Tekelec EAGLE® 5 Integrated Signaling System

Installation Manual

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Chapter 1

Safety Information

Topics:

- *General.....21*
- *Frames.....21*
- *Power.....22*
- *Electrostatic Discharge.....24*
- *Components.....25*

General

These icons and text throughout this manual are to alert the reader, to assure personnel safety, to minimize service interruptions, and to warn of potential equipment damage.

Table 1: Admonishments

	TOPPLE/DANGER: (This icon and text indicate the possibility of ***personnel injury and equipment damage*** .)
	DANGER: (This icon and text indicate the possibility of ***personnel injury*** .)
	WARNING: (This icon and text indicate the possibility of ***equipment damage*** .)
	CAUTION: (This icon and text indicate the possibility of ***service interruptions*** .)

WARNING: All personnel associated with the installation of these systems must adhere to all safety precautions and use required protection equipment to avoid the possibility of injury, equipment damage, service degradation, or service interruption.

WARNING: Some procedures may interrupt service. When possible, perform maintenance during low traffic and database provisioning periods, such as the maintenance window.

Frames

TOPPLE: Always read and understand instructions thoroughly and completely before working on, moving, raising or lowering the frame, any portion of the frame, attachments to the frame, or equipment.

TOPPLE: Never try to unpack any frame from the shipping container without at least two people to steady any movement of the frame and related components. At least two people are required to safely move and position a frame into place.

TOPPLE: Never pull out the shelf of a frame that is not anchored properly. Systems with sliding shelves must be securely anchored to the floor and to the overhead cable racks. Extending a shelf without correctly anchoring the frame can cause the frame to topple and endanger personnel and damge equipment.

TOPPLE: Frames are required to be attached to over-head ladder-racks before shelves are extended.

DANGER: Moving an application server chassis requires two people. Each chassis weighs approximately 25 kg (55 lbs) and may cause injury or damage to internal components due to shock and vibration if not handled properly.

WARNING: Before drilling holes in any flooring, verify with facilities personnel that the area is free of gas or water pipes, ventilation plenum, and electrical wiring conduits.

WARNING: Finger-tighten nuts on threaded rods inside the frames above the raised floor before finger tightening the nuts below the raised floor.

CAUTION: Frame ground. *Do not* "double lug": The practice of using one bolt through a lug and the ground bar, and through another lug on the other side of the ground bar, held in place by one nut.

A bolt through any nut must show at least two threads beyond the nut.

Power

DANGER: Strictly observe all grounding requirements to reduce the risk of electric shock.

DANGER: Do not use or place commercially AC-powered equipment within 7 ft. of –48V equipment. Close proximity can create a shock or current loop that is severely hazardous to personnel and equipment.

WARNING: The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the Outside Plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition

of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

WARNING: The power (-48 VDC) and return connections of Fuse and Alarm Panels (FAP) 870-0243-08 and 870-1606-xx are physically reversed at the input terminal.

WARNING: Before testing -48VDC power source:

- Ensure that no power is being provided to the system from the –48VDC power source, such as a power board
- Ensure that no circuit cards are installed in the shelves
- Remove all fuses from the fuse and alarm panels
- Recheck wiring and connections for proper polarity

WARNING: Always install an isolator pad between the frame and ground. Tekelec frames are shipped with isolator pads to completely isolate the frames from ground. If a non-Tekelec frame is used, an isolator pad must be provided.

WARNING: Frames with HCMIM cards require 60A breakers, ELAP frames use 30A and 60A breakers, and EPAP and EOAP frames use 30A breakers. Existing frames that are fused at 40A can be upgraded to support 60A with a FAP upgrade kit.

WARNING: Verify that all breakers for application servers are set to the OFF (O) position. An application server chassis is redundantly powered from both A and B -48VDC buses. Ensure that both the circuit breaker supplying A power to the chassis and the circuit breaker supplying B power to the chassis are turned OFF by measuring the voltage with a VOM on the cable that connects the chassis to its breakers. Both A and B power LEDs on the front panel of the chassis should be OFF.

CAUTION: Redundant systems allow service during normal maintenance. When repairs require a total power disconnect, both input supply sources must be disconnected. This causes service interruption and takes down the systems.

CAUTION: This equipment has a connection between the earthed conductor of the DC supply circuit and the earthing conductor.

CAUTION: The Branch Circuit Overcurrent Protection shall be rated at 48V minimum and 40A maximum.

CAUTION: Install equipment in restricted access areas in accordance with articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70.

CAUTION: Incorporate a readily accessible approved disconnect device in the field wiring.

CAUTION: Connect to a reliably grounded SELV source that is reliably earthed and electrically isolated from the AC source.

CAUTION: Use only listed closed-loop connectors for connection to the power supply.

Electrostatic Discharge

DANGER: Do not wear metal, chains, rings, watches, or jewelry or carry exposed metal, keys, or tools in pockets when working on system equipment or other related electrostatic-sensitive components.

DANGER: Always wear a wrist strap or other electrostatic protection when handling printed circuit cards and other electrostatic-sensitive devices.

WARNING: Observe proper ESD procedures when handling the application server chassis. Always wear an ESD wrist strap connected to a grounded bench or frame.

WARNING: Use the antistatic wrist strap connected to the wrist strap grounding point on the frame when performing these procedures.

WARNING: Do not leave or allow unused metal objects, such as screws or washers, to remain anywhere within the equipment. Remove all unused material from the equipment.

WARNING: Do not allow any metal shavings to remain in the equipment area. Shavings may occur from over tightened screws or bolts. These small metal particles are hazardous to electronic equipment. Be careful not to over tighten screws or bolts.

WARNING: Do not use tie wraps on or above the top traverse arms on a frame. Always trim tie wrap flush and turn the trimmed tie wrap to the rear of the cable. Contact the Site Supervisor for site-specific customer information.

Components

WARNING: If components arrive in containters that might have been subjected to extreme temperatures or variations in humidity (such as air transport), allow 6 hours for the components to aclimatize to your site conditions before operating.

WARNING: Metal points on Printed Circuit Boards conducts -48VDC and can cause shorts, shocks, and damage if not handled properly.

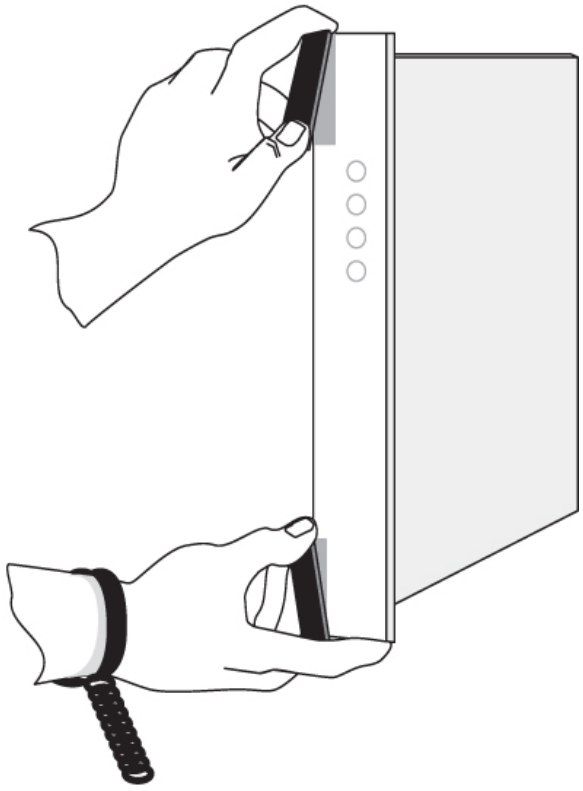
CAUTION: New CPCI cards may have a small plastic cover over the screws or the alignment ejector pins. Remove and discard these plastic covers. If inserting the cards takes an excessive amount of force, check for obstructions. Forcing the card into a slot may damage the ejector handle or pin.

CAUTION: In EAGLE 5 ISS, make sure that the DCM card is inserted into the correct odd numbered slots. In IP^7 Secure Gateway systems, there are no slot provisioning requirements. Cards may be provisioned in any slot where they physically fit except for the HMUX and MAS dedicated card slots.

CAUTION: After the frame has been shipped or moved, remove all cards prior to applying power. Carefully reset cards to avoid possible faulty connections.

To remove or install a card, use the module locking tabs at the top and bottom of the card faceplate. See to *Figure 1: Removing a Card*.

Figure 1: Removing a Card



CAUTION

CAUTION: Do not impact the faceplate in order to mate the connectors. Any impact to the card's faceplate can damage the faceplate, the pins, or the connectors.

CAUTION

CAUTION: Be sure to install the fan assembly 890-0001-04 before installing the HCMIM card.

CAUTION

CAUTION: Before powering up the fans, ensure that the shelf directly above the fan does not contain any empty slots. Install an air management card in any empty slots to ensure proper air flow. These filler cards have no electrical connection to the system.

CAUTION

CAUTION: *Do not* form FAN POWER cables with LIM cables.

Chapter 2

Introduction

Topics:

- *About this Manual.....28*
- *Scope and Audience.....28*
- *Organization.....28*
- *Related Publications.....29*
- *Documentation Availability, Packaging, and Updates.....29*
- *Locate Product Documentation on the Customer Support Site.....30*
- *Regulatory Compliance and Certification.....30*
- *Environmental Requirements.....31*
- *Product Packaging and Delivery.....32*
- *Customer Care Center.....33*
- *Hardware Repair and Return.....36*

About this Manual

This manual provides installation information for new systems or components based on EAGLE 5 ISS releases 40.0 and later. For installation information of previous releases, contact your sales representative.

Scope and Audience

This manual is intended for qualified technical installation and test personnel that must have thorough knowledge of telecommunication installation specifications, procedures, and equipment standards.

Note: All personnel must be aware of and conform to the safety information provided in *Safety Information* and through out this document.

This manual does not cover testing or system software.

Hardware Operational Testing is designed to verify the functionality of the finalized construction of the hardware at the customer site. The demarcation line for the testing is, up to and including the patch panel, directly connected to the system. All installations are site specific, therefore a comprehensive site survey is necessary for all installations.

For hardware descriptions or basic site engineering information, refer to the *Hardware Manual* included with your system documentation. For replacement procedures of existing hardware components, refer to the *Maintenance Manual* included with your system documentation.

Organization

This manual is organized into the following chapters:

- *Safety Information* provides important safety information for installers. Know this information prior to attempting an installation.
- *Introduction* provides information about the manual, Tekelec products, and installation support.
- *General Installation Information* lists Tekelec Signaling Productscomponents that make up the systems, explains in general how to label cables, and how to install a module.
- *Frames and Shelves* describes the unpacking, floor preparation, installation, anchoring, and labeling of frames and shelves.
- *Fuses and Alarm Panel* describes fuse and alarm panels and circuit breaker installation and cabling for power and grounding. This chapter also provides information on fuse verification.
- *Assemblies* describes EAGLE 5 ISS assemblies, including cabling, clock, and termination information, fan assemblies, master timing, Ohm converter, and hardware acceptance information.
- *LED Information* provides Light Emitting Diode (LED) information.
- *Backplane Connectors* provides information on connectors.
- *Cables and Adapters* provides information on cables and adapters.

- *Part Numbers* provides part number information on orderable items.

Related Publications

For information about additional publications that are related to this document, refer to the *Related Publications* document. The *Related Publications* document is published as a part of the *Release Documentation* and is also published as a separate document on the Tekelec Customer Support Site.

Documentation Availability, Packaging, and Updates

Tekelec provides documentation with each system and in accordance with contractual agreements. For General Availability (GA) releases, Tekelec publishes a complete EAGLE 5 ISS documentation set. For Limited Availability (LA) releases, Tekelec may publish a documentation subset tailored to specific feature content or hardware requirements. Documentation Bulletins announce a new or updated release.

The Tekelec EAGLE 5 ISS documentation set is released on an optical disc. This format allows for easy searches through all parts of the documentation set.

The electronic file of each manual is also available from the *Tekelec Customer Support* site. This site allows for 24-hour access to the most up-to-date documentation, including the latest versions of Feature Notices.

Printed documentation is available for GA releases on request only and with a lead time of six weeks. The printed documentation set includes pocket guides for commands and alarms. Pocket guides may also be ordered separately. Exceptions to printed documentation are:

- Hardware or Installation manuals are printed without the linked attachments found in the electronic version of the manuals.
- The Release Notice is available only on the Customer Support site.

Note: Customers may print a reasonable number of each manual for their own use.

Documentation is updated when significant changes are made that affect system operation. Updates resulting from Severity 1 and 2 PRs are made to existing manuals. Other changes are included in the documentation for the next scheduled release. Updates are made by re-issuing an electronic file to the customer support site. Customers with printed documentation should contact their Sales Representative for an addendum. Occasionally, changes are communicated first with a Documentation Bulletin to provide customers with an advanced notice of the issue until officially released in the documentation. Documentation Bulletins are posted on the Customer Support site and can be viewed per product and release.

Locate Product Documentation on the Customer Support Site

Access to Tekelec's Customer Support site is restricted to current Tekelec customers only. This section describes how to log into the Tekelec Customer Support site and locate a document. Viewing the document requires Adobe Acrobat Reader, which can be downloaded at www.adobe.com.

1. Log into the *Tekelec Customer Support* site.

   Note: If you have not registered for this new site, click the **Register Here** link. Have your customer number available. The response time for registration requests is 24 to 48 hours.

2. Click the **Product Support** tab.
3. Use the Search field to locate a document by its part number, release number, document name, or document type. The Search field accepts both full and partial entries.
4. Click a subject folder to browse through a list of related files.
5. To download a file to your location, right-click the file name and select **Save Target As**.

Regulatory Compliance and Certification

Tekelec products are tested to meet the following regulatory standards:

- Network Equipment Building System (NEBS) level 3 as listed in Telcordia SR-3580.
- Applicable Telcordia Electromagnetic Compatibility and Electrical Safety requirements in GR-1089-CORE.
- Applicable Physical Protection requirements in GR-63-CORE.
- Relevant directives and harmonized standards in support of the products Compliance European (CE) mark required in Europe. *Figure 2: European Directives CE Mark* shows the mark used to indicate this compliance.

  Figure 2: European Directives CE Mark

- Relevant standards in ElectroMagnetic Compatibility (EMC) directive 89/336/EEC.
- Relevant standards in Safety directive 73/23/EEC, supported by Certified Body (CB) Test Certificates US/5923/UL or US/5451/UL issued by the National Certification Body as tested to IEC 60950 with national differences for European countries .
- Underwriters Laboratories (UL) listed under UL File E200146 for USA and c-UL for Canada. *Figure 3: Combined UL Mark for the United States and Canada* shows the mark used to indicate this compliance.

  Figure 3: Combined UL Mark for the United States and Canada

- Relevent standards in SJ/T 11363-2006 for limits of certain hazardous substances.

Figure 4: Hazardous Substances

部件名称 (Parts)	有毒有害物质或元素 (Hazardous Substance)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属部件 (Metal Parts)	○	○	○	○	○	○
电路模块 (Circuit Modules)	×	○	○	○	○	○
电缆及电缆组件 (Cables & Cable Assemblies)	×	○	○	○	○	○
塑料和聚合物部件 (Plastic and Polymeric parts)	○	○	○	○	○	○

○：表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/Txxxx-xxxx标准规定的限量要求以下。
Indicates that the concentration of the hazardous substance in all homogeneous materials in the parts is below the relevant threshold of the SJ/T 11363-2006 standard.

×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/Txxxx-xxxx标准规定的限量要求。
Indicates that the concentration of the hazardous substance of at least one of all homogeneous materials in the parts is above the relevant threshold of the SJ/T 11363-2006 standard.

Environmental Requirements

The environmental conditions for the system must be maintained to the following specifications.

Temperature Variation

Typical environmental conditions are temperature and humidity controlled. With loss of environmental control the equipment covered in this manual complies with these conditions:

- Operating: 5° C to 40° C (41° F to 104° F)
-
- Storage: -5° C to 50° C (23° F to 122° F)

Relative Humidity

- Operating: 5% to 85% non-condensing (maximum absolute humidity of 0.024 kg of water per kg of dry air)
- Short Term Operating: 5% to 90% non-condensing (maximum absolute humidity of 0.024 kg of water per kg of dry air)

Elevation

Operating: 60m below sea level at ambient temperature of 30˚ C to +4000m above sea level at ambient temperature of 40˚ C.

Building Requirements

The building requirements are standard telephony industry requirements for equipment installation.

The building must provide a clear, uncluttered route between the loading/receiving dock and the planned location. In order to move the equipment to the proper location, recommend hall clearance is at least 4.5 feet, (1.4 meters) wide by 8 feet, (2.4. meters) tall.

Four feet, (1.2 meter) side aisles should be used to allow maneuvering frames into place and provide ample work space around the equipment.

Product Packaging and Delivery

DANGER: At least two people are required to safely move and position any frame.

Before opening any shipping container, inspect for evidence of damage during shipment. Report any damage to the carrier for investigation and possible claims. Also report any damage to the Tekelec site supervisor.

Check the packing slips against the equipment specification list for this installation site. Report any discrepancies to Tekelec Production Control at 1-888-673-4827, or if necessary, call 919-460-2150 inside the USA.

Inventory the shipment to make sure that all items listed on the pick list have been received in good condition. Report any discrepancies or damaged equipment by calling 1-888-673-4827.

TEKELEC

Attn: RMA Department

5200 Paramount Parkway

Morrisville, NC 27560

RMA#: <assigned by Tekelec>

Customer Care Center

The Tekelec Customer Care Center is your initial point of contact for all product support needs. A representative takes your call or email, creates a Customer Service Request (CSR) and directs your requests to the Tekelec Technical Assistance Center (TAC). Each CSR includes an individual tracking number. Together with TAC Engineers, the representative will help you resolve your request.

The Customer Care Center is available 24 hours a day, 7 days a week, 365 days a year, and is linked to TAC Engineers around the globe.

Tekelec TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

Tekelec Technical Assistance Centers are located around the globe in the following locations:

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

  Phone:

  1-888-FOR-TKLC or 1-888-367-8552 (toll-free, within continental USA and Canada)

  1-919-460-2150 (outside continental USA and Canada)

  TAC Regional Support Office Hours:

  8:00 a.m. through 5:00 p.m. (GMT minus 5 hours), Monday through Friday, excluding holidays

- **Central and Latin America (CALA)**

  Phone:

  USA access code +1-800-658-5454, then 1-888-FOR-TKLC or 1-888-367-8552 (toll-free)

  TAC Regional Support Office Hours (except Brazil):

  10:00 a.m. through 7:00 p.m. (GMT minus 6 hours), Monday through Friday, excluding holidays

  - **Argentina**

    Phone:

    0-800-555-5246 (toll-free)

  - **Brazil**

    Phone:

    0-800-891-4341 (toll-free)

    TAC Regional Support Office Hours:

    8:30 a.m. through 6:30 p.m. (GMT minus 3 hours), Monday through Friday, excluding holidays

  - **Chile**

Phone:

1230-020-555-5468

- **Columbia**

  Phone:

  01-800-912-0537

- **Dominican Republic**

  Phone:

  1-888-367-8552

- **Mexico**

  Phone:

  001-888-367-8552

- **Peru**

  Phone:

  0800-53-087

- **Puerto Rico**

  Phone:

  1-888-367-8552 (1-888-FOR-TKLC)

- **Venezuela**

  Phone:

  0800-176-6497

- **Europe, Middle East, and Africa**

  Regional Office Hours:

  8:30 a.m. through 5:00 p.m. (GMT), Monday through Friday, excluding holidays

  - **Signaling**

    Phone:

    +44 1784 467 804 (within UK)

  - **Software Solutions**

    Phone:

    +33 3 89 33 54 00

- **Asia**

  - **India**

    Phone:

    +91 124 436 8552 or +91 124 436 8553

    TAC Regional Support Office Hours:

10:00 a.m. through 7:00 p.m. (GMT plus 5 1/2 hours), Monday through Saturday, excluding holidays

- **Singapore**

  Phone:

  +65 6796 2288

  TAC Regional Support Office Hours:

  9:00 a.m. through 6:00 p.m. (GMT plus 8 hours), Monday through Friday, excluding holidays

Problem Report (PR)

The assigned Technical Support engineer opens a problem report (PR) using problem criteria as defined in "TL-9000 Quality System Metrics (Book Two, Release 3.0" and the following sections.

Critical

Critical problems severely affect service, capacity/traffic, billing, and maintenance capabilities and requires immediate corrective action, regardless of time of day or day of the week, as viewed by a customer upon discussion with the supplier. For example:

- A loss of service that is comparable to the total loss of effective functional capacity of an entire switching or transport system.
- A reduction in capacity or traffic handling capacity such that expected loads cannot be handled.
- Any loss of safety or emergency capability (for example, 911 calls).

Major

Major problems cause conditions that seriously affect system operations, maintenance, and administration, etc., and require immediate attention as viewed by the customer upon discussion with the supplier. The urgency is less than in a critical situations because of a lesser immediate or impending effect on system performance, customer, and the customer's operation and review. For example:

- Reduction in any capacity/traffic measurement function
- Any loss of functional visibility and/or diagnostic capability
- Short outage equivalent to system or subsystem outages, with accumulated duration of greater than two minutes in any 24-hour period, or that continue to repeat during longer periods
- Repeated degradation of DS1 or higher rate spans or connections
- Prevention of access for routine administrative activity
- Degradation of access for maintenance or recovery operations
- Degradation of the system's ability to provide any required critical or major trouble notification
- Any significant increase in product related customer trouble reports
- Billing error rates that exceed specifications
- Corruption of system or billing databases

Minor

Other problems that a customer does not view as critical or major are considered minor. Minor problems do not significantly impair the functioning of the system and do not significantly affect service to customers. These problems are tolerable during system use.

