AT&T System 85

Release 2 Versions 1, 2, 3, and 4

Remote Module and Remote Group Interface

Installation and Test

555-103-112 Issue 1, July 1987

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INTRODUCTION

PURPOSE

This manual provides the instructions for installing the remote equipment associated with System 85. This includes the Remote Module Interface (RMI), with and without a remote console, and the Remote Group Interface (RGI).

This manual provides instructions for installing and testing the Phase 1 and/or Phase 2 RMI for all Versions of a Release 2 System 85. A Phase 1 system can place up to 15 module control cabinets at one or more remote locations. For each remote module control, there must be a module control at the central location. The remote modules are tied into the rest of the system by using TN456 circuit packs that channel them through a central module to the common control.

A Phase 2 system utilizes the RMI carrier to provide up to 30 remote modules with only one central module control. The remote modules are tied to the central module using TN456 Lightguide Interface circuit packs that channel them through the RMI carrier to the common control.

The remote console is a feature associated with the RMI. The console requires the use of two Optically Remoted Peripheral Interfaces (ORPIs) in a fiber-optic link subsystem.

The installation and testing will require limited downtime to each individual module control cabinet associated with the RMI during installation procedures. Included are instructions for hardware requirements, cabling details, and general guidelines for installation.

This manual also provides the installation procedures for the Remote Group Interface (RGI) feature. This feature utilizes the Remote Group Housing (RGH), an ANN15B in the DS1/MFAT carrier at the central location, and an ANN16B at the remote location. It utilizes the SN228, SN270, SN238, and ANN17B port circuit packs to provide remote service.

Complete all other installation procedures using *AT&T System 85 Installation* (555-103-104) before installing the RMI or RGI.

HOW TO USE THIS MANUAL

A "start to finish" sequence to the installation process is arranged to permit several tasks to be accomplished at a time. For example, if more than one person is working on the job, one can work at the remote location while another works at the central location. Some of the installation processes described in this book may already be in place if the system being worked on is a new system that was engineered with RMI or RGI in mind.

It is recommended that you become familiar with the contents and organization of this manual. Make use of the Table of Contents and Index to locate your task.

ORGANIZATION

This manual is divided into the sections described as follows:

- RMI SYSTEM INSTALLATION—The installation procedures for Phase 1 and Phase 2 RMI on an Unduplicated and Duplicated System 85. It also contains the installation procedures for the remote console.

- CUSTOMIZING FIBER-OPTIC LINKS—The procedure for adjusting the fiber-optic links between central remote locations after the installation procedures are completed.
- RGI INSTALLATION—The installation procedures for the RGI feature and its associated hardware.
- SYSTEM TESTS—The testing procedure for Phases 1 and 2 RMI on a Duplicated and Unduplicated System 85. It also describes the testing procedure for the RGI.
- INDEX—A permuted index.

RMI SYSTEM INSTALLATION

This section contains instructions for installing RMI hardware in an unduplicated and duplicated system. Figures 1 and 2 are basic block diagrams showing the connections necessary to add Phase 1 RMI to an existing unduplicated or duplicated System 85. Figures 3 and 4 are basic block diagrams showing the connections necessary to add Phase 2 RMI to an existing unduplicated or duplicated system. The duplicated systems shown in Figures 2 and 4 are for fully duplicated control functions (common control, module control, and Time-Multiplexed Switch [TMS]). It is possible to have other combinations of duplication. The actual connections for these configurations are shown later in this manual.

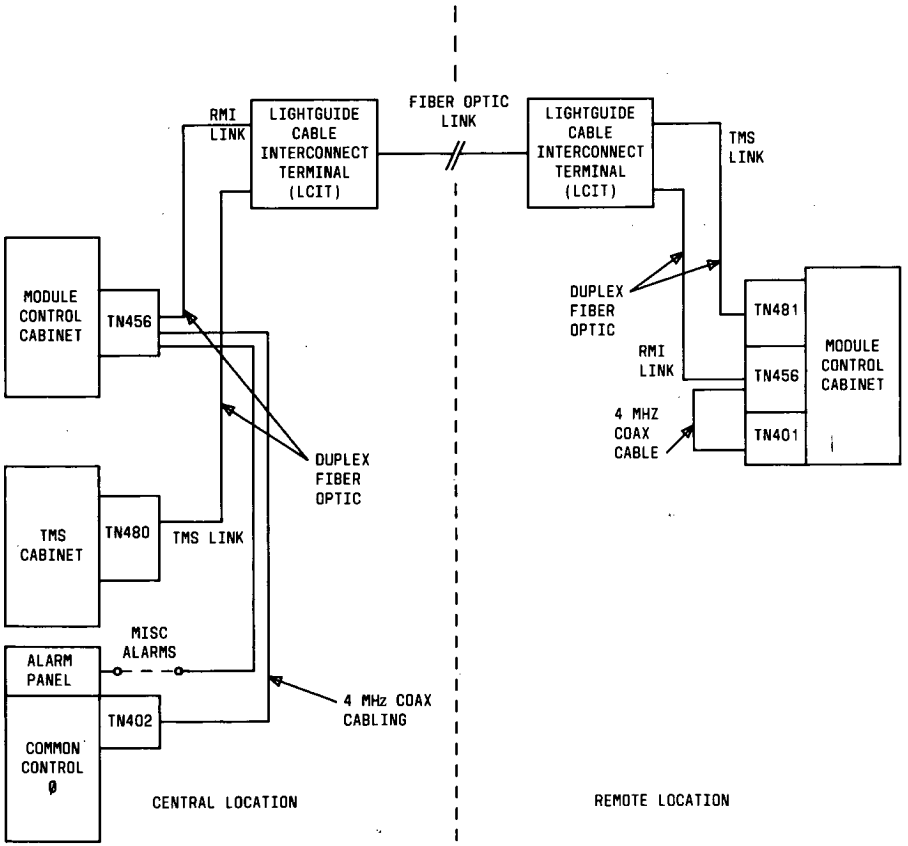


Figure 1. Unduplicated RMI System (Phase 1) Block Diagram

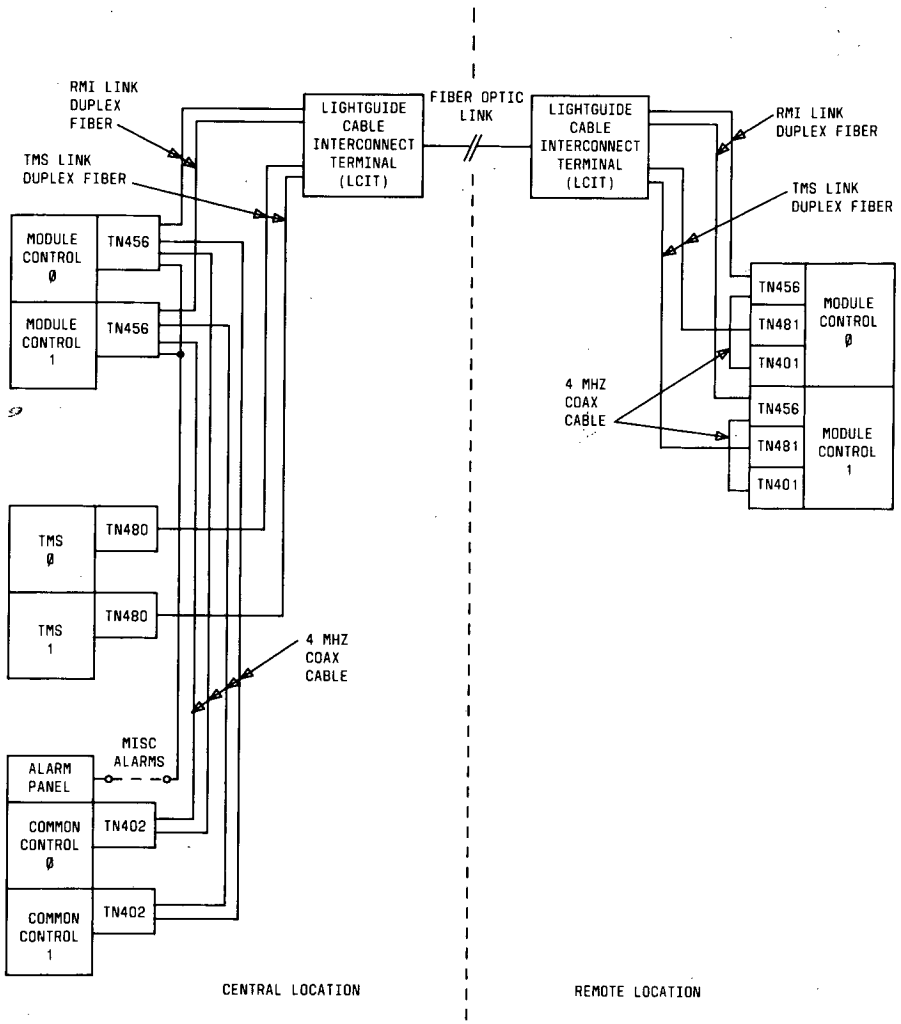


Figure 2. Duplicated RMI System (Phase 1) Block Diagram

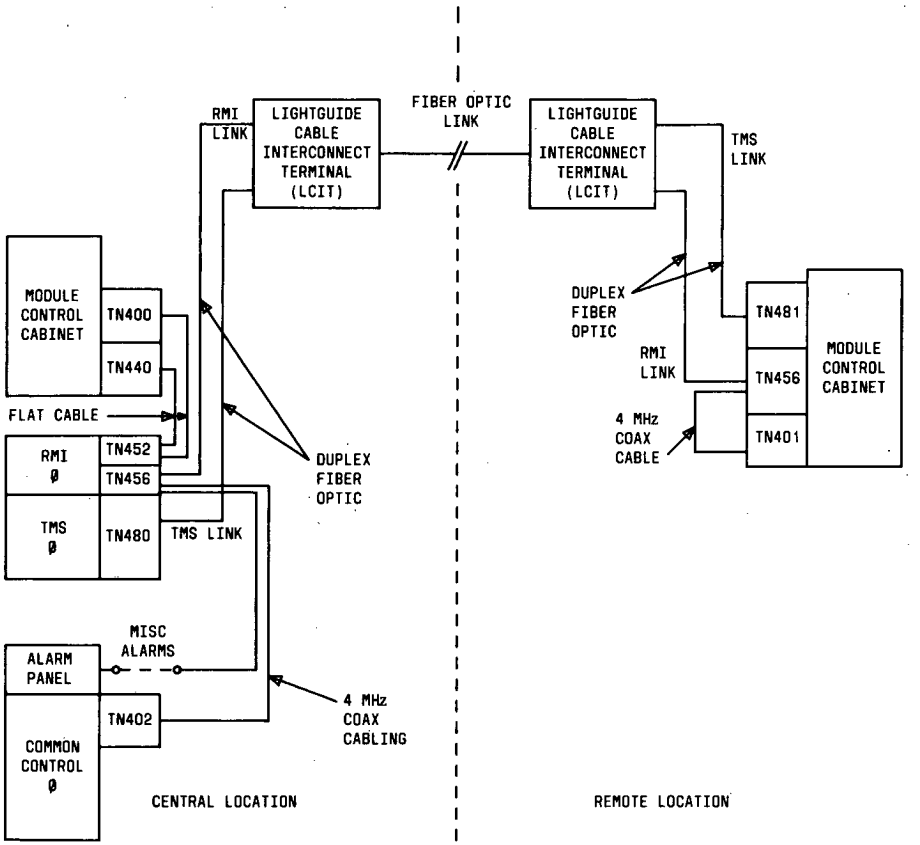


Figure 3. Unduplicated RMI System (Phase 2) Block Diagram

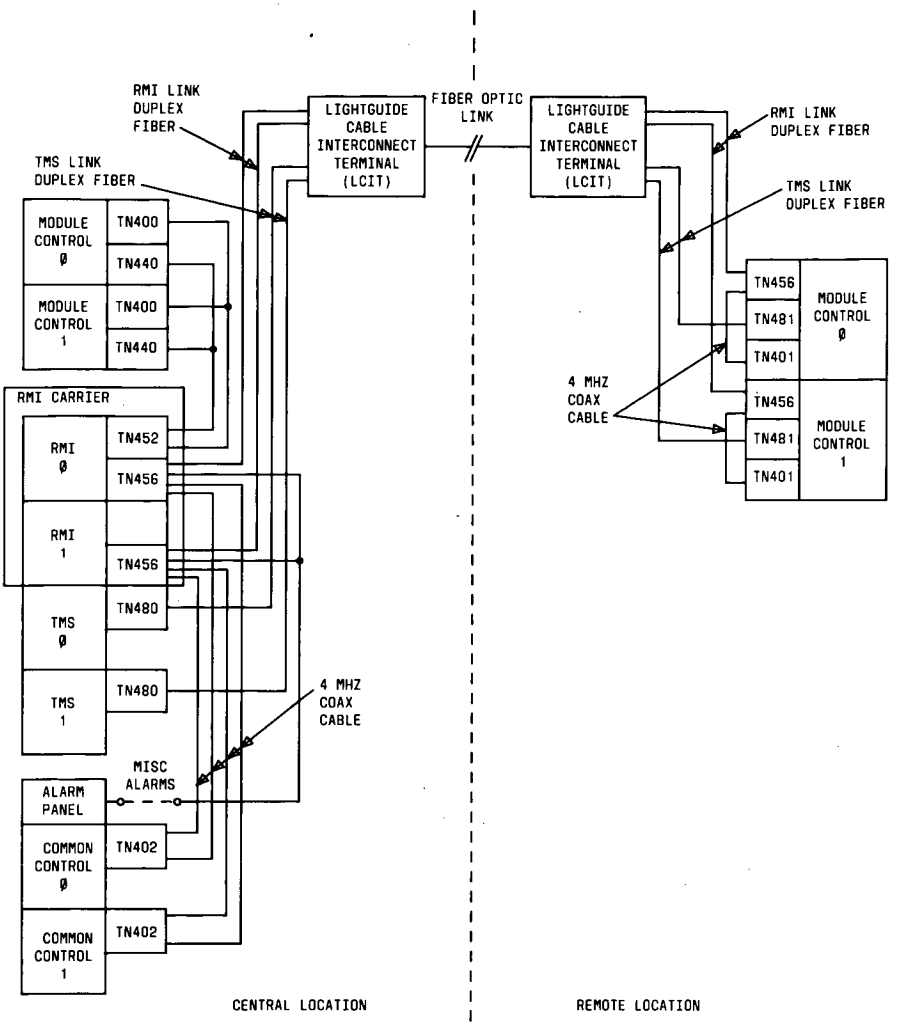


Figure 4. Duplicated RMI System (Phase 2) Block Diagram

CABINET INSTALLATION

Any System 85 Common Control, Module Control, or Time-Multiplexed Switch (TMS)/ Remote Module Interface (RMI) cabinet(s) required by the addition of RMI should be installed according to *AT&T System 85 Installation* (555-103-104).

REMOTE MODULE INTERFACE CARRIER INSTALLATION (PHASE 2)

Each RMI carrier provides up to 16 unduplicated remote modules or 8 duplicated remote modules using the TN456 circuit packs. The system has a capacity of two RMI carriers for unduplicated systems and four RMI carriers for duplicated systems. Each RMI carrier should be mounted in the proper carrier location as determined by the Customer System Document (CSD). Install the RMI carrier(s) as shown in Figure 5.

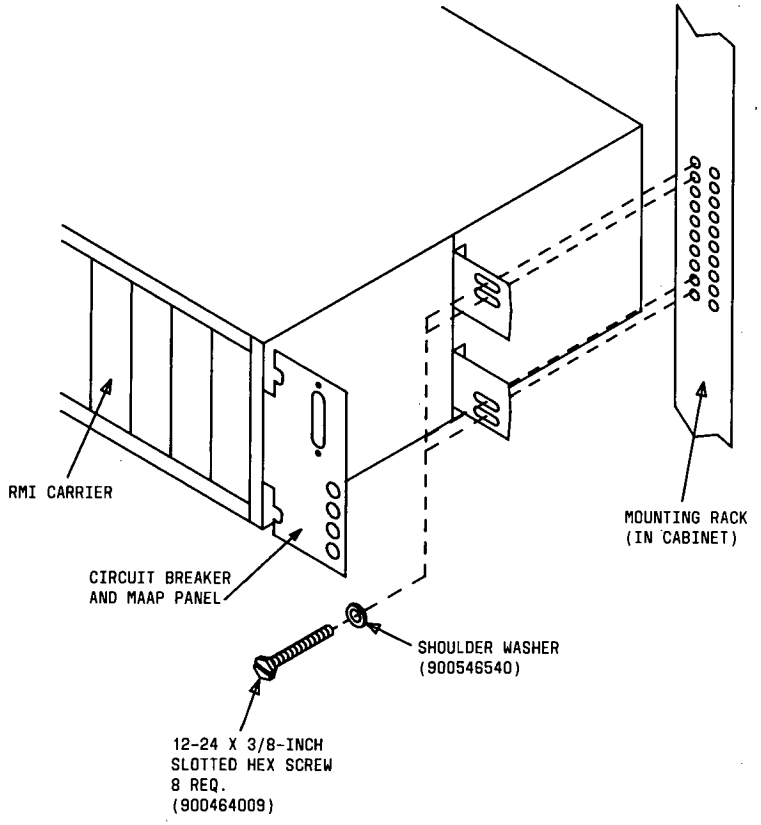


Figure 5. RMI Carrier (Phase 2) Installation

The power, ground, and alarm connections for the RMI carrier are made from a unit cable connected to the backplane of the RMI carrier, as shown in Table A. These connections are made to the 334A cabinet rectifiers through the power bus in the TMS/RMI cabinet. The right half (slots 00 through 10) of each RMI carrier is powered by the 334A-0 or OLS(0) rectifier, and the left half (slots 11 through 22) is powered by the 334A-1 or OLS(1) rectifier.

Note: For systems with only one unduplicated RMI carrier (located in position 3) in a TMS/RMI cabinet with three TMS carriers, both sides of the RMI carrier must be powered by the 334A-1 or OLS(1) rectifier.

TABLE A. Power, Ground, and Alarm Connections for the RMI Carrier

ORIGINATION	DESTINATION	CONNECTOR (WIRE COLOR)
RMI CARRIER (0-3) Backplane	Bus Bar –48 (334A-0 or OLS(0))*	Red-Blue
	Bus Bar GRD (334A-0 or (OLS(0))*	Black-Blue
	Bus Bar –48 (334A-1 or OLS(1))	Red-White
	Bus Bar GRD (334A-1 or OLS (1))	Black-White
	PALM of Succeeding RMI Carrier (if applicable)	JALM (Blue)
	JALM of Preceding RMI Carrier or J1 of AEH4 (if RMI carrier 00)	PALM (Black)

* See preceding Note.

LIGHTGUIDE CABLE INTERCONNECT TERMINAL (LCIT)

The LCIT must be installed within 100 feet of related module control and TMS cabinets at the central and remote locations. A 1/2-inch plywood backboard and mounting hardware must be provided locally.

> ***WARNING: The LCIT is 12 inches deep. Choose a location so that the LCIT will be out of the way of traffic.***

Install the LCIT (Figure 6) as follows:

1. Mark the location of the 134A mounting bracket holes on the 1/2-inch plywood backboard.
2. Make sure that the plywood backboard is mounted on the wall so that it will not interfere with the 134A hole locations. Mount this backboard using standard procedures for the type of wall used.
3. Mount the 134A mounting bracket (using hardware provided with the 134A) to the plywood backboard in the location marked in Step 1.
4. Mount the LCIT to the 134A mounting bracket with hardware provided.
5. Attach ED-1E466 Group 212 label, and write the LCIT number on the LCIT Number label (factory attached to the LCIT) in the locations shown in Figure 6.

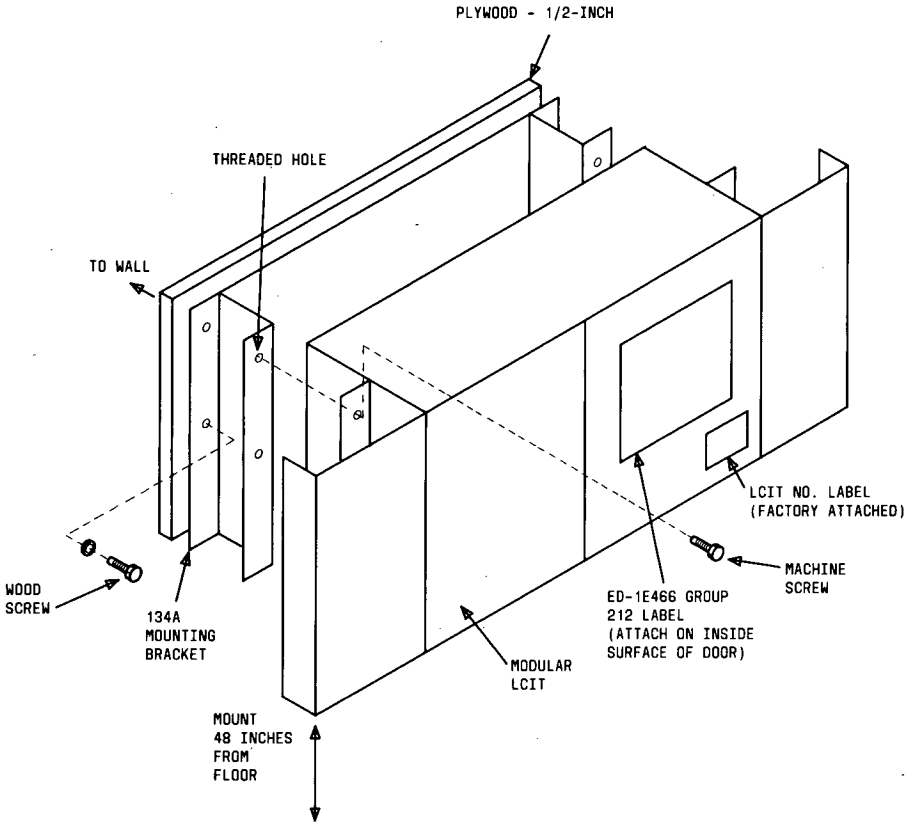


Figure 6. LCIT Installation on Wall

CENTRAL AND REMOTE MODULE CONTROL CARRIER PAIRING

Phase 1

Assign module numbers to the central and remote modules. Module numbers are first assigned at the central location (Module 0, Module 1, . . ., Module N) and then at the remote location (Module N+1, Module N+2, . . .).

Each remote module control carrier must be paired with a central module control carrier equipped with a TN456 circuit pack.

> *Note:* At least as many module control carriers must be at the central location as there are at the remote location(s). Only **one** remote module control carrier with a TN456 circuit pack can be assigned to a central module control carrier with a TN456 circuit pack.

Unduplicated System

The first (Module 0) module control carrier at the central location is paired with the first (Module N+1) module control carrier at a remote location. The second (Module 1) module control carrier at the central location is paired with the second (Module N+2) module control carrier at a remote location. Repeat the pairings until all remote module control carriers are assigned to central module control carriers. Figure 7 is an example of how the module control carriers should be assigned.

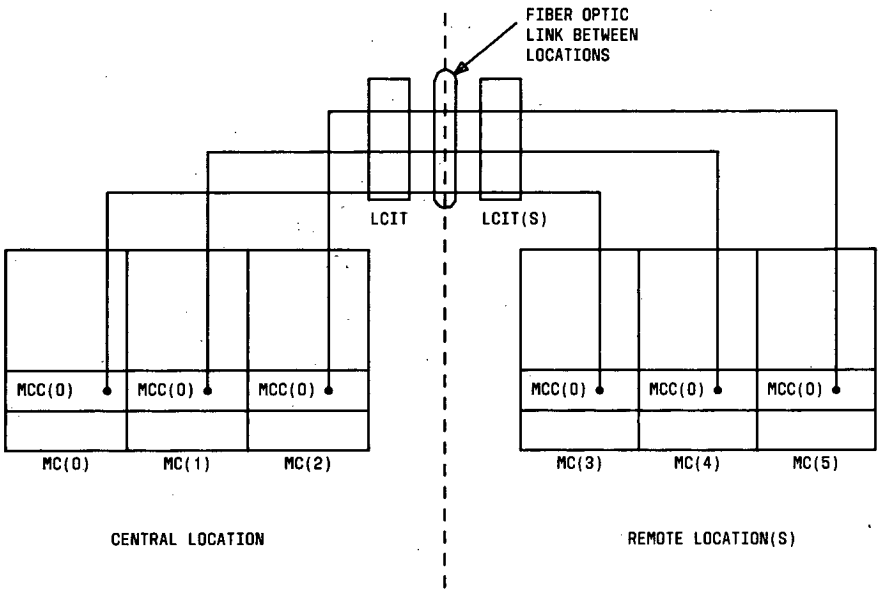


Figure 7. Assigned Module Control Carriers for Unduplicated System (Phase 1)

Duplicated System

For a duplicated system, carriers for remote modules should be paired with central module control carriers that are located in different cabinets. This pairing allows the RMI (TN456) circuit packs to be powered by different rectifiers. If your system only has one central and one remote module, then it is not possible to have the remote module control carriers paired to central module control carriers that are in different cabinets.

Figure 8 is an example of how the module control carriers should be paired for a 2-module system. Figures 9 and 10 are examples of two possible configurations of how modules may be paired for two typical systems.

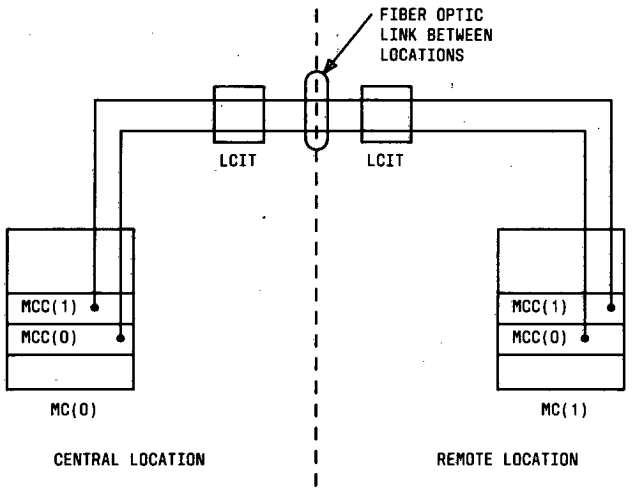


Figure 8. Assigned Module Control Carriers for a Duplicated System With One Central and One Remote Module (Phase 1)

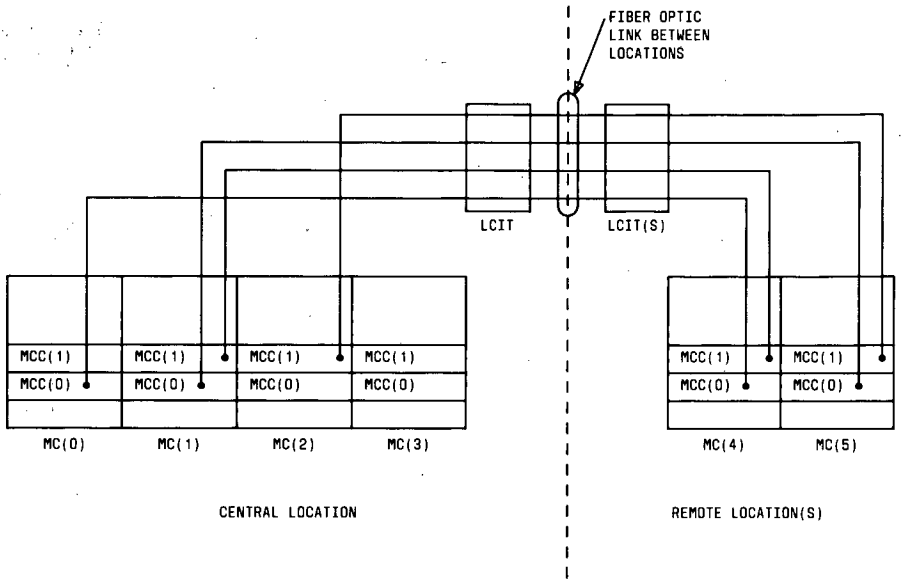


Figure 9. Assigned Module Control Carriers for a Duplicated System With Four Central and Two Remote Modules (Phase 1)

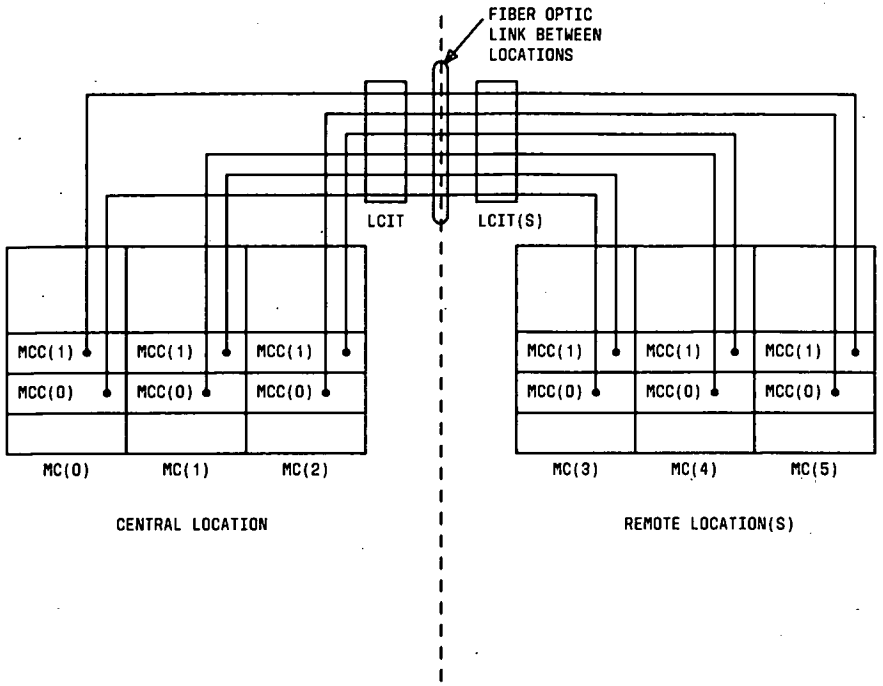


Figure 10. Assigned Module Control Carriers for a Duplicated System With Three Central and Three Remote Modules (Phase 1)

Phase 2

Each remotely located module control carrier must be assigned to a TN456 circuit pack located in an RMI carrier at the central location.

Unduplicated System

The unduplicated remote module control carriers are assigned TN456 circuit packs for the RMI carrier(s) in the following order to achieve a balanced load on the dc/dc converters: slot 00, 13, 01, 14, etc. Refer to Table B for the assignment order.

TABLE B. Assignment Order of TN456 Circuit Packs (Unduplicated Phase 2)

REMOTE MODULE NUMBER (NOTE)	RMI CARRIER	RMI SLOT NUMBER FOR MCC (00)
1	0	00
2	0	13
3	0	01
4	0	14
5	0	02
6	0	15
7	0	03
8	0	16
9	0	05
10	0	18
11	0	06
12	0	19
13	0	07
14	0	20
15	0	08
16	0	21
17	1	00
18	1	13
19	1	01
20	1	14
21	1	02
22	1	15
23	1	03
24	1	16
25	1	05
26	1	18
27	1	06
28	1	19
29	1	07
30	1	20

Note: This is the number of the module at the remote locale, not the actual module number within the system.

Duplicated System

The duplicated remote module control carriers are assigned TN456 circuit packs for the RMI carrier(s) in the following order to achieve a balanced load on the dc/dc converters: slot 00, 13, 01, 14, etc. Refer to Table C for the assignment order.

TABLE C. Assignment Order of TN456 Circuit Packs (Duplicated Phase 2)

REMOTE MODULE NUMBER (NOTE)	RMI CARRIER	RMI SLOT NUMBER FOR MCC (00)	RMI SLOT NUMBER FOR MCC (01)
1	0	00	13
2	0	01	14
3	0	02	15
4	0	03	16
5	0	05	18
6	0	06	19
7	0	07	20
8	0	08	21
9	1	00	13
10	1	01	14
11	1	02	15
12	1	03	16
13	1	05	18
14	1	06	19
15	1	07	20
16	1	08	21
17	2	00	13
18	2	01	14
19	2	02	15
20	2	03	16
21	2	05	18
22	2	06	19
23	2	07	20
24	2	08	21
25	3	00	13
26	3	01	14
27	3	02	15
28	3	03	16
29	3	05	18
30	3	06	19

Note: This is the number of the module at the remote locale, not the actual module number within the system.

CABLING AND CIRCUIT PACKS

Power down the common control, module control, and TMS cabinets that are associated with the RMI while the cabling and hardware additions are made to the central and remote locations. Become familiar with this section and the material that is needed to install the equipment. This effort will provide the shortest possible downtime.

Note: It is recommended that the cabling and hardware additions be done during low traffic times for minimum disruption to the customer, as the system will be down when power is removed.

Cable Connector Plates

Central Location Rear Connector Plates (Phases 1 and 2)

At the rear of the central module control cabinet(s) associated with RMI, remove the original blank plate(s) (844172304). Install the new rear connector plate(s) (845416585). The connector plate(s) is required in the central module control cabinet for Phase 1 systems only. Figure 11 is an example of the plate(s) and location(s). Two plates must be added for a duplicated system, and only one plate (lower) is added for an unduplicated system.

Note: The 845416585 plate mounts only on R2 cabinet frames. If this is a retrofit R1 frame, use a standard R1 connector plate to accommodate at least one Amphenol connector. It will be necessary to loosen several connector plates in order to remove the blank plate(s) and install the new one(s). All plates should be secured to cabinet after the new plates are in place.

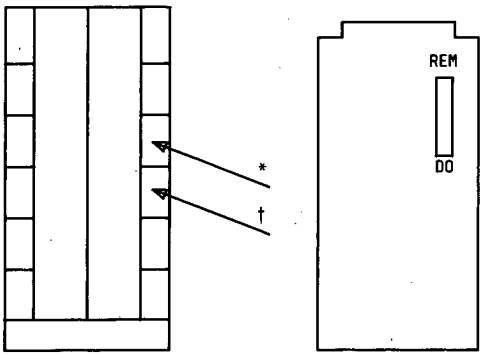


Figure 11. Rear Connector Plate (845416585) and Locations (Phase 1)

At the rear of the central TMS/RMI cabinet(s) associated with RMI, remove the original blank plate(s) (844172304). Install the new rear connector plate(s) (845416585). The connector plate(s) is required in the TMS/RMI cabinet for Phase 2 systems only. Figure 12 is an example of the plate(s) and location(s). One plate must be added for each RMI carrier in the TMS/RMI cabinet.

Note: The 845416585 plate mounts only on R2 cabinet frames. If this is a retrofit R1 frame, use a standard R1 connector plate to accommodate at least one Amphenol connector. It will be necessary to loosen several connector plates in order to remove the blank plate(s) and install the new one(s). All plates should be secured to cabinet after the new plates are in place.

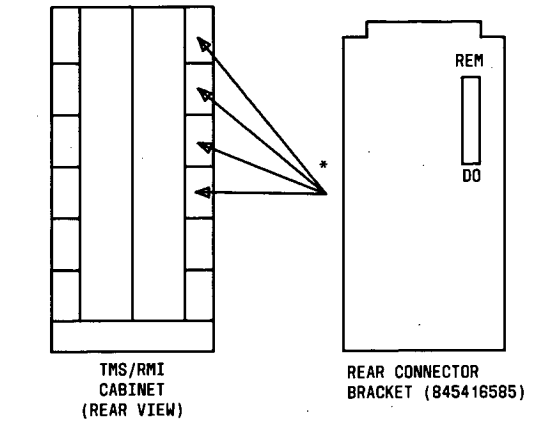


Figure 12. Rear Connector Plate (845416585) and Locations (Phase 2)

At the rear of the central module control cabinet(s) associated with RMI, remove the original blank plate(s) (844172304). Install a new rear connector plate (845416577). These connector plates are required for Phase 1 and Phase 2 systems. This plate is located near the level of the fan assembly unit. Figure 13 is an example of the plate and location.

Note: The 845416577 plate mounts only on R2 cabinet frames. If this is a retrofit R1 frame, use a standard R1 connector plate to accommodate at least two Amphenol connectors. It will be necessary to loosen several connector plates in order to remove the blank plate and install the new one. All plates should be secured to cabinet after the new plate is in place.

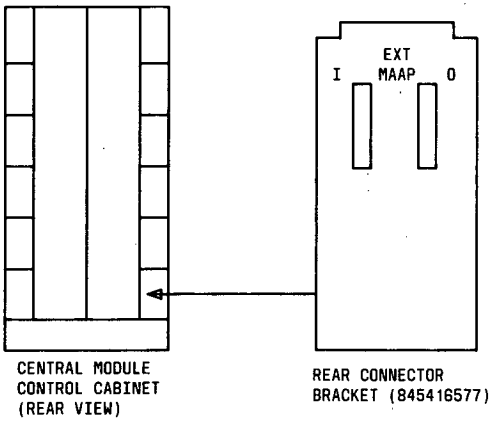


Figure 13. Rear Connector Plate (845416577) and Location (Phases 1 and 2)

Remote Location Rear Connector Plate (Emergency Transfer)

If the new system has the option Remote Emergency Transfer, replace existing plate (844172429) at the rear of the remote module control cabinet(s) with connector plate(s) 845417229 in the location shown in Figure 14. The connector plate(s) is required for Phase 1 and Phase 2 systems.

