



AT&T

AT&T System 85

Release 2, Versions 1, 2, and 3

Installation

Service Manual

555-102-104

Issue 1, May 1986

*555-104-104
for bita guide to remote*

AT&T System 85
Release 2, Versions 1, 2, and 3

Installation
Service Manual

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AT&T System 85

INSTALLATION MANUAL

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† Trademark of PORTA-SYSTEM Corporation

‡ Trademark of Cook Electronics

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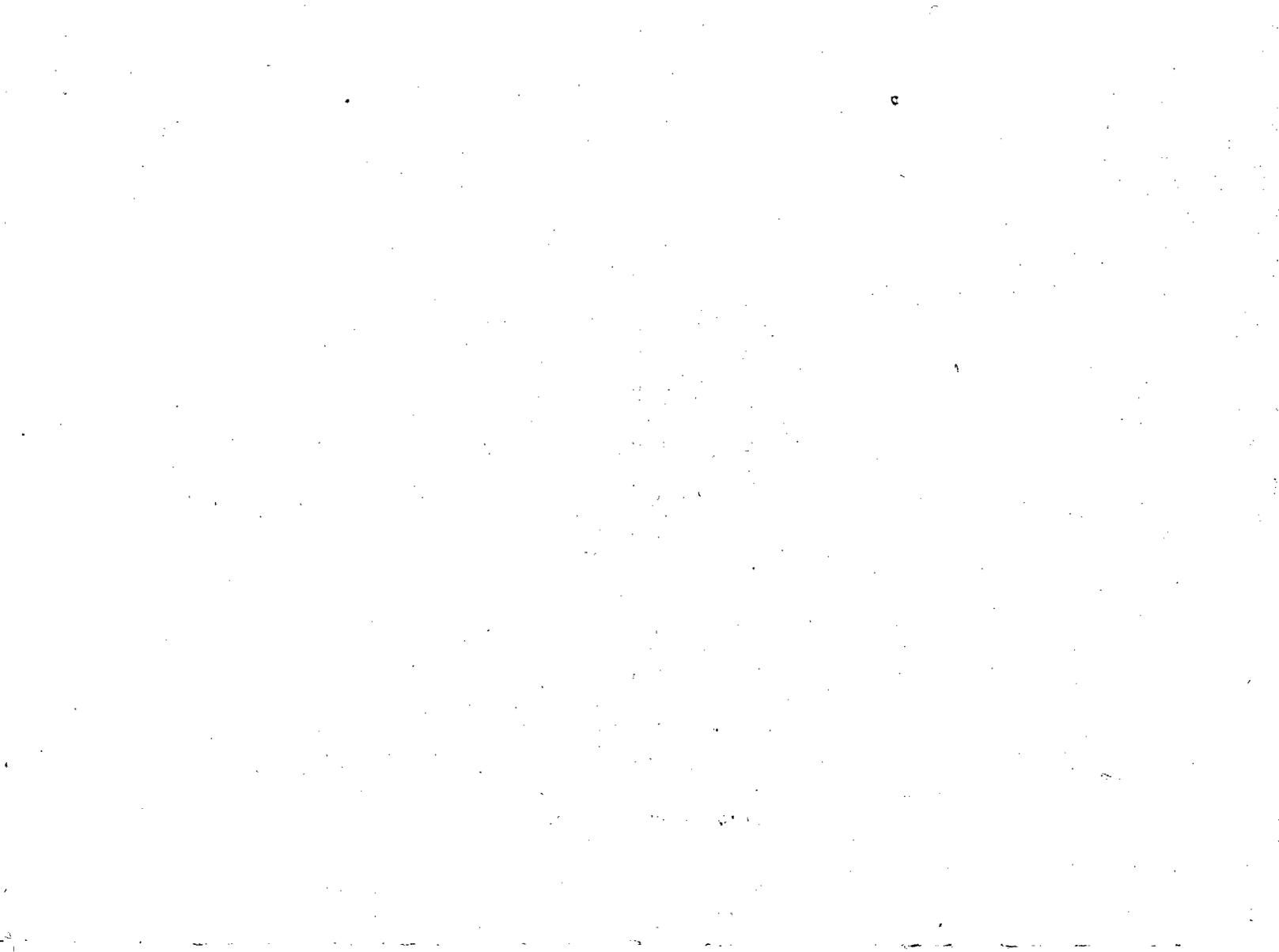
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INTRODUCTION

PURPOSE

This manual contains the instructions necessary to enable you to install System 85 cabinets and hardware components. The manual is primarily intended for use by personnel trained in the installation and connection of telephone switching equipment. The manual requires (and assumes) that you have the Customer System Document and are familiar with its contents. The Customer System Document identifies the equipment and cabling which will be installed as part of your system. This will enable you to identify in this manual the installation and connection information which applies to your system.

SUPPORT DOCUMENTS

This manual is one of a series of manuals used to install, test, administer, and maintain a System 85. Other manuals in this series are:

X-Ray Test (R2V1)	555-101-105
X-Ray Test (R2V2)	555-101-114
X-Ray Test (R2V3)	555-102-105
Feature Translation (R2V1 and V2)	555-101-107
Feature Translations (R2V3)	555-102-107
Maintenance (R2V1 and V2)	555-101-108
Maintenance	555-102-108
System Test	555-102-109
In Service Upgrades R1-R2	555-101-111
Remote Module Interface Installation	555-101-112

HOW TO USE THIS MANUAL

This manual provides a "start-to-finish" sequence to the installation process. Arranged in parts, it will permit several tasks to be accomplished at a time, if more than one person is working on the job. For example, one can install the cross-connect field components while another works on the cabinets.

Each part in the manual is numbered in the lower right corner for quick access to the tasks. The pages are numbered within a Part. A list of contents is provided on the first page of each Part.

Block diagrams, wiring tables, and line drawings of equipment units are used extensively to describe and illustrate the interfacing of system components. Text is limited to describing portions of the installation that are not given in pictorial format such as descriptions of systems options, cautions and warnings to the user, power and grounding requirements, etc.

It is recommended that you become familiar with the content and organization of the manual before starting. Before performing each task, reread that Part to be sure you understand the procedure to be followed and have the required tools and components at hand.

If you are using the manual to add music-on-hold to an existing system, use the Table of Contents to locate the part entitled AUXILIARY and PERIPHERAL EQUIPMENT and turn to the page indicated for the hardware to be installed.

Note: Coverage of peripherals in this manual is limited to cabling, connections, and options required for interfacing the device to System 85. The physical installation of the device will be described in documents furnished with or available for the device.

ORGANIZATION

The installation service manual is organized in parts, each part covering a major work area. The Parts are arranged within the manual in a suggested installation sequence. This sequence may be revised as needed by individual job requirements.

The parts of the manual and the work areas covered are:

- **GETTING STARTED** – This part contains information on tools and test equipment required and describes use of the Customer System Document. It also contains the Installation Acceptance Procedure (IAP).
- **FLOOR PLANS AND WORK SPACE** – This part contains general information for use in site preparation. The actual floor plan for your installation is provided by the Communication System Representative. This part of the manual will serve as a guide as to what should be provided in the system floor plan.
- **MAIN CROSS-CONNECT FIELD (ADMINISTRATION FIELD)** – This part contains information on the layout, assembly, and designation of the 110-Type connecting blocks used for the main wall-mounted cross-connect field.
- **CABINET INSTALLATION** – This part contains instructions on unpacking, locating, and installing the system switch cabinets.
- **OVERHEAD CABLE DUCT ASSEMBLY** – This part describes the components and assembly of the overhead cable duct hardware between the switch cabinets and the wall cross-connect field.
- **AC POWER DISTRIBUTION** – This part contains requirements and wiring diagrams of the distribution of ac power to the various system cabinets and components.
- **EXTENDED POWER RESERVE** – This part contains wiring diagrams of the distribution of dc power and grounding to the various system cabinets. It also covers the dc power alarm connections and the ac distribution for auxiliary equipment and an AP if provided.
- **GROUNDING** – This part describes the single-point grounding system required for the switch cabinets. Requirements for the various grounding methods and diagrams of the ground lead connections are shown.
- **SYSTEM CABLING, 25-PAIR SHIELDED CONNECTOR CABLES** – This part describes the 25-pair shielded cables from the system cabinets to the wall cross-connect field. Connections for the various circuit packs in the cabinets are described.
- **INTRA- AND INTERCABINET CABLING** – This part describes the interconnection of the various system cabinets. Flat-ribbon and triaxial cables as well as 25-pair shielded cables and loose wiring is covered.
- **PERIPHERAL AND AUXILIARY EQUIPMENT INSTALLATION** – This part contains wiring diagrams showing connections required to interface peripheral equipment to the switch components. It also covers installing the hardware associated with features such as Radio Paging, Recorded Announcement Intercept and others.
- **TRANSMISSION EQUIPMENT** – This part describes the installation and connection of components necessary to provide transmission and signaling range extension for the system trunking. It includes CPFT, PMFTA, and DS-1 equipment.

- DATA EQUIPMENT – This part gives the connections for connecting data equipment to System 85.
- REMOTE EQUIPMENT – This part gives the connections required to connect the System 85 and its remote group. It also gives the connections required for Remote Module Interface.
- ATTENDANT CONSOLE – This part provides installation and connection information for attendant consoles and related hardware components.
- AP 16 CONNECTIONS – This part gives the connections between the AP and the System 85. It also covers connecting the AP to private line network.
- FINAL CABINET INSTALLATION – This part contains instructions for installing cabinet ground straps and cabinet covers.
- POWER UP SEQUENCE – This part provides the sequence of applying power to the system cabinets. A cabinet visual inspection routine is also presented.
- INITIAL SWITCH TEST – This part contains the initial testing procedure for the switch. Microdiagnostic testing and X-RAY testing are described. After these tests are verified, the system is initialized by loading the program tape.
- CIRCUIT PACK DATA – This part contains reference material on the various circuit packs associated with the system. Circuit packs requiring option switch settings for use with System 85 are shown and the options described.
- FEATURE BLOCK DIAGRAMS – This part provides block diagrams of features and services which require special cabling or peripheral hardware for connection to the switch.
- SYSTEM ADDITIONS – This part gives the connections for retrofitting a port or DS-1/MFAT carrier in an existing cabinet in an existing system.

PART 1. GETTING STARTED

CONTENTS

General	1.1
Inventory	1.2
Installation Acceptance Procedure	1.3

1.1 General

1.1.1 Survey the designated area in which the switch components will be located to familiarize yourself with the proposed arrangement of the cabinets and adjuncts. Use the floor plan provided with your system and the Customer System Document (CSD) to visualize the installation and verify that any customer-provided equipment, such as ac power sources, are in place. The typical floor plans in Part 2 can be used to identify customer-provided and installed equipment.

1.1.2 Special precautions must be taken if the System 85 is being installed in a building under construction. Refer to 555-102-201 System 85 System Description Reference Manual for this information.

1.2 Inventory

1.2.1 Using the CSD equipment list, inventory the materials at the job site to identify any missing components. Arrangements should be made to obtain any missing items.

1.2.2 In addition to normal installation tools, some specialized and nonstandard tools are required during certain phases of the installation task. Table A is a listing of these tools and test equipment items. Use Table A as a guide in obtaining the recommended item or a suitable equivalent.

1.2.3 The X-Ray test procedures referred to in Part 15, Initial Switch Test are contained in service manual entitled AT&T SYSTEM 85, X-RAY TESTS which is furnished with the X-Ray tape. If X-Ray tests will be run on your switch, be sure the tape and manual are available.

1.3 Installation Acceptance Procedure

1.3.1 An INSTALLATION ACCEPTANCE PROCEDURE (IAP) is found at the end of this part. The IAP is to be used to record time spent on various phases of the system installation. The IAP should be removed from the manual, completed during the installation, and returned to the installation supervisor as directed.

TOOLS AND TEST EQUIPMENT INVENTORY.

TABLE A

TASKS	EQUIPMENT REQUIRED	RECOMMENDED TYPE
Unpacking Cabinets	Tin Snips	
	Utility Knife	
	Adjustable Wrench	6- or 8-inches
	Ratchet	1/2-inch drive
	Sockets	5/16- and 9/16-inch
	Pinch Bar	3-feet
	Two Boards (For Cabinets Without Wheels)	4- x 6- x 30-inches
Installing Cabinets and Earthquake Mounting	Electric Drill	1/2-inch impact type
	Masonry Bit	1/2-inch
	Drill Bit (For Wood Floors Only)	1/4-inch
	Drill Bit (For Computer Floors Only)	5/8-inch
	Carpenter's Level	30-inches or longer
	Chalk Line	
	Measuring Tape	30-inches or longer
	Adjustable Wrench	6- or 8-inches
	Ratchet	1/2-inch drive
Sockets	5/16- and 9/16-inch	
Install Cable Ducts	Adjustable Wrench	6- or 8-inches
	Screwdrivers	8- and 18-inch flat blade
	Nutdrivers	3/8- and 5/16-inches
Final Cabinet Installation	Off-Set Screwdriver	Flat blade
System Test	MAAP	
Power Test	Digital Multimeter	KS-20599 or equivalent
Cutdown of 110-Type Hardwire	Single-Pair Insertion/Cutoff tool	788D or equivalent

INSTALLATION ACCEPTANCE PROCEDURE (IAP) FOR AT&T SYSTEM 85

NOTES

THE INSTALLATION ACCEPTANCE PROCEDURE IS DIVIDED INTO TWO SECTIONS: SECTION I - HARDWARE INSTALLATION PROCEDURES AND SECTION II - ACCEPTANCE PROCEDURES. SECTION III - OTHER WORK CATEGORIES, IS PROVIDED FOR RECORDING ESTIMATE OR JOB ORDER FOR NONSWITCH CHARGES THAT ARE NOT CONSIDERED A PART OF THE SWITCH INSTALLATION AND ACCEPTANCE.

ALL IAP ITEMS SHOULD BE COMPLETED IN THE SEQUENCE LISTED. TIME REQUIRED TO COMPLETE EACH ITEM SHOULD BE RECORDED IN THE ADJACENT BOX. TROUBLES ENCOUNTERED SHOULD BE CLEARED BEFORE PROCEEDING TO THE NEXT ITEM.

REFERENCES IN THE IAP ARE CONTAINED IN THIS OR OTHER DOCUMENTS. FOR EQUIPMENT AND FEATURES NOT A PART OF THIS PACKAGE, REFER TO THE APPROPRIATE DOCUMENTATION.

TESTING OF MISCELLANEOUS CIRCUIT PACKS (SN232, SN233, ETC.) SHOULD BE COMPLETED WITH INSTALLATION AND TESTING OF ASSOCIATED NONSWITCH (I.E., TRANSMISSION, DIAL TONE, ETC.) EQUIPMENT. TIME CHARGES FOR THIS INSTALLATION AND TESTING WORK SHOULD BE RECORDED IN SECTION III - OTHER WORK CATEGORIES. IT SHOULD NOT BE SHOWN IN SECTIONS I OR II.

WIRING AND OVERALL TESTING OF ALL TRUNKS AND ASSOCIATED NONSWITCH EQUIPMENT SHOULD BE CHARGED TO THE APPROPRIATE ACCOUNT CODES AND RECORDED IN SECTION III ONLY.

ALL TIME CHARGES TO THE SALES ORDER OR WORK ORDER SHOULD BE SHOWN ON THE IAP AND SHOULD EQUAL THE HOURS CHARGED ON YOUR DAILY TIME REPORTS FOR THIS WORK.

TIME CHARGES FOR WORK NOT COVERED BY THE IAP SUCH AS WALL FIELD CROSS-CONNECTS, WIRING, CABLING AND TESTING, SHOULD NOT BE RECORDED OR INCLUDED IN THE IAP TOTAL HOURS. TIME FOR THOSE WORK FUNCTIONS SHOULD BE CHARGED TO STATION ACCOUNTING CODE 78AE.

RETURN THE COMPLETED IAP FORM TO YOUR SUPERVISOR THE DAY FOLLOWING THE IN-SERVICE DATE. FORMS SHOULD BE FORWARDED TO:

DIST. MGR., LARGE BUSINESS SYSTEMS, AT&TIS
11900 NORTH PECOS ST., DENVER, CO. 80234

CAUTION

ELECTRIC STATIC DISCHARGE CAN DESTROY AND/OR DAMAGE CIRCUIT PACKS.
ALWAYS ATTACH A WRIST GROUNDING BEFORE HANDLING OR WORKING WITH
SYSTEM AND CIRCUIT PACKS.

IAP TOOL REQUIREMENTS

The tools required for Installation and Acceptance are listed in Part 1. Items not included in Part 1 which are normally listed as IAP Tool Requirements are shown below.

<u>ITEM</u>	<u>USE</u>
Normal installer-repair tools	As required
C key kit AT 8032	Ground bus connections
Primary maintenance spare circuit packs	As required
C test cord	Connect station set to 110-type connector block
FASTECH* connector carrier tool and replacement pins	As required
Adapter for trunk testing	As required
Logic probe power supply	As required
Touch-tone telephone (2500 or 7101A type)	Test system dial tone
X-Ray tape	System tests
MAAP† (Maintenance and Administration Panel)	Test procedures
CHAPS tape‡ (Customized Hardware and Pseudo Software)	System Tests

In order to run X-ray test, the system must be equipped with a TN392 memory circuit pack in slot 07 of the control carrier.

Installed and tested test trunk
required for acceptance testing

* Trademark of AT&T.

† Not provided with the system, must be ordered separately.

‡ Provided with system.

	Time Spent Item
SECTION IIA ACCEPTANCE TESTING (CONT'D)	
5. Perform X-Ray Test: 555-101-105 (R2V1) 555-101-114 (R2V2) or 555-102-105 (R2V3)	
6. Install and Load System Program Tape, Part 19	
7. Clear All Software Failure History Records: 555-101-108 (R2V1 or V2) or 555-102-108 (R2V3)	
8. Test SMDR/CDRR If applicable	
9. Clear Software Failure History. Record and Clear Trouble before Clearing Out	
SECTION IIA-ACCEPTANCE SUBTOTAL	
SECTION IIB OPERATIONAL TESTS (Complete Applicable Steps in Sequence) 158 AC	
1. Check for trunk dial tone at all trunk circuit packs using 249A adapter and 1013 handset. Attach lead for ground start (Possibly 2 persons)	
2. Connect telephone set (500, 2500, or 7101A) to a station connection using C test cord at cross-connect field, check station for dial tone. (1 Per Line Port Pack)	
3. Connect telephone set (500, 2500, or 7101A) to a station connection using C test cord at cross-connect field and dial each console once, from each line carrier equipped cabinet in each module and then from each console dial back to the station. (1 Per Port Carrier)	
4. Test Features Applicable to System 555-101-109 (R2V1,V2) or 555-102-109 (R2V3) Number of Items = _____	
5. Store records, install cable duct covers, rear panels and front doors.	
6. Test Aux. Cab. Features use CD(s) and SD(s) Associated with feature	
7. Test AP: 585-200-101IS	
SECTION II B-Operational Tests Subtotal	
SECTION II A&B Total	
SECTION I & II = Total IAP HOURS 158C	
SECTION III OTHER WORK CATEGORIES (Not included in IAP totals) Labor Hours	
1. Translation changes (158AM) (DEFERRED)	
2. Overall trunk test and turn up of C.O., WATS, tie trunks, FEX, and other 158AC	
SECTION III-TOTAL OTHER HOURS	
REMAINDER: All hours charged to this estimate on the time sheets must also be reflected on this IAP worksheet.	
For Equipment Damage / Trouble Found During IAP	PLEASE CONTACT YOUR MARKETING BRANCH OFFICE
SHIPPING DAMAGE	SHIPPING SHORTAGES
DEFECTIVE CIRCUIT PACKS, ETC. (Identify by Code, Serial No.)	TECHNICIANS COMMENTS:

RETURN COMPLETED FORM TO YOUR SUPERVISOR

PART 2. FLOOR PLANS AND WORK SPACE

Contents

General	2.1
Typical Floor Plan for Long Equipment Room	2.2
Typical Floor Plan for Confined Equipment Room	2.3

2.1 General

2.1.1 A drawing should be made of the installation area showing the desired placement of the system equipment cabinets and components. This floor plan layout is to be provided on site to the installation personnel. It is used for placing cabinets and auxiliary equipment and for laying out the connecting cables and wiring. The drawing assures that all system components are located according to agreements made with the user. System 85 cabinets must not be installed in physical contact with cabinets of any other communication systems. Contact your Marketing Branch Office if discrepancies are detected.

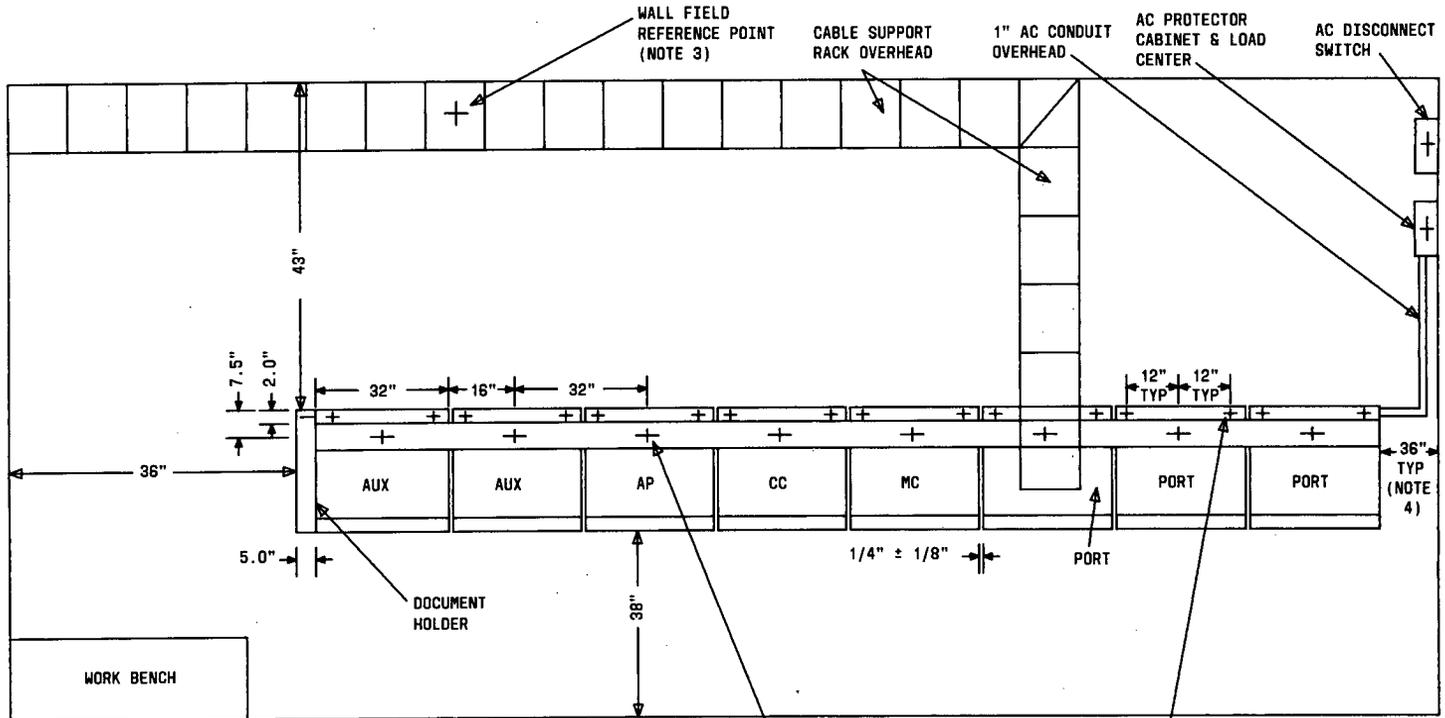
2.1.2 The installation personnel should use the floor plan as a site inspection guide to ensure that customer-provided electrical and mechanical facilities are correct and in accordance with plant and electrical codes or requirements before starting installation. Any discrepancies should be referred to the Marketing Branch Office.

2.1.3 If the System 85 is being installed on a raised floor and the switch is equipped with reserve power, special considerations are required for the unusually heavy battery weight.

2.1.4 All electrical outlets must be properly fused and labeled in accordance with existing electrical codes and any other local regulations which may apply. The ac disconnect switch is capable of removing power from the entire system in case of emergency.

2.1.5 A facility should be provided near the cabinets to allow for disassembly and repair of components. Storage facilities for spare parts are also recommended.

2.2 Typical Floor Plan for Long Equipment Room
with Cabinets in Line



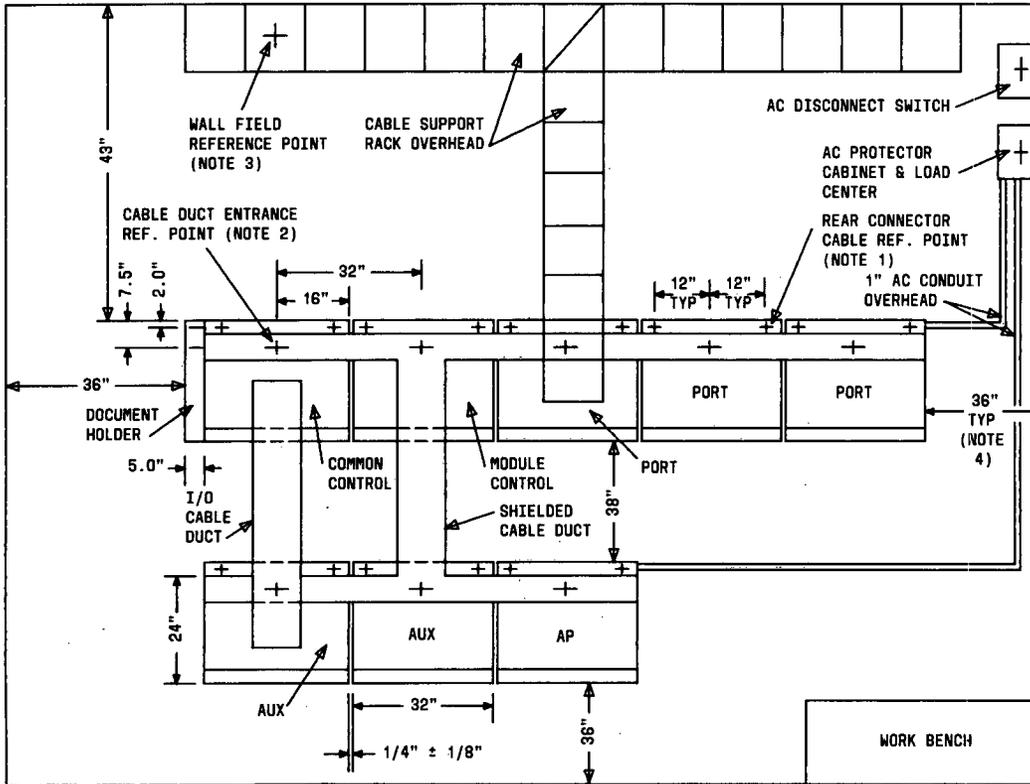
NOTES:

1. POINT WHERE I/O CABLES DRESS UP BACK OF CABINET.
2. CENTER OF THE CHIMNEY OF THE SHIELDED DUCT.
3. CENTER LINE OF I/O CABLE DROPS TO MAIN CROSS-CONNECT FIELD.
4. WHEN TERMINATING I/O CABLES TO WALL FROM THE SIDE OF A CABINET SPACE FROM CABINET TO WALL MUST BE 43 INCHES.

CABLE DUCT ENTRANCE
REF. POINT (NOTE 2)

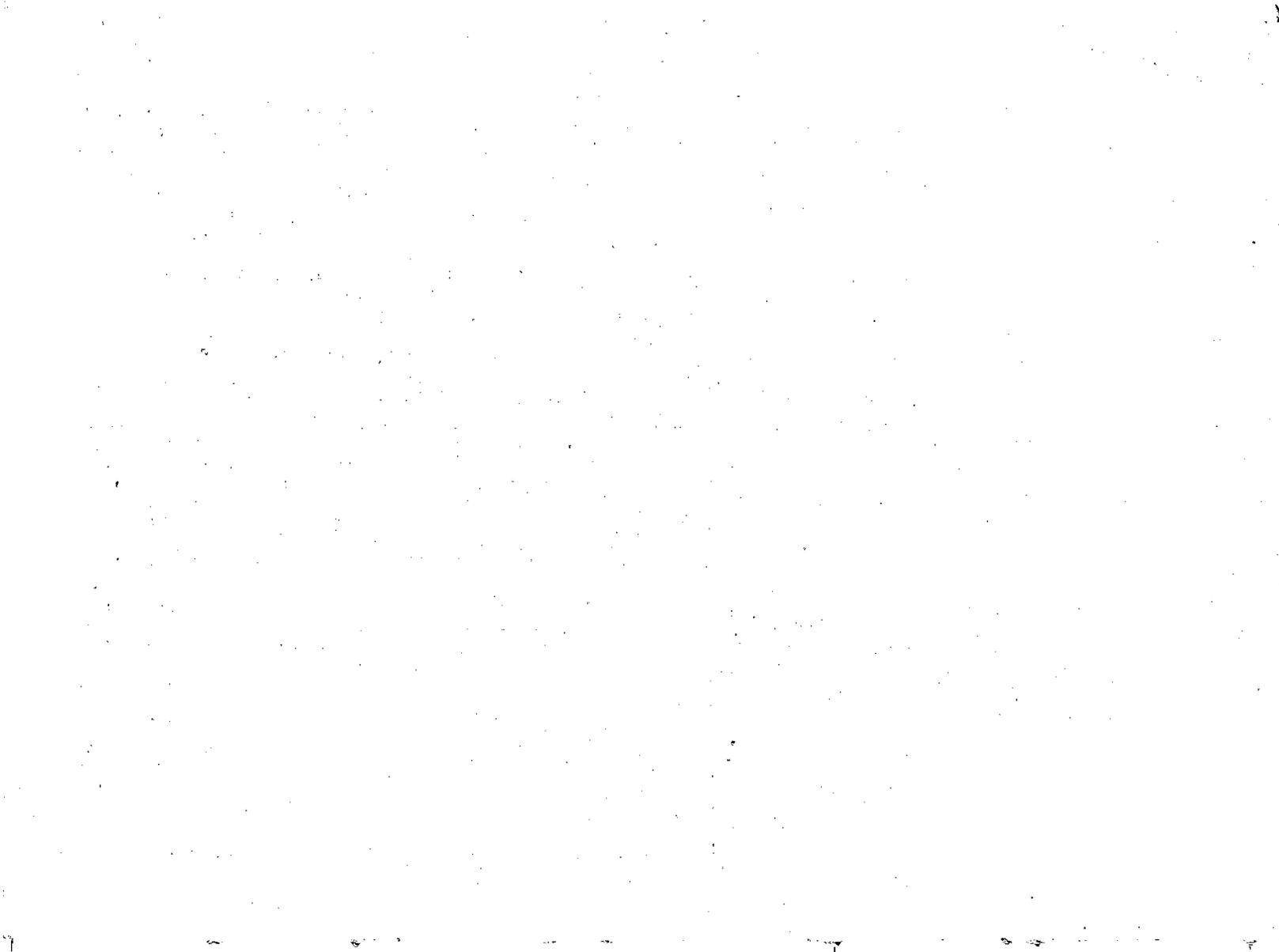
REAR CONNECTOR
CABLE REF. POINT
(NOTE 1)

2.3 Typical Floor Plan for Confined Equipment Room
with Two Rows of Cabinets



NOTES:

1. POINT WHERE I/O CABLES DRESS UP BACK OF CABINET.
2. CENTER OF THE CHIMNEY OF THE SHIELDED DUCT.
3. CENTER LINE OF I/O CABLE DROPS TO MAIN CROSS-CONNECT FIELD.
4. WHEN TERMINATING I/O CABLES TO WALL FROM THE SIDE OF A CABINET SPACE, DISTANCE FROM CABINET TO WALL MUST BE 43 INCHES.



PART 3. MAIN CROSS-CONNECT FIELD (ADMINISTRATION FIELD)

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Requirements	3.2
Installation and Connections	3.3

3.1 General

3.1.1 The main cross-connect field (administration field) is the interface for the system cabling and wiring. It provides for interconnection of the system components. It organizes circuits into groupings consistent with the number of circuits on each circuit pack and the system cabling plan.

3.1.2 Cables from the local telephone company enter the building wiring system at the network interface (NI), from which they connect to the trunk/AUX field. The switch contributes leads to both the trunk/AUX field and the building distribution field. House cables proceed to the satellite locations. The satellite modules in turn connect with the information outlets to which terminal devices connect.

Designation label inserts within fields are color codes as follows to identify field functions.

- GREEN - Central Office (CO) connections (telephone company)
- BLUE - Information outlets
- PURPLE - Trunk and line terminations
- YELLOW - Auxiliary connections, AP and switch auxiliary leads
- WHITE - House cable terminations
- ORANGE - Network Interface

3.1.3 In most System 85 installations, the connector cables and intercabinet cabling are run in overhead ductwork. This ductwork is provided with the System 85. Its installation is covered in Part 5. If the System 85 is installed

on a raised floor, the cables may or may not be run in the space under the raised floor. There are several matters of concern that should be considered when running the cables under the floor.

If the raised floor space is being used as an air plenum, the National Electrical Code has restrictions on what types of cables can be placed in that space. The amount of space under the floor must be considered. The customer should also be made aware of the fact that some of the floor tile will require cutting and modifying. All of these matters should be handled before the installation starts.

Only the I/O cables and power cables can be run under the raised floor. Inter-cabinet cabling still runs in the normal cable ducts over each cabinet. Flat cables between cabinet lineups still require flat cable cross-aisle ducts.

If the cables are to be run under the raised floor, there are certain precautions that the installer should take. The Module I/O cables must not cross similar I/O cables from another module or any house cables. All of the under floor cables must be dressed and run according to the CSD (Customer System Document).

3.2 Requirements

3.2.1 The administration field includes two groups of terminal blocks: the trunk/AUX field and the building distribution field. The customer may elect to participate in the building distribution field with skilled personnel, but the trunk/AUX field is a craft area only.

3.2.2 Within the trunk/AUX field, the GREEN (CO) field in terminal block A receives the Network Interface leads through 25-pair cables, arranged consecutively. The GREEN field is cross-connected to the PURPLE (trunk) or YELLOW (auxiliary) fields in terminal block B. The PURPLE field in turn connects with circuit packs in the switch with 25-pair shielded cables with a connector at each end. The PURPLE field is arranged in 3-pair modularity to correspond to the configuration of circuit packs in the switch.

3.2.3 The building distribution field is made up of three different color fields. The PURPLE field receives the lines from the switch. The YELLOW field receives the cables from the AP and the auxiliary cabinet. The WHITE field receives the house wiring cables.

3.2.4 The WHITE field is all mounted in one area. The house wiring is referred to as riser cables. The riser cables and the switch cables cannot approach the cross-connect facility from the same direction. Since the switch cable normally enters from the top, the riser cables normally enter from the bottom.

3.2.5 An ORANGE field is used as a network interface providing a demarcation point between the network cables and the System 85. All trunks or off-premises stations going out to the network are connected via the network interface field. Customer-provided equipment should be connected to the System 85 through an ORANGE field. This

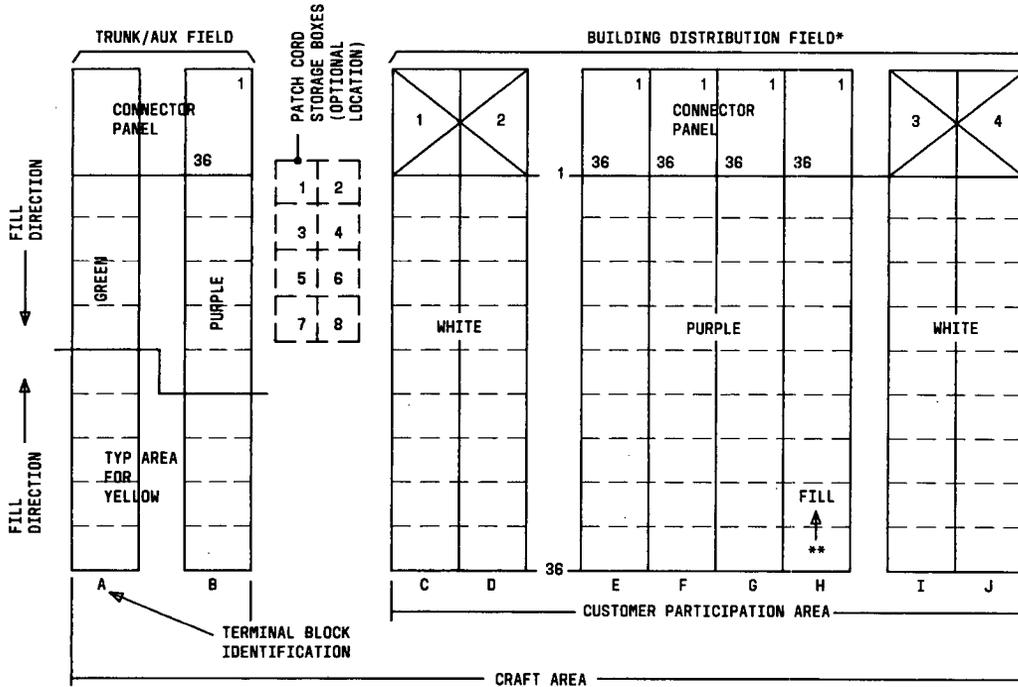
becomes the demarcation point to be used before extending service to the serving central offices and customer-provided equipment.

3.2.6 If the System 85 is mounted on a raised floor, the cabling will sometimes be run under the floor. If this condition exists, there are differences that show up at the cross-connect field. All the cables exit the cross-connect field from the bottom. For raised floor applications, the wall field is recommended to have a 40-inch stub cable which will go about 18 inches under the floor to interconnect with the I/O cables and trunk cables.

The cross-connect field may not be wall-mounted, but is rack-mounted. If the cross-connect field is rack mounted, there are two structural rules that must be observed. The bottom of the frame must be secured and connected with manufacturer-recommended hardware to the base floor or else must be suitably connected to the stringer system of the raised floor. The top of the frame requires lateral bracing. The bracing may be connected via rigid members to the ceiling, the bracing carries no load and is used only to prevent lateral frame movement during normal activity on the frame.

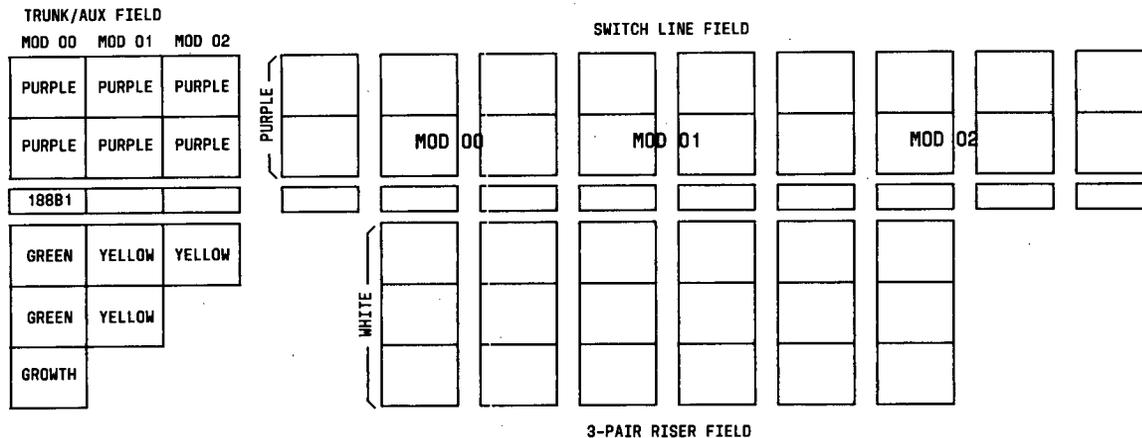
3.3 Installation and Connection

3.3.1 Typical main cross-connect field - single module (administration field)



* THIS FIELD MUST BE PLACED ON CONTINUOUS WALL.
 ** THIS FIELD MAY BE YELLOW.

3.3.2 Typical main cross-connect field - multimodule
(administration field)

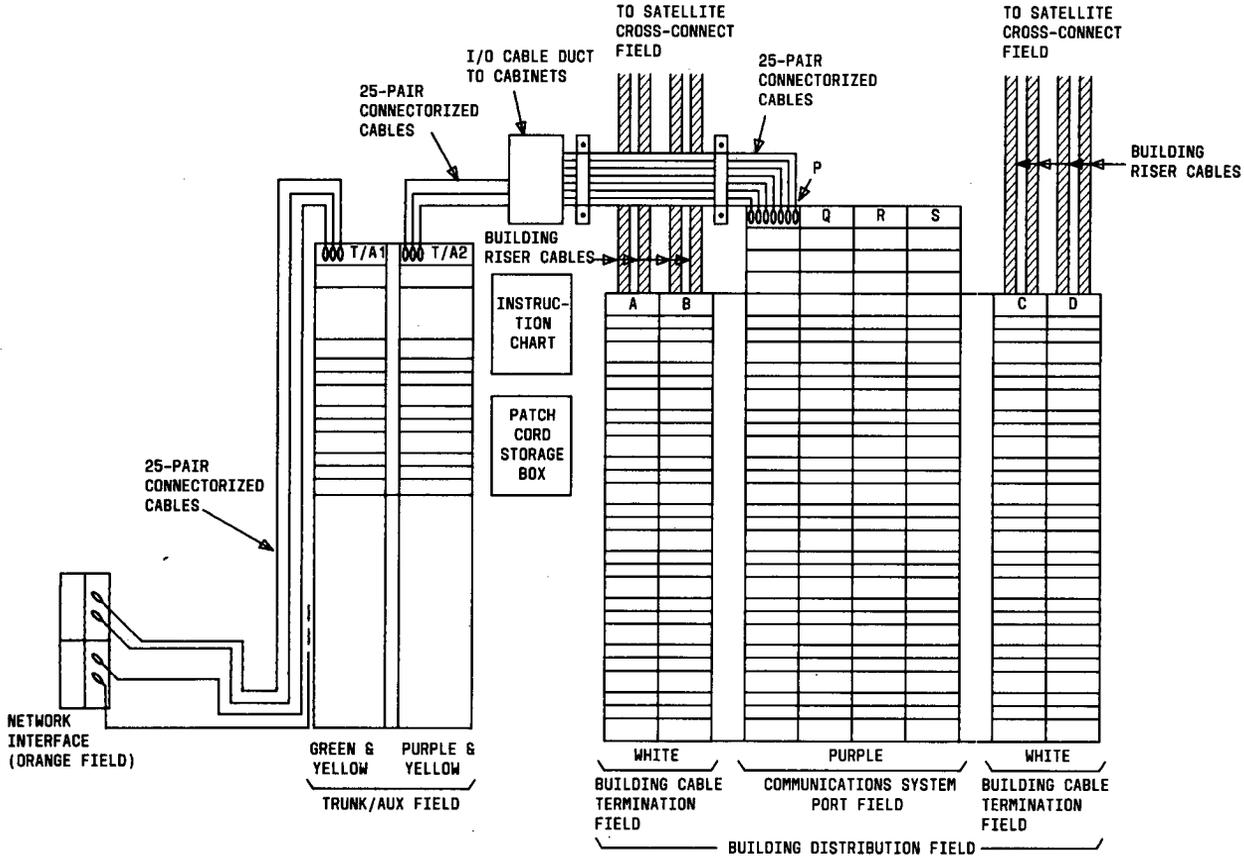


NOTE:

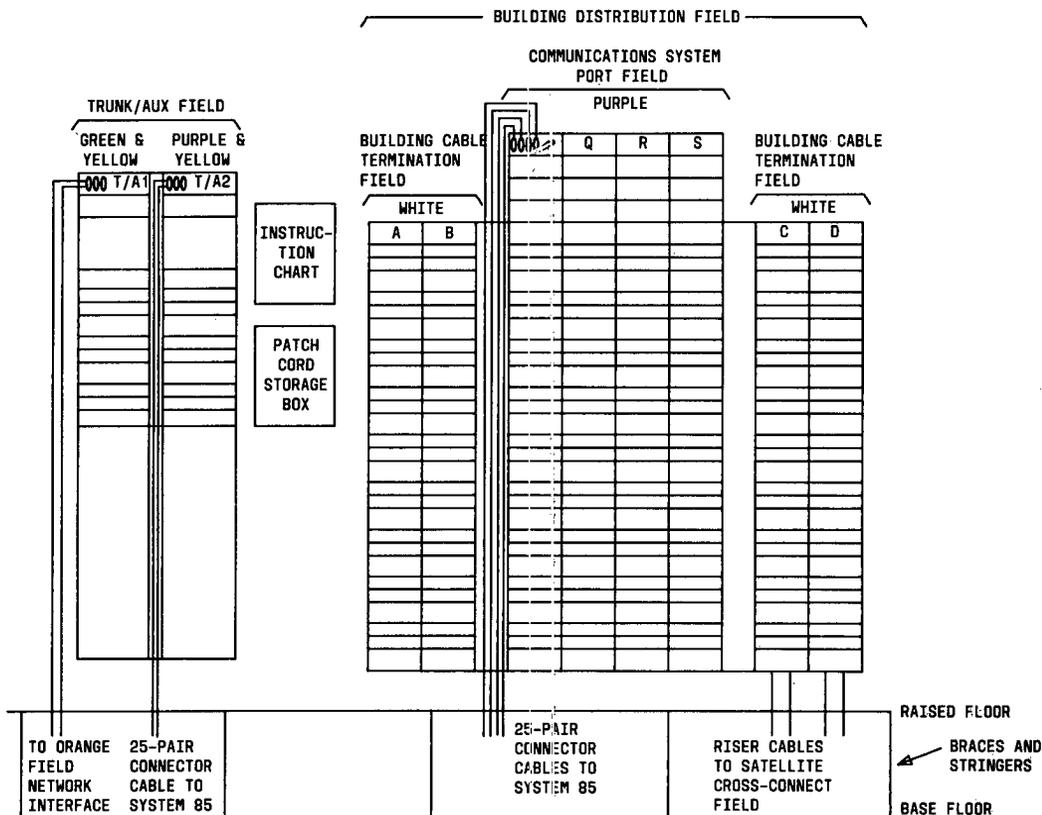
- RISER AND SWITCH CABLES MUST APPROACH THE CROSS-CONNECT FIELD FROM DIFFERENT DIRECTIONS

3.3.3 Typical cable routing at cross-connect field

3.3.3.1 Typical cable routing at main cross-connect field - System 85 equipped with overhead ducts



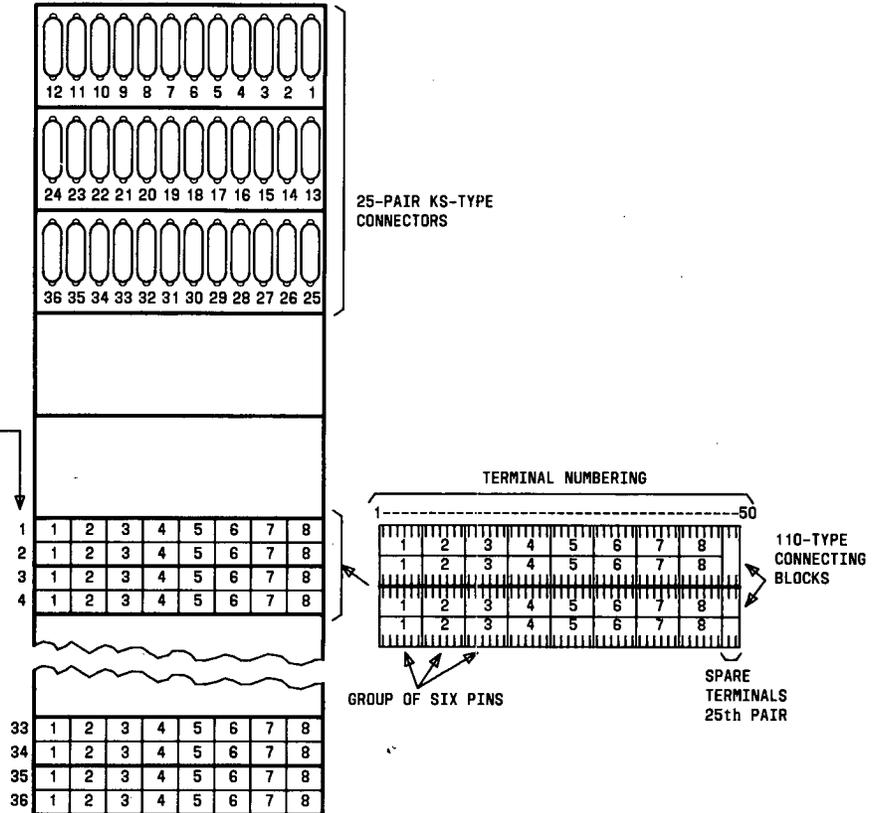
3.3.3.2 Typical cable routing at main cross-connect field - System 85 equipped with underfloor cabling



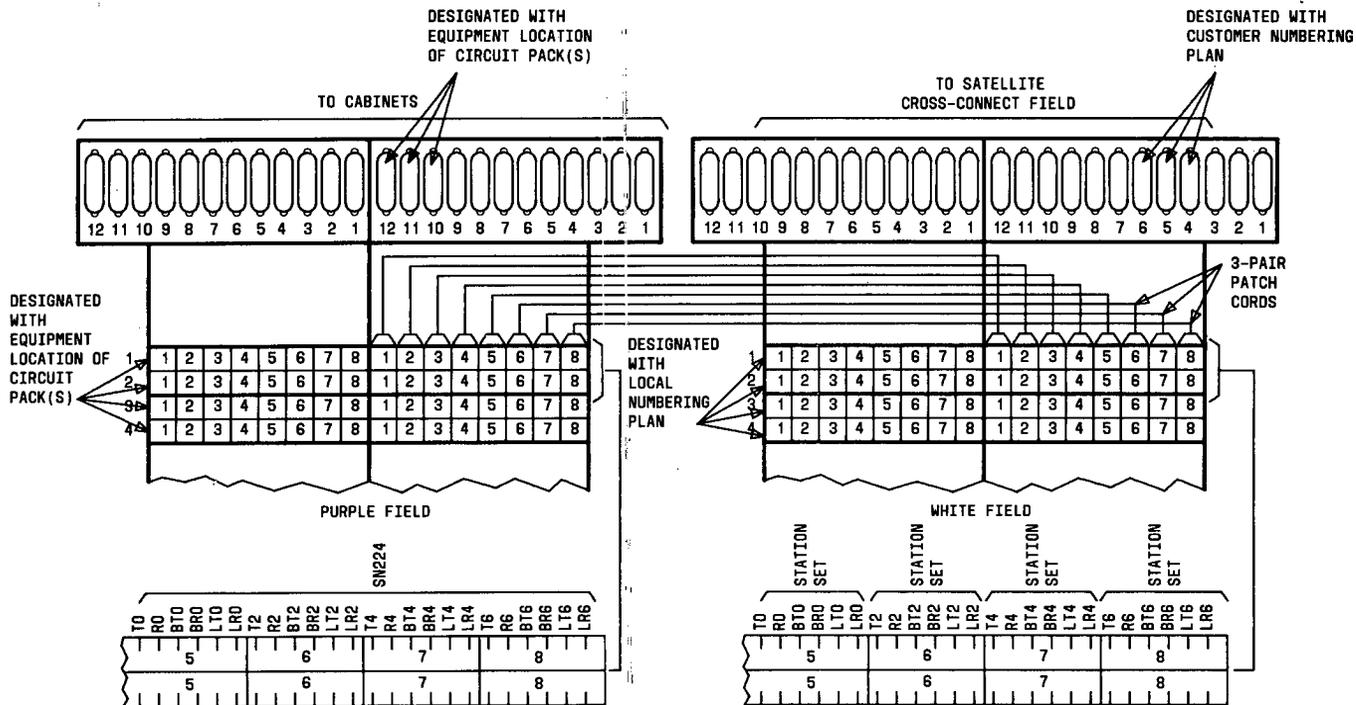
3.3.4 Typical 110-type terminal block

3.3.4.1 110-Type terminal block frame showing 25-pair KS-type connectors and associated 110-type connecting blocks.

NUMBERS 1-36 REPRESENT THE 110-TYPE BLOCK THAT IS FACTORY WIRED TO THE ASSOCIATED KS-TYPE CONNECTOR



3.3.5 Typical station line circuit cross-connection



PART 4. CABINET INSTALLATION

Contents

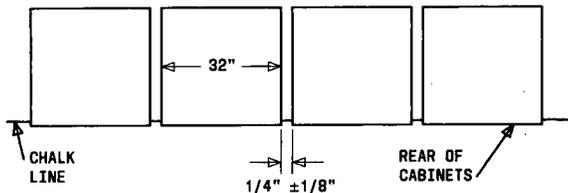
General	4.1
Marking Location Layout	4.2
Cabinet Damage	4.3
Unpacking and Positioning Cabinets	4.4

4.1 General

4.1.1 Each cabinet is shipped in a polyethylene bag, packed in a cardboard container. Cabinets are fastened to a wood/styrofoam pallet by four 3/8-inch carriage bolts. The cardboard container is strapped to the pallet by two metal bands.

4.2 Marking Location Layout

4.2.1 Using the floor layout of the equipment room, mark the floor with a chalk line, allowing 32 inches per cabinet with 1/4-inch \pm 1/8-inch separation between each cabinet.



4.3 Cabinet Damage

4.3.1 The cardboard container has a shockwatch indicator attached to it. A red color shown in the center of the indicator (above the white arrow) indicates rough handling. If the indicator shows rough handling or has been removed, contact the Regional MLO Claim Coordinator.

4.3.2 If any damage to the cabinets is observed while unpacking and installing (paragraph 4.4), contact the Regional MLO Claim Coordinator.

4.4 Unpacking and Positioning of Cabinets

4.4.1 Perform the following procedures to install the cabinets:

DANGER
Each cabinet may weigh as much as 750 pounds.

(1) Move one packaged cabinet to its position directly behind the chalk line indicating the rear of that cabinet.

DANGER
Care must be exercised to avoid injury while cutting and removing metal bands.

(2) Cut and remove metal bands.

WARNING
Deep knife penetration may damage the cabinet.

(3) Cut one corner of the cardboard container from top to bottom.

(4) Remove all cardboard, tape, and plastic.

(5) Determine which cabinet has ramps stored under it. It must be the first cabinet unpacked.

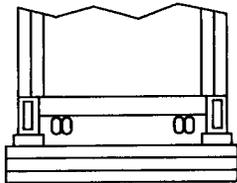
(6) Open the front door panel of the cabinet.

(7) Remove the lower rear panel using a 5/16-inch socket wrench.

(8) Remove the carriage bolt nuts located at each of the four bottom corners using a 9/16-inch socket wrench.

(9) Remove the carriage bolts holding the cabinet to the pallet.

- (10) Remove the ramps stored under the cabinet.
- (11) Using one of the ramps as a pry bar, place it under one of the rear corners and pry up just enough to remove the wooden supporting blocks. Repeat the procedure for the other rear corner.
- (12) Turn the leveling feet all the way up (so they will clear pallet while being removed).
- (13) Align ramps with cabinet rollers and secure.
- (14) Roll the cabinet off the pallet. There is a 3/4-inch drop when the cabinet reaches the ramp



WARNING
Leveling legs become fragile under the weight of the cabinet. Care must be taken to assure that legs do not break.

- (15) Carefully move the cabinet into its designated position.

WARNING
Anchor bolts must not contact building steel.

- (16) If earthquake mounting is required:
 - (a) Open the front door panel.
 - (b) Insert a pencil or marker through the holes previously occupied by the carriage bolts and mark the floor directly beneath each hole.
 - (c) Move the cabinet away from the installation location and drill holes where marked according to the type of floor:
 - computer 5/8-inch hole
 - concrete 1/2-inch hole
 - wood 1/4-inch hole
 - (d) If the floor is concrete, insert anchors in the holes.
 - (e) Move the cabinet back into place and align the cabinet holes with the holes in the floor.

(17) Repeat procedure from Step (1) for each cabinet to be installed.

(18) When all cabinets are in place, adjust the leveling legs until cabinets are level. The cabinets must be level front to rear as well as side to side.

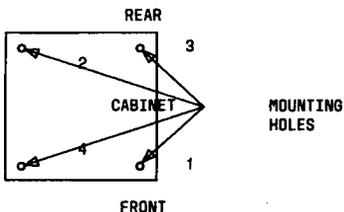
Note: If equipped with an AP cabinet that does not have leveling feet, cabinets in line with AP must be leveled to it.

(19) If earthquake mounting is required:

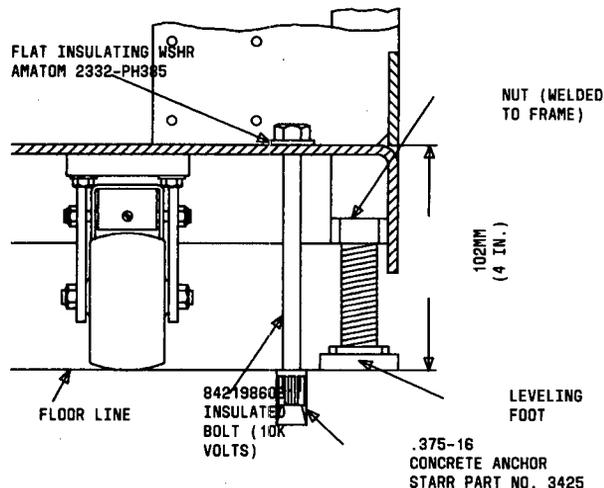
(a) Install hardware for securing cabinet to floor according to floor-type (see paragraph 4.4.2):

- computer 1/2-inch bolt with flat washer and nut
- concrete 3/8-inch lag bolt with flat washer
- wood 3/8-inch lag bolt with flat washer

(b) Tighten bolts in sequence shown:



4.4.2 Cabinet with Wheels and Leveling Feet



PART 5. OVERHEAD CABLE DUCT ASSEMBLY

Contents

General	5.1
Installation	5.2

5.1 General

The cable duct is assembled from various group numbers of ED-1E465. The assembly, installed after the cabinets have been installed, provides ducts for three types of cables: inter-cabinet cables, I/O cables (tip and ring), and ac power cables. A typical assembled duct work is shown in Figure 5.1.

The shielded inter-cabinet cable duct provides the path for the flat cables between the cabinets of a module. This duct is the first installed. Covers for the shielded duct should be stored until the inter-cabinet cabling is completed.

The I/O cable duct provides the path for I/O cables to the cross-connect field. The I/O cables originate at connectors on the backs of the cabinets and terminate on connectors at the yellow cross-connect field.

The ac power duct provides the path for the ac wiring that will power the system. This duct mounts to the back of the shielded duct that runs across each cabinet. Five group numbers provide various arrangements of receptacles necessary for different types of cabinets. Knockouts are provided for 1-inch, 1-1/2 inch, or 2-inch conduits which provide ac power connection at one end of each cabinet lineup. Covers for the power duct should be stored until the ac wiring is completed.

Two methods are available for running the I/O cables from the I/O ducts to the cross-connect field. These methods are: (1) using an overhead cable rack or (2) using cable duct group 20 or a combination of both. Equipment room layout and expected growth determines which method is to be used. Installation of an overhead rack is covered by Document 800-614-157.

An overhead view of a typical cable duct assembly installation is shown in Figure 5.2 with callouts to various parts of the cable duct assembly. These callouts refer to drawings which provide the detailed assembly information.

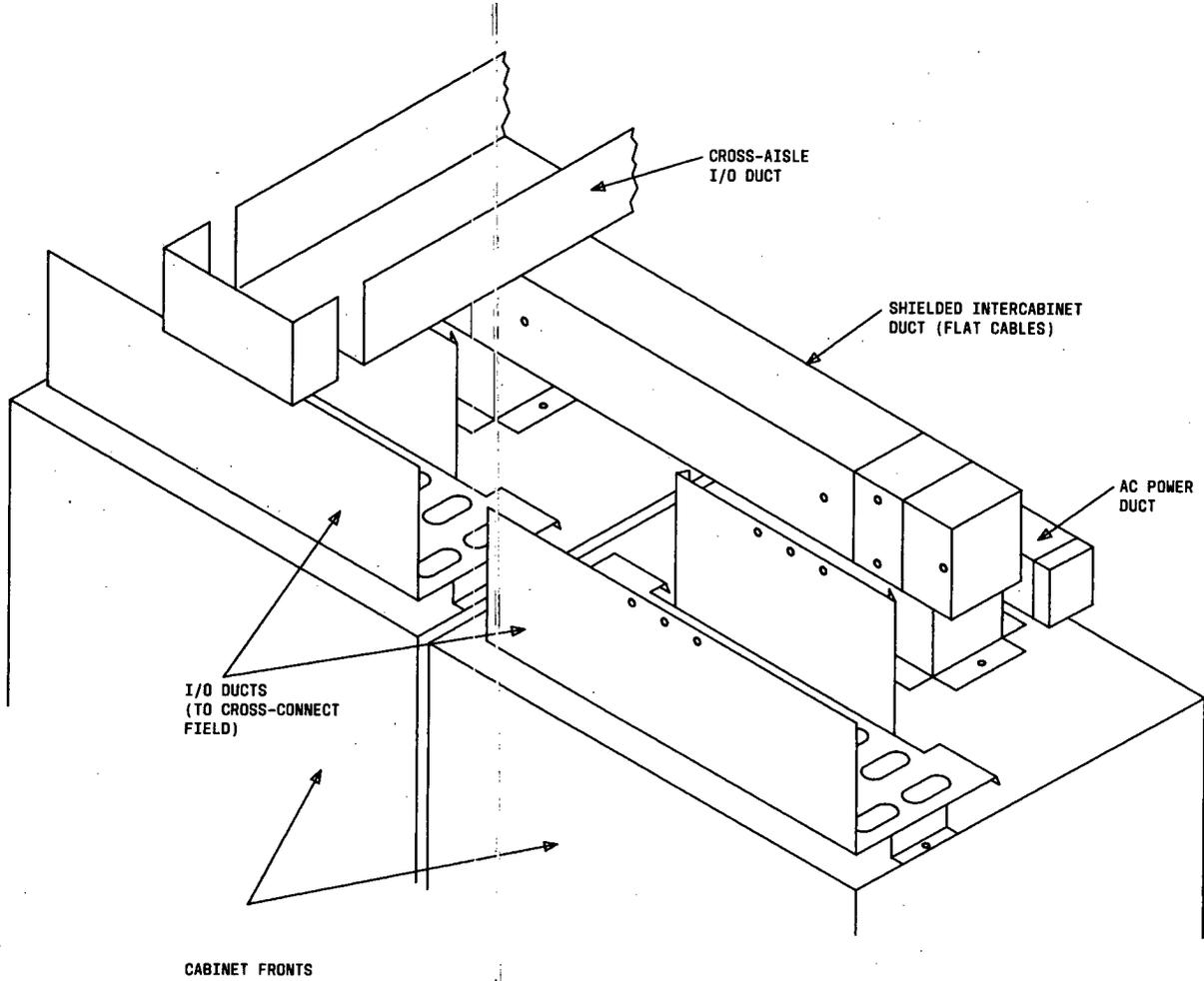


Figure 5.1 - Typical Assembled Duct Work

5.2 Installation

This duct work consists of components identified as group numbers on drawing ED-1E465. The group numbers shipped with the system are those called for in the Customer System Document and System Floor Plan layout.

Inventory the materials received and mark a copy of the floor plan with the location of each group number to be installed. Hardware used to assemble each item is packaged with the individual groups and should not be misplaced.

Table A shows the available group numbers and a brief description of each group. Some ducts are equipped with covers which should be stored until all cabling is completed. When storing, tag the covers with their associated group numbers for ease in identification.

TABLE A
ED-1E465 GROUP NUMBERS

GROUP	DESCRIPTION
1	Basic hardware for one cabinet
2	Right or left end plate for shielded ductwork
4	Front end plate for shielded ductwork
5	Rear end plate for shielded ductwork
6	Rear or front end plate for I/O ductwork
8	I/O cable rack coupling to rear of cabinet
9	I/O cable rack riser to side of cabinet
10	I/O cross-aisle ductwork
11	Shielded cross-aisle ductwork
12	AC power duct
13	AC power duct with one 3-wire twist-lock receptacle (right side viewed from the rear)

TABLE A (Contd)
ED-1E465 GROUP NUMBERS

GROUP	DESCRIPTION
14	AC power duct with one 3-wire twist-lock receptacle (left side viewed from the rear)
15	AC power duct with two 3-wire twist-lock receptacles (right side)
16	AC power duct with four 3-wire twist-lock receptacles (left side)
17	Raceway cover
18	Raceway cover with utility outlet
19	AC power duct combination end
20	(MD) I/O cross aisle to wall
21	AC power duct with one 4-wire twist-lock receptacle (right side viewed from the rear)
22	I/O duct-side of Cabinet to Wall (43 in. aisle)
23	I/O duct-side of Cabinet to wall over one cabinet
24	I/O duct-side of cabinet to wall over two cabinets
25	I/O duct-side of cabinets to wall over three cabinets
26	I/O duct-Center rear of cabinet to wall (43 in. aisle)
27	Transition between older DIMENSION* System type cabinet and new System 85 cabinets for shielded cable ducts
28	Transition between older DIMENSION System type cabinet and new System 85 cabinets for I/O cables

* Registered trademark of AT&T.

TABLE A (Contd)
ED-1E465 GROUP NUMBERS

GROUP	DESCRIPTION
29	Shielded duct assembly transition from the front of an R1 cabinet to the rear of an R2 cabinet
30	I/O duct transition assembly for cross-aisle (R1 lineup to bridge an R2 lineup)
31	Shielded duct assembly transition from rear of R1 cabinet to front of R2 cabinet
32	AC power with a 4-wire twist-lock receptacle (left side viewed from the rear)
33	Ladder rack supported 86 or 88-1/2 inches from the floor
34	AC power duct with two 3-wire receptacle (250 volt) (right side)
35	AC power duct with one 3-wire receptacle (250 volt) (right side)

Install the various cable ducts in order shown in Table B. Refer to the figures for detailed information.

Figure 5.2 shows an overhead view of a typical installation of current production duct work. Callouts indicate other figures in this part which describe the group numbers and assembly procedures in detail.

WARNING

Place cardboard or equivalent in cable ducts to catch the metal filings from the self-threading screws to prevent damage to the cabinet circuitry or cables.

**TABLE B
INSTALLATION SEQUENCE**

STEP	GROUP	FIGURE 5.1 AND FIGURES	REMARKS
1	1	5.3	Install basic duct work on each cabinet.
2	11	5.4	Install cross-aisle shielded duct work.
3	10 or 20	5.5 5.6	Install I/O cross aisle or cabinet to wall cable trough.
	22-25	5.7	Install I/O cross aisle to wall trough duct.
4	8	5.8	Install I/O cable rack coupling to rear of cabinet
	or 9	or 5.9	or Install I/O cable rack riser to end of cabinet.
5	12-16, 21, 32, 34, and 35	5.10	Install ac power ducts.

STEP	GROUP	FIGURE 5.1 AND FIGURES	REMARKS
6	27	5.11	Install shielded cable ducts between System 85 (R2) and DIMENSION System 85 (R1).
7	28	5.12	Install I/O cable ducts between System 85 (R2) and DIMENSION System 85 (R1).
8	29 and 31	5.13	Install shielded duct assembly from front of R1 cabinet to rear of R2 cabinet (Grp 29) or front of R2 cabinet to rear of R1 cabinet (Grp 31).
9	30	5.14	I/O transition assembly for cross aisle (R1 to R2).
10	33	5.15	Ladder rack supported 86 or 88-1/2 inches from the floor.

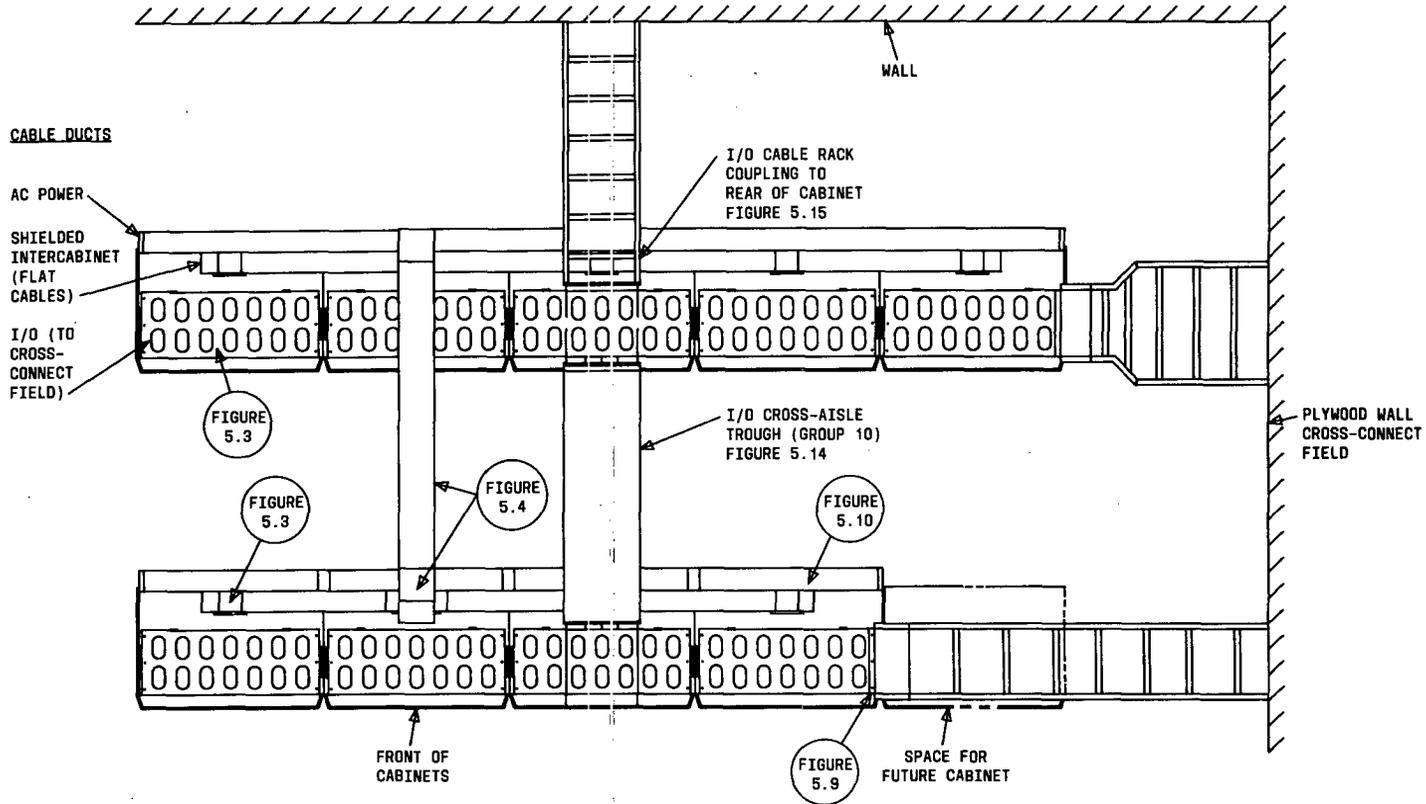
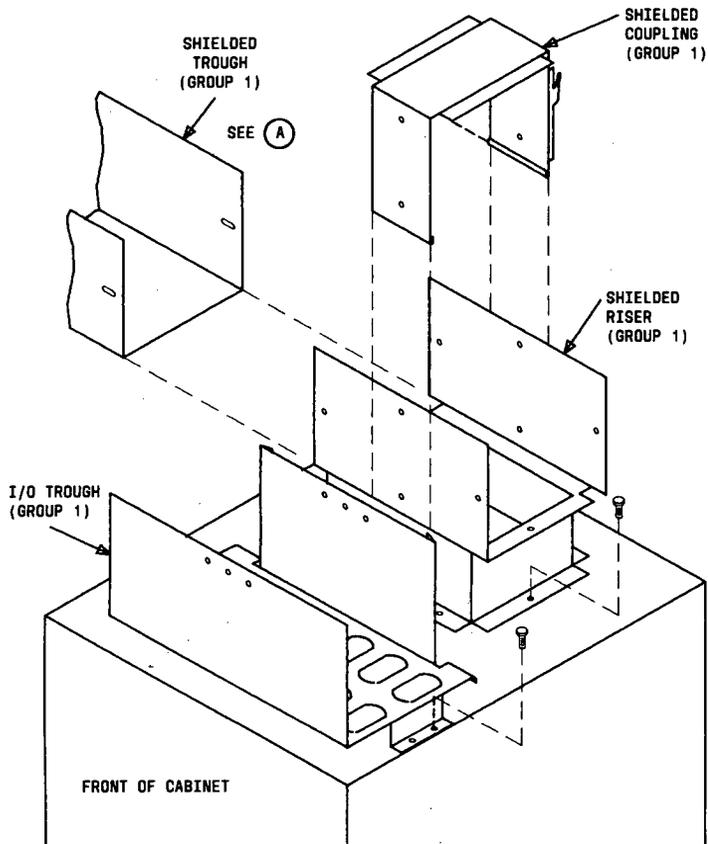


Figure 5.2 - Overhead View of A Typical Duct Work Installation
(Current Version ED-1E465)



NOTE:
STORE ALL COVERS AND END PLATES UNTIL
WIRING AND CABLING IS COMPLETE.

ASSEMBLE IN FOLLOWING ORDER:

1. ATTACH SHIELDED RISER OVER CABLE EXIT HOLE ON CABINET USING 3/16-24 X 5/16" THREAD FORMING SCREWS.
2. INSTALL SHIELDED TROUGH BETWEEN TWO RISERS USING 3/16-24 X 5/16" THREAD FORMING SCREWS. SEE FLYSKETCH (A)
3. REPEAT STEP 2 FOR EACH SHIELDED TROUGH.
4. INSTALL I/O TROUGH TO CABINET IN FRONT OF RISER USING THREAD FORMING SCREWS.
5. REPEAT STEPS 1 AND 2 FOR EACH CABINET TO BE EQUIPPED WITH BASIC HARDWARE.
6. ON EACH CABINET, EXCEPT FOR CABINETS TO WHICH THE CROSS-AISLE SHIELDED DUCT WILL BE INSTALLED, INSTALL A SHIELDED COUPLING ON THE RISER. SECURE USING 3/16-24 X 5/16" THREAD FORMING SCREWS.

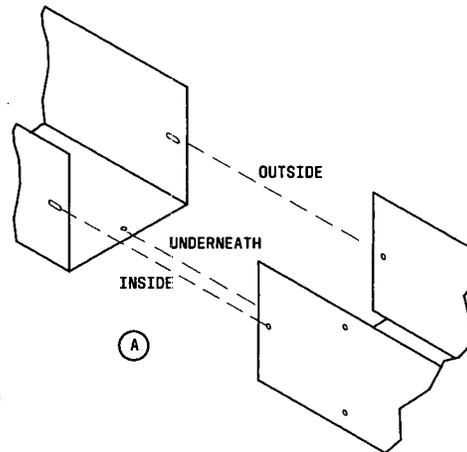
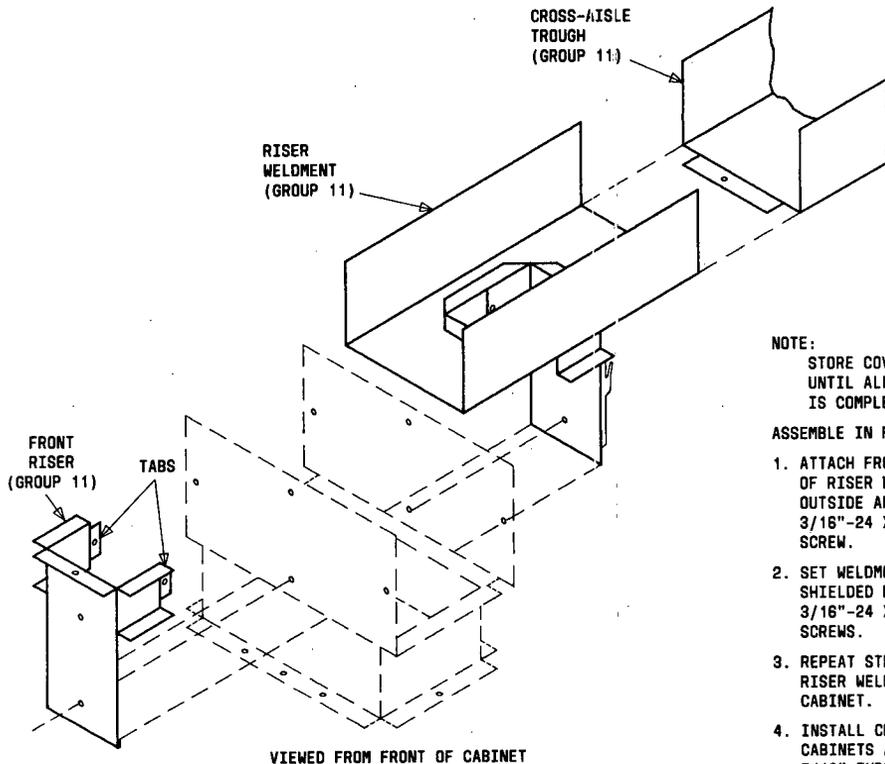


Figure 5.3 - Installation of Basic Duct Work for One Cabinet (Group 1)



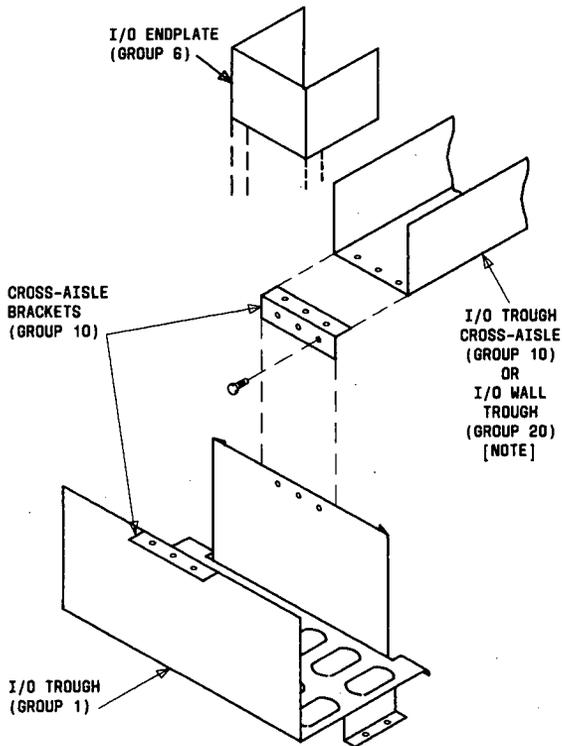
NOTE:

STORE COVERS AND END PLATES UNTIL ALL WIRING AND CABLING IS COMPLETE.

ASSEMBLE IN FOLLOWING ORDER:

1. ATTACH FRONT RISER TO UNDERSIDE OF RISER WELDMENT WITH TABS OUTSIDE AND SECURE USING 3/16"-24 X 5/16" THREAD FORMING SCREW.
2. SET WELDMENT ASSEMBLY DOWN OVER SHIELDED RISER AND SECURE USING 3/16"-24 X 5/16" THREAD FORMING SCREWS.
3. REPEAT STEPS 1 AND 2 TO ATTACH RISER WELDMENT TO CROSS-AISLE CABINET.
4. INSTALL CROSS-AISLE TROUGH BETWEEN CABINETS AND SECURE USING 3/16"-24 X 5/16" THREAD FORMING SCREWS.

Figure 5.4 - Installation of Cross-Aisle Shielded Duct Work (Group 11)



VIEWED FROM FRONT OF CABINET

**Figure 5.5 – Installation of Cross-Aisle I/O Duct Work
(Group 10) or I/O Cross-Aisle to Wall
Trough (Group 20) Using Group 10 Angle Braces**

NOTE:

IF WALL TROUGH IS BEING INSTALLED,
LOCALLY PROVIDED HARDWARE IS REQUIRED
AT WALL END OF DUCT.

ASSEMBLE IN FOLLOWING ORDER:

1. IF REQUIRED, ATTACH I/O ENDPLATE (GROUP 6) TO THE CROSS-AISLE BRACKETS (GROUP 10).
2. INSTALL A CROSS-AISLE BRACKET ON BOTH SIDES OF THE I/O TROUGH WHERE CROSS-AISLE OR WALL TROUGH IS TO BE USED. PLACE THE BRACKET INSIDE THE I/O TROUGH WITH ITS ANGLE END OUTSIDE. SECURE USING THREE THREAD FORMING SCREWS IN EACH.
3. IF CROSS-AISLE, INSTALL BRACKETS ON I/O TROUGH OF CROSS-AISLE CABINET.
4. PLACE I/O CROSS-AISLE TROUGH (GROUP 10) OR I/O WALL TROUGH (GROUP 20) ON BRACKETS AND SECURE WITH THREAD FORMING SCREWS.

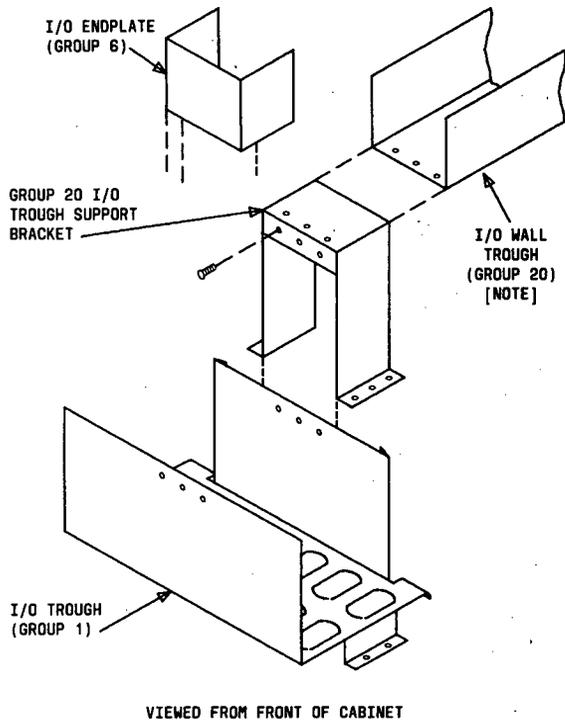


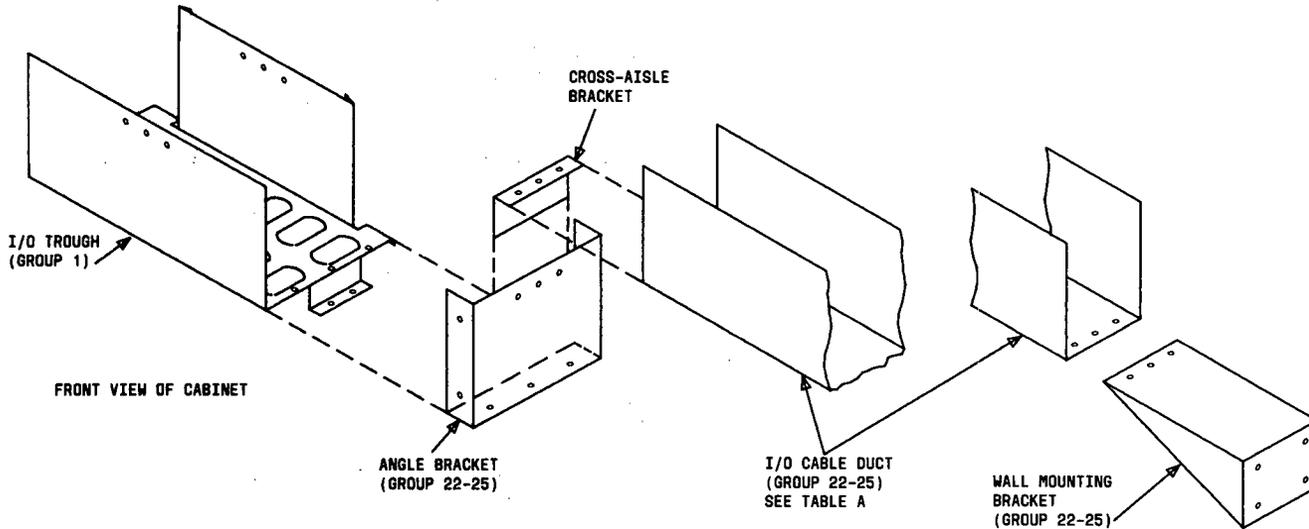
Figure 5.6 – Installation of I/O Cross-Aisle to Wall Trough (Group 20) Using Group 20 I/O Trough Support.

NOTE:

IF WALL TROUGH IS BEING INSTALLED, LOCALLY PROVIDED HARDWARE IS REQUIRED AT THE WALL END OF DUCT.

ASSEMBLE IN THE FOLLOWING ORDER:

1. INSTALL AN I/O TROUGH SUPPORT BRACKET ON BOTH SIDES OF THE I/O TROUGH WHERE THE WALL TROUGH IS TO BE USED. SECURE TO THE CABINET AND THE I/O TROUGH WITH THE THREAD FORMING SCREWS.
2. IF REQUIRED, ATTACH THE I/O ENDPLATE (GROUP 6) TO THE I/O TROUGH SUPPORT BRACKET.
3. PLACE I/O WALL TROUGH (GROUP 20) ON BRACKETS AND SECURE WITH THREAD FORMING SCREWS.



ASSEMBLE IN THE FOLLOWING ORDER:

1. INSTALL WALL MOUNTING BRACKET TO DESIGNATED LOCATION. HARDWARE TO MOUNT BRACKET SHOULD BE DETERMINED ACCORDING TO WALL TYPE AND SHOULD BE LOCALLY PROVIDED.
2. ATTACH ANGLE BRACKET TO I/O TROUGH USING THREAD FORMING SCREWS.
3. ATTACH CROSS-AISLE BRACKET TO ANGLE BRACKET USING NO. 10-24 X 3/4" SCREWS, NUTS AND WASHERS.
4. ATTACH THE I/O CABLE DUCT TO THE CROSS-AISLE BRACKET USING THE THREAD FORMING SCREWS. ATTACH THE OTHER END OF THE I/O DUCT TO THE WALL MOUNTING USING NO. 10-24 X 3/4" SCREWS, NUTS AND WASHERS.

Figure 5.7 – Installation of I/O Cross-Aisle to Wall Trough (Group 22-25)

NOTE: CABLE RACK AND COUPLING PLATES ARE
LOCALLY ENGINEERED AND PROVIDED.

ASSEMBLE IN FOLLOWING ORDER AS REQUIRED:

1. ATTACH I/O TROUGH TO TOP OF CABINET
USING THREAD FORMING SCREWS.
2. ATTACH CROSS-AISLE BRACKET TO I/O TROUGH
USING THREAD FORMING SCREWS.
3. ATTACH I/O COUPLING TROUGH TO CROSS-AISLE
BRACKET USING THREAD FORMING SCREWS.
4. ATTACH CABLE RACK TO COUPLING TROUGH USING
COUPLING PLATES AND $3/8"$ - $18 \times 1/2"$
HEX HEAD BOLTS WITH NUTS.
5. ATTACH OTHER END OF CABLE RACK TO WALL
USING LOCALLY PROVIDED HARDWARE SUITABLE
TO TYPE OF WALL.

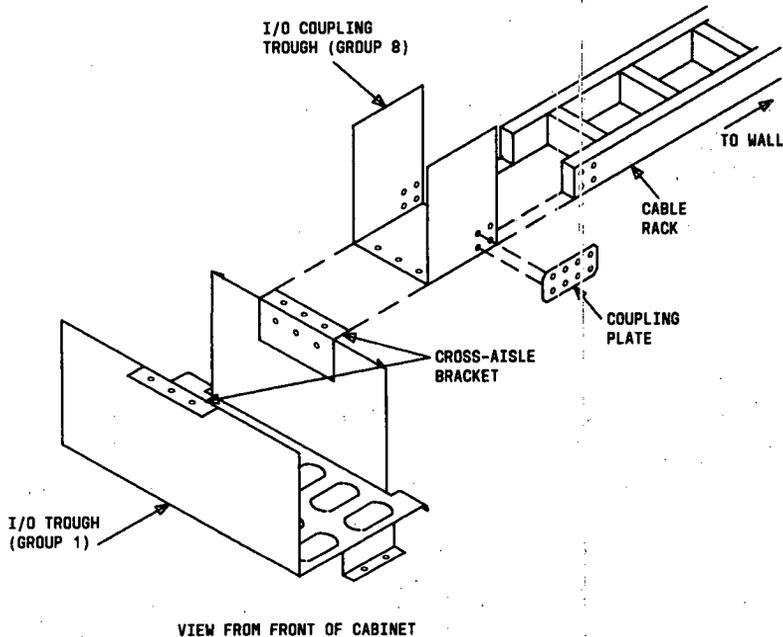


Figure 5.8 - Installing I/O Cable Rack Coupling
to Rear of Cabinet (Group 8)

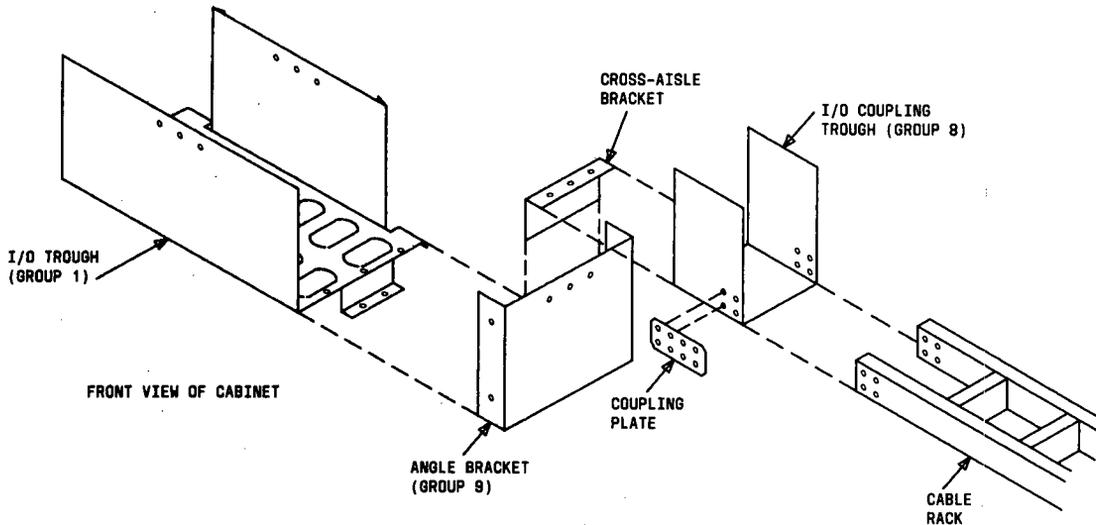
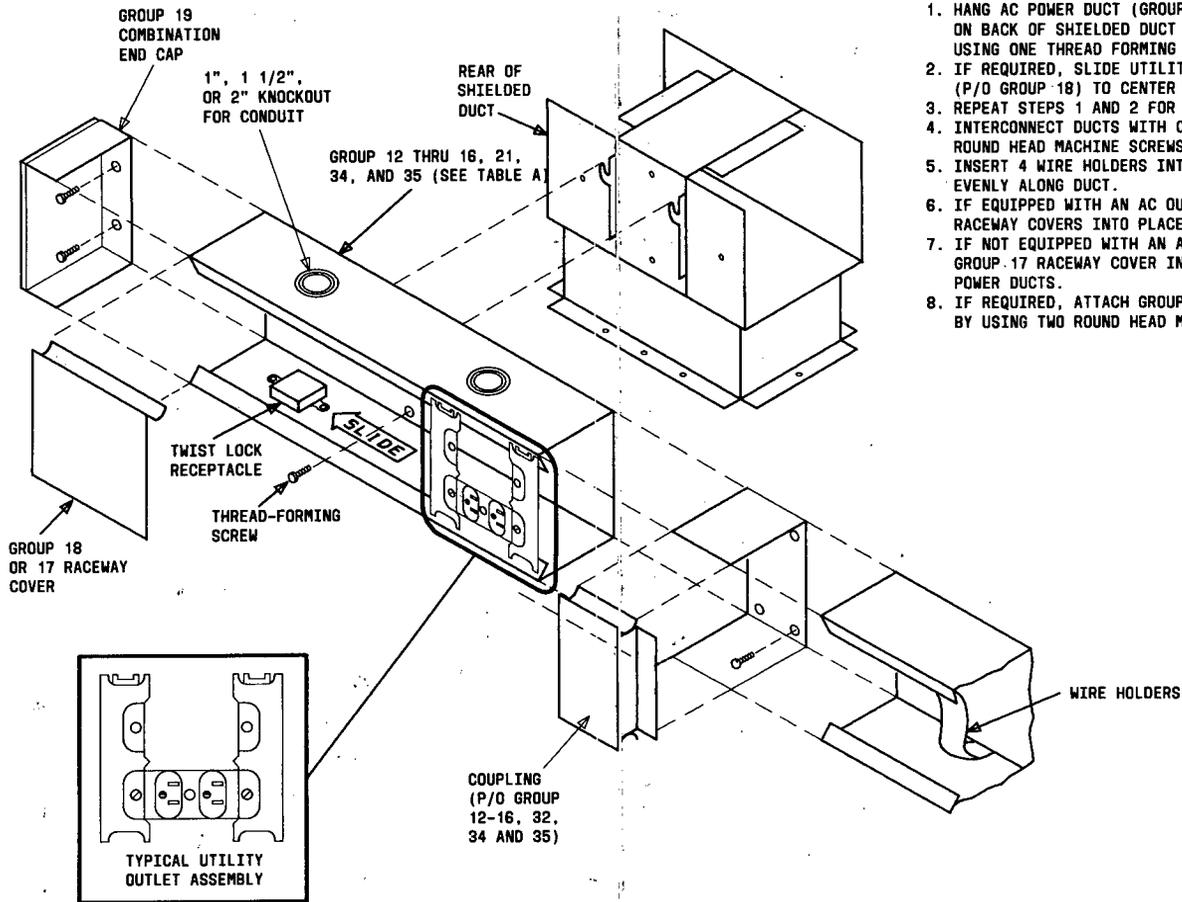


Figure 5.9 – Installing I/O Cable Rack Riser to End of Cabinet (Group 9)

NOTE: CABLE RACK AND COUPLING PLATE SHOULD BE LOCALLY ENGINEERED AND PROVIDED. ASSEMBLE IN FOLLOWING ORDER:

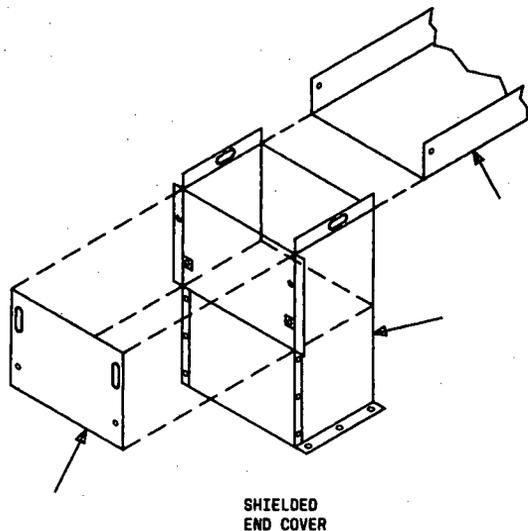
1. ATTACH ANGLE BRACKET (GROUP 9) TO I/O TROUGH USING THREAD FORMING SCREWS.
2. ATTACH CROSS-AISLE BRACKET TO ANGLE BRACKET USING THREAD FORMING SCREWS.
3. ATTACH I/O COUPLING TROUGH (GROUP 8) TO CROSS-AISLE BRACKET USING THREAD FORMING SCREWS.
4. ATTACH CABLE RACK TO COUPLING TROUGH USING COUPLING PLATES AND 3/8" - 18 X 1/2" HEX BOLTS AND NUTS.
5. ATTACH OTHER END OF CABLE RACK TO WALL USING LOCALLY PROVIDED HARDWARE SUITABLE TO TYPE OF WALL.



ASSEMBLE IN THE FOLLOWING ORDER:

1. HANG AC POWER DUCT (GROUP 12 THROUGH 16 AND 21) ON BACK OF SHIELDED DUCT AND ANCHOR IN PLACE USING ONE THREAD FORMING SCREW AT EACH CABINET.
2. IF REQUIRED, SLIDE UTILITY OUTLET ASSEMBLY (P/O GROUP 18) TO CENTER OF DUCT FROM THE END.
3. REPEAT STEPS 1 AND 2 FOR EACH CABINET.
4. INTERCONNECT DUCTS WITH COUPLINGS USING FOUR ROUND HEAD MACHINE SCREWS.
5. INSERT 4 WIRE HOLDERS INTO EACH DUCT SPACED EVENLY ALONG DUCT.
6. IF EQUIPPED WITH AN AC OUTLET, SNAP TWO GROUP 18 RACEWAY COVERS INTO PLACE ONTO THE AC POWER DUCTS.
7. IF NOT EQUIPPED WITH AN AC OUTLET, SNAP A GROUP 17 RACEWAY COVER INTO PLACE ONTO THE AC POWER DUCTS.
8. IF REQUIRED, ATTACH GROUP 19 (COMBINATION END CAP) BY USING TWO ROUND HEAD MACHINES SCREWS.

Figure 5.10 - Installing AC Power Duct



SHIELDED
DUCT

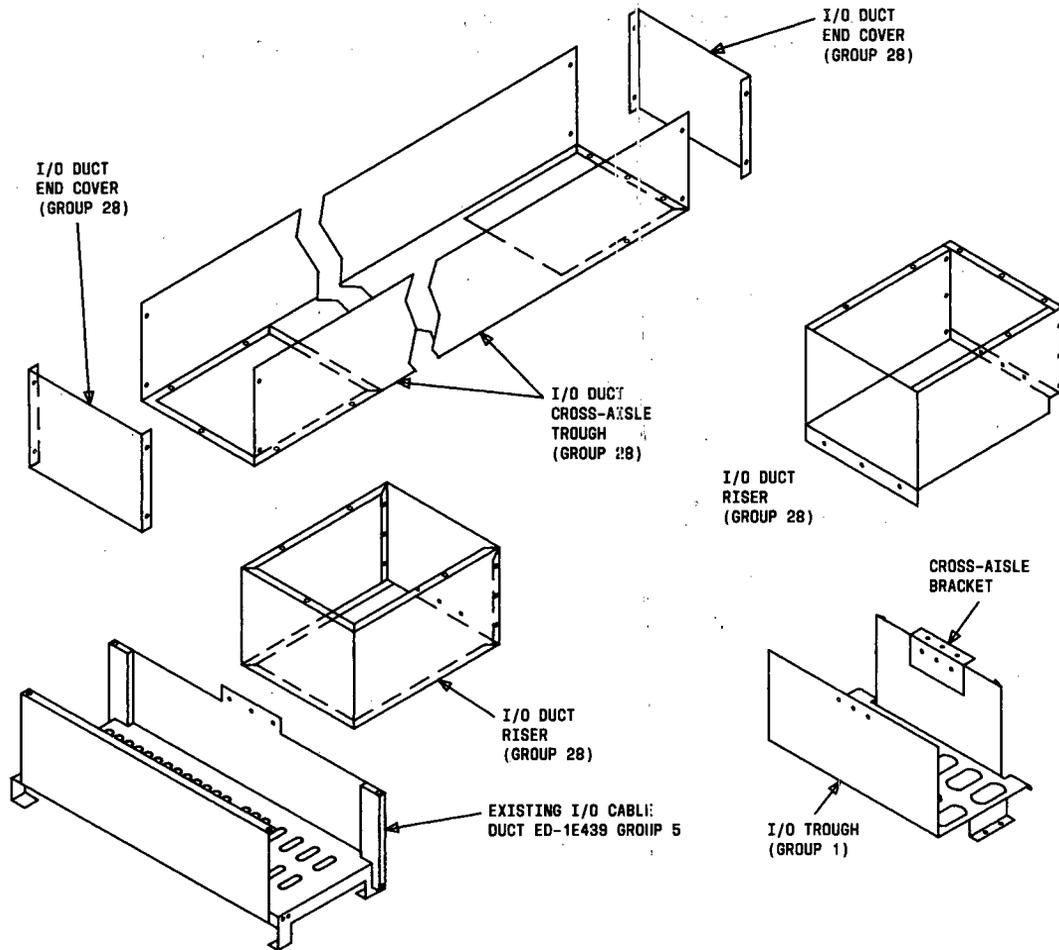
RISER
ASSEMBLY

SHIELDED
END COVER

ASSEMBLE IN THE FOLLOWING ORDER:

1. ATTACH SHIELDED RISER ASSEMBLY TO TOP OF CABINET USING 3/16"-24 X 5/16" THREAD FORMING SCREWS.
2. PLACE ONE END OF THE SHIELDED CABLE DUCT IN THE SHIELDED RISER ASSEMBLY AND THE END IN THE EXISTING DUCTWORK ON THE "DIMENSION" SYSTEM 85 R1 SYSTEM.
3. SECURE THE SHIELDED CABLE DUCT AT BOTH ENDS USING 3/16"-24 X 5/16" THREAD FORMING SCREWS.
4. SHIELDED END COVER AND SHIELDED DUCT COVER SHOULD BE STORED UNTIL CABLE INSTALLATION IS COMPLETED. END COVER IS THEN MOUNTED USING 3/16"-24 X 5/16" THREAD FORMING SCREWS. TROUGH COVER IS MOUNTED USING 3/16"-24 X 5/16" THREAD FORMING SCREWS AT SYSTEM 85 R2 END AND #0.10-24 X 3/4" SCREWS AT "DIMENSION" SYSTEM 85 R1 END.

**FIGURE 5.11 - Ducts for Transition Between System 85
Duct Work and DIMENSION System 85 Duct Work.**



ASSEMBLE IN THE FOLLOWING ORDER AS REQUIRED:

1. AT THE SYSTEM 85 (R2), ATTACH CROSS-AISLE BRACKET (GROUP 9) TO THE I/O TROUGH (GROUP 9) USING 3/16" THREAD FORMING SCREWS.
2. ATTACH I/O DUCT RISER (GROUP 28) TO THE CROSS-AISLE BRACKET AND I/O TROUGH USING 3/16" THREAD FORMING SCREWS.
3. AT "DIMENSION" SYSTEM 85 (R1), ATTACH I/O DUCT RISER (GROUP 28) TO EXISTING I/O CABLE DUCT (GROUP 5 ED-1E439) USING 3/16" THREAD FORMING SCREWS AND NO. 10-24 X 3/4" SCREWS, NUTS AND WASHERS.
4. AT BOTH ENDS, ATTACH I/O CROSS-AISLE TROUGH (GROUP 28) TO TWO PREVIOUSLY INSTALLED RISERS USING 3/16" THREAD FORMING SCREWS.
5. ATTACH I/O DUCT END COVERS (GROUP 28) TO BOTH ENDS OF CROSS-AISLE DUCT USING 3/16" THREAD FORMING SCREWS.

FIGURE 5.12 - I/O Cable Ducts for Transition Between System 85 (R2) and DIMENSION System 85 (R1)

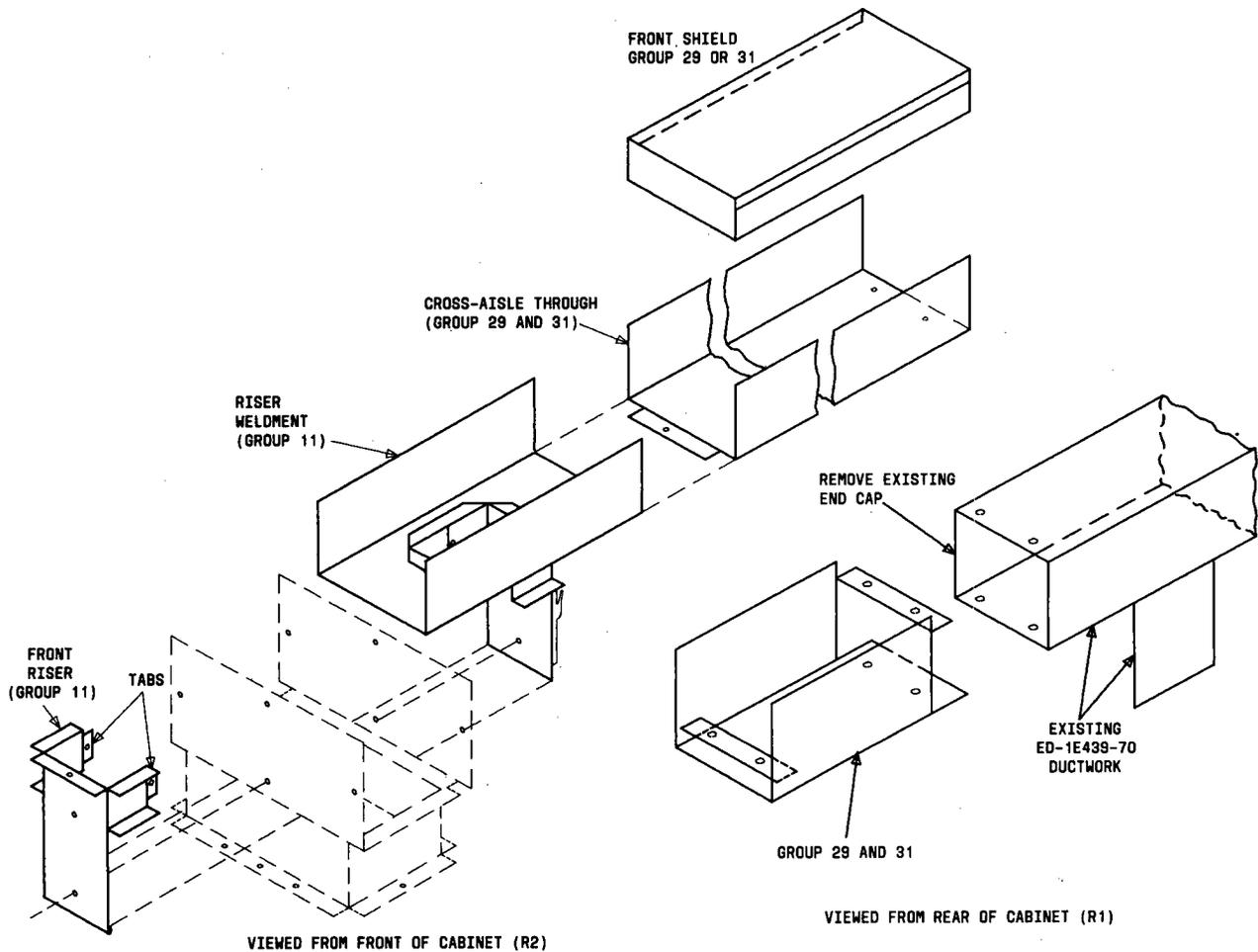
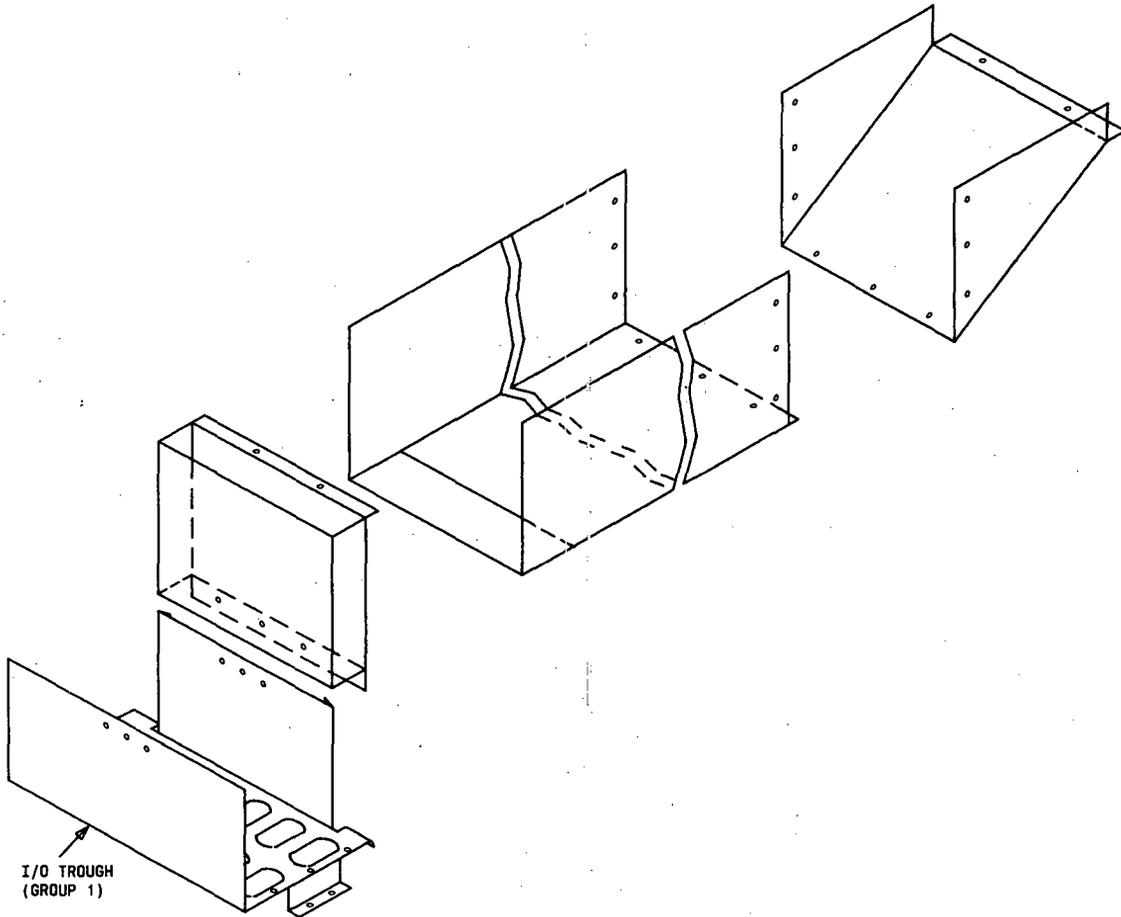


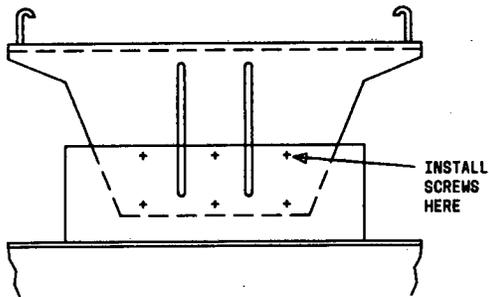
FIGURE 5.13 - Shield Transition Duct Work from System 85 (R2 or R3) to DIMENSION System 85 (R1)



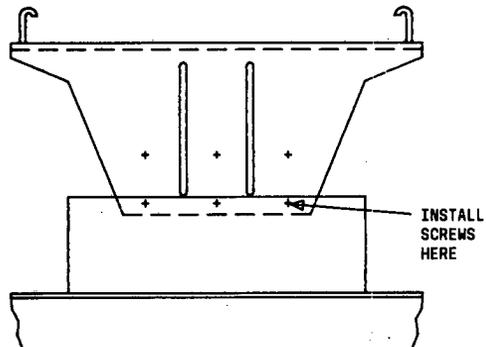
I/O TROUGH
(GROUP 1)

VIEWED FROM FRONT OF CABINET

FIGURE 5.14 - I/O Dust Transition Assembly for Cross-Aisle CR1 Lineup to Bridge an R2 Lineup (GRP 30)

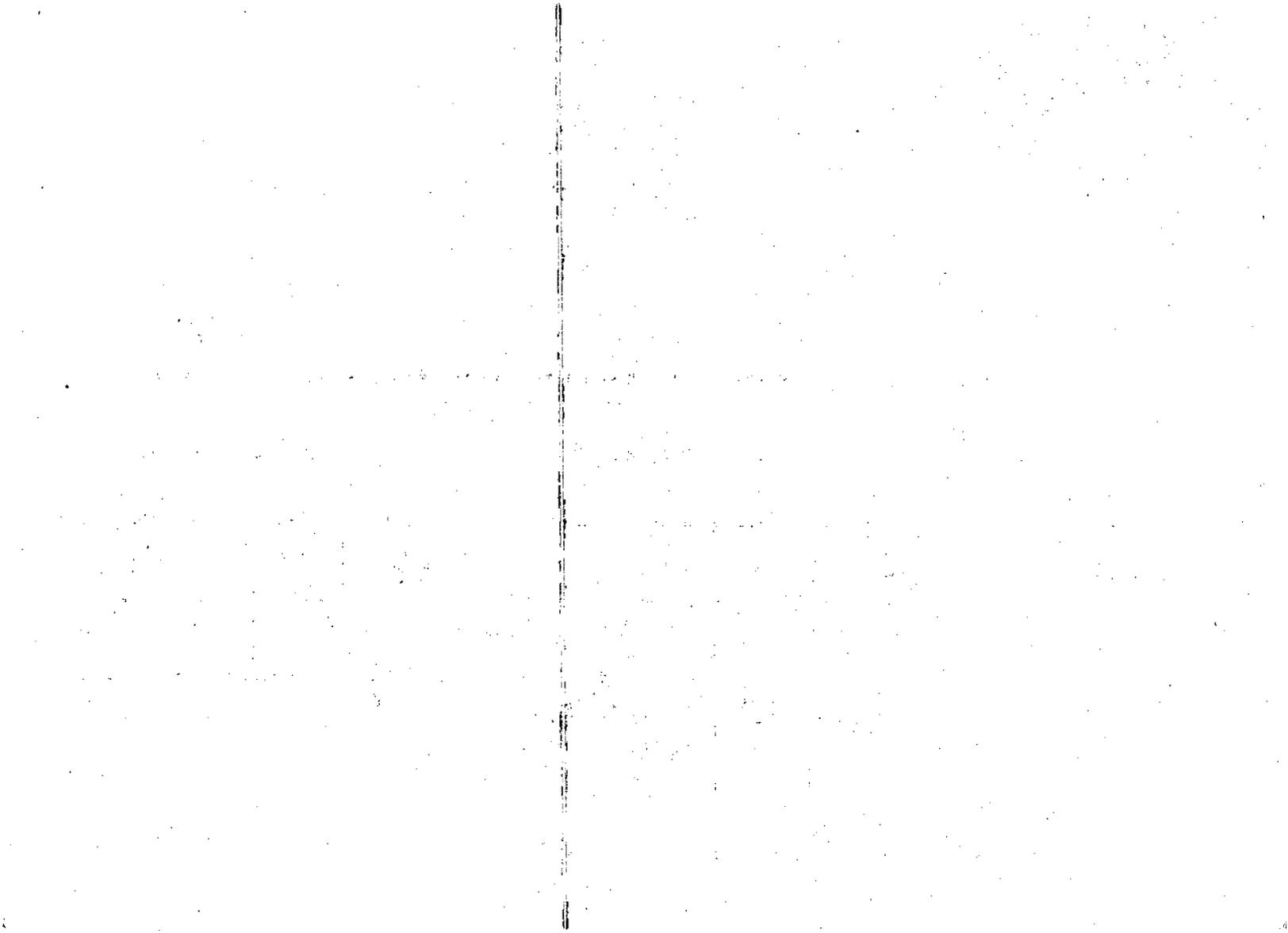


FOR 86-INCH LADDER HEIGHT



FOR 88-1/2 INCH LADDER HEIGHT

FIGURE 5.15 - Ladder Rack Supported 86 or 88-1/2 Inches From Floor (GRP 33)



**PART 6. AC POWER DISTRIBUTION FOR SYSTEM WITHOUT
EXTENDED HOLDOVER POWER RESERVE**

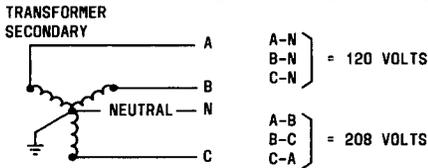
Contents

General 6.1
Requirements 6.2

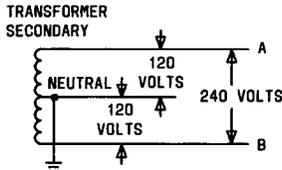
6.1 General

6.1.1 The ac service to the system provides 120-volt and 208-volt rms, 60-Hz power from a 3-phase, 4-wire, grounded wye configuration (A. below), or 120-volt and 240-volt rms, 60-Hz power from a single-phase, 3-wire configuration (B. below). These two wiring configurations are for International Telephone and Telegraph Consultative Committee (CCITT), North American (60-Hz) Standard Feature Applications.

A. Three-phase, 4-wire, grounded wye configuration:



B. Single-phase, 3-wire configuration:



6.2 Requirements

6.2.1 The system is powered by a dedicated ac power distribution system consisting of the following:

- (a) nonfusible disconnect switch
- (b) ac protector cabinet with a single point ground terminal
- (c) ac load center equipped with appropriate circuit breakers
- (d) ac duct assembly installed on top rear of cabinets
- (e) associated cabling
- (f) receptacles

Power flows from the disconnect switch to the ac protector cabinet, then to the ac load center where it branches to receptacles located on the ac duct assembly.

6.2.2 The nonfusible disconnect switch provides a means to remove ac power from the system. If 3-phase power is used, the disconnect switch will be a 3-pole type. If single-phase power is used, the disconnect switch can be either a double-pole type or a 3-pole type. If a 3-pole type is used, one pole (phase C) will have no connection.

6.2.3 The ac protector cabinet supplies the following:

- (a) lightning arresters
- (b) fuses and alarm relays
- (c) alarm lamps
- (d) single-point ground terminal

The lightning arresters protect against power surges. If the arrester fails (becomes short circuited), an associated fuse opens and a relay releases. The released relay operates an alarm light on the ac protector cabinet and signals the common control. The single-point ground terminal provides the connection for the approved ground and other system grounds. Connection to this terminal is covered in Part 7 of this manual.

6.2.4 The ac load center provides the ac power distribution and over-current protection. Each module requires two 20-ampere, double-pole circuit breakers and a number of 20-ampere, single-pole circuit breakers. The quantity of single-pole circuit breakers is dependent on the number of auxiliary cabinets and other peripheral equipment. A single-pole, 20-ampere circuit breaker is always required for each Applications Processor (AP) cabinet, each Station Message Detail Recording (SMDR) cabinet, each auxiliary cabinet and the utility feeder. Two single-pole, 20-ampere circuit breakers are required for each duplicated common control and time multiplexed switch (TMS) cabinet.

In some systems, module control, unduplicated common controls and port cabinets may be equipped with bulk OLS power supplies. The number of circuit breakers and feeders required by these cabinets is dependent upon the number of equipped DS-1 carriers the cabinets contains. If two or more equipped DS-1 carriers in a cabinet, two power supplies are required; thus two circuit breakers and feeders are required. It is recommended that for the

sake of growth and simpler cabinet ac distribution that all feeders to these cabinets have two circuit breakers.

6.2.5 The ac load center distributes power through cables that run in conduit from the load center to the ac duct assembly on the top rear of the cabinets. Receptacles are provided in this duct assembly which provide connection to the cabinet ac distribution units. Utility receptacles are also provided for craft use.

6.2.6 If an AP cabinet is in the lineup of system switch cabinets, the 120-volt ac power for the AP must be supplied from the same ac source as the switch cabinets.

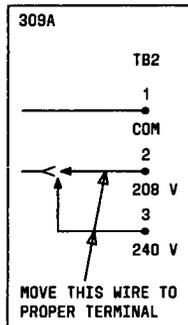
6.2.7 If the auxiliary cabinet is equipped with a PEC 3947 power unit, refer to the top of the unit for 50-Hz and 60-Hz strapping options.

6.2.8 The 309A/310A power units contained in the module control cabinet and port cabinet can operate with either 208- or 240-volt ac input. An option panel on the 309A power unit is provided with taps that are used to match the input voltage.

6.2.8.1 Access the 309A input voltage tap terminal strip by performing the following steps:

1. Set the **AC INPUT** circuit breaker to **OFF**.
2. Disconnect the ac power cord.
3. Remove the top two screws of the front panel.
4. Lower the hinged top half of the front panel.

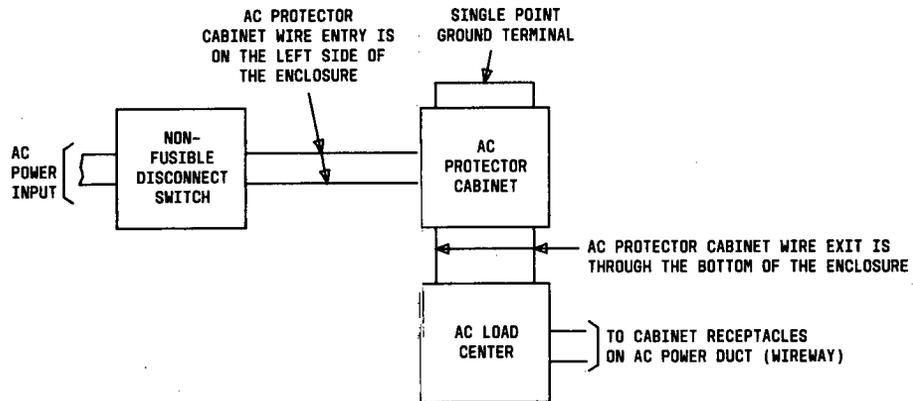
6.2.8.2 At TB2, connect the wire to the proper terminal.



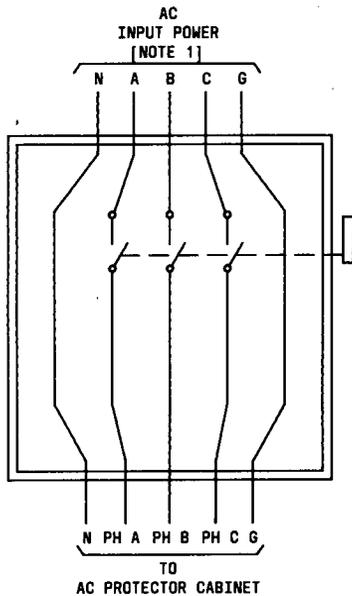
6.2.8.3 Close up and restore the 309A to service.

1. Close the hinged top half of the front panel.
2. Replace the top two screws of the front panel.
3. Reconnect the ac power cord.
4. Set the **AC INPUT** circuit breaker to **ON**.

6.2.9 Power distribution - block diagram



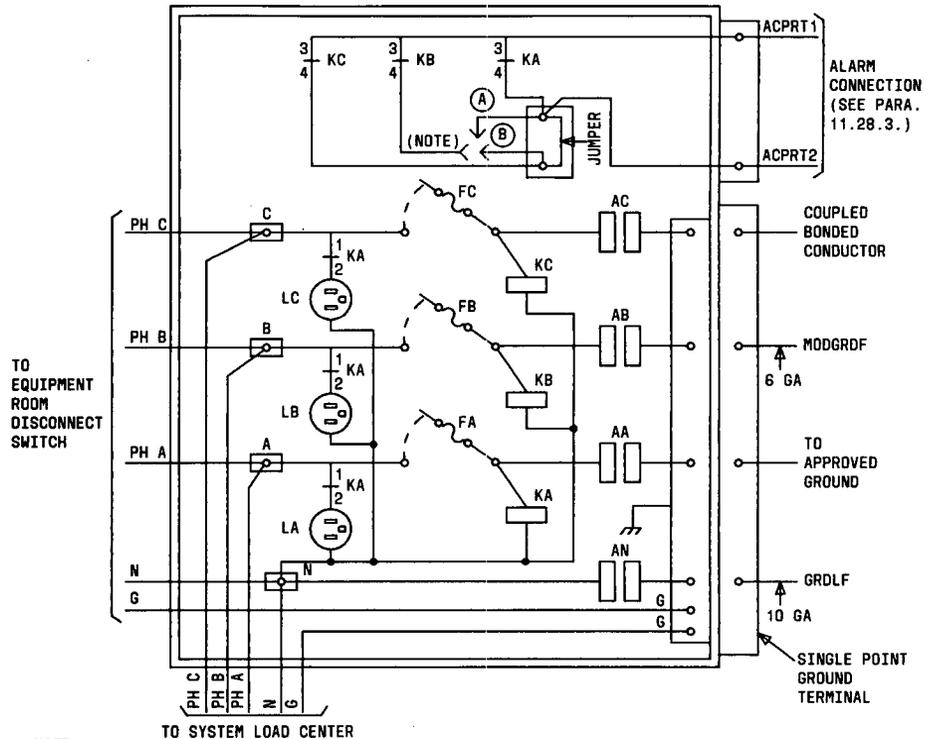
6.2.10 Nonfusible disconnect switch connections



NOTE:

1. WHEN SYSTEM IS ARRANGED FOR SINGLE-PHASE 120 AND 240, THE INPUT POWER SHALL ONLY BE CONNECTED TO PHASE A AND B. PHASE C WILL HAVE NO CONNECTION.

6.2.11 Typical ac protector cabinet connections



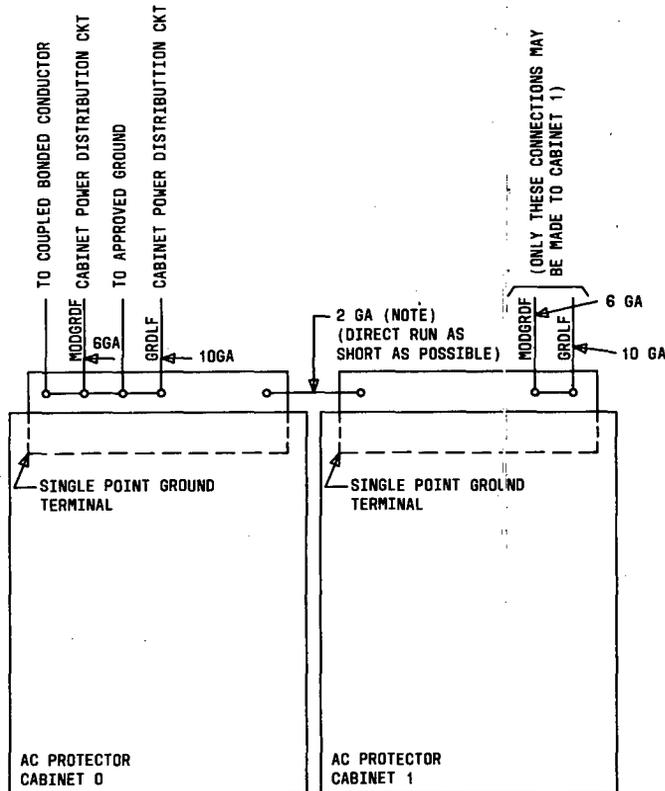
NOTE:

WHEN THE SYSTEM IS ARRANGED FOR SINGLE-PHASE, 60-HZ POWER, UNITS ARE WIRED PER ARRANGEMENT (A). DISCONNECT RELAY KC, BY REMOVING THE JUMPER (STRAP) BETWEEN THE TWO TERMINALS OF THE JUMPER TERMINAL STRIP OF THE AC PROTECTOR CABINET, JOSLYN PART NO. 1455-75. INPUT POWER SHALL ONLY BE CONNECTED TO PHASES A AND B. PHASE C WILL NOT HAVE A CONNECTION. WHEN THE SYSTEM IS ARRANGED FOR SINGLE-PHASE, 50-HZ POWER, UNITS ARE WIRED PER ARRANGEMENT (B). DISCONNECT RELAYS KB AND KC. BY REMOVING THE JUMPER (STRAP) BETWEEN THE TWO TERMINALS OF THE JUMPER TERMINAL STRIP OF THE AC PROTECTOR CABINET, JOSLYN PART NO. 1455-75E. INPUT POWER SHALL ONLY BE CONNECTED TO PHASE A. PHASES B AND C WILL NOT HAVE A CONNECTION.

6.2.12 Two ac protector cabinet arrangement for larger systems

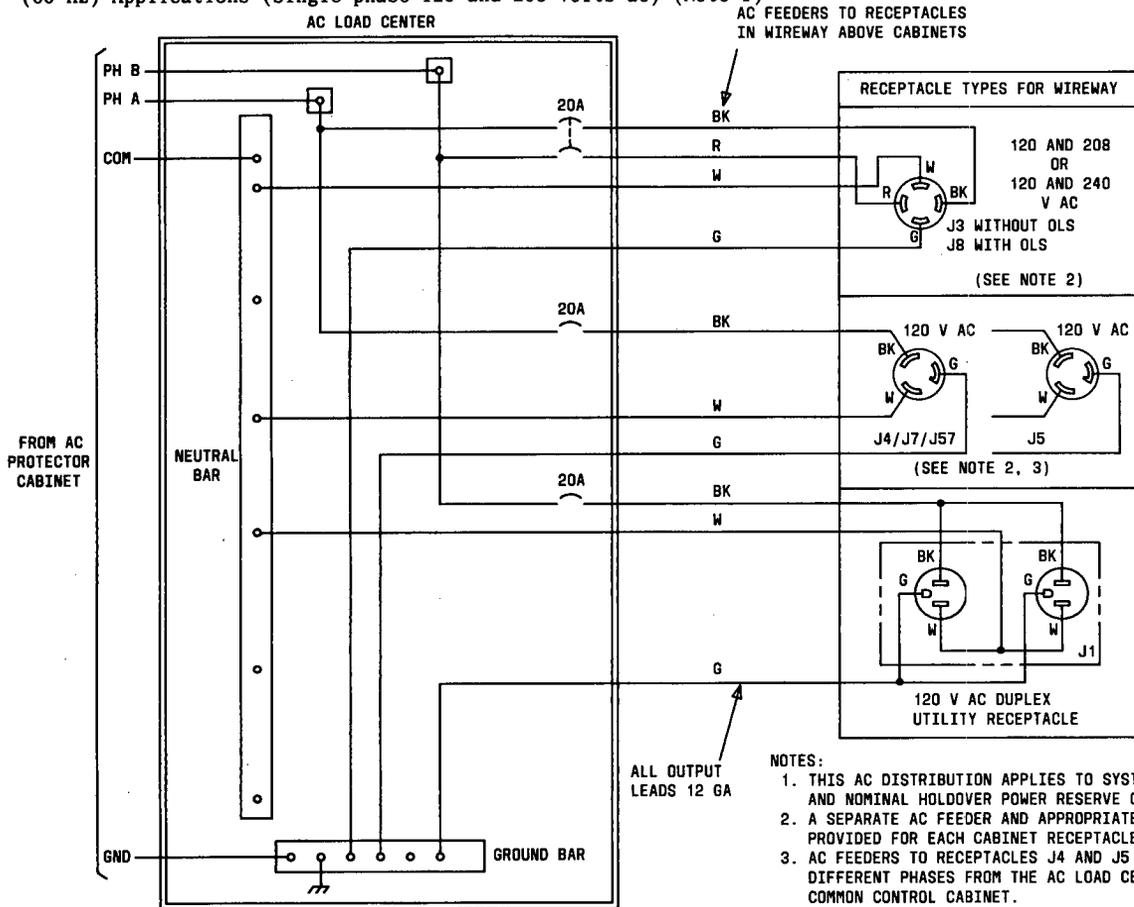
6.2.12.1 The second ac protector cabinet is required when a maximum of 11 modules is exceeded, or when the number of terminals (holes) available in the single point ground terminal of the first ac protector cabinet is inadequate, or when the total number of modules exceeds the 200 ampere rating of the ac protector cabinet, whichever comes first.

6.2.12.2 Mount ac protector cabinets side by side or as close as possible, but preferably not more than 3 feet apart.



NOTE:
TERMINATE BOTH ENDS WITH TYPE
ILSCO #SLS125 OR EQUIVALENT
SOLDERLESS TERMINAL LUGS AND
FASTEN TO THE SINGLE POINT GROUND
TERMINAL MOUNTING BAR BOLTS.

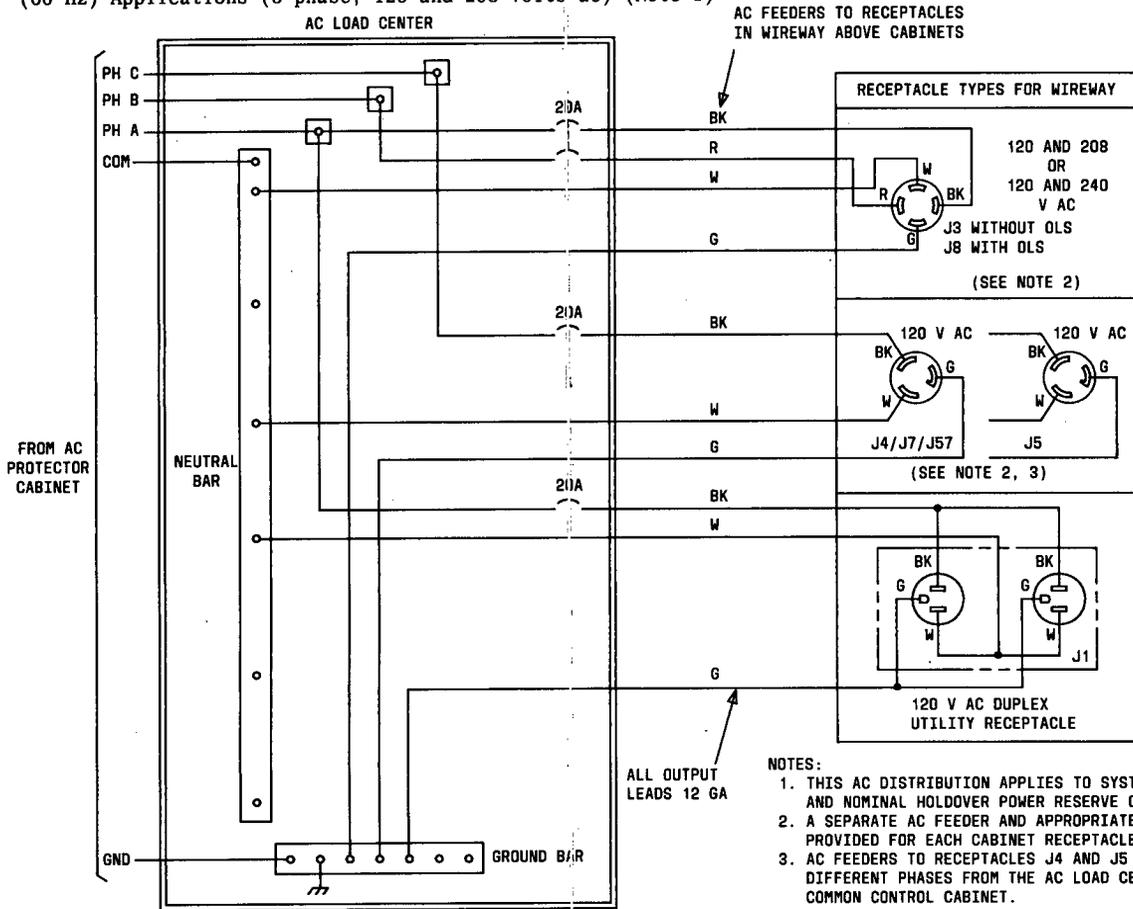
6.2.13 AC distribution load center connections for CCITT, North American
(60 Hz) Applications (Single-phase 120 and 208 volts ac) (Note 1)



NOTES:

1. THIS AC DISTRIBUTION APPLIES TO SYSTEMS WITH -48 V RECTIFIERS AND NOMINAL HOLDOVER POWER RESERVE ONLY.
2. A SEPARATE AC FEEDER AND APPROPRIATE CIRCUIT BREAKER SHALL BE PROVIDED FOR EACH CABINET RECEPTACLE REQUIRED FOR THE WIREWAY.
3. AC FEEDERS TO RECEPTACLES J4 AND J5 SHALL BE PROVIDED ON DIFFERENT PHASES FROM THE AC LOAD CENTER FOR THE DUPLICATED COMMON CONTROL CABINET.

6.2.14 AC distribution load center connections for CCITT, North American
(60 Hz) Applications (3-phase, 120 and 208 volts ac) (Note 1)



- NOTES:**
1. THIS AC DISTRIBUTION APPLIES TO SYSTEMS WITH -48 V RECTIFIERS AND NOMINAL HOLDOVER POWER RESERVE ONLY.
 2. A SEPARATE AC FEEDER AND APPROPRIATE CIRCUIT BREAKER SHALL BE PROVIDED FOR EACH CABINET RECEPTACLE REQUIRED FOR THE WIREWAY.
 3. AC FEEDERS TO RECEPTACLES J4 AND J5 SHALL BE PROVIDED ON DIFFERENT PHASES FROM THE AC LOAD CENTER FOR THE DUPLICATED COMMON CONTROL CABINET.

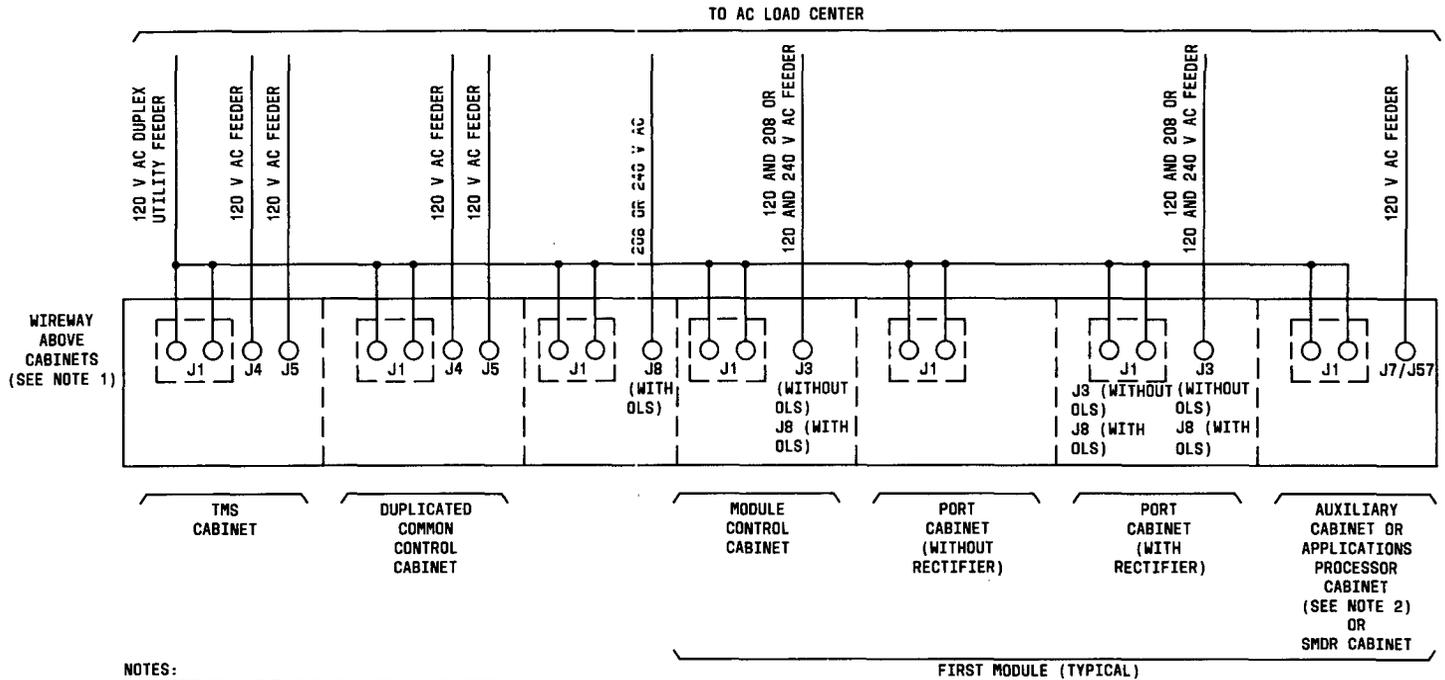
6.2.15 Type and number of receptacles required for the ac wireway at each cabinet

RECEPTACLE TYPES FOR WIREWAY		TMS	DUPLICATED COMMON CONTROL	UNDUPLICATED COMMON CONTROL	MODULE CONTROL	PORT WITHOUT RECTIFIER	PORT WITH RECTIFIER	AUX	AP	SMDR	
FROM AC LOAD CENTER				- (SEE NOTE 1) J8 (NOTE 6)	J3 (SEE NOTES 1, 2) J8 (NOTE 6)	- (SEE NOTES 2, 4)	J3 (SEE NOTE 4) J8 (NOTE 6)				
		J4, J5 (SEE NOTE 3)	J4, J5 (SEE NOTE 5)						J7	J57	J7
		J1	J1	J1	J1	J1	J1	J1	J1	J1	J1

NOTES:

- FOR SYSTEMS WITH UNDUPLICATED COMMON CONTROL, THE MODULE CONTROL CABINET PROVIDES -48 VOLT DC POWER FOR THE UNDUPLICATED COMMON CONTROL CABINET.
- FOR SYSTEMS WITH DUPLICATED COMMON CONTROL, THE MODULE CONTROL CABINET PROVIDES DC POWER FOR THE PORT CABINET WITHOUT RECTIFIER.
- AC FEEDERS AND RECEPTACLES J4 AND J5 FOR THE TMS CABINET ARE REQUIRED ONLY FOR MULTI-MODULE SYSTEMS.
- PORT CABINETS WITH RECTIFIERS ALSO PROVIDE DC POWER FOR AN ADJACENT PORT CABINET WITHOUT RECTIFIER.
- AC FEEDERS TO RECEPTACLES J4 AND J5 SHALL BE PROVIDED ON DIFFERENT PHASES FROM THE AC LOAD CENTER FOR THE DUPLICATED COMMON CONTROL CABINET.
- IF EQUIPPED WITH OLS.