Engineering complaints are classified as minor unless otherwise negotiated between the customer and supplier.

Emergency Response

In the event of a critical service situation, emergency response is offered by the Tekelec Customer Care Center 24 hours a day, 7 days a week. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with an EAGLE 5 ISS that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical problems affect service and/or system operation resulting in:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with the Tekelec Customer Care Center.

Hardware Repair and Return

Any system components being returned for repair or replacement must be processed through the Tekelec Return Material Authorization (RMA) procedures. A hardware repair is defined as an item returned to Tekelec due to a failure, with the returned item being repaired and returned to the customer. It is essential that serial numbers are recorded correctly. RMAs cannot be created without a valid serial number. All repair and quality information is tracked by serial number. *Table 2: Basic RMA Types* lists the basic RMA types.*Table 3: RMA Reasons for Return* lists the RMA return reasons.

Table 2: Basic RMA Types

Replacement Type	Description	Turnaround
Priority Advance Replacement	Customer requests the URGENT replacement of a damaged product	Same Day Shipment

Replacement Type	Description	Turnaround
Advance Replacement	Customer request the replacement of a damaged product	Shipment Within 3 Business Days
Repair / Return	Customer will return a damaged product for repair	Shipment Within 5 Days After Receipt
Expendable	A damaged part, such as a cable, is replaced, but the Customer does not return the damaged product	Depends on Urgency - Shipment Within 3 Business Days

Table 3: RMA Reasons for Return

Reason for Return	Description
Damaged by Environment	Product damaged by environmental phenomena such as water damage or earthquake.
Damaged in Shipment	Damaged between shipment from Tekelec and receipt at the Customer's installation site.
DOA – Dead on Arrival	Product is not functional when it is first installed at the Customer's location.
Lab Return	Products returned from lab sites.
Product Capture	Defect to be captured by Quality or Engineering (not Product Recall).
Product Deficiency	Anything wrong with the part that doesn't fall into another category.
Product Recall	Products recalled by divisions for the repair of a defect or replacement of defective products.
Return – No Product Deficiency	Anything returned without the product being defective.

Repair and Return Shipping Instructions

All returned equipment, assemblies, or subassemblies must be shipped to the Tekelec Repair and Return Facility specified by the Technical Services engineer. The item being returned must be shipped

in the original carton or in an equivalent container assuring proper static handling procedures and with the freight charges prepaid.

The assigned RMA number must be clearly printed on the "RMA#:" line of the shipping label on the outside of the shipping package. If the RMA number is not placed on the label, the return could be delayed.

Procedure - RMA

1. Obtain and confirm the following information before contacting the *Customer Care Center*:
   - Your name:
   - Company name:
   - Call-back number:
   - Email address:
   - Which product you are calling about?
   - Site location:
   - CLLI number
   - System serial number (NT, CE, LM, DS, etc…):
   - Complete software release (e.g., 28.0.1-41.53.0):
   - Upgrade forms

     WI005153

     WI005154

     WI005218

     WI005219

     WI005220
   - Tekelec card type: (e.g., MPL, DSM, etc.):
   - Tekelec card part number (870-####-##):
   - Associated serial number (102########):
   - Reason for return or replacement (isolated from system):
   - Full name of person the replacement card is being shipped to:
   - Shipping address:

     Note: If possible, include associated alarms (UAMs) and a copy of the associated output (capture file).

2. Contact the *Customer Care Center* and request a Return of Material Authorization (RMA).
3. If the item is a like-for-like advance replacement, the Technical Services engineer arranges for shipment of the replacement item to the customer.
   a) Wait for the replacement component to arrive.
   b) Package the defective component in the box of materials you received with your replacement. Use proper static handling procedures.
   c) Label the outside and inside of the box with your RMA number clearly visible. Place the packing slip from the received replacements on the inside of your box.

d) Ship the defective component to the return address listed on the packing slip.

4. If the item is a repair/return, the Technical Services engineer arranges for shipment of the replacement item to the customer.
   a) Package the defective component in a suitable package for shipping. Use proper static handling procedures.
   b) Label the outside and inside of the box with your RMA number clearly visible. Include a packing slip with all the information from *Step 1* along with the RMA number.
   c) Ship the defective component to the following address:

      TEKELEC

      Attn: RMA Department

      5200 Paramount Parkway

      Morrisville, NC 27560

      RMA#: <assigned by Tekelec>

   d) Wait for the repaired component to arrive.

Returning a Crate

Use the following procedure to return a shipping crate and dollies to Tekelec.

1. Replace the retaining brace.
2. Replace the shipping container front panel using the bolts saved previously and arrange the return shipment by contacting:

   Shipping Manager TEKELECAttn: RMA Department5200 Paramount ParkwayMorrisville, NC 27560RMA#: <assigned by Tekelec>

3. After the frame is positioned and the dollies are removed from the frame, the dollies are returned to the same address as the shipping container listed above.

   If the equipment is being immediately installed ship the dollies back to Tekelec in the crate after use. After installing the equipment bolt the dollies securely in the crate and return to Tekelec.

   OR

   If the equipment is not being immediately installed ship the dollies back to Tekelec in the box supplied with the crate. After unpacking the equipment return the crate to Tekelec and retain the box to return the dollies. After installing the equipment remove the dollies and return to Tekelec in the supplied box.

   Note:

   It is the site supervisor's responsibility to assure the crate and dollies are returned to Tekelec.

Chapter 3

General Installation Information

Topics:

- *Hardware Operational Testing.....41*
- *Components Overview.....41*
- *Card Installation and Replacement.....43*
- *Labeling.....44*
- *EAGLE 5 ISS Post-Installation Inspection.....47*

Hardware Operational Testing

Hardware operational testing is designed to verify the functionality of the finalized construction of the hardware at the customer site. The demarcation line for the testing is up to and including the patch panel directly connected to the system. All cabling, alarm output, clock input, and other Tekelec equipment is also verified operational per the *Hardware Operational Test Manual* provided with the test equipment..

WARNING: If components arrive in containters that might have been subjected to extreme temperatures or variations in humidity (such as air transport), allow 6 hours for the components to aclimatize to your site conditions before operating.

Components Overview

The name, function, and part number(s) of the most current EAGLE 5 ISS components are listed in alphabetical order. For a detailed hardware description, refer to the *Hardware Manual* included with your system documentation. For more history and part numbers of these components, refer to *LED Information*.

Table 4: EAGLE 5 ISS Components

Acronym	Name	Function
	Air Management Card	Filler card without electrical connections
CI	Clock Interface Card (Holdover Clock)	Input signal redundancy.
DCM	Database Communications Module	IP connectivity
DCMX	Expandable Database Communications Module	IP connectivity
DSM	Database Service Module	Large-capacity SCCP database
E5-E1T1	E5-E1/T1 Interface Module	Single slot card providing eight trunk terminations processing up to 32 signaling links of configurable channelized E1 or T1 connectivity
E5-ENET	E5-ENET Interface Module	one or more Ethernet interfaces.
E5-SM4G	Database Service Module	SCCP Database.

Acronym	Name	Function
E5-SLAN	E5-ENET Interface Module	IP connectivity
E5-STC	E5-ENET Interface Module	IP connectivity
E5-TSM	Translation Service Module	GLS functionality
EDCM	Enhanced Database Communications Module	IP connectivity
EDCM	Enhanced Database Communications Module	IP connectivity
EDCM-A	Enhanced Database Communications Module A	IP connectivity
EOAP	Embedded Operations Support System Applications Processor	Provide Signaling and Engineering Administration System (SEAS) interfacing between the EAGLE 5 ISS system and a SEAS console
HIPR	High-Speed IMT Packet Router Module	Provides Interprocessor Message Transport (IMT) bus continuity for all cards connected to the IMT bus for large systems
HIPR2	High-Speed IMT Packet Router 2 Module	Provides Interprocessor Message Transport (IMT) bus continuity for all cards connected to the IMT bus at a rate of 2.5 Gbps for large systems
HMUX	High-Speed Multiplexer	Provides Interprocessor Message Transport (IMT) bus continuity for all cards connected to the IMT bus for large systems
LIM	Link Interface Module	Provides specific SS7 interfaces
LIM-ATM	Link Interface Module - Asynchronous Transfer Module	Provides 1 Asynchronous Transfer Mode over T1 Interface at 1.544 Mbps
E1-T1 MIM	E1-T1 Multichannel Interface Module 02	Connection point from system backplane to external E1 andE1-T1 MIM interface
GPSM-II	General Purpose Service Module	IP connectivity, replaces MCAP in large systems

Acronym	Name	Function
MCA	Matrix Controller Automatic (Holdover Clock)	Controls output protection switch matrix
MDAL	Maintenance Disk and Alarm Card	Alarming and cartridge-based loading of software
MIS	Maintenance Interface System Card (Holdover Clock)	Provides alarms output to system control shelf
MPL	Multi-Port Link Interface Module	Provides up to 8 ANSI 56 Kbps DS0 link connectivity
MPLT	Multi-Port Link Interface Module with Taxi Component	Provides eight DS0 ports, transporting SS7 traffic, in a single EAGLE 5 ISS card slot
MPS	Multi-purpose Server	Database/reload functionality to various applications
TDM-GTI	Terminal Disk Module - Global Timing Interface	Hard disk storage.
TOCA	Timing Output Composite Automatic (Holdover Clock)	Clocks outputs (TO1 and TO2) for A and B through the system control shelf
TSM	Translation Service Module	SCCP database

Card Installation and Replacement

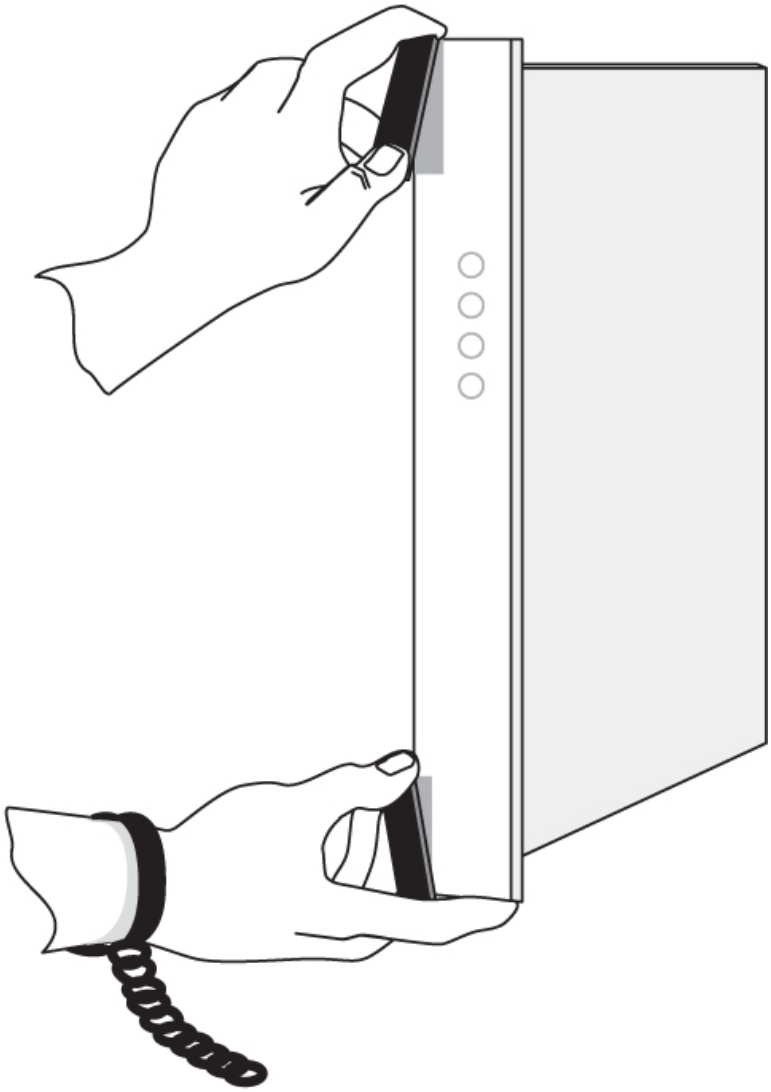
The frame arrives configured with the cards in place. After installing the frame in its final location, remove all cards prior to powering up the frame. Reinstall all cards in the control shelf, extension shelves, and other frames carefully to avoid possible faulty connections. When installing a card, be aware of possible electrostatic discharge or shorts.

WARNING: Always wear a wrist strap or other electrostatic protection when handling electronic cards or electrostatic sensitive devices.

Cam-out/lock-in levers on the front edge of the card assist in insertion and removal of the card. Grasp the card at the top and bottom, as shown in the figure below, and slide the card into the appropriate slot. Using the card slot guides in the shelf, slide the card into the shelf until the connectors on the card seat with the connectors on the backplane. Press both tabs in until they lock the card in place. To ensure proper seating, the levers must be held in the release position until the locking tabs can engage with the upper and lower flange on the shelf. Once the locking tabs on the levers engage the shelf

plane, the tabs are pressed to the card faceplate, and must be flush with the faceplate when the card is completely seated.

Figure 5: Removing an EAGLE 5 ISS card



Part number, LEDs, text and bar code (CLEI and serial number) are located on the faceplate of each card. The cards in the frames are configured with specific functions and services.

Labeling

This section provides general labeling instructions for cables, frames, shelves, and fuse and alarm panels.

Cable Labeling

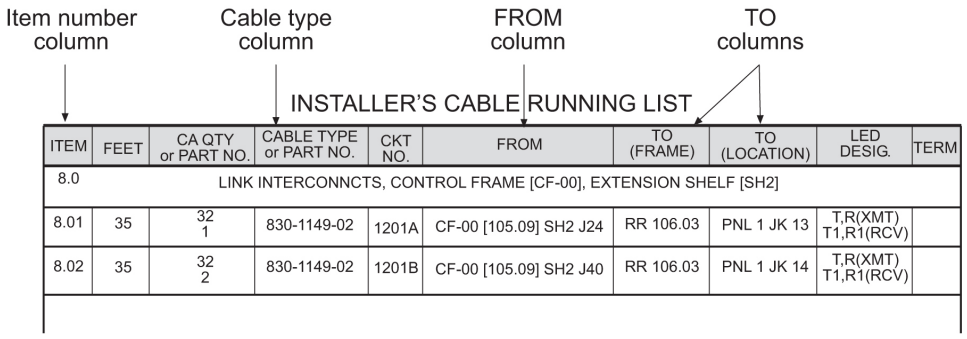
Before installing, use this procedure to label the cables to ensure connection to the proper ports and ease of future maintenance.

Tools

- Installer's Cable Running List
- All cables listed in Installer's Cable Running List
- Any non-Tekelec cables
- Cable labels (including blank labels for non-Tekelec cables)
- Fine point marker

1. Locate the Installer's Cable Running List in the *Equipment Specification* for the site.
   Refer to for an example.

   Figure 6: Installer's Cable Running List Example



ITEM	FEET	CA QTY or PART NO.	CABLE TYPE or PART NO.	CKT NO.	FROM	TO (FRAME)	TO (LOCATION)	LED DESIG.	TERM
8.0	LINK INTERCONNCTS, CONTROL FRAME [CF-00], EXTENSION SHELF [SH2]								
8.01	35	32 1	830-1149-02	1201A	CF-00 [105.09] SH2 J24	RR 106.03	PNL 1 JK 13	T,R(XMT) T1,R1(RCV)	
8.02	35	32 2	830-1149-02	1201B	CF-00 [105.09] SH2 J40	RR 106.03	PNL 1 JK 14	T,R(XMT) T1,R1(RCV)	

2. Locate the labels included with the cable shipment.
3. Take one cable and identify the cable's part number in the *Cable Type* column of the cable running list.
4. Match the cable with its corresponding pair of labels:
   a) Go to the cable's *From* column of the cable running list.
   b) Match the *From* column information to the *From* information on one label.
   c) Match the *From* column information to the *To* information on the other label.

   Note: The label for the connector end of these cables can be identified by the presence of a "J" number, for example: J32, that appears in the "From" area of the label.

   Note: Make sure that all cables specific to an A or B side are clearly labeled as A cable and B cable.

5. Repeat *Step 4*for each cable to ensure that all labels are present and that originations and destinations of all cables are clearly identified.
6. For cables that come from the factory with connectors already installed, apply the appropriate label onto each end of the cable approximately two inches from the connector.

   Note: Ensure that the labels are positioned so they are still readable after the cables are installed.

7. For cables that need to be cut to the appropriate length: After the cable is cut to the appropriate length, affix labels with the item number approximately two inches from the end of the cable insulation.
8. For cables not ordered through Tekelec, confirm source, part number, and origination/destination points before labeling them.

   Note: All cables must be labeled "TO" and "FROM"

   After you have labeled all cables, you are ready for cable installation.

Fuse and Alarm Panel Labeling

EAGLE 5 ISS frames arrive from the factory with labels in place. If a frame is assembled at a site, a labeling kit may be necessary.

Label Kit for FAP (P/N 870-2804-001)

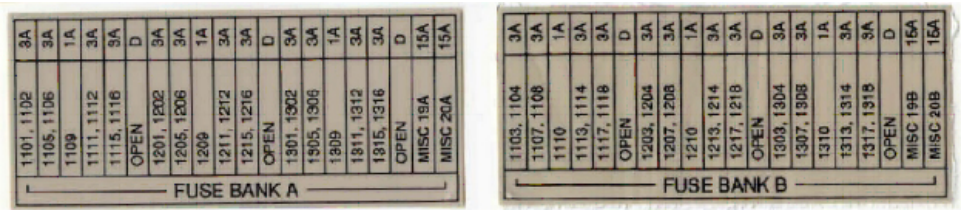
A label Kit contains sheets of die-cut stick-on labels for the FAP:

- For FUSE BANK A
- For FUSE BANK B

1. Peel the individual die-cut label that designates a specific frame from one of the three die-cut sheets of labels.
2. The label designates either CONTROL FRAME or EF-00 through EF-04. The labels must be pressed onto the drip tray of the correct frame.
3. Press the sticky side of the label into the silk screened area on the front of the drip tray located just below the Fuse and Alarm Panel for the specific frame.

   Place the label marked FUSE BANK A on the left side of the drip tray faceplate. The label marked FUSE BANK B is placed on the right side of the drip tray faceplate.

   Figure 7: Control Frame Fuse Label



Label Kit for FAP (P/N 870-1606-xx/870-2320-xx)

Label Kit (P/N 870-1915-02) contains large sheets of die-cut stick-on labels for the appropriate frames. There are three large sheets of die-cut, stick-on labels:

- Sheet (P/N 658-0604-01) is for FUSE BANK A, CONTROL FRAME through EF-04
- Sheet (P/N 658-0604-02) is for FUSE BANK B, CONTROL FRAME through EF-04
- Sheet (P/N 658-0604-03) is for MISC FRAME

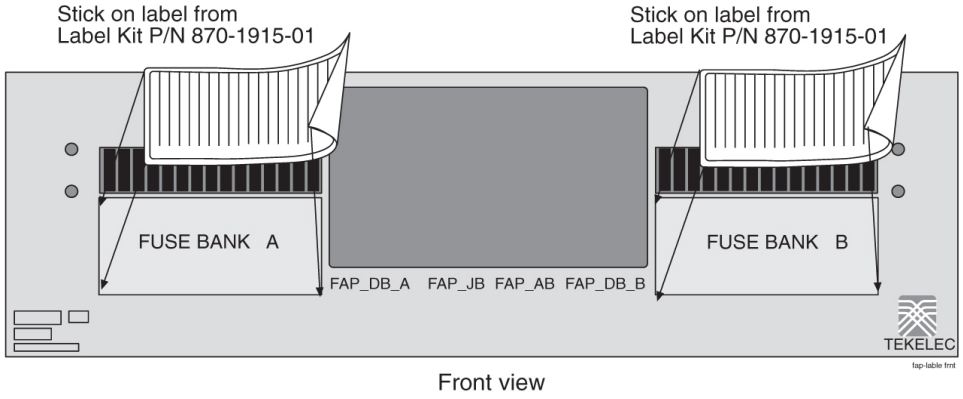
Also included in the Label Kit (P/N 870-1915-02) are smaller die-cut stick-on labels for different fuses relating to different amps and individual pieces of site-specific equipment; these are to be pressed into fuse OPEN spaces.

1. Peel the individual die-cut label that designates a specific frame from one of the three large die-cut sheets of labels.
2. Press the sticky side of the label into the silk screened area on the front of the faceplate of the Fuse and Alarm Panel (P/N 870-1606-xx) for the specific frame. (refer to *Figure 42: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Front*).

   The left side of the faceplate is marked A and the right side of the faceplate is marked B.
3. The labels must be pressed into place on the front faceplate of the correct frame.

   The left side of the faceplate is marked A and the right side of the faceplate is marked B.

Figure 8: FAP, Fuse Label Kit (P/N 870-1915-02)



The label designates CONTROL FRAME or EF-00 through EF-04.

There are also labels for the MISC FRAME.

EAGLE 5 ISS Post-Installation Inspection

This section describes a general EAGLE 5 ISS system inspection after installation.

Verify the following:

1. All items listed in the Equipment Specification have been installed.
2. Shipping container is properly packed with ramp and frame dollies shipped.
3. Cabling is neatly installed and the labels are correct and easily readable.
4. Power cabling does not run through a cable rack.
5. Power cabling is not be routed together with any other cables and has at least six inches of clearance.
6. Racks have protective paper between the rack and any cables that would otherwise touch the rack.

