-117
Bridging Controller; Trunk – J1C015MB – Replace	DLP-572
Channel Amplifiers – Recorded Announcement Frame – Test	NTP-009
Drum Wiper – Common Systems Recorded Announcement Frame – Inspect	NTP-010
Extended Station Capability – Nonkey Set Only – Reported Failure	TAP-123
External Alert – Horn, Ringer, Etc. – Remove	NTP-028
Interchange Two Working Station Numbers	NTP-081
LED: BRDG – Does Not Light – Correct	TAP-117
Loudspeaker Paging – Add	NTP-059
New International Trunk, R1 Signaling – Incoming – Establish	NTP-010
New Tandem Trunk – T-Carrier and Digroup Terminal – Establish	NTP-008
Station Capability; Extended – Nonkey Set Only – Reported Failure	TAP-123
System Test – Perform	NTP-016
Trunk Bridging Controller – J1C015MB – Replace	DLP-572

Fig. 1 – Typical List of Jobs You May Have to Do

Now, look at Fig. 1. It is a typical 001 procedure and is always called a "Task Index List." It is an alphabetical listing of the jobs that you may have to do. To use a 001, just find the job you need to do in the "FIND YOUR JOB IN THE LIST BELOW" column. Next, follow the dotted line to the procedure number for that job in the "THEN GO TO" column. Then turn to that procedure number and begin the task.

For example, suppose you are given the job of doing a system test. On the 001 as shown in Fig. 1, find your job. Note that it is listed in the "FIND YOUR JOB IN THE LIST BELOW " column as "System Test-Perform." Now find the procedure number for that job. Note that it is listed in the "THEN GO TO" column as "NTP-016." It could have been any other 3-digit number. Now what does this procedure give you? Turn to next page.

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Issue 2

NTP-016
Page 1 of 2

PERFORM SYSTEM TEST

DO ITEMS BELOW IN ORDER LISTED . .	FOR DETAILS, GO TO
1 Test Local Maintenance Terminal	DLP-531
2 Place SEC/SEB in Off-Line Mode	
A. If in On-Line Mode, Change System From On-Line to Off-Line	DLP-509
B. If Powered Down, Condition System for Off-Line Operation as Follows	
1. Power up Minicomputer	DLP-503
2. Power up Line Printer	DLP-528
3. Power up Maintenance Terminal	DLP-510

7	Run Computer Display Terminal Test For All Positions	DLP-513
8	Mount Tape	DLP-500
9	Test Computer Display	DLP-522

Fig. 2 – Typical List of Specific Instructions for Doing a Job

Look at Fig. 2. It consists of numbered items (or steps) listed in the order that you must do them to complete your job. To use this procedure, you must start with item 1 in the "DO ITEMS BELOW IN THE ORDER LISTED" column and continue until all items have been done. When you get to an item that you do not know how to do, look for the procedure number for that item under the "FOR DETAILS, GO TO" column. This is the number of the procedure that will give you detailed step-by-step instructions to do that item. Note that item 2 in Fig. 2 uses lettered (A, B) entries. This means that there are alternate ways of doing item 2 depending on equipment options or equipment conditions. You do only the one that fits your equipment options or equipment conditions.

For example, suppose you are doing a system test. The 001 as shown in Fig. 1 has directed you to 016 as shown in Fig. 2 and you are on item 8 "Mount Tape" in the "DO ITEMS BELOW IN ORDER LISTED" column. If you know how to mount the tape, do it. If you do not know how to mount the tape, go to the procedure number listed in the "FOR DETAILS, GO TO" column for the detailed step-by-step instructions. In this case, it happens to be 500. In either case, you must continue with the next item listed in 016 until you complete the job.

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Issue 2

DLP-500
Page 1 of 2

MOUNT TAPE

SUMMARY: Install tape with or without write enable ring, as required. Thread tape and position tape at beginning of tape (BOT) marker.

1. Get file reel and empty take-up reel.
2. Set ***START/STOP*** switch to ***STOP***.
3. Set ***ON LINE/OFF LINE*** switch to ***OFF LINE***.
4. Set ***LOAD/BR REL*** switch to center position.
5. Is data to be written on tape?

   If **YES**, then install write enable ring on file reel and go to Step **7**.
   If **NO**, then do Step **6**.
6. Ensure that write enable ring is not installed on file reel

   Reference: **DLP-563**
7. Open tape transport door.