6.2.16 AC power distribution for one module of a multimodule system



NOTES:

1. WIREWAY ABOVE CABINETS AS VIEWED FROM THE BACK OF THE CABINETS.
2. THE CABINET RECEPTACLE AND DUPLEX UTILITY RECEPTACLE FOR THE APPLICATIONS PROCESSOR CABINET ARE INTERCHANGED IN THE WIREWAY.

PART 7. GROUNDING - FOR SYSTEMS WITHOUT EXTENDED POWER RESERVE

CONTENTS

General	7.1
System Ground	7.2
Module Ground	7.3
Circuit Ground	7.4
TMS Ground	7.5
Lightning Ground	7.6
Coupled Bonding Conductor Grounding	7.7
Bonding Straps	7.8
Auxiliary Cabinet and AP Grounding	7.9
Grounding for System 85 colocated with a "DIMENSION*" PBX	7.10

7.1 General

7.1.1 The system uses a single point ground. The single point ground is a copper block at the ac protector cabinet. The first connection to the single point ground is the system ground which travels to the approved ground source. The module ground, lightning ground, and coupled bonding conductor also connect to the single point ground.

7.1.2 Spools of 6-gauge and 10-gauge wire are provided with the system for making ground connections.

WARNING

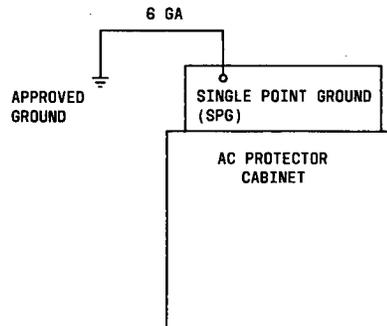
Any ground sources within reach of any portion of the system components not connected to the single point ground must be insulated or removed.

7.2 System Ground

7.2.1 The system ground is accomplished by connecting a 6-gauge copper wire from the single point ground block on the ac protector cabinet to an approved ground. Approved grounds as specified in Section 250-81 of the National Electric Code may consist of any of the following:

- Metallic cold water pipe that is continuous and electrically connected to the street side of the water meter
- Building steel that is bonded to water pipes and power source ground
- Ground electrode encased by at least 2 inches of concrete and in direct contact with the earth
- A ground ring that encircles a building and is at least 2-1/2 feet below the earth's surface.

7.2.2 System ground connection.

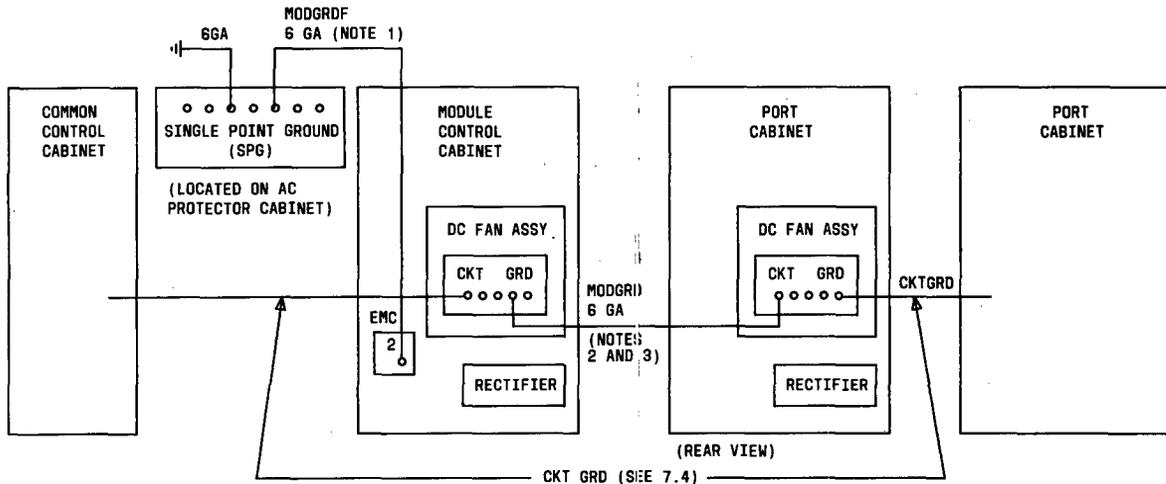


* Registered trademark of AT&T

7.3 Module Ground

7.3.1 The module ground is a 6-gauge wire connected from the single point ground to the EMC filter in the module control cabinet. The module ground goes through the filter to the cabinet's copper ground block through a factory installed lead. From this ground block, a 6-gauge wire is connected to the copper ground block in each cabinet containing a rectifier. In a multimodule system, each module must provide its own similar, but separate MODGRD connections from its associated module control cabinet.

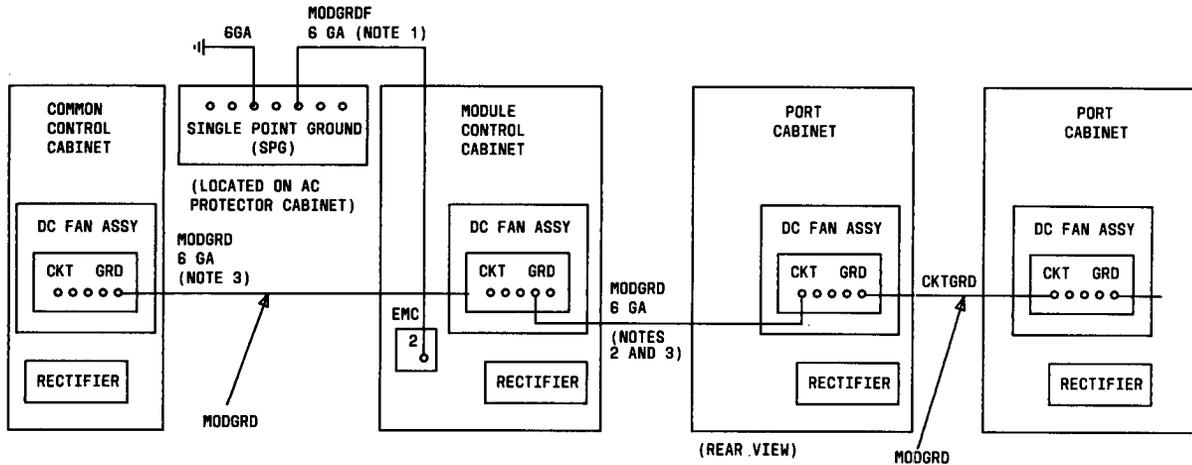
7.3.2 Module ground - unduplicated common control



NOTES:

1. THE MODGRD WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. IT RUNS UP THE REAR OF CABINET AND DRESSES INTO THE I/O DUCT CARRYING THE TIP AND RING CABLES AND SHOULD TAKE THE SHORTEST ROUTE TO THE SPG BLOCK.
2. IF PORT CABINETS IN THE SAME MODULE ARE PLACED CROSS AISLE FROM THE MODULE CONTROL CABINET, MODGRD IS CONNECTED FROM THE GROUND BLOCK IN THE MODULE CONTROL CABINET, ROUTED THROUGH THE SHIELDED FLAT CABLE DUCT, TO THE GROUND BLOCK IN THE FIRST CROSS AISLE PORT CABINET EQUIPPED WITH A RECTIFIER. GRD AND MODGRD MUST BE SEPARATED AS MUCH AS POSSIBLE.
3. RUN THROUGH THE SMALL DUCT ON LOWER REAR OF CABINET WHEN CABINETS ARE LOCATED SIDE BY SIDE.

7.3.2.2 For systems with OLS power supplies

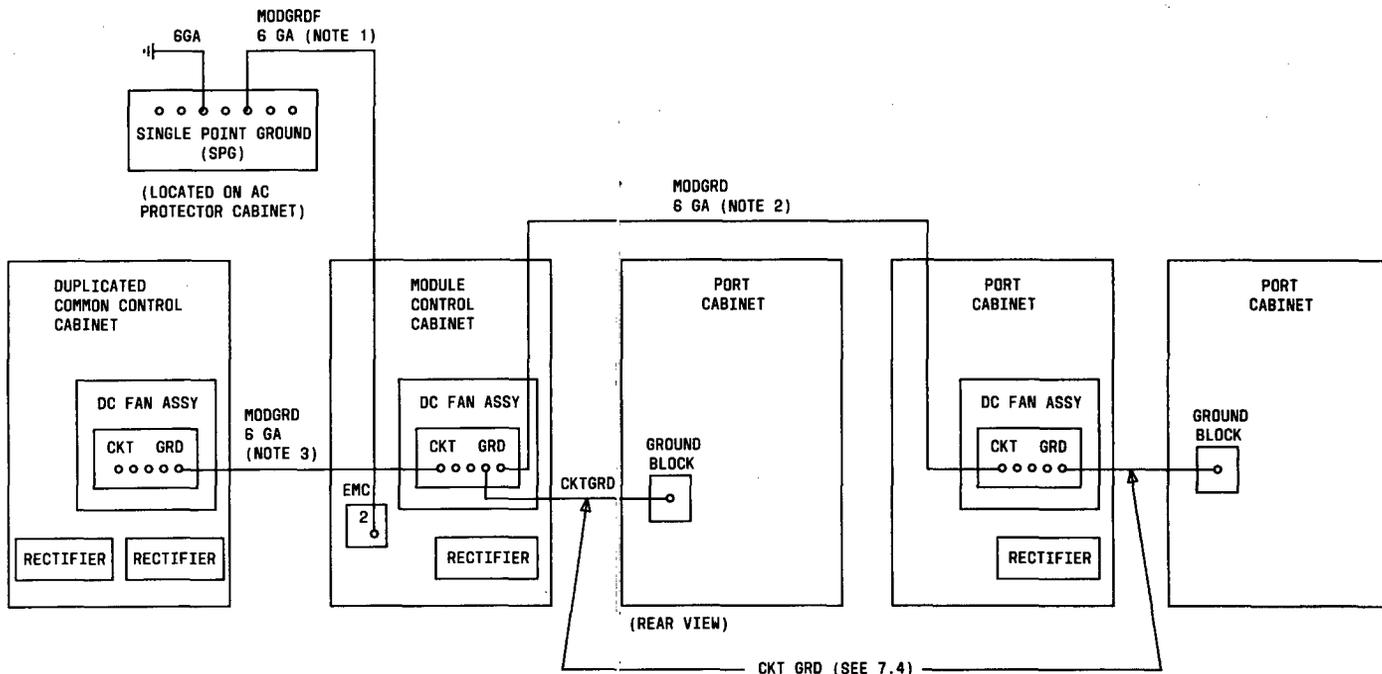


NOTES:

1. THE MODGRDF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. IT RUNS UP THE REAR OF CABINET AND DRESSES INTO THE I/O DUCT CARRYING THE TIP AND RING CABLES AND SHOULD TAKE THE SHORTEST ROUTE TO THE SPG BLOCK.
2. IF PORT CABINETS IN THE SAME MODULE ARE PLACED CROSS-AISLE FROM THE MODULE CONTROL CABINET, MODGRD IS CONNECTED FROM THE GROUND BLOCK IN THE MODULE CONTROL CABINET, ROUTED THROUGH THE SHIELDED FLAT CABLE DUCT, TO THE GROUND BLOCK IN THE FIRST CROSS-AISLE PORT CABINET EQUIPPED WITH A RECTIFIER. GRD1 AND MODGRD MUST BE SEPARATED AS MUCH AS POSSIBLE.
3. RUN THROUGH THE SMALL DUCT ON LOWER REAR OF CABINET WHEN CABINETS ARE LOCATED SIDE BY SIDE.

7.3.3 Module ground – duplicated common control; one module of a multimodule system is shown.

7.3.3.1 For systems without OLS power supplies

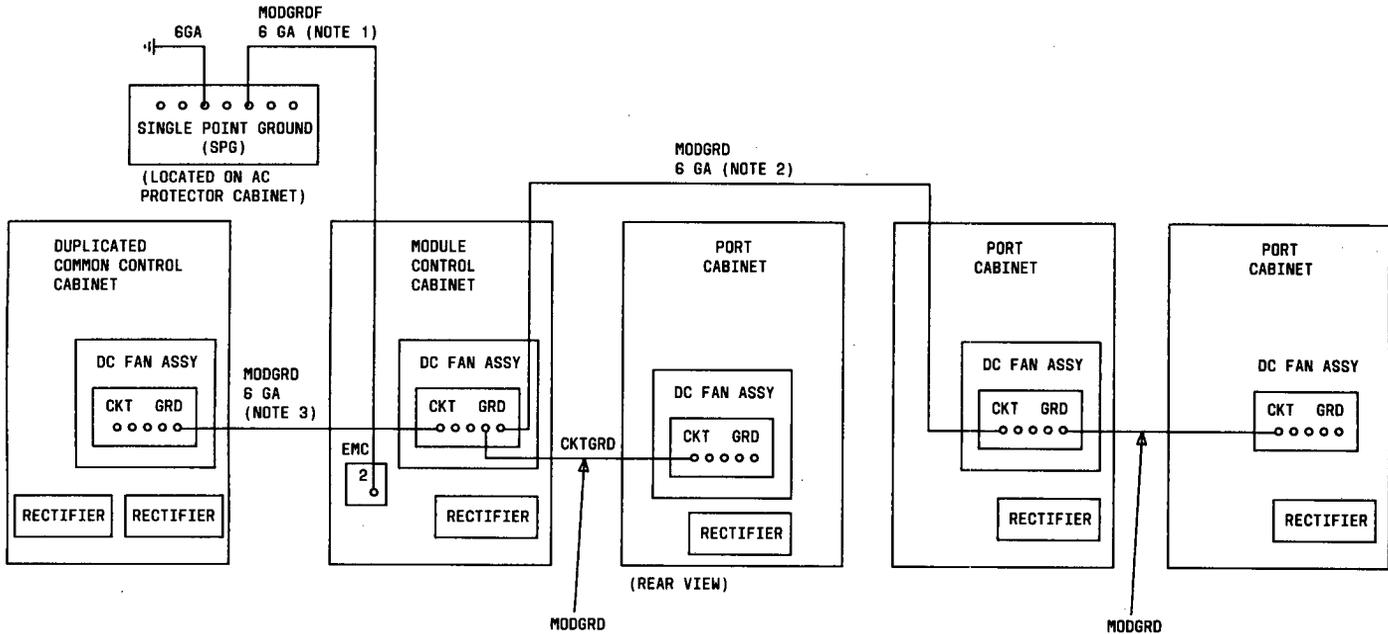


NOTES:

1. THE MODGRDF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. IT RUNS UP THE REAR OF CABINET AND DRESSES INTO THE I/O DUCT CARRYING THE TIP AND RING CABLES.
2. IF PORT CABINETS ARE PLACED CROSS-AISLE FROM THE MODULE CONTROL CABINET, MODGRD IS CONNECTED FROM THE GROUND BLOCK IN THE MODULE CONTROL CABINET, FOUTED THROUGH THE SHIELDED FLAT CABLE DUCT, TO THE GROUND BLOCK IN THE FIRST CROSS-AISLE PORT CABINET EQUIPPED WITH A RECTIFIER. GRDL AND MODGRD MUST BE SEPARATED AS MUCH AS POSSIBLE.

3. RUN THROUGH THE SMALL DUCT ON LOWER REAR OF CABINET WHEN CABINETS ARE LOCATED SIDE BY SIDE.

7.3.3.2 For systems with OLS power supplies



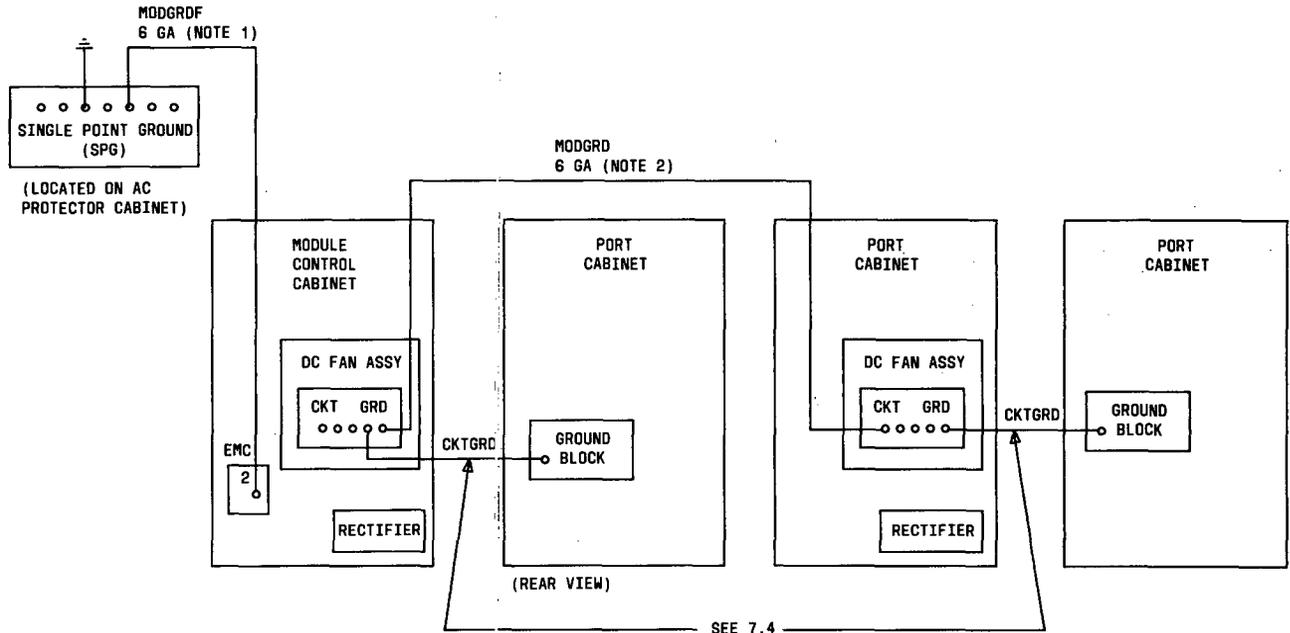
NOTES:

1. THE MODGRDF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. IT RUNS UP THE REAR OF CABINET AND DRESSES INTO THE I/O DUCT CARRYING THE TIP AND RING CABLES.
2. IF PORT CABINETS ARE PLACED CROSS-AISLE FROM THE MODULE CONTROL CABINET, MODGRD IS CONNECTED FROM THE GROUND BLOCK IN THE MODULE CONTROL CABINET, ROUTED THROUGH THE SHIELDED FLAT CABLE DUCT, TO THE GROUND BLOCK IN THE FIRST CROSS-AISLE PORT CABINET EQUIPPED WITH A RECTIFIER. GRDL AND MODGRD MUST BE SEPARATED AS MUCH AS POSSIBLE.

3. RUN THROUGH THE SMALL DUCT ON LOWER REAR OF CABINET WHEN CABINETS ARE LOCATED SIDE BY SIDE.

7.3.4 Module ground without common control cabinet
in the same lineup; one module of a multimodule
system is shown.

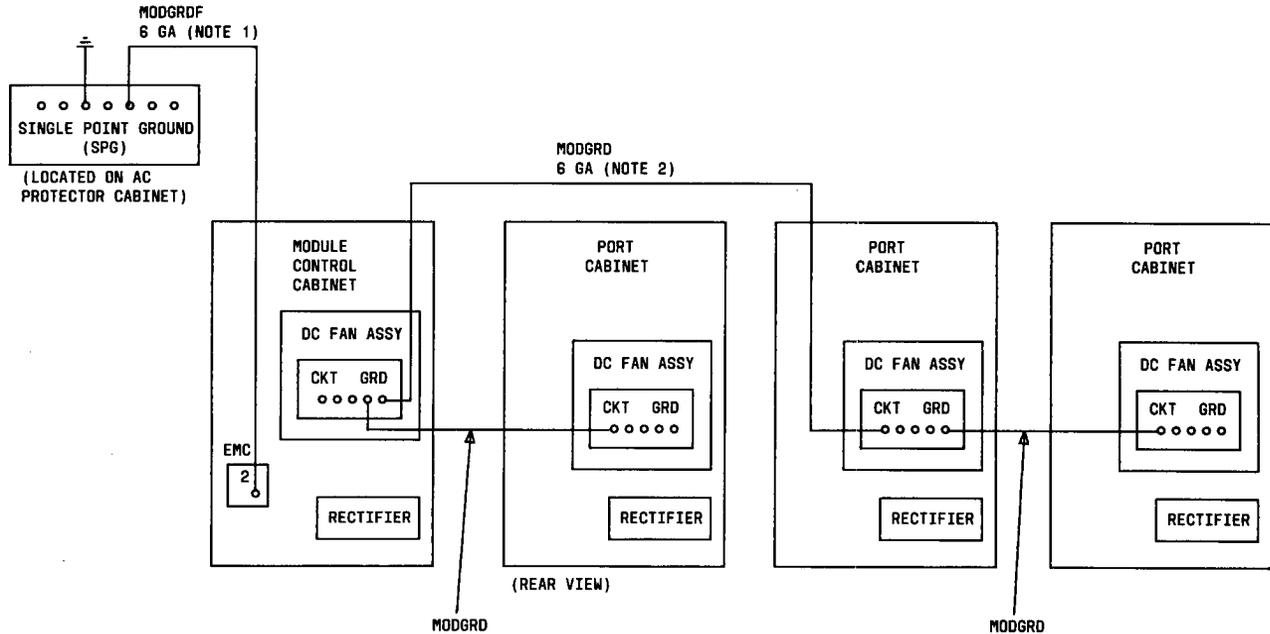
7.3.4.1 For systems without OLS power supplies



NOTES:

1. THE MODGRDF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. IT RUNS UP THE REAR OF CABINET AND DRESSES INTO THE I/O DUCT CARRYING THE TIP AND RING CABLES.
2. IF PORT CABINETS ARE PLACED CROSS AISLE FROM THE MODULE CONTROL CABINET, MODGRD IS CONNECTED FROM THE GROUND BLOCK IN THE MODULE CONTROL CABINET, ROUTED THROUGH THE SHIELDED FLAT CABLE DUCT, TO THE GROUND BLOCK IN THE FIRST CROSS-AISLE PORT CABINET EQUIPPED WITH A RECTIFIER. GRD AND MODGRD MUST BE SEPARATED AS MUCH AS POSSIBLE.

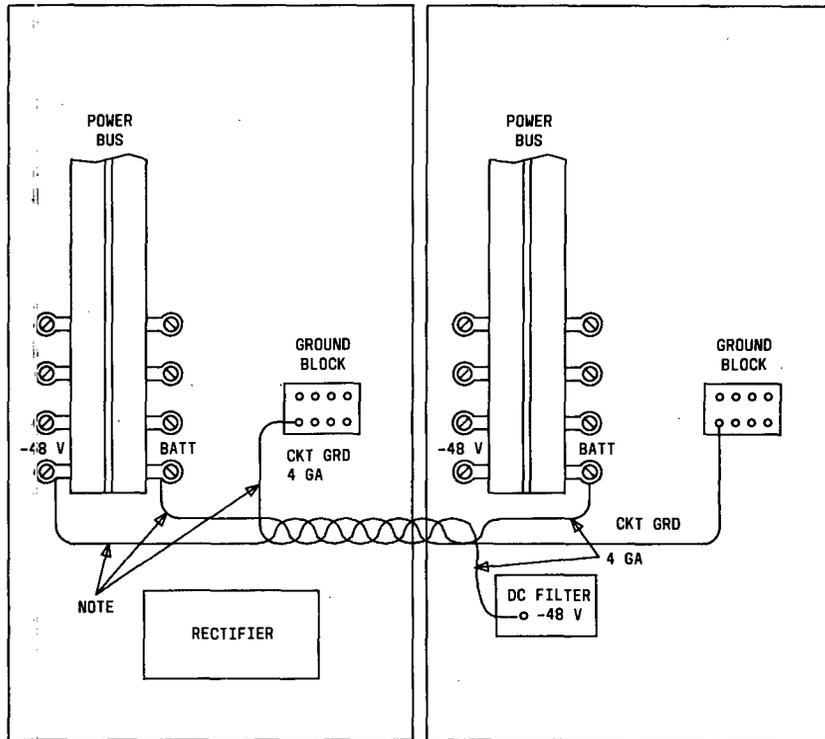
7.3.4.2 For systems with OLS power supplies



NOTES:

1. THE MODGRDF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. IT RUNS UP THE REAR OF CABINET AND DRESSES INTO THE I/O DUCT CARRYING THE TIP AND RING CABLES.
2. IF PORT CABINETS ARE PLACED CROSS-AISLE FROM THE MODULE CONTROL CABINET, MODGRD IS CONNECTED FROM THE GROUND BLOCK IN THE MODULE CONTROL CABINET, ROUTED THROUGH THE SHIELDED FLAT CABLE DUCT, TO THE GROUND BLOCK IN THE FIRST CROSS-AISLE PORT CABINET EQUIPPED WITH A RECTIFIER. GRDL AND MODGRD MUST BE SEPARATED AS MUCH AS POSSIBLE.

7.4 The circuit ground (CKT GRD) connects the copper ground blocks in two adjoining cabinets, one of which contains the rectifier needed to power both cabinets. This wire is tightly twisted with the BATT and -48 V wires that connect bus bars. The BATT and -48 V wires should be connected at this time.



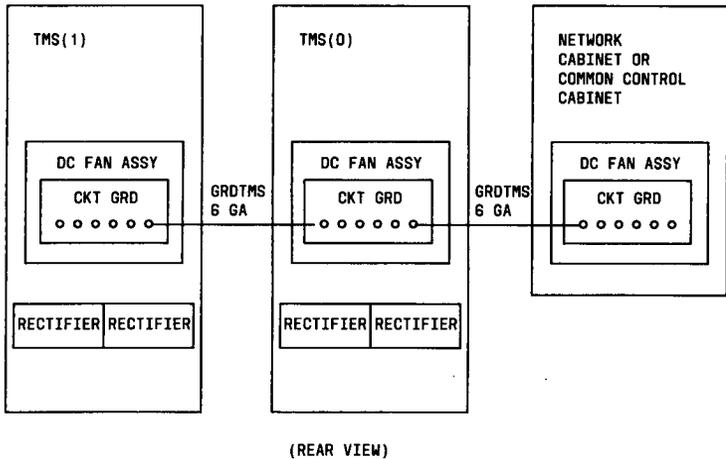
MODULE CONTROL CABINET	UNDUPLICATED COMMON CONTROL CABINET
OR	
PORT CABINET	PORT CABINET
OR	
MODULE CONTROL CABINET	PORT CABINET

NOTE:
 THESE WIRES ARE THE SAME COLOR
 AND ARE MARKED TO ENSURE CORRECT
 TERMINATION. ROUTE THROUGH
 UPPER DUCT (SECOND HOLE) ON
 LOWER REAR OF CABINETS.

(REAR VIEW)

7.5 TMS Ground

7.5.1 TMS ground (GRDTMS) must connect to copper block in the nearest adjacent duplicated common control, unduplicated common control (only if required with OLS power supply), module control, or port cabinet equipped with rectifier. It is normally run through the upper small duct on the lower rear of the cabinet but may be routed through the overhead shielded cable duct if necessary. This wire should be as short as possible.



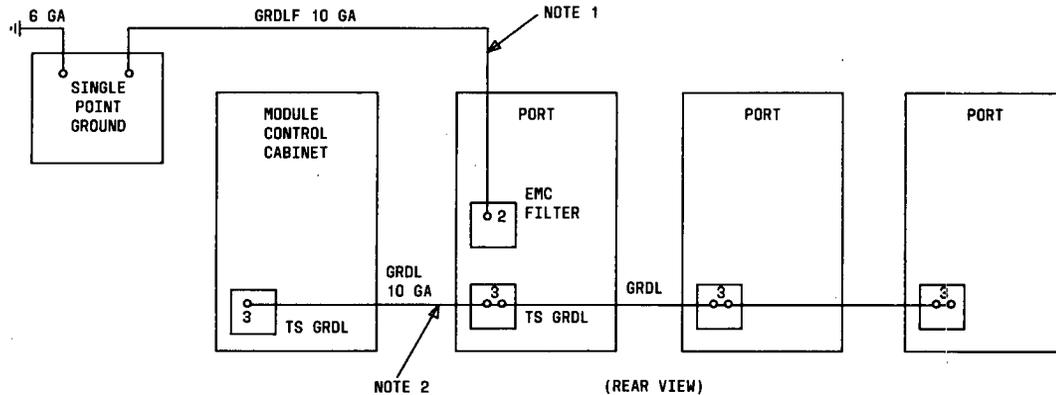
7.6 Lightning Ground

7.6.1 Lightning ground (GRDL) is used in any cabinet equipped with port carriers to route lightning surges away from system components. A 10-gauge wire (GRDLF) connects from the single point ground at the ac protector cabinet to the EMC filter in the common control cabinet (for unduplicated common control systems) or to the EMC filter in the first port cabinet (for duplicated common control systems). Lightning ground goes through the EMC filter to terminal strip GRDL on the lower left upright of the cabinet. From terminal strip GRDL, a 10-gauge wire (GRDL) is daisy-chained to terminal strip GRDL in each cabinet equipped with a port carrier. GRDL should be as short as possible and must not be connected to the cabinet frame or any other grounds.

7.6.2 In a multimodule system, each module must provide its own similar but separate GRDLF connections from their cabinets equipped with port carriers to the single point ground at the ac protector cabinet. The GRDLF must exit the cabinet from an EMC filter. This EMC filter shall be a separate filter and not have any other grounds connected to it. The GRDL may be chained within each module. This is shown in paragraph 7.6.6.

7.6.3 Port carrier equipped cabinets within the same module but placed cross aisle from other port carrier equipped cabinets must provide similar but separate GRDLF connections to the single point ground at the ac protector cabinet. The GRDLF must exit the cabinet from an EMC filter. This EMC filter shall be a separate filter and not have any other grounds connected to it. A module control cabinet can have two EMC filters for use in a cross-aisle situation. The GRDL lead from the cross-aisle cabinet may be chained to all the adjacent cabinets. This is shown in paragraph 7.6.7.

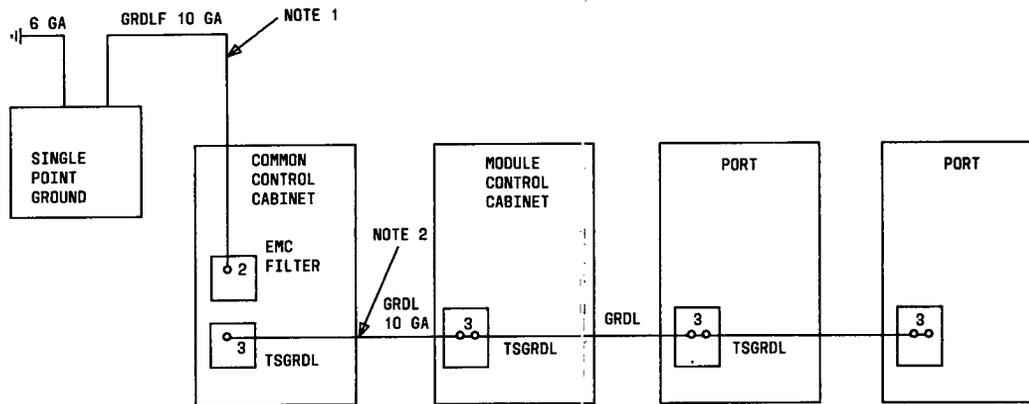
7.6.4 Typical lightning ground connections - duplicated
 common control, single module, all cabinets on same aisle



NOTES:

1. THE GRDLF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. THIS WIRE RUNS UP THE REAR OF THE CABINET AND IS ROUTED IN THE CABINET OVERHEAD DUCT WHICH CONTAINS THE TIP AND RING CABLES AND SHOULD BE PLACED AGAINST THE SIDE OF THE DUCT (INSIDE) OR LADDER RACK, IF A LADDER RACK IS ALSO USED FOR TIP AND RING CABLES. A MINIMUM SEPARATION OF 6 INCHES SHOULD BE MAINTAINED BETWEEN THIS WIRE (GRDLF) AND MODGRDF WHICH ALSO RESIDES IN THE SAME DUCT. THIS WIRE SHOULD BE RUN BY THE SHORTEST ROUTE.
2. GRDL IS RUN THROUGH THE BOTTOM SMALL DUCT ON THE LOWER REAR OF THE CABINET.

7.6.5 Typical lightning ground connections – unduplicated common control, single module, cabinets all on same aisle

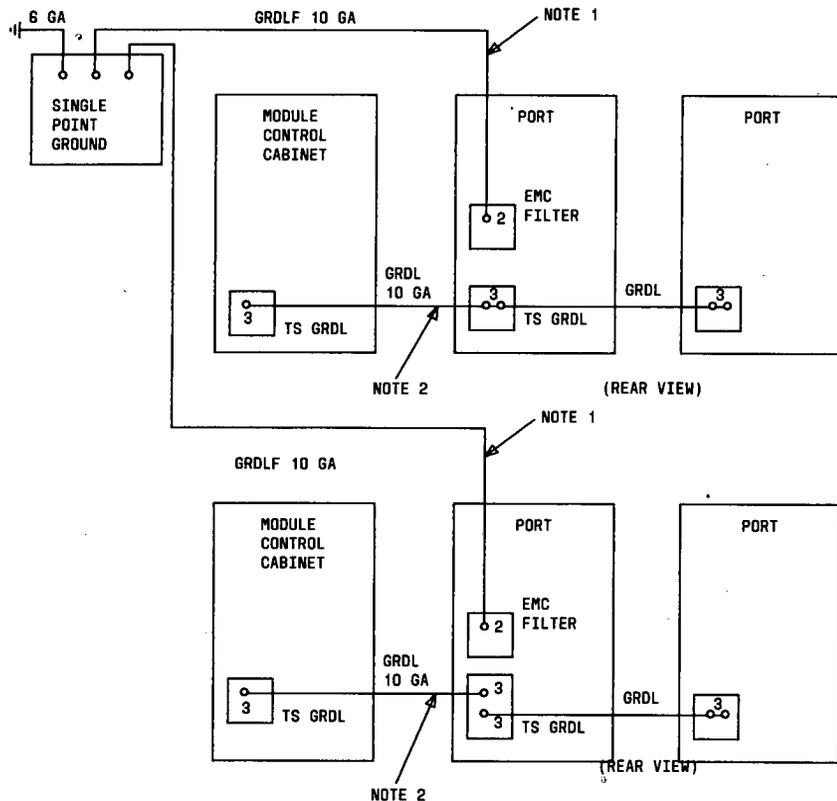


(REAR VIEW)

NOTES:

1. THE GRDLF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. THIS WIRE RUNS UP THE REAR OF THE CABINET AND IS ROUTED IN THE CABINET OVERHEAD DUCT WHICH CONTAINS THE TIP AND RING CABLES AND SHOULD BE PLACED AGAINST THE SIDE OF THE DUCT (INSIDE) OR LADDER RACK, IF A LADDER RACK IS ALSO USED FOR TIP AND RING CABLES. A MINIMUM SEPARATION OF 6 INCHES SHOULD BE MAINTAINED BETWEEN THIS WIRE (GRDLF) AND MODGRDF WHICH ALSO RESIDES IN THE SAME DUCT. THIS WIRE SHOULD BE RUN BY THE SHORTEST ROUTE.
2. GRDL IS RUN THROUGH THE BOTTOM SMALL DUCT ON THE LOWER REAR OF THE CABINET.

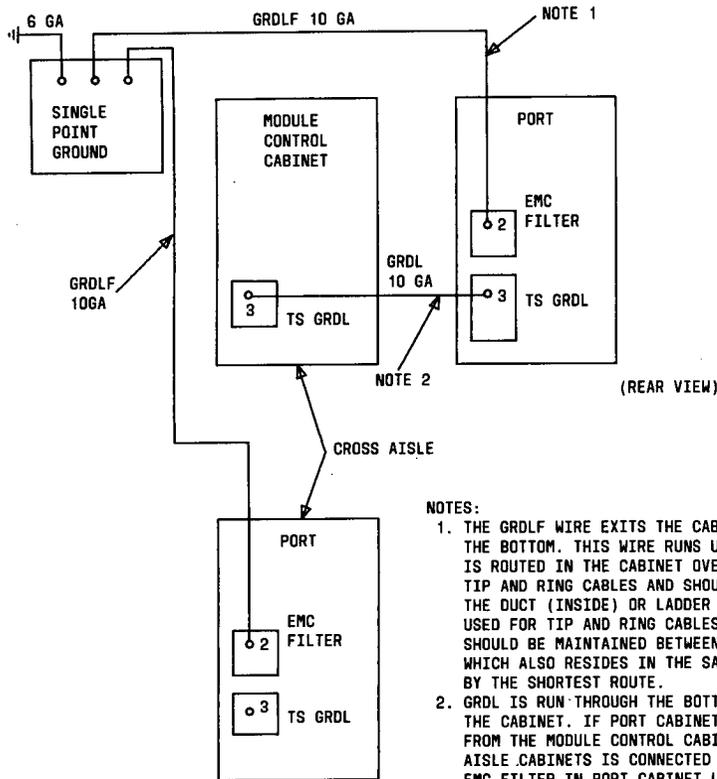
7.6.6 Typical lightning ground connections - unduplicated common control, multimodule, all cabinets within a module on the same aisle, with modules on same or cross aisle.



NOTES:

1. THE GRDLF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. THIS WIRE RUNS UP THE REAR OF THE CABINET AND IS ROUTED IN THE CABINET OVERHEAD DUCT WHICH CONTAINS THE TIP AND RING CABLES AND SHOULD BE PLACED AGAINST THE SIDE OF THE DUCT (INSIDE) OR LADDER RACK, IF A LADDER RACK IS ALSO USED FOR TIP AND RING CABLES. A MINIMUM SEPARATION OF 6 INCHES SHOULD BE MAINTAINED BETWEEN THIS WIRE (GRDLF) AND MODGRDF WHICH ALSO RESIDES IN THE SAME DUCT. THIS WIRE SHOULD BE RUN BY THE SHORTEST ROUTE.
2. GRDL IS RUN THROUGH THE BOTTOM SMALL DUCT ON THE LOWER REAR OF THE CABINET.

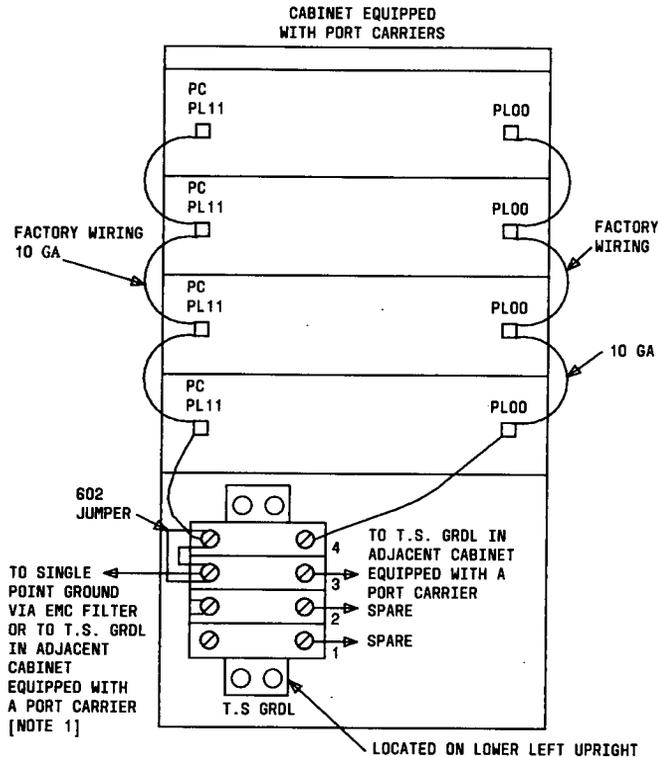
7.6.7 Typical lightning ground connections - unduplicated
 common control, single module, port equipped cabinet
 cross aisle from module control cabinet



NOTES:

1. THE GRDLF WIRE EXITS THE CABINET USING THIRD HOLE UP FROM THE BOTTOM. THIS WIRE RUNS UP THE REAR OF THE CABINET AND IS ROUTED IN THE CABINET OVERHEAD DUCT WHICH CONTAINS THE TIP AND RING CABLES AND SHOULD BE PLACED AGAINST THE SIDE OF THE DUCT (INSIDE) OR LADDER RACK, IF A LADDER RACK IS ALSO USED FOR TIP AND RING CABLES. A MINIMUM SEPARATION OF 6 INCHES SHOULD BE MAINTAINED BETWEEN THIS WIRE (GRDLF) AND MODGRDF WHICH ALSO RESIDES IN THE SAME DUCT. THIS WIRE SHOULD BE RUN BY THE SHORTEST ROUTE.
2. GRDL IS RUN THROUGH THE BOTTOM SMALL DUCT ON THE LOWER REAR OF THE CABINET. IF PORT CABINETS OF A MODULE ARE PLACED CROSS AISLE FROM THE MODULE CONTROL CABINET, ANOTHER GRDLF FOR THE CROSS AISLE CABINETS IS CONNECTED TO THE SINGLE POINT GROUND FROM THE EMC FILTER IN PORT CABINET USING THE SHORTEST ROUTE.

7.6.8 Lightning ground (GRDL) connections for cabinet equipped with port carriers



NOTE 1:
 THE GROUND WIRE THAT EXITS A CABINET WILL USE THE BOTTOM SMALL DUCT ON LOWER REAR INTERCONNECTING ADJACENT CABINETS.

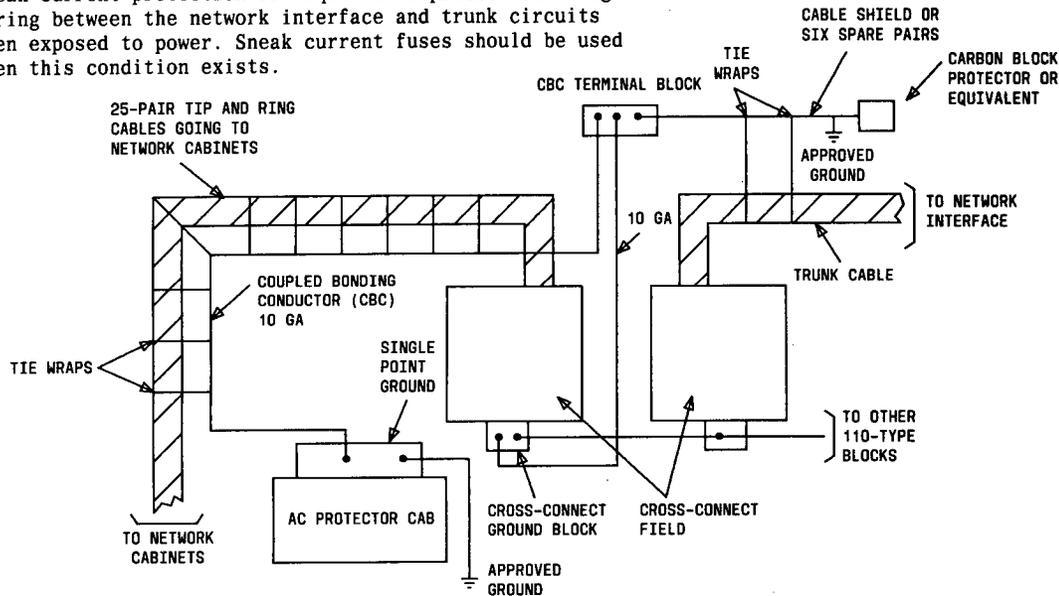
7.7 Coupled Bonding Conductor Grounding

7.7.1 Coupled bonding conductor (CBC) is used to reduce the difference in electrical potential between the tip and ring leads and the system ground which may result from lightning surges. It consists of a 10-gauge copper wire tie-wrapped to the tip and ring cables from the single point ground block to the CBC terminal block located above the cross-connect field. From the CBC terminal block, the coupled bonding conductor is connected to the ground of the connecting block lightning protector where the trunk cables enter the building.

WARNING

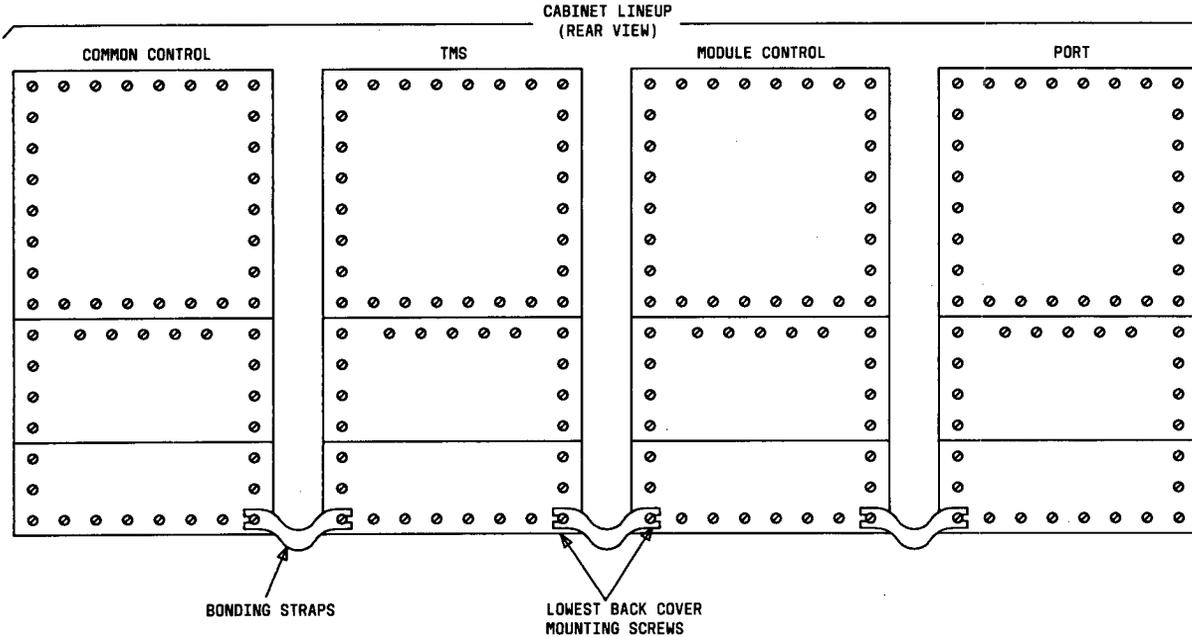
Fire hazards exist when building wiring trunk circuits are exposed to power exceeding 300 volts rms.

Sneak current protection is required to protect building wiring between the network interface and trunk circuits when exposed to power. Sneak current fuses should be used when this condition exists.



7.8 Bonding Straps

Braided straps approximately 5 inches long, are installed between cabinets in the lineup. Bonding straps are not installed on auxiliary cabinets or AP cabinets.

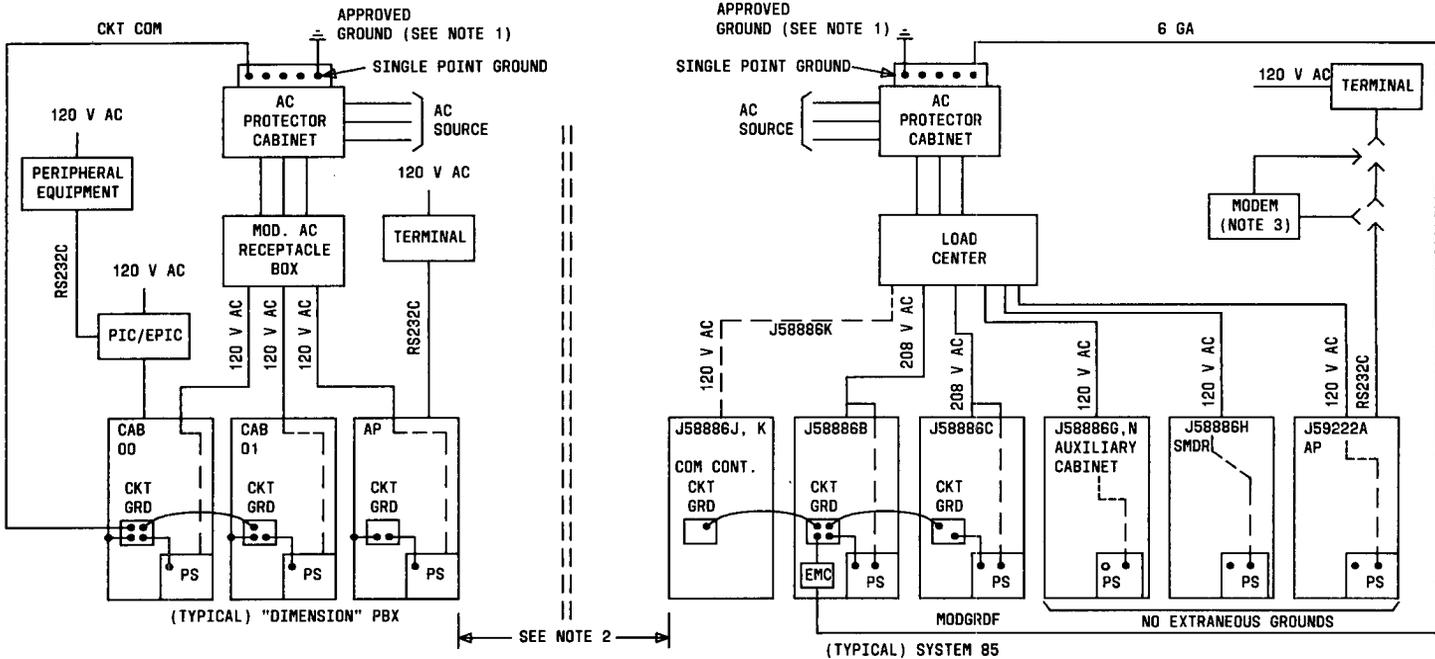


7.9 Auxiliary Cabinet, SMDR Cabinet, and AP Cabinet Grounding

7.9.1 The auxiliary cabinet(s), SMDR cabinet, and application processor are grounded only by green wire ground. No cabinet straps or other type of grounding should be connected to these cabinets. When either of these cabinets is collocated (in the same equipment room) with system cabinets, it must be powered by the same ac source as the system cabinets to ensure a common green wire ground.

7.9.2 However, the ground lead SPG for power failure transfer should be brought to the auxiliary cabinet from the ac protector cabinet copper single point ground or from the battery plant ground discharge bar.

7.10 Grounding Information for System 85 Located in Same Equipment Room
With a DIMENSION PBX



NOTES:

1. THE AC PROTECTOR CABINETS SHALL BE LOCATED AS CLOSE TO EACH OTHER AS POSSIBLE. A SIX (6) GAUGE WIRE CONNECTS EACH SINGLE POINT GROUND BACK TO THE NEAREST "APPROVED" GROUND USING THE SHORTEST ROUTE.
2. THE "DIMENSION" SYSTEM CABINETS SHALL BE SEPARATED FROM SYSTEM 85 CABINETS WITH NO PHYSICAL CONTACT.
3. MODEM IS REQUIRED IF THE TERMINAL AND THE AP USE DIFFERENT AC SOURCES.

PART 8. EXTENDED POWER RESERVE

Contents

General 8.1
System Ground 8.2
DC Feeder and Ground Connections 8.3
Extended Power Reserve Grounding 8.4
Extended Power Reserve AC Distribution 8.5
Battery Plant Alarm Arrangements 8.6
Lightning Ground 8.7
Coupled Bonding Conductor Grounding 8.8

8.1.3 The system uses a single point ground. The single point ground is the ground discharge bar on the battery plant. The system ground connects the single point ground to the approved ground source.

8.1 General

WARNING

Battery plant voltage must remain between -42.0 and 52.5 volts at all times to insure proper operation and to prevent System 85 hardware damage.

8.1.1 Extended power reserve sustains operations of the main system cabinets for 2 to 8 hours, using a battery plant.

8.1.2 Configurations vary according to system requirements. Details of the battery plants, battery strings, and feeder arrangements shall be furnished to the installer. The battery plant may consist of several cabinets and/or racks. Western Electric* type 133B, 151B, 153A, or 155A battery plants are recommended. Each system cabinet equipped for extended power reserve has a dc frame filter for the -48 V and GRD connections. A bulk inverter and an ac load center may be used to power a colocated Applications Processor (AP) and ac-powered equipment mounted in an auxiliary cabinet.

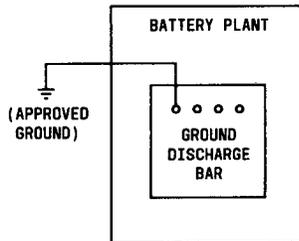
* Registered trademark of AT&T

8.2 System Ground

8.2.1 The system ground, using a 6-gauge copper wire, must be run from the single point ground block to an approved ground. Approved grounds as specified in Section 250-81 of the National Electric Code may consist of any of the following:

- Metallic cold water pipe that is continuous and electrically connected to the street side of the water meter
- Building steel that is bonded to water pipes and power source ground
- Ground electrode encased by at least 2 inches of concrete and in direct contact with the earth
- A ground ring that encircles a building and is at least 2-1/2 feet below the earth's surface

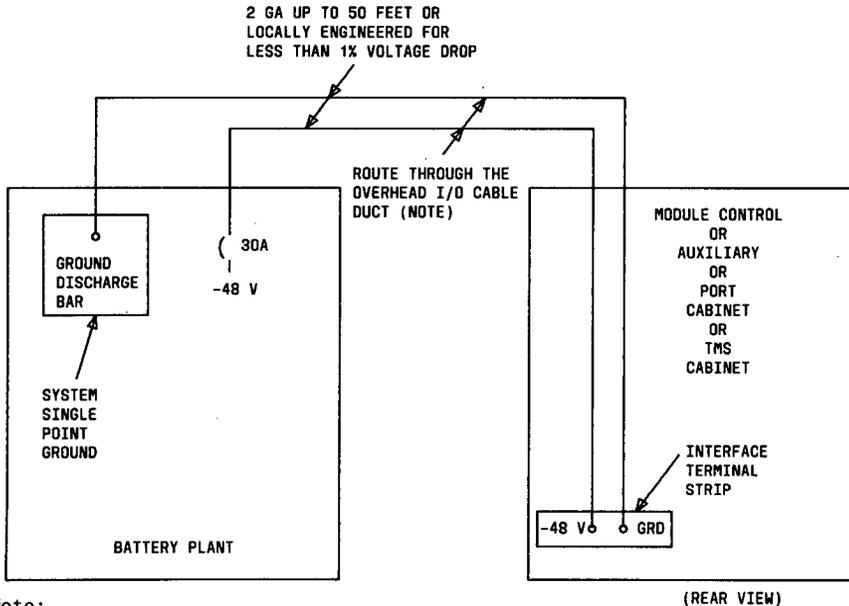
8.2.2 System ground connections



8.3 DC Feeder and Ground Connections

NOTE: If the module control or port cabinets are equipped with 40 or more ANN 17B MFAT circuit packs, refer to paragraph 8.3.2.

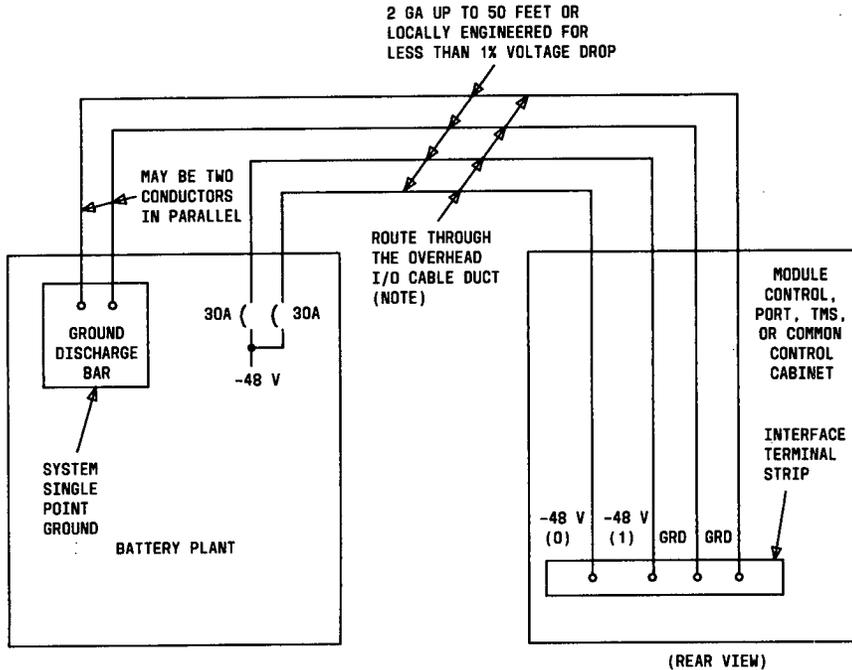
8.3.1 Connections from the battery plant to the module control cabinet, unduplicated TMS cabinet equipped with only one growth carrier, port cabinet, and auxiliary cabinet.



Note:

Where dictated by local codes, the -48 V and ground feeders may be required to be contained in their own enclosed duct work and may be routed under a raised floor.

8.3.2 Connections from the battery plant to the common control cabinet, module control or port cabinet equipped with more than 40 ANN 17B MFAT circuit packs duplicated TMS cabinet and unduplicated TMS cabinet equipped with more than one growth carrier



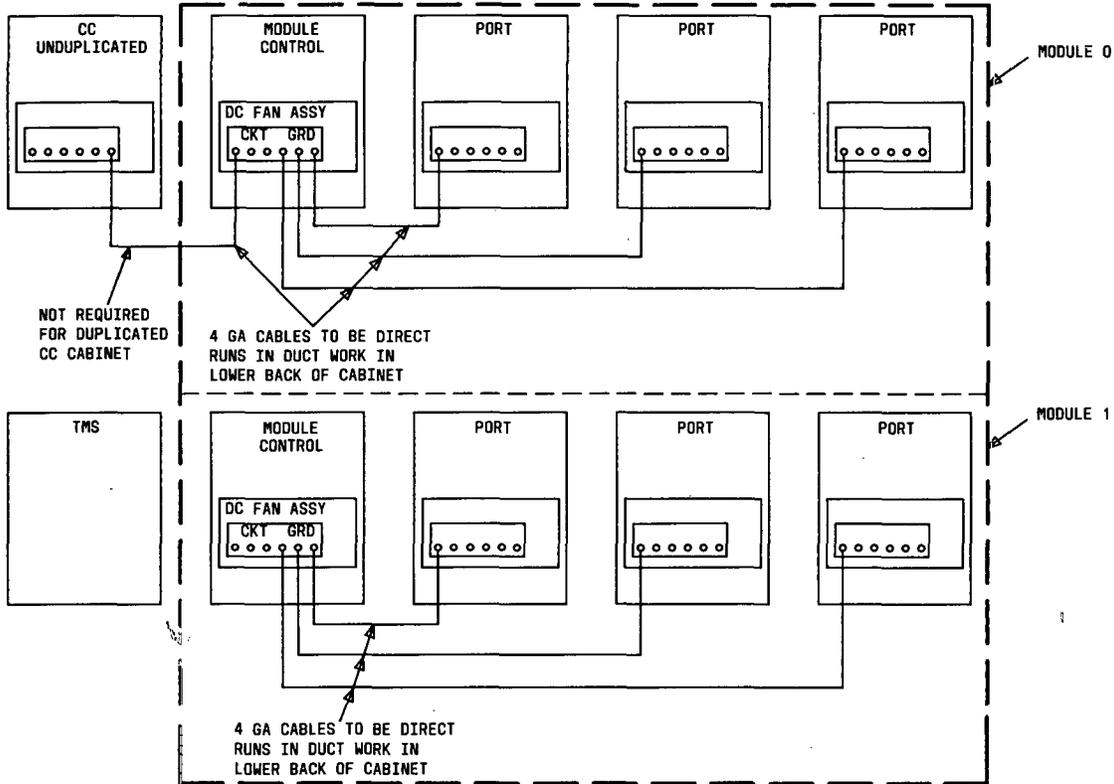
Note:

Where dictated by local codes, the -48 V and ground feeders may be required to be contained in their own enclosed ductwork and they may be routed under a raised floor.

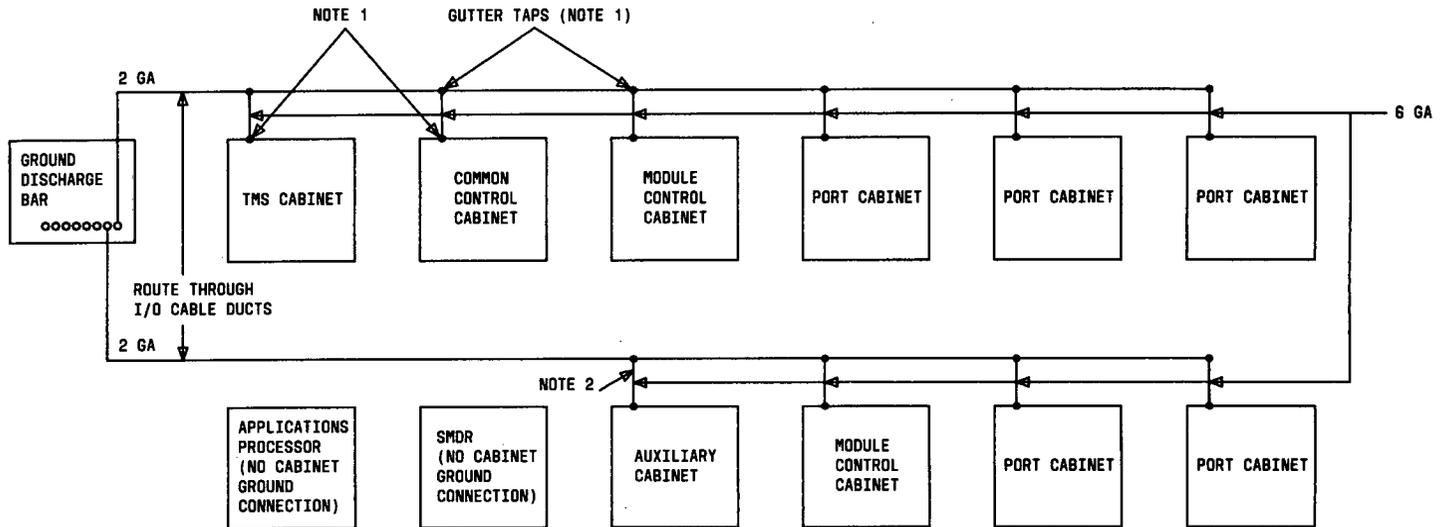
8.4 Extended Power Reserve Grounding

8.4.1 Extended power reserve equalizing ground arrangement

8.4.1.1 Extended power reserve equalizing ground is required between the module control cabinet and each port cabinet (including unduplicated common control) within a module.



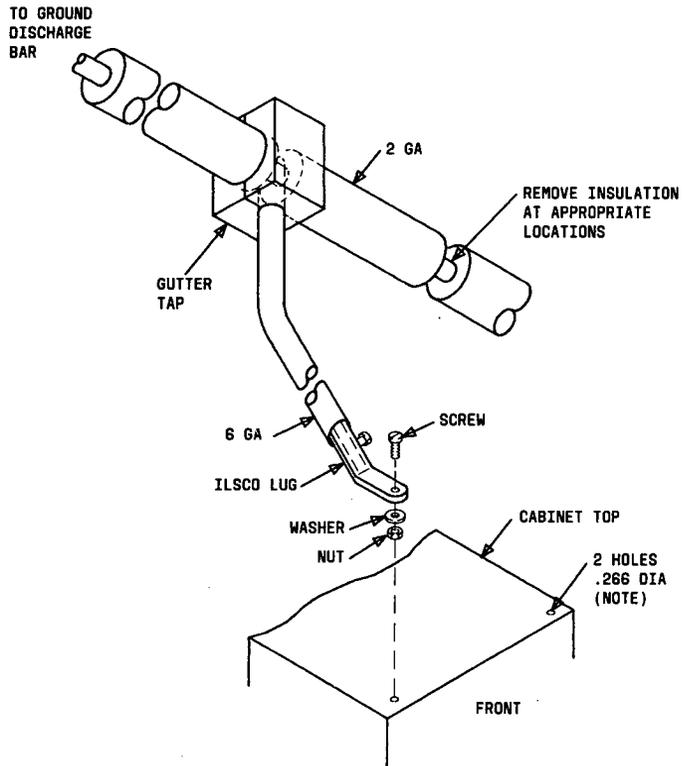
8.4.2 Extended power reserve cabinet ground arrangement



NOTE:

1. SEE PARAGRAPH 8.4.2.1 FOR THESE CONNECTIONS.
2. THIS GUTTER TAP CONNECTION TO THE AUXILIARY CABINET IS REQUIRED ONLY WHEN AC POWER IS NOT ROUTED TO THE CABINETS

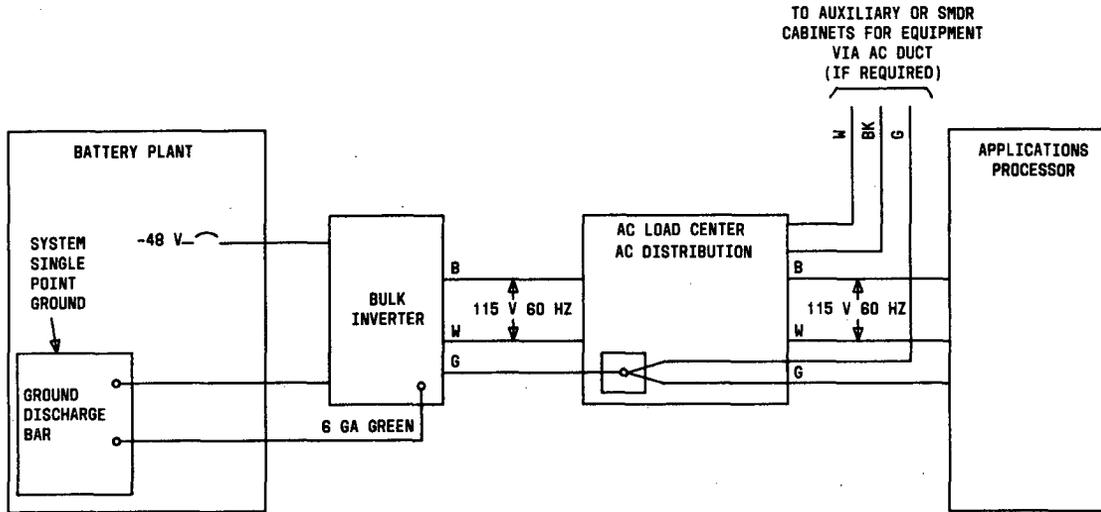
8.4.2.1 Extended power reserve grounding connections



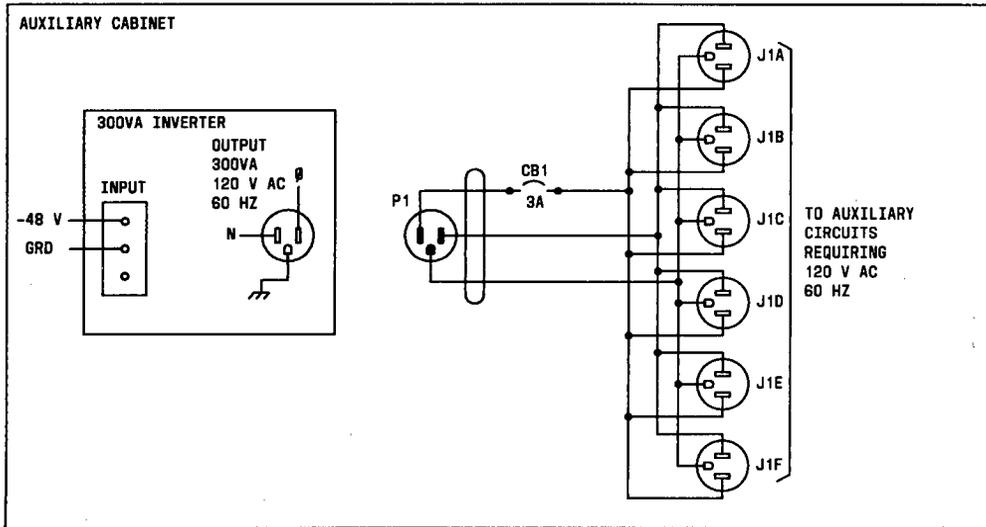
NOTE:
EITHER HOLE ON CABINET TOP MAY
BE USED TO CONNECT ILSCO LUG.

8.5 Extended Power Reserve AC Distribution

8.5.1 Extended power reserve ac distribution using bulk inverter to supply the required ac for system

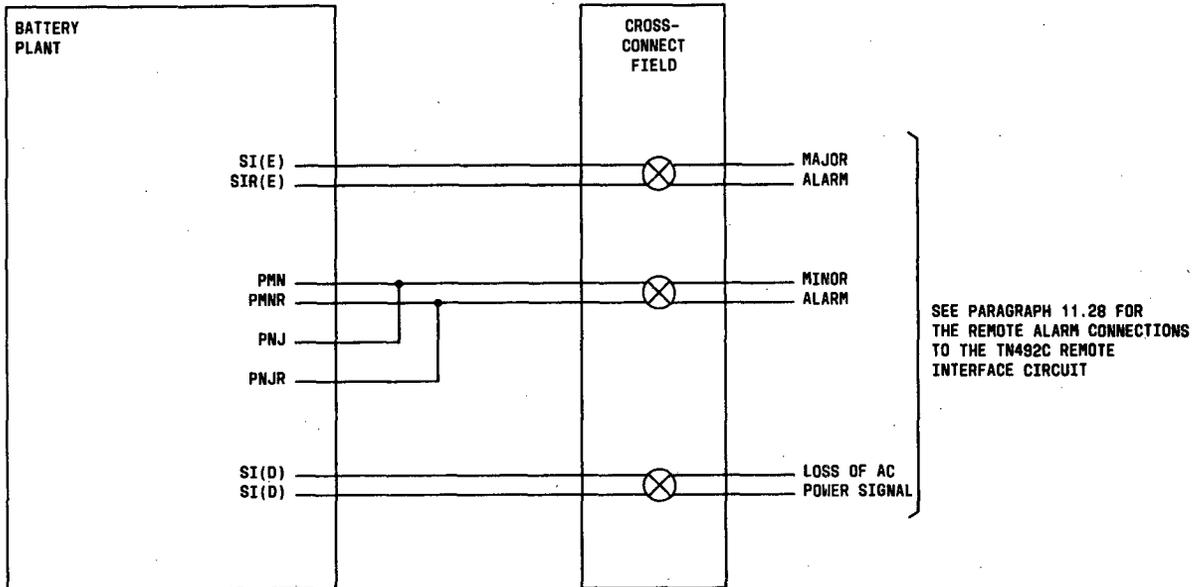


8.5.2 Extended power reserve ac distribution for auxiliary cabinet when bulk inverter does not provide required ac.

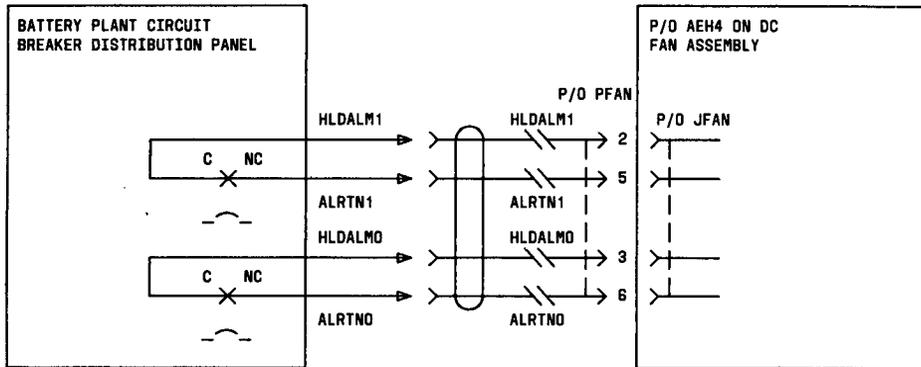


8.6 Battery Plant Alarm Arrangements

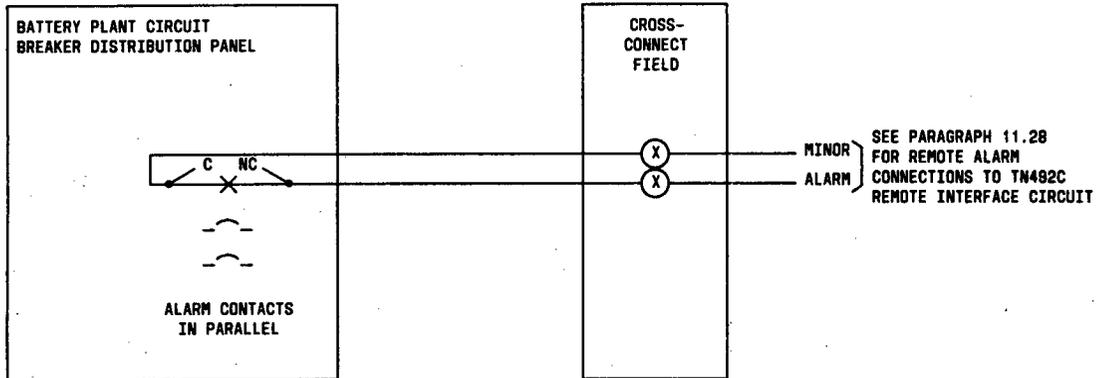
8.6.1 Typical alarm connections for WECO 133B, 151B, 153A, and 155A Battery Plants



8.6.2 Alarm arrangement for battery plant circuit breaker panels with individual circuit breaker alarm contacts.



8.6.3 Alarm arrangement for battery plant circuit breaker panels where alarm contacts are in parallel



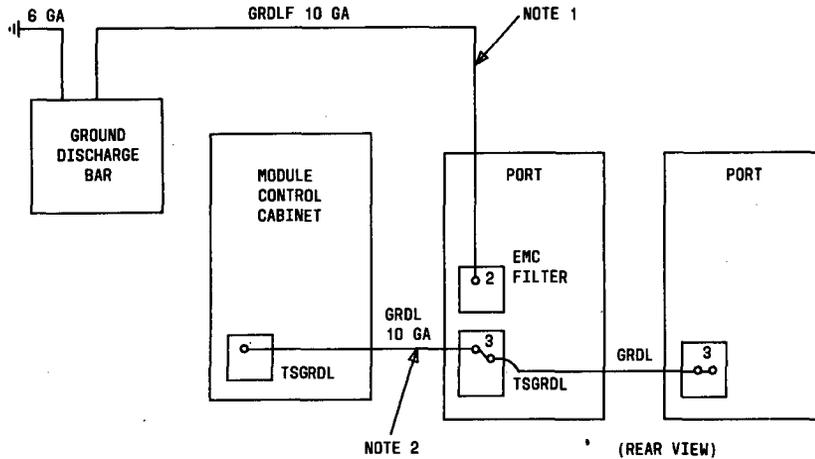
8.7 Lightning Ground

8.7.1 Lightning ground (GRDL) is used in any cabinet equipped with port carriers to route lightning surges away from system components. A 10-gauge wire (GRDLF) connects from the single point ground at the ground discharge bar to the EMC filter in the common control cabinet (for unduplicated common control systems) or to the EMC filter in the first port cabinet (for duplicated common control systems). Lightning ground goes through the EMC filter to terminal strip GRDL on the lower left upright of the EMC cabinet. From terminal strip GRDL, a 10-gauge wire (GRDL) is daisy-chained to terminal strip GRDL in each cabinet equipped with a port carrier. GRDL should be as short as possible and must not be connected to the cabinet frame or any other grounds.

8.7.2 In a multimodule system, each module must provide its own similar but separate GRDLF connections from the cabinets equipped with port carriers to the single point ground at the ground discharge bar. The GRDLF must exit the cabinet from an EMC filter. This EMC filter must be a separate filter and not have any other grounds connected to it. The GRDL is chained within each module as shown in paragraph 8.7.6.

8.7.3 Port carrier equipped cabinets within the same module but placed cross aisle from other port carrier equipped cabinets must provide similar but separate GRDLF connections to the single point ground at the ground discharge bar. The GRDLF must exit the cabinet from an EMC filter. This EMC filter must be a separate filter and not have any other grounds connected to it. The GRDL lead in the cross-aisle cabinet line up is chained to all the adjacent cabinets as shown in paragraph 8.7.7.

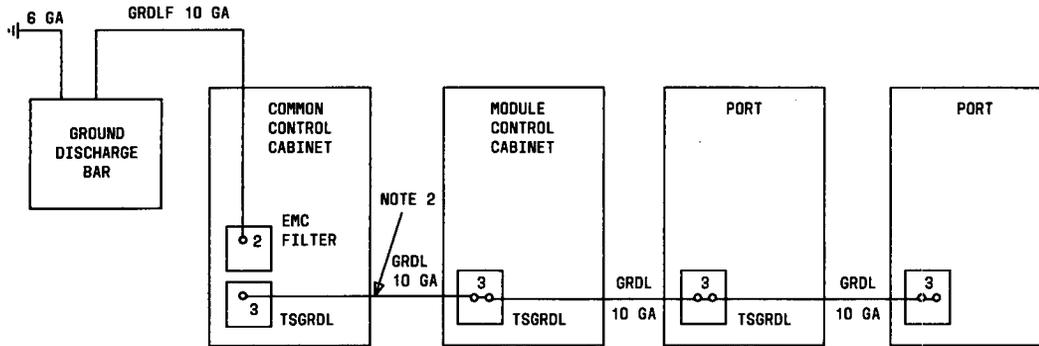
8.7.4 Typical lightning ground connections - duplicated common control, single module, all cabinets on same aisle



NOTES:

1. THE GRDLF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. IT RUNS UP THE REAR OF THE CABINET AND IS ROUTED IN THE CABINET OVERHEAD DUCT WHICH CONTAINS THE TIP AND RING CABLES AND SHOULD BE PLACED AGAINST THE SIDE OF THE DUCT (INSIDE) OR LADDER RACK, IF A LADDER RACK IS ALSO USED FOR TIP AND RING CABLES. A MINIMUM SEPARATION OF 6 INCHES SHOULD BE MAINTAINED BETWEEN THIS WIRE (GRDLF) AND MODGRDF WHICH ALSO RESIDES IN THE SAME DUCT. THIS WIRE SHOULD BE RUN BY THE SHORTEST ROUTE.
2. GRDL IS RUN THROUGH THE BOTTOM SMALL DUCT ON THE LOWER REAR OF THE CABINETS.

8.7.5 Typical lightning ground connections – unduplicated common control, single module, cabinets all on same aisle

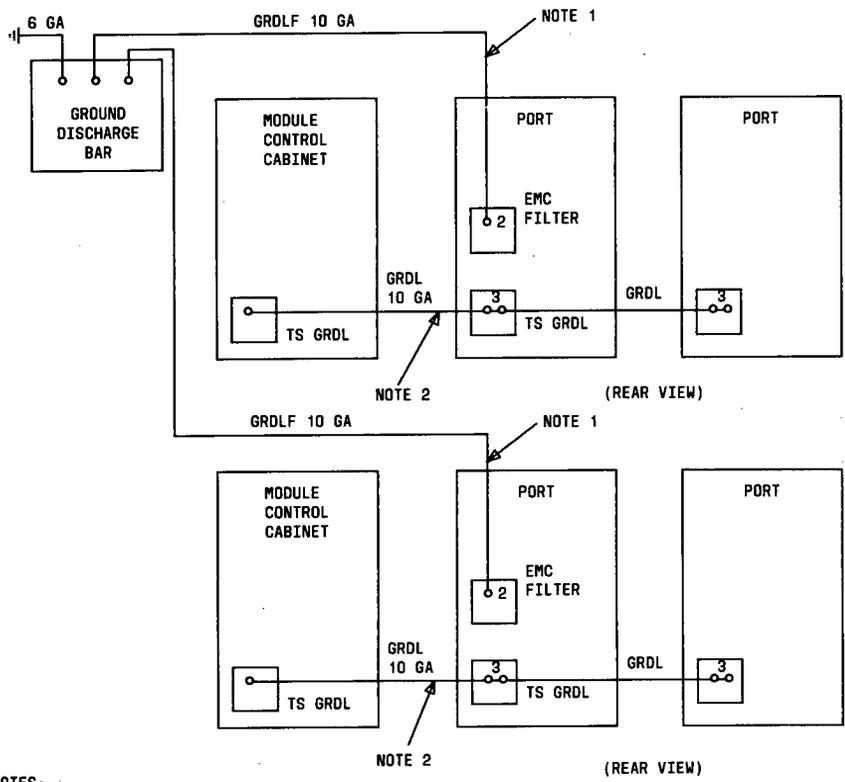


(REAR VIEW)

NOTES:

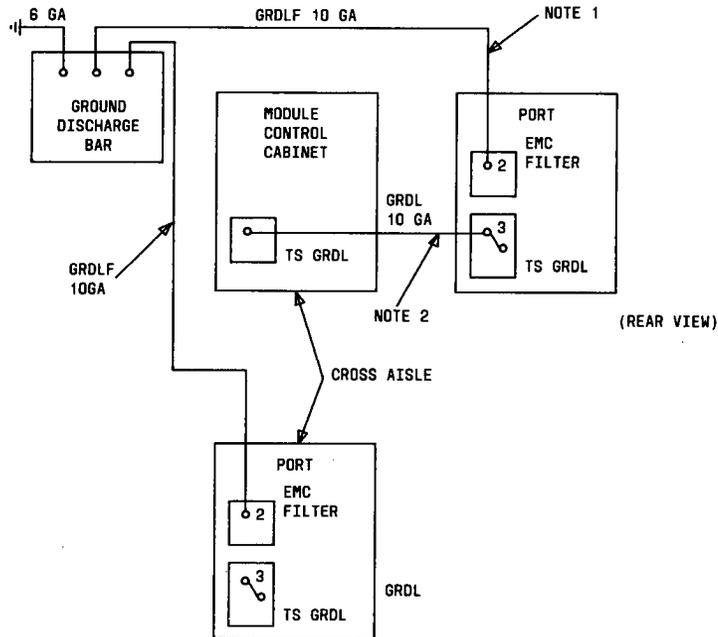
1. THE GRDLF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. THIS WIRE RUNS UP THE REAR OF THE CABINET AND IS ROUTED IN THE CABINET OVERHEAD DUCT WHICH CONTAINS THE TIP AND RING CABLES AND SHOULD BE PLACED AGAINST THE SIDE OF THE DUCT (INSIDE) OR LADDER RACK, IF A LADDER RACK IS ALSO USED FOR TIP AND RING CABLES. A MINIMUM SEPARATION OF 6 INCHES SHOULD BE MAINTAINED BETWEEN THIS WIRE (GRDLF) AND MODGRDF WHICH ALSO RESIDES IN THE SAME DUCT. THIS WIRE SHOULD BE RUN BY THE SHORTEST ROUTE.
2. GRDL IS RUN THROUGH THE BOTTOM SMALL DUCT ON THE LOWER REAR OF THE CABINET.

8.7.6 Typical lightning ground connections - unduplicated common control, multi-module all cabinets within a module on the same aisle, modules are on the same or different aisles.



- NOTES:
1. THE GRDLF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. THIS WIRE RUNS UP THE REAR OF THE CABINET AND IS ROUTED IN THE CABINET OVERHEAD DUCT WHICH CONTAINS THE TIP AND RING CABLES AND SHOULD BE PLACED AGAINST THE SIDE OF THE DUCT (INSIDE) OR LADDER RACK, IF A LADDER RACK IS ALSO USED FOR TIP AND RING CABLES. A MINIMUM SEPARATION OF 6 INCHES SHOULD BE MAINTAINED BETWEEN THIS WIRE (GRDLF) AND MODGRDF WHICH ALSO RESIDES IN THE SAME DUCT. THIS WIRE SHOULD BE RUN BY THE SHORTEST ROUTE.
 2. GRDL IS RUN THROUGH THE BOTTOM SMALL DUCT ON THE LOWER REAR OF THE CABINET.

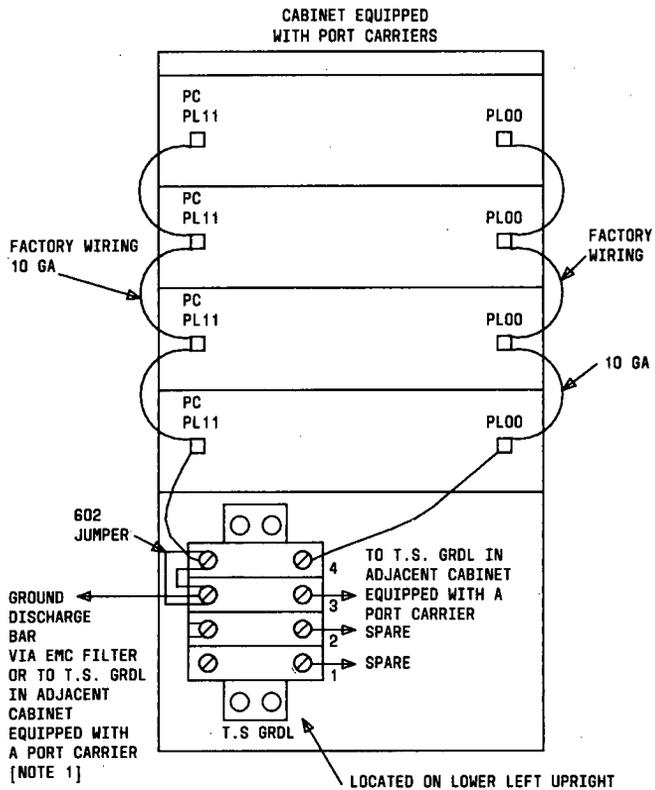
8.7.7 Typical lightning ground connections – unduplicated common control, single module, port equipped cabinet cross aisle from module control cabinet



NOTES:

1. THE GRDLF WIRE EXITS THE CABINET USING THE THIRD HOLE UP FROM THE BOTTOM. THIS WIRE RUNS UP THE REAR OF THE CABINET AND IS ROUTED IN THE CABINET OVERHEAD DUCT WHICH CONTAINS THE TIP AND RING CABLES AND SHOULD BE PLACED AGAINST THE SIDE OF THE DUCT (INSIDE) OR LADDER RACK, IF A LADDER RACK IS ALSO USED FOR TIP AND RING CABLES. A MINIMUM SEPARATION OF 6 INCHES SHOULD BE MAINTAINED BETWEEN THIS WIRE (GRDLF) AND MODGRDL WHICH ALSO RESIDES IN THE SAME DUCT. THIS WIRE SHOULD BE RUN BY THE SHORTEST ROUTE.
2. GRDL IS RUN THROUGH THE BOTTOM SMALL DUCT ON THE LOWER REAR OF THE CABINETS. IF PORT CABINETS OF A MODULE ARE PLACED CROSS AISLE FROM THE MODULE CONTROL CABINET, ANOTHER GRDLF FOR THE CROSS-AISLE CABINETS IS CONNECTED TO THE SINGLE POINT GROUND FROM THE EMC FILTER IN PORT CABINET USING THE SHORTEST ROUTE.

8.7.8 Lightning ground (GRDL) connections for cabinet equipped with port carriers



NOTE 1:
 THE GROUND WIRE THAT EXITS A CABINET WILL USE THE BOTTOM SMALL DUCT ON LOWER REAR INTERCONNECTING ADJACENT CABINETS.

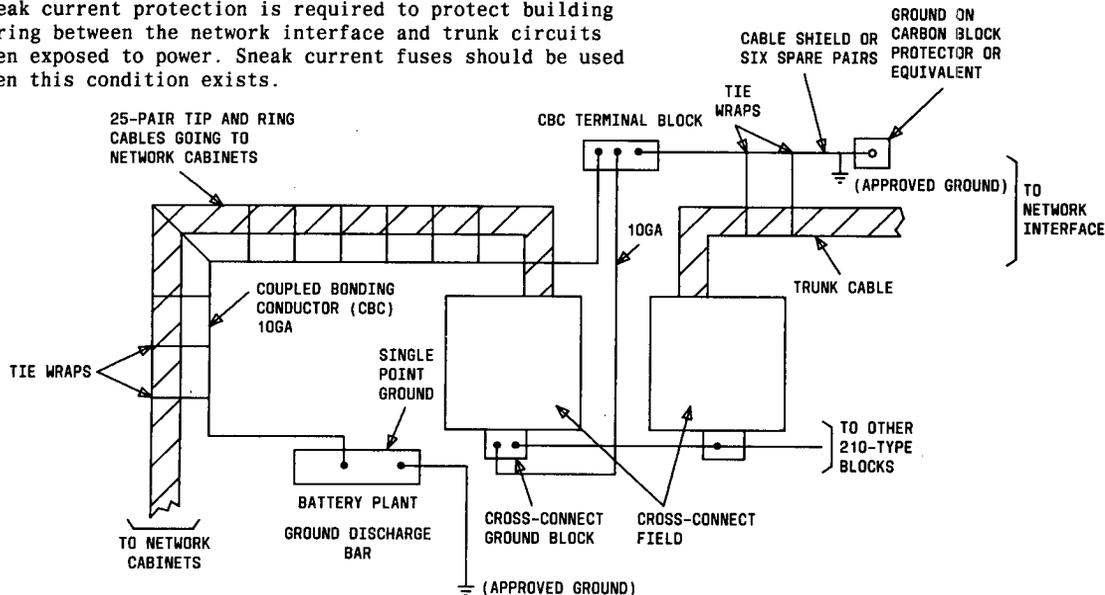
8.8 Coupled Bonding Conductor Grounding

8.8.1 Coupled bonding conductor (CBC) is used to reduce the difference in electrical potential between the tip and ring leads and the system ground which may result from lightning surges. It consists of a 10-gauge copper wire tie-wrapped to the tip and ring cables from the single point ground block to the CBC terminal block located above the cross-connect field. From the CBC terminal ground, the coupled bonding conductor is connected to the ground of the connecting block lightning protector where the trunk cables enter the building.

WARNING

Fire hazards exist when building wiring trunk circuits are exposed to power exceeding 300 volts rms.

Sneak current protection is required to protect building wiring between the network interface and trunk circuits when exposed to power. Sneak current fuses should be used when this condition exists.





PART 9. SYSTEM CABLING, 25-PAIR SHIELDED CONNECTOR CABLES

Contents

General	9.1
Requirements	9.2
Connections	9.3
Terminations	9.4

9.1 General

9.1.1 This section describes the 25-pair shielded cabling from the system cabinets to the cross-connect field. If the system's cable harness 25-pair cables are equipped with ferrite cores, there is no minimum length for the shielded 25-pair connector cables. If the system is not equipped with the ferrite cores, a 50-foot minimum length is in effect. Cable terminations and connections required for each type of circuit pack are described.

9.1.2 The connectors on the rear of the cabinet are equipped with a metal shield for protection during transit. This shield can be removed by removing one screw. The shield should then be discarded or stored locally according to the customer's wishes.

9.1.3 Installation of system features (i.e., attendant console, ANI, etc.) are covered in other sections of this manual.

9.2 Requirements

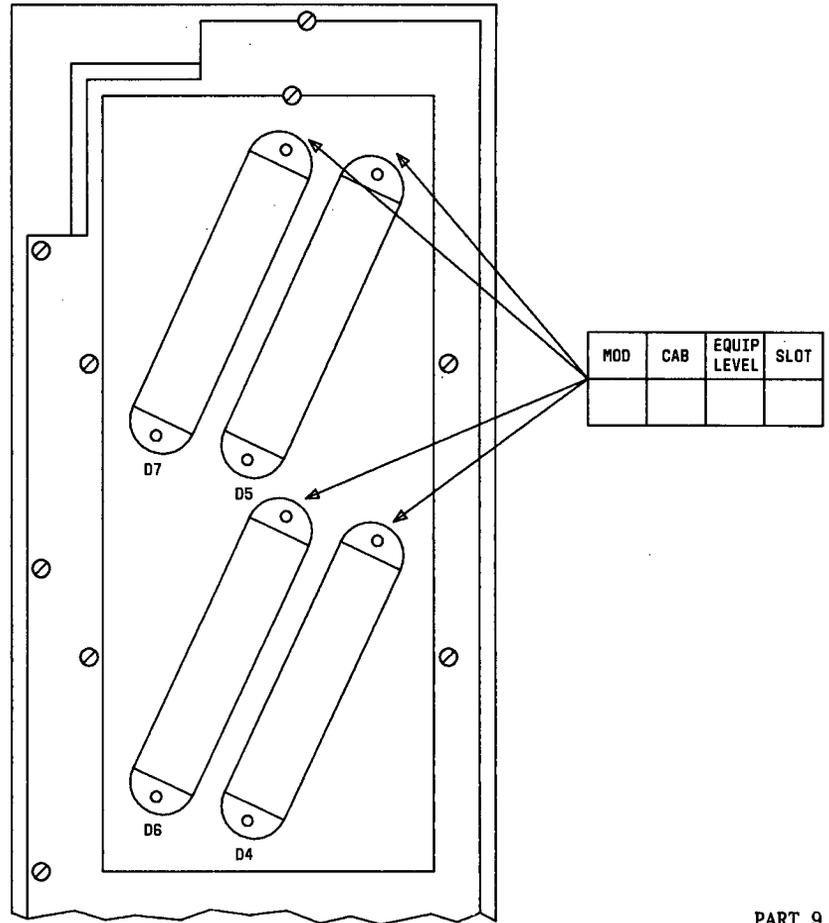
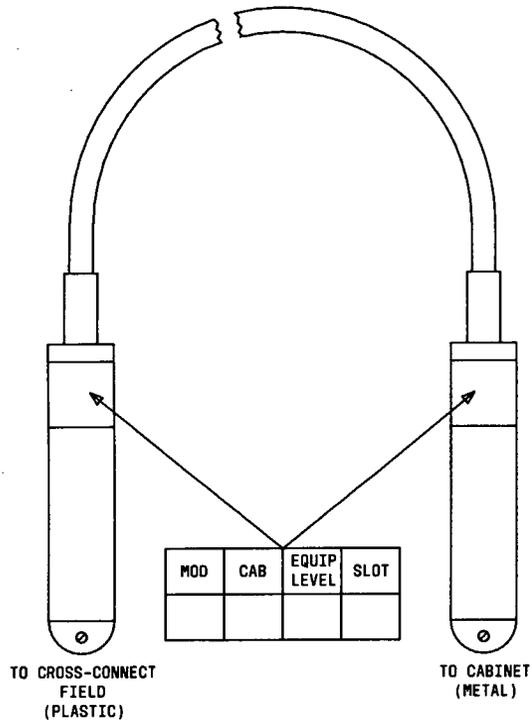
9.2.1 Port carriers, DS1-MFAT carriers, and the common control carrier, among other units, are cabled to the cross-connect field by ED-1E434, group 300 cables or group 340 cables. Group 300 cables are 24-gauge having hooded connectors at each end. Group 340 cables are 24-gauge "Y" type cables with hooded connectors at each end for use with duplicated common controls. The metal hooded connector attaches to the cabinet and the plastic hooded connector attaches to the cross-connect field. The cables are dressed up the rear of the cabinet and placed in the I/O cable duct to the cross-connect field.

9.2.2 Each port carrier requires eight 25-pair cables, one cable for two circuit pack slots. Port carriers can accept any SN-type circuit pack in slots 0-3, 5-8, 13-16, and 18-21.

ANN 17B circuit packs can be placed in slots 0-3, 6-8, 13-16, and 19-21; however, only the even numbered ports, (00, 02, 04, and 06) can be used.

9.2.3 Each DS1-MFAT carrier requires sixteen 25-pair cables. DS1-MFAT carriers may have ANN 17B circuit pack in slots 0-3, 5-8, 13-16, and 18-21 unless the carrier is equipped with an ANN 11. Due to time slot requirements, slots 0-2, 6 and 7 must be vacant when a ANN 11B is in slot 5; slots 13-15, 19 and 20 must be vacant when a ANN 11B is in slot 18. If slots 5 and 18 are equipped with an ANN 11B, slots 3, 8, 16, and 20 can be used for a ANN 17B or any SN-type port circuit pack.

9.2.4 Labels that identify the physical location of a circuit pack are installed on the hood of each connector. A smaller label is installed above the mating connector on the cabinet.



9.2.5 SN-type circuit packs have four circuits with the exception of SN221, SN222, SN228, SN229 and SN241 which have eight. The cross-connect field is arranged to accept eight circuits on each 25-pair 25-pair cable. Since a cable serves two slots, an cable serves two slots, an SN221, SN222, SN228, SN229, or SN241 produces more than eight circuits on a 25-pair cable. Therefore, when a cable serves an SN221, SN222, SN228, SN229, or SN241, a "Y" cables (ED-1E434 Group 71) must be connected to the 25-pair cables at the cross-connect field.

9.2.6 The data channels and remote interface alarms of the common control carrier are cabled to the cross-connect field by seven 25-pair cables (ED-1E434, group 300 for single common control, groups 340 and 300 duplicated common control).

9.2.7 The ANN 17B circuit pack has eight ports. The ANN 17B cannot be used in slots 05 and 18 of the port carrier. ANN 17B is located in a port carrier, only four ports may be used. If the ANN 17B is located in the DS1-MFAT carrier, all eight ports are used.

9.2.8 The ANN 11B and ANN 15B can only be located in a DS-1/MFAT carrier. Several restrictions apply to the placement of these circuit packs. They are:

1. If an ANN 15B is in slot 00, slots 01 and 02 must be vacant.
2. If an ANN 15B is in slot 05, slots 06 and 07 must be vacant.
3. If an ANN 11B is in slot 05, slots 00, 01, 02, 06, and 07 must be vacant.
4. If an ANN 15B is in slot 13, slots 14 and 15 must be vacant.
5. If an ANN 15B is in slot 18, slots 19 and 20 must be vacant.
6. If an ANN 11B is in slot 18, slots 13, 14, 15, 19, and 20 must be vacant.
7. An ANN 11B and ANN 15B cannot be located in the same carrier half.

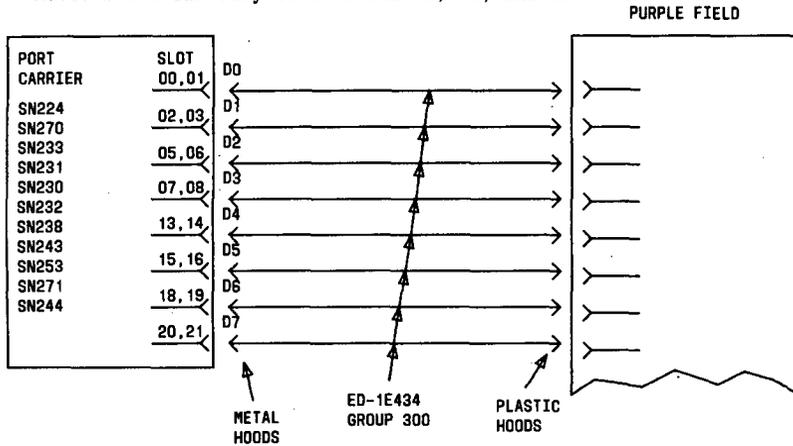
9.2.9 The connections and terminations for the circuit packs are found in Table A.

TABLE A			
CIRCUIT PACK	CARRIER	CONNECTIONS	TERMINATIONS
SN-TYPE	PORT	9.3.1	9.4.2
SN-TYPE	PORT	9.3.2	9.4.3
SN-TYPE	DS-1/MFAT	9.3.3	9.4.4
TN-TYPE	UNDUPLICATED COM CONTROL	9.3.4	9.4.5 9.4.6
TN-TYPE	DUPLICATED COM CONTROL	9.3.5	9.4.5 9.4.6
ANN 17B	PORT	9.3.6	9.4.9
ANN 17B	DS-1/MFAT	9.3.7	9.4.8
ANN 11B	DS-1/MFAT	9.3.8	9.4.10
ANN 15B	DS-1/MFAT	9.3.9	9.4.10

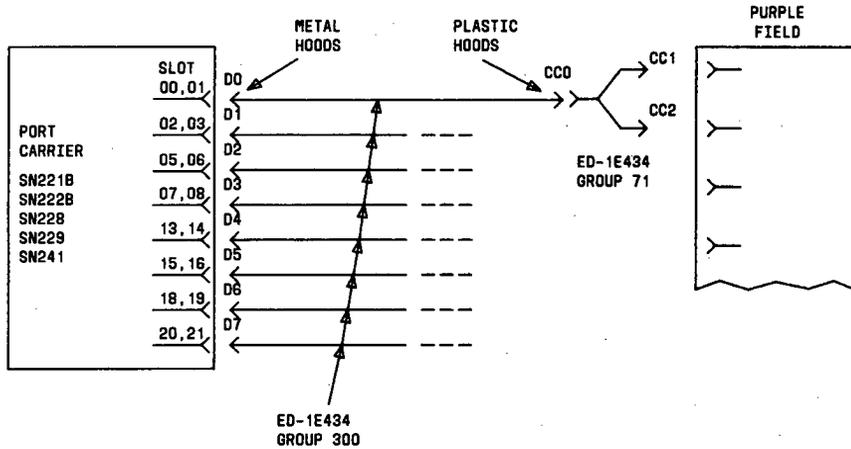
9.3 Connections

9.3.1 Connectors, slots, and cables for various SN type circuit packs located in port carrier

Note: SN244 can only be in slots 00, 01, and 02.

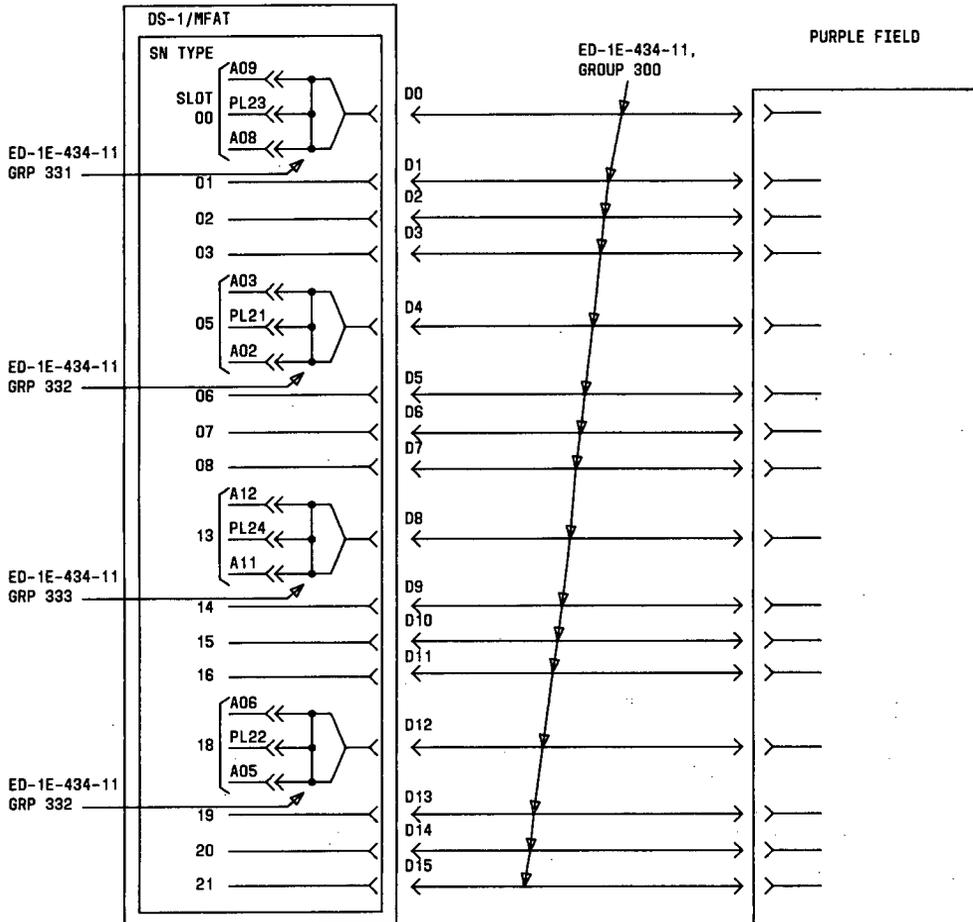


9.3.2 Connectors, slots, and cables for SN221B, SN222B, SN228, SN229,
and SN241 circuit packs located in port carriers

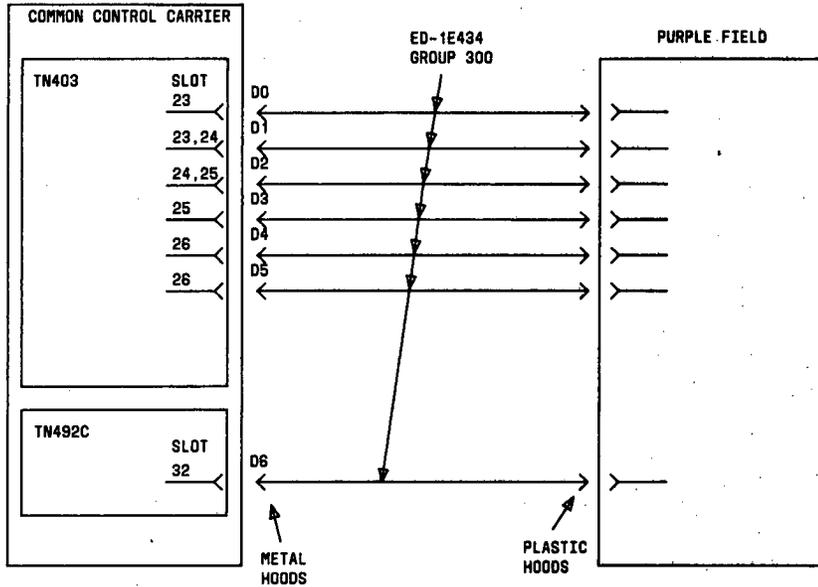


9.3.3 Connectors, slots, and cables for SN221, SN222, SN224B, SN228, SN229, SN230, SN231, SN232, SN233, SN238, SN241, SN243, SN244, SN253, SN270, or SN271 circuit packs located in DS-1/MFAT carrier

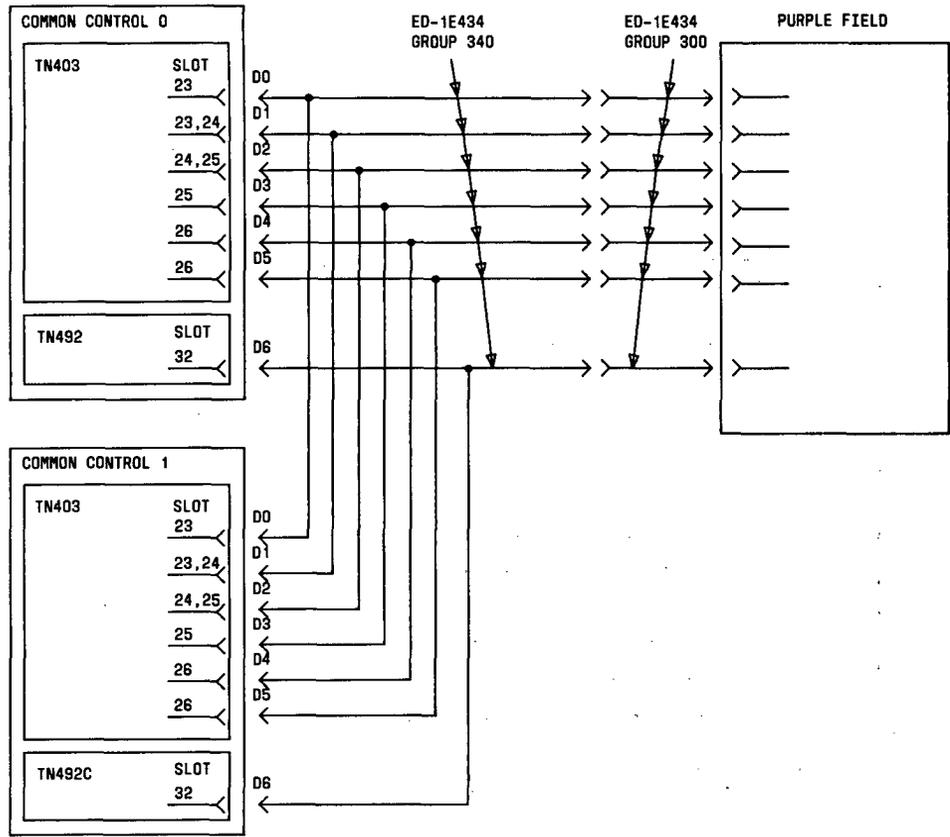
Note: SN244 can only be in slot 00, 01, or 02.



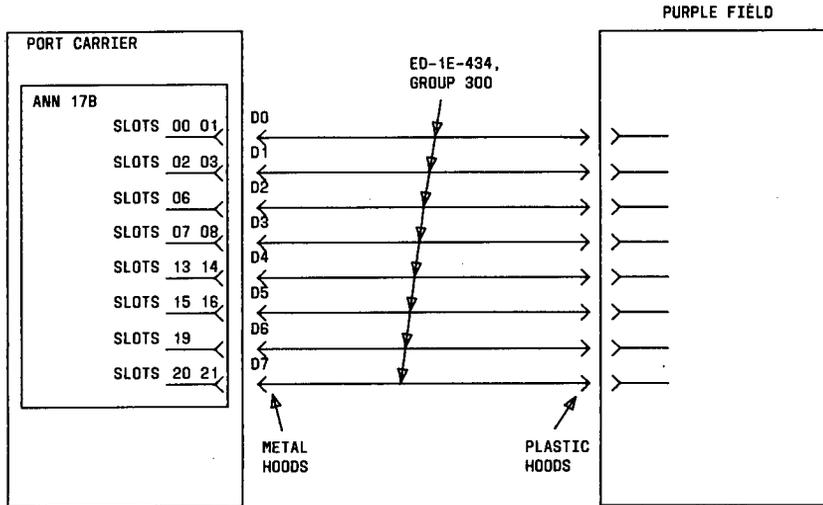
9.3.4 Connectors, slots, and cables for TN403 data channel circuit packs and TN492C alarm interface circuit pack for unduplicated common control



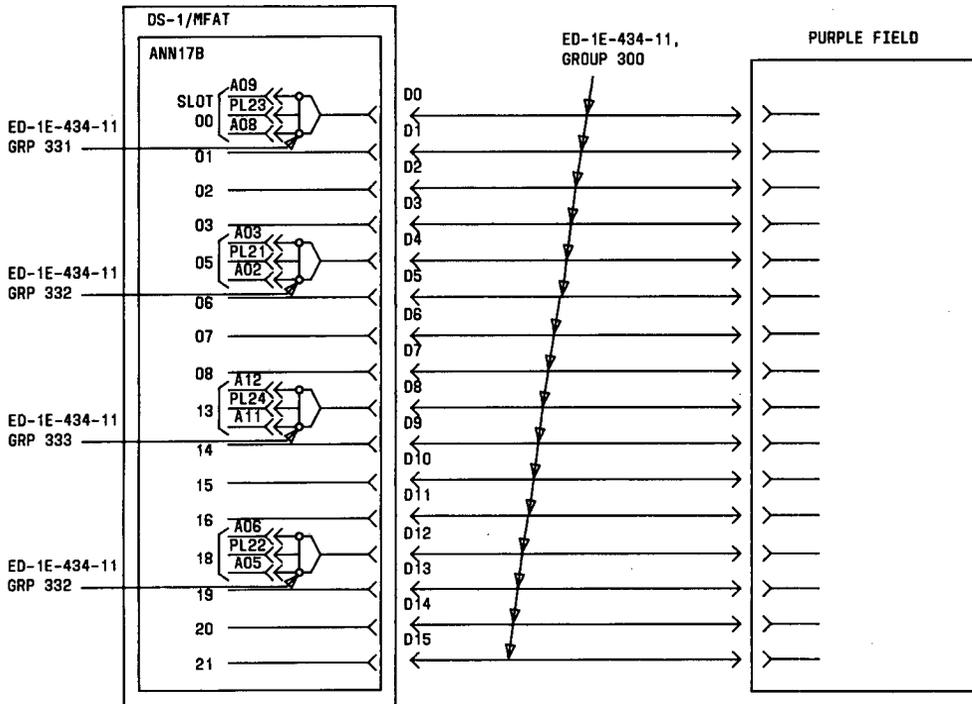
9.3.5 Connectors, slots, and cables for TN403 data channel circuit packs and TN492C alarm interface circuit pack for duplicated common control



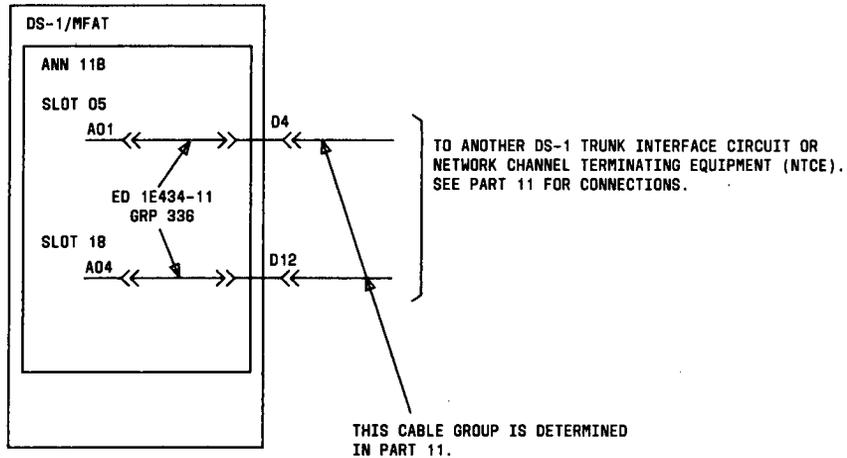
9.3.6 Connectors, slots, and cables for ANN 17B
multifunctional analog terminal located
in port carrier



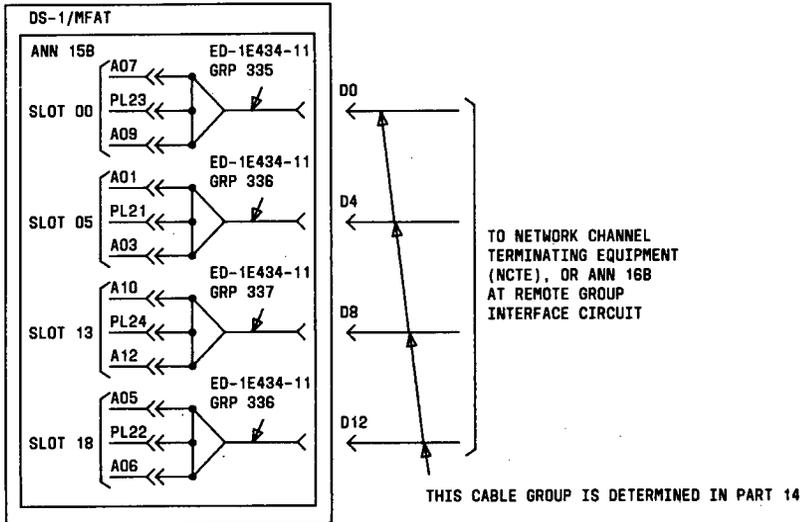
9.3.7 Connectors, slots, and cables for ANN 17B
 multifunctional analog terminal located in
 DS-1/MFAT carrier



9.3.8 Connections, slots and cables for ANN 11B
DS-1 trunk port located in DS-1/MFAT carrier



9.3.9 Connections, slots, and cables for ANN 15B Remote Carrier Local located in a DS-1/MFAT carrier.



9.4. Terminations

9.4.1 This paragraph shows the relationship between the 50-pin connector on the cabinet skin, the 25-pair connector cable, and the 110-type connector block terminals.

50-PIN CONNECTOR ON CABINET SKIN	LEAD COLOR	CONNECTING BLOCK TERMINAL
26	W-BL	1
1	BL-W	2
27	W-O	3
2	O-W	4
28	W-GR	5
3	GR-W	6
29	W-BR	7
4	BR-W	8
30	W-SL	9
5	SL-W	10
31	R-BL	11
6	BL-R	12
32	R-O	13
7	O-R	14
33	R-GR	15
8	GR-R	16
34	R-BR	17
9	BR-R	18
35	R-SL	19
10	SL-R	20
36	BK-BL	21
11	BL-BK	22
37	BK-O	23
12	O-BK	24

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

9.4.2 25-pair shielded connector cable terminations for various SN type circuit packs in port carrier (for slots 00, 02, 05, 07, 13, 15, 18, 20) (Sheet 1 of 2)

LEAD COLOR	CONNECTING BLOCK TERMINAL	110-TYPE CONN. BLOCK GROUP	SN224 MFET LINE	SN270 GENERAL PURPOSE PORT	SN233 TIE TRUNK	SN231 AUXILIARY TRUNK	SN230 CO TRUNK	SN232 DID TRUNK	SN238 EIA INTERFACE	SN243 DATA PORT	SN253 AUXILIARY TONES	SN244 AUTOMATIC NUMBER IDENTIFICATION
W-BL	1	1	TT0		T0	T0	T0	T0		T0	DIAL1	T0
BL-W	2		TR0		R0	R0	R0	R0		R0	DIAL2	RO
W-O	3		BT0	RT0	T10				R10			
O-W	4		BR0	RR0	R10				R20			
W-GR	5		LT0	TT0	E0	AL0			S10		ARING1	
GR-W	6		LR0	TR0	M0	S0			S20		ARING2	
W-BR	7	2	TT2		T1	T1	T1	T1		T1	PABSY1	T1
BR-W	8		TR2		R1	R1	R1	R1		R1	PABSY2	R1
W-SL	9		BT2	RT2	T11				R12			
SL-W	10		BR2	RR2	R11				R22			
R-BL	11		LT2	TT2	E1	AL1			S12			
BL-R	12		LR2	TR2	M1	S1			S22			
R-O	13	3	TT4		T2	T2	T2	T2		T2	PASEZ1	
O-R	14		TR4		R2	R2	R2	R2		R2	PASEZ2	
R-GR	15		BT4	RT4	T12				R14			
GR-R	16		BR4	RR4	R12				R24			
R-BR	17		LT4	TT4	E2	AL2			S14			
BR-R	18		LR4	TR4	M2	S2			S24			
R-SL	19	4	TT6		T3	T3	T3	T3		T3	ECR1	
SL-R	20		TR6		R3	R3	R3	R3		R3	ECR2	
BK-BL	21		BT6	RT6	T13				R16			
BL-BK	22		BR6	RR6	R13				R26			
BK-O	23		LT6	TT6	E3	AL3			S16		CHIME1	
O-BK	24		LR6	TR6	M3	S3			S26		CHIME2	

9.4.2 25-pair shielded connector cable terminations for various SN type circuit packs
(for slots 01, 03, 06, 08, 14, 16, 19, 21) (Sheet 2 of 2)

LEAD COLOR	CONNECTING BLOCK TERMINAL	110-TYPE CONN. BLOCK GROUP	SN224 MFET LINE	SN270 GENERAL PURPOSE PORT	SN233 TIE TRUNK	SN231 AUXILIARY TRUNK	SN230 CO TRUNK	SN232 DID TRUNK	SN238 EIA INTERFACE	SN243 DATA PORT	SN253 AUXILIARY TONES	SN244 AUTOMATIC NUMBER IDENTIFICATION
BK-GR	25	5	TT0		T0	T0	T0	T0		T0	DIAL1	TO
GR-BK	26		TR0		R0	R0	R0	R0		R0	DIAL2	RO
BK-BR	27		BT0	RT0	T10				R10			
BR-BK	28		BR0	RR0	R10				R20			
BK-SL	29		LT0	TT0	E0	AL0			S10		ARING1	
SL-BK	30		LR0	TR0	M0	S0			S20		ARING2	
Y-BL	31	6	TT2		T1	T1	T1	T1		T1	PABSY1	T1
BL-Y	32		TR2		R1	R1	R1	R1		R1	PABSY2	R1
Y-O	33		BT2	RT2	T11				R12			
O-Y	34		BR2	RR2	R11				R22			
Y-GR	35		LT2	TT2	E1	AL1			S12			
GR-Y	36		LR2	TR2	M1	S1			S22			
Y-BR	37	7	TT4		T2	T2	T2	T2		T2	PASEZ1	
BR-Y	38		TR4		R2	R2	R2	R2		R2	PASEZ2	
Y-SL	39		BT4	RT4	T12				R14			
SL-Y	40		BR4	RR4	R12				R24			
V-BL	41		LT4	TT4	E2	AL2			S14			
BL-V	42		LR4	TR4	M2	S2			S24			
V-O	43	8	TT6		T3	T3	T3	T3		T3	ECR1	
O-V	44		TR6		R3	R3	R3	R3		R3	ECR2	
V-GR	45		BT6	RT6	T13				R16			
GR-V	46		BR6	RR6	R13				R26			
V-BR	47		LT6	TT6	E3	AL3			S16		CHIME1	
BR-V	48		LR6	TR6	M3	S3			S26		CHIME2	
V-SL	49		GRDD	GRDD	GRDD	GRDD	GRDD	GRDD		GRDD	GRDD	GRDD
SL-V	50		GRDD	GRDD	GRDD	GRDD	GRDD	GRDD		GRDD	GRDD	GRDD

9.4.3 25-Pair shielded connector cable terminations for SN221B, SN228, SN222B, SN229, and SN241 circuit packs in port carrier (for slots 00, 02, 05, 07, 13, 15, 18, 20) (Sheet 1 of 2)

CONNECTOR CCO			CONNECTING BLOCK TERMINAL
SN221B SN222B STA. LINE	SN228 SN229 INTERFACE	SN241 CONTACT	
T0	CID0		1
R0	CIG0		2
T1	CID1		3
R1	CIG1		4
T2	CID2		5
R2	CIG2		6
T3	CID3		7
R3	CIG3		8
			9
			10
			11
			12
			13
			14
			15
			16
T4	CID4		17
R4	CIG4		18
T5	CID5		19
R5	CIG5		20
T6	CID6		21
R6	CIG6		22
T7	CID7		23
R7	CIG7		24

CONNECTOR CC1			CONNECTING BLOCK TERMINAL	CONNECTOR CC1			CONNECTING BLOCK TERMINAL
SN221B SN222B STA. LINE	SN228 SN229 INTERFACE	SN241 CONTACT		SN221B SN222B STA. LINE	SN228 SN229 INTERFACE	SN241 CONTACT	
T0	CID0		1	T4	CID4	25	
R0	CIG0		2	R4	CIG4	26	
			3			27	
			4			28	
			5			29	
			6			30	
T1	CID1		7	T5	CID5	31	
R1	CIG1		8	R5	CIG5	32	
			9			33	
			10			34	
			11			35	
			12			36	
T2	CID2		13	T6	CID6	37	
R2	CIG2		14	R6	CIG6	38	
			15			39	
			16			40	
			17			41	
			18			42	
T3	CID3		19	T7	CID7	43	
R3	CIG3		20	R7	CIG7	44	
			21			45	
			22			46	
			23			47	
			24			48	
						49	
						50	

9.4.3 Shielded 25-pair connector cable terminations for SN221B, SN222B, SN228, SN229, and SN241 circuit packs in port carrier (for slots 01, 03, 06, 08, 14, 16, 19, 21) (Sheet 2 of 2)

CONNECTOR C00			CONNECTING BLOCK TERMINAL
SN221B SN222B STA. LINE	SN228 SN229 CONTACT INTERFACE	SN241 CONTACT INTERFACE	
T0	CID0		25
R0	CIG0		26
T1	CID1		27
R1	CIG1		28
T2	CID2		29
R2	CIG2		30
T3	CID3		31
R3	CIG3		32
			33
			34
			35
			36
			37
			38
			39
			40
T4	CID4		41
R4	CIG4		42
T5	CID5		43
R5	CIG5		44
T6	CID6		45
R6	CIG6		46
T7	CID7		47
R7	CIG7		48
			49
			50

CONNECTOR CC2			CONNECTING BLOCK TERMINAL	CONNECTOR CC2		CONNECTING BLOCK TERMINAL
SN221B SN222B STA. LINE	SN228 SN229 CONTACT INTERFACE	SN241 CONTACT INTERFACE		SN221B SN222B STA. LINE	SN241 CONTACT INTERFACE	
T0	CID0		1	T4	CID4	25
R0	CIG0		2	R4	CIG4	26
			3			27
			4			28
			5			29
			6			30
T1	CID1		7	T5	CID5	31
R1	CIG1		8	R5	CIG5	32
			9			33
			10			34
			11			35
			12			36
T2	CID2		13	T6	CID6	37
R2	CIG2		14	R6	CIG6	38
			15			39
			16			40
			17			41
			18			42
T3	CID3		19	T7	CID7	43
R3	CIG3		20	R7	CIG7	44
			21			45
			22			46
			23			47
			24			48
						49
						50

9.4.4 25-pair shielded connector cable terminations for various SN type circuit packs for DS-1/MFAT carrier (for slots 00-03, 05-08, 13-16 and 18-21) Sheet 1 of 2)

LEAD COLOR	CONNECTING BLOCK TERMINAL	110-TYPE CONN. BLOCK GROUP	SN224 MFET LINE	SN270 GENERAL PURPOSE PORT	SN233 TIE TRUNK	SN231 AUXILIARY TRUNK	SN230 CO TRUNK	SN232 DID TRUNK	SN238 EIA INTERFACE	SN243 DATA PORT	SN253 AUXILIARY TONES	SN221, SN228 SN222, SN229 STA. LINE	SN241 CONTACT INTERFACE	SN244 AUTOMATIC NUMBER IDENTIFICATION	
W-BL	1	1	TT0		T0	T0	T0	T0		T0	DIAL1	T0	CID0	T0	
BL-W	2		TR0		R0	R0	R0	R0		R0	DIAL2	R0	CIG0	R0	
W-O	3		BT0	RT0	T10				R10				T1	CID1	
O-W	4		BR0	RR0	R10				R20				R1	CIG1	
W-GR	5		LT0	TT0	E0	AL0			S10		ARING1		T2	CID2	
GR-W	6		LR0	TR0	M0	S0			S20		ARING2		R2	CIG2	
W-BR	7	2	TT2		T1	T1	T1	T1		T1	PABSY1	T3	CID3	T1	
BR-W	8		TR2		R1	R1	R1	R1		R1	PABSY2		R3	CIG3	R1
W-SL	9		BT2	RT2	T11				R12						
SL-W	10		BR2	RR2	R11				R22						
R-BL	11		LT2	TT2	E1	AL1			S12						
BL-R	12		LR2	TR2	M1	S1			S22						
R-O	13	3	TT4		T2	T2	T2	T2		T2	PASEZ1				
O-R	14		TR4		R2	R2	R2	R2		R2	PASEZ2				
R-GR	15		BT4	RT4	T12				R14						
GR-R	16		BR4	RR4	R12				R24						
R-BR	17		LT4	TT4	E2	AL2			S14				T4	CID4	
BR-R	18		LR4	TR4	M2	S2			S24				R4	CIG4	
R-SL	19	4	TT6		T3	T3	T3	T3		T3	ECR1	T5	CID5		
SL-R	20		TR6		R3	R3	R3	R3		R3	ECR2		R5	CIG5	
BK-BL	21		BT6	RT6	T13				R16				T6	CID6	
BL-BK	22		BR6	RR6	R13				R26				R6	CIG6	
BK-O	23		LT6	TT6	E3	AL3			S16		CHIME1		T7	CID7	
O-BK	24		LR6	TR6	M3	S3			S26		CHIME2		R7	CIG7	

9.4.4 25-pair shielded connector cable terminations for various SN type circuit packs
for DS-1/MFAT carrier (for slots 00-03, 05-08, 13-16, and 18-21) (Sheet 2 of 2)

LEAD COLOR	CONNECTING BLOCK TERMINAL	110-TYPE CONN. BLOCK GROUP	SN224 MFET LINE	SN270/ SN271 GENERAL PURPOSE PORT	SN233 TIE TRUNK	SN231 AUXILIARY TRUNK	SN230 CO TRUNK	SN232 DID TRUNK	SN238 EIA INTERFACE	SN243 DATA PORT	SN253 AUXILIARY TONES	SN221B SN228 SN222B SN229 STA. LINE	SN241 CONTACT INTERFACE	SN244 AUTOMATIC NUMBER IDENTIFICATION	
BK-GR	25	5													
GR-BK	26														
BK-BR	27														
BR-BK	28														
BK-SL	29														
SL-BK	30														
Y-BL	31	6													
BL-Y	32														
Y-O	33														
O-Y	34														
Y-GR	35														
GR-Y	36														
Y-BR	37	7													
BR-Y	38														
Y-SL	39														
SL-Y	40														
V-BL	41														
BL-V	42														
V-O	43	8													
O-V	44														
V-GR	45														
GR-V	46														
V-BR	47														
BR-V	48														
V-SL	49		GRDD	GRDD	GRDD	GRDD	GRDD	GRDD		GRDD	GRDD			GRDD	
SL-V	50		GRDD	GRDD	GRDD	GRDD	GRDD	GRDD		GRDD	GRDD			GRDD	

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 1 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
23	1	IOXB01	D0	W-BL	1
		IOXA01		BL-W	2
		IORB01		W-O	3
		IORA01		O-W	4
	2	IOXB02		W-G	5
		IOXA02		G-W	6
		IORB02		W-BR	7
		IORA02		BR-W	8
	3	IOXB03		W-S	9
		IOXA03		S-W	10
		IORB03		R-BL	11
		IORA03		BL-R	12
	4	IOXB04		R-O	13
		IOXA04		O-R	14
		IORB04		R-G	15
		IORA04		G-R	16
	5	IOXB05		R-BR	17
		IOXA05		BR-R	18
		IORB05		R-S	19
		IORA05		S-R	20
	6	IOXB06		BK-BL	21
		IOXA06		BL-BK	22
		IORB06		BK-O	23
		IORA06		O-BK	24

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 2 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
23	7	IOXB07	D0	BK-G	25
		IOXA07		G-BK	26
		IORB07		BK-BR	27
		IORA07		BR-BK	28
	8	IOXB08		BK-S	29
		IOXA08		S-BK	30
		IORB08		Y-BL	31
		IORA08		BL-Y	32
	9	IOXB09		Y-O	33
		IOXA09		O-Y	34
		IORB09		Y-G	35
		IORA09		G-Y	36
	10	IOXB10		Y-BR	37
		IOXA10		BR-Y	38
		IORB10		Y-S	39
		IORA10		S-Y	40
	11	IOXB11		V-BL	41
		IOXA11		BL-V	42
		IORB11		V-O	43
		IORA11		O-V	44
			V-G	45	
			G-V	46	
			V-BR	47	
			BR-V	48	
			V-S	49	
			S-V	50	

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 3 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
23	12	IOXB12	D1	W-BL	1
		IOXA12		BL-W	2
		IORB12		W-O	3
		IORA12		O-W	4
	13	IOXB13		W-G	5
		IOXA13		G-W	6
		IORB13		W-BR	7
		IORA13		BR-W	8
				W-S	9
				S-W	10
				R-BL	11
				BL-R	12
				R-O	13
				O-R	14
				R-G	15
				G-R	16
24	16	IOXB16		R-BR	17
		IOXA16		BR-R	18
		IORB16		R-S	19
		IORA16		S-R	20
	17	IOXB17		BK-BL	21
		IOXA17		BL-BK	22
		IORB17		BK-O	23
		IORA17		O-BK	24

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 4 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
24	18	IOXB18	D1	BK-G	25
		IOXA18		G-BK	26
		IORB18		BK-BR	27
		IORA18		BR-BK	28
	19	IOXB19		BK-S	29
		IOXA19		S-BK	30
		IORB19		Y-BL	31
		IORA19		BL-Y	32
	20	IOXB20		Y-O	33
		IOXA20		O-Y	34
		IORB20		Y-G	35
		IORA20		G-Y	36
	21	IOXB21		Y-BR	37
		IOXA21		BR-Y	38
		IORB21		Y-S	39
		IORA21		S-Y	40
	22	IOXB22		V-BL	41
		IOXA22		BL-V	42
		IORB22		V-O	43
		IORA22		O-V	44
23	IOXB23	V-G	45		
	IOXA23	G-V	46		
	IORB23	V-BR	47		
	IORA23	BR-V	48		
			V-S	49	
			S-V	50	

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 5 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
24	24	IOXB24	D2	W-BL	1
		IOXA24		BL-W	2
		IORB24		W-O	3
		IORA24		O-W	4
	25	IOXB25		W-G	5
		IOXA25		G-W	6
		IORB25		W-BR	7
		IORA25		BR-W	8
	26	IOXB26		W-S	9
		IOXA26		S-W	10
		IORB26		R-BL	11
		IORA26		BL-R	12
	27	IOXB27		R-O	13
		IOXA27		O-R	14
		IORB27		R-G	15
		IORA27		G-R	16
	28	IOXB28		R-BR	17
		IOXA28		BR-R	18
		IORB28		R-S	19
		IORA28		S-R	20
	29	IOXB29		BK-BL	21
		IOXA29		BL-BK	22
		IORB29		BK-O	23
		IORA29		O-BK	24

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 6 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
24	30	IOXB30	D2	BK-G	25
		IOXA30		G-BK	26
		IORB30		BK-BR	27
		IORA30		BR-BK	28
	31	IOXB31		BK-S	29
		IOXA31		S-BK	30
		IORB31		Y-BL	31
		IORA31		BL-Y	32
25	32	IOXB32		Y-O	33
		IOXA32		O-Y	34
		IORB32		Y-G	35
		IORA32		G-Y	36
	33	IOXB33		Y-BR	37
		IOXA33		BR-Y	38
		IORB33		Y-S	39
		IORA33		S-Y	40
	34	IOXB34		V-BL	41
		IOXA34		BL-V	42
		IORB34		V-O	43
		IORA34		O-V	44
	35	IOXB35		V-G	45
		IOXA35		G-V	46
		IORB35		V-BR	47
		IORA35		BR-V	48
				V-S	49
			S-V	50	

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 7 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
25	36	IOXB36	D3	W-BL	1
		IOXA36		BL-W	2
		IORB36		W-O	3
		IORA36		O-W	4
	37	IOXB37		W-G	5
		IOXA37		G-W	6
		IORB37		W-BR	7
		IORA37		BR-W	8
	38	IOXB38		W-S	9
		IOXA38		S-W	10
		IORB38		R-BL	11
		IORA38		BL-R	12
	39	IOXB39		R-O	13
		IOXA39		O-R	14
		IORB39		R-G	15
		IORA39		G-R	16
	40	IOXB40		R-BR	17
		IOXA40		BR-R	18
		IORB40		R-S	19
		IORA40		S-R	20
	41	IOXB41		BK-BL	21
		IOXA41		BL-BK	22
		IORB41		BK-O	23
		IORA41		O-BK	24

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 8 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL	
25	42	IOXB42	D3	BK-G	25	
		IOXA42		G-BK	26	
		IORB42		BK-BR	27	
		IORA42		BR-BK	28	
	43	IOXB43		BK-S	29	
		IOXA43		S-BK	30	
		IORB43		Y-BL	31	
		IORA43		BL-Y	32	
	44	IOXB44		Y-O	33	
		IOXA44		O-Y	34	
		IORB44		Y-G	35	
		IORA44		G-Y	36	
	45	IOXB45		Y-BR	37	
		IOXA45		BR-Y	38	
		IORB45		Y-S	39	
		IORA45		S-Y	40	
	46	IOXB46		V-BL	41	
		IOXA46		BL-V	42	
		IORB46		V-O	43	
		IORA46		O-V	44	
	47	IOXB47		V-G	45	
		IOXA47		G-V	46	
		IORB47		V-BR	47	
		IORA47		BR-V	48	
					V-S	49
					S-V	50

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 9 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
26	48	IOXB48	D4	W-BL	1
		IOXA48		BL-W	2
		IORB48		W-O	3
		IORA48		O-W	4
	49	IOXB49		W-G	5
		IOXA49		G-W	6
		IORB49		W-BR	7
		IORA49		BR-W	8
	50	IOXB50		W-S	9
		IOXA50		S-W	10
		IORB50		R-BL	11
		IORA50		BL-R	12
	51	IOXB51		R-O	13
		IOXA51		O-R	14
		IORB51		R-G	15
		IORA51		G-R	16
	52	IOXB52		R-BR	17
		IOXA52		BR-R	18
		IORB52		R-S	19
		IORA52		S-R	20
	53	IOXB53		BK-BL	21
		IOXA53		BL-BK	22
		IORB53		BK-O	23
		IORA53		O-BK	24

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 10 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
26	54	IOXB54	D4	BK-G	25
		IOXA54		G-BK	26
		IORB54		BK-BR	27
		IORA54		BR-BK	28
	55	IOXB55		BK-S	29
		IOXA55		S-BK	30
		IORB55		Y-BL	31
		IORA55		BL-Y	32
	56	IOXB56		Y-O	33
		IOXA56		O-Y	34
		IORB56		Y-G	35
		IORA56		G-Y	36
	57	IOXB57		Y-BR	37
		IOXA57		BR-Y	38
		IORB57		Y-S	39
		IORA57		S-Y	40
	58	IOXB58		V-BL	41
		IOXA58		BL-V	42
		IORB58		V-O	43
		IORA58		O-V	44
59	IOXB59	V-G	45		
	IOXA59	G-V	46		
	IORB59	V-BR	47		
	IORA59	BR-V	48		
			V-S	49	
			S-V	50	

9.4.5 25-Pair connector cable terminations for TN403 circuit pack (data channels)
 (Sheet 11 of 11)

SLOT	DATA CHANNEL NUMBER	LEAD DESIGNATION	CONNECTOR	LEAD COLOR	CONNECTING BLOCK TERMINAL
26	60	IOXB60	D5	W-BL	1
		IOXA60		BL-W	2
		IORB60		W-O	3
		IORA60		O-W	4
	61	IOXB61		W-G	5
		IOXA61		G-W	6
		IORB61		W-BR	7
		IORA61		BR-W	8
	62	IOXB62		W-S	9
		IOXA62		S-W	10
		IORB62		R-BL	11
		IORA62		BL-R	12
	63	IOXB63		R-O	13
		IOXA63		O-R	14
		IORB63		R-G	15
		IORA63		G-R	16

9.4.6 25-Pair connector cable terminations for TN492C circuit pack (slot 32 - alarms)
 (Sheet 1 of 2)

CONNECTOR	LEAD DESIGNATION	LEAD COLOR	CONNECTING BLOCK TERMINAL
D6	UNIT20	W-BL	1
	UNIT19	BL-W	2
	UNIT22	W-O	3
	UNIT21	O-W	4
	UNIT24	W-G	5
	UNIT23	G-W	6
		W-BR	7
	UNIT25	BR-W	8
	UNIT27	W-S	9
	UNIT26	S-W	10
	UNIT29	R-BL	11
	UNIT28	BL-R	12
	UNIT31	R-O	13
	UNIT30	O-R	14
	AUXCTMP	R-G	15
	UNIT32	G-R	16
	EXTEQMN	R-BR	17
	EXTEQMJ	BR-R	18
	AUXCRCT	R-S	19
	AUXCHO	S-R	20
	AUXCCB	BK-BL	21
	AUXFRQ	BL-BK	22
	AUXCFAN	BK-O	23
		O-BK	24

CONNECTOR	LEAD DESIGNATION	LEAD COLOR	CONNECTING BLOCK TERMINAL
D7	TIPO RINGO	W-BL	26
		BL-W	1
		W-O	3
		O-W	4
		W-G	5
		G-W	6
		W-BR	7
		BR-W	8
		W-S	9
		S-W	10
		R-BL	11
		BL-R	12
		R-O	13
		O-R	14
		R-G	15
		G-R	16
		R-BR	17
		BR-R	18
		R-S	19
		S-R	20
		BK-BL	21
		BL-BK	22
		BK-O	23
		O-BK	24

9.4.6 25-Pair connector cable terminations for TN492 circuit pack (slot 32 - alarms)
 (Sheet 2 of 2)

CONNECTOR	LEAD DESIGNATION	LEAD COLOR	CONNECTING BLOCK TERMINAL
D6	EXTPRMJ	BK-G	25
	EXTPRMN	G-BK	26
	UNIT2	BK-BR	27
	UNIT1	BR-BK	28
	UNIT4	BK-S	29
	UNIT3	S-BK	30
	UNIT6	Y-BL	31
	UNIT5	BL-Y	32
	UNIT8	Y-O	33
	UNIT7	O-Y	34
	UNIT10	Y-G	35
	UNIT9	G-Y	36
		Y-BR	37
	UNIT11	BR-Y	38
	UNIT13	Y-S	39
	UNIT12	S-Y	40
	UNIT15	V-BL	41
	UNIT14	BL-V	42
	UNIT17	V-O	43
	UNIT16	O-V	44
		V-G	45
	UNIT18	G-V	46
	RINGO	V-BR	47
	TIPO	BR-V	48
	RING1	V-S	49
TIP1	S-V	50	

CONNECTOR	LEAD DESIGNATION	LEAD COLOR	CONNECTING BLOCK TERMINAL
D7		BK-G	25
		G-BK	26
		BK-BR	27
		BR-BK	28
		BK-S	29
		S-BK	30
		Y-BL	31
		BL-Y	32
		Y-O	33
		O-Y	34
		Y-G	35
		G-Y	36
		Y-BR	37
		BR-Y	38
		Y-S	39
		S-Y	40
		V-BL	41
		BL-V	42
		V-O	43
		O-V	44
		V-G	45
	C	G-V	46
	D1	V-BR	47
	ABO	BR-V	48
		V-S	49
S-V		50	

9.4.7 25-Pair connector cable terminations for ANN 17B circuit pack in DS-1/MFAT carriers slots 00, 05, 13, 18 only

WARNING: The ANN 17B 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 voltage will damage the ANN 17B.