7. The main central office ground cable is correctly labeled and is marked "TO and "FROM" with the "Do Not Remove" tag installed on both ends of the cable at the central office grounding bar.
8. The –48VDC power feeds are correctly labeled at the central office power distribution panel.
   There should be an A feed and a B feed for each breaker panel and FAP.
9. The –48VDC returns are correctly labeled.
   Each frame has an A return and a B return for each breaker panel or FAP.
10. Frames are level.
11. Earthquake bracing, if any, is properly installed.
12. Adequate floor clearances have been maintained.
13. Rear panels are installed.
14. Cable connections are tight at the backplane connections.
15. Cable sheets are properly marked and located in door pocket.
16. All documentation has been received and is available.
17. Terminals and printers connected to the system are operational.
18. Data cartridges have been received and are properly stored.
19. Any attached modems are operational.
20. Any attached Media Access Units (MAUs) are operational with power indicator on.

Chapter 4

Frames and Shelves

Topics:

- *Heavy Duty Frame.....50*

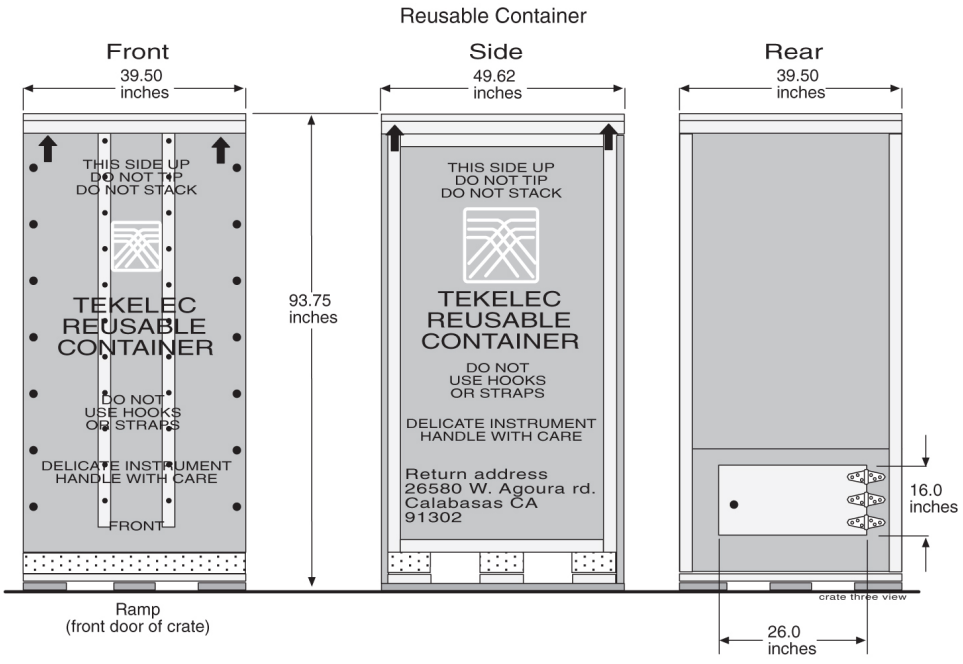
Heavy Duty Frame

Unpacking

DANGER: At least two people are required to safely move and position the frames. Read and understand this procedure completely before continuing.

1. Before opening any shipping container, inspect it for evidence of damage during shipment. Report any damage to the carrier for investigation and possible claims. Also report any damage to the Tekelec site supervisor.
2. Check the packing slips against the equipment specification list for this installation site. Report any discrepancies to the *Customer Care Center*
3. Use the 9/16 inch wrench to remove all of the bolts that hold the front to the shipping container. Do not discard the bolts. Remove the shipping container front panel. Place the bolts into the bag provided inside the shipping container. The shipping container will be returned before and separately from the dolly holding the frame in place. The dolly is used to move and position the frame. Save all bolts and hardware.

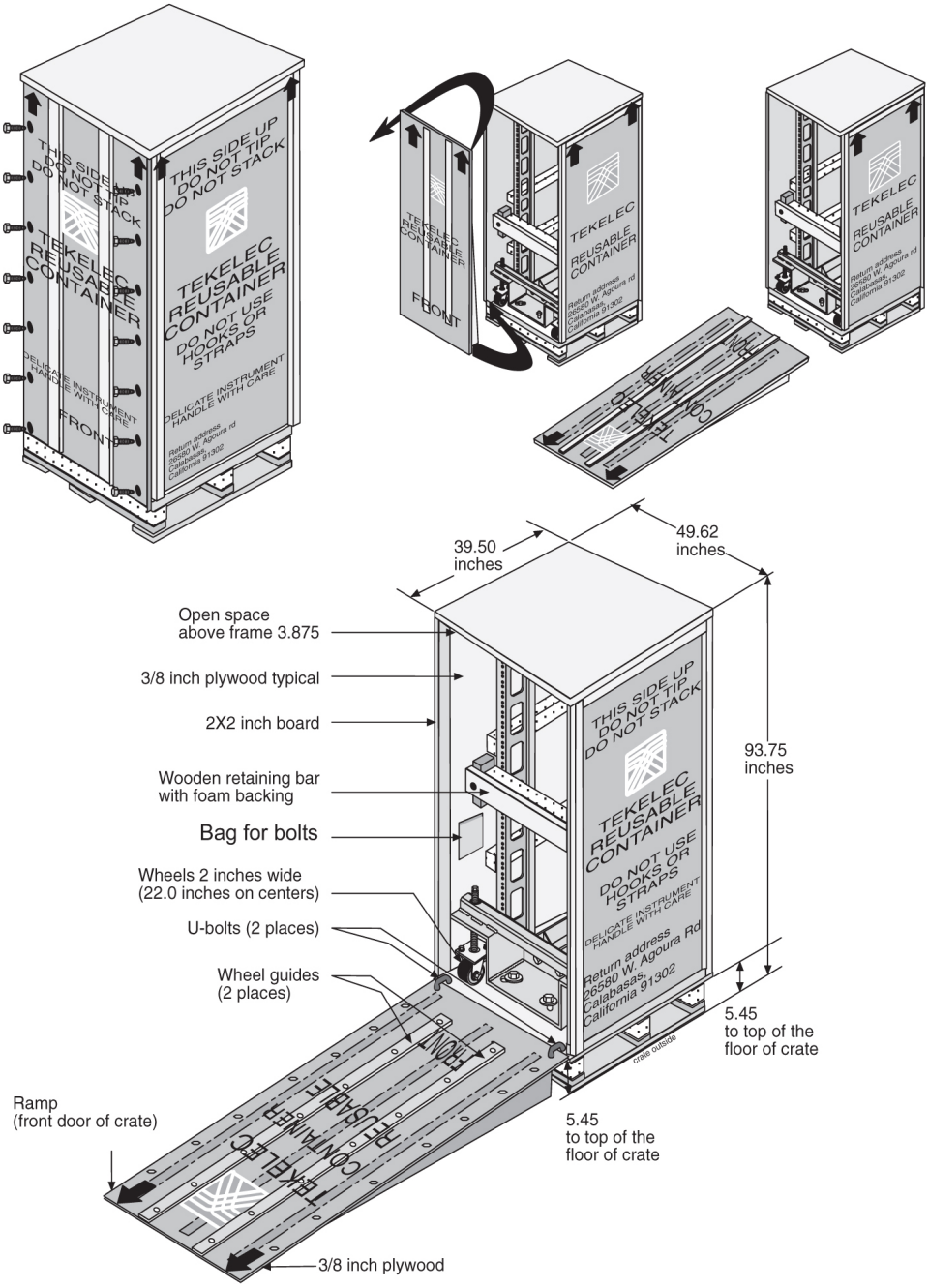
Figure 9: Shipping Container for Heavy Duty Frame



4. Use the front panel of the shipping container as a ramp to remove the frame from the shipping compartment. Place the ramp against the front of the container making sure the angle side is up and slants away from the frame in the container. Place the ramp against the front edge of the shipping container. Insert the U-bolts in the holes to secure the ramp support and container together.

5. Open the rear door of the shipping container

Figure 10: Shipping Container for Heavy Duty Frame



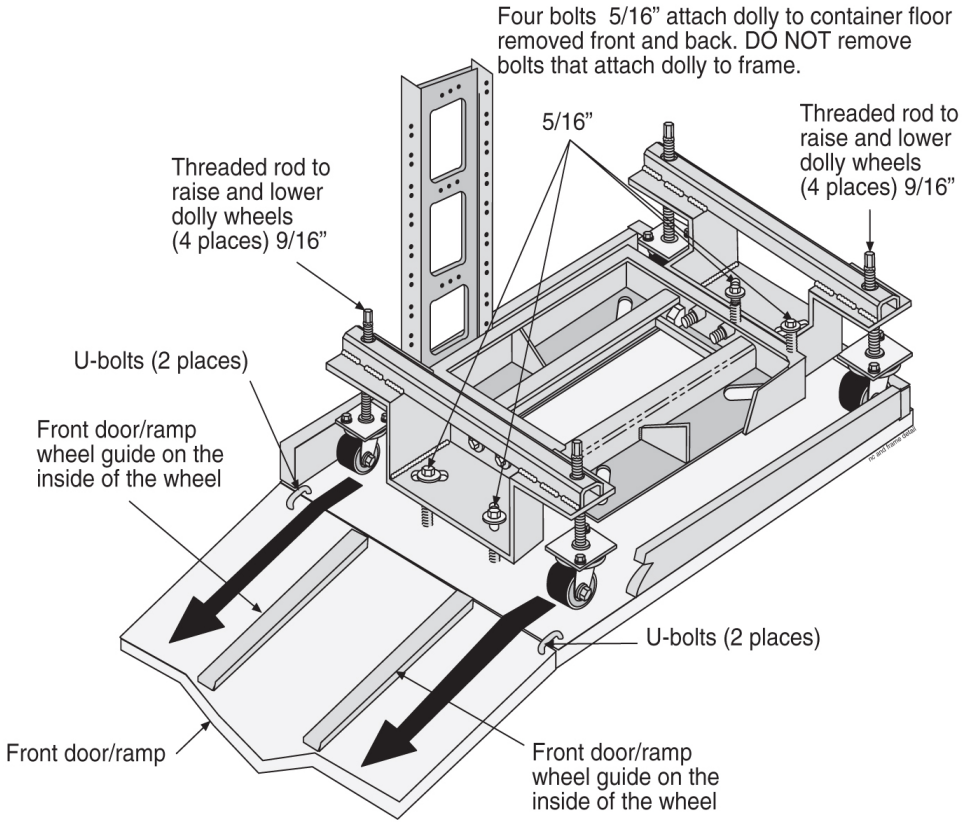
6. Use the 9/16 inch wrench to unbolt the wooden retaining bar across the front of the frame. Do not discard the retaining brace or the bolts. At this time Do not remove the bolts holding the dolly to the frame. Refer to *Figure 11: Shipping, Detach Dolly Heavy Duty Frame*.
7. At least two people are required any time a frame is moved. Use the 9/16 inch wrench to turn the threaded rod counter clockwise to lower the wheels of the dolly and to raise the frame and dolly enough to clear the front edge of the shipping container, approximately 1-1/2 inches. The threaded

bolts must be turned at the same time by two people, one in the front and one in the rear to avoid making the frame tilt.

8. Only raise the frame high enough to clear the angle created by the front ramp. When the frame and dolly have been raised enough to clear the angle created by the front ramp, slowly and carefully roll the frame out of the shipping container.

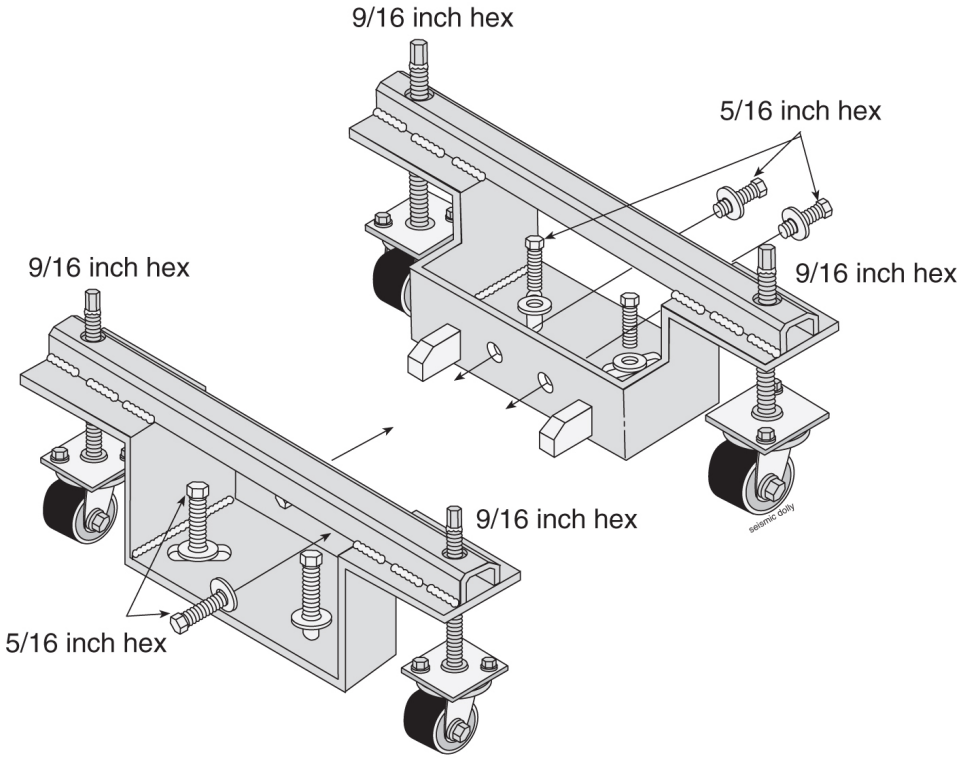
   Note: For clarity, the frame in the shipping container is shown without system hardware components.

   Figure 11: Shipping, Detach Dolly Heavy Duty Frame



9. With a minimum of two people, carefully move the frame to the next location.
10. At the correct site location, turn the threaded rods counter clockwise to lower the frame by raising the wheels of the dolly. Again two technicians must turn the threaded rods at the same time avoid tilting. Refer to *Figure 12: Heavy Duty Frame Dolly* for the location of the threaded rods attached to wheels.

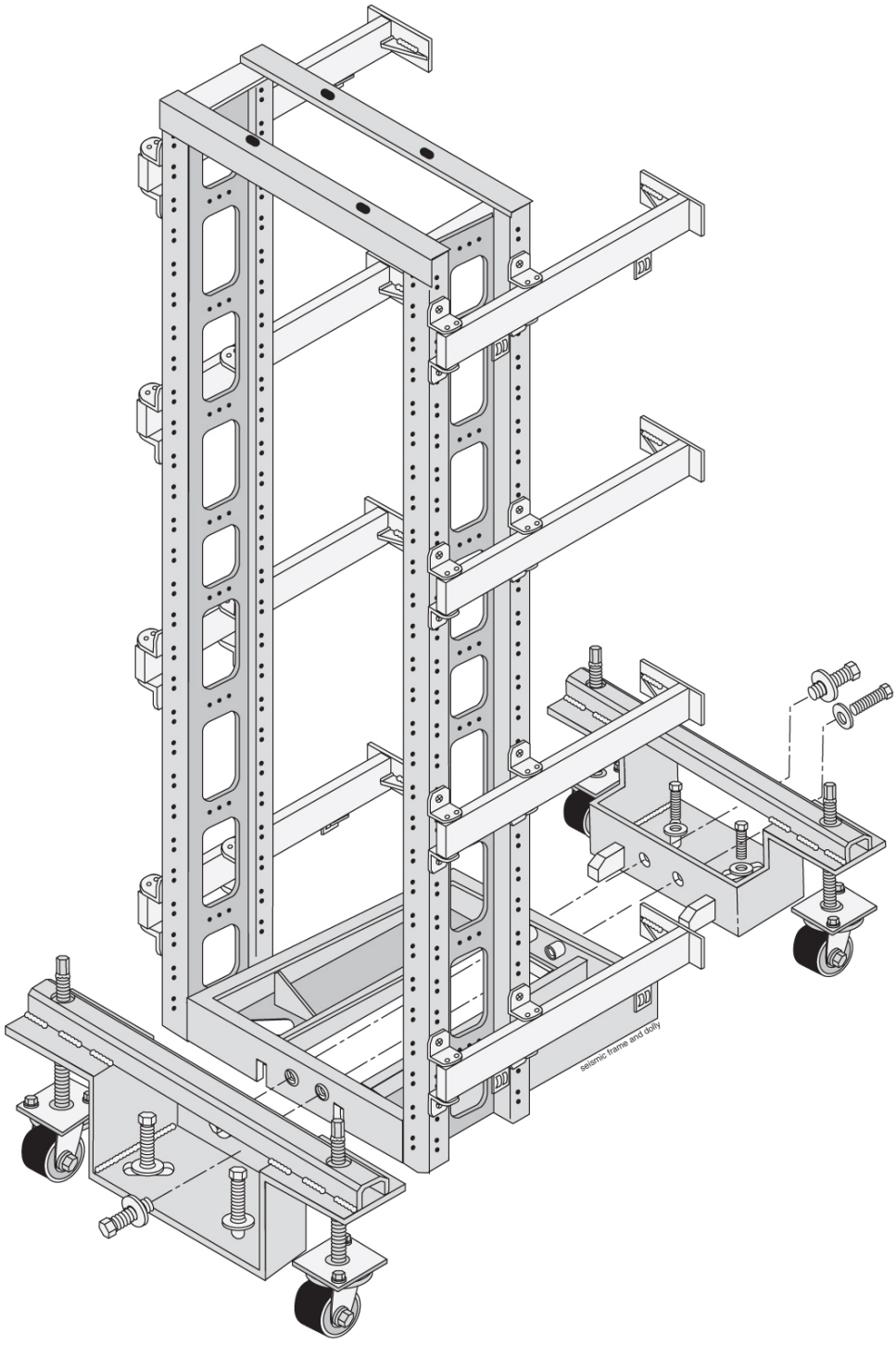
    Figure 12: Heavy Duty Frame Dolly



11. Remove the bolts, front and rear, that attach the dolly to the frame. Refer to *Figure 13: Heavy Duty Frame with Dolly*.

Note: For clarity, the Frame is shown without system hardware components.

Figure 13: Heavy Duty Frame with Dolly



12. When the dollies are removed from the frame after the frame has been moved to a permanent location, the dollies are returned separately from the shipping container.
13. Inventory the shipment to make sure that all items listed on the pick list have been received in good condition. Report any discrepancies or damaged equipment to the *Customer Care Center*.

14. Do not allow the empty shipping containers to become a safety problem or a fire hazard. Contact the site supervisor for specific instructions. Dispose of leftover packaging materials according to local recycling procedures.
15. Follow this procedure when opening all similar shipping containers.

Use this procedure if the shipping container is to be returned to Tekelec.

1. Replace the retaining brace and re-attach the ramp support to the front of the shipping container using the bolts saved previously.

   If the shipping container has been returned already, ship both dollies to the same location listed in the next step.
2. After replacing the shipping container front panel arrange the return shipment by contacting:

   Shipping ManagerTEKELEC

   Attn: RMA Department

   5200 Paramount Parkway

   Morrisville, NC 27560

   RMA#: <assigned by Tekelec>

Floor Preparation

This section describes how to lay out the floor plan for on-site flooring, and how to prepare a raised floor or a concrete floor for frame installation. For specific types of flooring refer to *Concrete Floor* or *Anchoring to Overhead Rack of Heavy Duty Frame* .

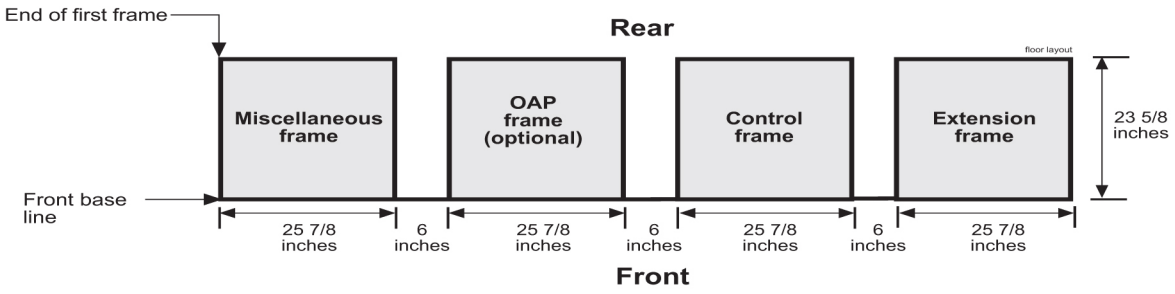
General Floor Preparation

The floor layout for the frame is site specific. The most typical frame layout is constructed with Extension Frames to the right of the Control Frame when viewed from the front. The OAP Frame (if applicable) is typically on the left of the Control Frame. Miscellaneous Frames and other support or feature specific frames are lined up to the left of the Control Frame. Refer to the figure below.

Typically, the aisle space from the rear of the frame to the front of other frames or equipment is three feet. The end of the frame layout must be no less than 12 inches from other telco frames.

Note: The recommended minimum aisle spacing is 2-1/2 ft. (75 cm) front and rear.