> *Note:* The 845417229 plate mounts only on R2 cabinet frames. If this is a retrofit R1 frame, use a standard R1 connector plate that will accommodate at least one Amphenol connector. It will be necessary to loosen several connector plates to remove the blank plate and install the new one. All plates should be secured to the cabinet after the new plate is in place.

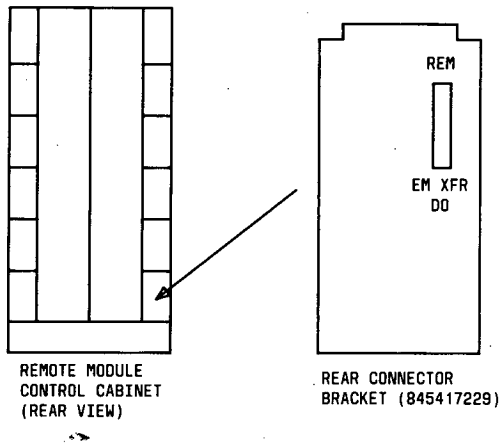


Figure 14. Rear Connector Plate (845417229) and Location (Phases 1 and 2)

ED-1E469 Extended MAAP Brackets

Group 4 Central Extended MAAP Bracket (Phase 2)

Install ED-1E469, Group 4 Extended MAAP Bracket (Figure 15) in each Phase 2 TMS/RMI cabinet equipped with an RMI carrier. When viewed from the rear of the cabinet, the bracket is mounted to the right of J58889V fan assembly shelf using the hardware provided.

The ED-1E469, Group 4 Extended MAAP Bracket has a circuit pack mounted on the back that is designated **ZAEY2**. This bracket and the circuit pack connections are described in the "Central Location Cabling" section.

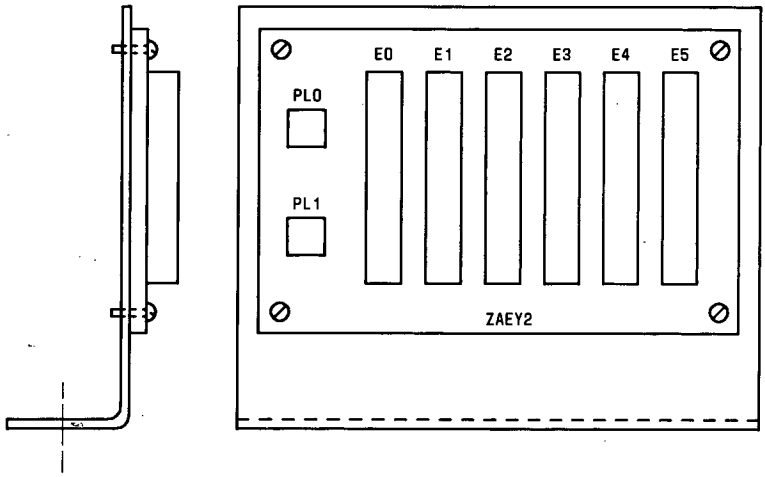


Figure 15. ED-1E469, Group 4 Central Extended MAAP Bracket (Phase 2)

Group 3 Central Extended MAAP Bracket (Phases 1 and 2)

Install ED-1E469, Group 3 Extended MAAP Bracket (Figure 16) in each Phase 1 central module control cabinet associated with RMI.

For Phase 2, this bracket is only required when a Phase 2 system is used in combination with a Phase 1 system. The bracket is placed in the Phase 1 central module control cabinets that have extended MAAP.

When viewed from the front of the cabinet, this bracket is mounted on the left cabinet upright as shown in Figure 17 using the hardware provided.

The ED-1E469, Group 3 Extended MAAP Bracket has a circuit pack mounted on the back that is designated **ZAEY2**. This bracket and circuit pack connections are described in the "Central Location Cabling" section.

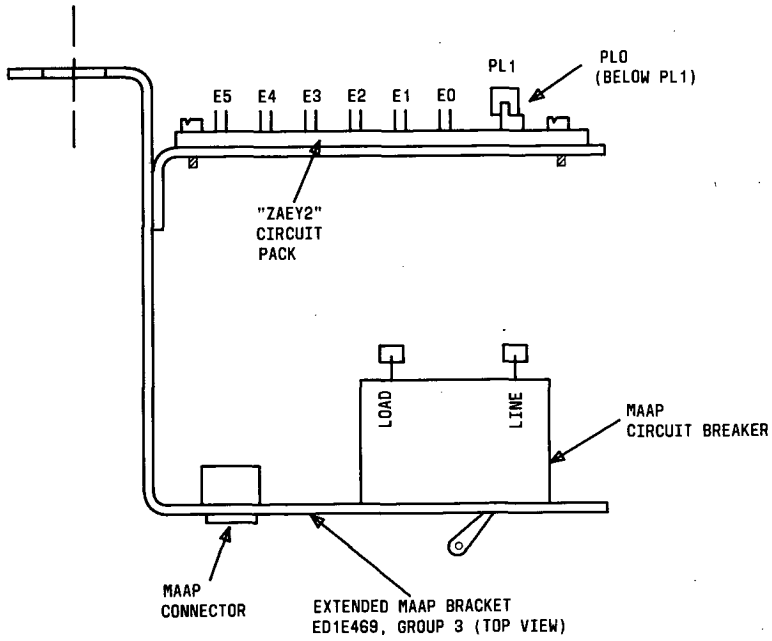


Figure 16. ED-1E469, Group 3 Central Extended MAAP Bracket (Phases 1 and 2)

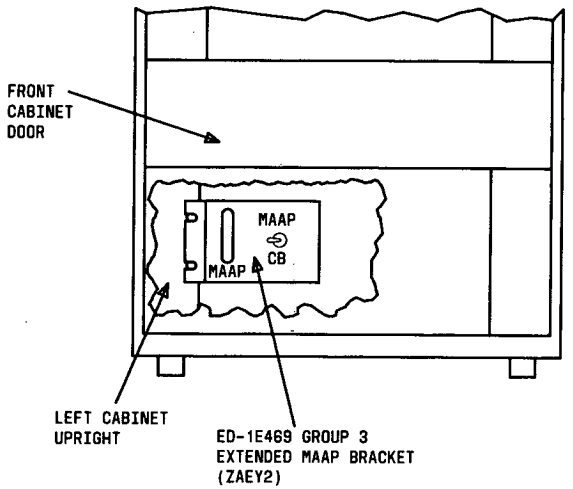


Figure 17. ED-1E469, Group 3 Central Extended MAAP Bracket Mounting Location

Group 2 Remote Extended MAAP Bracket (Phases 1 and 2)

Install ED-1E469, Group 2 Extended MAAP Bracket (Figure 18) in each Phase 1 or Phase 2 remote module control cabinet. When viewed from the front of the cabinet, this bracket is mounted on the left cabinet upright as shown in Figure 19 using the hardware provided.

The ED-1E469, Group 2 Extended MAAP Bracket has a circuit pack mounted on the back that is designated **ZAEY1**. This bracket and the circuit pack connections are described in the "Remote Location Cabling" section.

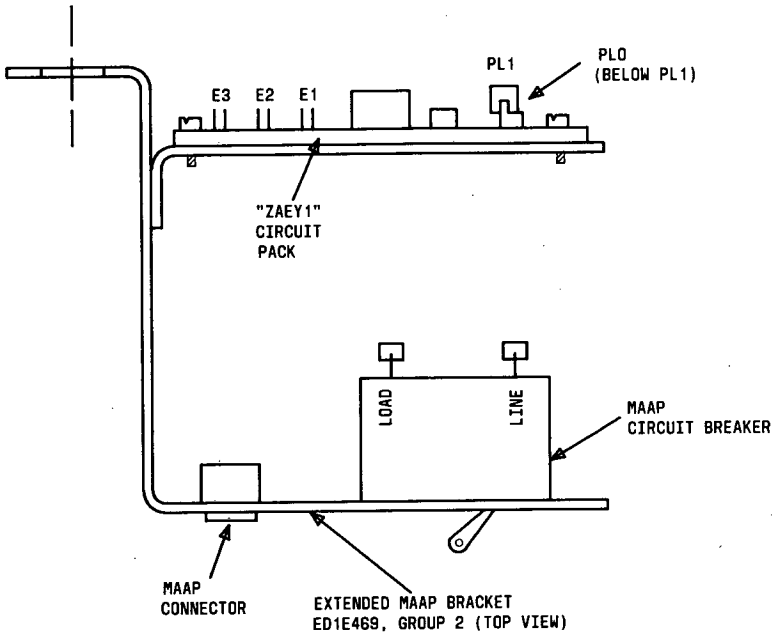


Figure 18. ED-1E469, Group 2 Remote Extended MAAP Bracket (Phases 1 and 2)

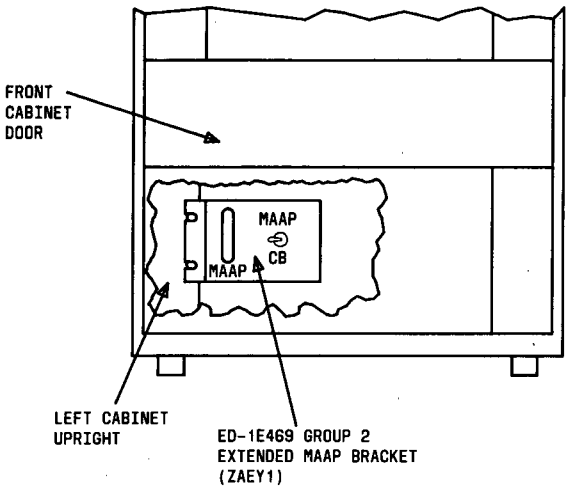


Figure 19. ED-1E469, Group 2 Remote Extended MAAP Bracket Mounting Location

TN456 Circuit Packs

For Phase 1 systems, a TN456 circuit pack must be installed in slot 25 of each central and remote module control carrier that is associated with RMI. For Phase 2 systems, one TN456 (two if duplicated) circuit pack must be installed in the RMI carrier(s) for each remote module control carrier, and one TN456 must be installed in slot 25 of each remote module control carrier. The option switches must be set before the circuit pack is installed. Proceed as follows:

1. Locate the wrist strap (ground) and cable assembly in the bottom of the module control cabinet next to the ac distribution unit.
2. Attach the wrist strap to either wrist.
3. Connect the alligator clip to the screw that fastens the door latch to the frame.
4. Set option switches 1 and 2 (slide-type) on each TN456 circuit pack to **CENTRAL** or **REMOTE** for the location of the module control carrier where the circuit pack will be placed. Figure 20 is an illustration of the TN456 circuit pack and switch locations.
5. Install one TN456 circuit pack in the appropriate location as shown in the Customer System Document (CSD) for each remote module control carrier (J 58888M).
6. Remove wrist strap and cable assembly. Replace them in the bottom of the module control cabinet for future use.

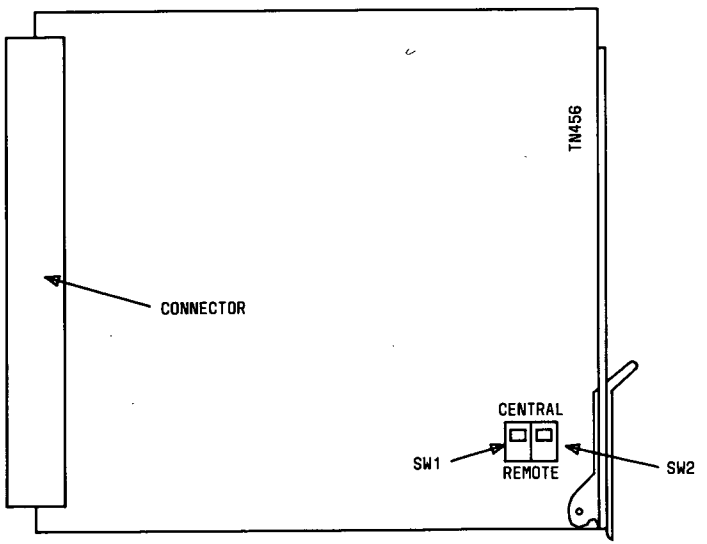


Figure 20. Option Switch Locations for TN456 Circuit Pack

Central Location Cabling (Phase 1)

ED-1E434, Group 133 Cable

Install the ED-1E434, Group 133 (Figure 21) intracabinet cable(s) in the central module control cabinet(s) associated with RMI as shown in Table D. These cables connect from the module control carrier backplane pins **E56** to the inside of the rear connector **REM D0** on the plates (845416585) added as described in the "Cable Connector Plates" section. The connection for module control (01) is for duplicated systems only.

TABLE D. ED-1E434, Group 133 Cable Connections (Phase 1)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
Module Control(00) Backplane	E56 (Slot 25)	Module Control (00) Connector Plate	REM D0
Module Control(01)* Backplane	E56 (Slot 25)	Module Control (01) Connector Plate	REM D0

* This cable is used for duplicated systems only.

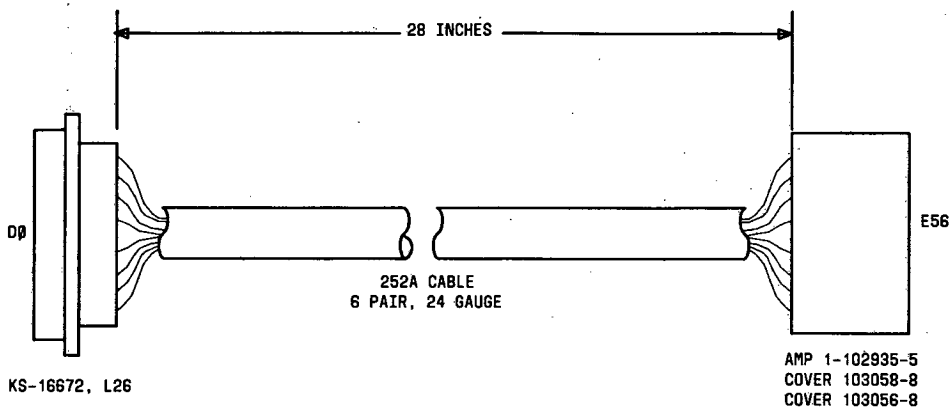


Figure 21. ED-1E434, Group 133 Cable

ED-1E434, Group 8 Cable

Install the ED-1E434, Group 8 cable(s) (Figure 22) from **E57** on the module control (01) backplane to connector **E2** on the ZAEY2 circuit pack (ED-1E469, Group 3 Extended MAAP Bracket) for each central module associated with RMI as shown in Table E. This cable is not required for an unduplicated system.

TABLE E. ED-1E434, Group 8 Cable Connection(s) (Phase 1)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
Module Control (01)* Backplane	E57 (Slot 25)	ZAEY2 (Extended MAAP Bracket)	E2

* This cable is used for duplicated systems only.

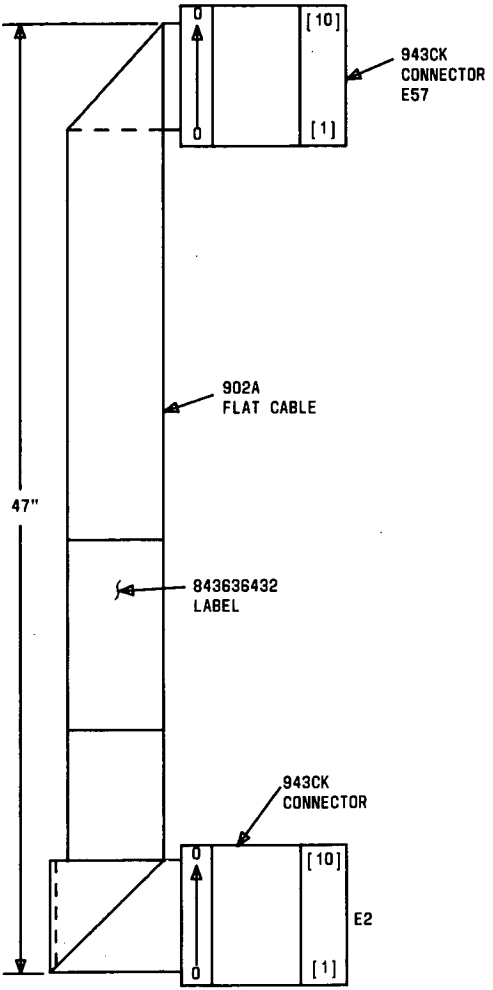


Figure 22. ED-1E434, Group 8 Cable

ED-1E434, Group 25 Cable

Install the ED-1E434, Group 25 cable(s) (Figure 23) from **E57** on the module control (00) backplane to connector **E1** on the ZAEY2 circuit pack (ED-1E469, Group 3 Extended MAAP Bracket) for each central module associated with RMI as shown in Table F.

TABLE F. ED-1E434, Group 25 Cable Connection(s) (Phase 1)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
Module Control (00) Backplane	E57 (Slot 25)	ZAEY2 (Extended MAAP Bracket)	E1

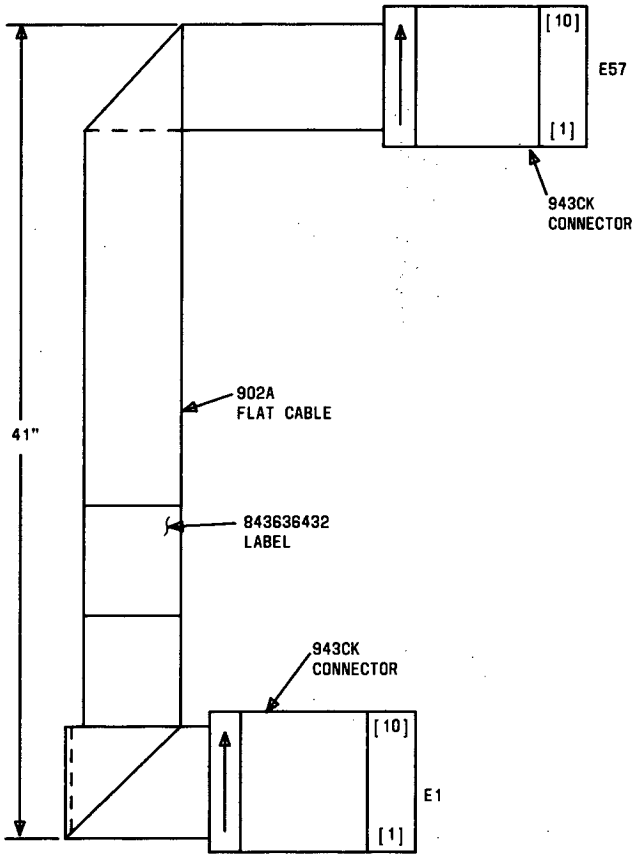


Figure 23. ED-1E434, Group 25 Cable

ED-1E434, Group 131 Cable

Install the ED-1E434, Group 131 intracabinet cable(s) (Figure 24) in the module control cabinet(s) associated with RMI as shown in Table G. This cable connects from **E5** on ZAEY2 of the Group 3 Extended MAAP Bracket to **EXT MAAP I** and **EXT MAAP O** on the inside of the connector plate (845416577) added as described in the "Cable Connector Plates" section. This plate is located at the fan assembly level.

TABLE G. ED-1E434, Group 131 Cable Connection (Phase 1)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
ZAEY2 (Extended MAAP Bracket)	E5	Connector Plate at Fan Assembly Level	EXT MAAP I,O

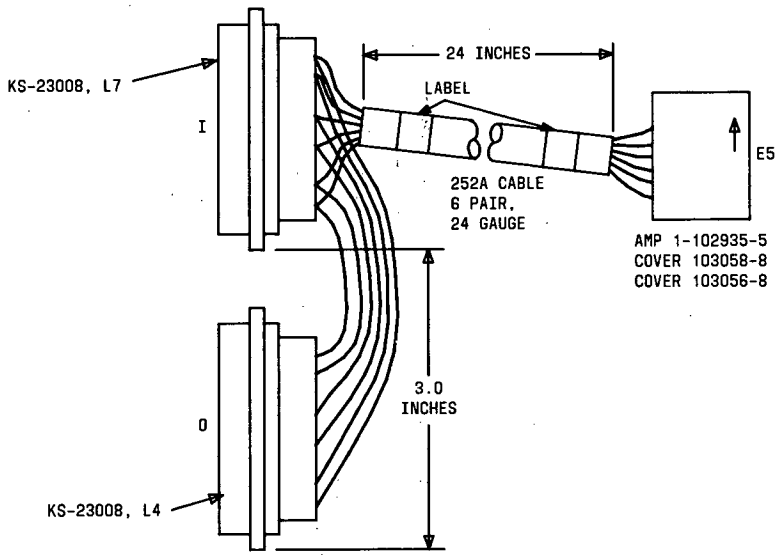


Figure 24. ED-1E434, Group 131 Cable

ED-1E434, Group 132 Cable

Connect ED-1E434, Group 132 cable (Figure 25) from **MAAP** (backside of connector) to **E0** on the ED-1E469, Group 3 Extended MAAP Bracket (Figure 16) as shown in Table H.

TABLE H. ED-1E434, Group 132 Cable Connection (Phase 1)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
ED-1E469 Group 3 (Extended MAAP Bracket)	MAAP	ZAEY2 (Extended MAAP Bracket)	E0

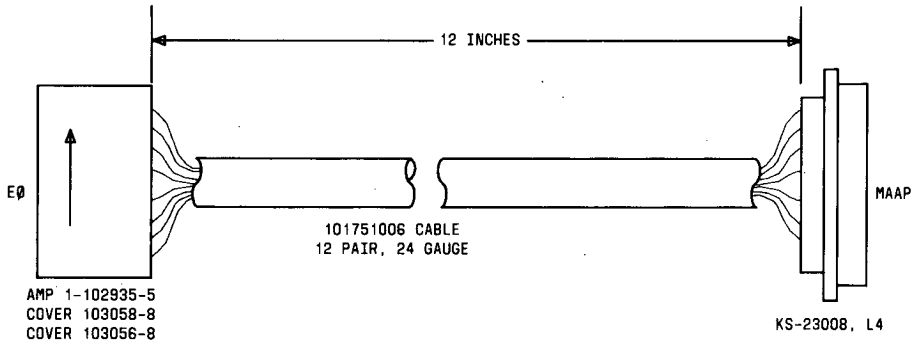


Figure 25. ED-1E434, Group 132 Cable

ED-1E434, Group 300 Cable

Install the ED-1E434, Group 300 cables (Figure 26) from the common control to the module control and TMS/RMI cabinets. These cables provide connections to daisy chain the extended MAAP feature.

The Group 300 cables run from **D5 (EXT MAAP)** on the common control cabinet to **EXT MAAP I** on the module control cabinet or TMS/RMI cabinet connector plate 845416577. Then another Group 300 cable is run from **EXT MAAP O** on the same connector plate to **EXT MAAP I** on the next module control or TMS/RMI cabinet. This process is repeated until all the module control and TMS/RMI cabinets that require the extended MAAP feature are connected. After the last cabinet is connected, a ED-1E434, Group 344 terminating plug is required in connector **EXT MAAP O** of the last connector plate 845416577.

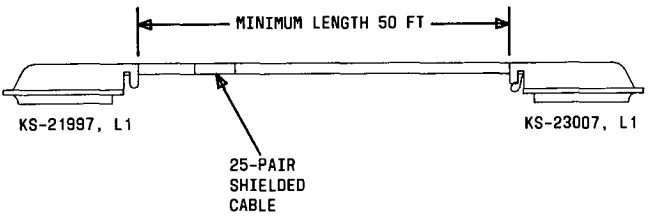


Figure 26. ED-1E434, Group 300 Cable

ED-1E434, Group 84 Coaxial Cabling

Connect the ED-1E434, Group 84 intercabinet coaxial cable(s) (Figure 27) from the common control backplane(s) to the module control backplane(s). Figure 28 illustrates the connections for an all unduplicated system. Figure 29 illustrates the typical connections for an all duplicated system; while Figure 30 shows the connections for a typical system with duplicated common control and unduplicated module control. Route the cable between the cabinets through the duct work (use the shielded intercabinet duct for flat cables). The B and D legs are not used in an all unduplicated system, or a duplicated common control and unduplicated module control. The B and D legs should be coiled and stored in the cable duct (if space permits). Use the Customer System Document (CSD) and Tables I, J, and K to determine the backplane pin locations used at the common control and the leg(s) of the cable that is to be connected at each module control.

Use Tables I, J, and K to determine this association by looking up the remote module number (to be paired with a central module) to find the appropriate common control backplane connector(s) and the leg that is used for the central module control.

The first column in Tables I, J, and K is the remote module number. This is not the number the module is assigned within the total system, but is the number assigned the remote module. The first remote module may be the sixth module within the system. For example, if your remote module being installed is the fourth remote module in the system, then for an all unduplicated system, a Group 84 cable will run from **E8** on the common control backplane to **B04** on the module control backplane using leg C. However, for an all duplicated system, the Group 84 cable will run from **E8** on both common control backplanes to **B03** and **B04** on both the module control backplanes using legs C and D.

For a duplicated common control and unduplicated module control system, the Group 84 cable will run from **E8** on both common controls. Leg A from CC0 will connect to **B04**, while leg A of CC1 will connect to **B03** of the same module control carrier. Leg B of each cable is connected in the same manner to the next module. Legs C and D are not used, and should be stored. Repeat this process for each central module control that is being linked to a remote module.

A Group 89 cable can be used to extend each leg of the Group 84 cable. The combined length of Groups 84 and 89 cable must be a maximum of 200 feet. The maximum length of the unused Group 84 cable must be 8 feet.

An existing Group 84 cable can be used if its unused legs are not dead-dressed or cut off. If the existing cable must be replaced, the original connections must be replaced.

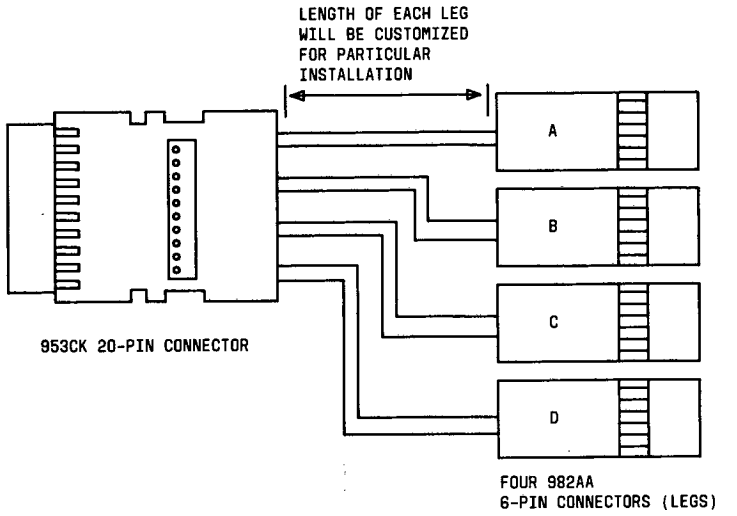


Figure 27. ED-1E434, Group 84 Coaxial Cable

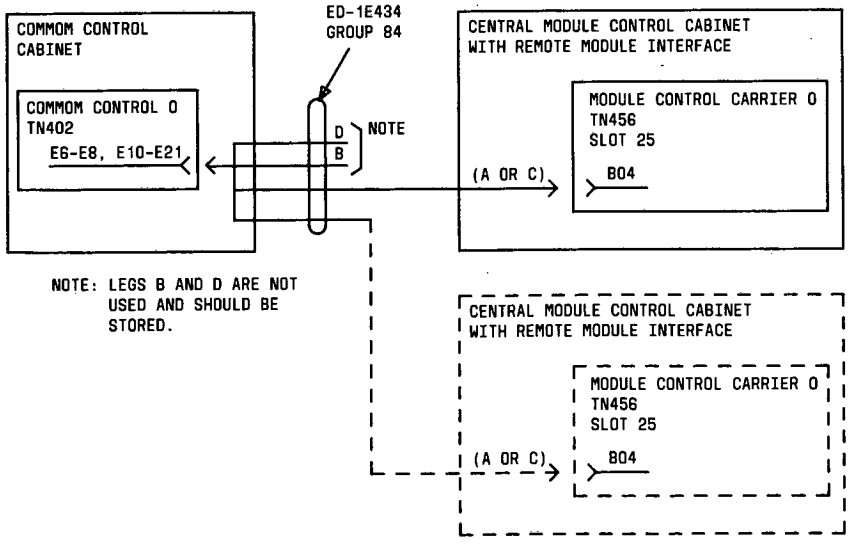


Figure 28. ED-1E434, Group 84 Connections for an All Unduplicated System (Phase 1)

TABLE I. ED-1E434, Group 84 Connections for an All Unduplicated System (Phase 1)

REMOTE MODULE (NOTE)	COMMON CONTROL BACKPLANE CONNECTOR	MODULE CONTROL LEG (GROUP 84)	CONNECTOR
01	E7	A	B04
02		C	B04
03	E8	A	B04
04		C	B04
05	E6	A	B04
06		C	B04
07	E13	A	B04
08		C	B04
09	E11	A	B04
10		C	B04
11	E12	A	B04
12		C	B04
13	E10	A	B04
14		C	B04
15	E17	A	B04
16		C	B04
17	E15	A	B04
18		C	B04
19	E16	A	B04
20		C	B04
21	E14	A	B04
22		C	B04
23	E21	A	B04
24		C	B04
25	E19	A	B04
26		C	B04
27	E20	A	B04
28		C	B04
29	E18	A	B04
30		C	B04

Note: This is the number of the module at the remote locale, not the actual module number within the system.

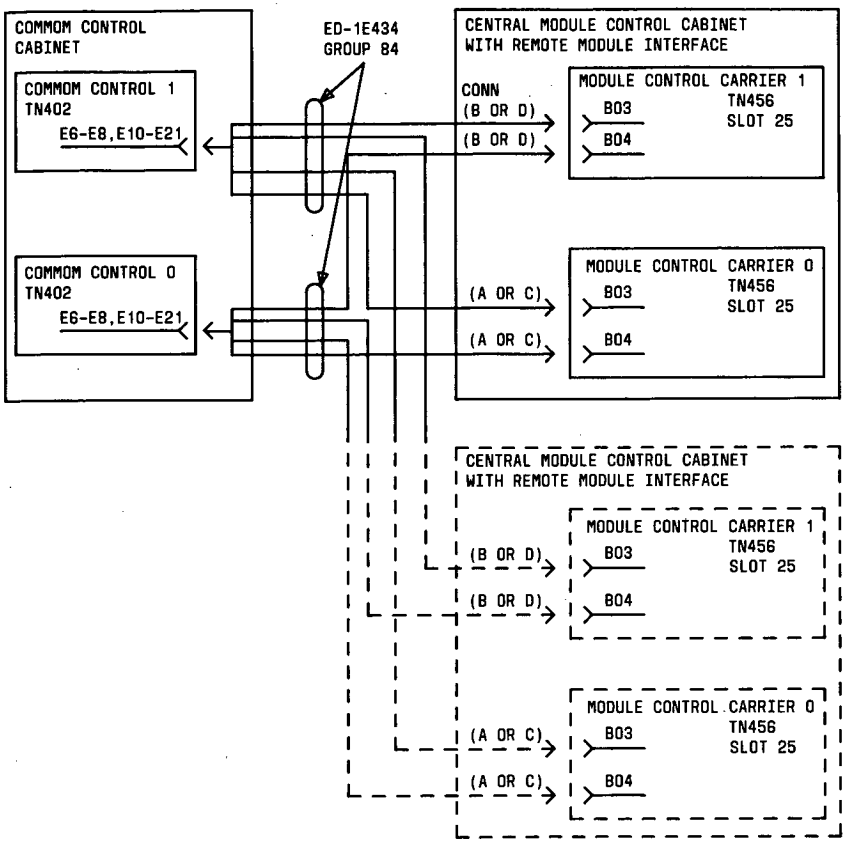


Figure 29. ED-1E434, Group 84 Connections for an All Duplicated System (Phase 1)

TABLE J. ED-1E434, Group 84 Connections for an All Duplicated System (Phase 1)

REMOTE MODULE (NOTE)	COMMON CONTROL(00) AND (01) BACKPLANE CONNECTOR	MODULE CONTROL LEGS (GROUP 84)	CONNECTOR
01	E7	A and B	B04
02		C and D	B03
03	E8	A and B	B04
04		C and D	B03
05	E6	A and B	B04
06		C and D	B03
07	E13	A and B	B04
08		C and D	B03
09	E11	A and B	B04
10		C and D	B03
11	E12	A and B	B04
12		C and D	B03
13	E10	A and B	B04
14		C and D	B03
15	E17	A and B	B04
16		C and D	B03
17	E15	A and B	B04
18		C and D	B03
19	E16	A and B	B04
20		C and D	B03
21	E14	A and B	B04
22		C and D	B03
23	E21	A and B	B04
24		C and D	B03
25	E19	A and B	B04
26		C and D	B03
27	E20	A and B	B04
28		C and D	B03
29	E18	A and B	B04
30		C and D	B03

Note: This is the number of the module at the remote locale, not the actual module within the system.

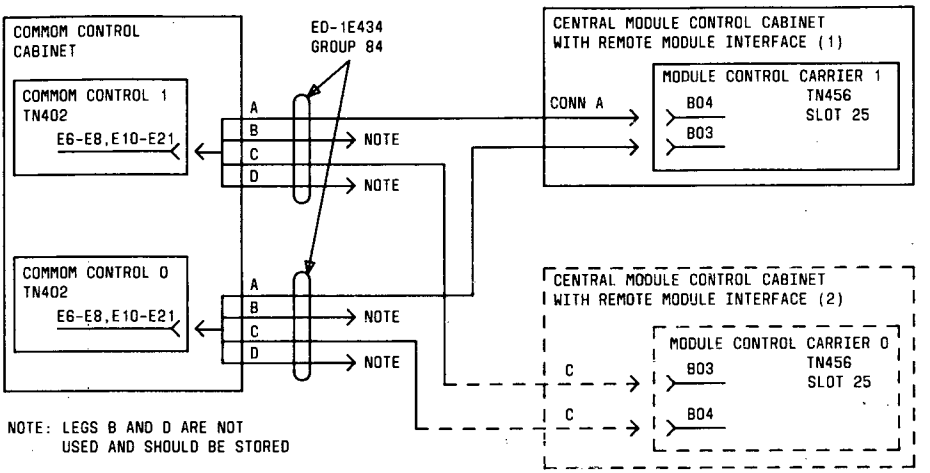


Figure 30. ED-1E434, Group 84 Connections for all Duplicated Common Control and Unduplicated Module Control System (Phase 1)

TABLE K. ED-1E434, Group 84 Connections for all Duplicated Common Control and Unduplicated Module Control System (Phase 1)

REMOTE MODULE (NOTE)	COMMON CONTROL BACKPLANE CONNECTOR	MODULE CONTROL LEG (GROUP 84)	CONNECTOR
01	E7(0)	A	B04
	E7(1)	A	B03
02	E7(0)	C	B04
	E7(1)	C	B03
03	E8(0)	A	B04
	E8(1)	A	B03
04	E8(0)	C	B04
	E8(1)	C	B03
05	E6(0)	A	B04
	E6(1)	A	B03
06	E6(0)	C	B04
	E6(1)	C	B03
07	E13(0)	A	B04
	E13(1)	A	B03
08	E13(0)	C	B04
	E13(1)	C	B03
09	E11(0)	A	B04
	E11(1)	A	B03
10	E11(0)	C	B04
	E11(1)	C	B03
11	E12(0)	A	B04
	E12(1)	A	B03
12	E12(0)	C	B04
	E12(1)	C	B03
13	E10(0)	A	B04
	E10(1)	A	B03
14	E10(0)	C	B04
	E10(1)	C	B03
15	E17(0)	A	B04
	E17(1)	A	B03

Note: This is the number of the module at the remote locale, not the actual module number within the system.

TABLE K. ED-1E434, Group 84 Connections for all Duplicated Common Control and Unduplicated Module Control System (Phase 1) (Contd)

REMOTE MODULE (NOTE)	COMMON CONTROL BACKPLANE CONNECTOR	MODULE CONTROL LEG (GROUP 84)	CONNECTOR
16	E17(0)	C	B04
	E17(1)	C	B03
17	E15(0)	A	B04
	E15(1)	A	B03
18	E15(0)	C	B04
	E15(1)	C	B03
19	E16(0)	A	B04
	E16(1)	A	B03
20	E16(0)	C	B04
	E16(1)	C	B03
21	E14(0)	A	B04
	E14(1)	A	B03
22	E14(0)	C	B04
	E14(1)	C	B03
23	E21(0)	A	B04
	E21(1)	A	B03
24	E21(0)	C	B04
	E21(1)	C	B03
25	E19(0)	A	B04
	E19(1)	A	B03
26	E19(0)	C	B04
	E19(1)	C	B03
27	E20(0)	A	B04
	E20(1)	A	B03
28	E20(0)	C	B04
	E20(1)	C	B03
29	E18(0)	A	B04
	E18(1)	A	B03
30	E18(0)	C	B04
	E18(1)	C	B03

Note: This is the number of the module at the remote locale, not the actual module number within the system.

Loose Wiring

Install the cable connections in the module control cabinet as shown in Table L. These connections are needed to connect the ZAEY2 circuit pack to the bus bar –48 V and bus-bar ground through the MAAP circuit breaker.