NOTE: Because of time slot limitations, if an ANN 11B is in slot 5, an ANN 17B cannot be in slots 00, 01, 02, 06, or 07. If ANN 11B is in slot 18, an ANN 17B cannot be in slots 13, 14, 15, 18, 19 and 20.

CIRCUIT PACK LEAD DESIG	CONNECTOR LEAD DESIG	BACKPLANE CONNECTOR PIN NO.	CABLE CONN PIN NO.	COLOR
V1R4	R06	24	7	O-R
V1T4	T06	12	32	R-O
CR4	R07	23	8	G-R
CT4	T07	11	33	R-G
P+4	R08	22	9	BR-R
P-4	T08	10	34	R-BR
V1R6	R09	21	10	S-R
V1T6	T09	9	35	R-S
CR6	R10	20	11	BL-BK
CT6	T10	8	36	BK-BL
P+6	R11	19	12	O-BK
P-6	T11	7	37	BK-O
V1R5	R18	18	19	BR-Y
V1T5	T18	6	44	Y-BR
CR5	R19	17	20	S-Y
CT5	T19	5	45	Y-S
P+5	R20	16	21	BL-V
P-5	T20	4	46	V-BL
V1R7	R21	15	22	O-V
V1T7	T21	3	47	V-O
CR7	R22	14	23	G-V
CT7	T22	2	48	V-G
P+7	R23	13	24	BR-V
P-7	T23	1	49	V-BR

CIRCUIT PACK LEAD DESIG	CONNECTOR LEAD DESIG	BACKPLANE CONNECTOR PIN NO.	CABLE CONN PIN NO.	COLOR
V1R0	R00	24	1	BL-W
V1T0	T00	12	26	W-BL
CR0	R01	23	2	O-W
CT0	T01	11	27	W-O
P+0	R02	22	3	G-W
P-0	T02	10	28	W-G
V1R2	R03	21	4	GR-W
V1T2	T03	9	29	W-GR
CR2	R04	20	5	S-W
CT2	T04	8	30	W-S
P+2	R05	19	6	BL-R
P-2	T05	7	31	R-BL
V1R1	R12	18	13	G-BK
V1T1	T12	6	38	BK-G
CR1	R13	17	14	BR-BK
CR2	T13	5	39	BK-BR
P+1	R14	16	15	S-BK
P-1	T14	4	40	BK-S
V1R3	R15	15	16	BL-Y
V1T3	T15	3	41	Y-BL
CR3	R16	14	17	O-Y
CT3	T16	2	42	Y-O
P+3	R17	13	18	G-Y
P-3	T17	1	43	Y-G

9.4.8 25-Pair connector cable terminations for ANN-17B circuit pack in DS-1/MFAT carrier slots 01, 02, 03, 06, 07, 08, 14, 15, 16, 19, 20, 21 only

WARNING: The ANN 17B 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 voltage will damage the ANN 17B.

NOTE: Because of time slot limitations, if an ANN 11B is in slot 05, an ANN 17B cannot be in slots 00, 01, 02, 06 or 07. If an ANN 17B is in slot 18, and ANN 17B cannot be in slots 13, 14, 15, 18, 19 and 20.

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
V1T6	T21	47	V-O
V1R6	R21	22	O-V
CT6	T22	48	V-G
CR6	R22	23	G-V
P-6	T23	49	V-BR
P+6	R23	24	BR-V
GRD	GRDCOM	50	V-S
GRD	GRDCOM	25	S-V

9.4.9 25-Pair connector cable terminations for ANN 17B circuit pack in port carrier slots 00-03, 06-08, 13-16, and 19-21

WARNING: The ANN 17B 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 voltage will damage the ANN 17B.

NOTE: An ANN 17B cannot be located in slots 05 or 18 because of carrier stiffener interference.

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

CONN LEAD DESIG	CKT	CIRCUIT PACK LEAD DESIGNATION	PIN NO.	COLOR
T00	0	V1T0	38	BK-G
R00		V1R0	13	G-BK
T01		CT0	39	BK-BR
R01		CRO	14	BR-BK
T02		P-0	40	BK-S
R02		P+0	15	S-BK
T03	2	V1T2	41	Y-BL
R03		V1R2	16	BL-Y
T04		CT2	42	Y-O
R04		CR2	17	O-Y
T05		P-2	43	Y-G
R05		P+2	18	G-Y
T06	4	V1T4	44	BR-Y
R06		V1R4	19	Y-BR
T07		CT4	45	Y-S
R07		CR4	20	S-Y
T08		P-4	46	Y-BL
R08		P+4	21	BL-Y
T09	6	V1T6	47	V-O
R09		V1R6	22	O-V
T10		CT6	48	V-G
R10		CR6	23	G-V
T11		P-6	49	V-BR
R11		P+6	24	BR-V
GRD D		GRDD	50	V-S
GRD D		GRDD	25	S-V

9.4.10 25-pair connector cable terminations for ANN 11B and ANN 15B in the DS-1/MFAT carrier.

NOTES:

1. ANN 11B can only be in slots 05 and 18
2. The following limitations exist when ANN 11B or ANN 15B is placed in the DS-1/MFAT carrier.

If an ANN 15B is in slot 00, slots 01 and 02 must be vacant.
 If an ANN 15B is in slot 05, slots 06 and 07 must be vacant.
 If an ANN 11B is in slot 05, slots 00, 01, 02, 06, and 07 must be vacant.
 If an ANN 15B is in slot 13, slots 14 and 15 must be vacant.
 If an ANN 15B is in slot 18, slots 19 and 20 must be vacant.
 If an ANN 11B is in slot 18, slots 13, 14, 15, 19, and 20 must be vacant.
 An ANN 11B and an ANN 15B cannot be located in the same half carrier.

SLOT	LEAD DESIGNATIONS	CONNECTOR	CONNECTOR PIN NUMBER
See TABLE A	LIN	See TABLE A	26
	LIP		1
	L175		27
			2
	LON 75		28
	LOP 175		3
	LON 120		29
	LOP 120		4
			30
	LON		5
	LBACK2		31
	LBACK1		6

SLOT	CONNECTION
00	D0
05	D4
13	D8
18	D12

PART 10. INTRA- AND INTERCABINET CABLING

Contents

General	10.1
Intracabinet Cabling	10.2
Intercabinet Cabling	10.3

10.1 General

10.1.1 Cabling within the system is provided by various group numbers of ED-1E434. The two basic cable types are 902A flat ribbon and 4-MHz channel coaxial. Other cables include 25-pair connectorized, shielded cables, and discrete wires terminated with connectors or spade lugs. If the system's cable harness 25-pair cables are equipped with ferrite cores, there is no minimum length for the shielded 25 pair. If the system is not equipped with the ferrite cores, there is a 50-foot minimum length for the cables. If the ferrite core on the cable is broken, it cannot be repaired by gluing, soldering, etc. Another cable with the proper ferrite core must be obtained

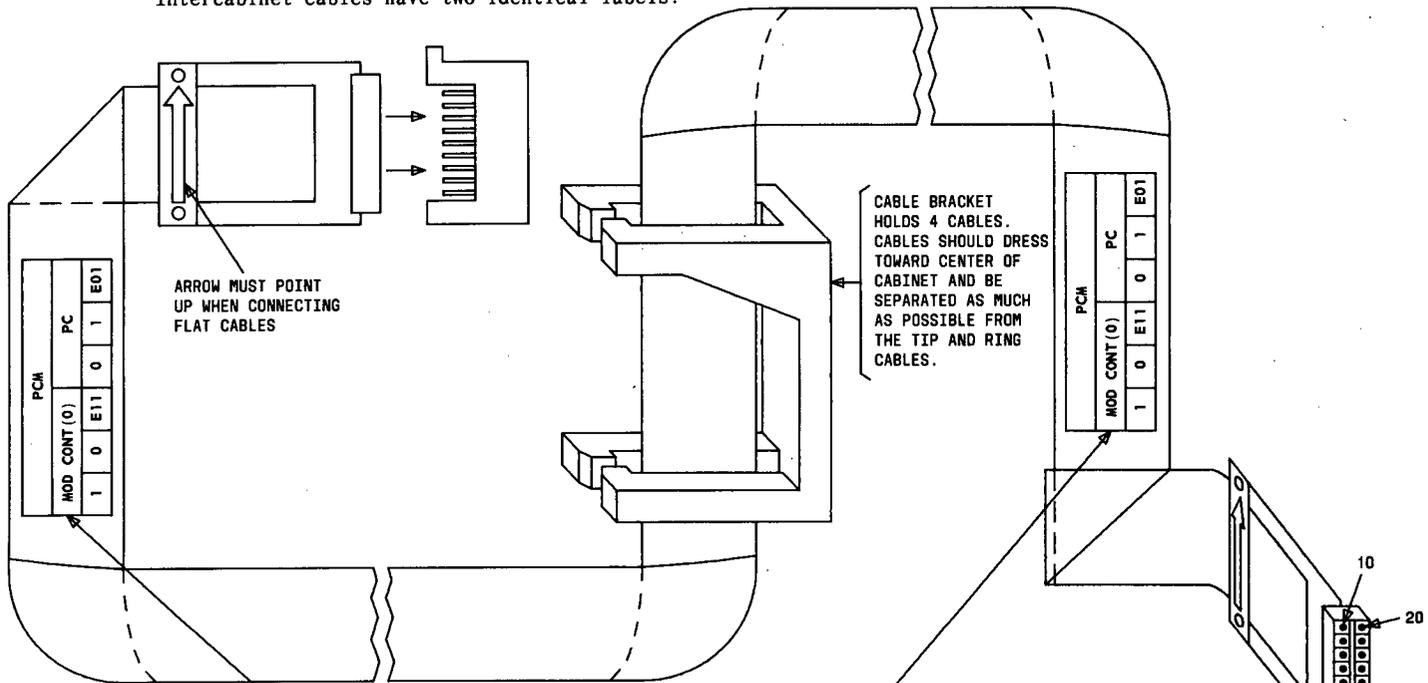
10.1.2 This section is made up of tables that provide point-to-point wiring in the system. Cable types and group numbers are used to locate various cables. Connectors are given at each point which the cable connects. Intracabinet cabling is contained in the front of the section followed by intercabinet cabling.

10.1.3 After a cable is removed from the bundle, it is dressed toward the center of the cabinet using the plastic cable brackets shown in paragraph 10.1.5. One method of installing the flat cables that is easy and neat is to connect the cables to the "E" connectors starting with the lowest "E" number and work from the right (looking from the rear) to the left. The intercabinet cables are then placed in the shielded duct and routed to their destination. Any fiber optic cable in the duct should be placed on top of the other cables.

10.1.4 Differences in floor layouts affect the lengths and group numbers of PCM, I/O, and alarm cables. The following intercabinet cabling is based on the typical cabinet lineups shown in paragraphs 10.1.6 through 10.1.1. Paragraph 10.1.10 gives a rear view of the carrier backplane to assist in connector location.

10.1.5 Flat cables - labels, dress, and connectors

NOTE: Intra cabinet cables have one label,
Intercabinet cables have two identical labels.



PCM CABLE					
TO			FROM		
MOD CONTROL CARRIER(0)		CARRIER	PORT CARRIER		CARRIER
Cabinet Number	Carrier Physical Location	Connector designation	Cabinet Number	Carrier Physical Location	Connector designation
1	0	E11	0	1	E01

PCM CABLE					
TO			FROM		
MOD CONTROL CARRIER(0)		CARRIER	PORT CARRIER		CARRIER
Cabinet Number	Carrier Physical Location	Connector Designation	Cabinet Number	Carrier Physical Location	Connector Designation
1	0	E11	0	1	E01

10.1.6 Typical single module system unduplicated common control

NETWORK CAB. (3) J58886C	NETWORK CAB. (2) J58886C	NETWORK CAB. (1) J58886B	NETWORK CAB. (0) J58886J
-----	PORT CARRIER [8] J58888A OR DS-1/MFAT CARRIER [8] J58888N (3)	PORT CARRIER [1] J58888A OR DS-1/MFAT CARRIER [1] J58888N (3)	ALARM PANEL J58889W
PORT CARRIER [11] J58888A OR DS-1/MFAT CARRIER [11] J58888N (2)	PORT CARRIER [7] J58888A OR DS-1/MFAT CARRIER [7] J58888N (2)	PORT CARRIER [0] J58888A OR DS1/MFAT CARRIER [0] J58888N (2)	PORT CARRIER [4] J58888A OR DS-1/MFAT CARRIER [4] J58888N (3)
PORT CARRIER [10] J58888A OR DS-1/MFAT CARRIER [10] J58888N (1)	PORT CARRIER [6] J58888A OR DS-1/MFAT CARRIER [6] J58888N (1)	MODULE CONTROL [1] J58888M OR PORT CARRIER [2,5,OR 9] J58888A	PORT CARRIER [3] J58888A OR DS-1/MFAT CARRIER [3] J58888N (2)
PORT CARRIER [9] J58888A OR DS-1/MFAT CARRIER [9] J58888N (0)	PORT CARRIER [5] J58888A OR DS-1/MFAT CARRIER [5] J58888N (0)	DS1/MFAT CARRIER [2,5,OR 9] J58888N OR NO-CARRIER ADAPTER (1)	PORT CARRIER [2] J58888A OR DS-1/MFAT CARRIER [2] J58888N (1)
FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	MODULE CONTROL [0] J58888M (0)	COMMON CONTROL J58888E (0)
		FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V

ELECTRICAL POSITION

EQUIPMENT POSITION

10.1.7 Typical single module system duplicated common control

NETWORK CAB. (3) J58886C	NETWORK CAB. (2) J58886C	NETWORK CAB. (1) J58886C	NETWORK CAB. (0) J58886B	SYSTEM CABINET (0) J58886K	
	PORT CARRIER [9] J58888A OR DS-1/MFAT CARRIER [9] J58888N (3)	PORT CARRIER [5] J58888A OR DS-1/MFAT CARRIER [5] J58888N (3)	PORT CARRIER [1] J58888A OR DS-1/MFAT CARRIER [1] J58888N (3)	ALARM PANEL J58889X	ELECTRICAL POSITION EQUIPMENT POSITION
	PORT CARRIER [8] J58888A OR DS-1/MFAT CARRIER [8] J58888N (2)	PORT CARRIER [4] J58888A OR DS-1/MFAT CARRIER [4] J58888N (2)	PORT CARRIER [0] J58888A OR DS-1/MFAT CARRIER [0] J58888N (2)	COMMON CONTROL CONVERTERS J58888F	
PORT CARRIER [11] J58888A OR DS-1/MFAT CARRIER [11] J58888N (1)	PORT CARRIER [7] J58888A OR DS-1/MFAT CARRIER [7] J58888N (1)	PORT CARRIER [3] J58888A OR DS-1/MFAT CARRIER [3] J58888N (1)	MODULE CONTROL J58888M [1] OR PORT CARRIER [2, 6, OR 10] J58888A OR DS-1/MFAT CARRIER [2, 6, OR 10] J58888N OR NO-CARRIER ADAPTER	COMMON CONTROL [1] J58888E (1)	
PORT CARRIER [10] J58888A OR DS-1/MFAT CARRIER [10] J58888N (0)	PORT CARRIER [6] J58888A OR DS-1/MFAT CARRIER [6] J58888N (0)	PORT CARRIER [2] J58888A OR DS-1/MFAT CARRIER [2] J58888N (0)		COMMON CONTROL [0] (0)	
FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	MODULE CONTROL [0] J58888M (0)	J58888E (0)	
			FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	

10.1.8 Typical multimodule system, duplicated TMS, and duplicated module control for maximum of 15 modules (n = 1-14)

MOD (0) NTKW CB (2) J58886C	MOD (0) NTKW CB (1) J58886C	MOD (0) NTKW CB (0) J58886B	SYSTEM (0) J58886K	SYSTEM (1) J58886F
PORT CARRIER [9] J58888A OR DS-1/MFAT CARRIER [9] J58888N (3)	PORT CARRIER [5] J58888A OR DS-1/MFAT CARRIER [5] J58888N (3)	PORT CARRIER [1] J58888A OR DS-1/MFAT CARRIER [1] J58888N (3)	ALARM PANEL J58889X	TMS GROWTH (1) J58889C
PORT CARRIER [8] J58888A OR DS-1/MFAT CARRIER [8] J58888N (2)	PORT CARRIER [4] J58888A OR DS-1/MFAT CARRIER [4] J58888N (2)	PORT CARRIER [0] J58888A-2 OR DS-1/MFAT CARRIER [0] J58888N (2)	DC/DC CONV J58888F (2)	TMS BASIC (1) J58888C (2)
PORT CARRIER [7] J58888A OR DS-1/MFAT CARRIER [7] J58888N (1)	PORT CARRIER [3] J58888A OR DS-1/MFAT CARRIER [3] J58888N (1)	MODULE CONTROL [1] J58888M OR DS-1/MFAT CARRIER [0] J58888N (1)	COMMON CONTROL [1] J58888E (1)	NO CARRIER ADAPTER OR TMS GROWTH (0) J58888C (1)
PORT CARRIER [6] J58888A OR DS-1/MFAT CARRIER [6] J58888N (0)	PORT CARRIER [2] J58888A OR DS-1/MFAT CARRIER [2] J58888N (0)	MODULE CONTROL [0] J58888M OR DS-1/MFAT CARRIER [0] J58888N (0)	COMMON CONTROL [0] J58888E (0)	TMS BASIC [0] J58888C (0)
FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V

MOD (n) NTKW CB (3) J58886C	MOD (n) NTKW CB (2) J58886C	MOD (n) NTKW CB (1) J58886C	MOD (n) NTKW CB (0) J58886B	MOD (0) NTKW CB (3) J58886C
	PORT CARRIER [9] J58888A OR DS-1/MFAT CARRIER [9] J58888N (3)	PORT CARRIER [5] J58888A OR DS-1/MFAT CARRIER [5] J58888N (3)	PORT CARRIER [1] J58888A OR DS-1/MFAT CARRIER [1] J58888N (3)	
	PORT CARRIER [8] J58888A OR DS-1/MFAT CARRIER [8] J58888N (2)	PORT CARRIER [4] J58888A OR DS-1/MFAT CARRIER [4] J58888N (2)	PORT CARRIER [0] OR DS-1/MFAT CARRIER [0] J58888A-2 (2)	
PORT CARRIER [11] J58888A OR DS-1/MFAT CARRIER [11] J58888N (1)	PORT CARRIER [7] J58888A OR DS-1/MFAT CARRIER [7] J58888N (1)	PORT CARRIER [3] J58888A OR DS-1/MFAT CARRIER [3] J58888N (1)	MODULE CONTROL [1] J58888M (1)	PORT CARRIER [11] J58888A-2 OR DS-1/MFAT CARRIER [11] J58888N (1)
PORT CARRIER [10] J58888A OR DS-1/MFAT CARRIER [10] J58888N (0)	PORT CARRIER [6] J58888A OR DS-1/MFAT CARRIER [6] J58888N (0)	PORT CARRIER [2] J58888A OR DS-1/MFAT CARRIER [2] J58888N (0)	MODULE CONTROL [0] J58888N (0)	PORT CARRIER [10] J58888A-2 OR DS-1/MFAT CARRIER [10] J58888N (0)
FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V	FAN ASSEMBLY J58889V

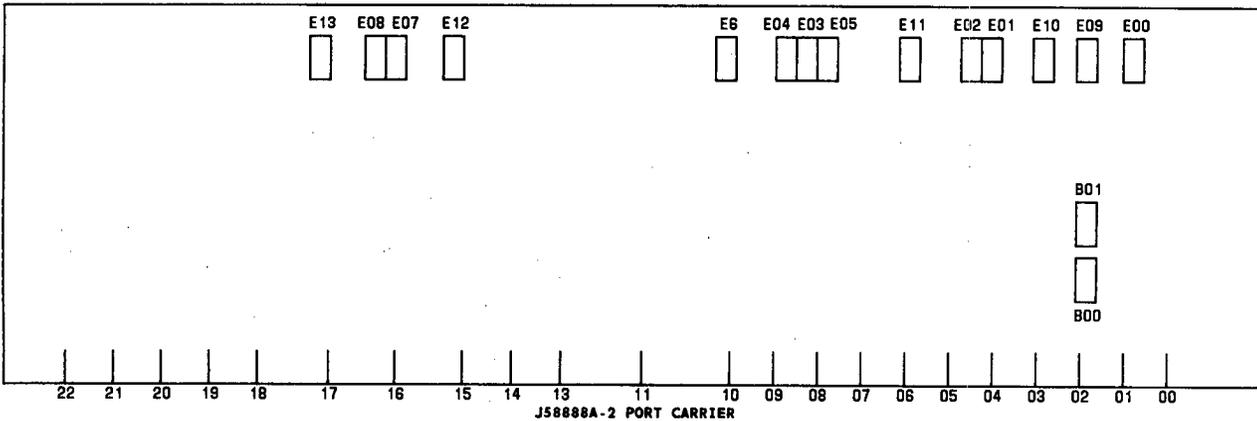
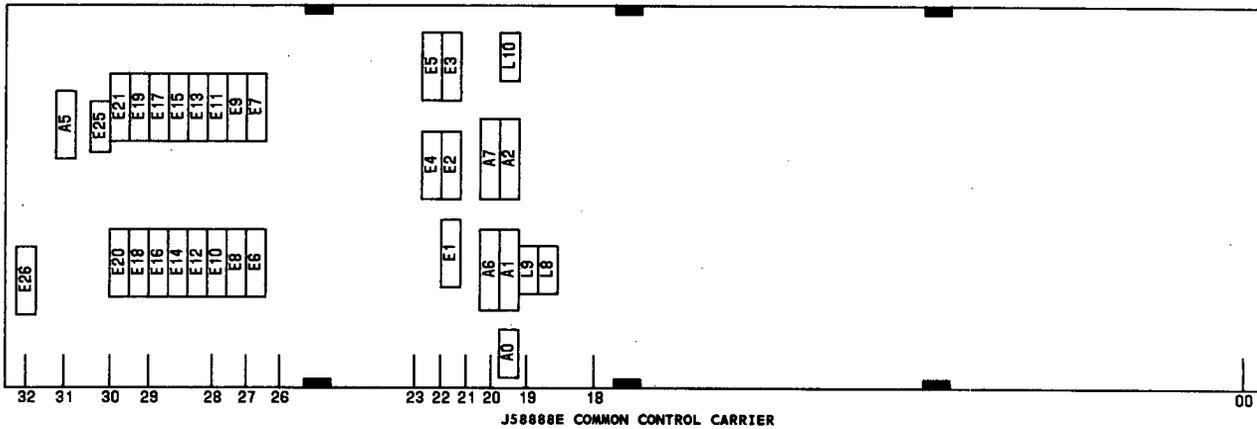
ELECTRICAL
LOCATION

EQUIPMENT
LOCATION

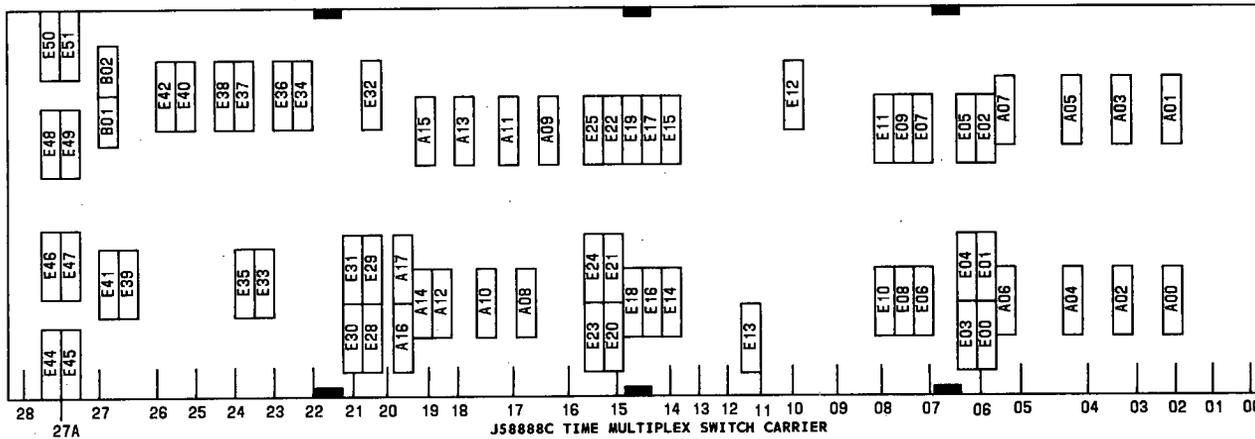
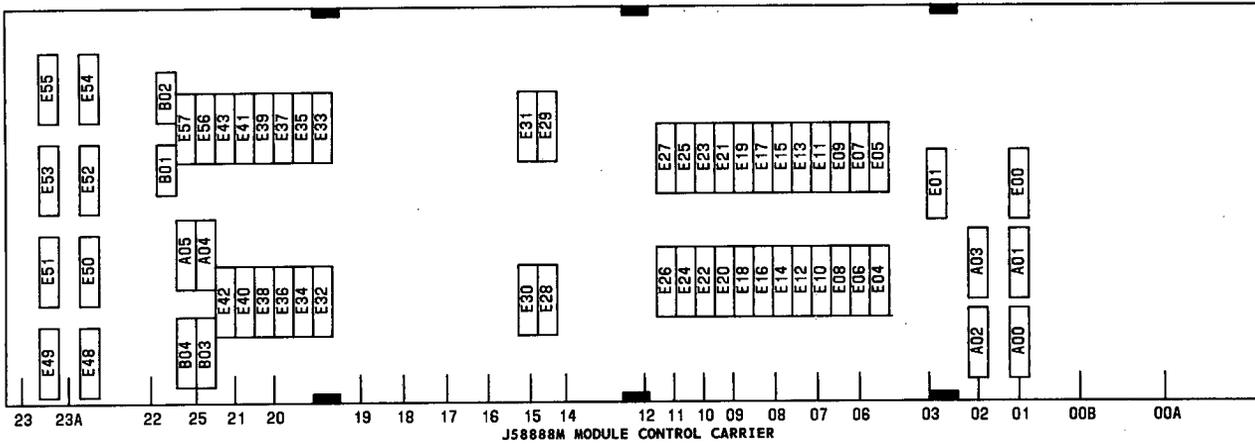
10.1.9 Typical multimodule system, duplicated TMS, and duplicated module control for a maximum of 31 modules (n = 1-30)

MOD (0) NTKW CB (1&2) J58886C	MOD (0) NTKW CB (0) J58886B	SYSTEM (0) J58886K	SYSTEM(1) J58886F	SYSTEM(2) J58886F
PORT CARRIER [5] J58888A OR DS-1/MFAT CARRIER [5] J58888N (3)	PORT CARRIER [1] J58888A OR DS-1/MFAT CARRIER [1] J58888N (3)	ALARM PANEL J58889X	TMS GROWTH [3] J58888C (3)	TMS GROWTH [2] J58888C (3)
PORT CARRIER [4] J58888A OR DS-1/MFAT CARRIER [4] J58888N (2)	PORT CARRIER [0] J58888A-2 [0] OR DS-1/MFAT CARRIER [0] J58888N (2)	DC/DC CONV J58888F (2)	TMS GROWTH [1] J58888C (2)	TMS GROWTH [1] J58888C (2)
PORT CARRIER [3] J58888A OR DS-1/MFAT CARRIER [3] J58888N (1)	MODULE CONTROL [1] J58888M [1] (1)	COMMON CONTROL [1] J58888E (1)	TMS GROWTH [0] J58888C (1)	TMS GROWTH [0] J58888C (1)
PORT CARRIER [2] J58888A OR DS-1/MFAT CARRIER [2] FAN ASSEMBLY (0)	MODULE CONTROL [0] J58888M [0] (0)	COMMON CONTROL [0] J58888E (0)	TMS BASIC [0] J58888C (0)	TMS BASIC [0] [0] J58888C (0)
J58888N	FAN ASSEMBLY	FAN ASSEMBLY	FAN ASSEMBLY	FAN ASSEMBLY
J58889V	J58889V	J58889V	J58889V	J58889V
MOD (n) NTKW CB (3) J58886C	MOD (n) NTKW CB (2) J58886C	MOD (n) NTKW CB (1) J58886C	MOD (n) NTKW CB (0) J58886B	MOD (0) NTKW CB (3) J58886C
	PORT CARRIER [9] J58888A OR DS-1/MFAT CARRIER [9] J58888N (3)	PORT CARRIER [5] J58888A OR DS-1/MFAT CARRIER [5] J58888N (3)	PORT CARRIER [1] J58888A OR DS-1/MFAT CARRIER [1] J58888N (3)	
	PORT CARRIER [8] J58888A OR DS-1/MFAT CARRIER [8] J58888N (2)	PORT CARRIER [4] J58888A OR DS-1/MFAT CARRIER [4] J58888N (2)	PORT CARRIER [0] J58888A-2 OR DS-1/MFAT CARRIER [0] J58888N (2)	
PORT CARRIER [11] J58888A OR DS-1/MFAT CARRIER [11] J58888N (1)	PORT CARRIER [7] J58888A OR DS-1/MFAT CARRIER [7] J58888N (1)	PORT CARRIER [3] J58888A OR DS-1/MFAT CARRIER [3] J58888N (1)	MODULE CONTROL [1] J58888M (1)	PORT CARRIER [7] J58888A OR DS-1/MFAT CARRIER [7] J58888N (1)
PORT CARRIER [10] J58888A OR DS-1/MFAT CARRIER [10] J58888N (0)	PORT CARRIER [6] J58888A OR DS-1/MFAT CARRIER [6] J58888N (0)	PORT CARRIER [2] J58888A OR DS-1/MFAT CARRIER [2] J58888N (0)	MODULE CONTROL [0] J58888M (0)	PORT CARRIER [6] J58888A OR DS-1/MFAT CARRIER [6] J58888N (0)
FAN ASSEMBLY	FAN ASSEMBLY	FAN ASSEMBLY	FAN ASSEMBLY	FAN ASSEMBLY
J58889V	J58889V	J58889V	J58889V	J58889V

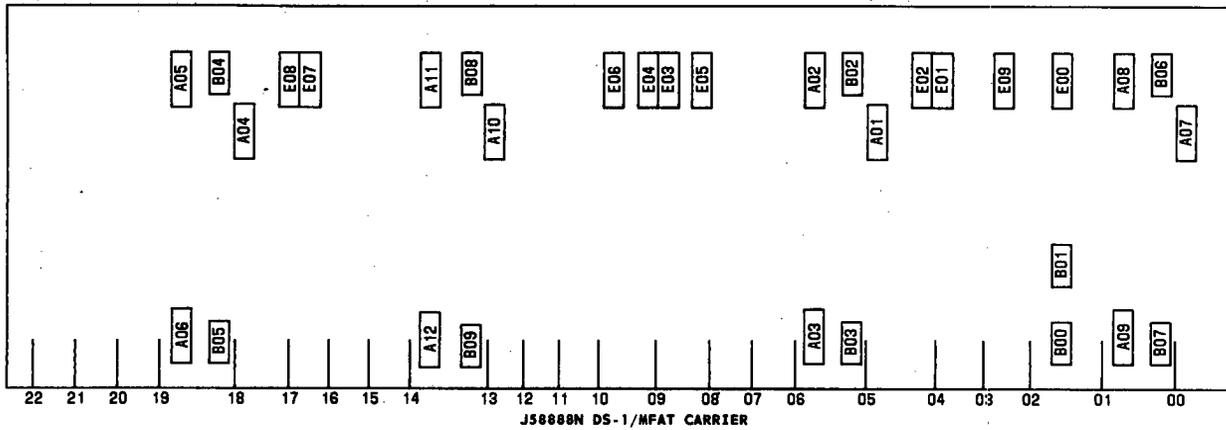
10.1.10 Rear view of carriers showing connector locations (Sheet 1 of 3)



10.1.10 Rear view of carriers showing connector locations (Sheet 2 of 3)



10.1.10 Rear view of carriers showing connector locations (Sheet 3 of 3)



10.2 Intracabinet Cabling

10.2.1 Duplicated common control connections

FROM	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	TO	CONN DESIG
COMMON CONTROL (0)	FLAT	36	A0	COMMON CONTROL (1)	A0
COMMON CONTROL (0)	FLAT	36	A1	COMMON CONTROL (1)	A1
COMMON CONTROL (0)	FLAT	36	A2	COMMON CONTROL (1)	A2
COMMON CONTROL (0)	FLAT	38	L8	COMMON CONTROL (1)	L9
COMMON CONTROL (0)	FLAT	33	E26	COMMON CONTROL (1)	E26
COMMON CONTROL (0)	FLAT	38	L9	COMMON CONTROL (1)	L8
COMMON CONTROL (0)	FLAT	38	L10	COMMON CONTROL (1)	L10
COMMON CONTROL (0)	WOVEN	43	A5	DC/DC CONVERTER	A0
COMMON CONTROL (1)	WOVEN	42	A5	DC/DC CONVERTER	A1
COMMON CONTROL (0)	FLAT	2	E1	FAN (AEH4 CP)	E3
COMMON CONTROL (1)	FLAT	4	E1	FAN (AEH4 CP)	E4

10.2.2 Alarm panel connections – unduplicated common control

FROM	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN. DESIG.	TO	CONN. DESIG.
REAR CONNECTOR PANEL	12-PAIR	106	D1	ALARM PANEL	E2
REAR CONNECTOR PANEL	12-PAIR	107	D5	ALARM PANEL	E1
REAR CONNECTOR PANEL	12-PAIR	108	D6	ALARM PANEL	E3
COMMON CONTROL (0)	FLAT	26	E2	ALARM PANEL	E6
COMMON CONTROL (0)	FLAT	26	E3	ALARM PANEL	E7
COMMON CONTROL (0)	FLAT	26	E4	ALARM PANEL	E8
COMMON CONTROL (0)	FLAT	26	E5	ALARM PANEL	E9
COMMON CONTROL (0)	FLAT	26	E25	ALARM PANEL	E5

10.2.3 Alarm panel connections – duplicated common controls

FROM	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN. DESIG.	TO	CONN. DESIG.
REAR CONNECTOR PANEL	12-PAIR	124	D1	ALARM PANEL	E2
REAR CONNECTOR PANEL	12-PAIR	125	D5	ALARM PANEL	E1
REAR CONNECTOR PANEL	12-PAIR	126	D6	ALARM PANEL	E3
COMMON CONTROL (0)	FLAT	146	E2	ALARM PANEL	E4
COMMON CONTROL (0)	FLAT	146	E3	ALARM PANEL	E5
COMMON CONTROL (0)	FLAT	151	E4	ALARM PANEL	E6
COMMON CONTROL (0)	FLAT	148	E5	ALARM PANEL	E10
COMMON CONTROL (0)	FLAT	150	E25	ALARM PANEL	E12
COMMON CONTROL (1)	FLAT	149	E2	ALARM PANEL	E11
COMMON CONTROL (1)	FLAT	147	E3	ALARM PANEL	E9
COMMON CONTROL (1)	FLAT	147	E4	ALARM PANEL	E7
COMMON CONTROL (1)	FLAT	147	E5	ALARM PANEL	E8
COMMON CONTROL (1)	FLAT	146	E25	ALARM PANEL	E13

10.2.4 Minirecorder connections - unduplicated common control

FROM	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN. DESIG.	TO	CONN. DESIG.
COMMON CONTROL	FLAT	37	A6	MINIRECORDER	P2
COMMON CONTROL	FLAT	39	A7	MINIRECORDER	P1

10.2.5 Minirecorder connections - duplicated common controls

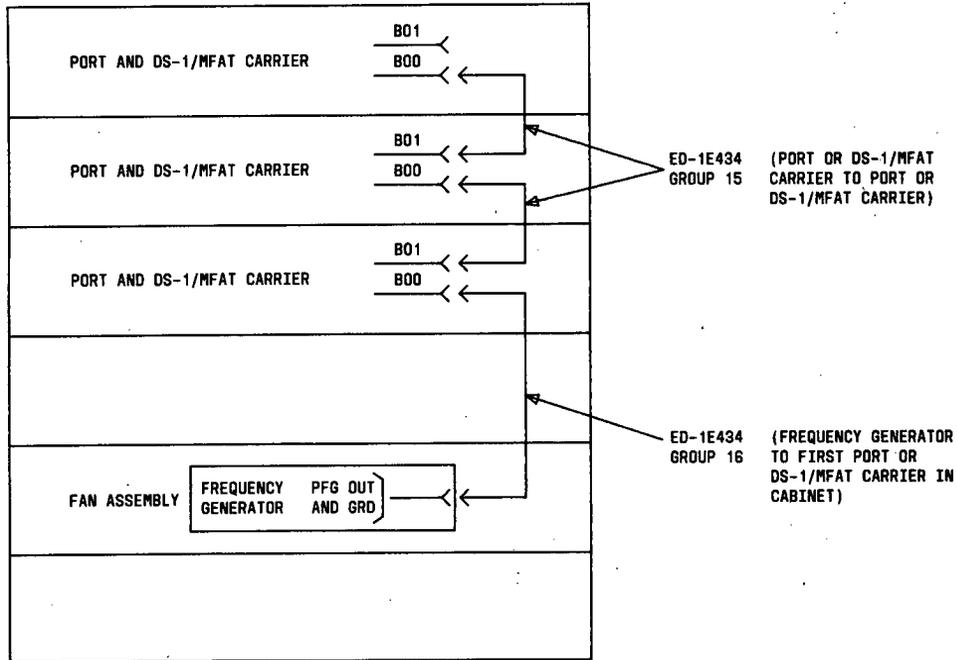
FROM	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN. DESIG.	TO	CONN. DESIG.
COMMON CONTROL (0)	FLAT	37	A6	MINIRECORDER (0)	P2
COMMON CONTROL (0)	FLAT	39	A7	MINIRECORDER (0)	P1
COMMON CONTROL (1)	FLAT	40	A6	MINIRECORDER (1)	P2
COMMON CONTROL (1)	FLAT	41	A7	MINIRECORDER (1)	P1

10.2.6 Duplicated module control carrier intramodule control
cabling - unduplicated and duplicated common control

FROM	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN. DESIG.	TO	CONN. DESIG.
MOD. CONTROL (0)	902A	1	E00	MOD. CONTROL (1)	E01
MOD. CONTROL (0)	902A	2	E01	MOD. CONTROL (1)	E00
MOD. CONTROL (0)	902A	1	E28	MOD. CONTROL (1)	E28
MOD. CONTROL (0)	902A	1	E29	MOD. CONTROL (1)	E29
MOD. CONTROL (0)	902A	1	E30	MOD. CONTROL (1)	E30
MOD. CONTROL (0) (NOTE 1)	902A	14	E31	MOD. CONTROL (1)	E31

Note: The connector on this cable is inverted on the module control (1) end. The arrow will point upward.

10.2.7 Typical ring lead wiring to port or DS-1/MFAT carriers
 (any cabinet with port or DS-1/MFAT carriers)



10.2.8-TMS-intracabinet cabling - duplicated basic carriers + 1 growth carrier each (maximum of 15 modules)

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO		
CARRIER	SLOT	CONN			CARRIER	SLOT	CONN
00 (BASIC 0)	06	E00	FLAT	401 ✓	01 (GROWTH 0)	07	E06 ✓
		E03	FLAT	402 ✓	01 (GROWTH 0)	07	E07 ✓
	07	E06	FLAT	401 ✓	01 (GROWTH 0)	06	E00 ✓
		E07	FLAT	400 ✓	01 (GROWTH 0)	06	E03 ✓
	10	E12	902A	29	00 (BASIC 0)	26	E40
	11	E13	FLAT	404	00 (BASIC 0)	21	E28
	14	E14	FLAT	401 ✓	01 (GROWTH 0)	15	E20 ✓
		E15	FLAT	400 ✓	01 (GROWTH 0)	15	E23 ✓
	15	E20	FLAT	401 ✓	01 (GROWTH 0)	14	E14 ✓
		E23	FLAT	402 ✓	01 (GROWTH 0)	14	E15 ✓
	21	E30	FLAT	404	01 (GROWTH 0)	11	E13 ✓
		E32	902A	45	02 (BASIC 1) ✓	21	E32 ✓
	23	E33	902A	3	02 (BASIC 1) ✓	23	E33 ✓
		E34	902A	3	02 (BASIC 1) ✓	23	E34 ✓
E35		902A	3	02 (BASIC 1) ✓	23	E35 ✓	
E36		902A	45	02 (BASIC 1) ✓	23	E36 ✓	
26	E42	902A	27 ✓	01 (GROWTH 0)	10	E12 ✓	
27A	E44	902A	2	FAN ASSY	AEH4	E1	

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO		
CARRIER	SLOT	CONN			CARRIER	SLOT	CONN
02	06	E00	FLAT	401	03 (GROWTH 1)	07	E06
		E03	FLAT	402	03 (GROWTH 1)	07	E07
	07	E06	FLAT	401	03 (GROWTH 1)	06	E00
		E07	FLAT	400	03 (GROWTH 1)	06	E03
	10	E12	902A	29	02 (BASIC 1)	26	E40
	11	E13	FLAT	404	02 (BASIC 1)	21	E28
	14	E14	FLAT	401	03 (GROWTH 1)	15	E20
		E15	FLAT	400	03 (GROWTH 1)	15	E23
	15	E20	FLAT	401	03 (GROWTH 1)	14	E14
		E23	FLAT	402	03 (GROWTH 1)	14	E15
	21	E30	FLAT	404	03 (GROWTH 1)	11	E13
26	E42	902A	27	03 (GROWTH 1)	10	E12	
27A	E44	902A	26	FAN ASSY	AEH4	E2	

22

2-404's

8-401
4-400
4-402
2-27
2-2?
2-408?

10.2.9 TMS intracabinet cabling - duplicated (2-cabinet system) or unduplicated (1-cabinet system) - single basic carrier + 3 growth carriers (maximum of 31 modules) (Sheet 1 of 2)

NOTE: For duplicated TMS cabinets, see paragraph 10.3.8 for intercabinet interface cabling.

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO		
CARRIER*	SLOT	CONN			CARRIER*	SLOT	CONN
00	06	E00	FLAT	401	01	07	E06
		E01	FLAT	404	02	07	E06
		E02	FLAT	405	03	07	E06
		E03	FLAT	402	01	07	E07
		E04	FLAT	404	02	07	E07
	E05	FLAT	406	03	07	E07	
	07	E06	FLAT	401	01	06	E00
		E07	FLAT	400	01	06	E03
		E08	FLAT	403	02	06	E00
		E09	FLAT	403	02	06	E03
		E10	FLAT	406	03	06	E00
	E11	FLAT	405	03	06	E03	
	10	E12	902A	29	00	26	E40
	11	E13	FLAT	411	00	21	E28
	14	E14	FLAT	401	01	15	E20
E15		FLAT	400	01	15	E23	
E16		FLAT	403	02	15	E20	
E17		FLAT	402	02	15	E23	
E18		FLAT	415	03	15	E20	
E19	FLAT	405	03	15	E23		

* Carrier 00 Basic carrier 0
 Carrier 01 Growth carrier 0
 Carrier 02 Growth carrier 1
 Carrier 03 Growth carrier 2

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO		
CARRIER*	SLOT	CONN			CARRIER*	SLOT	CONN
00	15	E20	FLAT	401	01	14	E14
		E21	FLAT	404	02	14	E14
		E22	FLAT	405	03	14	E14
		E23	FLAT	402	01	14	E15
		E24	FLAT	405	02	14	E15
	E25	FLAT	406	03	14	E15	
	21	E29	FLAT	408	02	11	E13
		E30	FLAT	408	01	11	E13
		E31	FLAT	408	03	11	E13
	26	E39	902A	23	02	10	E12
		E41	902A	28	03	10	E12
		E42	902A	27	01	10	E12
	27A†	E44	902A	2	FAN ASSY	AEH4	E1
	27A†	E45	902A	26	FAN ASSY	AEH4	E2
	01	06	E01	FLAT	401	02	07
E02			FLAT	403	03	07	E08
E04			FLAT	401	02	07	E09
E05			FLAT	404	03	07	E09
E08			FLAT	413	02	06	E01
07		E09	FLAT	400	02	06	E04
		E10	FLAT	404	03	06	E01
		E11	FLAT	403	03	06	E04

† For System cabinet 1 make E44 to E1 connection.
 For System cabinet 2 make E45 to E2 connection.

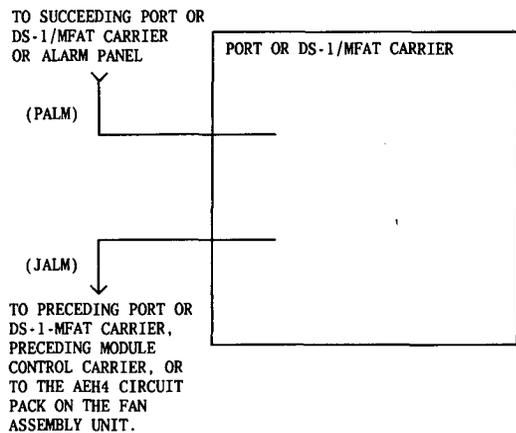
* Carrier 00 Basic carrier 0
 Carrier 01 Growth carrier 0
 Carrier 02 Growth carrier 1
 Carrier 03 Growth carrier 2

10.2.9 TMS intracabinet cabling - duplicated (2-cabinet system) or unduplicated (1-cabinet system) - single basic carrier + 3 growth carriers (maximum of 31 modules) (Sheet 2 of 2)

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO		
CARRIER*	SLOT	CONN			CARRIER*	SLOT	CONN
01	14	E16	FLAT	401	02	15	E21
		E17	FLAT	414	02	15	E24
		E18	FLAT	404	03	15	E21
		E19	FLAT	403	03	15	E24
	15	E21	FLAT	401	02	14	E16
		E22	FLAT	412	03	14	E16
		E24	FLAT	402	02	14	E17
		E25	FLAT	404	03	14	E17
02	06	E02	FLAT	400	03	07	E10
		E05	FLAT	401	03	07	E11
	07	E10	FLAT	402	03	06	E02
		E11	FLAT	401	03	06	E05
	14	E18	FLAT	403	03	15	E22
		E19	FLAT	401	03	15	E25
	15	E22	FLAT	400	03	14	E18
		E25	FLAT	401	03	14	E19

* Carrier 00 Basic carrier 0
 Carrier 01 Growth carrier 0
 Carrier 02 Growth carrier 1
 Carrier 03 Growth carrier 2

10.2.10 Alarm leads for port carrier and/or the DS-1/MFAT carrier



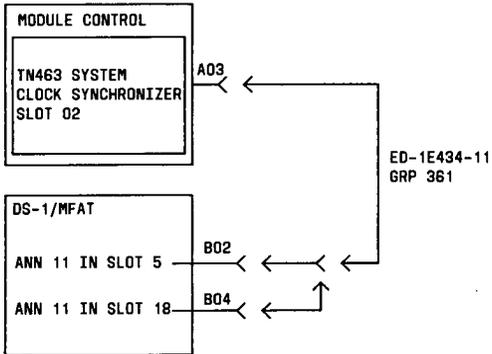
10.2.11 DS-1 signaling synchronization cabling with DS-1/
MFAT carrier used for synchronization located in
the module control cabinet

NOTE 1: DS-1 synchronization cabling for a system
with the DS-1 carrier used for synchronization
in a network cabinet is shown in paragraph
10.3.6 and 10.3.7.

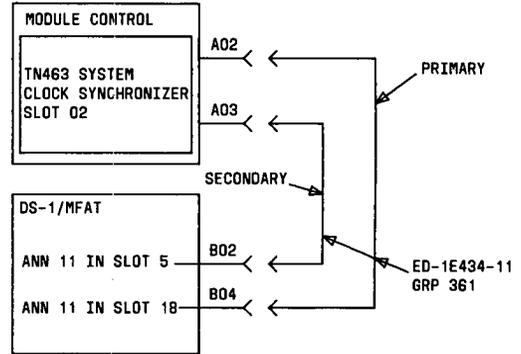
NOTE 2: See CSD for translation assignment of primary
and secondary timing board to determine proper
connection.

10.2.11.1 Unduplicated module control

10.2.11.1.1 Primary reference

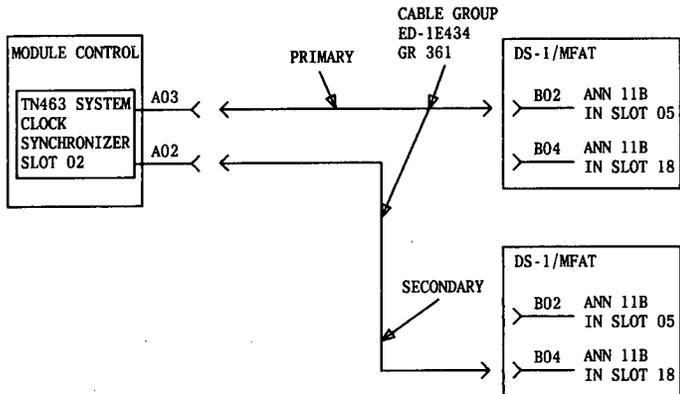


10.2.11.1.2 Primary and secondary reference - same
carrier



10.2.11.1.3 Primary and secondary reference - different carriers

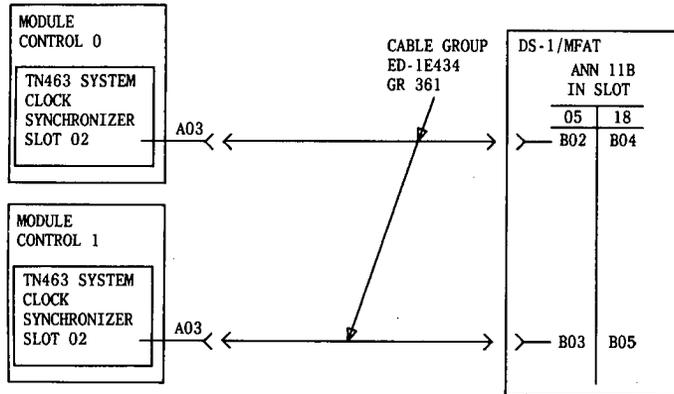
NOTE: The connections at the DS-1 MFAT carriers may be reversed as long as primary and secondary references remain in different slots in different carriers.



10.2.11.2 Duplicate module control

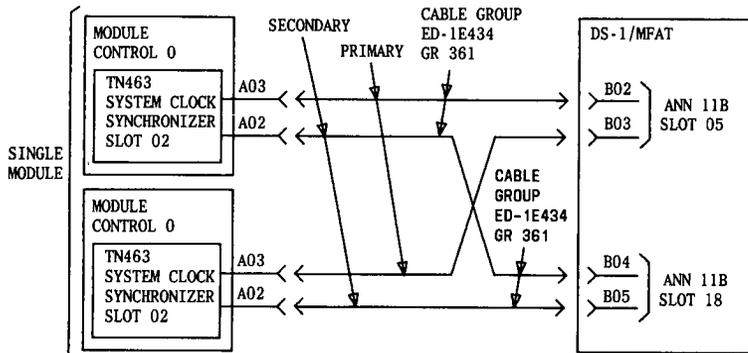
10.2.11.2.1 Primary reference - same carrier

NOTE: See CSD for translation assignment for primary and secondary timing board to determine proper connections.



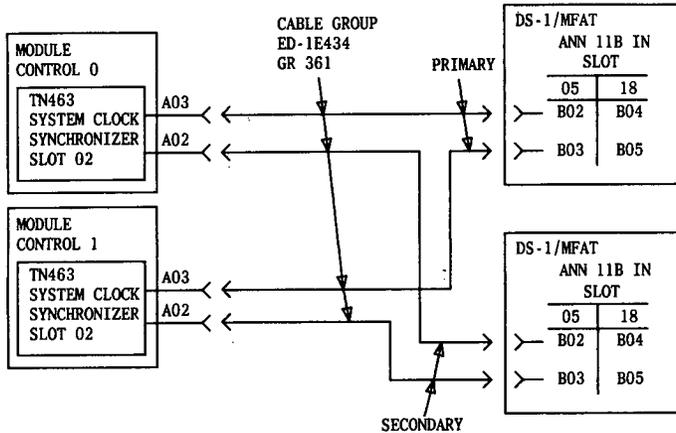
10.2.11.2.2 Primary and secondary references - same carrier

NOTE: The primary synchronization cables can come from either ANN 11B; however, they must come from the same ANN 11B.



10.2.11.2.3 Primary and secondary references - different carrier

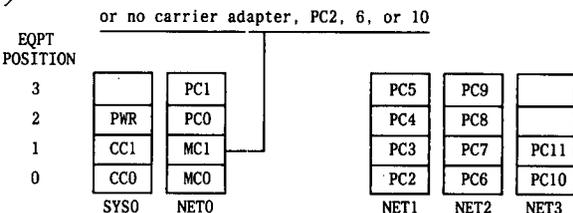
NOTE: Primary synchronization cables can come from either ANN 11B; however, they must come from the same ANN 11B.



10.3 Intercabinet Cabling

10.3.1 PCM cabling, module control to port or DS-1/MFAT carriers – all modules of duplicated common controls and modules 1 thru n of unduplicated common control (Sheet 1 of 3)

FROM				TO			
MOD CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
* 0	902A	24	E09	2	1	0	E07
* 0	902A	27	E11	2	1	0	E01
† 0	902A	24	E17	6	1	0	E07
† 0	902A	27	E19	6	1	0	E01
‡ 0	902A	24	E25	10	1	0	E07
‡ 0	902A	27	E27	10	1	0	E01
0	902A	23	E05	0	2	0	E07
0	902A	23	E07	0	2	0	E01
0	902A	25	E04	1	3	0	E07
0	902A	25	E06	1	3	0	E01
0	902A	59	E09	2	0	1	E07
0	902A	58	E11	2	0	1	E01
0	902A	58	E08	3	1	1	E07
0	902A	57	E10	3	1	1	E01
0	902A	55	E13	4	2	1	E07
0	902A	55	E15	4	2	1	E01
0	902A	55	E12	5	3	1	E07
0	902A	54	E14	5	3	1	E01
0	902A	65	E17	6	0	2	E07
0	902A	64	E19	6	0	2	E01
0	902A	64	E16	7	1	2	E07
0	902A	63	E18	7	1	2	E01



* If carrier position 1 in Network Cabinet 0 is equipped with port or DS-1/MFAT carrier electrical position 2, make these connections.

† If carrier position 1 in Network Cabinet 0 is equipped with port or DS-1/MFAT carrier electrical position 6, make these connections.

‡ If carrier position 1 in Network Cabinet 0 is equipped with port or DS-1/MFAT carrier electrical position 10, make these connections.

10.3.1 PCM cabling, module control to port or DS-1/MFAT carriers - all modules of duplicated common controls and modules 1 thru n for unduplicated common control (Sheet 2 of 3)

FROM				TO			
MOD CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
0	902A	62	E21	8	2	2	E07
0	902A	61	E23	8	2	2	E01
0	902A	61	E20	9	3	2	E07
0	902A	60	E22	9	3	2	E01
0	902A	69	E25	10	0	3	E07
0	902A	69	E27	10	0	3	E01
0	902A	68	E24	11	1	3	E07
0	902A	68	E26	11	1	3	E01
1	902A	24	E05	0	2	0	E08
1	902A	27	E07	0	2	0	E02
1	902A	28	E04	1	3	0	E08
1	902A	28	E06	1	3	0	E02
1	902A	57	E09	2	0	1	E08
1	902A	56	E11	2	0	1	E02
1	902A	55	E08	3	1	1	E08
1	902A	54	E10	3	1	1	E02
1	902A	54	E13	4	2	1	E08
1	902A	53	E15	4	2	1	E02
1	902A	53	E12	5	3	1	E08
1	902A	52	E14	5	3	1	E02

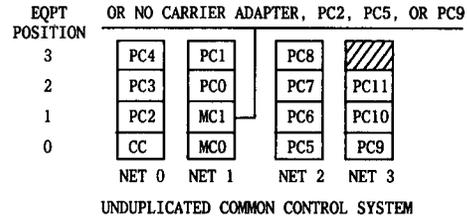
10.3.1 PCM cabling, module control to port or DS-1/MFAT carriers - all modules of duplicated common controls and modules 1 thru n for unduplicated common control (Sheet 3 of 3)

FROM				TO			
MOD CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
1	902A	63	E17	6	0	2	E08
1	902A	62	E19	6	0	2	E02
1	902A	62	E16	7	1	2	E08
1	902A	62	E18	7	1	2	E02
1	902A	60	E21	8	2	2	E08
1	902A	60	E23	8	2	2	E02
1	902A	60	E20	9	3	2	E08
1	902A	58	E22	9	3	2	E02
1	902A	68	E25	10	0	3	E08
1	902A	67	E27	10	0	3	E02
1	902A	67	E24	11	1	3	E08
1	902A	67	E26	11	1	3	E02

10.3.2 PCM cabling, module control to port or DS-1/MFAT carrier – module 0 of unduplicated common controls (Sheet 1 of 3)

NOTE: For modules 1 thru n of unduplicated common control system, see paragraph 10.3.1.

FROM				TO			
MODULE CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
* 0	902A	24	E09	2	1	1	E07
* 0	902A	27	E11	2	1	1	E01
† 0	902A	24	E12	5	1	1	E07
† 0	902A	27	E14	5	1	1	E01
‡ 0	902A	24	E20	9	1	1	E07
‡ 0	902A	27	E22	9	1	1	E01
0	902A	23	E05	0	2	1	E07
0	902A	23	E07	0	2	1	E01
0	902A	25	E04	1	3	1	E07
0	902A	25	E06	1	3	1	E01
0	902A	58	E09	2	1	0	E07
0	902A	57	E11	2	1	0	E01
0	902A	55	E08	3	2	0	E07
0	902A	55	E10	3	2	0	E01
0	902A	55	E13	4	3	0	E07
0	902A	54	E15	4	3	0	E01
0	902A	59	E12	5	0	2	E07
0	902A	58	E14	5	0	2	E01



* If carrier position 1 in Network Cabinet 1 is equipped with Port or DS-1/MFAT carrier 2, make these connections.

† If carrier position 1 in Network Cabinet 1 is equipped with Port or DS-1/MFAT carrier 5, make these connections.

‡ If carrier position 1 in Network Cabinet 1 is equipped with Port or DS-1/MFAT carrier 9, make these connections.

10.3.2 PCM cabling, module control to port or DS-1/MFAT carrier - module 0 of unduplicated common control (Sheet 2 of 2)

FROM				TO			
MODULE CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
0	902A	58	E17	6	1	2	E07
0	902A	57	E19	6	1	2	E01
0	902A	55	E16	7	2	2	E07
0	902A	55	E18	7	2	2	E01
0	902A	55	E21	8	3	2	E07
0	902A	54	E23	8	3	2	E01
0	902A	65	E20	9	0	3	E07
0	902A	64	E22	9	0	3	E01
0	902A	64	E25	10	1	3	E07
0	902A	63	E27	10	1	3	E01
0	902A	62	E24	11	2	3	E07
0	902A	61	E26	11	2	3	E01
1	902A	24	E05	0	2	1	E08
1	902A	27	E07	0	2	1	E02
1	902A	28	E04	1	3	1	E08
1	902A	28	E06	1	3	1	E02
1	902A	55	E09	2	1	0	E08
1	902A	54	E11	2	1	0	E02
1	902A	54	E08	3	2	0	E08
1	902A	53	E10	3	2	0	E02

10.3.2 PCM cabling, module control to port or DS-1/MFAT carrier - module 0
of unduplicated common control (Sheet 3 of 3)

FROM				TO			
MODULE CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
1	902A	53	E13	4	3	0	E08
1	902A	52	E15	4	3	0	E02
1	902A	57	E12	5	0	2	E08
1	902A	56	E14	5	0	2	E02
1	902A	56	E17	6	1	2	E08
1	902A	55	E19	6	1	2	E02
1	902A	54	E16	7	2	2	E08
1	902A	53	E18	7	2	2	E02
1	902A	53	E21	8	3	2	E08
1	902A	52	E23	8	3	2	E02
1	902A	63	E20	9	0	0	E08
1	902A	62	E22	9	0	0	E02
1	902A	62	E25	10	1	1	E08
1	902A	62	E27	10	1	1	E02
1	902A	60	E24	11	2	2	E08
1	902A	60	E26	11	2	2	E02

10.3.3 Module control to alarm field (AEH4) cabling - duplicated and unduplicated common control

NOTE: All connections that have been made by the factory before shipping should be checked and verified against the CSD since the cabling differs for different cabinet configurations.

FROM	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN. DESIG.	TO	CABINET	CONN. DESIG.
MOD. CONTROL (0)	902A	61	E48	ALARM FIELD (AEH4 CP)	NET. (1)	E1
MOD. CONTROL (0)	902A	2	E49	ALARM FIELD (AEH4 CP)	NET. (0)	E1
MOD. CONTROL (0)	902A	70	E50	ALARM FIELD (AEH4 CP)	NET. (3)	E1
MOD. CONTROL (0)	902A	66	E51	ALARM FIELD (AEH4 CP)	NET. (2)	E1
MOD. CONTROL (1)	902A	60	E48	ALARM FIELD (AEH4 CP)	NET. (1)	E2
MOD. CONTROL (1)	902A	4	E49	ALARM FIELD (AEH4 CP)	NET. (0)	E2
MOD. CONTROL (1)	902A	70	E50	ALARM FIELD (AEH4 CP)	NET. (3)	E2
MOD. CONTROL (1)	902A	66	E51	ALARM FIELD (AEH4 CP)	NET. (2)	E2

PC4	PC1	PC8	
PC3	PC0	PC7	PC11
PC2	MC1	PC6	PC10
CC	MC0	PC5	PC9

NET0 NET1 NET2 NET3

UNDUPLICATED COMMON CONTROL

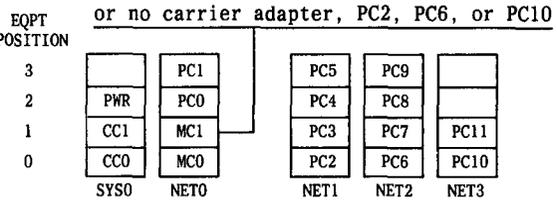
	PC1	PC5	PC9	
PWR	PC0	PC4	PC8	
CC	MC1	PC3	PC7	PC11
CC	MC0	PC2	PC6	PC10

SYS0 NET0 NET1 NET2 NET3

DUPLICATED COMMON CONTROL

10.3.4. I/O cabling module control to port or DS1-MFAT carriers, duplicated common control (Sheet 1 of 2)

FROM				TO			
MOD CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		NETWORK CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
* 0	902A	29	E32	2	1	0	E03
† 0	902A	29	E36	6	1	0	E03
‡ 0	902A	29	E40	10	1	0	E03
0	902A	23	E33	0	2	0	E03
0	902A	26	E35	1	3	0	E03
0	902A	59	E32	2	0	1	E03
0	902A	57	E34	3	1	1	E03
0	902A	54	E37	4	2	1	E03
0	902A	53	E39	5	3	1	E03
0	902A	65	E36	6	0	2	E03
0	902A	63	E38	7	1	2	E03
0	902A	61	E41	8	2	2	E03
0	902A	59	E43	9	3	2	E03
0	902A	69	E40	10	0	3	E03
0	902A	68	E42	11	1	3	E03



* If equipment level 1 in Network Cabinet 0 contains a port or DS-1/MFAT carrier with electrical position 2, make this connection.

† If equipment level 1 in Network Cabinet 0 contains a port or DS-1/MFAT carrier with electrical position 6, make this connection.

‡ If equipment level 1 in Network Cabinet 0 contains a port or DS-1/MFAT carrier with electrical position 10, make this connection.

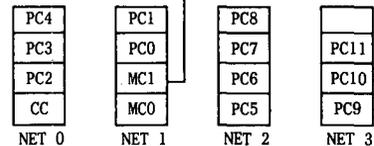
10.3.4 I/O cabling module control to port or DS-1/MFAT carriers,
duplicated common control (Sheet 2 of 2)

FROM				TO			
MODULE CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
1		29	E33	0	2	0	E04
1		23	E35	1	3	0	E04
1		57	E32	2	0	1	E04
1		56	E34	3	1	1	E04
1		53	E37	4	2	1	E04
1		52	E39	5	3	1	E04
1		63	E36	6	0	2	E04
1		62	E38	7	1	2	E04
1		59	E41	8	2	2	E04
1		58	E43	9	3	2	E04
1		68	E40	10	0	3	E04
1		68	E42	11	1	3	E04

10.3.5 Cabling module control to port or DS-1/MFAT carriers,
unduplicated common control (Sheet 1 of 2)

FROM				TO			
MODULE CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		NETWORK CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
0*		29	E32	2	1	1	E03
0†		29	E39	5	1	1	E03
0‡		29	E43	9	1	1	E03
0		23	E33	0	2	§	E03
0		26	E35	1	3	1	E03
0		57	E32	2	1	0	E03
0		54	E34	3	2	0	E03
0		53	E37	4	3	0	E03
0		59	E39	5	0	2	E03
0		57	E36	6	1	2	E03
0		54	E38	7	2	2	E03
0		53	E41	8	3	2	E03
0		65	E43	9	0	3	E03
0		63	E40	10	1	3	E03
0		61	E42	11	2	3	E03

or No Carrier Adapter or PC2, PC5 or PC9



* If equipment level 1 in Network Cabinet 1 contains a port or DS-1/MFAT carrier with electrical position 2, make this connection.

† If equipment level 1 in Network Cabinet 1 contains a port or DS-1/MFAT carrier with electrical position 5, make this connection.

‡ If equipment level 1 in Network Cabinet 1 contains a port or DS-1/MFAT carrier with electrical position 9, make this connection.

10.3.5 Cable module control to port or DS-1/MFAT carriers,
unduplicated common control (Sheet 2 of 2)

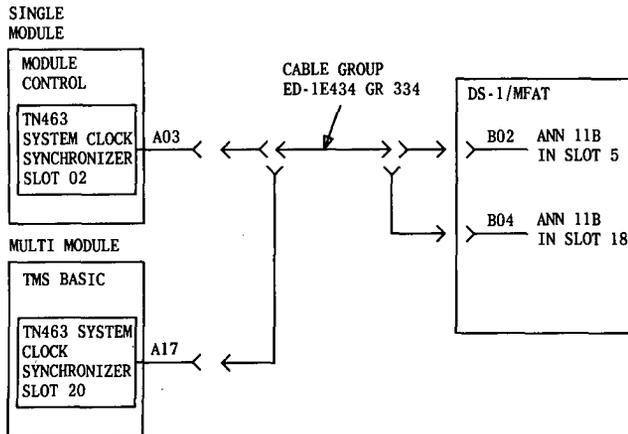
FROM				TO			
MODULE CONTROL CARRIER NUMBER	CABLE TYPE	ED-1E434 GROUP NUMBER	CONN DESIG	PORT OR DS-1/MFAT CARRIER		CABINET	CONN DESIG
				ELECTRICAL NUMBER	EQUIPMENT POSITION		
1	902A	29	E33	0	2	1	E04
1	902A	23	E35	1	3	1	E04
1	902A	56	E32	2	1	0	E04
1	902A	53	E34	3	2	0	E04
1	902A	52	E37	4	3	0	E04
1	902A	57	E39	5	0	2	E04
1	902A	56	E36	6	1	2	E04
1	902A	53	E38	7	2	2	E04
1	902A	52	E41	8	3	2	E04
1	902A	63	E43	9	0	3	E04
1	902A	62	E40	10	1	3	E04
1	902A	59	E42	11	2	3	E04

10.3.6 DS-1 signaling synchronization cabling - unduplicated module control

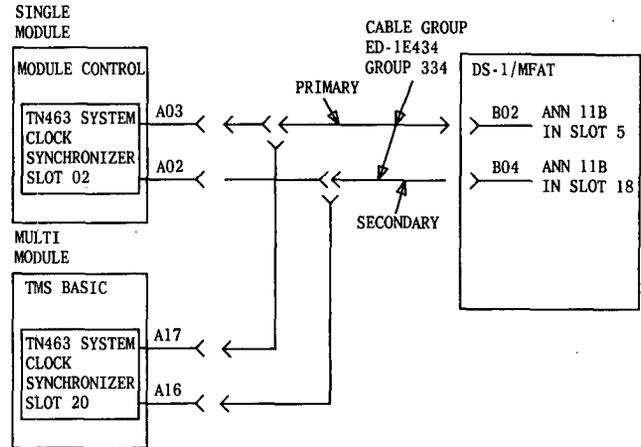
NOTE 1: The cabling for a system with DS-1/MFAT carrier used for synchronization in the module control carrier is shown in paragraph 10.2.11.

NOTE 2: See CSD for translation assignment of primary and secondary timing board to determine proper connection

10.3.6.1 Primary reference

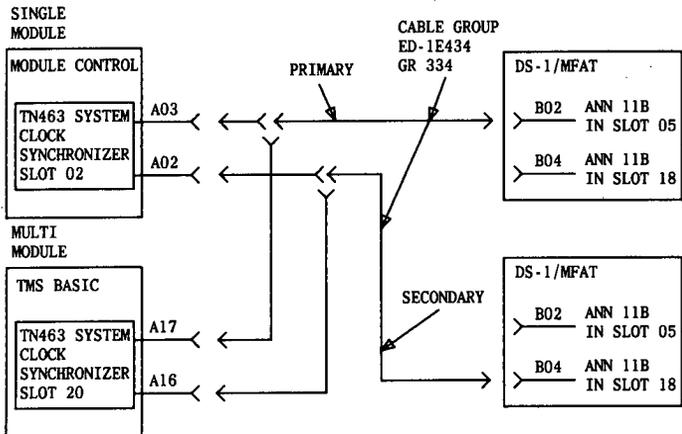


10.3.6.2 Primary and secondary reference - same carrier



10.3.6.3 Primary and secondary reference - different carriers

NOTE: The connections at the DS-1 MFAT carriers may be reversed as long as primary and secondary references remain in different slots in different carriers.

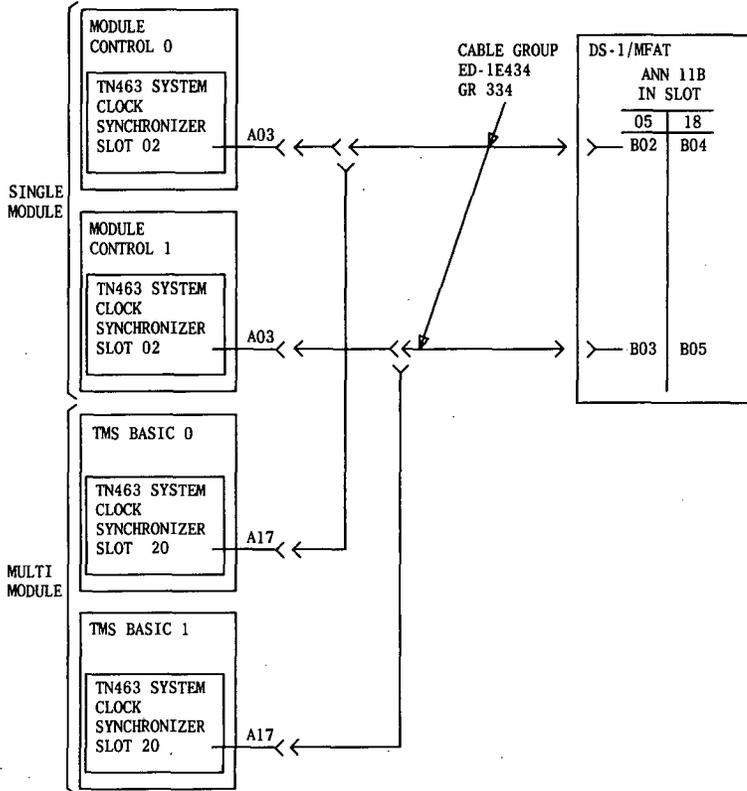


10.3.7. DS-1 signaling synchronization cabling - duplicated module control

NOTE 1: The cabling for a system with DS-1/MFAT carrier used for synchronization in the module control carrier is shown in paragraph 10.2.11.

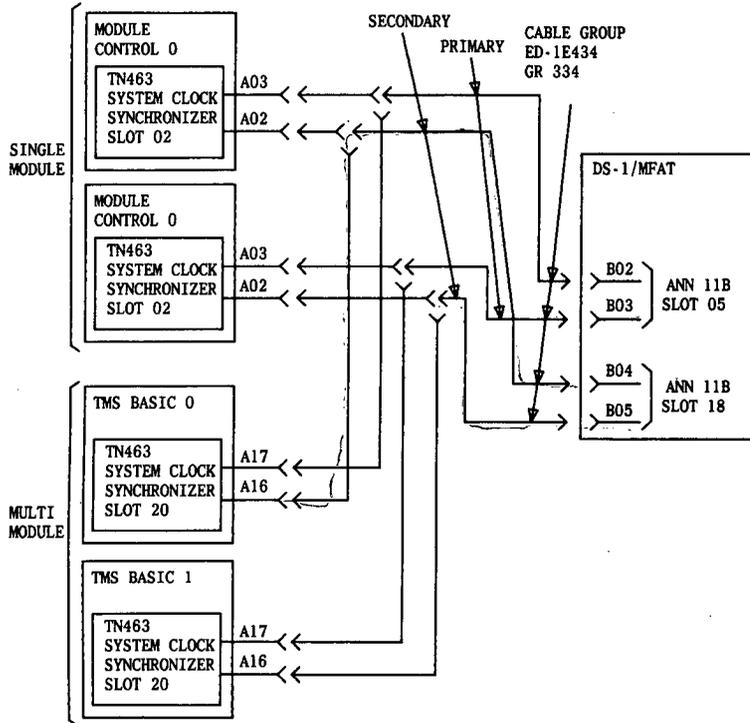
NOTE 2: See CSD for translation assignment for primary and secondary timing board to determine proper connections.

10.3.7.1. Primary reference - same carrier



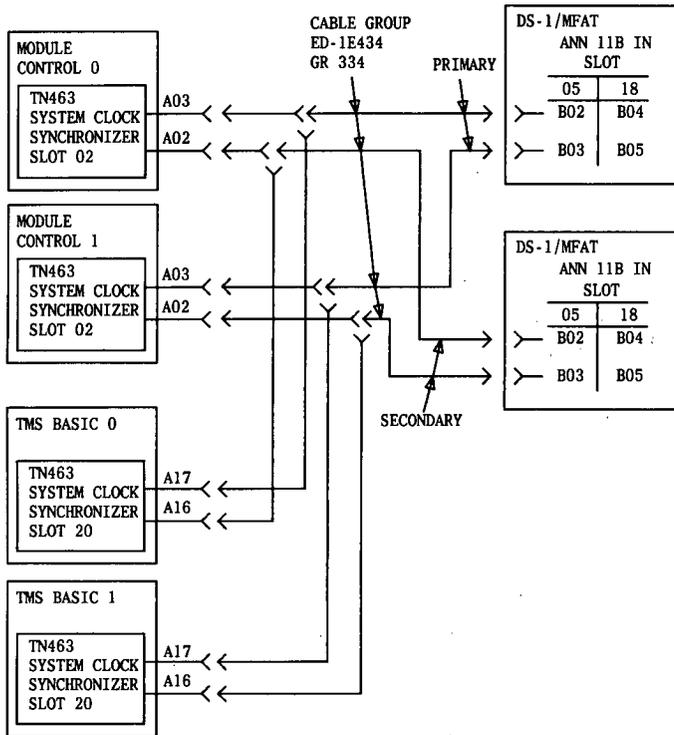
10.3.7.2. Primary and secondary references - same carrier

NOTE: The primary and secondary synchronization cables can come from either ANN 11B; however, they must come from the same ANN 11B.



10.3.7.3 Primary and secondary references - different carrier

NOTE: Primary and secondary synchronization cables can come from either ANN 11B; however, they must come from the same ANN 11B.



10.3.8 Interface cables for duplicated TMS cabinets

FROM				CABLE TYPE	SD-1E434 GROUP NUMBER	TO			
CABINET	CARRIER	SLOT	CONN			CABINET	CARRIER	SLOT	CONN
SYSTEM 2	00	21	E32	902A	85	SYSTEM 1	00	21	E32
SYSTEM 2	00	23	E33	902A	200	SYSTEM 1	00	23	E33
SYSTEM 2	00	23	E34	902A	200	SYSTEM 1	00	23	E34
SYSTEM 2	00	23	E35	902A	200	SYSTEM 1	00	23	E35
SYSTEM 2	00	23	E36	902A	85	SYSTEM 1	00	23	E36

SYSTEM CABINET 2
3rd Growth
2nd Growth
1st Growth
BASIC

SYSTEM CABINET 1
3rd Growth
2nd Growth
1st Growth
BASIC

10.3.9 4-MHz Cable

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

10.3.9.1 Duplicated common control to dual module control and duplicated TMS for a maximum of 31 modules (Sheet 1 of 4)

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN			
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN				
SYS0	00 (COMMON CONTROL 0)	27	E9	COAX	84		System 1	00	27	B02	A			
						0	System 1/2*	02/00	27	B02	B			
						0	0	00	22	B02	C			
						0	0	01	22	B02	D			
			E7	COAX	84	1	0	00	22	B02	A			
						1	0	01	22	B02	B			
						2	0	00	22	B02	C			
						2	0	01	22	B02	D			
			E8	COAX	84	3	0	00	22	B02	A			
						3	0	01	22	B02	B			
						4	0	00	22	B02	C			
						4	0	01	22	B02	D			
		E6	COAX	84	5	0	00	22	B02	A				
					5	0	01	22	B02	B				
					6	0	00	22	B02	C				
					6	0	01	22	B02	D				
		28	E13	COAX	84	7	0	00	22	B02	A			
						7	0	01	22	B02	B			
						8	0	00	22	B02	C			
						8	0	01	22	B02	D			
						E11	COAX	84	9	0	00	22	B02	A
									9	0	01	22	B02	B
									10	0	00	22	B02	C
									10	0	01	22	B02	D
E12	COAX					84	11	0	00	22	B02	A		
							11	0	01	22	B02	B		
							12	0	00	22	B02	C		
							12	0	01	22	B02	D		
E10	COAX	84	13	0	00	22	B02	A						
			13	0	01	22	B02	B						
			14	0	00	22	B02	C						
			14	0	01	22	B02	D						

* For 15 modules or less, terminate cable at System cabinet 1, carrier 02.
For more than 15 modules, terminate cable at System cabinet 2, carrier 00.

10.3.9.1 – Duplicated common control to dual module control and duplicated TMS for a maximum of 31 modules (Sheet 2 of 4)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN	
SYSO	00 (COMMON CONTROL 0)	29	E17	COAX	84	15	0	00	22	B02	A
						15	0	01	22	B02	B
						16	0	00	22	B02	C
						16	0	01	22	B02	D
			E15	COAX	84	17	0	00	22	B02	A
						17	0	01	22	B02	B
						18	0	00	22	B02	C
						18	0	01	22	B02	D
			E16	COAX	84	19	0	00	22	B02	A
						19	0	01	22	B02	B
						20	0	00	22	B02	C
						20	0	01	22	B02	D
		E14	COAX	84	21	0	00	22	B02	A	
					21	0	01	22	B02	B	
					22	0	00	22	B02	C	
					22	0	01	22	B02	D	
		30	E21	COAX	84	23	0	00	22	B02	A
						23	0	01	22	B02	B
						24	0	00	22	B02	C
						24	0	01	22	B02	D
E19	COAX		84	25	0	00	22	B02	A		
				25	0	01	22	B02	B		
				26	0	00	22	B02	C		
				26	0	01	22	B02	D		
E20	COAX	84	27	0	00	22	B02	A			
			27	0	01	22	B02	B			
			28	0	00	22	B02	C			
			28	0	01	22	B02	D			
E18	COAX	84	29	0	00	22	B02	A			
			29	0	01	22	B02	B			
			30	0	00	22	B02	C			
			30	0	01	22	B02	D			

10.3.9.1 Duplicated common control to dual module control and duplicated TMS for a maximum of 31 modules (Sheet 3 of 4)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN			
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN				
SYS0	01 (COMMON CONTROL 1)	27	E9	COAX	84		System 1	00	27	B01	A			
							System 1/2*	02/00	27	B01	B			
						0	0	00	22	B01	C			
						0	0	01	22	B01	D			
			E7	COAX	84	1	0	00	22	B01	A			
						1	0	01	22	B01	B			
						2	0	00	22	B01	C			
						2	0	01	22	B01	D			
			E8	COAX	84	3	0	00	22	B01	A			
						3	0	01	22	B01	B			
						4	0	00	22	B01	C			
						4	0	01	22	B01	D			
		E6	COAX	84	5	0	00	22	B01	A				
					5	0	01	22	B01	B				
					6	0	00	22	B01	C				
					6	0	01	22	B01	D				
		28	E13	COAX	84	7	0	00	22	B01	A			
						7	0	01	22	B01	B			
						8	0	00	22	B01	C			
						8	0	01	22	B01	D			
						E11	COAX	84	9	0	00	22	B01	A
									9	0	01	22	B01	B
									10	0	00	22	B01	C
									10	0	01	22	B01	D
						E12	COAX	84	11	0	00	22	B01	A
									11	0	01	22	B01	B
									12	0	00	22	B01	C
									12	0	01	22	B01	D
E10	COAX	84	13	0	00	22	B01	A						
			13	0	01	22	B01	B						
			14	0	00	22	B01	C						
			14	0	01	22	B01	D						

* For 15 modules or less, terminate cable at System cabinet 1, carrier 02.
For more than 15 modules, terminate cable at System cabinet 2, carrier 00.

10.3.9.1 - Duplicated common control to dual module control and duplicated TMS for a maximum of 31 modules (Sheet 4 of 4)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN
CABINET	CARRIER	SLOT	CONN			MODULE	CABINET	CARRIER	SLOT	CONN	
SYS0	01 (COMMON CONTROL 1)	29	E17	COAX	84	15	0	00	22	B01	A
						15	0	01	22	B01	B
						16	0	00	22	B01	C
						16	0	01	22	B01	D
			E15	COAX	84	17	0	00	22	B01	A
						17	0	01	22	B01	B
						18	0	00	22	B01	C
						18	0	01	22	B01	D
			E16	COAX	84	19	0	00	22	B01	A
						19	0	01	22	B01	B
						20	0	00	22	B01	C
						20	0	01	22	B01	D
		E14	COAX	84	21	0	00	22	B01	A	
					21	0	01	22	B01	B	
					22	0	00	22	B01	C	
					22	0	01	22	B01	D	
		30	E21	COAX	84	23	0	00	22	B01	A
						23	0	01	22	B01	B
						24	0	00	22	B01	C
						24	0	01	22	B01	D
E19	COAX		84	25	0	00	22	B01	A		
				25	0	01	22	B01	B		
				26	0	00	22	B01	C		
				26	0	01	22	B01	D		
E20	COAX	84	27	0	00	22	B01	A			
			27	0	01	22	B01	B			
			28	0	00	22	B01	C			
			28	0	01	22	B01	D			
E18	COAX	84	29	0	00	22	B01	A			
			29	0	01	22	B01	B			
			30	0	00	22	B01	C			
			30	0	01	22	B01	D			

10.3.9.2 Duplicated common control to unduplicated module control and unduplicated TMS for a maximum of 31 modules (Sheet 1 of 4)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN	
SYSO	00 (COMMON CONTROL 0)	27	E9	COAX	84	0	*System 1 0	00 00	27 22	B02 B02	A C
			E7	COAX	84	1 2	0 0	00 00	22 22	B02 B02	A C
			E8	COAX	84	3 4	0 0	00 00	22 22	B02 B02	A C
			E6	COAX	84	5 6	0 0	00 00	22 22	B02 B02	A C
			E13	COAX	84	7 8	0 0	00 00	22 22	B02 B02	A C
			E11	COAX	84	9 10	0 0	00 00	22 22	B02 B02	A C
			E12	COAX	84	11 12	0 0	00 00	22 22	B02 B02	A C
			E10	COAX	84	13 14	0 0	00 00	22 22	B02 B02	A C

* For 15 modules or less, terminate cable at system cabinet 1, carrier 02.
For more than 15 modules, terminate cable at system cabinet 1, carrier 00.

10.3.9.2 Duplicated common control to unduplicated module control and unduplicated TMS for a maximum of 31 modules (Sheet 2 of 4)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN			
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN				
SYS0	00 (COMMON CONTROL 0)	29	E17	COAX	84	15	0	00	22	B02	A			
						16	0	00	22	B02	C			
			E15	COAX	84	17	0	00	22	B02	A			
						18	0	00	22	B02	C			
		E16	COAX	84	19	0	00	22	B02	A				
					20	0	00	22	B02	C				
		E14	COAX	84	21	0	00	22	B02	A				
					22	0	00	22	B02	C				
		30	E21	COAX	84	23	0	00	22	B02	A			
						24	0	00	22	B02	C			
						E19	COAX	84	25	0	00	22	B02	A
									26	0	00	22	B02	C
E20	COAX	84	27	0	00	22	B02	A						
			28	0	00	22	B02	C						
E18	COAX	84	29	0	00	22	B02	A						
			30	0	00	22	B02	C						

10.3.9.2 Duplicated common control to unduplicated module control and unduplicated TMS for a maximum of 31 modules (Sheet 3 of 4)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN	
SYS0	01 (COMMON CONTROL 1)	27	E9	COAX	84	0	*System 1 0	00 00	27 22	B01 B01	A C
			E7	COAX	84	1 2	0 0	00 00	22 22	B01 B01	A C
			E8	COAX	84	3 4	0 0	00 00	22 22	B01 B01	A C
			E6	COAX	84	5 6	0 0	00 00	22 22	B01 B01	A C
		28	E13	COAX	84	7 8	0 0	00 00	22 22	B01 B01	A C
			E11	COAX	84	9 10	0 0	00 00	22 22	B01 B01	A C
			E12	COAX	84	11 12	0 0	00 00	22 22	B01 B01	A C
			E10	COAX	84	13 14	0 0	00 00	22 22	B01 B01	A C

* For 15 modules or less, terminate cable at system cabinet 1, carrier 02.
For more than 15 modules, terminate cable at system cabinet 1, carrier 00.

10.3.9.2 - Duplicated common control to unduplicated module control and unduplicated TMS for a maximum of 31 modules (Sheet 4 of 4)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN	
SYSO	01 (COMMON CONTROL 1)	29	E17	COAX	84	15 16	0 0	00 00	22 22	B01 B01	A C
			E15	COAX	84	17 18	0 0	00 00	22 22	B01 B01	A C
			E16	COAX	84	19 20	0 0	00 00	22 22	B01 B01	A C
			E14	COAX	84	21 22	0 0	00 00	22 22	B01 B01	A C
		30	E21	COAX	84	23 24	0 0	00 00	22 22	B01 B01	A C
			E19	COAX	84	25 26	0 0	00 00	22 22	B01 B01	A C
			E20	COAX	84	27 28	0 0	00 00	22 22	B01 B01	A C
			E18	COAX	84	29 30	0 0	00 00	22 22	B01 B01	A C

10.3.9.3 Unduplicated common control to duplicated module control and duplicated TMS for a maximum of 31 modules (Sheet 1 of 2)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN	
Net 1	00 (COMMON CONTROL 0)	27	E9	COAX	84		System 0	00	27	B02	A
						0	*System 0/1	02/00	27	B02	B
						0	1	00	22	B02	C
						0	1	01	22	B02	D
			E7	COAX	84	1	0	00	22	B02	A
						1	0	01	22	B02	B
						2	0	00	22	B02	C
						2	0	01	22	B02	D
			E8	COAX	84	3	0	00	22	B02	A
						3	0	01	22	B02	B
						4	0	00	22	B02	C
						4	0	01	22	B02	D
		E6	COAX	84	5	0	00	22	B02	A	
					5	0	01	22	B02	B	
					6	0	00	22	B02	C	
					6	0	01	22	B02	D	
		28	E13	COAX	84	7	0	00	22	B02	A
						7	0	01	22	B02	B
						8	0	00	22	B02	C
						8	0	01	22	B02	D
E11	COAX		84	9	0	00	22	B02	A		
				9	0	01	22	B02	B		
				10	0	00	22	B02	C		
				10	0	01	22	B02	D		
E12	COAX		84	11	0	00	22	B02	A		
				11	0	01	22	B02	B		
				12	0	00	22	B02	C		
				12	0	01	22	B02	D		
E10	COAX	84	13	0	00	22	B02	A			
			13	0	01	22	B02	B			
			14	0	00	22	B02	C			
			14	0	01	22	B02	D			

* For 15 modules or less, terminate cable at system cabinet 0, carrier 02.
For more than 16 modules, terminate cable at system cabinet 1, carrier 0.

10.3.9.3 - Unduplicated common control to duplicated module control and duplicated TMS for a maximum of 31 modules (Sheet 2 of 2)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN	
NET 1	00 (COMMON CONTROL 0)	29	E17	COAX	84	15	0	00	22	B02	A
						15	0	01	22	B02	B
						16	0	00	22	B02	C
						16	0	01	22	B02	D
			E15	COAX	84	17	0	00	22	B02	A
						17	0	01	22	B02	B
						18	0	00	22	B02	C
						18	0	01	22	B02	D
			E16	COAX	84	19	0	00	22	B02	A
						19	0	01	22	B02	B
						20	0	00	22	B02	C
						20	0	01	22	B02	D
		E14	COAX	84	21	0	00	22	B02	A	
					21	0	01	22	B02	B	
					22	0	00	22	B02	C	
					22	0	01	22	B02	D	
		30	E21	COAX	84	23	0	00	22	B02	A
						23	0	01	22	B02	B
						24	0	00	22	B02	C
						24	0	01	22	B02	D
E19	COAX		84	25	0	00	22	B02	A		
				25	0	01	22	B02	B		
				26	0	00	22	B02	C		
				26	0	01	22	B02	D		
E20	COAX	84	27	0	00	22	B02	A			
			27	0	01	22	B02	B			
			28	0	00	22	B02	C			
			28	0	01	22	B02	D			
E18	COAX	84	29	0	00	22	B02	A			
			29	0	01	22	B02	B			
			30	0	00	22	B02	C			
			30	0	01	22	B02	D			

10.3.9.4 Unduplicated common control to unduplicated module control and unduplicated TMS for a maximum of 31 modules (Sheet 1 of 2)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN	
NET1	00 (COMMON CONTROL 0)	27	E9	COAX	84	0	*System 0 0	00 00	27 22	B02 B02	A C
			E7	COAX	84	1 2	0 0	00 00	22 22	B02 B02	A C
			E8	COAX	84	3 4	0 0	00 00	22 22	B02 B02	A C
			E6	COAX	84	5 6	0 0	00 00	22 22	B02 B02	A C
		28	E13	COAX	84	7 8	0 0	00 00	22 22	B02 B02	A C
			E11	COAX	84	9 10	0 0	00 00	22 22	B02 B02	A C
			E12	COAX	84	11 12	0 0	00 00	22 22	B02 B02	A C
			E10	COAX	84	13 14	0 0	00 00	22 22	B02 B02	A C

* For 15 modules or less, terminate cable at TMS cabinet 0, carrier 02.

10.3.9.4 Unduplicated common control to unduplicated module control and unduplicated TMS for a maximum of 31 modules (Sheet 2 of 2)

WARNING: The 4-MHz cable has a minimum bend radius of 0.75 inch.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO					CABLE CONN
CABINET	CARRIER	SLOT	CONN			MODULE	NETWORK CABINET	CARRIER	SLOT	CONN	
NET 1	00 (COMMON CONTROL 0)	29	E17	COAX	84	15 16	0 0	00 00	22 22	B02 B02	A C
			E15	COAX	84	17 18	0 0	00 00	22 22	B02 B02	A C
			E16	COAX	84	19 20	0 0	00 00	22 22	B02 B02	A C
			E14	COAX	84	21 22	0 0	00 00	22 22	B02 B02	A C
		30	E21	COAX	84	23 24	0 0	00 00	22 22	B02 B02	A C
			E19	COAX	84	25 26	0 0	00 00	22 22	B02 B02	A C
			E20	COAX	84	27 28	0 0	00 00	22 22	B02 B02	A C
			E18	COAX	84	29 30	0 0	00 00	22 22	B02 B02	A C

10.3.10 TMS Interface Cabling

10.3.10.1 TMS module interface (duplicated TMS one cabinet) for a maximum of 15 modules (Sheet 1 of 2)

WARNING: This fiber optic cable has a minimum bend radius of 1.5 inch. The cable must be loosely supported to prevent distortion in the fiber optic.

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS 1)					MODULE	NET CABINET	NETWORK CARRIER	SLOT	CONN*
CARRIER	SLOT	CONN*							
00	18	A12(T) A13(R)	LB2B-B	451	00	0	00	01	A01(R) A00(T)
	17	A10(T) A11(R)	LB2B-B	451	01	0	00	01	A01(R) A00(T)
	16	A08(T) A09(R)	LB2B-B	451	02	0	00	01	A01(R) A00(T)
	02	A00(T) A01(R)	LB2B-B	451	03	0	00	01	A01(R) A00(T)
	03	A02(T) A03(R)	LB2B-B	451	04	0	00	01	A01(R) A00(T)
	04	A04(T) A05(R)	LB2B-B	451	05	0	00	01	A01(R) A00(T)
	05	A06(T) A07(R)	LB2B-B	451	06	0	00	01	A01(R) A00(T)

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS 1)					MODULE	NET CABINET	NETWORK CARRIER	SLOT	CONN*
CARRIER	SLOT	CONN*							
01	19	A14(T) A15(R)	LB2B-B	451	07	0	00	01	A01(R) A00(T)
	18	A12(T) A13(R)	LB2B-B	451	08	0	00	01	A01(R) A00(T)
	17	A10(T) A11(R)	LB2B-B	451	09	0	00	01	A01(R) A00(T)
	16	A08(T) A09(R)	LB2B-B	451	10	0	00	01	A01(R) A00(T)
	02	A00(T) A01(R)	LB2B-B	451	11	0	00	01	A01(R) A00(T)
	03	A02(T) A03(R)	LB2B-B	451	12	0	00	01	A01(R) A00(T)
	04	A04(T) A05(R)	LB2B-B	451	13	0	00	01	A01(R) A00(T)
	05	A06(T) A07(R)	LB2B-B	451	14	0	00	01	A01(R) A00(T)

* Connectors designated "T" use paddleboard transmitter adapters Z982A.
Connectors designated "R" use paddleboard receiver adapters Z982B.

10.3.10.1 TMS module interface (duplicated TMS one cabinet) for a maximum of 15 modules (Sheet 2 of 2)

WARNING: This fiber optic cable has a minimum bend radius of 1.5 inch. The cable must be loosely supported to prevent distortion in the fiber optic.

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS 1)					MODULE	NET CABINET	NETWORK CARRIER	SLOT	CONN*
CARRIER	SLOT	CONN*							
02	18	A12(T) A13(R)	LB2B-B	451	00	0	01	01	A01(R) A00(T)
	17	A10(T) A11(R)	LB2B-B	451	01	0	01	01	A01(R) A00(T)
	16	A08(T) A09(R)	LB2B-B	451	02	0	01	01	A01(R) A00(T)
	02	A00(T) A01(R)	LB2B-B	451	03	0	01	01	A01(R) A00(T)
	03	A02(T) A03(R)	LB2B-B	451	04	0	01	01	A01(R) A00(T)
	04	A04(T) A05(R)	LB2B-B	451	05	0	01	01	A01(R) A00(T)
	05	A06(T) A07(R)	LB2B-B	451	06	0	01	01	A01(R) A00(T)

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS 1)					MODULE	NET CABINET	NETWORK CARRIER	SLOT	CONN*
CARRIER	SLOT	CONN*							
03	19	A14(T) A15(R)	LB2B-B	451	07	0	01	01	A01(R) A00(T)
	18	A12(T) A13(R)	LB2B-B	451	08	0	01	01	A01(R) A00(T)
	17	A10(T) A11(R)	LB2B-B	451	09	0	01	01	A01(R) A00(T)
	16	A08(T) A09(R)	LB2B-B	451	10	0	01	01	A01(R) A00(T)
	02	A00(T) A01(R)	LB2B-B	451	11	0	01	01	A01(R) A00(T)
	03	A02(T) A03(R)	LB2B-B	451	12	0	01	01	A01(R) A00(T)
	04	A04(T) A05(R)	LB2B-B	451	13	0	01	01	A01(R) A00(T)
	05	A06(T) A07(R)	LB2B-B	451	14	0	01	01	A01(R) A00(T)

* Connectors designated "T" use paddleboard transmitter adapters Z982A.
Connectors designated "R" use paddleboard receiver adapters Z982B.

10.3.10.2 TMS module interface (duplicated TMS two cabinets)
for a maximum of 31 modules (Sheet 1 of 4)

WARNING: This fiber optic cable has a minimum bend radius
of 1.5 inch. The cable must be loosely supported to
prevent distortion in the fiber optic.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS)	CARRIER	SLOT	CONN*			MODULE	NET CABINET	CARRIER	SLOT	CONN*
1	00	18	A12(T) A13(R)	LB2B-B	451	00	0	00	01	A01(R) A00(T)
		17	A10(T) A11(R)	LB2B-B	451	01	0	00	01	A01(R) A00(T)
		16	A08(T) A09(R)	LB2B-B	451	02	0	00	01	A01(R) A00(T)
		02	A00(T) A01(R)	LB2B-B	451	03	0	00	01	A01(R) A00(T)
		03	A02(T) A03(R)	LB2B-B	451	04	0	00	01	A01(R) A00(T)
		04	A04(T) A05(R)	LB2B-B	451	05	0	00	01	A01(R) A00(T)
		05	A06(T) A07(R)	LB2B-B	451	06	0	00	01	A01(R) A00(T)

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS)	CARRIER	SLOT	CONN*			MODULE	NET CABINET	CARRIER	SLOT	CONN*
1	01	19	A14(T) A15(R)	LB2B-B	451	07	0	00	01	A01(R) A00(T)
		18	A12(T) A13(R)	LB2B-B	451	08	0	00	01	A01(R) A00(T)
		17	A10(T) A11(R)	LB2B-B	451	09	0	00	01	A01(R) A00(T)
		16	A08(T) A09(R)	LB2B-B	451	10	0	00	01	A01(R) A00(T)
		02	A00(T) A01(R)	LB2B-B	451	11	0	00	01	A01(R) A00(T)
		03	A02(T) A03(R)	LB2B-B	451	12	0	00	01	A01(R) A00(T)
		04	A04(T) A05(R)	LB2B-B	451	13	0	00	01	A01(R) A00(T)
		05	A06(T) A07(R)	LB2B-B	451	14	0	00	01	A01(R) A00(T)

* Connectors designated "T" use paddleboard transmitter adapters Z982A.
Connectors designated "R" use paddleboard receiver adapters Z982B.

10.3.10.2 TMS module interface (duplicated TMS two cabinets)
for a maximum of 31 modules (Sheet 2 of 4)

WARNING: This fiber optic cable has a minimum bend radius
of 1.5 inch. The cable must be loosely supported to
prevent distortion in the fiber optic.

FROM					TO						FROM					TO					
TMS CABINET (SYS)	CARRIER	SLOT	CONN*	CABLE TYPE	ED-1E434 GROUP NUMBER	MODULE	NET CABINET	CARRIER	SLOT	CONN*	TMS CABINET (SYS)	CARRIER	SLOT	CONN*	CABLE TYPE	ED-1E434 GROUP NUMBER	MODULE	NET CABINET	CARRIER	SLOT	CONN*
1	02	19	A14(T) A15(R)	LB2B-B	451	15	0	00	01	A01(R) A00(T)	1	03	19	A14(T) A15(R)	LB2B-B	451	23	0	00	01	A01(R) A00(T)
		18	A12(T) A13(R)	LB2B-B	451	16	0	00	01	A01(R) A00(T)			18	A12(T) A13(R)	LB2B-B	451	24	0	00	01	A01(R) A00(T)
		17	A10(T) A11(R)	LB2B-B	451	17	0	00	01	A01(R) A00(T)			17	A10(T) A11(R)	LB2B-B	451	25	0	00	01	A01(R) A00(T)
		16	A08(T) A09(R)	LB2B-B	451	18	0	00	01	A01(R) A00(T)			16	A08(T) A09(R)	LB2B-B	451	26	0	00	01	A01(R) A00(T)
		02	A00(T) A01(R)	LB2B-B	451	19	0	00	01	A01(R) A00(T)			02	A00(T) A01(R)	LB2B-B	451	27	0	00	01	A01(R) A00(T)
		03	A02(T) A03(R)	LB2B-B	451	20	0	00	01	A01(R) A00(T)			03	A02(T) A03(R)	LB2B-B	451	28	0	00	01	A01(R) A00(T)
		04	A04(T) A05(R)	LB2B-B	451	21	0	00	01	A01(R) A00(T)			04	A04(T) A05(R)	LB2B-B	451	29	0	00	01	A01(R) A00(T)
		05	A06(T) A07(R)	LB2B-B	451	22	0	00	01	A01(R) A00(T)			05	A06(T) A07(R)	LB2B-B	451	30	0	00	01	A01(R) A00(T)

- * Connectors designated "T" use paddleboard transmitter adapters Z982A.
Connectors designated "R" use paddleboard receiver adapters Z982B.

10.3.10.2 TMS module interface (duplicated TMS two cabinets)
for a maximum of 31 modules (Sheet 3 of 4)

WARNING: This fiber optic cable has a minimum bend radius of 1.5 inch. The cable must be loosely supported to prevent distortion in the fiber optic.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS)	CARRIER	SLOT	CONN*			MODULE	NET CABINET	CARRIER	SLOT	CONN*
2	00	18	A12(T) A13(R)	LB2B-B	451	00	0	01	01	A01(R) A00(T)
		17	A10(T) A11(R)	LB2B-B	451	01	0	01	01	A01(R) A00(T)
		16	A08(T) A09(R)	LB2B-B	451	02	0	01	01	A01(R) A00(T)
		02	A00(T) A01(R)	LB2B-B	451	03	0	01	01	A01(R) A00(T)
		03	A02(T) A03(R)	LB2B-B	451	04	0	01	01	A01(R) A00(T)
		04	A04(T) A05(R)	LB2B-B	451	05	0	01	01	A01(R) A00(T)
		05	A06(T) A07(R)	LB2B-B	451	06	0	01	01	A01(R) A00(T)

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS)	CARRIER	SLOT	CONN*			MODULE	NET CABINET	CARRIER	SLOT	CONN*
2	01	19	A14(T) A15(R)	LB2B-B	451	07	0	01	01	A01(R) A00(T)
		18	A12(T) A13(R)	LB2B-B	451	08	0	01	01	A01(R) A00(T)
		17	A10(T) A11(R)	LB2B-B	451	09	0	01	01	A01(R) A00(T)
		16	A08(T) A09(R)	LB2B-B	451	10	0	01	01	A01(R) A00(T)
		02	A00(T) A01(R)	LB2B-B	451	11	0	01	01	A01(R) A00(T)
		03	A02(T) A03(R)	LB2B-B	451	12	0	01	01	A01(R) A00(T)
		04	A04(T) A05(R)	LB2B-B	451	13	0	01	01	A01(R) A00(T)
		05	A06(T) A07(R)	LB2B-B	451	14	0	01	01	A01(R) A00(T)

* Connectors designated "T" use paddleboard transmitter adapters Z982A.
Connectors designated "R" use paddleboard receiver adapters Z982B.

10.3.10.2 TMS module interface (duplicated TMS two cabinets)
for a maximum of 31 modules (Sheet 4 of 4)

WARNING: This fiber optic cable has a minimum bend radius
of 1.5 inch. The cable must be loosely supported to
prevent distortion in the fiber optic.

FROM					TO						FROM					TO					
TMS CABINET (SYS)	CARRIER	SLOT	CONN*	CABLE TYPE	ED-1E434 GROUP NUMBER	MODULE	NET CABINET	CARRIER	SLOT	CONN*	TMS CABINET (SYS)	CARRIER	SLOT	CONN*	CABLE TYPE	ED-1E434 GROUP NUMBER	MODULE	NET CABINET	CARRIER	SLOT	CONN*
2	02	19	A14(T) A15(R)	LB2B-B	451	15	0	01	01	A01(R) A00(T)	2	03	19	A14(T) A15(R)	LB2B-B	451	23	0	01	01	A01(R) A00(T)
		18	A12(T) A13(R)	LB2B-B	451	16	0	01	01	A01(R) A00(T)			18	A12(T) A13(R)	LB2B-B	451	24	0	01	01	A01(R) A00(T)
		17	A10(T) A11(R)	LB2B-B	451	17	0	01	01	A01(R) A00(T)			17	A10(T) A11(R)	LB2B-B	451	25	0	01	01	A01(R) A00(T)
		16	A08(T) A09(R)	LB2B-B	451	18	0	01	01	A01(R) A00(T)			16	A08(T) A09(R)	LB2B-B	451	26	0	01	01	A01(R) A00(T)
		02	A00(T) A01(R)	LB2B-B	451	19	0	01	01	A01(R) A00(T)			02	A00(T) A01(R)	LB2B-B	451	27	0	01	01	A01(R) A00(T)
		03	A02(T) A03(R)	LB2B-B	451	20	0	01	01	A01(R) A00(T)			03	A02(T) A03(R)	LB2B-B	451	28	0	01	01	A01(R) A00(T)
		04	A04(T) A05(R)	LB2B-B	451	21	0	01	01	A01(R) A00(T)			04	A04(T) A05(R)	LB2B-B	451	29	0	01	01	A01(R) A00(T)
		05	A06(T) A07(R)	LB2B-B	451	22	0	01	01	A01(R) A00(T)			05	A06(T) A07(R)	LB2B-B	451	30	0	01	01	A01(R) A00(T)

* Connectors designated "T" use paddleboard transmitter adapters Z982A.
Connectors designated "R" use paddleboard receiver adapters Z982B.

10.3.10.3 TMS module interface (unduplicated TMS one cabinet) for a maximum of 15 modules

WARNING: This fiber optic cable has a minimum bend radius of 1.5 inch. The cable must be loosely supported to prevent distortion in the fiber optic.

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS 1)					MODULE	NET CABINET	CARRIER	SLOT	CONN*
CARRIER	SLOT	CONN*							
00	18	A12(T) A13(R)	LB2B-B	451	00	0	00	02	A03(R) A02(T)
	17	A10(T) A11(R)	LB2B-B	451	01	0	00	02	A03(R) A02(T)
	16	A08(T) A09(R)	LB2B-B	451	02	0	00	02	A03(R) A02(T)
	02	A00(T) A01(R)	LB2B-B	451	03	0	00	02	A03(R) A02(T)
	03	A02(T) A03(R)	LB2B-B	451	04	0	00	02	A03(R) A02(T)
	04	A04(T) A05(R)	LB2B-B	451	05	0	00	02	A03(R) A02(T)
	05	A06(T) A07(R)	LB2B-B	451	06	0	00	02	A03(R) A02(T)

FROM			CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET (SYS 1)					MODULE	NET CABINET	CARRIER	SLOT	CONN*
CARRIER	SLOT	CONN*							
01	19	A14(T) A15(R)	LB2B-B	451	07	0	00	02	A03(R) A02(T)
	18	A12(T) A13(R)	LB2B-B	451	08	0	00	02	A03(R) A02(T)
	17	A10(T) A11(R)	LB2B-B	451	09	0	00	02	A03(R) A02(T)
	16	A08(T) A09(R)	LB2B-B	451	10	0	00	02	A03(R) A02(T)
	02	A00(T) A01(R)	LB2B-B	451	11	0	00	02	A03(R) A02(T)
	03	A02(T) A03(R)	LB2B-B	451	12	0	00	02	A03(R) A02(T)
	04	A04(T) A05(R)	LB2B-B	451	13	0	00	02	A03(R) A02(T)
	05	A06(T) A07(R)	LB2B-B	451	14	0	00	02	A03(R) A02(T)

* Connectors designated "T" use paddleboard transmitter adapters Z982A.
Connectors designated "R" use paddleboard receiver adapters Z982B.

10.3.10.4 TMS module interface (unduplicated TMS, one cabinet) for a maximum of 31 modules (Sheet 1 of 2)

WARNING: This fiber optic cable has a minimum bend radius of 1.5 inch. The cable must be loosely supported to prevent distortion in the fiber optic.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET SYS	CARRIER	SLOT	CONN*			MODULE	NET CABINET	CARRIER	SLOT	CONN*
1	00	18	A12(T) A13(R)	LB2B-B	451	00	0	00	02	A03(R) A02(T)
		17	A10(T) A11(R)	LB2B-B	451	01	0	00	02	A03(R) A02(T)
		16	A08(T) A09(R)	LB2B-B	451	02	0	00	02	A03(R) A02(T)
		02	A00(T) A01(R)	LB2B-B	451	03	0	00	02	A03(R) A02(T)
		03	A02(T) A03(R)	LB2B-B	451	04	0	00	02	A03(R) A02(T)
		04	A04(T) A05(R)	LB2B-B	451	05	0	00	02	A03(R) A02(T)
		05	A06(T) A07(R)	LB2B-B	451	06	0	00	02	A03(R) A02(T)

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET SYS	CARRIER	SLOT	CONN*			MODULE	NET CABINET	CARRIER	SLOT	CONN*
1	01	19	A14(T) A15(R)	LB2B-B	451	07	0	00	02	A03(R) A02(T)
		18	A12(T) A13(R)	LB2B-B	451	08	0	00	02	A03(R) A02(T)
		17	A10(T) A11(R)	LB2B-B	451	09	0	00	02	A03(R) A02(T)
		16	A08(T) A09(R)	LB2B-B	451	10	0	00	02	A03(R) A02(T)
		02	A00(T) A01(R)	LB2B-B	451	11	0	00	02	A03(R) A02(T)
		03	A02(T) A03(R)	LB2B-B	451	12	0	00	02	A03(R) A02(T)
		04	A04(T) A05(R)	LB2B-B	451	13	0	00	02	A03(R) A02(T)
		05	A06(T) A07(R)	LB2B-B	451	14	0	00	02	A03(R) A02(T)

* Connectors designated "T" use paddleboard transmitter adapters Z982A.
Connectors designated "R" use paddleboard receiver adapters Z982B.

10.3.10.4 TMS module interface (unduplicated TMS, one cabinet) for a maximum of 31 modules (Sheet 2 of 2)

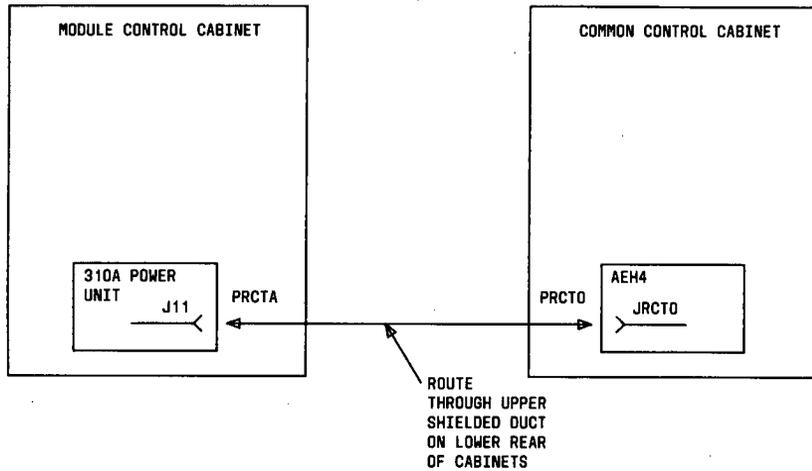
WARNING: This fiber optic cable has a minimum bend radius of 1.5 inch. The cable must be loosely supported to prevent distortion in the fiber optic.

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET SYS	CARRIER	SLOT	CONN*			MODULE	NET CABINET	CARRIER	SLOT	CONN*
1	02	19	A14(T) A15(R)	LB2B-B	451	15	0	00	02	A03(R) A02(T)
		18	A12(T) A13(R)	LB2B-B	451	16	0	00	02	A03(R) A02(T)
		17	A10(T) A11(R)	LB2B-B	451	17	0	00	02	A03(R) A02(T)
		16	A08(T) A09(R)	LB2B-B	451	18	0	00	02	A03(R) A02(T)
		02	A00(T) A01(R)	LB2B-B	451	19	0	00	02	A03(R) A02(T)
		03	A02(T) A03(R)	LB2B-B	451	20	0	00	02	A03(R) A02(T)
		04	A04(T) A05(R)	LB2B-B	451	21	0	00	02	A03(R) A02(T)
		05	A06(T) A07(R)	LB2B-B	451	22	0	00	02	A03(R) A02(T)

FROM				CABLE TYPE	ED-1E434 GROUP NUMBER	TO				
TMS CABINET SYS	CARRIER	SLOT	CONN*			MODULE	NET CABINET	CARRIER	SLOT	CONN*
1	03	19	A14(T) A15(R)	LB2B-B	451	23	0	00	02	A03(R) A02(T)
		18	A12(T) A13(R)	LB2B-B	451	24	0	00	02	A03(R) A02(T)
		17	A10(T) A11(R)	LB2B-B	451	25	0	00	02	A03(R) A02(T)
		16	A08(T) A09(R)	LB2B-B	451	26	0	00	02	A03(R) A02(T)
		02	A00(T) A01(R)	LB2B-B	451	27	0	00	02	A03(R) A02(T)
		03	A02(T) A03(R)	LB2B-B	451	28	0	00	02	A03(R) A02(T)
		04	A04(T) A05(R)	LB2B-B	451	29	0	00	02	A03(R) A02(T)
		05	A06(T) A07(R)	LB2B-B	451	30	0	00	02	A03(R) A02(T)

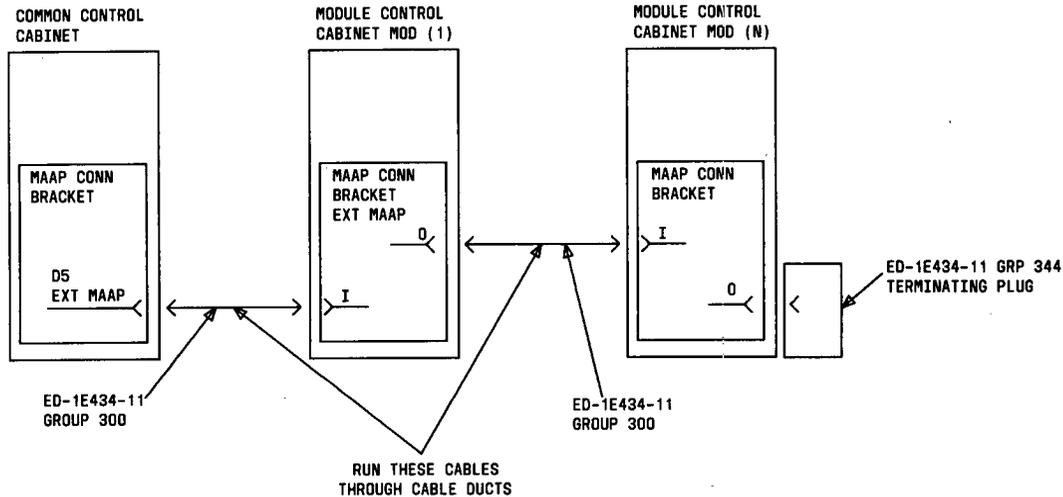
* Connectors designated "T" use paddleboard transmitter adapters Z982A.
Connectors designated "R" use paddleboard receiver adapters Z982B.

10.3.11 Alarm Cable - Unduplicated Common Control



10.3.12 Extended MAAP Cabling

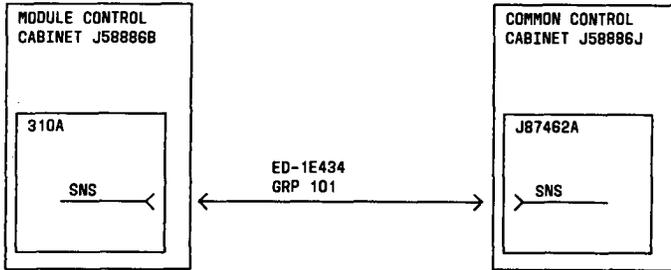
10.3.12.1 A cable must be run connecting the MAAP connecting block from the common control cabinet to each module control cabinet in a multi-module system. This cable should be a shielded 25-pair cable (ED-1E434-11 Group 300). This cable should be run through the cable ducts. It should have a maximum length of 500 feet. The last module control cabinet should be equipped with an ED-1E434-11 Group 344 terminating plug.



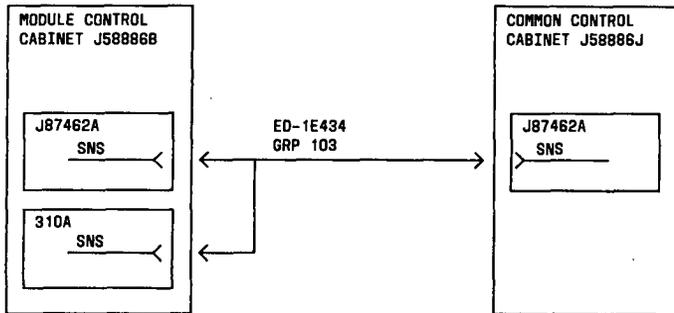
10.3.13 SNS Lead

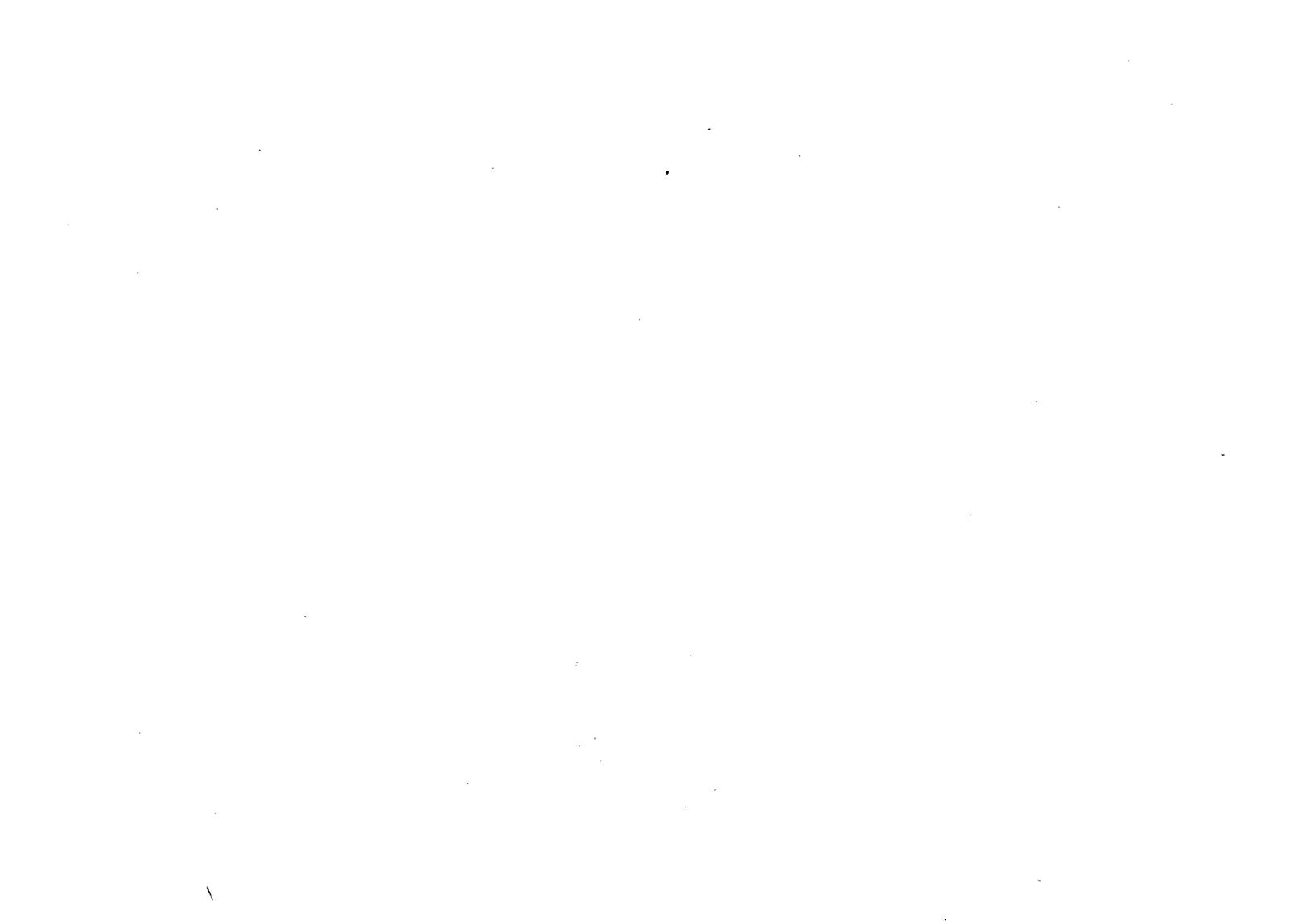
NOTE: There is no SNS lead on systems equipped with bulk OLS power supplies

10.3.13.1. Module control cabinet not equipped with nominal holdover



10.3.13.2. Module control cabinet equipped with nominal holdover





PART 11. AUXILIARY AND PERIPHERAL EQUIPMENT

Contents

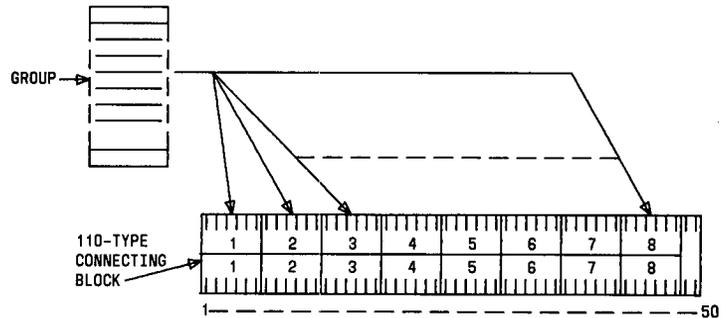
General 11.1
 30A8 System Status Indicator 11.2
 89A Control Unit 11.3
 Audix 11.4
 Colocated Tie Trunks 11.5
 Astro Endyne* E&M Converter
 J53035 C1, L2 E&M Converter
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 Remote Maintenance Administration and
 Traffic System (RMATS) 11.16
 SMDR, NCOSS, CSMDR, LMDR, and LSU 11.17
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11.1 General

11.1.1 This section describes the connection of numerous peripheral and auxiliary pieces of equipment used with features provided by System 85. The equipment described in this section is normally mounted in the auxiliary cabinets provided with the System 85. In some cases, this is not possible so the equipment will be mounted elsewhere. Some of the equipment will be mounted in a convenient spot near the cross-connect field. In other cases, the equipment will be located at a convenient location for customer use.

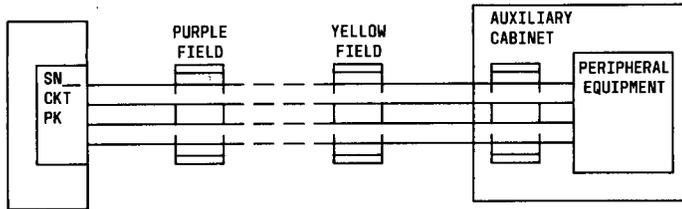
11.1.2 If the equipment is located in an auxiliary cabinet, it is cabled to the 110-type connecting blocks in the cabinet. These blocks are then connected to the 110-type connecting blocks in the auxiliary (yellow) portion of the TRUNK/AUX field of the main cross-connect field. If the equipment was installed elsewhere, it should be cabled directly to the yellow field.

11.1.3 The 110-type connecting blocks on the cross-connect field and in the auxiliary cabinet contain two rows of 50 terminals. Each row of 50 terminals is divided into eight groups of six. The last two terminals are not used. Each group of six terminals is represented graphically by:



* Trademark of ASTRO-ENDYNE Corporation
 † Trademark of the PORTA-SYSTEM Corporation
 ‡ Trademark of Cook Electronics

11.1.4 A typical cross-connection using 110-type blocks would be:



11.1.5 To conserve space in the connection drawings in this section:

- Unused terminals in a group are not shown.
- Connectors D0-D7 on the system cabinet and on the auxiliary cabinet are not shown.
- Connectors are not shown on the cross-connect field.

11.1.6 To determine connector numbers and cross-connect information, refer to the cable running lists and Customer System Document furnished with each installation. Cross-connections can be made by either patch cords or cut-down wiring.

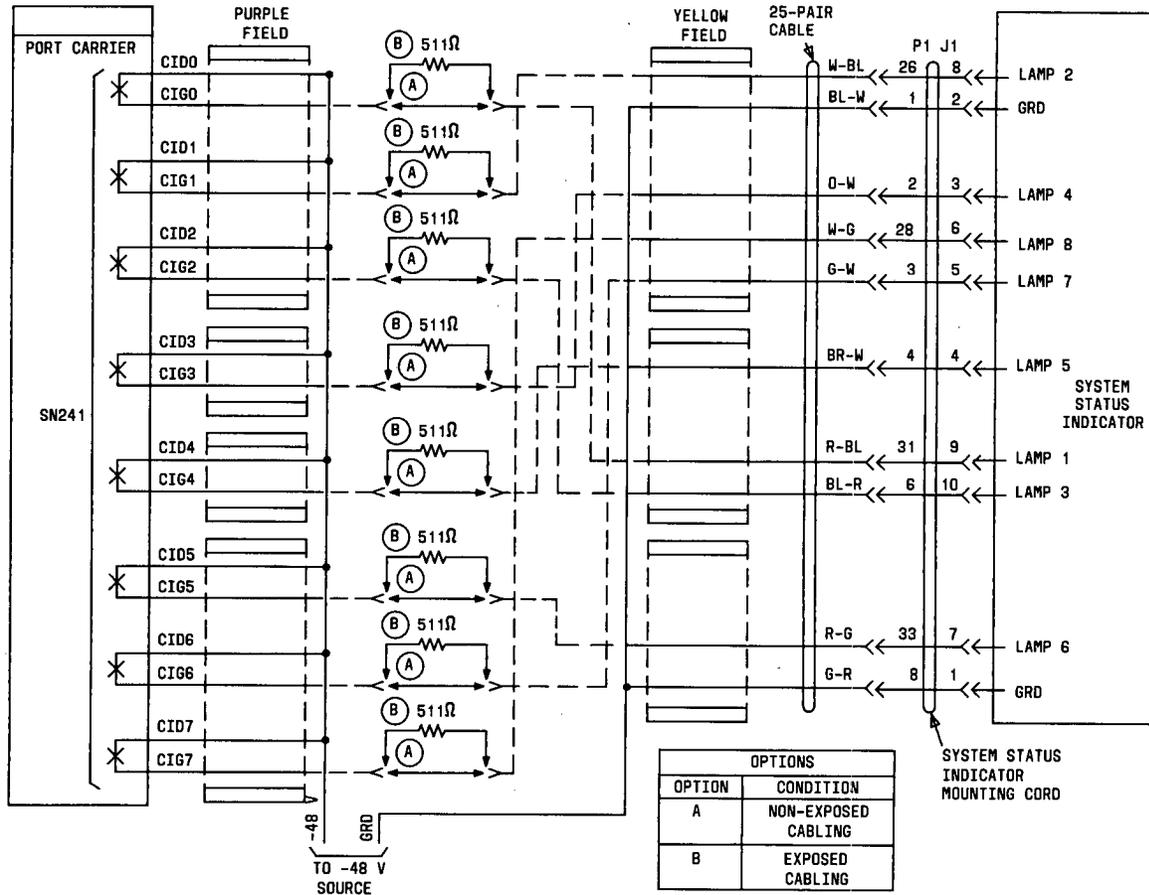
11.1.7 The connections and the terminations for the System 85 circuit packs are located in Part 9, paragraph 9.2.9.

11.2 30A8 System Status Indicator

11.2.1 The system status indicator is used in conjunction with the Centralized Attendant Service (CAS) and Direct Department Calling (DDC)/Uniform Call Distribution features to provide a status monitoring capability.

11.2.2 30A8 System status indicator connections

(See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



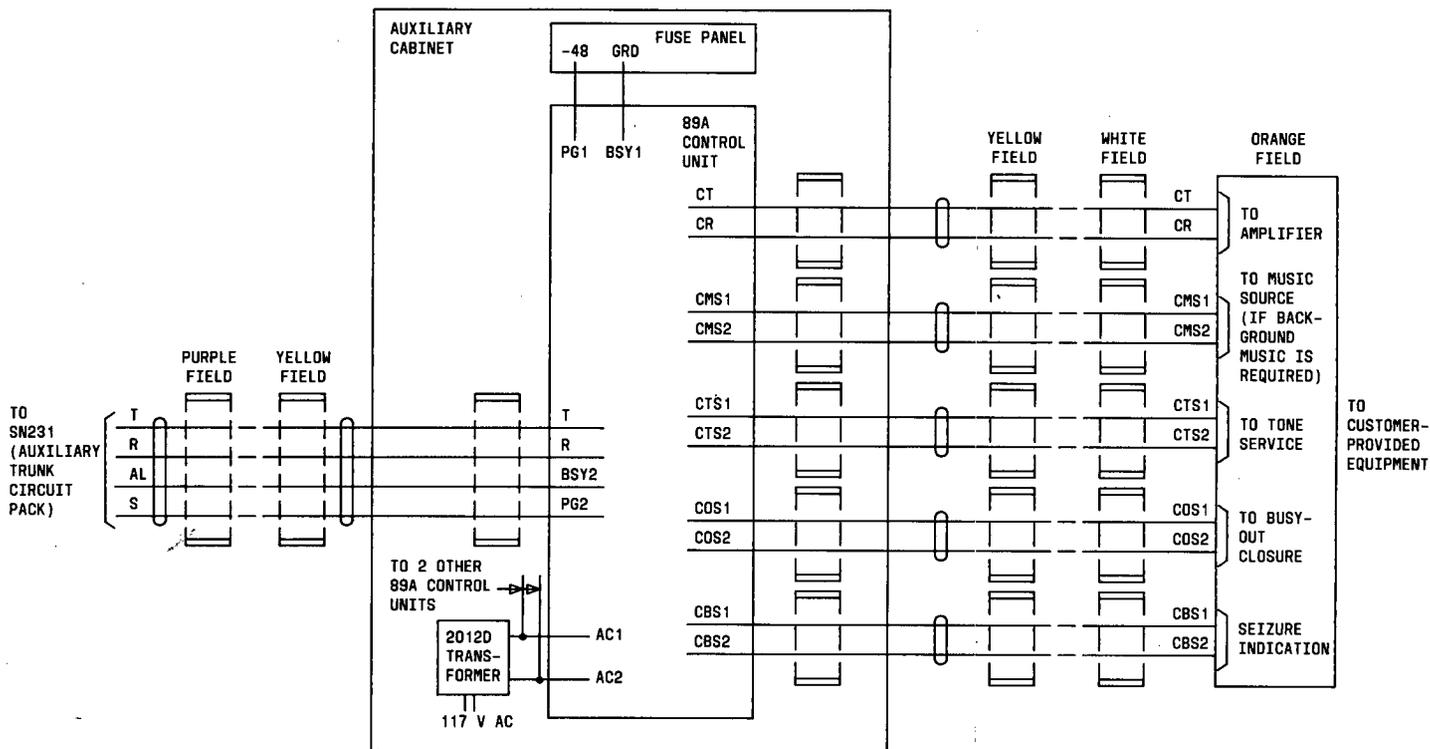
11.3 89A Control Unit

11.3.1 The 89A control unit is used for the Loudspeaker Paging (Basic and Deluxe) and Chime Paging features. One control unit is required for each paging zone. Two 89A control units may be connected together if a single paging zone is to be accessed by both the Loudspeaker Paging and Chime Paging features.

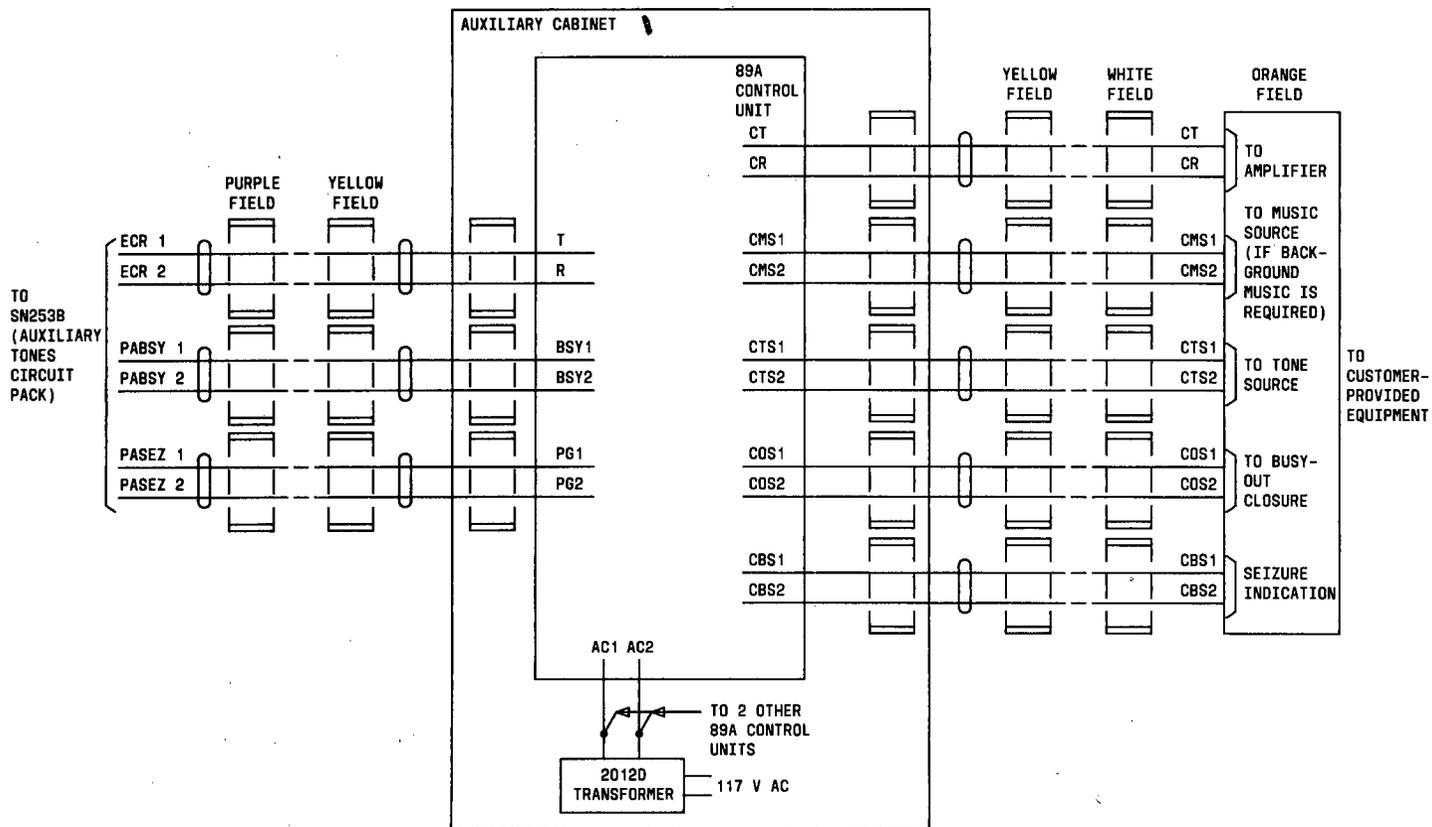
11.3.2 Install 89A control unit mounting details

11.3.3 Mount control units in auxiliary cabinet or on an 11-inch structural foam panel. One structural foam panel can accommodate two 89A control units. Remove cover. Separate the printed circuit board from the base pan by removing the six retaining screws. Attach the base pan to the mounting surface with two suitable screws. Position pan so that music and tone controls will be on top when circuit pack is reattached on base pan. Reattach printed circuit board to base pan with six screws (music and tone control at top). Do not plug the 2012D transformer(s) into its assigned outlet until all other connections are complete.