Figure 14: Typical Frame Layout



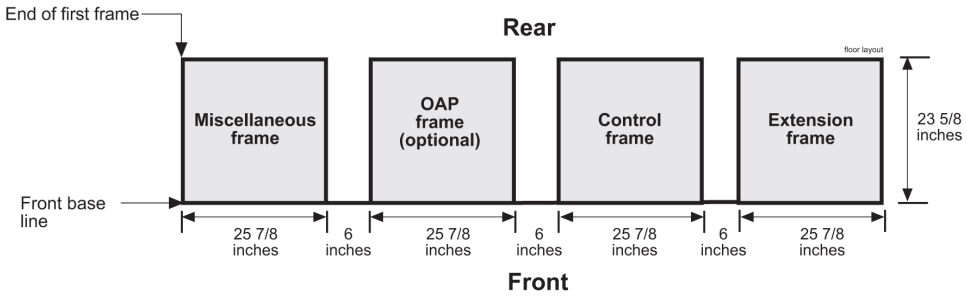
Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label Field Tool Identification wrap.

- Safety glasses
- Chalk-line, with chalk
- Fiberglass tape measure
- Felt tip pen
- Isolation sheet (template in mounting hardware kit) to mount one frame

1. Verify with a customer representative that the required area dimensions and equipment location corresponds to the marked floor plan.
2. Use the floor plan provided with the engineering site file specifications to mark the front base line and the borders of the first frame with the chalk line (refer to *Figure 15: Typical Floor Layout for Frames*).

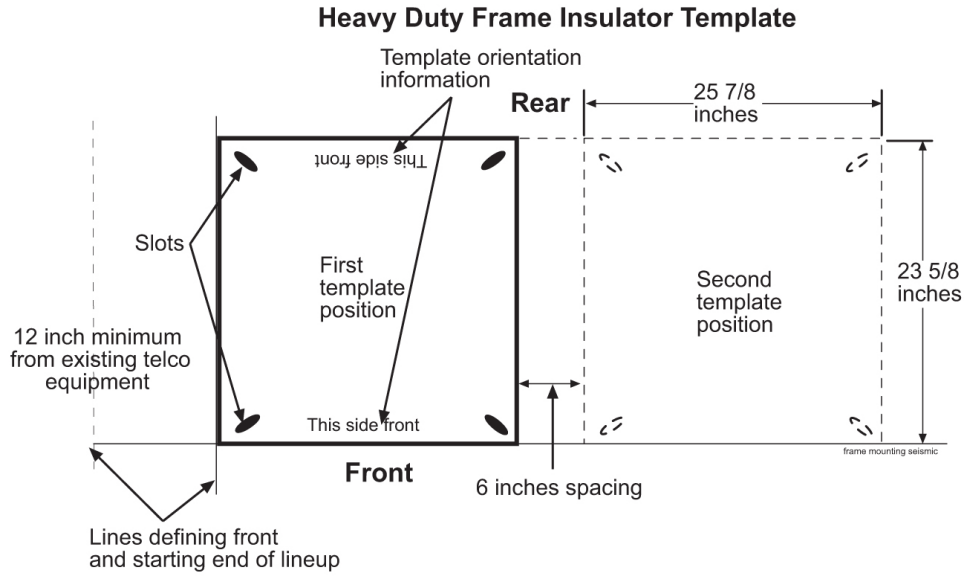
   Figure 15: Typical Floor Layout for Frames



3. Align the frame isolation sheet/template (refer to *Figure 16: Isolation Sheet/Template for Frame*) along the chalk line to mark anchor location in the middle of each oval anchor slot and to mark the corners of the first frame.

   Create another chalk line that allows 6 inches between each frame for correct spacing. Align the template again against the chalk line and continue the process of aligning, marking, and moving the template until the site specific number of frame spaces have been laid out on the floor.
4. Use the felt tip pen to mark the anchor location in the middle of each slot and corners for each successive frame.

   Figure 16: Isolation Sheet/Template for Frame



The next section describes how to prepare a raised floor for frame installation.

Raised Floor

This section describes how to prepare a raised floor for a heavy duty frame installation with anchors. Always get permission from facility personnel before drilling holes.

Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses
- Rotary impact drill
- 18 mm masonry drill-bit
- 1 inch drill-bit (hole saw)
- Extension cord
- Vacuum cleaner (an approved, industrial type, that prevents escaping dust particles that may contaminate electronic equipment)
- Masking tape
- Fiberglass tape measure
- Isolation sheet (in mounting hardware kit P/N 840-0092-01)
- Subfloor marking tool
- Ear protectors
- Felt tipped marking pen
- File
- Mounting hardware kit (furnished with each heavy duty frame)

The procedure for preparing raised flooring is **highly site specific**. For more information, refer to the site specific specification as per the Method Of Procedure (MOP) for the particular installation.

WARNING: Before drilling holes in any flooring, verify with facilities personnel that the area will support a loaded frame and is free of gas or water pipes, ventilation ducts, electrical wiring conduits, or any other items that may be damaged. If the hole is drilled at an angle the anchor and frame will not come together properly. After marking anchor locations, remove the tiles and take them to an approved location for drilling. *Do not* drill tiles in the equipment area.

1. On the raised floor mark the corners of the tiles so that the same tile will be returned to the same place when the job is complete.

   Mark the spot to be drilled, and remove the tiles from the equipment area.
2. Drill a 1 inch (2.54 cm) diameter hole in the tiles corresponding to the marked anchor locations.

   Use a vacuum cleaner to collect the shavings while drilling.
3. Use a file to remove any sharp edges or protrusions from metal parts if applicable and vacuum.
4. Return to the equipment area and replace the tiles, making sure the holes match, where the frames will be installed.
5. Insert the raised floor marking tool into the anchor holes, making sure that the tool is perpendicular with the hole.

   If the hole is drilled at an angle the anchor and frame will not come together properly. With a hammer, tap the head of the star bit with enough force to mark the concrete floor. Repeat this step for each hole associated with all frames.
6. Remove the floor tiles for access to the concrete floor.
7. Drill an 18 mm diameter hole in the concrete floor to a depth of 3 inches (7.7 cm).

   Use a vacuum cleaner to collect the dust while drilling any hole and clean out each hole after the drilling is complete.

Drill Cable Holes

Mark holes and remove tiles from the equipment area, using a carbide-toothed hole saw of the appropriate diameter. Drill any cable holes required in the raised floor tiles. Replace tiles in the original tiles location.

Heavy Duty Frame Anchoring

This section describes how to anchor a frame on a raised floor.

1. If necessary, remove the tiles and finish drilling the anchor holes in the concrete using an 18 mm diameter masonry bit.
2. Insert the anchor assembly, including the threaded rod, into the drilled holes in the concrete floor.
3. Install a flat washer and nut onto the anchor assembly, as shown in ***Figure 17: Raised Floor Installation Elements*** .
4. Lock the anchor assembly into the concrete by tightening the nut
5. If earthquake bracing is required, perform the procedure described in *Raised Floor Earthquake Bracing* before continuing.

   Note: Earthquake bracing is required in earthquake zones 3 and 4 when installing a frame onto a raised floor with a spacing of 1.5 feet or more between the raised floor and the subfloor.

6. Install a nut onto the threaded rod.

   The nut will need to be threaded approximately 2 inches below the top of the raised floor

7. Install the washers onto the threaded rod.
8. Adjust the nut until the washer and nuts are flush with the bottom of the floor tile.

   Note: Do not over adjust as this may cause the tile or frame to tilt.

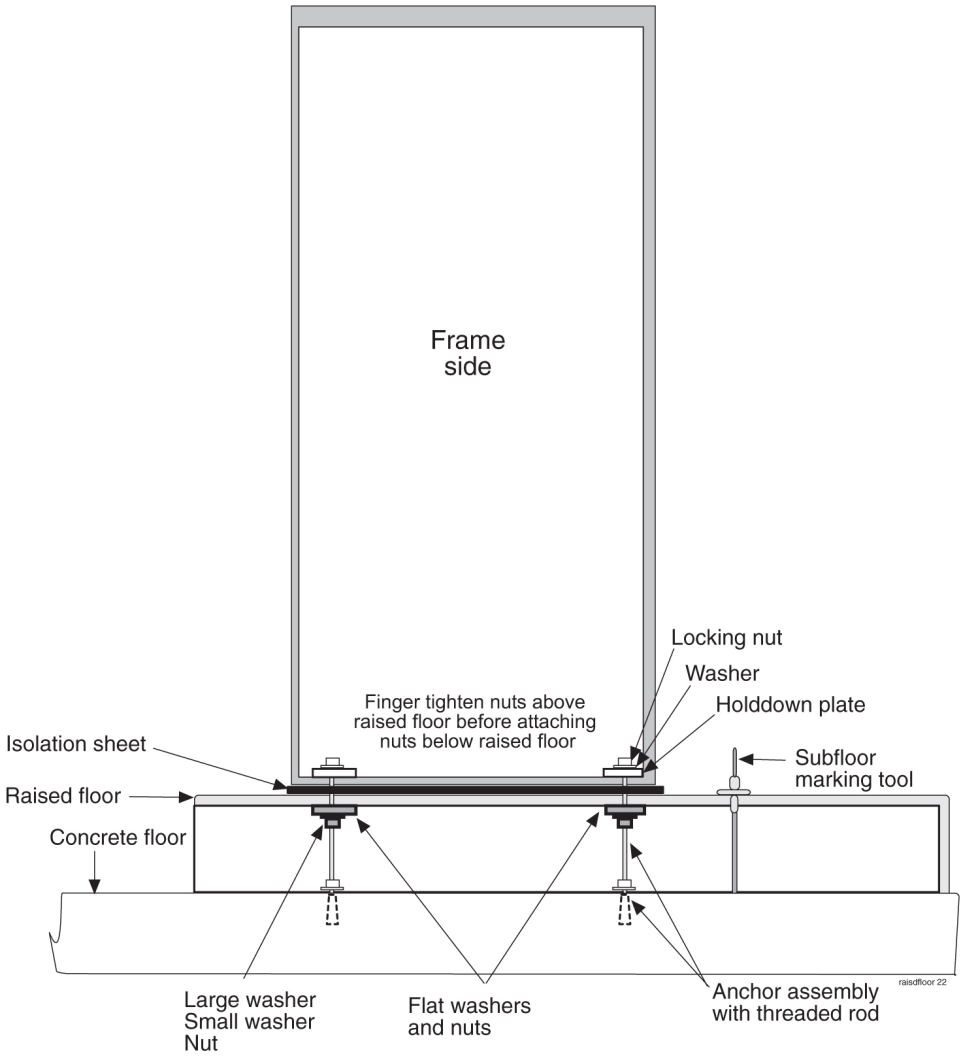
9. If removed, reinstall the floor tiles.
10. Install the isolation sheet.
11. Mount the frame onto the threaded rods.

CAUTION: Two people are needed to position the frame onto threaded rods.

12. Install hold down plates, washers, and nuts in the bottom of the frame.
13. Finger tighten the nuts on threaded rods located inside the frame above the raised floor.
14. Tighten the nuts below the raised floor.
15. Securely tighten the nuts inside the frame.
16. Replace tiles if necessary.

    The following figure shows a heavy duty frame installed on a raised floor.

    Figure 17: Raised Floor Installation Elements

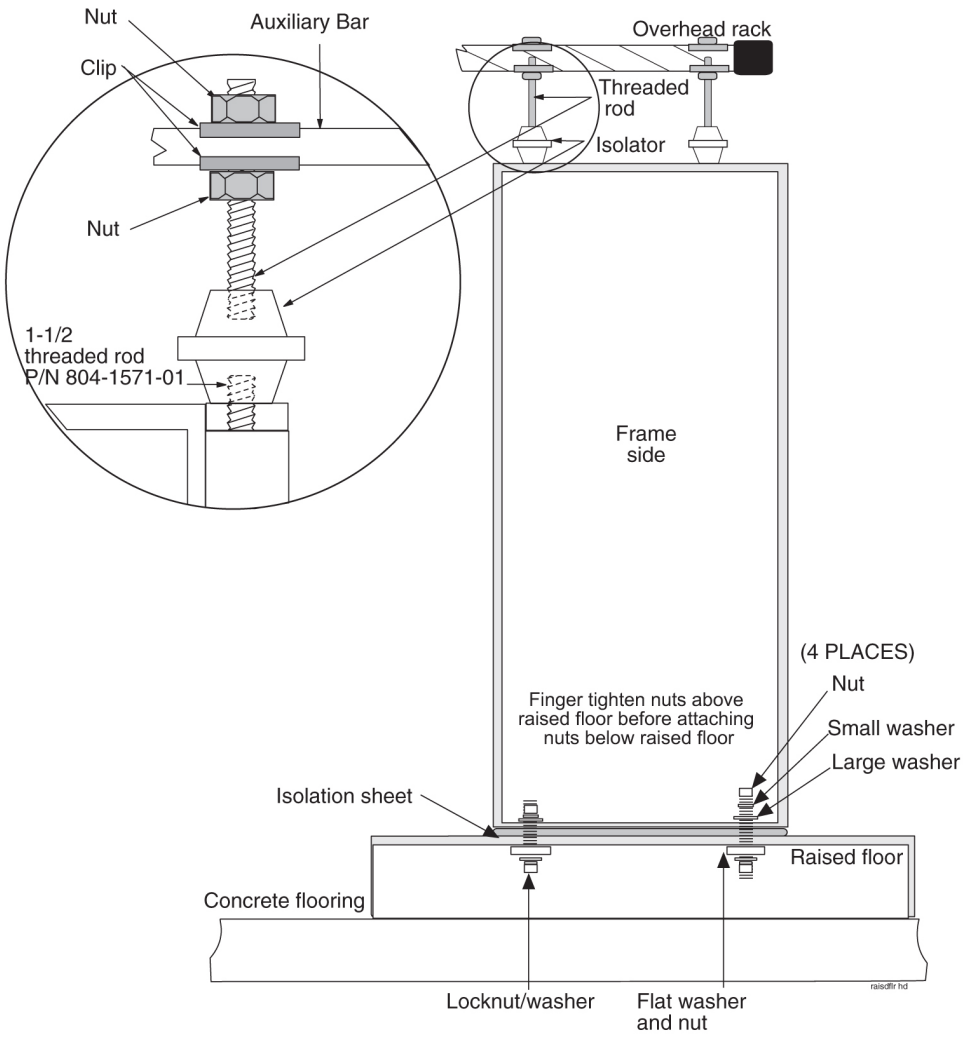


WARNING

WARNING: Finger tighten nuts on threaded rods inside the frames above the raised floor before tightening the nuts below the raised floor.

Refer to *Figure 18: Raised Floor With Overhead Rack* when installing the heavy duty frame on a raised floor using overhead racks, flat washers, and nuts, Cable Rack Mounting Kit.

Figure 18: Raised Floor With Overhead Rack

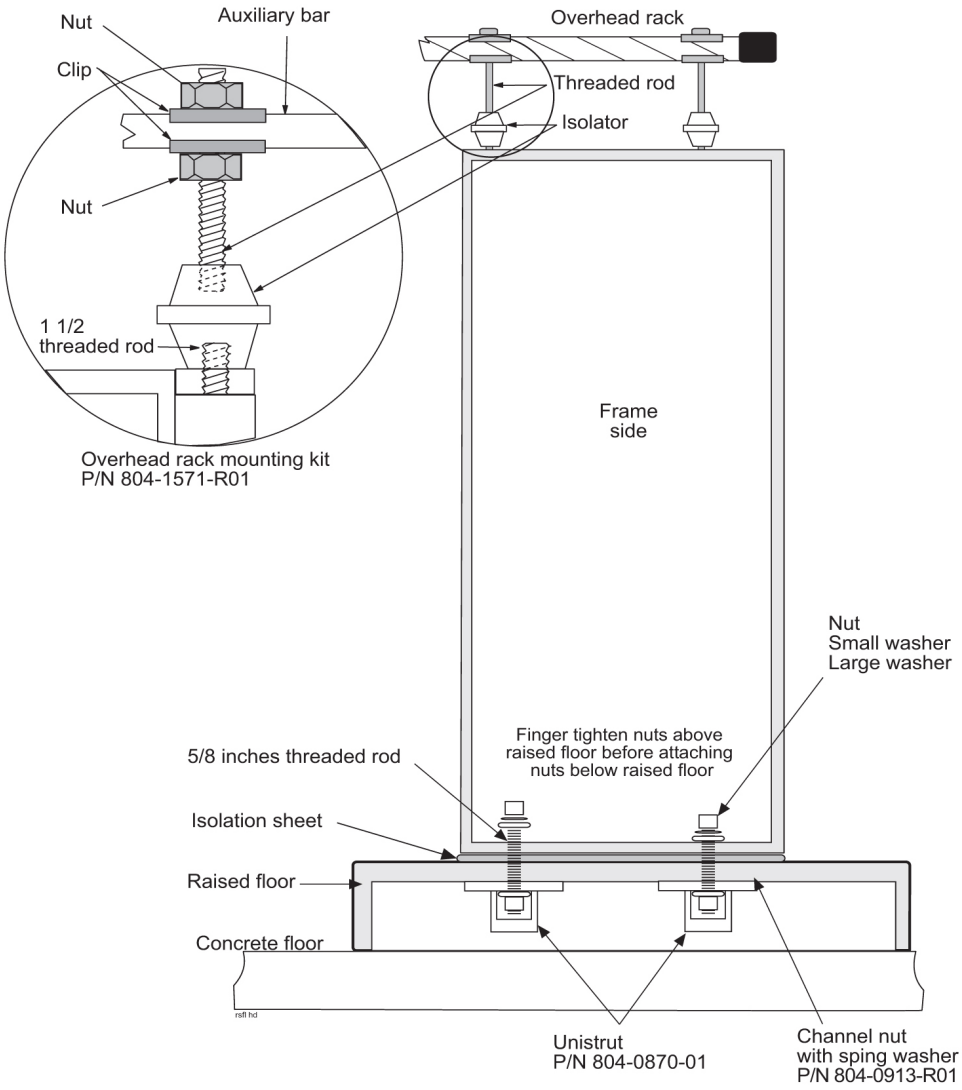


WARNING: Finger tighten nuts on threaded rods inside the frames above the raised floor before tightening the nuts below the raised floor.

WARNING

Refer to *Figure 19: Raised Floor Installation With Unistrut* when installing the heavy duty frame on a raised floor using Unistruts and the Cable Rack Mounting Kit (P/N 804-0219-01).

Figure 19: Raised Floor Installation With Unistrut



WARNING

WARNING: Finger tighten nuts on threaded rods inside the frames above the raised floor before tightening the nuts below the raised floor.

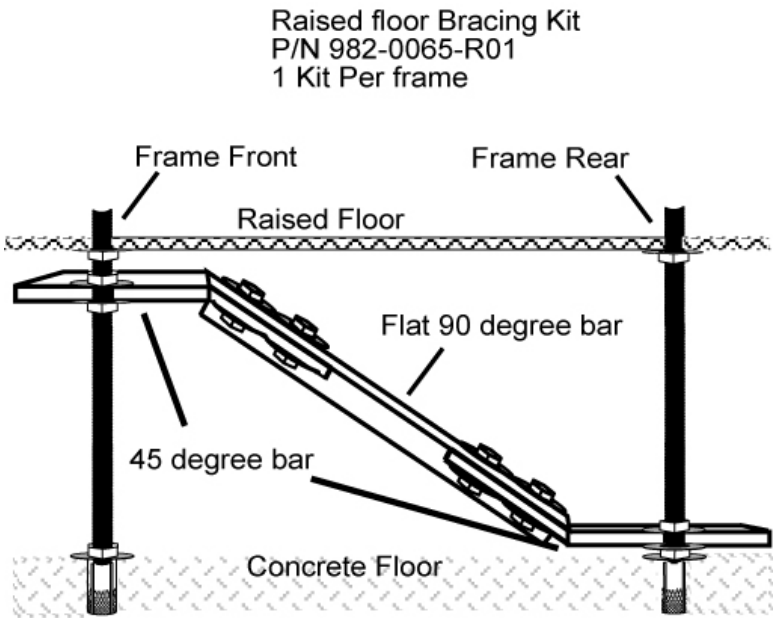
Raised Floor Earthquake Bracing

This section describes how to install earthquake bracing to a raised floor installation. Bracing is required in earthquake zones 3 and 4 when installing a frame onto a raised floor with a spacing of 1.5 feet or more between the raised floor and the subfloor.

1. Assemble the Earthquake Brace by securing the 45 degree bar steel pieces to the flat 90 degree bar.

   Use the Earthquake Brace Kit P/N 982-0065-R01.

   Figure 20: Earthquake Bracing



2. On the threaded rod located at the front of the frame:
   a) Install a 5/8 nut onto the rod.

      The nut will need to be threaded approximately 5 inches from the top of the raised floor .
   b) Place a helical washer onto the rod.
   c) Place a flat washer onto the rod.
3. On the threaded rod located at the back of the frame, place a Flat washer on the threaded rod so that the washer is sitting on the nut holding the anchor in place.
4. Place a flat washer on the back threaded rod.
5. Slide the Earthquake brace onto the threaded rod from the front threaded rod to the back threaded rod. Refer to the figure above.

   Note: Do not over adjust as this may cause the tile or frame to tilt.
6. On the threaded rod located at the rear of the frame:
   a) Place a flat washer onto the rod.
   b) Place a helical washer onto the rod.
   c) Install a 5/8 nut onto the rod and secure tightly, but do not overtighten.
7. On the threaded rod located at the front of the frame:
   a) Place a flat washer onto the rod.
   b) Place a helical washer onto the rod.
   c) Install a 5/8 nut onto the rod.
8. Adjust the front rod nuts and washers so that the flat portion of the Earthquake bracing bar attached at the threaded rod is level.
9. Repeat all the above steps for all additional sets of front and back threaded rods.
10. Once all Earthquake Bracing is installed, continue with the installation of the frames to the raised floor.