TABLE L. Loose Wiring Connections (Phase 1)

ORIGINATION	CONNECTOR	CABLE	DESTINATION	CONNECTOR
MAAP Circuit Breaker	"Line Side"	GROUP 4 H600-161	BUS BAR –48V	N/A
ZAEY2 (Extended MAAP Bracket)	PL1	GROUP 5 H600-161	BUS BAR GRD	N/A
ZAEY2 (Extended MAAP Bracket)	PL0	GROUP 6 H600-161	MAAP Circuit Breaker	"Load Side"

Central Location Cabling (Phase 2)

ED-1E434, Group 133 Cable

Install the ED-1E434, Group 133 (Figure 31) intracabinet cable(s) in the TMS/RMI cabinet(s) that is equipped with an RMI carrier, as shown in Table M. These cables connect from the remote module carrier backplane pins **E06** to the inside of the rear connector **REM D0** on the plates (845416585) added as described in the "Cable Connector Plates" section.

TABLE M. ED-1E434, Group 133 Cable Connections (Phase 2)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
RMI Carrier Backplane (Position 00)*	E06	RMI Carrier (00) Connector Plate	REM D0
RMI Carrier Backplane (Position 01)*	E06	RMI Carrier (01) Connector Plate	REM D0
RMI Carrier Backplane (Position 02)*	E06	RMI Carrier (02) Connector Plate	REM D0
RMI Carrier Backplane (Position 03)*	E06	RMI Carrier (03) Connector Plate	REM D0

* Used only if RMI carrier is equipped in that position.

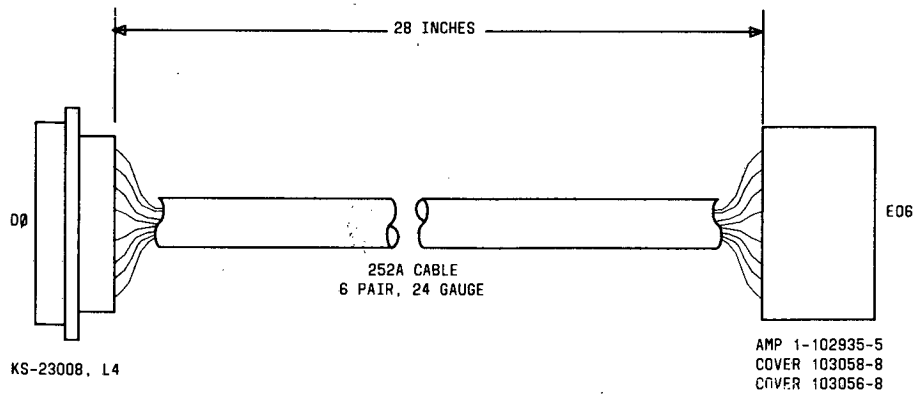


Figure 31. ED-1E434, Group 133 Cable

ED-1E434, Group 9, 137, 138, and 139 Cables

Install the ED-1E434, Group 9, 137, 138, and 139 cables (Figure 32) from **E07** on the RMI carrier(s) backplane to connector **E1**, **E2**, **E3**, and **E4** on the ZAEY2 circuit pack (ED-1E469, Group 4 Extended MAAP Bracket) as shown in Table N. One cable connection is made for each RMI carrier.

TABLE N. ED-1E434, Group 9, 137, 138, and 139 Cable Connections (Phase 2)

ORIGINATION	CONNECTOR	GROUP	DESTINATION	CONNECTOR
RMI Carrier Backplane (Position 00)*	E07	9	ZAEY2 (Extended MAAP Bracket)	E1
RMI Carrier Backplane (Position 01)*	E07	137	ZAEY2 (Extended MAAP Bracket)	E2
RMI Carrier Backplane (Position 02)*	E07	138	ZAEY2 (Extended MAAP Bracket)	E3
RMI Carrier Backplane (Position 03)*	E07	139	ZAEY2 (Extended MAAP Bracket)	E4

* Used only if RMI carrier is equipped in that position.

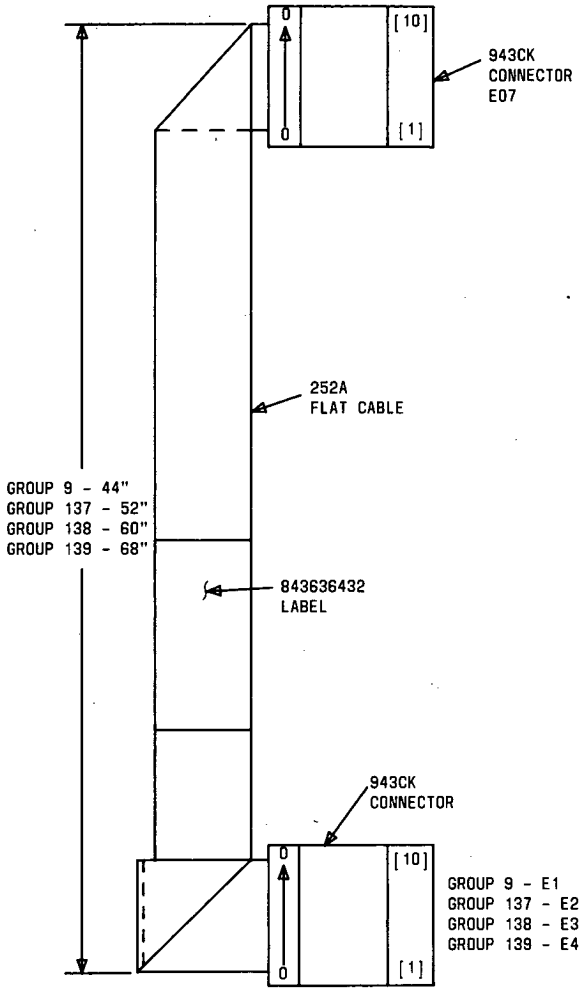


Figure 32. ED-1E434, Group 9, 137, 138, and 139 Cable

ED-1E434, Group 131 Cable

Install the ED-1E434, Group 131 intracabinet cable(s) (Figure 33) in the TMS/RMI cabinet(s) as shown in Table O. This cable connects from **E5** on ZAEY2 of the Group 4 Extended MAAP Bracket to **EXT MAAP I** and **EXT MAAP O** on the inside of the connector plate (845416577) added as described in the "Cable Connector Plates" section. This plate is located at the fan assembly level.

TABLE O. ED-1E434, Group 131 Cable Connection (Phase 2)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
ZAEY2 (Extended MAAP Bracket)	E5	Connector Plate at Fan Assembly Level	EXT MAAP I,O

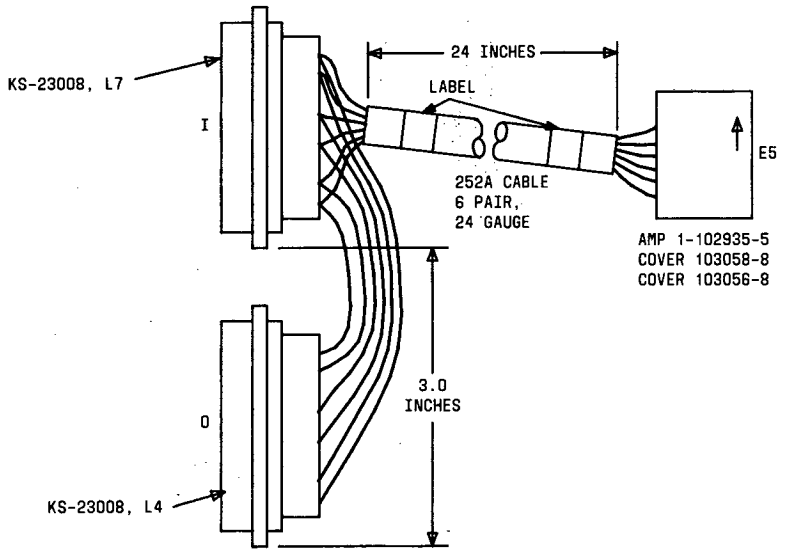


Figure 33. ED-1E434, Group 131 Cable

ED-1E434, Group 200 Cable

Install the ED-1E434, Group 200 cables (Figure 34) from the RMI carrier backplane(s) to the backplane of the central module(s) selected to provide the on-line and maintenance signals to the RMI carrier. Connect the cables from **E00**, **E01**, **E02**, and **E03** on the RMI carrier backplane to the next available electrical port on the designated module control carrier(s) (Table P).

TABLE P. ED-1E434, Group 200 Cable Connection (Phase 2)

RMI Carrier Connector		E00	E01*	E02	E03*
Module Control Carrier		00	01	00	01
Electrical Port Number	1	E35	E35	E04	E04
	2	E32	E32	E09	E09
	3	E34	E34	E08	E08
	4	E37	E37	E13	E13
	5	E39	E39	E12	E12
	6	E36	E36	E17	E17
	7	E38	E38	E16	E16
	8	E41	E41	E21	E21
	9	E43	E43	E20	E20
	10	E40	E40	E25	E25
	11	E42	E42	E24	E24

* RMI Carrier Connector E01 and E03 are used for Duplicated Systems only.

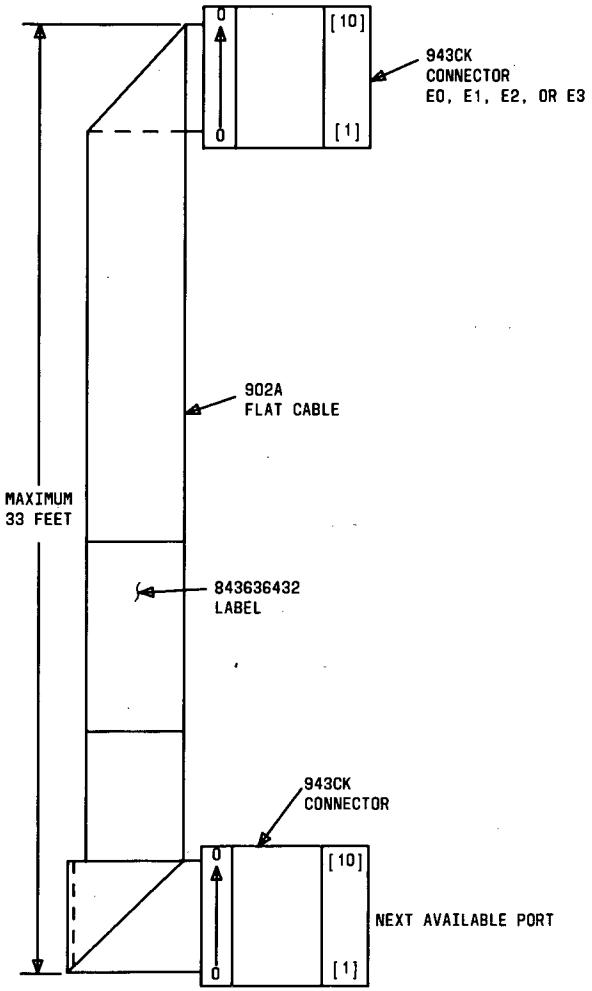


Figure 34. ED-1E434, Group 200 Cable

ED-1E434, Group 300 Cable

Install the ED-1E434, Group 300 cables (Figure 35) from the common control to the module control and TMS/RMI cabinets. These cables provide connections to daisy chain the extended MAAP feature. All TMS/RMI cabinets with the RMI carrier will require the daisy chain MAAP cabling.

The Group 300 cables run from **D5** (EXT MAAP) on the common control cabinet to **EXT MAAP I** on the module control cabinet or TMS/RMI cabinet connector plate 845416577. Then another Group 300 cable is run from **EXT MAAP O** on the same connector plate to **EXT MAAP I** on the next module control or TMS/RMI cabinet. This process is repeated until all the module control and TMS/RMI cabinets that require the extended MAAP feature are connected. After the last cabinet is connected, a ED-1E434, Group 344 terminating plug is required in connector **EXT MAAP O** of the last connector plate 845416577.

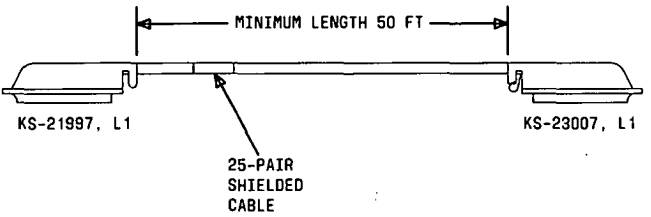


Figure 35. ED-1E434, Group 300 Cable

ED-1E434, Group 84 Coaxial Cabling

Connect the ED-1E434, Group 84 intercabinet coaxial cable(s) (Figure 36) from the common control backplane(s) to the RMI carrier backplane(s). Figures 37 illustrates the connections for an all unduplicated system. Figure 38 illustrates the connections for a typical all duplicated system, while Figure 39 shows the connections for a typical system with duplicated common control and unduplicated module control. Route the cable between the cabinets through the duct work (use the shielded intercabinet duct for flat cables). The B and D legs are not used in an all unduplicated or a duplicated common control and unduplicated module control system and should be coiled and stored in the cable duct (if space permits).

Use the Customer System Document (CSD) and Tables Q, R, and S to determine the backplane pin locations used at the common control and the backplane pin locations used at the RMI carrier. These tables should also be used to determine the legs that are used at the RMI carrier. This association can be determined by looking up the remote module number to find the appropriate common control backplane connector(s) and the leg that is used for the RMI carrier.

The first column in Tables Q, R, and S is the remote module number. This is not the number the module is assigned within the total system, but the number assigned to the remote module. The first remote module may be the sixth module within the system. For example, if your remote module being installed is the fourth in the system, then for an all unduplicated system a Group 84 cable will run from **E8** on the common control backplane to **B18** on the RMI carrier backplane using leg C. However, for an all duplicated system, the Group 84 cable will run from **E8** on both common control backplanes to **B06, B07, B22,** and **B23** on the RMI carrier (00) backplane using legs C and D off of each cable. For a duplicated common control and unduplicated module control system, the Group 84 cable will run from **E08** on both common controls. Leg C will connect to **B06** of the RMI carrier with leg C of the other common control running to **B22** on the same RMI carrier. Leg A of both cables will have been used previously on the third remote module. Repeat this process for each central module control that is being linked to a remote module.

A cable Group 89 can be used to extend each leg of the Group 84 cable. The combined length of Groups 84 and 89 must be a maximum of 200 feet.

> *Note:* There may be unused legs for a Group 84 cable if connections are not needed for a succeeding module to the RMI carrier.

An existing Group 84 cable can be used if its unused legs are not dead-dressed or cut off. If existing cable must be replaced, the original connections must be replaced.

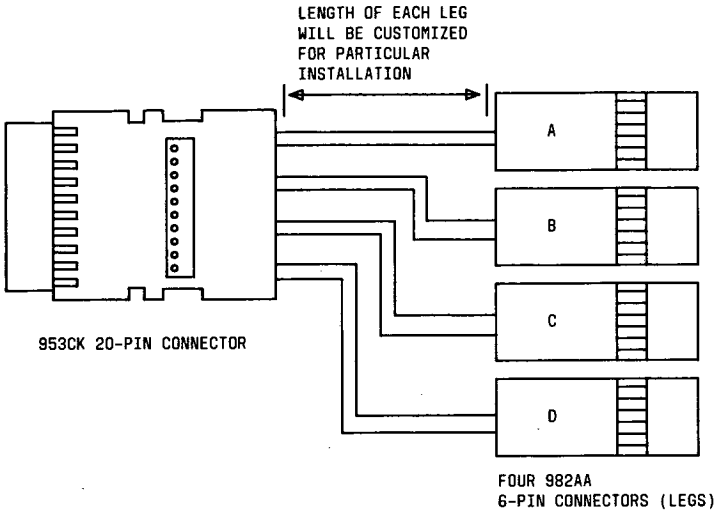
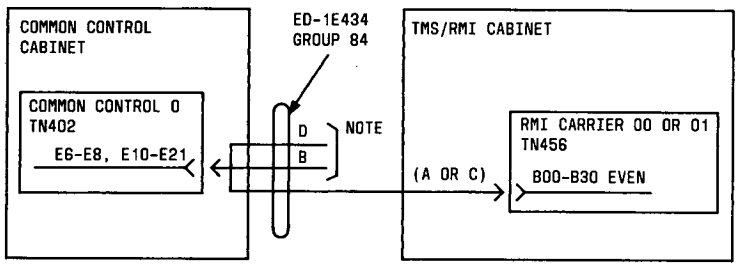


Figure 36. ED-1E434, Group 84 Coaxial Cable



NOTE: LEGS B AND D ARE NOT USED AND SHOULD BE STORED.

Figure 37. ED-1E434, Group 84 Connections for an Unduplicated System (Phase 2)

TABLE Q. ED-1E434, Group 84 Connections for an Unduplicated System (Phase 2)

REMOTE MODULE (NOTE)	COMMON CONTROL BACKPLANE CONNECTOR	MODULE CONTROL LEG (GROUP 84)	RMI CARRIER	RMI CARRIER SLOT NUMBER	RMI CARRIER BACKPLANE CONNECTOR
01	E7	A	00	00	B00
02		C	00	13	B16
03	E8	A	00	01	B02
04		C	00	14	B18
05	E6	A	00	02	B04
06		C	00	15	B20
07	E13	A	00	03	B06
08		C	00	16	B22
09	E11	A	00	05	B08
10		C	00	18	B24
11	E12	A	00	06	B10
12		C	00	19	B26
13	E10	A	00	07	B12
14		C	00	20	B28
15	E17	A	00	08	B14
16		C	00	21	B30
17	E15	A	01	00	B00
18		C	01	13	B16
19	E16	A	01	01	B02
20		C	01	14	B18
21	E14	A	01	02	B04
22		C	01	15	B20
23	E21	A	01	03	B06
24		C	01	16	B22
25	E19	A	01	05	B08
26		C	01	18	B24
27	E20	A	01	06	B10
28		C	01	19	B26
29	E18	A	01	07	B12
30		C	01	20	B28

Note: This is the number of the module at the remote locale, not the actual module number within the system.

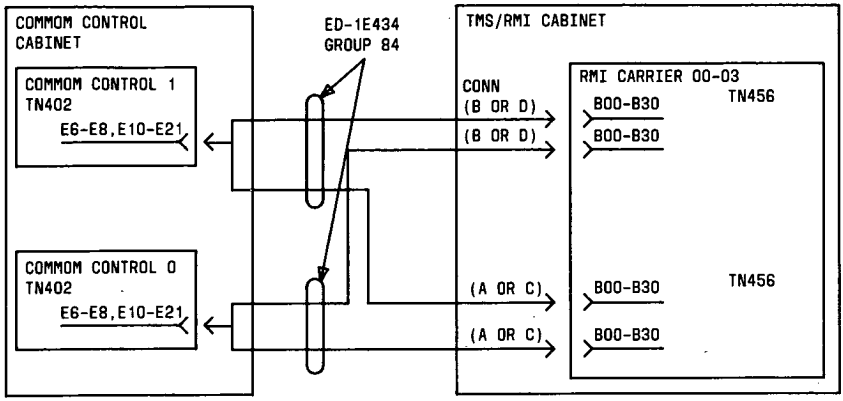


Figure 38. ED-1E434, Group 84 Connections for a Duplicated System (Phase 2)

TABLE R. ED-1E434, Group 84 Connections for a Duplicated System (Phase 2)

REMOTE MODULE (NOTE)	COMMON CONTROL	COMMON CONTROL CONNECTOR	MODULE CONTROL LEGS (GROUP 84)	RMI CARRIER	RMI CARRIER SLOT NUMBER	RMI CARRIER BACKPLANE CONNECTORS
01	00	E7	A and B	00	00	B00 and B01
	01		A and B	00	13	B16 and B17
02	00		C and D	00	01	B02 and B03
	01		C and D	00	14	B18 and B19
03	00	E8	A and B	00	02	B04 and B05
	01		A and B	00	15	B20 and B21
04	00		C and D	00	03	B06 and B07
	01		C and D	00	16	B22 and B23
05	00	E6	A and B	00	05	B08 and B09
	01		A and B	00	18	B24 and B25
06	00		C and D	00	06	B10 and B11
	01		C and D	00	19	B26 and B27
07	00	E13	A and B	00	07	B12 and B13
	01		A and B	00	20	B28 and B29
08	00		C and D	00	08	B14 and B15
	01		C and D	00	21	B30 and B31
09	00	E11	A and B	01	00	B00 and B01
	01		A and B	01	13	B16 and B17
10	00		C and D	01	01	B02 and B03
	01		C and D	01	14	B18 and B19
11	00	E12	A and B	01	02	B04 and B05
	01		A and B	01	15	B20 and B21
12	00		C and D	01	03	B06 and B07
	01		C and D	01	16	B22 and B23
13	00	E10	A and B	01	05	B08 and B09
	01		A and B	01	13	B24 and B25
14	00		C and D	01	06	B10 and B11
	01		C and D	01	19	B26 and B27
15	00	E17	A and B	01	07	B12 and B13
	01		A and B	01	20	B28 and B29
16	00		C and D	01	08	B14 and B15
	01		C and D	01	21	B30 and B31

Note: This is the number of the module at the remote locale, not the actual module number within the system.

TABLE R. ED-1E434, Group 84 Connections for a Duplicated System (Phase 2) (Contd)

REMOTE MODULE (NOTE)	COMMON CONTROL	COMMON CONTROL CONNECTOR	MODULE CONTROL LEGS (GROUP 84)	RMI CARRIER	RMI CARRIER SLOT NUMBER	RMI CARRIER BACKPLANE CONNECTORS
17	00	E15	A and B	02	00	B00 and B01
	01		A and B	02	13	B16 and B17
18	00		C and D	02	01	B02 and B03
	01		C and D	02	14	B18 and B19
19	00	E16	A and B	02	02	B04 and B05
	01		A and B	02	15	B20 and B21
20	00		C and D	02	03	B06 and B07
	01		C and D	02	16	B22 and B23
21	00	E14	A and B	02	05	B08 and B09
	01		A and B	02	18	B24 and B25
22	00		C and D	02	06	B10 and B11
	01		C and D	02	19	B26 and B27
23	00	E21	A and B	02	07	B12 and B13
	01		A and B	2	20	B28 and B29
24	00		C and D	02	08	B14 and B15
	01		C and D	02	21	B30 and B31
25	00	E19	A and B	03	00	B00 and B01
	01		A and B	03	13	B16 and B17
26	00		C and D	03	01	B02 and B03
	01		C and D	03	14	B18 and B19
27	00	E20	A and B	03	02	B04 and B05
	01		A and B	03	15	B20 and B21
28	00		C and D	03	03	B06 and B07
	01		C and D	03	16	B22 and B23
29	00	E18	A and B	03	05	B08 and B09
	01		A and B	03	18	B24 and B25
30	00		C and D	03	06	B10 and B11
	01		C and D	03	19	B26 and B27

Note: This is the number of the module at the remote locale, not the actual module number within the system.

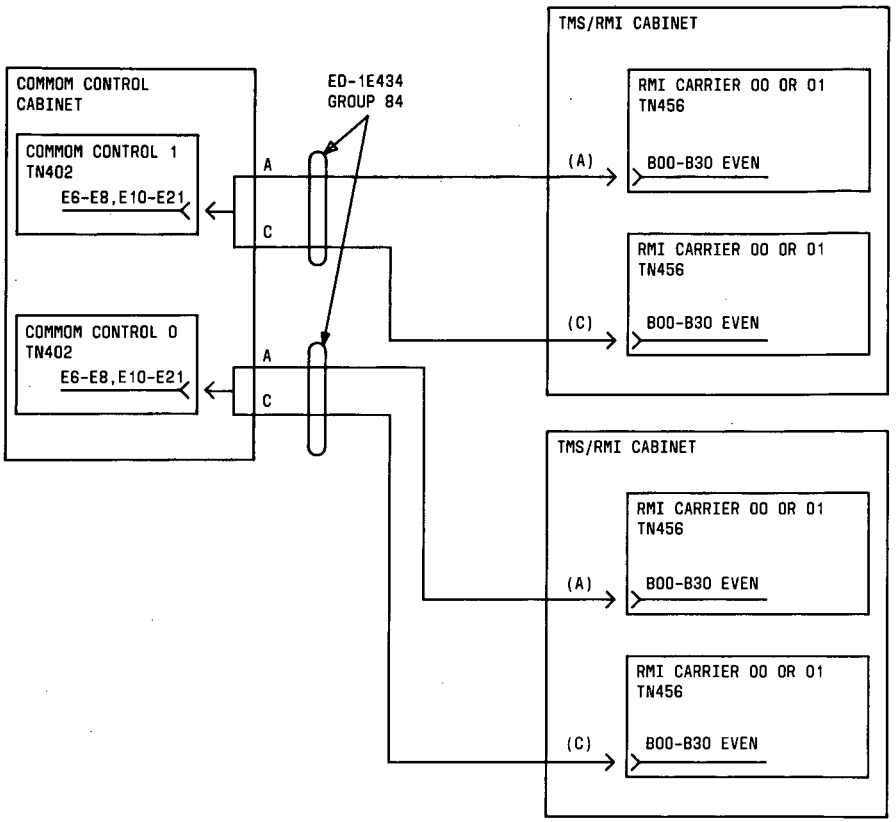


Figure 39. ED-1E434, Group 84 Connections for a Duplicated Common Control and Unduplicated Module Control System (Phase 2)

TABLE S. ED-1E434, Group 84 Connections for a Duplicated Common Control and Unduplicated Module Control System (Phase 2)

REMOTE MODULE (NOTE)	COMMON CONTROL	COMMON CONTROL CONNECTOR	MODULE CONTROL LEG (GROUP 84)	RMI CARRIER	RMI CARRIER SLOT NUMBER	RMI CARRIER BACKPLANE CONNECTORS
01	00	E7	A	00	00	B00
	01		A	00	13	B16
02	00		C	00	01	B02
	01		C	00	14	B18
03	00	E8	A	00	02	B04
	01		A	00	15	B20
04	00		C	00	03	B06
	01		C	00	16	B22
05	00	E6	A	00	05	B08
	01		A	00	18	B24
06	00		C	00	06	B10
	01		C	00	19	B26
07	00	E13	A	00	07	B12
	01		A	00	20	B28
08	00		C	00	08	B14
	01		C	00	21	B30
09	00	E11	A	01	00	B00
	01		A	01	13	B16
10	00		C	01	01	B02
	01		C	01	14	B18
11	00	E12	A	01	02	B04
	01		A	01	15	B20
12	00		C	01	03	B06
	01		C	01	16	B22
13	00	E10	A	01	05	B08
	01		A	01	13	B24
14	00		C	01	06	B10
	01		C	01	19	B26
15	00	E17	A	01	07	B12
	01		A	01	20	B28
16	00		C	01	08	B14
	01		C	01	21	B30

Note: This is the number of the module at the remote locale, not the actual module number within the system.

TABLE S. ED-1E434, Group 84 Connections for a Duplicated Common Control and Unduplicated Module Control System (Phase 2) (Contd)

REMOTE MODULE (NOTE)	COMMON CONTROL	COMMON CONTROL CONNECTOR	MODULE CONTROL LEG (GROUP 84)	RMI CARRIER	RMI CARRIER SLOT NUMBER	RMI CARRIER BACKPLANE CONNECTORS
17	00	E15	A	02	00	B00
	01		A	02	13	B16
18	00		C	02	01	B02
	01		C	02	14	B18
19	00	E16	A	02	02	B04
	01		A	02	15	B20
20	00		C	02	03	B06
	01		C	02	16	B22
21	00	E14	A	02	05	B08
	01		A	02	18	B24
22	00		C	02	06	B10
	01		C	02	19	B26
23	00	E21	A	02	07	B12
	01		A	2	20	B28
24	00		C	02	08	B14
	01		C	02	21	B30
25	00	E19	A	03	00	B00
	01		A	03	13	B16
26	00		C	03	01	B02
	01		C	03	14	B18
27	00	E20	A	03	02	B04
	01		A	03	15	B20
28	00		C	03	03	B06
	01		C	03	16	B22
29	00	E18	A	03	05	B08
	01		A	03	18	B24
30	00		C	03	06	B10
	01		C	03	19	B26

Note: This is the number of the module at the remote locale, not the actual module number within the system.

Remote Location Cabling (Phases 1 and 2)

ED-1E434, Group 97 Cable

Install the ED-1E434, Group 97 cable(s) (Figure 40) from **E56** on the module control (00) backplane to connector **E1** on the ZAEY1 circuit pack (ED-1E469, Group 2 Extended MAAP Bracket) for each remote module as shown in Table T.

TABLE T. ED-1E434, Group 97 Cable Connection(s) (Phases 1 and 2)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
Module Control(00) Backplane	E56	ZAEY1 (Extended MAAP Bracket)	E1

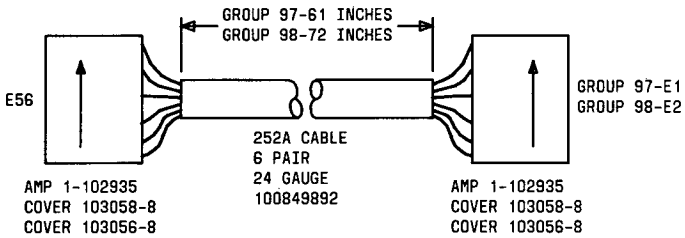


Figure 40. ED-1E434, Group 97 and 98 Cable

ED-1E434, Group 98 Cable

Install the ED-1E434, Group 98 cable(s) (Figure 40) from **E56** on the module control (01) backplane to connector **E2** on the ZAEY1 circuit pack (ED-1E469, Group 2 Extended MAAP Bracket) for each remote module as shown in Table U. This cable is not required for an unduplicated system.

TABLE U. ED-1E434, Group 98 Cable Connection(s) (Phases 1 and 2)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
Module Control (01)* Backplane	E56	ZAEY1 (Extended MAAP Bracket)	E2

* This cable is used for duplicated systems only.

ED-1E434, Group 93 Cable

Install the ED-1E434, Group 93 cables (Figure 41) from **E3** on the ZAEY1 circuit pack (ED-1E469, Group 2 Extended MAAP Bracket) to **D0 (REM) EMER XFER** on the Remote Emergency Transfer Plate (845417229) as shown in Table V. This connection is made on the inside of the bracket for each module control cabinet at a remote location.

TABLE V. ED-1E434, Group 93 Cable Connection(s) (Phases 1 and 2)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
ZAEY1 (Extended MAAP Bracket)	E3	Remote Emergency Transfer Plate	D0(REM) EMER XFER

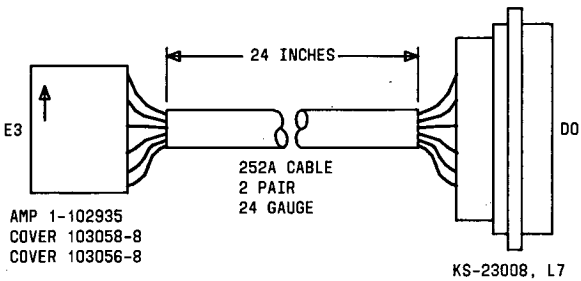


Figure 41. ED-1E434, Group 93 Cable

ED-1E434, Group 96 Cable

Connect ED-1E434, Group 96 cable (Figure 42) from **MAAP** on the ED-1E469, Group 2 Extended MAAP Bracket (Figure 18) to connector **E57** on the backplanes of both module control carriers with legs E57A and E57B. Leg E57B connects to module control carrier (00), and leg E57A connects to module control carrier (01).

Note: Leg E57A is used for duplicated module control systems only.

Install the other legs from the ED-1E434, Group 96 cable from **MAAP** on the Extended MAAP Bracket to **PL0**, **PL1**, **Bus-Bar Ground**, and the MAAP Circuit Breaker **Load Side**, respectively, for each remote module as shown in Figure 42 and Table W.

TABLE W. ED-1E434, Group 96 Cable Connections (Phases 1 and 2)

ORIGINATION	CONNECTOR	CABLE	DESTINATION	CONNECTOR
ED-1E469 Group 2 (Extended MAAP Bracket)	MAAP	GROUP 96	Module Control Carrier (01)	E57A
ED-1E469 Group 2 (Extended MAAP Bracket)	MAAP	GROUP 96	Module Control Carrier (00)	E57B
ED-1E469 Group 2 (Extended MAAP Bracket)	MAAP	GROUP 96 (24-Gauge Black Wire)	ZAEY1 (Extended MAAP Bracket)	PL0
ED-1E469 Group 2 (Extended MAAP Bracket)	MAAP	GROUP 96 (24-Gauge Red Wire)	ZAEY1 (Extended MAAP Bracket)	PL1
ZAEY1 (Extended MAAP Bracket)	PL0	GROUP 96 (22-Gauge Black Wire)	BUS BAR GRD	N/A
ZAEY1 (Extended MAAP Bracket)	PL1	GROUP 96 (22-Gauge Red Wire)	MAAP Circuit Breaker	"Load Side"

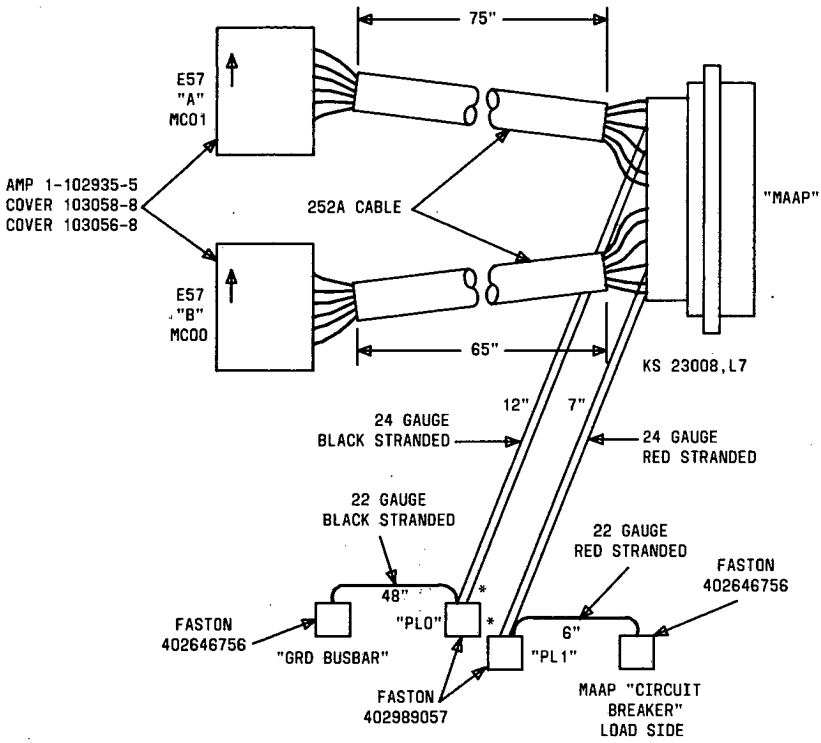


Figure 42. ED-1E434, Group 96 Cable

ED-1E434, Group 92 Cable

Install the ED-1E434, Group 92 cables (Figure 43) from **B04** on module control (00) and (01) to connector **B02** on the same module control carrier for each remote module as shown in Table X. The connection for module control (01) is for duplicated systems only.

TABLE X. ED-1E434, Group 92 Cable Connection(s) (Phases 1 and 2)

ORIGINATION	CONNECTOR	DESTINATION	CONNECTOR
Module Control(00) Backplane	B04	Module Control (00) Backplane	B02
Module Control (01)* Backplane	B04	Module Control (01) Backplane	B02

* This cable is used for duplicated systems only.

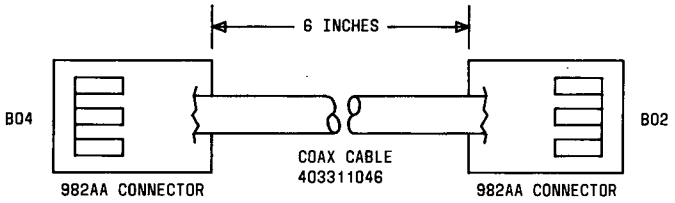


Figure 43. ED-1E434, Group 92 Cable

Loose Wiring

Connect the loose wire from the **Line Side** of the MAAP Circuit Breaker to **Bus Bar -48 V** for each remote module as shown in Table Y.

TABLE Y. Loose Wire Connection(s) (Phases 1 and 2)

ORIGINATION	CONNECTOR	CABLE	DESTINATION
MAAP Circuit Breaker	"Line Side"	GROUP 2 H600-161	BUS BAR -48 V

Fiber-Optic Links

Figure 44 is an example of a duplex cable (lightguide) with the paddleboard transmitter and receiver. Figure 45 illustrates the proper mounting position for the paddleboard transmitter and receiver.

Four types of duplex cable may be used for the lightguide connections; Group 461 (LL2A-B) or Group 463 (LB2A-B) for RMI, and Group 460 (LL2A-B) or Group 462 (LB2A-B) for TMS. The leads of the LL2A-B (62.5 micron) cable are designated ***Fiber1*** and ***Fiber2***, and the LB2A-B (50 micron) leads are designated ***Blue*** and ***White***. These cables are fragile and should be routed from the appropriate carrier to the LCIT (Figure 46) outside the overhead duct work. Figure 47 illustrates how the fiber cables should be routed.

The procedure for adjusting the fiber links should not be performed until all the cabling and hardware installation is complete. The procedure to adjust the fiber links is in the "CUSTOMIZING FIBER-OPTIC LINKS" section.