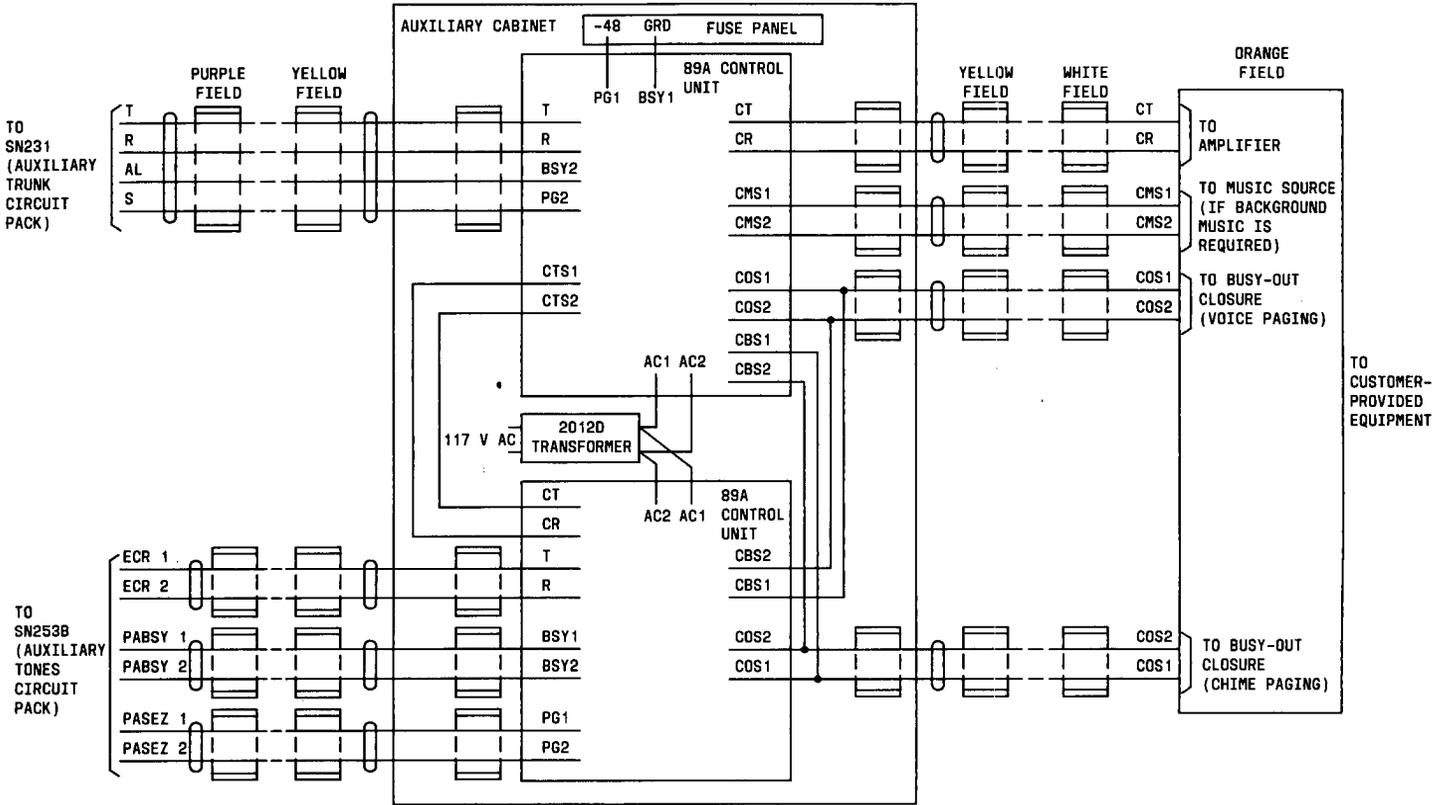
11.3.4 89A control unit connections - Loudspeaker Paging feature
 (See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



11.3.5 89A control unit connections - Chime Paging feature
 (See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)

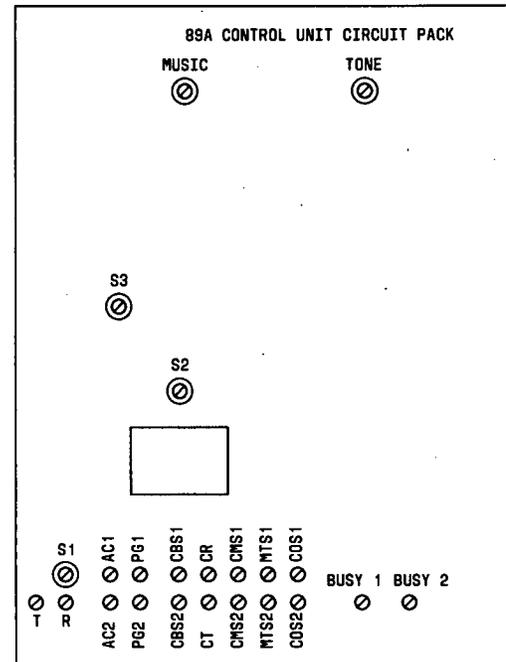


11.3.6 89A control unit connection – Loudspeaker Paging and Chime Paging features
 (See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



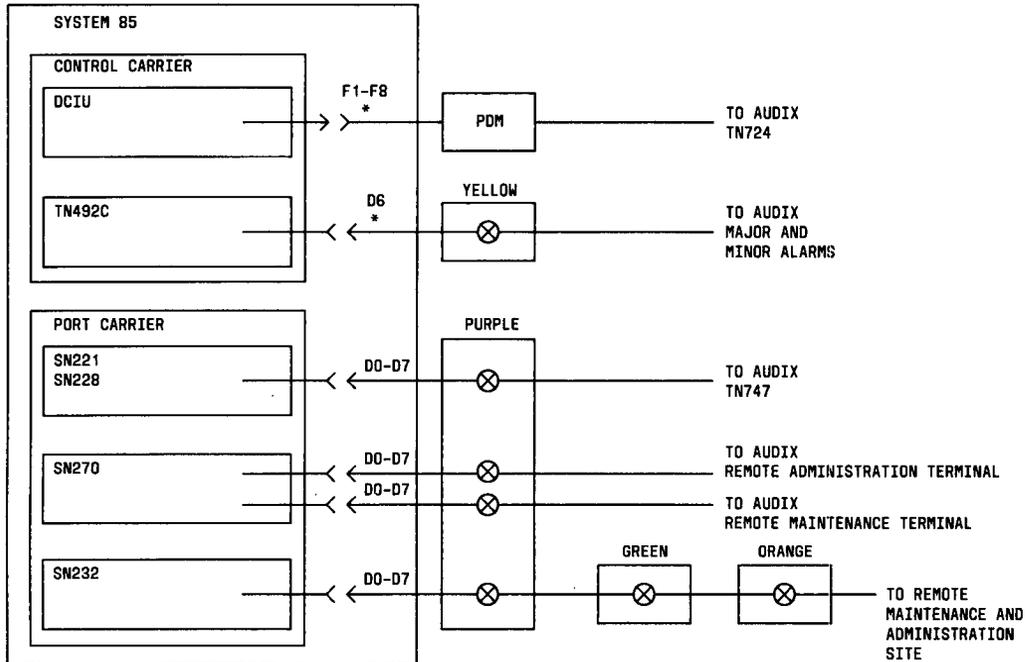
11.3.7 89A control unit - options and adjustments

CONTROL UNIT OPTIONS			
OPTION DESCRIPTION		OPTION	ACTION
INPUT IMPEDANCE	600Ω SINGLE 89A	Y	S1 CLOSED FULL CLOCKWISE
	15000Ω MULTIPLE 89A IN PARALLEL		S1 OPEN FULL COUNTER CLOCKWISE
CLICK SUPPRESSION	DEACTIVATED	X	S2 CLOSED FULL CLOCKWISE
	ACTIVE		S2 OPEN FULL COUNTER-CLOCKWISE
BUSY OUT SIGNAL	NOT INTERRUPT PAGE	Z	S3 CLOSED FULL CLOCKWISE
	INTERRUPT PAGE		S3 OPEN FULL COUNTER CLOCKWISE



11.4 AUDIX

Connection and Terminations for System 85 circuit packs are located in Part 9, paragraph 9.2.9. Connections for the Remote Alarms are located in paragraph 11.8. Connections for the AUDIX system are located in 585-300-101.



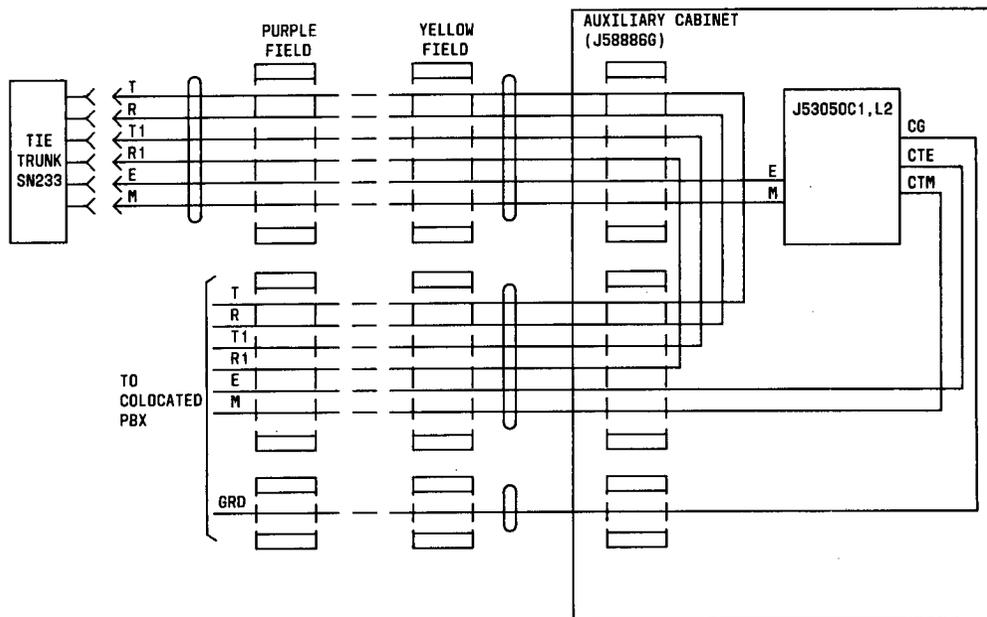
* IF SYSTEM 85 IS EQUIPPED WITH DUPLICATED COMMON CONTROL, USE WYE CABLES AND CONNECT TO THE SAME SLOT AND CIRCUIT IN THE SECOND COMMON CONTROL.

11.5 Colocated Tie Trunk Connections

11.5.1 If colocated System 85s are each equipped with an SN233B circuit pack, an E&M converter must be used to make the E&M signaling between the switches compatible. The instructions for installing the J53050C1,L2 E&M converter are given in paragraph 11.5.2. The instructions for installing the ASTRO-ENDYNE* 11625-1-1 E&M converter are given in paragraph 11.5.3. If colocated System 85s are equipped with SN233C tie trunk circuit packs, no E&M converter is required.

11.5.2 Colocated tie trunk connections - J53050C1, L2

(See Part 9, paragraph 9.2.9 for SN233 circuit pack translations and connections.)

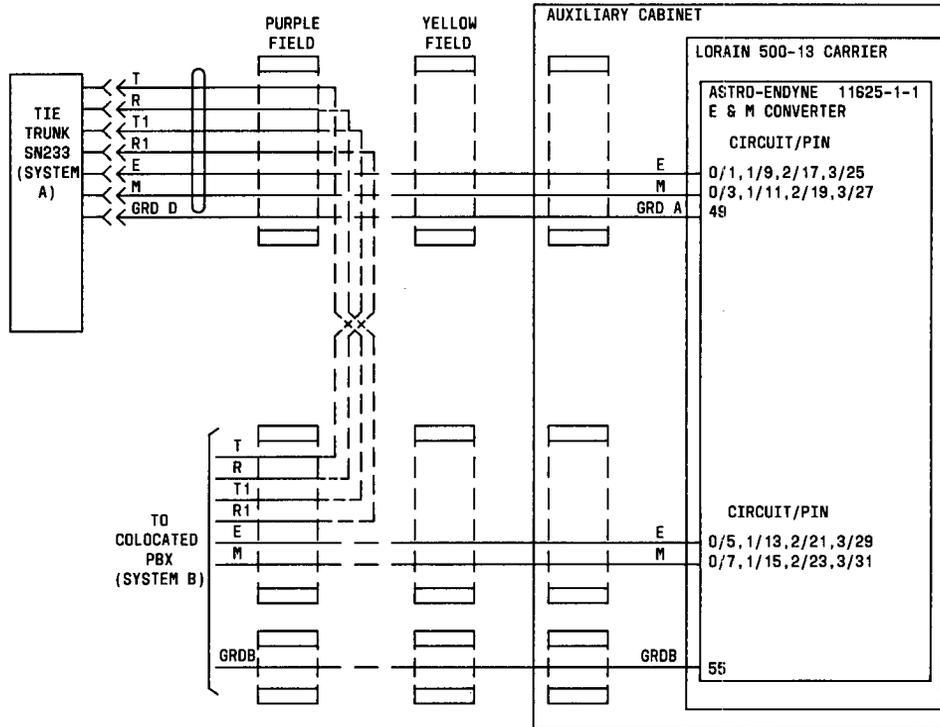


* Trademark of ASTRO-ENDYNE Corporation

11.5.3 Colocated tie trunk connections - ASTRO-ENDYNE 11625-1-1 E&M converter

11.5.3.1 The ASTRO-ENDYNE 11625-1-1 E&M converter is designed for on-premises, colocated nonexposed applications. Each E&M converter circuit card contains four circuits. The E&M converter mounts in a Lorain 500-13 or equivalent carrier. Each carrier can hold 13 circuit cards for a maximum of 52 circuits per carrier. The carrier is located in the System 85 auxiliary cabinet.

11.5.3.2 ASTRO-ENDYNE 11625-1-1 E&M converter connections - System A is System 85 being installed.
(See Part 9, paragraph 9.2.9 for SN233 circuit pack connections and terminations.)

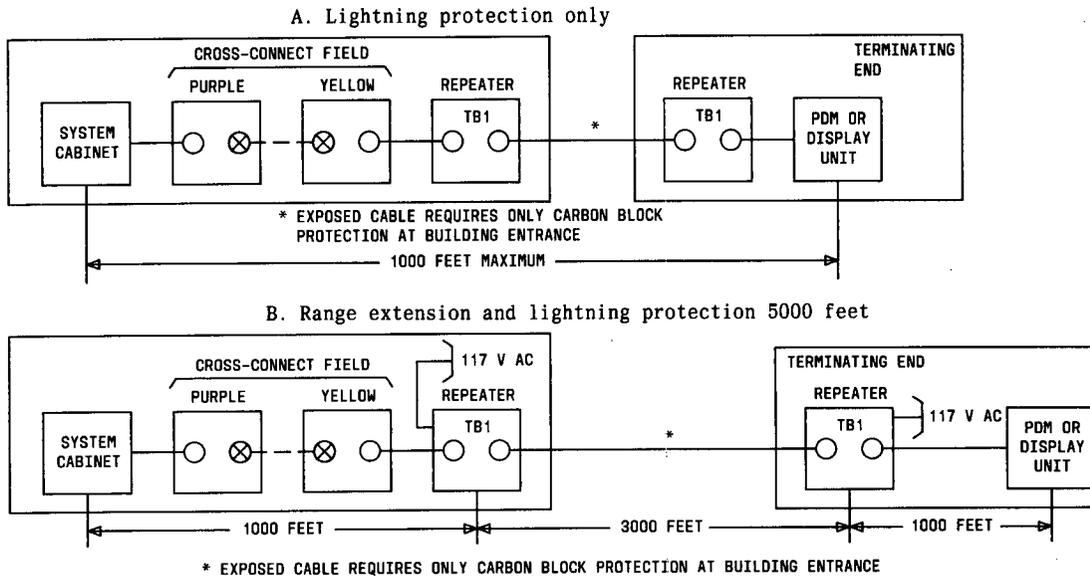


11.6 Data Channel Repeaters

11.6.1 The data channel repeaters provide range extension and/or lightning protection for low speed data channels. Up to four repeaters can be used to provide maximum data range extension of 11,000 feet. Only two repeaters are required for lightning protection (maximum range from terminal equipment must be 1000 feet or less). They can be arranged for single or dual channels and are mounted on a wall. A 28D1 power unit is needed on each repeater used for lightning protection and range extension. The 28D1 power unit, however, is not required for repeaters used only for lightning protection.

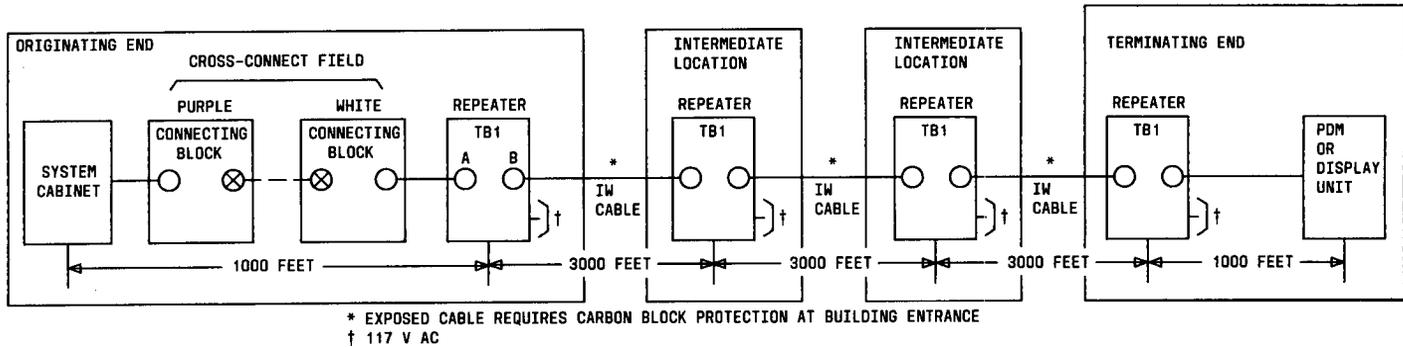
11.6.2 Requirements

11.6.2.1 Distance and power requirements (24-gauge cable)



11.6.2.1 - Contd

C. Range extension and lightning protection 11,000 feet



11.6.2.2 Circuit pack requirements

A. Lightning protection only

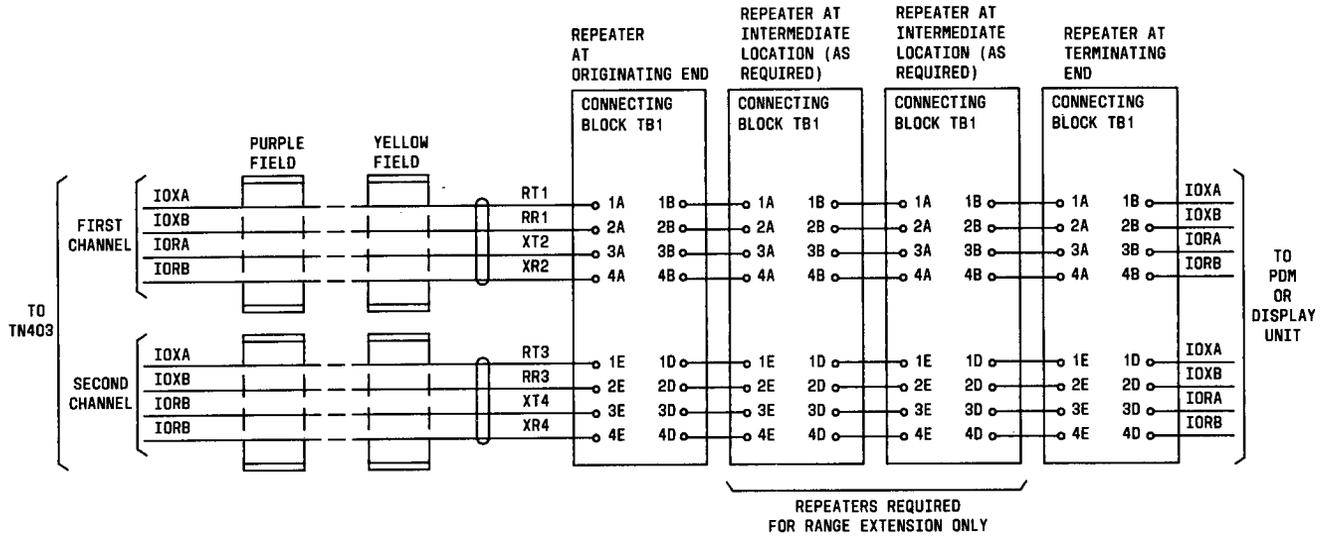
CHANNEL	CONNECTOR	CIRCUIT PACK REQUIRED
1	J1	WJ3
	J2	WJ3
2	J3	WJ3
	J4	WJ3

B. Range extension and lightning protection

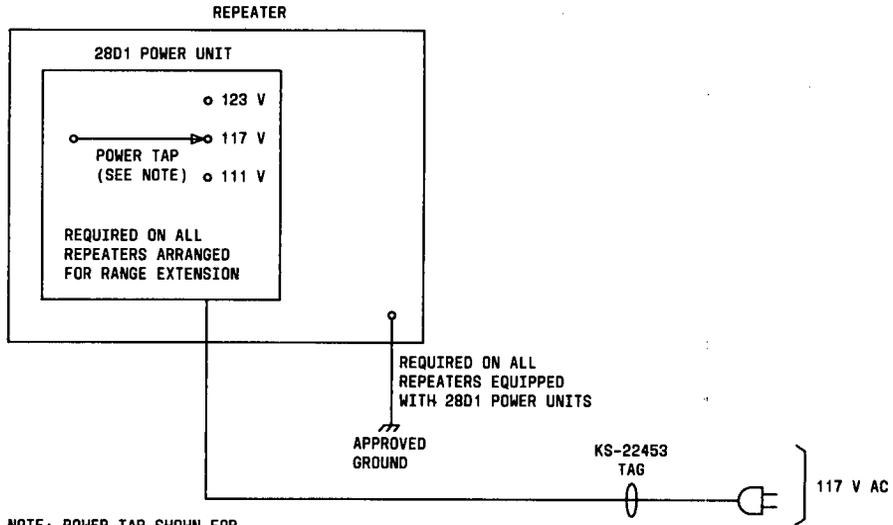
CHANNEL	CONNECTOR	CIRCUIT PACK REQUIRED
1	J1	AE48
	J2	AE48
2	J3	AE48
	J4	AE48
1 and 2	J5	AE49 and 28D1 Power Unit

11.6.3 Data channel repeater connections

(See Part 9, paragraph 9.2.9 for TN403 circuit pack connections and terminations.)



11.6.4 Repeater grounding and power connections



NOTE: POWER TAP SHOWN FOR
CONNECTION TO 117 V AC
MEASURED IN RANGE 117±3 V AC.
RECONNECT POWER TAP IF AC
POWER MEASUREMENT DIFFERS FROM
REQUIRED RANGE.

11.7 Display Units

Contents

102-Type display unit 11.7.1

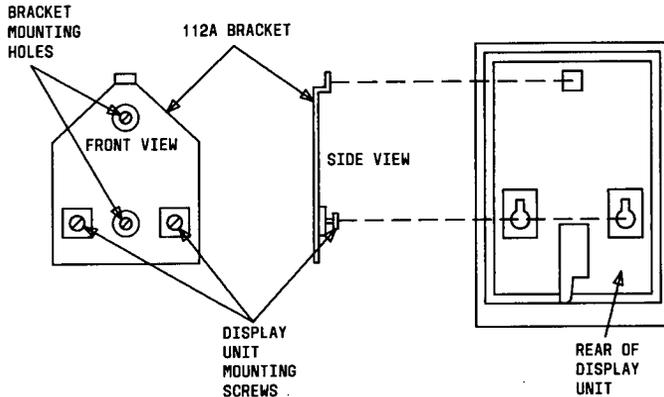
106-Type display unit 11.7.2

11.7.1 Display unit - 102 type

11.7.1.1 The 102-type display unit is used in conjunction with the KS-19252, L7 adapter and the 211A power unit.

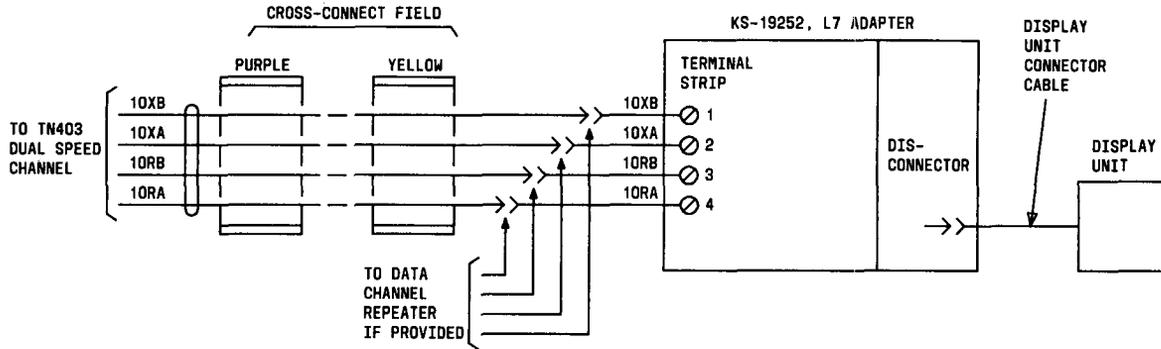
11.7.1.2 To mount display unit on wall:

- (1) Mount 112A bracket on wall.
- (2) Remove faceplate from display unit.
- (3) Remove display unit cover and trim ring assembly from base by removing four attaching screws.
- (4) Rotate cover and trim ring assembly 180° and reassemble to base.
- (5) Install faceplate.
- (6) Mount display unit to 112A bracket.



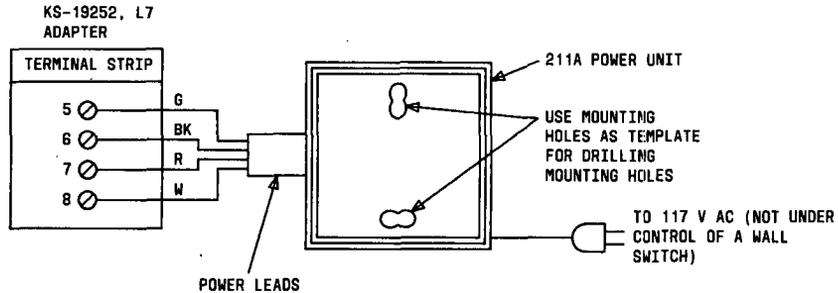
11.7.1.3 KS-19252, L7 adapter connections

(See Part 9, paragraph 9.2.9 for TN403 circuit pack terminations and connections.)



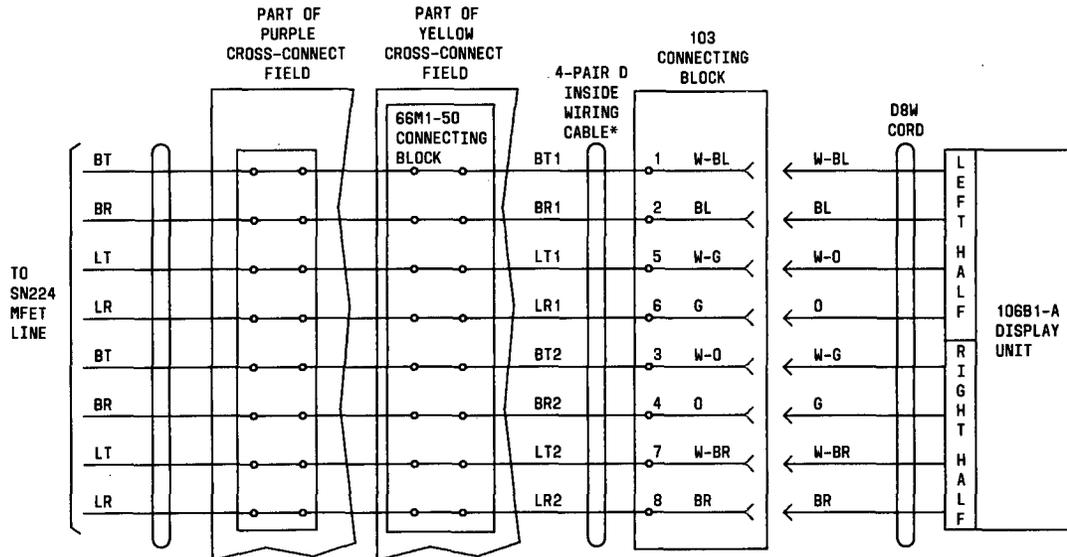
11.7.1.4 211A power unit installation and connections

CAUTION: Do not make any power connection until all other connections have been made.



11.7.2 106-type display unit

(See Part 9, paragraph 9.2.9 for SN224 circuit pack connections and terminations.)



* TYPE 286A (0.51 MM OR 24-GAUGE) CABLE IS EQUIVALENT. TYPE 285A (0.64 MM OR 22-GAUGE) REQUIRED IF ONLY ONE PORT (DISPLAY UNIT HALF) IS CONNECTED AND RUN EXCEEDS 210 M (700 FEET).

11.8 External Alarms

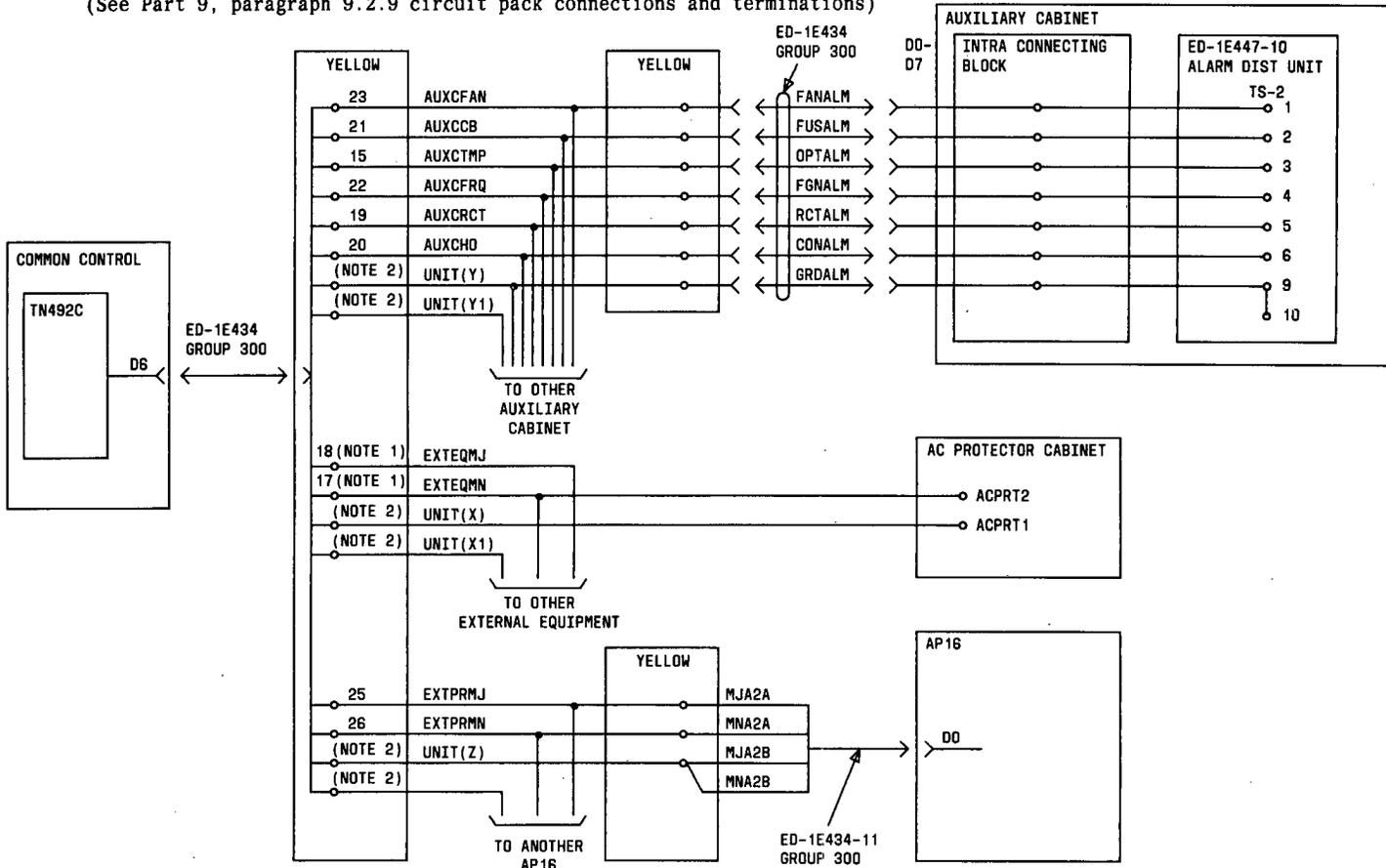
11.8.1 External alarms from auxiliary cabinets, Applications Processors,

AC protector cabinet, and other external units may be input to the System 85 common control through the TN492 circuit pack. These alarms can then be automatically reported to a remote maintenance center equipped with INADS/RMATS II, Issue 3. The connection of external alarms must be coordinated with RMATS II center.

11.8.2 The TN492 has 10 leads which serve as a common bus for 10 different alarm types plus 32 unit leads for identifying the equipment associated with the alarm. A unit number is assigned to each remote device that can uniquely initiate an alarm. A contact closure between the unit lead and an alarm type lead will be detected and registered.

11.8.3 External alarm connections

(See Part 9, paragraph 9.2.9 circuit pack connections and terminations)



NOTES:

1. THESE LEADS MUST GO TO ANOTHER 110 BLOCK TO BE FANNED OUT FOR USE WITH OTHER EXTERNAL EQUIPMENT.
2. SEE PARAGRAPH 11.8.4 FOR LEAD DESIGNATIONS.

11.8.4 Unit number pin numbers

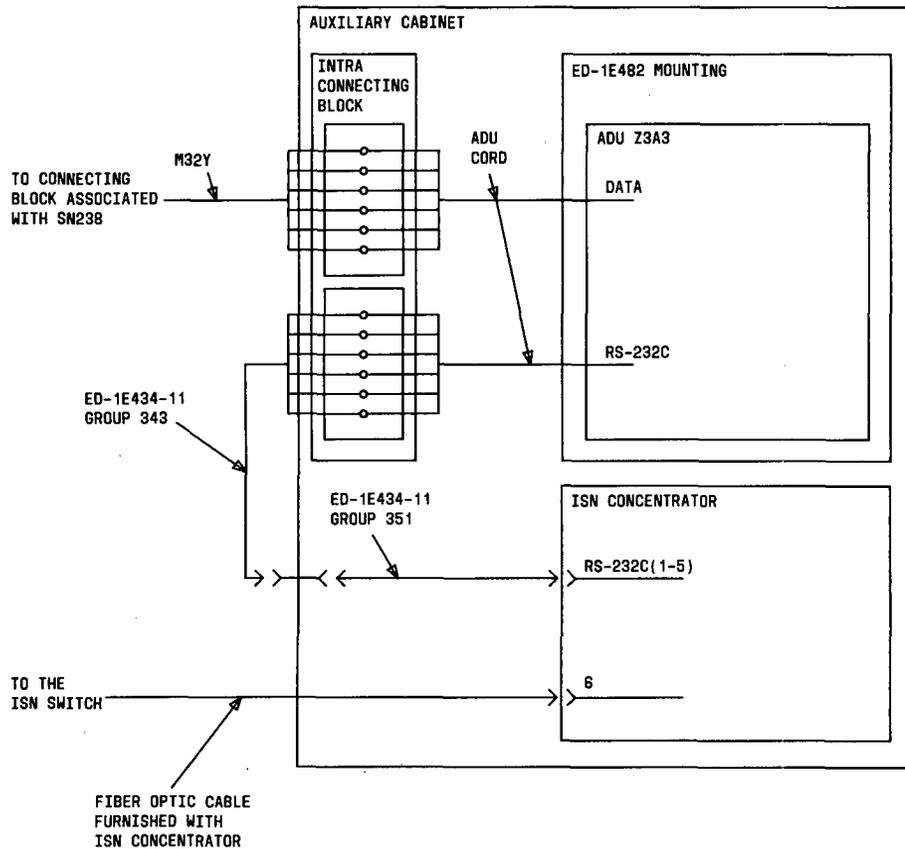
CONNECTOR	LEAD DESIGNATION	LEAD COLOR	CONNECTING BLOCK TERMINAL
D6	UNIT20	W-BL	1
	UNIT19	BL-W	2
	UNIT22	W-O	3
	UNIT21	O-W	4
	UNIT24	W-G	5
	UNIT23	G-W	6
		W-BR	7
	UNIT25	BR-W	8
	UNIT27	W-S	9
	UNIT26	S-W	10
	UNIT29	R-BL	11
	UNIT28	BL-R	12
	UNIT31	R-O	13
	UNIT30	O-R	14
	AUXCTMP	R-G	15
	UNIT32	G-R	16
	EXTEQMN	R-BR	17
	EXTEQMJ	BR-R	18
	AUXCRCT	R-S	19
	AUXCHO	S-R	20
	AUXCCB	BK-BL	21
	AUXCFRQ	BL-BK	22
	AUXCFAN	BK-O	23
		O-BK	24

CONNECTOR	LEAD DESIGNATION	LEAD COLOR	CONNECTING BLOCK TERMINAL
D6	EXTPRMJ	BK-G	25
	EXTPRMN	G-BK	26
	UNIT2	BK-BR	27
	UNIT1	BR-BK	28
	UNIT4	BK-S	29
	UNIT3	S-BK	30
	UNIT6	Y-BL	31
	UNIT5	BL-Y	32
	UNIT8	Y-O	33
	UNIT7	O-Y	34
	UNIT10	Y-G	35
	UNIT9	G-Y	36
		Y-BR	37
	UNIT11	BR-Y	38
	UNIT13	Y-S	39
	UNIT12	S-Y	40
	UNIT15	V-BL	41
	UNIT14	BL-V	42
	UNIT17	V-O	43
	UNIT16	O-V	44
		V-G	45
	UNIT18	G-V	46
	RINGO	V-BR	47
	TIPO	BR-V	48
RING1	V-S	49	
TIP1	S-V	50	

11.9 Information System Network (ISN) to System 85 Connections

11.9.1 This paragraph shows the connections for one typical ISN port. For the pin assignments for cable group 351 and the RS-232 connector on the ISN concentrator, see paragraph 11.9.2.

See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.



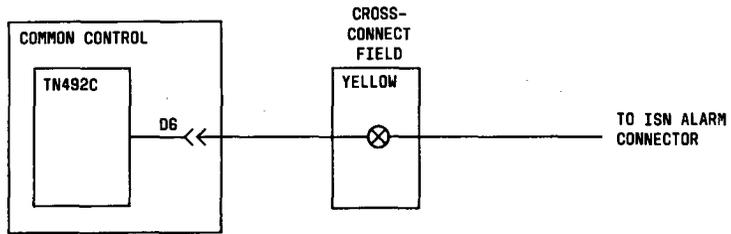
11.9.2 Lead and pin assignments for ISN concentrator

LEAD DESIGNATION	RS-232 CONNECTOR PIN NUMBER	CONDUCTOR COLOR	CONNECTOR				
			1	2	3	4	5
			ISN PORT NUMBER				
	1	BL-W	1	9	17	25	33
	26	W-BL					
R10	2	O-W					
R20	27	W-O					
S10	3	G-W					
S20	28	W-G	2	10	18	26	34
	4	BR-W					
	29	W-BR					
R12	5	S-W					
R22	30	W-S					
S12	6	BL-R	3	11	19	27	35
S22	31	R-BL					
	7	O-R					
	32	R-O					
R14	8	G-R					
R24	33	R-G	4	12	20	28	36
S14	9	BR-R					
S24	34	R-BR					
	10	S-R					
	35	R-S					
R16	11	BL-BK					
R26	36	BK-BL					
S16	12	O-BK					
S26	37	BK-O					

LEAD DESIGNATION	RS-232 CONNECTOR PIN NUMBER	CONDUCTOR COLOR	CONNECTOR				
			1	2	3	4	5
			ISN PORT NUMBER				
	13	G-BK	5	13	21	29	37
	38	BK-G					
R10	14	BR-BK					
R20	39	BK-BR					
S10	15	S-BK					
S20	40	BK-S	6	14	22	30	38
	16	BL-Y					
	41	Y-BL					
R12	17	O-Y					
R22	42	Y-O					
S12	18	G-Y	7	15	23	31	39
S22	43	Y-G					
	19	BR-Y					
	44	Y-BR					
R14	20	S-Y					
R24	45	Y-S	8	16	24	32	40
S14	21	BL-V					
S24	46	V-BL					
	22	O-V					
	47	V-O					
R16	23	G-V					
R26	48	V-G					
S16	24	BR-V					
S26	49	V-BR					
	25	S-V					
	50	V-S					

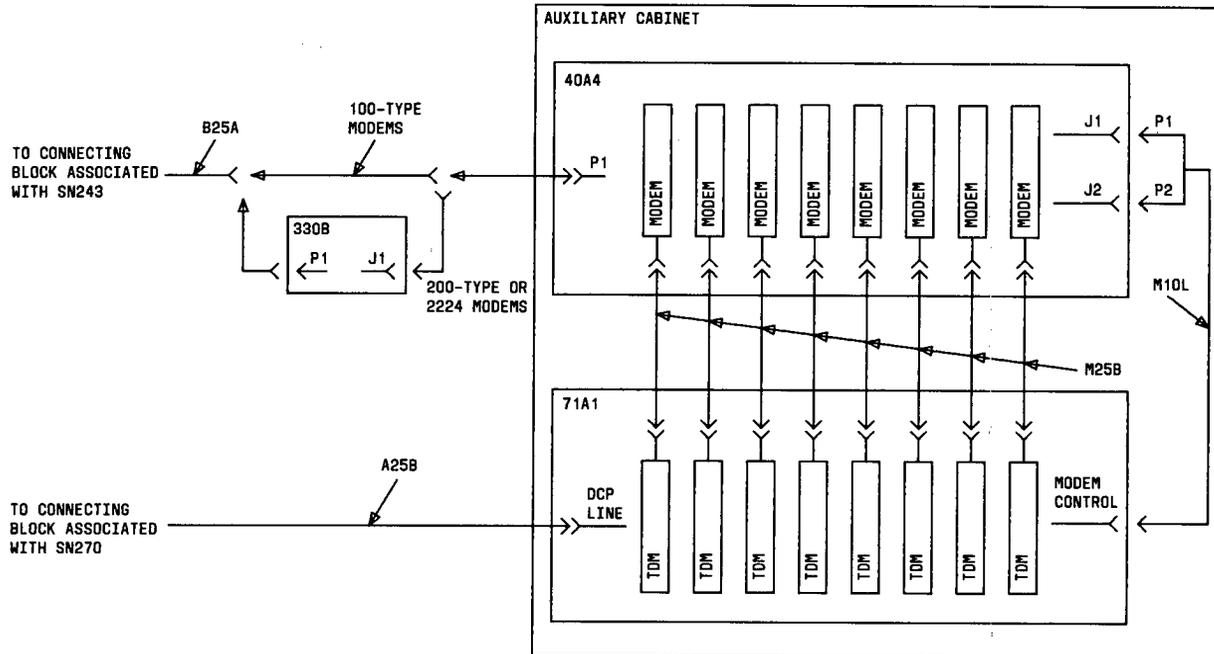
11.9.3 ISN alarm connection

Lead designations and pin numbers for D6 connector can be found in paragraph 11.8



11.10 Modem Pooling

11.10.1 Modem pooling connections - See paragraph 11.10.2 for the lead terminations for 40A4 P1 connections and 71A1 DCP LINE connections. (See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



11.10.2 Modem pooling - lead terminations

CONNECTOR PIN	40A4	71A1
	CONN P1	DCP LINE
LEAD DESIGNATION	LEAD DESIGNATION	
26	T(1)	
1	R(1)	
27	T(2)	OD1(1)
2	R(2)	OD2(1)
28	T(3)	1D1(1)
3	R(3)	1D2(1)
29	T(4)	
4	R(4)	
30	T(5)	OD1(2)
5	R(5)	OD2(2)
31	T(6)	1D1(2)
6	R(6)	1D2(2)
32	T(7)	
7	R(7)	
33	T(8)	OD1(3)
8	R(8)	OD2(3)
34		1D1(3)
9		1D2(3)
35	MB2(1)	
10	MB1(1)	
36	MB2(2)	OD1(4)
11	MB1(2)	OD2(4)
37	MB2(3)	1D1(4)
12	MB1(3)	1D2(4)
38	MB2(4)	

CONNECTOR PIN	40A4	71A1
	CONN P1	DCP LINE
LEAD DESIGNATION	LEAD DESIGNATION	
13	MB1(4)	
39	MB2(5)	OD1(5)
14	MB1(5)	OD2(5)
40	MB2(6)	1D1(5)
15	MB1(6)	1D2(5)
41	MB2(7)	
16	MB1(7)	
42	MB2(8)	OD1(6)
17	MB1(8)	OD2(6)
43	TSLO	1D1(6)
18	RSLO	1D2(6)
44		
19		
45		OD1(7)
20		OD2(7)
46	RD(5)	1D1(7)
21	RD(1)	1D2(7)
47	RD(6)	
22	RD(2)	
48	RD(7)	OD1(8)
23	RD(3)	OD2(8)
49	RD(8)	1D1(8)
24	RD(4)	1D2(8)
50	FG	
25	GRD	

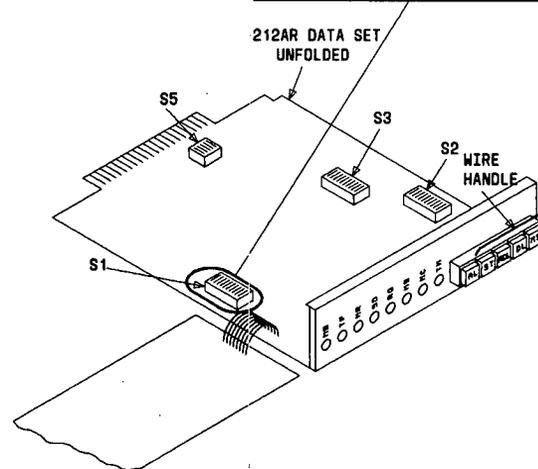
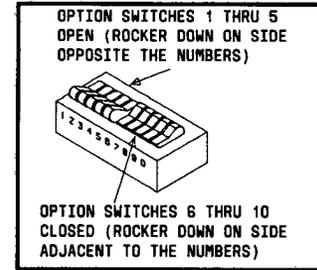
11.10.3 212AR Modem (Data Set) Options

The screw switch S1 should be fully open so signal ground is not connected

E3 to frame ground. Plug in straps should be installed between terminals E2 and E4 and between terminals and E5. The pushbutton switches on the 212AR should never be operated unless the modem is in the test mode.

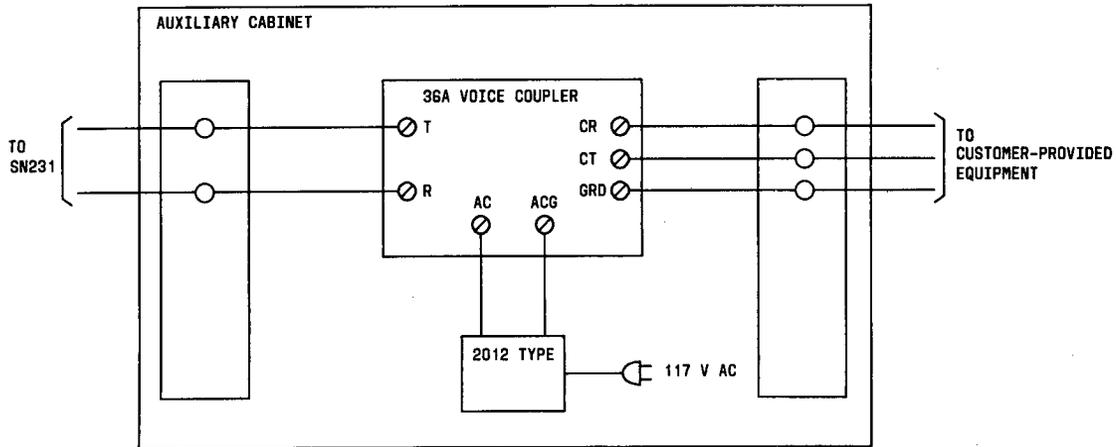
212AR OPTIONS			
SWITCH	ROCKER	COMMENT	
S1	0	C=CLOSE LOOP IN MB/AL MODE	
	0	0=NO FUNCTION	
	C	C=MODEM READY INDICATION IN AL MODE	
S2	0	0=SPEED CONTROLLED BY PIN 23	
	0	0=MB/AL CONTROLLED BY PIN 25	
	0	0=HIGH SPEED INTERNAL TIMING	
	0	0=HIGH SPEED ASYNCHRONOUS OPERATION	
	C	C=10 BITS PER CHARACTER	
	0	0=HIGH SPEED DL CONTROLLED REMOTELY	
	C	C=RDL CONTROLLED BY PIN 21	
	C	C=SPEED CONTROLLED BY PIN 23	
	S3	C	C=MODEM DISCONNECTS IF LOSS OF CARRIER
		C	C=MODEM DISCONNECTS IF SPACES RECEIVED
C		C=NOT CLEAR TO SEND IF NO CARRIER	
C		C=SEND SPACES AT END OF CALL	
0		0=AUTOMATICALLY ANSWER INCOMING CALL	
0		0=NO ANSWER INDICATION ON PIN 22	
0		C=HIGH SPEED OPERATION ONLY	
C	C=SPEED INDICATION ON PIN 12		
S5	0	0=HIGH SPEED ASYNCHRONOUS OPERATION	
	0		

0= OPEN (ROCKER DOWN ON SIDE OPPOSITE TO NUMBERS)
C= CLOSED (ROCKER DOWN ON SIDE ADJACENT TO NUMBERS)



11.11 Music-on-Hold - 36A Voice Coupler

11.11.1 S1 switch should be set in the closed or down position



11.12 Power Failure Transfer

Contents

609-type panel	11.12.1
PORTA-SYSTEM* 574-5	11.12.2

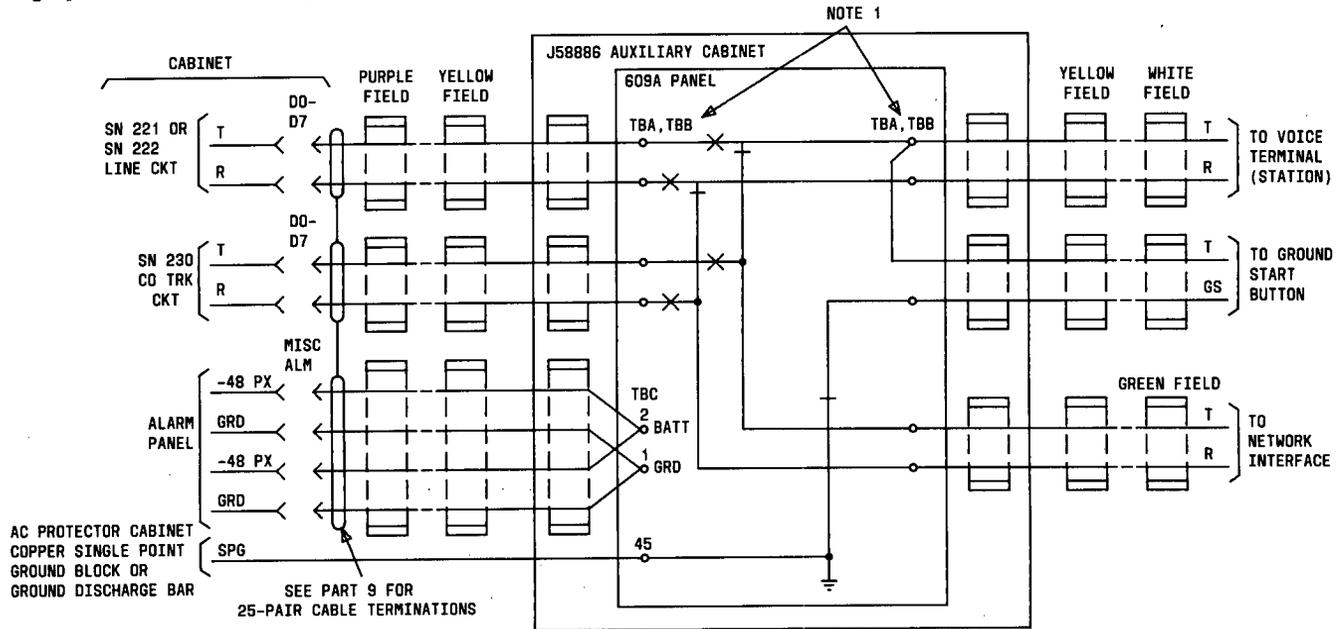
11.12.1 609-type panel

11.12.1.1 Prewired 609-type panels are used to provide connections to power failure transfer facilities.

Each 609-type panel contains apparatus for transferring ten stations to ten CO cable pairs during power failure or major alarm conditions. The panels are mounted in the auxiliary cabinet.

11.12.1.2 Ground start for power failure transfer stations is provided by a single conductor from the cabinet copper ground block to the 609-type transfer panel. This ground start conductor runs through a relay contact in the 609 panel to an externally mounted ground start key. Ground start leads are provided for each system station set assigned for power failure transfer service.

11.12.1.3 Power failure transfer connections showing one transfer voice terminal (station) and power connections. (See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



- NOTES:
 1. SEE PARAGRAPH 11.12.1.4 FOR TERMINAL NUMBERS

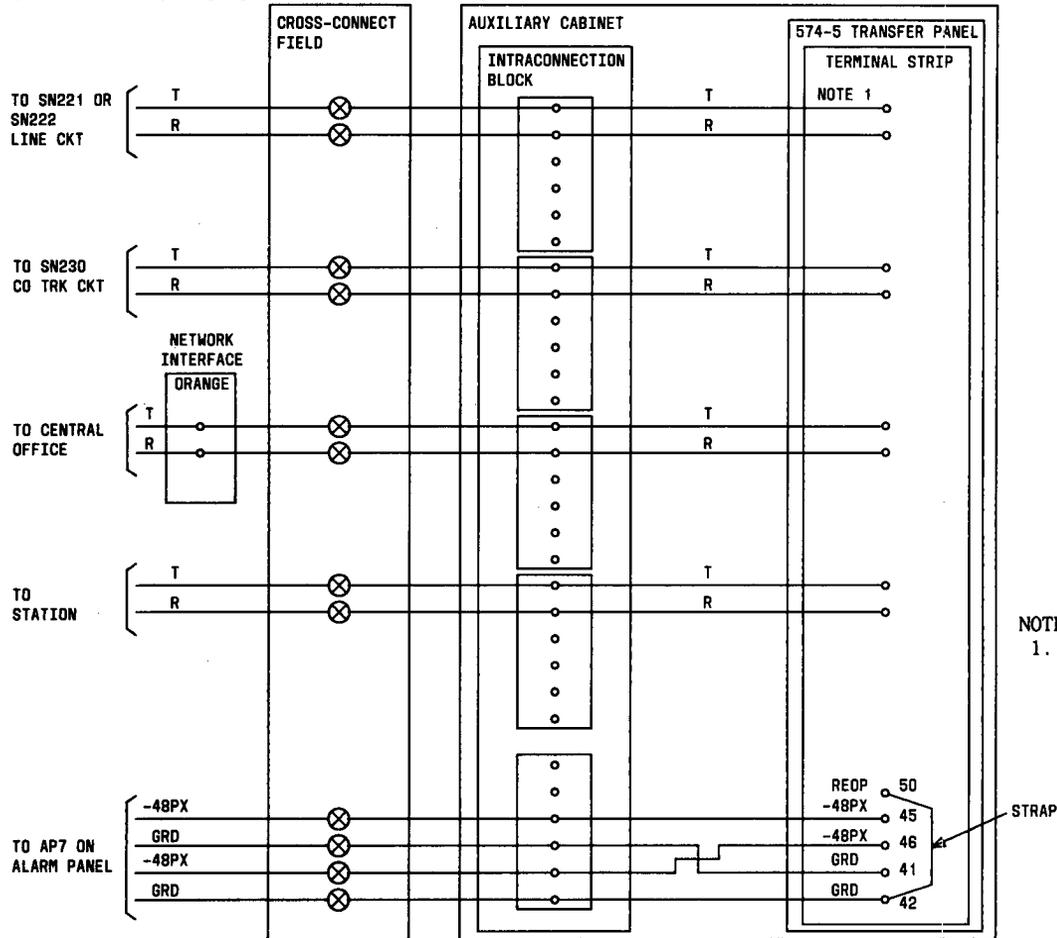
11.12.1.4 Power failure transfer connections for 1 through 10 voice terminals (stations)

FROM	LEAD DESIG	TO 609 PANEL									
		1ST STATION	2ND STATION	3RD STATION	4TH STATION	5TH STATION	6TH STATION	7TH STATION	8TH STATION	9TH STATION	10TH STATION
		TBA	TBA	TBA	TBA	TBA	TBB	TBB	TBB	TBB	TBB
Voice Terminal (Station)	T	1	11	21	31	41	1	11	21	31	41
	R	2	12	22	32	42	2	12	22	32	42
Ground Start Button	T	1	11	21	31	41	1	11	21	31	41
	GS	3	13	23	33	43	3	13	23	33	43
SN221 or SN222 Line Ckt	T	4	14	24	34	44	4	14	24	34	44
	R	5	15	25	35	45	5	15	25	35	45
SN230 Trk Ckt	T	6	16	26	36	46	6	16	26	36	46
	R	7	17	27	37	47	7	17	27	37	47
CO Trunk	T	8	18	28	38	48	8	18	28	38	48
	R	9	19	29	39	49	9	19	29	39	49

11.12.2 PORTA-SYSTEM 574-5 Emergency Transfer Panel

11.12.2.1 The PORTA-SYSTEM 574-5 are used to provide connection to power failure transfer facilities. Each 574-5 panel contains apparatus for transferring five stations to five CO cable pairs during power failure or major alarm conditions. The panels are mounted in the auxiliary cabinet or may be wall mounted. Ground start buttons are not required.

11.12.2.2 Power failure transfer connections showing one transfer voice terminal (station) and power connections mounted in auxiliary cabinet.
 (See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



- NOTES:
 1. See paragraph 11.12.2.3 for terminal numbers.

11.12.2.3 Power failure transfer connections - 1 through 5 voice terminals (stations)

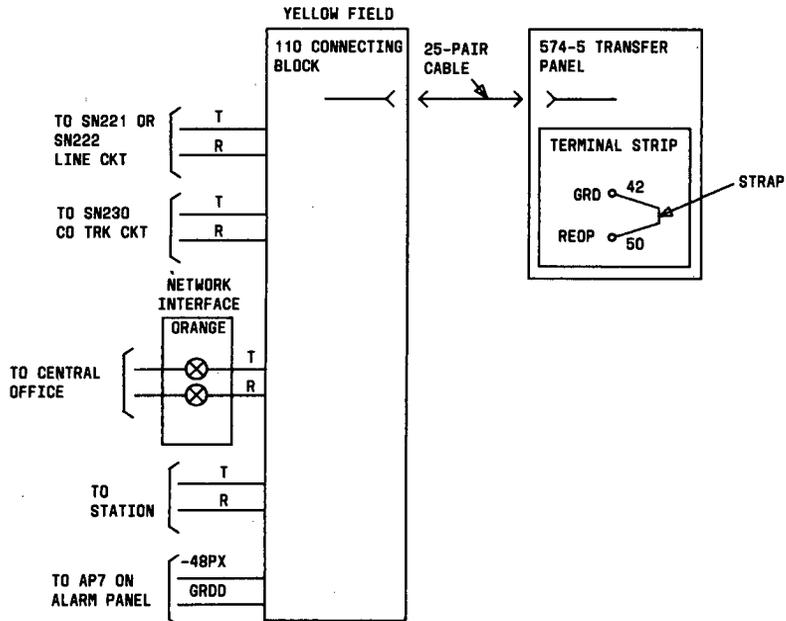
FROM	LEAD DESIG	TO 573-5 PANEL				
		1ST STATION	2ND STATION	3RD STATION	4TH STATION	5TH STATION
		TBA	TBA	TBA	TBA	TBA
Voice Terminal (Station)	T	3	11	19	27	35
	R	4	12	20	28	36
SN221 or SN222 Line Ckt	T	1	9	17	25	33
	R	2	10	18	26	34
SN230 TRK Ckt	T	7	15	23	31	39
	R	8	16	24	32	40
CO Trunk	T	5	13	21	29	37
	R	6	14	22	30	38

11.12.2.4 Power failure transfer – wall mounted

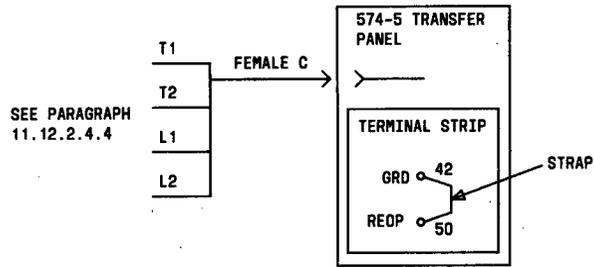
11.12.2.4.1 There are two cables with the 574-5 transfer panel.

One cable is a 25-pair connector cable. It is connectorized on both ends. In the figure shown in paragraph 11.12.2.4.2, the cable should be connected to the transfer panel and to a 110-type connecting block. The 110 block is then cross-connected to appropriate 110 blocks in the purple field. The wiring for this cable is given in paragraph 11.12.2.4.4 in the column Female C. The other cable is a 25-pair cable with one connector on one end and 4 legs each equipped with a connector. This allows modular connection. The wiring for this cable is given in paragraph 11.12.2.4.4.

11.12.2.4.2 25-pair cable – single leg



11.12.2.4.3 25-pair cable - 4 legs



11.12.2.4.4 Cable Terminations

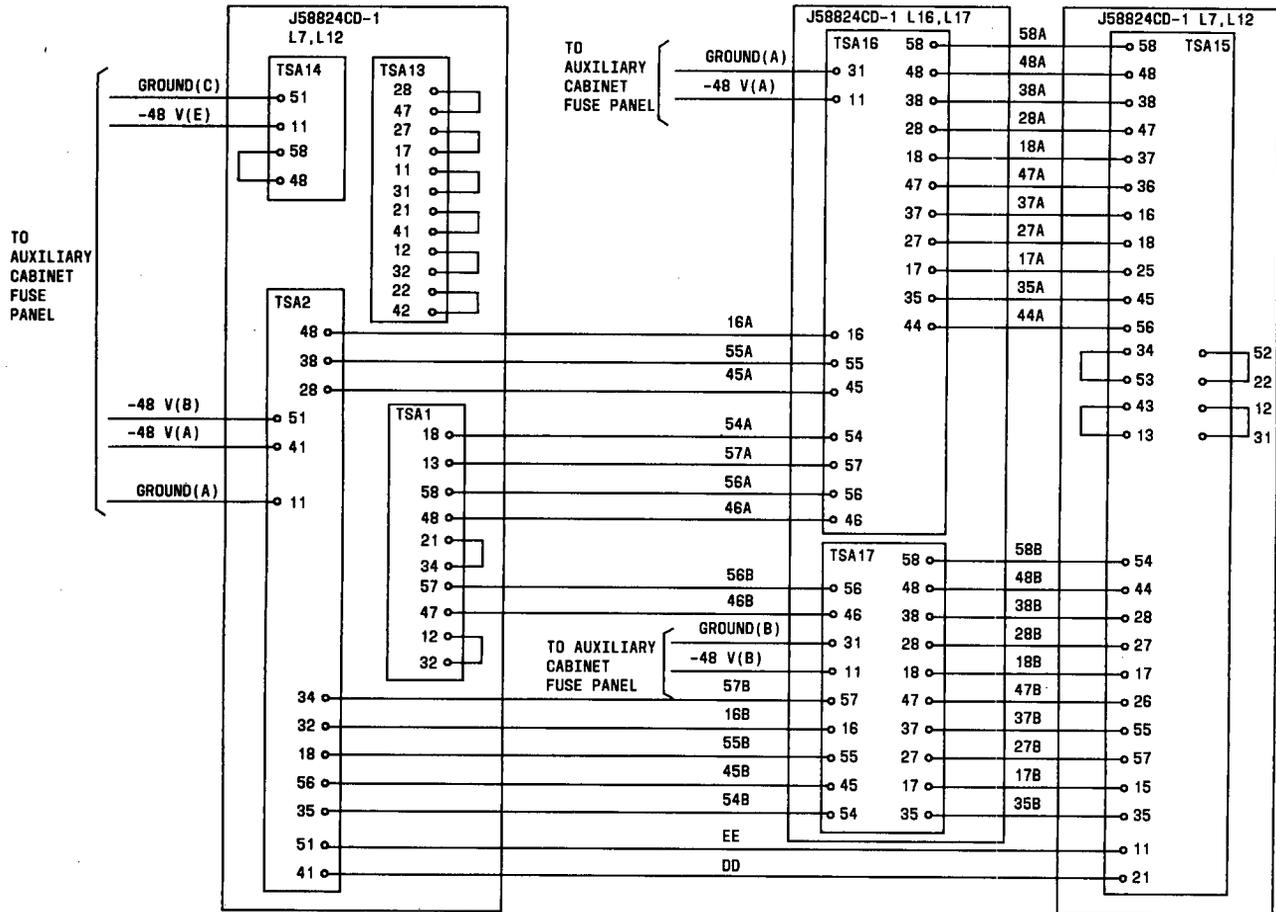
CONN PIN NUMBER	COLOR	FEMALE C	T1	T2	L1	L2
26	W-BL	TO PBX	TO CO	T4 CO	TO PBX	T4 PBX
1	BL-W	RO LINE	RO TRK	R4 TRK	RO LINE	R4 LN
27	W-O	TO				
2	O-W	RO STA				
28	W-G	TO CO				
3	G-W	RO TRK				
29	W-BR	TO PBX	TO PBX	T4 PBX	TO STA	T4 STA
4	BR-W	RO TRK	RO TRK	R4 TRK		
30	W-S	BSY IN				
5	S-W	BSY OUT				
31	R-BL	T1 PBX				
6	BL-R	R1 LN				
32	R-O	T1 STA	T1 CO		T1 PBX	
7	O-R	R1	R1 TRK		R1 LINE	
33	R-G	T1 CO				
8	G-R	R1 TRK				
34	R-BR	T1 PBX				
9	BR-R	R1 TRK				
35	R-S	NC	T1 PBX		T1 STA	
10	S-R	NO	R1 TRK			
36	BK-BL	T2 PBX				
11	BL-BK	R2 LINE				
37	BL-O	T2 STA				
12	O-BK	R2				
38	BK-G	T2 CO	T2 CO		T2 PBX	
13	G-BK	R2 TRK	R2 TRK		R2 LINE	

CONN PIN NUMBER	COLOR	FEMALE C	T1	T2	L1	L2
39	BK-BR	T2 PBX				
14	BR-BK	R2 TRK				
40	BK-S	COM				
15	S-BK	REOP				
41	Y-BL	T3 PBX	T2 PBX		T2 STA	
16	BL-Y	R3 LINE	R2 TRK		R2 STA	
42	Y-O	T3 STA				
17	O-Y	R3				
43	Y-G	T3 CO				
18	G-Y	R3 TRK				
44	Y-BR	T3 PBX	T3 CO		T3 PBX	
19	BR-Y	R3 TRK	R3 TRK		R3 LINE	
45	Y-S					
20	S-Y					
46	V-BL	T4 PBX				
21	BL-V	R4 LINE				
47	V-O	T4 STA	T3 PBX	BSY IN	T3 STA	
22	O-V	R4	R3 TRK	BSY OUT	R3 STA	
48	V-G	T4 CO		NC		
23	G-V	R4 TRK		NO		
49	V-BR	T4 PBX		COM		
24	BR-V	R4 TRK		REOP		
50	V-S	GRD		GRD		
25	S-V	-48 V		-48 V		

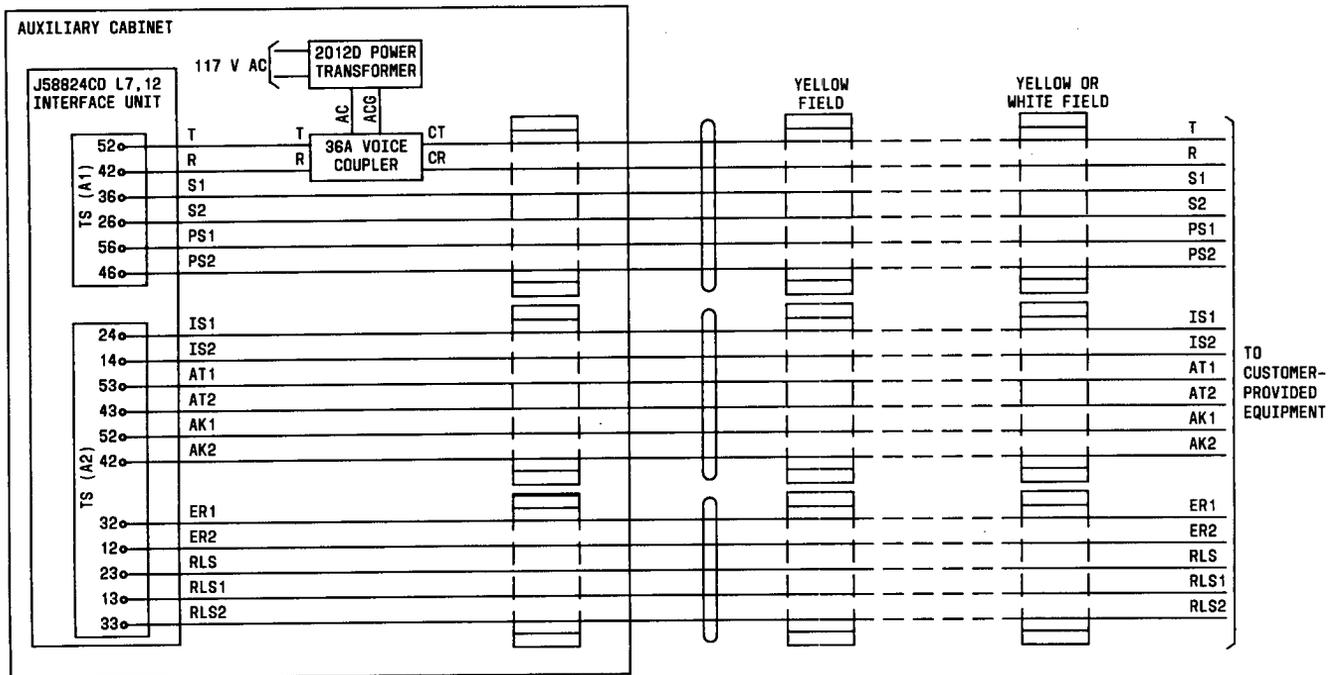
11.13 Radio Paging Access

11.13.1 The Radio Paging Access feature provides attendant and station users dial access to customer-owned radio paging equipment to selectively tone alert or voice page individuals carrying pocket radio receivers.

11.13.2 Radio paging access - interface unit connections (Lists 7, 12, 16, 17)

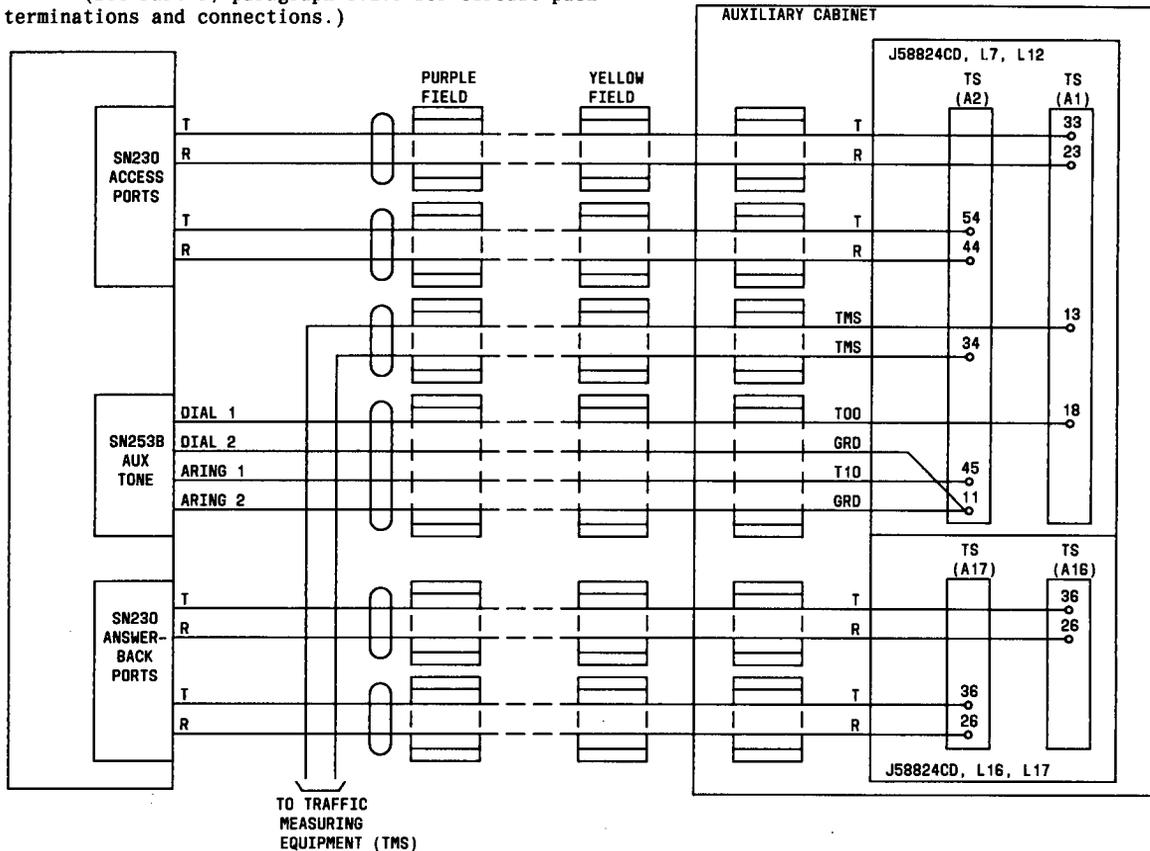


11.13.3 Radio paging access - customer equipment connections



11.13.4 Radio paging access - connections

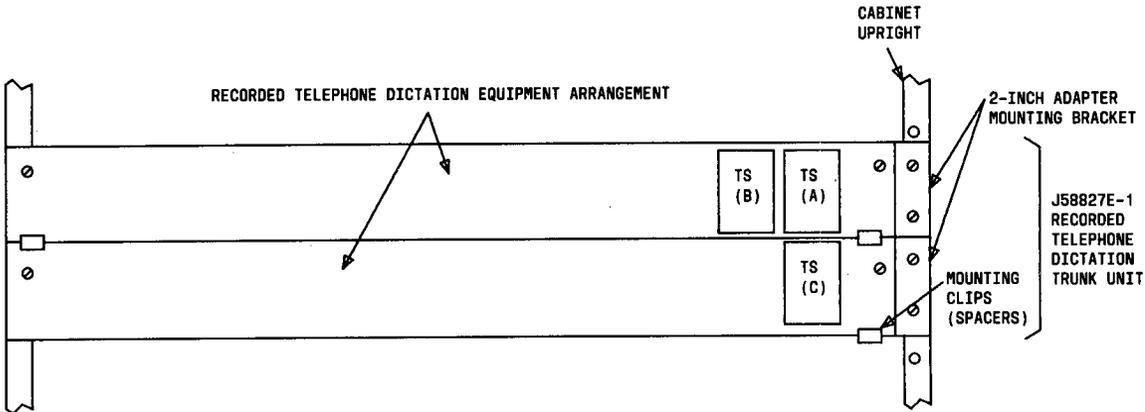
(See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



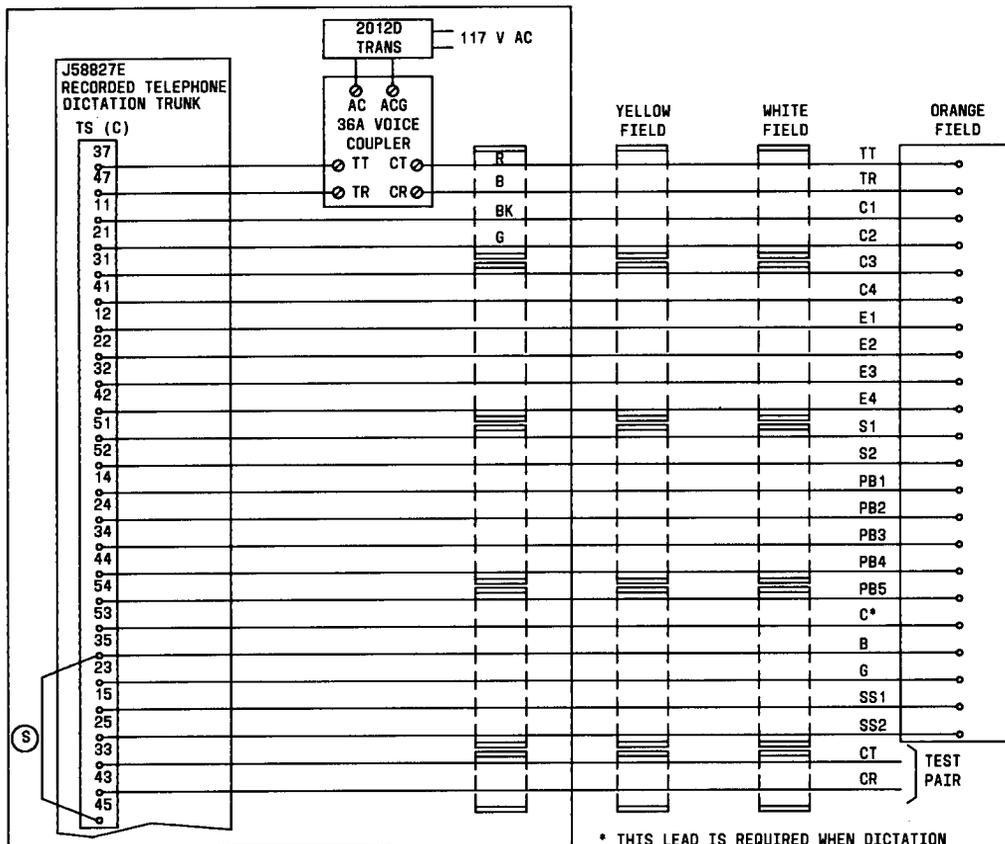
11.14 Recorded Telephone Dictation Trunk and 36A Voice Coupler

11.14.1 The Recorded Telephone Dictation Trunk feature allows access to and control of customer-owned dictating equipment by station users within the system. A 36A voice coupler must be provided when the dictation trunk connects to nonregistered customer equipment. The voice coupler limits excess signal power and filters out above voice band components generated by the customer's equipment.

11.14.2 To install the dictation trunk unit in the auxiliary cabinet, install two 2-inch adapter mounting brackets to the right-hand cabinet upright in the space to be used. Secure the trunk unit to the adapter brackets and the left-side cabinet upright using the mounting screws provided. The mounting clips are used as spacers between the unit mounting plates.

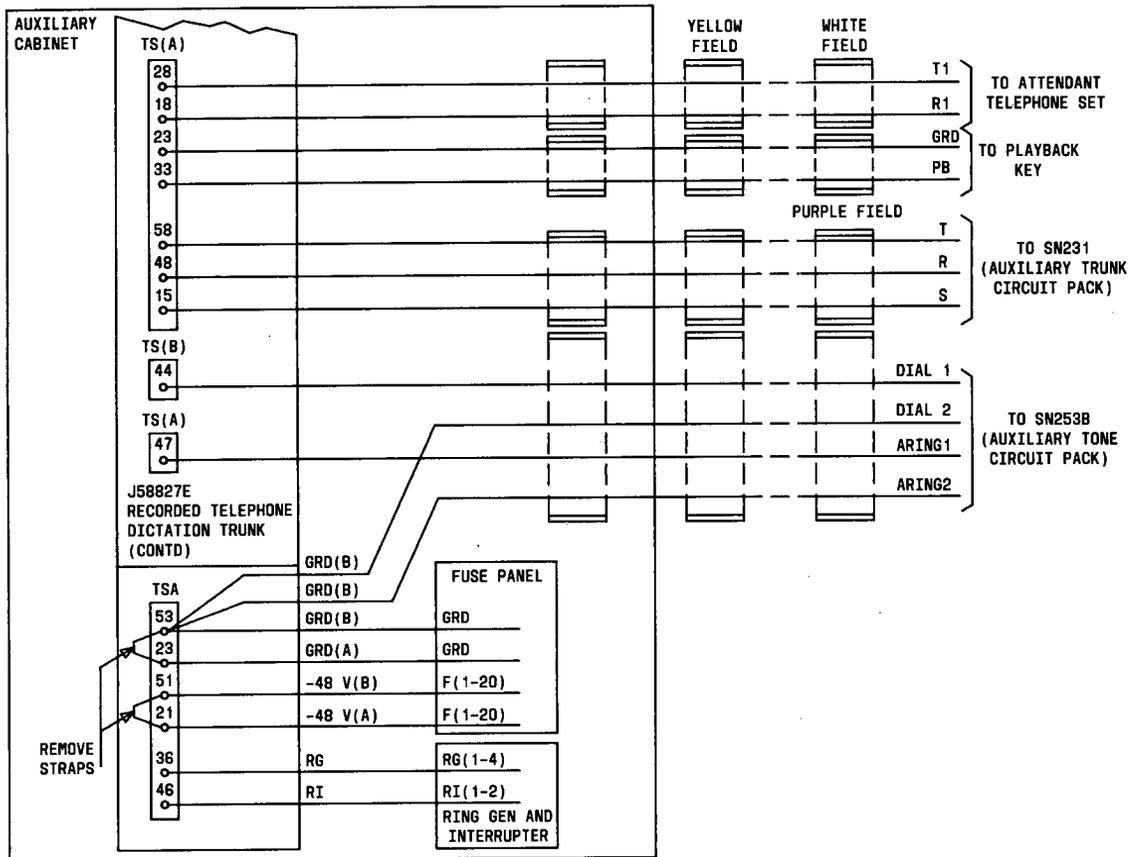


11.14.3 Dictation trunk - customer equipment connections



* THIS LEAD IS REQUIRED WHEN DICTATION MACHINE PROVIDES GROUND SIGNAL INDICATING PLAYBACK IN PROGRESS

11.14.4 Dictation trunk – terset, playback key, ringing generator, and fuse panel connections
 (See Part 9, paragraph 9.2.9 for the circuit pack terminations and connections.)



11.14.5 Recorded telephone dictation trunk options
(Sheet 1 of 2)

OPTION	FEATURE OR OPTION DESCRIPTION		STRAPS REQUIRED ON J58827E			
			TS (A)	TS (B)	TS (C)	
YC	To increase tone levels from dictation machine (ready to dictate tone, ringing tone, dial tone, etc.)		Install 0.55µF capacitor from contact 5 of key to contact 4M of BI relay			
R	Additional machine playback features (specify one only)	Mach. provides playback signal Dial 3 extends playback Dial 1 ends playback	No No Yes		48-58	53-54
N		Mach. provides playback signal Dial 3 extends playback Dial 1 ends playback	Yes Yes No		28-38 46-56	13-14
Q		Mach. provides playback signal Dial 3 extends playback Dial 1 ends playback	Yes No Yes		48-58	
A		Mach. provides playback signal Dial 3 extends playback Dial 1 ends playback	Yes Yes Yes		46-56	13-14
S	Trunk located at switching system		35-45			
ZJ	Not ESS No. 1 Centrex		24-34			17-27
ZL	Loop resistance to attendant telephone set	Less than 300 OHMS	Not Required			
ZM		More than 300 OHMS	25-55 14-24			
ZC	Touch-tone operation	Required			18-28	
ZB		Not Required			48-58 28-38 18-57 47-57	
B	Dictation Machine unavailable to record	Makes trunk busy and signals attendant	13-23	26-36		
ZA		Makes trunk busy	13-23			

11.14.5 Recorded telephone dictation trunk options
 (Sheet 2 of 2)

OPTION	FEATURE OR OPTION DESCRIPTION		STRAPS REQUIRED ON J58827E			
			TS (A)	TS (B)	TS (C)	
F	Playback reduced by dialing digit 2			42-52		
F with ZB or ZC				35-55		
E with ZB or ZC				45-55		
M	Dictation machine start/stop by	DIAL 1 Touch-tone or Rotary Dial	46-56			
W			11-21	18-57 37-47 17-27 33-43 34-44		
ZG			47-57			
G			46-56			
W		DIAL 1 Rotary Dial only	11-21	18-57 37-47 17-27 33-43 34-44		
M			46-56			
V		VOICE		15-54 47-57 34-44 24-34 23-33		
YH			Required			27-56
YE, YG		Key Telephone Operation	Not Required			17-27 46-56

11.15 Recorded Announcement

Contents

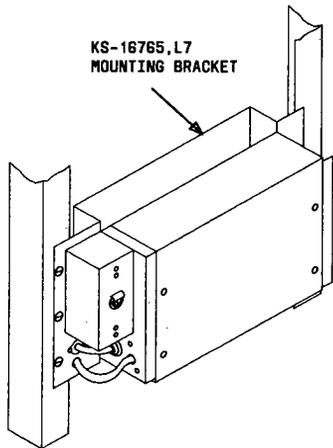
KS-16765 Recorded Announcement Unit 11.15.1
13A Announcement System 11.15.2
Cook Electrical 213300-2301610 Digital Announcer 11.15.3

11.15.1 Recorded announcement unit KS-16765

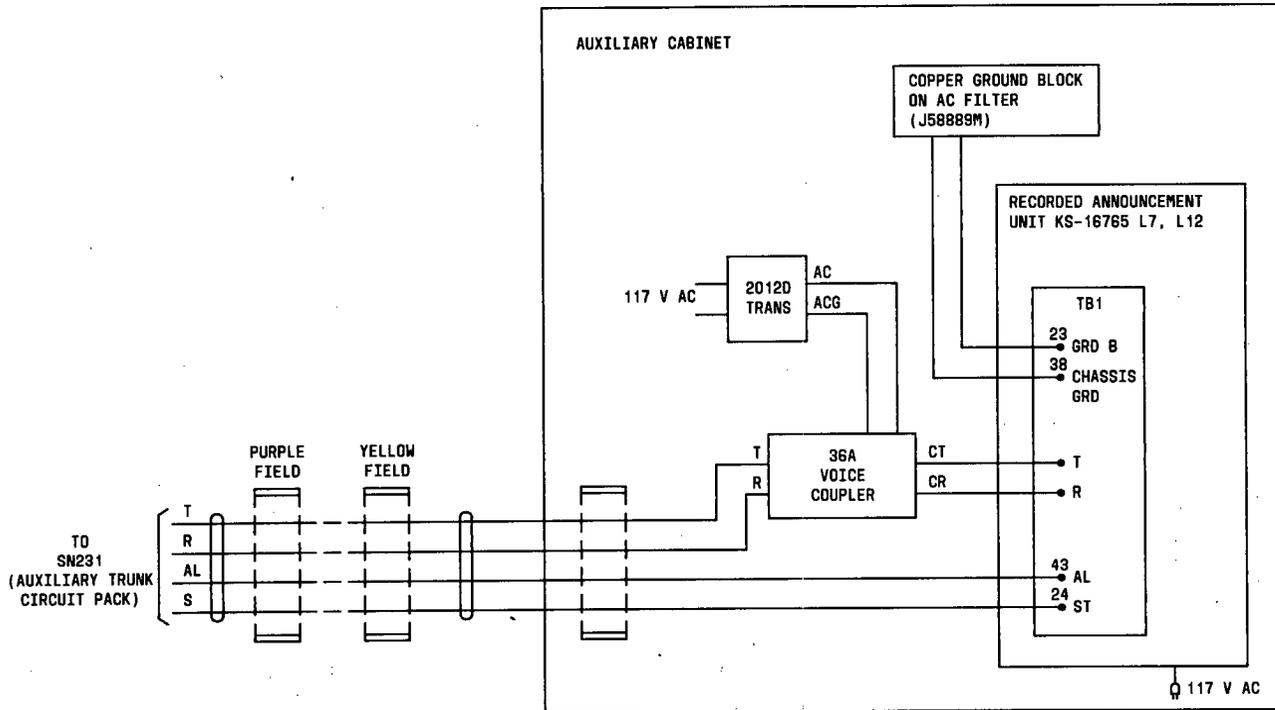
11.15.1.1 The KS-16765 recorded announcement unit is used in association with the intercept feature.

Incoming calls are intercepted and routed to a recorder which indicates to the caller the reason for the interception. Only one message can be given.

11.15.1.2 Recorded announcement unit KS-16765 mounting arrangement



11.15.1.3 Recorded announcement unit KS-16765 connections
 (See Part 9, paragraph 9.2.9 for SN231 circuit pack connections and terminations.)

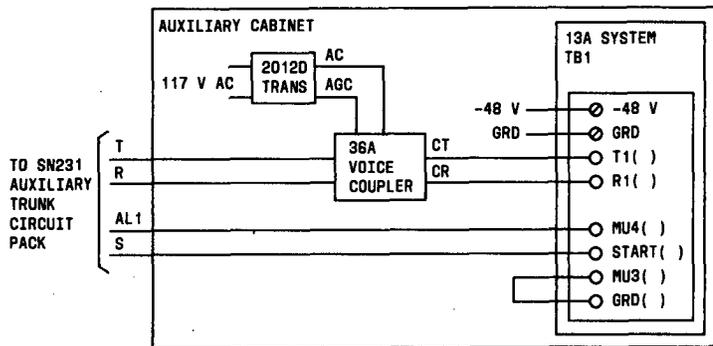


11.15.2 13A announcement system

11.15.2.1 The 13A announcement system mounts in the auxiliary cabinet. A minimum of 2 inches is required above and below the system. Check the equipment and see that correct circuit packs are in place. Up to eight announcement circuits may be provided.

11.15.2.2 13A announcement system connections

(See Part 9, paragraph 9.2.9 for SN231 circuit pack terminations and connections.)



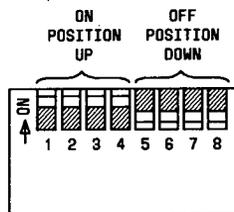
TB1 TERMINATIONS					
CIRCUIT	DESIG	TERM	CIRCUIT	DESIG	TERM
0	R1(0)	15	4	R1(4)	71
	T1(0)	16		T1(4)	72
	GRD(0)	17		GRD(4)	73
	MU3(0)	25		MU3(4)	81
	MU4(0)	26		MU4(4)	82
	START(0)	28		START(4)	84
1	R1(1)	29	5	R1(5)	85
	T1(1)	30		T1(5)	86
	GRD(1)	31		GRD(5)	87
	MU3(1)	39		MU3(5)	95
	MU4(1)	40		MU4(5)	96
	START(1)	42		START(5)	98
2	R1(2)	43	6	R1(6)	99
	T1(2)	44		T1(6)	100
	GRD(2)	45		GRD(6)	101
	MU3(2)	53		MU3(6)	109
	MU4(2)	54		MU4(6)	110
	START(2)	56		START(6)	112
3	R1(3)	57	7	R1(7)	113
	T1(3)	58		T1(7)	114
	GRD(3)	59		GRD(7)	115
	MU3(3)	67		MU3(7)	123
	MU4(3)	68		MU4(7)	124
	START(3)	70		START(7)	126

11.15.3 Digital announcer - Cook Electrical* 213300 - 2301610

11.15.3.1 Option switch settings

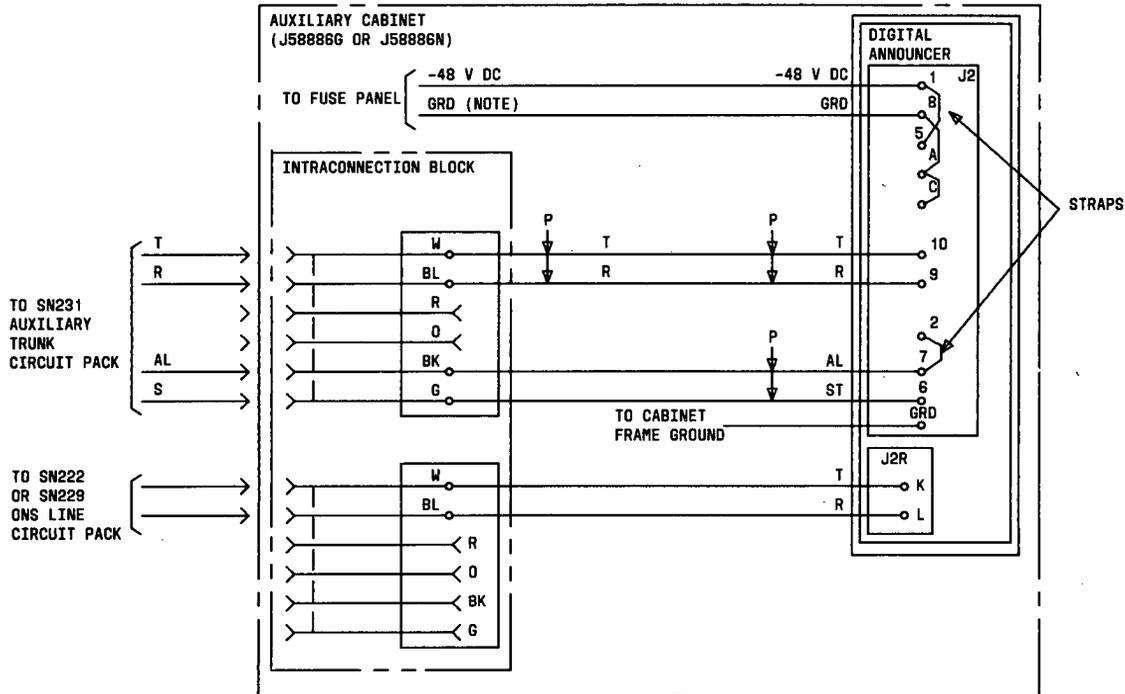
(Switch S6 is located on the rear panel of the unit.)

SWITCH DESIGNATION	SWITCH SETTING
S6 - 1	N/A
S6 - 2	N/A
S6 - 3	N/A
S6 - 4	N/A
S6 - 5	OFF
S6 - 6	OFF
S6 - 7	ON
S6 - 8	N/A



* Trademark of Cook Electrical Co.

11.15.3.2 The digital announcement unit mounts in the auxiliary cabinet. The unit has a vertical height of 1.755 inches. (See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



Note:

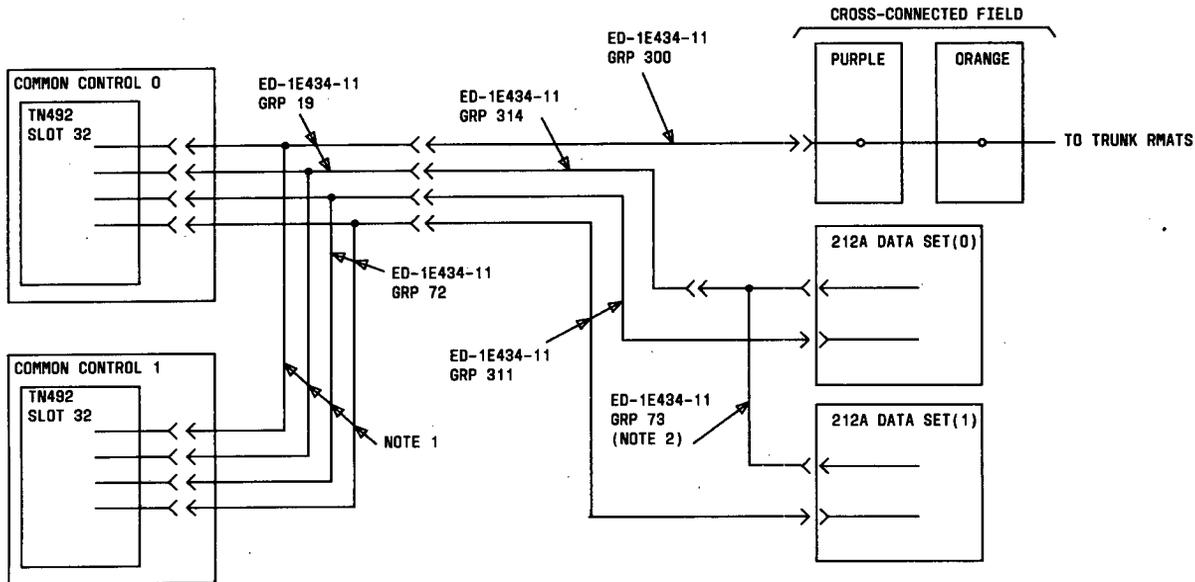
If an AC converter is used to power the announcement unit, Pin 8 must still be placed at the same potential as frame ground or single-port ground. If Pin 8 is not connected to the fuse panel, it should be connected to the cabinet frame ground.

11.16. RMATS

Contents

- RMATS - data set not in auxiliary cabinet 11.16.1
- RMATS - data set in auxiliary cabinet 11.16.2
- 212A data set options 11.16.3

11.16.1 RMATS - data set not in auxiliary cabinet (See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



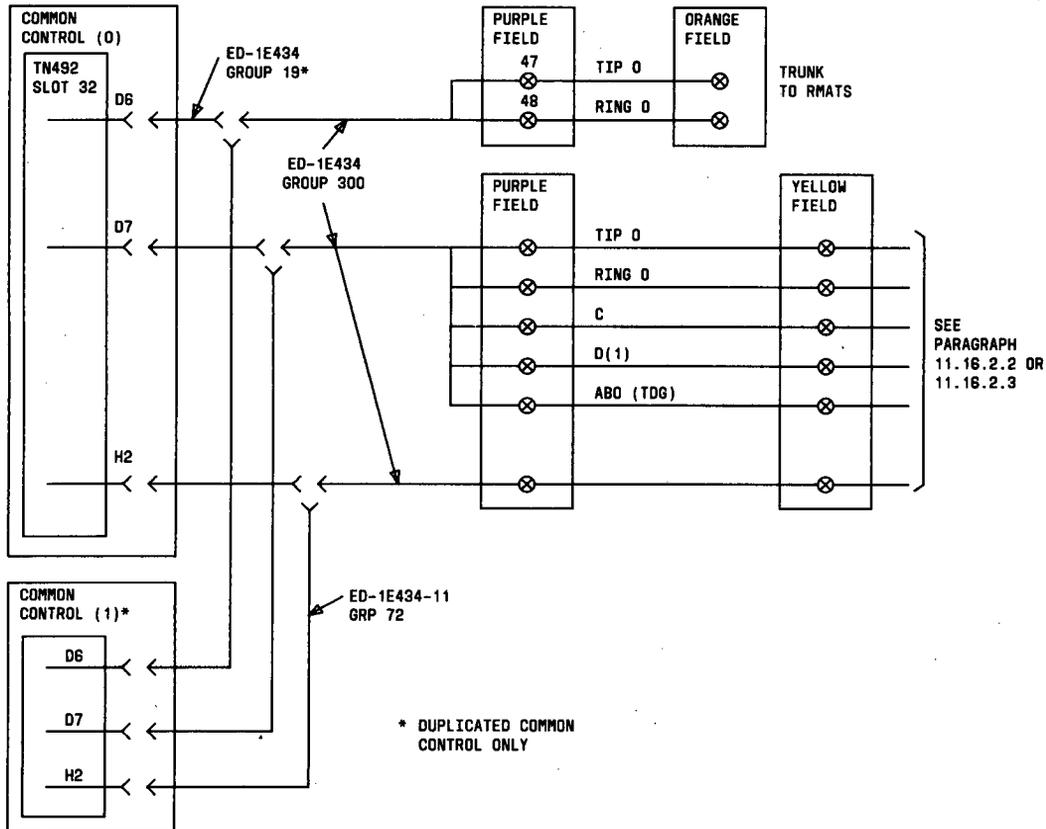
NOTES:

1. For unduplicated common control, these cables are not used.
2. For single data set, use ED-1E434-11 GRP 109

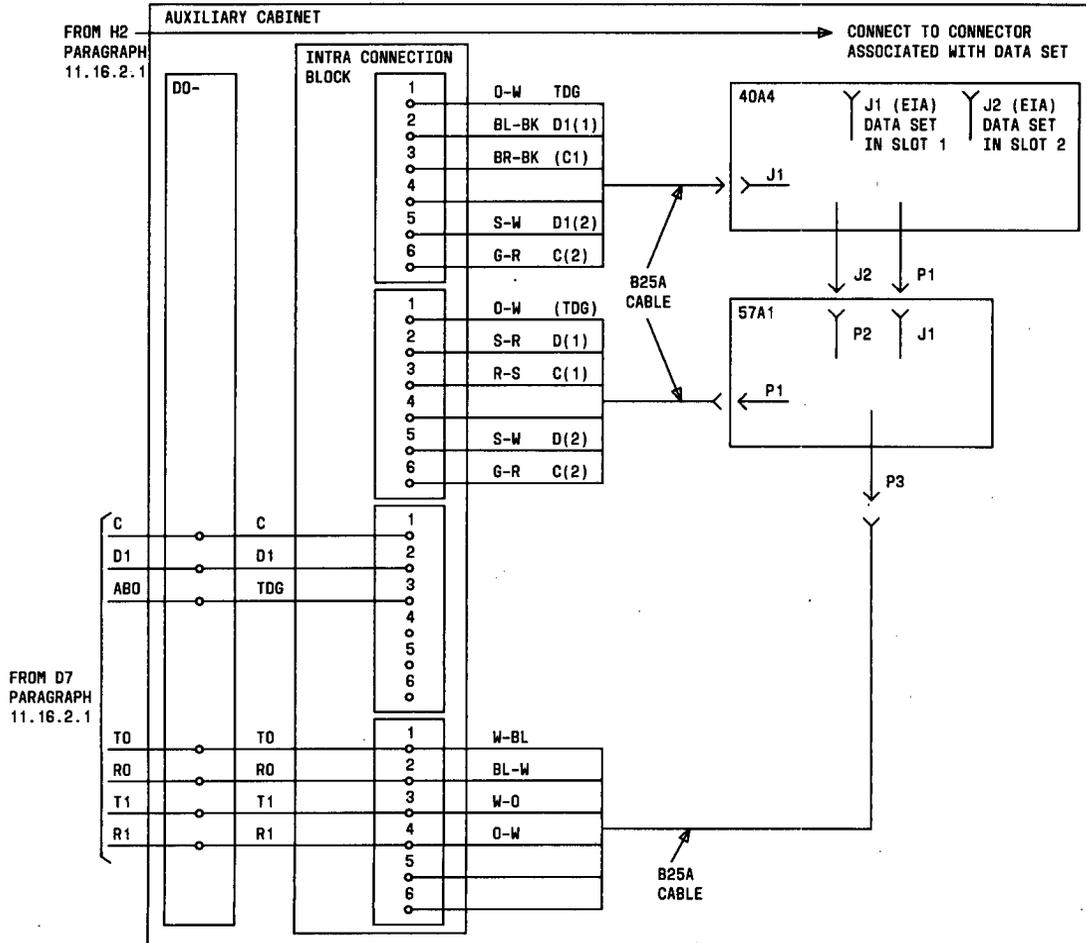
11.16.2 RMATS - Data Set in Auxiliary Cabinet

11.16.2.1 RMATS connections at the common control carrier

(See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



11.16.2.2 RMATS connection with data set in slot 1 or 2 (Sheet 1 of 2)
 (See Page 2 for cross-connections.)



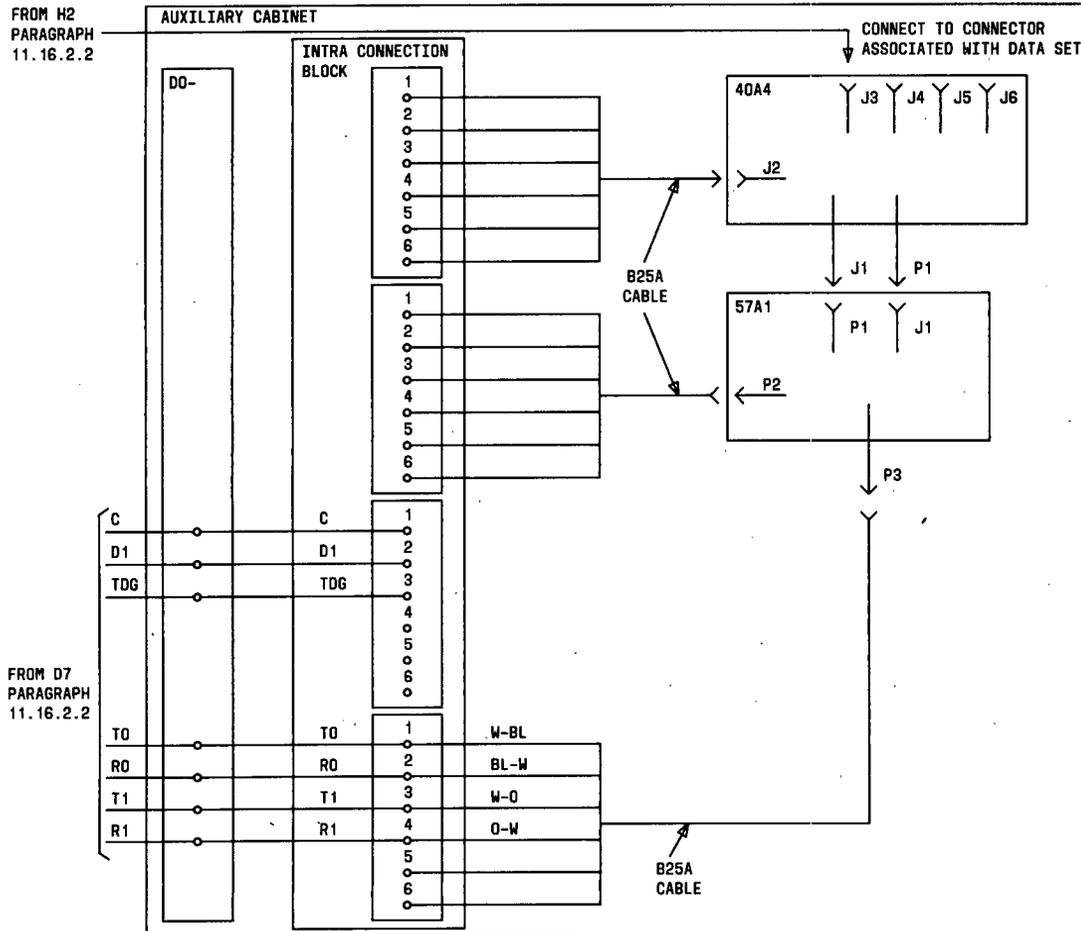
11.16.2.2 RMATS connection with data set in slot 1 or 2 (Sheet 2 of 2)

DATA SET IN SLOT	FROM		TO			
	110 INTRACONNECT BLOCK ASSOCIATED WITH COMMON CONTROL D7 CONNECTIONS		110 INTRACONNECT BLOCK ASSOCIATED WITH 57A1 CONNECTOR P1		110 INTRACONNECT BLOCK ASSOCIATED WITH 40A4 CONNECTOR J1	
	TERMINAL	LEAD DESIGNATION	TERMINAL	LEAD DESIGNATION	TERMINAL	LEAD DESIGNATION
1	1	C	1	TDG	1	TDG
	2	D1	2	D1(1)	2	D1(1)
	3	TDG	3	C(1)	3	C(1)
2	1	C	1	TDG	1	TDG
	2	D1	5	D1(2)	5	D1(2)
	3	TDG	6	C(2)	6	C(2)

11.16.2.3 RMATS - data set in slots 3-6 (Sheet 1 of 3)

(See Sheet 2 for connection of B25A cable to J2 of 40A4 and P2 of 57A1.)

(See Sheet 3 for cross-connections between 110 intraconnecting blocks.)



11.16.2.3 RMATS connections - data set in slot 3-6 (Sheet 2 of 3)

CONNECTOR J2 ON 40A4 AND P2 ON 57A1			
DATA SET IN SLOT	LEAD DESIGNATION	B25A CABLE WIRE COLOR	110 INTRACONNECTING BLOCK PIN NUMBER
3	TDG	O-W	1
	C(3)	R-S	2
	D1(3)	S-R	3
4	TDG	O-W	1
	C(4)	V-BL	2
	D1(4)	BL-V	3
5	TDG	O-W	1
	C(5)	V-O	2
	D1(5)	O-V	3
6	TDG	O-W	1
	C(6)	BR-BK	2
	D1(6)	BL-BK	3

11.16.2.3 RMATS connections - data set in slot 3-6 (Sheet 3 of 3)

DATA SET IN SLOT	FROM		TO			
	110 INTRACONNECT BLOCK ASSOCIATED WITH COMMON CONTROL D7 CONNECTIONS		110 INTRACONNECT BLOCK ASSOCIATED WITH 57A1, CONNECTOR P2		110 INTRACONNECT BLOCK ASSOCIATED WITH 40A4 CONNECTOR J2	
	TERMINAL	LEAD DESIGNATION	TERMINAL	LEAD DESIGNATION	TERMINAL	LEAD DESIGNATION
3	1	C(3)	2	C(3)	2	C(3)
	2	D1(3)	3	D1(3)	3	D1(3)
	3	TDG	1	TDG	1	TDG
4	1	C(4)	2	C(4)	2	C(4)
	2	D1(4)	3	D1(4)	3	D1(4)
	3	TDG	1	TDG	1	TDG
5	1	C(5)	2	C(5)	2	C(5)
	2	D1(5)	3	D1(5)	3	D1(5)
	3	TDG	1	TDG	1	TDG
6	1	C(6)	2	C(6)	2	C(6)
	2	D1(6)	3	D1(6)	3	D1(6)
	3	TDG	1	TDG	1	TDG

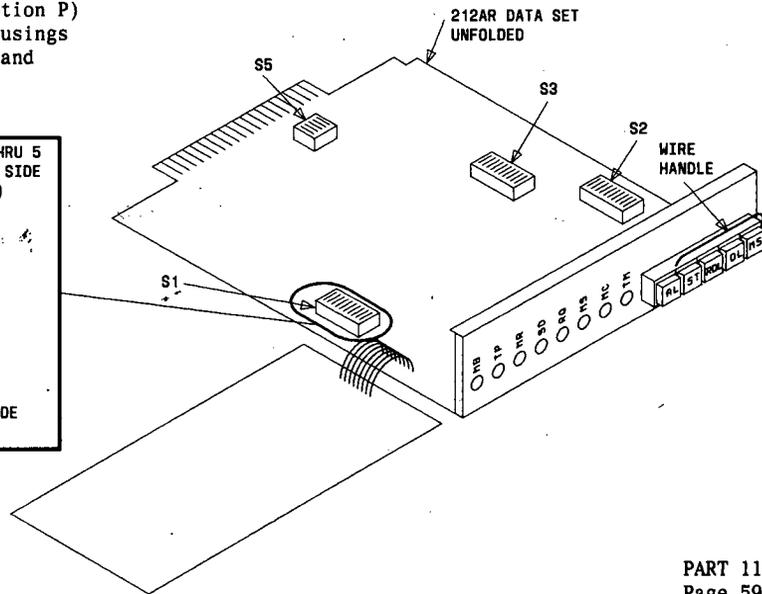
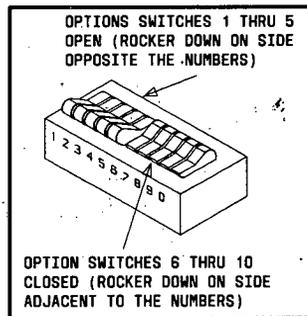
11.16.3 The 212AR data sets must be equipped with options E, ZF, XK, YF, YC, YG, YJ, YL, XM, S, Y, A, U, ZH, W, YO, YQ, XO and P. This results in the data set having the following settings.

SWITCH	SWITCH SECTION								
	1	2	3	4	5	6	7	8	9
S1	0	DC	X	-	-	-	-	-	-
S2	X	X	0	0	0	X	X	0	X
S3	X	0	X	0	0	0	XX	-	-
S5	0	0	-	-	-	-	-	-	-

→ C, 0, C
 C, 0, 0, 0, 0, C, C, 0, 0
 C, 0, C, 0, 0, 0, C, 0
 0, 0, / 2203

X = Contact closed DC = Don't care
 0 = Contact opened - = Switch section doesn't exist

A strap must be placed between circuit points E3 and E4. A second strap must be placed between circuit points E1 and E2. If the 47D housing is used, connection S1 must be open (Option P) to disconnect signal ground from frame ground. If other housings are used, care must be taken to ensure that signal ground and frame ground are not connected to each other.

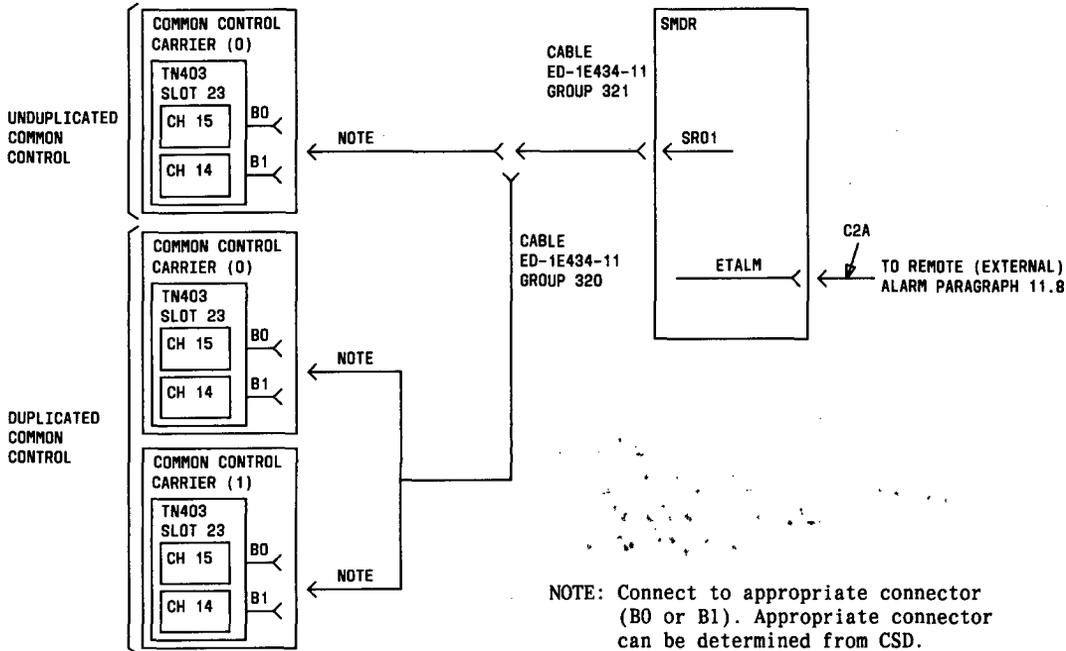


11.17 SMDR, NCOSS, CSMDR, and LSU

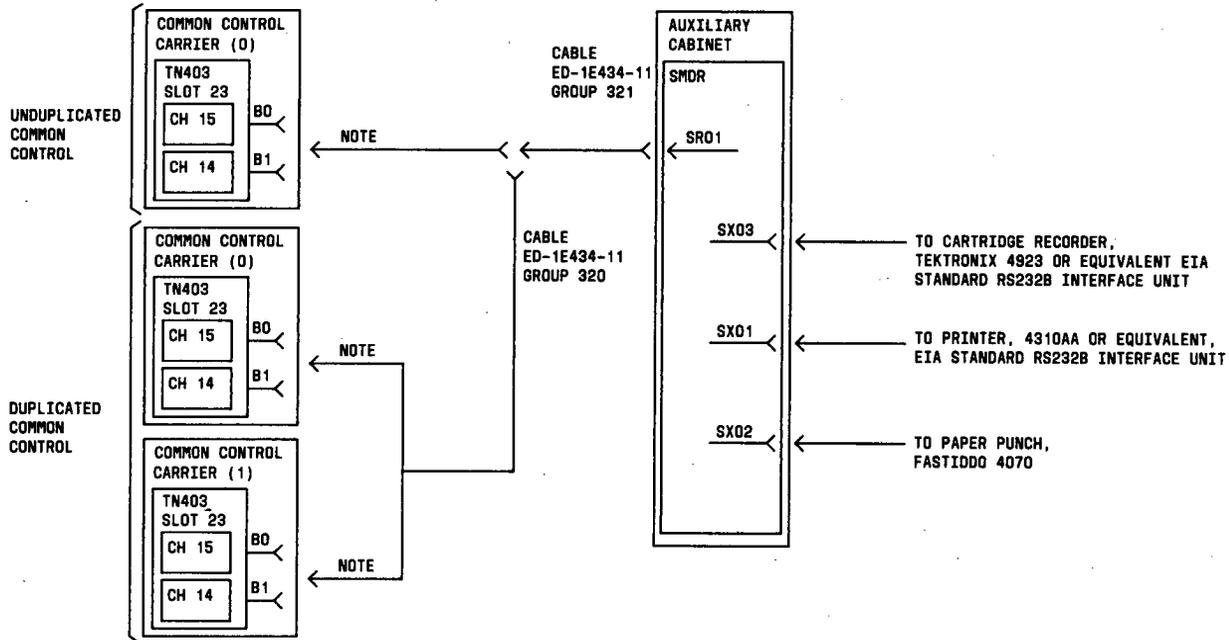
NOTE: Paragraph 11.17.3 gives the instructions for connecting a LSU to the System 85. It also gives a block diagram for connecting the LSU to its associated peripheral devices. For complete connections, see Document 190-402-000.

Contents

9-track SMDR 11.17.1
 Direct output SMDR 11.17.2
 Interface to NCOSS, CSMDR
 and CMDR using LSUs 11.17.3
 11.17.1 9-track SMDR



11.17.2 Direct output SMDR

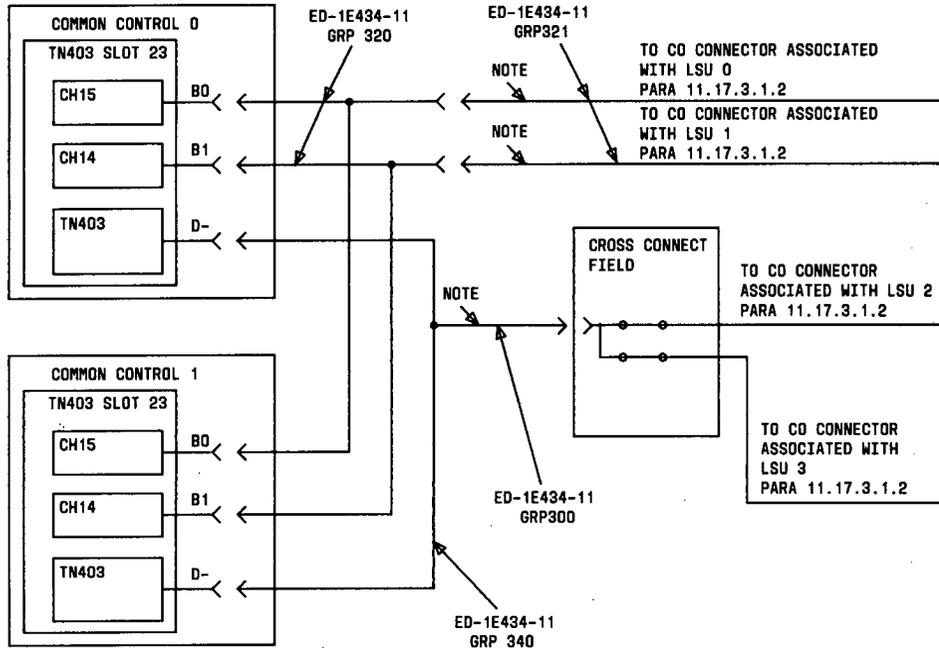


NOTE: Connect to appropriate connector (B0 or B1). Appropriate connector can be determined from CSD.

11.17.3 Interface to NCOSS, CMDR, and CSMDR using LSUs

11.17.3.1 LSU 0-3

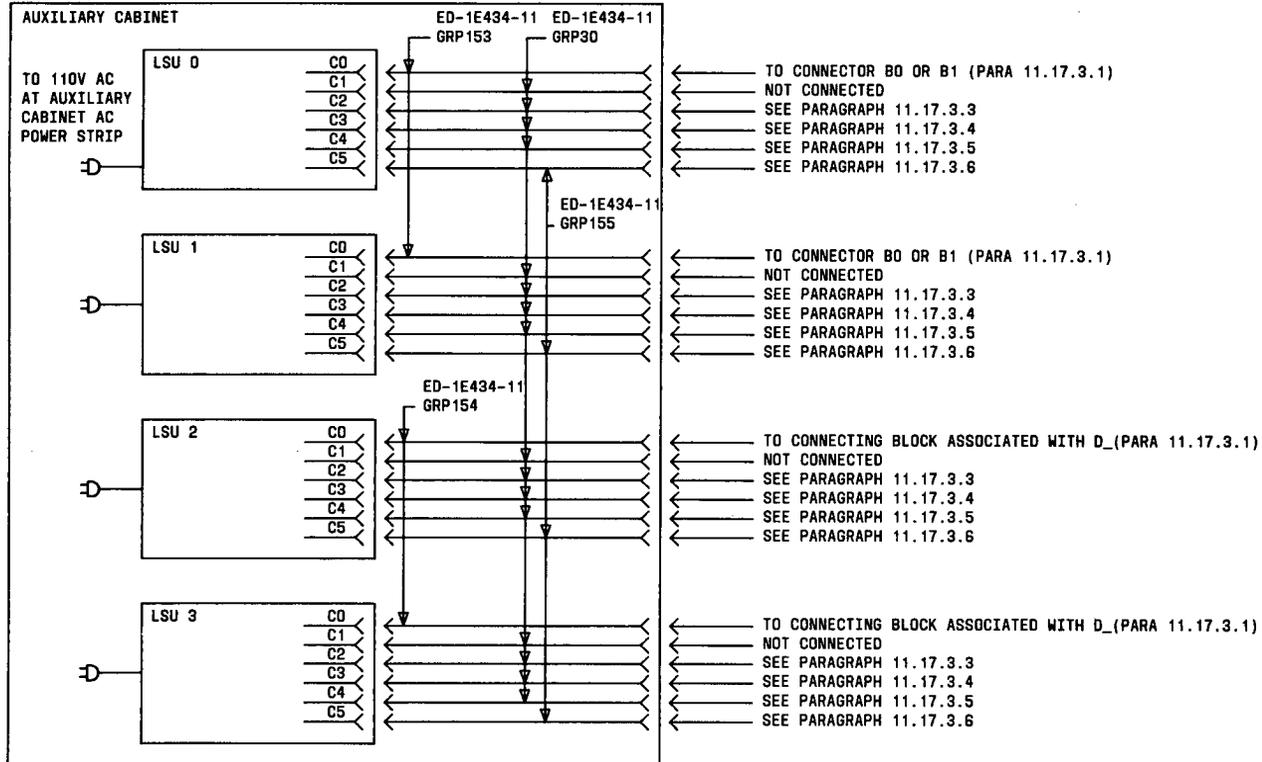
11.17.3.1.1 LSU to System 85 connections



NOTE:

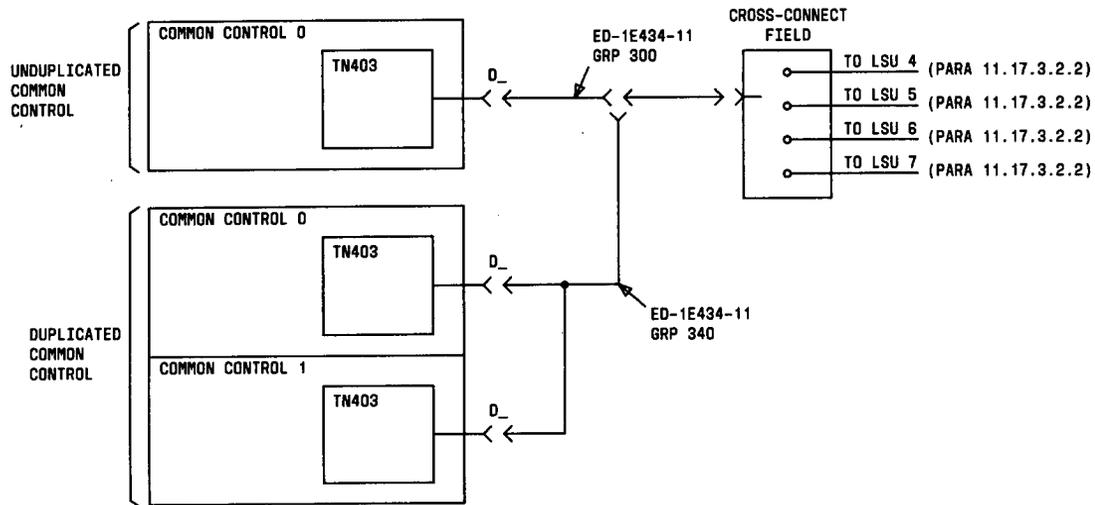
1. Connect this cable directly to appropriate connector or System 85 control cabinet if the system is unduplicated common control.

11.17.3.1.2 Connections at the LSU

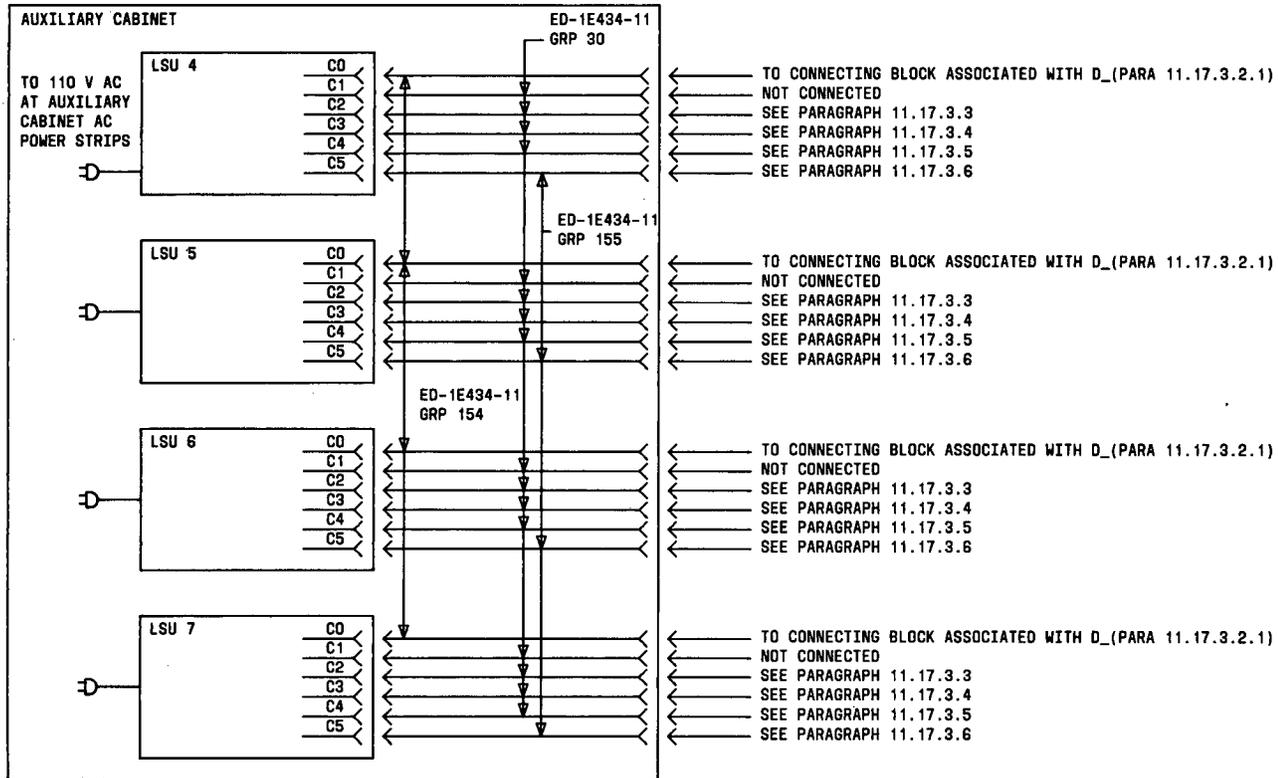


11.17.3.2 LSUs 4-7

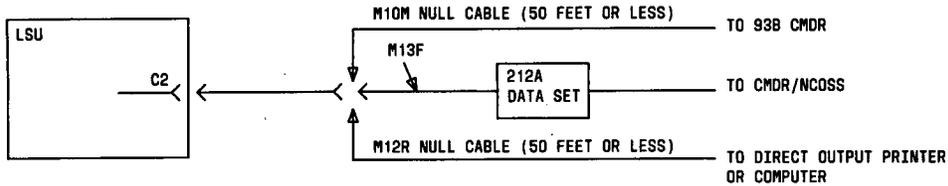
11.17.3.2.1 LSU to System 85 connections



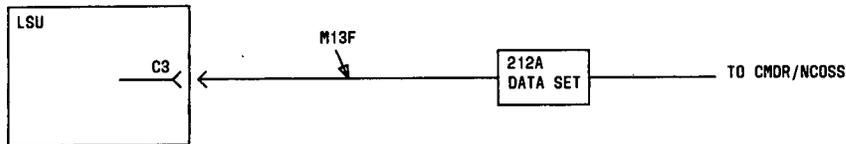
11.17.3.2.2 Connections at the LSU



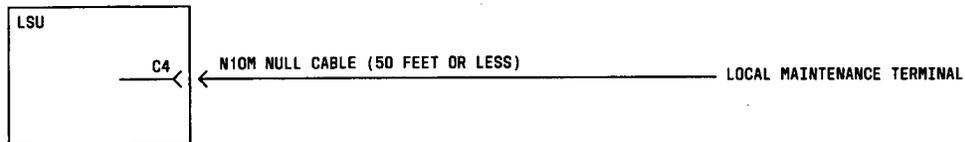
11.17.3.3 LSU connector C2 connections



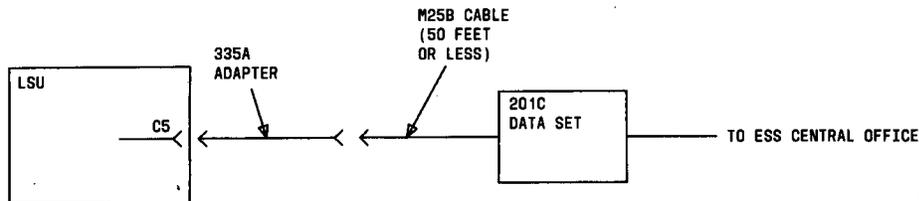
11.17.3.4 LSU connector C3 connections



11.17.3.5 LSU connector C4 connections

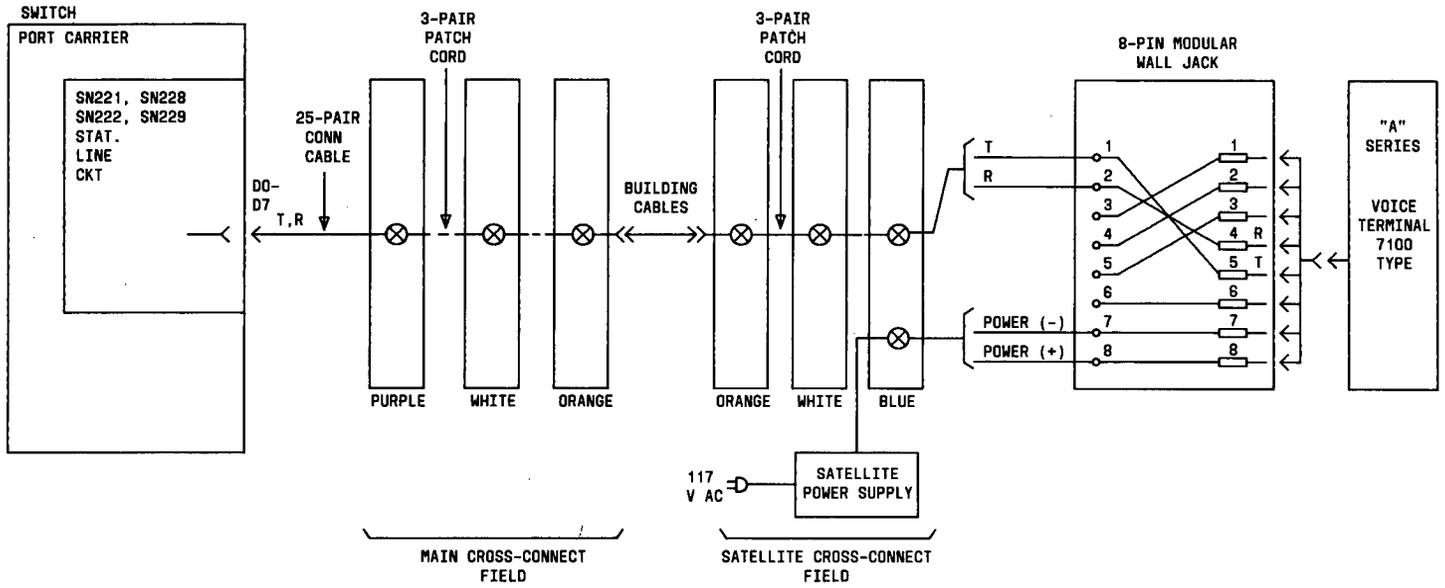


11.17.3.6 LSU connector C5 connections



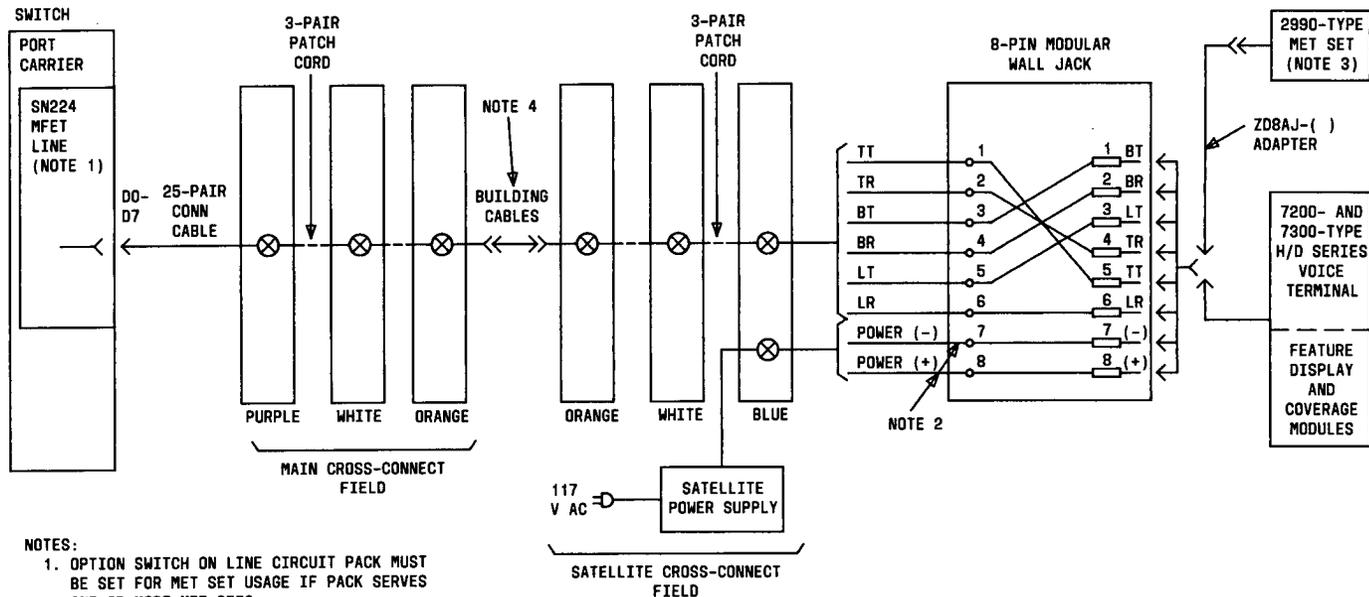
11.19 Typical Voice Terminal Connections to System Cabinets

11.19.1 Typical "A" series voice terminal connections to switch
 (See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



11.19.2 Typical electronic voice terminal connections to switch
 (See Part 9 paragraph 9.2.9 for circuit pack connections
 and terminations.)

WARNING: Connecting 2990-type MET set to wall jack
 having power applied to terminals 7 and 8
 will damage the MET set.

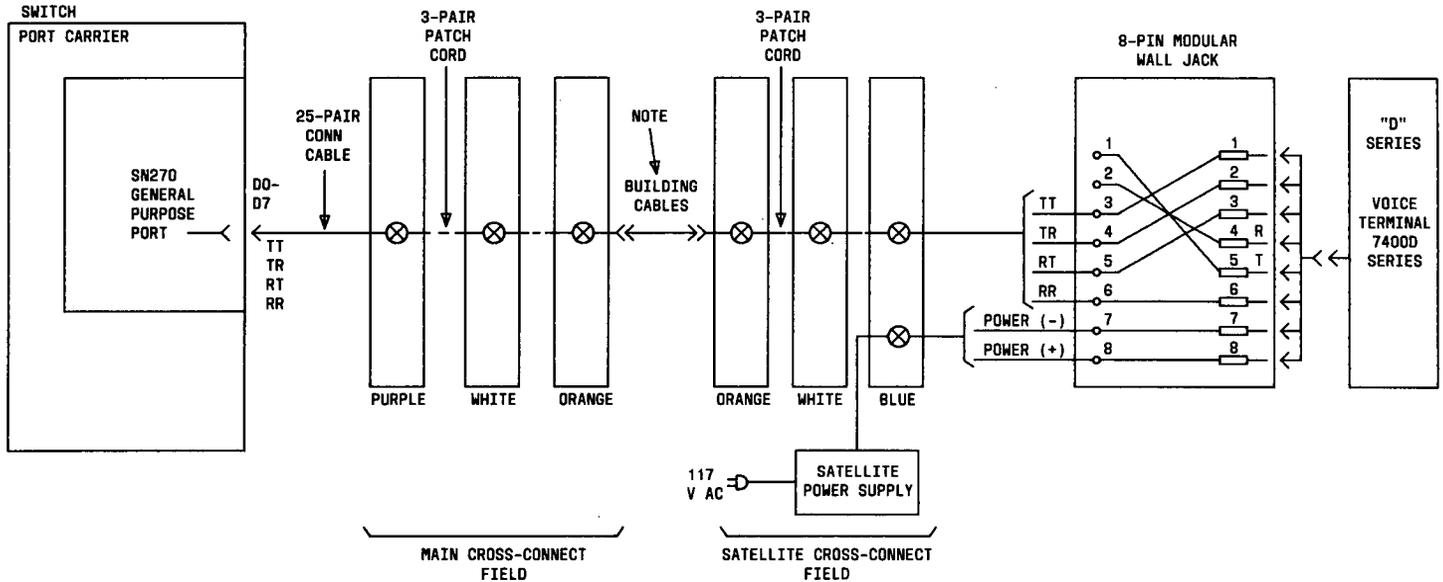


NOTES:

1. OPTION SWITCH ON LINE CIRCUIT PACK MUST BE SET FOR MET SET USAGE IF PACK SERVES ONE OR MORE MET SETS.
2. POWER LEADS MUST BE REMOVED AT TERMINALS 7 AND 8 IF MET SET IS CONNECTED TO WALL JACK.
3. MET SET MUST BE LOCATED WITHIN 1000 FEET OF SWITCH CABINET.
4. IF THIS IS EXPOSED CABLING, SEE PARAGRAPH 11.20 FOR THE PROPER PROTECTION DEVICE.