Concrete Floor

This section describes how to prepare a concrete floor for heavy duty frame installation. Always get permission from facility personnel before drilling holes. Before drilling holes in any flooring, verify with facilities personnel that the area is free of gas or water pipes, ventilation ducts, electrical wiring conduits, or any other items that may be damaged.

Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses
- Rotary impact drill
- 18 mm masonry drill-bit
- Extension cord
- Vacuum cleaner (an approved, industrial type, that prevents escaping dust particles that may contaminate electronic equipment)
- Masking tape
- Fiberglass tape measure
- Isolation sheet (in mounting hardware kit)
- Ear protectors
- Felt tipped marking pen
- Mounting hardware kit (furnished with each heavy duty frame)

CAUTION: All personnel associated with the installation of this system must adhere to all safety precautions and use required protection equipment to avoid the possibility of injury to personnel, service degradation, and/or service interruption.

CAUTION: This is a redundant system to allow service during normal maintenance. When repairs require a total power disconnect, both input supply sources must be disconnected. Disconnection will cause service interruption and take down the any system.

WARNING: Before drilling holes in any flooring, verify with facilities personnel that the area is free of gas or water pipes, ventilation and electrical wiring conduits.

The personnel must have a thorough knowledge of telecommunication installation specifications and procedures.**If the holes are drilled at an angle the anchor and frame will not come together properly**.

1. Drill an 18 mm hole at the marked anchor location in the concrete floor to a depth of 3 inches (7.7 cm).

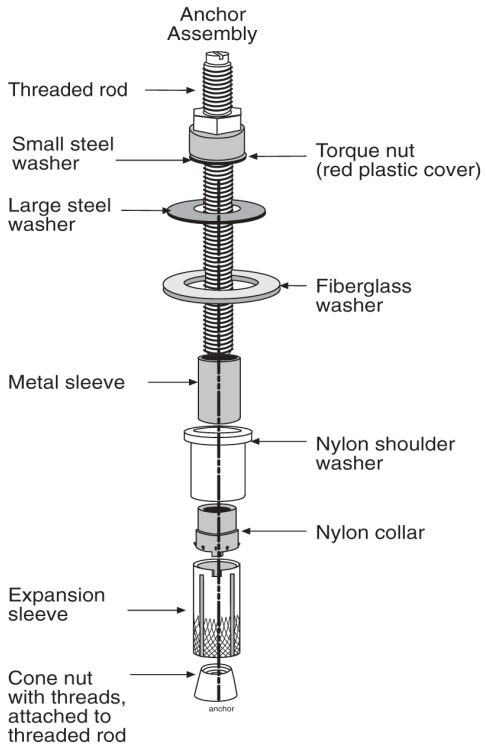
   Use the vacuum cleaner to collect the dust while drilling holes. Clean out each hole after drilling is completed.

Note: If any obstruction is encountered while drilling the hole, fill the unusable hole with "pour stone" or an equivalent product. After allowing sufficient set time, drill the hole in another spot within the marked area.

2. Check the hole to make sure the fully assembled anchors can be set into the concrete three inches.

   The metal sleeve shown in *Figure 21: Anchor Assembly* must be below the floor.

   Figure 21: Anchor Assembly



3. Install two square washers below the round fiberglass washer as shown in *Figure 21: Anchor Assembly*.
4. Install the anchor assemblies in the order shown in *Figure 21: Anchor Assembly*.

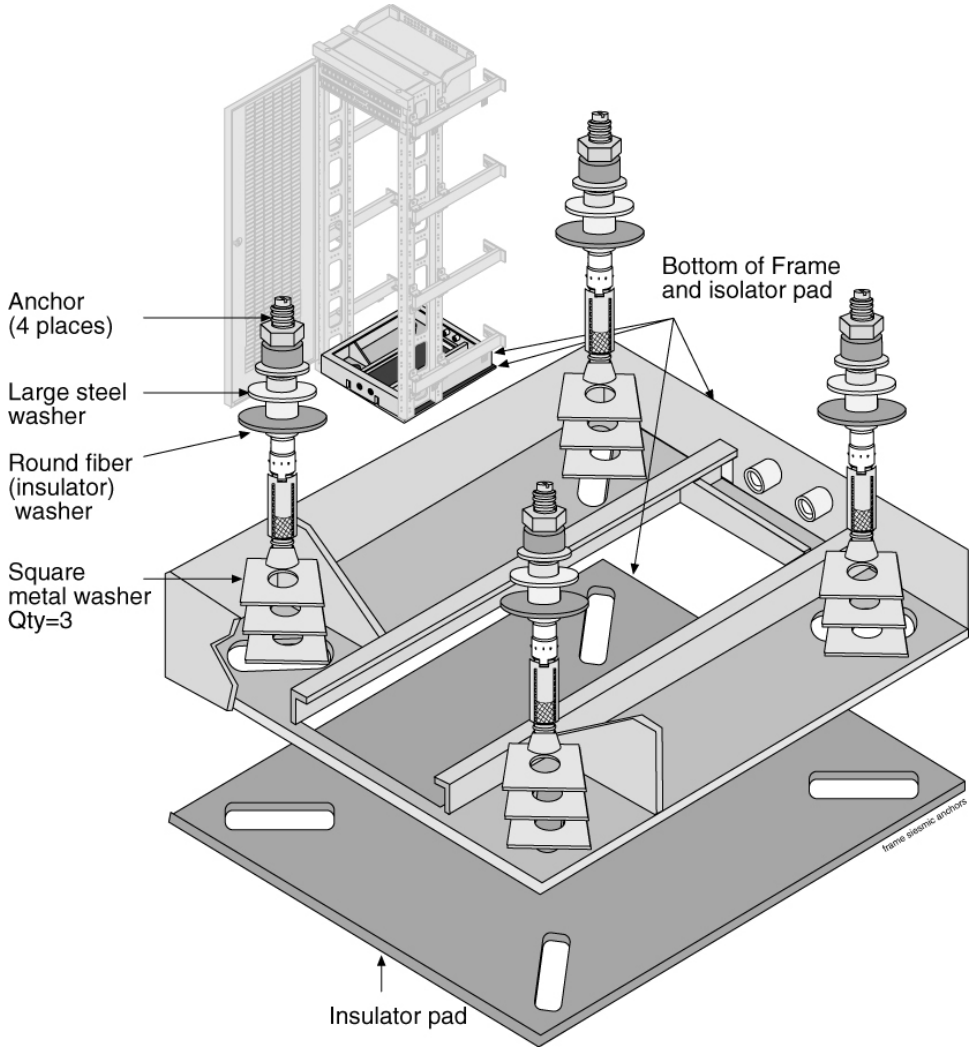
   The large steel washer, nylon shoulder washer, and round fiberglass washer are found in the mounting hardware kit.

   Note: When reassembling an anchor bolt assembly, lightly finger tighten only.

   When reassembling an anchor stud assembly, the stud must be flush with the bottom of the cone nut and the torque nut must be near the top of the stud.

5. Insert each anchor into an anchor hole through the three square washers, frame base, and isolation sheet (refer to *Figure 22: Anchor Installation of Heavy Duty Frame*).

   Figure 22: Anchor Installation of Heavy Duty Frame



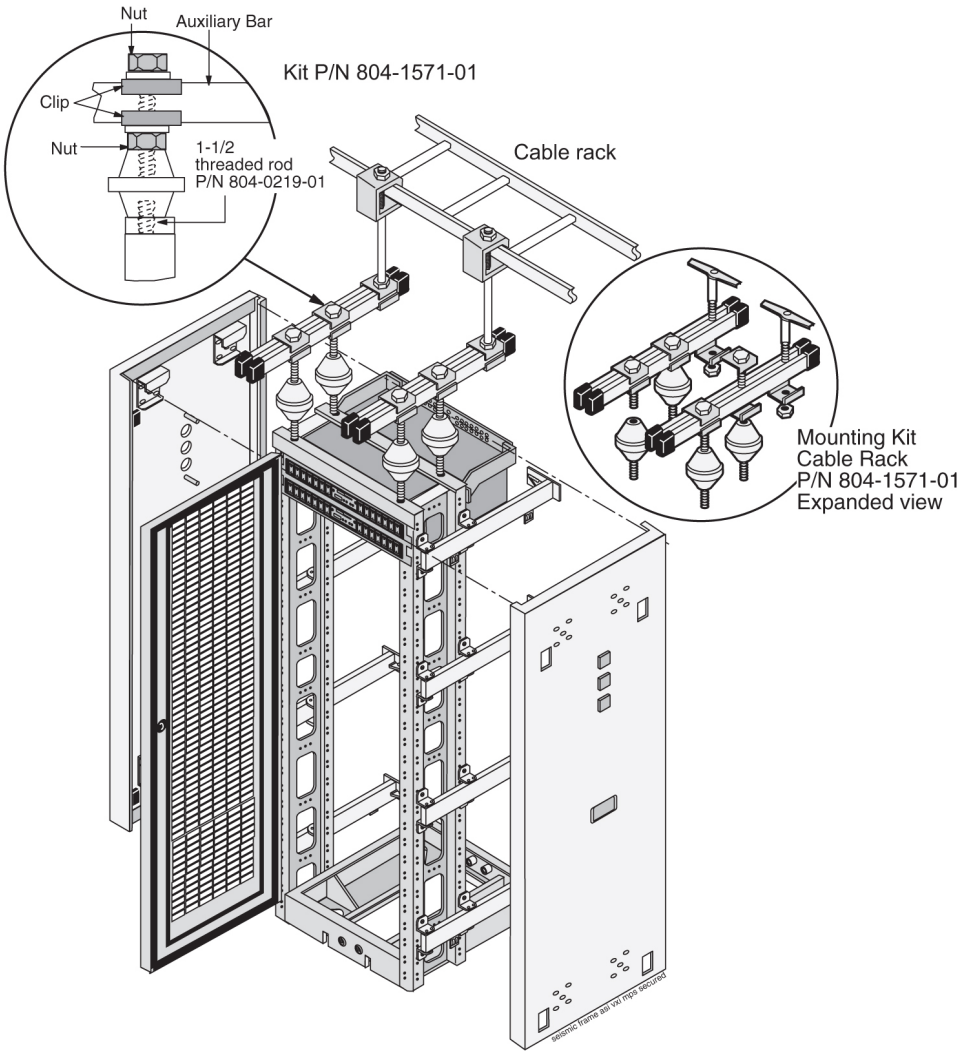
6. Tighten the torque nut on the anchor stud assembly with a box end wrench until the top of the nut breaks free.
7. Discard the hex nut or the broken-free portion of the torque nut.

Anchoring to Overhead Rack of Heavy Duty Frame

Frames with shelves that may be extended by pulling the shelf into the aisle must be attached to overhead ladder racks to prevent toppling.

1. Using the Cable Rack Mounting kit comprised of ladder hooks threaded rods and insulators, place the assembly directly above the frame for overhead support.
2. Secure the top of the frame to the overhead cable ladder rack using a threaded rod with hardware as shown in *Figure 23: Heavy Duty Frame Installation With Cable Rack*.

Figure 23: Heavy Duty Frame Installation With Cable Rack

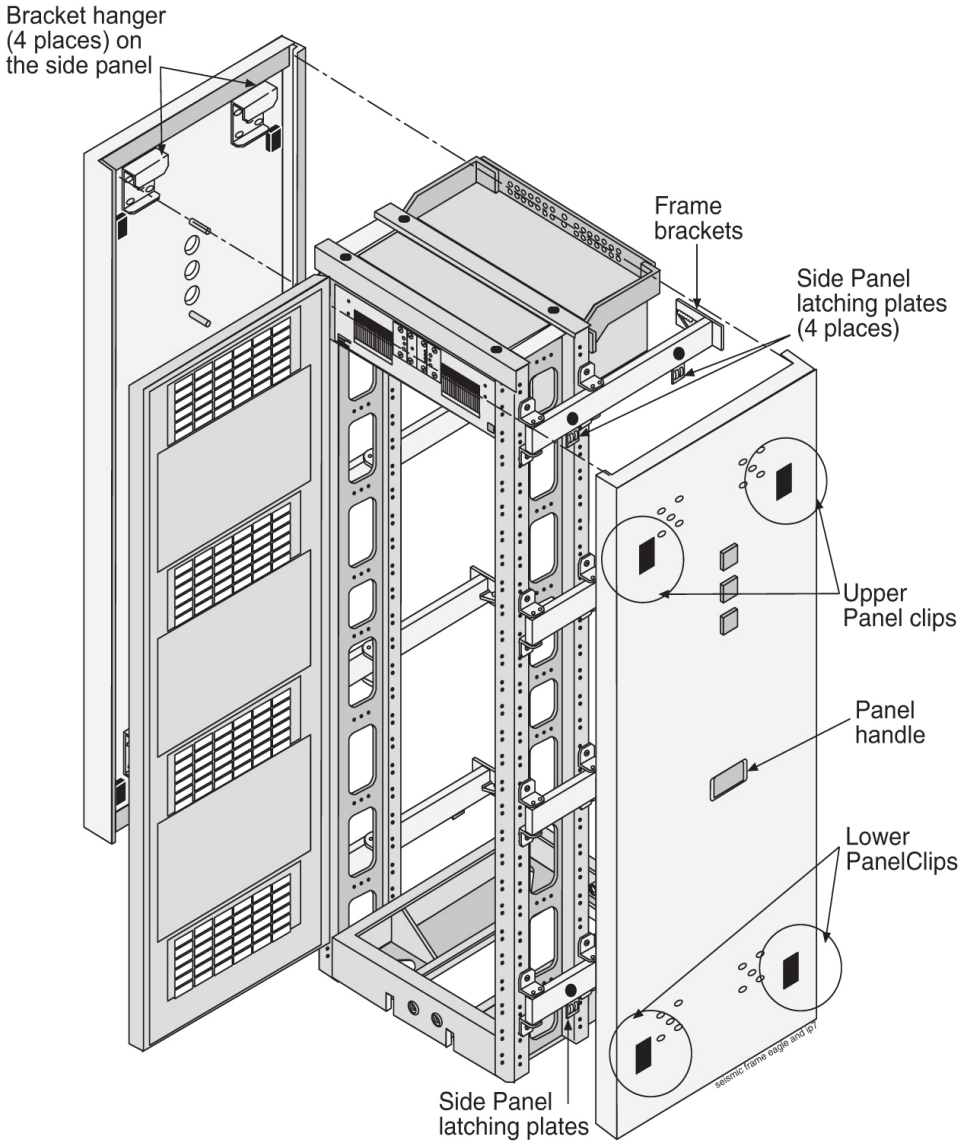


Heavy Duty Frame Panels and Rear Covers

Removing Heavy Duty Frame Panels

1. Pull down on the upper panel clips and pull the panel away from the frame.
2. Pull down on the lower panel clips and pull the panel away from the frame.
3. Grasp the handle in the middle panel and lift the panel off of the frame bracket shown in*Figure 24: Heavy Duty Frame Panels* .

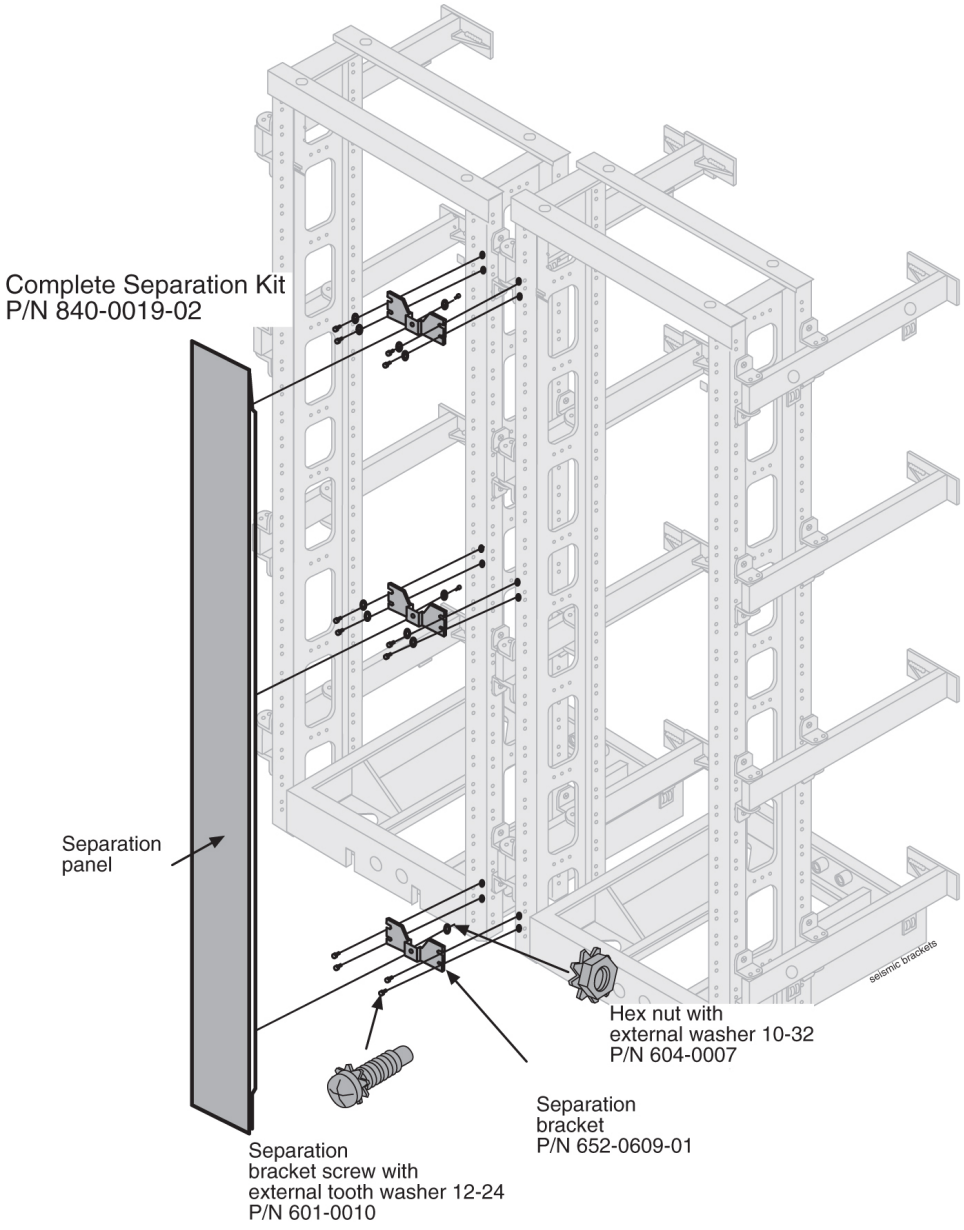
Figure 24: Heavy Duty Frame Panels



Installing Unit Separation Brackets

1. Use preexisting holes in the frames.
2. Use 12 screws to attach three unit separation brackets with studs as shown in *Figure 25: Unit Separation Bracket Installation*.

Figure 25: Unit Separation Bracket Installation

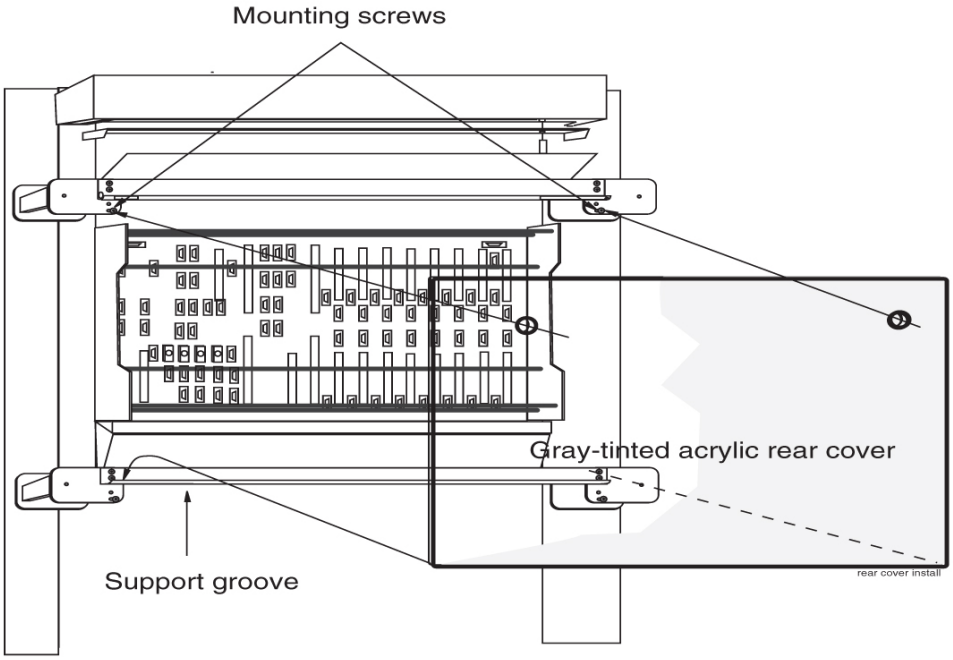


Rear Covers

Gray tinted plastic rear covers with round holes are provided, three per frame, to physically protect the system backplanes and cables, see *Figure 26: Rear Cover Installation*.

1. Carefully peel off the protective wrapper from each cover.
2. With the round holes up, place the cover into the support groove.
3. Line up the rear cover holes with the holes in the frame support arm.
4. Secure rear cover in place with two screws.

Figure 26: Rear Cover Installation



For more information on Frames and Shelves refer to the *Hardware Description Manual* included in your current documentation suite.