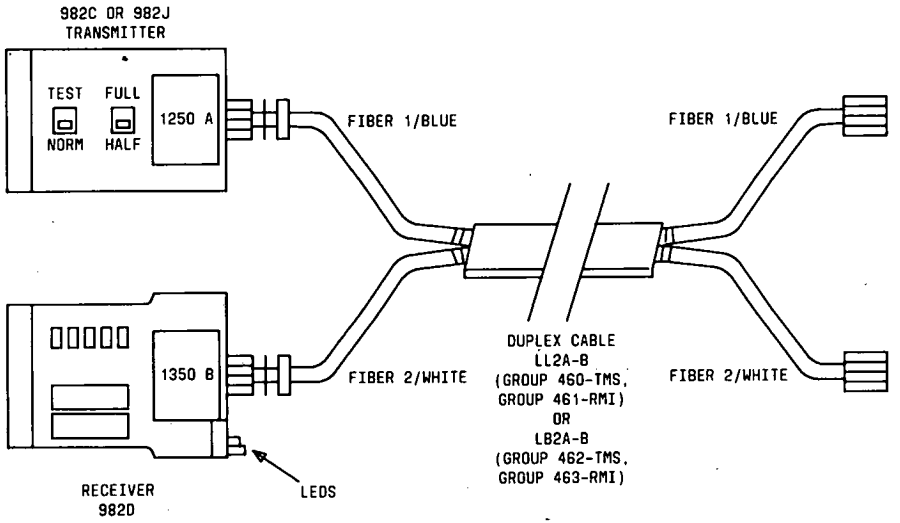


Figure 44. Duplex Cable (Lightguide) With Paddleboard Transmitter and Receiver

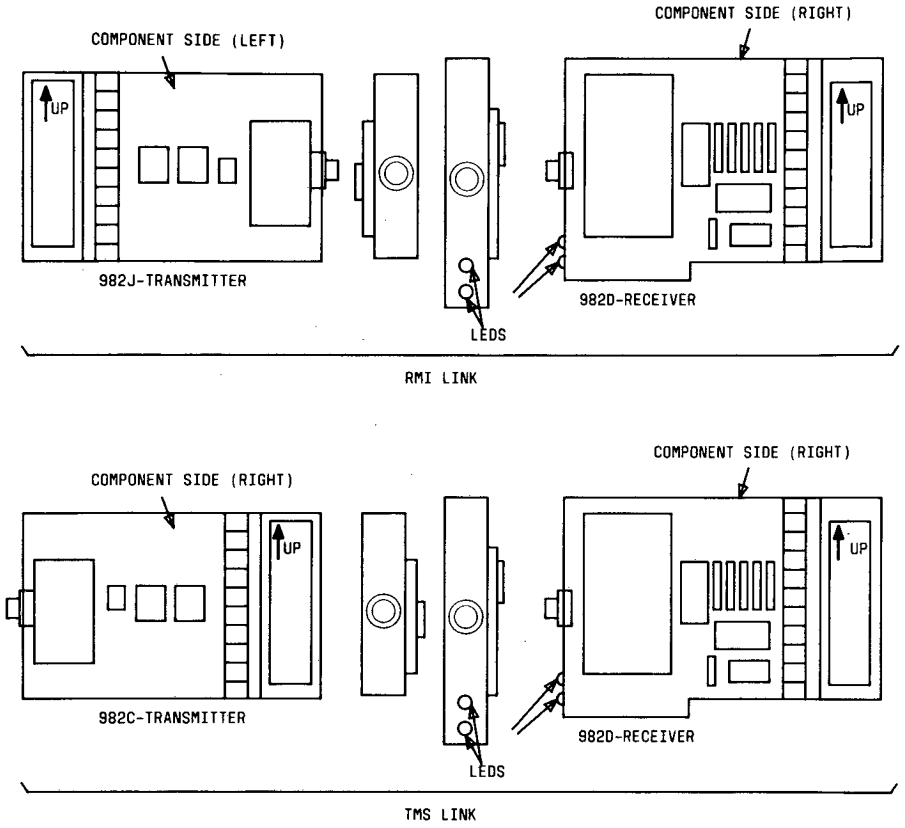


Figure 45. Z982J, Z982C, and Z982D Paddleboards and Mounting Locations

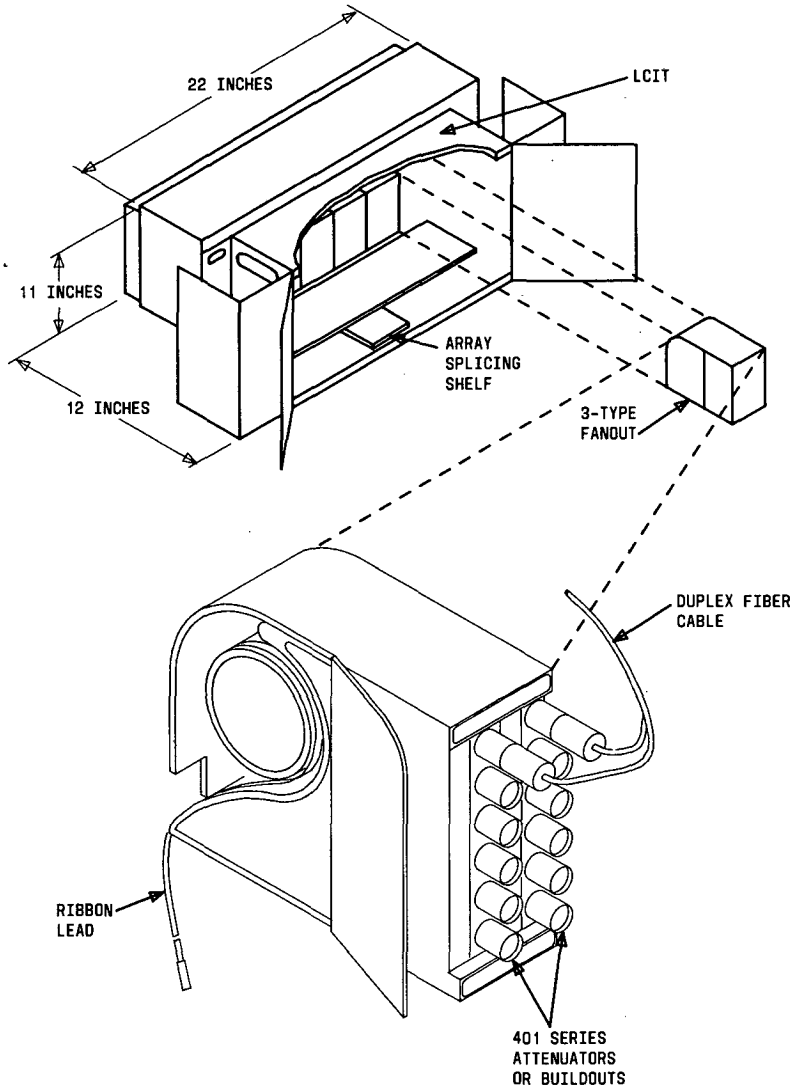


Figure 46. LCIT With 3-Type Fanout

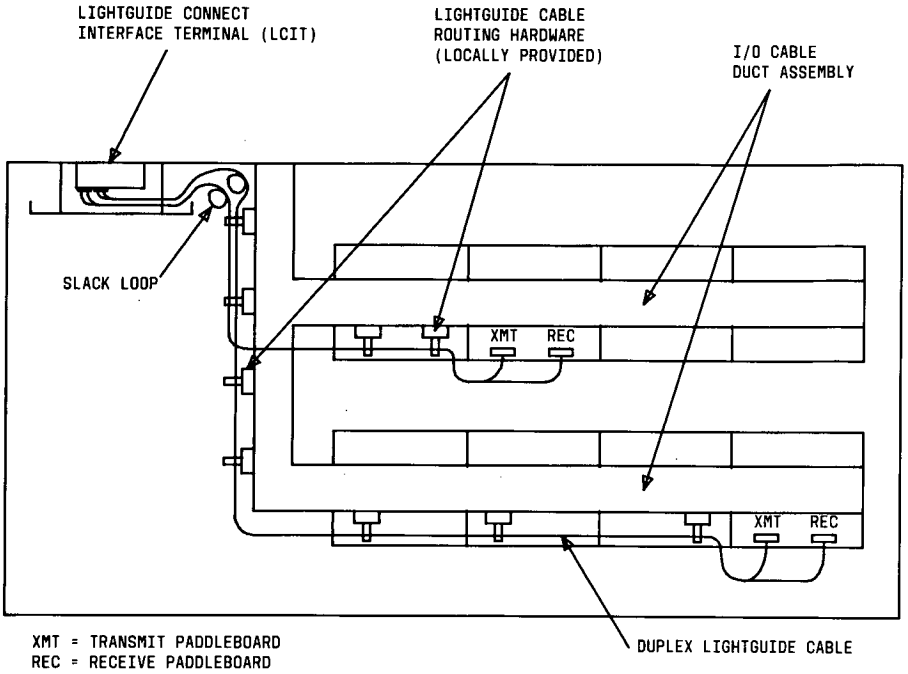


Figure 47. Routing of Lightguide Cables to LCIT

Central Location ED-1E434, Group 461 or 463 RMI Fiber Link(s) (Phase 1)

Install the RMI fiber link(s) for the central location from the module control(s) to the central LCIT.

> ***WARNING: The cable must be loosely supported to prevent damage. The fiber-optic cable has a minimum bend radius of 1.5 inches.***

Figures 48 and 49 show the RMI fiber link for an unduplicated and duplicated system at the central location. Install the RMI fiber link(s) as follows:

1. Connect transmitter (Z982J) and receiver (Z982D) paddleboards to **A05** and **A04** on the backplane of the module control carriers. The transmitter paddleboard must be mounted first.
2. Connect transmitter paddleboard Z982J to Fiber1/Blue and the receiver paddleboard Z982D to Fiber2/White of the ED-1E434, Group 461 or 463 lightguide cable.
3. Route the cable out of the module control cabinet to the central LCIT outside the overhead ducts using the locally provided hardware. This cable should enter the right side of the LCIT. Figure 47 illustrates the routing of lightguide cables.
4. Connect the appropriate attenuator to the central LCIT (Figure 46) in the correct position as determined by your CSD.
5. Connect the fiber-optic cables to the appropriate attenuator as shown in Figures 48 and 49.

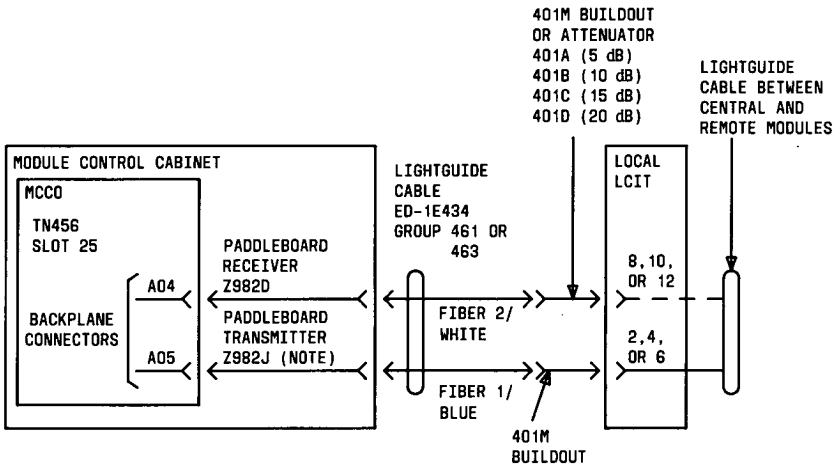


Figure 48. Central RMI Fiber-Link Connections for Unduplicated Module Control (Phase 1)

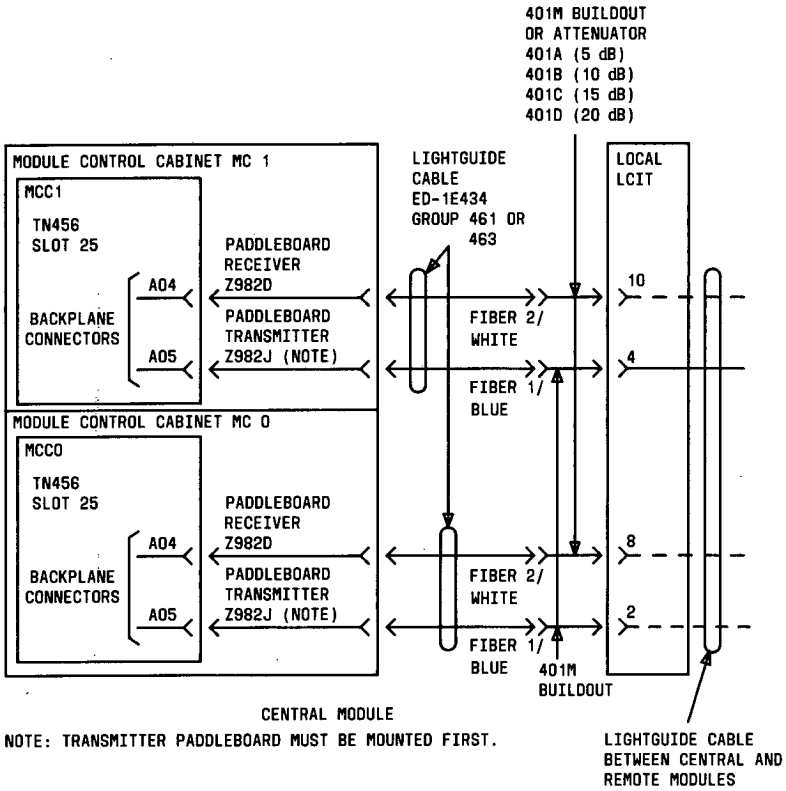


Figure 49. Central RMI Fiber-Link Connections for Duplicated Module Control (Phase 1)

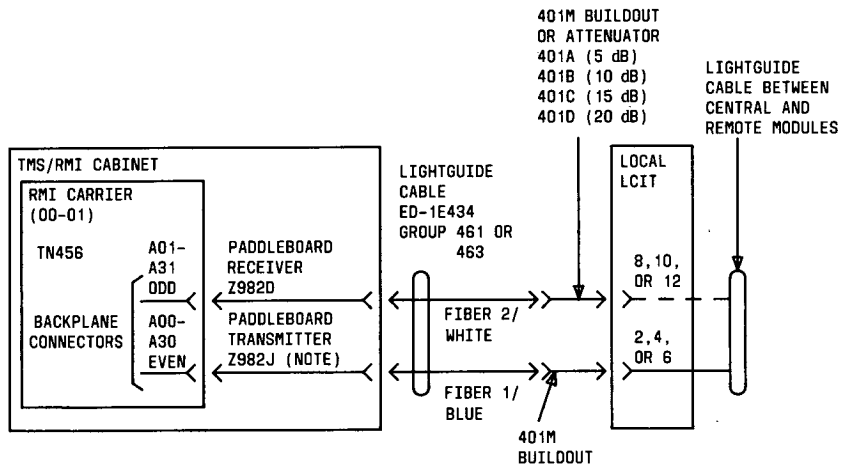
Central Location ED-1E434, Group 461 or 463 RMI Fiber Link(s) (Phase 2)

Install the RMI fiber link(s) for the central location from the RMI carriers to the central LCIT.

> ***WARNING: The cable must be loosely supported to prevent damage. The fiber-optic cable has a minimum bend radius of 1.5 inches.***

Figures 50 and 51 show the RMI fiber link, and Tables Z and AA show the appropriate backplane connectors used for an unduplicated and duplicated system at the central location. Install the RMI fiber link(s) as follows:

1. Connect transmitter (Z982J) and receiver (Z982D) paddleboards to **A00-A30** even and **A01-A31** odd on the backplane of the RMI carriers. The transmitter paddleboard must be mounted first.
2. Connect transmitter paddleboard Z982J to Fiber1/Blue and the receiver paddleboard Z982D to Fiber2/White of the ED-1E434, Group 461 or 463 lightguide cable.
3. Route the cable out of the TMS/RMI cabinet to the central LCIT outside the overhead ducts using the locally provided hardware. This cable should enter the right side of the LCIT. Figure 47 illustrates the routing of lightguide cables.
4. Connect the appropriate attenuator to the central LCIT (Figure 46) in the correct position as determined by your CSD.
5. Connect the fiber-optic cables to the appropriate attenuator as shown in Figures 50 and 51.



NOTE: TRANSMITTER PADDLEBOARD MUST BE MOUNTED FIRST.

Figure 50. Central RMI Fiber-Link Connections for Unduplicated Module Control (Phase 2)

TABLE Z. RMI Carrier Backplane Connections for Unduplicated Module Control (Phase 2)

REMOTE MODULE (NOTE)	RMI CARRIER	RMI CARRIER SLOT NUMBER	RMI CARRIER BACKPLANE CONNECTOR	
			TRANSMITTER	RECEIVER
01	00	00	A00	A01
02	00	13	A16	A17
03	00	01	A02	A03
04	00	14	A18	A19
05	00	02	A04	A05
06	00	15	A20	A21
07	00	03	A06	A07
08	00	16	A22	A23
09	00	05	A08	A09
10	00	18	A24	A25
11	00	06	A10	A11
12	00	19	A26	A27
13	00	07	A12	A13
14	00	20	A28	A29
15	00	08	A14	A15
16	00	21	A30	A31
17	01	00	A00	A01
18	01	13	A16	A17
19	01	01	A02	A03
20	01	14	A18	A19
21	01	02	A04	A05
22	01	15	A20	A21
23	01	03	A06	A07
24	01	16	A22	A23
25	01	05	A08	A09
26	01	18	A24	A25
27	01	06	A10	A11
28	01	19	A26	A27
29	01	07	A12	A13
30	01	20	A28	A29

Note: This is the number of the module at the remote locale, not the actual module number within the system.

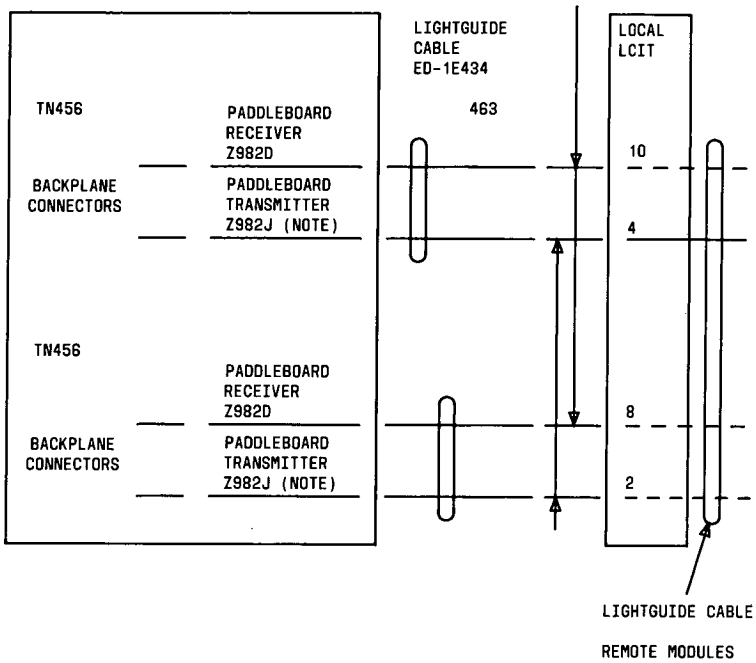


Figure 51. Central RMI Fiber-Link Connections for Duplicated Module Control (Phase 2)

TABLE AA. RMI Carrier Backplane Connections for Duplicated Module Control (Phase 2)

REMOTE MODULE (NOTE)	RMI CARRIER SLOT	RMI CARRIER NUMBER	RMI CARRIER BACKPLANE CONNECTOR	
			TRANSMITTER	RECEIVER
01	00	00	A00	A01
	00	13	A16	A17
02	00	01	A02	A03
	00	14	A18	A19
03	00	02	A04	A05
	00	15	A20	A21
04	00	03	A06	A07
	00	16	A22	A23
05	00	05	A08	A09
	00	18	A24	A25
06	00	06	A10	A11
	00	19	A26	A27
07	00	07	A12	A13
	00	20	A28	A29
08	00	08	A14	A15
	00	21	A30	A31
09	01	00	A00	A01
	01	13	A16	A17
10	01	01	A02	A03
	01	14	A18	A19
11	01	02	A04	A05
	01	15	A20	A21
12	01	03	A06	A07
	01	16	A22	A23
13	01	05	A08	A09
	01	18	A24	A25
14	01	06	A10	A11
	01	19	A26	A27
15	01	07	A12	A13
	01	20	A28	A29
16	01	08	A14	A15
	01	21	A30	A31

Note: This is the number of the module at the remote locale, not the actual module number within he system.

TABLE AA. RMI Carrier Backplane Connections for Duplicated Module Control (Phase 2) (Contd)

REMOTE MODULE (NOTE)	RMI CARRIER	RMI CARRIER SLOT NUMBER	RMI CARRIER BACKPLANE CONNECTOR	
			TRANSMITTER	RECEIVER
17	02	00	A00	A01
	02	13	A16	A17
18	02	01	A02	A03
	02	14	A18	A19
19	02	02	A04	A05
	02	15	A20	A21
20	02	03	A06	A07
	02	16	A22	A23
21	02	05	A08	A09
	02	18	A24	A25
22	02	06	A10	A11
	02	19	A26	A27
23	02	07	A12	A13
	02	20	A28	A29
24	02	08	A14	A15
	02	21	A30	A31
25	03	00	A00	A01
	03	13	A16	A17
26	03	01	A02	A03
	03	14	A18	A19
27	03	02	A04	A05
	03	15	A20	A21
28	03	03	A06	A07
	03	16	A22	A23
29	03	05	A08	A09
	03	18	A24	A25
30	03	06	A10	A11
	03	19	A26	A27

Note: This is the number of the module at the remote locale, not the actual module number within the system.

Central Location ED-1E434, Group 460 or 462 TMS Fiber Link(s) (Phases 1 and 2)

Install the TMS fiber link(s) for the central location from the TMS carrier(s) to the central LCIT. Figures 52 and 53 show the connections for an unduplicated and duplicated system.

> ***WARNING: The cable must be loosely supported to prevent damage. The fiber-optic cable has a minimum bend radius of 1.5 inches.***

Use the CSD to determine the connector pins that are used on TMS carriers(s) for the TMS fiber link to each remote module. If CSDs are unavailable, Table AB can be used to determine this information for an unduplicated system. Tables AC and AD can be used to determine this information for a duplicated system. Look up the module number of each remote module in the appropriate table, and use the corresponding TMS carrier and pin numbers to connect from the TMS backplane to the LCIT as shown in Figures 52 and 53. The number of a remote module is determined by the module that is in the system.

Install the TMS fiber link as follows:

1. Connect transmitter (Z982C) and receiver (Z982D) paddleboards to the appropriate connectors on the backplane of the TMS carrier(s). The transmitter paddleboard must be mounted first.
2. Connect transmitter paddleboard Z982C to Fiber1/Blue and the receiver paddleboard Z982D to Fiber2/White of the ED-1E434, Group 460 or 462 lightguide cable.
3. Route the cable out of the auxiliary cabinet to the central LCIT along the outside of the overhead ducts using locally provided hardware. Figure 47 illustrates the routing of lightguide cables.
4. Connect the appropriate attenuator to the central LCIT (Figure 46) in the correct position as determined by your CSD.
5. Connect the fiber-optic cables to the appropriate attenuator as shown in Figures 52 and 53.

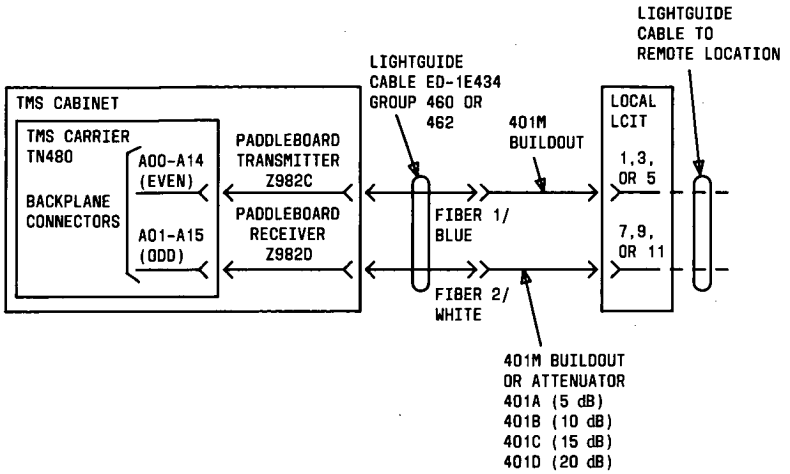


Figure 52. Central TMS Fiber-Link Connections for Unduplicated Module Control (Phases 1 and 2)

TABLE AB. Central TMS Fiber-Link Connections for Unduplicated Module Control (Phases 1 and 2)

REMOTE MODULE	TMS CARRIER	SLOT NUMBER	TMS BACKPLANE CONNECTOR
01	00	17	A10(T) A11(R)
02	00	16	A08(T) A09(R)
03	00	02	A00(T) A01(R)
04	00	03	A02(T) A03(R)
05	00	04	A04(T) A05(R)
06	00	05	A06(T) A07(R)
07	01	19	A14(T) A15(R)
08	01	18	A12(T) A13(R)
09	01	17	A10(T) A11(R)
10	01	16	A08(T) A09(R)
11	01	02	A00(T) A01(R)
12	01	03	A02(T) A03(R)
13	01	04	A04(T) A05(R)
14	01	05	A06(T) A07(R)

(T) designates transmitter paddleboard Z982C
(R) designates receiver paddleboard Z982D

TABLE AB. Central TMS Fiber-Link Connections for Unduplicated Module Control (Phases 1 and 2) (Contd)

REMOTE MODULE	TMS CARRIER	SLOT NUMBER	TMS BACKPLANE CONNECTOR
15	02	19	A14(T) A15(R)
16	02	18	A12(T) A13(R)
17	02	17	A10(T) A11(R)
18	02	16	A08(T) A09(R)
19	02	02	A00(T) A01(R)
20	02	03	A02(T) A03(R)
21	02	04	A04(T) A05(R)
22	02	05	A06(T) A07(R)
23	03	19	A14(T) A15(R)
24	03	18	A12(T) A13(R)
25	03	17	A10(T) A11(R)
26	03	16	A08(T) A09(R)
27	03	02	A00(T) A01(R)
28	03	03	A02(T) A03(R)
29	03	04	A04(T) A05(R)
30	03	05	A06(T) A07(R)

(T) designates transmitter paddleboard Z982C
(R) designates receiver paddleboard Z982D

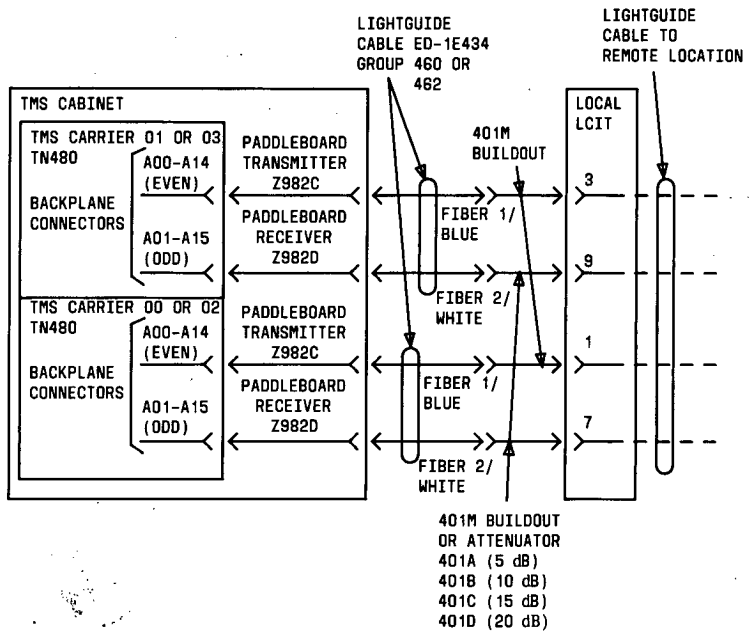


Figure 53. Central TMS Fiber-Link Connections for Duplicated Module Control (Phases 1 and 2)

TABLE AC. Central TMS Fiber-Link Connections for a 1 Through 15 Module System (Phases 1 and 2 Duplicated Module Control)

REMOTE MODULE	TMS CARRIER	SLOT NUMBER	TMS BACKPLANE CONNECTOR
01	00 and 02	17	A10(T) A11(R)
02	00 and 02	16	A08(T) A09(R)
03	00 and 02	02	A00(T) A01(R)
04	00 and 02	03	A02(T) A03(R)
05	00 and 02	04	A04(T) A05(R)
06	00 and 02	05	A06(T) A07(R)
07	01 and 03	19	A14(T) A15(R)
08	01 and 03	18	A12(T) A13(R)
09	01 and 03	17	A10(T) A11(R)
10	01 and 03	16	A08(T) A09(R)
11	01 and 03	02	A00(T) A01(R)
12	01 and 03	03	A02(T) A03(R)
13	01 and 03	04	A04(T) A05(R)
14	01 and 03	05	A06(T) A07(R)

(T) designates transmitter paddleboard Z982C
(R) designates receiver paddleboard Z982D

TABLE AD. Central TMS Fiber-Link Connections for a 1 Through 31 Module System (Phases 1 and 2 Duplicated Module Control)

REMOTE MODULE	TMS CABINET	TMS CARRIER	SLOT NUMBER	TMS BACKPLANE CONNECTOR
01	00 and 01	00	17	A10(T) A11(R)
02	00 and 01	00	16	A08(T) A09(R)
03	00 and 01	00	02	A00(T) A01(R)
04	00 and 01	00	03	A02(T) A03(R)
05	00 and 01	00	04	A04(T) A05(R)
06	00 and 01	00	05	A06(T) A07(R)
07	00 and 01	01	19	A14(T) A15(R)
08	00 and 01	01	18	A12(T) A13(R)
09	00 and 01	01	17	A10(T) A11(R)
10	00 and 01	01	16	A08(T) A09(R)
11	00 and 01	01	02	A00(T) A01(R)
12	00 and 01	01	03	A02(T) A03(R)
13	00 and 01	01	04	A04(T) A05(R)
14	00 and 01	01	05	A06(T) A07(R)

(T) designates transmitter paddleboard Z982C
(R) designates receiver paddleboard Z982D

TABLE AD. Central TMS Fiber-Link Connections for a 1 Through 31 Module System (Phases 1 and 2 Duplicated Module Control) (Contd)

REMOTE MODULE	TMS CABINET	TMS CARRIER	SLOT NUMBER	TMS BACKPLANE CONNECTOR
15	00 and 01	02	19	A14(T) A15(R)
16	00 and 01	02	18	A12(T) A13(R)
17	00 and 01	02	17	A10(T) A11(R)
18	00 and 01	02	16	A08(T) A09(R)
19	00 and 01	02	02	A00(T) A01(R)
20	00 and 01	02	03	A02(T) A03(R)
21	00 and 01	02	04	A04(T) A05(R)
22	00 and 01	02	05	A06(T) A07(R)
23	00 and 01	03	19	A14(T) A15(R)
24	00 and 01	03	18	A12(T) A13(R)
25	00 and 01	03	17	A10(T) A11(R)
26	00 and 01	03	16	A08(T) A09(R)
27	00 and 01	03	02	A00(T) A01(R)
28	00 and 01	03	03	A02(T) A03(R)
29	00 and 01	03	04	A04(T) A05(R)
30	00 and 01	03	05	A06(T) A07(R)

(T) designates transmitter paddleboard Z982C
(R) designates receiver paddleboard Z982D

Remote Location ED-1E434, Group 461 or 463 RMI Fiber Link(s) (Phases 1 and 2)

Install the RMI fiber link for the remote location from the module control to the central LCIT.

> ***WARNING: The cable must be loosely supported to prevent damage. The fiber-optic cable has a minimum bend radius of 1.5 inches.***

Figures 54 and 55 show the RMI fiber link for the remote location for an unduplicated and duplicated system. Install the RMI fiber link as follows:

1. Connect transmitter (Z982J) and receiver (Z982D) paddleboards to **A05** and **A04** on the backplane of the module control carriers. The transmitter paddleboard must be mounted first.
2. Connect transmitter paddleboard Z982J to Fiber1/Blue and the receiver paddleboard Z982D to Fiber2/White of the ED-1E434, Group 461 or 463 lightguide cable.
3. Route the cable out of the module control cabinet to the remote LCIT along the outside of the overhead ducts using locally provided hardware. Figure 47 illustrates the routing of lightguide cables.
4. Connect the appropriate attenuator to the central LCIT (Figure 46) in the correct position as determined by your CSD.
5. Connect the fiber-optic cables to the appropriate attenuator as shown in Figures 54 and 55.

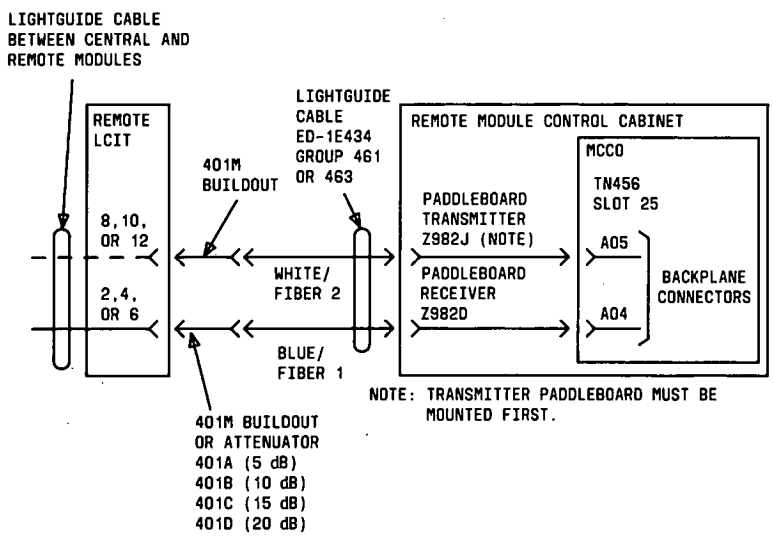


Figure 54. Remote RMI Fiber-Link Connections for Unduplicated Module Control (Phases 1 and 2)

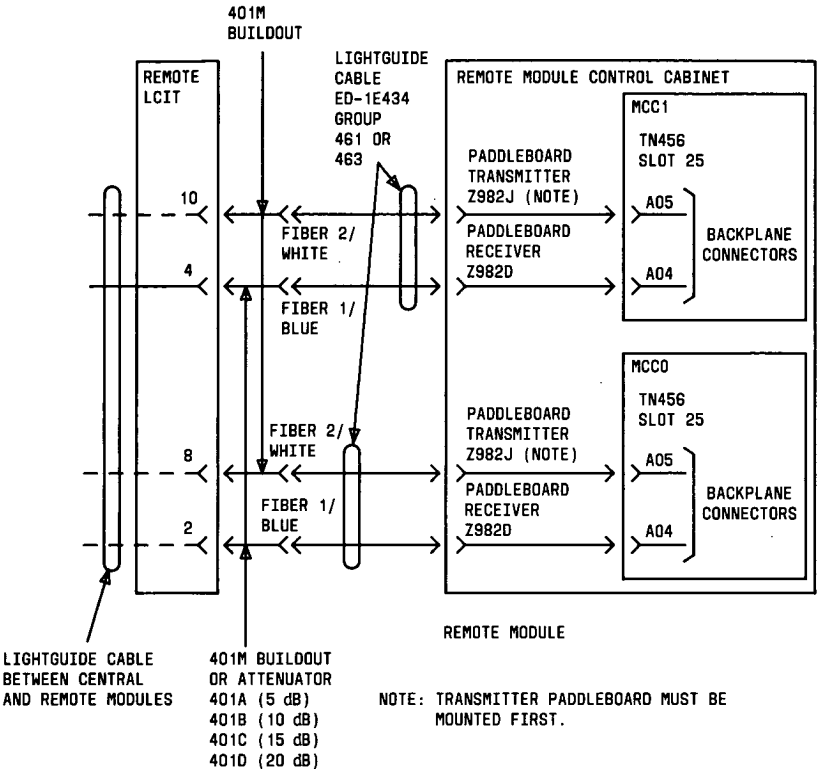


Figure 55. Remote RMI Fiber-Link Connections for Duplicated Module Control (Phases 1 and 2)

Remote Location ED-1E434, Group 460 or 462 TMS Fiber Link(s) (Phases 1 and 2)

Install all the TMS fiber link(s) for the remote location from the TMS carrier(s) to the remote LCIT as shown in Figures 56 and 57 for an unduplicated and duplicated system.

> ***WARNING: The cable must be loosely supported to prevent damage. The fiber-optic cable has a minimum bend radius of 1.5 inches.***

Install the TMS fiber link as follows:

1. Connect transmitter (Z982C) and receiver (Z982D) paddleboards to the appropriate connectors on the backplane of the module control carrier(s). The transmitter paddleboard must be mounted first.
2. Connect transmitter paddleboard Z982C to Fiber1/Blue and the receiver paddleboard Z982D to Fiber2/White of the ED-1E434, Group 460 or 462 lightguide cable.
3. Route the cable out of the auxiliary cabinet to the remote LCIT along the outside of the overhead ducts using locally provided hardware. Figure 47 illustrates the routing of fiber-optic cables.
4. Connect the appropriate attenuator to the central LCIT (Figure 46) in the correct position as determined by your CSD.
5. Connect the fiber-optic cables to the appropriate attenuator as shown in Figures 56 and 57.