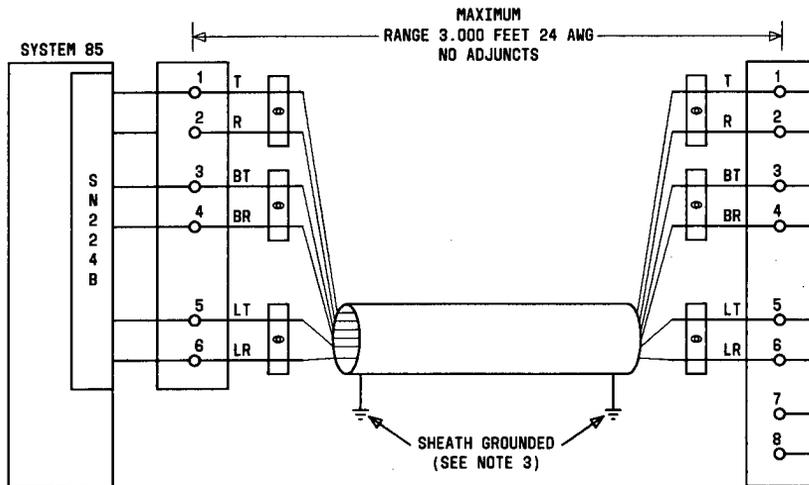
11.19.3 Typical digital voice terminal connections to switch
 (See Part 9, paragraph 9.2.9 for circuit pack connections
 and terminations.)

NOTE: IF THIS IS EXPOSED CABLING, SEE PARAGRAPH 11.20 FOR THE
 PROPER PROTECTION DEVICE.



11.20 Protection Devices for Digital and Hybrid Off-Premise Exposed Terminals

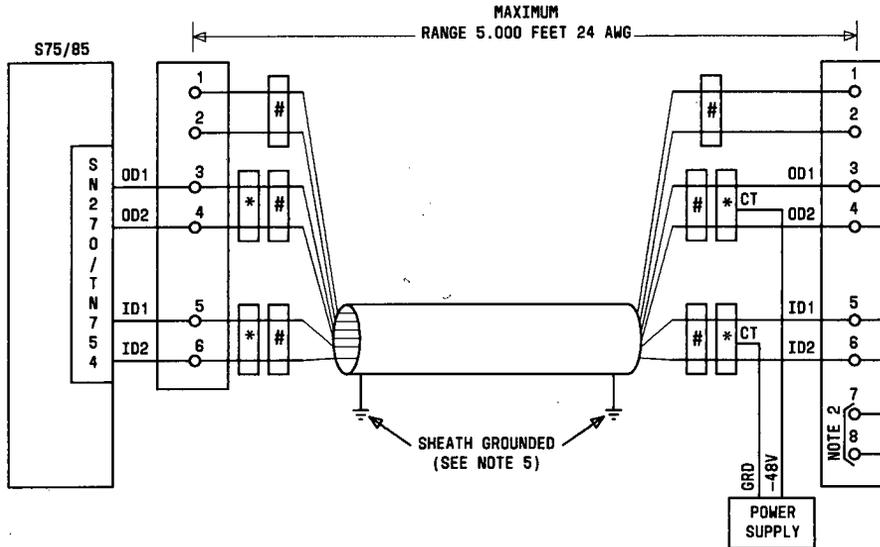
11.20.1 Port powered 7200-type hybrid terminal



NOTES:

1. Φ = PORTA DELTA PROTECTOR (PDP) OR ITW PROTECTORS. RANGE IS REDUCED IF ITW PROTECTORS ARE USED.
2. SWITCH-END PROTECTORS MUST BE LOCATED ADJACENT TO SWITCH.
3. CABLE MUST HAVE AN OVERALL METALLIC SHEATH GROUNDED AT EACH END.

11.20.3 Locally powered 7400-type digital terminal

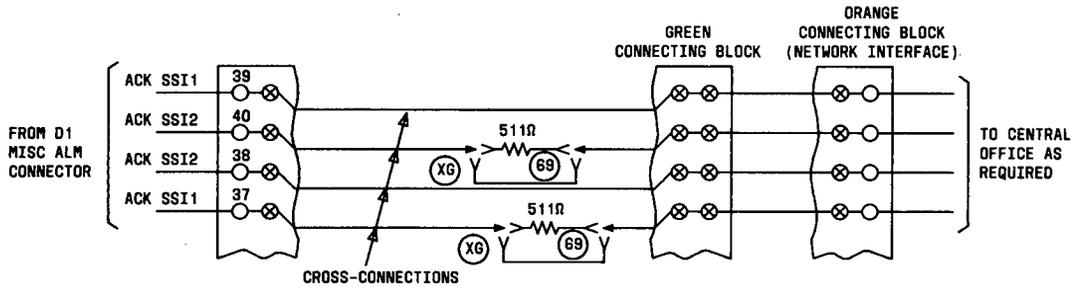


NOTES:

1. # = STANDARD PROTECTION. * = DATA LINK PROTECTORS
2. POWER SUPPLY SHOULD BE STRAPPED TO 7 & 8 TO POWER ADJUNCTS
3. PAIR 1 NOT USED IN DIGITAL APPLICATIONS
4. COMMERCIALY POWERED DIGITAL TERMINAL DOES NOT REQUIRE POWER SUPPLY.
5. CABLE MUST HAVE AN OVERALL METALLIC SHEATH GROUNDED AT EACH END

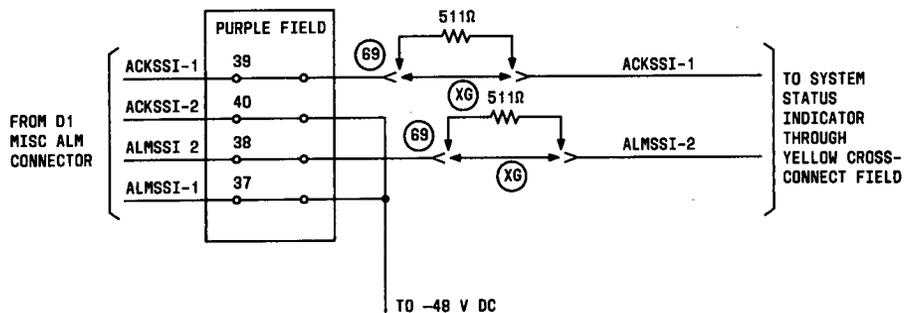
11.21 Extending the ALM and ACK Leads to a Remote System Status Indicator

11.21.1 Alarms connected through the central office only



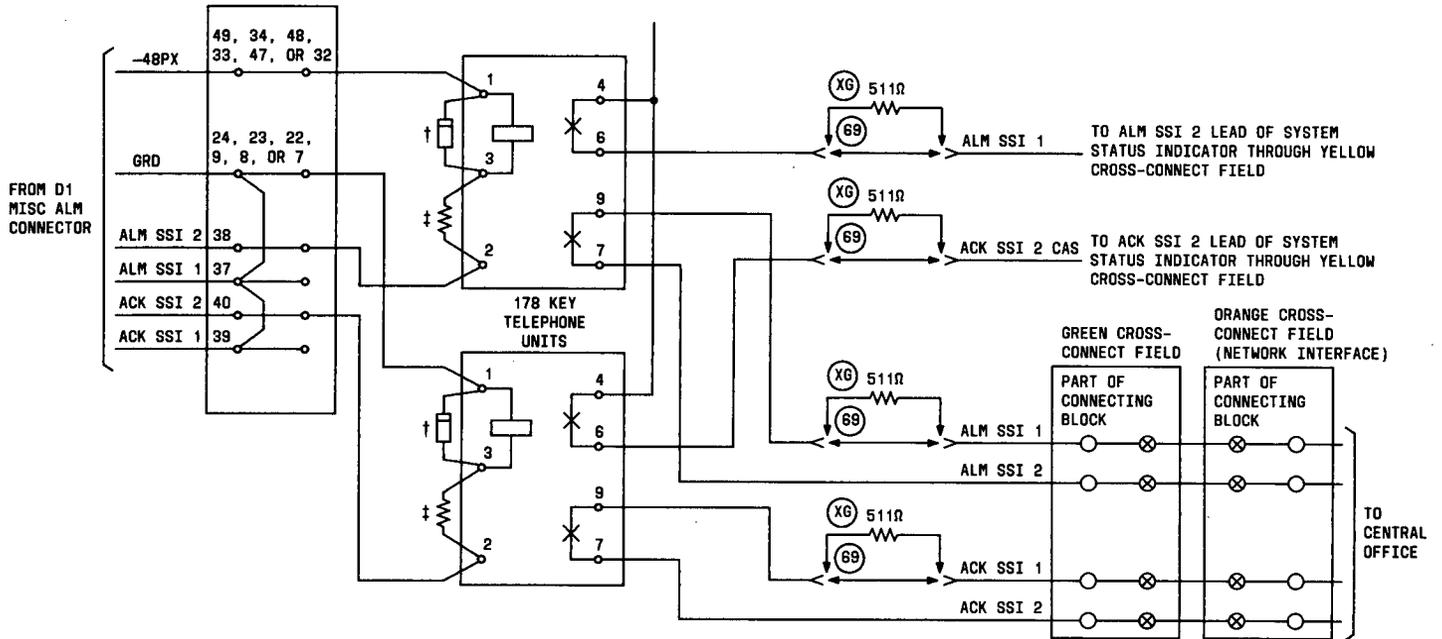
OPTION	CONDITION
(XG)	Unexposed cabling used
(69)	Exposed cabling used (511Ω resistor mounted at cross-connect field on 842155822 apparatus mounting)

11.21.2 System status indicator only



OPTION	CONDITION
(XG)	Unexposed cabling used
(69)	Exposed cabling used (511Ω resistor mounted at cross-connect field on 842155822 apparatus mounting)

11.21.3 Alarms connected to system status indicator and central office





PART 12. TRANSMISSION EQUIPMENT

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12.1 General

12.1.1 Digital Switching

12.1.1.1 DS-1 signaling provides a high performance digital communications interface to the System 85. Each channel may be used for digitized voice, data, or signaling transmission.

12.1.1.2 DS-1 interface can be used as a tie-trunk between two System 85s. It is also used with the Remote Group feature. The DS-1 interface may also be used in conjunction with transmission terminal products such as D4 channel banks, channel expansion multiplexers, channel division multiplexers, and customer service units. This section covers those units that are considered part of the System 85.

12.1.2 Loop Signaling

12.1.2.1 Transmission support equipment provides transmission and signaling range extension.

It consists of:

- customer premises facility terminal (CPFT)
- packaged metallic facility terminal assemblies (PMFTA)
- 24V4 and 44V4 repeaters
- LORAIN voice-switched gain amplifier

12.1.2.2 The CPFT equipment consists of metallic facility terminal (MFT) circuit packs and terminal balancing networks housed in connectorized shelves (carriers). The CPFT is a standard arrangement which supplies all of the transmission and signaling functions required to terminate either 2-wire or 4-wire metallic facilities. The CPFT equipment can be installed in the auxiliary cabinet if it does not interface with interconnect equipment. If CPFT interfaces with interconnect equipment, it must be mounted in a cabinet separate from the system.

12.1.2.3 The J99400 packaged metallic facility terminal assemblies (PMFTA) are housings that are self-contained and designed to accept metallic facility terminal (MFT) plug-in units. These housings are sized according to the number of circuits needed and are mounted on a wall, table, or floor. Installation instructions are contained in an ED-7C233 Installation Sheet Assembly which is stored above the mounting shelf or in an unused circuit pack slot.

12.1.2.4 Type 24V4 repeaters are used to interface 600 ohm 2-wire trunk circuits (SN230) and 4-wire 600 ohm loaded or nonloaded trunks. A 24V4 consists of a mounting shelf which holds plug-in components and test jacks. The 24V4 repeater can be used for voice and data transmission.

12.1.2.5 Type 44V4 repeaters can be used to interface 4-wire trunk circuits (SN233) and 4-wire 600 ohm loaded or nonloaded trunks. A 44V4 repeater consists of two 227-type amplifiers, two 359-type equalizers, and a jack field. The mounting shelf, which has two complete repeaters, may be wired to accept any combination of amplifiers, equalizers and power supply arrangements necessary for a particular circuit.

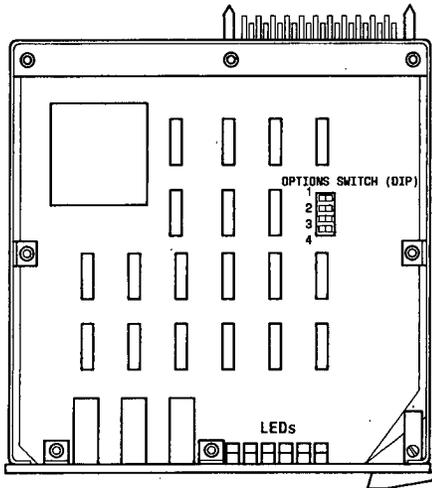
12.1.2.6 The LORAIN voice-switched gain amplifier (VFR-5050,L1) is a circuit pack mounted in a 500-13 carrier in the auxiliary cabinet. Each carrier can handle a maximum of 13 circuit packs containing one circuit per pack. Connected with SN230 (CO trunk) circuit packs the 2-wire amplifier automatically adds fixed transmission gain.

12.2 Channel Division Multiplexer (CDM) - The installation for the CDM used with DS-1 switching is located in paragraph 12.5; for use with Remote Groups, see paragraph 14.2. For other information, see Document 365-165-101.

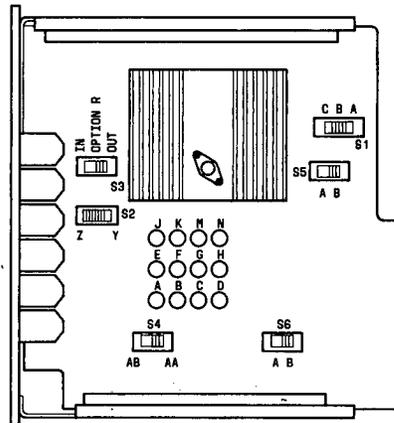
12.3 Channel Expansion Multiplexer (CEM) - The installation for the CEM used with DS-1 switching is located in paragraph 12.5; for use with Remote Groups, see paragraph 14.2. For other information, see Document 365-160-101.

12.4 Channel Service Unit (CSU) - The installation for the CSU used with DS-1 switching is located in paragraph 12.5; for use with Remote Groups, see paragraph 14.2. For other information, see Document 999-100-189IS.

- 12.5 DS-1 Trunk Port to T1 Carrier or Another Colocated System 85
- 12.5.1 Option Settings (as required)
 - 12.5.1.1 551V customer service unit
 - 12.5.1.1.1 The settings for each individual installation should be determined from the CSD.
 - 12.5.1.1.2 Option switch locations



SYSTEM MONITOR UNIT



OFFICE REPEATER

12.5.1.1.3 Signal Monitor Unit (SMU) options

551 V SMU BOARD			
OPTION		SWITCH	SETTING
All Ones		1	C
		2	0
ESS		1	0
		2	C
Zeros	16	3	C
	50	3	0
Active Fault Locate		4	C

12.5.1.1.4 Office Repeaters (OR) option

551 V OR POWERING MODE DATA					
SCREW OPTIONS		S2	S3	S4	S6
60 MA 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

12.5.1.2 Channel Expansion Multiplexer (CEM) options

12.5.1.2.1 The settings for each individual installation should be determined from the CSD.

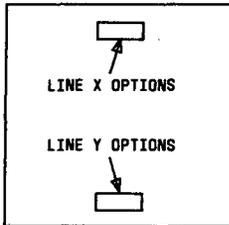
12.5.1.2.2 SM470 Options

SM470								
PORT	1	2	3	4	5	6	7	8
SWITCH	1	2	3	4	5	6	7	8
ECHO CANCELING PROVIDED	0	0	0	0	0	0	0	0
ECHO CANCELING NOT PROVIDED	C	C	C	C	C	C	C	C

12.5.1.2.3 TM501 (Line Z options)

TM501									
OPTION		SWITCH							
		1	2	3	4	5	6	7	8
EQUALIZER VALUE	0-133 ft	C	C	0					
	134-267 ft	C	0	C					
	268-400 ft	C	0	0					
	401-533 ft	0	C	C					
	534-655 ft	0	C	0					
FRAMING FORMAT	D4				C				
	Fe				0				
LINE FORMAT	BIPOLAR					C			
	B8ZS					0			

12.5.1.2.4 TM500 (line X and Y options)



		TM500							
OPTION		SWITCH							
		1	2	3	4	5	6	7	8
EQUALIZER VALUE	0-133 ft	C	C	0					
	134-267 ft	C	0	C					
	268-400 ft	C	0	0					
	401-533 ft	0	C	C					
	534-655 ft	0	C	0					
FRAMING FORMAT	D4				C				
	Fe				0				
LINE FORMAT	BIPOLAR					C			
	B8ZS					0			

NOT
USED

12.5.1.2.5 MC90069A-1

12.5.1.2.5.1 MC90069A-1 dip switch options

MC90069A-1											
OPTION		SWITCH									
		1	2	3	4	5	6	7	8		
CLOCK REFERENCE	Local BCM		0	0	0	0	0	0			
	Line X		C	0	0	0	0	C			
	Line Y		0	C	0	0	0	C			
	Line X		0	0	C	0	0	C			
ECHO TAIL LENGTH	LINE X	Not used or 16 ms							0		
		32 ms							C		
	LINE Y	Not used or 16 ms								0	
		32 ms								C	

12.5.1.2.5.2 MC90069A-1 faceplate options

12.5.1.2.5.2.1 No through channels

M90069A-1 FACEPLATE OPTIONS - NO THROUGH CHANNELS							
	SWITCH	ROCKER					
		1	2	3	4	5	6
Line X Channels 1-12	1	C	C	0	0	0	0
	2	0	C	0	0	0	0
Line X Channels 13-24	1	C	0	0	0	0	0
	2	0	0	0	0	0	0
Line Y Channels 1-12	3	C	C	0	0	0	0
	4	0	C	0	0	0	0
Line Y Channels 13-24	3	C	0	0	0	0	0
	4	C	0	0	0	0	0

12.5.1.2.5.2.2 All 12 channels compressed - no signaling

SWITCH					
1	2	3	4	5	6
C	C	C	0	0	C

12.5.1.2.5.2.3 With through channels - with signaling

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

12.5.1.2.5.2.4 With through channels – without signaling

NO SIGNALING CHANNELS WITH THROUGH CHANNELS														
NUMBER OF THROUGH CHANNELS	SWITCHES		AVAILABLE CHANNEL CONFIGURATIONS											
	OPEN	CLOSED	1	2	3	4	5	6	7	8	9	10	11	12
			OR 13	OR 14	OR 15	OR 16	OR 17	OR 18	OR 19	OR 20	OR 21	OR 22	OR 23	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
4	1,2,4	3,5,6	T	-	-	-	C	C	C	C	C	C	T	T
	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	T
	2,4	1,3,5,6	T	T	-	-	-	-	C	C	C	C	T	T
5	4	1,2,3,5,6	T	-	T	-	-	-	C	C	C	C	T	T
	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
6	1,2,3	4,5,6	T	-	T	-	T	-	-	-	C	C	T	T
	1,6	2,3,4,5	T	T	T	T	T	T	-	-	-	-	-	-
	6	1,2,3,4,5	-	-	-	-	-	-	T	T	T	T	T	T
6	2,3,5	1,4,6	T	T	T	T	T	-	-	-	-	-	-	T

C = COMPRESSED, T = THROUGH, - = UNUSED

12.5.1.2.6 MC90070A-1

12.5.1.2.6.1 MC90070A-1 dip switch options

MC90070A1									
OPTION		SWITCH							
		1	2	3	4	5	6	7	8
CLOCK REFERENCE	Local BCM	0	0	0	0	C	0		
	Line X	C	0	0	0	0	C		
	Line Y	0	C	0	0	0	C		
	Line X	0	0	C	0	0	C		
ECHO TAIL LENGTH	LINE X	Not used or 16 ms						0	
		32 ms						C	
	LINE Y	Not used or 16 ms							0
		32 ms							C

12.5.1.2.6.2 MC900 70A-1 faceplate options

12.5.1.2.6.2.1 With through channels (Sheet 1 of 3). Use Switch 1 for channels 1-12 and Switch 2 for channels 13-24.

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

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

12.5.1.2.6.2.1 With through channel (Sheet 3 of 3)

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
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
7	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
	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
8	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
	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

12.5.1.3 Channel Division Multiplexer

12.5.1.3.1 Matrix programming

12.5.1.3.1.1 The CDM has an address matrix which permits an individual channel to occupy any time slot by installing a matrix jumper. For example, channel one may be programmed to occupy time slot 24 and channel 2 may be programmed to occupy time slot 7, etc. 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 requirements for each channel unit is one time slot with the exception of the 56/64 KXN DCUs which may occupy multiple time slots.

12.5.1.3.1.2 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 KXN 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 (CEM). These time slots carry signaling information for the bundled voice channels.

f. 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

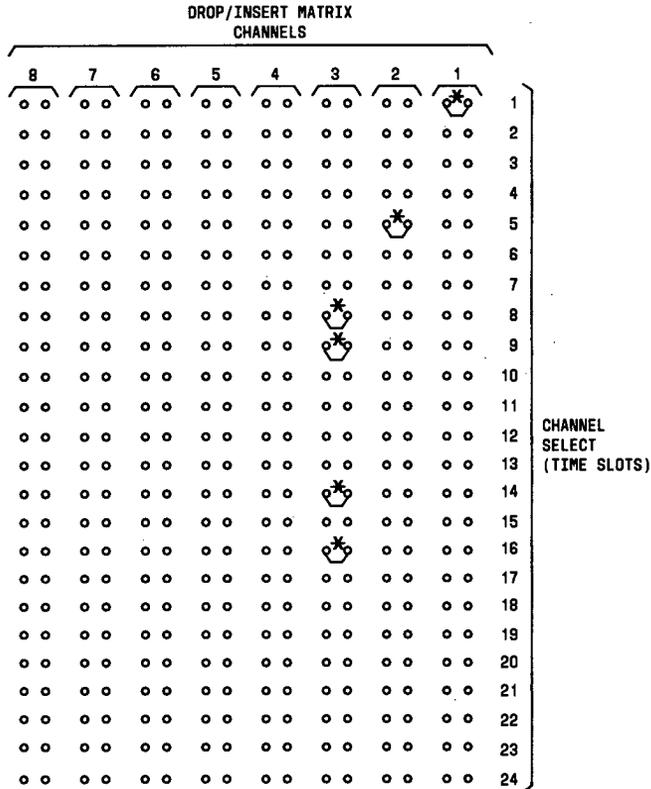
g. Record the channels on the Matrix Programming Guide. The matrix programming guide must be filled out for each direction of transmission.

MATRIX PROGRAMMING GUIDE								
SELECT TIME SLOT	CDM CHANNEL UNIT TYPE							
						DATA 56/64XN	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 matrices

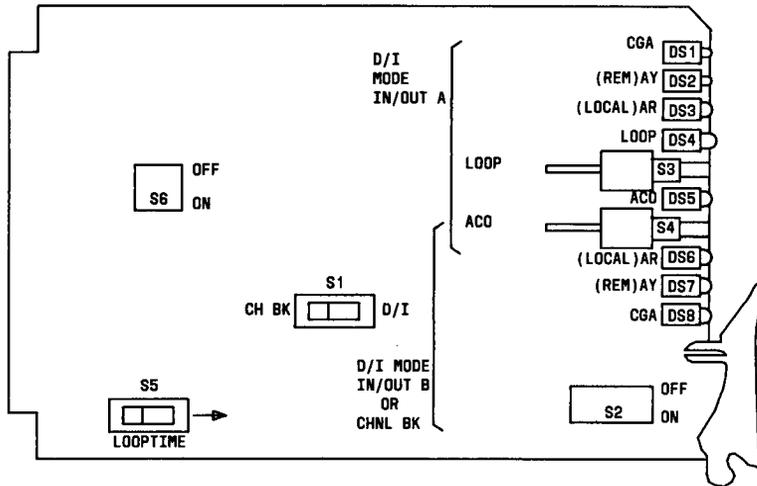
12.5.1.3.1.3 Programming the matrix – Loosen the thumbscrews at the top of the data service panel and let the panel swing down. Place the jumpers on the Drop and Insert matrixes as shown in paragraph 12.5.1.3.1.4 using the Programming Guide. Close and secure the panel.

12.5.1.3.1.4 Drop insert channel select matrix.



* PLACE JUMPER ON BOTH DROP AND
INSERT MATRIXES

12.5.1.3.2 Alarm unit (30005-001)



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	LOOPTIME	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)		

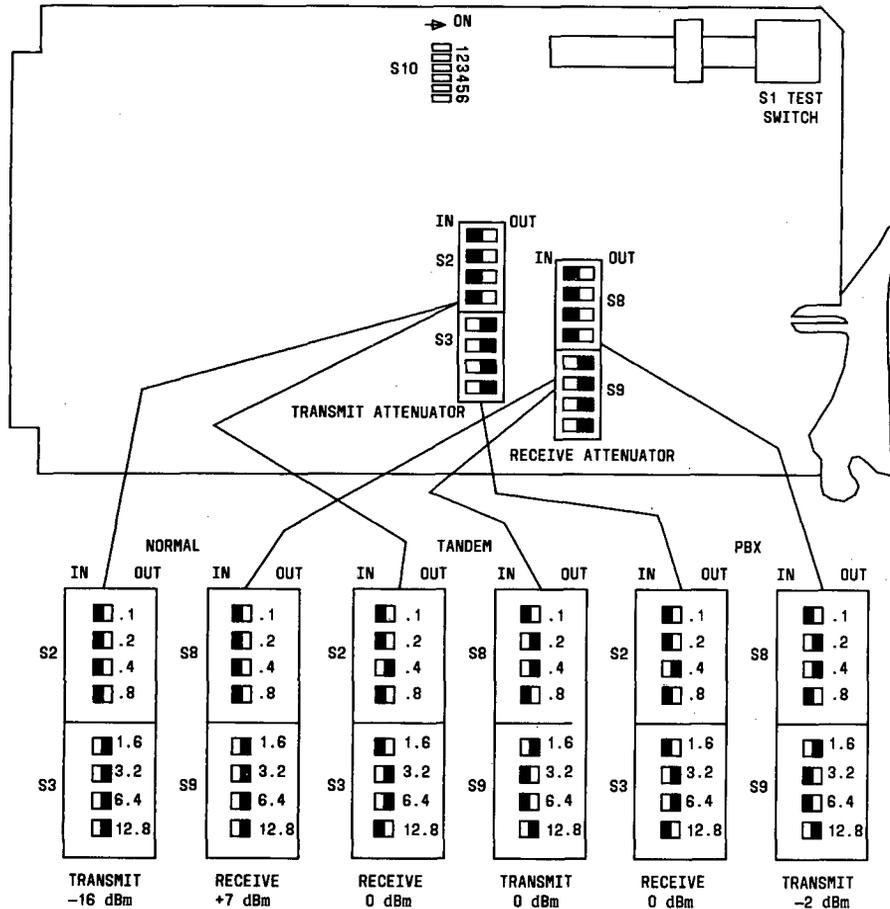
* In the Channel Bank mode one CDM is usually optioned for LOCAL and the far end is optioned for LOOPED. The exception is when the DS-1 facility provides timing. In that case, both CDMs are optioned for LOOPED.

12.5.1.3.3 Four-wire E&M channel unit

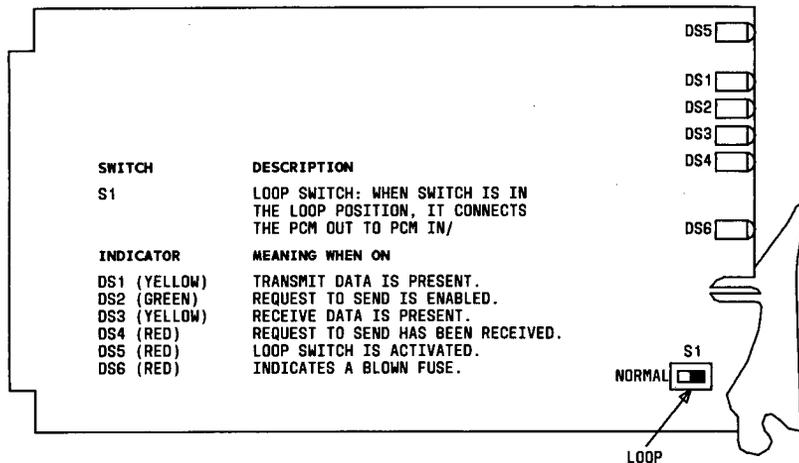
12.5.1.3.3.1 Option procedures

1. To set transmit attenuator:
 - a. For No. 30003-002 (paragraph 12.5.1.3.3.2), 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 (paragraph 12.5.1.3.3.3), 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 S6 and S7 as required to obtain a meter reading of +.84.
2. To set receiver attenuator:
 - a. For No. 30003-002 (paragraph 12.5.1.3.3.2), 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 (paragraph 12.5.1.3.3.4), 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 achieve the proper system level.
3. On No. 30003-002, set switch S10 as shown in paragraph 12.5.1.3.3.5.
4. On No. 30044-002, set switches S2, S3, S5, and S10 as shown in paragraph 12.5.1.3.3.6.

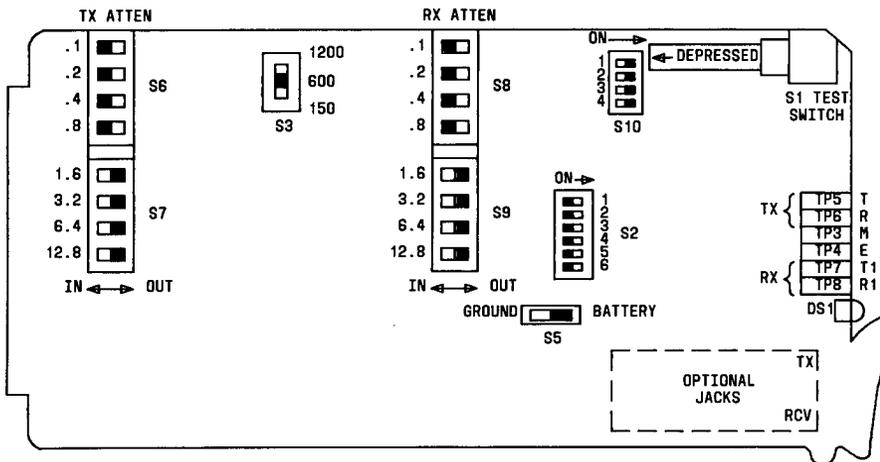
12.5.1.3.3.2 30003-002 four-wire E&M channel unit



12.5.1.3.3 Switch locations and settings for 0 to 19.2 kbps asynchronous data channel unit



12.5.1.3.3.4 30044-002 four-wire E&M channel unit switch location



12.5.1.3.3.5 S10 switch settings for 30003-002 four-wire E&M channel unit

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			Busy immediately	
	5	ON		Idle immediately then busy after a delay	
	6	OFF			
	5	OFF			
	6	ON			

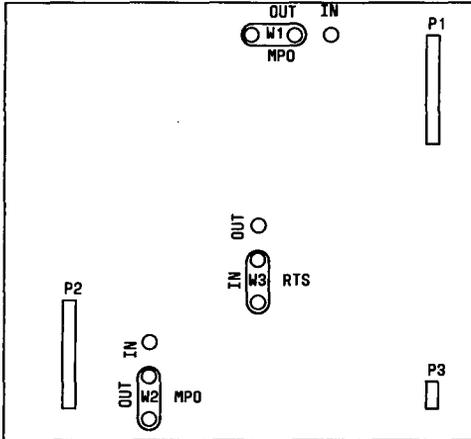
* Most PBX interfaces will require Type I signaling and idle immediately then busy after a delay. Type II and III signaling require a 4-connector (VF connector) CDM shelf.

12.5.1.3.3.6 S2, S3, S5, and S10 switch settings for 30044-002 four-wire E&M channel unit

SWITCH	SECTION	SETTING	DESCRIPTION	
S2	1	OFF	E-lead routines on CGA	Idle immediately
	2	OFF		Busy immediately
	1	OFF		Busy immediately
	2	ON		Idle immediately, then busy
S5	1	ON	E&M Operation	E lead (Busy=GND)
	2	OFF		
S2	3	OFF	PLR Operation	M lead (Busy=BAT)
	4	ON		
S5	3	ON	PLR Operation	E-lead busy
	4	ON		
S2	5	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	

12.5.1.3.4 RS-422 interface subboard

12.5.1.3.4.1 Switch locations

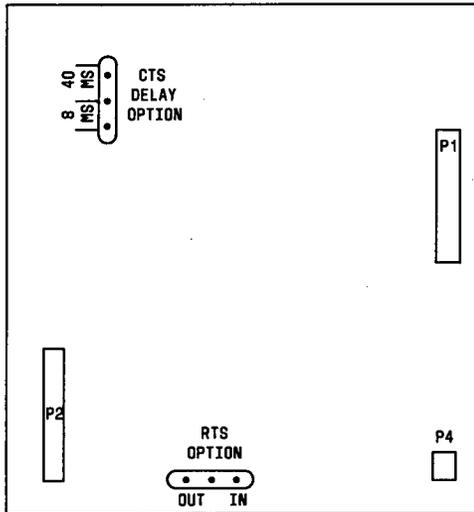


12.5.1.3.4.2 Option settings

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).

12.5.1.3.5 RS-232C interface subboard

12.5.1.3.5.1 Option plug locations



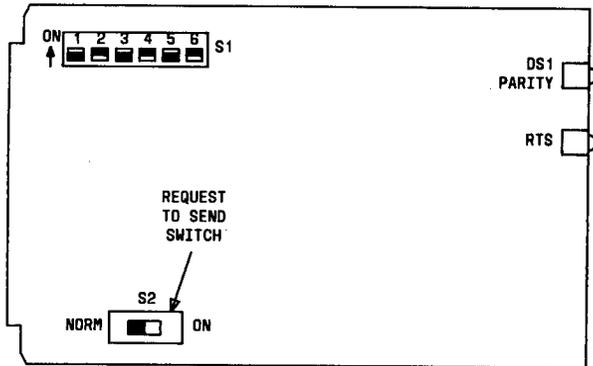
12.5.1.3.5.2 Option settings

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)

12.5.1.3.6 56/64 kbps synchronous data channel unit

12.5.1.3.6.1 Set the request to send switch per CSD

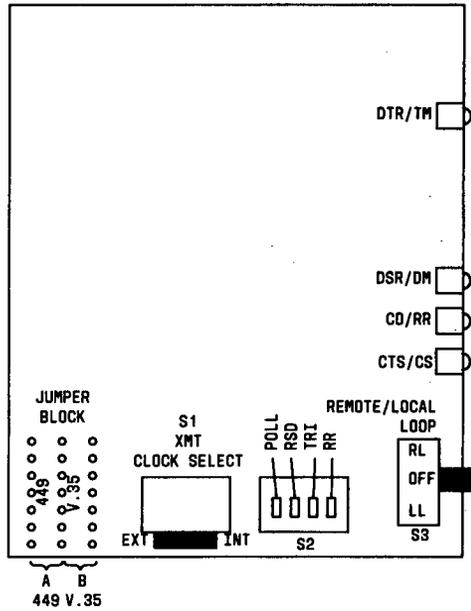
12.5.1.3.6.2 Switch locations



12.5.1.3.7 V.35/RS-449 subboard

12.5.1.3.7.1 Set the jumpers V.35 or .449 position per the CSD

12.5.1.3.7.2 Option switch locations



12.5.1.3.7.3 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.

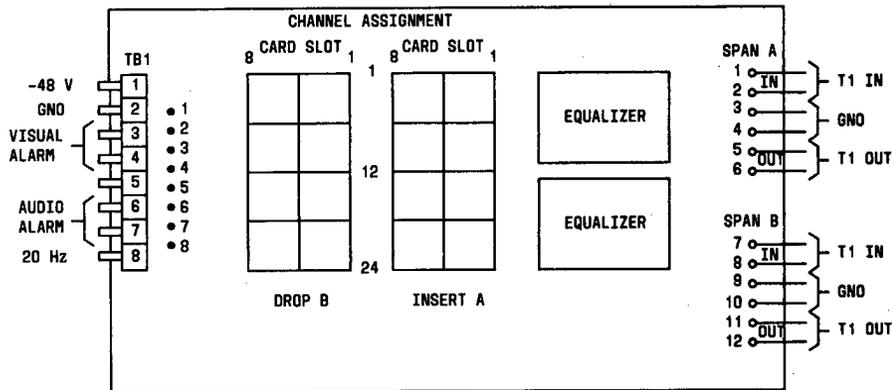
Located on front of board.

12.5.1.3.8 Equalization

12.5.1.3.8.1 CDM equalizers

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

12.5.1.3.8.2 Equalizer locations

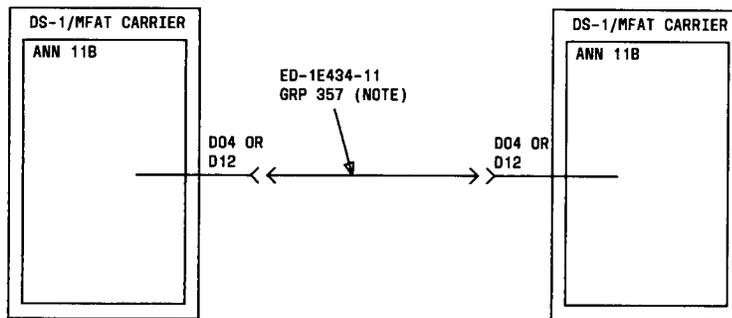


12.5.1.3.8.3 Setting the equalization

- a. Determine the proper equalizer using the CSD and paragraph 12.5.1.3.8.1.
- b. At the rear of the CDM, loosen thumbscrews at the top of the Data Service Panel and swing the panel down.
- c. Unplug the equalizers – See paragraph 12.5.1.3.8.2.
- d. Plug in the proper equalizers with component side out. The components are located on the lower half of the equalizers.
- e. Close and secure the Data Service Panel.

12.5.2 Connections between two colocated System 85

See Part 9, paragraph 9.2.9 for circuit pack connections and terminations



NOTE: SEE PARAGRAPH 12.5.7 FOR WIRING 6-PAIR CONNECTOR PROVIDED WITH CABLE GRP 357

12.5.1.4 DS-1/MFAT carrier-J58888N

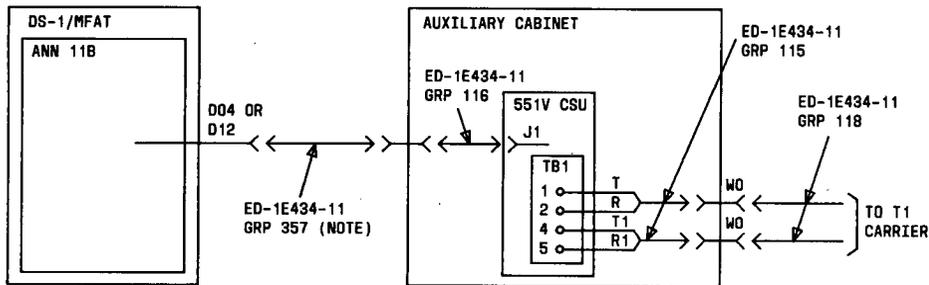
12.5.1.4.1 In slots 05 and 18 of the DS-1 carrier ANN1C can be used in a Line Only mode and a Line/Trunk mode. This option is set by installing or removing straps on the carrier backplane. Use the CSD and the following table to set the options.

OPTION	STRAPPING
Line & Trunk	No strapping required
Line Only	Strap Carrier Backplane pins 208 and 224 together on the appropriate slot

12.5.3 Connections to T1 carrier using a 551V CSU.

12.5.3.1 Equipment located in auxiliary cabinet.

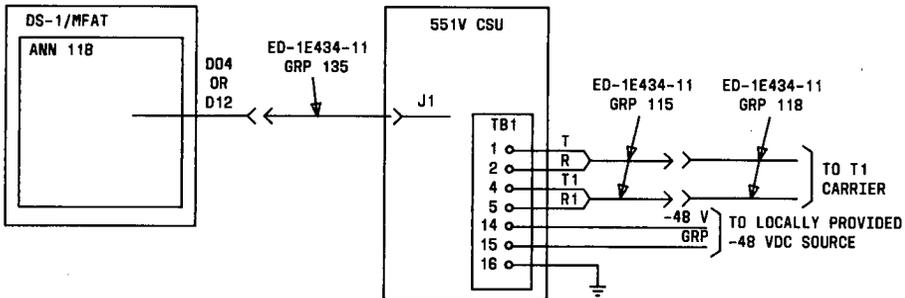
(See Part 9, paragraph 9.2.9 for circuit pack connection and terminations.)



NOTE: SEE PARAGRAPH 12.5.7 FOR WIRING INSTRUCTIONS FOR 15-PIN CONNECTOR PROVIDED WITH CABLE GROUP 357

12.5.4.3 Equipment not located in an auxiliary cabinet.

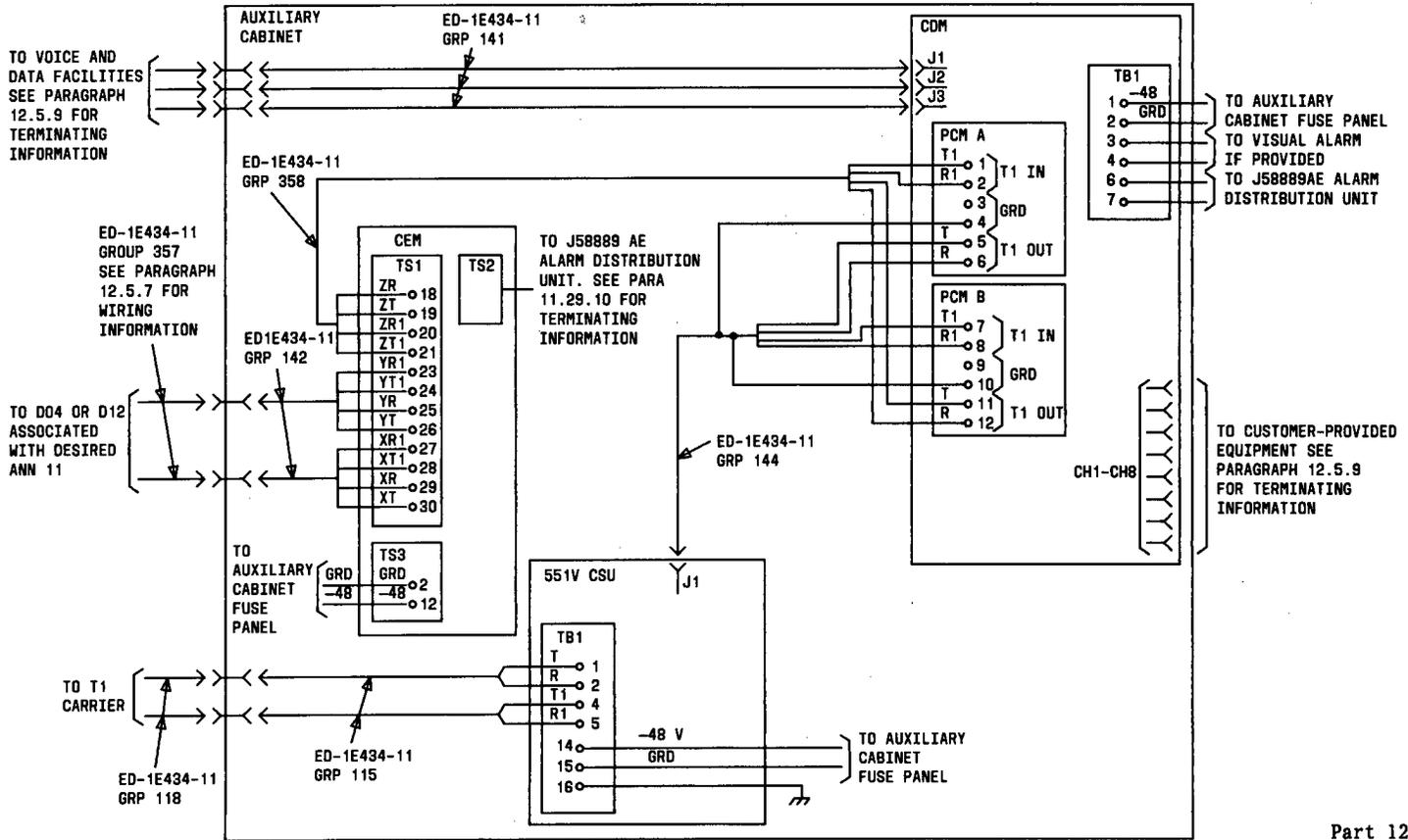
(See Part 9 paragraph 9.2.9 for circuit pack connections and terminations.)



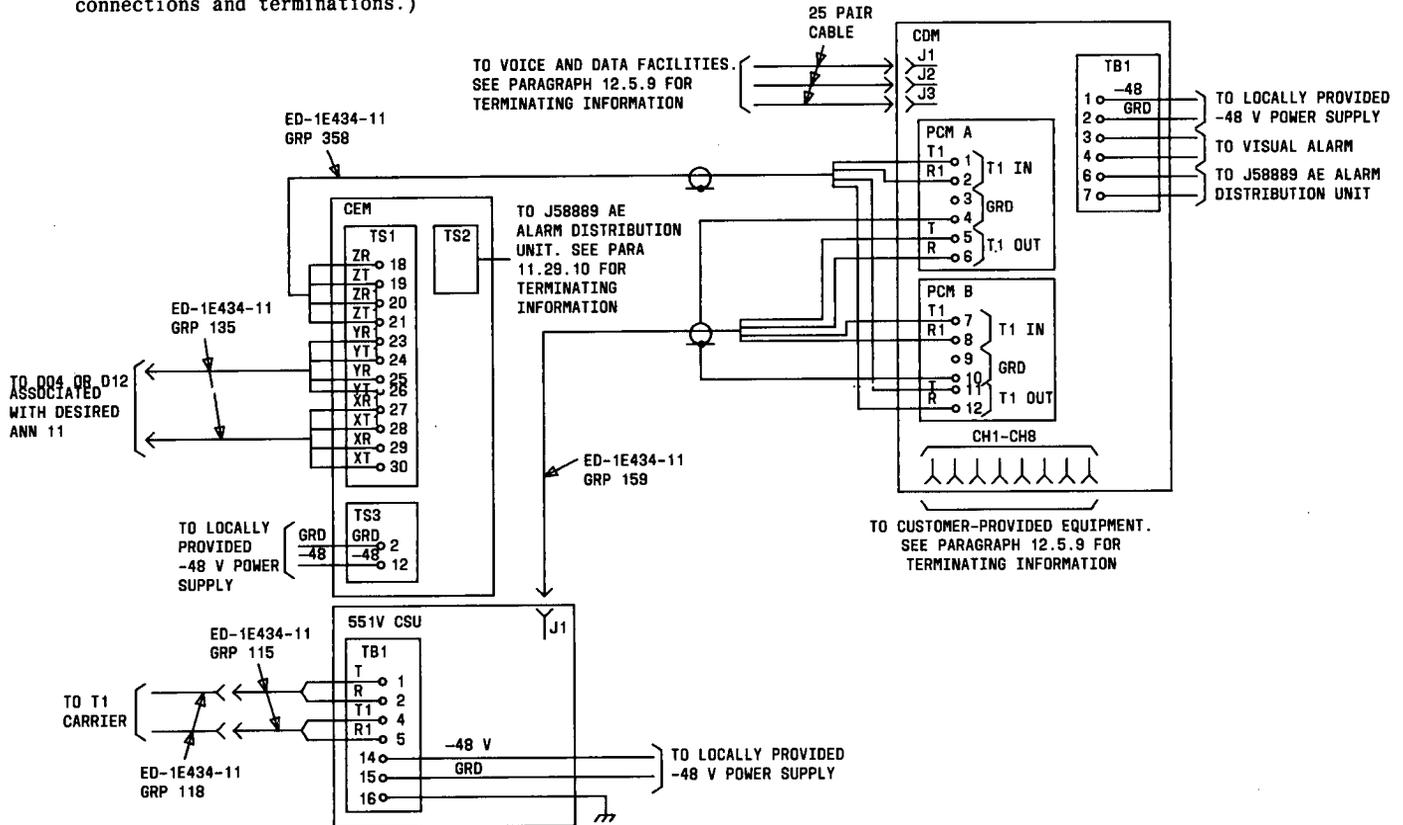
12.5.4 DS-1 trunk port to T1 carrier using CDM, CEM and 551V CSU

12.5.4.1 Equipment located in an auxiliary cabinet.

(See Part 9, paragraph 9.2.9 for ANN 11 connections and terminations.)



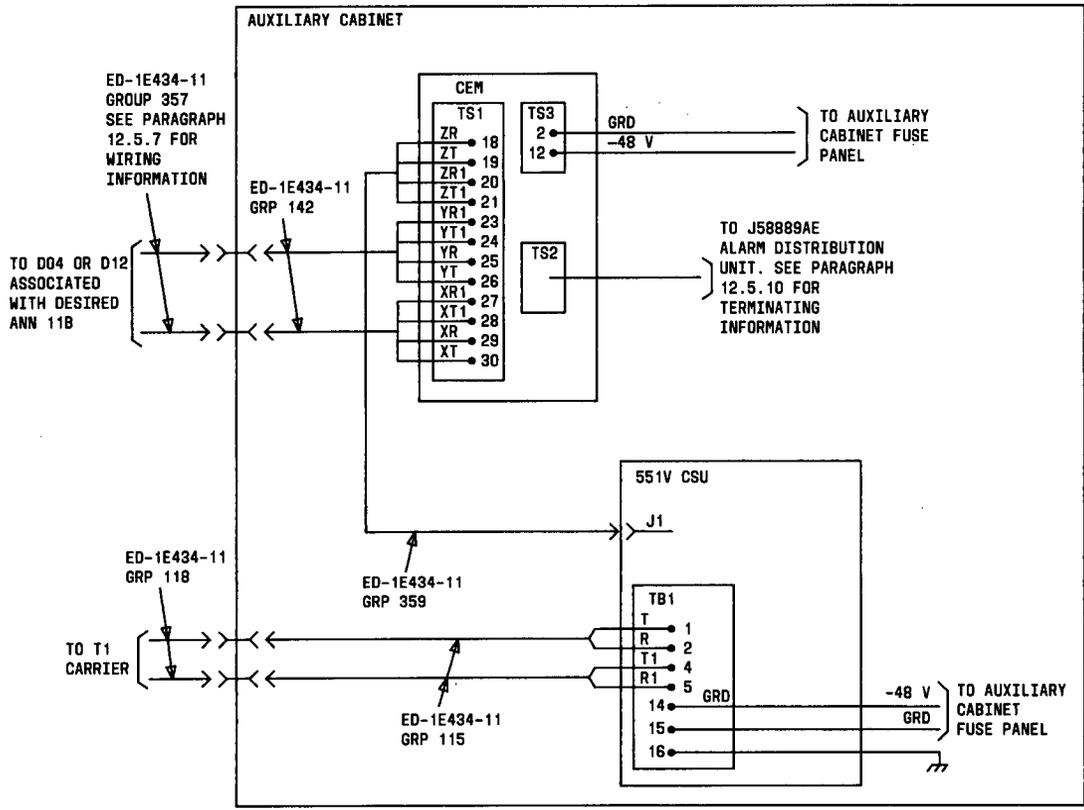
12.5.4.2 Equipment not located in an Auxiliary Cabinet
 (See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



12.5.5 DS-1 trunk port to T1 carrier using CEM and 551V CSU

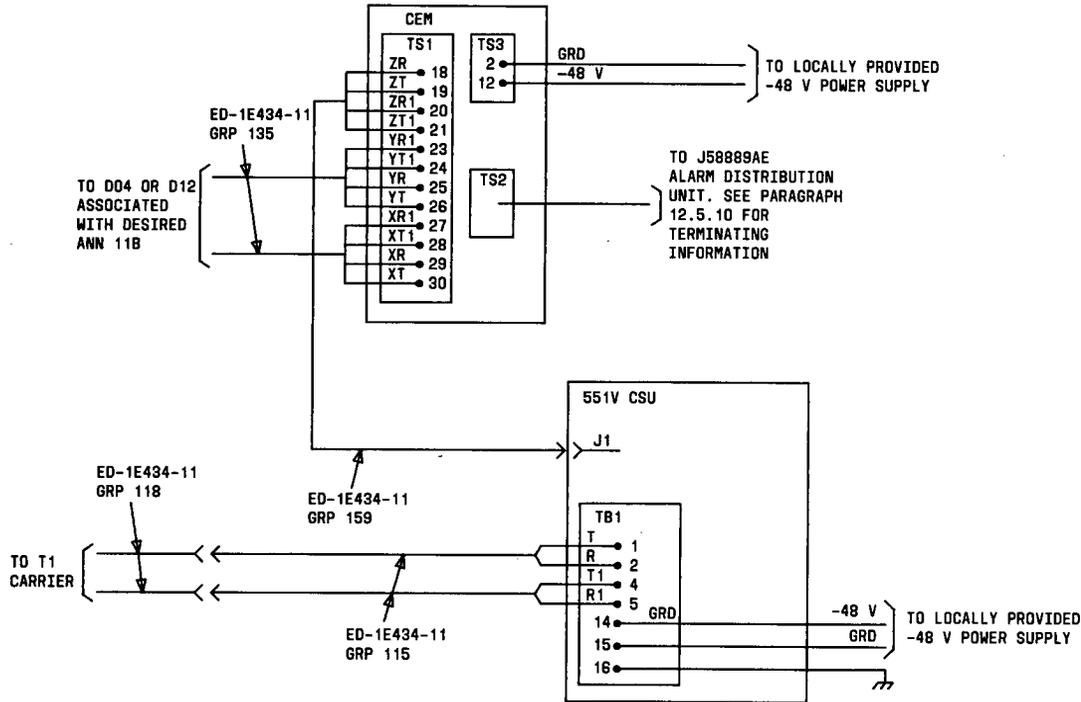
12.5.5.1 Equipment located in an Auxiliary Cabinet

(See Part 9, paragraph 9.2.9 for circuit pack connection and terminations.)



12.5.5.2 Equipment not in an Auxiliary Cabinet

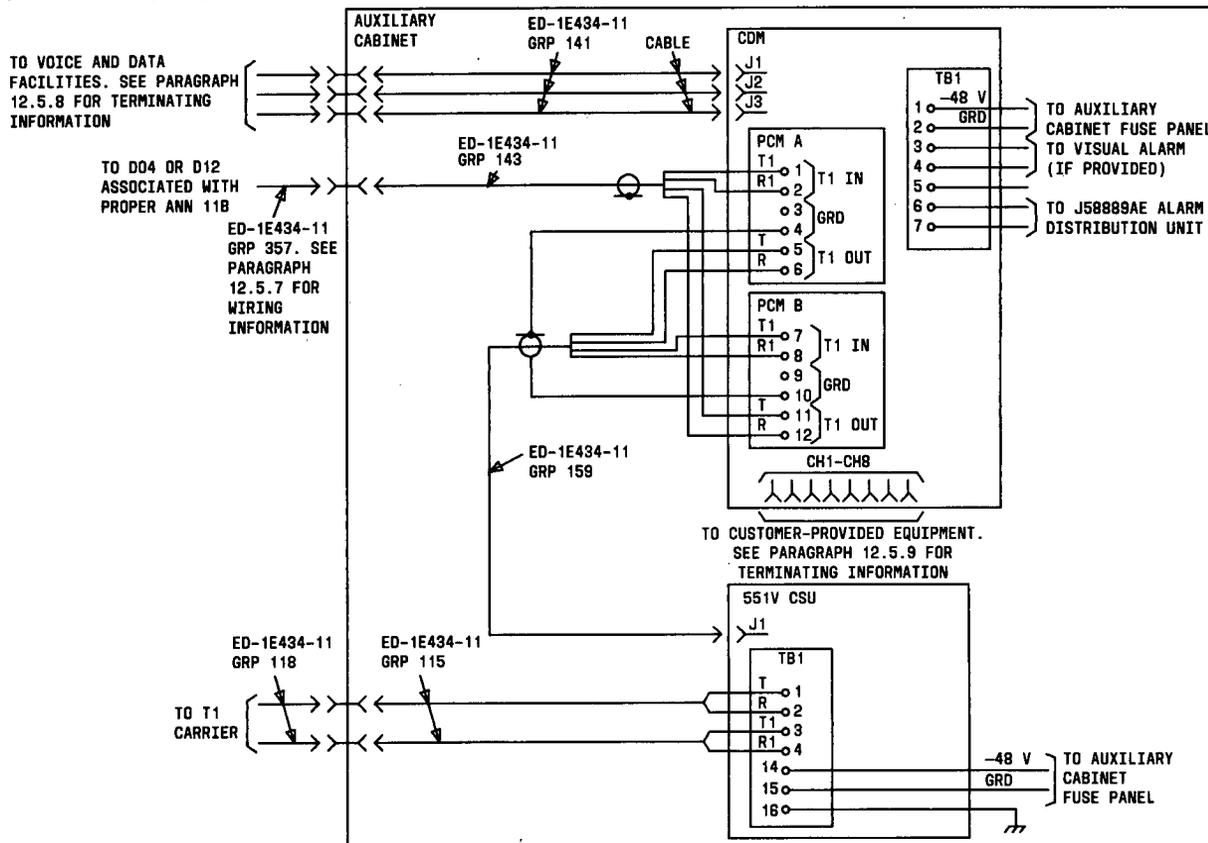
(See Part 9, paragraph 9.2.9 for ANN 11 connections and terminations.)



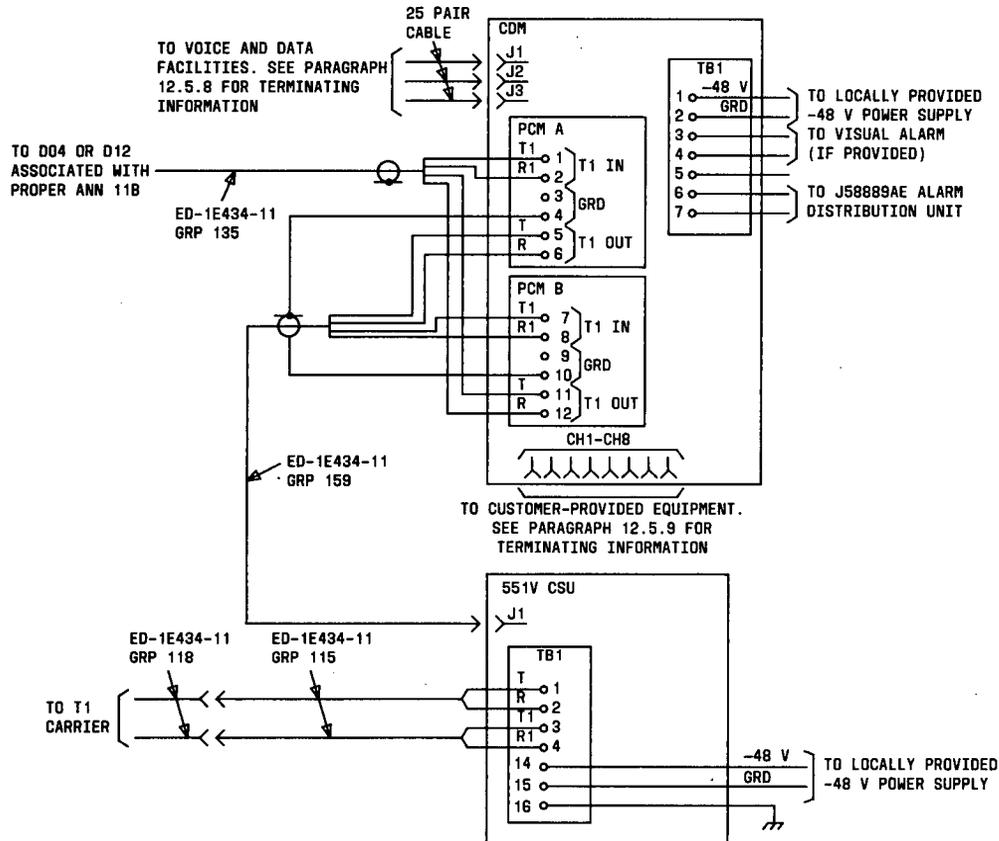
12.5.6 DS-1 trunk port to T1 carrier using CDM and 551V CSU

12.5.6.1 Equipment located in an Auxiliary Equipment

(See Part 9, paragraph 9.2.9 for ANN 11 connections and terminations.)

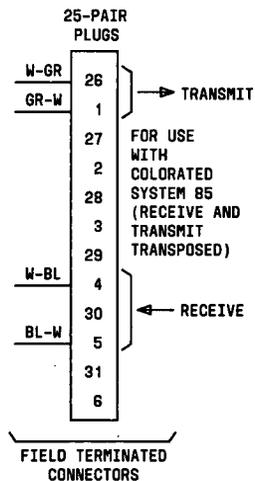
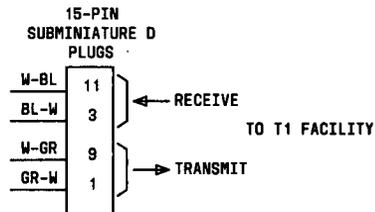
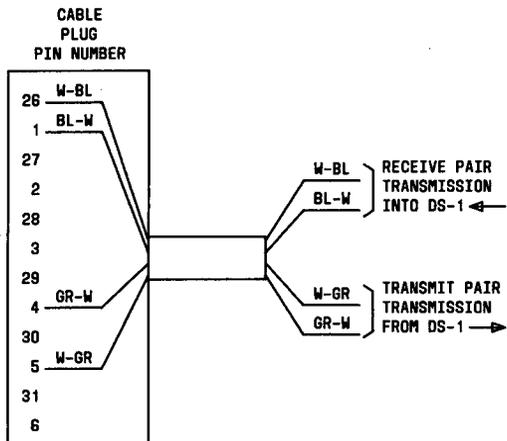


12.5.6.2 Equipment not located in an Auxiliary Equipment
 (See Part 9, paragraph 9.2.9 for ANN 11 connections and terminations.)



12.5.7 Attaching 15-pin or 25-pair connector to ED-1E434-11 GRP 357.

Cable group 357 is a 6-pair cable with a 25-pair connector on one end. The other end is not connectorized. A 25-pair connector and a 15-pin subminiature connector is provided with the cable. Determine which connector is required and attach it to the cable.



12.5.8 Terminating information for J1, J2, and J3 on CDM

12.5.8.1 24-Channel CDM

CONNECTIONS FOR MODEL NO. 2521-024

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	CONNECT LEADS TO CORRESPONDING CONNECTING BLOCK TERMINALS FOR ASSOCIATED EQUIPMENT
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	

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	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

12.5.8.2 8-Channel CDM

CONNECTIONS FOR MODEL NO. 2521-008

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	CONNECT LEADS TO CORRESPONDING CONNECTING BLOCK TERMINALS FOR ASSOCIATED EQUIPMENT
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

12.5.9 Terminations for CH1-CH8 connectors on CDM

DATA CHANNEL CABLE CONNECTOR CABLE WIRING (CUSTOMER END)

CONN PIN NO.	CDM						CONNECT TO CUSTOMER INTERFACE CONNECTOR PIN NO.				
	DATA LEAD DESIGNATION FOR INTERFACE TYPE						INFOTRON V. 35	V. 35	RS-449	RS-422	RS-232
	INFOTRON V. 35 (NOTE 1)	V. 35 (NOTE 2)	RS-449 (NOTE 1)	RS-422	RS-232 (NOTE 3)	TTY					
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:

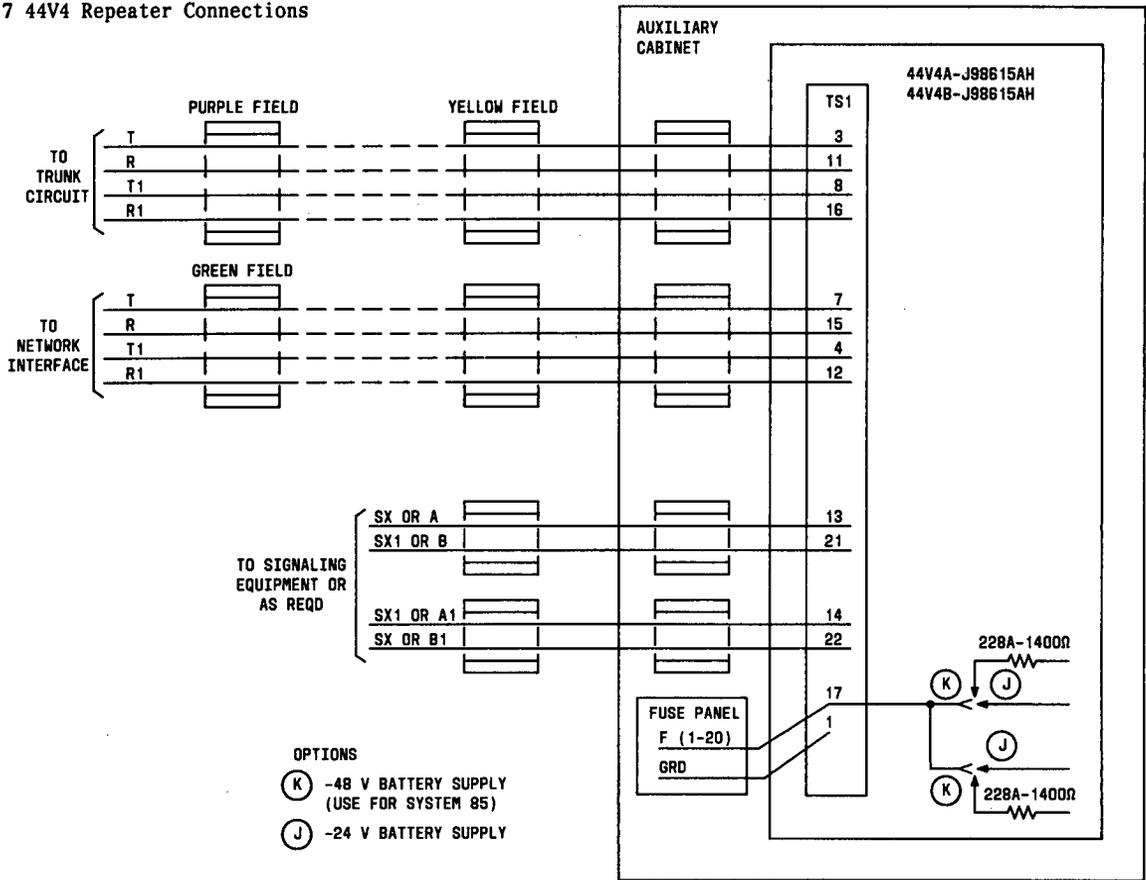
1. 37-pin D-type connector
2. 34-pin Winchester connector
3. 25-pin D-type connector

* Strap these terminals together in the connector.

12.5.10 CEM TS2 Alarm Terminations

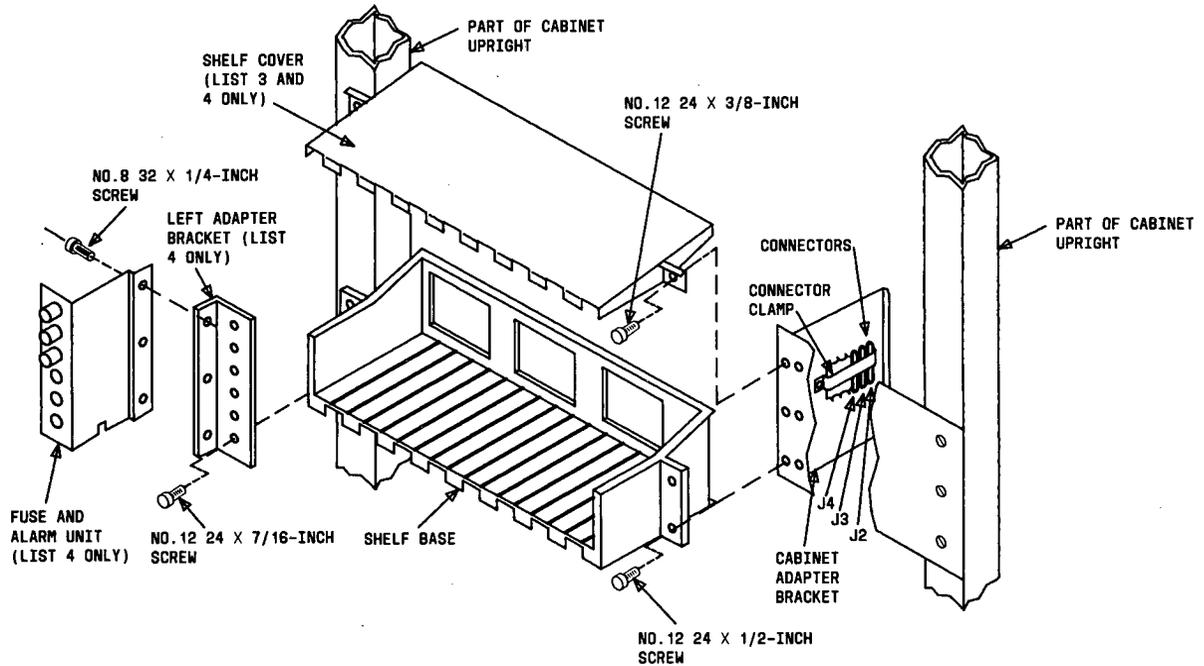
ALARM CONNECTIONS	
PINS	DESIGNATION
1+2	Office audible
3+4	Office visual
5+6	Remote equipment
7+22	Remote processor visual
10+25	Remote processor audible
8+9	Remote line z
14+15	Remote line y
11+12	Remote line x

12.7 44V4 Repeater Connections



- OPTIONS
- (K) -48 V BATTERY SUPPLY
(USE FOR SYSTEM 85)
 - (J) -24 V BATTERY SUPPLY

12.8 CPFT-Mounting Arrangement for J99380A-1 Shelf Assembly



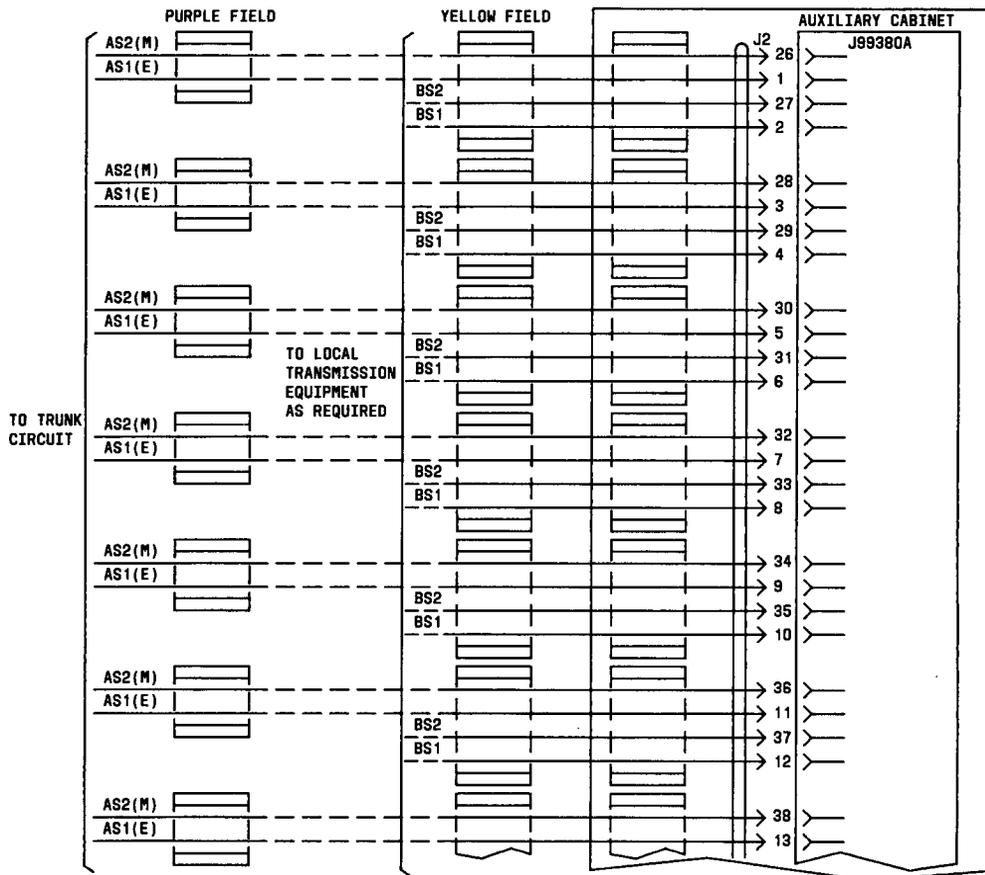
12.8.1 Connections from shelf base to fuse and alarm unit

FROM SHELF BASE		TO FUSE AND ALARM UNIT
LEAD	DESIGNATION	
Orange with one red stripe	GRD A (1)	Terminal B on alarm fuse block
Orange with one red stripe	GRD A (2)	
Orange with two red stripes from odd numbered circuits	-48A (1)	Center terminal on FA1 fuse block
Orange with two red stripes from even numbered circuits	-48A (2)	Center terminal on FA2 fuse block

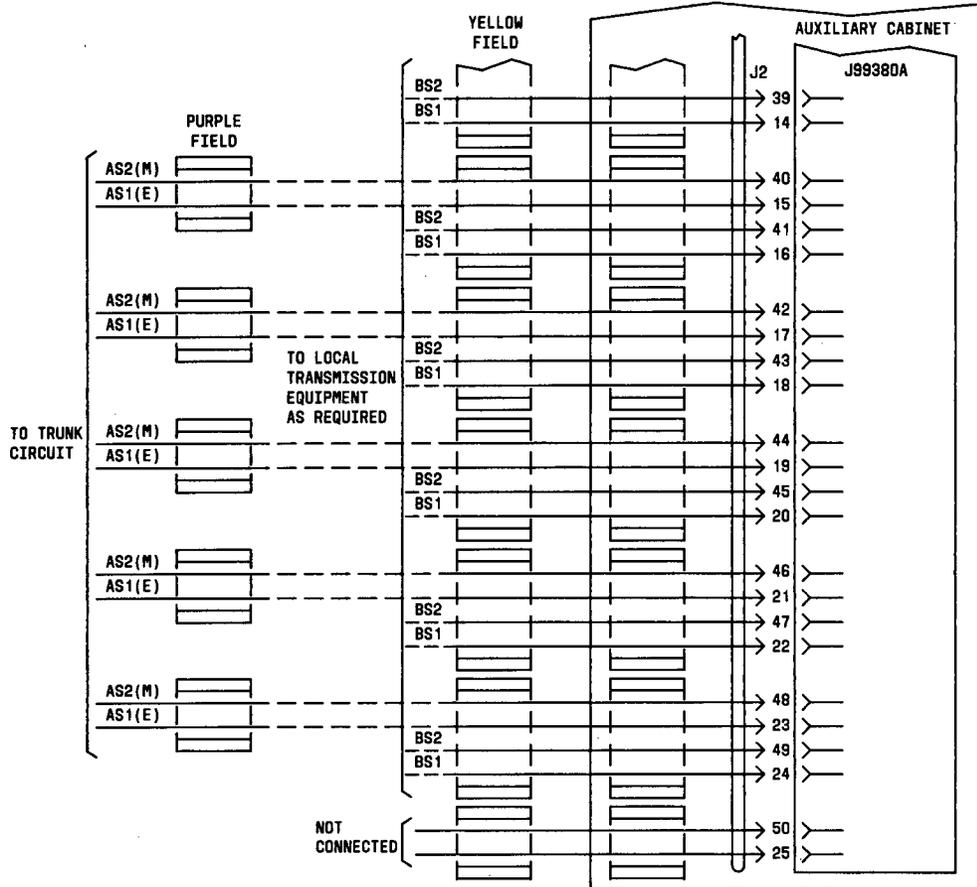
12.8.2 Connection from fuse and alarm unit to auxiliary cabinet fuse panel

DESIGNATION	CABLE	CONNECT TO
-48	SLATE	Terminal 2, 3, or 4 of TS1
GRD	SLATE-BLACK	Terminal 7, 8, or 9 of TS1
ALARM	Connector Cable PFOO	Fuse alarm bus which connects to terminal 3 of connector PFOO

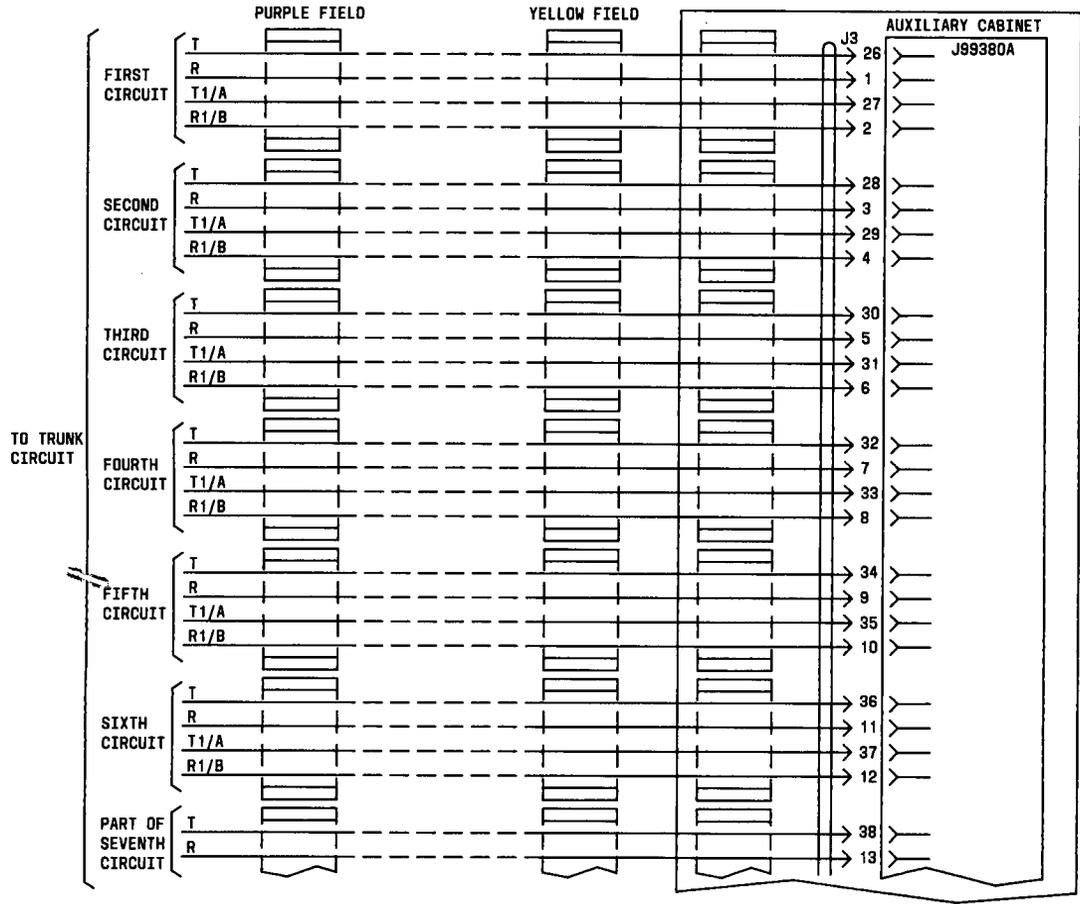
12.8.3 Connection from J2 connector to cross-connection field (Sheet 1 of 2)



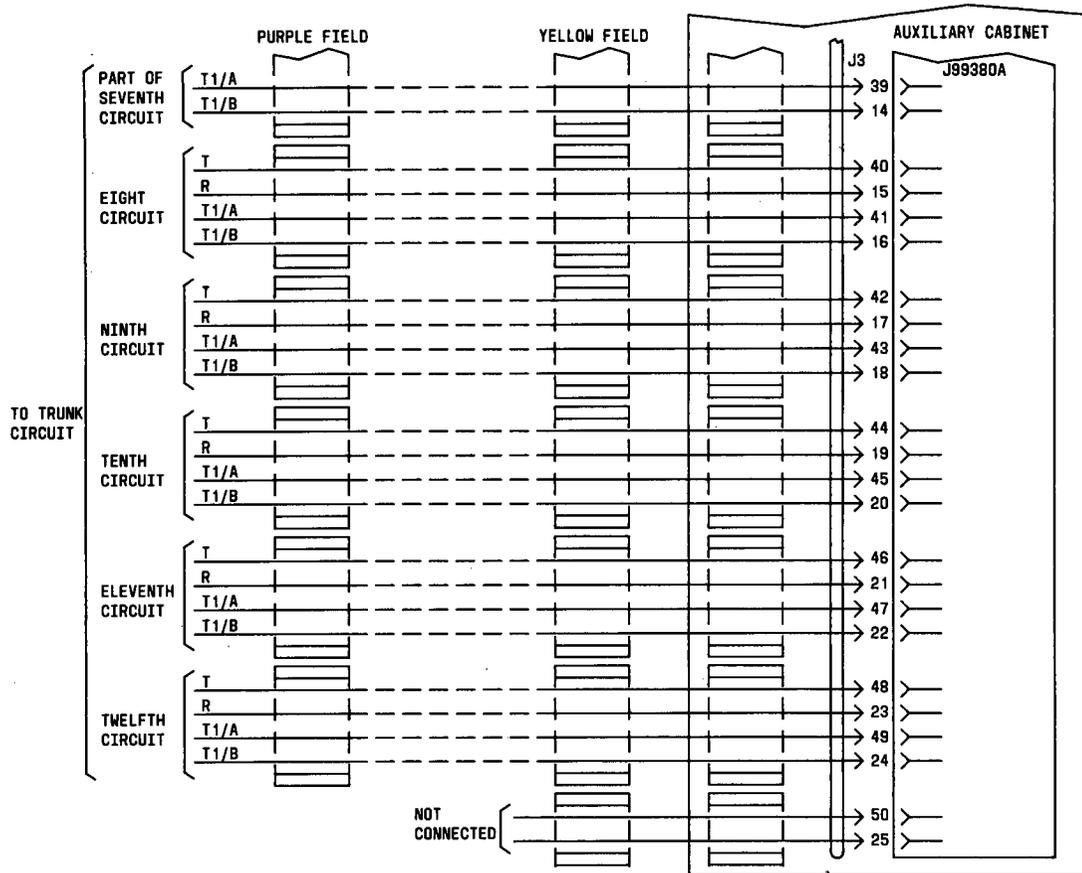
12.8.3 Connection from J2 connector to cross-connection field (Sheet 2 of 2)



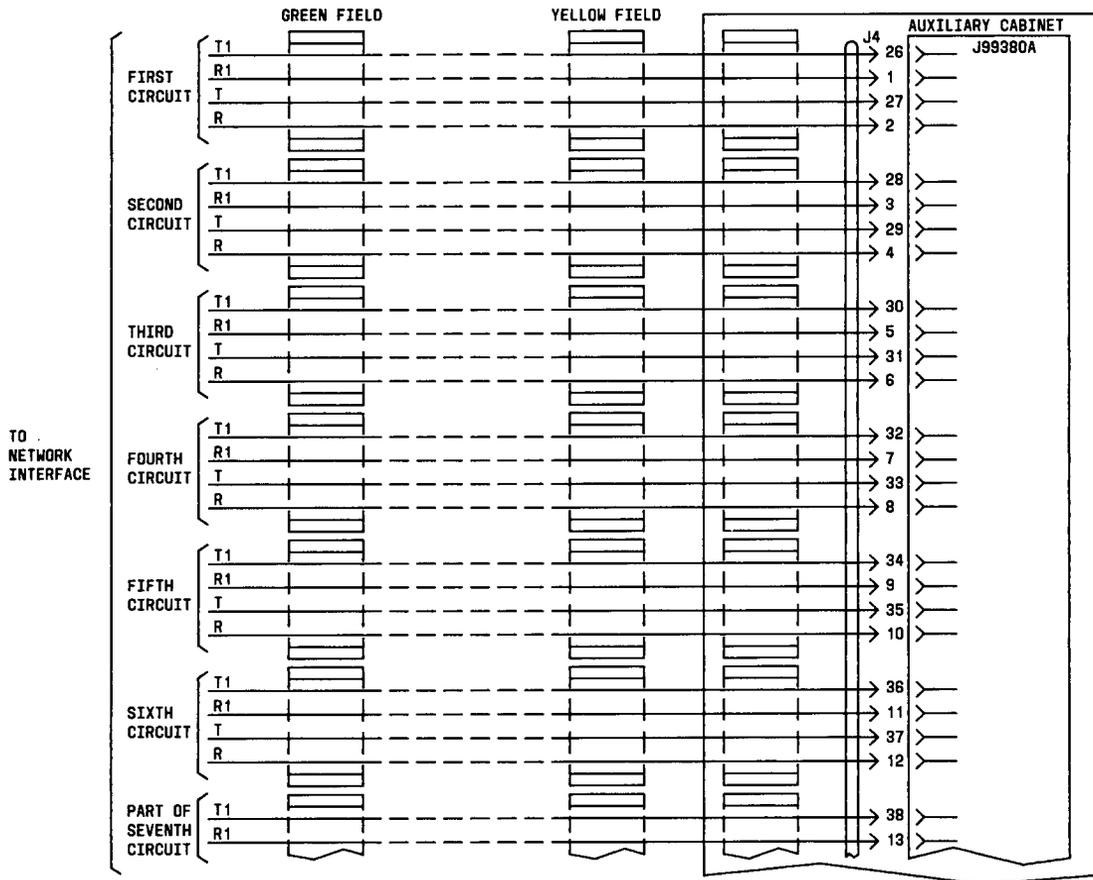
12.8.4 Connections from J3 connector to cross-connection field (Sheet 1 of 2)



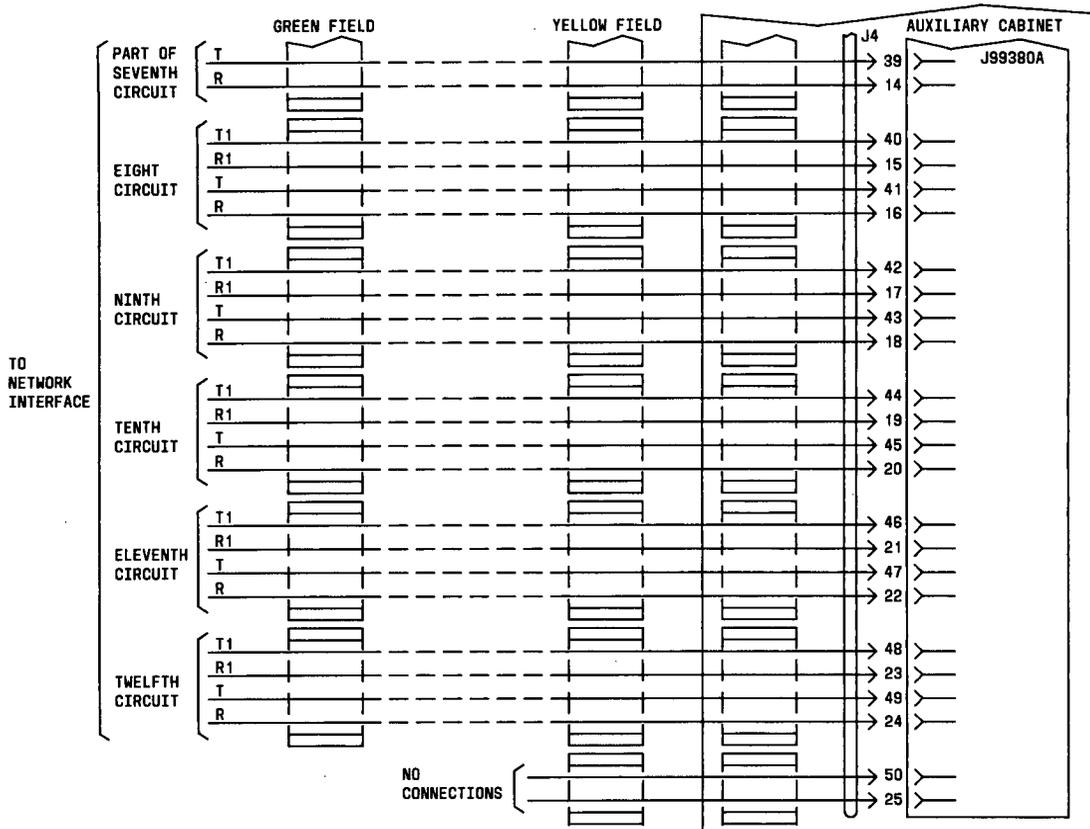
12.8.4 Connections from J3 connector to cross-connect field (Sheet 2 of 2)



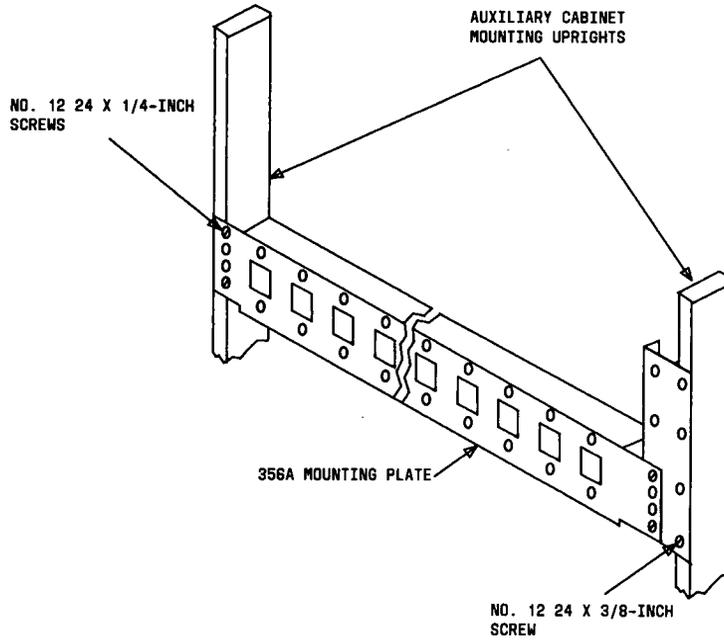
12.8.5 Connections from J4 connector to cross-connect field (Sheet 1 of 2)



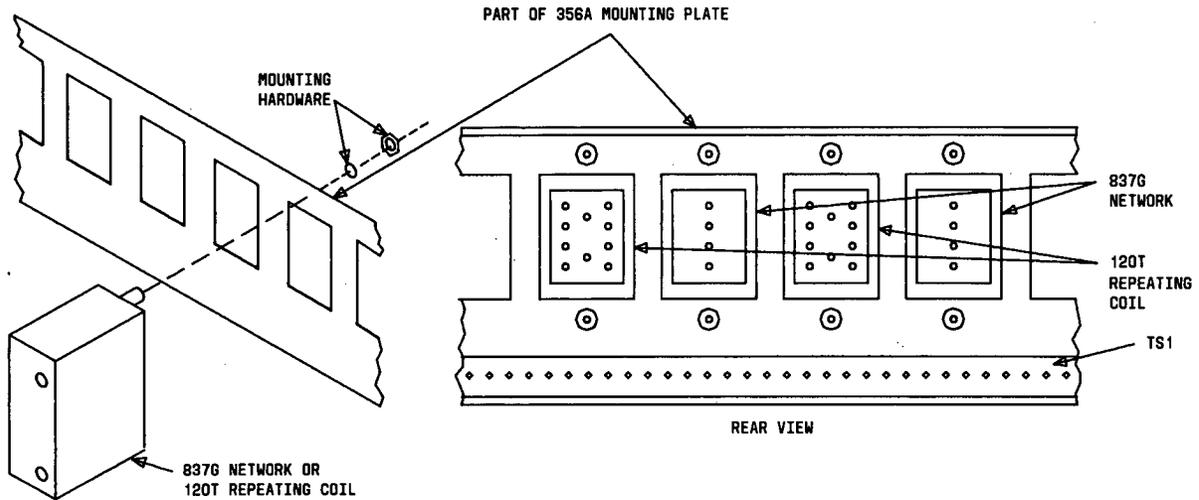
12.8.5 Connections from J4 connector to cross-connect field (Sheet 2 of 2)



12.9 CPFT-Mounting Arrangement for J99380B-1 Mounting Panel

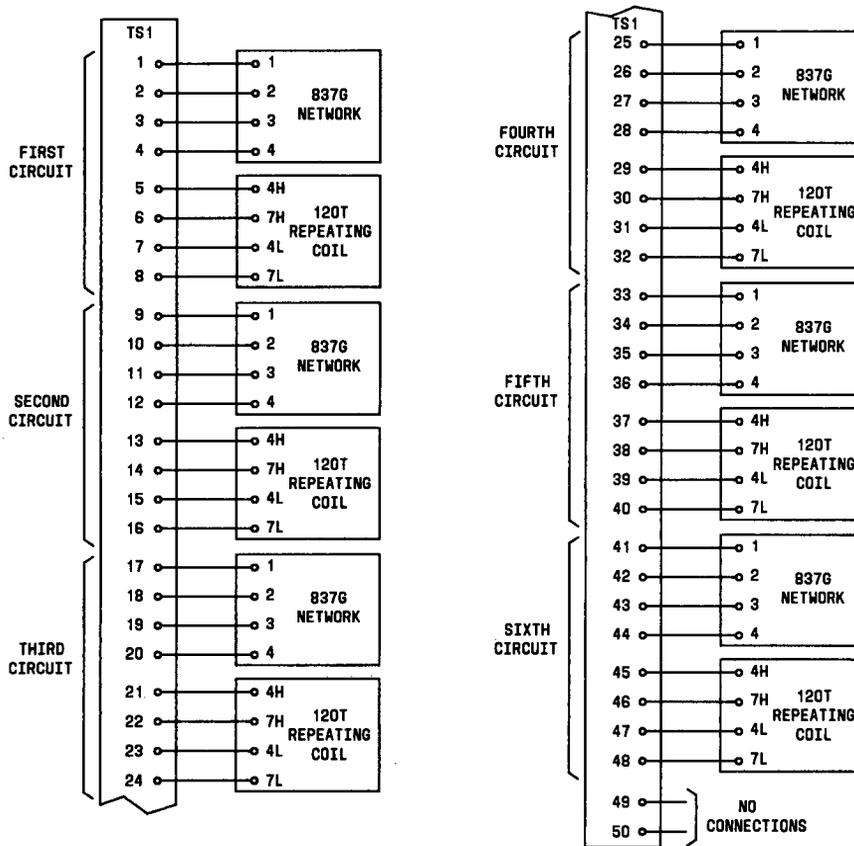


12.9.1 Mounting 837G network and 120T repeat coil on J99380B-1 apparatus panel

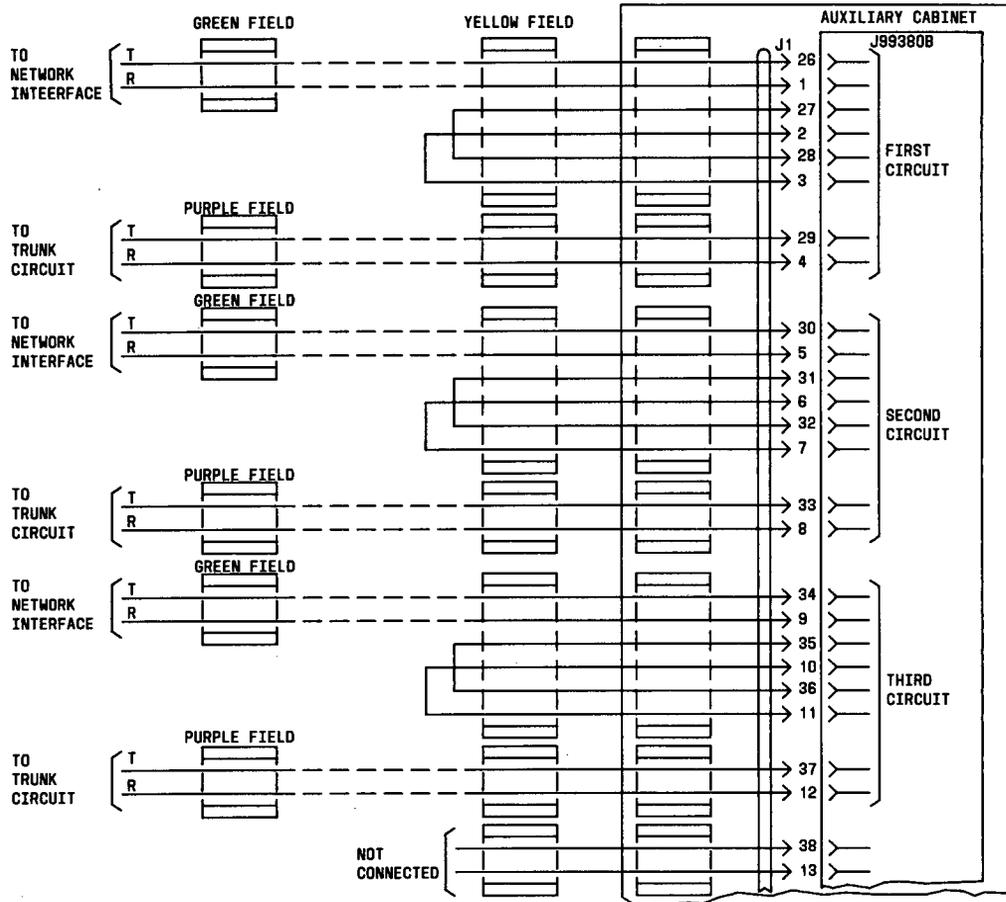


NOTE: CONNECT A 535DK CAPACITOR BETWEEN TERMINALS
3 AND 8 OF 120T REPEAT COIL

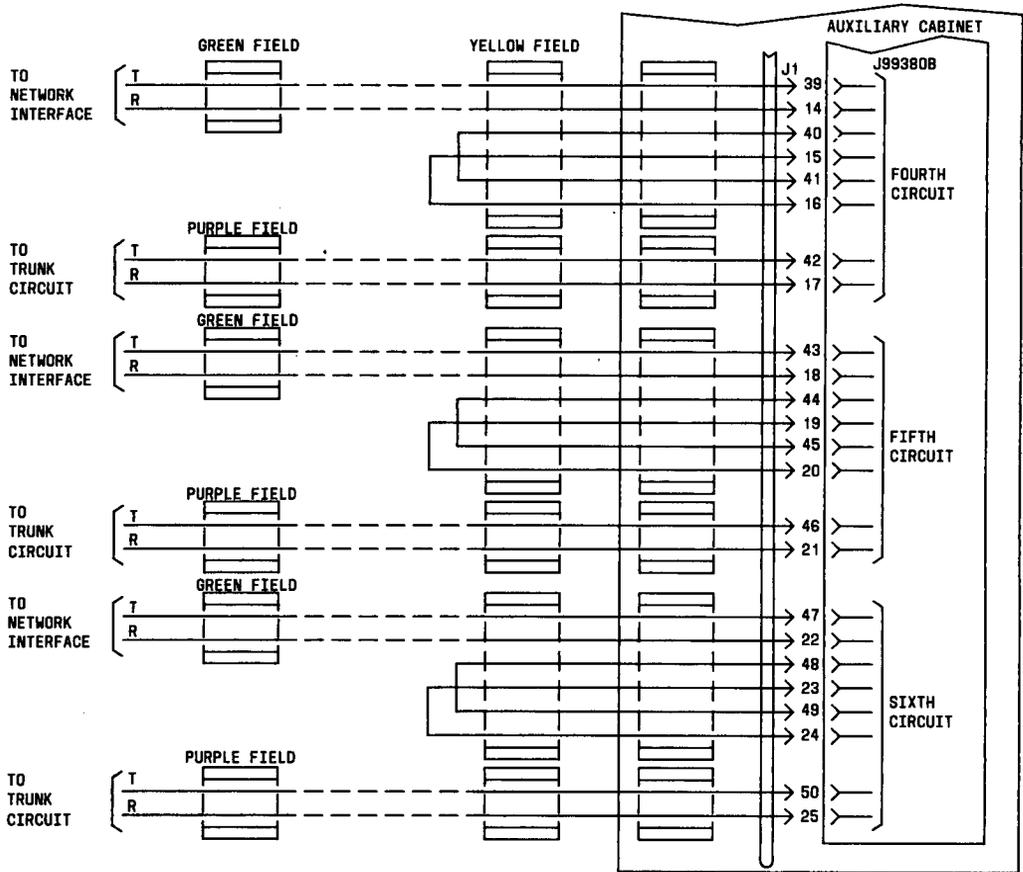
12.9.2 Wiring 837G networks and 120T repeating coils



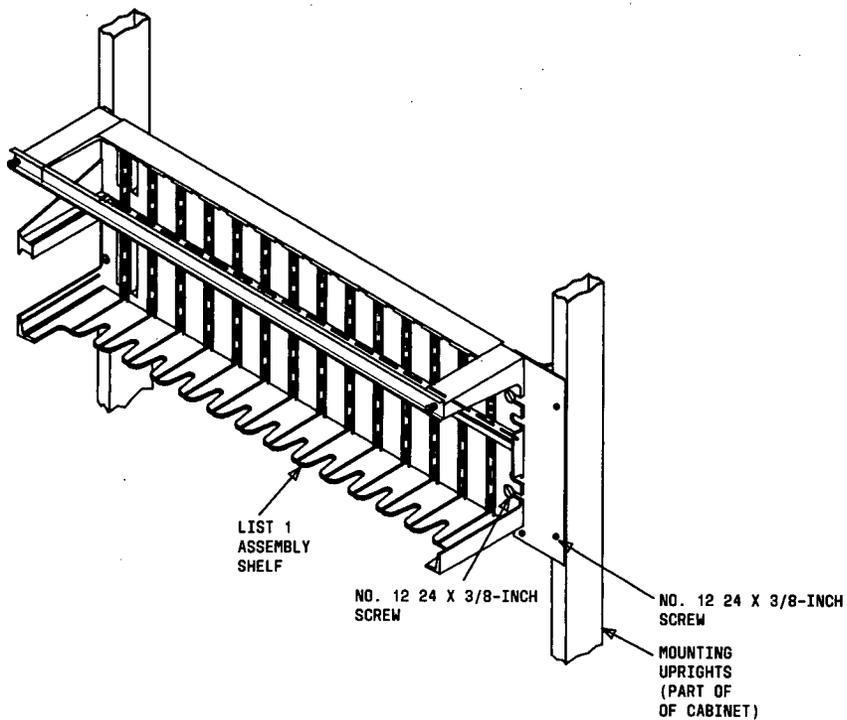
12.9.3 Connections between J1 connector and cross-connect field (Sheet 1 of 2)



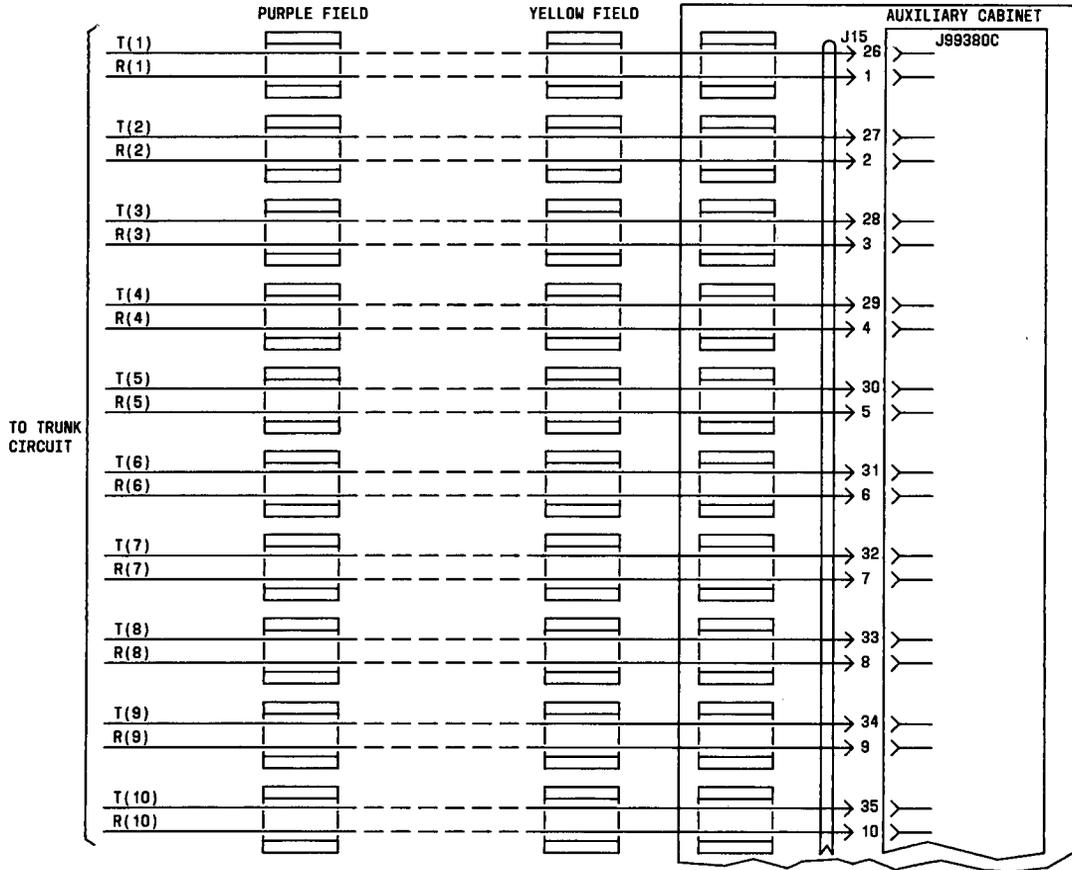
12.9.3 Connections between J1 connector and cross-connect field (Sheet 2 of 2)



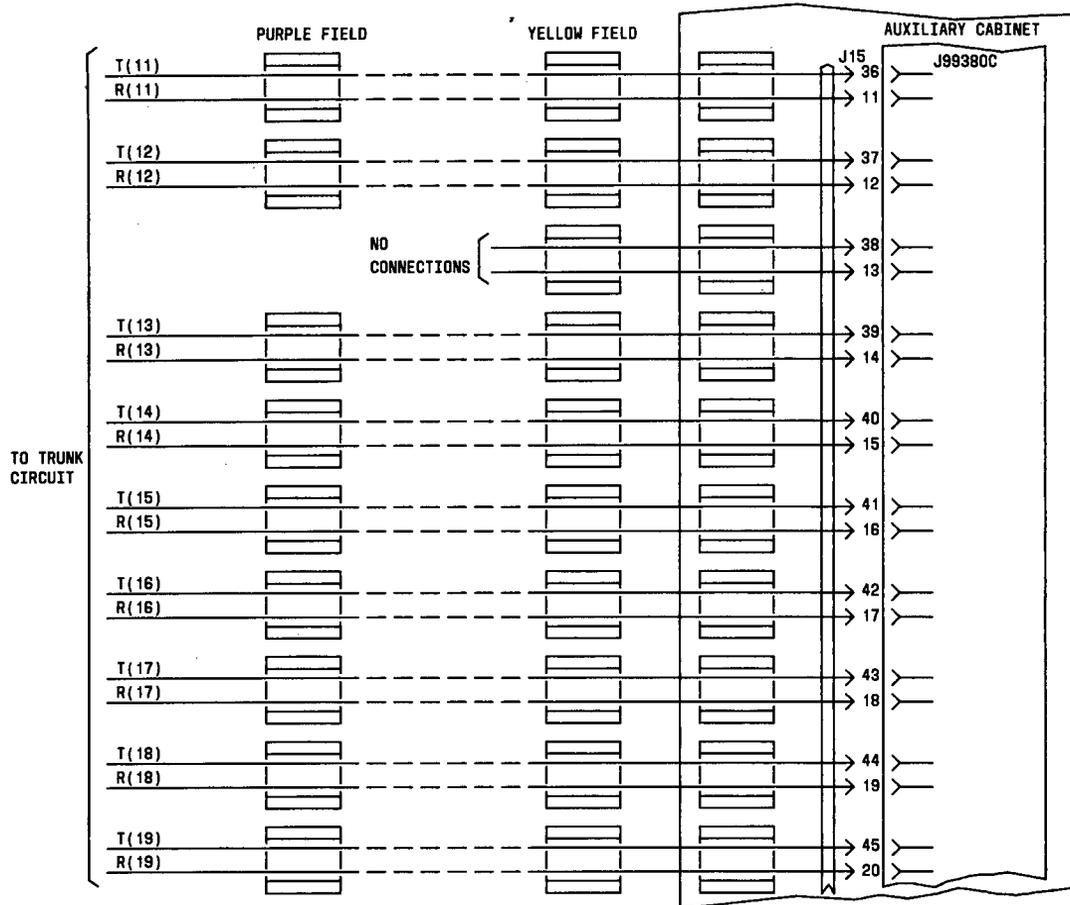
12.10 CPFT-Mounting Arrangement for J99380C-1 Shelf Assembly



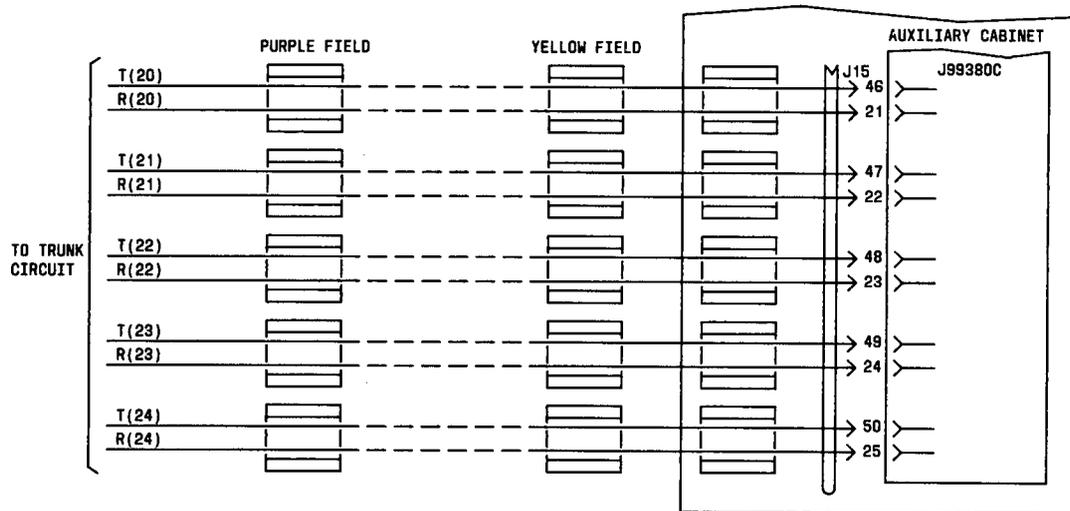
12.10.1 Connections from J15 connector and cross-connect field (Sheet 1 of 3)



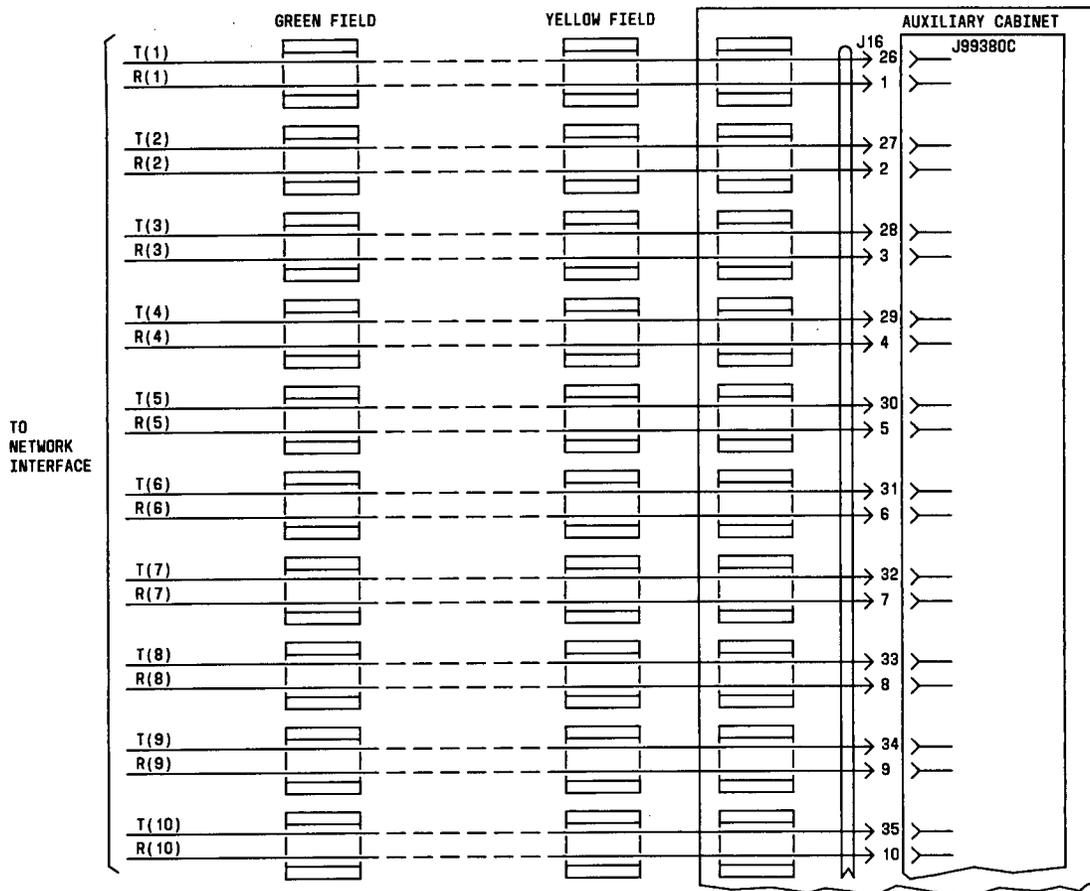
12.10.1 Connections between J15 connector and cross-connect field (Sheet 2 of 3)



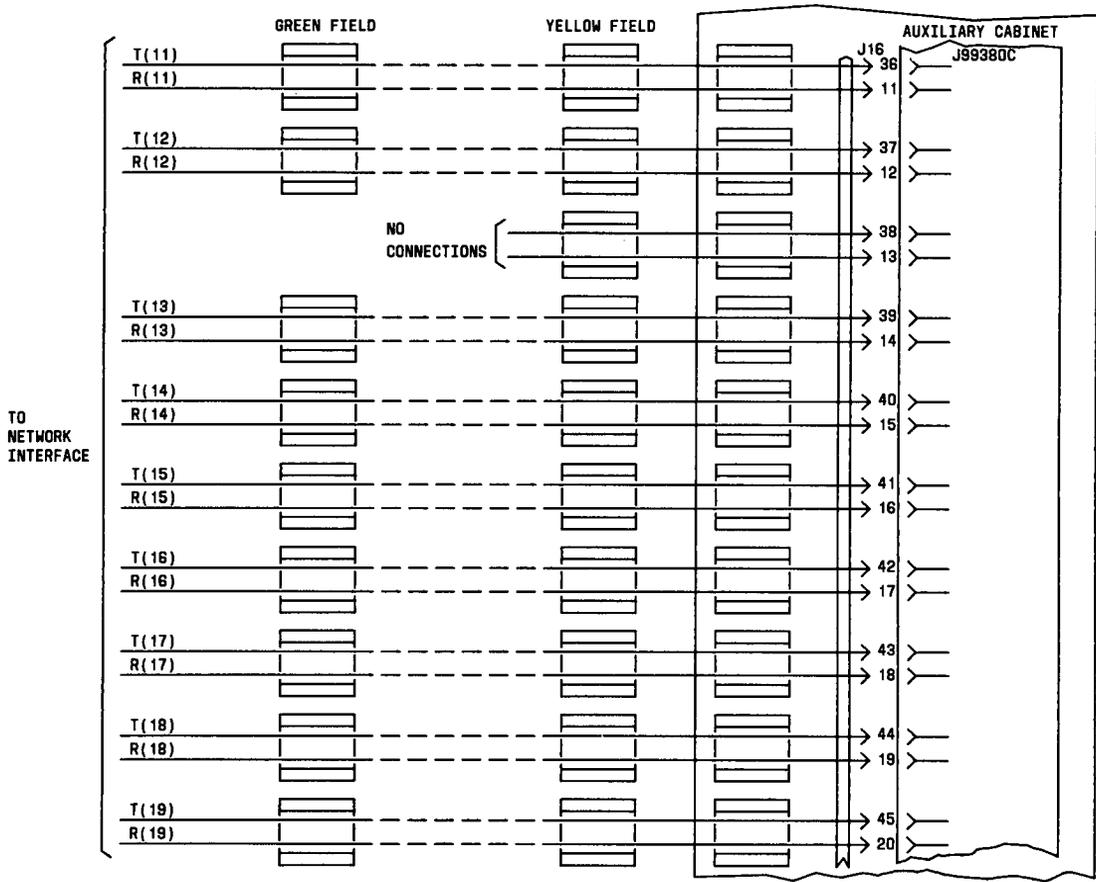
12.10.1 Connections between J15 connector and cross-connect field (Sheet 3 of 3)



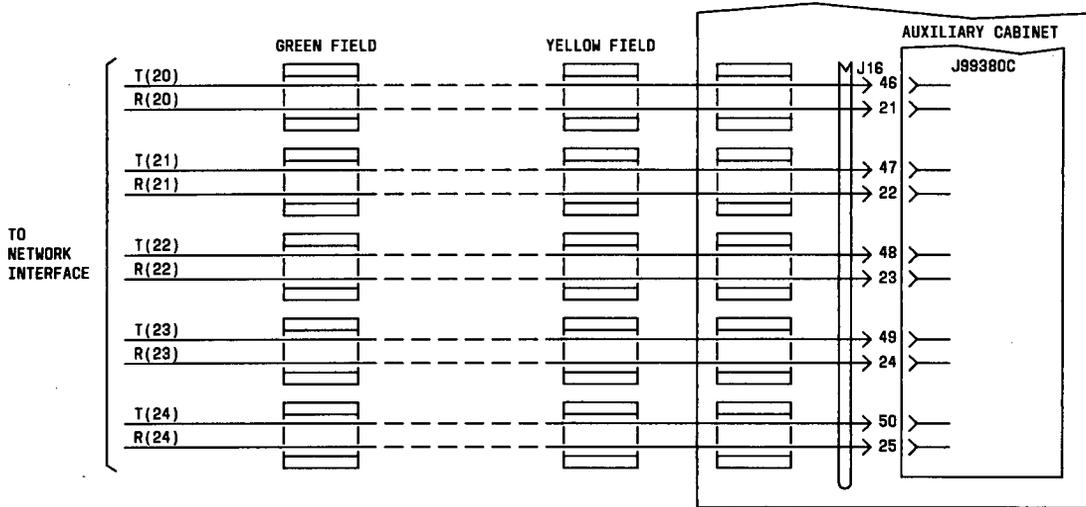
12.10.2 Connections between J16 connector and cross-connect field (Sheet 1 of 3)



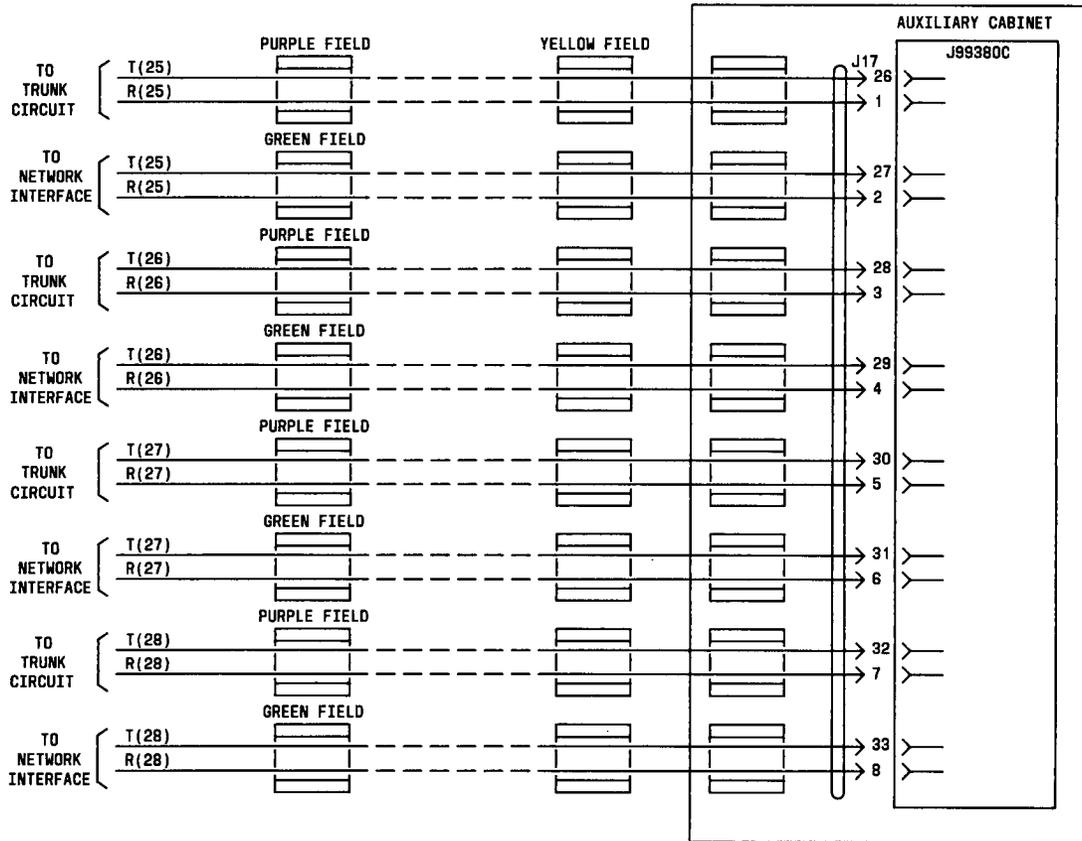
12.10.2 Connections between J16 connector and cross-connect field (Sheet 2 of 3)



12.10.2 Connections between J16 connector and cross-connect field (Sheet 3 of 3)



12.10.3 Connections between J17 connector and cross-connect field



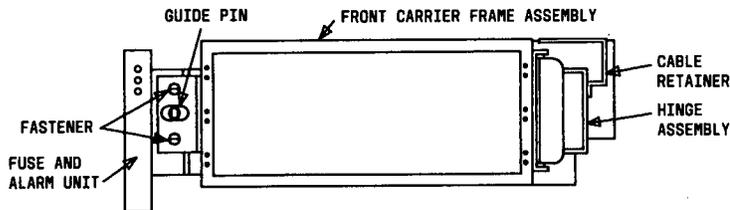
12.11 CPFT- Mounting Arrangements for the J99380D-1
Double Depth Shelf Assembly

12.11.1 Various combinations of shelf assemblies and mounting panels can be installed in the two sections of the J99380D-1, L1 double depth frame assembly. The following listing describes this capacity:

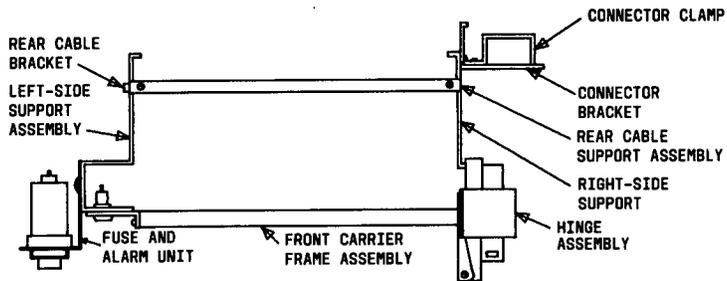
Front Section	Rear Section
(1) J99380A-1 or	(1) J99380C-1 or
(1) J99380C-1 or	(2) J99380B-1
(1) J99380E-1 or	
(2) J99380B-1	

12.11.2 Connections for the units installed in the double depth frame assembly are shown in the following paragraphs:

Unit	Paragraph
J99380A-1 Shelf Assembly	12.8
J99380B-1 Mounting Panel	12.9
J99380C-1 Shelf	12.10
J99380E-1 Shelf	12.12

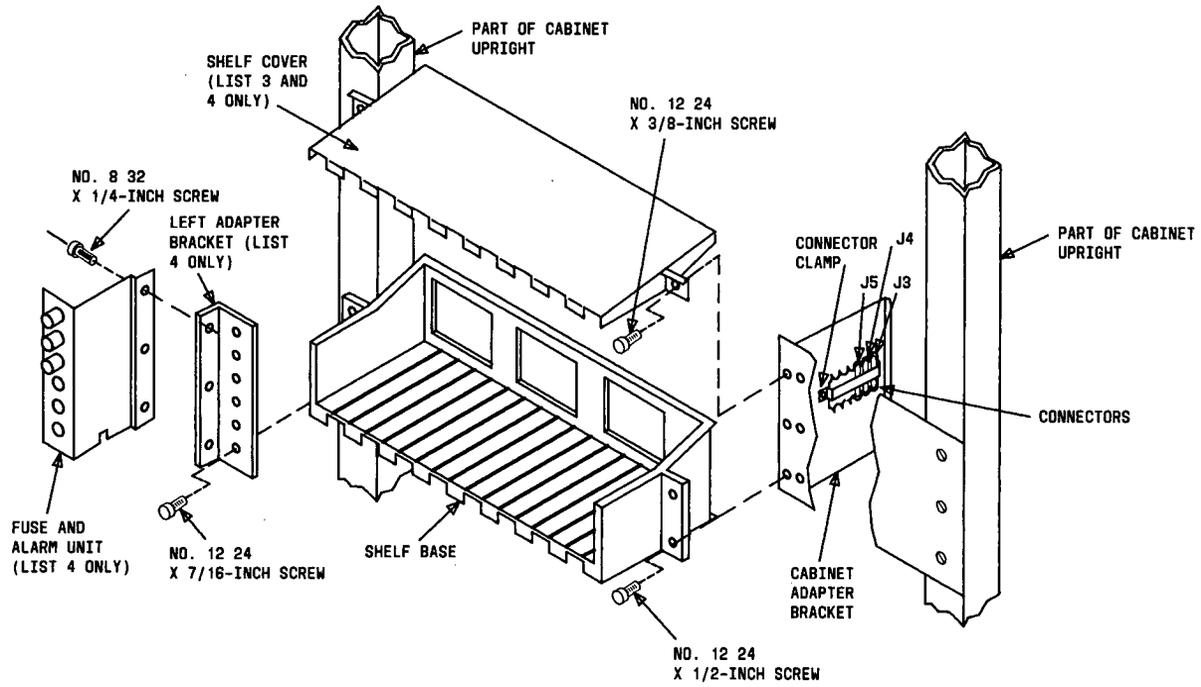


J99380D - Front View



J99380D - Top View

12.12 CPFT- Mounting Arrangement for the J99380E1, Shelf Assembly



12.12.1 Connections from shelf base to fuse and alarm unit

CONNECT FROM SHELF BASE TO FUSE AND ALARM UNIT					
LEAD	DESIGNATION	TO	LEAD	DESIGNATION	TO
Orange With One Red Stripe	GROUND A (1)	Terminal B on Alarm Fuse Block	Orange With Two Red Stripes	-48 V B (1)	Center Terminal on FA1 Fuse Block
Orange With One Red Stripe	GROUND B (1)		Orange With Two Red Stripes	-48V A (2)	Center Terminal on FA2 Fuse Block
Orange With One Red Stripe	GROUND A (2)		Orange With Two Red Stripes	-48 V B (2)	
Orange With One Red Stripe	GROUND B (2)		Red-Brown	20 Hz	RL1 Resistance Lamp
Orange With Two Red Stripes	-48V A (1)	Center Terminal On FA1 Fuse Block	Red-Brown	SRS	

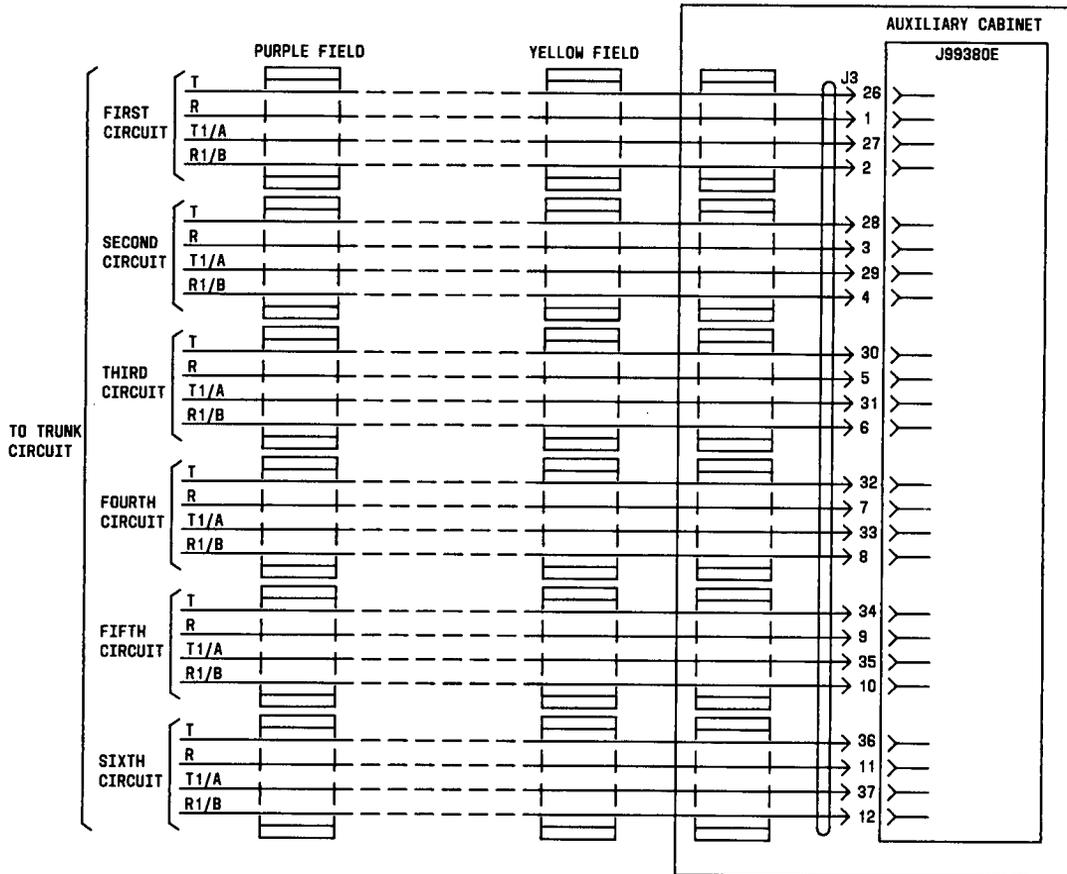
12.12.2 Connections from associated fuse and alarm unit

DESIGNATION	CABLE	CONNECT TO
-48 V	Slate	Terminal 2, 3, or 4 of TSI
GROUND	Slate-Black	Terminal 7, 8, or 9 of TSI
ALARM	Connector Cable PF00	Fuse alarm bus which connects to terminal 3 of connector PFUSE

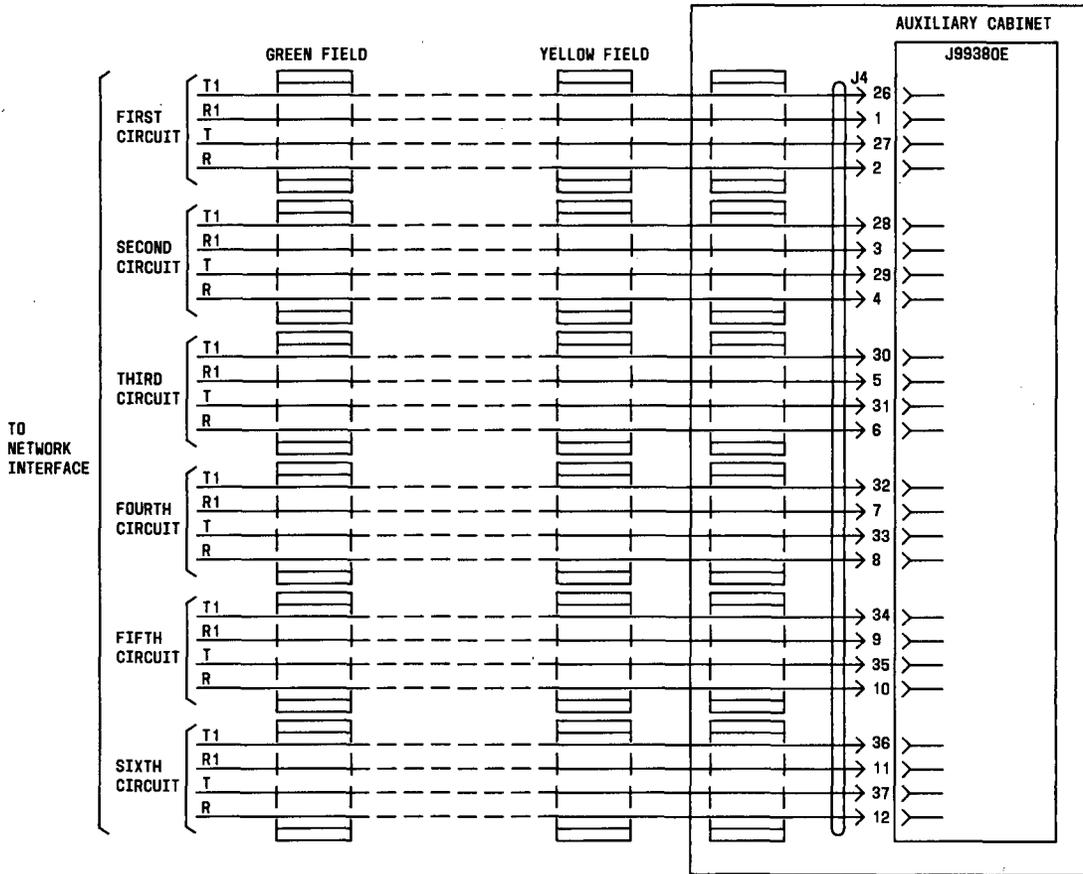
12.12.3 Connections for ringing leads

DESIGNATION	LEAD	CONNECT TO
20 Hz	Red-Brown	Terminal 1, 2, 3, or 4 of TS3 on frequency generator and interrupter unit
RG	Brown	Terminal 5, 6, 7, or 8 of TS3 on frequency generator and interrupter unit

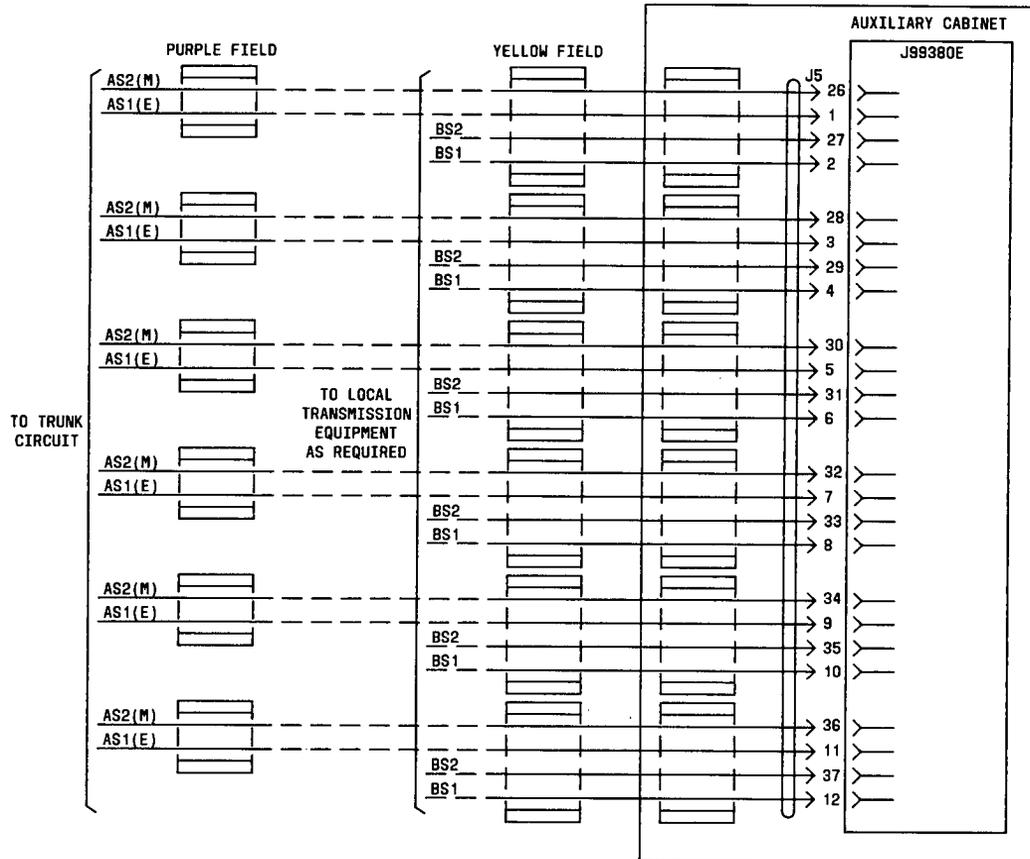
12.12.4 Connections between J3 connector and cross-connection field



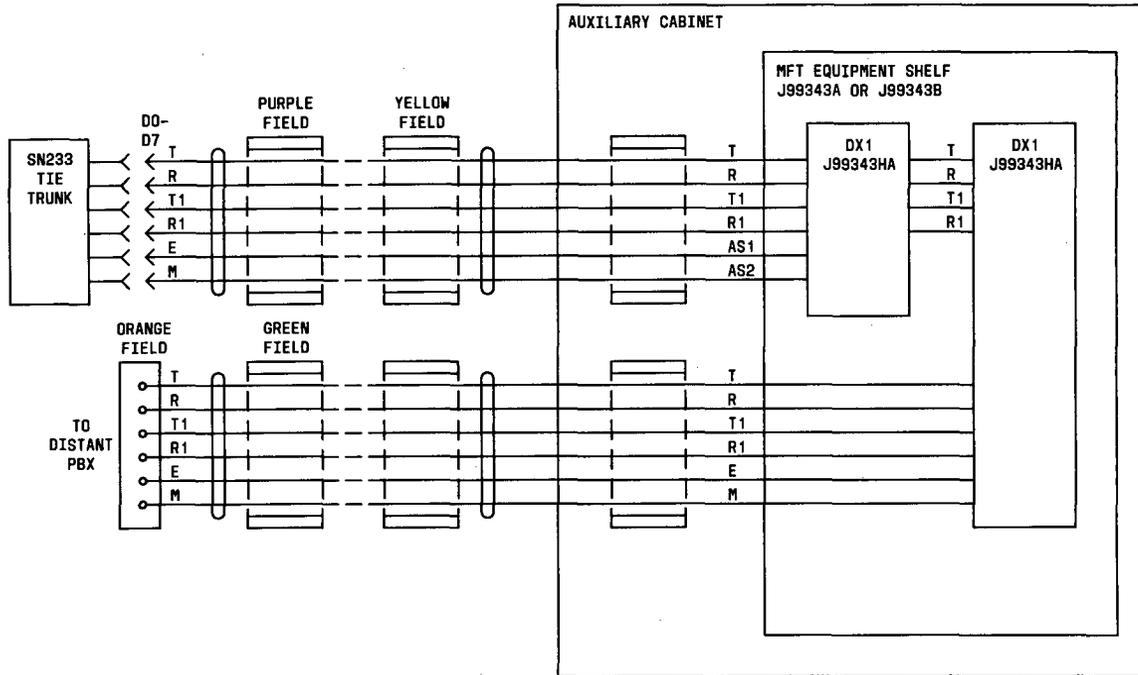
12.12.5 Connections between J4 connector
and cross-connect field



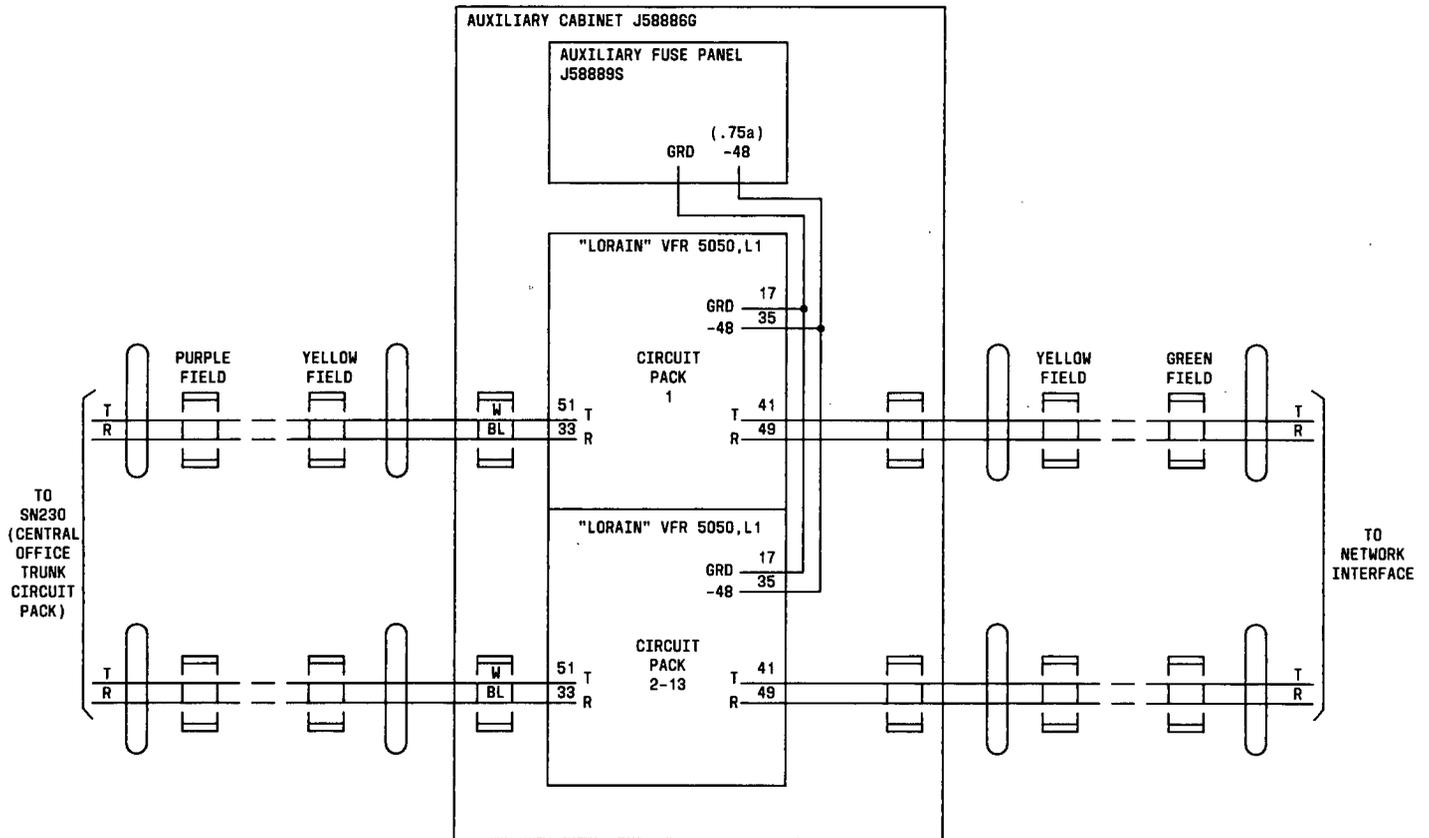
12.12.6 Connections between J5 connector
and cross-connect field



12.13 Metallic Facility Terminal (MFT)
 DX1-DX2, 4-Wire to 4-Wire Repeater

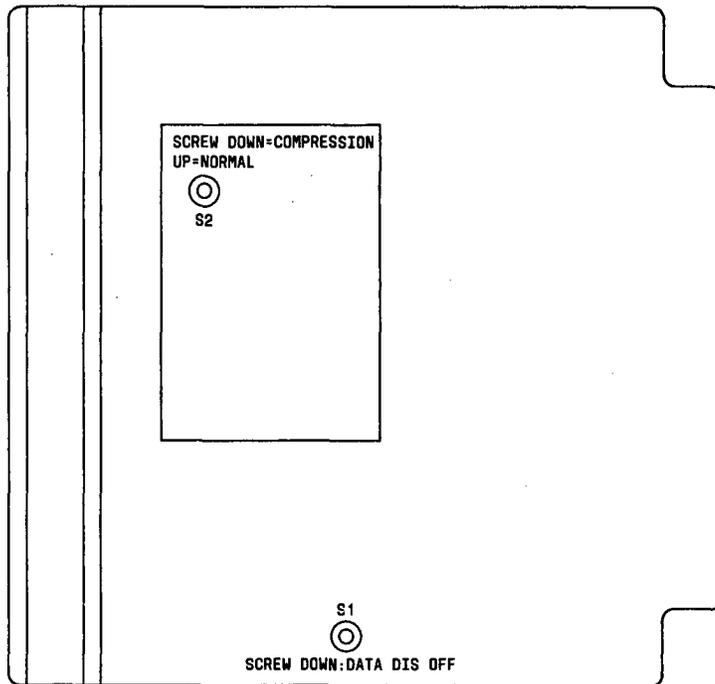
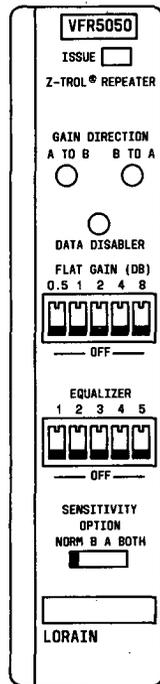


12.14 LORAIN Voice Switched Amplifier Connections

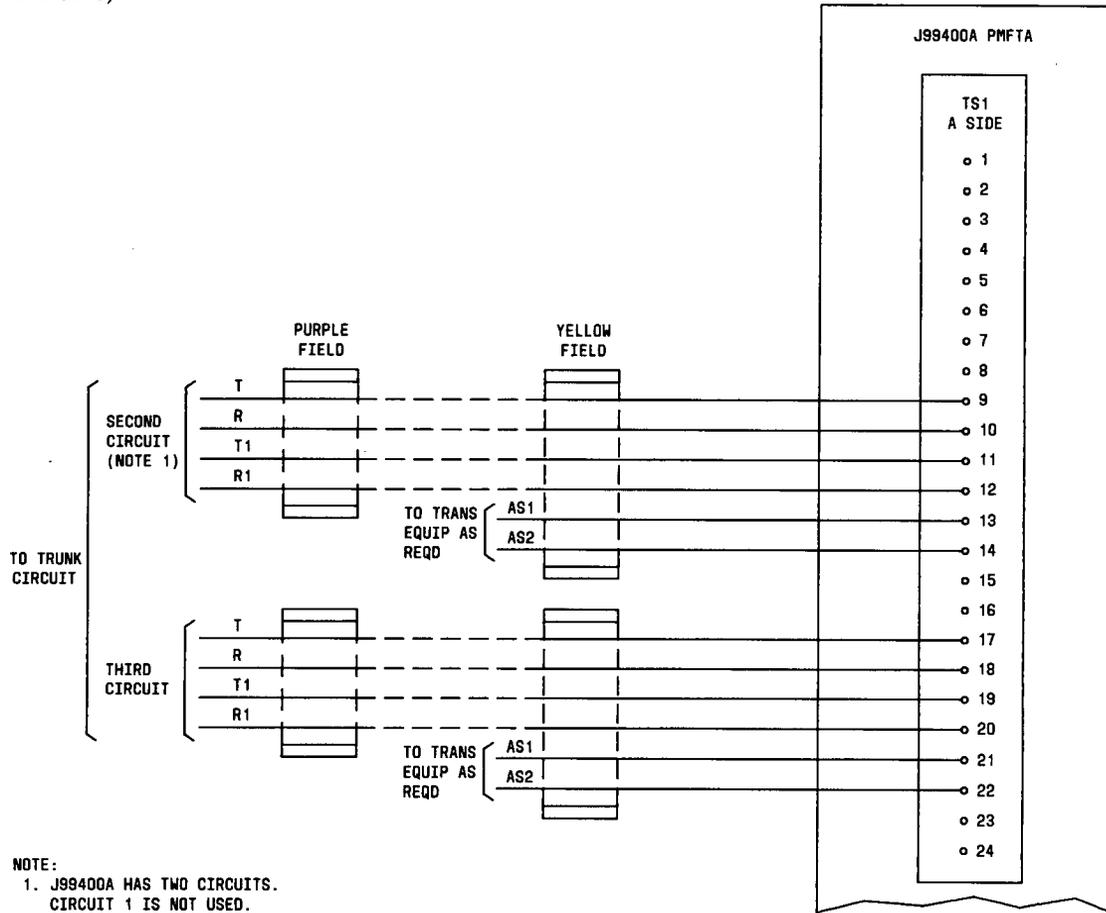


12.14.1 LORAIN voice gain amplifier switch settings

LORAIN Voice Gain Amplifier	
Flat Gain	Switch Setting
12dB	.5, 1, and 2 off; 4 and 8 on
8dB	.5, 1, 2, and 4 off; 8 on
Equalizer	1, 2, 3, 4, and 5 off
Sensitivity	Norm
Screws S1 and S2	Up position

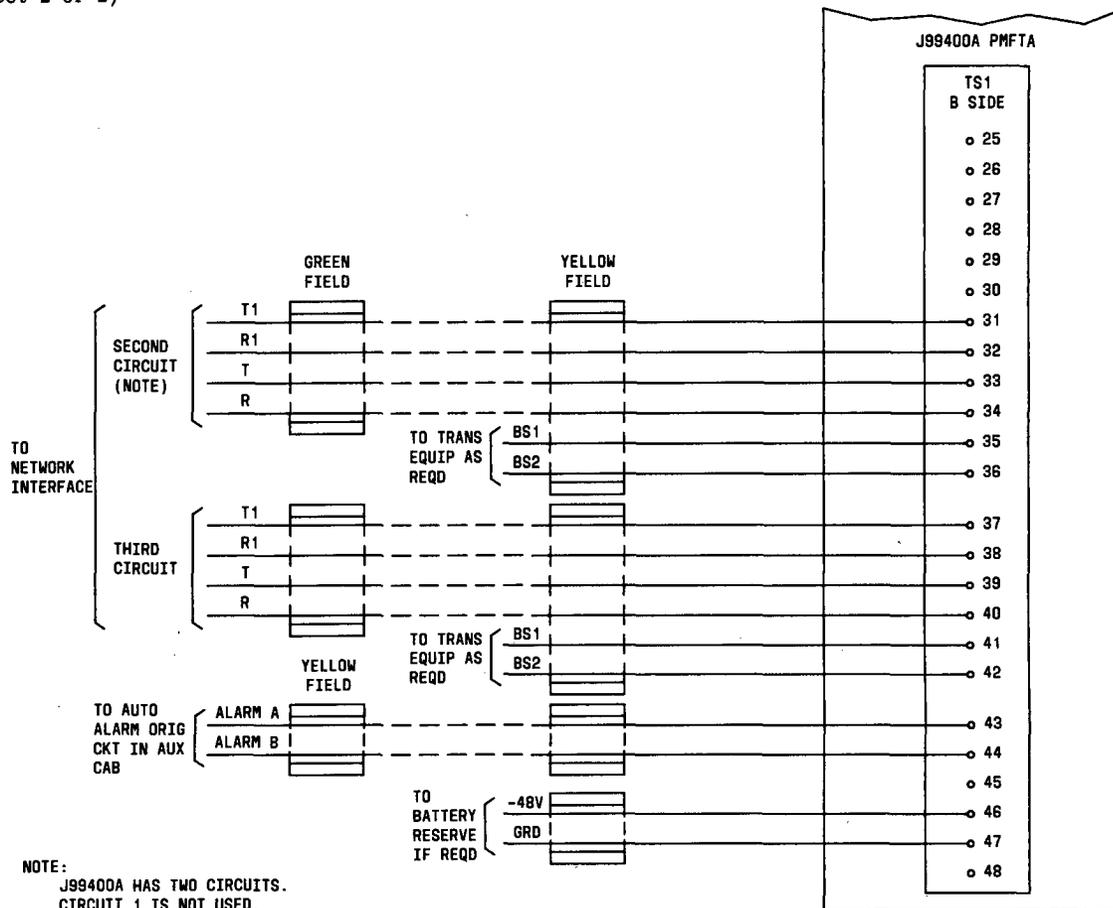


12.15 PMFTA - Connections for J99400A
 (Sheet 1 of 2)



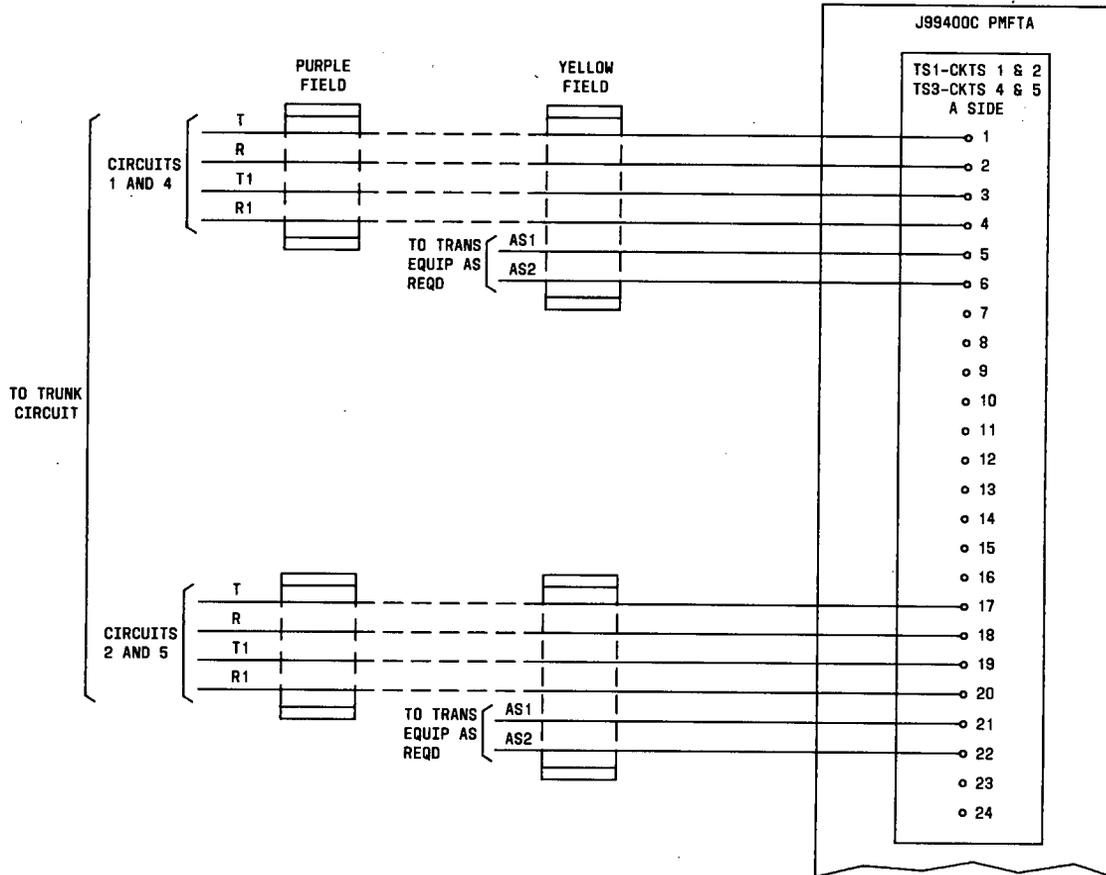
NOTE:
 1. J99400A HAS TWO CIRCUITS.
 CIRCUIT 1 IS NOT USED.