Fig. 3 – Typical List of Detailed Instructions for Doing a Job

Now, lets look at 500 as shown in Fig. 3. It is a typical page of a procedure that gives numbered step-by-step instructions. To use this procedure, you must start with Step 1 and proceed as directed by the instructions until you complete this procedure. Note that Step 1 of this procedure is preceded by a statement called a "SUMMARY." A summary is used as a "memory jogger," and briefly tells you how to do the procedure and what measurements or results you can observe. If you can do the procedure after reading the "SUMMARY", go ahead and do it without reading any further. Not all procedures have a "SUMMARY" statement.

Now, look at Step 6 of the 500 as shown in Fig. 3. Note that following the action statement there is the word "Reference" followed by "DLP-563" (Detailed Level Procedure). When you see a reference like this, it means that additional step-by-step instructions for doing just that step are given in the referenced procedure. In this case, 563 gives you the details on how to "Ensure that the write-enable ring is not installed on the file reel." If you, in this case, can do Step 6 without going to 563, go ahead and do it. If you do not know how to do Step 6, then go to 563. In either case, you must continue with Step 7 until you have completed the procedure. In some cases, you may be directed to a procedure where the procedure number is preceded by the letters "TAP" (Trouble Analysis Procedure), for example, TAP-109. This means that you have trouble in the equipment and in this case TAP-109 will give you step-by-step instructions to fix the trouble. After you have fixed the trouble, you must return to Step 1 of the procedure that sent you to TAP-109.

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Issue 2

IXL-001
Page 1 of 2

TASK INDEX LIST

FIND YOUR JOB IN THE LIST BELOW . .	. . THEN GO TO
Alert; External – Horn, Ringer, Etc. – Remove	. . . . . NTP-028
Alarm – Major – Clear	. . . . . TAP-109

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Issue 2

TAP-109
Page 1 of 2

CLEAR MAJOR ALARM AT TERMINAL

1. The following ISD is available for support

   Reference: ISD-108

2. Is PWR ALM alarm lamp lighted on power regulator in terminal?

   If YES, then do Step 3
   If NO, then do Step 4

ISD-108
Page 1 of 1

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Issue 2

MAJOR ALARM STR

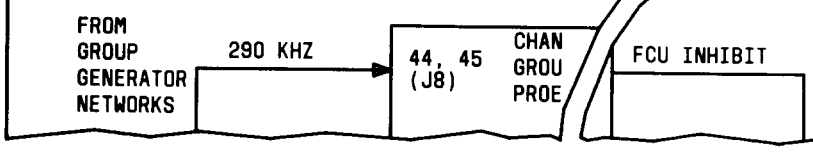

Fig. 4 – Typical Data Accessing for Trouble-Clearing Work

However, if you came directly from 001 to 109 as shown in Fig. 4, then your job is completed when you have fixed the trouble.

Note that Step 1 in TAP-109 as shown in Fig. 4 gives you a reference to "ISD-108." This is a block diagram of the trouble area and gives you support information for the 109 procedure.

Safety: Always do your job safely. Three safety notices are used in TOP as follows:

> ***DANGER: This means there is a possibility of personal injury.***

Caution: This means there is a possibility of service interruption.

Warning: This means there is a possibility of equipment damage.

Important Items: Look at Table A. It lists the more important items used in TOP.

Reporting TOP Errors: If, while using TOP you find errors, call the "TOP HOTLINE" number located on the front cover in the lower right corner. You can also report errors by using comment form E-3973. Details on how to fill out this form are in AT&T 000-010-015. Your comments are needed to provide useful and accurate TOP coverage.

TABLE A

IMPORTANT TOP ITEMS AND DEFINITIONS

ITEM	DEFINITION
Acceptance (NTP-002)	Provides information and identifies jobs to be done to accept equipment after it is installed.
Maintenance Philosophy (TAD-100)	The maintenance philosophy, when provided, gives an overview of the considerations designed into the trouble-clearing procedures.
Checklist (CKL-891)	The checklist reflects the content (inventory) at any given time.
Documentation Plan (DPL-895)	The documentation plan gives a bird's-eye view of all the TOP books covering a system. This plan can help you to quickly determine the correct books to use.
DLP (Detailed Level Procedure)	Detailed step-by-step instructions.
ISD (Isolation Diagram)	A functional block diagram defining the trouble universe
TAD (Trouble Analysis Data)	A trouble-clearing aid other than instructions. It may be a functional schematic, text, trouble-locating chart, etc.
TAP (Trouble Analysis Procedure)	Step-by-step trouble-clearing instructions to locate and/or fix troubles.
NTP (Non Trouble-Clearing Procedure)	A list of items to perform normal work other than trouble-clearing.