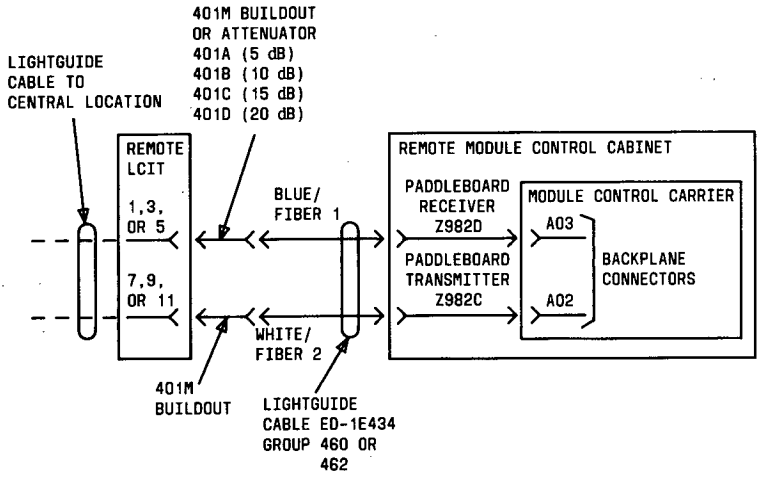


Figure 56. Remote TMS Fiber-Link Connections for Unduplicated Module Control (Phases 1 and 2)

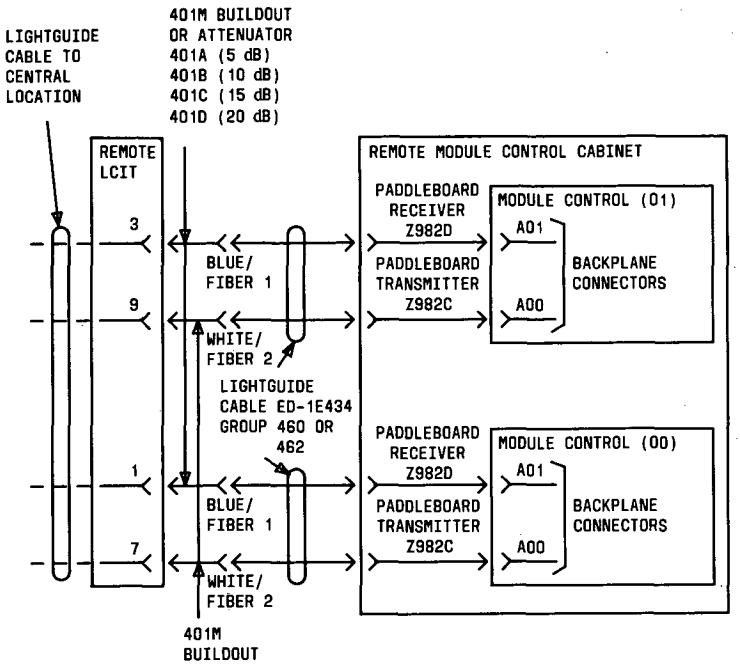
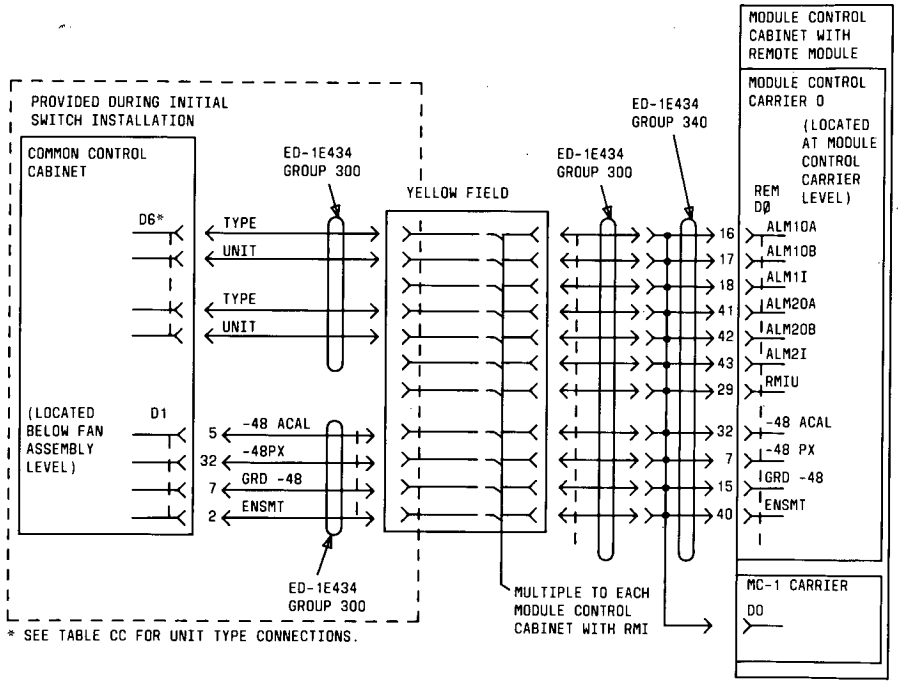


Figure 57. Remote TMS Fiber-Link Connections for Duplicated Module Control (Phases 1 and 2)

ED-1E434, Group 300 Cross-Connect Field Cabling

Central Location (Phase 1)

Connect the ED-1E434, Group 300 cables from **D0** on the module control cabinet(s), that is associated with a remote module, through the ductwork to the cross-connect field. Make standard cross-connect field connections from the common control cabinet to the module control cabinet(s) as shown in Figure 58. These cross-connections should be made in the yellow wall field to each central module control associated with a remote module.



NOTE: FOR DUPLICATED SYSTEMS, AN ED-1E434 GROUP 340 CABLE IS USED TO "Y" MC0 AND MC1 "DO" CONNECTORS TOGETHER, AND THEN CONNECTS TO THE GROUP CABLE.

Figure 58. Central Alarm and MAAP Connections (Phase 1)

Central Location (Phase 2)

Connect the ED-1E434, Group 300 cables from **D0** on the TMS/RMI cabinet(s), that has an RMI carrier, through the ductwork to the cross-connect field as shown in Table AE. Make standard cross-connect field connections from the common control cabinet to the module control cabinet(s) for the alarms and MAAP as shown in Figure 59. These cross-connections should be made in the yellow wall field to each RMI carrier.

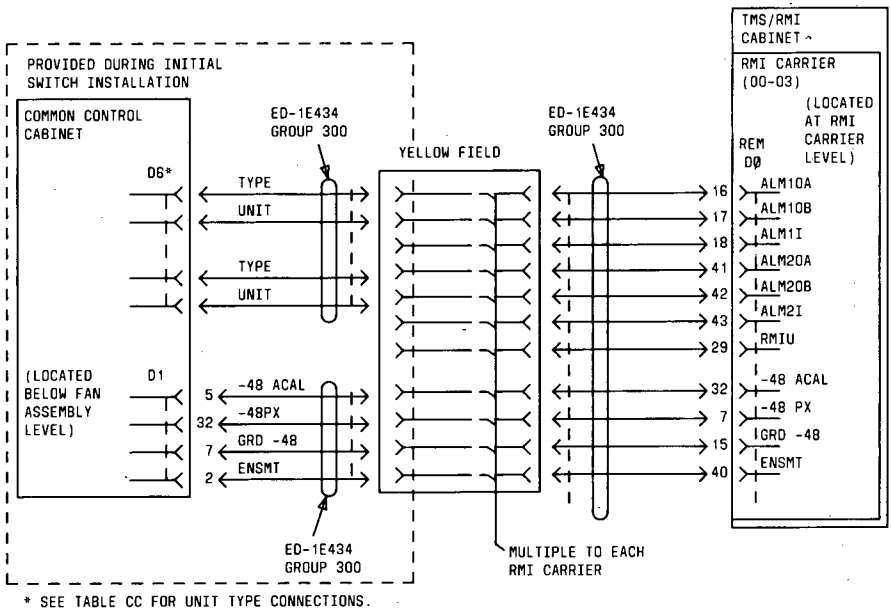


Figure 59. Central Alarm and MAAP Connections (Phase 2)

TABLE AE. Unit Lead Connections

CONNECTOR PIN	LEAD DESIGNATION	CONNECTOR PIN	LEAD DESIGNATION
26	Unit 20	39	Unit 2
1	Unit 19	14	Unit 1
27	Unit 22	40	Unit 4
2	Unit 21	15	Unit 3
28	Unit 24	41	Unit 6
3	Unit 23	16	Unit 5
29		42	Unit 8
4	Unit 25	17	Unit 7
30	Unit 27	43	Unit 10
5	Unit 28	18	Unit 9
31	Unit 29	44	
6	Unit 28	19	Unit 11
32	Unit 31	45	Unit 13
7	Unit 30	20	Unit 12
33	AUXCTMP	46	Unit 15
8	Unit 32	21	Unit 14
34	EXTEQMN	47	Unit 17
9	EXTEQMJ		22
35	AUXCRCT	48	
10	AUXCHO	23	Unit 18
36	AUXCCB	49	RING0
11	AUXCFRQ	24	TIP0
37	AUXCFAN	50	RING1
12		25	TIP1
38	EXTPRMJ		
13	EXTPRMN		

Remote Location (Phases 1 and 2)

If the Remote Emergency Transfer feature is provided, connect ED-1E434, Group 300 from **D0** on the rear connector plate 845417229 (Figure 14) to yellow wall field. Standard cross-connections for remote emergency transfer and alarm leads are required (Figure 60). Refer to *AT&T System 85 Installation* (555-103-104) for standard cross-connections.

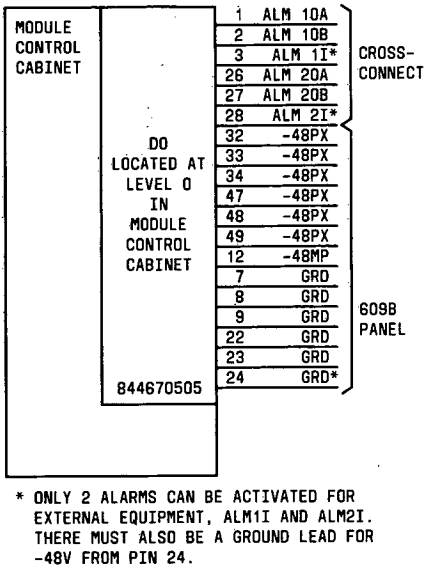


Figure 60. Remote Location Cross-Connections (Phases 1 and 2)

Lightguide Splicing in LCIT

The lightguide cables should be spliced in the LCITs at the central and remote locations according to standard splicing procedures for lightguide cable. Refer to *LGA1 Lightguide Cable Splicing and Splice Testing* (640-252-101) for the procedures to splice the lightguide cables.

> *Note:* It is recommended that splicing lightguide cable be performed by a qualified technician trained in this operation.

The procedure for splicing lightguide cable requires the "1030B Splice Tool Kit" and special training for splicing the cable in a vacuum environment.

REMOTE CONSOLE

Introduction

A remote console is available for use with systems equipped with Remote Modules. This feature requires connections at both the remote and central locations. In addition to the connections required at the remote location, the connections unique to the remote console at the central location are contained in this manual. The connections at the central location that are not unique to remote console are contained in *AT&T System 85 Installation* (555-103-104). A block diagram of the Remote Console connection is shown in Figure 61.

This feature uses the 107A Optically Remoted Peripheral Interface (ORPI) in a fiber-optic link subsystem in combination with the TMS and RMI links to provide attendant console service for one or more remote System 85 modules. The ORPI unit is intended to function in pairs, one located at the central location and the other at the remote location. The ORPI has the capability to serve a maximum of five consoles. The ORPI should be mounted adjacent to or near the cross-connect field since the ORPI requirements of data, voice and control, alarm and power come from the System 85 via the cross-connect field.

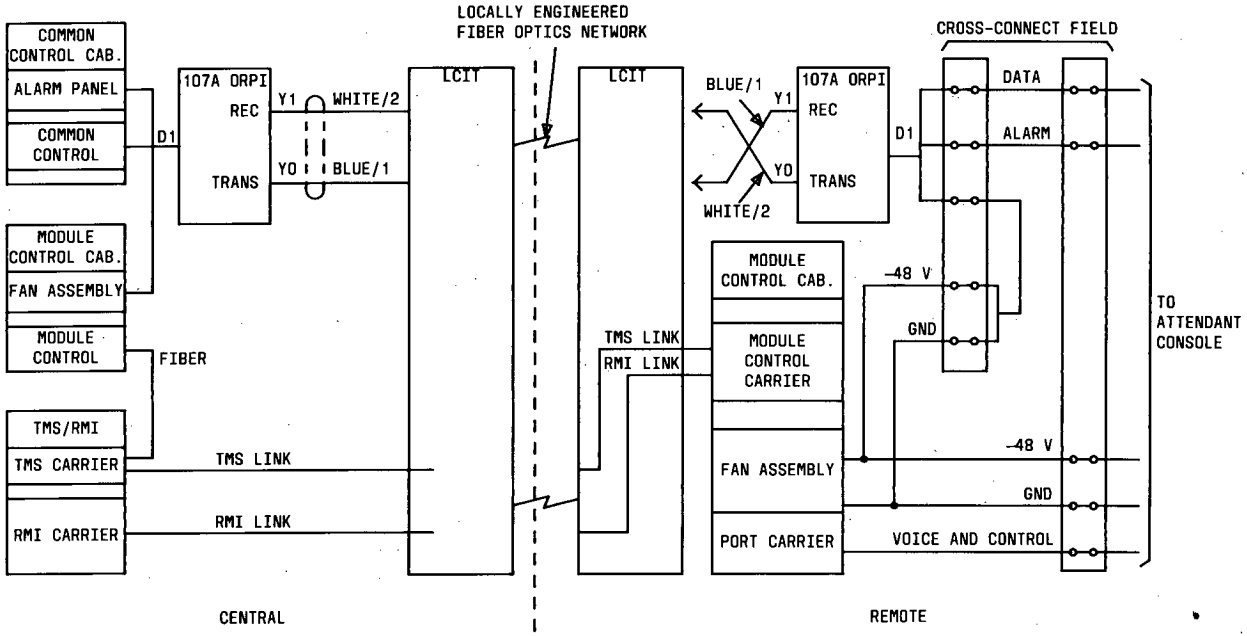


Figure 61. Remote Console Block Diagram

Install the ORPI

An ORPI is required at both the central and remote locations and should be mounted near the cross-connect field. The ORPIs equipped with AEW3, Vintage 1 circuit pack are position sensitive and must be wall mounted because the ORPIs contain mercury relays that will not operate if mounted horizontally. The ORPIs equipped with AEW3 Vintage 2 circuit packs can be mounted in any position.

Attach the "WARNING" label (Figure 62) supplied with the ORPI unit to the carrier fuse panel that supplies power to the ORPI.

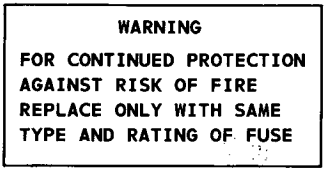


Figure 62. ORPI Warning Label

Install the LCIT

An LCIT is required at the central and remote location. The procedures for installing the LCIT are described in the "Lightguide Cable Interconnect Terminal (LCIT)" section.

Central Location Connections

ORPI to System 85 Connections

You can connect the ORPI using Figure 63 and Table AF. Figure 63 shows the connections required at the System 85 cross-connect field. Use *AT&T System 85 Installation* (555-103-104) for the connections from the switch to the cross-connect field. Table AF contains the lead and pin designations required to connect the ORPI.

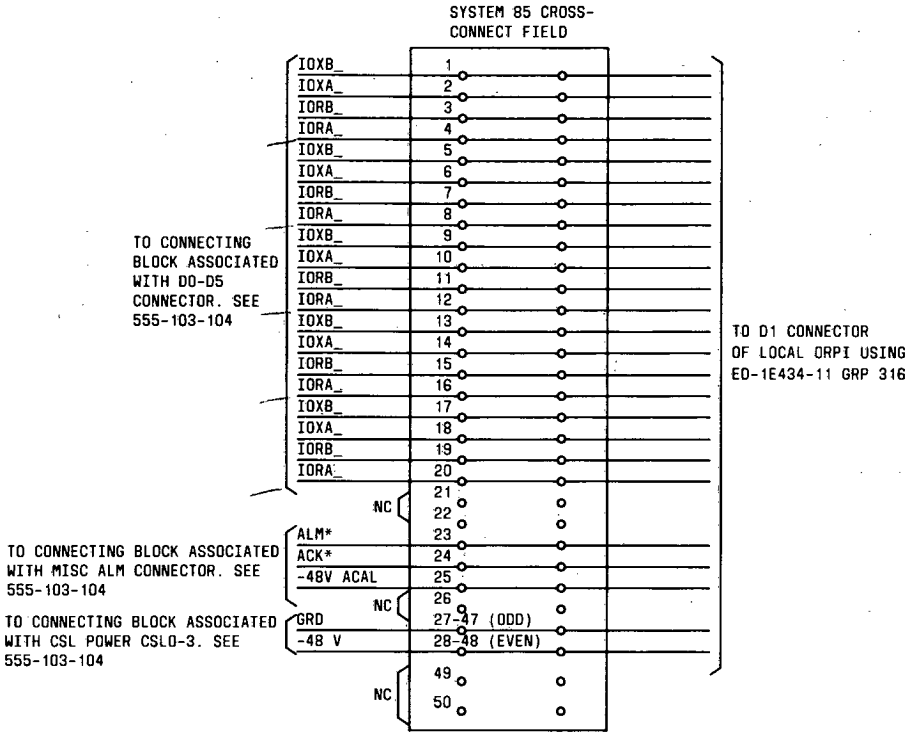


Figure 63. System 85 to ORPI Connections

TABLE AF. D1 Connector Lead Designations

LEAD DESIGNATION	D1 ON ORPI	LEAD COLOR	CONNECTING BLOCK TERMINAL
IOXB0	26	W-BL	1
IOXA0	1	B-W	2
IORB0	27	W-O	3
IORA0	2	O-W	4
IOXB1	28	W-GR	5
IOXA1	3	GR-W	6
IORB1	29	W-BR	7
IORA1	4	BR-W	8
IOXB2	30	W-SL	9
IOXA2	5	SL-W	10
IORB2	31	R-BL	11
IORA2	6	BL-R	12
IOXB3	32	R-O	13
IOXA3	7	O-R	14
IORB3	33	R-GR	15
IORA3	8	GR-R	16
IOXB4	34	R-BR	17
IOXA4	9	BR-R	18
IORB4	35	R-SL	19
IORA4	10	SL-R	20
		BK-BL	21
		BL-BK	22
ALM*	37	BK-O	23
ACK*	12	O-BK	24

LEAD DESIGNATION	D1 ON ORPI	LEAD COLOR	CONNECTING BLOCK TERMINAL
-48 ACAL	38	BK-GR	25
		GR-BK	26
GRD	39	BK-BR	27
-48V	14	BR-BK	28
GRD	40	BK-SL	29
-48V	15	SL-BK	30
GRD	41	Y-BL	31
-48V	16	BL-Y	32
GRD	42	Y-O	33
-48V	17	O-Y	34
GRD	43	Y-GR	35
-48V	18	GR-Y	36
GRD	44	Y-BR	37
-48V	19	BR-Y	38
GRD	45	Y-SL	39
-48V	20	SL-Y	40
GRD	46	V-BL	41
-48V	21	BL-V	42
GRD	47	V-O	43
-48V	22	O-V	44
GRD	48	V-GR	45
-48V	23	GR-V	46
GRD	49	V-BR	47
-48V	24	BR-V	48
	50	V-SL	49
	25	SL-V	50

ORPI to LCIT Connections

Use Table AG to determine the proper cable group. Make the connections between the LCIT and ORPI using the previously selected cable and Figure 64.

TABLE AG. Cable Group

CABLE GROUP ED1E434-11	CABLE TYPE	MICRON	LENGTH (FT)
464	LA2A-B	50	10, 15, 20, 25, 30 40, 50, 75, 100
465	LL2A-B	62.5	

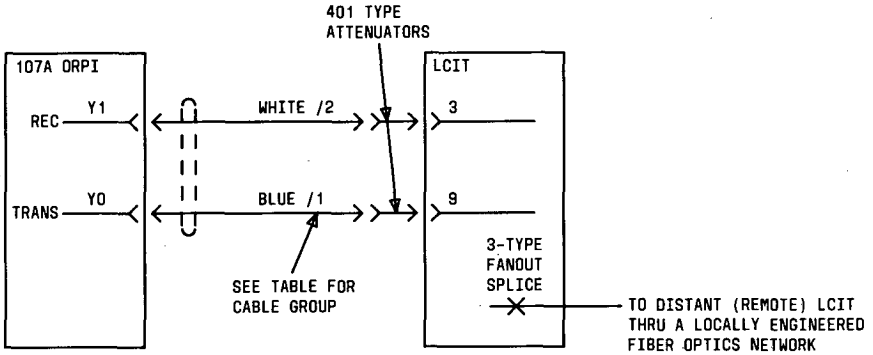


Figure 64. ORPI to LCIT Connections

Remote Location Connections

The remote console is connected to several sources through the remote cross-connect field, and receives its data from the remotely located ORPI. The alarm leads also come from the ORPI but must be fanned out if more than one remote console is provided. The remote console receives its voice from an SN233 located in a remote port carrier. The remote console receives its power from a remote module control or port cabinet with a power supply.

LCIT to ORPI Connections

Use Table AH to determine the proper cable group. Make the connections between the LCIT and ORPI using the previously selected cable and Figure 65.

TABLE AH. Cable Group

CABLE GROUP ED1E434-11	CABLE TYPE	MICRON	LENGTH (FT)
464	LA2A-B	50	10, 15, 20, 25, 30 40, 50, 75, 100
465	LL2A-B	62.5	

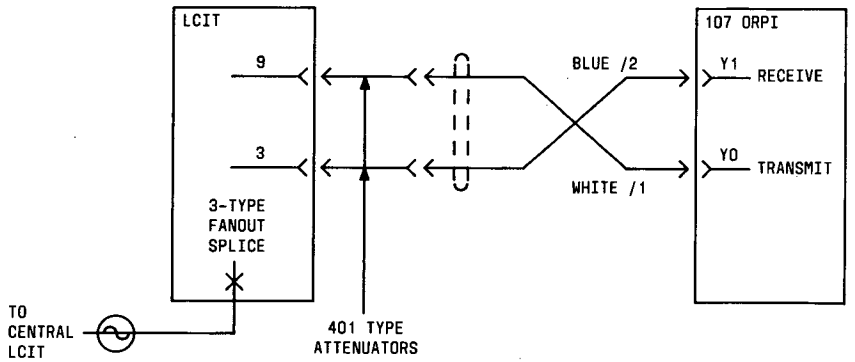


Figure 65. ORPI to LCIT Connections

ORPI Connections

Make the connections shown in Table AI and Figure 66 at the ORPI and the remote cross-connect field.

TABLE AI. D1 Connector Lead Designation

LEAD DESIGNATION	D1 ON ORPI	LEAD COLOR	CONNECTING BLOCK TERMINAL
IOXB0	26	W-BL	1
IOXA0	1	B-W	2
IORB0	27	W-O	3
IORA0	2	O-W	4
IOXB1	28	W-GR	5
IOXA1	3	GR-W	6
IORB1	29	W-BR	7
IORA1	4	BR-W	8
IOXB2	30	W-SL	9
IOXA2	5	SL-W	10
IORB2	31	R-BL	11
IORA2	6	BL-R	12
IOXB3	32	R-O	13
IOXA3	7	O-R	14
IORB3	33	R-GR	15
IORA3	8	GR-R	16
IOXB4	34	R-BR	17
IOXA4	9	BR-R	18
IORB4	35	R-SL	19
IORA4	10	SL-R	20
OUTALM*	36	BK-BL	21
OUTACK*	11	BL-BK	22
	37	BK-O	23
	12	O-BK	24

LEAD DESIGNATION	D1 ON ORPI	LEAD COLOR	CONNECTING BLOCK TERMINAL
	38	BK-GR	25
COMALARM	13	GR-BK	26
GRD	39	BK-BR	27
-48V	14	BR-BK	28
GRD	40	BK-SL	29
-48V	15	SL-BK	30
GRD	41	Y-BL	31
-48V	16	BL-Y	32
GRD	42	Y-O	33
-48V	17	O-Y	34
GRD	43	Y-GR	35
-48V	18	GR-Y	36
GRD	44	Y-BR	37
-48V	19	BR-Y	38
GRD	45	Y-SL	39
-48V	20	SL-Y	40
GRD	46	V-BL	41
-48V	21	BL-V	42
GRD	47	V-O	43
-48V	22	O-V	44
GRD	48	V-GR	45
-48V	23	GR-V	46
GRD	49	V-BR	47
-48V	24	BR-V	48
	50	V-SL	49
	25	SL-V	50

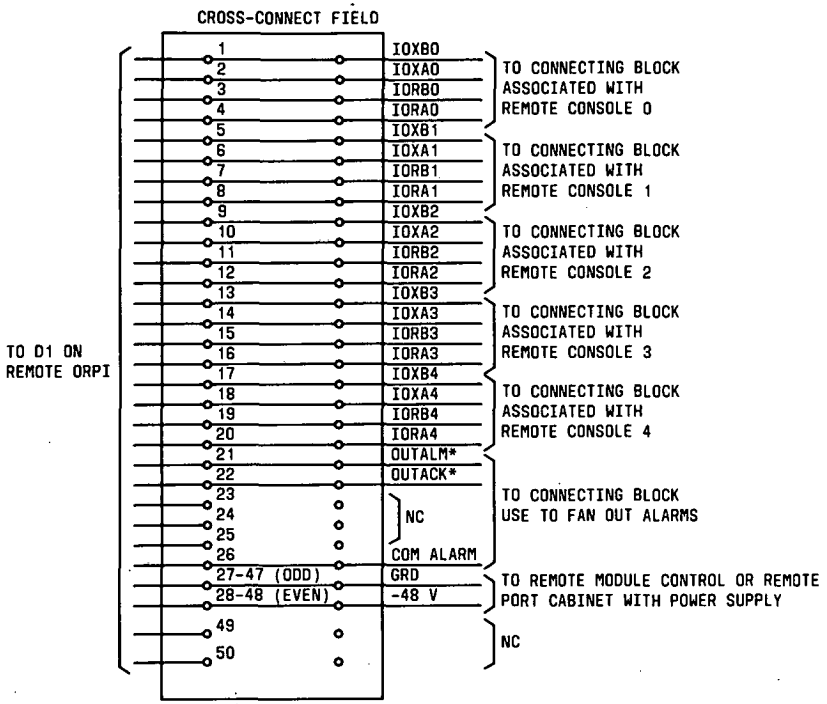


Figure 66. D1 Cross-Connect Connections

Fanning Out Alarm Leads

Only one appearance of the alarm leads is provided by the ORPI. If more than one console is to be located at the remote location, the alarm leads must be fanned out. Use the information in Figure 67 to fan the leads out.

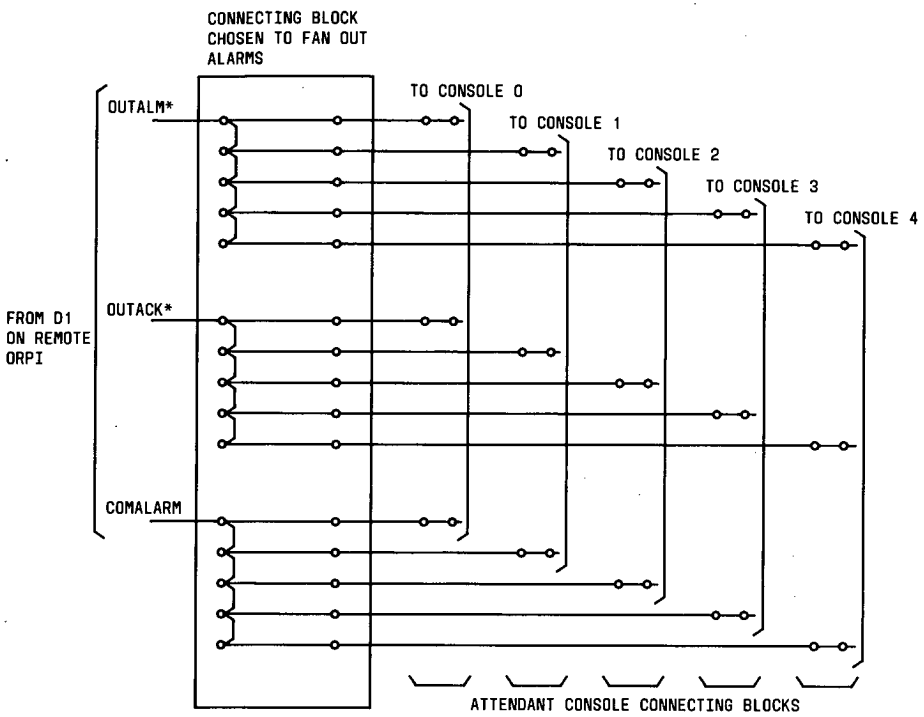


Figure 67. Fanning Out Alarm Leads

Console Connections

Make the connections from the console to the cross-connect field as shown in Figure 68.

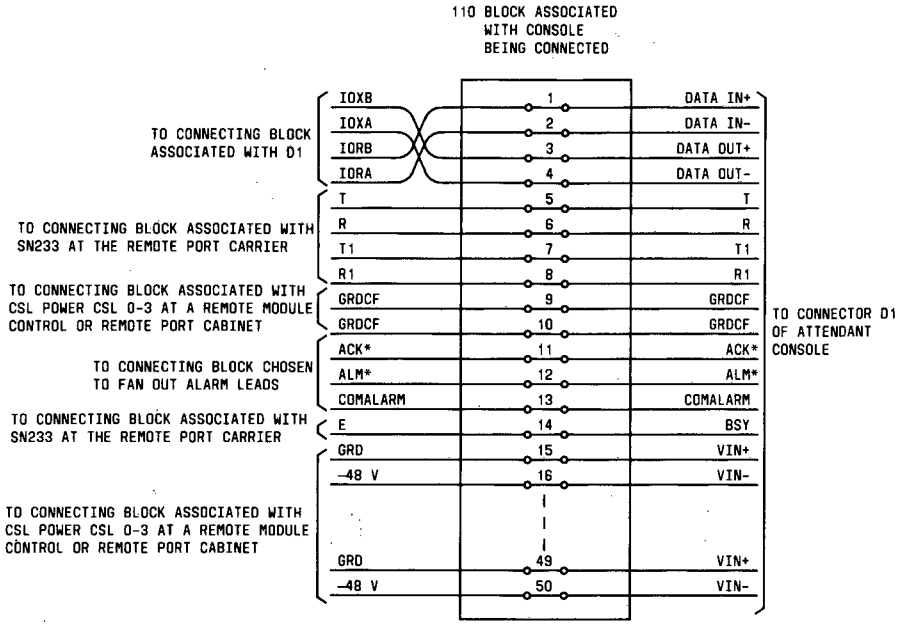
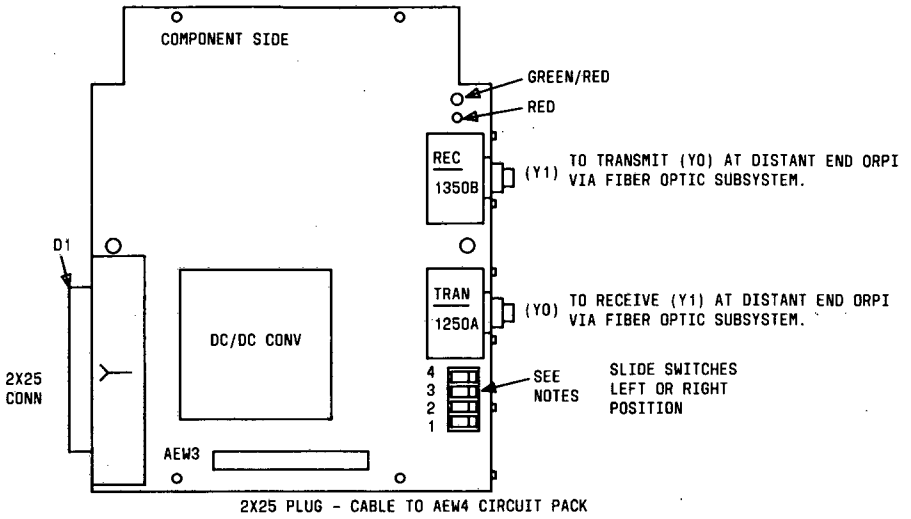


Figure 68. Console Connector Terminating Information

Customizing Fiber-Optic Links

The fiber-optic network between the ORPI and the LCIT must be customized to achieve the required power levels. Each fiber link must be tested individually.

Figure 69 shows the location of switches that are used in customizing the fiber network; Figure 70 shows the attenuator location.



Notes:

1. Switch 1 is used in balancing the lightguide. Settings are TST or NORMAL.
2. Switch 2 is used to select power level for the transmitter. Settings are HALF or FULL.
3. Switch 3 is used for factory test only. Ensure that S3 is in the NORMAL position (as shipped from the factory) when performing the balancing tests.
4. Switch 4 is not used.

Figure 69. Circuit Pack AEW3 Switch Locations

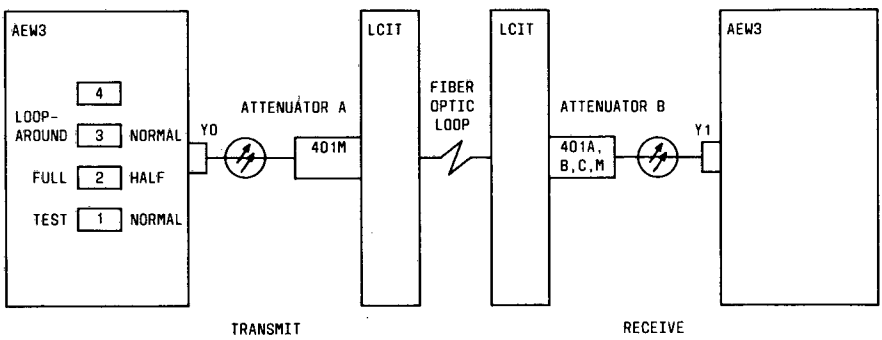


Figure 70. Attenuator Locations

Adjust the fiber-optic link as follows:

1. On the AEW3, in the transmit LCIT, set the switch 1 to TEST. (See Figure 69.)
2. Insert 401M as attenuator A.
3. Set Switch 2 (FULL or HALF), and insert Attenuator B according to Table AJ.
4. Determine the condition of the fiber-optic link by observing the LEDs on the receiver and AEW3.
    a. If one green LED lights, the link is within the required power range.
    b. If both LEDs are red, the link is in an overdriven condition.
    c. If a single LED is red, the link is in an underdriven condition.
5. Adjust the fiber-optic link if overdriven or underdriven by changing the power level settings on the Transmit AEW3 and/or replacing the 401-series attenuators at the Receive LCIT with different values (see Table AJ). If the link still doesn't fall into adjustment, use the information in the flowchart shown in Figure 71. Adjust until the out-of-range condition is eliminated.
6. Return Switch 1 to the Normal Mode. Disregard LED indications when operating in the Normal Mode.

TABLE AJ. Fiber-Optic Link Power Options

LCIT to LCIT DISTANCE	FIBER GRADE	SWITCH 2 FULL/HALF	ATTEN-UATOR B	INITIAL ACTION IF UNDER-DRIVEN 1 RED LED	INITIAL ACTION IF OVER-DRIVEN 2 RED LED
0 - 1000 ft 0 - 0.19 mi 0 - 0.30 km	L	FULL	10 dB 401B	Switch 2 to half power; ATTEN B to D 5 dB	Switch 2 to half power
1000 - 2800 ft 019 - 0.53 mi 0.30 - 0.85 km	L	HALF	5 dB 401A	Switch 2 to full power	Switch 2 to half power; ATTEN B to 10 dB
2800 - 4900 ft 0.53 - 0.93 mi 0.85 - 1.49 km	L	FULL	5 dB 401A	Switch 2 to half power; ATTEN B to 0 dB	Switch 2 to half power
4900 - 7200 ft 0.93 - 1.36 mi 1.49 - 2.20 km	L	HALF	0 dB 401M	Switch 2 to full power	Switch 2 to half power; ATTEN B to 5 dB
7200 - 9800 ft 1.36 - 1.86 mi 2.20 - 2.99 km	N	HALF	0 dB 401M	Switch 2 to full power	Switch 2 to half power; ATTEN B to 5 dB
9800 - 13000 ft 1.86 - 2.46 mi 2.99 - 4.00 km	N	FULL	0 dB 401M		Switch 2 to half power

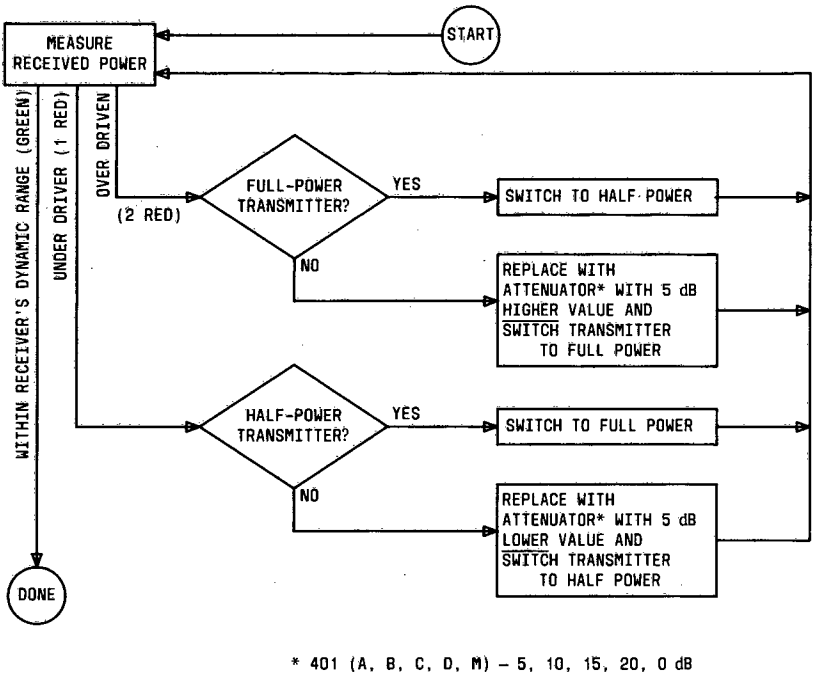


Figure 71. Flowchart for Adjusting the ORPI Fiber-Optic Link

CUSTOMIZING FIBER-OPTIC LINKS

After the RMI hardware is installed and the cabling is completed at both the central and remote locations, test the fiber-optic links. Adjust the fiber link if necessary, to achieve the required power levels. Each fiber link must be tested individually.