12.15 PMFTA - Connections for J99400A
 (Sheet 2 of 2)

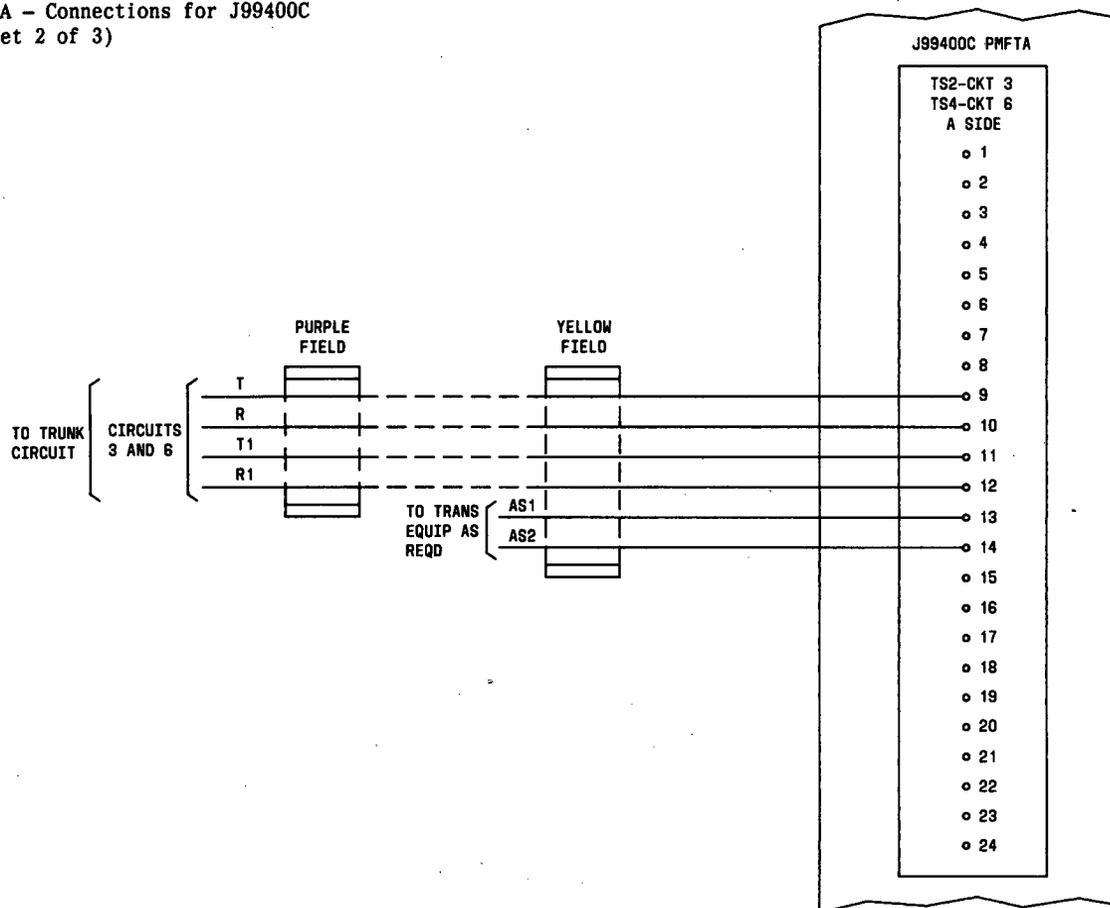


NOTE:
 J99400A HAS TWO CIRCUITS.
 CIRCUIT 1 IS NOT USED.

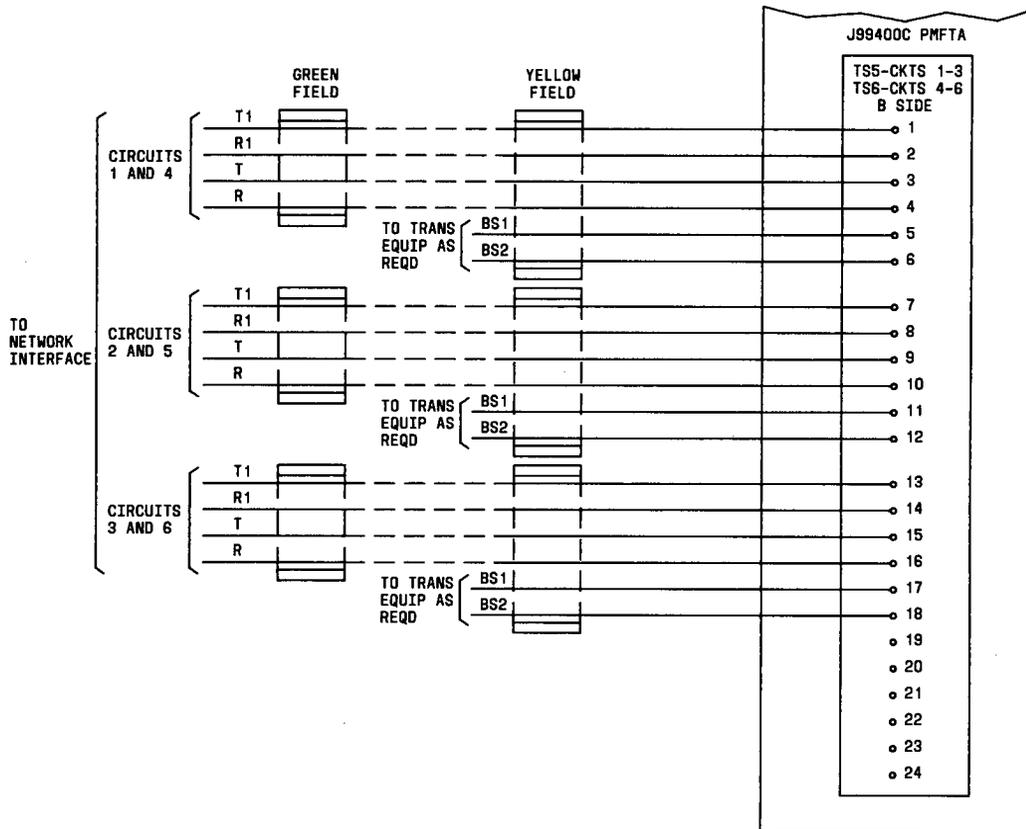
12.16 PMFTA - Connections for J99400C
 (Sheet 1 of 3)



12.16 PMFTA - Connections for J99400C
(Sheet 2 of 3)



12.16 PMFTA - Connections for J99400C
 (Sheet 3 of 3)



12.17 PMFTA - Connections for J99400D
 (Sheet 1 of 2)

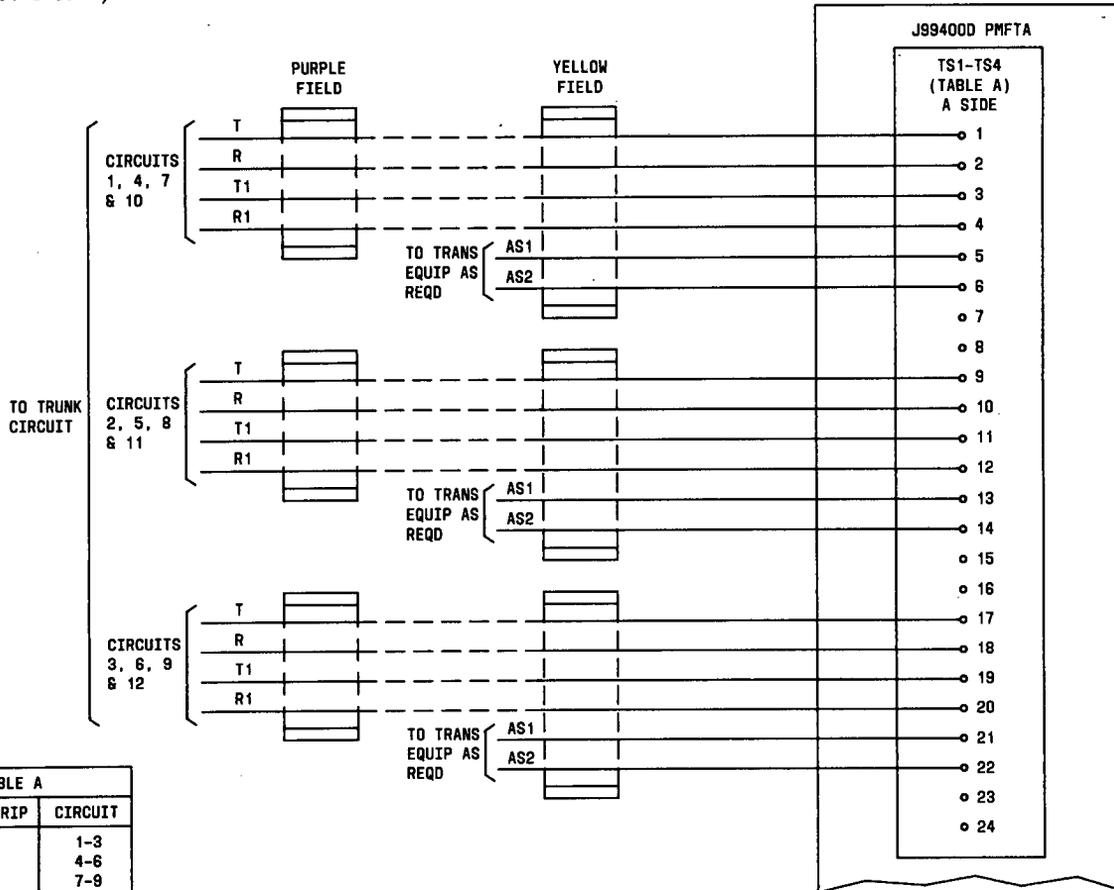


TABLE A	
TERMINAL STRIP	CIRCUIT
TS1	1-3
TS2	4-6
TS3	7-9
TS4	10-12

12.17 PMFTA - Connections for J99400D
(Sheet 2 of 2)

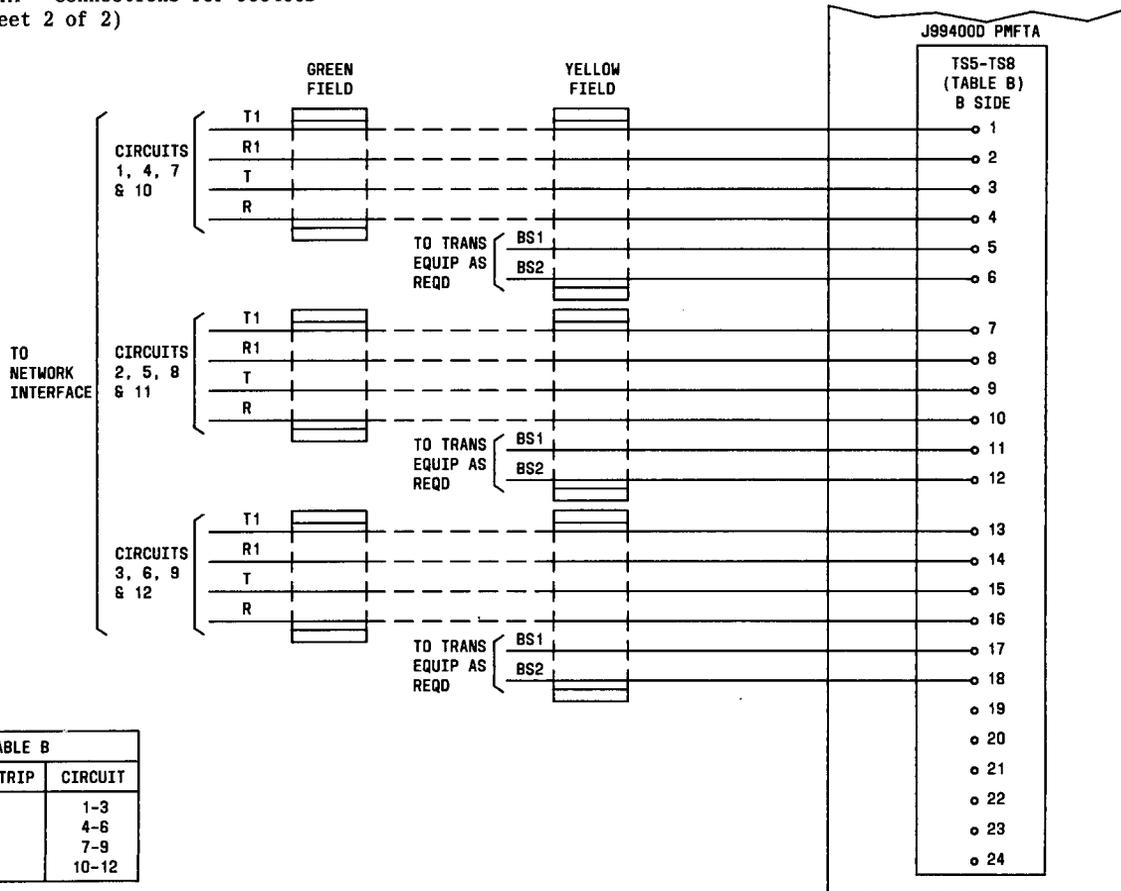


TABLE B	
TERMINAL STRIP	CIRCUIT
TS5	1-3
TS6	4-6
TS7	7-9
TS8	10-12

12.18 PMFTA - Connections for J99400E
 (Sheet 1 of 2)

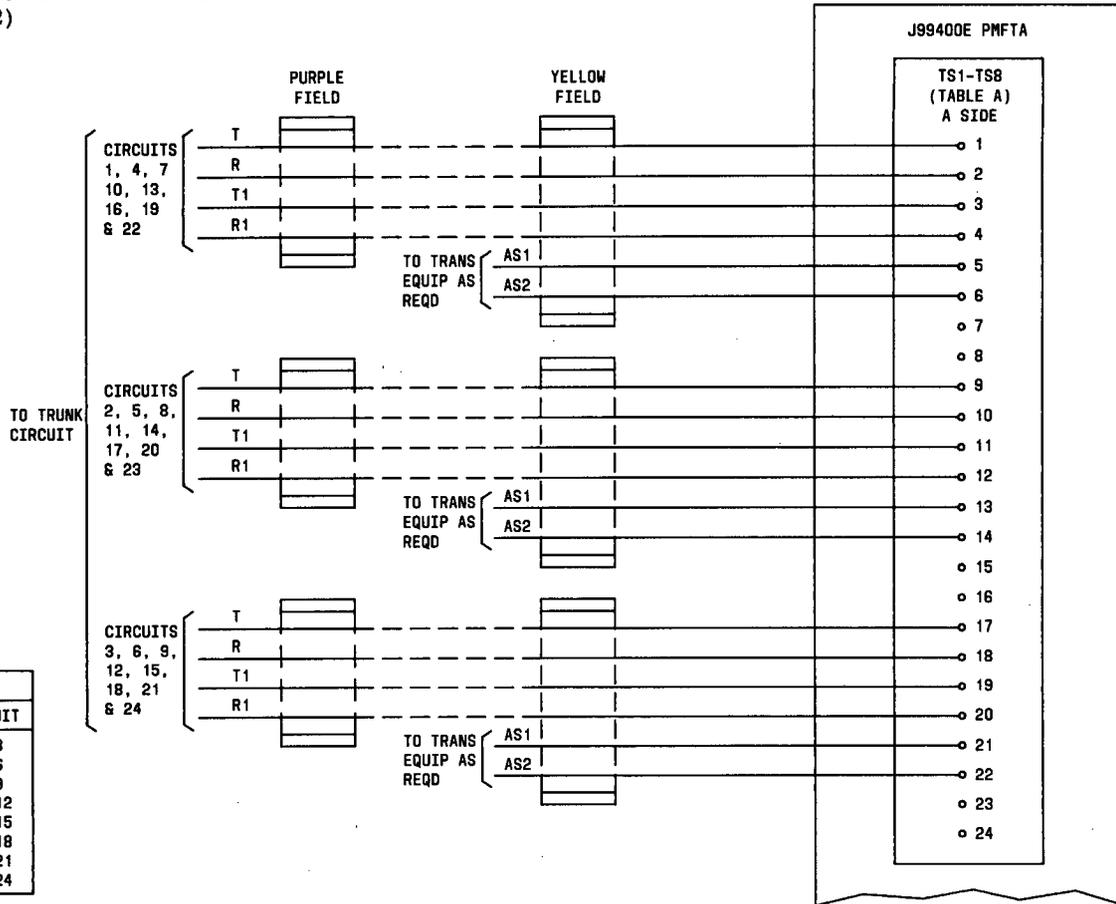


TABLE A	
TERMINAL STRIP	CIRCUIT
TS1	1-3
TS2	4-6
TS3	7-9
TS4	10-12
TS5	13-15
TS6	16-18
TS7	19-21
TS8	22-24

12.18 PMFTA - Connections for J99400E
 (Sheet 2 of 2)

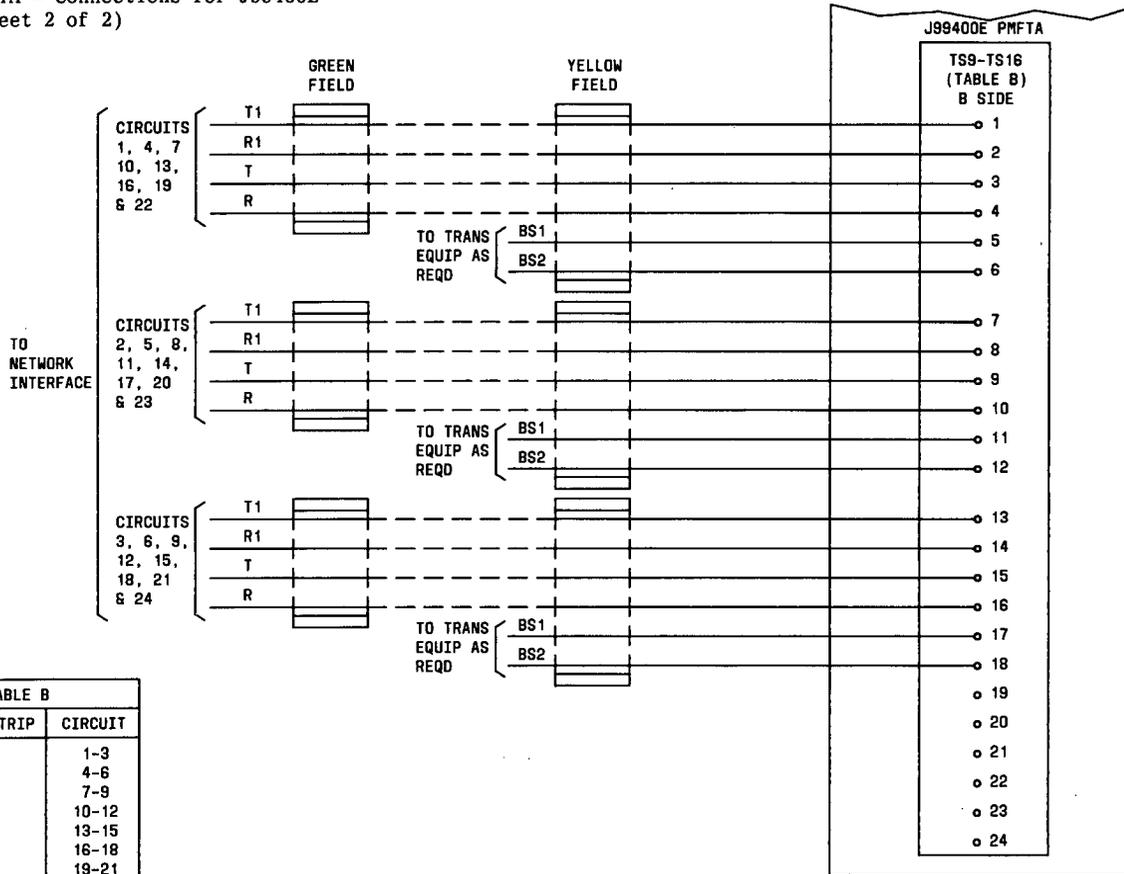
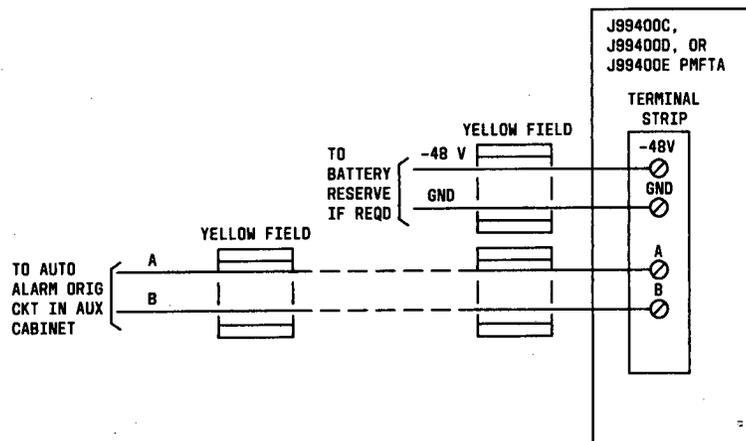


TABLE B	
TERMINAL STRIP	CIRCUIT
TS 9	1-3
TS10	4-6
TS11	7-9
TS12	10-12
TS13	13-15
TS14	16-18
TS15	19-21
TS16	22-24

12.19 PMFTA - Power Alarm and Battery Reserve
Connections for J99400C, J99400D, or J99400E



PART 13. Data Equipment

CONTENTS

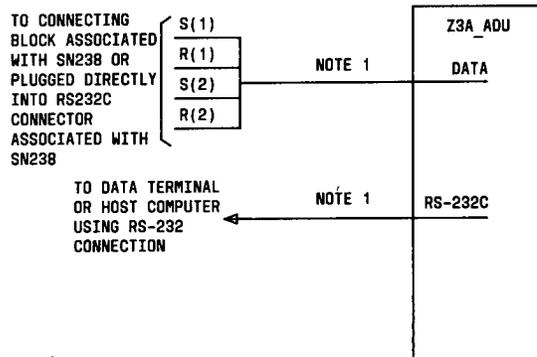
Asynchronous Data Unit Z3A_	13.1
Business Communications Terminal	13.2
BCT513	
BCT515	
Data Connections to the Switch	13.4
Data Modules	13.5
PDM	
MPDM	
TDM	
MTDM	
DTDM	
Data Modules - 3270 Type Proton Converters	13.6
EIA-RS-232-C Connections	13.7
Multiple Asynchronous Data Unit (MADU)	13.8
PC6300/7300 Connections to System 85	13.9

13.1 Asynchronous Data Unit (ADU) Z3A_

13.1.1 The ADU (Z3A_) is a Data Communications Equipment device that allows direct connection between RS-232C equipment and the System 85. The ADU interfaces with the SN238 in the System 85. The ADU can be mounted in the auxiliary cabinet, a satellite closet, to a wall or cabinet by use of a velcro strip, or plugged directly into RS-232 connector (Z3A2 only).

13.1.2 ADU connections

(See Part 9, paragraph 9.2.9 for connections and terminations.)



NOTE 1: The four models of the ADU have different connection/cables. These are given in this table

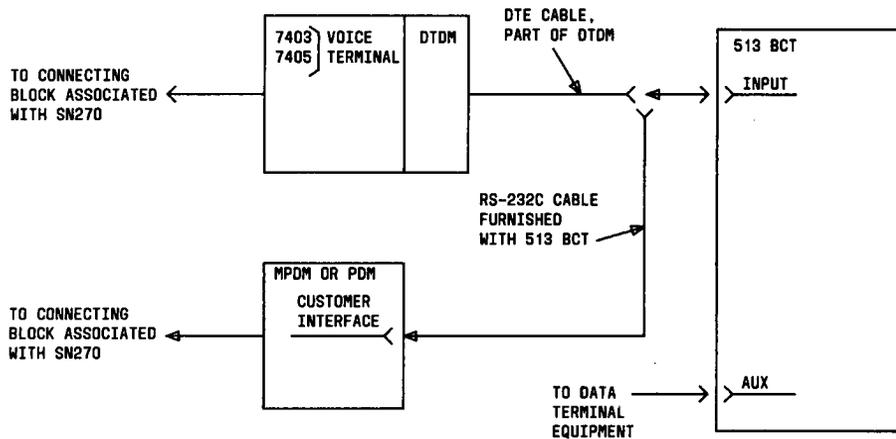
ADU (Z3A) MODELS

MODEL CODE	RS-232C CONNECTOR	DATA CONNECTOR
Z3A1	25-pin plug on 3-ft. cable	Modular
Z3A2	25-pin plug no cable	Modular
Z3A3	"110" patch cord	"110" patch cord
Z3A4	25-pin receptacle on 3-ft. cable	Modular

13.2 Business Communications Terminals (BCT)

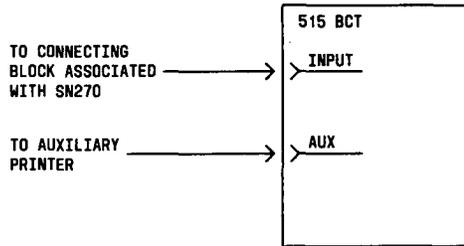
13.2.1 513 BCT connections

(See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



13.2.2 515 BCT connections

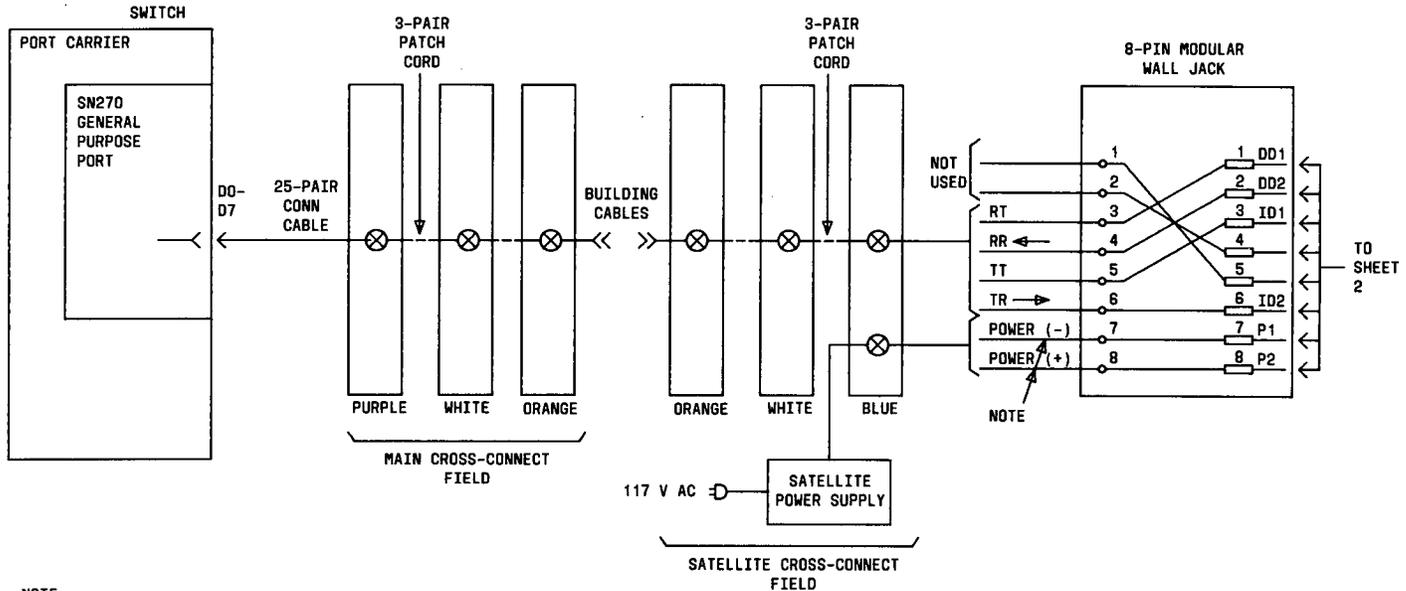
(See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



13.4 Data Connections to Switch

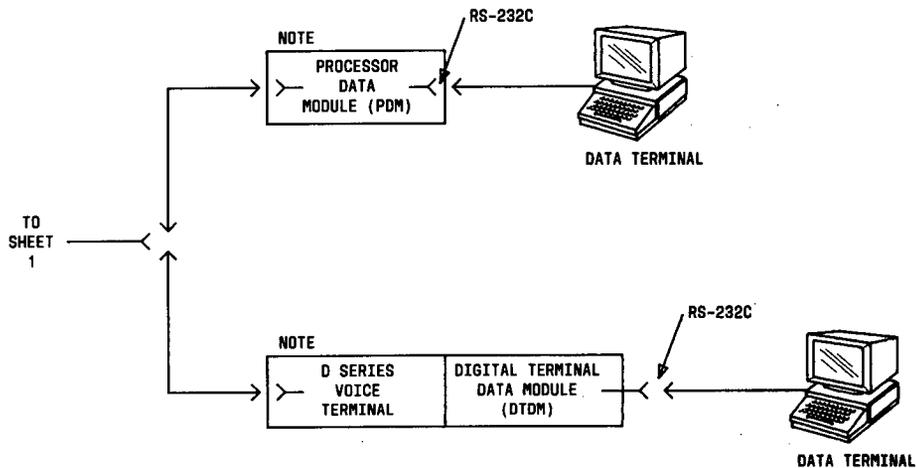
13.4.1 Digital voice terminal and data terminal connections to switch (Sheet 1 of 2)

(See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



NOTE:
POWER LEADS ARE NOT CONNECTED TO
PROCESSOR DATA MODULE (PDM).

13.4.1 Digital voice terminal and data terminal connections to switch (Sheet 2 of 2)

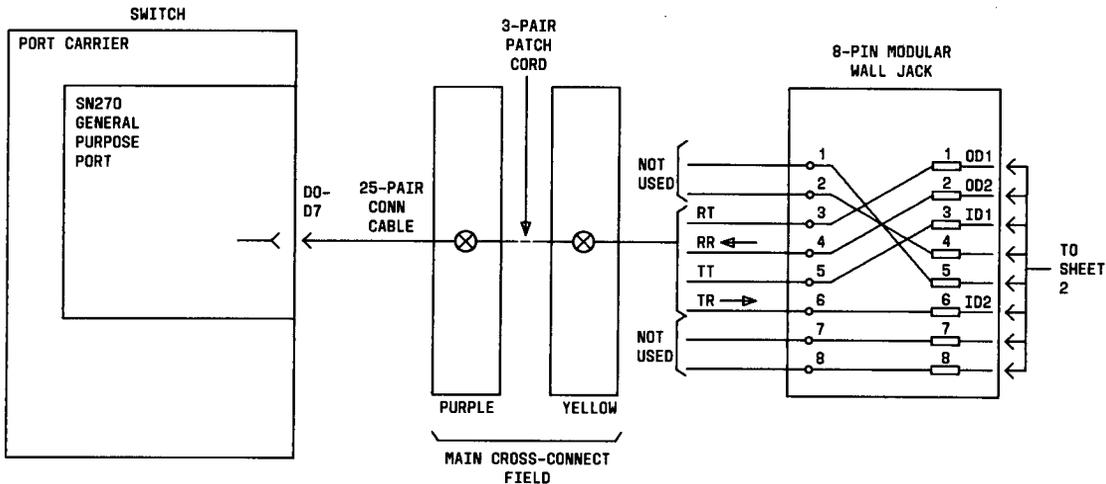


NOTE: CONNECTION INFORMATION FOR THE PDM AND DTDM IS IN PART 11.19 OF THIS MANUAL.

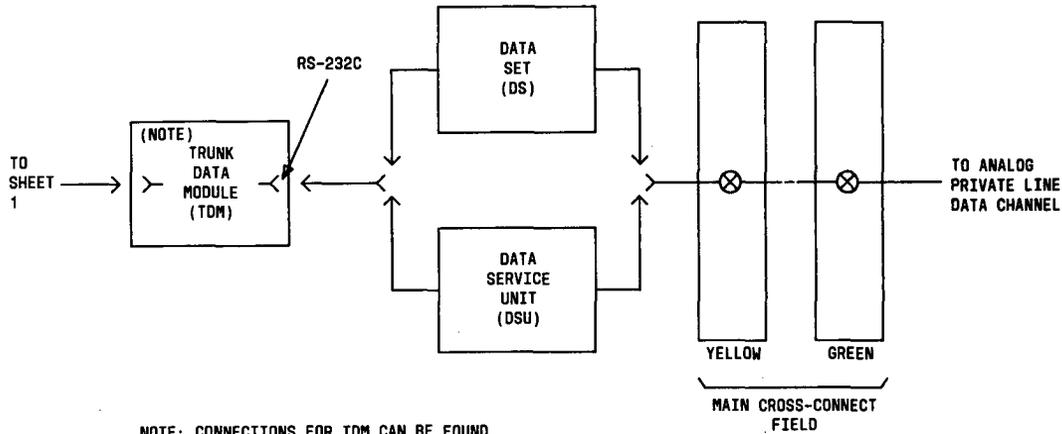
13.4.2 Data channel connection to switch

(Sheet 1 of 2)

(See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



13.4.2 Data channel connection to switch
(Sheet 2 of 2)



NOTE: CONNECTIONS FOR TDM CAN BE FOUND
IN PART 13.5 OF THIS MANUAL.

13.5 Data Modules – PDM, MPDM, TDM, MTDM, DTDM

13.5.1 Processor data module (PDM) installation and connections

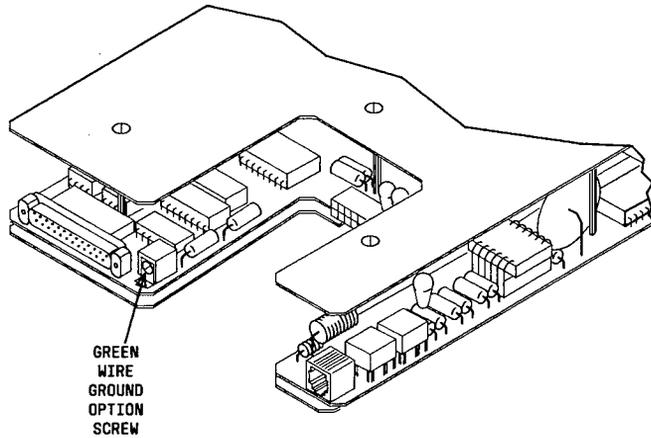
13.5.1.1 The PDM (DSU700A) is a Data Communications Equipment (DCE) type equipment that allows Data Terminal Equipment (DTE) and computer systems within the System 85 environment to access the system data switching capabilities.

13.5.1.2 Stand-alone configurations and multiple-mounting configurations are available. In the multiple-mounting configuration (in a rack that holds eight data modules), the faceplate is reversed to display panel callouts for vertical mounting.

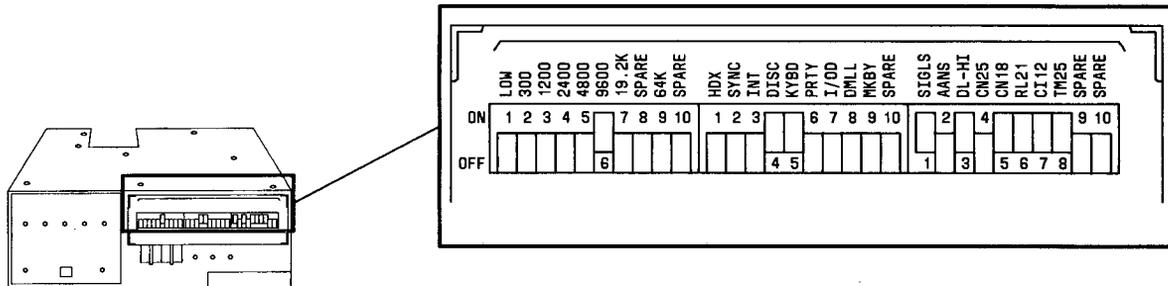
13.5.1.3 Options

13.5.1.3.1 To set the signal ground to frame connection option, the PDM must be removed from the mounting. For use with the System 85, the frame ground and the signal grounds are isolated. To isolate the grounds, the option screw should be loosened (not making contact). The option screw is shown in paragraph 13.5.1.3.2.

13.5.1.3.2 Signal ground to frame ground connection option switch location



13.5.1.3.3 Located behind the front cover in the upper right-hand corner of the faceplate is a panel of 30 switches - 25 for option and 5 for spares.



13.5.1.3.4 Option settings (Sheet 1 of 2)

SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
LOW *	ON	Low-speed
	OFF	-
300 *	ON	300
	OFF	-
1200 *	ON	1200
	OFF	-
2400 *	ON	2400
	OFF	-
4800 *	ON	4800
	OFF	-
9600 *	ON	9600
	OFF	-
19.2 Kb/s *	ON	19.2 Kb/s
	OFF	-
64 Kb/s *	ON	64 Kb/s (HDX switch must be OFF)
	OFF	-
HDX	ON	Half-duplex
	OFF	Full-duplex
SYNC	ON	Synchronous operation
	OFF	Asynchronous operation
INT	ON	Internal timing
	OFF	External timing (SYNC must be ON)
DISC	ON	Long space signal (SYNC must be OFF)
	OFF	-
KYBD	ON	ASCII dialing enabled
	OFF	ASCII dialing disabled

* More than one switch can be set ON at a time. The PDM and its data module will select the highest common speed.

13.5.1.3.4 Option settings (Sheet 2 of 2)

SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
PRTY	NOTE 1	
	NOTE 1	
1/OD	NOTE 1	
	NOTE 1	
DMLL	ON	Data set ready lead on during local loop testing
	OFF	
MKBY	ON	PDM looks busy in self-test and local loop test
	OFF	
SIGLS	ON	Signal loss disconnect feature
	OFF	
AANS	ON	Automatic answer feature enables
	OFF	Automatic answer feature disables
DL-HI	ON	PDM will dial at highest speed selected
	OFF	Dials according to CH input
CN25 *	ON	EIA CN lead connected to pin 25
	OFF	EIA CN lead not connected to pin 25
CN18 *	ON	EIA CN lead connected to pin 18
	OFF	EIA CN lead not connected to pin 18
RL21	ON	EIA Remote Loop Circuit lead connected to pin 21
	OFF	EIA Remote Loop Circuit lead not connected to pin 21
CI12	ON	EIA CI lead connected to pin 12
	OFF	EIA CI lead not connected to pin 12
TM25 *	ON	EIA CI lead connected to pin 25
	OFF	EIA CI lead not connected to pin 25

* Only one of these three switches may be in the ON position at one time.

NOTE:

1. Select one of the four parity types using the PRTY and 1/OD switches.

PARITY	PRTY SETTING	1/OD SETTING
EVEN	ON	OFF
ODD	ON	ON
ZERO	OFF	OFF
ONE	OFF	ON

13.5.1.4 Installation

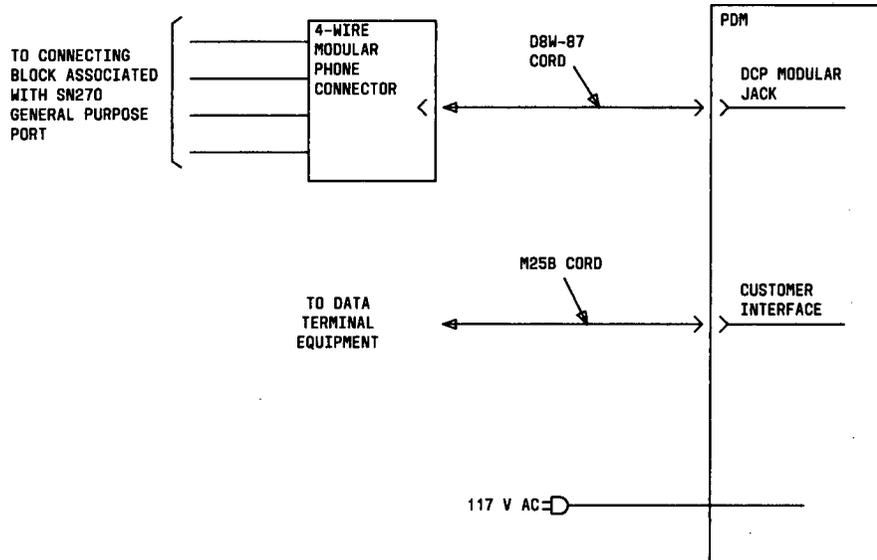
13.5.1.4.1 Stand-alone installation

13.5.1.4.1.1 Ensure that faceplate is turned for horizontal operation.

Open the magnetically latched front cover. Align the circuit pack with the extruded rails on the stand-alone mounting. Slide the circuit pack in the mounting until the circuit pack latch handle is flush with the front edge of the mounting. Replace the rear cover if necessary.

13.5.1.4.1.2 Stand-alone connection

(See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



13.5.1.4.2 Multiple-mount installation

13.5.4.4.2.1 Ensure that faceplate is turned for vertical operation.

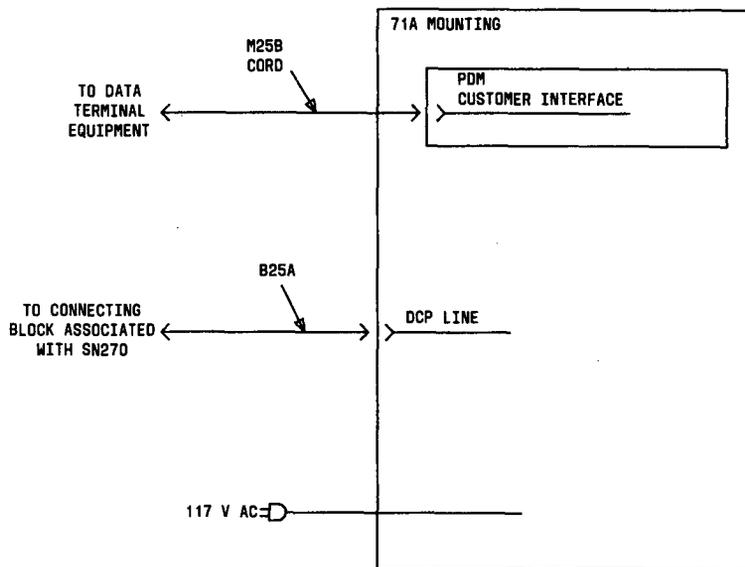
Open the mechanically hinged front panel of the 71A mounting. Align the PDM circuit pack with the extruded rails in the mounting. Slide circuit pack in the mounting until the circuit pack latch handle is flush with front edge of the mounting.

13.5.4.4.2.2 Multiple-mount connections

(See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)

DIGITAL COMMUNICATION PROTOCOL LINE (DCP) CONNECTOR ASSIGNMENTS FOR MULTIPLE MOUNTING

PIN NO. (J1)	LEAD DESIGNATIONS	PDM LOCATION NO.	FUNCTIONS
27, 2	OD1, OD2	1	TRANSMIT PAIR
28, 3	1D1, 1D2	1	RECEIVE PAIR
30, 5	OD1, OD2	2	TRANSMIT PAIR
31, 6	1D1, 1D2	2	RECEIVE PAIR
33, 8	OD1, OD2	3	TRANSMIT PAIR
34, 9	1D1, 1D2	3	RECEIVE PAIR
36, 11	OD1, OD2	4	TRANSMIT PAIR
37, 12	1D1, 1D2	4	RECEIVE PAIR
39, 14	OD1, OD2	5	TRANSMIT PAIR
40, 15	1D1, 1D2	5	RECEIVE PAIR
42, 17	OD1, OD2	6	TRANSMIT PAIR
43, 18	1D1, 1D2	6	RECEIVE PAIR
45, 20	OD1, OD2	7	TRANSMIT PAIR
46, 21	1D1, 1D2	7	RECEIVE PAIR
48, 23	OD1, OD2	8	TRANSMIT PAIR
49, 24	1D1, 1D2	8	RECEIVE PAIR



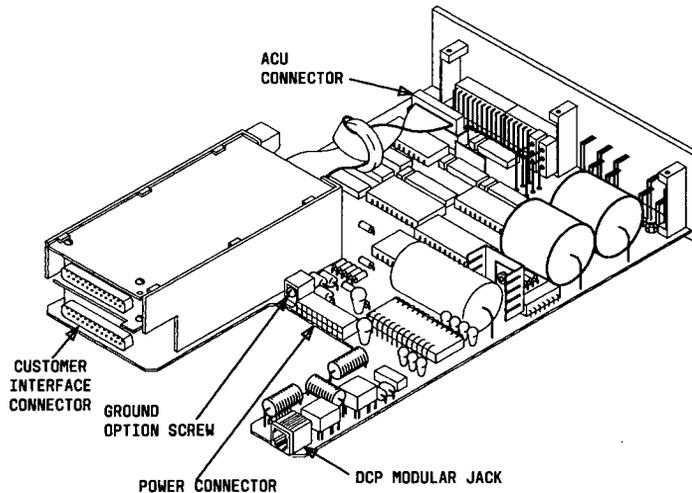
13.5.2 Modular processor data module (MPDM)

13.5.2.1 The MPDM consists of a main printed wiring board circuit pack and modular data interface circuit pack. The main MPDM circuit pack holds both the data interface circuit pack and an optional ACU interface printed wiring board circuit pack. The MPDM can either be mounted in a stand-alone or multiple mounting.

13.5.2.2 Options

13.5.2.2.1 To set the signal ground to frame connection option, the MPDM must be removed from the mounting. For use with the System 85, the frame ground and the signal grounds are isolated. To isolate the grounds, the option screw should be loosened (not making contact). The option screw is shown in paragraph 13.5.2.2.2.

13.5.2.2.2 Signal ground to frame ground connection option switch location



13.5.2.2.4 Option settings (Sheet 2 of 3)

SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
TRBK	ON	MPDM will end a call by recognizing three breaks – SYNC must be OFF, DISC must be ON.
	OFF	Three breaks disconnect is disabled.
HDX	ON	Half-duplex.
	OFF	Full-duplex.
SYNC	ON	Synchronous.
	OFF	Asynchronous.
INT	ON	Internal timing. _____ SYNC must be ON
	OFF	External timing.
DISC	ON	Disconnects from keyboard dialed calls after 2-second spacing.
	OFF	Will not disconnect from keyboard dialed calls after 2-second spacing.
KYBD	ON	Enables ASCII keyboard dialing.
	OFF	Disables ASCII keyboard dialing – must be OFF if MPDM contains ACU circuit pack.
PRTY	NOTE 1	KYBD must be ON for this switch to be operational.
	NOTE 1	
I/OD	NOTE 1	
	NOTE 1	
DMLL	ON	RS-232C Lead CC is turned on during the local loop test mode.
	OFF	–
MKBY	ON	MPDM looks busy in self-test and local loop modes.
	OFF	–
SIGLS	ON	Signal loss disconnect – system must receive an update message every 4 seconds or it will disconnect.
	OFF	
AANS	ON	Automatic Answer feature is ON.
	OFF	Automatic Answer feature is OFF.

NOTE 1: Select one of four parity types using the PRTY and I/OD switches.

Parity	PRTY setting	I/OD setting
Even	ON	OFF
Odd	ON	ON
Zero	OFF	OFF
One	OFF	ON

13.5.2.2.4 Option settings (Sheet 3 of 3)

OPTIONAL RS-232C INTERFACE CIRCUIT PACK		
SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
TM25*	ON	EIA TM lead circuit is connected to Pin 25.
	OFF	EIA TM lead circuit is disconnected from Pin 25.
RL21	ON	EIA remote loop circuit is connected to Pin 21.
	OFF†	EIA remote loop circuit is disconnected from Pin 21.
DL-HI	ON	MPDM dials at highest selected speed.
	OFF	MPDM dials at speed of EIA pin 23 (CH) input.
CN25*	ON	EIA CN lead is connected to Pin 25.
	OFF	EIA CN lead is not connected to Pin 25.
CN18*	ON	EIA CN lead is connected to Pin 18.
	OFF	EIA CN lead is not connected to Pin 18.
CI12	ON	EIA CI lead is connected to Pin 12.
	OFF†	EIA CI lead is not connected to Pin 12.

* Only one of these options can be on at any one time.

† Recommended setting.

13.5.2.3 Installation

13.5.2.3.1 Connect the 34-conductor ribbon on the main MPDM circuit pack to the data interface circuit pack ribbon connector. Slide the data interface circuit pack component side down) into the lower level of the plastic chassis.

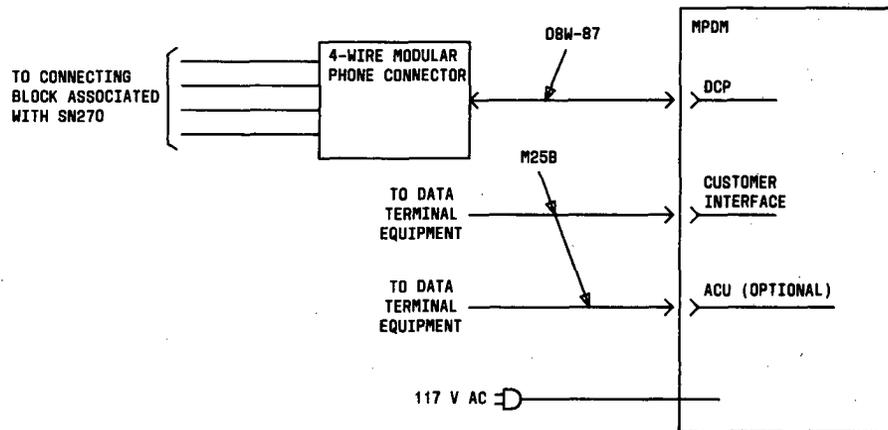
Slide the data interface circuit pack component side down) into the lower level of the plastic chassis.

13.5.2.3.2 If required, slide the ACU interface circuit pack (component side down) on the upper level of the plastic chassis on the main MPDM circuit pack. Attach the 20-pin conductor ribbon cable of the ACU pack to the 20-pin connector on the main MPDM circuit pack.

13.5.2.3.3 Open the magnetically latched front cover. Align the assembled MPDM with the rails of the mounting. Slide the MPDM into the mounting until the latch handle is flush with the front edge of the mounting. Replace the rear cover if necessary.

13.5.2.3.4 MPDM connections (stand-alone mounting)

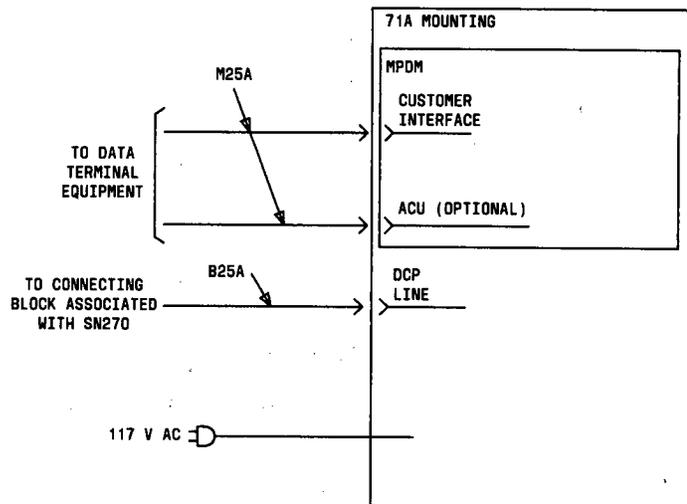
(See Part 9, paragraph 9.2.9 for circuit pack connection and termination.)



13.5.2.3.5 MPDM connections (multiple-mount application)

(See Part 9, paragraph 9.2.9 for circuit pack connection and terminations.)

MOUNTING SLOT NO.	DCP LINE	LEAD DESIGNATIONS (NOTE)	FUNCTIONS
1	27,2	OD1,OD2	Transmit Pair
	28,3	ID1,ID2	Receive Pair
2	30,5	OD1,OD2	Transmit Pair
	31,6	ID1,ID2	Receive Pair
3	33,8	OD1,OD2	Transmit Pair
	34,9	ID1,ID2	Receive Pair
4	36,11	OD1,OD2	Transmit Pair
	37,12	ID1,ID2	Receive Pair
5	39,14	OD1,OD2	Transmit Pair
	40,15	ID1,ID2	Receive Pair
6	42,17	OD1,OD2	Transmit Pair
	43,18	ID1,ID2	Receive Pair
7	45,20	OD1,OD2	Transmit Pair
	46,21	ID1,ID2	Receive Pair
8	48,23	OD1,OD2	Transmit Pair
	49,24	ID1,ID2	Receive Pair



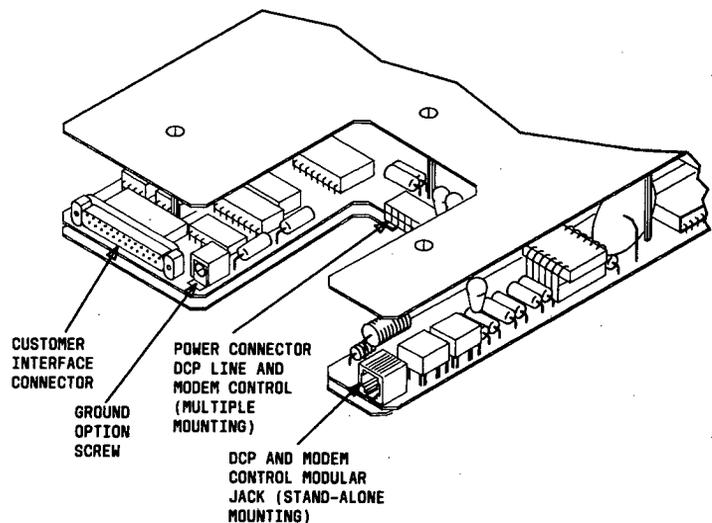
13.5.3 Trunk data module (TDM)

13.5.3.1 The TDM is a Data Terminal Equipment type device used to interface the System 85 data capabilities to conventional analog data channel via a modem or data service unit using an RS-232C interface.

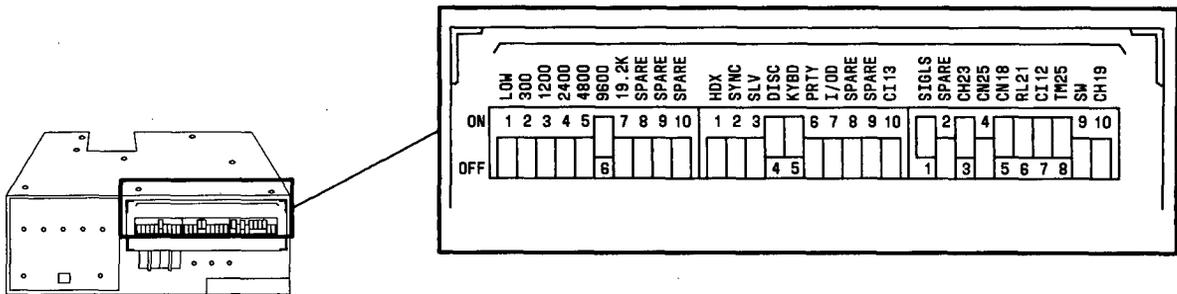
13.5.3.2 Options

13.5.3.2.1 To set the signal ground frame connection option, the TDM must be removed from the mounting. For use with the System 85, the frame ground and the signal grounds are isolated. To isolate the grounds, the option screw should be loosened (not making contact). The option is shown in paragraph 13.5.3.2.2.

13.5.3.2.2 Signal ground to frame ground connection option switch location



13.5.3.2.3 The TDM front panel contains 30 switches, 24 for options and 6 spares.



13.5.3.2.3 Option settings (Sheet 1 of 3)

SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
LOW*	ON	Low speed
	OFF	-
300*	ON	300
	OFF	-
1200*	ON	1200
	OFF	-
2400*	ON	2400
	OFF	-
4800*	ON	4800
	OFF	-
9600*	ON	9600
	OFF	-
	OFF	-
19.2 kb/s*	ON	19.2 Kb/s
	OFF	-

* More than one switch can be set ON at a time. The TDM and its data module will select the highest common speed.

13.5.3.2.4 Option settings (Sheet 2 of 3)

SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
HDX	ON	Half-duplex.
	OFF	Full-duplex.
SYNC	ON	Synchronous operation.
	OFF	Asynchronous operation.
SLV	ON	Slave timing.
	OFF	Internal timing. SYNC must be in ON position
DISC*	ON	Permits 2-second spacing signal to terminate a call
	OFF	- SYNC must be OFF
KYBD*	ON	Enables ASCII keyboard dialing.
	OFF	Disables ASCII keyboard dialing.
PRTY	NOTE 1	
	NOTE 1	
1/OD	NOTE 1	
	NOTE 1	
CI13	ON	Connects EIA and CI2 to Pin 13 - allowing TDM to select proper speed of modem being interfaced.
	OFF	Disconnects EIA lead CI2 to Pin 13.
SIGLS	ON	Enables signal loss disconnect feature.
	OFF	Disables signal loss disconnect feature.
CH23	ON	EIA CH circuit is connected to Pin 23.
	OFF	EIA CH circuit is disconnected to Pin 23.

* Option is ignored if the SW option is ON.

NOTE 1: Select one of four parity types using the PRTY and 1/OD switches.

PARITY	PRTY OPTION SETTING	1/OD OPTION SETTING
EVEN PARITY	ON	OFF
ODD PARITY	ON	ON
ZERO PARITY	OFF	OFF
ONE PARITY	OFF	ON

13.5.3.2.4 Option settings (Sheet 3 of 3)

SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
CN25	ON	Connects EIA CN lead to Pin 25 - TM25 must be OFF
	OFF	Disconnects EIA CN lead from Pin 25
CN18	ON	Connects EIA CN lead to Pin 18
	OFF	Disconnects EIA CN lead from Pin 18
RL21	ON	Connects EIA RL lead to Pin 21
	OFF	Disconnects EIA lead from Pin 21
CI12	ON	Connects EIA CI lead to Pin 12
	OFF	Disconnects EIA CI lead from Pin 12
TM25	ON	Connects EIA TM lead to Pin 25 - CN25 must be OFF
	OFF	Disconnects EIA TM lead from Pin 25
SW	ON	Allows TDM to interface to analog switched network modems
	OFF	Allows TDM to interface to private line modems
CH19	ON	Connects EIA lead CH2 to Pin 19 - SW must be ON
	OFF	Disconnects EIA lead CH2 from Pin 19

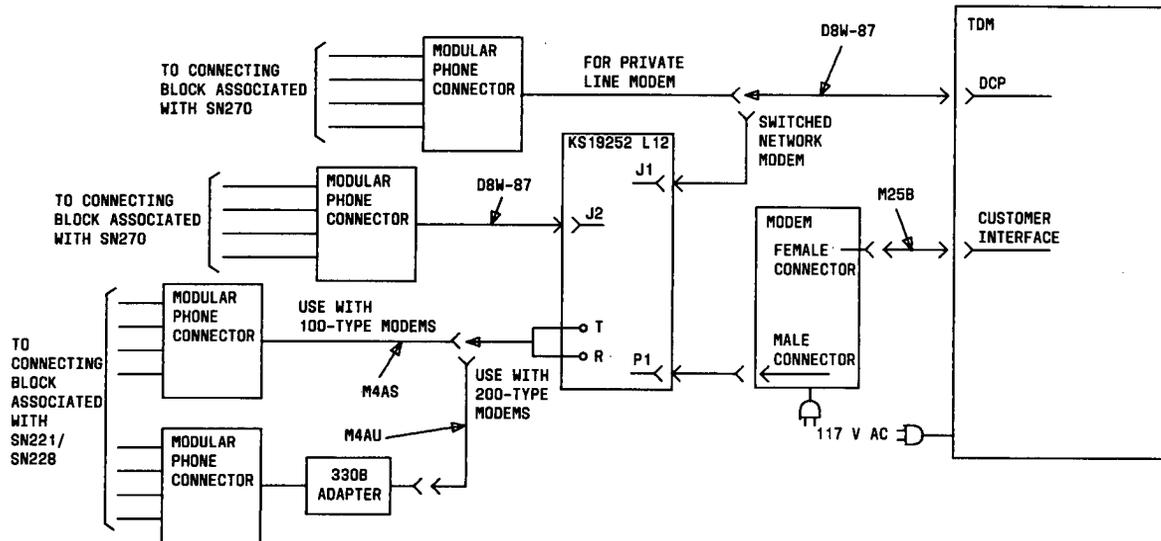
13.5.3.3 Connections

13.5.3.3.1 Stand-alone mounting

13.5.3.3.1.1 Ensure the faceplate is turned for horizontal operation. Open the magnetically hinged front cover. Align the circuit pack with the rails on the stand-alone mounting. Slide the circuit pack in the mounting until the circuit pack latch is flush with the front edge of the mounting. Replace the rear cover if required.

13.5.3.3.1.2 Connections

(See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)

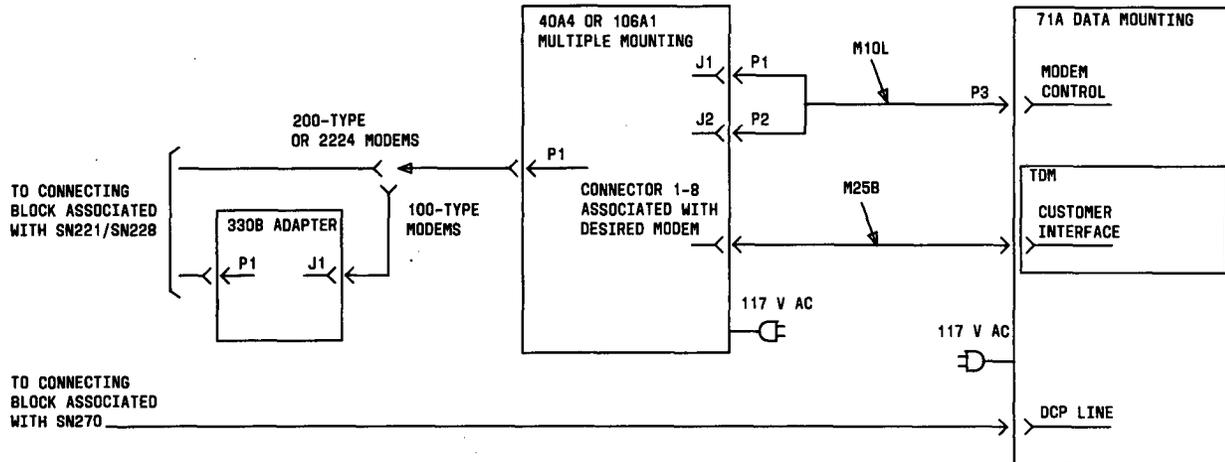


13.5.3.3.2 Multiple-mount connections

13.5.3.3.2.1 Ensure the faceplate is turned for vertical operation. Open the magnetically latched front panel. Align the circuit packs with the extruded rails of the mounting. Slide the circuit pack in the mounting until the latch is flush with the front of the mounting.

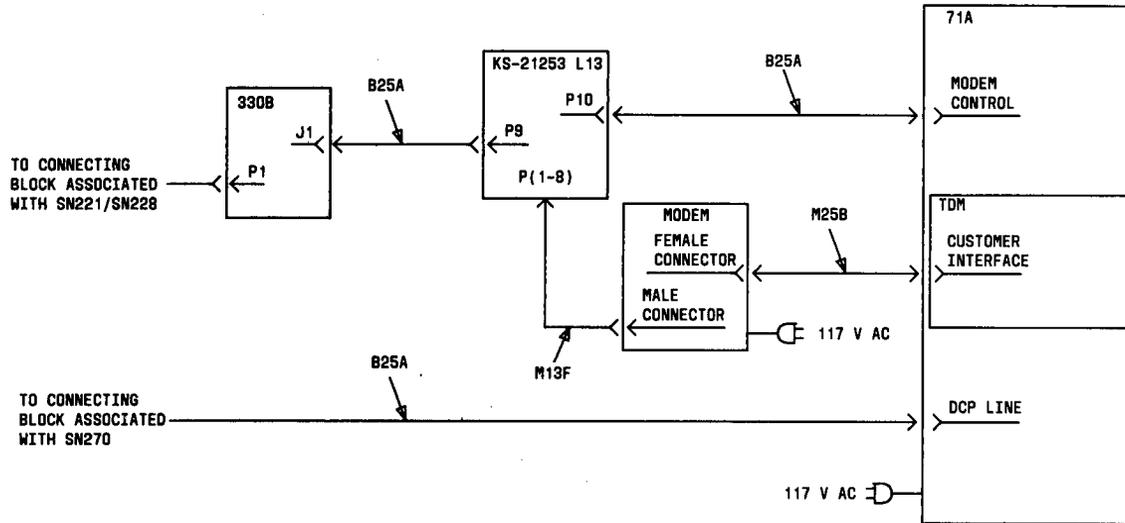
13.5.3.3.2.2 Connections using 40A4 or 106A1 mounting

(See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



13.5.3.3.2.3 Connections using 201CR and/or 208BR modems

(See Part 9, paragraph 9.2.9 for circuit pack terminations and cross-connections.)



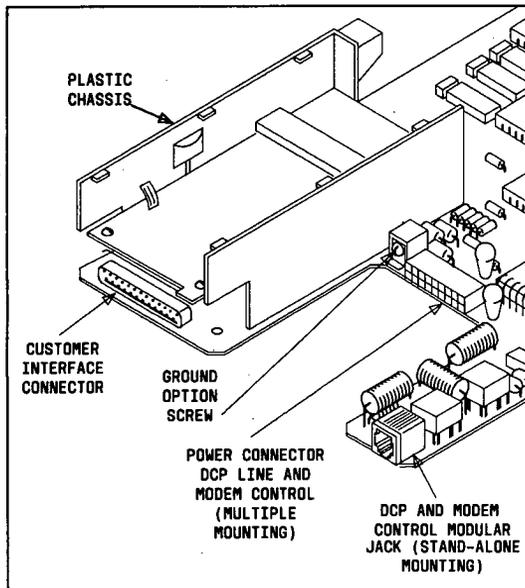
13.5.4 Modular trunk data module (MTDM)

13.5.4.1 The MTDM is a data terminal equipment type device used to interface the System 85 data capabilities to a conventional analog data channel via a modem or data service unit using an EIA RS-232C interface.

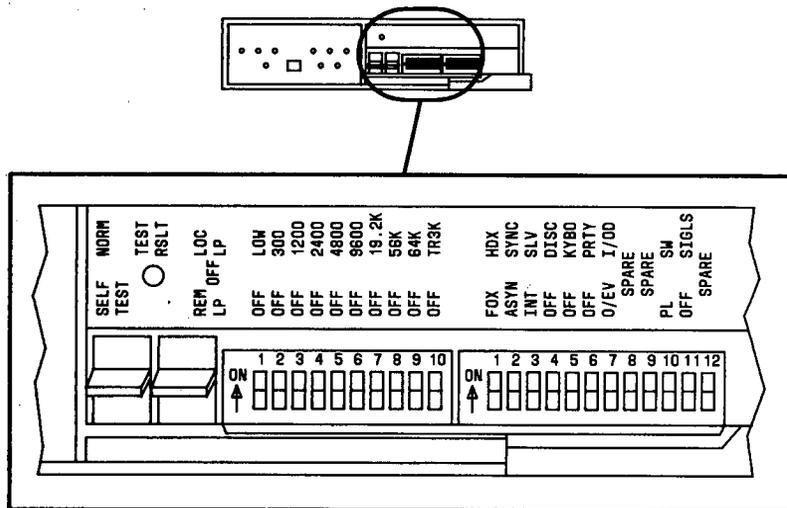
13.5.4.2 Options

13.5.4.2.1 To set the signal ground to frame connection option, the MTDM must be removed from the mounting. For use with the System 85, the frame ground and the signal grounds are isolated. To isolate the grounds, the option screw should be loosened (not making contact). The location of the screw is shown in paragraph 13.5.4.2.2

13.5.4.2.2 Ground option screw



13.5.4.2.3 The MTDM is equipped with two DIP switches containing 19 selectable options and 3 spares.



13.5.4.2.4 Option settings (Sheet 1 of 3)

SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
LOW *	ON	LOWSPEED
	OFF	-
300 *	ON	300
	OFF	-
1200 *	ON	1200
	OFF	-
2400 *	ON	2400
	OFF	-
4800 *	ON	4800
	OFF	-
9600 *	ON	9600
	OFF	-
19.2 Kb/s *	ON	19.2 Kb/s
	OFF	-
56 Kb/s *	ON	56 Kb/s (SYNC, AND SLV WILL AUTOMATICALLY BE SELECTED)
	OFF	
64 Kb/s *	ON	64 Kb/s (SYNC, INT, AND FDX WILL AUTOMATICALLY BE SELECTED)
	OFF	

* MORE THAN ONE SWITCH CAN BE SET ON AT A TIME. THE MPDM AND ITS DATA MODULE WILL SELECT THE HIGHEST COMMON SPEED.

13.5.4.2.4 Option settings (Sheet 2 of 3)

SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
TRBK	ON	ENABLES TRIPLE BREAK DISCONNECTS.
	OFF	DISABLES TRIPLE BREAK DISCONNECTS.
HDX- FDX	HDX (ON)	HALF-DUPLEX.
	FDX (OFF)	FULL-DUPLEX.
SYNC	SYNC (ON)	SYNCHRONOUS OPERATION.
ASYN	ASYN (OFF)	ASYNCHRONOUS OPERATION.
SLV	SLV (ON)	SLAVE TIMING.
INT	INT (OFF)	INTERNAL TIMING.
DISC	ON	ENABLES DISCONNECT AFTER 2 SECONDS OF SPACING SIGNAL (OPTION IS IGNORED IF SW IS ON).
	OFF	DISABLES DISCONNECT AFTER 2 SECONDS OF SPACING SIGNAL.
KYBD	ON	ENABLES ASCII KEYBOARD DIALING.
	OFF	DISABLES ASCII KEYBOARD DIALING.
PRTY	NOTE 1	
	NOTE 1	
1/OD- O/EV	NOTE 1	
	NOTE 1	
SW- PL	SW (ON)	MTDM CAN BE PAIRED WITH ANALOG SWITCHED NETWORK MODEMS.
	PL (OFF)	MTDM CAN BE PAIRED WITH PRIVATE LINE MODEMS.
SIGLS	ON	ENABLES SIGNAL LOSS DISCONNECT.
	OFF	DISABLES SIGNAL LOSS DISCONNECT.

NOTE 1: SELECT ONE OF FOUR PARITY TYPES USING THE PRTY AND THE 1/OD SWITCHES

PARITY	PRTY SETTING	O/EV - 1/OD SETTING
EVEN PARITY	ON	OFF
ODD PARITY	ON	ON
ZERO PARITY	OFF	OFF
ONE PARITY	OFF	ON

13.5.4.2.4 Option setting (Sheet 3 of 3)

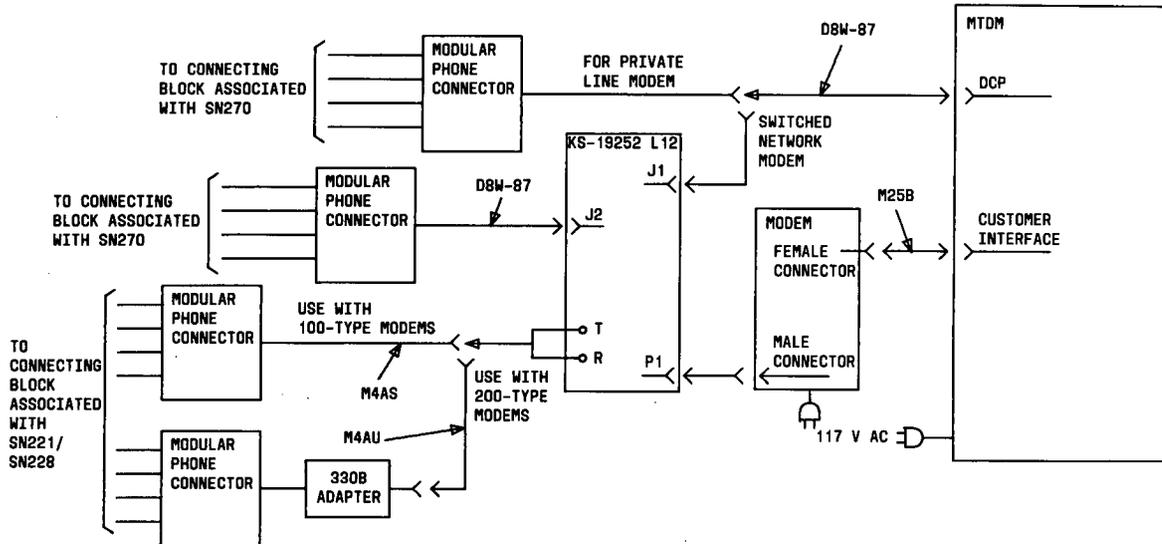
OPTIONS ON RS-232C DATA INTERFACE CIRCUIT PACK		
SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
CI12	ON	CONNECTS EIA LEAD CI TO PIN 12
	OFF	DISCONNECTS EIA LEAD CI FROM PIN 12
CN25	ON	CONNECTS EIA LEAD CN TO PIN 25 - TM25 MUST BE OFF
	OFF	DISCONNECTS EIA LEAD CN FROM PIN 25
TM25	ON	CONNECTS EIA LEAD TM TO PIN 25 - CN25 MUST BE OFF
	OFF	DISCONNECTS EIA LEAD TM FROM PIN 25
CI13	ON	CONNECTS EIA LEAD CI 2 TO PIN 13 - SW MUST BE ON
	OFF	DISCONNECTS EIA LEAD CI 2 FROM PIN 13
CI18	ON	CONNECTS EIA LEAD CN TO PIN 18
	OFF	DISCONNECTS EIA LEAD CN FROM PIN 18
CH23	ON	CONNECTS EIA CH LEAD TO PIN 23
	OFF	DISCONNECTS EIA CH LEAD FROM PIN 23
RL21	ON	CONNECTS EIA RL LEAD TO PIN 21
	OFF	DISCONNECTS EIA RL LEAD FROM PIN 21
CH19	ON	CONNECTS EIA LEAD CH 2 CIRCUIT TO PIN 19
	OFF	DISCONNECTS EIA LEAD CH 2 CIRCUIT FROM PIN 19

13.5.4.3 Installation

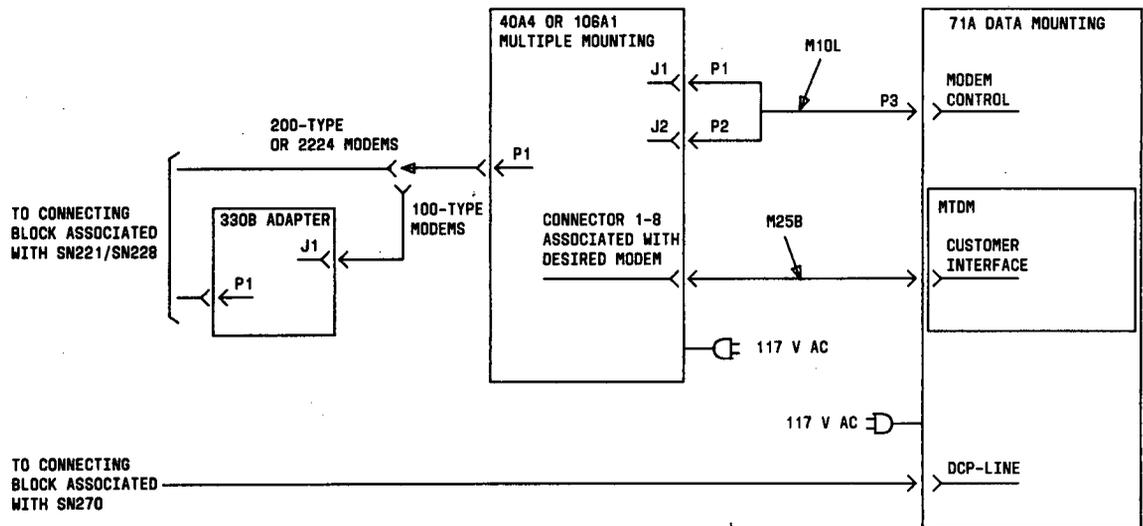
13.5.4.3.1 Attach the 34-conductor ribbon cable on the main MTDM circuit pack to the data interface circuit pack ribbon connector. Slide the data interface circuit (component side down) on the lower level of the plastic chassis. Open the front cover and align the assembled MTDM with the rails of the mounting. Slide the MTDM into the mounting until the latch is flush with the front edge of the mounting. Replace the rear cover if necessary.

13.5.4.3.2 Stand-alone mounting connections

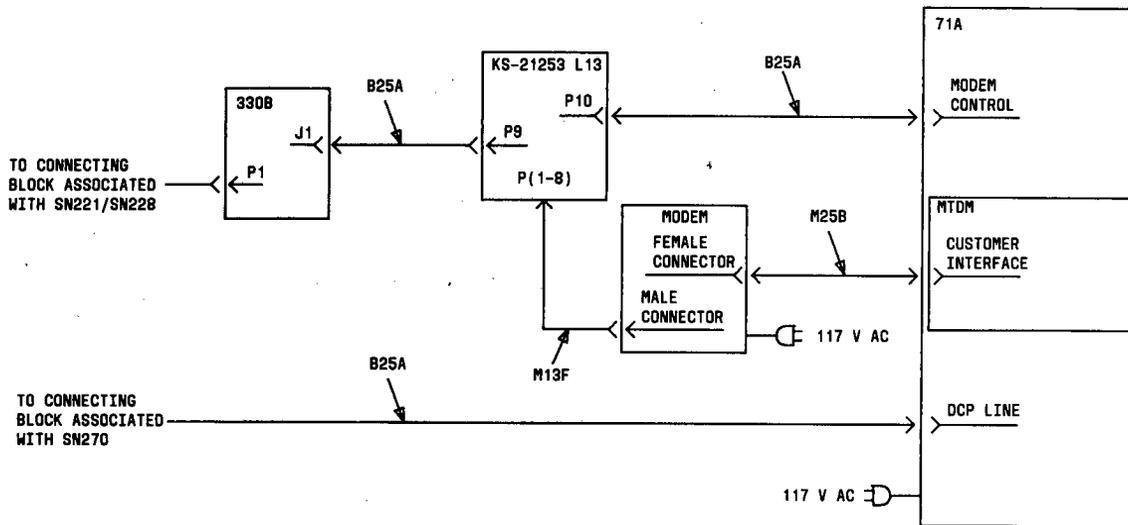
(See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



13.5.4.3.3 Multiple-mount connections with 40A4 or 106A1 mounting
 (See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



13.5.4.3.4 Multiple-mount connections with 201CR and 208BR modems
 (See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.)



13.5.5.2.2 Speed select options

The thumbwheel switch selects data rates of LOW, 300, 1200, 2400, 4800, 9600, and 19.2 kb/s. The switch is located behind the side cover. The numbers on the switch corresponding to the speed selected should be visible. To establish a call, the other end of the connection must have at least one common speed selected. The other data module, in conjunction with the DTDM, will select the highest common proper speed during handshaking. Once a call is established, the DTDM will ignore any changes in the speed select switch setting.

13.5.5.2.3 The DTDM is equipped with seven option switches. The options must be selected prior to placing a data call and must be compatible with the options of the data terminal and with the module being called.

SWITCH NAME	SWITCH SETTING	OPTION DESCRIPTION
ASYN/ SYNC	UP	Asynchronous operation
	DOWN	Synchronous operation
FDX/ HDX	UP	Full-duplex
	DOWN	Duplex
EXT/ INT	UP	External timing
	DOWN	Internal timing
DISC*	UP	OFF
	DOWN	Permits 2 seconds of spacing signal from a DTE to terminate a call
KYBD	UP	Disables ASCII dialing
	DOWN	Enables ASCII dialing
PRTY	NOTE 1	
	NOTE 1	
0-EVEN/ 1-ODD	NOTE 1	
	NOTE 1	

* ASYNC/SYNC must be Down-Asynchronous

NOTE: SELECT ONE OF FOUR PARITY TYPES USING THE PRTY AND THE 0 EV/1 OD SWITCHES:

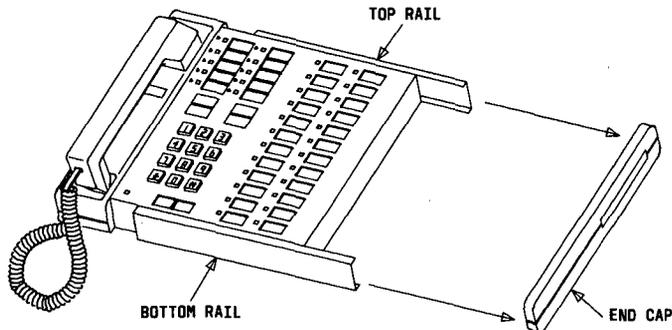
PARITY	PRTY SETTING	0 EV/1 OD SETTING
EVEN PARITY	DOWN	UP
ODD PARITY	DOWN	DOWN
ZERO PARITY	UP	UP
ONE PARITY	UP	DOWN

13.5.5.3 Installation

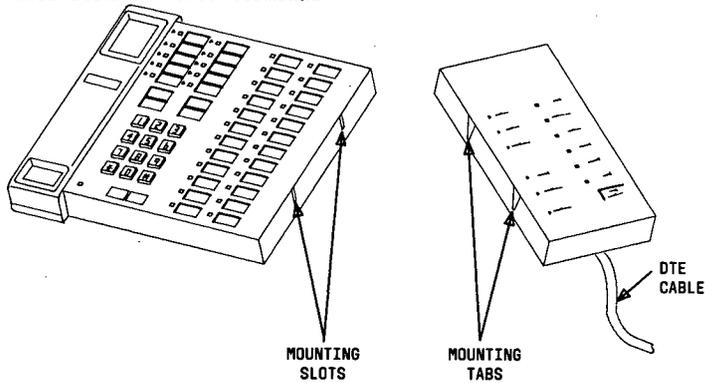
13.5.5.3.1 Before the DTDM can be installed to the digital voice terminal, the proper D kit of parts must be obtained. For a 12-inch configuration (7403D), use the D181169 kit. For a 15-inch configuration (7405D), use the D181169 kit. For an 18-inch configuration (7405D with function key module), use a D181171 kit.

Caution: Disconnect the line cord from the voice terminal and the connecting block on the wall to avoid destroying the DTDM internal circuitry.

13.5.5.3.2 Remove end cap, then top and bottom rail.

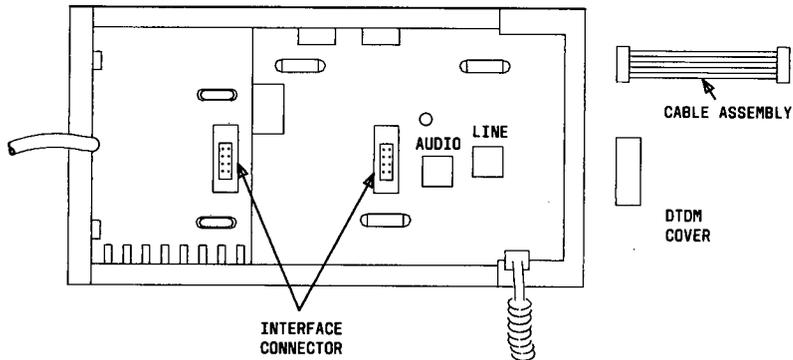


13.5.5.3.3 Attach DTDM to voice terminal

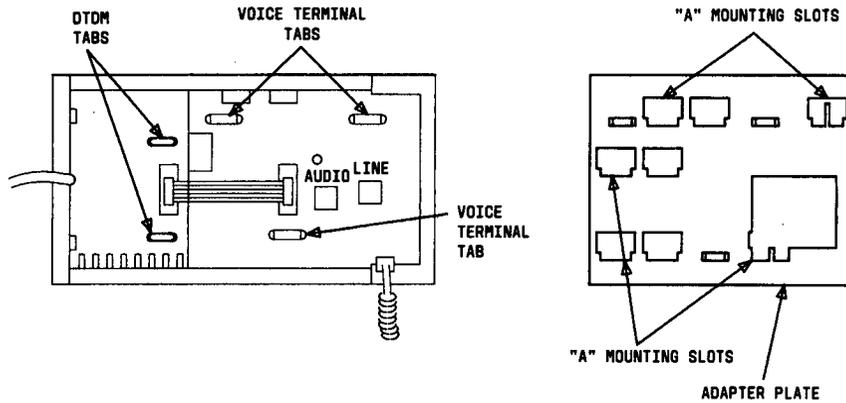


13.5.5.3.4 Locate the proper top and bottom rails from the D parts kit. Install both the top and bottom rails, then the end rails. Refer to paragraph 11.19.5.3.2 for an illustration.

13.5.5.3.5 Turn the configuration over and on the bottom, remove the DTDM cover. Install the ribbon cable assembly (from the D parts kit) between the interface connectors of the digital voice terminal and DTDM.



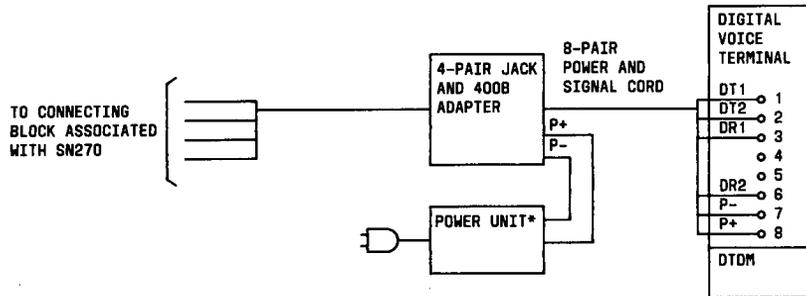
13.5.5.3.6 Install the adapter plate on the back of the configuration



13.5.5.3.7 Connect the line cord to digital voice terminal, connect the handset if required, then attach the configuration to a wall mounting or to a stand for desk mounting.

13.5.5.3.8 Connections

(See Part 9, paragraph 9.2.9 for circuit pack terminations and connections.)



* IF AC POWER IS NOT FROM A LOCAL AC OUTLET, BUT FROM AN AC POWER STRIP IN A CONNECTING CLOSET, THE POWER IS CONNECTED AT PROPER CONNECTING BLOCK IN THE CLOSET. THE 400B ADAPTER IS THEN NOT REQUIRED.

13.6 3270 Data Modules

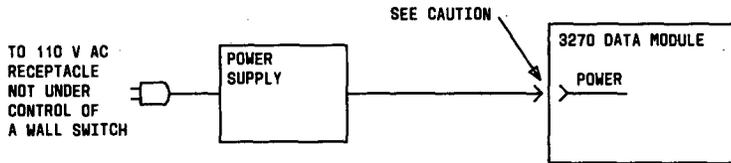
Contents

3270T or 3270A data module 13.6.1
3270C data module 13.6.2

13.6.1 3270T or 3270A data modules

13.6.1.1 AC power connections

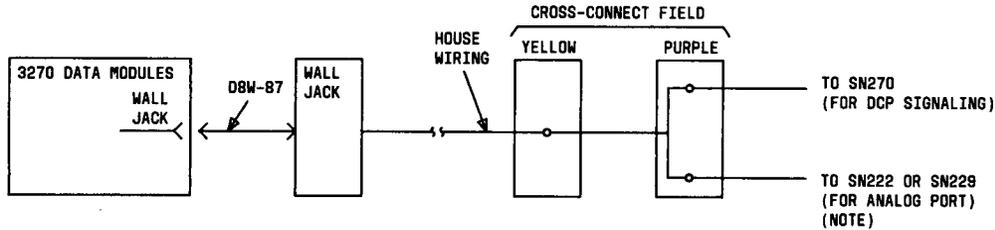
CAUTION
*Power cord must be inserted into the data module
with notched side up*



13.6.1.2 Connections to the System 85

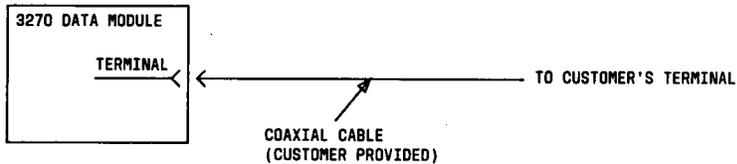
(See paragraph 9.2.9 for circuit pack terminating information.)

(See paragraph 13.6.1.5 for wall jack terminating information.)

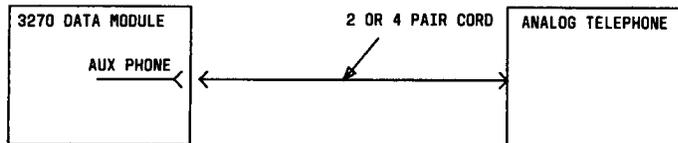


NOTE: This connection is only required when the optional analog telephone is installed.

13.6.1.3 Connections to the terminal



13.6.1.4 Connections to the analog telephone set (optional)



13.6.1.5 WALL JACK pin assignments

3270T and 3270A Data Module "WALL JACK" Pin Assignments		
Pin No. (Note 1)	Lead Designation (Note 2)	Function
1	OD1	Transmit Data (from terminal)
2	OD2	Transmit Data (from terminal)
3	ID1	Receive Data (to terminal)
4	R	Analog Data (Voice Ring)
5	T	Analog Line (Voice Tip)
6	ID2	Receive Data (to terminal)
7	-	Not used
8	-	Not used

Note 1: Pins are numbered from left to right as you look into a jack with the tab slot down.

Note 2: These signals are rearranged by the building wiring before they reach the cross-connect field. Wires should be connected at the cross-connect field in the order shown:
 Pair #1 (Pins 1 and 2) - Analog Line (ring and tip)
 Pair #2 (Pins 3 and 4) - Transmit Data (from terminal)
 Pair #3 (Pins 5 and 6) - Receive Data (to terminal)
 Pair #4 (Pins 7 and 8) - Not used

13.6.1.6 AUX PHONE pin assignments

3270T and 3270A Data Module "AUX PHONE" Pin Assignments		
Pin No. (Note)	Lead Designation	Function
1-3	-	Not used
4	R	Analog Line (Voice Ring)
5	T	Analog Line (Voice Tip)
6-8	-	Not used

Note: Pins are numbered from left to right as you look into a jack with the tab slot down.

13.6.2 3270C data module

13.6.2.1 Mounting the data module

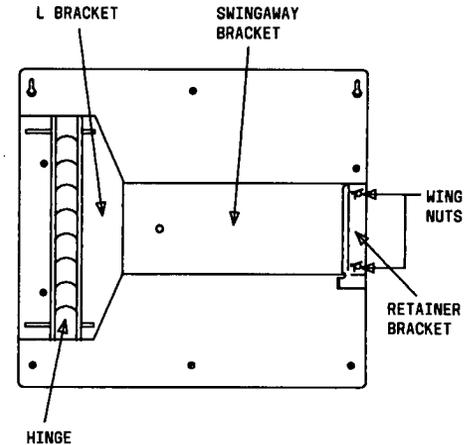
13.6.2.1.1 Cabinet mounting. Place the 3270C data module housing in the desired location. The 3270C data module can be readily mounted in a 19-inch cabinet. To mount the data module in a 23-inch or 25-inch cabinet, extra mounting hardware is required.

13.6.2.1.2 Wall mounting – perform the following steps to wall mount the data module.

- a. Mount a plywood backboard to the wall. The backing should measure at least 28 inches in width by 22 inches in height and be at least 3/4-inch thick.
- b. Place two of the 3/4-inch wood screws 25-3/8 inches apart near the top of the plywood backing.
- c. Insert the screws far enough to temporarily hold the wall-mounting bracket.
- d. Holding the wall-mounting bracket with the slotted holes at the top, place the bracket over the two screws, then tighten.
- e. Insert wood screws in remaining seven holes of the wall-mounting bracket, then tighten.
- f. Loosen the wing nut clamps on the retainer bracket. Slide the bracket to the right to free the hinged bracket.
- g. Swing the hinged bracket away from the wall.
- h. Position the data module so the rear of the data module faces the hinge.
- i. Slide the U bracket on the under side of the data module until the rear edge meets the L bracket.
- j. Tighten the screw on the back of the hinged bracket against the base of the data module.

k. Swing the hinged bracket with the mounted data module housing closed.

- l. Slide the retainer bracket to the left and tighten the wing nuts to secure the hinged bracket.



13.6.2.2 Install the 3270C circuit packs into the 3270C data module.

Note: The 3270C data module will hold four 3270C circuit packs. The circuit packs should be installed starting at the bottom slot and working to the top.

13.6.2.2.1 Remove the front cover from the 3270C data module.

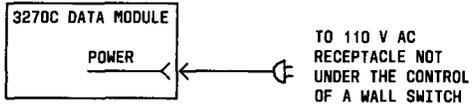
13.6.2.2.2 Place the circuit pack to be installed in the desired slot so the LEDs appear along the bottom of the front panel.

13.6.2.2.3 Open the latch on the front of the circuit pack and slide into the housing. Ensure that the connector on the rear attaches to the connector inside the 3270C data module rear panel. The coaxial cable connectors should exit out the holes in the rear panel.

13.6.2.2.4 Close the latch on the circuit pack. Repeat the procedure for other circuit packs.

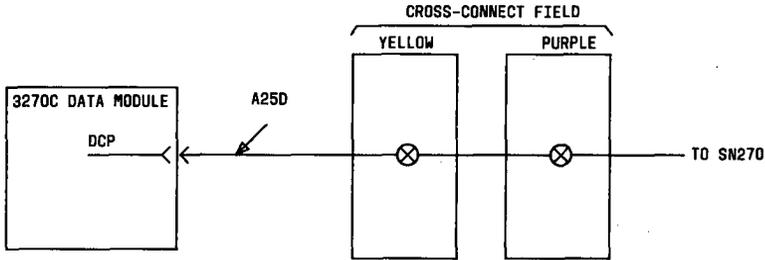
13.6.2.2.5 Replace the front cover.

13.6.2.3 AC power connections



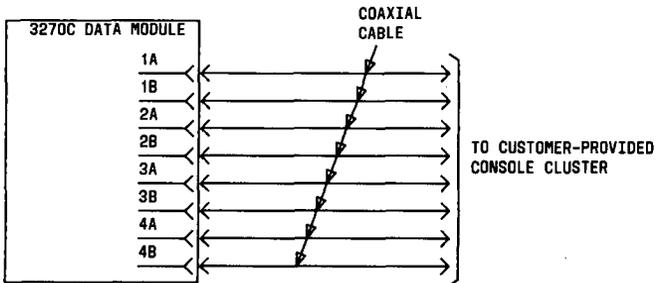
13.6.2.4 Connections to the System 85

(See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.) (See paragraph for DCP connections and terminations.)



13.6.2.5 Connections to the Cluster Controller

Connectors 1A and 1B are associated with slot 1, Connectors 1A and 2B are associated with slot 2 and so forth.

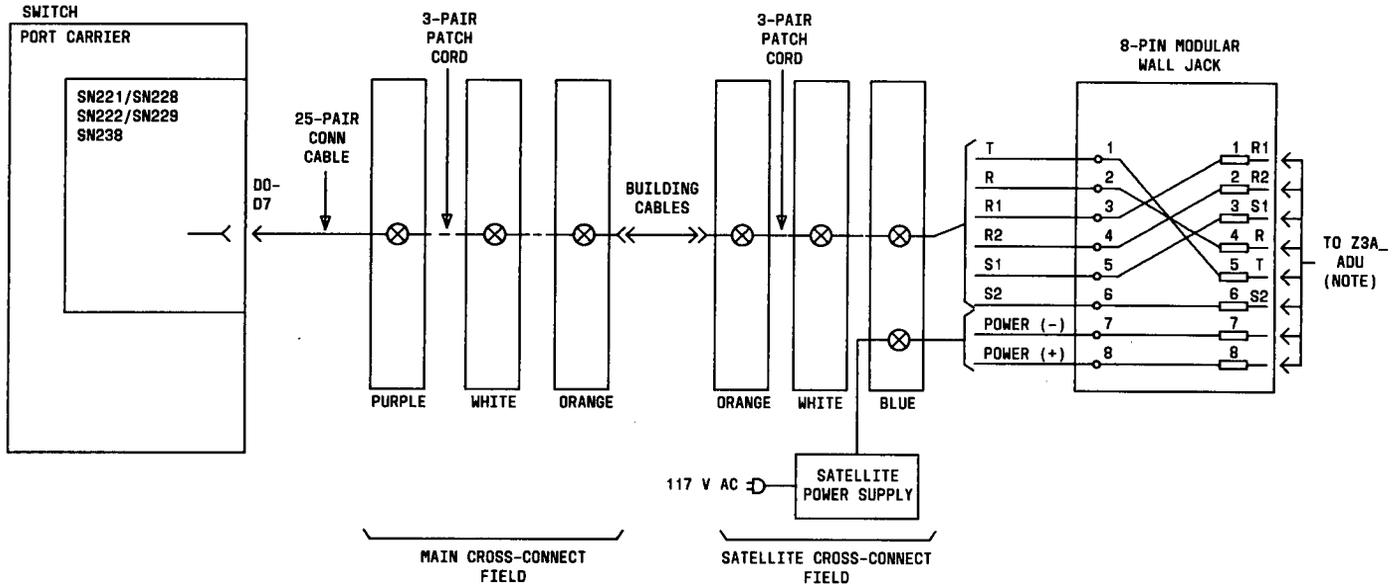


13.6.3.6 DCP terminations and connections

Pin No.	Lead Designation (Note)	Circuit Pack No.	Port	Function
27, 2	OD1, OD2	1	B	Transmit Pair
28, 3	ID1, ID2	1	B	Receive Pair
30, 5	OD1, OD2	1	A	Transmit Pair
42, 6	ID1, ID2	1	A	Receive Pair
33, 8	OD1, OD2	2	B	Transmit Pair
34, 9	ID1, ID2	2	B	Receive Pair
36, 11	OD1, OD2	2	A	Transmit Pair
37, 12	ID1, ID2	2	A	Receive Pair
39, 14	OD1, OD2	3	B	Transmit Pair
40, 15	ID1, ID2	3	B	Receive Pair
42, 17	OD1, OD2	3	A	Transmit Pair
43, 18	ID1, ID2	3	A	Receive Pair
45, 20	OD1, OD2	4	B	Transmit Pair
46, 21	ID1, ID2	4	B	Receive Pair
48, 23	OD1, OD2	4	A	Transmit Pair
49, 24	ID1, ID2	4	A	Receive Pair

Note: Signals are referenced to the 3270C Data Module (transmitted by or received from the data module). These signals are transmitted over a 25-pair cable to the cross-connect field on the System 85 switch.

13.7 EIA Standard RS-232-C Interface Connections to System Cabinets
 (See Part 9, paragraph 9.2.9 for circuit pack terminations and connection.)



NOTE: Connections for Z3A ADU located in Part 13.1.

13.8 Multiple Asynchronous Data Unit (MADU)

Contents

Stand-alone MADU mounting	13.8.1
Multiple mounted MADU mounting	13.8.2
MADU option switch settings	13.8.3
25-pair cable connections - stand-alone	13.8.4
AC power connections - stand-alone	13.8.5
25-pair cable connections - multiple mounted.	13.8.6
AC power connections - multiple mounted	13.8.7
Cable routing - multiple mount	13.8.8
BUILDING WIRING lead designation	13.8.9
To DTE HOST COMPUTER lead designation	13.8.10
To DCE HOST COMPUTER lead designation	13.8.11
M48C octopus cable connecting information	13.8.12
M48G octopus cable connecting information	13.8.13
RS-232C interface adapter	13.8.14

13.8.1 Stand-alone mounted MADU

13.8.1.1 The stand-alone mounting allows one MADU circuit pack to be mounted on desk or table near the Host Computer. The user will then have access to eight data ports on the System 85.

13.8.1.2 Before connecting the MADU, it should be removed from the mounting and the options verified or set as required. The option information is given in paragraph 13.8.3. After the options are set, the MADU circuit pack should be reinserted into the housing.

13.8.1.3 Make the connections shown in paragraph 13.8.4.

13.8.1.9 Make the ac power connections shown in paragraph 13.8.5.

13.8.2 Multiple mounted MADU

13.8.2.1 The MADU Circuit Packs (BPP2) are inserted in a 72A data mounting which is then mounted in a data cabinet.

13.8.2.2 The mounting flange on the left side of the 72A mounting is reversible so the mounting can be used in a 23- or 25-inch wide cabinet. For use in a 23-inch cabinet, the bracket should be mounted so that the shorter edge sticks out. For use with a 25-inch cabinet, the longer edge should stick out.

13.8.2.3 Before installing the MADU circuit pack, verify or set the options. The option information is given in paragraph 13.8.3. The hinged front cover must be opened to install the circuit packs. To help facilitate cable installation, the circuit packs should be installed from right to left. After all the circuit packs are installed, close the front gate.

13.8.2.4 Open the hinged rear panel of the carrier, then loosen the screw holding the reversible cable bracket. Refer to paragraph 13.8.8 for the proper positioning of the cables and the reversible cable bracket.

13.8.2.5 Install the TO BUILDING WIRING cables. Use paragraph 13.8.5 for the proper connections and paragraph 13.8.8 to properly run the cables. After the TO BUILDING WIRING cables are installed, partially tighten the screw on the cable bracket.

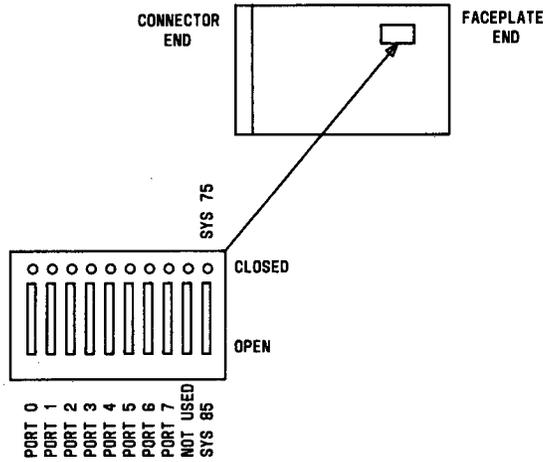
13.8.2.6 Plug a transformer in the power distribution box on the rear cover. Make the connections shown in paragraph 13.8.7.

13.8.2.7 Install the TO HOST COMPUTER cables. Use paragraph 13.8.6 for the proper connections and paragraph 13.8.8 to properly run the cables. After the TO HOST COMPUTER cables are installed, tighten the screw on the cable bracket

13.8.2.8 Plug the power cord attached to the power distribution box into a 117 V ac outlet in the data cabinet.

13.8.3 MADU option switch settings

13.8.3.1 Switch location and description



13.8.3.2 Option settings and functions

DIP Switch Positions and Functions		
Switch:	Position:	Function:
PORT 0	OPEN	Enables busy-out from computer port pin 25 for MADU port 0
	CLOSED	Disables busy-out from computer port pin 25 for MADU port 0
PORT 1	OPEN	Enables busy-out from computer port pin 25 for MADU port 1
	CLOSED	Disables busy-out from computer port pin 25 for MADU port 1
PORT 2	OPEN	Enables busy-out from computer port pin 25 for MADU port 2
	CLOSED	Disables busy-out from computer port pin 25 for MADU port 2
PORT 3	OPEN	Enables busy-out from computer port pin 25 for MADU port 3
	CLOSED	Disables busy-out from computer port pin 25 for MADU port 3
PORT 4	OPEN	Enables busy-out from computer port pin 25 for MADU port 4
	CLOSED	Disables busy-out from computer port pin 25 for MADU port 4
PORT 5	OPEN	Enables busy-out from computer port pin 25 for MADU port 5
	CLOSED	Disables busy-out from computer port pin 25 for MADU port 5
PORT 6	OPEN	Enables busy-out from computer port pin 25 for MADU port 6
	CLOSED	Disables busy-out from computer port pin 25 for MADU port 6
PORT 7	OPEN	Enables busy-out from computer port pin 25 for MADU port 7
	CLOSED	Disables busy-out from computer port pin 25 for MADU port 7
-	OPEN	Not used
	CLOSED	Not used
SYS 85	OPEN	Adapts all eight MADU ports for System 85
SYS 75	CLOSED	Adapts all eight MADU ports for System 75

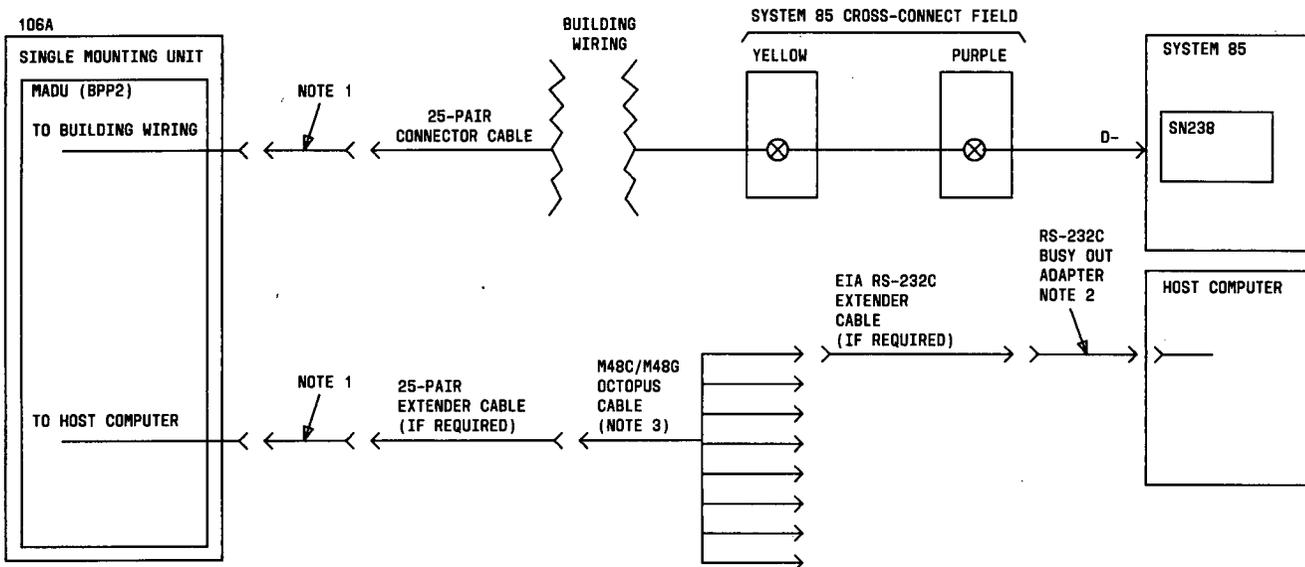
13.8.4 25-pair cable connections - stand-alone mounting

(The connections and terminations for SN238 are shown in Part 9, paragraph 9.2.9.)

(The connecting information for the TO BUILDING WIRING is shown in paragraph 13.8.9.)

(The connecting information for the TO HOST COMPUTER is shown in paragraph 13.8.10.)

(The connecting information for a leg of the M48C cable is shown in paragraph 13.8.11.)

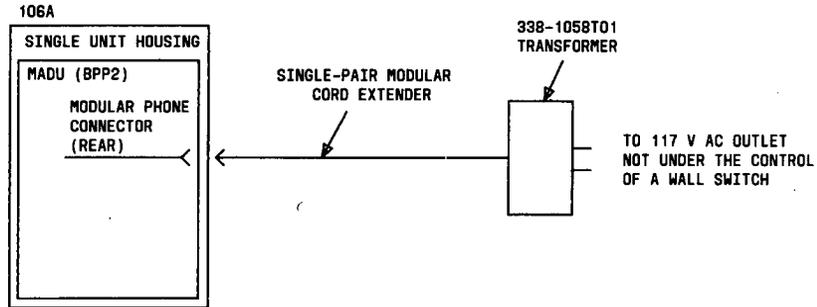


NOTES:

1. 50-pin center feed male connector to 50-pin end feed connector adapter cable, 2 feet long. This cable is not required if the 25-pair connector cable is equipped with a center feed connector.
2. This adapter is required when pin 25 on the host computer is used to busy out a port. The wiring information for the RS-232 adapter is shown in paragraph 13.8.12. The option switch for that port must be properly set in paragraph 13.8.3.
3. Use M48C cable with DTE, use M48G for DCE.

13.8.5 AC power connection - stand-alone mounting

The modular connector on the rear of the unit is 4-pair connector. The single-pair modular connector will snap into place and use the correct pins of the connector.



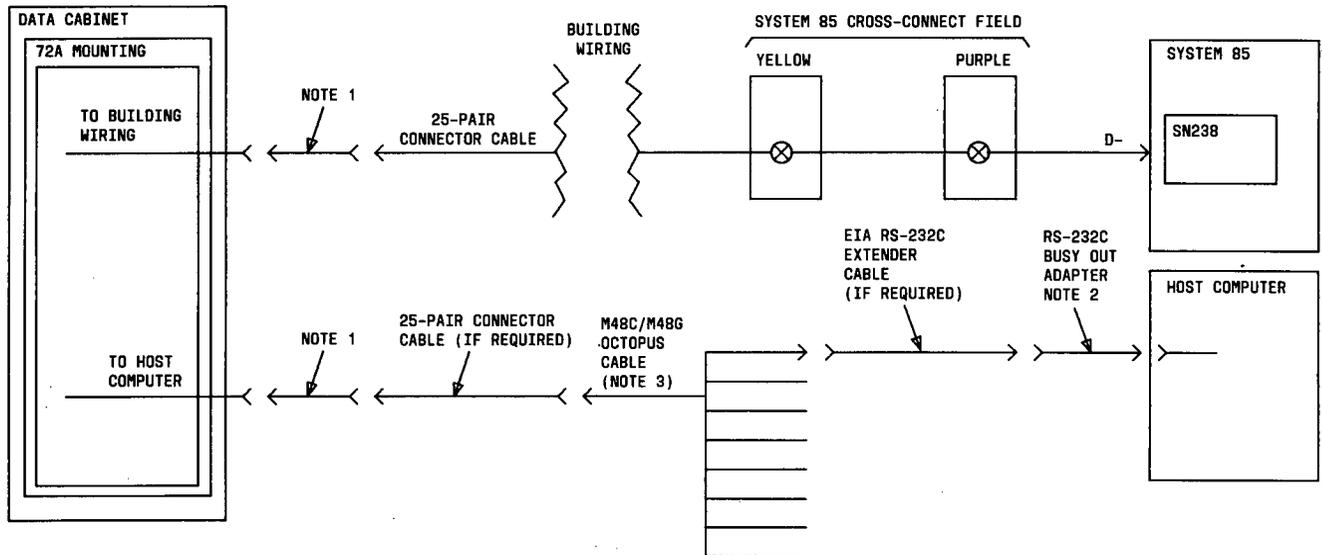
13.8.6 25-pair cable connections - multiple mounted

(The connections for the SN238 are shown in Part 9, paragraph 9.2.9.)

(The connecting information for the TO BUILDING WIRING is shown in paragraph 13.8.9.)

(The connecting information for the TO HOST COMPUTER is shown in paragraph 13.8.10.)

(The connecting information for a leg of the M48C cable is shown in paragraph 13.8.11.)

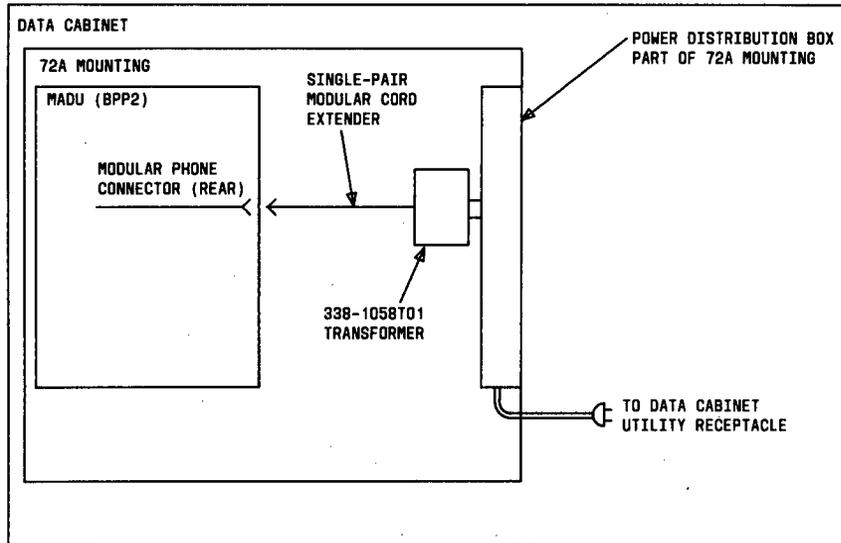


NOTES:

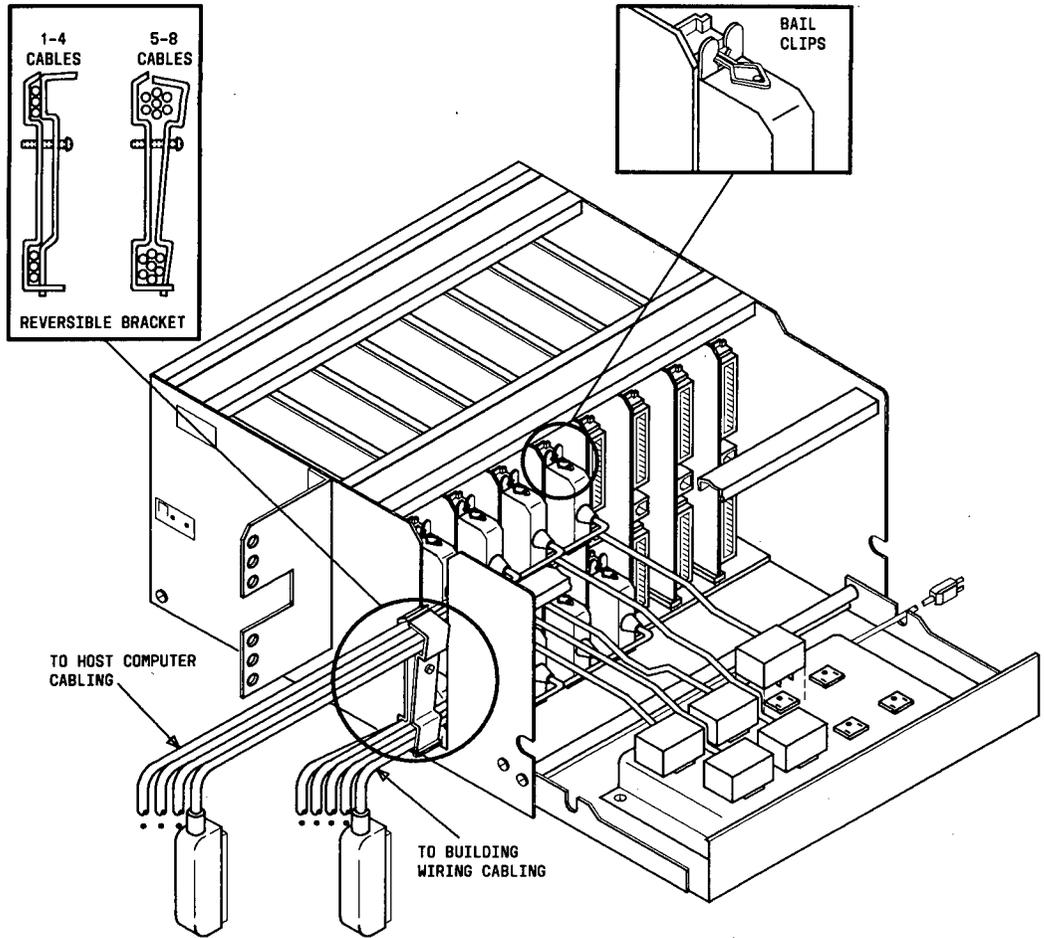
1. 50-pin center feed male connector to 50-pin end feed connector adapter cable, 2 feet long. This cable is not required if the 25-pair connector cable is equipped with a center feed connector.
2. This adapter is required when Pin 25 on the host computer is used to busy out a port. The wiring information for the RS-232 adapter is shown in paragraph 13.8.12. The option switch for that port must be properly set in paragraph 13.8.3.
3. Use M48C cable with DTE, M48G for DCE.

13.8.7 AC power connections - multiple mount

The modular connector on the rear of the unit is a 4-pair connector. The single-pair modular connector will snap into place and use the correct pins of the connector.



13.8.8 Cable routing for multiple mounted MADU



13.8.9 Connecting information for TO BUILDING WIRING connector

BUILDING WIRING CONNECTOR		PORT NO.	CONNECTING BLOCK NO.	LEAD COLOR
PIN NO.	LEAD DESIGNATION			
27	OD1	0	3	W-O
2	OD2	0	4	O-W
28	ID1	0	5	W-G
3	ID2	0	6	G-W
30	OD1	1	9	W-S
5	OD2	1	10	S-W
31	ID1	1	11	R-BL
6	ID2	1	12	BL-R
33	OD1	2	15	R-G
8	OD2	2	16	G-R
34	ID1	2	17	R-BR
9	ID2	2	18	BR-R
36	OD1	3	21	BK-BL
11	OD2	3	22	BL-BK
37	ID1	3	23	BK-O
12	ID2	3	24	O-BK
39	OD1	4	27	BK-BR
14	OD2	4	28	BR-BK
40	ID1	4	29	BK-S
15	ID2	4	30	S-BK
42	OD1	5	33	Y-O
17	OD2	5	34	O-Y
43	ID1	5	35	Y-G
18	ID2	5	36	G-Y
45	OD1	6	39	Y-S
20	OD2	6	40	S-Y
46	ID1	6	41	V-BL
21	ID2	6	42	BL-V
48	OD1	7	45	V-G
23	OD2	7	46	G-V
49	ID1	7	47	B-BR
24	ID2	7	48	BR-V

13.8.10 Connecting information for TO HOST DTE COMPUTER connector

TO HOST COMPUTER		Port No.	M48C Cable Arm No.
Pin No.	Lead Designation		
26	(RD) BB	0	1
1	(GRD) AAB	0	1
27	(BUS) BUS	0	1
2	(CTS,DSR,CF) CBF	0	1
28	(DTR) CD	0	1
3	(TD) BA	0	1
29	BB	1	2
4	AAB	1	2
30	BUS	1	2
5	CBF	1	2
31	CD	1	2
6	BA	1	2
32	BB	2	3
7	AAB	2	3
33	BUS	2	3
8	CBF	2	3
34	CD	2	3
9	BA	2	3
35	BB	3	4
10	AAB	3	4
36	BUS	3	4
11	CBF	3	4
37	CD	3	4
12	BA	3	4

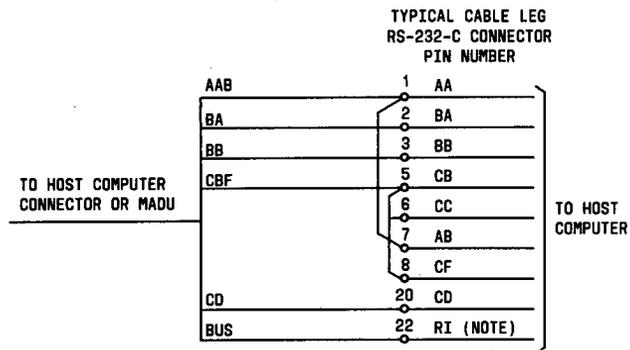
TO HOST COMPUTER		Port No.	M48C Cable Arm No.
Pin No.	Lead Designation		
38	BB	4	5
13	AAB	4	5
39	BUS	4	5
14	CBF	4	5
40	CD	4	5
15	BA	4	5
41	BB	5	6
16	AAB	5	6
42	BUS	5	6
17	CBF	5	6
43	CD	5	6
18	BA	5	6
44	BB	6	7
19	AAB	6	7
45	BUS	6	7
20	CBF	6	7
46	CD	6	7
21	BA	6	7
47	BB	7	8
22	AAB	7	8
48	BUS	7	8
23	CBF	7	8
49	CD	7	8
24	BA	7	8

13.8.11 Connecting information for TO HOST DCE COMPUTER connector

TO HOST COMPUTER		Port No.	M48C Cable Arm No.
Pin No.	Lead Designation		
26	(TD) BB	0	1
1	(GRD) AAB	0	1
27	(BUS) BUS	0	1
2	(DTR RTS) CBF	0	1
28	(CF) CD	0	1
3	(RD) BA	0	1
29	BB	1	2
4	AAB	1	2
30	BUS	1	2
5	CBF	1	2
31	CD	1	2
6	BA	1	2
32	BB	2	3
7	AAB	2	3
33	BUS	2	3
8	CBF	2	3
34	CD	2	3
9	BA	2	3
35	BB	3	4
10	AAB	3	4
36	BUS	3	4
11	CBF	3	4
37	CD	3	4
12	BA	3	4

TO HOST COMPUTER		Port No.	M48C Cable Arm No.
Pin No.	Lead Designation		
38	BB	4	5
13	AAB	4	5
39	BUS	4	5
14	CBF	4	5
40	CD	4	5
15	BA	4	5
41	BB	5	6
16	AAB	5	6
42	BUS	5	6
17	CBF	5	6
43	CD	5	6
18	BA	5	6
44	BB	6	7
19	AAB	6	7
45	BUS	6	7
20	CBF	6	7
46	CD	6	7
21	BA	6	7
47	BB	7	8
22	AAB	7	8
48	BUS	7	8
23	CBF	7	8
49	CD	7	8
24	BA	7	8

13.8.12 M48C octopus cable connecting information

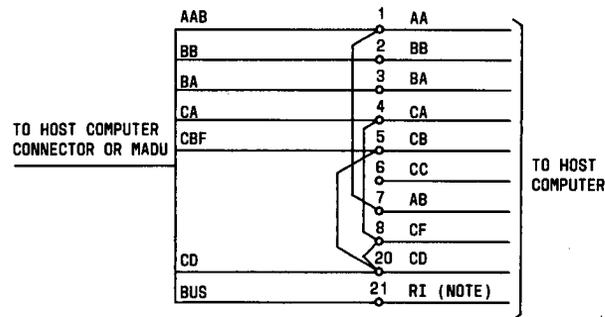


NOTE: Busy Out adapter must be used if pin 18 or 25 on the host computer is used to busy out a port.

13.8.13 RS-232-C Busy Out adapter connecting information

RS-232C Busy Out Adapter		
M48C Pin	connects to	Host Pin
1	_____	1
2	_____	2
3	_____	3
5	_____	5
6	_____	6
7	_____	7
8	_____	8
20	_____	20
22	_____	25
	└─┬─┘	18

13.8.14 M48G octopus cable connecting information



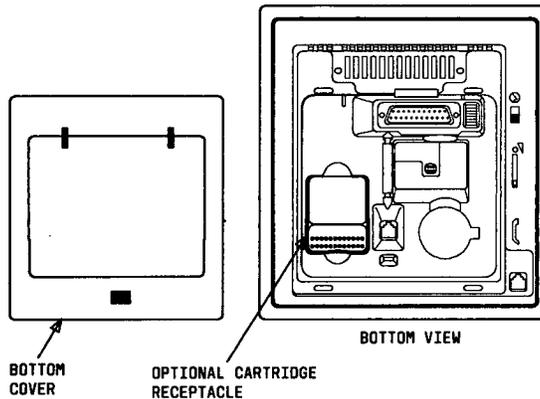
NOTE: Busy Out adapter must be used if pin 18 or 25 on the host computer is used to busy out a port.