Shelves

Figure 27: EAGLE 5 ISS Frame with Door Ground

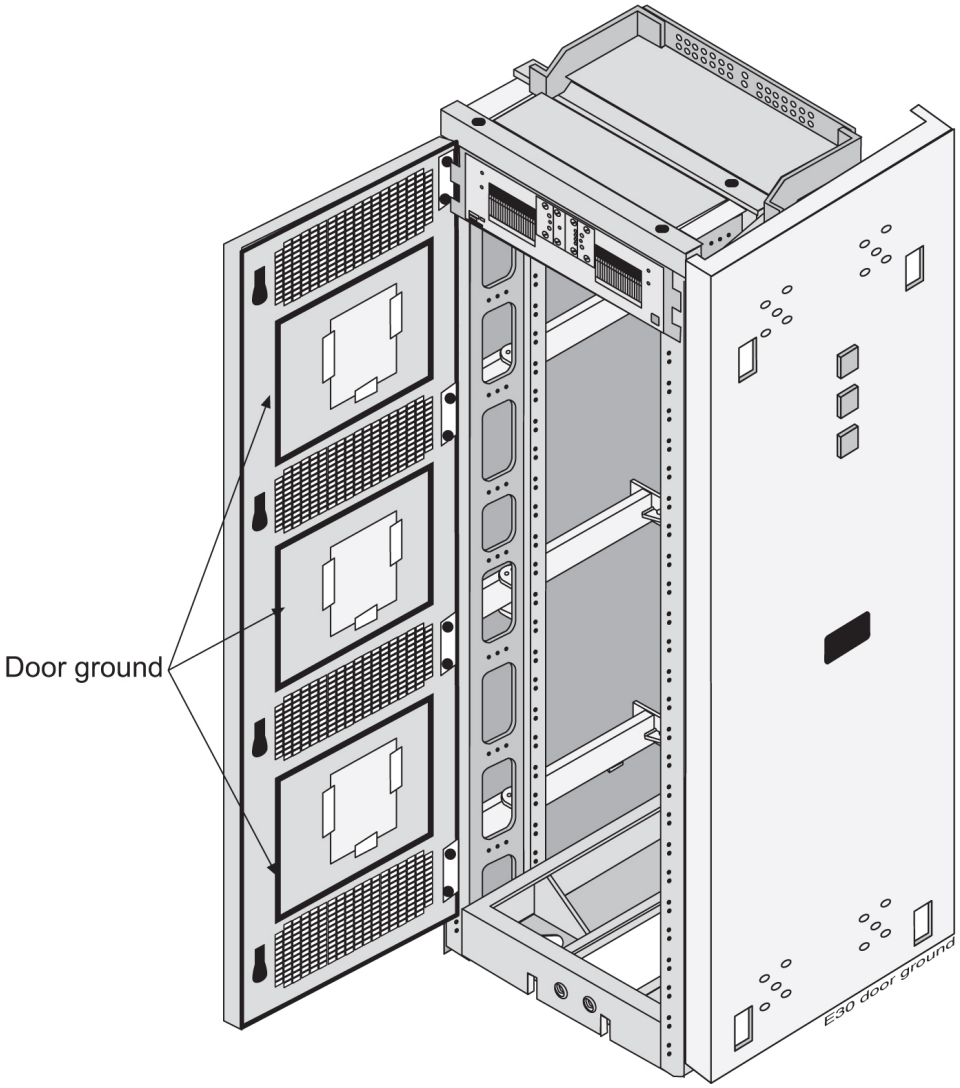
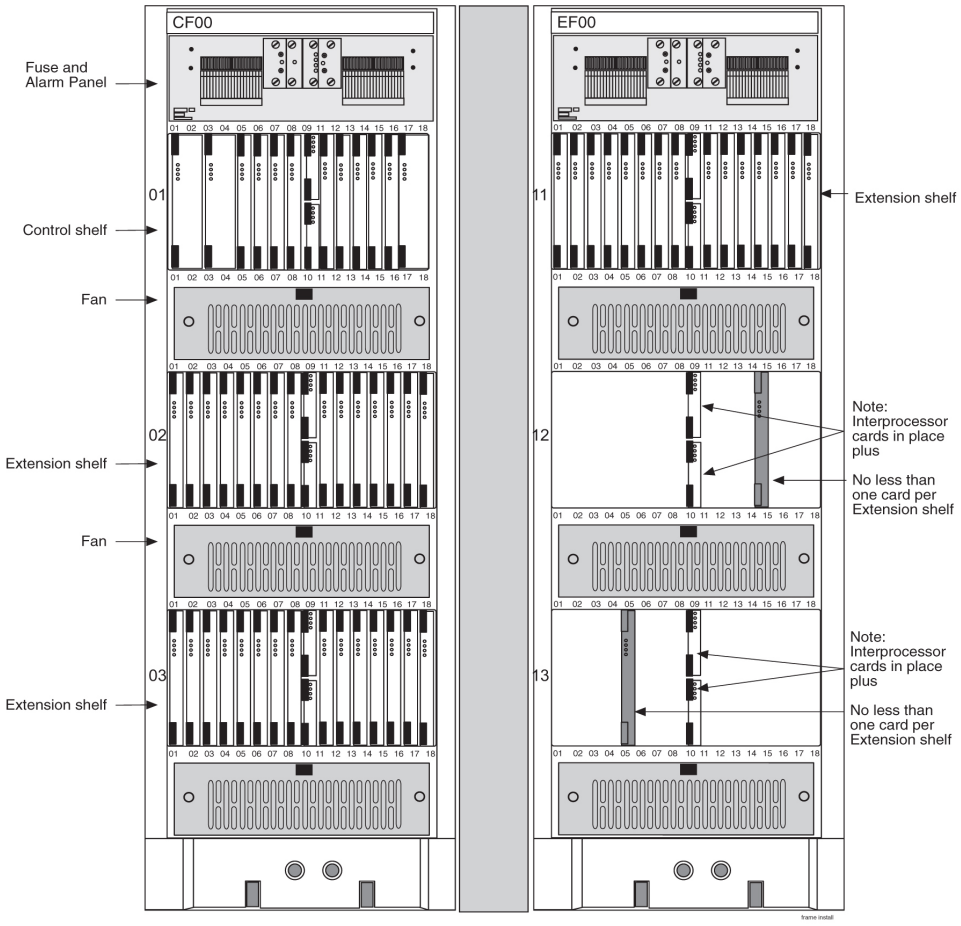


Figure 28: EAGLE 5 ISS Frame with Shelves



See .*Rear Covers*.

Labeling

End Aisle Labeling

This section details the application of the frame lineup end aisle labels. All of the frame lineups are labeled the same way on end panels.

The frame lineup identification placard (P/N 658-0816-01) is applied to the side panel of the end aisle frame. This placard, when populated, shows each frame type and shelf used in the lineup. Frame Type labels and System/Shelf Equipment labels from the equipment identification sheets (P/N 658-1093-01) are used to populate the placard.

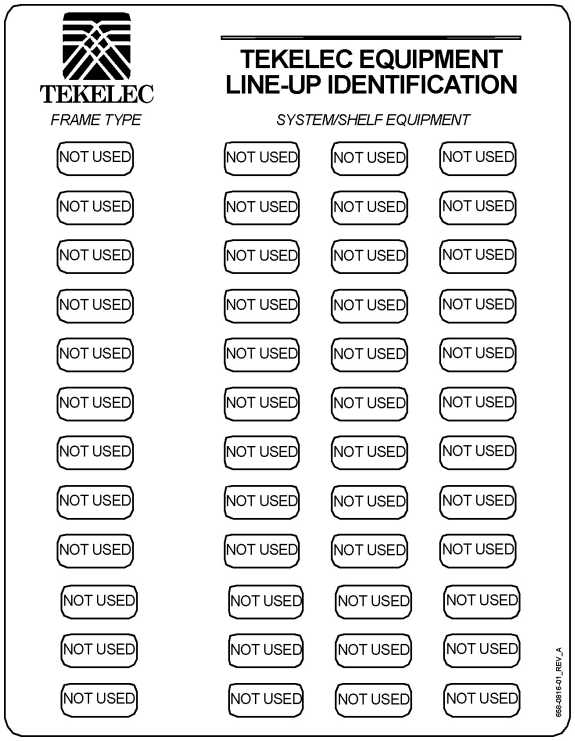
The placard lists the frame lineup with the top line of the placard corresponding to the frame nearest the end aisle to which the placard is attached.

1. Locate the clear pocket containing all labels.

   This pocket is located on the side panel that has the Alarm indicators. This should be the end aisle frame.

2. From the clear pocket, remove the the frame lineup identification placard (P/N 658-0816-01).

Figure 29: Frame Lineup Identification Placard (P/N 658-0816-01)



3. From the clear pocket, remove the the equipment identification sheets (P/N 658-0816-01).
4. From the equipment identification sheets (P/N 658-1093-01), remove the appropriate Frame Type label and System/Shelf Equipment labels and place them on the frame lineup identification placard. See *Table 5: Frame Type and Labels* .

Note: The top line of the placard corresponds to the frame nearest the end aisle to which the placard is attached.

Table 5: Frame Type and Labels

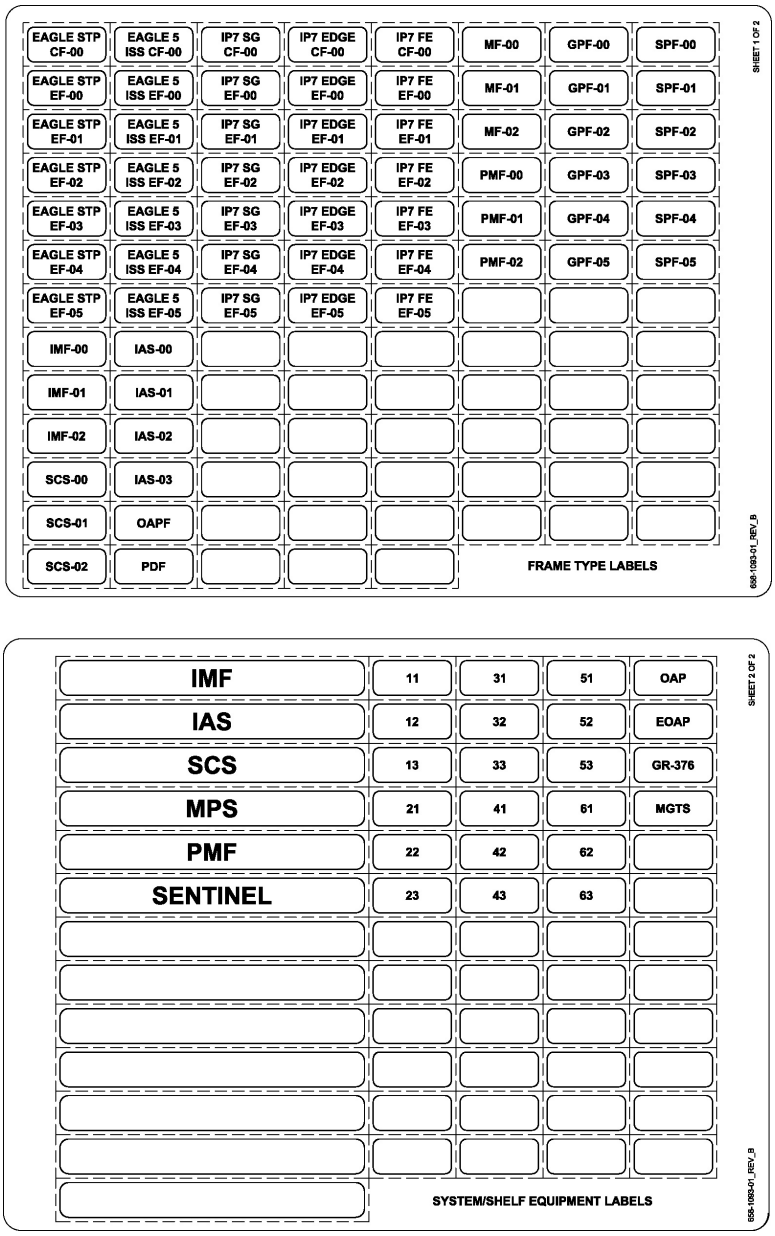
Application	Frame Type	System/Shelf Equipment		
Eagle 5- Control FrameCF- 00 Single Control Shelf	Eagle 5 ISS CF-00	11		
Eagle 5- Control Frame CF-00 Single Control Shelf + 1200 extension shelf		11	12	

Application	Frame Type	System/Shelf Equipment		
Eagle 5- Control Frame CF-00 Single Control Shelf + 1200 and 1300 extension shelf		11	12	13
Eagle 5- Extension Frame EF-00 with 2100 extension shelf	Eagle 5 ISS EF-00	21		
Eagle 5- Extension Frame EF-00 with 2100 and 2200 extension shelves		21	22	
Eagle 5- Extension Frame EF-00 with 2100, 2200 and 2300 extension shelves		21	22	23
Eagle 5- Extension Frame EF-01 with 3100 extension shelf	Eagle 5 ISS EF-01	31		
Eagle 5- Extension Frame EF-01 with 3100 and 3200 extension shelves		31	32	
Eagle 5- Extension Frame EF-01 with 3100, 3200 and 3300 extension shelves		31	32	33
Eagle 5- Extension Frame EF-02 with 4100 extension shelf	Eagle 5 ISS EF-02	41		
Eagle 5- Extension Frame EF-02 with		41	42	

Application	Frame Type	System/Shelf Equipment		
4100, and 4200 extension shelves				
Eagle 5- Extension Frame EF-02 with 4100, 4200 and 4300 extension shelves		41	42	43
Eagle 5- Extension Frame EF-03 with 5100 extension shelf	Eagle 5 ISS EF-03	51		
Eagle 5- Extension Frame EF-03 with 5100 and 5200 extension shelves		51	52	
Eagle 5- Extension Frame EF-03 with 5100, 5200 and 5300 extension shelves		51	52	53
Eagle 5- Extension Frame EF-04 with 6100 extension shelf	Eagle 5 ISS EF-04	61		
Misc Frame	GPF-00			
MPS	GPF-00 trhu GPF-05	MPS		
LSMS	GPF-00 trhu GPF-05	MPS		
Sentinel	SPF-00 thru SPF-05	Sentinel		
SCS	SCS-00 thru SCS-02	SCS		

Application	Frame Type	System/Shelf Equipment
IMF	IMF-00 thru IMF-02	IMF
PMF	PMF-00 thru PMF-01	PMF

Figure 30: Frame Type and System/Shelf Equipment Label Sheets (P/N 658-1093-01)



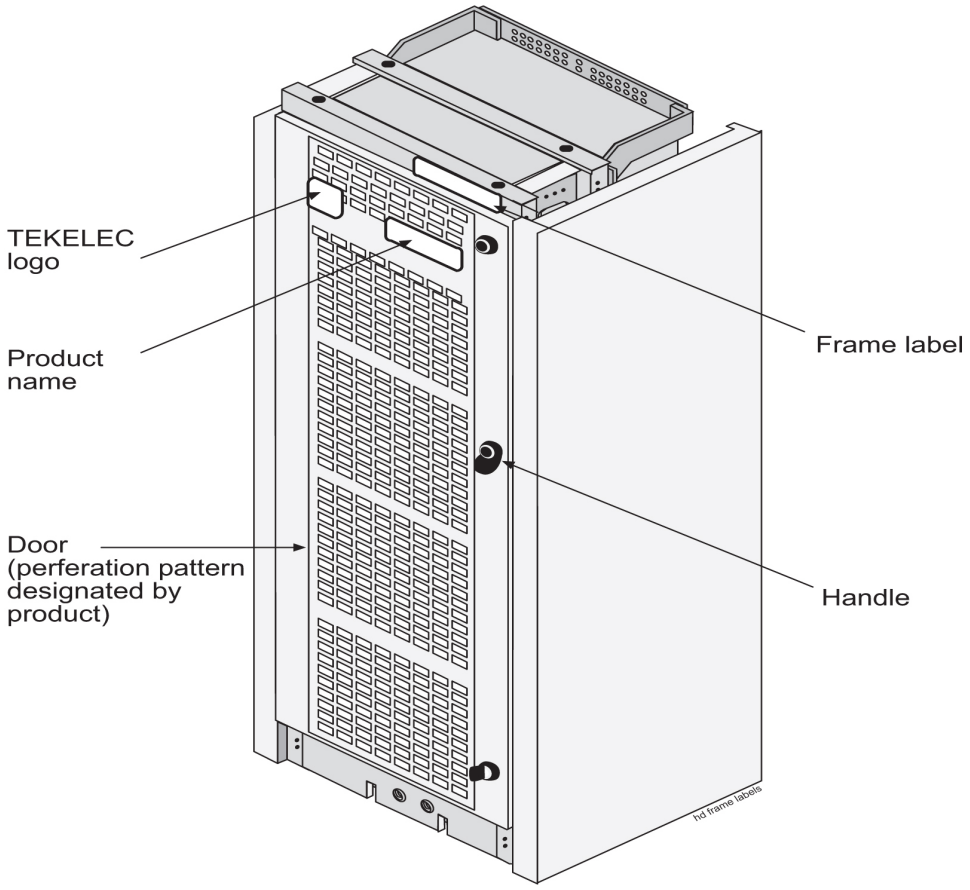
5. Place any unused labels back into the clear pocket.

6. Place the populated frame lineup identification placard into the clear pocket such that the populated side of the placard is visible.

Frame Labeling

This section details the application of frame and shelf labels. Additional labels on the newer heavy duty frame shown in *Figure 31: Heavy-Duty Frame Label Location* come pre-installed.

Figure 31: Heavy-Duty Frame Label Location



Note: The heavy-duty frame comes from manufacturing with the assembly information label in place.

All of the frames shown in *Table 6: Frame Labels and Part Numbers* are labeled the same way on end panels and separation panels, see *Figure 32: Frame and Shelf Label Locations* and *Figure 33: Frame Label Location - Detail*.

Apply frame labels to the front of each frame as shown in *Figure 32: Frame and Shelf Label Locations*.

Table 6: Frame Labels and Part Numbers

Frame	Label	Label Part Number
Control frame	CF-00	658-0486-01

Frame	Label	Label Part Number
Extension frame 00	EF-00	658-0486-02
Extension frame 01	EF-01	658-0486-03
Extension frame 02	EF-02	658-0486-04
Extension frame 03	EF-03	658-0486-05
Extension frame 04	EF-04	658-0486-06
Miscellaneous frame 00	MF-00	658-0374-01
Miscellaneous frame 01	MF-01	658-0374-02
OAP frame	OAPF	658-0486-08
Heavy Duty Frame	GPF	658-0374-01

1. Remove the protective backing from the frame label.
2. Firmly press the label into place as shown in *Figure 32: Frame and Shelf Label Locations* and *Figure 33: Frame Label Location - Detail*..

Figure 32: Frame and Shelf Label Locations

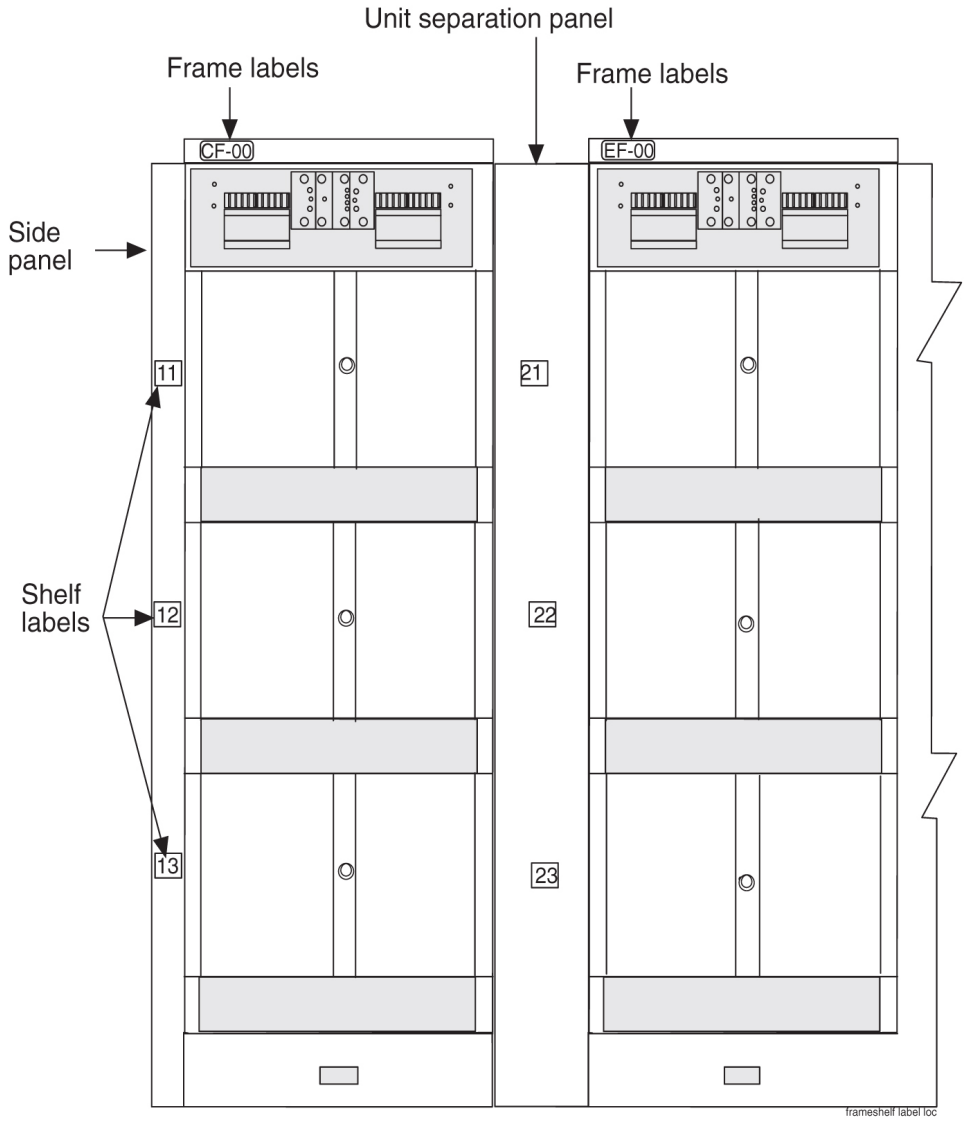
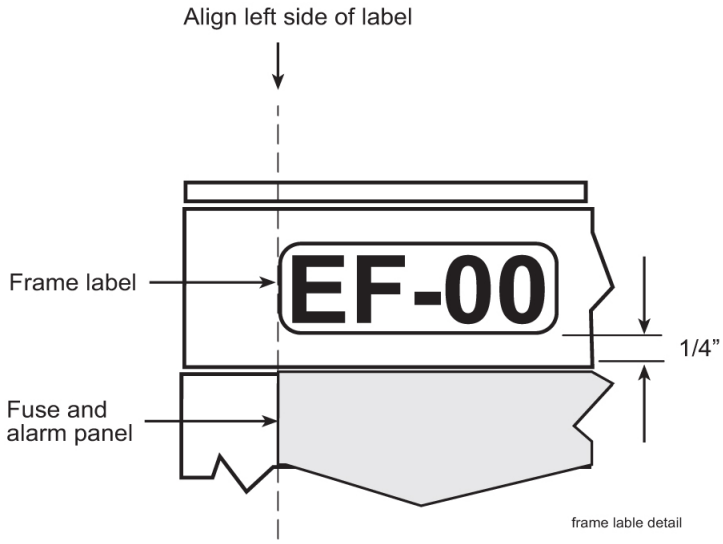


Figure 33: Frame Label Location - Detail



Shelf Labeling

Apply shelf labels to the frames of the system as shown in *Frame Labeling*. Refer to *Figure 34: Shelf Label Location - Detail* for exact placement. Refer to *Table 7: Shelf Labels and Part Numbers* for the proper label for each shelf.