Adjust the fiber-optic link as follows:

1. Set the switch settings on the transmitter paddleboard (Z982C or Z982J, Figure 44) to the **TEST** mode.

   Note: If transmitter is not in test mode, the LEDs on the receiver will not give valid information. The LEDs should be ignored when the transmitter paddleboard is in the normal mode.

2. Set the power switch on the transmitter paddleboard to **FULL** or **HALF** based on distance between central and remote locations (Table AK).
3. Determine the condition of the fiber-optic link by observing the LEDs on the receiver paddleboard (Z982D). These conditions are:
   a. If one green LED lights, the link is within the required power range.
   b. If both LEDs are red, the link is in an overdriven condition.
   c. If a single LED is red, the link is in an underdriven condition.
4. To adjust the fiber-optic link if underdriven or overdriven, adjust the link components necessary to achieve the required power level (Table AK, Figure 72). These adjustments include:
   a. Changing power level settings on transmitter paddleboard to **HALF**/**FULL** power
   b. Replacing 401-series attenuator at LCIT with one of different value.
5. Repeat Step 4 until link is within required power range.
6. Return the switch settings on the transmitter paddleboard (Z982C or Z982J) to the **NORMAL** mode.

TABLE AK. Options for Fiber-Optic Link Power Levels

LCIT to LCIT DISTANCE	FIBER GRADE	XMTR POWER	ATTEN-UATOR	INITIAL ACTION IF UNDER-DRIVEN	INITIAL ACTION IF OVER-DRIVEN
0 - 1000 ft 0 - 0.19 mi 0 - 0.30 km	L	Full	10 dB	Switch XMTR to half power; ATTEN to 5 dB	Switch XMTR to half power
1000 - 2800 ft 0.19 - 0.53 mi 0.30 - 0.85 km	L	Half	5 dB	Switch XMTR to full power	Switch XMTR to full power; ATTEN to 10 dB
2800 - 4900 ft 0.53 - 0.93 mi 0.85 - 1,49 km	L	Full	5 dB	Switch XMTR to half power; ATTEN to 0 dB	Switch XMTR to half power
4900 - 7200 ft 0.93 - 1.36 mi 1.49 - 2.20 km	L	Half	0 dB	Switch XMTR to full power	Switch XMTR to full power; ATTEN to 5 dB
7200 - 9800 ft 1.36 - 1.86 mi 2.20 - 2.99 km	N	Half	0 dB	Switch XMTR to full power	Switch XMTR to full power; ATTEN to 5 dB
9800 - 13000 ft 1.86 - 2.46 mi 2.99 - 4.00 km	N	Full	0 dB		Switch XMTR to half power

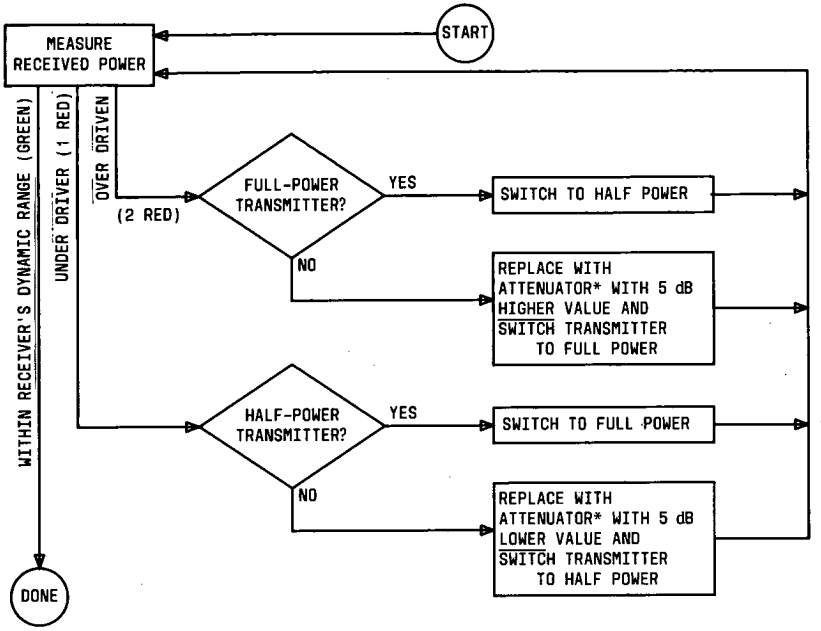


Figure 72. Flowchart for Adjusting the RMI Fiber-Optic Link

REMOTE GROUP INTERFACE (RGI) INSTALLATION

The RGI feature provides for small groups of voice and/or data terminals at a remote location connected directly to the system switch through DS1 facilities. Because this configuration involves only small numbers of DS1 port interface, there are no switch considerations. Each remote port group is connected to a DS1 carrier in a port cabinet at the central location through a pair of dedicated RGI circuit packs. The ANN15B is located at the central location, and the ANN16B is located at the remote location in the Remote Group Housing. The Remote Group Housing also contains the required conventional port circuits.

A block diagram of the RGI feature is shown in Figure 73.

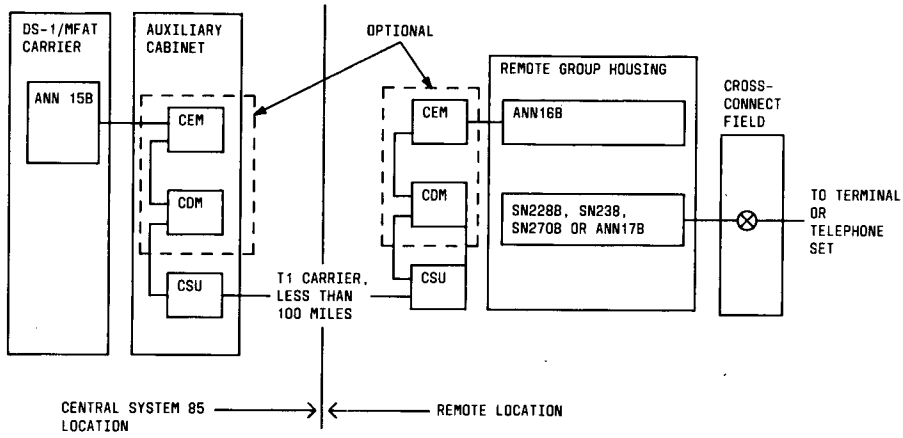


Figure 73. Remote Group Interface Block Diagram

CENTRAL LOCATION CONNECTIONS

Remote Group Interface requires that an ANN15B circuit pack be installed in the J58888N DS1/MFAT carrier at the System 85. The terminations and connections for this circuit pack are in *AT&T System 85 Installation* (555-103-104).

The remote group uses DS1 signaling via DS1 interface ANN15B from the central location to the DS1 interface ANN16B at the remote location. The DS1 connections are in *AT&T System 85 Installation* (555-103-104).

REMOTE LOCATION CONNECTIONS

The Remote Group Housing (RGH) can be wall mounted or set on a table or shelf. If the housing is wall mounted, refer to the next paragraph. The RGH must be mounted in a position where both sides are not blocked. Air vents are in each side; proper airflow is critical. If the Remote Group Housing is equipped with an ANN17B circuit pack, the

connector (D01, D02, D03, D05, D07, or D08) must be equipped with a J58889AN (-1 or -2), List 8 EMI filter. When this filter is used, it is critical that the retaining screws are properly tightened.

A rear view of the J58889AN-1 Remote Group Housing is shown in Figure 74. A rear view of the J58889AN-2 Remote Group Housing is shown in Figure 75.

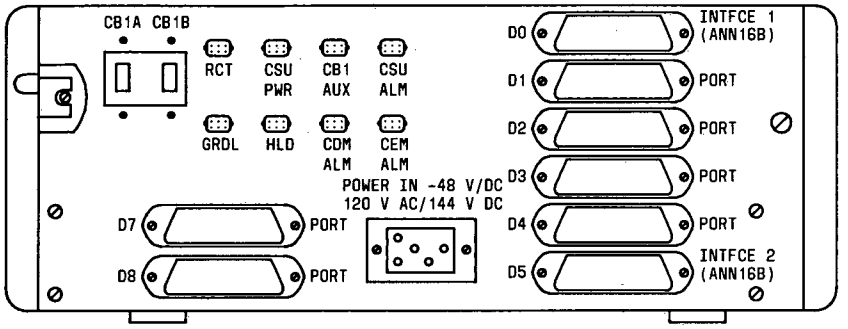


Figure 74. Remote Group Housing (J58889AN-1)

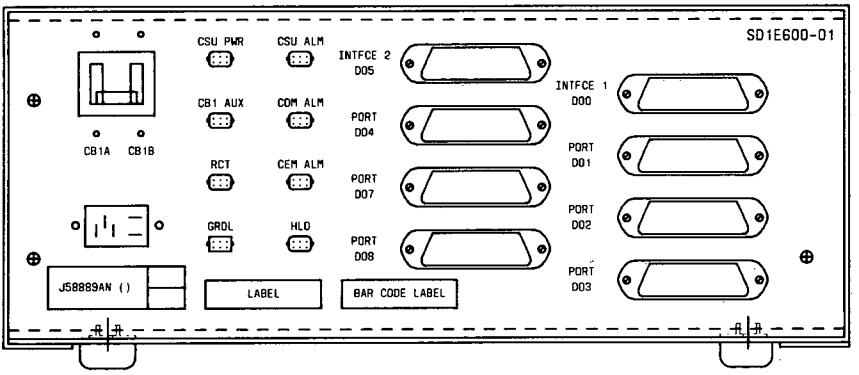


Figure 75. Remote Group Housing (J58889AN-2)

A cross-connect field must be established at the remote group location. This cross-connect field is usually mounted on a wall close to the remote group interface. Use the information provided in Part 3 of the System 85 Installation Manual to set up the cross-connect field.

Wall Mounting the Remote Group Housing

Perform the following steps to wall mount the Remote Group Housing (Figure 76).

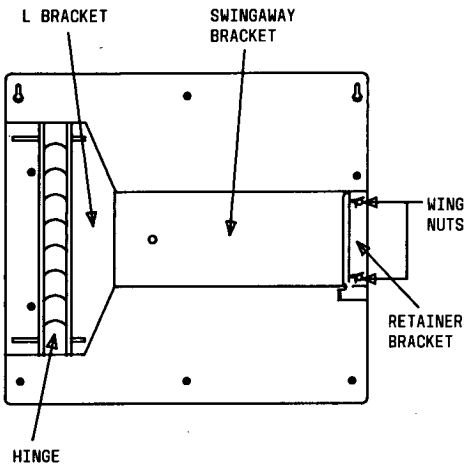


Figure 76. RGH Wall Mounting Bracket

1. Mount a plywood backboard to the wall. The bottom of the RGH should be a least 24 inches from the floor; mount the plywood accordingly. The plywood must be securely attached to the wall studs, because the weight of the wall mounting bracket and RGH exceeds 100 labs. The backing should measure at least 28 inches wide by 22 inches high and be at least 3/4-inch thick.
2. Place two of the 3/4-inch wood screws 25-3/8 inches apart near the top of the plywood backing.
3. Insert the screws far enough to temporarily hold the wall mounting bracket.
4. Holding the wall mounting bracket with the slotted holes at the top, place the bracket over the two screws; then tighten.
5. Insert wood screws in remaining seven holes of the wall mounting bracket, and then tighten.
6. Loosen the wing nut clamps on the retainer bracket. Slide the bracket to the right to free the the hinged bracket.
7. Swing the hinged bracket away from the wall.
8. Position the Remote Group Housing so the rear of the Remote Group Housing faces the hinge.
9. Slide the U bracket on the underside of the Remote Group Housing until the rear edge meets the L bracket.
10. Tighten the screw on the back of the hinged bracket against the base of the Remote Group Housing.
11. Swing the hinged bracket with the mounted Remote Group Housing closed.
12. Slide the retainer bracket to the left, and tighten the wing nuts to secure the hinged bracket.

Removing and Installing Circuit Packs

Before the circuit packs can be removed or installed, the Remote Group Housing front cover must be removed. There are three different methods of removing the front cover of the J58888AN-1 RGH. One method uses one quarter-turn captive screw accessed from the front cover. This is shown in sketch A of Figure 77. The second method uses two threaded screws accessed from both sides of the RGH. This is shown in sketch B of Figure 77. The third method uses two quarter-turn captive screws accessed from the front of the RGH. This is shown in sketch C of Figure 77. After the screws are loosened or removed, snap the front cover off to access the circuit packs.

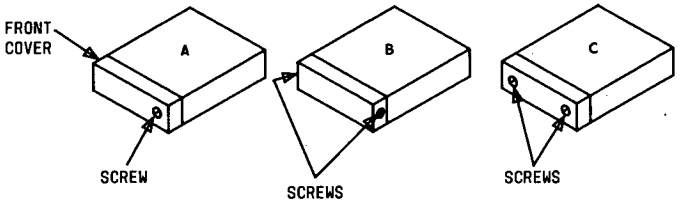


Figure 77. J58889AN-1 Front Cover Description

The front cover of the J58888AN-2 RGH is removed by loosening, but not removing, the screws shown in Figure 78. The front cover can then be removed by sliding it off.

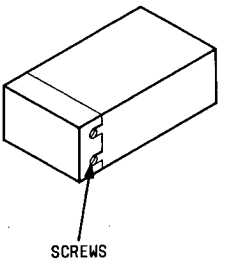


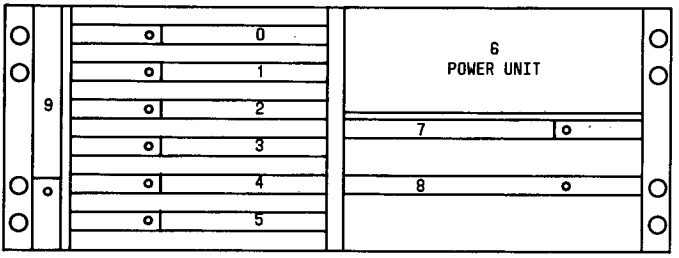
Figure 78. J58889AN-2 Front Cover Description

To install or verify the option settings on the CAL1B board, remove the housing cover (one piece, front and side). After the front cover has been removed, turn the RGH so that the bottom is accessible. Six screws hold the the housing cover in place. Remove the front and middle pairs of screws. The two rear screws should be loosened only. The cover can then be slid off toward the front.

> ***WARNING: Electrostatic discharge can damage circuit packs containing integrated circuits (ICs).***

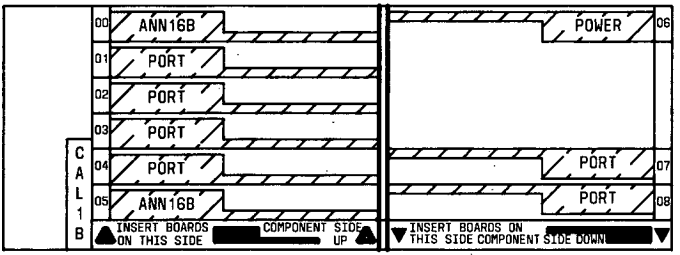
Installation personnel must always attach properly grounded wrist-grounding straps before handling circuit packs. The J58889AN-1 circuit pack and locations are shown in Figure 79. The J58889AN-2 circuit packs and locations are shown in Figure 80. After the proper circuit slot has been determined, remove the circuit pack by unfastening the latch and pulling the circuit pack straight out. To install the circuit pack, insert the circuit pack in the desired slot and fasten the latch.

> ***WARNING: Circuit packs in slots 00 through 05 mount component side up; circuit packs in slots 06 through 08 mount component side down.***



SLOT 0 ANN16 B
1 PORT
2 PORT
3 PORT
4 PORT
5 ANN16B
6 POWER UNIT
7 PORT
8 PORT
9 CAL1B

Figure 79. J58889AN-1 Circuit Pack Location



SLOT 0 ANN16 B
1 PORT
2 PORT
3 PORT
4 PORT
5 ANN16B
6 POWER UNIT
7 PORT
8 PORT

Figure 80. J58889AN-2 Circuit Pack Locations

Option Settings

Use the following paragraphs to set the options on all the circuit packs, power supplies, CDMs, CSUs, and CEMs associated with the RGH.

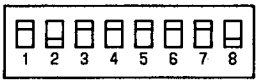
CAL1B

The CAL1B circuit pack options should be factory set. Verify using Figure 81.

There is a cable that connects to the CAL1B that must be disconnected before the board can be removed. After the CAL1B is reinserted, reconnect the cable. After the cable is reconnected, care should be taken that the cable is placed in the cable trough so it will not interfere with the operation of the fan.

POWER UNIT	SWITCH							
	1	2	3	4	5	6	7	8
OLS	0	1	0	0	0	0	0	1
DC CONVERTER	0	1	0	0	0	1	1	0

1 = OPTION DIP SWITCH CLOSED
0 = OPTION DIP SWITCH OPEN



A SWITCH IS CLOSED WHEN THE ROCKER ARM IS DEPRESSED TOWARD THE SWITCH POLE NUMBER. AS SHOWN, POLES 2 AND 8 ARE CLOSED.

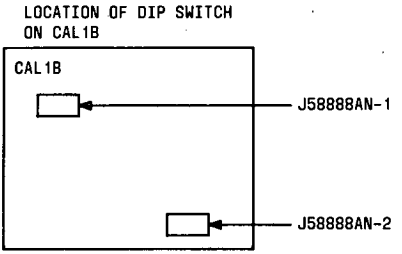


Figure 81. CAL1B Options

ANN15B and ANN16B Options

One switch package (S1) containing three rocker switch sections is positioned on the circuit pack as shown in Figure 82.

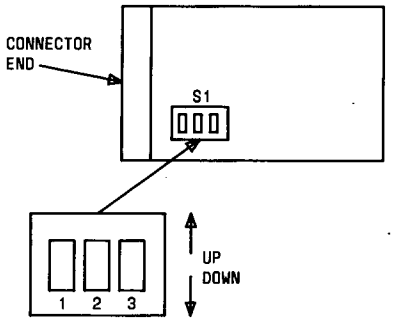


Figure 82. ANN15B and ANN16B Switch Locations

Set the option switches based on the length of the DS1 cross-connect point using Table AL. If a DS1 trunk port from a System 85 is connected to another system or device that has similar equalization options, a phantom point midway between the two systems should be chosen as the distance. The options at both systems should be set at the distance to the phantom point. If the unit being connected to the DS1 trunk port does not have equalization options, the distance should be set to the input of the device.

TABLE AL. Switch Settings

CABLE LENGTH	SW1	SW2	SW3
0-133 feet	D	D	U
133-266 feet	D	U	D
266-399 feet	D	U	U
399-533 feet	U	D	D
533-655 feet	U	D	U

634WAAB1 Series 4 and Higher Power Supply

The input voltage switch should be factory set to the 110 V position. Verify that it is properly set. If it isn't, set the input voltage switch to the 110 V position using a nonmetallic tool. See Figure 83 for the switch locations.

> *Note:* Only Vintage 4 and above power supplies are set to 110 V. Older vintages of the power supply should not be in the field.

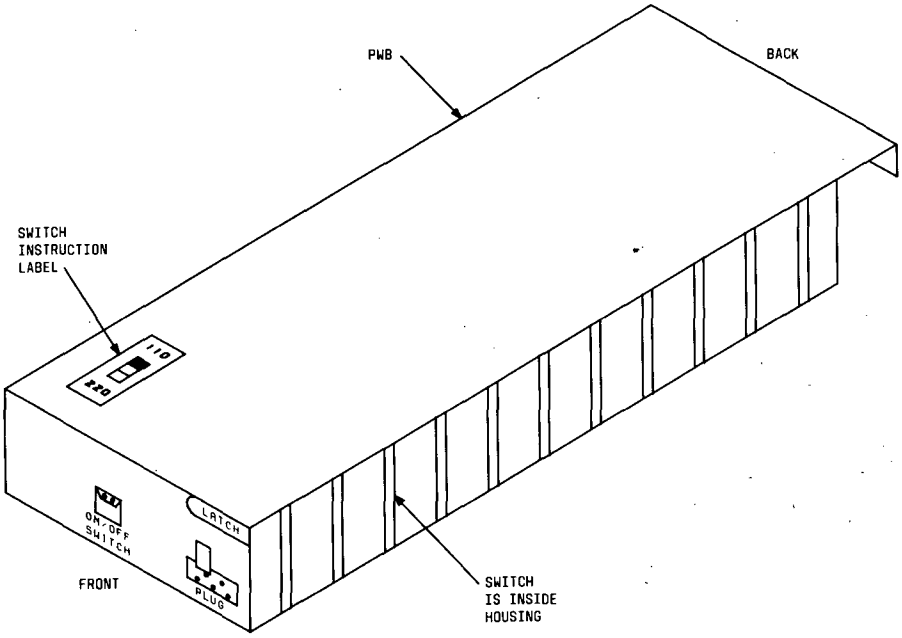


Figure 83. 634WAAB1 Switch Locations

551V CSU Options

The settings for each installation can be determined from the hardware CSD.

The option switch location for the system monitor unit and the office repeater boards of the CSU are shown in Figures 84 and 85.

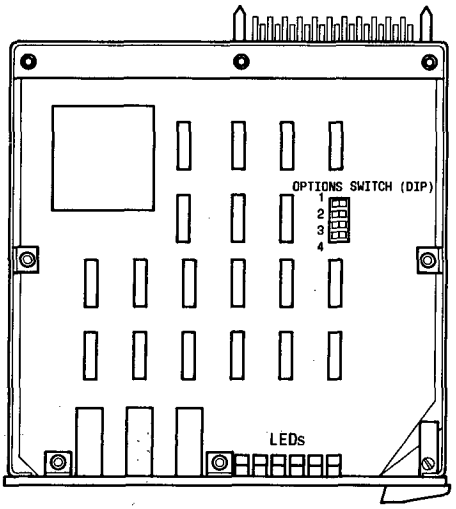
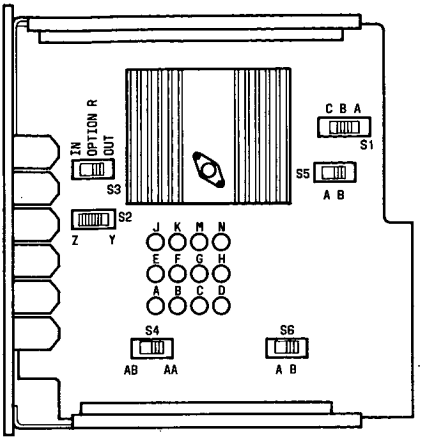


Figure 84. System Monitor Unit



OFFICE REPEATER

Figure 85. Office Repeater

The Signal Monitor Unit (SMU) option settings are shown in Table AM.

TABLE AM. SMU Options

OPTION		SWITCH	SETTING
All Ones		1	C
		2	O
ESS		1	O
		2	C
Zeros	16	3	C
	50	3	O
Active Fault Locate		4	C

The Office Repeater (OR) option settings are shown in Table AN.

TABLE AN. OR Options

551 V OR POWERING MODE DATA					
SCREW OPTIONS		S2	S3	S4	S6
60mA LINE Line Power	C, E, K	N/A	N/A	AB	B
-48 V with sealing current	C, E, K	Y	OUT	AA	B
-48 V without sealing current	C, G, J	Y	OUT	AA	B

ARTIFICIAL LINE OPTION SELECTION		
dB LEVEL	S1	S5
0 db	C	NA
7.5 db	A	A
15 db	B	B

Channel Expansion Multiplexer (CEM) Options

The settings for each individual installation can be determined from the hardware CSD.

The option settings for the SM470 are shown in Table AO.

TABLE AO. SM470 Options

PORT	1	2	3	4	5	6	7	8
SWITCH	1	2	3	4	5	6	7	8
ECHO CANCELING PROVIDED	O	O	O	O	O	O	O	O
ECHO CANCELING NOT PROVIDED	C	C	C	C	C	C	C	C

The option settings for the TM501 (Line Z Options) are shown in Table AP.

TABLE AP. TM501 Options

OPTION		SWITCH							
		1	2	3	4	5	6	7	8
EQUALIZER VALUE	0-133 ft	C	C	O			NOT USED		
	134-267 ft	C	O	C					
	268-400 ft	C	O	O					
	401-533 ft	O	C	C					
	534-655 ft	O	C	O					
FRAMING FORMAT	D4				C				
	Fe				O				
LINE FORMAT	BIPOLAR					C			
	B8ZS					O			

The option settings for the TM500 (line X and Y options) are shown in Table AQ. The switch locations are shown in Figure 86.

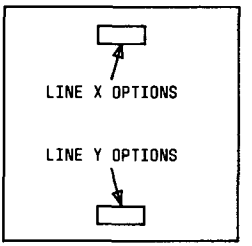


Figure 86. Switch Locations

TABLE AQ. TM500 Options

OPTION		SWITCH							
		1	2	3	4	5	6	7	8
EQUALIZER VALUE	0-133 ft	C	C	O			NOT USED		
	134-267 ft	C	O	C					
	268-400 ft	C	O	O					
	401-533 ft	O	C	C					
	534-655 ft	O	C	O					
FRAMING FORMAT	D4				C				
	Fe				O				
LINE FORMAT	BIPOLAR					C			
	B8ZS					O			

The option switch settings for the MC90069A-1 are shown in Table AR.

TABLE AR. MC90069A-1 Options

OPTION			SWITCH							
			1	2	3	4	5	6	7	8
CLOCK REFERENCE	Local BCM		O	O	O	O	O	O		
	Line X		C	O	O	O	O	C		
	Line Y		O	C	O	O	O	C		
	Line X		O	O	C	O	O	C		
ECHO TAIL LENGTH	LINE X	Not used or 16 ms							O	
		32 ms							C	
	LINE Y	Not used or 16 ms								O
		32 ms								C

The MC90069A-1 faceplate options are shown in Tables AS and AT.

TABLE AS. MC90069A-1 Faceplate Options—No Through Channels

	SWITCH	ROCKER					
		1	2	3	4	5	6
Line X Channels 1-12	1	C	C	O	O	O	O
	2	O	C	O	O	O	O
Line X Channels 13-24	1	C	O	O	O	O	O
	2	O	O	O	O	O	O
Line Y Channels 1-12	3	C	C	O	O	O	O
	4	O	C	O	O	O	O
Line Y Channels 13-24	3	C	O	O	O	O	O
	4	C	O	O	O	O	O

TABLE AT. 12 Channels Compressed—No Signaling

SWITCH					
1	2	3	4	5	6
C	C	C	O	O	C

The signaling channels with through channel options are shown in Table AU.

TABLE AU. Signaling Channels With Through Channels

NUMBER OF THROUGH CHANNELS	SWITCHES		AVAILABLE CHANNEL CONFIGURATIONS											
	OPEN	CLOSED	1 OR 13	2 OR 14	3 OR 15	4 OR 16	5 OR 17	6 OR 18	7 OR 19	8 OR 20	9 OR 21	10 OR 22	11 OR 23	12 OR 24
1	2,3,4,5,6	1	T-N	–	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	–
	1,3,4,5,6	2	T-S	–	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	–
	2,5	1,3,4,6	–	–	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
2	3,4,5,6	1,2	T-N	T-N	–	–	C-S	C-S	C-S	C-S	C-S	C-S	C-S	–
	1,2,4,5,6	3	T-N	T-S	–	–	C-S	C-S	C-S	C-S	C-S	C-S	C-S	–
	2,4,5,6	1,3	T-S	T-S	–	–	C-S	C-S	C-S	C-S	C-S	C-S	C-S	–
	2,4,6	1,3,5	T-N	–	T-N	–	C-S	C-S	C-S	C-S	C-S	C-S	C-S	–
	1,5	2,3,4,6	T-N	–	–	–	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	2,3	1,4,5,6	–	–	–	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
3	1,4,5,6	2,3	T-N	T-N	T-N	–	–	–	C-S	C-S	C-S	C-S	C-S	–
	4,5,6	1,2,3	T-N	T-N	T-S	–	–	–	C-S	C-S	C-S	C-S	C-S	–
	1,2,3,5,6	4	T-N	T-S	T-S	–	–	–	C-S	C-S	C-S	C-S	C-S	–
	2,3,5,6	1,4	T-S	T-S	T-S	–	–	–	C-S	C-S	C-S	C-S	C-S	–
	1,4,6	2,3,5	T-N	–	T-N	–	T-N	–	C-S	C-S	C-S	C-S	C-S	–
	5	1,2,3,4,6	T-N	T-N	–	–	–	–	C-S	C-S	C-S	C-S	C-S	T-N
	2,3,4	1,5,6	T-N	–	T-N	–	–	–	C-S	C-S	C-S	C-S	C-S	T-N
	1,3	2,4,5,6	T-N	–	–	–	–	C-S	C-S	C-S	C-S	C-S	T-N	T-N
4	1,3,5,6	2,4	T-N	T-N	T-N	T-N	–	–	–	–	C-S	C-S	C-S	–
	3,5,6	1,2,4	T-N	T-N	T-N	T-S	–	–	–	–	C-S	C-S	C-S	–
	1,2,5,6	3,4	T-N	T-N	T-S	T-S	–	–	–	–	C-S	C-S	C-S	–
	2,5,6	1,3,4	T-N	T-S	T-S	T-S	–	–	–	–	C-S	C-S	C-S	–
	1,5,6	2,3,4	T-S	T-S	T-S	T-S	–	–	–	–	C-S	C-S	C-S	–
	4,6	1,2,3,5	T-N	–	T-N	–	T-N	–	T-N	–	C-S	C-S	C-S	–
	1,2,3,4	5,6	T-N	T-N	T-N	–	–	–	–	–	C-S	C-S	C-S	T-N
	3	1,2,4,5,6	T-N	T-N	–	–	–	–	–	C-S	C-S	C-S	T-N	T-N
	1,3,4	2,5,6	T-N	–	T-N	–	T-N	–	–	–	C-S	C-S	C-S	T-N
5	5,6	1,2,3,4	T-N	T-N	T-N	T-N	T-N	–	–	–	–	–	C-S	–
	1,2,3,4,6	5	T-N	T-N	T-N	T-N	T-S	–	–	–	–	–	C-S	–
	2,3,4,6	1,5	T-N	T-N	T-N	T-S	T-S	–	–	–	–	–	C-S	–
	1,3,4,6	2,5	T-N	T-N	T-S	T-S	T-S	–	–	–	–	–	C-S	–
	3,4,6	1,2,5	T-N	T-S	T-S	T-S	T-S	–	–	–	–	–	C-S	–
	1,2,4,6	3,5	T-S	T-S	T-S	T-S	T-S	–	–	–	–	–	C-S	–

C = COMPRESSED, T = THROUGH, S = SIGNALING, N = NO SIGNALING, – = UNUSED

The no signaling channels with through channel options are shown in Table AV.

TABLE AV. No Signaling Channels With Through Channels

NUMBER OF THROUGH CHANNELS	SWITCHES		AVAILABLE CHANNEL CONFIGURATIONS											
	OPEN	CLOSED	1 OR 13	2 OR 14	3 OR 15	4 OR 16	5 OR 17	6 OR 18	7 OR 19	8 OR 20	9 OR 21	10 OR 22	11 OR 23	12 OR 24
1	2,3,6	1,4,5	T	–	C	C	C	C	C	C	C	C	C	C
	1,2,4,5	3,6	–	C	C	C	C	C	C	C	C	C	C	T
2	1,3,6	2,4,5	T	T	–	–	C	C	C	C	C	C	C	C
	1,2,3,4,5	6	T	–	T	–	C	C	C	C	C	C	C	C
	2,4,5	1,3,6	T	–	–	C	C	C	C	C	C	C	C	T
	3,4	1,2,5,6	–	–	C	C	C	C	C	C	C	C	T	T
3	3,6	1,2,4,5	T	T	T	–	–	–	C	C	C	C	C	C
	2,3,4,5	1,6	T	–	T	–	T	–	C	C	C	C	C	C
	1,4,6	2,3,6	T	T	–	–	–	C	C	C	C	C	C	T
	1,3,5	2,4,6	T	–	T	–	–	C	C	C	C	C	C	T
	1,2,4	3,5,6	T	–	–	–	C	C	C	C	C	C	T	T
4	1,2,6	3,4,5	T	T	T	T	–	–	–	–	C	C	C	C
	1,3,4,5	2,6	T	–	T	–	T	–	T	–	C	C	C	C
	4,5	1,2,3,6	T	T	T	–	–	–	–	C	C	C	C	T
	3,5	1,2,4,6	T	–	T	–	T	–	–	C	C	C	C	T
	2,4	1,3,5,6	T	T	–	–	–	–	C	C	C	C	T	T
	4	1,2,3,5,6	T	–	T	–	–	–	C	C	C	C	T	T
5	2,6	1,3,4,5	T	T	T	T	T	–	–	–	–	–	C	C
	3,4,5	1,2,6	T	–	T	–	T	–	T	–	T	–	C	C
	1,2,3,5	4,6	T	T	T	T	–	–	–	–	–	C	C	T
	1,2,5	3,4,6	T	–	T	–	T	–	T	–	–	C	C	T
	1,4	2,3,5,6	T	T	T	–	–	–	–	–	C	C	T	T
	1,2,3	4,5,6	T	–	T	–	T	–	–	–	C	C	T	T
6	1,6	2,3,4,5	T	T	T	T	T	T	–	–	–	–	–	–
	6	1,2,3,4,5	–	–	–	–	–	–	T	T	T	T	T	T
	2,3,5	1,4,6	T	T	T	T	T	–	–	–	–	–	–	T

C = COMPRESSED, T = THROUGH, – = UNUSED

The MC9007A-1 dip switch options are shown in Table AW.

TABLE AW. MC90007A-1 Dip Switch Options

OPTION			SWITCH							
			1	2	3	4	5	6	7	8
CLOCK REFERENCE	Local BCM		O	O	O	O	C	O		
	Line X		C	O	O	O	O	C		
	Line Y		O	C	O	O	O	C		
	Line X		O	O	C	O	O	C		
ECHO TAIL LENGTH	LINE X	Not used or 16 ms							O	
		32 ms							C	
	LINE Y	Not used or 16 ms								O
		32 ms								C

The MC90007A-1 faceplate options for Robbed-Bit Signaling with through channels are shown in Table AX.