13.9 PC 6300/7300 Connection to System 85

13.9.1 There are two methods available for connecting the PC 6300 and 7300 to the System 85. One method uses a 7404D voice terminal. The 7404D voice terminal must be equipped with a CMA cartridge. The other method uses a DCP circuit board in the PC and voice terminal (7404D, 7403D, or 7402D).

13.9.2 PC Voice Data Set/Communication Management (VDS/CMA) to System 85

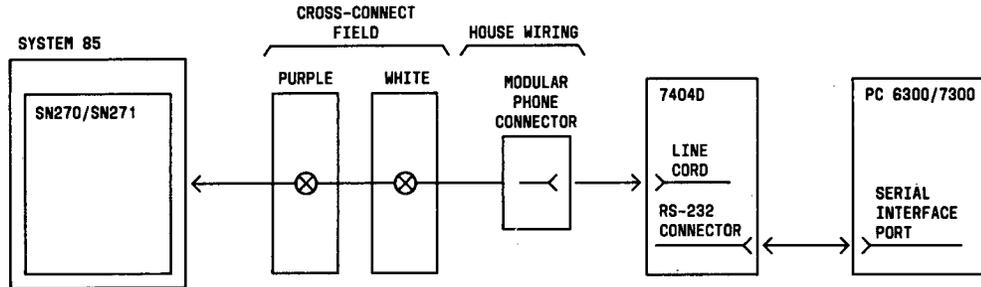
13.9.2.1 Installing the CMA cartridge in the 7404D - The optional cartridge plugs into the cartridge receptacle.



13.9.2.2 PC VDS/CMA to System 85 connection.

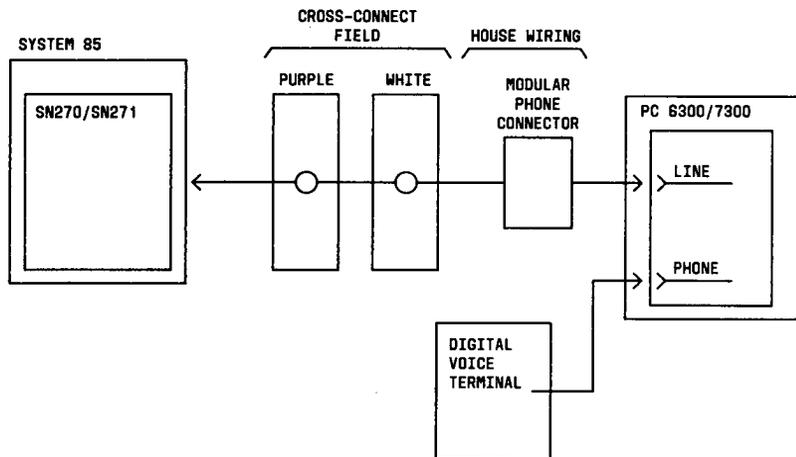
For detailed information on the PC 6300/7300, see 555-016-701 or 555-016-702.

See Part 9, paragraph 9.2.9 for SN270/SN271 connecting and terminating information.

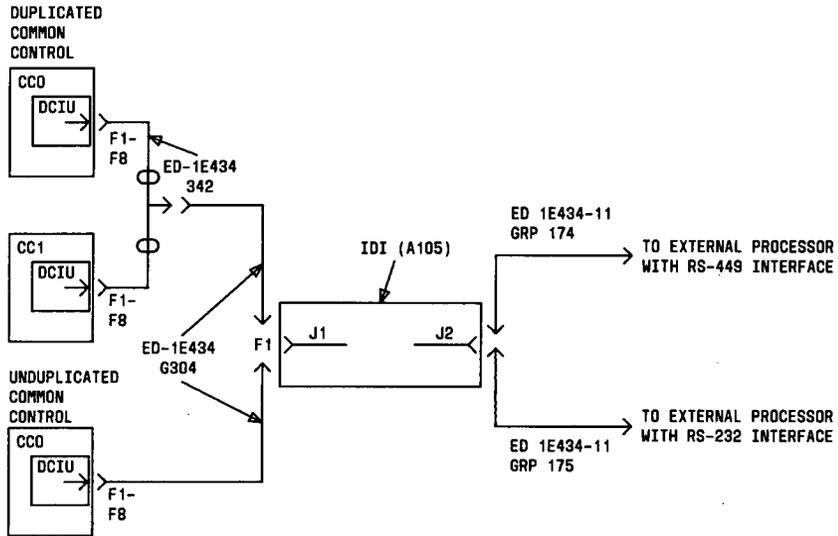


13.9.3 PC 6300/7300 connection to System 85 using DCP circuit board.

For more detailed information on the PC 6300/7300, see 555-016-703 or 555-016-704.
See Part 9, paragraph 9.2.9 for SN270/SN271 connections and terminations.



13.10 Isolating Data Interface (IDI) - 105A



PART 14. Remote Equipment

Contents

Remote Module Interface (RMI) 14.1
Remote Group Interface 14.2

14.1 Remote Module Interface (RMI) Connections and Lightguide Circuit
Balancing Information

14.1.1 All the information for installing the RMI feature is contained in Service Manual 555-101-112. This manual includes the installation procedures for the Central Location and the Remote Location. It also contains all the lightguide balancing information.

14.2 Remote Group Interface

14.2.1 Connections at the System 85 (Central Location)

14.2.1.1 Remote group interface requires an ANN 15B circuit pack be installed in J5888N DS-1/MFAT carrier at the System 85. The terminations and connections for this circuit pack are found in Part 9, paragraph 9.2.9.

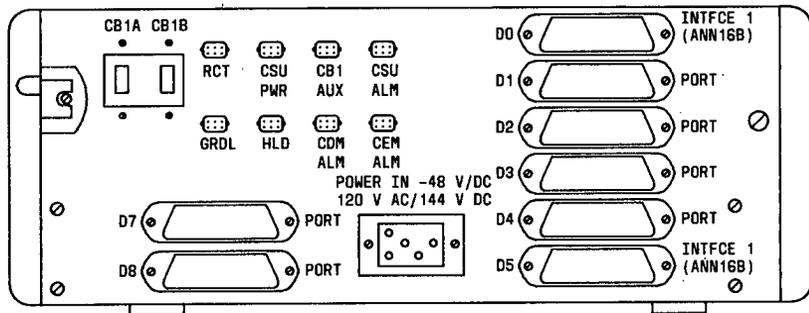
The remote group uses DS-1 signaling via DS-1 interface ANN 15B from the central location to the DS-1 interface ANN 16B at the remote location. The DS-1 connections are given in Part 12, paragraph 12.5.

WARNING: *Circuit packs in slots 00-05 mount component side up, circuit packs in slot 06-08 mount component side down.*

14.2.2 Connections at the Remote Location

14.2.2.1 The remote group housing can be mounted in an auxiliary, refer to Part 4 for cabinet, wall mounted, or set on a table or shelf. If the housing is to be mounted in an auxiliary, refer to Part 4 for cabinet installation information. If the housing is wall mounted, refer to paragraph 14.2.2.4. If the remote group housing is equipped with an ANN 17B circuit pack, the connector (D1, D2, D3, D5, D7, or D8) must be equipped with a J58888AN, List 8 EMI filter. If the remote group housing is in an auxiliary cabinet, the cabinet must be equipped with a special rear cover.

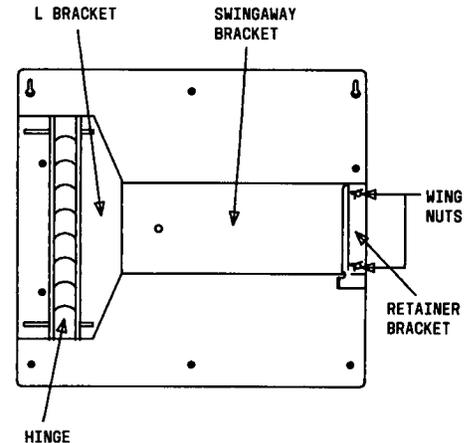
14.2.2.2 Rear view of the remote group housing



14.2.2.2.3 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 this manual to set up the cross-connect field.

14.2.2.2.4 Wall mounting – perform the following steps to wall mount the remote group housing:

- a. Mount a plywood backboard to the wall. The backing should measure at least 28 inches in width by 22 inches in height and be at least 3/4-inch thick.
- b. Place two of the 3/4-inch wood screws 25-3/8 inches apart near the top of the plywood backing.
- c. Insert the screws far enough to temporarily hold the wall-mounting bracket.
- d. Holding the wall mounting bracket with the slotted holes at the top, place the bracket over the two screws, then tighten.
- e. Insert wood screws in remaining seven holes of the wall-mounting bracket, then tighten.
- f. Loosen the wing nut clamps on the retainer bracket. Slide the bracket to the right to free the hinged bracket.
- g. Swing the hinged bracket away from the wall.
- h. Position the remote group housing so the rear of the remote group housing faces the hinge.
- i. Slide the U bracket on the under side of the remote group housing until the rear edge meets the L bracket.
- j. Tighten the screw on the back of the hinged bracket against the base of the remote group housing.
- k. Swing the hinged bracket with the mounted remote group housing closed.
- l. Slide the retainer bracket to the left and tighten the wing nuts to secure the hinged bracket.



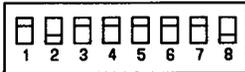
14.2.2.5 Option settings

14.2.2.5.1 Set the option switches on CAL1 circuit pack.

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

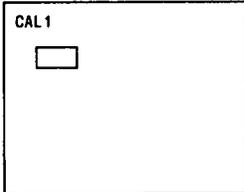
1 = OPTION DIP SWITCH CLOSED

0 = OPTION DIP SWITCH OPEN



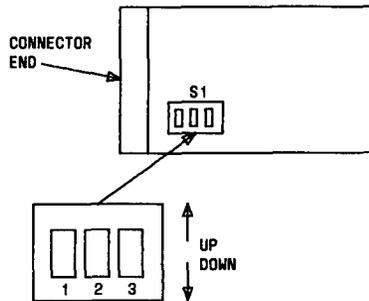
A SWITCH IS CLOSED WHEN THE ROCKER ARM IS DEPRESSED TOWARD THE SWITCH POLE NUMBER. AS SHOWN, POLES 2 AND 8 ARE CLOSED.

LOCATION OF DIP SWITCH
ON CAL1



14.2.2.5.2 Option settings for circuit pack ANN 16B

14.2.2.5.2.1 There is one switch package (S1), containing three rocker switch sections, that is positioned on the circuit pack as shown in the following diagram. The switch is set to the cable length distance of the DS-1 cable.



14.2.2.5.2.2 Set the option switches based on the length of the DS-1 cable between the cabinet and the DS-1 cross-connect point using the following table. If a DS-1 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 DS-1 trunk port does not have equalization options, the distance should be set to the input of the device.

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

14.2.2.5.3 CDM, CEM and CSU options – Options on these units should be set using the CSD and the information provided in Part 12, paragraph 12.5.1.

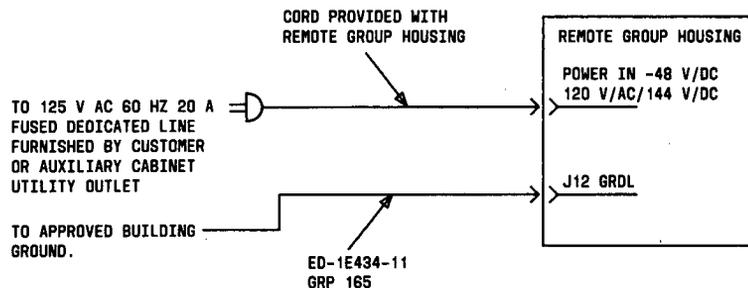
14.2.2.6 Power, grounding, and alarms

14.2.2.6.1 There are six arrangements of power equipment used with the remote group housing to provide the dc power.

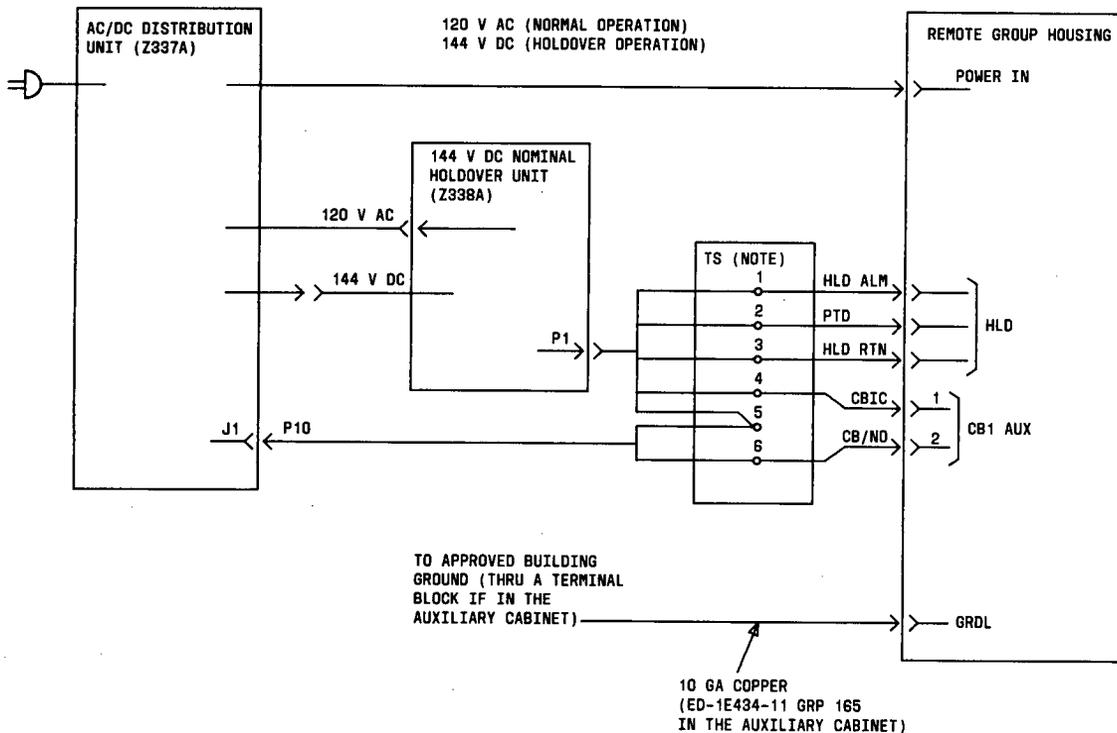
14.2.2.6.2 Off-line switcher (OLS) with no holdover or reserve power.

This configuration is used with or without an auxiliary cabinet.

The remote group housing must have an OLS board (634WAAB) in slot 06.



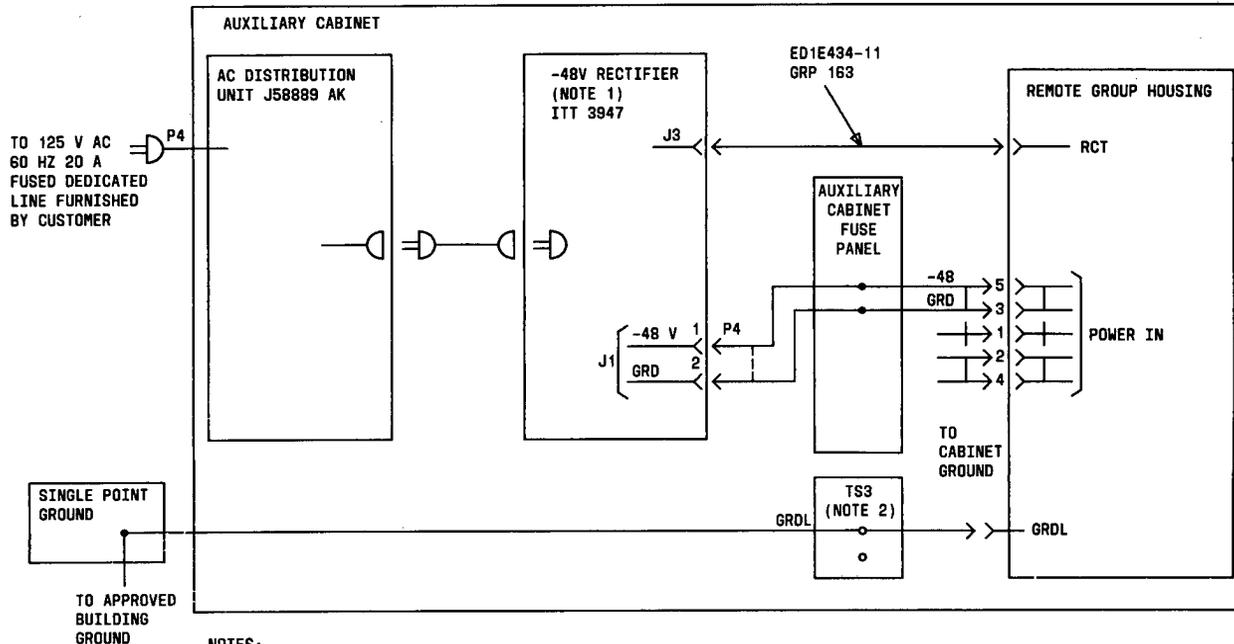
14.2.2.6.3 OLS with nominal holdover. This configuration can be used with or without an auxiliary cabinet. The remote group housing must have an OLS board (634WAAB) in slot 06.



NOTE: THIS TERMINAL STRIP IS LOCALLY PROVIDED WHETHER IN THE AUXILIARY CABINET OR NOT.

14.2.2.6.4 DC power provided by -48 V rectifier. No holdover or reserve power.

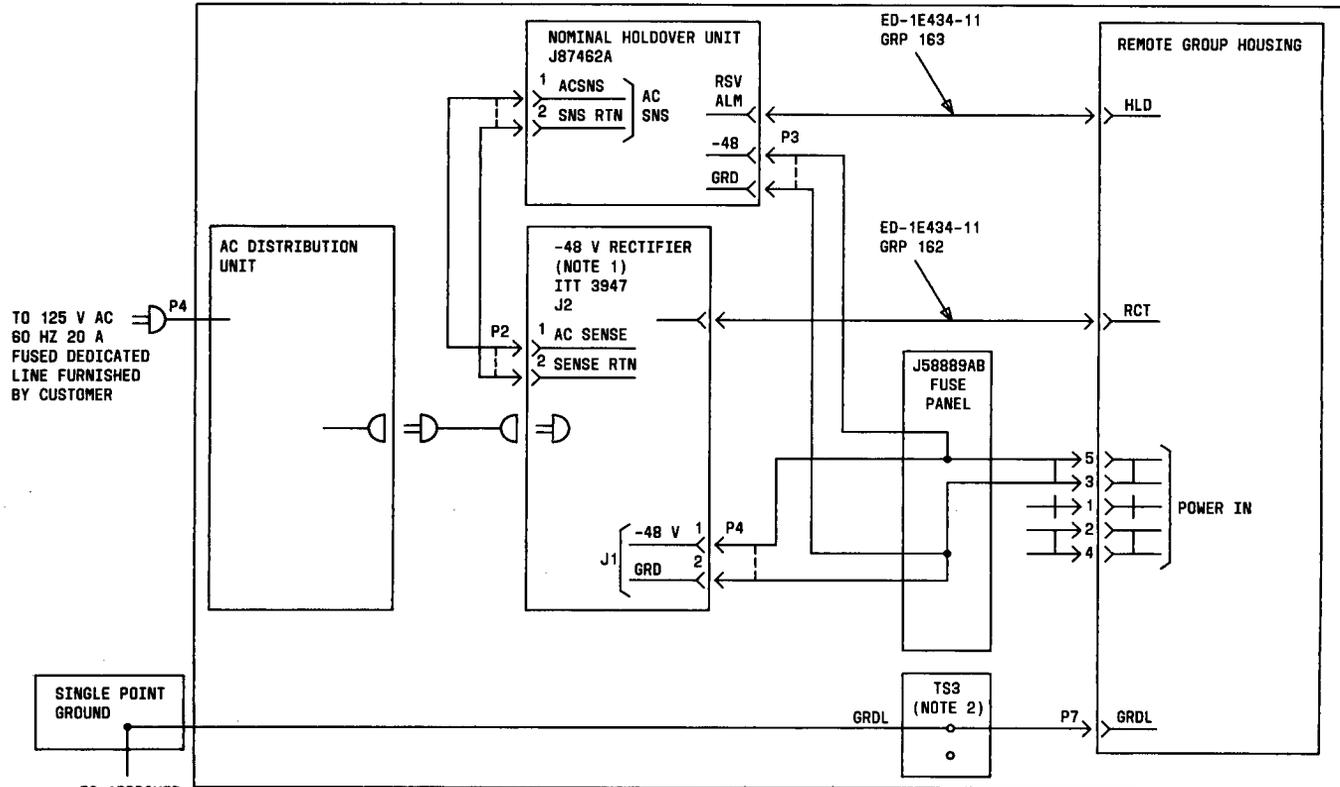
A dc/dc converter must be located in slot 06 of the Remote Group Housing for this configuration. This configuration can be used whether the remote group is mounted in an auxiliary cabinet or not. The connections shown are for use in an auxiliary cabinet. If the Remote Group Housing is not mounted in an auxiliary cabinet, the electrical connections are the same, but different cables and some locally provided terminal strips may be required.



NOTES:

1. THE 48-V RECTIFIER SHALL BE STRAPPED INTERNALLY FOR 60 HZ, 120 V OPERATION. REFER TO THE TABLE ON THE TOP OF THE UNIT FOR STRAP INFORMATION.
2. THESE TERMINAL STRIPS MUST BE LOCALLY PROVIDED.

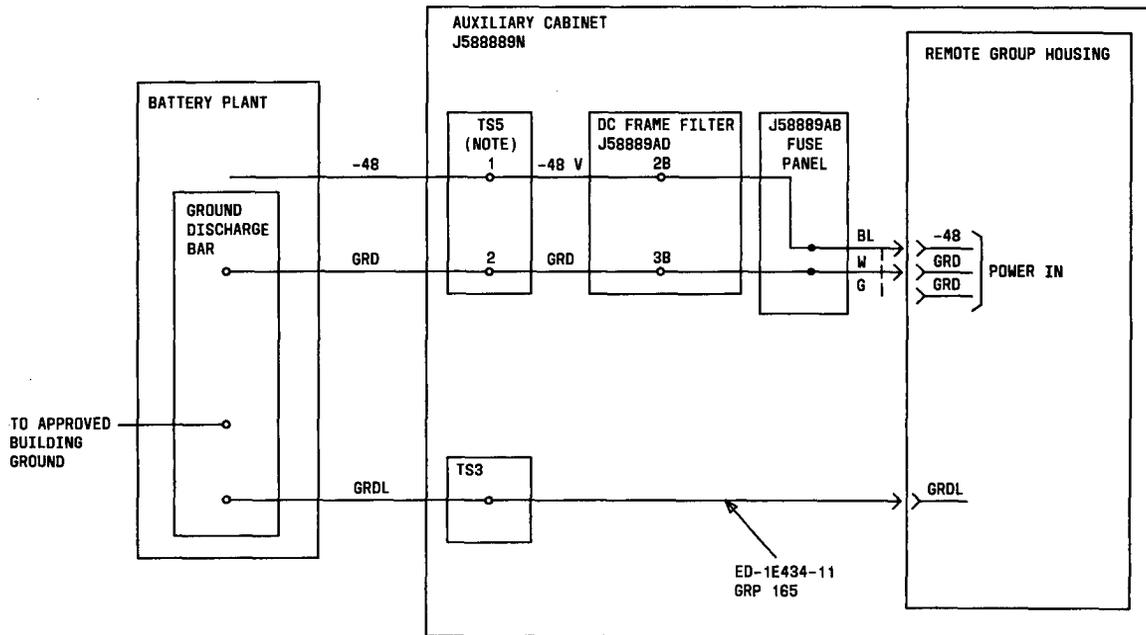
14.2.2.6.5 DC power provided by -48 V rectifier with nominal holdover and no power reserve. This configuration can only be used when the remote group housing is mounted in an auxiliary cabinet. A dc/dc converter (495JB) must be located in slot 06 of the remote group housing.



NOTES:

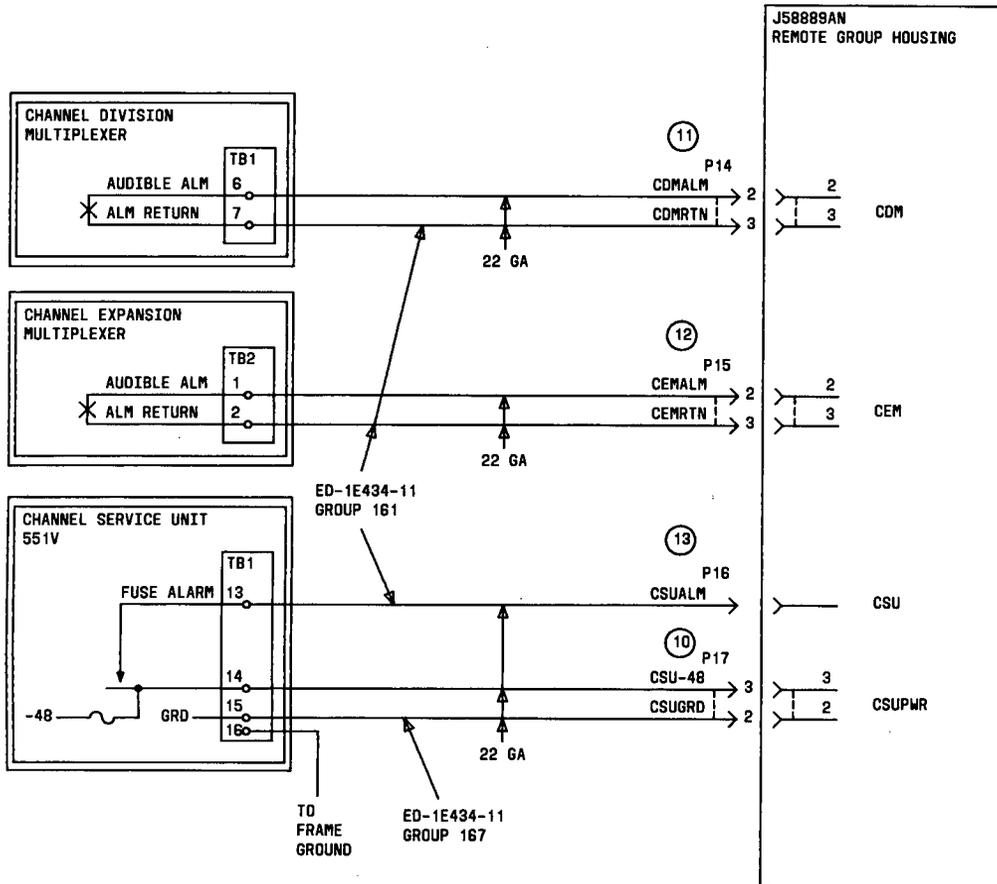
1. THE 48-V RECTIFIER SHALL BE STRAPPED INTERNALLY FOR 60 HZ 120 V AC OPERATION. REFER TO THE TABLE ON THE TOP OF THE UNIT FOR STRAP INSTRUCTIONS.
2. THESE TERMINAL STRIPS SHOULD BE LOCALLY PROVIDED.

14.2.2.6.6 Extended power reserve. This configuration is used with either an OBS or 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 OBS or dc-dc connector. The system must be in an auxiliary cabinet. The battery plant should be engineered by AT&T-IS National Customer Support Center.



NOTE: THESE TERMINAL STRIPS MUST BE LOCALLY PROVIDED

14.2.2.6.7 Power grounding and alarm connections for CSU, CDM, and CEM

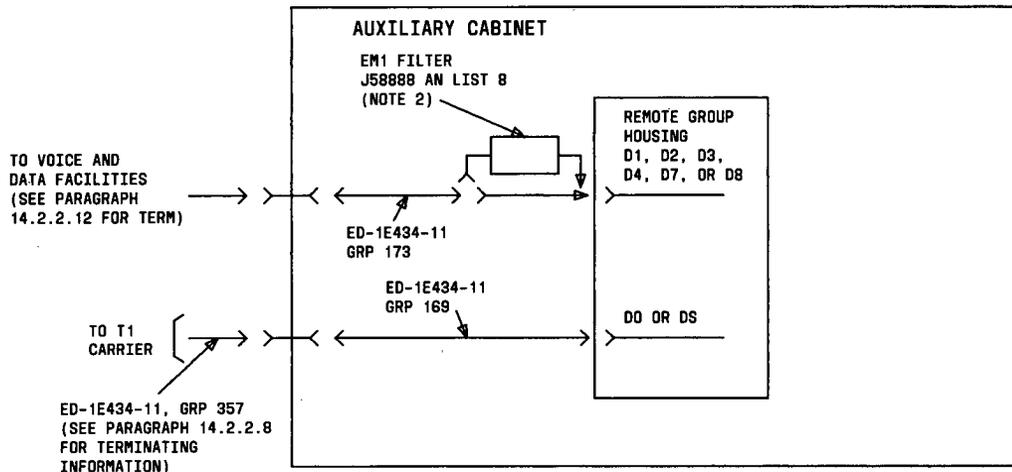


14.2.2.7 T1 carrier to remote group interface

14.2.2.7.1 T1 carrier to remote group interface
mounted in an auxiliary cabinet

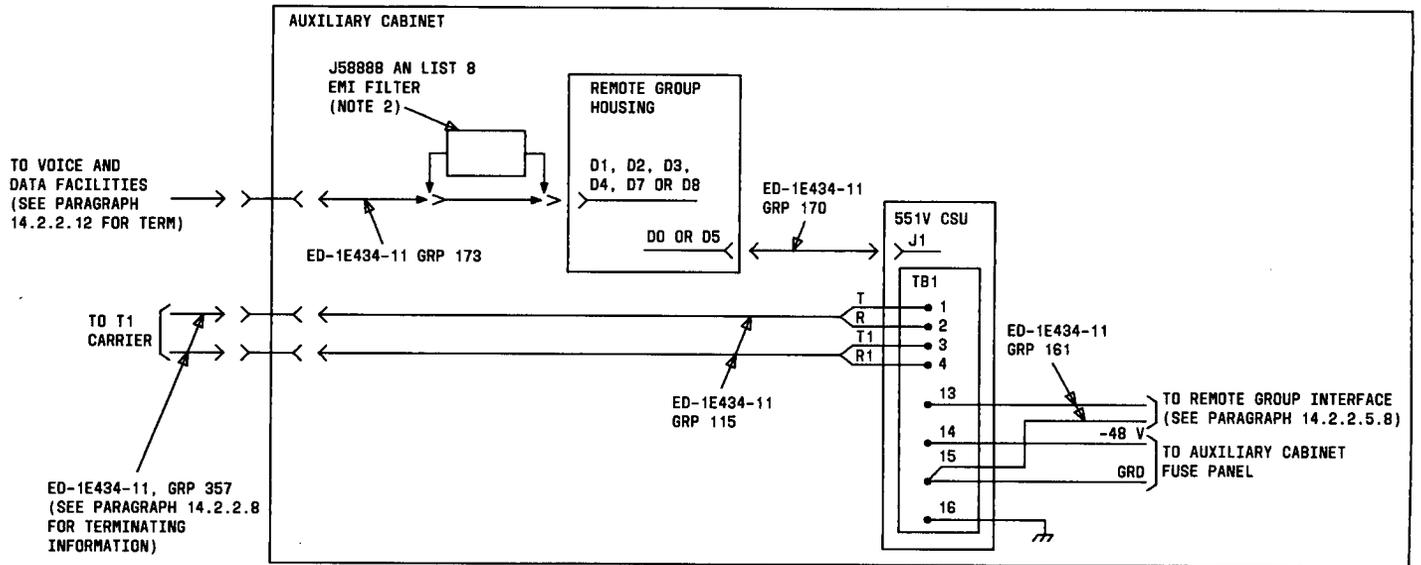
NOTES:

1. The power, grounding, and alarm leads are covered elsewhere in this part.
2. This filter is required only if RGH is equipped with ANN17B, but each ANN17B requires a filter.



14.2.2.7.2 T1 carrier to remote group interface using the CSU mounted in the auxiliary cabinet

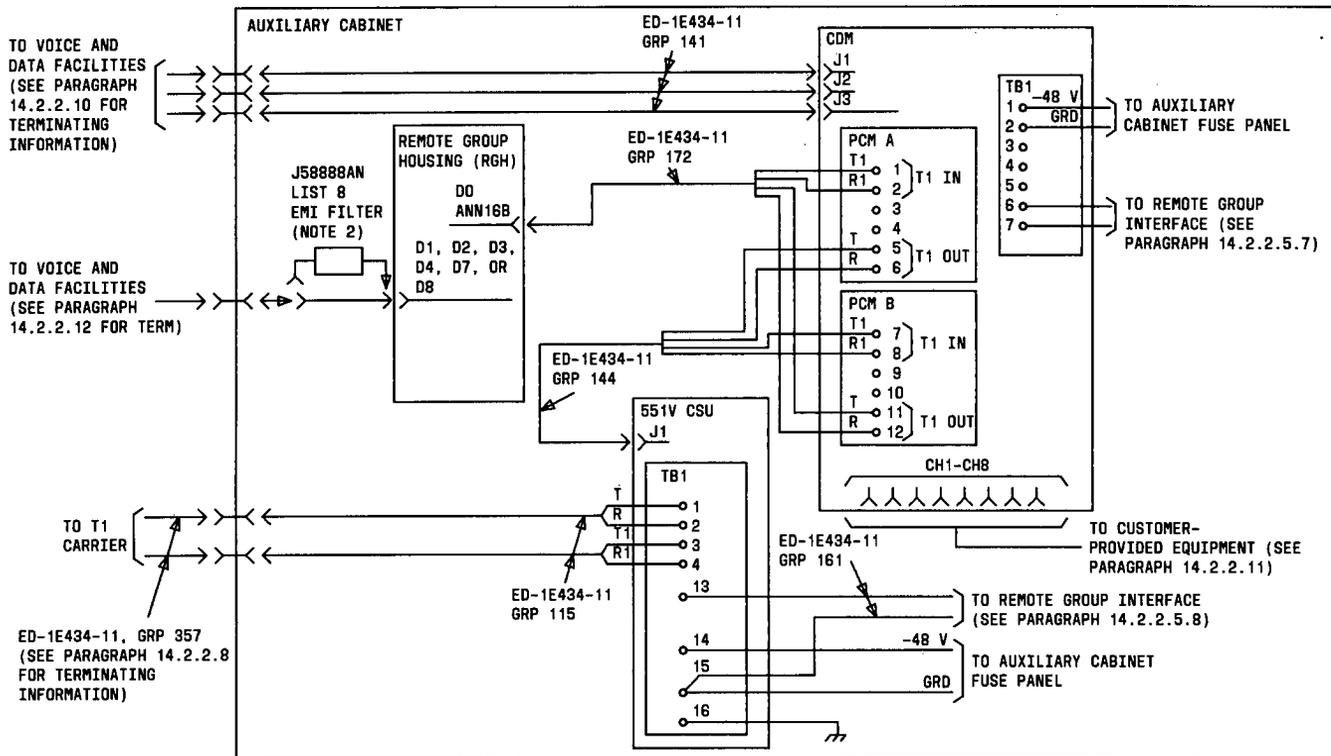
- Notes: 1. The power, grounding and alarm leads are covered elsewhere in this part.
 2. This filter is required only if RGH is equipped with ANN 17B; but, a filter is required for each ANN 17B.



14.2.2.7.3 T1 carrier to remote group interface using CDM and 551V CSU mounted in an auxiliary cabinet

NOTE 1: The power, grounding, and alarm leads are covered elsewhere in this part.

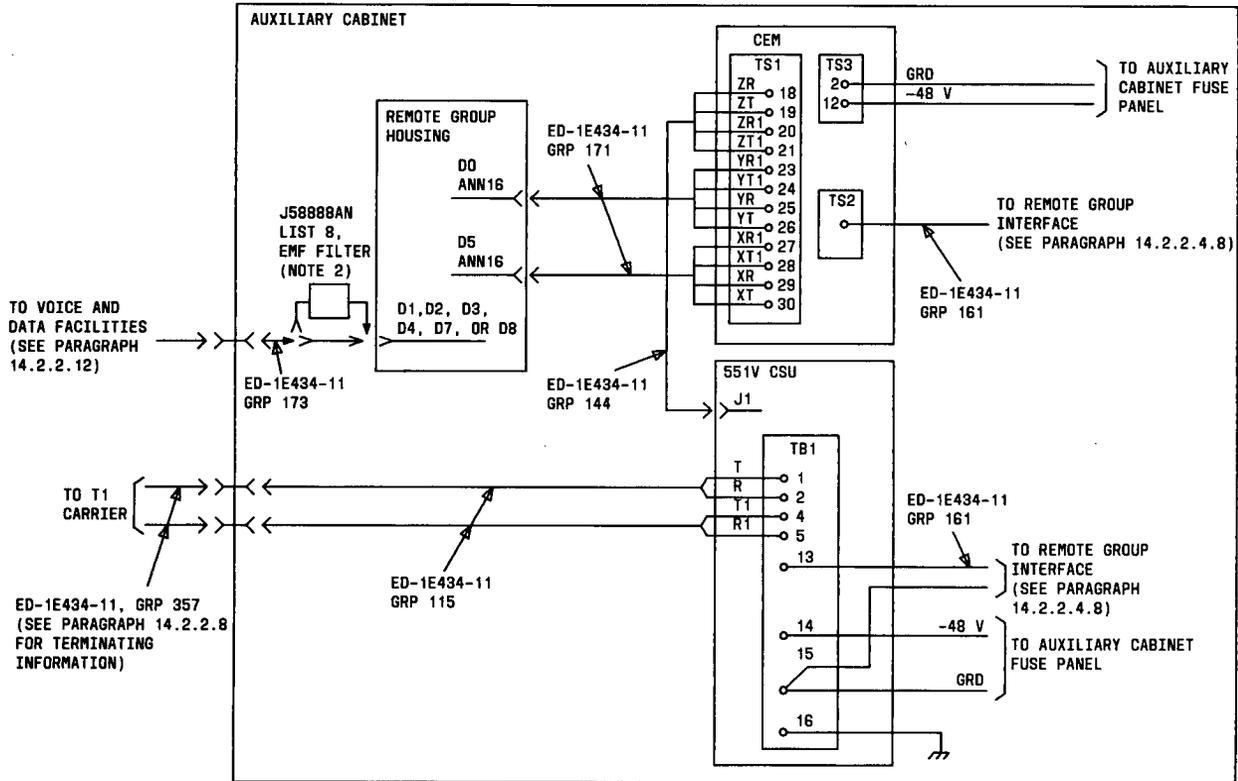
NOTE 2: This filter is required only if RGH is equipped with an ANN 17B, but a filter is required for each ANN 17B.



14.2.2.7.4 T1 carrier to remote group interface using CEM and 551V CSU mounted in auxiliary cabinet

NOTE 1: The power, grounding and alarm leads are covered elsewhere in this part.

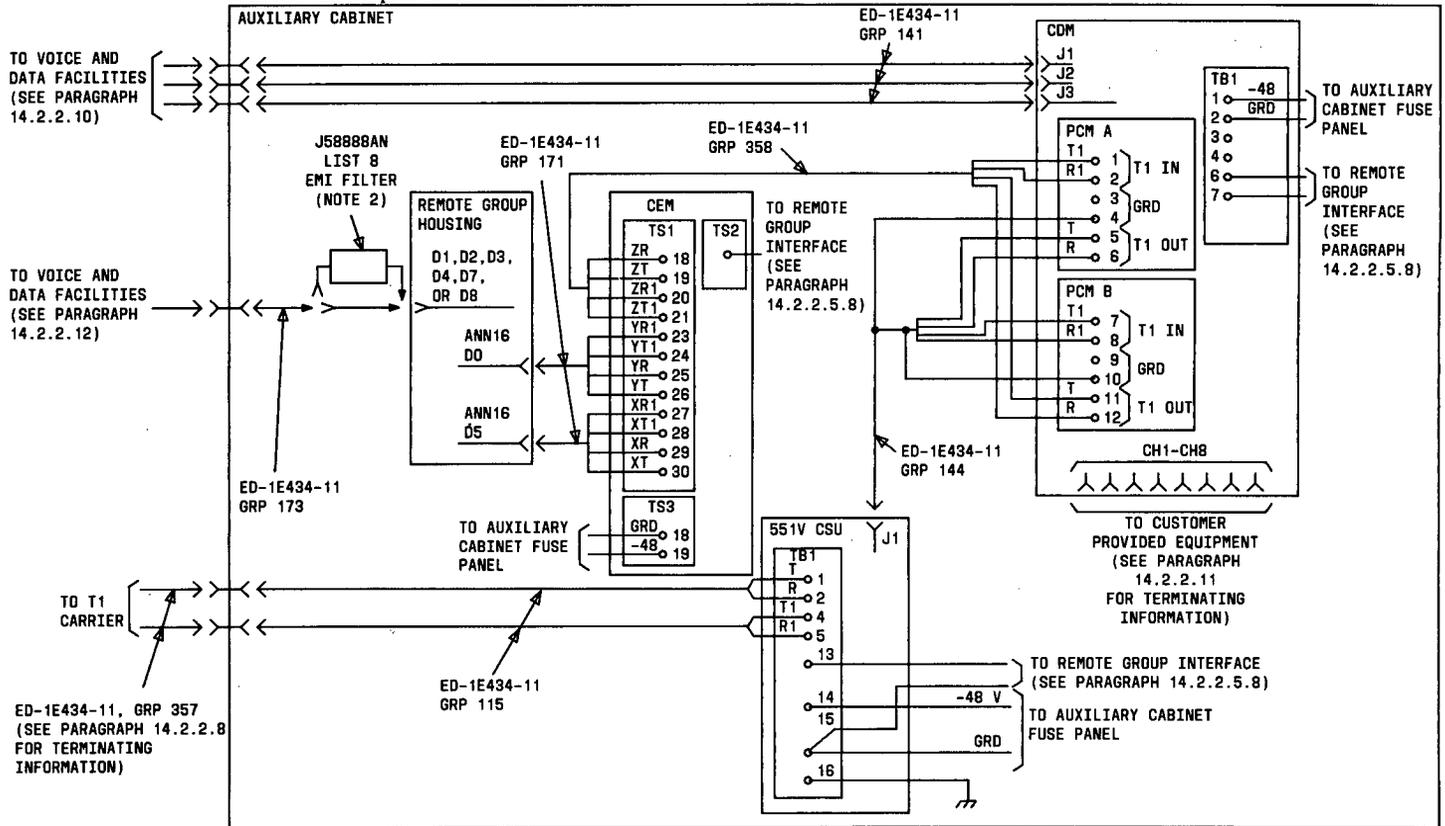
NOTE 2: This filter is required only if RGH is equipped with an ANN 17B, but a filter is required for each ANN 17B.



14.2.2.7.5 T1 carrier to remote group interface using CEM, CDM, and 551V CSU mounted in auxiliary cabinet

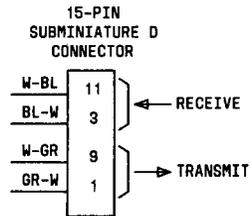
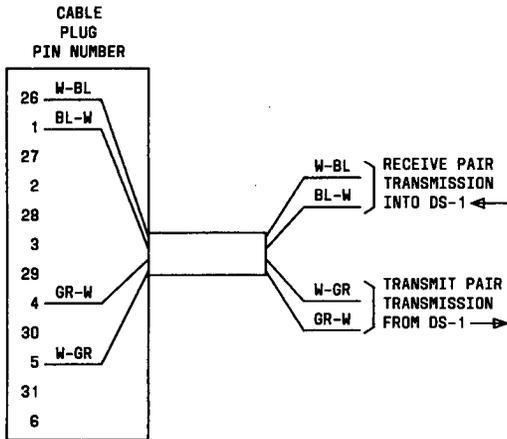
NOTE 1: The power, grounding and alarm leads are covered elsewhere in this part.

NOTE 2: This filter is required only if RGH is equipped with an ANN 17B, but a filter is required for each ANN 17B.

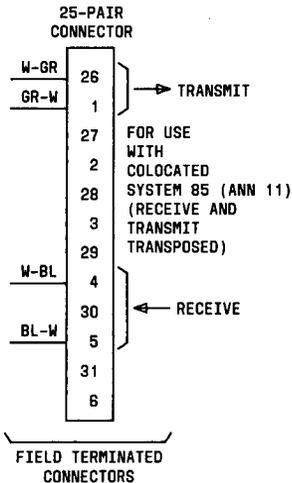


14.2.2.8 Attaching 15-pin or 25-pair plugs to ED-1E434-11 GRP 357.

Cable group 357 is a 6-pair cable with a 25-pair connector on one end. The other end is not connectorized. A 25-pair connector and a 15-pin subminiature connector is provided with the cable. Determine which connector is required and attach it to the cable.



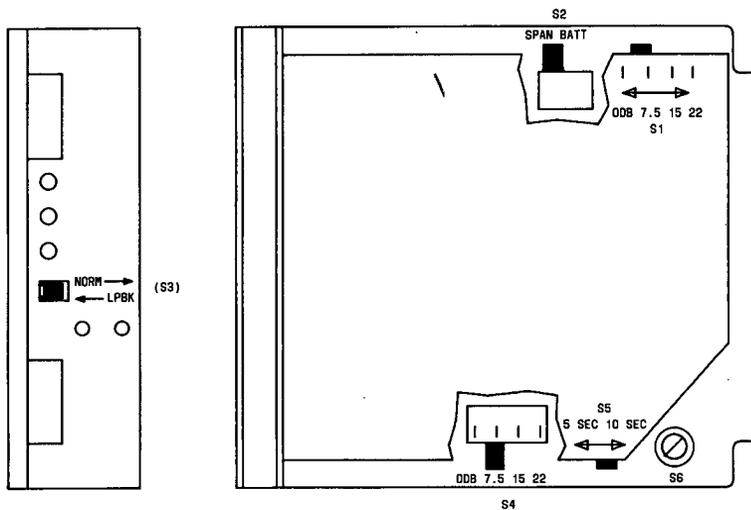
TO T1 FACILITY



14.2.2.9 Looping Office Repeater – This repeater is required at the local and remote location if the Remote Group Housing is more than 3400 cable feet from the ANN 15B 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 mounted in a small wall-mounted rack equipped with its own -48 V power supply.

14.2.2.9.1 Options

14.2.2.9.1.1 Option switch locations



14.2.2.9.1.2 LBO 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

14.2.2.9.1.3 Power switch S2

SETTING	POWER SOURCE
SPAN	60 or 140 ma span current
BATT	-48 V dc

14.2.2.9.1.4 Loopback switch S3

SETTING	OPTION
LPBK	Loopback operation
NORM	Normal operation

14.2.2.9.1.5 Loop-up timing switch (S5)

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

14.2.2.9.1.6 Fault locate switch S6

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

14.2.2.9.2 Connections

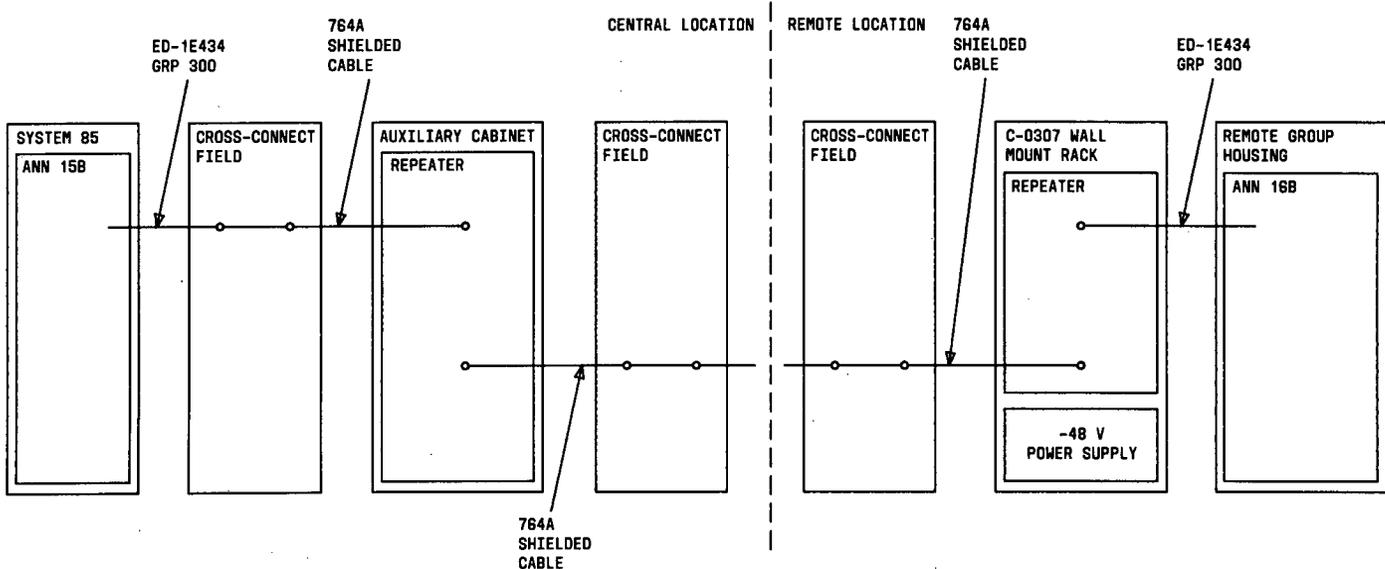
14.2.2.9.2.1 All of the connections should be wire wrapped to a 56-pin connector at the rear of the shelf. This is true for the rack-mounted shelf and the smaller wall-mounted unit used at the remote locations.

14.2.2.9.2.2 Block diagram of a Remote Group Interface using LOR

See paragraph 9.2.9 for ANN 15 connections and terminations.

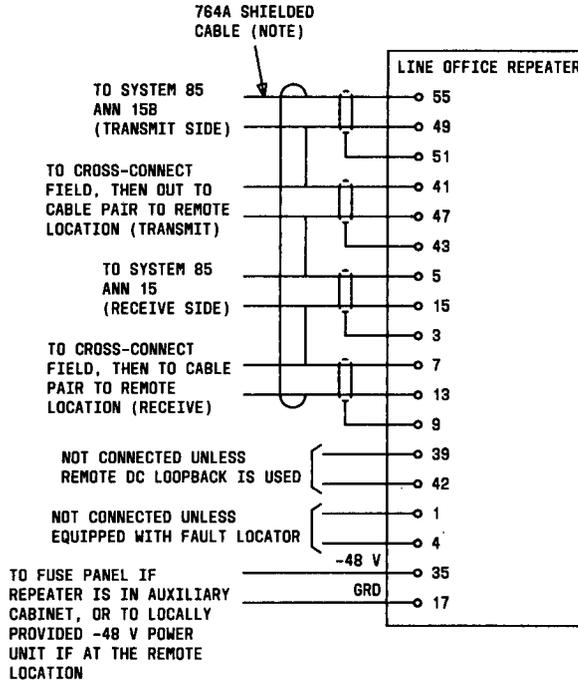
See paragraph 14.2.2.13 for ANN 16 connections and terminations.

See paragraph 14.2.2.9.2.3 for repeater connections.



14.2.2.9.2.3 Repeater connections

Note: Shield should be connected at cross-connect field and at repeater.



14.2.2.10 Terminating information for J1, J2, and J3 on CDM

14.2.2.10.1 24-channel CDM

CONNECTIONS FOR MODEL NO. 2521-024

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	CONNECT LEADS TO CORRESPONDING CONNECTING BLOCK TERMINALS FOR ASSOCIATED EQUIPMENT
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	

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	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

14.2.2.10.2 8-channel CDM

CONNECTIONS FOR MODEL NO. 2521-008

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	CONNECT LEADS TO CORRESPONDING CONNECTING BLOCK TERMINALS FOR ASSOCIATED EQUIPMENT
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

14.2.2.11 Terminations for CH1-CH8 Connectors on CDM

DATA CHANNEL CABLE CONNECTOR CABLE WIRING (CUSTOMER END)

CONN PIN NO.	CDM						CONNECT TO CUSTOMER INTERFACE CONNECTOR PIN NO.				
	DATA LEAD DESIGNATION FOR INTERFACE TYPE						INFOTRON V. 35	V. 35	RS-449	RS-422	RS-232
	INFOTRON V. 35 (NOTE 1)	V. 35 (NOTE 2)	RS-449 (NOTE 1)	RS-422	RS-232 (NOTE 3)	TTY					
1	GRD	GRD	GRD		GRD	GRD	1	I	I		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.

14.2.2.12 Port circuit pack terminating information

14.2.2.12.1 25-pair connector cable terminations for ANN 17B
 circuit pack in the remote group housing slots
 01, 02, 03, 04, 07, and 08

WARNING: *The ANN 17B 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 ANN 17B.*

LEAD DESIG	PIN NO.	COLOR
T00	26	W-BL
R00	1	BL-W
T01	27	W-O
R01	2	O-W
T02	28	W-G
R02	3	G-W
T03	29	W-BR
R03	4	BR-W
T04	30	W-S
R04	5	S-W
T05	31	R-BL
R05	6	BL-R
T06	32	R-O
R06	7	O-R
T07	33	R-G
R07	8	G-R
T08	34	R-BR
R08	9	BR-R
T09	35	R-S
R09	10	S-R
T10	36	BK-BL
R10	11	BL-BK
T11	37	BK-O
R11	12	O-BK
T12	38	BK-G
R12	13	G-BK

LEAD DESIG	PIN NO.	COLOR
T13	39	BK-BR
R13	14	BR-BK
T14	40	BK-S
R14	15	S-BK
T15	41	Y-BL
R15	16	BL-Y
T16	42	Y-O
R16	17	O-Y
T17	43	Y-G
R17	18	G-Y
T18	44	Y-BR
R18	19	BR-Y
T19	45	Y-S
R19	20	S-Y
T20	46	V-BL
R20	21	BL-V
T21	47	V-O
R21	22	O-V
T22	48	V-G
R22	23	G-V
T23	49	V-BR
R23	24	BR-V
GRDCOM	50	V-S
GRDCOM	25	S-V

14.2.2.12.2 25-pair connector cables terminations for SN228B, SN238, and SN270B
in Remote Carrier Group Housing slots 01, 02, 03, 04, 07, and 08

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

14.2.2.13 25-pair connector cable terminations for ANN 16 in remote group housing slots 00 and 05

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

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

PART 15. ATTENDANT CONSOLE

Contents

General	15.1
Requirements	15.2
Console Connections	15.3
Console Repeaters	15.4
Visually Impaired Attendant Console Adjunct	15.5

15.1 General

15.1.1 This section provides installation and connection information for attendant consoles and related hardware. This includes conventional attendant consoles, attendant console repeaters, and visually impaired attendant console adjuncts.

15.1.2 The console is equipped with an 8-foot long, 12-pair mounting cord that is connected to a B12A (12-pair) or B25A (25-pair) connecting cable from the system. The mounting cord is equipped with a 50-pin KS-16689, List 1 connector. The mating connector terminates the 12- or 25-pair connecting cable.

15.1.3 The range of the 12-pair cable is 700 feet and the range of the 25-pair cable is 1000 feet. This range can be extended to a maximum of 11,000 feet with attendant console repeaters. If the attendant console is located in a building other than the one in which the system is located, attendant console repeaters must be used.

15.1.4 Visually impaired attendant service is provided by using a light-sensitive probe, grooved console faceplate, and additional audible tones which identify the type of call. The system consoles allow plugging an audible tone adjunct directly into the console.

15.2 Requirements

15.2.1 The attendant console interfaces the system through four connector cables connected to the single console connector cable via a cross-connection arrangement on the auxiliary cross-connect field. The attendant console functions provided by the four connector cables are voice and control, power and ground, data channels, and alarms.

15.2.2 Cabling between the console and the system cabinets must be 24- or 26-gauge shielded cable using KS-16689 connectors with high hoods. Cables cut down on the back side of the 110 terminal block may be 22, 24, or 26 gauge. The jumper wires or cable cut down on the front side must be 24 gauge.

15.2.3 Each console connection requires a power cable from a module control or port cabinet that contains the power supply. A maximum of four consoles can be powered by a single power supply.

15.2.4 A shorting plug ED-1E434-11 GRP 360 is plugged into the connector associated with the 110 block chosen to be used to cross-connect the alarm leads. This will provide extension of the alarms to a maximum of 15 consoles. For a system to operate with more than 15 consoles, a second 110 block and shorting connector is required. See paragraph 15.3.4.

15.2.5 The first console cable (console 0) is run to a module control cabinet connector. This connector (CONS IN) is jumpered internally in the cabinet to the adjoining connector (CONS TST) and a cable is then run back to the auxiliary or white field. These jumpered connectors allow the console to be disconnected and a "test" console connected at the module control cabinet. All other console cables extend from the auxiliary field to the console location.

15.2.6 Due to differences in the installation environment, the path of the console cable from the main cross-connect field to the console location varies. The console cable may exit as part of a riser cable or as a separate 25-pair cable. This cable may go to a satellite cross-connect field and then to the console or directly to the console.

15.3 Console Connections

15.3.1 Connecting Instructions

15.3.1.1 This paragraph (15.3) shows the connections for a typical installation of a single console. The 110 connecting block used in this paragraph is randomly picked for the ease of explanation. The actual selection made by the craftperson should be made to allow for orderly growth. Each console requires cross-connections from four different circuits within the System 85. These four circuits are data channel leads from TN403 circuit pack in a common control cabinet, voice and control leads from an SN233 circuit pack in a port carrier, alarm leads from the alarm panel in the common control cabinet and power leads from a fan assembly in a network cabinet with a power supply.

15.3.1.2 Paragraph 15.3.2 shows a block diagram of the connections for a typical console. The terminations and connections for SN233 and TN403 can be found in Part 9, paragraph 9.2.9. Paragraph 15.3.3 is a suggested method of setting up a 110-type connectorized cross-connect field. The alarm leads are cross-connected from the MISC ALM connector on the common control cabinet. To obtain the multiple appearances of these alarm leads required for multiple consoles, perform paragraph 15.3.4. The power and ground leads are cross-connected from the CSL PWR connector on a network cabinet equipped with a rectifier. These terminations and connections are shown in paragraph 15.3.5.

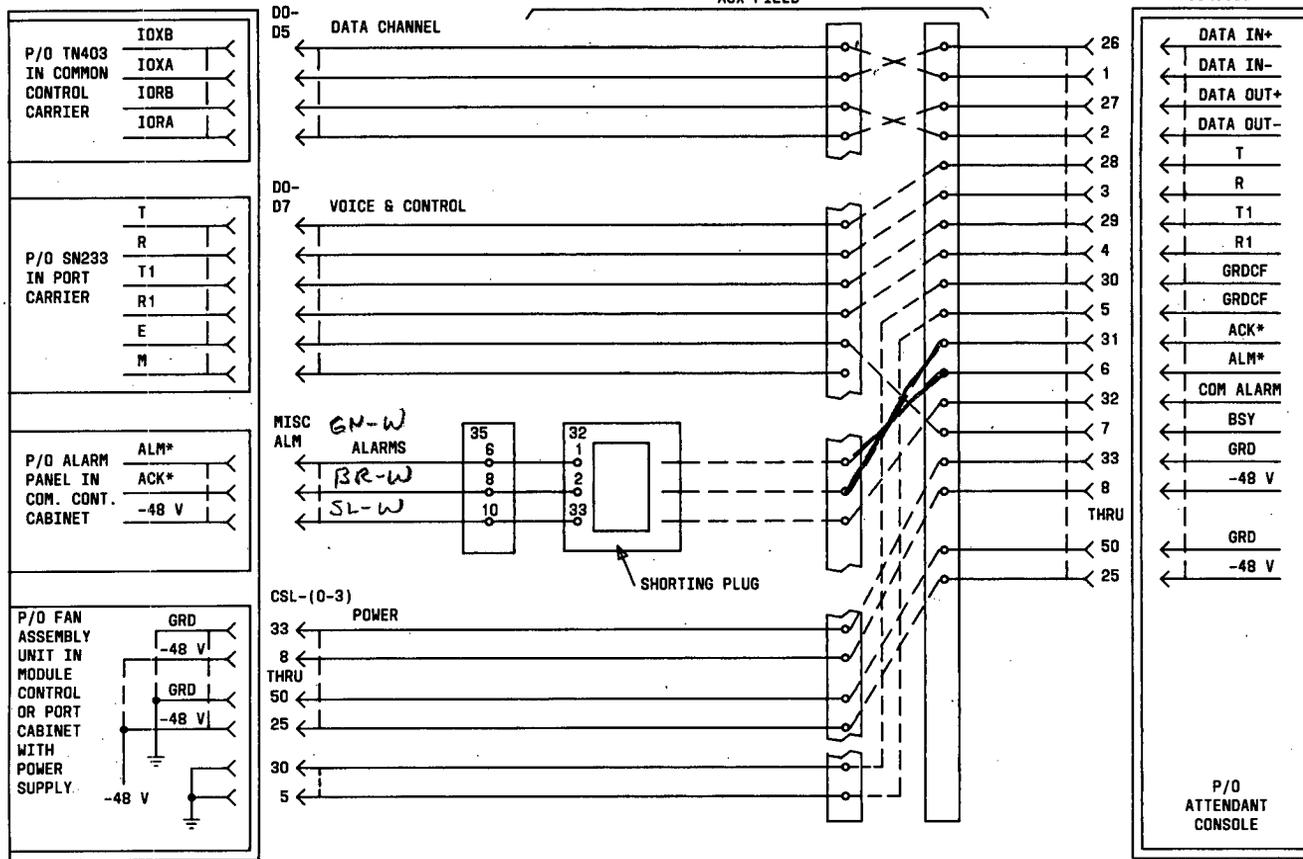
15.3.1.3 The leads from each of these circuits should be cross-connected to a connecting block used as the console connecting block. This is shown in paragraph 15.3.6. After these cross-connections are made, this block is connected to the console using a 25-pair cable and/or the console mounting cable. This is shown in paragraph 15.3.7.

15.3.1.4 As more consoles are added to the system, more of each type circuits will be required than one connecting block can provide. By using the CSD, Part 9 and this Part (15), the craftperson should be able to locate these circuits. These circuits should then be cross-connected to the desired 110 block for connection to the console.

15.3.1.5 The power for the consoles should be obtained from different cabinets as possible. This will reduce the possibility of a total console failure.

15.3.2 Block diagram-console connections

1 = BL-W
26 = W-BL



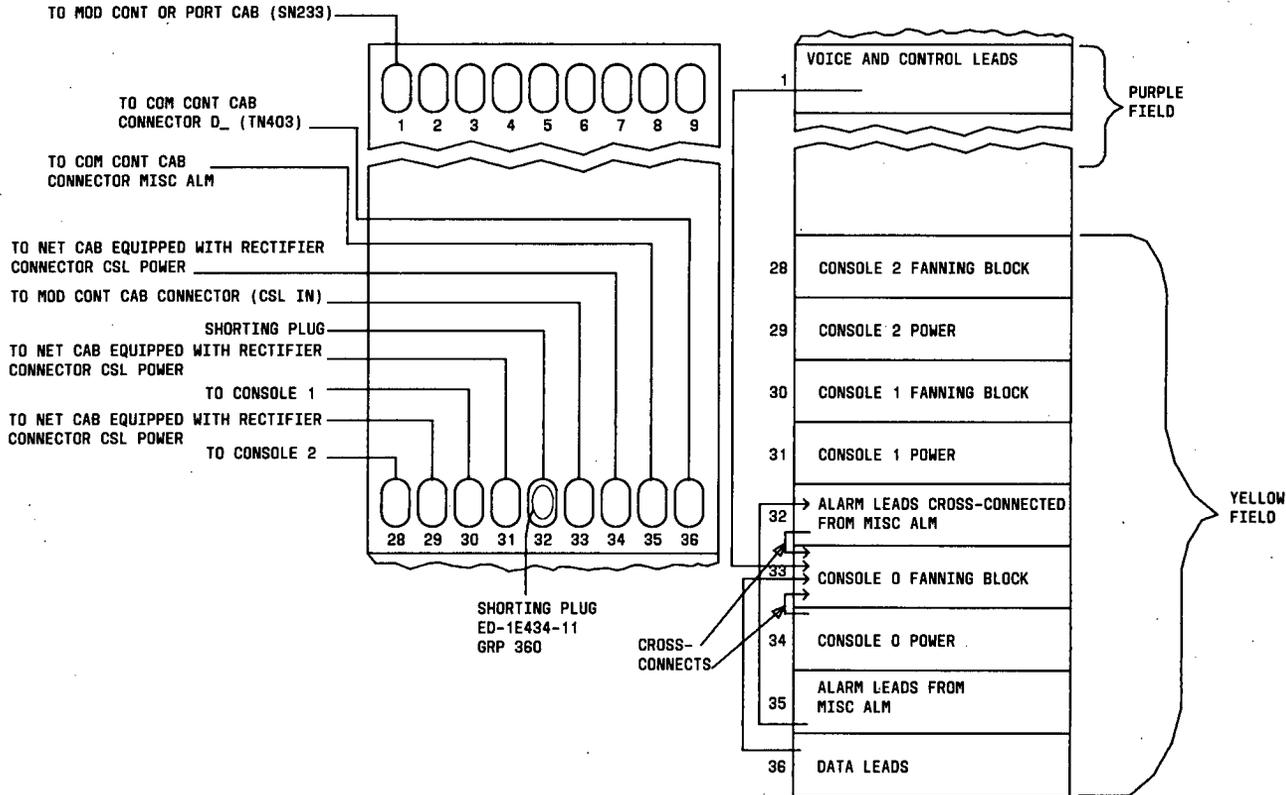
15.3.3 Setting up 110 cross-connect field

See Part 9, paragraph 9.2.9 for circuit pack connections and terminations.

See paragraph 15.3.4 for alarm lead cross-connections.

See paragraph 15.3.5 for CNSLO-3 terminations.

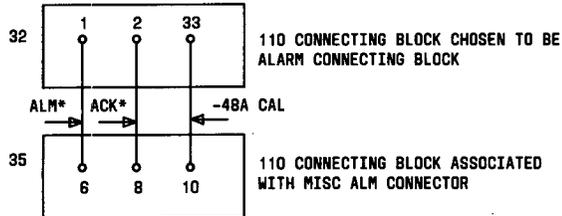
See paragraph 15.3.6 for console cross-connections.



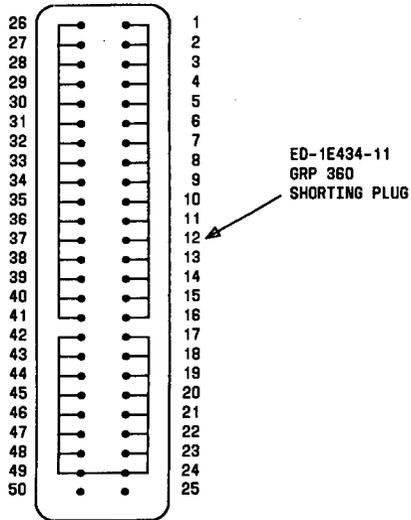
15.3.4 Fanning out alarm leads

15.3.4.1 Fanning out alarm leads with connectorized 110 connecting blocks

15.3.4.1.1 Cross-connect alarm leads from 110 connecting block associated with the MISC ALM to the 110 block chosen to be alarm connecting block.



15.3.4.1.2 Install shorting plug ED-1E434-11 Group 360 into 110 connecting block chosen to be alarm connection block (block 32 in this part).

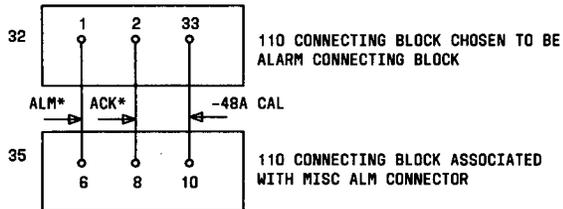


15.3.4.1.3 Lead designations for 110 connecting block chosen as alarm block

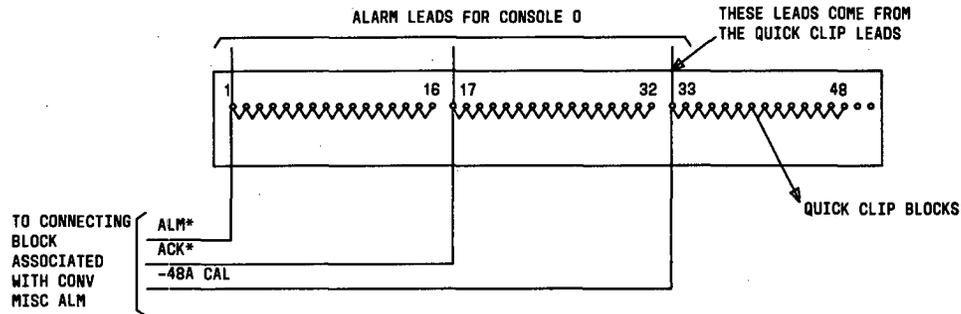
LEAD DESIGNATION	CONNECTING BLOCK TERMINAL																																			
ALM*	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31																				
ACK*	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32																				
-48ACAL	3	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48																				

15.3.4.2 Fanning out Alarm leads with nonconnectorized 110 connecting blocks

15.3.4.2.1 Cross-connect alarm leads from 110 connecting block associated with the MISC ALM to the 110 block chosen to be the alarm connecting block.



15.3.4.2.2 Install the Quick-Clip blocks on the terminals shown on the connecting block chosen as the alarm block



15.3.4.2.3 Lead designations for 110 connecting block chosen as alarm block

LEAD DESIGNATION	CONNECTING BLOCK TERMINAL															
ALM*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ACK*	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
-48ACAL	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

15.3.5 Connecting and Terminating information on CSL POWER CSL 0-3 connecting blocks.

LEAD DESIGNATION	CONNECTOR PIN NUMBER	COLOR	CONNECTING BLOCK TERMINAL
	26	W-BL	1
	1	B-W	2
	27	W-O	3
	2	O-W	4
	28	W-G	5
	3	G-W	6
	29	W-BR	7
	4	BR-W	8
GRDCF	30	W-S	9
GRDCF	5	S-W	10
	31	R-BL	11
	6	BL-R	12
	32	R-O	13
	7	O-R	14
GRD	33	R-G	15
-48C	8	G-R	16
GRD	34	R-BR	17
-48C	9	BR-R	18
GRD	35	R-S	19
-48C	10	S-R	20
GRD	36	BK-BL	21
-48C	11	BL-BK	22
GRD	37	BK-O	23
-48C	12	O-BK	24
GRD	38	BK-G	25
-48C	13	G-BK	26
GRD	39	BK-BR	27
-48C	14	BR-BK	28
GRD	40	BK-S	29
-48C	15	S-BK	30

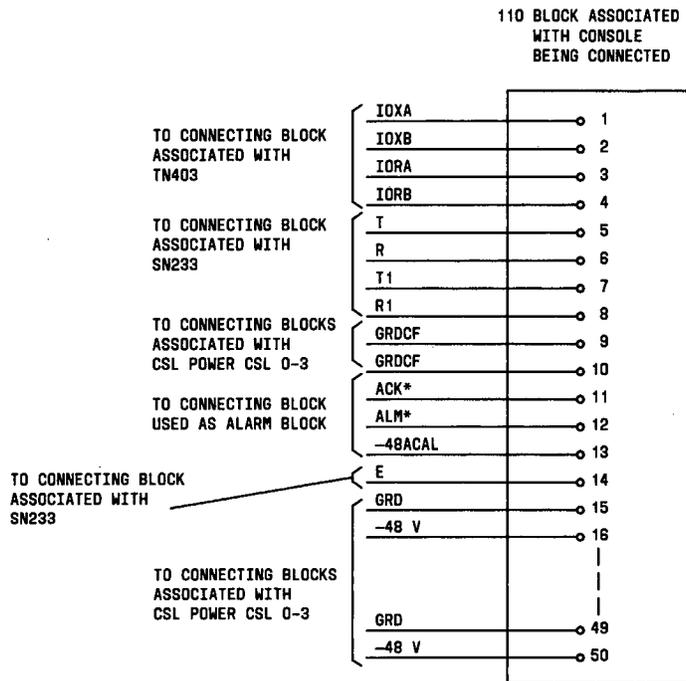
LEAD DESIGNATION	CONNECTOR PIN NUMBER	COLOR	CONNECTING BLOCK TERMINAL
GRD	41	Y-BL	31
-48C	16	BL-Y	32
GRD	42	Y-O	33
-48C	17	O-Y	34
GRD	43	Y-G	35
-48C	18	G-Y	36
GRD	44	Y-BR	37
-48C	19	BR-Y	38
GRD	45	Y-S	39
-48C	20	S-Y	40
GRD	46	V-BL	41
-48C	21	BL-V	42
GRD	47	V-O	43
-48C	22	O-V	44
GRD	48	V-G	45
-48C	23	G-V	46
GRD	49	V-BR	47
-48C	24	BR-V	48
GRD	50	V-S	49
-48C	25	S-V	50

15.3.6 Cross-connect to the 110 block associated with the console being connected

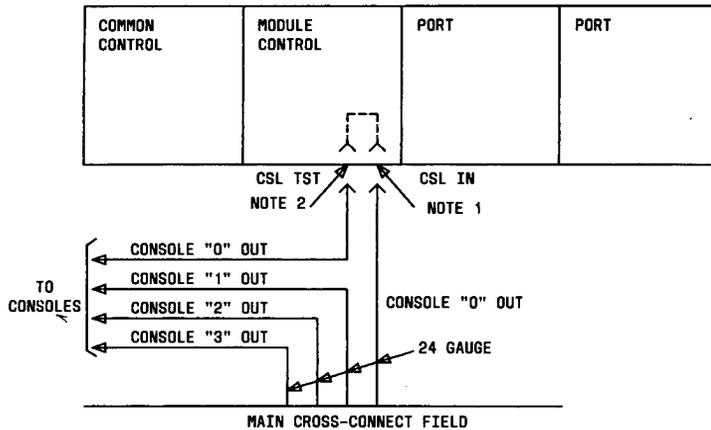
See Part 9, paragraph 9.29 for circuit pack termination.

See paragraph 15.3.4 for alarm lead connections.

See paragraph 15.3.5 for CSL POWER CSL 0-3 terminations.



15.3.7 Console connection from main cross-connect field to console



NOTES:

1. CONNECTORS LOCATED FACING CABINET REAR ON RIGHT SIDE AT MODULE CONTROL CARRIER Q1.
2. BREAK POINT FOR "TEST" CONSOLE.

15.4 Console Repeaters

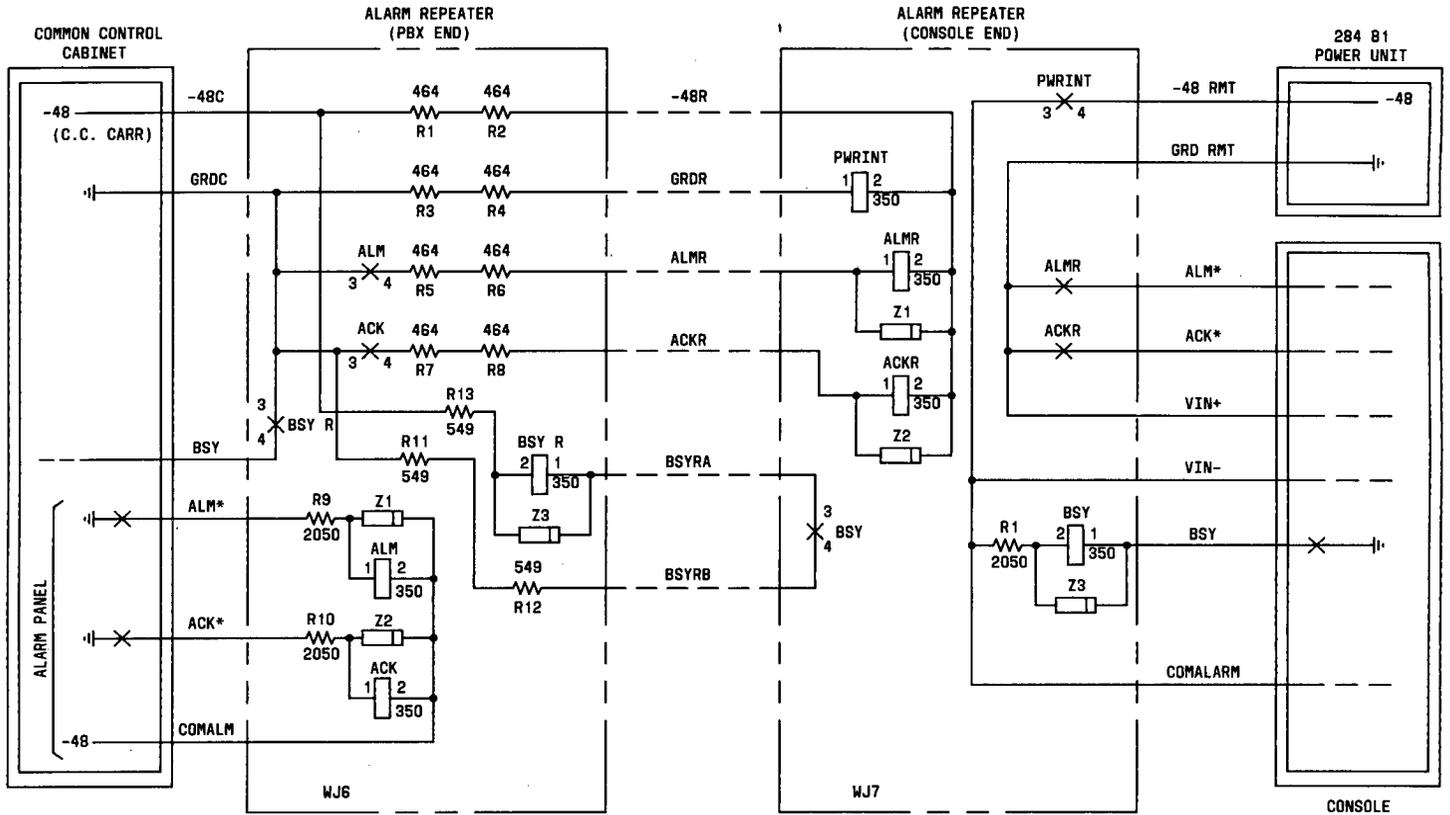
15.4.1 The console repeater consists of the J58889Y console range extender unit equipped with a 28D2 power supply and data channel repeaters (circuit packs AE48 and AE49). Two alarm repeater circuit packs are necessary for the console as shown in paragraph 15.4.5.

15.4.2 Console range can be increased from 1000 feet to 2000 feet by adding data channel repeaters (CP-AE49B and AE48) at one end if the console is located in the same building. This is illustrated in paragraph 15.4.6.

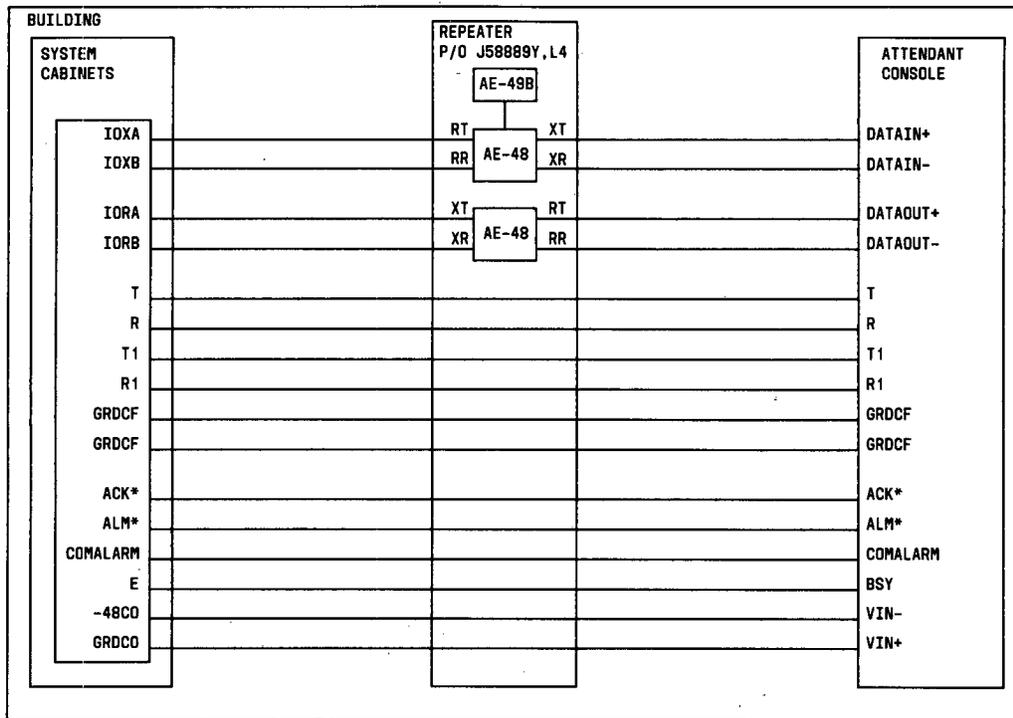
15.4.3 When the console is required to be off premises without range extension, the console repeaters require only data link buffers (circuit pack WJ3) to provide lightning protection on the data channels and the two circuit pack codes to provide protection of the alarm and power leads. This arrangement is shown in paragraph 15.4.7.

15.4.4 When the console requires off-premises range extension, one console repeater at each end provides a maximum of 3000 feet between repeaters plus an additional 1000-foot maximum at each end for a total of 5000 feet. A maximum of four repeaters can be used in series to achieve a total distance of 11,000 feet. Intermediate repeaters require no alarm lead repeaters. This arrangement is shown in paragraph 15.4.8.

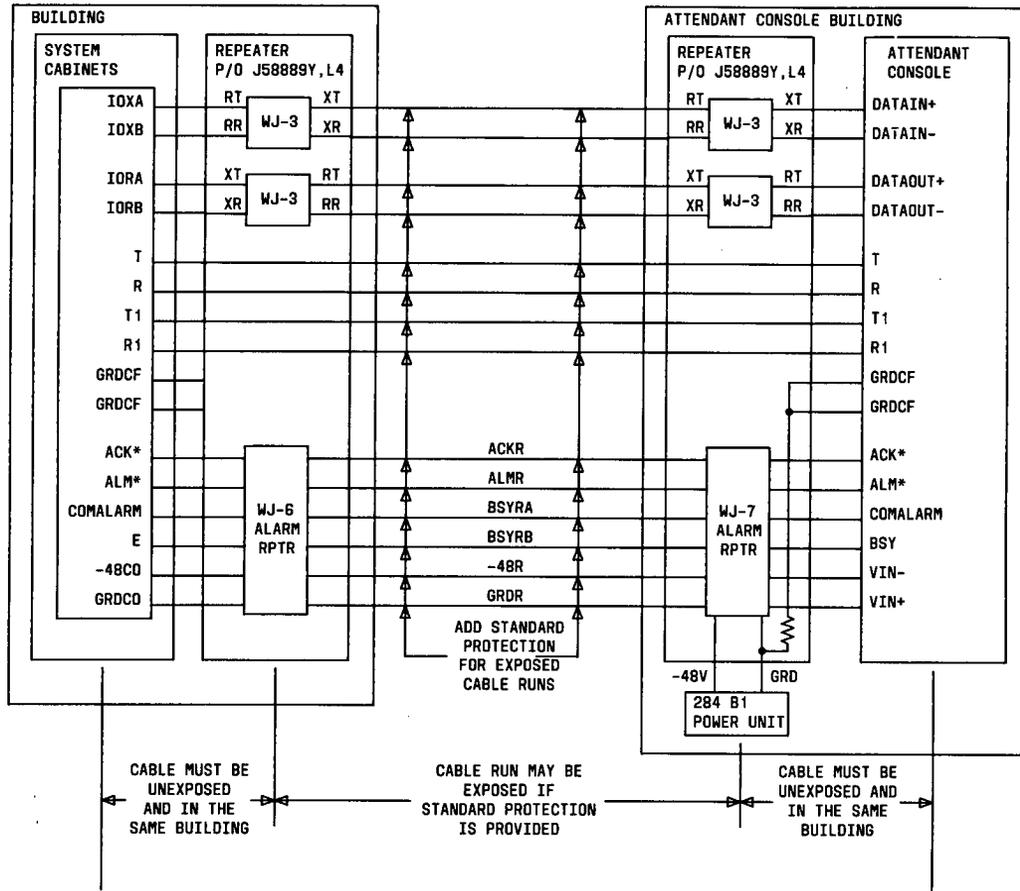
15.4.5 Alarm repeater circuit packs and connections



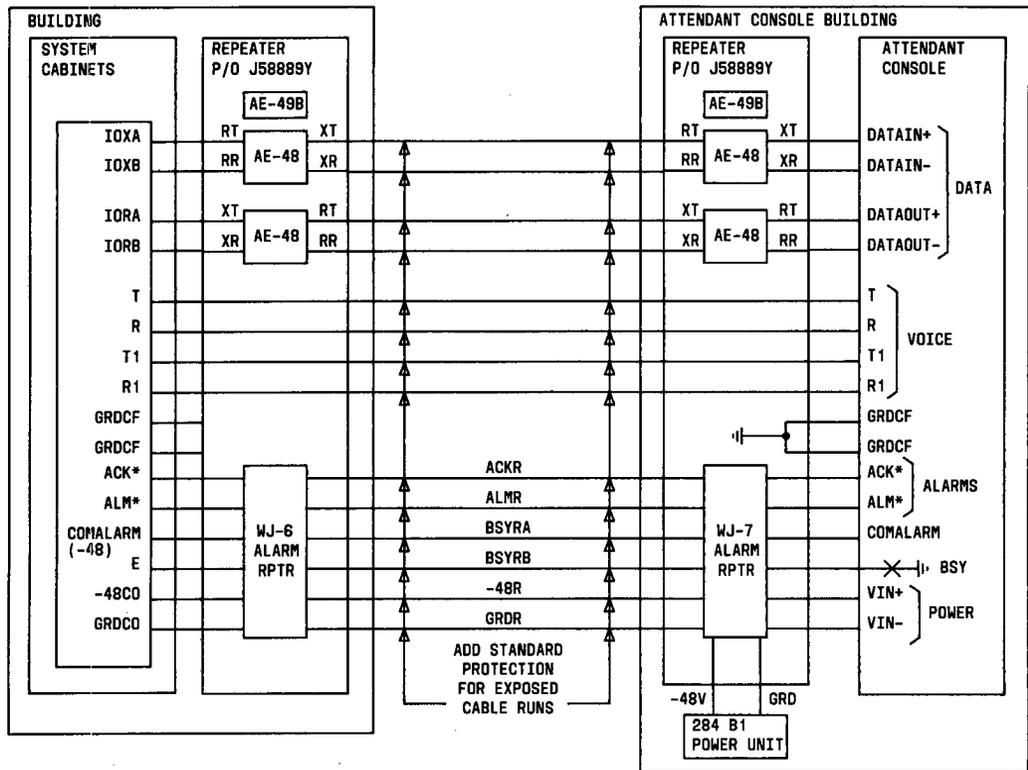
15.4.6 Range extension - system and attendant console
in same building



15.4.7 Off-premises console with lightning protection only



15.4.8 Off-premises console with range extension and lightning protection



15.5 Visually impaired attendant console adjunct

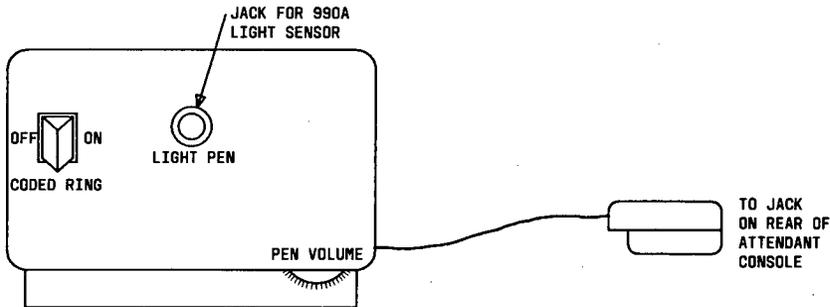
15.5.1 The visually impaired attendant console adjunct consists of a 990A light sensor, a 2A translator, and a 6C guide (console faceplate). The adjunct is used with a system console which is modified with a KS-16689 connector assembly in the console base.

15.5.2 990A light sensor

TO JACK
ON FRONT OF
2A TRANSLATOR



15.5.3 2A translator



15.5.4 The 6C guide (console faceplate) is installed by peeling off backing and placing it squarely on the existing faceplate on the console.

PART 16. Applications Processor (AP)

Contents

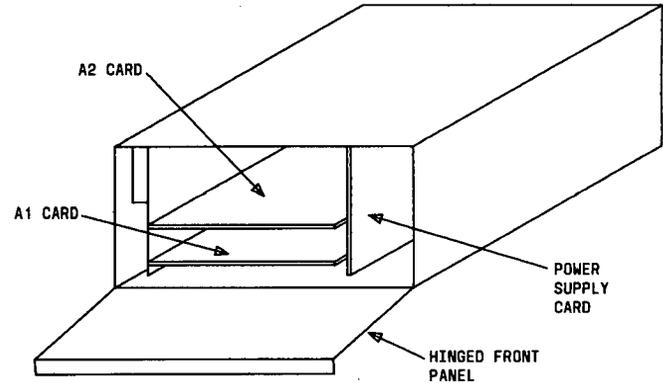
General	16.1
LADS Options	16.2
LDSU Options	16.3
212AR MODEM Options	16.4
801CR Data Auxiliary Set Options	16.5
AP to DCIU Using LADS/LDSU – Less Than 100 Feet Separation	16.6
AP to DCIU Using LADS/LDSU – Greater Than 100 Feet Separation	16.7
AP to DCIU Using IDI-105A, Less Than 400 Feet Separation	16.8
Dial Up Link Between AP and System 85 Using Modems	16.9
AP Maintenance Port	16.10
AP Intelligent Communications Interface (ICI) Connections	16.11
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AP EIA/ACU Cabling to Data Sharing Unit	16.13

16.1 General

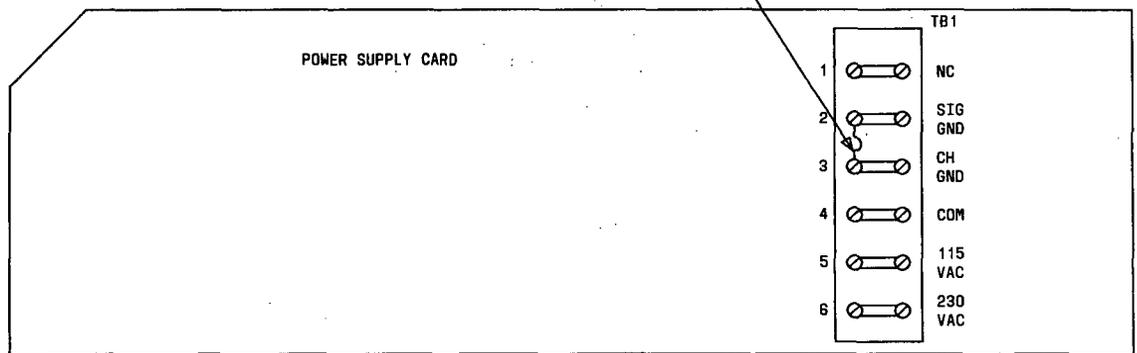
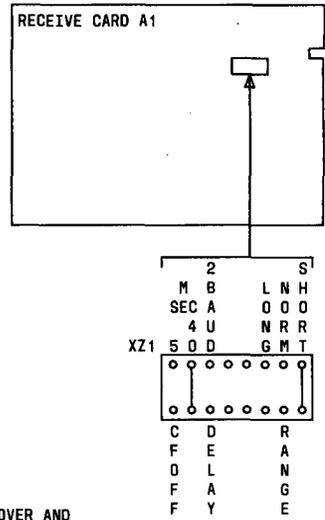
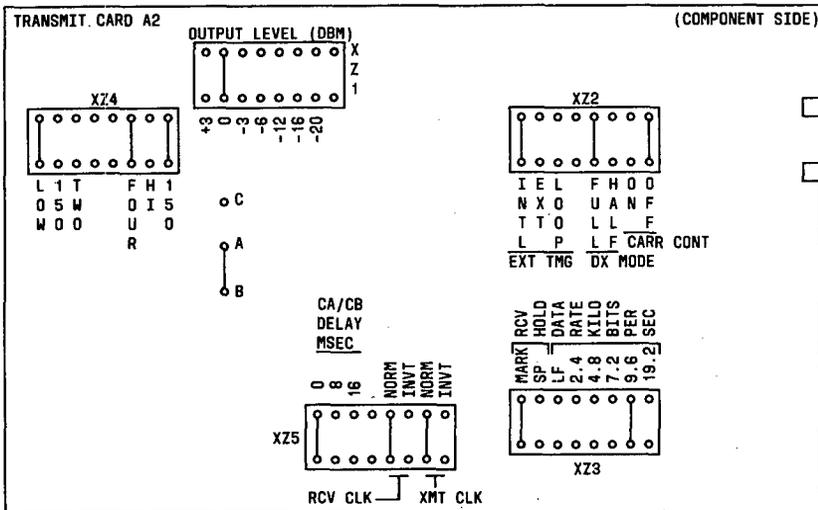
The AP is housed in a cabinet with the same dimensions as the System 85 cabinets. The AP and the System 85 combine to furnish several communications features. This section gives the connections between the System 85 and the AP. Additional information on the AP can be found in documentation written for the AP.

16.2 Local Area Data Sets (LADS) Options

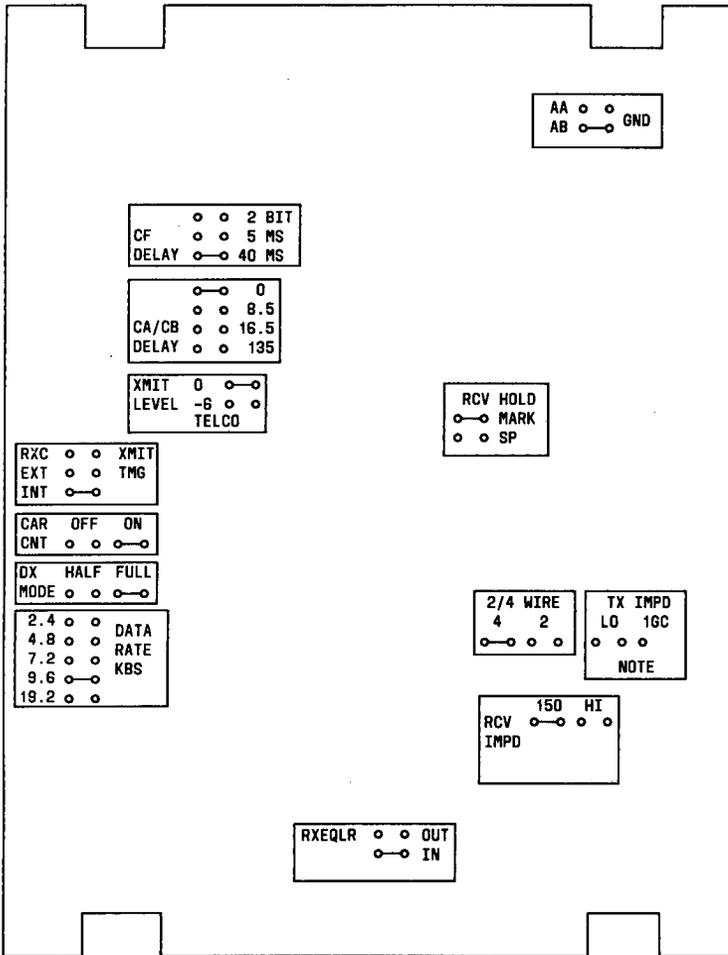
16.2.1 LADS – showing location of A1, A2, and power supply cards



16.2.2 LADS (48230) - option settings



16.3 Local Distribution Service Unit (LDSU) 48250 Options



NOTE:

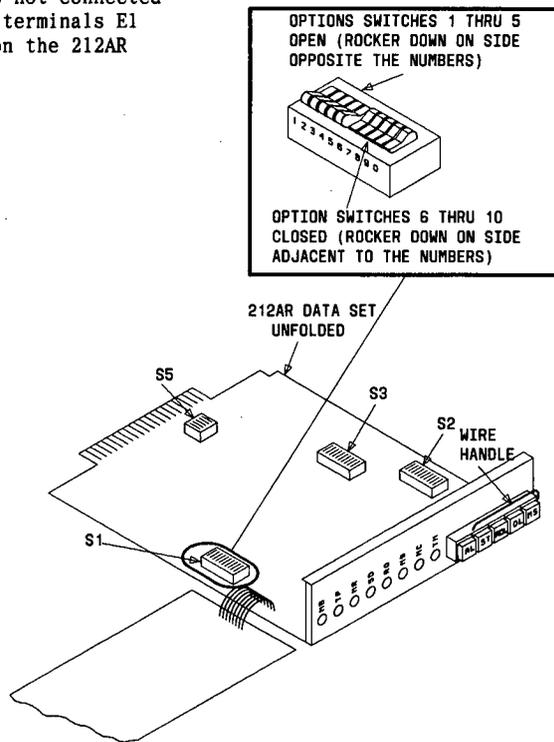
TX IMPD SWITCH IS SET TO 150 WHEN THE LDSU IS NONCOLOCATED. THE TX IMPD SWITCH IS SET TO HI WHEN THE LOSU IS COLOCATED.

16.4 212AR Modem (Data Set) Options

The screw switch S1 should be fully open so signal ground is not connected to frame ground. Plug in straps should be installed between terminals E1 and E2 and between terminals E3 and E4. The pushbutton switches on the 212AR should never be operated unless the modem is in the test mode.

212AR OPTIONS					
SWITCH	ROCKER	212 ASSOCIATED WITH			COMMENT
		AP16	AT&T SYSTEM 85 R2	AP16 MAIN-TENANCE PORT	
S1	1	O	C	O	C-CLOSE LOOP IN MB/AL MODE
	2	O	O	O	O-NO FUNCTION
	3	C	C	C	C-MODEM READY INDICATION IN AL MODE
S2	1	O	C	C	O=SPEED CONTROLLED BY PIN 23
	2	C	O	C	O=MB/AL CONTROLLED BY PIN 25
	3	O	O	O	O=HIGH SPEED INTERNAL TIMING
	4	O	O	O	
	5	O	O	O	O=HIGH SPEED ASYNCHRONOUS OPERATION
	6	C	C	C	C=10 BITS PER CHARACTER
	7	C	C	C	O=HIGH SPEED DL CONTROLLED REMOTELY
	8	O	O	O	O=RDL CONTROLLED BY PIN 21
	9	C	O	O	C=SPEED CONTROLLED BY PIN 23
S3	1	C	C	C	C-MODEM DISCONNECTS IF LOSS OF CARRIER
	2	O	O	O	C-MODEM DISCONNECTS IF SPACES RECEIVED
	3	C	C	C	C=NOT CLEAR TO SEND IF NO CARRIER
	4	O	O	O	C=SEND SPACES AT END OF CALL
	5	O	O	O	O=AUTOMATICALLY ANSWER INCOMING CALL
	6	O	O	O	O=NO ANSWER INDICATION ON PIN 22
	7	O	C	O	C=HIGH SPEED OPERATION ONLY
	8	O	O	C	C=SPEED INDICATION ON PIN 12
S5	1	O	O	O	O=HIGH SPEED ASYNCHRONOUS OPERATION
	2	O	O	O	

O= OPEN (ROCKER DOWN ON SIDE OPPOSITE TO NUMBERS)
C= CLOSED (ROCKER DOWN ON SIDE ADJACENT TO NUMBERS)

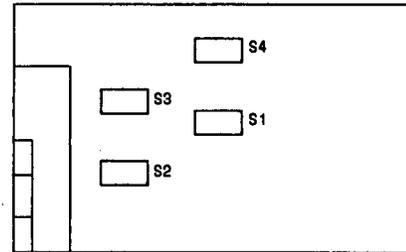


16.5 801CR Data Auxiliary Set Options

To separate frame ground from signal ground, the screw switch on the backplane of the unit must be set open (loosened). The pushbutton switches on the front panel should never be operated unless the automatic calling unit (ACU) is in the test mode.

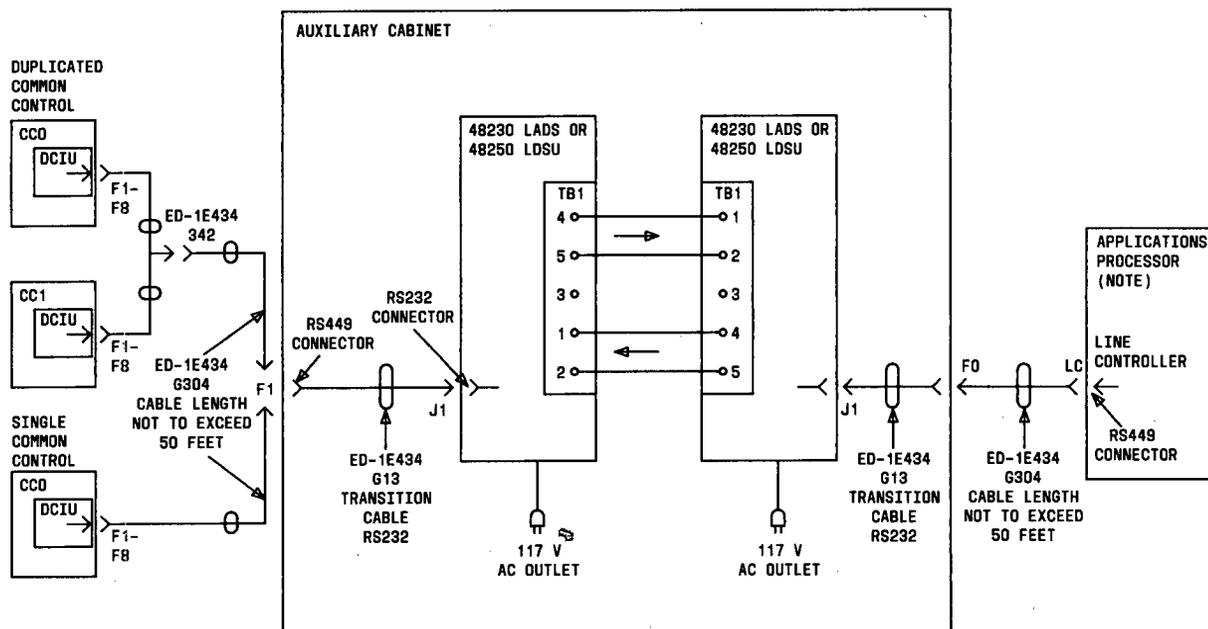
801CR DIP SWITCH SETTINGS

SWITCH	ROCKER	SETTING	COMMENT
S1	1	C	Grounded answer relay contact
	2	0	Loop start operation
	3	0	Grounded answer relay contact
	4	C	Clear signal to modem
S2	1	0	Loop start operation
	2	C	Detect 2225 Hz answer tone
	3	0	
	4	C	Loop start operation
S3	1	C	Stop ACR timer when modem goes on-line
	2	C	
	3	0	Modem goes on-line at start of answer tone
	4	0	ACR interval is 28 Sec (see note below)
	5	0	
S4	1	C	Loop start operation
	2	C	Modem disconnects when AP not ready



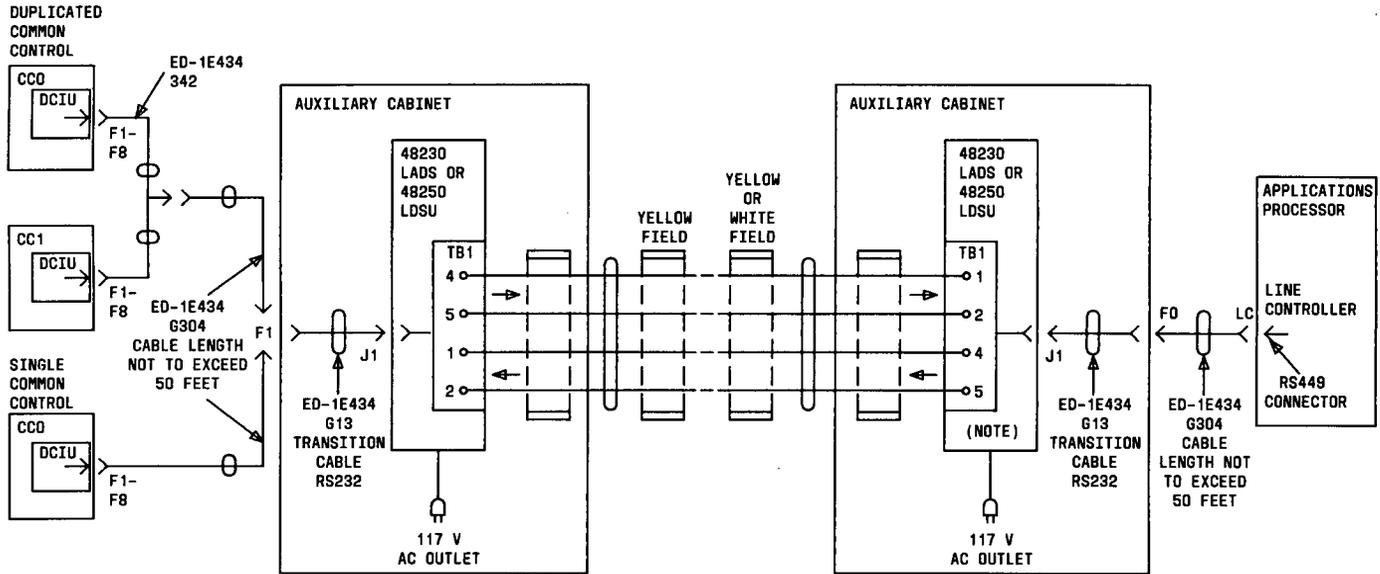
Note: Too short of an ACR interval may cause the ACU to tear down the call before the modem at the far end can return answer tone. Too long of an ACR interval may tie up the link and ACU longer than necessary. For long distance calls (dial 1 and Cornet), the ACR interval should be 28 seconds as shown in table. For local calls, 14 seconds is long enough, in which case switch 3 rockers 4 and 5 should be closed.

16.6 Applications Processor to System Connections Through DCIU and LADS/LDSU - Distance Less than 100 Feet



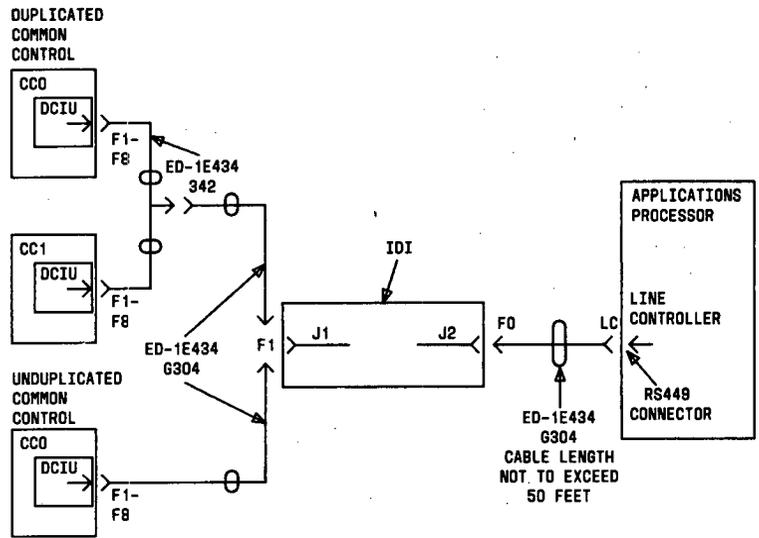
NOTE: FOR GROUND ISOLATION, THE LADS MUST BE PROVIDED IN THE DATA LINK, EVEN IF THE APPLICATION PROCESSOR CABINET IS IN THE SAME LINEUP WITH THE SWITCH CABINETS.

16.7 Applications Processor to System Connections Through DCIU and LADS/LDSU – Distance Greater than 100 Feet



NOTE: THIS LOCAL AREA DATA SET MAY OR MAY NOT BE IN AN AUXILIARY CABINET DEPENDING UPON CUSTOMER APPLICATIONS. IF AN AUXILIARY CABINET IS NOT PROVIDED, CONNECT ED-1E434-11 GROUP 13 DIRECTLY TO ED-1E434-11 GROUP 304.

16.8 Applications Processor to system connections through DCIU and IDI - distance less than 400 feet



16.9 Dial-Up Link Between the AP and AT&T System 85

16.9.1 See part 16.4 for 212AR option settings.

16.9.2 See part 16.5 for 801CR option settings.

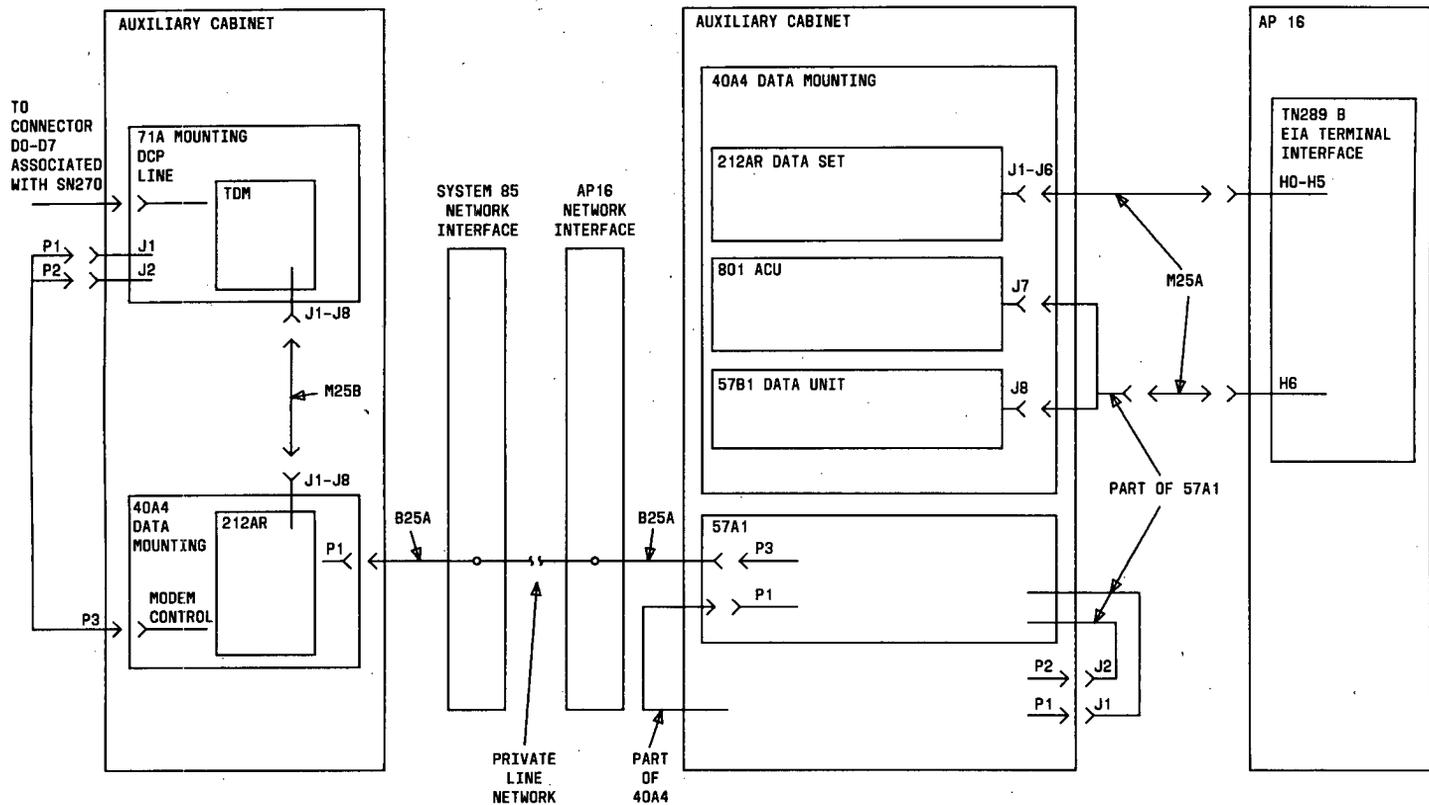
16.9.3 40A4 options

To separate the frame and signal grounds, remove the strap from the rear of the power unit. The MB and SL toggle switches should be in the UP position for each slot containing a modem.

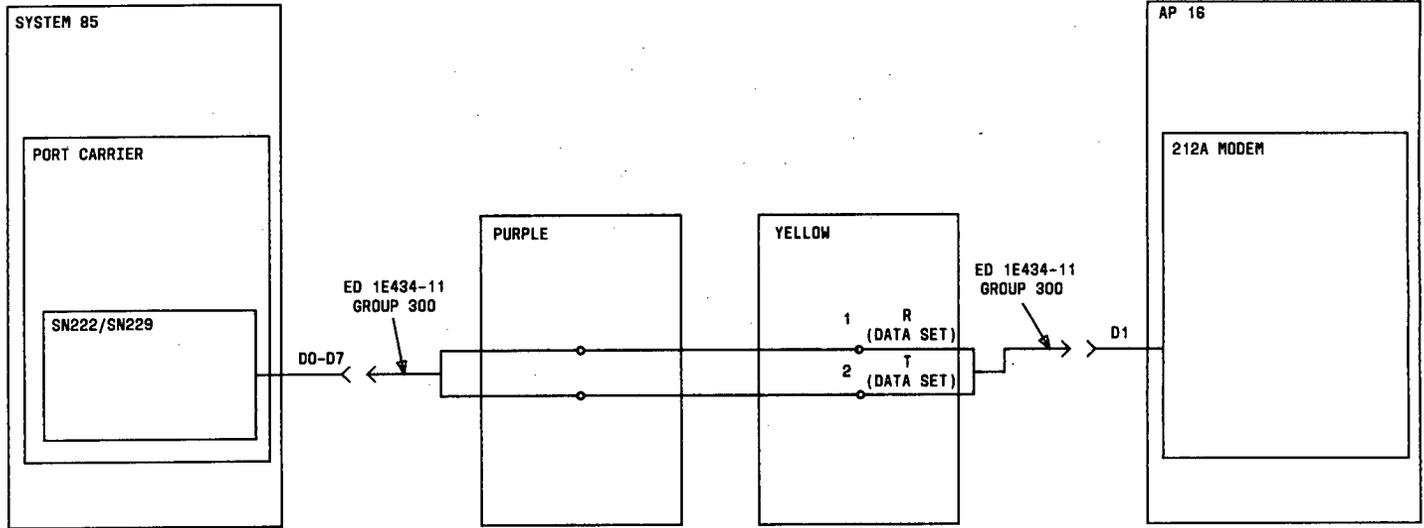
16.9.4 57B1 options

The MB toggle switch should be set to the right for each slot containing a modem. DIP switch S10 should have all four rockers open for the first or only 57B1 associated with a 801C and closed for a second (if provided) 57B1 associated with the 801C.

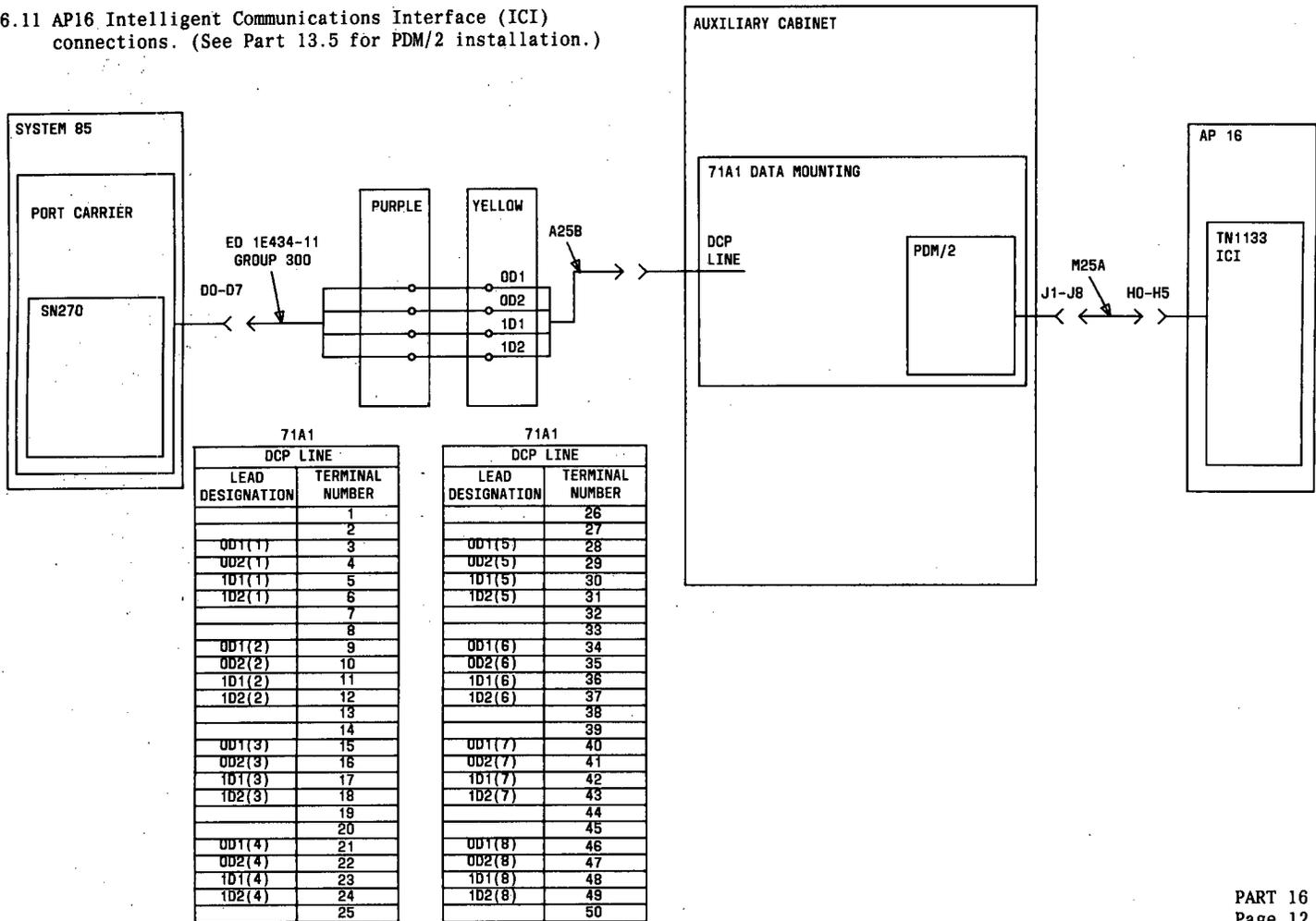
16.9.5 Dial up link between the AP and AT&T System 85



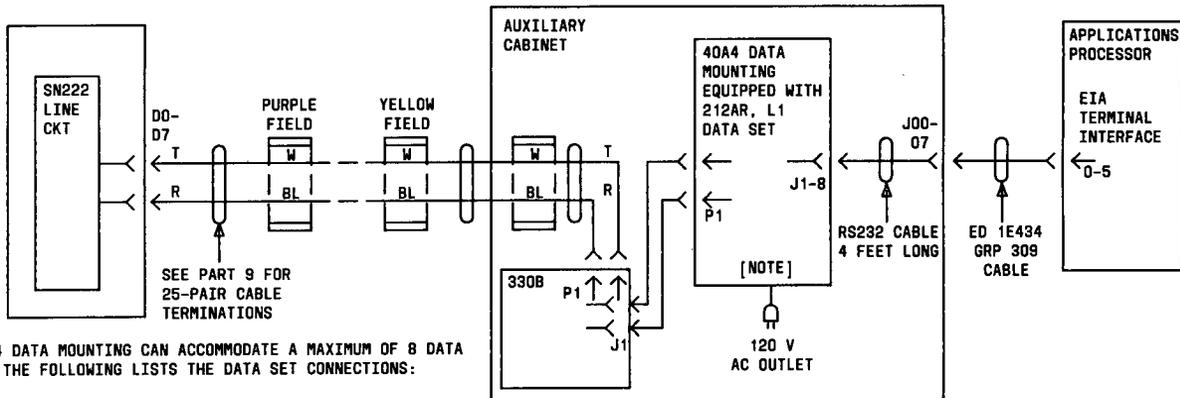
16.10 AP Maintenance Port
(See Part 16.4 for 212AR option settings.)



16.11 AP16 Intelligent Communications Interface (ICI) connections. (See Part 13.5 for PDM/2 installation.)



16.12 Applications Processor – Traffic
(See Part 16.4 for 212AR option settings.)



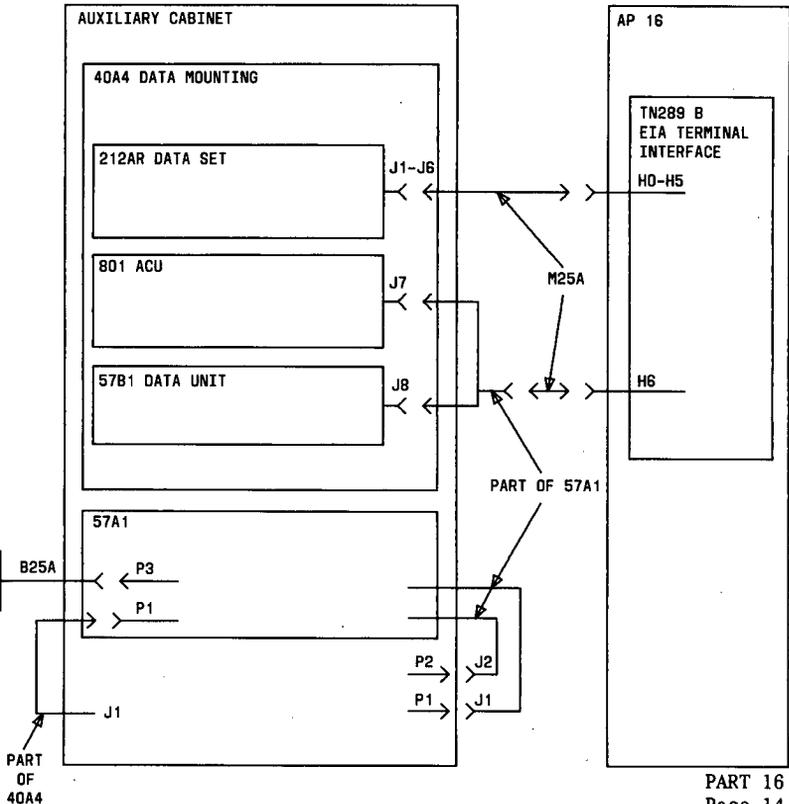
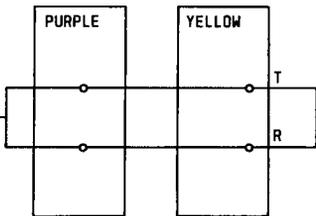
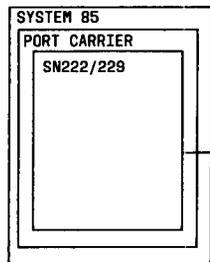
NOTE:
A 40A4 DATA MOUNTING CAN ACCOMMODATE A MAXIMUM OF 8 DATA SETS. THE FOLLOWING LISTS THE DATA SET CONNECTIONS:

LEAD NAME	PIN NO. OF P1 CONN ON 40A4	DATA SET SLOT	ASSOC RS232 CONN ON 40A4	ASSOC RS232 CONN ON BACK OF AUXILIARY CABINET
T	26	1	J1	J00
R	1			
T	27	2	J2	J01
R	2			
T	28	3	J3	J02
R	3			
T	29	4	J4	J03
R	4			
T	30	5	J5	J04
R	5			
T	31	6	J6	J05
R	6			
T	32	7	J7	J06
R	7			
T	33	8	J8	J07
R	8			

16.13 AP EIA/ACU Cabling to the Data Sharing Unit
 (See Part 16.4 for 212AR option settings.)
 (See Part 16.5 for 801CR option settings.)

57A1 CONN P3. LEAD DESIGNATION	TERMINAL NUMBER
T(1)	1
R(1)	2
T(2)	3
R(2)	4
T(3)	5
R(3)	6
T(4)	7
R(4)	8
T(5)	9
R(5)	10
T(6)	11
R(6)	12
	13
	14
	15
	16
TSLI	17
RSLI	18
MB2(1)	19
MB1(1)	20
MB2(2)	21
MB1(2)	22
MB2(3)	23
MB1(3)	24

57A1 CONN P3 LEAD DESIGNATION	TERMINAL NUMBER
MB2(4)	25
MB1(4)	26
MB2(5)	27
MB1(5)	28
MB2(6)	29
MB1(6)	30
	31
	32
	33
	34
TSLO	35
RSLO	36
	37
	38
	39
	40
RD(5)	41
RD(1)	42
RD(6)	43
RD(2)	44
	45
RD(3)	46
	47
RD(4)	48
	49
	50



PART 17. FINAL CABINET INSTALLATION

Contents

Installation and Connections 17.1
Rear Panels and Hole Covers 17.2
Carrier Covers 17.3
Document File Installation 17.4

17.1 Installation and Connections

- 17.1.1 Install shielded duct covers and end caps per paragraph 5.2.3 and 5.2.4.
- 17.1.2 Install any remaining cable duct assembly per Part 5.

3

- 17.1.3 On common control or port cabinets that do not have rectifiers, install lower rear panel.
- 17.1.4 Install braided ground strap (843637281) between each switch cabinet using lower rear cover mounting screws on adjacent cabinets as shown in Figure 17.1.

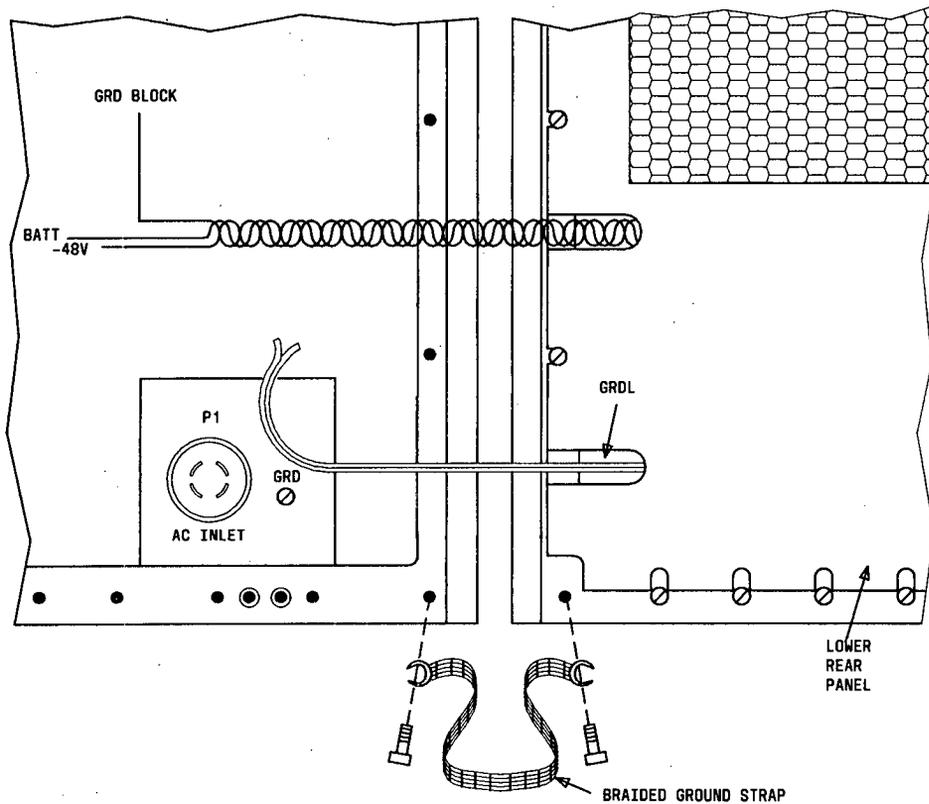


Figure 17.1 - Braided Ground Strap

17.2 Rear Panels and Hole Covers

Install all rear panels making sure all retaining screws are in place.

Install hole covers over all unused holes as shown in Figure 17.2. Unused holes are those which do not provided exit or entrance for any wiring.

Place wire covers over any exterior wires as shown in Figure 17.2. These covers maintain the integrity of the cabinet shielding.

Install ac power cables but do not plug into power outlet at this time.

17.3 Carrier Covers

At front of each cabinet, remove any shipping bars from the carriers. The common control carriers are normally shipped with bars. Other carriers may be.

Install the plastic covers on each carrier. These covers must be in place to provide the air flow to cool the carrier components.

17.3.1 A liquid anti-static coating has been applied to the plastic covers to prevent Electric Static Discharge (ESD) damage to circuit components. If fingerprints and smudges appear on these covers, and an attempt is made at cleaning, only a soft clean dry cloth or tissue may be used on the outside of the cover. Do not use any type of liquid cleaner. No attempt should be made to clean the inside surface.

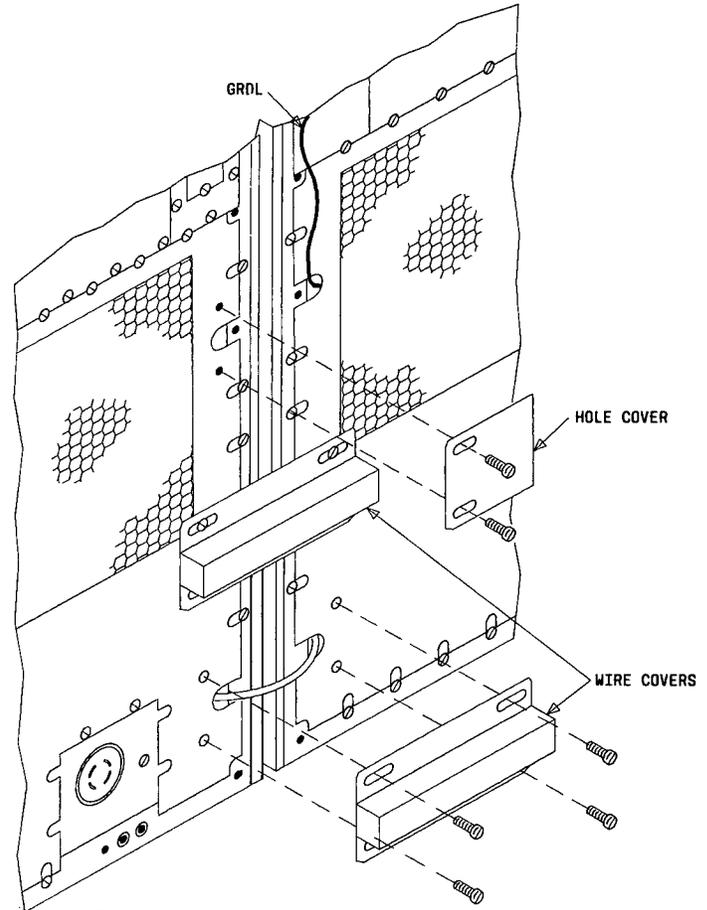


Figure 17.2 - Rear Panels and Hole Covers

17.4 Document File.

Position document file hooks over the upper edge of the cabinet side panel as shown in Figure 17.3. Slide file down until hooks are secured to cabinet edge. Open front door of document file to access holder assembly in bottom of file. Rotate the holder assembly until its hook is under the bottom edge of cabinet and tighten bolt to secure it.

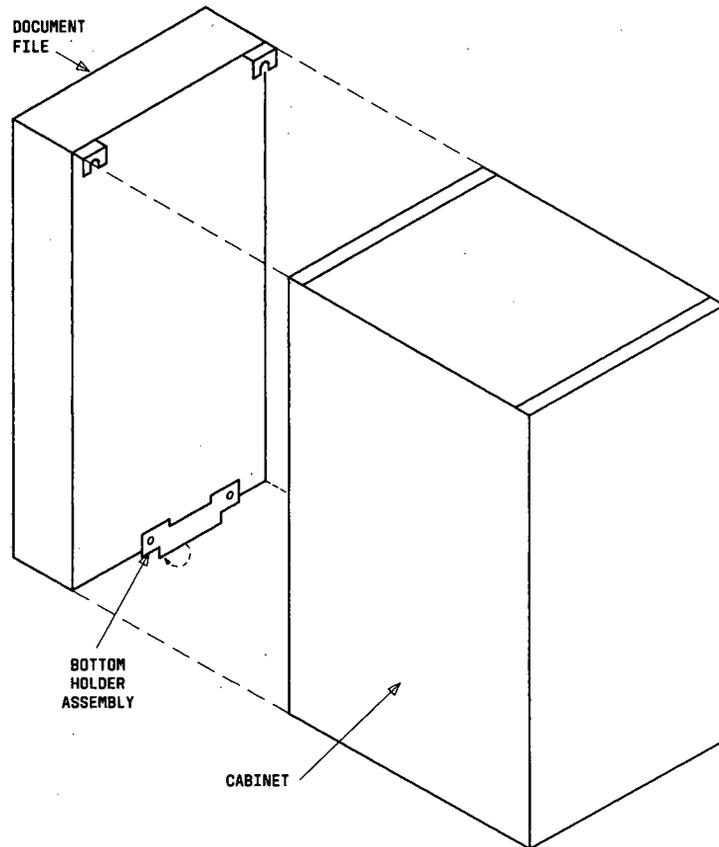


Figure 17.3 - Document File Installation

PART 18. POWER UP SEQUENCE

Contents

Inspection	18.1
Powering System Up	18.2

18.1 Inspection

18.1.1 Set the ac disconnect switch to **OFF**.

18.1.2 At 309A/310A power unit or the Bulk OLS power supply in module control and port cabinets, set the **AC INPUT** circuit breaker to **OFF**.

18.1.3 At the common control cabinet (if provided), set the 334A power unit or the Bulk OLS power supply **AC INPUT** circuit breaker to **OFF**.

18.1.4 At power supply (if provided) in auxiliary cabinet(s), set **AC INPUT** power switch to **OFF**.

18.1.5 At the cabinet containing the control carrier, set the memory holdover unit to **OFF**.

- module control cabinet – 311A, J87462, L5, 6, or 7 or PEC 3965-2
- common control cabinet – 312A or J87462, L5, 6, or 7 or PEC 3965-2

18.1.6 Verify that:

- circuit pack option settings are according to customer system document and PART 20
- all circuit packs are fully seated in proper slots
- all dc-dc converters are fully seated, all circuit breakers associated with the dc-dc converters to **ON**, and their switch latch is closed
- power supply power tap is set to 208 V.

18.1.7 Ensure that:

- all fuse holders are equipped with correct fuses
- all connector cables are properly labeled, plugged into proper connectors, and secured
- all foreign materials have been removed from the cabinet
- system is properly grounded.

18.1.8 Connect all cabinet ac power cords.

18.1.9 Set all cabinet circuit breakers to **ON** except the **AC INPUT** circuit breaker on the 309A/310A power unit or the Bulk OLS power supply in the module control and port cabinets, the **AC INPUT** circuit breaker on the 334A power unit or the Bulk OLS power supply in the common control carrier (if provided), and the **AC INPUT** power switch on the auxiliary power supply.

18.2 Powering System Up

18.2.1 At alarm panel:

- A. Set **EMERGENCY TRANSFER** to **NORMAL**.
- B. If equipped with duplicated common control, set **COMMON CONTROL** to **OFF**.
- C. Set **GO/HALT** to **GO**.

18.2.2 Place all ac circuit breakers in the system load center to **ON**, except the one for the applications processor (if provided).

18.2.3 Operate the ac disconnect switch to **ON**.

18.2.4 At the common control cabinet (if provided), set the 334A power unit or the Bulk OLS power supply **AC INPUT** circuit breaker to **ON**.

18.2.5 At 309A/310A power unit in module control cabinet, set the **AC INPUT** circuit breaker to **ON**.

- 18.2.6 At 309A/310A power unit in port cabinet(s), operate **AC INPUT** circuit breaker to **ON**.
- 18.2.7 If the cabinet containing the common control carrier is equipped with a J87462 power unit, verify the **Model Selector** switch is set to the correct list number.
- 18.2.8 At the cabinet containing the common control carrier, set the memory holdover unit to **ON**
- module control cabinet – 311A, J87462, L5, 6, or 7 or PEC 3965-2
 - common control cabinet – 312A, J87462, L5, 6, or 7. or PEC 3965-2
- 18.2.9 At auxiliary cabinet power supply (if provided), operate **AC INPUT** switch to **ON**.
- 18.2.10 Measure rectifier output voltages. Allow for the tolerance of the multimeter when making measurements.

18.2.11 Measure converter output voltages. Allow for the tolerance of the multimeter when making measurements. A red LED indicates a malfunction due to low voltage, high voltage, or overcurrent.

CONVERTER	VOLTAGE	MINIMUM	MAXIMUM
490AA	5 V	4.9	5.3
494GA	5 V	4.9	5.3
495FA	5 V	4.9	5.3

CABINET TYPE	POWER SUPPLY TYPE WITHOUT OLS	OLS POWER SUPPLY	VOLTAGE	MAX	MIN
Unduplicated Common Cont.	NA	PEC 3965-1	-48 V	-50.5	-45.5
Duplicated Common control	334A	NA	-48 V	-52	-46
RMI/TMS					
MODULE CONTROL or PORT	309A/310A		-48 V	-52	46
		PEC 3965-1	-48 V	-50.5	-45.5
Auxiliary	ITT 3947	NA	-48 V	-52.6	-46

PART 19. INITIAL SWITCH TEST

Contents

General	19.1
Test Procedure	19.2
Set System Clocks	19.3
Set Software/Hardware Time of Day Clock	19.4

NOTE: Before performing any of these tests, notify the RMATS center that the switch will be under test. This will prevent the RMATS center from reacting to any alarms they may receive. When the testing is completed, verify that RMATS received the alarms, then notify RMATS that testing is complete.

19.1 General

19.1.1 The initial testing of the switch equipment is performed after power is applied to the system. The first tests are the microdiagnostic tests, a series of 15 test programs used by the processor for fault detection within the processor and its associated components. With the exception of test 0, each microdiagnostic test uses circuits tested by the previous test. Therefore, the microdiagnostic tests should be run in numerical sequence starting with test 0 and progressing through test 9. A tape is then inserted in the minirecorder and tests 10 through 14 is run. Test 15 is the TAPE LOAD procedure and is not run until all system self-check (microdiagnostic) tests are completed and any fault conditions are cleared.

19.1.2 After the 15 microdiagnostic tests have been successfully completed, the next series of tests are to be performed with the X-Ray tape installed in the system minirecorder and the Maintenance and Administration Panel (MAAP) connected as a test set and data analysis tool. X-Ray is a test of the hardware components of the system and requires that certain hardware equipments or appropriate loop-around test devices be installed for peripheral equipment testing. The equipment requirements and testing procedures for conducting these tests is found in the service manual entitled AT&T SYSTEM 85 - X-Ray TESTS provided with the X-Ray tape.

19.1.3 When the X-Ray tests have been completed, remove the X-Ray tape and install the system program tape in the minirecorder and initialize the system. System initialization loads the memory with the parameters of the specific system including all preassigned customer features and services, line and trunk assignments as well as dial and feature access codes identified by the customer system document.

19.1.4 Customized Hardware and Pseudo Software (CHAPS) permits the operational field testing of the system before the customers tape and translations are available. The installer can use the CHAPS after X-Ray is completed to start testing the system. The system will be shipped with a CHAPS Customer System Document and tape.