Note: The procedure for the placement of labels is the same on most of the frames. Typically, the system is pre-labeled.

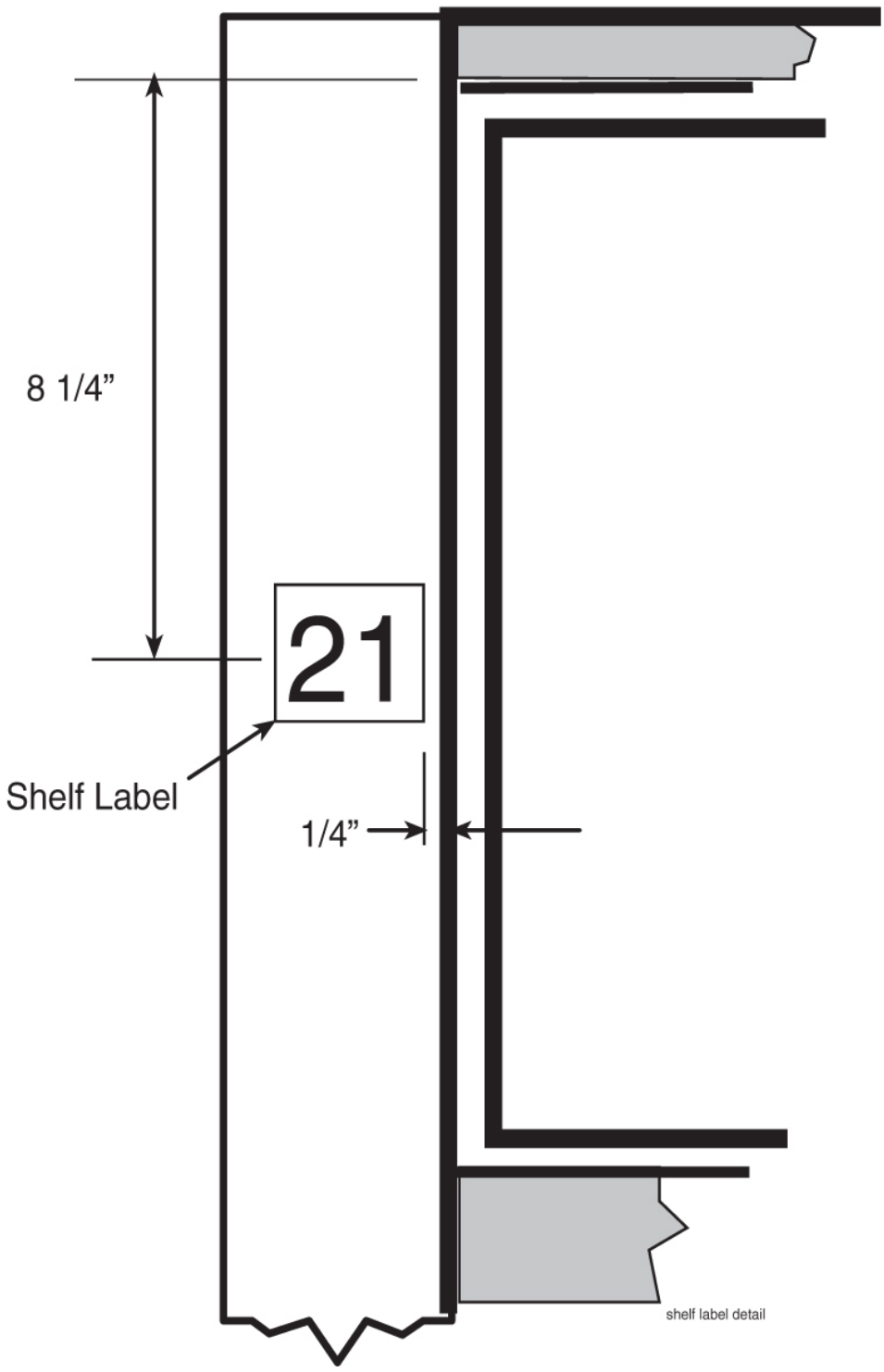
Table 7: Shelf Labels and Part Numbers

Frame	Shelf	Label	Label Part Number
Control Frame CF-00 The Control Frame is always the FIRST frame	1	11= Frame 1 and Shelf 1	658-0490-01
	2	12= Frame 1 and Shelf 2	658-0490-02
	3	13= Frame 1 and Shelf 3	658-0490-03
Extension Frame EF-00 Extension Frame 00 is the first extension frame but the second frame in the line-up	1	21= Frame 2 and Shelf 1	658-0490-04
	2	22= Frame 2 and Shelf 2	658-0490-05
	3	23= Frame 2 and Shelf 3	658-0490-06
Extension Frame EF-01 Extension Frame 01 is the second extension frame but the third frame in the line-up	1	31= Frame 3 and Shelf 1	658-0490-07
	2	32= Frame 3 and Shelf 2	658-0490-08

Frame	Shelf	Label	Label Part Number
(numbering continues in additional frames)	3	33= Frame 3 and Shelf 3	658-0490-09
Extension Frame EF-02	1	41	658-0490-10
	2	42	658-0490-11
	3	43	658-0490-12
Extension Frame EF-03	1	51	658-0490-13
	2	52	658-0490-14
	3	53	658-0490-15
Extension Frame EF-04	1	61	658-0490-16
OAP Frame OAPF	EOAP	EOAP	658-0499-05
Heavy Duty Frame	As needed	As needed	658-0374-01

1. Remove the protective backing from the shelf label.
2. Firmly press the label into place as shown in *Frame Labeling* and *Figure 34: Shelf Label Location - Detail*.

Figure 34: Shelf Label Location - Detail


8 1/4”
21
Shelf Label
1/4”
shelf label detail

Chapter 5

Fuses and Alarm Panel

Topics:

- *Fuse and Alarm Panels.....84*
- *Installing Power Cables.....96*
- *Frame Ground and Logic Ground Cabling Procedures.....99*
- *Fuse Verification.....109*
- *Verification of Fuse Alarm Function.....111*
- *FAP Alarm System Test.....112*
- *Fuse Assignments.....114*
- *Fuse and Card Locations.....116*
- *Card Locations in Control and Extension Shelves.....136*

Fuse and Alarm Panels

The Fuse and Alarm Panel (FAP) provides protected distribution of –48VDC power to the shelves in the frame. The site voltage input to each frame should be between -40VDC and -57.5VDC. Allowing for the full population of a frame and for the failure of one primary supply, new installations of Control and Extension frames require two 60A feeds. Frames with EOAPs require 30A.

The FAP is installed at the top of the frame and uses two cables to bring A and B power to the frame. The FAP contains two separate circuits, A and B. Current flows from the input terminals to the fuse bus. Protection is provided by fuses placed in fuse holders on the front panel. When a fuse is installed in a fuse holder, the circuit is completed to the output connector.

WARNING

WARNING: Existing frames that are fused at 40 amps may be upgraded to support 60 amps with a FAP upgrade kit. Frames that contain HC-MIMs must be upgraded to support 60 amps. Customers do not perform a FAP upgrade; these upgrades are performed by Tekelec personnel.

WARNING

WARNING: The FAP P/N 870-1606-02 Revs A-B can be upgraded to FAP P/N 870-1606-02 Rev C with FAP upgrade kit P/N 870-1831-01. The FAP P/N 870-2320-01 Revs A-I can be upgraded to FAP P/N 870-2320-01 Rev J with FAP upgrade kit P/N 870-1831-02.

CAUTION

CAUTION: All personnel associated with the installation of this system must adhere to all safety precautions and protection equipment required to avoid the possibility of injury to personnel, service degradation, and/or service interruption.

CAUTION

CAUTION: This is a redundant system to allow service during normal maintenance. When repairs require a total power disconnect, both input supply sources must be disconnected. This will cause service interruption and take down the system.

Fuses

The fuse and alarm panel uses GMT-type fuses of different amperage ratings for individual circuit protection. If a frame circuit fuse is blown the alarm is indicated by an LED on the front panel and a small colored flag on the fuse shows the fuse that has failed (refer to *Figure 35: Fuse (GMT Brand Shown)*. Refer to the *Maintenance Manual* for procedures on replacing fuses and the FAP assembly.

CAUTION

CAUTION: Always use a fuse of the same type and amperage rating when replacing a failed fuse.

Figure 35: Fuse (GMT Brand Shown)

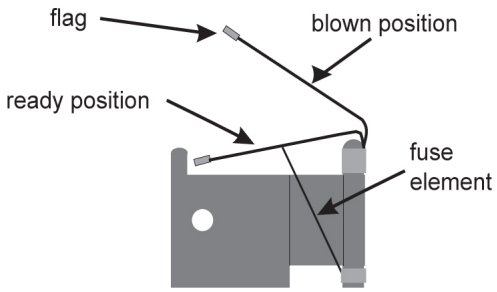


Table 8: Fuse Color Codes of Alarm Flags

Fuse Amp	Fuse Flag Color		Fuse Amp	Fuse Flag Color
0.18A	Orange-Red		2A	Orange
0.2A	Black-Red		2.5A	White-Orange
0.25A	Violet		3A	Blue
0.33A	Yellow-Green		3.5A	White-Blue
0.375A	White-Green		4A	White -Brown
0.5A	Red		5A	Green
0.65A	Black		7.5A	Black-White
0.75A	Brown		10A	Red-White
1A	Gray		12A	Yellow-Green
1.33A	White		15A	Red-Blue
1.5A	White-Yellow			

Fuse and Alarm Panel (P/N 870-2804-01)

The FAP (P/N 870-2804-01) is a low-profile (1U) unit that can be installed in the Control Frame (CF) and the Extension Frame (EF).

The Power Alarm LED indicates the input power state to the FAP. The LED is green when input power is applied to that bus of the FAP and is red when there is no input power to that bus of the FAP. An unlit Power Alarm LED indicates a failed LED or no input power to either bus of the FAP.

Alarm LEDs to indicate Critical, Major, and Minor alarms are located to the left of the diode board. The LEDs indicate alarms generated by the system that are applicable to that frame which the FAP is installed.

The FAP contains a Diode board and a Shorting board. These boards are located at the front center of the FAP. The FAP also contains two fuse blocks, one to the left (A-side) and one to the right (B-side) of diode and shorting boards, consisting of 20 fuse positions each. The Fuse Alarm LED indicates the failure of a fuse.

The diode board in the FAP contains power diodes and circuitry which allow one bus to pick up the entire load when there is a loss of input power on the other bus.

The Shorting board allows the removal of the diode board without taking down the system. This permits periodic maintenance of the diodes without having to power down or remove the unit from the shelf. For maintenance operation, the Shorting board has to be removed, flipped over, and reinstalled. In the bypass position, both A and B power is connected to the fuse blocks so the diode board can be safely removed. The Shorting board has an LED which is off when the board is in normal operational mode and is green when in the bypass mode of operation. With the Shorting board in the bypass mode, the OR'ing functon is not available. Refer to the Maintenance Manual for additional information to place the FAP into Maintenance Mode of operation.

Figure 36: Fuse and Alarm Panel - Front View (P/N 870-2804-xx) and *Table 9: Fuse and Alarm Panel Front Items (P/N 870-2804-xx)* describes the front panel configuration of the fuse and alarm panel (P/N 870-2804-01).

Figure 36: Fuse and Alarm Panel - Front View (P/N 870-2804-xx)

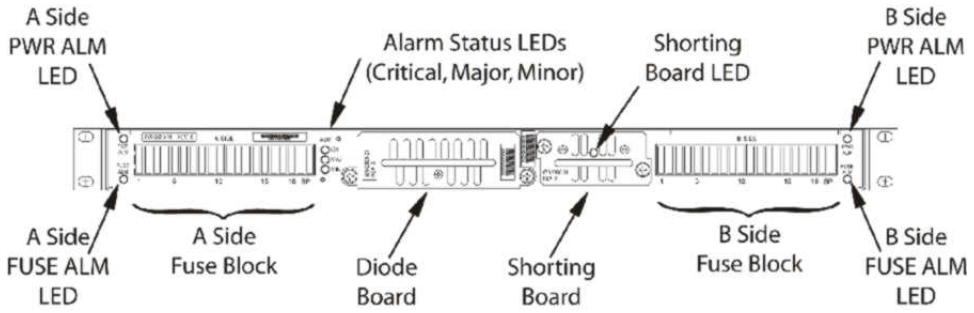


Table 9: Fuse and Alarm Panel Front Items (P/N 870-2804-xx)

Fuse Panel Item	Description
Fuse Positions	Two groups of 20 GMT fuses
Shorting Board LED	LED indicator for shorting board.
Fuse Alarm	LED indicator for fuse fail alarm
Power Alarm	LED indicator for input power
Critical Alarm	LED indicator for critical alarm

Fuse Panel Item	Description
Major Alarm	LED indicator for major alarm
Minor Alarm	LED indicator for minor alarm

Table 10: Fuse State and LED condition (P/N870-2804-01). presents possible alarm LED states and corresponding fuse conditions.

Table 10: Fuse State and LED condition (P/N870-2804-01).

Fuse State A side	Fuse State B side	Fuse LEDs A side	Fuse LEDs B side
No fuses blown	No fuses blown	Green	Green
No fuses blown	At least 1 fuse blown	Green	Red
At least 1 fuse blown	No fuses blown	Red	Green
At least 1 fuse blown	At least 1 fuse blown	Red	Red
Shorting board enabled (in bypass mode), Shorting board LED is green.		Red	Red
Shorting board in normal operational mode, Shorting board LED is off. No fuses blown.		Green	Green

Figure 37: Fuse and Alarm Panel Rear (P/N870-2804-01). and *Table 11: Fuse and Alarm Panel Rear Items (P/N870-2804-01).* describes the rear panel configuration. Refer to the *Installation Manual* for cabling connection information.

Figure 37: Fuse and Alarm Panel Rear (P/N870-2804-01).

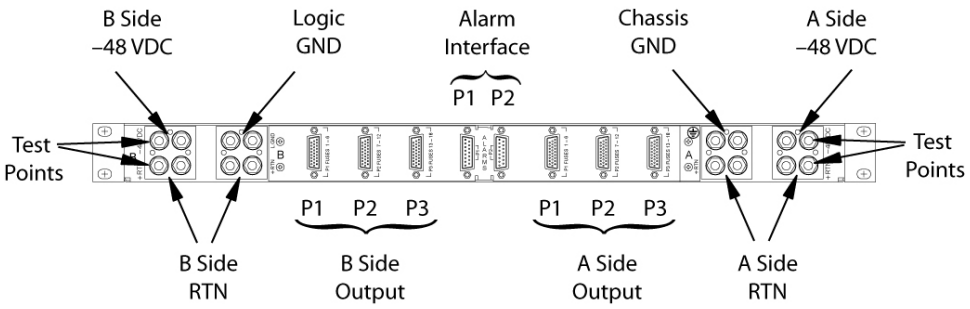


Table 11: Fuse and Alarm Panel Rear Items (P/N870-2804-01).

Fuse Panel Item	Description
Input Terminal Block A	Input and Return for power source A and FAP Chassis Ground
Input Terminal Block B	Input and Return for power source B and FAP Logic Ground
–48VDC Outputs A	26-pin "D" connectors for A-side outputs: • P1 - Fuses 1 through 6 • P2 - Fuses 7 through 12 • P3 - Fuses 13 through 18
–48VDC Outputs B	26-pin "D" connectors for B-side outputs: • P1 - Fuses 1 through 6 • P2 - Fuses 7 through 12 • P3 - Fuses 13 through 18
Alarm Interface	15-pin "D" connectors: • P1 to the EAGLE • P2 to a power distribution breaker panel

Table 12: Fuse and Alarm Panel Specifications (P/N870-2804-01). presents the power requirements and physical dimensions for the FAP.

Table 12: Fuse and Alarm Panel Specifications (P/N870-2804-01).

Power Requirements	
Voltage	–48VDC
Current Capacity	60 amp "A" or "B"
Power Dissipation	8 W, no fuse load
Dimensions	
Height	1.75 inches (4.4 cm)

Width	21.5 inches (53.8 cm)
Depth	10 inches (25 cm)

Shorting Board

The Shorting board allows the removal of the diode board without taking down the system. This permits periodic maintenance of the diodes without having to power down or remove the unit from the shelf. The Shorting board has an LED which is off when the board is in normal operational mode and is green when in the bypass mode of operation. With the Shorting Board in the maintenance mode, the Diode Board can be removed for maintenance while still allowing the FAP to operate. No OR'ed power is available in this mode. After installing the Diode Board, the Shorting Board must be reset to normal mode.

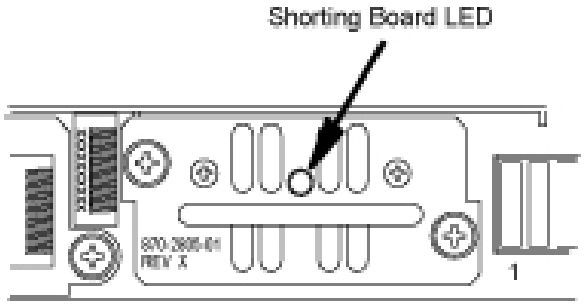
Maintenance Mode

This section describes how to place the Shorting Board into maintenance (bypass) mode. Maintenance mode allows the removal of the Diode Board without taking down the system.

Procedure — Shorting Board Maintenance Mode

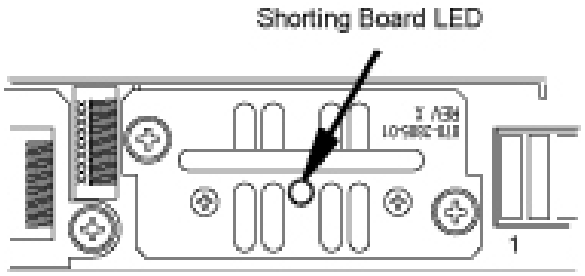
1. Check to verify the Shorting Board LED is not on, indicating the FAP is in normal mode.2.
2. Locate two screws securing the Shorting Board in its slot (see *Figure 38: Shorting Board Faceplate, Normal Mode*). Note the orientation of the Shorting Board LED. Turn the screws at each corner of the board to the left until they disengage.

   Figure 38: Shorting Board Faceplate, Normal Mode



3. Pull the board straight out of the FAP until the board is clear of the frame.
4. Turn the Shorting Board over and reinsert the board into its slot. Note the orientation of the Shorting Board LED (see *Figure 39: Shorting Board Faceplate, Maintenance Mode*).

   Figure 39: Shorting Board Faceplate, Maintenance Mode



The Shorting Board LED turns green and the fuse alarm LEDs turn red.

5. Ensure the board is seated properly and tighten the two screws to secure the board.
6. The Shorting Board is now in the maintenance (bypass) mode of operation.

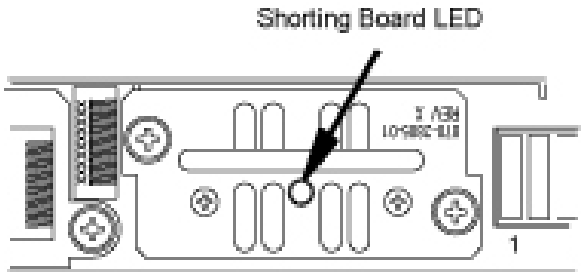
Normal Mode

Use this procedure to place the Shorting board into normal mode. This mode of operation allows one bus to pick up the entire load when there is a loss of input power on the other bus.