TABLE AX. Robbed-Bit Signaling With Through Channels

NUMBER OF THROUGH CHANNELS	ROCKERS		AVAILABLE CHANNEL CONFIGURATIONS											
	CLOSED	OPEN	1 OR 13	2 OR 14	3 OR 15	4 OR 16	5 OR 17	6 OR 18	7 OR 19	8 OR 20	9 OR 21	10 OR 22	11 OR 23	12 OR 24
1	2,3,4,5,6	1	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,3,4,5,6	2	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,4,5	3,6	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
2	3,4,5,6	1,2	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,4,5,6	3	T-N	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	2,4,5,6	1,3	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,3,4,5	6	T-N	C-S	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	2,4,5	1,3,6	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	1,4,5	2,3,6	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	1,3,4	2,5,6	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
3	1,4,5,6	2,3	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	4,5,6	1,2,3	T-N	T-N	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,3,5,6	4	T-N	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	2,3,5,6	1,4	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	2,3,4,5	1,6	T-N	C-S	T-N	C-S	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,3,4,5	2,6	T-N	C-S	T-N	C-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	4,5	1,2,3,6	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	1,2,3,5	4,6	T-N	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	2,3,5	1,4,6	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	5	1,2,3,4,6	T-N	C-S	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	3,4	1,2,5,6	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
	1,2,4	3,5,6	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
4	1,3,5,6	2,4	T-N	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	3,5,6	1,2,4	T-N	T-N	T-N	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,5,6	3,4	T-N	T-N	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	2,5,6	1,3,4	T-N	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,5,6	2,3,4	T-S	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	3,4,5	1,2,6	T-N	C-S	T-N	C-S	T-N	C-S	T-N	C-S	C-S	C-S	C-S	C-S
	1,3,5	2,4,6	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	3,5	1,2,4,6	T-N	T-N	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	1,2,3,4	5,6	T-N	C-S	T-N	C-S	T-N	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	2,4	1,3,5,6	T-S	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
	1,4	2,3,5,6	T-N	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
	1	2,3,4,5,6	T-N	C-S	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N

TABLE AX. Robbed-Bit Signaling With Through Channels (Contd)

NUMBER OF THROUGH CHANNELS	ROCKERS		AVAILABLE CHANNEL CONFIGURATIONS											
	CLOSED	OPEN	1 OR 13	2 OR 14	3 OR 15	4 OR 16	5 OR 17	6 OR 18	7 OR 19	8 OR 20	9 OR 21	10 OR 22	11 OR 23	12 OR 24
5	5,6	1,2,3,4	T-N	T-N	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,3,4,6	5	T-N	T-N	T-N	T-N	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	2,3,4,6	1,5	T-N	T-N	T-N	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,3,4,6	2,5	T-N	T-N	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	3,4,6	1,2,5	T-N	T-S	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,4,6	3,5	T-S	T-S	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,5	3,4,6	T-N	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	2,3,4	1,5,6	T-N	C-S	T-N	C-S	T-N	C-S	T-N	C-S	C-S	C-S	C-S	T-N
	4	1,2,3,5,6	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
	1,2,3	4,5,6	T-N	T-N	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
	2,3	1,4,5,6	T-N	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
	1,3	2,4,5,6	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
	–	1,2,3,4,5,6	T-N	C-S	T-N	C-S	T-N	C-S	C-S	C-S	C-S	C-S	T-N	T-N
6	2,4,6	1,3,5	T-N	T-N	T-N	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S
	1,4,6	2,3,5	T-N	T-N	T-N	T-N	T-N	T-S	C-S	C-S	C-S	C-S	C-S	C-S
	4,6	1,2,3,5	T-N	T-N	T-N	T-N	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,3,6	4,5	T-N	T-N	T-N	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S
	2,3,6	1,4,5	T-N	T-N	T-S	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,3,6	2,4,5	T-N	T-S	T-S	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S
	3,6	1,2,4,5	T-S	T-S	T-S	T-S	T-S	T-S	C-S	C-S	C-S	C-S	C-S	C-S
	1,2,6	3,4,5	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N	T-N	T-N	T-N	T-N
	2,6	1,3,4,5	C-S	C-S	C-S	C-S	C-S	C-S	T-S	T-S	T-S	T-S	T-S	T-S
	2,5	1,3,4,6	T-N	T-N	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	C-S	T-N
	3	1,2,4,5,6	T-N	T-S	T-S	T-N	C-S	C-S	C-S	C-S	C-S	C-S	T-N	T-N
7	1,5	2,3,4,6	T-N	T-N	T-N	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	T-N
	1,2	3,4,5,6	T-N	T-N	T-N	T-N	T-N	C-S	C-S	C-S	C-S	C-S	T-N	T-N
8	2	1,3,4,5,6	T-N	T-N	T-N	T-N	T-N	T-N	C-S	C-S	C-S	C-S	T-N	T-N
12	1,6	2,3,4,5	T-N	T-N	T-N	T-N	T-N	T-N	T-N	T-N	T-N	T-N	T-N	T-N
	6	1,2,3,4,5	T-S	T-S	T-S	T-S	T-S	T-S	T-S	T-S	T-S	T-S	T-S	T-S

Matrix Programming

The CDM has an address matrix that permits an individual channel to occupy any time slot by installing a matrix jumper. For example, channel 1 may be programmed to occupy time slot 24, and channel 2 may be programmed to occupy time slot 7. On Model No. 2521-024, only the first eight channels can be programmed. Thirty matrix jumpers are provided with the CDM.

> *Note:* The channel select matrix must always be programmed if any other 8-channel drop slots are to be used.

Channel and bandwidth selections are made by programming the matrix with the jumpers. The bandwidth requirement for each channel unit is one time slot with the exception of the 56/64 KXN DCUs that may occupy multiple time slots.

The following example is given on how to program the matrix.

Assume that from a given site the following services are to be provided:

a. E&M service for one subscriber

b. 4.8 kbps data service for one subscriber

c. 56/64 KNX data service for one subscriber operating at 256 kbps when N = 4

d. Bandwidth requirements:

- E&M circuit requires one drop- and one insert-time slot
- 0-19.2 kbps data channel requires one drop- and one insert-time slot
- 56/64 KXN data channel requires four drop- and four insert-time slots

e. Available time slots are 1, 5, 8, 9, 14, and 16

> ***WARNING: Do not use time slots 6, 12, 18, or 24 when the CDM is used in conjunction with the Channel Expansion Multiplexer (CDM). These time slots carry signaling information for the bundled voice channels.***

Assign the channel units

- E&M service is channel 1, time slot 1
- 0-19.2 data service is channel 2, time slot 5
- 56/64 KXN data service is channel 3, time slots 8, 9, 14, and 16

Record the channels on the Matrix Programming Guide (Table AY). The Matrix Programming Guide must be filled out for each direction of transmission.

TABLE AY. Matrix Programming Guide

SELECT TIME SLOT	CDM CHANNEL UNIT TYPE							
						DATA 56/64KXN	DATA 0-19	E&M
	CARD SLOT							
	8	7	6	5	4	3	2	1
1								*
2								
3								
4								
5							*	
6								
7								
8						*		
9						*		
10								
11								
12								
13								
14						*		
15								
16						*		
17								
18								
19								
20								
21								
22								
23								
24								

* Place jumpers on both drop and insert matrixes.

To program the matrix, loosen the thumbscrews at the top of the data service panel; and let the panel swing down. Place the jumpers on the Drop and Insert matrixes as shown in Figure 87 using the programming guide. Close and secure the panel.

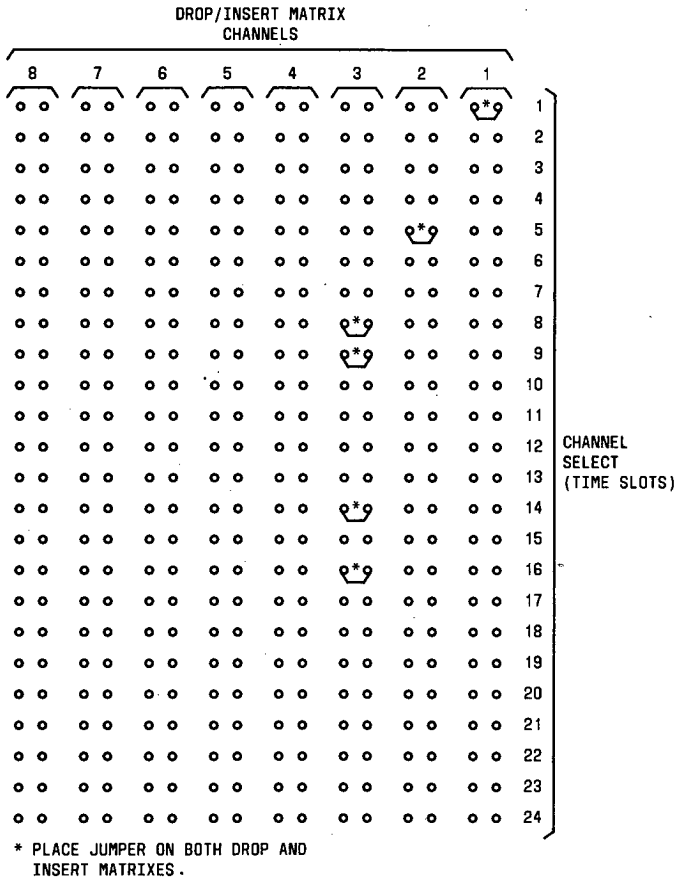


Figure 87. Drop/Insert Matrix

Alarm Unit 30005-001

Set the options on the alarm unit using Figure 88 and Table AZ.

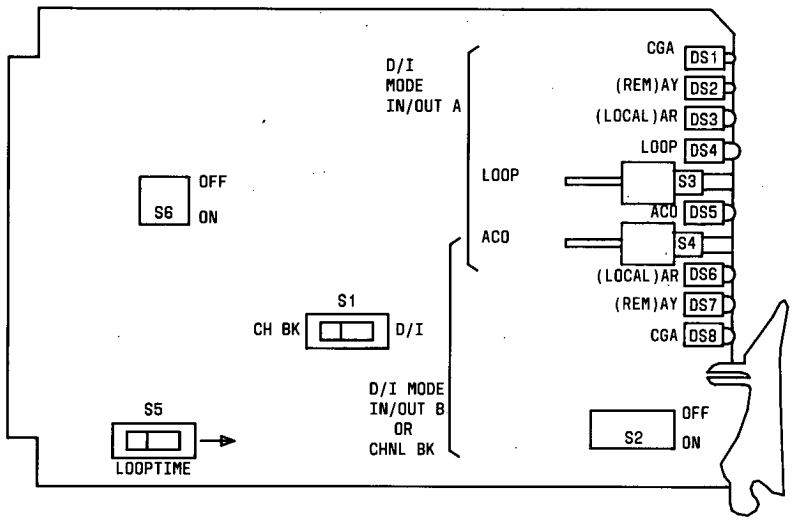


Figure 88. Switch Locations

TABLE AZ. Switch Settings

SWITCH NO.	MODE	SWITCH POSITION	SWITCH DESCRIPTION	
S1		CH BK	CDM operates as a channel bank (terminating multiplex)	
		D/I	CDM operates as a drop and insert terminal (multiplex)	
S2		OFF (all sections)		
S3		Momentary pushbutton	Places terminal in loop if CD1 is in CGA and ACO is operated	
S4		Momentary pushbutton	ACO is momentary switch that turns off audible alarm in an alarmed condition	
S5	CH BK*	LOCAL	Source of Timing	Onboard clock
		LOOPED		Incoming DS-1 signal
	D/I	LOCAL		Alarm timing derived from on-board clock in alarmed condition
		LOOPTIME		Alarm timing derived from opposite direction DS-1 signal in alarmed condition
S6		OFF (all sections)		

* In the Channel Bank mode one CDM is usually optioned for LOCAL and the far end is optioned for LOOPED except when the DS-1 facility provides timing. In that case, both CDMs are optioned for LOOPED.

Four-Wire E&M Channel Unit

Set the options on the 4-wire E&M channel unit using the following procedures.

1. To set the transmit attenuator:

   a. For No. 30003-002 (Figure 89), insert a 1004-Hz signal at the proper system level into the channel. Connect a dB meter (600-ohm bridged) to J1. Set switches S2 and S3 as required to obtain a meter reading of +.84.

   b. For No. 30044-002 (Figure 90), insert a 1004-Hz signal at the proper system level into the channel. Connect a dB meter (600-ohm bridged) to TP5 and TP6. Set switches on S8 and S9 to obtain a meter reading of +.84.

2. To set receiver attenuator:

   a. For No. 30003-002 (Figure 89), connect a dB meter (600-ohm bridged) to J2. From a distant end transmitter, transmit a 1004-Hz signal at the proper system level. Set the switches on S8 and S9 to achieve the proper system level.

b. For No. 30044-002 (Figure 91), connect a dB meter (600-ohm bridged) to TP7 and TP8. From a distant end transmitter, transmit a 1004-Hz signal at the proper system level. Set the switches on S8 and S9 to achieve the proper system level.

3. On No. 30003-002, set switch S10 as shown in Table BA.
4. On No. 30044-002, set switches S2, S3, S5, and S10 as shown in Table BB.

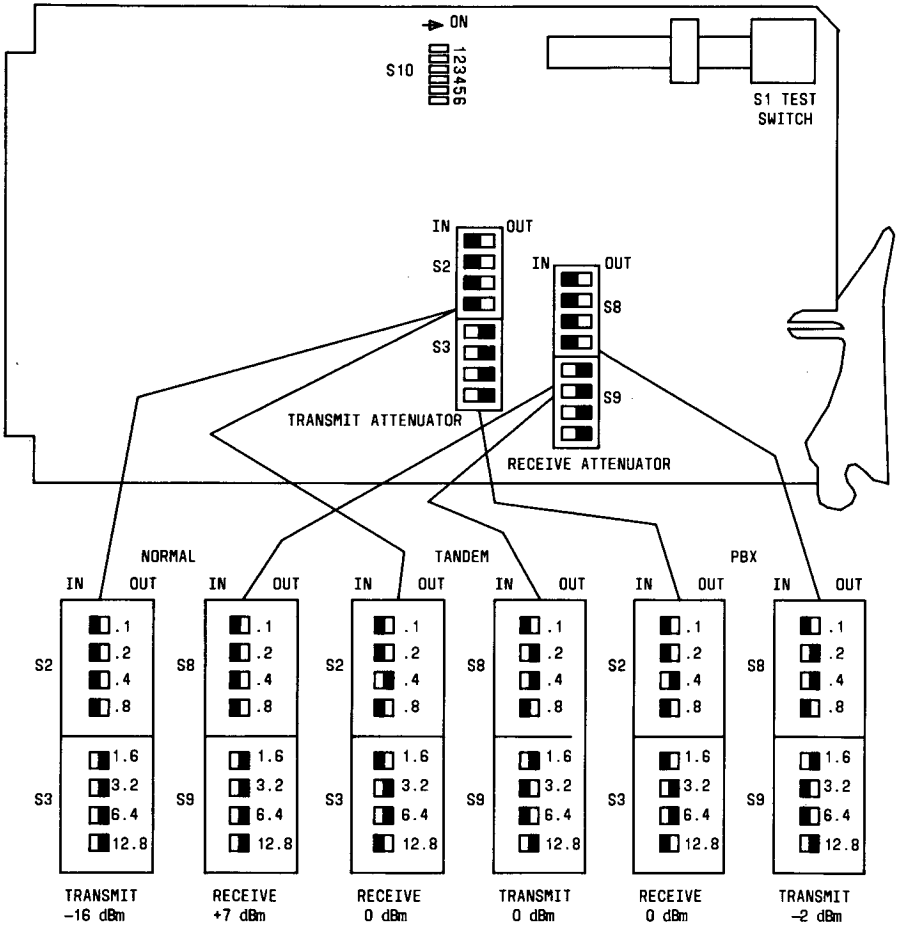


Figure 89. 30003-002 4-Wire E&M Channel Unit

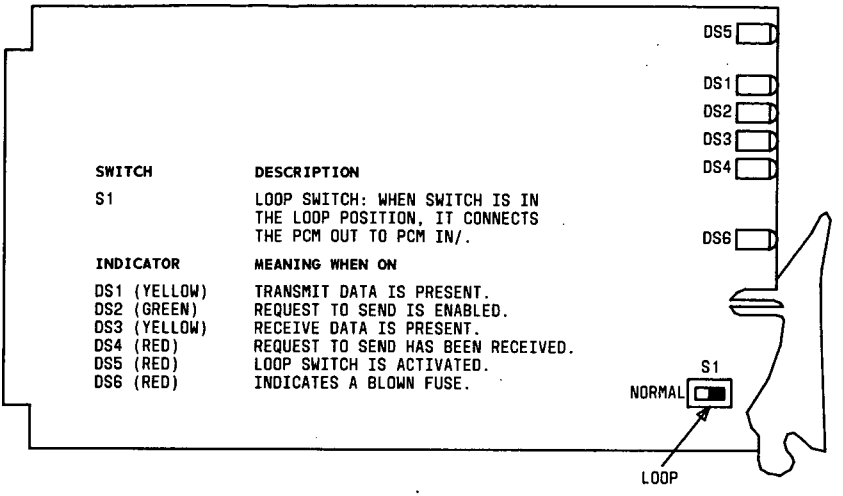


Figure 90. Asynchronous Data Channel Unit Switch Locations and Setting

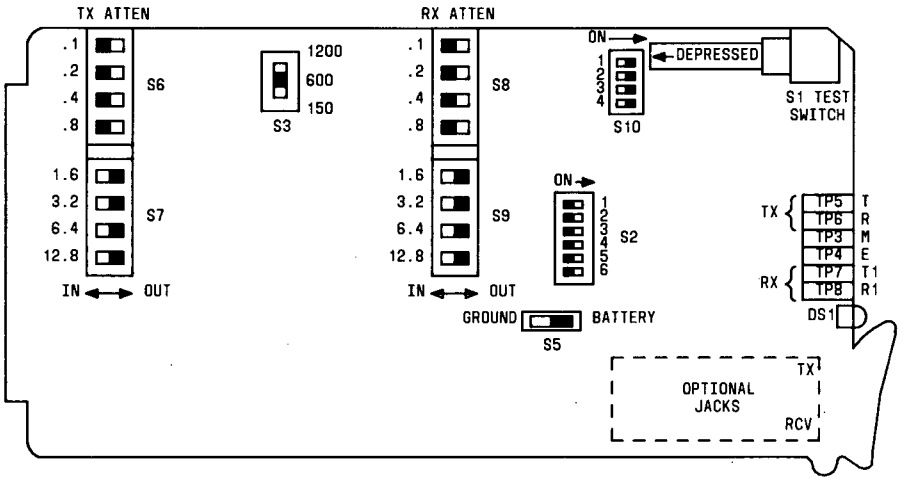


Figure 91. 30044-002 4-Wire E&M Channel Unit Switch Locations

TABLE B A. 30003-002 4-Wire E&M Unit—S10 Switch Settings

SWITCH	SECTION	SETTING	DESCRIPTION		
S10	1	OFF			
	2	OFF			
	3	ON	Type of Signaling	I	E-lead switch setting for E&M signaling
		OFF		II	
		ON		III	
	4	OFF			
	5	OFF	E-lead routines on CGA*	Idle immediately	
	6				
	5	ON		Busy immediately	
	6	OFF			
	5	OFF		Idle immediately then busy after a delay	
	6	ON			

* Most PBX interfaces will require Type I signaling and idle immediately then busy, after a delay. Types II and III signaling require a 4-connector (VF connector) CDM shelf.

TABLE BB. 30044-002 4-Wire E&M Unit—S2, S3, S5, and S10 Settings

SWITCH	SECTION	SETTING	DESCRIPTION	
S2	1 2	OFF OFF	E-lead routines on CGA	Idle immediately
	1 2	OFF ON		Busy immediately
	1 2	ON OFF		Idle immediately, then busy
	3 4	OFF ON	E&M Operation	E lead (Busy=GND)
S5		GND		
S2	5	OFF		M lead (Busy=BAT)
	3 4	ON ON	PLR Operation	E-lead busy
S5		BAT		
S2	5	ON		M lead (Busy=GND)
S3		150 600 1200	150 ohms 600 ohms 1200 ohms	
S10	1 2 3 4	OFF OFF OFF OFF	Breaks connection to external equipment	

RS-422 Interface Subboard

Set the options on the RS-422 interface subboard using Figure 92 and Table BC.

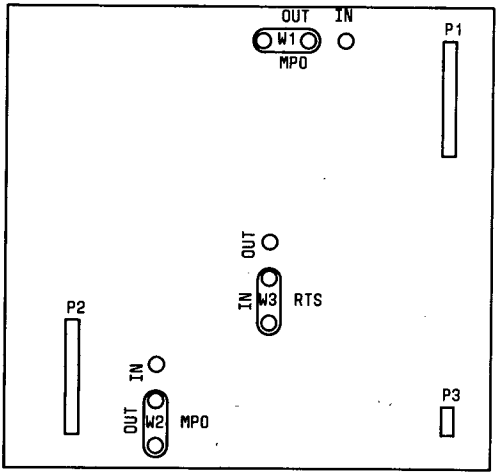


Figure 92. RS-422 Switch Locations

TABLE BC. RS-422 Option Settings

OPTION	SWITCH		DESCRIPTION
	LOCATION	POSITION	
MPO (Transmit and receive)	W1,W2	IN	Tristate mode is activated. Both data and control bits are received/transmitted simultaneously on the same pair or wires.
		OUT (Normal setting)	Tristate mode is disabled. Unit transmits and receives data only.
RTS Channel Control	W3	IN	Enables insert strobe (Polled).
		OUT (Normal setting)	Insert strobe is enabled all the time (Nonpolled).

RS-232C Interface Subboard

Set the options on the RS-232C Interface Subboard using Figure 93 and Table BD.

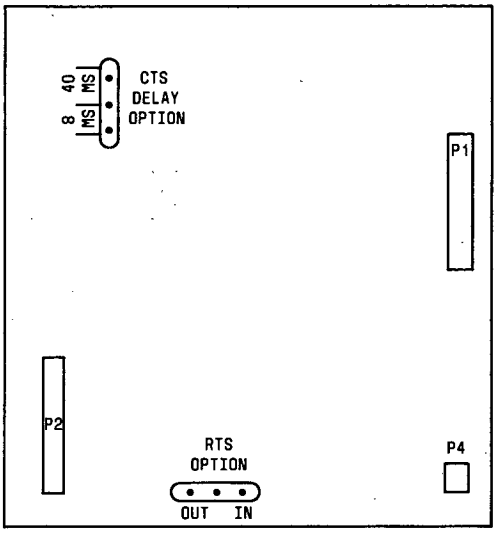


Figure 93. RS-232C Switch Locations

TABLE BD. RS-232C Option Settings

ALARM OPTION	SWITCH POSITION	DESCRIPTION
CTS	IN	Delays clear to send signal for 40 msec
	OUT (Normal setting)	Delays clear to send signal for 8 msec
RTS	IN	Enables insert strobe (Polled)
	OUT (Normal setting)	Insert strobe is enabled all the time (nonpolled)

56/64 kbps Synchronous Data Channel Unit

Use the hardware CSD and Figure 94 to set the options on the data channel unit.

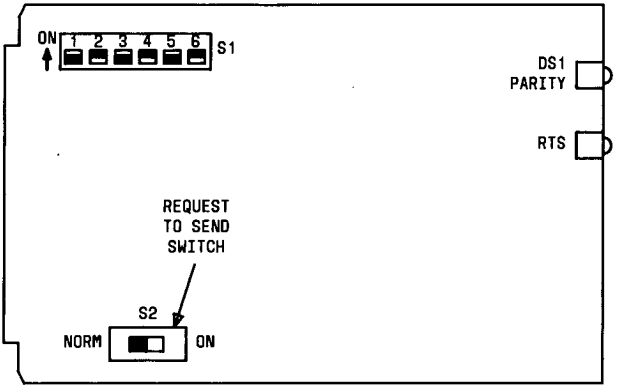


Figure 94. 56/64 kbps Synchronous Data Channel Unit

V.35/RS-449 Subboard

Set the jumpers to the V.35 or RS-449 position using the hardware CSD, Figure 95, and Table BE.

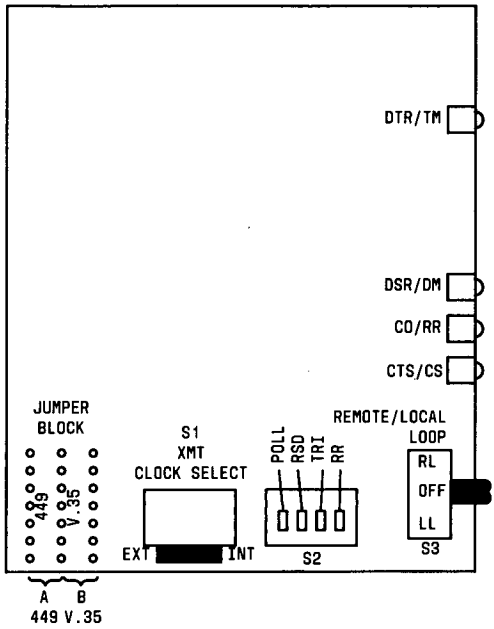


Figure 95. V.35/RS-449 Option Switch Locations

TABLE BE. V.35/RS-449 Option Settings

SWITCH DESIGNATION	SWITCH	SECTION	SWITCH POSITION	DESCRIPTION	
POLL	S2	1	ON†	Enables polling	Polling application
			OFF*	Normal operation	
RSD		2	ON†	RS to CS = 0 msec	RS to CS delay
			OFF*	RS to CS = 4 msec, normal operation	
TR1		3	ON†	Enables polling	Tristate
			OFF*	Normal operation	
RR		4	ON*	Receiver ready, normal operation	Receiver ready control
			OFF†	Receiver ready, continuous operation	
Remote/Local loop†			LL	Local loop (XMT PCM to RCV PCM)	Loop switch
			OFF	No loop	
			RL	Remote loop (RCV to XMT data)	
XMT clock select			INT*	Internal clock control	
			EXT	External clock control	

* Normal setting.
† Polled setting.
Located on front of board.

Equalization

Perform the following steps to set the Channel Division Multiplexer (CDM) equalization.

1. Determine the proper equalizer using the CSD and Table BF.
2. At the rear of the CDM, loosen thumbscrews at the top of the Data Service Panel and swing the panel down.
3. Unplug the equalizers, see Figure 96.
4. Plug in the proper equalizers with the component side out. The components are located on the lower half of the equalizers.
5. Close and secure the Data Service Panel.

TABLE BF. CDM Equalizers

PART NO.	DISTANCE
39004-001	0-150 FEET
39004-002	150-450 FEET
39004-003	450-750 FEET
39004-004	LIGHTNING ARRESTER

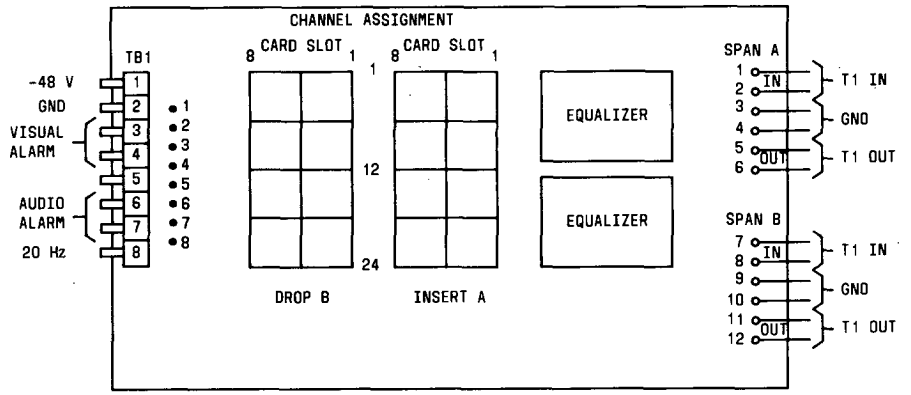


Figure 96. Equalizer Location

Power, Grounding and Alarm Connections

Six arrangements of power equipment are used with the Remote Group Housing to provide the power for the unit.

Off-line Switcher (OLS) With No Holdover or Reserve Power

The Remote Group Housing must have an OLS (634WAAB) board in slot 06 for this power arrangement. This connection is shown in Figure 97.

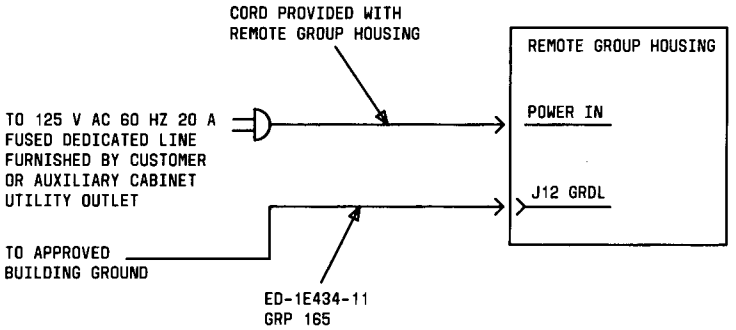


Figure 97. OLS With No Holdover

OLS With Nominal Holdover

The Remote Group Housing must have an OLS (634WAAB) board in slot 06 for this power arrangement. This connection is shown in Figure 98.

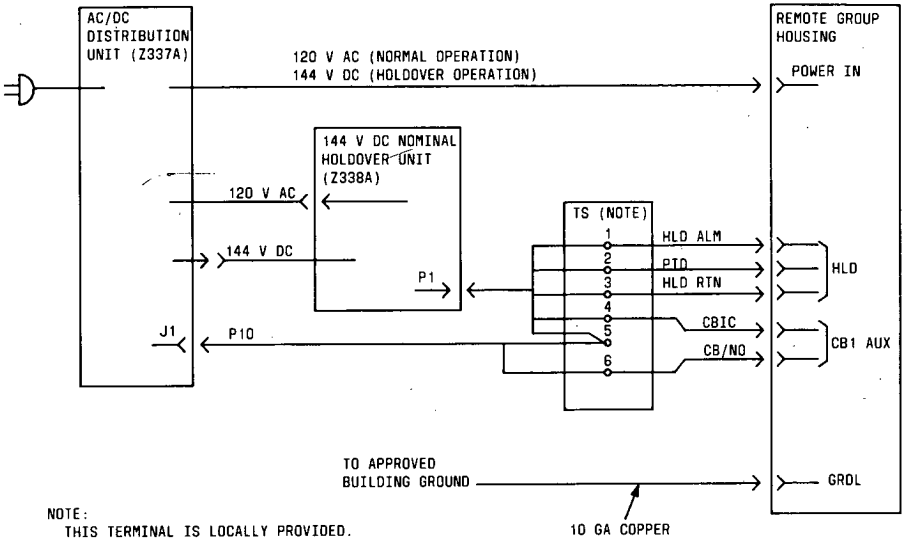


Figure 98. OLS With Holdover

-48 V Rectifier With No Holdover

A dc/dc converter (495J B) must be located on slot 06 of the Remote Group Housing for this power arrangement. This connection is shown in Figure 99.

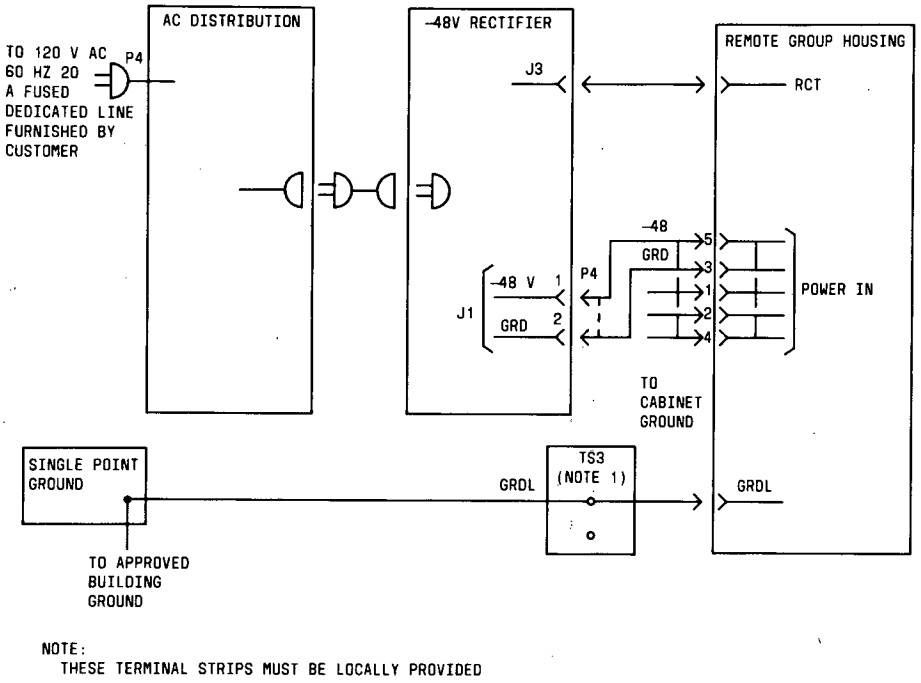


Figure 99. -48 V Rectifier With No Holdover

Extended Power Reserve

This configuration is used with a dc/dc converter installed in slot 06. Connections to the Remote Group Housings are as shown. The housing is wired internally to properly distribute –48 V to the dc/dc converter. The battery plant should be engineered by AT&T National Customer Support Center. This connection is shown in Figure 100.

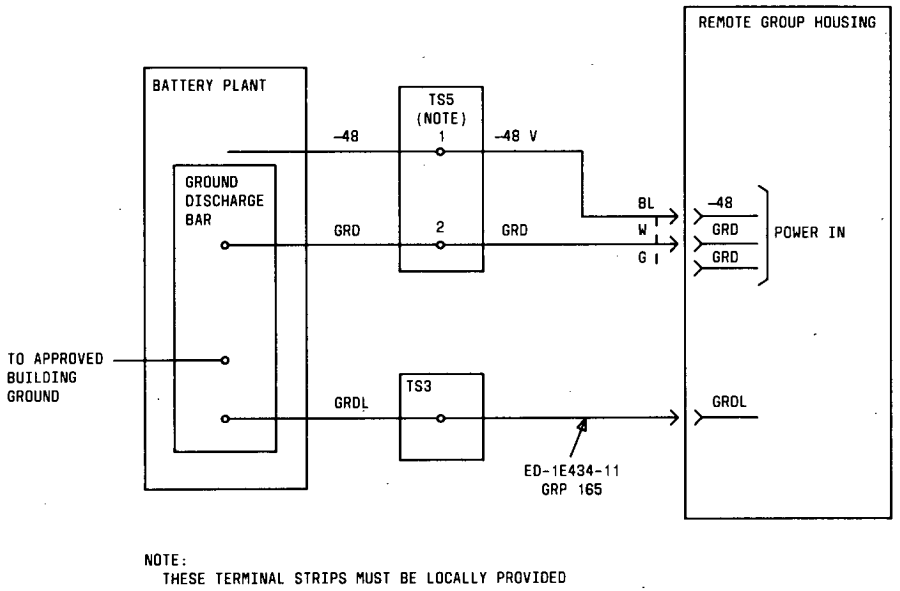


Figure 100. Extended Power Reserve

CSU, CDM, and CEM Power, Grounding, and Alarms

Connect the Channel Service Unit (CSU), Channel Division Multiplexer (CDM), and Channel Expansion Multiplexer (CEM) power, grounding, and alarms using the information in Figure 101.

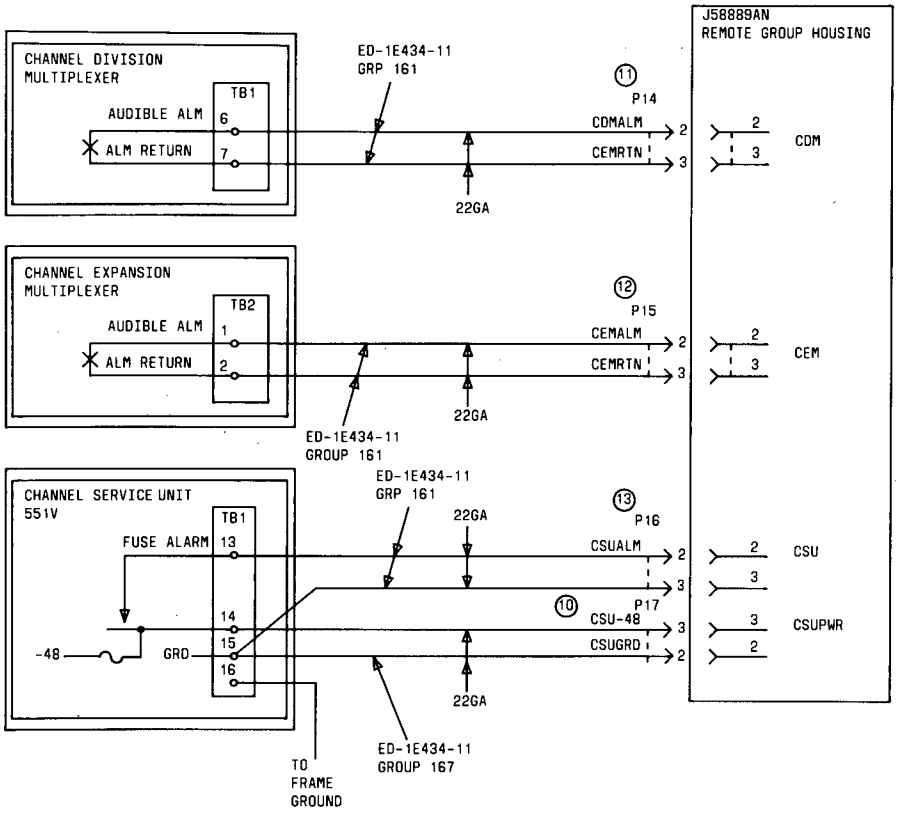


Figure 101. CSU, CDM, and CEM Power, Grounding, and Alarms

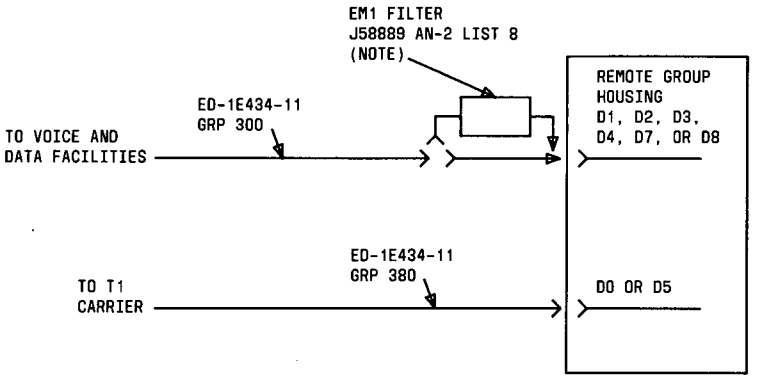
T1 Carrier to RGI

The RGI power, grounding, and alarm leads are covered on the preceding page.

Before the 25-pair cables are attached to the DO__ connectors, place the 4A cable retainer clip on the connector. If the J58889AN-2, List 8 filter is being used, extensions (845798081) must be used with the retaining clip. After the clips are in place, connect the cables. Then snap the latch at the retainer into place. Detailed instructions are furnished with the RGH.

T1 Carrier Directly to RGI

Connect the T1 carrier directly to the RGI using the information in Figure 102.



NOTE:
This filter is required only if RGH is equipped with ANN17B, but each connector associated with ANN17B requires a filter.

Figure 102. T1 Carrier Directly to RGI

T1 Carrier to RGI Using CSU

Connect the T1 carrier to the RGI through the CSU using the information in Figure 103.