19.2 Test Procedure

A. Microdiagnostics

Perform microdiagnostic tests 0 through 14 as covered in Table A.

B. X-Ray - Perform X-Ray tests as outlined in the service manual entitled AT&T SYSTEM 85 - X-Ray TESTS.

C. System initialization - unduplicated common control

1. Insert system program tape in minirecorder.
2. Set TEST SELECT switch to 15.
3. Set GO/HALT switch to GO.
4. Depress RESET, ENABLE.
5. Wait for tape to load (approximately 2 minutes) and PASS lamp to light. If PASS lamp fails to light after tape is fully loaded or if FAIL, PROC, MEM, BIT SWAP, and TAPE lamps light, refer to the service manual entitled AT&T SYSTEM 85 - MAINTENANCE for corrective procedures.

D. System initialization - duplicated common control

1. Set CCI GO/HALT switch to HALT.
2. Set the lock on-line switch to CCO.
3. Do the following operations at CCO.
 - a. Insert system program tape in minirecorder.
 - b. Set TEST SELECT switch to 15.
 - c. Set GO/HALT switch to GO.
 - d. Depress RESET, ENABLE.
 - e. Wait for tape to load (approximately 2 minutes) and PASS lamp to light. If PASS lamp fails to light after tape is fully loaded or if FAIL, PROC, MEM, BIT SWAP, and TAPE lamps light, refer to the service manual entitled AT&T SYSTEM 85 - MAINTENANCE for corrective procedures.
4. Set the lock on-line to OFF.
5. Set the CCI GO/HALT switch to GO.
6. Set the CCO GO/HALT switch to HALT.
7. Set the lock on-line switch to CCI.

D. System initialization-duplicated common control
(Contd)

8. Do the following operations at CC1:
 - a. Insert system program tape in minirecorder.
 - b. Set TEST SELECT switch to 15.
 - c. Set GO/HALT switch to GO.
 - d. Depress RESET, ENABLE.
 - e. Wait for tape to load (approximately 2 minutes) and PASS lamp to light. If PASS lamp fails to light after tape is fully loaded or if FAIL, PROC, MEM, and TAPE lamps light, refer to the service manual entitled AT&T SYSTEM 85 - MAINTENANCE for corrective procedures.
9. Set the lock on-line to OFF.
10. Set the CCO GO/HALT switch to GO.

19.3 Set System Clocks

- 19.3.1 To set system clock, the MAAP must be used to administer PROC 284.

To set the hardware and software clocks, PROC 652, test 3 must be administered.

- 19.3.2 To administer PROC 284, depress:

- PROC NO; 284; ENTER
- DISPLAY; EXECUTE

Time and Date appear in fields 1 through 5.

To change time or date, depress:

- CHANGE FIELD; (No. of field to be changed); ENTER
- (New data); ENTER

Repeat the above procedure for each field to be changed.

After all changes are made, depress:

- CHANGE; EXECUTE

TABLE A
MICRODIAGNOSTIC TEST PROCEDURES

TEST SELECT	PROCEDURE	PASS LAMP LIGHTS	PASS LAMP FAILS TO LIGHT OR FAIL LAMP LIGHTS	TEST SELECT	PROCEDURE	PASS LAMP LIGHTS	PASS LAMP FAILS TO LIGHT OR FAIL LAMP LIGHTS
0	Depress Reset, ENABLE	Proceed to next test	Refer to service manual entitled AT&T SYSTEM 85 - MAINTENANCE	9	Depress Reset, ENABLE	Proceed to next test	Refer to service manual entitled AT&T SYSTEM 85 - MAINTENANCE
1	Depress Reset, ENABLE	Proceed to next test		10	Connect MAAP to MAAP connector with the common control being tested. Insert program tape or X-Ray tape in minirecorder. Depress RESET, ENABLE	Proceed to next test	
2	Depress Reset, ENABLE	Proceed to next test		11	Depress Reset, ENABLE	Proceed to next test	
3	Depress Reset, ENABLE	Proceed to next test		12	Depress Reset, ENABLE	Proceed to next test	
4	Depress Reset, ENABLE	Proceed to next test		13	Depress Reset, ENABLE	Proceed to next test	
5	Depress Reset, ENABLE	Proceed to next test		14	Depress Reset, ENABLE	Remove tape from mini-recorder	
6	Depress Reset, ENABLE	Proceed to next test					
7	Depress Reset, ENABLE	Proceed to next test					
8	Depress Reset, ENABLE	Proceed to next test					

19.4 Set Software/Hardware Time-of-Day Clocks

19.4.1 To set the software and/or hardware time-of-day clock, administer PROC 652, test 3.

19.4.2 To administer PROC 652, Test 3 depress:

- PROC NO; 652; EXECUTE
- NEXT TEST; NEXT TEST; EXECUTE

Contents of PROC 652 displayed.

If Fields 2-5 are blank, there is no hardware time-of-day clock. If they contain data, there is hardware time-of-day clock.

If data in Fields 6-12 are correct, depress:

- CLEAR DATA; EXECUTE

If data is not correct depress:

- CHANGE FIELD; (Field to be changed); ENTER
- (New Data); ENTER

Repeat above procedure for each field to be changed.

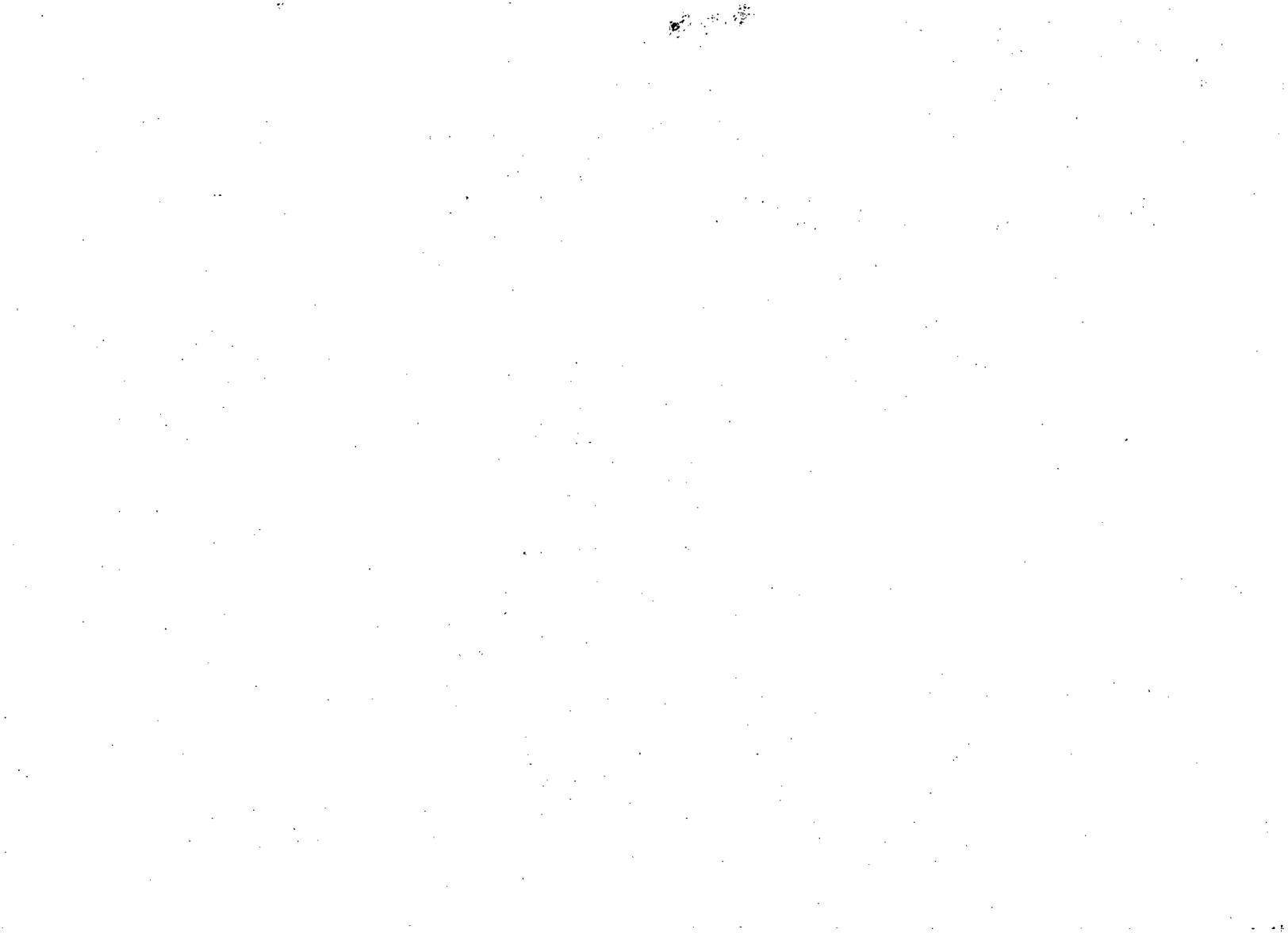
After all changes are made, depress:

- CLEAR DATA; EXECUTE

This sets both clocks equal to each other. To check to see if both clocks are equal depress:

- NEXT UNIT

Repeated use of NEXT UNIT toggles the display between the two clocks.



PART 20. CIRCUIT PACK DATA

Contents

General	20.1
Common Control Carrier and Associated Circuit Packs	20.2
Module Control Carrier and Associated Circuit Packs	20.3
Standard Port Carrier and Associated Circuit Packs	20.4
DS-1/MFAT Carrier and Associated Circuit Packs	20.5
Time Multiplex Switch Carrier and Associated Circuit Packs	20.6
Option Settings for Circuit Pack ANN 11B	20.7
Option Settings for Circuit Packs ANN 15 and ANN 16	20.8
Option Settings for Circuit Pack SN221	20.9
Option Settings for Circuit Pack SN224B	20.10
Option Settings for Circuit Pack SN228	20.11
Option Settings for Circuit Pack SN230	20.12
Option Settings for Circuit Pack SN231	20.13
Option Settings for Circuit Pack SN232B	20.14
Option Settings for Circuit Pack SN233B	20.15
Option Settings for Circuit Pack SN233C	20.16
Option Settings for Circuit Pack SN238	20.17
Option Settings for Circuit Pack SN243 and 243B	20.18
Option Settings for Circuit Pack SN243C	20.19
Option Settings for Circuit Pack SN250	20.20
Option Settings for Circuit Pack SN253B	20.21
Option Settings for Circuit Pack TN403	20.22
Option Settings for Circuit Pack TN492C	20.23
Option Settings for Circuit Pack TN513	20.24
Option Settings for Alarm Board AEH4	20.25
Procedures for Removing Circuit Packs From Common Control Carrier	20.26

20.1 General

20.1.1 Part 20 describes the various circuit packs associated with the system and the carrier and slot position each circuit pack occupies. Certain circuit packs have option switches that require setting. Included in this section is a list of those circuit packs and how the option switches are to be set.

20.1.2 Option settings by means of rocker-type switches use the following convention:

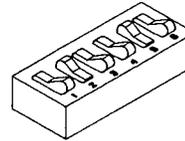
D - Down (switch contacts are closed)

U - Up (switch contacts are open)

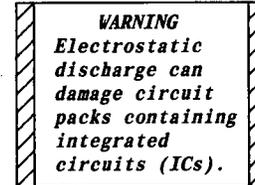
X - Don't care (switch contacts are not used and may be set in either position)

20.1.3 Switch sections are set down (closed) when the rocker end adjacent to the number is depressed and up (open) when the rocker end away from the number is depressed.

EXAMPLE:



SWITCH SECTIONS 2 AND 5 ARE DOWN (CLOSED)
SWITCH SECTIONS 1, 3, 4, 6 ARE UP (OPEN)



20.1.4 Installation personnel must always attach wrist grounding straps before handling circuit packs.

20.2 Common Control Carrier and Associated Circuit Packs
 (Sheet 1 of 2)

CARRIER SLOT POSITION	CIRCUIT PACK CODE	CIRCUIT PACK NAME	FUNCTION	NOTES
00	TN370	Sequencer	Contains the micro store and its logic	
01	UN151	ALU	Processes and temporarily stores data	
02	UN152	Instruction decoder	Contains special logic to accelerate the decoding of instruction fields	
03	UN153	Bus interface	Interfaces the cache bus and the system bus	
04	TN369	Cache memory	Contains frequently accessed instruction and data	
05	TN514	Scamper interface		
06	TN368	Memory protect	Prevents write operations in memory; also, performs sanity timing, bus resolutions, and miscellaneous control functions	
07	TN392	1 Meg RAM memory	Provides 1 megaword (16-bit words of memory)	
08				
09				
10				
11				
12		Unequipped		
13				
14				
15				
15	TN513	DCIU test support	Provides memory expansion for the DCIU	
16	TN406	DCIU processor memory	Provides the control and status registers used for passing information between the DCIU and processor	
17	TN405	DCIU system interface	Provides arbitration control for DCIU local bus and 128 kbytes of RAM for data storage	
18	UN156	DCIU I/O	Provides interface between DCIU and an external processor	
19	UN158	Duplicated controller	Selects common control, passes data between the controllers	
20	TN430	Tape interface	Connects the minirecorder to the processor	
21	TN404	I/O buffer	Buffers data and control leads	

20.3 Module Control Carrier and Associated Circuit Packs (Sheet 1 of 2)

CARRIER SLOT POSITION	CIRCUIT PACK CODE	CIRCUIT PACK NAME	FUNCTION	NOTES
00A	495FA	Power unit	DC-to-DC converter.	Provides +5 V for left 1/2 module control carrier.
00B	494GA		DC-to-DC converter.	For a single module unsynchronized switch, slots 00B, 01, and 02 are empty and TN460 (module clock) is used in slot 03. For a single module synchronized switch, slots 00B and 01 are empty, TN481 (light guide interface) is used in slot 02, and TN441 (TMS intermodule data store) is used in slot 03. For a duplicated multimodule switch, 494GA power unit is used in slot 00B, TN481 is used in slot 01, slot 02 is empty, and TN441 is used in slot 03.
01	TN481	TMS lightguide interface	Receives serial data from the intermodule data store and transmits it to TMS.	
02	TN481 or TN463	TMS lightguide interface	Provides synchronization of clock signals with an external clock.	
		System clock synchronizer		
03	TN441 or TN460C	TMS intermodule data store	Connects to the module buses and provides many functions for the intermodule calls.	
		Module clock	Source of timing in the module control.	
06 07 08 09 10 11	TN440B	Port data store	Provides an interface between serial and parallel data.	PDS supports 265 port circuits or two standard port carriers or four electronic telephone mode (ETM) half density carrier.
12	TN446	TSI ALU	Stores switching instructions for the TSI arithmetic logic unit to execute, and provides error detection and control functions.	One required for each module control.
13	TN445	TSI P-store	Provides execution logic for the switching instructions stored in the time slot interchange P-store.	One required for each module control.
14	TN444B	Maintenance interface	Interfaces the scanner to all the circuits in the module control for most maintenance purposes.	One required for each module control.
15	TN530	Duplication/update channel	Provides the hardware to link duplicated module control carrier in a module.	One required for each module control unit only for multimodule system - critical reliability application.
16		UNEQUIPPED		
17	TN380B	Module processor	Major control unit between the CC processor and the digital network.	One required for each module control unit.

20.4 Standard Port Carrier and Associated Circuit Packs (Sheet 1 of 2)

CARRIER SLOT POSITION	CIRCUIT PACK CODE	CIRCUIT PACK NAME	FUNCTION	NOTES
04	TN454	Port data interface	Provides the timing necessary to synchronize the port PCM or data to the network time slot.	(1) Port data interface for half a port carrier.
09	TN452	Universal port control interface	Provides I/O bus signal control.	One required for left half port carrier.
10	494GA	Converter 50W ±5 V	Provides power for one port group.	One required for right half port carrier.
11	494GA	Converter 50W ±5 V	Same as position 10.	
17	TN454	Port data interface	Same as position 04.	
***	NOTE	Carrier positions 00-03, 05-08, 13-16, 18-21 are universal port positions which can accept most port circuit packs - port circuit packs for use in these positions are described as follows:		
	ANN17B	Multifunctional analog terminal	Provides interface between digital switch and 7300S series voice terminal.	Cannot be used in slots 05 and 18, only four ports are used in a port carrier.
	SN221B/ SN228	Off-premises line circuit	Interface to analog telephone sets.	One SN221B/SN228 provides interface to eight ports for analog telephone sets for off-premises application.
	SN222B/ SN229	On-premises line circuit	Interface to analog telephone sets.	One SN222B/SN229 provides interface to eight ports for analog telephone sets with message waiting capabilities.
	SN224B	Line circuit (MFET/MET)	Interface to multifunction electronic telephone (MFET) and multibutton electronic telephone (MET) sets.	One SN224B provides interface to four ports for electronic telephone sets.
	SN230	Central office trunk (ground start)	Interface to central office trunks.	One SN230 provides four CO trunk ports.
	SN231	Auxiliary trunk	Interfaces with auxiliary units that require analog signaling.	One SN231 provides four trunk ports.
	SN232B	Direct inward dial trunk (DID)	Interfaces with direct inward dial central office trunks.	One SN232B provides four CO trunk ports.
	SN233C	Tie trunk/attendant interface	Interfaces the system to a tie trunk going to another system or to an attendant console.	One SN233B provides four port circuits.
	SN238	EIA port	Provides interface between the digital switch and general trade devices that employ an EIA-RS232C signaling protocol.	Provides four port interface circuits.

20.4 Standard Port Carrier and Associated Circuit Packs - (Sheet 2 of 2)

CARRIER SLOT POSITION	CIRCUIT PACK CODE	CIRCUIT PACK NAME	FUNCTION	NOTES
	SN241	Contact interface circuit	Provides the system a contact closure for use in features such as uniform Call Distribution (UCD).	One SN241 provides eight contact closures.
	SN243B	Data port circuit	Provides a loop signaling trunk with a line circuit function on the trunk side, includes ring, ring trip, dial tone, etc.	One SN243B provides four port circuits.
	SN244	Automatic number identification data transmitter circuit	Transmits station and trunk numbers for calls that are to be identified for billing purposes.	Only carrier positions 00-02 can accept this pack.
	SN250	Call progress tone circuit	Provides eight call progress tones.	Two SN250 per module should be located on separate power supplies.
	SN251	Touch-tone dialing receiver unit	Provides the dual tone multifrequency receiving capabilities.	One SN251 provides four touch-tone receiver circuits.
	SN252	Touch-tone dialing sender unit	Provides combination dual tone multifrequency sender capability.	One SN252 provides four touch-tone sender circuits.
	SN253	Auxiliary tone plant circuit	Provides four tones.	One SN253 required per system for code calling, radio paging, or recorded telephone dictation.
	SN254	Attendant conference circuit	Provides the system attendant with the ability to get up a conference of eight stations.	
	SN255	Tone detector 2	Detects tones necessary to provide terminal dialing.	
	SN260	Facility test circuit	Provides transmission testing from the system to a remote testing facility.	One SN260 required per system.
	SN261	Analog/digital facility test circuit		
	SN270B	General purpose port circuit	Provides an interface between the system and other digital devices including the digital terminal.	One SN270B provides four circuits.

20.5 DS-1/MFAT Carrier and Associated Circuit Packs (Sheet 1 of 2)

CARRIER SLOT POSITION	CIRCUIT PACK CODE	CIRCUIT PACK NAME	FUNCTION	NOTES
04	TN454	Port data interface	Provides the timing necessary to synchronize the port PCM or data to the network time slot.	(1) Port data interface for half a port carrier.
09	TN452	Universal port control interface	Provides I/O bus signal control.	One required for left half port carrier.
10	494GA	Converter 50W ±5 V	Provides power for one port group.	One required for right half port carrier.
11	494GA	Converter 50W ±5 V	Same as position 10.	
17	TN454	Port data interface	Same as position 04.	
***	NOTE	Carrier positions 00-03, 05-08, 13-16, 18-21 are universal port positions which can accept most port circuit packs - port circuit packs for use in these positions are described as follows:		
	ANN11B	DS-1 trunk interface	Provides connectivity between System 85 and other systems.	Can only be placed in slots 05 and 18.
	ANN15	RGI Central Location	Provides connectivity between System 85 and the remote carrier housing.	Can only be in slots 00, 05, 13, and 18.
	ANN17	Multifunction analog terminal (MFAT)	Provides interface between digital switch and 7300S series voice terminals.	Can only be placed in slots 03 and 08 when ANN11B in slot 05 and in slots 16 and 21 when ANN11B in slot 18.
	SN221B /SN228	Off-premises line circuit	Interface to analog telephone sets.	One SN221B/SN228 provides interface to eight ports for analog telephone sets for off-premises application.
	SN222B /SN229	On-premises line circuit	Interface to analog telephone sets.	One SN222B/SN229 provides interface to eight ports for analog telephone sets with message waiting capabilities.
	SN224B	Line circuit (MFET/MET)	Interface to multifunction electronic telephone (MFET) and multibutton electronic telephone (MET) sets.	One SN224B provides interface to four ports for electronic telephone sets.
	SN230	Central office trunk (ground start)	Interface to central office trunks.	One SN230 provides four CO trunk ports.
	SN231	Auxiliary trunk	Interfaces with auxiliary units that require analog signaling.	One SN231 provides four trunk ports.
	SN232B	Direct inward dial trunk (DID)	Interfaces with direct inward dial central office trunks.	One SN232B provides four CO trunk ports.

20.5 DS-1/MFAT Carrier and Associated Circuit Packs - (Sheet 2 of 2)

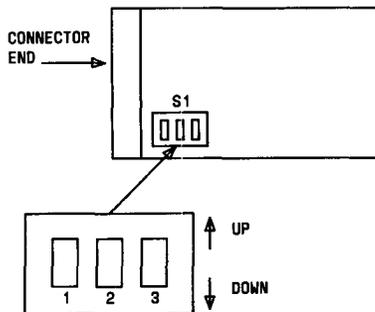
CARRIER SLOT POSITION	CIRCUIT PACK CODE	CIRCUIT PACK NAME	FUNCTION	NOTES
	SN233C	Tie trunk/attendant interface	Interfaces the system to a tie trunk going to another system or to an attendant console.	One SN233B provides four port circuits.
	SN241	Contact interface circuit	Provides the system a contact closure for use in features such as Uniform Call Distribution (UCD).	One SN241 provides eight contact closures.
	SN243B	Data port circuit	Provides a loop signaling trunk with a line circuit function on the trunk side, includes ring, ring trip, dial tone, etc.	One SN243B provides four port circuits.
	SN244	Automatic number identification data transmitter circuit	Transmits station and trunk numbers for calls that are to be identified for billing purposes.	Only carrier positions 00-02 can accept this pack.
	SN250	Call progress tone circuit	Provides eight call progress tones.	Two SN250 per module should be located on separate power supplies.
	SN251	Touch-tone dialing receiver unit	Provides the dual tone multifrequency receiving capabilities.	One SN251 provides four touch-tone receiver circuits.
	SN252	Touch-tone dialing sender unit	Provides combination dual tone multifrequency sender capability.	One SN252 provides four touch-tone sender circuits.
	SN253	Auxiliary tone plant circuit	Provides four tones.	One SN253 required per system used with centralized attendant services and code calling.
	SN254	Attendant conference circuit	Provides the system attendant with the ability to get up a conference of eight stations.	
	SN255	Tone detector 2	Detects all tone and tone pairs on the subscriber loop necessary for terminal dialing.	
	SN260	Facility test circuit	Provides transmission testing from the system to a remote testing facility.	One SN260 required per system.
	SN261	Analog/digital facility test circuit	Provides transmission testing for Analog and Digital Switching from the system to a remote testing facility.	
	SN270B	General purpose port circuit	Provides an interface between the system and other digital devices including the digital terminal.	One SN270B provides four circuits.

20.6 Time Multiplexed Switch Carrier and Associated Circuit Packs
(Sheet 1 of 2)

CARRIER SLOT POSITION	CIRCUIT PACK CODE	CIRCUIT PACK NAME	FUNCTION	NOTES
00	494GA	Power unit	DC-DC converter	
01				
02	TN480	Module interface	Receives data from and transmits data to the modules	One required per module.
03				
04				
05				
06				
06	TN473	Fanout	Distributes data from module interface to the multiplexer	
07	UN150	Fanin	Distributes data from module interface to the multiplexer	
08	TN470	MPX	Provides the half-connections which allow voice and data communications between modules	One TN470 required for first module and one TN470 for every two modules thereafter.
09				
10	TN452	Port control interface	Provides I/O bus signal control.	
11	TN462	Local clock termination	Receives clock oscillator signals and distributes them for the TMS carrier	
12	TN470	MPX	Provides the half connections which allow voice and data communications between modules	Same as position 08.
13				
14	UN150	Fanin	Distributes data from module interface to the multiplexer	
15	TN473	Fanout	Distributes data from module interface to the multiplexer	
16	TN480	Module interface	Receives data from and transmits data to the modules	Same as position 02. A TN480 may be installed in position 19 in the growth TMS carrier only.
17				
18				
19				
20	TN463	System clock synchronizer	Provides synchronization of clock signals with an external clock	Only in basic TMS carrier.
21	TN461	Clock oscillator	Generates reference clock signals for multimodule system and serves as an interface between the system clock synchronizer and secondary clock signals	Only in basic TMS carrier.

20.7 Option Settings for Circuit Pack ANN 11B

20.7.1 There is one switch package (S1), containing three rocker switch sections, that is positioned on the circuit pack as shown in the following diagram. The switch is set to the cable length distance of the DS-1 cable.

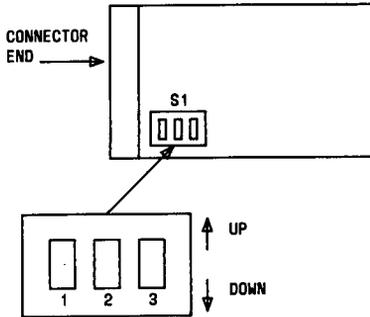


20.7.2 Set the option switches based on the length of the DS-1 cable between the cabinet and the DSX-1 cross-connect point using the following table. If a DS-1 trunk port from a System 85 is connected to another system or device that has similar equalization options, a phantom point midway between the 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 DS-1 trunk port does not have equalization options, the distance should be set to the input of the device.

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

20.8 Option Settings for Circuit Packs ANN 15 and ANN 16

20.8.1 There is one switch package (S1), containing three rocker switch sections, that is positioned on the circuit pack as shown in the following diagram. The switch is set to the cable length distance of the DS-1 cable.

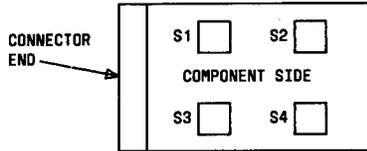


20.8.2 Set the option switches based on the length of the DS-1 cable between the cabinet and the DSX-1 cross-connect point using the following table. If a DS-1 trunk port from a System 85 is connected to another system or device that has similar equalization options, a phantom point midway between the 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 DS-1 trunk port does not have equalization options, the distance should be set to the input of the device.

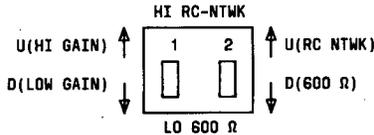
CABLE LENGTH	SW1	SW2	SW3
0-133 feet	D	D	U
133-266 feet	D	U	D
266-399 feet	D	U	U
399-533 feet	U	D	D
533-655 feet	U	D	U

20.9 Option Settings for Circuit Pack SN221

20.9.1 Four switch packages, S1-S4, each containing two rocker switch sections, are positioned on the circuit pack as shown in the following diagram. Each switch package serves two of the eight port circuits provided on the pack.



20.9.2 A single switch package is shown below to identify the two switch sections (1, 2) in the package.



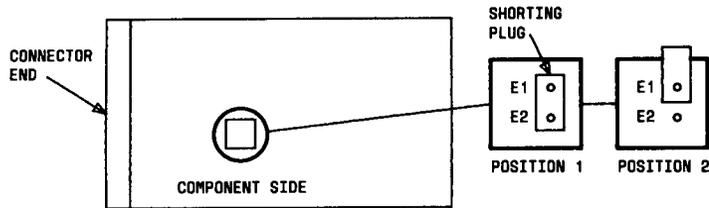
20.9.3 To select the required option for a port circuit, refer to the following table. First, identify the switch package (S1-S4) associated with the port circuit (locate the package as shown on the pack diagram). Next, set the single switch section for that port as shown in the table; (U) indicates the switch section is fully depressed at the upper end and (D) indicates the switch section is fully depressed at the lower end.

PORT	SWITCH PACKAGE	SWITCH SECTION	SWITCH SECTION POSITION*	
			OPTION 600Ω AND LO	OPTION (RC-NTWK) AND HI
0	1	1	D	U
1	1	2	D	U
2	2	1	D	U
3	2	2	D	U
4	3	1	D	U
5	3	2	D	U
6	4	1	D	U
7	4	2	D	U

* Use 600Ω and LO options for loop length less than 3500 feet (about 600Ω without set). Use RC-NTWK and HI options for loop length greater than 3500 feet.

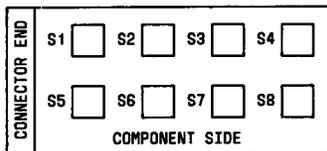
20.10 Option Setting for Circuit Pack SN224

20.10.1 A single shorting plug is provided to adapt the port circuits to interface with either multifunction electronic telephone (MFET) or multibutton electronic telephone (MET) sets. All four ports are altered by the single plug. Both MFET and MET sets can be used with the shorting plug in place (POSITION 1); however, the distance from station set to port is limited to 1000 feet. For MFET set distances to 3,000 feet, the plug must be set to POSITION 2. This makes the circuit pack incompatible with MET sets. Position 2 does nothing electrically to the circuit pack, it is just a method of storing the strap.

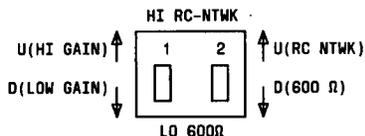


20.11 Option Settings for Circuit Pack SN228B

20.11.1 Eight switch packages, S1-S8, each containing two rocker switch sections, are positioned on the circuit pack as shown in the following diagram. Each switch package serves one of the eight port circuits provided on the pack:



20.11.2 A single switch package is shown below to identify the two switch sections (1, 2) in the package.



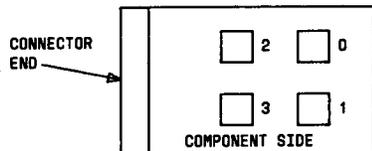
20.11.3 To select the required option for a port circuit, refer to the following table. First, identify the switch package (S1-S8) associated with the port circuit (locate the package as shown on the pack diagram). Next, set the single switch section for that port as shown in the table; (U) indicates the switch section is fully depressed at the upper end and (D) indicates the switch section is fully depressed at the lower end.

PORT	SWITCH PACKAGE	SWITCH SECTION	SWITCH SECTION POSITION*	
			OPTION	OPTION
			600Ω AND LO	(RC-NTWK) AND HI
0	1	1 and 2	D	U
1	2	1 and 2	D	U
2	3	1 and 2	D	U
3	4	1 and 2	D	U
4	5	1 and 2	D	U
5	6	1 and 2	D	U
6	7	1 and 2	D	U
7	8	1 and 2	D	U

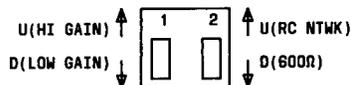
* Use 600Ω and LO options for loop length less than 3500 feet (about 600Ω without set). Use RC-NTWK and HI options for loop length greater than 3500 feet.

20.12 Option Settings for Circuit Pack SN230

20.12.1 Four switch packages, each containing two rocker switch sections, are positioned on the circuit pack as shown in the following diagram. Each switch package is assigned to a single port circuit as identified in the diagram.



20.12.2 A single switch package is shown below to identify the two switch sections (1, 2) in the package.



20.12.3 To select the required option for a port circuit, identify the associated switch package from the pack diagram. Then set the switch sections for that port as shown in the following table.

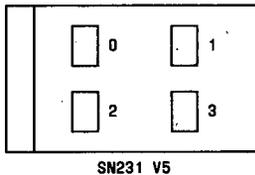
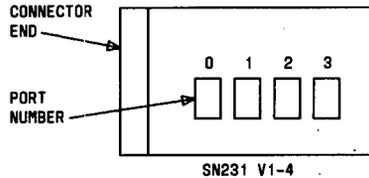
OPTION*	TERMINATION	SWITCH	
		1	2
W	RC BALANCE NETWORK	U	X
X	600 OHM	D	X

* Use 600Ω option for loop length less than 3500 feet (about 600Ω without set). Use RC BALANCE NETWORK option for loop length greater than 3500 feet.

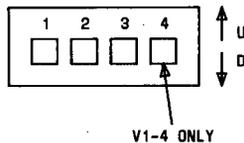
In the table, (U) indicates the switch is fully depressed at the upper end and (D) indicates the switch is fully depressed at the lower end. Note that switch section (2) is not used, as indicated by (X) and the position of this switch section has no effect on circuit operation.

20.13 Option Settings for Circuit Pack SN231

20.13.1 Four switch packages, each containing four (three for Version 5) rocker switch sections are positioned on the circuit pack. Each switch package is assigned to a single port circuit as identified in the following diagram.



20.13.2 A single switch package is shown below to identify the four switch sections in the package.



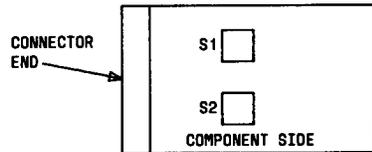
20.13.3 To select the required option for a port circuit, identify the associated switch package from the pack diagram. Then set switch sections for that port as shown in the following table.

OPTION	TRANSMISSION	SWITCH SECTION			
		1	2	3	4
S	ONE WAY INCOMING	X	D	U	X
R	ONE WAY OUTGOING	X	U	D	X
Q	TWO WAY	X	D	D	X
ZA	TWO WIRE SIGNALING	D	X	X	X
ZB	FOUR WIRE SIGNALING	U	X	X	X

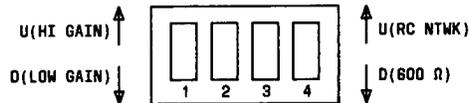
20.13.4 In the table, (U) indicates the switch is fully depressed at the upper end and (D) indicates the switch is fully depressed at the lower end. An X indicates that a switch section is not used in the option.

20.14 Option Settings for Circuit Pack SN232B

20.14.1 Two switch packages, S1 and S2, each containing two rocker switch sections, are positioned on the circuit pack as shown in the following diagram. Each package serves two port circuits.



20.14.2 A single switch package is shown below to identify the two switch sections in the package.



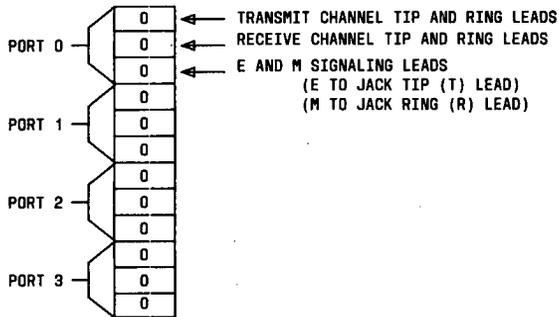
20.14.3 To select the required option for a port circuit, refer to the following table. The symbol (U) indicates that the switch section is fully depressed at the upper end and (D) indicates that the switch section is fully depressed at the lower end.

PORT CIRCUIT	SWITCH PACKAGE	SWITCH SECTION	SWITCH SECTION SETTING*	
			RC-NTWK	600Ω
0	S1	1	U	D
		2	D	U
1	S2	1	U	D
		2	D	U
2	S1	3	U	D
		4	D	U
3	S2	3	U	D
		4	D	U

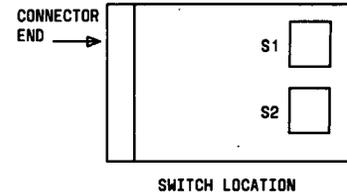
* Use 600Ω option for loop length less than 3500 feet (about 600Ω without set). Use RC-NTWK option for loop length greater than 3500 feet.

20.15 Option Settings for Circuit Pack SN233B

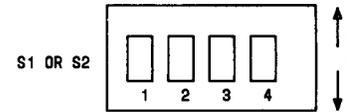
20.15.1 Access to both transmit and receive transmission channels and to the E and M signaling leads for each port is provided by jacks on the front of the pack. The jack assignment is shown below. Plug insertion into the transmit or receive channel jack accesses the local end, opening the channel toward the distant end. Plug insertion into the signaling jack opens the signaling leads toward the distant ends unless on-board switches are set as described below.



20.15.2 Two switch packages, S1 and S2, each containing four rocker switch sections, are located as shown on the pack diagram. Switch settings determine the type access from the E and M lead jack. With a switch section fully depressed at the upper end (U), access is to the pack circuitry only (open from distant end) when plug is inserted. If the switch section is fully depressed at the lower end (D), access bridges the signaling lead. The table shows the switch section assignments.



SWITCH LOCATION



SWITCH SECTION IDENTIFICATION

PORT	LEAD	SWITCH	SECTION
0	M	1	1
	E		2
1	M	1	3
	E		4
2	M	2	1
	E		2
3	M	2	3
	E		4

20.16 Option Settings for Circuit Packs SN233C

SWITCH ASSIGNMENT

THE TYPE OF SIGNALING USED ON THE PORT IS SET BY OPTION SWITCHES AS DESCRIBED BELOW. FOUR SWITCH PACKAGES, S1 THROUGH S4, ARE LOCATED AS SHOWN ON THE PACK DIAGRAM. S1 CONTAINS FOUR ROCKER SWITCH SECTIONS WHICH ARE SHARED BETWEEN PORT 0 AND PORT 1. S3 ALSO CONTAINS FOUR ROCKER SWITCH SECTIONS WHICH ARE SHARED BETWEEN PORT 2 AND PORT 3. S2 CONTAINS TEN ROCKER SWITCH SECTIONS WHICH ARE SHARED BETWEEN PORT 0 AND PORT 1. S4 ALSO CONTAINS TEN ROCKER SWITCH SECTIONS WHICH ARE SHARED BETWEEN PORT 2 AND PORT 3. THE SWITCH SETTINGS DETERMINE THE TYPE AND METHOD OF SIGNALING USED FOR THE PORT AND THE CODEC CONVERSION MODE. THE TABLE BELOW SHOWS THE SWITCH SETTINGS FOR THE VARIOUS SIGNALING TYPES FOR ANY PORT.

SWITCH SECTION		A	B	C	D	E	F
		a	b	c	d	e	f
STANDARD E&M TYPE	IA	D	D	D	D	U	U
	IB	U	U	D	U	U	U
	V	U	U	D	D	U	U
PROTECTED TYPE (NOTE 1)	IA	D	D	U	D	U	U
	IB	U	U	U	U	U	U
	V	U	U	U	D	U	U
SIMPLEX TYPE	IA	D	D	U	D	D	D
	IB	U	U	U	U	D	D
	V	U	U	U	D	D	D

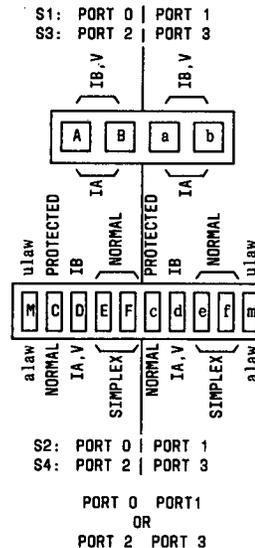
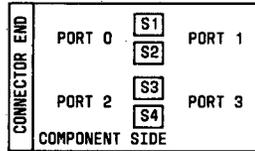
CAPITAL LETTERS A THROUGH F = PORT 0 AND PORT 2
 SMALL LETTERS A THROUGH F = PORT 1 AND PORT 3
 SET SWITCH M FOR APPROPRIATE CONVERSION MODE (NOTE 2):

ulaw (DOMESTIC) = U

alaw (INTERNATIONAL) = D

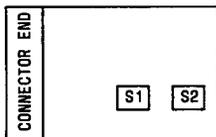
NOTE 1: THE M LEAD WHEN PROTECTED HAS SERIES RESISTANCE ADDED TO PROVIDE FOR LIGHTNING PROTECTION.

NOTE 2: SOME INTERNATIONAL COUNTRIES USE ulaw.

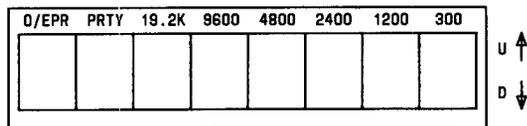


20.17 Option Settings for Circuit Pack SN238

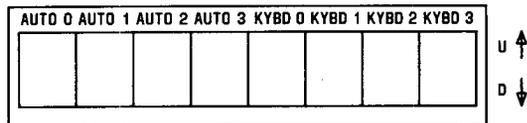
20.17.1 Two switch packages each containing eight switch sections. Switch S1 is used to select odd or even parity, enable or disable parity, and to select a baud (data) rate. Switch S2 is used to enable or disable auto baud and auto parity for ports 0-3. S2 is also used to enable or disable keyboard dialing for Ports 0-3.



S1



S2



20.17.2 S1 option setting

NOTE: If more than one baud rate is selected, the port board will determine the highest common baud rate with the distant end. When a call is disconnected or not initiated, the port board follows the highest baud rate selected on S1.

SWITCH	SETTING	FUNCTION
O/EPR	D	Odd parity
	U	Even parity
PRTY	D	Parity enabled
	U	Parity disabled
19.2K	D	19.2K baud
	U	Switch disabled
9600	D	9600 baud
	U	Switch disabled
4800	D	4800 baud
	U	Switch disabled
2400	D	2400 baud
	U	Switch disabled
1200	D	1200 baud
	U	Switch disabled
300	D	300 baud
	U	Switch disabled

20.17.3 S2 settings

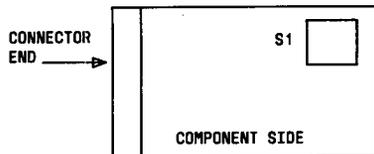
NOTE: If auto baud and auto parity are enabled with S2, the option settings on S1 are ignored. If auto baud and auto parity are enabled for a port, keyboard dialing for the same port must be enabled.

SWITCH	SETTING	FUNCTION
AUTO 0	D	Enables auto baud and auto parity for Port 0
	U	Disables auto baud and auto parity for Port 0
AUTO 1	D	Enables auto baud and auto parity for Port 1
	U	Disables auto baud and auto parity for Port 1
AUTO 2	D	Enables auto baud and auto parity for Port 2
	U	Disables auto baud and auto parity for Port 2
AUTO 3	D	Enables auto baud and auto parity for Port 3
	U	Disables auto baud and auto parity for Port 3
KYBD 0	D	Enables keyboard dialing for Port 0
	U	Disables keyboard dialing for Port 0
KYBD 1	D	Enables keyboard dialing for Port 1
	U	Disables keyboard dialing for Port 1
KYBD 2	D	Enables keyboard dialing for Port 2
	U	Disables keyboard dialing for Port 2
KYBD 3	D	Enables keyboard dialing for Port 3
	U	Disables keyboard dialing for Port 3

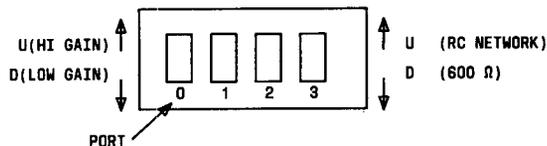
20.18 Option Settings for Circuit Packs SN243 and SN243B

20.18.1 SN243 and SN243B with a single switch.

20.18.1.1 A switch package containing four rocker switch sections is located on the circuit pack as shown in the following diagram:



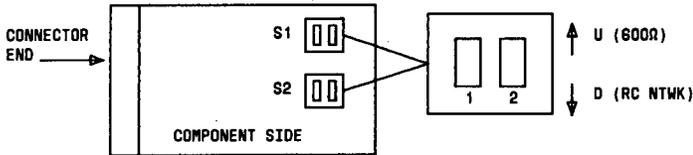
20.18.1.2 The switch package is shown below to identify the four switch sections and their settings.



20.18.1.3 Use the 600Ω option for loop length less than 3500 feet (about 600Ω without set). Use the RC NETWORK option for loop length greater than 3500 feet.

20.18.2 SN243B with two switches

20.18.2.1 Two switch packages, S1 and S2, each containing two rocker switch sections, are positioned on the circuit pack as shown. Each switch package serves two port circuits.



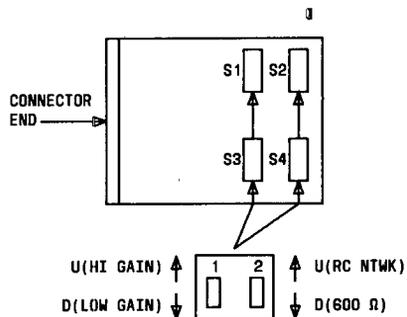
20.18.2.2 To select the desired option for a port circuit, refer to the following table. (U) indicates the switch section is fully depressed at the upper end and (D) indicates the switch section is fully depressed at the lower end.

PORT CIRCUIT	SWITCH PACKAGE	SWITCH SECTION	SWITCH SECTION SETTING*	
			600Ω	RC NTWK
0	S1	1	U	D
1	S1	2	U	D
2	S2	1	U	D
3	S2	2	U	D

* Use 600Ω option for loop length less than 3500 feet (about 600Ω without set). Use RC-NTWK option for loop length greater than 3500 feet.

20.19 Option Settings for Circuit Pack SN243C

20.19.1 Four switch packages, S1 through S4, are positioned on the circuit pack as shown in the following diagram. Each switch package serves a port circuit. A single switch package is shown in detail to identify the two switch sections in the package.

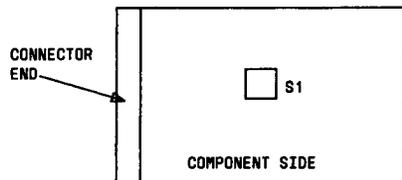


20.19.2 The following table shows the switch package associated with each port circuit. A switch section is fully depressed at the upper (U) end to provide the *RC NTWK* option and the *HI GAIN* (U) option. The switch section fully depressed to the lower (D) end provides the *600 OHM* option and the *LO GAIN* (D) option.

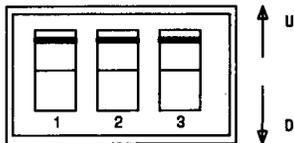
PORT	SWITCH
0	S1
1	S2
2	S3
3	S4

20.20 Option Settings for Circuit Pack SN250

20.20.1 A switch package containing three rocker switch sections is located on the circuit pack as shown in the following diagram:



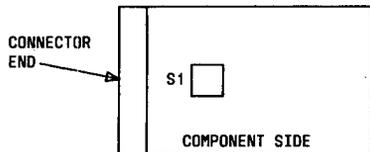
20.20.2 The switch package is shown below to identify the three switch sections. All of the switch sections should be depressed toward the numbers for use with this system.



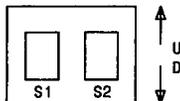
20.20.3 SN250 circuit packs identified as vintage 6 or later do not have this switch package and do not require option settings.

20.21 Option Settings for Circuit Pack SN253

20.21.1 A switch package containing two rocker switch sections is located on the circuit pack as shown in the following diagram:



20.21.2 The switch package is shown below to identify the two switch sections.



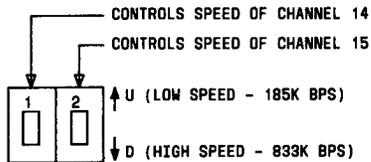
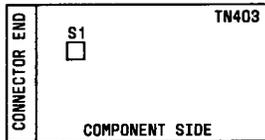
20.21.3 The following table indicates the switch section positions required for each option provided. (U) indicates the rocker switch is depressed at the upper end and (D) indicates the switch is depressed at the lower end.

FUNCTION	OPTION	SWITCH		
		S1	S2	
Internal system chime only (0.5 sec.)	K	U	U	
External chime period (sec.) *	0.50	J	D	U
	1.00	G	U	D
	2.00	F	D	D

* Internal chime will operate also, at same rate chosen for external chime.

20.22 Option Settings for Circuit Pack TN403 (Dual Speed Data Channels)

20.22.1 Switch S1 controls the data transmission rate for circuit pack channels 14 and 15.



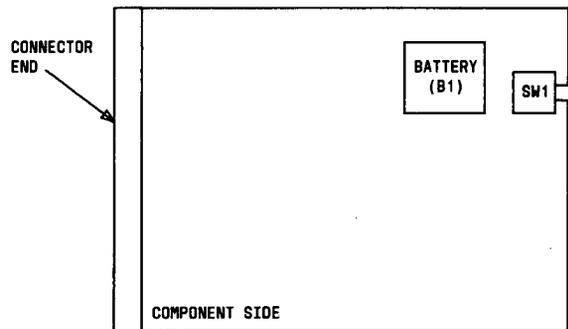
CARRIER SLOT NO.	CHANNEL NUMBERS	TN403 CHANNEL NUMBER	SWITCH SECTION	SWITCH POSITION
23	00-15	15	2	D
		14	1	D
24	16-31	15	2	U
		14	1	U
25	32-47	15	2	U
		14	1	U
26	48-63	15	2	U
		14	1	U

CHANNELS 0-13 ARE NOT SPEED OPTIONABLE, THEY WILL ONLY OPERATE AT LOW SPEED (185K BPS).

20.23 Option Settings for Circuit Pack TN492C

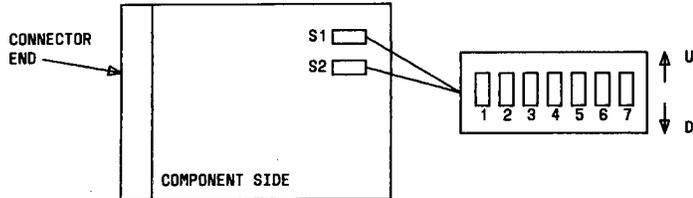
20.23.1 Switch SW1 is located at faceplate test position 9. It is used to turn on the back-up battery. It is a pushbutton turn-to-lock switch.

20.23.2 The back-up battery B1 (KS-20390, L5) must be replaced at least every 2 years.



20.24 Option Settings for Circuit Pack TN513

20.24.1 Two switch packages with seven switch sections allow configuration of the serial port hardware. Switch S1 is used to configure channel 0 USART and switch S2 is used to configure channel 1 USART.



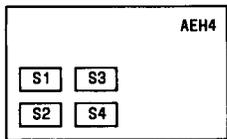
FUNCTION	SWITCH	SWITCH SECTION	POSITION
RX/TX DIRECT MODE	1 OR 2	1,4	D
		2,3	U
RX/TX NULL MODE	1 OR 2	2,3	D
		1,4	U
SHORT CTS/RTS	1 OR 2	5	D
SHORT DTR/DSR	1 OR 2	6	D
LOGICALLY (AND) CH0 AND CH1 USART INTERRUPTS	1	7	D
	2	7	U
INDEPENDENT CH0 AND CH1 USART INTERRUPTS	1	7	U
	2	7	D
DISABLE CH1 USART INTERRUPTS	1	7	U
	2	7	U

20.24.2 The following table indicates the S1 and S2 switch section positions required for each option provided. (U) indicates the rocker switch is depressed at the upper end and (D) indicates the switch is depressed at the lower end.

7322122

20.25 Option Settings for Alarm Board AEH4

20.25.1 AEH4 is located behind the dc fan assembly in the rear of each cabinet.



CLOSED = DOWN
OPEN = UP

AEH4 LOCATED IN THIS TYPE OF CABINET	SWITCH S1						SWITCH S2						SWITCH S3						SWITCH S4						
	SECTION						SECTION						SECTION						SECTION						
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	
UNDUPLICATED COMMON CONTROL (501CC) (CONTAINS PORT CIRCUITS)	U	D	D	U	U	D	D	U	U	U	U	U	U	U	U	U	U	U	U	D	D	U	U	U	D
DUPLICATED COMMON CONTROL (501CC) (DOES NOT CONTAIN PORT CIRCUITS)	U	D	D	U	U	D	D	U	U	U	D	U	U	U	D	D	U	U	U	U	U	D	U	D	U
MODULE CONTROL WITH 309A/310A UNDUPLICATED 501CC SYSTEM	D	U	U	D	D	U	U	D	D	D	D	U	U	U	U	U	U	U	U	U	U	U	D	U	
MODULE CONTROL WITH 309A/310A DUPLICATED 501CC SYSTEM	D	U	U	D	D	U	U	D	D	D	D	U	U	U	D	U	U	D	D	D	U	D	U	U	
PORT CABINET WITH 309A/310A	D	U	U	D	D	U	U	D	D	D	D	U	U	U	D	U	U	D	D	D	U	D	U	U	
PORT CABINET WITHOUT 309A/310A	D	U	U	D	D	U	U	D	U	U	U	U	U	U	U	U	U	U	U	U	U	U	D	U	
UNDUPLICATED TMS FOR UP TO 31 MODULES	D	U	U	D	D	U	U	D	D	D	D	D	D	D	D	U	U	D	D	D	D	D	U	U	
DUPLICATED TMS - ONE CABINET FOR UP TO 15 MODULES	D	U	U	D	D	U	U	D	D	D	D	D	D	D	D	U	U	D	D	D	D	D	U	U	
DUPLICATED TMS - TWO CABINETS FOR 16 - 31 MODULES	D	U	U	D	D	U	U	D	D	D	D	D	D	D	D	U	U	D	D	D	D	D	U	U	
AUXILIARY CABINET WITH DC FAN ASSEMBLY	U	D	D	U	U	D	D	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	D	D	
DUPLICATED MODULE CONTROL CABINET WITH 2 BULK OLS POWER SUPPLIES	D	U	U	D	D	U	U	D	D	D	D	D	D	U	U	U	U	D	U	D	U	D	D	D	

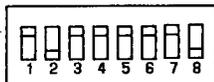
NOTE: All option settings and cable connections that have been made by the factory before shipping should be checked and verified since the cabling differs for different cabinet configurations.

20.26 Option Switch Settings on CAL1 Circuit Pack

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

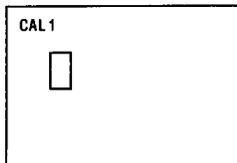
1 = OPTION DIP SWITCH CLOSED

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.

LOCATION OF DIP SWITCH ON CAL1



20.27 Procedures for Removing Circuit Packs From Common Control Carrier

20.27.1 Unduplicated common control - Check to see if system is in emergency transfer mode at the alarm panel. If it is, set the emergency transfer switch to **ACT**. If the system is not in emergency transfer, set emergency switch to **INHIB**. Notify the customer that no new calls will be processed. Set the **GO/HALT** switch to **HALT**. At this point, circuit packs can be removed from the common control carrier. After replacing the circuit packs that were removed from the common control carrier, the system can be reactivated. If the emergency transfer switch is in the **ACT** position at the alarm panel, set the **GO/HALT** switch to **GO**. If the system appears to be functioning properly, set the emergency transfer switch to **NORMAL**. Notify the customer that emergency transfer service will be interrupted. Depress **RESET**. If the emergency transfer switch is in **INHIB** position, at the alarm panel, depress **RESET** and set **GO/HALT** switch to **GO** within 5 seconds after depressing **RESET**. Set emergency transfer switch to **NORMAL**.

20.27.2 Duplicated common control - Determine if the circuit pack being replaced is in the on-line or off-line carrier of the duplicated common control. If the circuit pack being replaced is in the on-line carrier of the duplicated common control, use PROC 613 Test 3 to soft switch the on-line common control to the off-line carrier. If the soft switch cannot be performed, replace circuit pack(s) in the on-line carrier using the steps for unduplicated common control carrier circuit pack replacement above. Set the **LOCK ON LINE** switch to active (on-line) CC position; i.e., **CCO** or **CC1**. At the off-line common control, set **GO/HALT** switch to **HALT**. At the off-line common control, remove the circuit pack being replaced. Verify option settings on replacement circuit pack are correct (if applicable). At the off-line common control, replace the circuit pack and set the **GO/HALT** switch to **GO**. Set the **LOCK ON LINE** switch to **OFF**.

PART 21. FEATURE BLOCK DIAGRAMS

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Direct Department Calling/
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Information System Network (ISN)21.11

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Recorded Telephone
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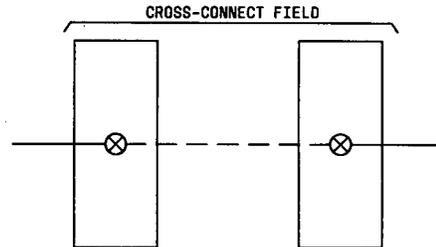
DS-1 Signaling Interface21.22

21.1 General

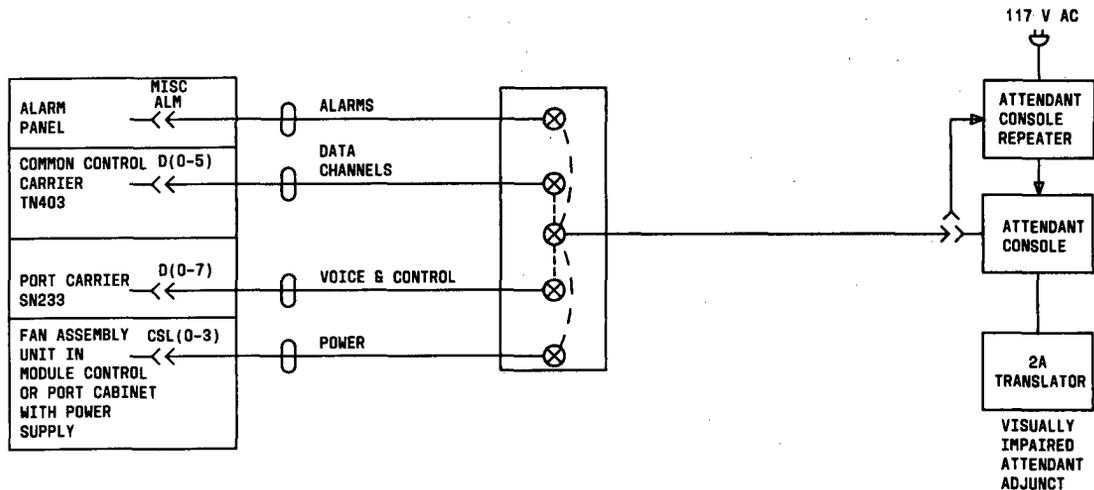
21.1.1 Part 21 provides a block diagram of each switch-oriented feature and service that requires special cabling or peripheral hardware. The diagrams show general connectivity between the peripheral hardware, the cross-connect field, and the circuit packs required in the switch. Also shown are the circuit packs that require option settings.

21.1.2 Double-circled letter symbols (e.g., (A)) are on the diagrams to direct the user to other parts of the manual which provide detailed wiring instructions and circuit pack option settings, if required, or other pertinent information. These are not intended to reflect system options shown on schematic diagrams (SDs).

21.1.3 Cross-connections in this part are illustrated below. These can be 110-type, 66-type, or any other type of connecting blocks.



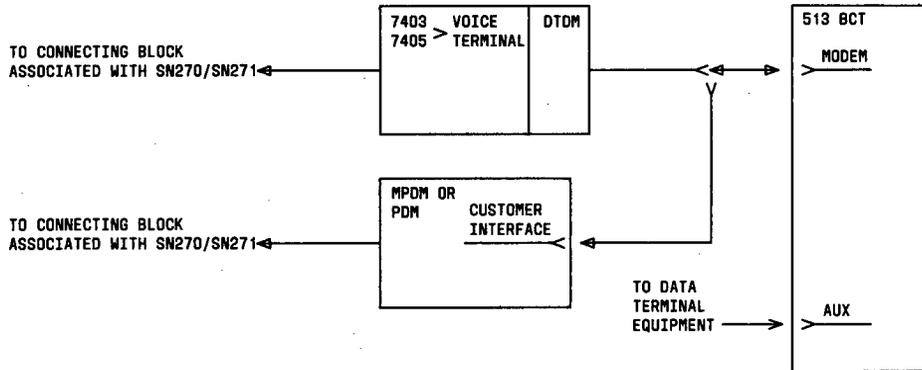
21.2 Feature Block Diagram - Attendant Console
 (Details contained in Part 15)



21.3 Feature Block Diagram - Business Communication Terminals (BCTs)

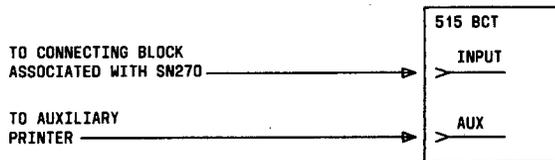
21.3.1 513 BCT

See Part 9, paragraph 9.2.9 for SN270 circuit pack connections and terminations.

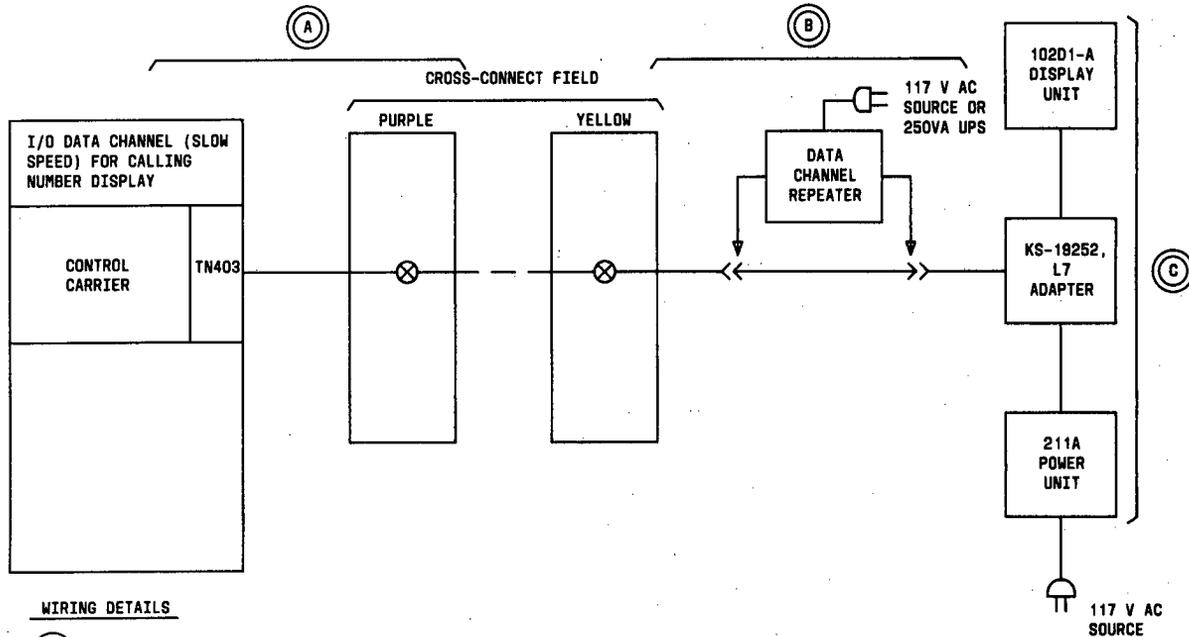


21.3.2 515 BCT

See Part 9, paragraph 9.2.9 for SN270 circuit pack connections and terminations.



21.4 Feature Block Diagram – Calling Number Display to Station

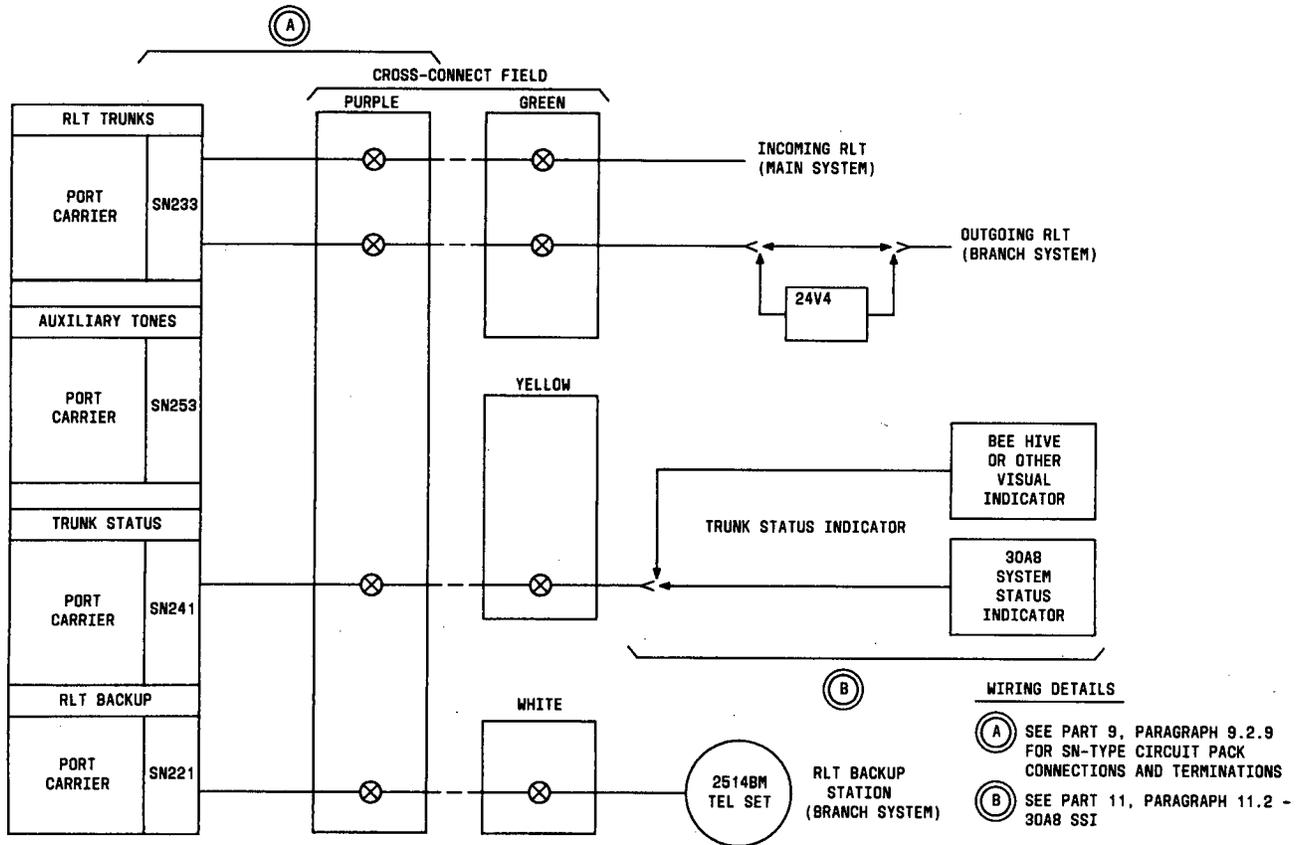


WIRING DETAILS

- (A) SEE PART 9, PARAGRAPH 9.2.9 FOR TN403 CIRCUIT PACK CONNECTIONS AND TERMINATIONS
- (B) SEE PART 11 PARAGRAPH 11.6 FOR DATA CHANNEL REPEATER CONNECTIONS
- (C) SEE PART 11, PARAGRAPH 11.7 FOR 102-TYPE DISPLAY UNIT CONNECTIONS

CIRCUIT PACK OPTION SETTINGS PART 20

21.5 Feature Block Diagram - Centralized Attendant Service

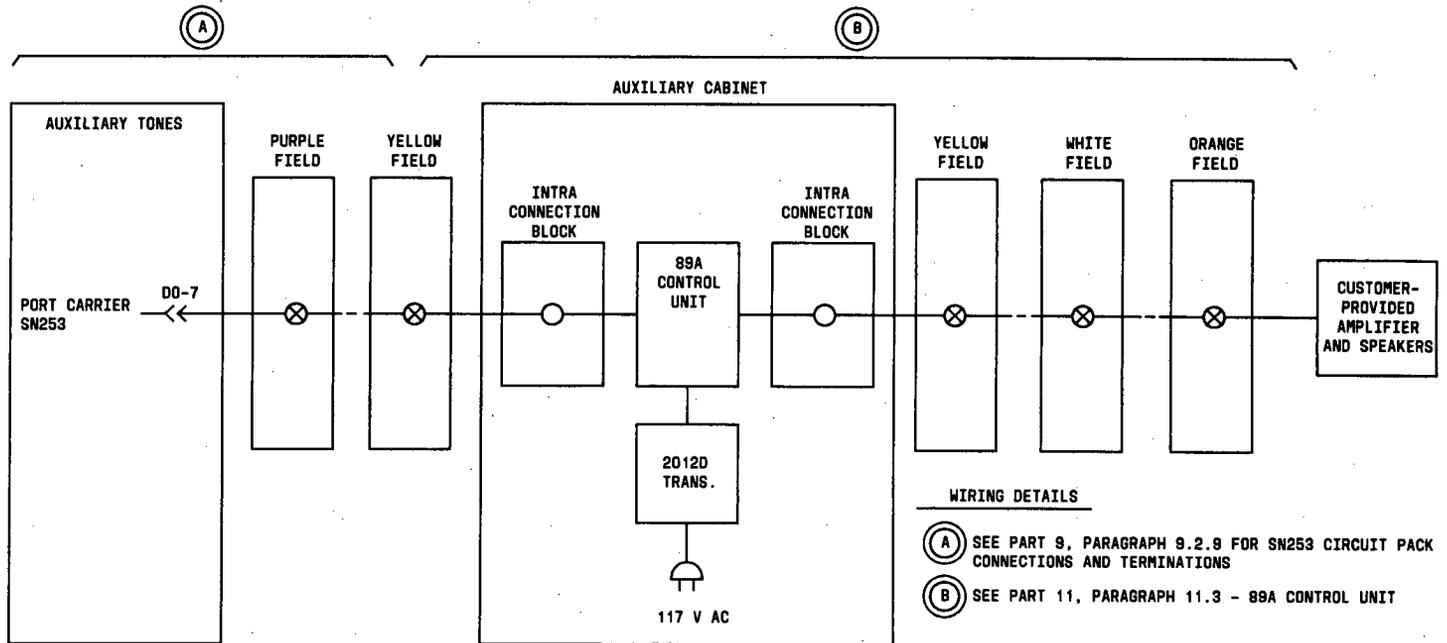


WIRING DETAILS

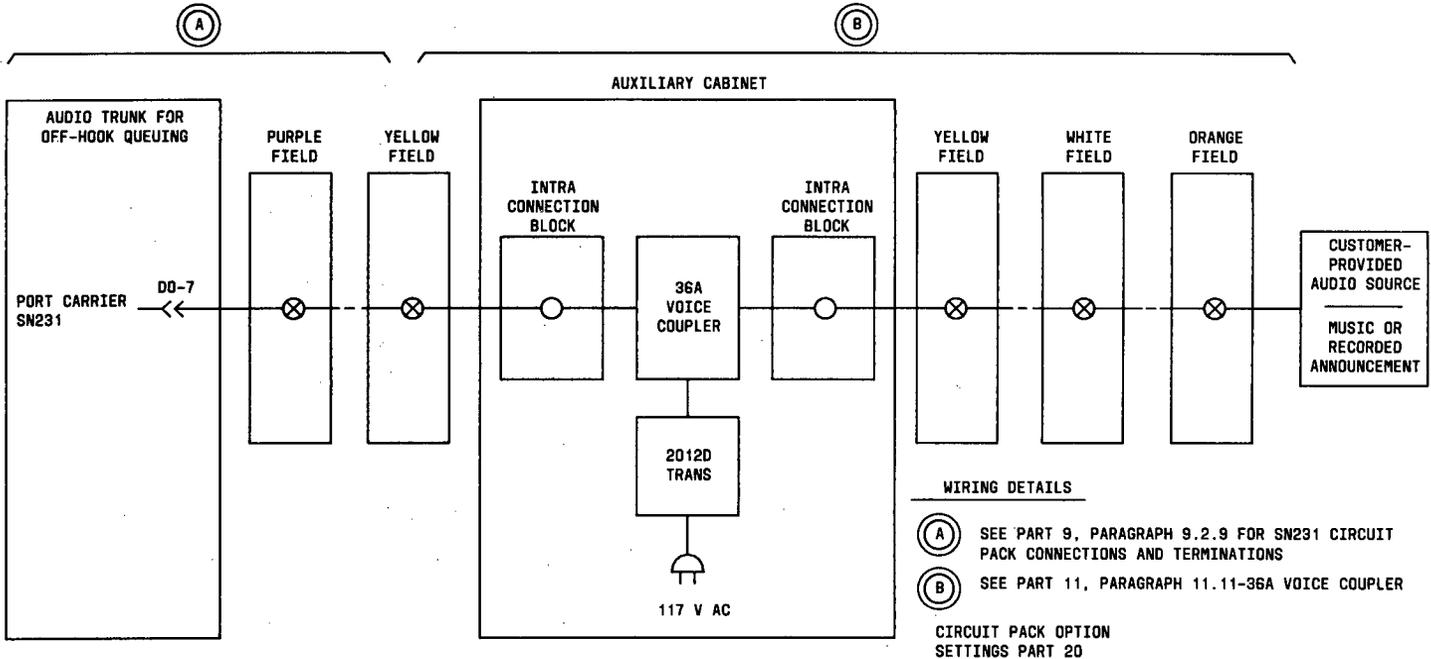
- (A) SEE PART 9, PARAGRAPH 9.2.9 FOR SN-TYPE CIRCUIT PACK CONNECTIONS AND TERMINATIONS
- (B) SEE PART 11, PARAGRAPH 11.2 - 30AB SSI

CIRCUIT PACK OPTION SETTINGS PART 20

21.6 Feature Block Diagram - Code Call (Chime Paging)

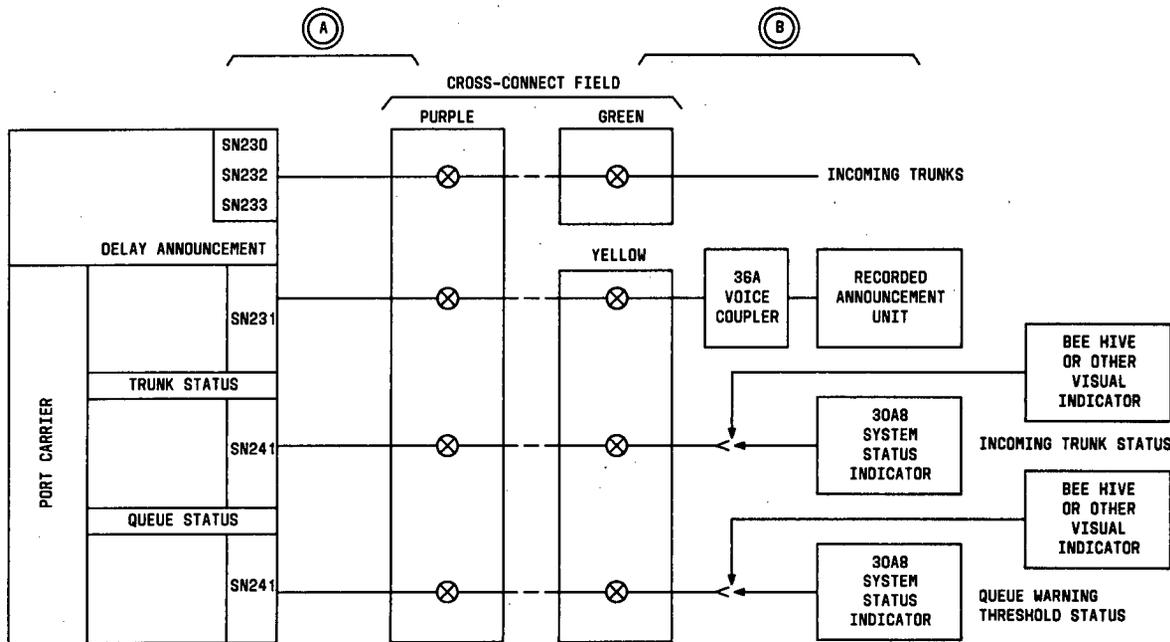


21.7 Feature Block Diagram – Deluxe Queuing



NOTE:
 IF MUSIC SOURCE OR RECORDED ANNOUNCEMENT SOURCE IS PROVIDED, SET SN231 OPTION SWITCHES AS SPECIFIED FOR "ONE WAY INCOMING".

21.8 Feature Block Diagram – Direct Department Calling (DDC)/
Uniform Call Distribution (UCD)



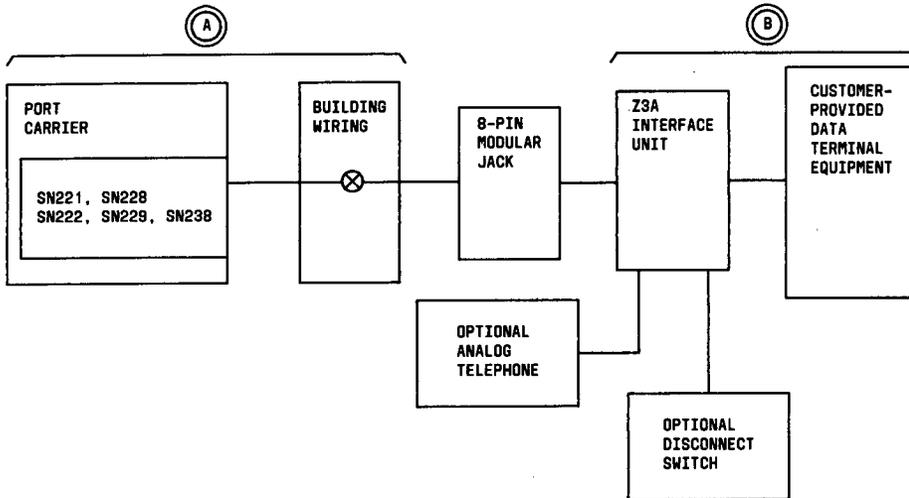
WIRING DETAILS

Ⓐ SEE PART 9, PARAGRAPH 9.2.9 FOR CIRCUIT PACK CONNECTIONS AND TERMINATIONS

Ⓑ SEE PART 11, PARAGRAPH 11.15 - RECORDED ANNOUNCEMENT UNIT AND PARAGRAPH 11.2 - 30A8 SSI

CIRCUIT PACK OPTION
SETTINGS PART 20

21.9 Feature Block Diagram - EIA Standard RS-232-C
Interface to Customer-Provided Data Terminal Equipment



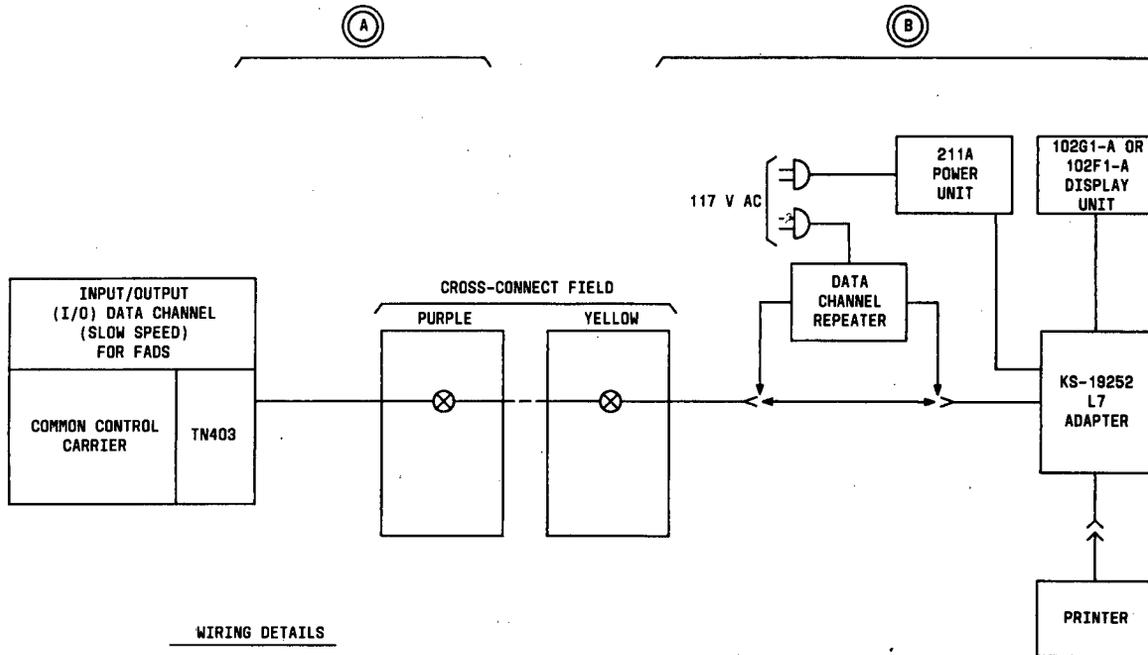
WIRING DETAILS

(A) SEE PART 9, PARAGRAPH 9.2.9 FOR CIRCUIT PACK CONNECTIONS AND TERMINATIONS

(B) SEE PART 13, PARAGRAPH 13.1 FOR Z3A CONNECTIONS

CIRCUIT PACK OPTION
SETTINGS PART 20

21.10 Feature Block Diagram - Force Administration Data System (FADS)



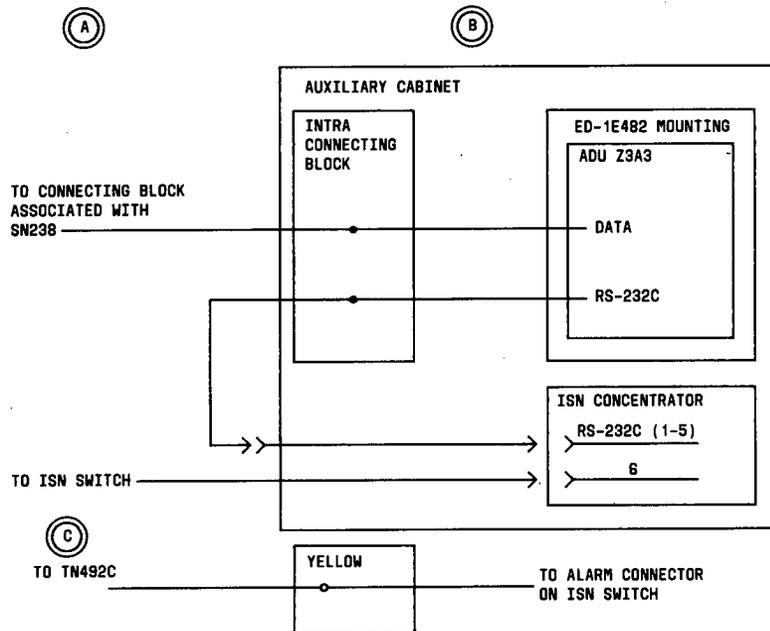
WIRING DETAILS

(A) SEE PART 9, PARAGRAPH 9.2.9 FOR TN403 CONNECTIONS

(B) SEE PART 11, PARAGRAPH 11.7 - 102 TYPE DISPLAY UNIT

CIRCUIT PACK OPTION
SETTINGS PART 20

21.11 Feature Block Diagram – Information System Network (ISN)

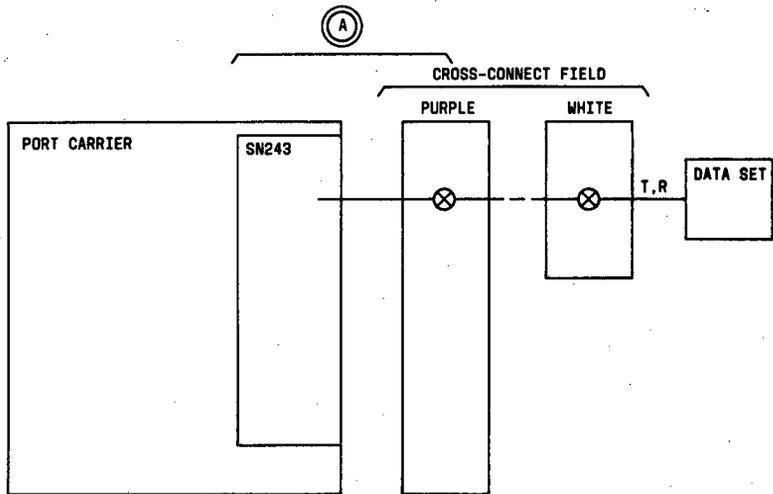


WIRING DETAILS

- (A) SEE PART 9, PARAGRAPH 9.2.9 FOR SN238 CIRCUIT PACK CONNECTIONS AND TERMINATIONS
- (B) SEE PART 11, PARAGRAPH 11.9 - ISN CONNECTIONS
- (C) SEE PART 11, PARAGRAPH 11.8 - EXTERNAL ALARMS

CIRCUIT PACK OPTION
SETTINGS PART 20

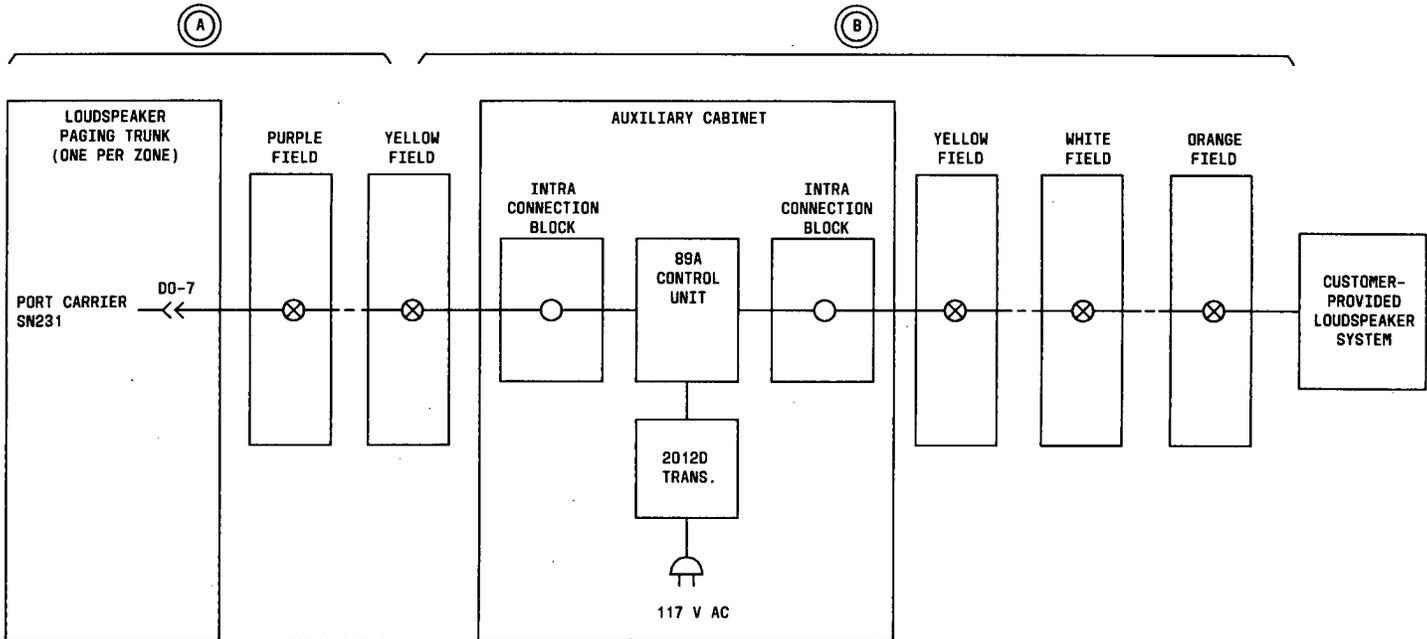
21.12 Feature Block Diagram - Loop Signaling Interface Trunk (Data Port)



WIRING DETAILS

Ⓐ SEE PART 9, PARAGRAPH 9.2.8 FOR CONNECTIONS AND TERMINATIONS

21.13 Feature Block Diagram – Loudspeaker Paging (Basic and Deluxe)

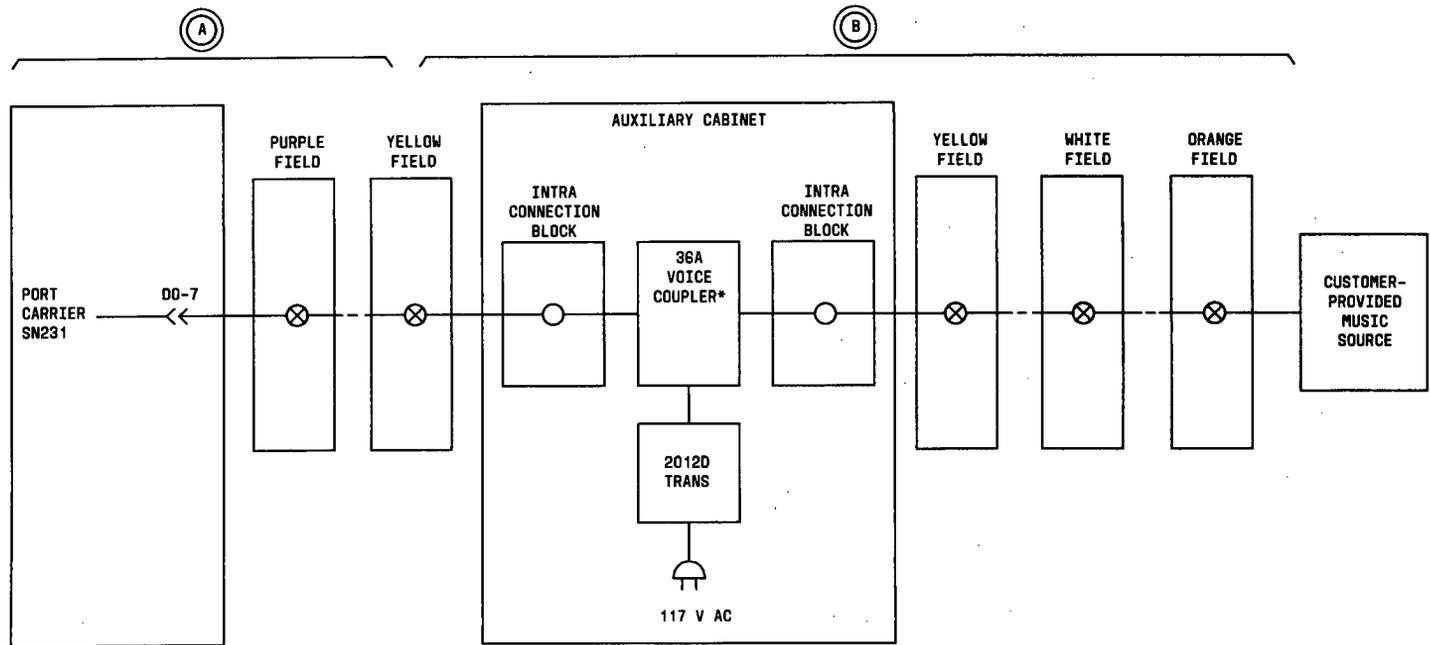


WIRING DETAILS

- (A) SEE PART 9, PARAGRAPH 9.2.9 FOR SN231 CIRCUIT PACK CONNECTIONS AND TERMINATIONS
- (B) SEE PART 11, PARAGRAPH 11.3 - 89A CONTROL UNIT

CIRCUIT PACK OPTION
SETTINGS PART 20

21.14 Feature Block Diagram – Music on Hold



WIRING DETAILS

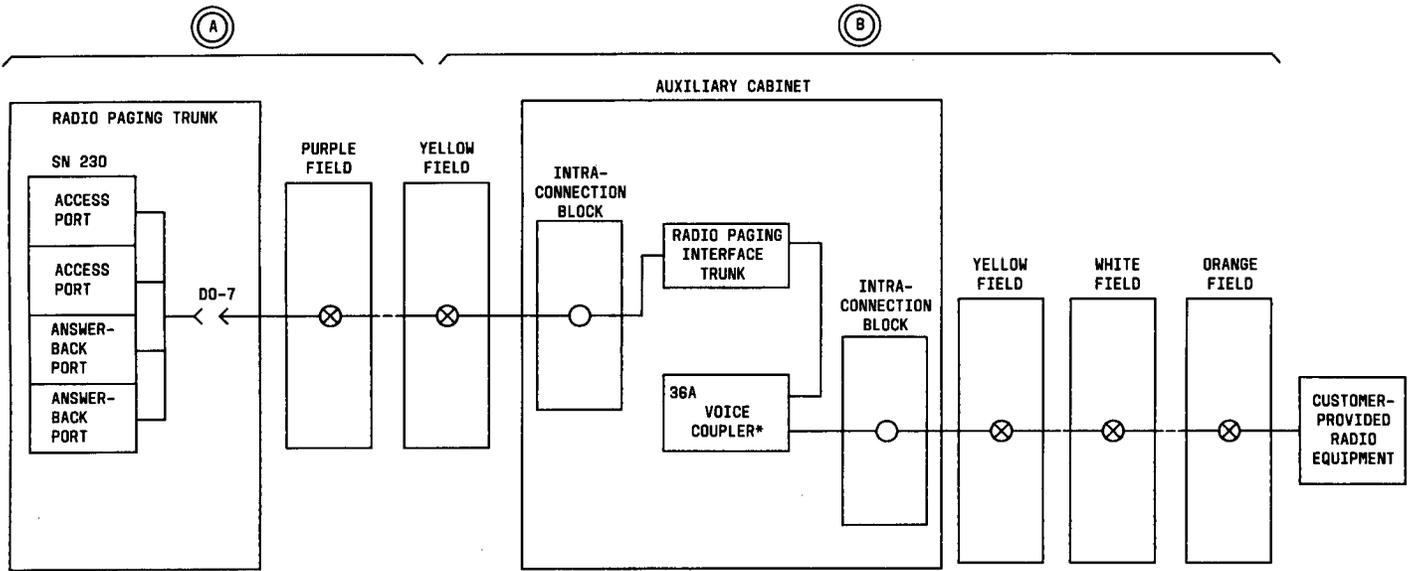
(A) SEE PART 9, PARAGRAPH 9.2.9 FOR SN231 CIRCUIT PACK CONNECTIONS AND TERMINATIONS

(B) SEE PART 11, PARAGRAPH 11.11 - 36A VOICE COUPLER

CIRCUIT PACK OPTION
SETTINGS PART 20

* REQUIRED IF CUSTOMER-
PROVIDED EQUIPMENT
IS NOT REGISTERED

21.15 Feature Block Diagram – Radio Paging



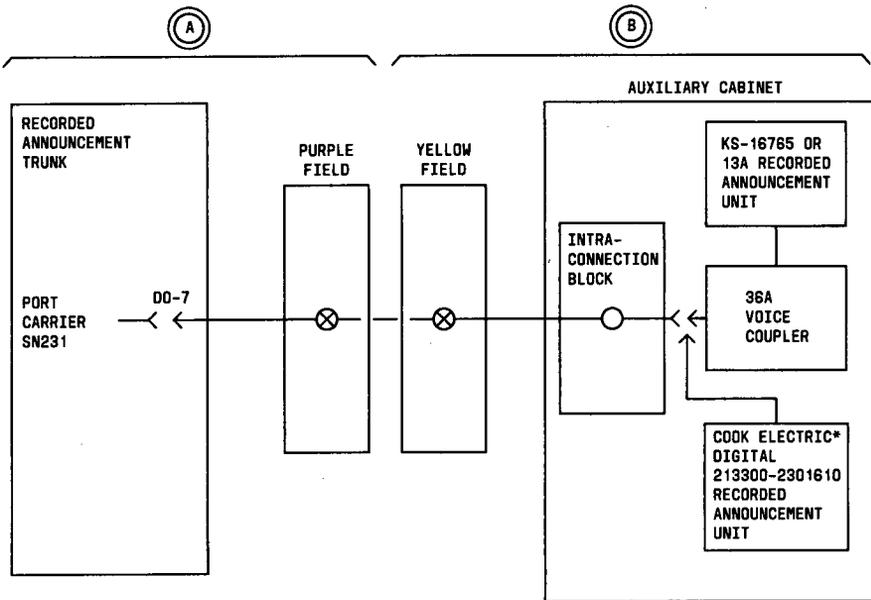
WIRING DETAILS

- (A) SEE PART 9, PARAGRAPH 9.2.9 FOR SN230 CIRCUIT PACK CONNECTIONS AND TERMINATIONS
- (B) SEE PART 11, PARAGRAPH 11.13 – RADIO PAGING ACCESS

CIRCUIT PACK OPTION
SETTINGS PART 20

* REQUIRED IF CUSTOMER-PROVIDED
EQUIPMENT IS NOT REGISTERED

21.16 Feature Block Diagram – Recorded Announcement Intercept



WIRING DETAILS

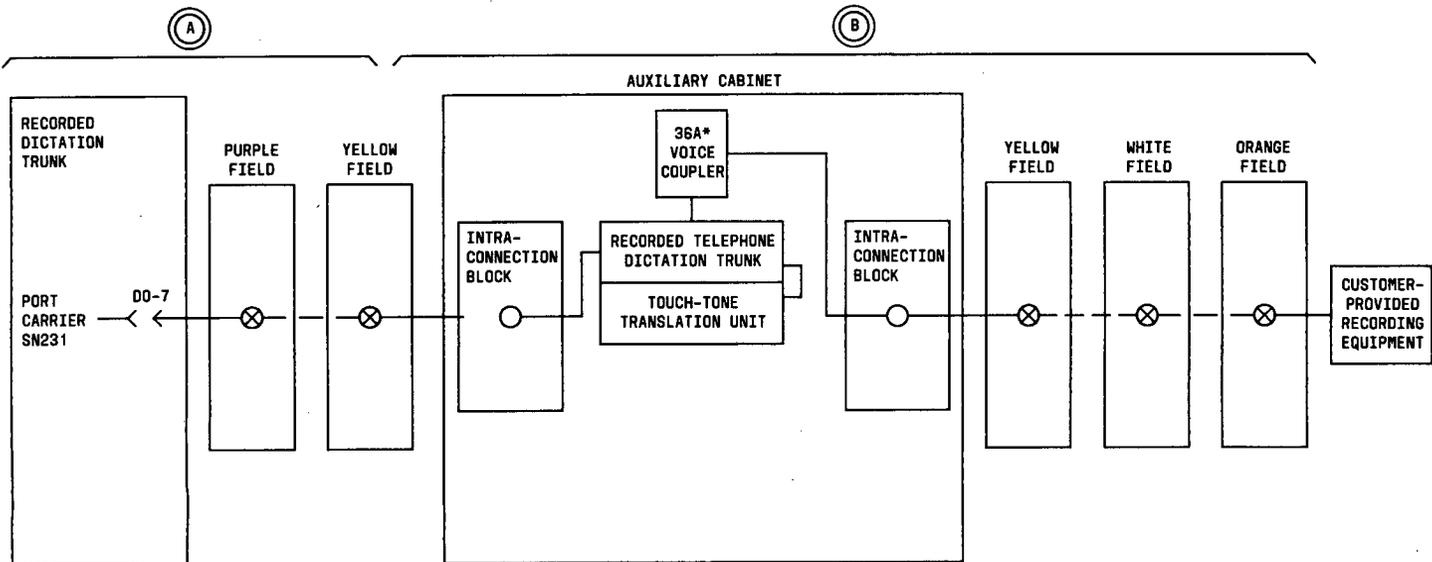
(A) SEE PART 9, PARAGRAPH 9.2.9 FOR SN231 CIRCUIT PACK CONNECTIONS AND TERMINATIONS

(B) SEE PART 11, PARAGRAPH 11.15 - RECORDED ANNOUNCEMENT UNIT

CIRCUIT PACK OPTION
 SETTINGS PART 20

* TRADEMARK OF COOK ELECTRONICS

21.17 Feature Block Diagram - Recorded Telephone Dictation



WIRING DETAILS

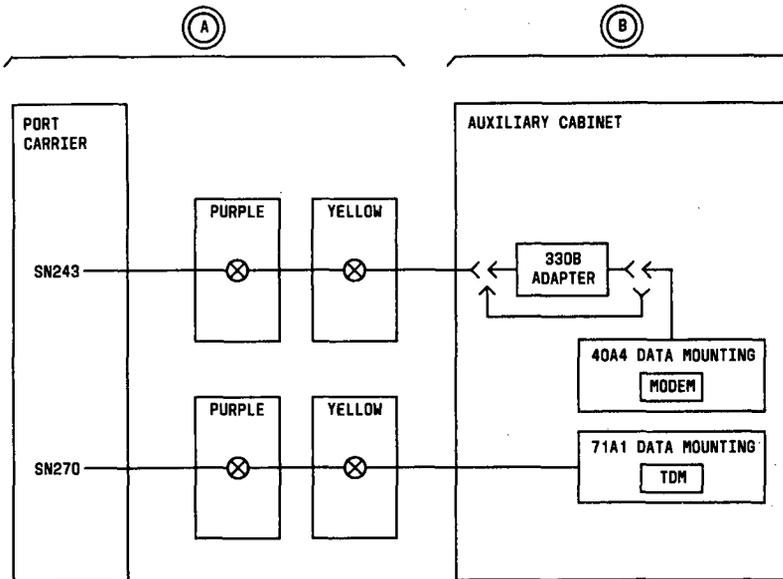
(A) SEE PART 9, PARAGRAPH 9.2.9 FOR SN232 CIRCUIT PACK CONNECTION AND TERMINATIONS

(B) SEE PART 11, PARAGRAPH 11.14 - RECORDED TELEPHONE DICTATION UNIT AND 36A VOICE COUPLER

CIRCUIT PACK OPTION
SETTINGS PART 20

* REQUIRED IF CUSTOMER-PROVIDED
EQUIPMENT IS NOT REGISTERED

21.18 Feature Block Diagram - Modem Pooling



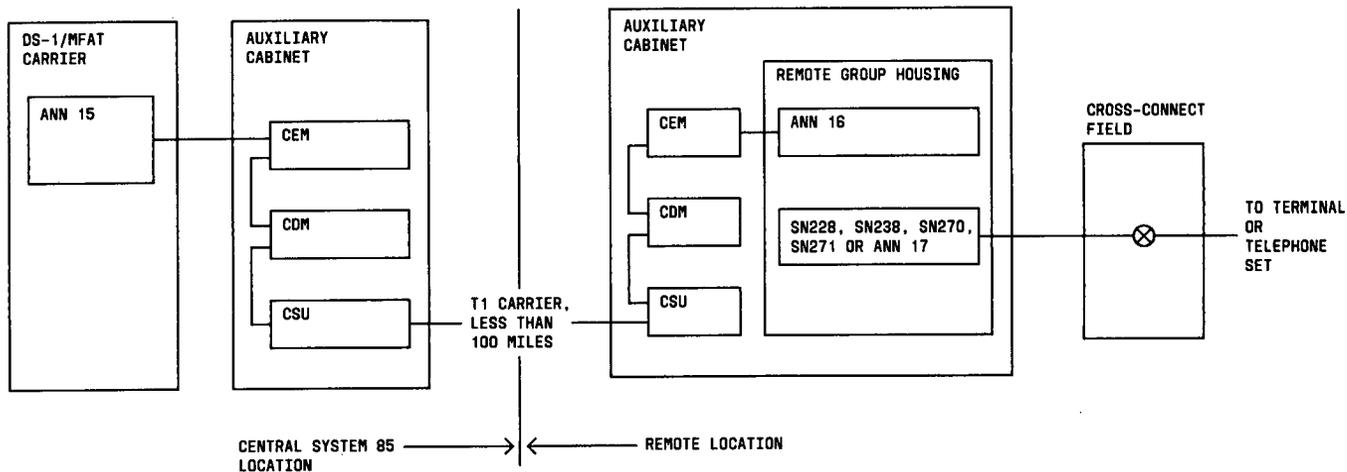
WIRING DETAILS

(A) SEE PART 9, PARAGRAPH 9.2.9 FOR SN-TYPE CIRCUIT PACK CONNECTIONS AND TERMINATIONS

(B) SEE PART 11, PARAGRAPH 11.10 - MODEM POOLING

21.19 Feature Block Diagram - Remote Group Interface

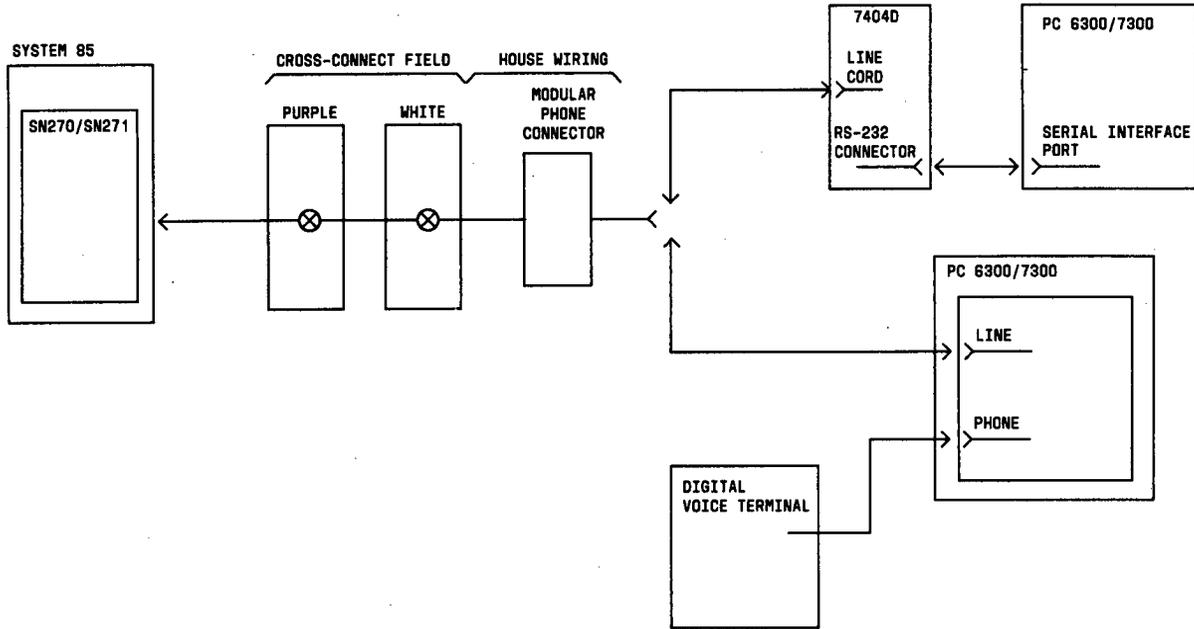
NOTE: This block diagram shows a configuration using a CSU, CPM, and CEM. Various configurations of these components can be used. See Part 14 for complete coverage.



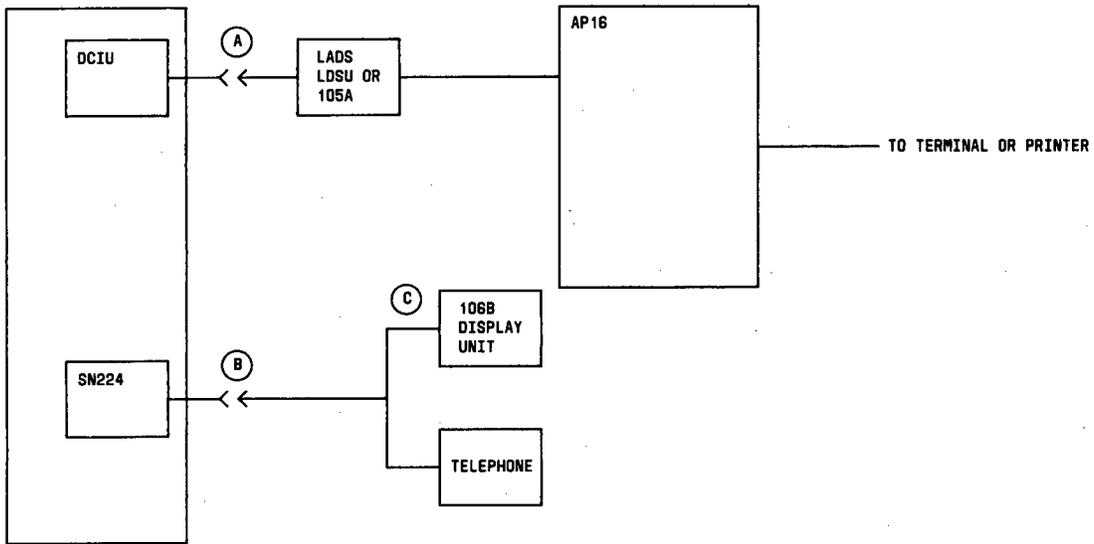
WIRING DETAILS

SEE PART 9, PARAGRAPH 9.2.9 FOR CIRCUIT PACK CONNECTIONS AND TERMINATIONS
 SEE PART 14 FOR REMOTE GROUP HOUSING INSTALLATION
 SEE PART 20 FOR CIRCUIT PACK OPTIONS

21.20 Feature Block Diagram - PC 6300/PC 7300 Connections to System 85



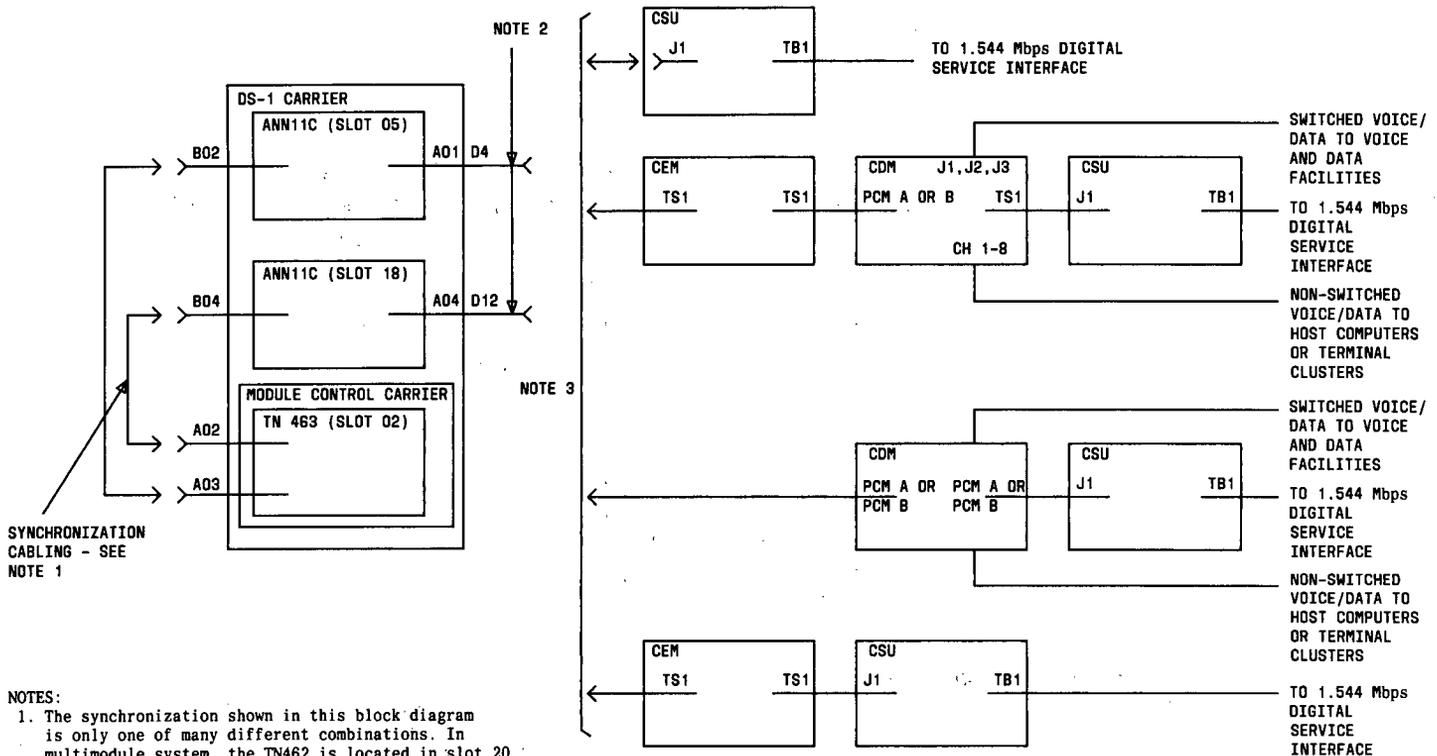
21.21 Feature Block Diagram - Call Management System



- (A) SEE PART 16, PARAGRAPH 16.6, 16.7, OR 16.8 FOR DCIV CONNECTIONS
- (B) SEE PART 9, PARAGRAPH 9.2.9 FOR SN224 CIRCUIT PACK CONNECTIONS AND TERMINATIONS
- (C) SEE PART 11, PARAGRAPH 11.7 FOR 106B CONNECTIONS

21.22 Feature Block Diagram - DS-1 Signaling Interface

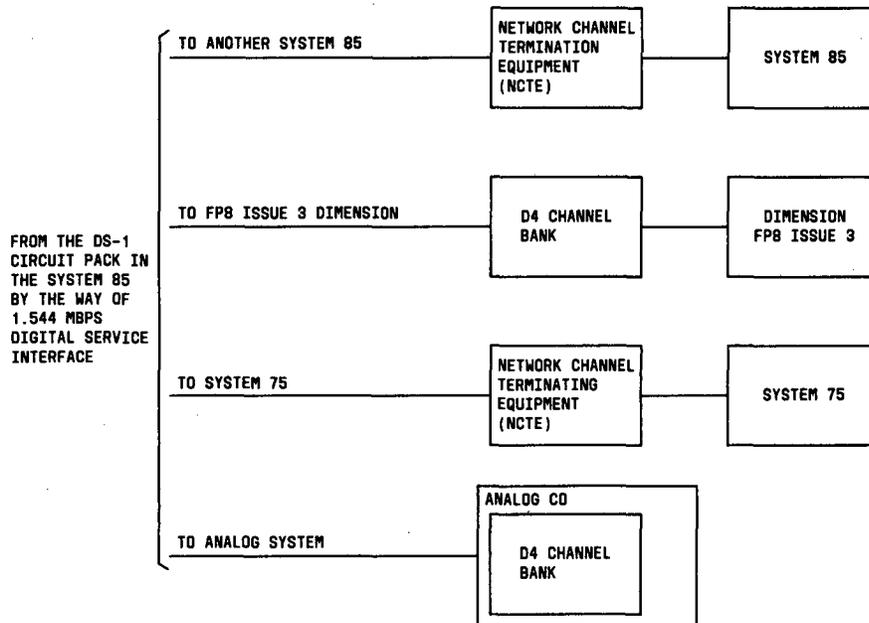
21.22.1 Block Diagram



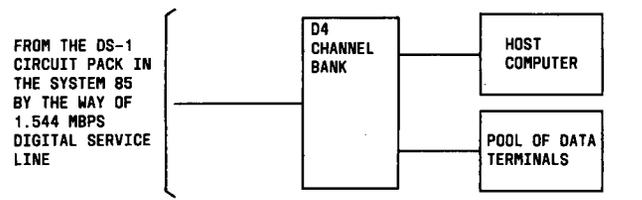
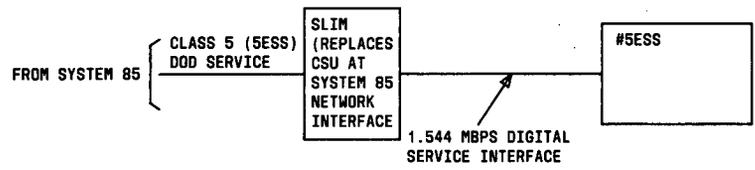
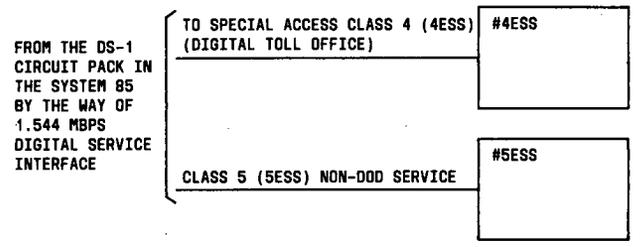
NOTES:

1. The synchronization shown in this block diagram is only one of many different combinations. In multimodule system, the TN462 is located in slot 20 of the carrier. See paragraphs 10.2.11 and 10.3.7 for all the different combinations of synchronizations.
2. The cabling instructions and connector termination information are shown in paragraphs 9.3.8 and 9.3.10.
3. The detailed connections of the different combinations of CSU, CDM, and CEM are shown in paragraph 12.5.

21.22.2 This paragraph gives a block diagram of some applications of System 85 DS-1 signaling. See 555-109-002 AT&T System 85 and System 75 DS-1 Interface Application Notes for a complete description. (Page 1 of 3)

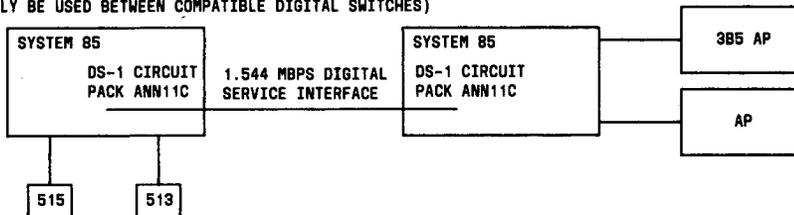


21.22.2 This paragraph gives a block diagram of some applications of System 85 DS-1 signaling.
 (Page 2 of 3)

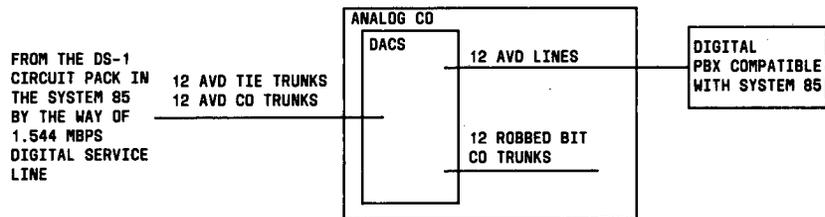


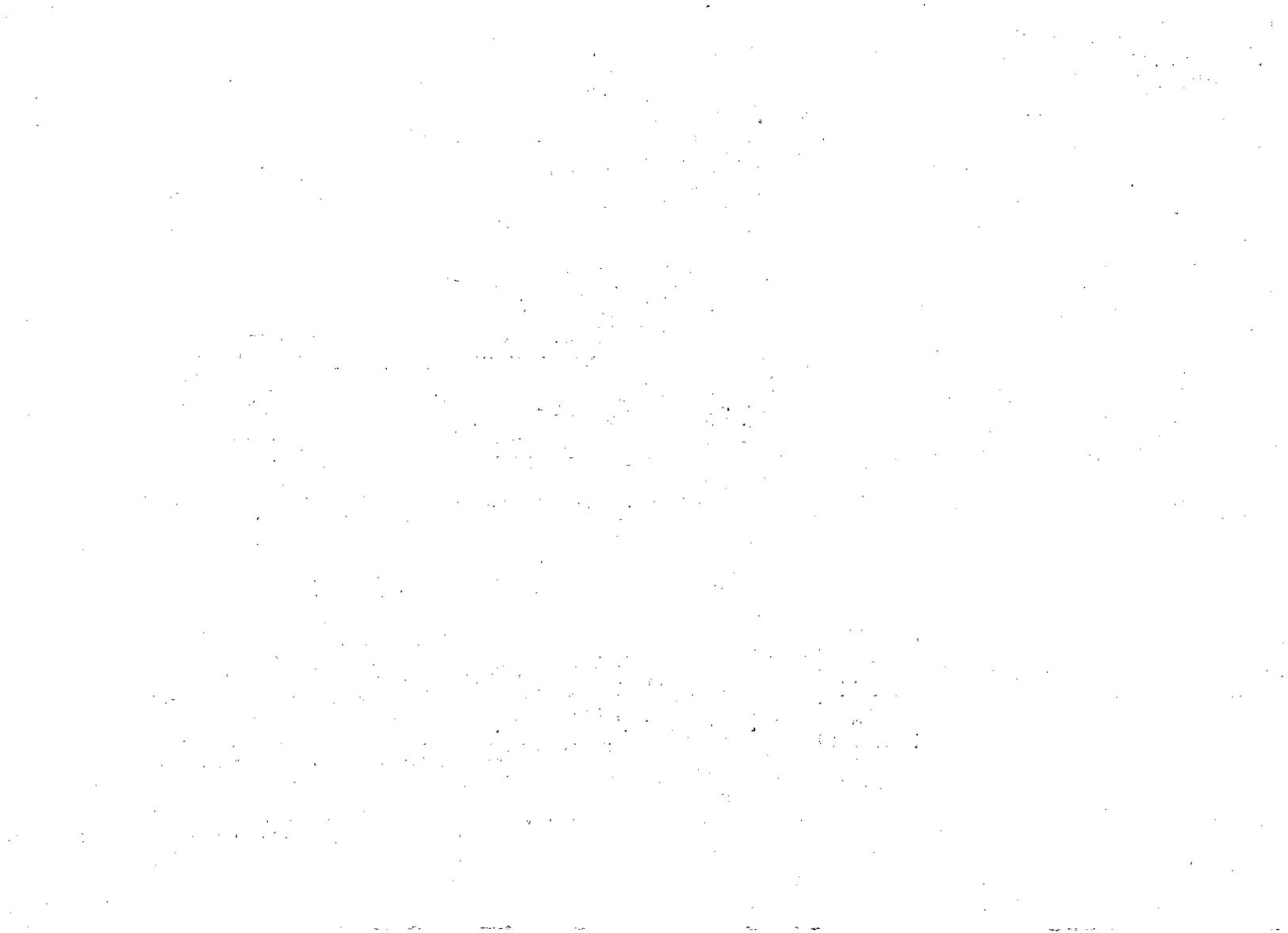
21.22.3 This paragraph gives a block diagram of some applications of System 85 DS-1 signaling (Page 3 of 3)

DS-1 INTERFACE WITH 64-KBPS AVD CHANNEL
(CAN ONLY BE USED BETWEEN COMPATIBLE DIGITAL SWITCHES)



DS-1 INTERFACE USING DACS (DIGITAL ACCESS AND CROSS CONNECT)
SYSTEM AT ANALOG CO





PART 22. SYSTEM ADDITIONS

22.1 Add Port or DS-1/MFAT Carrier to System

22.1.1 Remove power from the cabinet to receive the new carrier.

For systems with Extended Power Reserve:

At the battery plant distribution panel, set the circuit breaker for the cabinet to OFF.

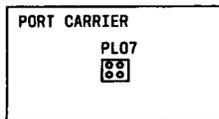
For systems without Extended Power Reserve:

At the 309/310 power unit which supplies power to the cabinet, set the AC INPUT circuit breaker to OFF.

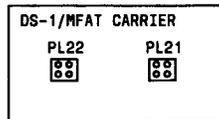
NOTE: The 309/310 power unit may be located in an adjacent cabinet.

22.1.2 Install the carrier in the cabinet.

Make a continuity check to make sure GRDD is not connected to the frame of the cabinet.



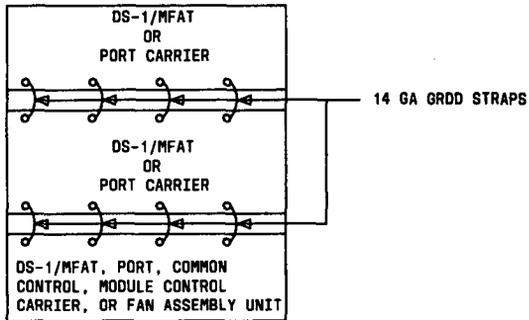
REAR VIEW



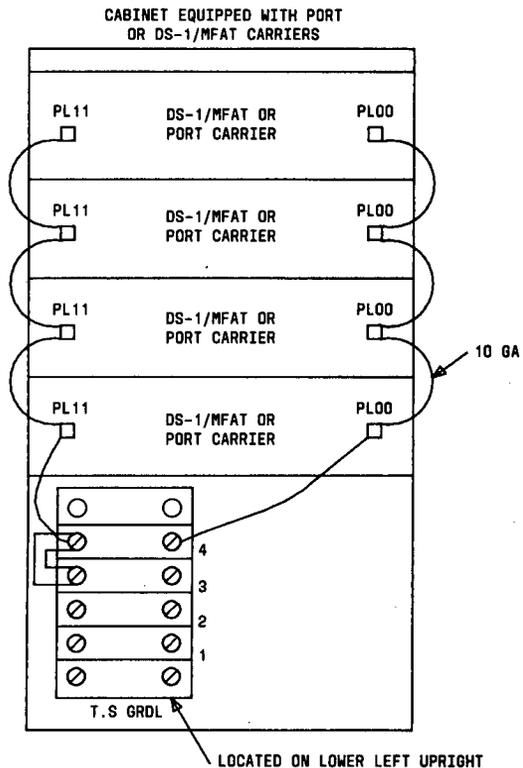
REAR VIEW

22.1.3 Digital Ground (GRDD) Connections

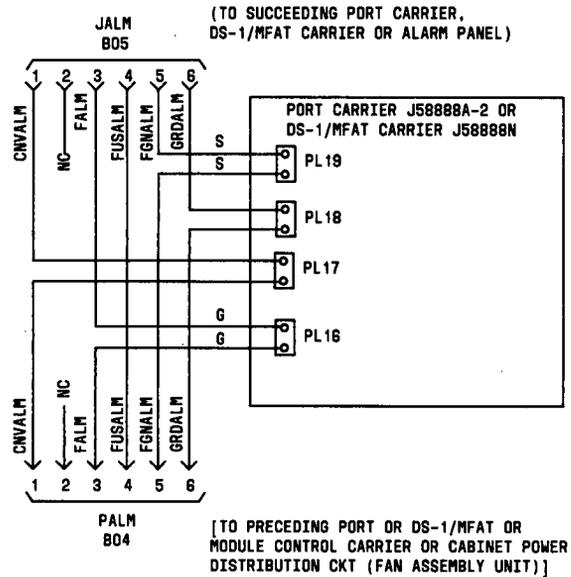
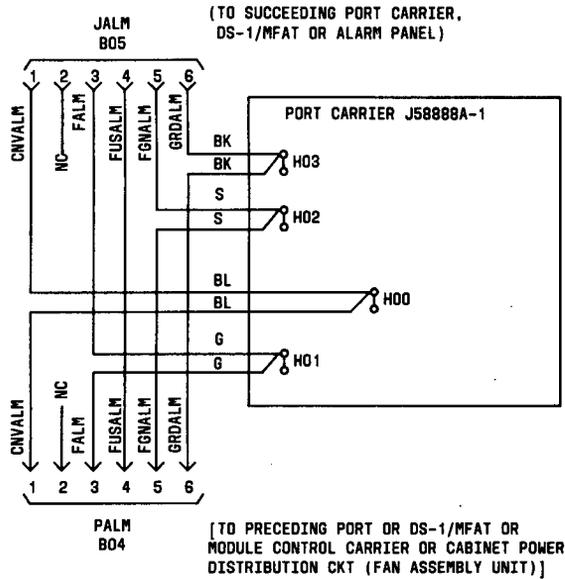
Each carrier is equipped with eight strapping lugs (four on top edge, four on bottom edge) for connecting GRDD ground to adjacent units. If a fan assembly is located in the position beneath the carrier being added, only two straps are used between the fan assembly and the carrier. Four 14-gauge straps are provided with each carrier. The top carrier in a cabinet is strapped only at the lower edge.



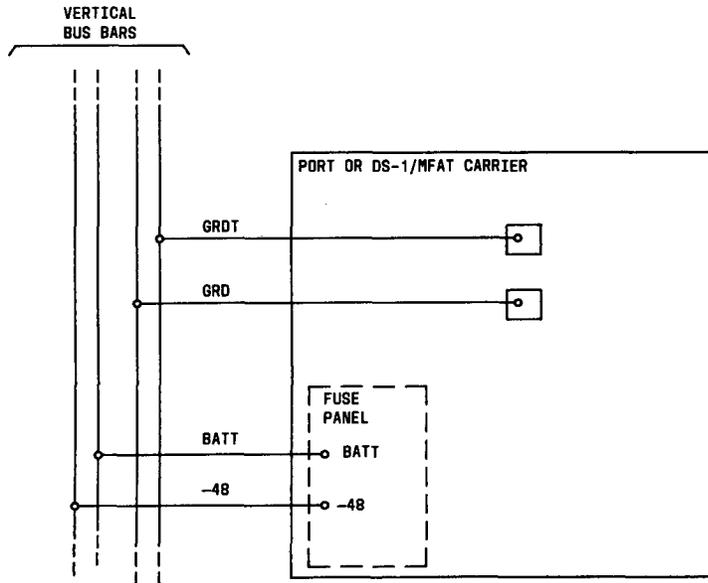
22.1.4 Lightning Ground (GRDL) Carrier Connections



22.1.5 Alarm Lead Connections

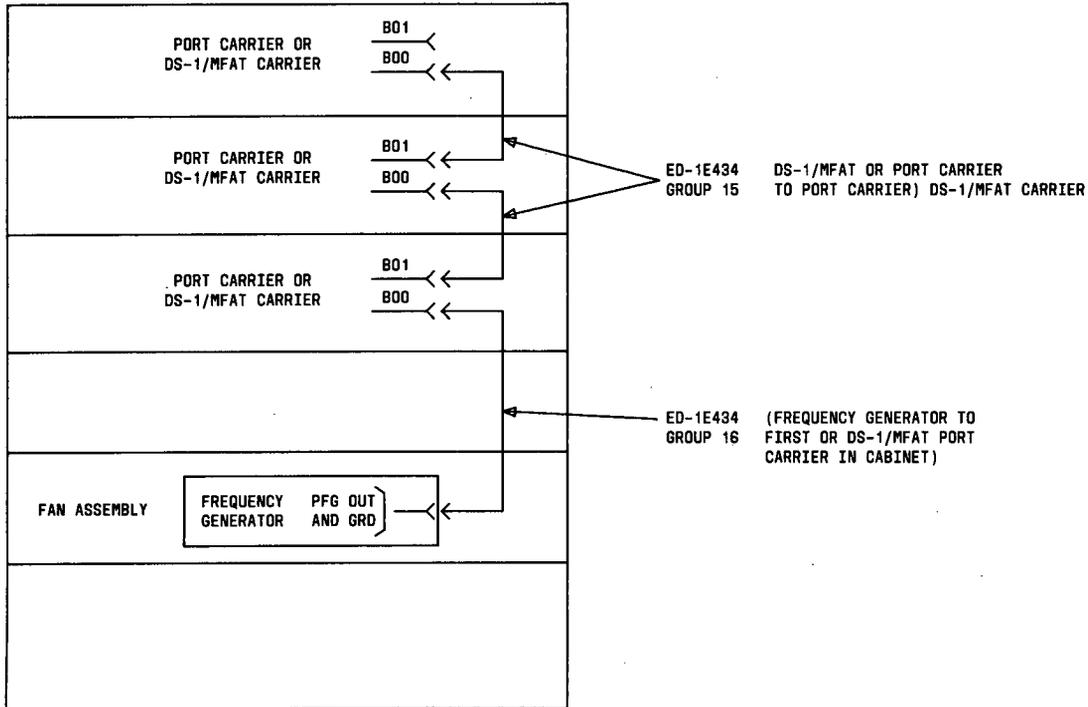


22.1.6 BUS Bar Connections



LEAD	PORT CARRIER CONNECTOR	DS-1/MFAT CARRIER CONNECTOR
GRDT	PL08	PL23 AND PL24
GRD	PL06	PL06 OR PL20

22.1.7 Typical ring lead wiring to port carriers (any cabinet with port or DS-1/MFAT carriers)



22.1.8 Refer to PARTS 9 and 10 for connecting I/O and PCM cables.

22.1.9 Power up the cabinet.

For systems with Extended Power Reserve:

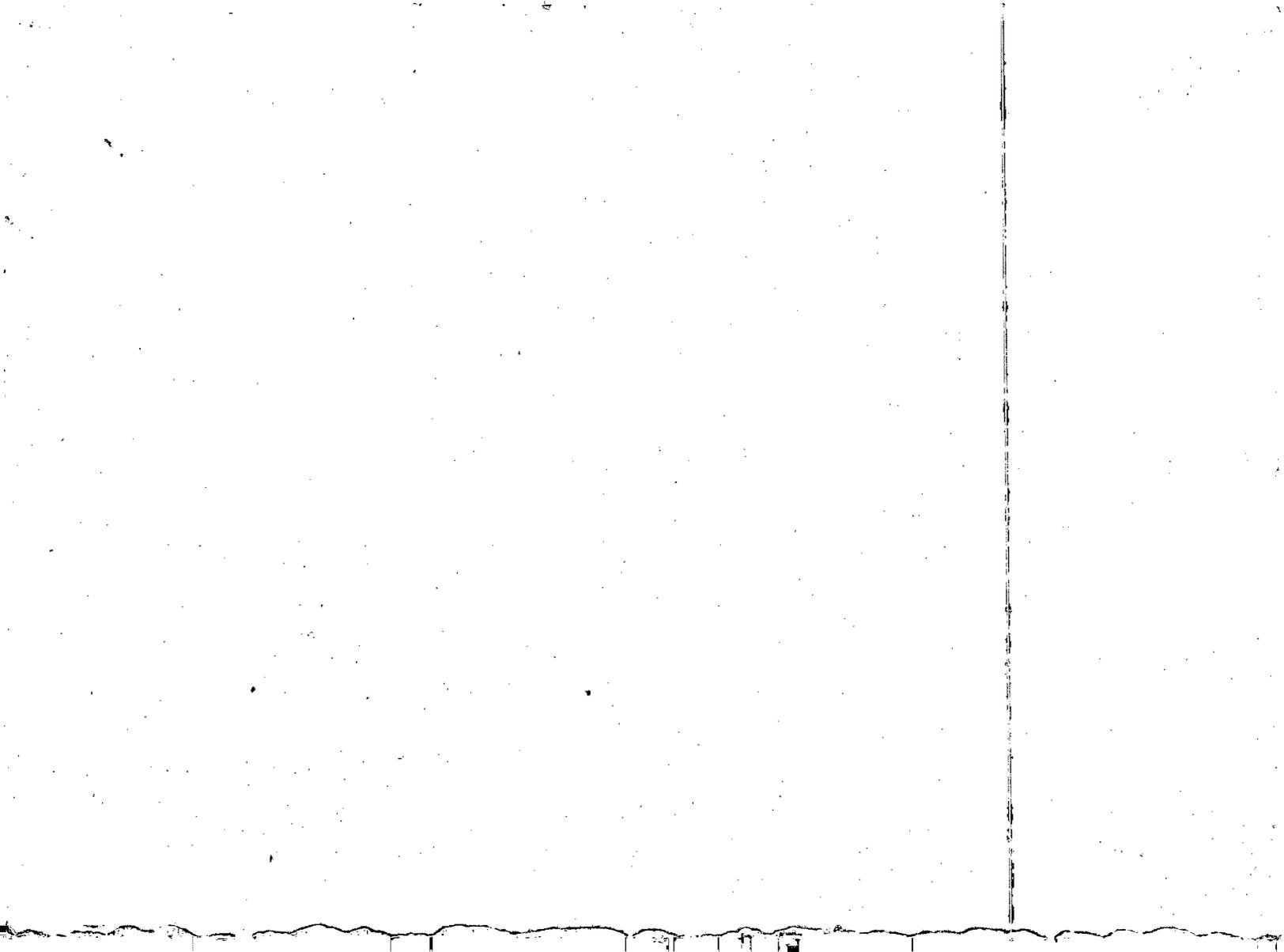
At the battery plant distribution panel, set the circuit breaker for the cabinet to ON.

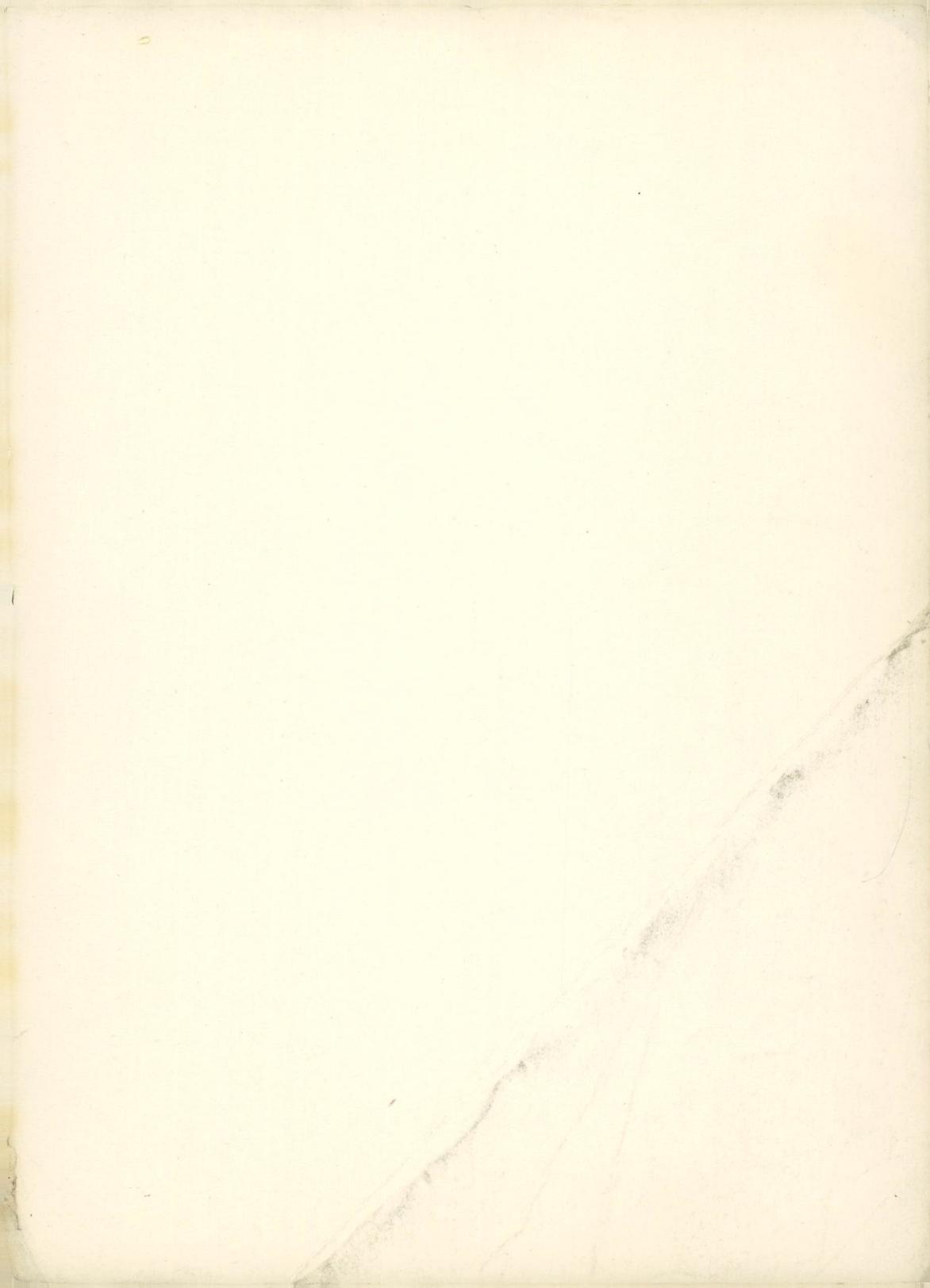
For systems without Extended Power Reserve:

At the 309/310 power unit which supplies power to the cabinet, set the AC INPUT circuit breaker to ON.

NOTE: The 309/310 power unit may be located in an adjacent cabinet.

22.1.10 Refer to AT&T SYSTEM 85 - MAINTENANCE service panel to clear any alarms caused by adding the new carrier.





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555-102-104