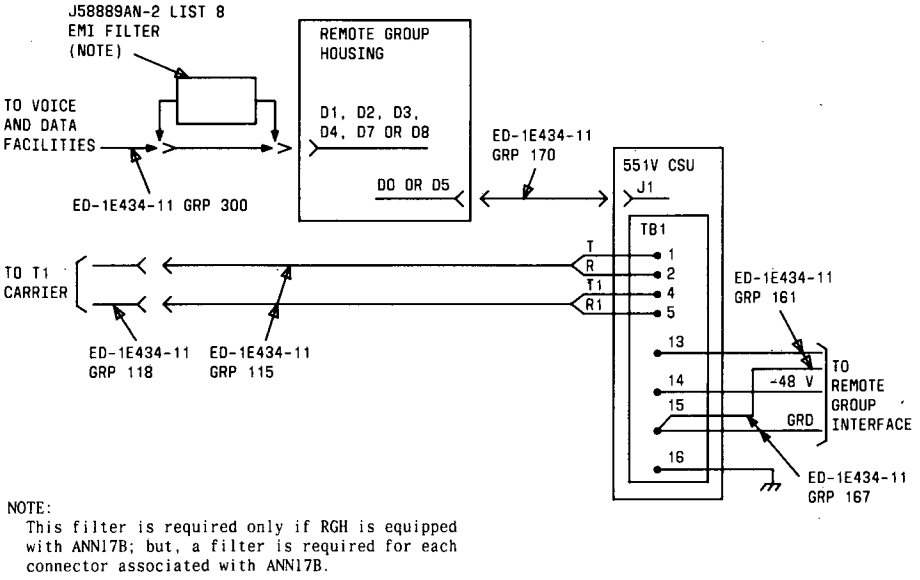


Figure 103. T1 Carrier to RGI Using CSU

T1 Carrier to RGI Using CDM and 551V CSU

Connect the T1 carrier to the RGI using the CDM and CSU per Figure 104.

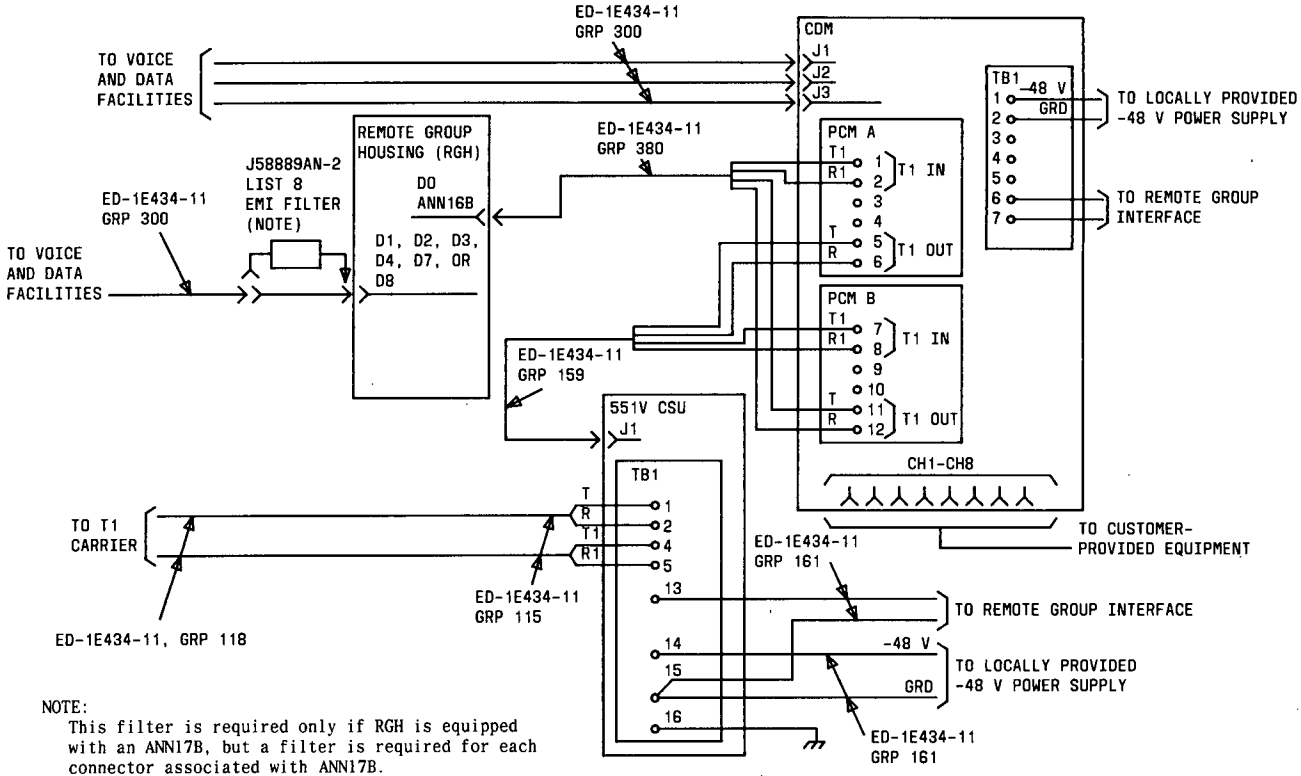


Figure 104. T1 Carrier to RGI Using CDM and CSU

T1 Carrier to RGI Using CEM and 551V CSU

Connect the T1 carrier to the RGI using the CEM and the CSU per Figure 105.

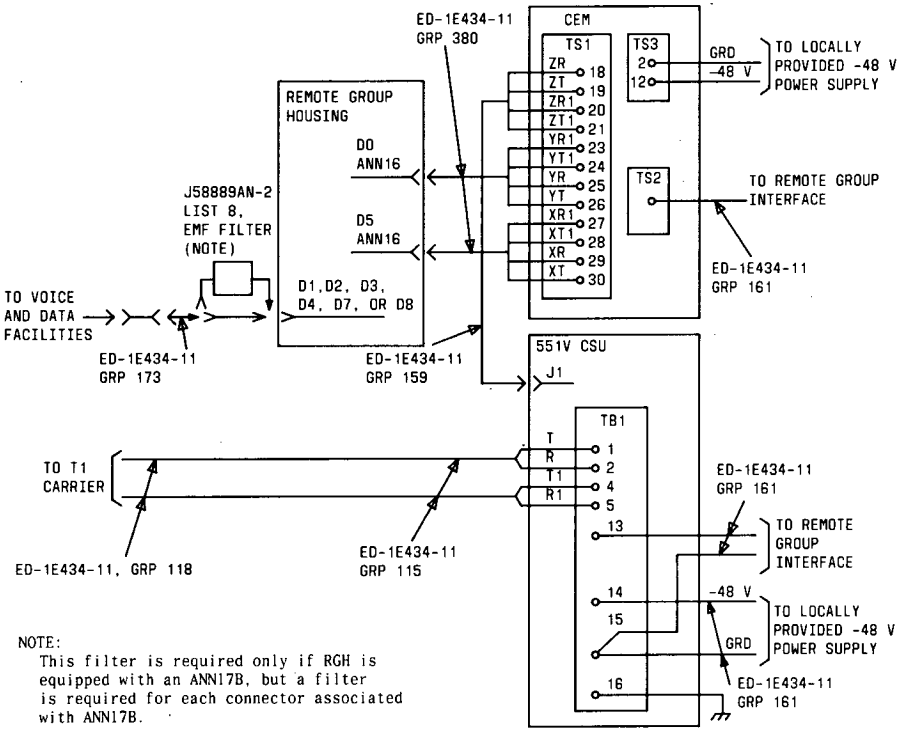


Figure 105. T1 Carrier to RGI Using CEM and CSU

T1 Carrier to RGI Using CEM, CDM, and CSU

Connect the T1 carrier to RGI using the CEM, CDM, and CSU per Figure 106.

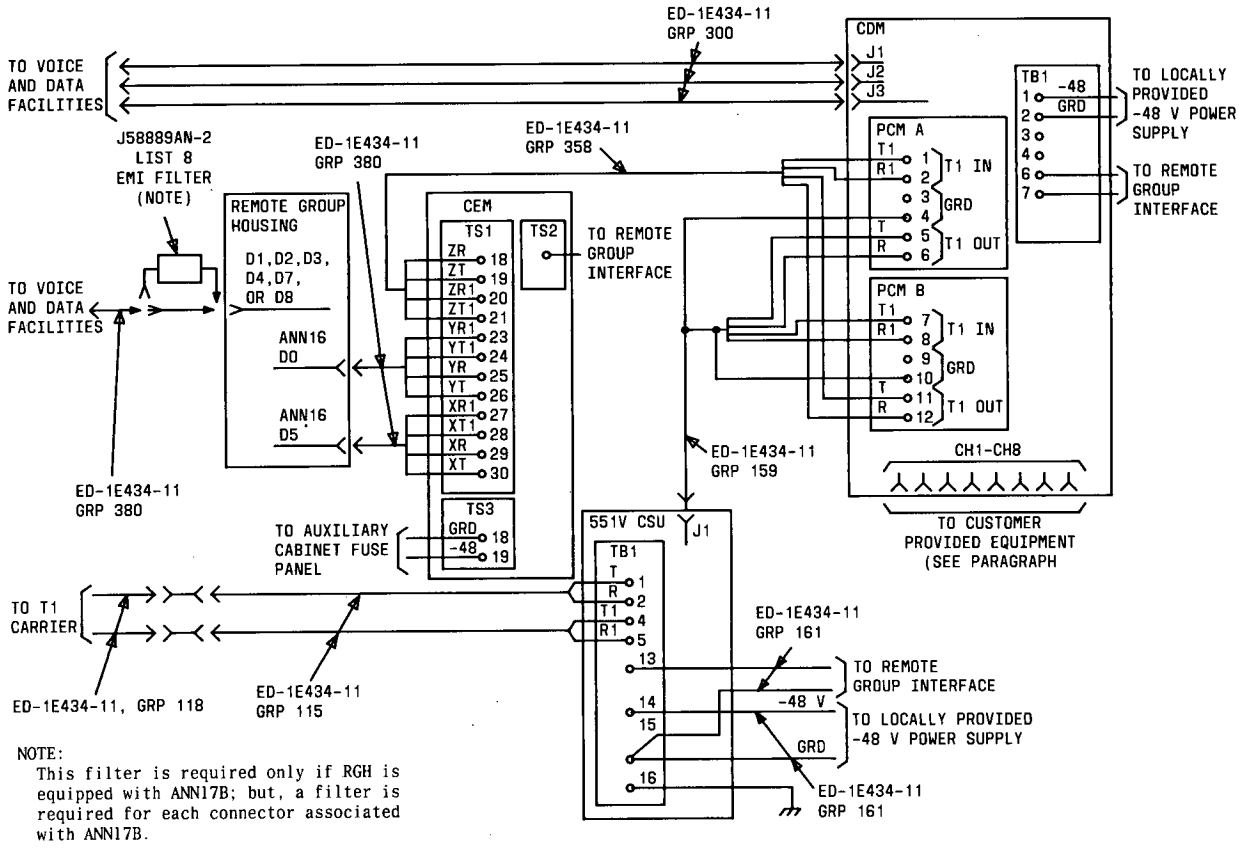


Figure 106. T1 Carrier to RGI Using CEM, CDM, and CSU

Looping Office Repeater (LOR)

This repeater is required at the local and remote location if the Remote Group Housing is more than 3400 cable feet from the ANN15B and local cable is being used. The repeater at the local location is usually rack mounted in an auxiliary cabinet. The repeater at the remote location is wall mounted in a small mounted rack equipped with its own –48 V power supply.

Options

Use Figure 107 and Tables BG, BH, BI, BJ, and BK to set the options on the LOR.

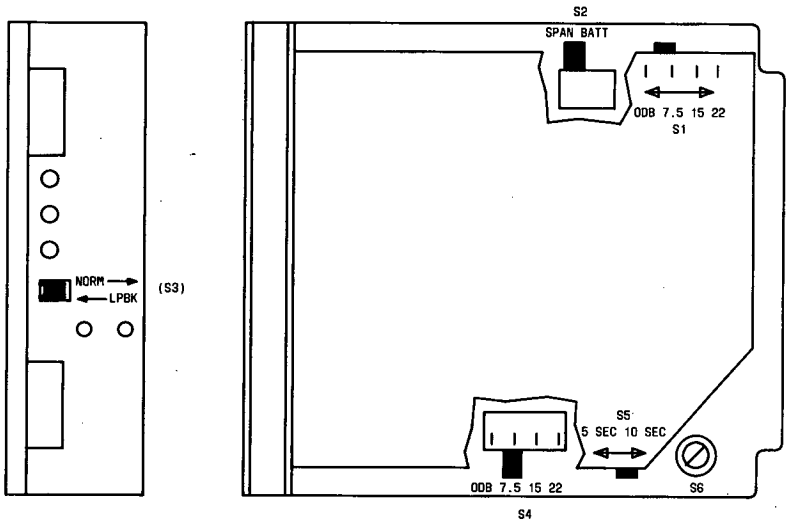


Figure 107. LOR Option Switch Locations

TABLE BG. LOR Switches S1 and S4

FACILITY LOSS IN dB	S1 (TRANSMIT AND S4 (LINE) SETTINGS
0 to 7.5	22
7.5 to 15	15
15 to 22.5	7.5
22.5 to 35	0

TABLE BH. Power Switch S2

SETTING	POWER SOURCE
SPAN	60 or 140 mA span current
BATT	–48 V dc

TABLE BI. Loopback Switch S3

SETTING	OPTION
LPBK	Loopback operation
NORM	Normal operation

TABLE BJ. Loop-Up Timing Switch S5

SETTING	OPTION
5 sec	5 second loop-up detect interval
10 sec	10 second loop-up detect interval

TABLE BK. Fault Locate Switch S6

SETTING	OPTION
OPEN	With fault locate filter
CLOSED	Without fault locate filter

Connections

All of the connections should be wire wrapped to a 56-pin connector at the rear of the shelf. This is true for the rack-mounted shelf and the smaller wall-mounted unit used at the remote location.

A block diagram of the Remote Group Interface using the Looping Office Repeater is shown in Figure 108.

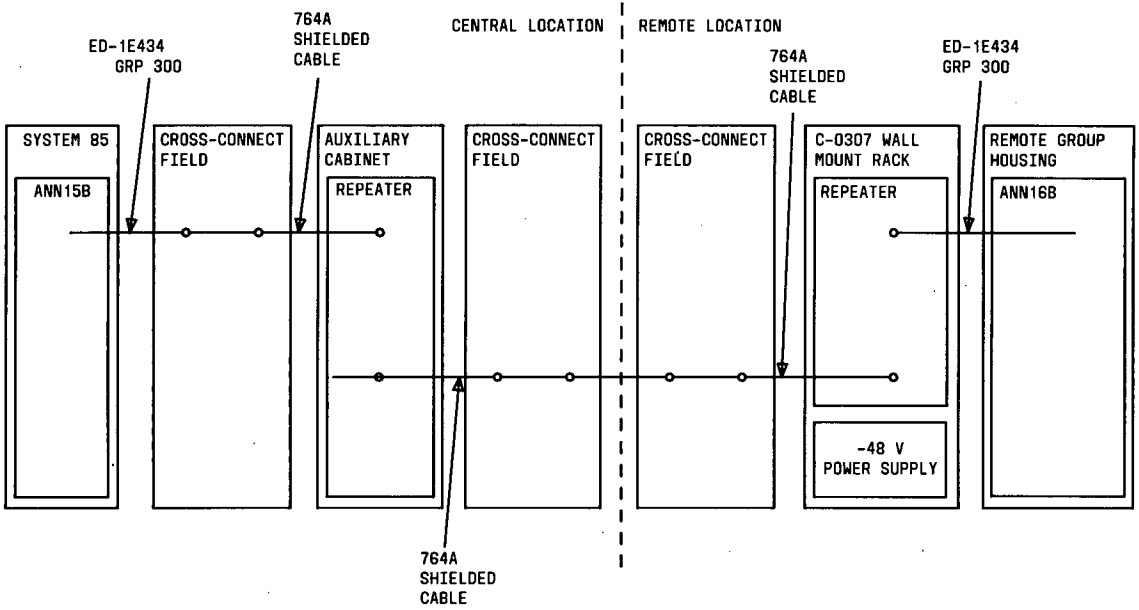


Figure 108. RGI With LOR Block Diagram

The LOR connections are shown in Figure 109. The 764A cable shield should be connected at the cross-connect field and at the repeater.

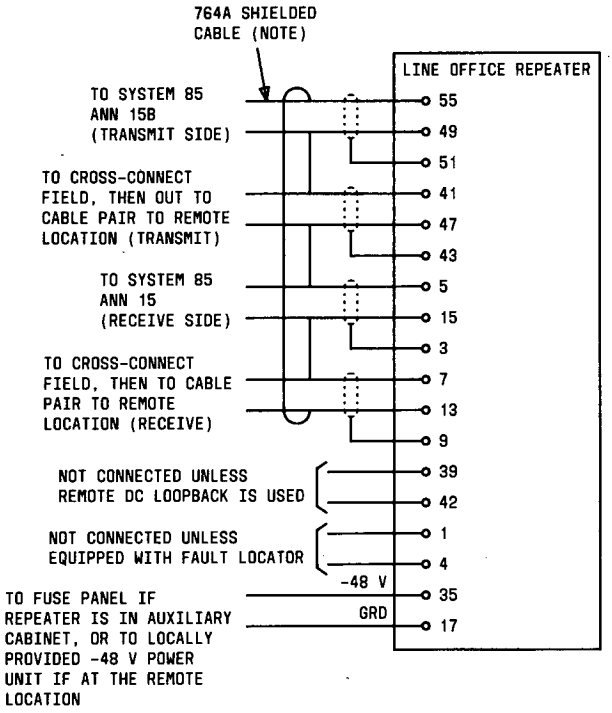


Figure 109. LOR Connections

CDM Terminating Information

The terminating information for the J1, J2, and J3 connectors on the 24-channel CDM is shown in Table BL. The terminating information for the J1, J2, and J3 connectors on the 8-channel CDM is shown in Table BM.

TABLE BL. Connections for 24-Channel CDM

LEAD DESIGNATIONS FROM CDM CONNECTORS			CDM CHANNEL NO.	LEAD COLOR	TO CROSS-CONNECT FIELD	
J1	J2	J3			CONN PIN NO.	CONN BLK TERM NO. (NOTE)
T	T1	E	1	W-BL	26	1
R	R1	M		BL-W	1	2
T	T1	E	2	W-O	27	3
R	R1	M		O-W	2	4
T	T1	E	3	W-G	28	5
R	R1	M		G-W	3	6
T	T1	E	4	W-BR	29	7
R	R1	M		BR-W	4	8
T	T1	E	5	W-S	30	9
R	R1	M		S-W	5	10
T	T1	E	6	R-BL	31	11
R	R1	M		BL-R	6	12
T	T1	E	7	R-O	32	13
R	R1	M		O-R	7	14
T	T1	E	8	R-G	33	15
R	R1	M		G-R	8	16
T	T1	E	9	R-BR	34	17
R	R1	M		BR-R	9	18
T	T1	E	10	R-S	35	19
R	R1	M		S-R	10	20
T	T1	E	11	BK-BL	36	21
R	R1	M		BL-BK	11	22
T	T1	E	12	BK-O	37	23
R	R1	M		O-BK	12	24
T	T1	E	13	BK-G	38	25
R	R1	M		G-BK	13	26
T	T1	E	14	BK-BR	39	27
R	R1	M		BR-BK	14	28
T	T1	E	15	BK-S	40	29
R	R1	M		S-BK	15	30
T	T1	E	16	Y-BL	41	31
R	R1	M		BL-Y	16	32
T	T1	E	17	Y-O	42	33
R	R1	M		O-Y	17	34
T	T1	E	18	Y-G	43	35
R	R1	M		G-Y	18	36
T	T1	E	19	Y-BR	44	37
R	R1	M		BR-Y	19	38
T	T1	E	20	Y-S	45	39
R	R1	M		S-Y	20	40
T	T1	E	21	V-BL	46	41
R	R1	M		BL-V	21	42
T	T1	E	22	V-O	47	43
R	R1	M		O-V	22	44
T	T1	E	23	V-G	48	45
R	R1	M		G-V	23	46
T	T1	E	24	V-BR	49	47
R	R1	M		BR-V	24	48
				V-S	50	49
				S-V	25	50

Note: One connecting block is associated with each of the CDM connectors J1-J3.

TABLE BM. Connections for 8-Channel CDM

LEAD DESIGNATIONS FROM CDM CONNECTORS			CDM CHANNEL NO.	LEAD COLOR	TO CROSS-CONNECT FIELD	
J1	J2	J3			CONN PIN NO.	CONN BLK TERM NO. (NOTE)
T	T1	E	1	W-BL	26	1
R	R1	M		BL-W	1	2
T	T1	E	2	W-O	27	3
R	R1	M		O-W	2	4
T	T1	E	3	W-G	28	5
R	R1	M		G-W	3	6
T	T1	E	4	W-BR	29	7
R	R1	M		BR-W	4	8
T	T1	E	5	W-S	30	9
R	R1	M		S-W	5	10
T	T1	E	6	R-BL	31	11
R	R1	M		BL-R	6	12
T	T1	E	7	R-O	32	13
R	R1	M		O-R	7	14
T	T1	E	8	R-G	33	15
R	R1	M		G-R	8	16
				R-BR	34	17
				BR-R	9	18
				R-S	35	19
				S-R	10	20
				BK-BL	36	21
				BL-BK	11	22
				BK-O	37	23
				O-BK	12	24
				BK-G	38	25
				G-BK	13	26
				BK-BR	39	27
				BR-BK	14	28
				BK-S	40	29
				S-BK	15	30
				Y-BL	41	31
				BL-Y	16	32

LEAD DESIGNATIONS FROM CDM CONNECTORS			CDM CHANNEL NO.	LEAD COLOR	TO CROSS-CONNECT FIELD	
J1	J2	J3			CONN PIN NO.	CONN BLK TERM NO. (NOTE)
				Y-O	42	33
				O-Y	17	34
				Y-G	43	35
				G-Y	18	36
				Y-BR	44	37
				BR-Y	19	38
				Y-S	45	39
				S-Y	20	40
				V-BL	46	41
				BL-V	21	42
				V-O	47	43
				O-V	22	44
				V-G	48	45
				G-V	23	46
				V-BR	49	47
				BR-V	24	48
				V-S	50	49
				S-V	25	50

Note: One connecting block is associated with each of the CDM connectors J1-J3.

The terminating information for the Data Channel Connector cable wiring (Customer End) connectors CH1 through CH8 is shown in Table BN.

TABLE BN. CDM CH1 Through CH8 Connecting Information

CDM							CONNECT TO CUSTOMER INTERFACE CONNECTOR PIN NO.				
	DATA LEAD DESIGNATION FOR INTERFACE TYPE										
CONN PIN NO.	INFOTRON V.35 (NOTE 1)	V.35 (NOTE 2)	RS-449 (NOTE 1)	RS-422	RS-232 (NOTE 3)	TTY	INFOTRON V.35	V.35	RS-449	RS-422	RS-232
1	GRD	GRD	GRD		GRD	GRD	1	1	1		1
2	TX1	TX1	SD1	SD1	TX1	OUT1	2	P	4	T	2
3	RX1	RX1	RD1	RD1	RX1	OUT2	3	R	6	T1	3
4	RTS	RTS	RS		RTS		4	C	7		4
5	CTS	CTS	CS		CTS		5	D	9		5
6		DSR	DM		DSR			E	11		6
7	SG	SG	SG		SG	OUT5	7*	B	19*		7*
8		CO	RR		CO	OUT7	13*	F	13		8
9			LL				19*		10		12*
10			RL			IN7			14		13*
11			TM			OUT6			18		14*
12									20*		16*
13									25*		19*
14	TX2	TX2	SD2	SD2		IN1	21	S	22	R	
15	TX CLK1	SCT1	ST1	RD2	SCT	IN3	15	Y	5	R1	15
16	RX2	RX2	RD2			IN2	22	T	24		
17	RX CLK1	SCR1	RT1		SCR	OUT3		V	8		17
18	RX CLK2	SCR2	RT2			OUT4	36	X	26		
19	TX CLK2	SCT2	ST2			IN4	34	AA	23		
20		DTR	TR		DTR	IN5		H	30		20
21									27*		
22									29*		
23									31*		
24									37*		
25						IN6					

Notes:

1. 37-pin D-type connector
2. 34-pin Winchester connector
3. 25-pin D-type connector

* Strap these terminals together in the connector.

Port Circuit Pack Terminating Information

ANN17B

The ANN17B circuit pack can be located in slots 01, 02, 03, 04, and/or 08. The terminating information for the 25-pair connector cable associated with the ANN17B is shown in Table BO.

WARNING: The ANN17B utilizes a solid state power-feed device to power the associated terminal. Care should be taken at the cross-connect field as voltages greater than -48 V dc or ringing voltages will damage the ANN17B.

TABLE BO. ANN17B Terminations

CIRCUIT PACK LEAD DESIG	CONNECTOR LEAD DESIG	PIN NO.	COLOR
V1T0	T00	26	W-BL
V1R0	R00	1	BL-W
CT0	T01	27	W-O
CR0	R01	2	O-W
P-0	T02	28	W-G
P+0	R02	3	G-W
V1T2	T03	29	W-BR
V1R2	R03	4	BR-W
CT2	T04	30	W-S
CR2	R04	5	S-W
P-2	T05	31	R-BL
P+2	R05	6	BL-R
V1T4	T06	32	R-O
V1R4	R06	7	O-R
CT4	T07	33	R-G
CR4	R07	8	G-R
P-4	T08	34	R-BR
P+4	R08	9	BR-R
V1T6	T09	35	R-S
V1R6	R09	10	S-R
CT6	T10	36	BK-BL
CR6	R10	11	BL-BK
P-6	T11	37	BK-O
P+6	R11	12	O-BK
V1T1	T12	38	BK-G
V1R1	R12	13	G-BK

CIRCUIT PACK LEAD DESIG	CONNECTOR LEAD DESIG	PIN NO.	COLOR
CT1	T13	39	BK-BR
CR1	R13	14	BR-BK
P-1	T14	40	BK-S
P+1	R14	15	S-BK
V1T3	T15	41	Y-BL
V1R3	R15	16	BL-Y
CT3	T16	42	Y-O
CR3	R16	17	O-Y
P-3	T17	43	Y-G
P+3	R17	18	G-Y
V1T5	T18	44	Y-BR
V1R5	R18	19	BR-Y
CT5	T19	45	Y-S
CR5	R19	20	S-Y
P-5	T20	46	V-BL
P+5	R20	21	BL-V
V1T7	T21	47	V-O
V1R7	R21	22	O-V
CT7	T22	48	V-G
CR7	R22	23	G-V
P-7	T23	49	V-BR
P+7	R23	24	BR-V
GRD	GRDCOM	50	V-S
GRD	GRDCOM	25	S-V

SN-Type Port Circuit Packs

The SN228B, SN238, and SN270B can be located in slots 01, 02, 03, 04, 07, and/or 08 of the Remote Group Housing. The terminating information for the 25-pair connector cable associated with the SN-type port circuit pack is given in Table BP.

TABLE BP. SN-Type Circuit Pack Terminations

SN228B	SN238 EIA INTERFACE	SN270B GENERAL PURPOSE PORT	LEAD COLOR	CONNECTING BLOCK TERMINAL
T0			W-BL	1
R0			BL-W	2
T1	R10	RT0	W-O	3
R1	R20	R20	O-W	4
T2	S10	TT0	W-GR	5
R2	S20	TR0	GR-W	6
T3			W-BR	7
R3			BR-W	8
	R12	RT2	W-SL	9
	R22	RR2	SL-W	10
	S12	TT2	R-BL	11
	S22	TR2	BL-R	12
			R-O	13
			O-R	14

SN228B	SN238 EIA INTERFACE	SN270B GENERAL PURPOSE PORT	LEAD COLOR	CONNECTING BLOCK TERMINAL
	R14	RT4	R-GR	15
	R24	RR4	GR-R	16
T4	S14	TT4	R-BR	17
R4	S24	TR4	BR-R	18
T5			R-SL	19
R5			SL-R	20
T6	R16	RT6	BK-BL	21
R6	R26	RR6	BL-BK	22
T7	S16	TT6	BK-O	23
R7	S26	TR6	O-BK	24
				NOT USED
	GRDD	GRDD	V-SL	49
	GRDD	GRDD	SL-V	50

ANN16B

The ANN16B can be located in slots 00 and 05 in the Remote Group Housing. The terminating information for the 25-pair connector cable associated with the ANN16B is shown in Table BQ.

TABLE BQ. ANN16B Terminations

SLOT	LEAD DESIGNATIONS	CONNECTOR	CONNECTOR PIN NUMBER
00	LIN	D0	26
	LIP		1
	L175		27
			2
	LON75		28
	LOP175		3
	LON120		29
	LOP120		4
			30
	LON		5
	LBACK2R8		31
	LBACK1R8		6
05	LIN	D5	26
	LIP		1
	L175		27
			2
	LON75		28
	LOP175		3
	LON120		29
	LOP120		4
			30
	LON		5
	LBACK2R8		31
	LBACK1R8		6

Front Cover Label

The label on the inside of the front cover is shown on Figure 110. This label is used to record the equipment location of the ANN15B(s) associated with the Remote Group Interface. This information can be obtained at the central location of the System 85. The craftsperson at the System 85 can obtain the required information by using local records or by using PROC 290, Word 2. The instructions for using PROC 290, Word 2 are contained in *AT&T System 85 Feature Translation Service Manual* [555-102-107 (R2V2) or 555-103-107 (R2V4)].

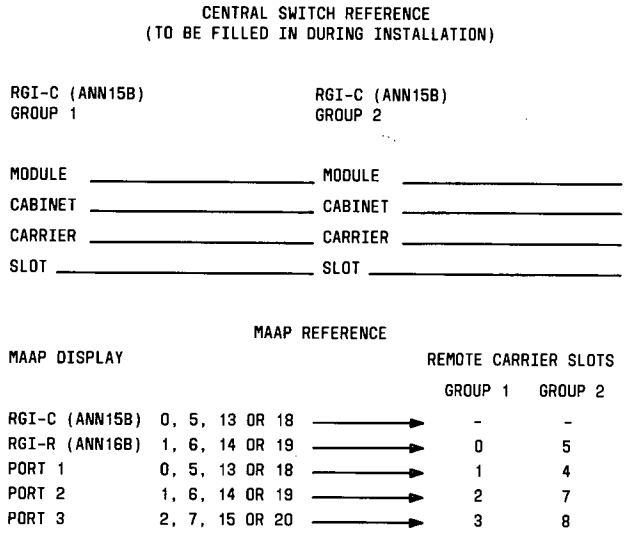


Figure 110. Front Cover Label

SYSTEM TESTS

GENERAL

This section contains the information to test the hardware associated with the RMI and RGI features. Since both the RGI and RMI tests require MAAP operations, arrangements must be made with the central location before the tests are run.

The System Demand and Feature tests are the same whether associated with remote or centrally located equipment. These tests require MAAP operations at the central location. Refer to the *AT&T System 85 System Tests Service Manual* (555-103-109) for these test procedures.

RMI SYSTEM TESTS

Two tests are used to verify the operation of the RMI hardware. Both of these tests should be run in order to thoroughly test the RMI equipment. Test the RMI fiber link as follows:

1. Observe the LEDs on the TN456 circuit packs at the central and remote locations. These LEDs will show if the TN456 circuit packs are transmitting and receiving data properly, and if the loop test built into the circuit packs is successful.
2. Run the demand test from the MAAP using PROC 620. This test will test all the digital networks that are associated with the RMI feature.

Two LEDs on the front of the TN456 circuit packs show that the TN456(s) is transmitting and receiving data properly. The Fiber Transmit Active LED (position 14) and the Fiber Receive Active LED (position 16) will be lighted green if the TN456 circuit packs are transmitting and receiving data properly. If a LED in position 14 or 16 is not lighted, the circuit pack is not transmitting or receiving data properly. This condition could be caused by a problem with the fiber-optic link, connections, option switches, or a faulty circuit pack.

> *Note:* A common problem causing the TN456 circuit packs to transmit or receive improperly is that the option switches on the TN456(s) are not set to the proper location (central or remote).

A loop test built into the TN456 circuit pack transmits logic from the central TN456(s) to the remote TN456(s) and back. If this test fails, a red LED in position 11 on the front of the circuit pack will light. This test is continuous, so the red LED in position 11 will stay lighted until the problem is corrected.

Two other LEDs are on the front of the TN456 circuit pack, the MAAP In Use (MIU) (position 9) LED, and the On Line (ONLINE) (position 7) LED. The MIU LED is a yellow LED that indicates to the craftsperson that somewhere in the system a MAAP or System Management Terminal (SMT) is in use. The MIU LED appears at both the local and remote RMI. Ideally, the intending MAAP user will look at this LED before attempting to plug in the MAAP. If, though, the user does not look at the LED and plugs in the MAAP and finds that it does not work, the user should remove the MAAP and reference this LED to see if another MAAP is in use on the system. The ONLINE LED is a yellow LED that indicates that the RMI board is associated with an on-line module control. The craftsperson should refer to this LED before removing an RMI board in order to prevent accidentally bringing down an on-line module. This LED reflects the on-line signal from the module control and is available at both ends of the links.

Test 2 of PROC 620 tests each unit type of the digital network individually. The unit type is set to 71 to test the digital network circuits associated with RMI for the entire switch.

> *Note:* PROC 620 of Release 2 software can be used only to test the digital network circuits. Release 1 software does not have this capability.

To test the RMI digital network circuits, proceed as follows:

1. At the MAAP, depress **PROC NO; 620; ENTER**.
2. Depress **NEXT TEST** to step to Test 2.
   - A default equipment location and unit type may be displayed in Fields 2 through 7. Field 2 (unit type) blinks, indicating an optional entry field.
3. Enter **71** (Remote Module Interface) in Field 2, and depress ENTER.
   - Fields 3 through 7 are dashed.
4. Depress **EXECUTE**.
   - All the digital network circuits of the selected unit type, starting with the first module, network cabinet, and carrier are tested.
   - While the unit type is being tested, the WAIT indicator is turned on.
5. When the unit type is tested, the WAIT indicator is turned off; and a summary is displayed.
6. If no circuits in the unit type tested failed, the following summary is displayed:
   a. A **2** is displayed in Field 1.
   b. The unit type tested is displayed in Field 2.
   c. The number of circuits tested is displayed in Field 12.
   d. A **0** (indicating no failures) is displayed in Field 13.
7. If failures are indicated in Field 13, depress NEXT CIRCUIT to display the first failure. Record the following information:
   a. The unit type of the failing circuit displayed in Field 2.
   b. The equipment location of the failing circuit displayed in Fields 3 through 7.
   c. The alarm status of the failing circuit displayed in Field 8.
   d. The current status of the failing circuit displayed in Field 9.
   e. The specific fault code displayed in Field 11.
   f. The number of circuits tested displayed in Field 12.
   g. The number of failing circuits displayed in Field 13.
8. When Field 13 is greater than 1, repeat Step 7 until all failures are displayed (all fields except Field 1 are dashed).

RGI SYSTEM TESTS

The RGI system is tested by performing the circuit pack insertion test. The circuit pack insertion test consists of a hardware test for all circuit packs in the remote carrier group and a software test for the ANN16B circuit pack. In order to perform the software test, the maintenance mode in the **MODE** display procedure **must not** be active.

Indications on the progress and results of the hardware and software tests are given by LEDs lighting on the circuit pack inserted.

The remote carrier group circuit pack insertion test LED indications depend on the circuit pack that is inserted; that is, ANN16B circuit pack or a remote circuit pack.

ANN16B Circuit Pack Insertion

Insert the ANN16B circuit pack in the remote carrier group, and verify that the following occurs.

> *Note:* When SN270B circuit pack is tested, all translated peripherals should be connected and have power on (when required); or the test may fail.

1. The hardware test on ANN16B is performed.

   The **RED** LED on ANN16B is turned on, then off.

   The **GREEN** LED on ANN16B is turned on, then off.

2. If the ANN16B hardware test passes, both LEDs remain off.

   If the ANN16B hardware test fails, the **RED** LED is lighted on the ANN16B circuit pack.

   > *Note:* The ANN16B **GREEN heartbeat** LED indicates a faster heartbeat after the firmware test is performed.

3. The hardware test on all port boards is performed.

   > *Note:* The hardware test on the port boards is performed only if the hardware test on the ANN16B passed.

   The **RED** LEDs are lighted on all port boards.

   Then the **GREEN** LEDs are lighted on all port boards.

4. If the port board hardware test passes, both LEDs remain off.

   If the port board hardware test fails, the **RED** LED is lighted on the failing port circuit pack(s).

5. After the hardware test on the ANN16B and all port boards is completed, communication with the switch is attempted.

   > *Note:* The hardware test on the ANN16B has to pass before communication is attempted.

   The ANN16B circuit pack's **GREEN heartbeat** LED indicates a slow heartbeat, and the ANN16B circuit pack's **YELLOW** LED is lighted; indicating communication with the switch is established.

6. If the hardware test on ANN16B passes, then the software test is executed on ANN16B.

   Note: No software test is executed for any port circuit packs.

7. The **GREEN** LED on ANN16B is lighted during the software test.
8. If the **GREEN** LED is not lighted on the ANN16B within 5 minutes after the hardware test is completed, the maintenance mode bit is probably activated by another facility.

   Contact the local or remote maintenance facility, and ask them to release the maintenance mode bit in the **MODE** display procedure.

9. When the ANN16B under test passes the software test, both LEDs are turned off.

   The **RED** LED is lighted if ANN16B fails the software test.

10. If any of the circuit packs fail the hardware test or if the ANN16B fails the software test indicated by a **RED** LED being lighted, refer to *AT&T System 85 Maintenance* (555-103-108).

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