Procedure — Shorting Board Normal Mode

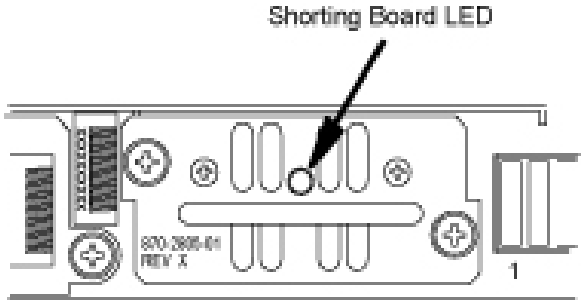
1. Check to verify the Shorting Board LED is green, indicating the FAP is in maintenance mode.
2. Locate two screws securing the Shorting Board in its slot. Note the orientation of the Shorting Board LED (*Figure 40: Shorting Board Faceplate, Maintenance Mode*). Turn the screws at each corner of the board to the left until they disengage.

   Figure 40: Shorting Board Faceplate, Maintenance Mode



3. Pull the board straight out of the FAP until the board is clear of the frame.
4. Turn the Shorting Board over and reinsert the board into its slot. Note the orientation of the Shorting Board LED (see *Figure 41: Shorting Board Faceplate, Normal Mode*).

   Figure 41: Shorting Board Faceplate, Normal Mode



   Note: The Shorting Board LED is off and the fuse alarm LEDs turn green.

5. Ensure the board is seated properly and tighten the two screws to secure the board.
6. The Shorting Board is now in the normal mode of operation.

Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx)

The FAP P/N 870-1606-xx can be installed in standard frames. The FAP P/N 870-2320-xx can be installed in heavy duty frames.

The FAP contains an alarm board, two diode boards, and a jumper board. These boards are located at the front center of the FAP. The fuse holders are to the left and right of these boards as shown in *Figure 42: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Front*.

The alarm board contains a FUSELED to indicate a failed fuse (for either bus A or B) and LEDs to indicate Critical, Major, and Minor alarms generated by the system that are applicable to that frame which the FAP is installed.

There are two diode boards in the FAP, one for bus A and one for bus B. Each diode board contains power diodes and circuitry which allow one bus to pick up the entire load when there is a loss of input power on the other bus. An LED indicates the input power state to the FAP. The LED is green when input power is applied to that bus of the FAP and is red when there is no input power to that bus of the FAP.

The Maintenance (Jumper) board allows the removal of one or both diode boards without taking down the system. The Jumper board has two connectors and a connector plug. During normal operation, the connector plug is seated on the first connector. For maintenance operation, the jumper board has to be removed and the connector plug moved to the second connector. In the maintenance position, the connector plug connects both A and B power feeds to the fuse panels so one or both diode boards can be safely removed. The OP/MAINTLED is green when the Jumper board is in normal operational mode and is red when in the maintenance mode of operation. Refer to the *Maintenance Manual*

Figure 42: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Front and *Table 13: Fuse and Alarm Panel Front Items* describes the front panel configuration of the fuse and alarm panel (P/N 870-1606-xx/870-2320-xx).

Figure 42: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Front

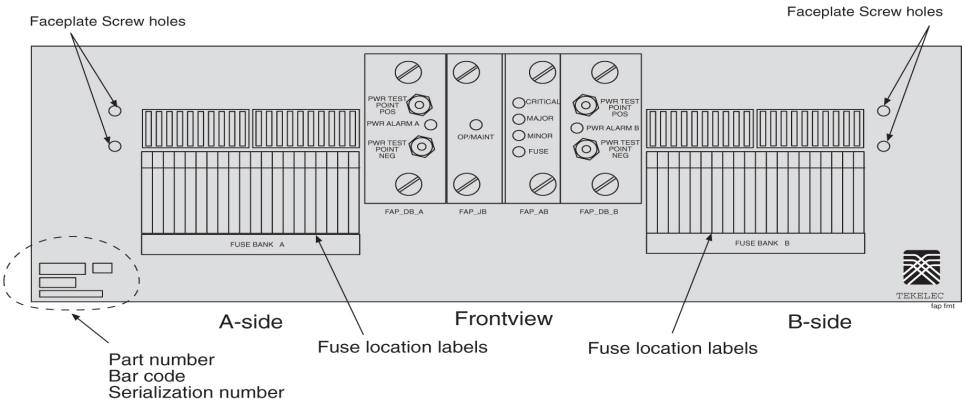


Table 13: Fuse and Alarm Panel Front Items

Fuse Panel Item	Description
Fuse Positions	Two groups of 20 GMT fuses
PWR ALARM	LED indicator for A or B diode board input power • Green - input power applied • Red - no input power to board

OP/MAINT	LED indicator for mode of operation • Green - normal • Red - maintenance
FUSE	LED indicator for fuse fail alarm • Green - normal • Red - blown fuse
CRITICAL	LED indicator for frame critical alarm
MAJOR	LED indicator for frame major alarm
MINOR	LED indicator for frame minor alarm

Figure 43: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Rear and *Table 14: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Rear* describes the rear panel configuration of fuse and alarm panel (P/N 870-1606-xx). Refer to the *Installation Manual* for cabling connection information.

Figure 43: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Rear

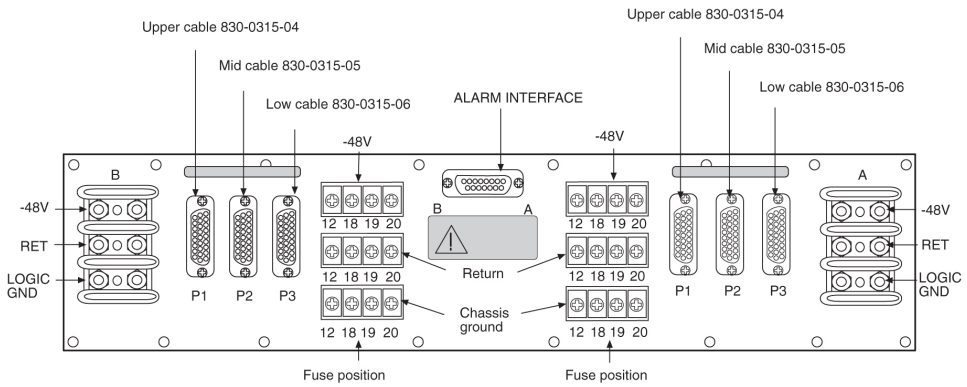


Table 14: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Rear

Fuse Panel Item	Description
Input Terminal Block A	Logic Ground, Return, and Input for power source A
Input Terminal Block B	Logic Ground, Return, and Input for power source B
Output Terminal Block A	–48VDC, Chassis Ground, and RTN for Fuse location 12, 18, 19, and 20 for side A.

Fuse Panel Item	Description
	These are miscellaneous extra capacity fuses refer to *Provision Rules for FAP Fuse Locations* .
Output Terminal Block B	–48VDC, Chassis Ground, and RTN for Fuse location 12, 18, 19, and 20 for side B. These are miscellaneous extra capacity fuses refer to *Provision Rules for FAP Fuse Locations*
–48VDC, Chassis Ground, and RTN Outputs A	26-pin "D" connectors, P1, P2, and P3 for A-side outputs.
–48VDC, Chassis Ground, and RTN Outputs B	26-pin "D" connectors, P1, P2, and P3 for B-side outputs.

Table 15: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Specifications

Power Requirements	
Voltage	–48VDC
Current Capacity	40 amp "A" or "B" for P/N 870-1606-01 40 amp "A" or "B" for P/N 870-1606-02 Rev A and B 40 amp "A" or "B" for P/N 870-2320-01 Rev A through H 60 amp "A" or "B" for P/N 870-1606-02 Rev C 60 amp "A" or "B" for P/N 870-2320-01 Rev J
Power Dissipation	8 W, no fuse load
Dimensions	
Height Width Depth	3 inches (7.6 cm) 17 inches (43.2 cm) 10.25 inches (26 cm)

Jumper Board

The Jumper board has two connectors and a connector plug. During normal operation, the connector plug is seated on the first connector. For maintenance operation, the jumper board has to be removed and the connector plug moved to the second connector. In the maintenance position, the connector plug connects both A and B power feeds to the fuse panels so one or both diode boards can be safely

removed. The OP/MAINT LED is green when the Jumper board is in normal operational mode and is red when in the maintenance mode of operation.

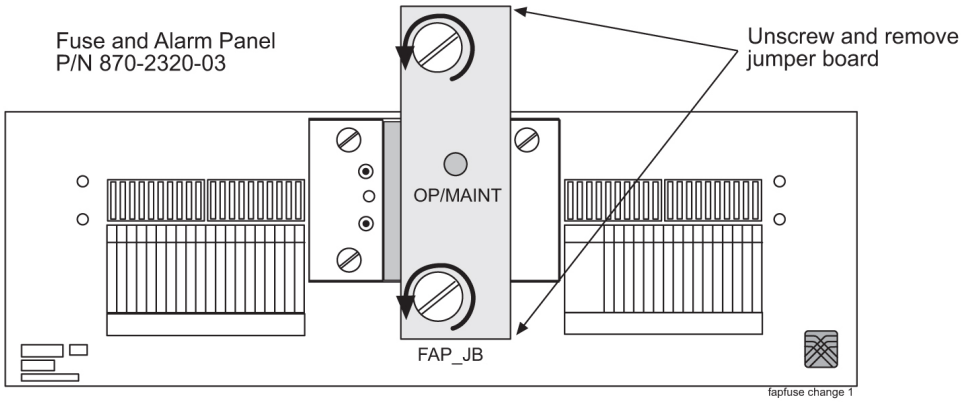
Maintenance Mode

Use this procedure to place the jumper board into maintenance mode. Maintenance mode allows the removal of one or both diode boards without taking down the system.

Procedure — Maintenance Mode

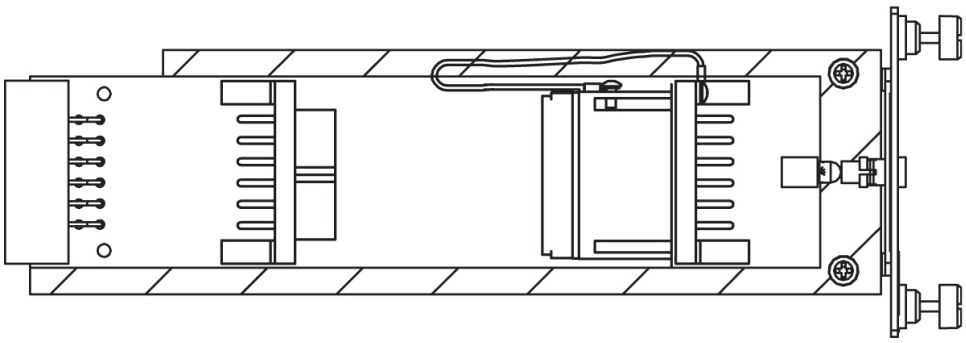
1. Locate the jumper board on the Fuse and Alarm Panel (FAP). See *Figure 44: Jumper Board FAP*.

   Figure 44: Jumper Board FAP



2. Remove the Jumper Board (FAP_JB) by turning the top and bottom screws to the left until they disengage.
3. Pull the board straight out of the FAP until the board is clear of the frame.
4. On the jumper circuit board, unclip the 12-pin connector jumper from P71 and re-attach it to P72. Insert it until the plastic retaining clips "snap". See *Figure 45: Jumper Connector - Maintenance Mode.*. Note that the jumper has a retaining strap so it will not get dropped or lost. This repositioning overrides the diodes, establishing a direct connection between the input and fuse panels.

   Figure 45: Jumper Connector - Maintenance Mode.



5. Slide the jumper board back into the FAP and verify both of the following alarms display:
   - the OP/MAINT LED lights red on the FAP
   - an EAGLE 5 ISS fuse alarm displays on the terminal

   You may now remove either or both diode circuit boards without affecting EAGLE 5 ISS service.

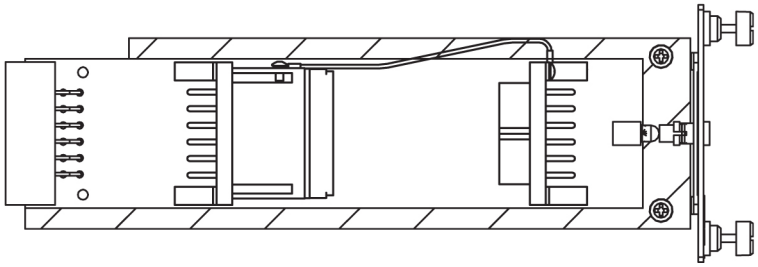
Note: Using the jumper override negates the backpower protection usually provided by the diode board.

The jumper board maintenance mode procedure is completed.

Procedure — Operational Mode

1. Locate the jumper board on the Fuse and Alarm Panel (FAP).
2. Unscrew the two thumbscrews securing the FAP jumper board and remove the board.
3. On the jumper circuit board, unclip the 12-pin connector jumper from P72 and re-attach it to P71. Insert it until the plastic retaining clips "snap". See *Figure 46: Jumper Connector - Operational Mode.*. Note that the jumper has a retaining strap so it will not get dropped or lost. This repositioning establishes a connection between the diode boards with the input and fuse panels.

   Figure 46: Jumper Connector - Operational Mode.



4. Slide the jumper board back into the FAP. Verify the OP/MAINT LED lights green. The fuse alarm LED returns to green.

   The jumper board operational mode procedure is completed.

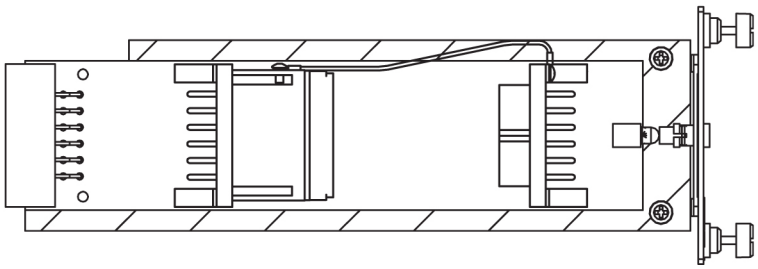
Operational Mode

Use this procedure to place the jumper board into operational mode. This mode of operation allows one bus to pick up the entire load when there is a loss of input power on the other bus.

Procedure — Operational Mode

1. Locate the jumper board on the Fuse and Alarm Panel (FAP).
2. Unscrew the two thumbscrews securing the FAP jumper board and remove the board.
3. On the jumper circuit board, unclip the 12-pin connector jumper from P72 and re-attach it to P71. Insert it until the plastic retaining clips "snap". Note that the jumper has a retaining strap so it will not get dropped or lost. This repositioning establishes a connection between the diode boards with the input and fuse panels.

   Figure 47: Jumper Connector - Operational Mode.



4. Slide the jumper board back into the FAP. Verify the OP/MAINT LED lights green. The fuse alarm LED returns to green.

   The jumper board operational mode procedure is completed.

Provision Rules for FAP Fuse Locations

The following are provisioning rules for fuse placement apply to FAP P/N870-2804-xx:

- Maximum fuse size 3 amp.
- Fuse positions 19 and 20 not used.
- Power feed must originate from the same power source.
- Fuse and Alarm Panel Shorting board in bypass mode must be less than 40 amp per distributed output side.

These provisioning rules for fuse placement apply to FAPs P/N 870-1606-xx and P/N 870-2320-xx.

- Maximum fuse size 3 amp for Fuse one through Fuse 18 when P1, P2, or P3 are used for power output
- P2 cannot be used if the Terminal Strip (output) position 12 is used.
- P3 cannot be used if the Terminal Strip (output) position 18 is used.
- Fuse maximum of 15 amp for fuse positions 12, 18, 19, and 20, all other fuse positions are 3 amp.

  Note: For fuse locations 12, 18, 19, and 20, the fuse maximum is 10 amp when adjacent locations are used.

- Power feed must originate from the same power source.
- Fuse and Alarm Panel, Jumper Board (P/N 870-1641-01) fuse size on boards 40 amp per side for P/N 870-1606-02 Rev A and B, and for P/N 870-2320-03 Rev A through I. Fuse size on boards 60 amp per side for P/N 870-1606-02 Rev C and 870-2320-03 Rev J.
- Fuse and Alarm Panel, Jumper board in maintenance mode must be less than 40 amp per distributed output side.

Installing Power Cables

Each frame is divided into A and B power buses. If loss of power on one of the buses occurs, the other bus must be able to supply current for the entire frame. Therefore, each bus requires wiring sized to handle 40A at –48VDC, with a maximum voltage drop of 0.6 volts, or 60A for new installations. All frames containing HCMIM cards require 60A. The site voltage input to each frame should be between -40VDC and -57.5VDC. To meet this specification:

- Fuse each bus at 40A if you have a FAP 870-2320-03 Rev A through Rev I.

  Note: Existing frames that are fused at 40A can be upgraded to support 60A with a FAP upgrade kit. 60A are required for frames that contain HC-MIMs. Upgrades will be performed by Tekelec personnel. Contact the Tekelec Customer Care Center for more information.

- Fuse each bus at 60A if you have a FAP 870-2320-04 Rev J, 870-0243-08 Rev C, 870-0243-09 Rev C, or 870-2804-01 Rev A.

- For Input Power, RTN, and Logic GND use only the following for Fuse and Alarm Panel connectors:
  - FAP P/N 870-2804-001; Straight, two-hole lugs, 1/4-inch on 5/8-inch centers, long barrel with windows (504-0817-02)
  - All other FAPs; Straight, two-hole lugs, #10 hole on 5/8-inch centers, long barrel with windows (502-0085-R01)

All connections to the FAP are #6AWG (number 6 American Wire Gage). *Table 16: Power Cable Conductor Sizes* shows the list of required wiring sizes based on the length of the cable run. H-tap to the main feed where larger gauge wire is required for long cable runs.

Use H-taps at the fuse and alarm panel and power board to reduce the wire size to #6 AWG.

Note: Specific wire sizes may be determined by the site requirements.

Table 16: Power Cable Conductor Sizes

Breaker Size in Amperes	Cable Length	Conductor Size (AWG)
40A	up to 40 ft. (12.2 meters)	#6
	up to 70 ft. (21.3 meters)	#4
	up to 110 ft. (33.5 meters)	#2
	up to 170 ft. (51.8 meters)	1/0
	up to 200 ft. (61 meters)	2/0
	up to 220 ft. (67.1 meters)	4/0
60A	up to 40 ft. (12.2 meters)	#2
	up to 70 ft. (21.3 meters)	1/0
	up to 110 ft. (33.5 meters)	2/0
	up to 170 ft. (51.8 meters)	4/0
	up to 200 ft. (61 meters)	350MCM
	up to 220 ft. (67.1 meters)	350MCM

Note: Where the cable leaves the cable rack, the cable must be protected with fiber paper throughout the system.

Recommended Tools

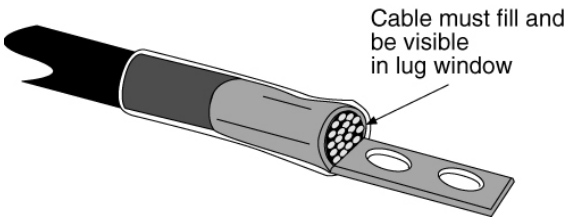
Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses
- Multimeter
- Lacing cord
- Cable cutters
- Cable stripper
- Crimping tool, embossing dies
- Socket wrench set with 1/4-inch or 3/8-inch drive or open end wrenches
- Heat-shrink gun (hot air blower)
- Torque wrench
- Fiber paper

Note: It is a requirement that when mating dissimilar metals non oxidizing grease is used between them as a corrosion inhibitor.

1. Apply the cable tags provided with the system to both ends of the supply and return cables.
2. Ensure that power is off at the central office power distribution board for the circuits being wired. Use a multimeter.
3. Remove the clear plastic cover from the back of the fuse and alarm panel.
4. Run, form, and dress the cable from the power distribution board, over the cable racks, to the fuse and alarm panel.
5. Strip the cable ends, slide a one-inch length of clear heat-shrink tubing over and past the portion of stripped cable.
6. Apply non oxidizing grease to the stripped end of the cable, and install the lug.
   The stripped cable must fill lug completely to the end of the barrel of the lug and be visible in the end window of the lug.

   Figure 48: Lug Installation



   Note: Input Power and RTN use straight, two hole lugs, 1/4-inch hole on 5/8-inch centers, long barrel with window (P/N 804-0817-02).

7. Double crimp the lugs onto the cable end using the embossing crimper.
8. Slide the one-inch length of clear tubing over the crimped lug and heat-shrink the one-inch length of clear tubing.

9. Fasten the lugs of the cables to the respective A-side and B-side -48VDC and RTN points on the FAP. Refer to *Figure 49: 1U Fuse and Alarm Panel Rear (P/N 870-2804-01)* and *Figure 50: 3U Fuse and Alarm Panel Rear (P/N 870-2320-03))*.

Figure 49: 1U Fuse and Alarm Panel Rear (P/N 870-2804-01)

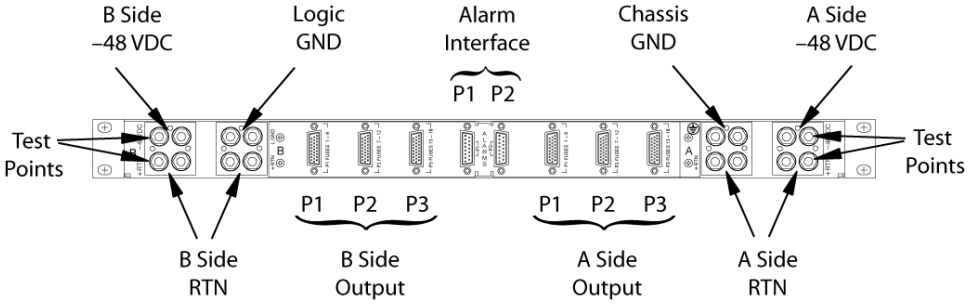
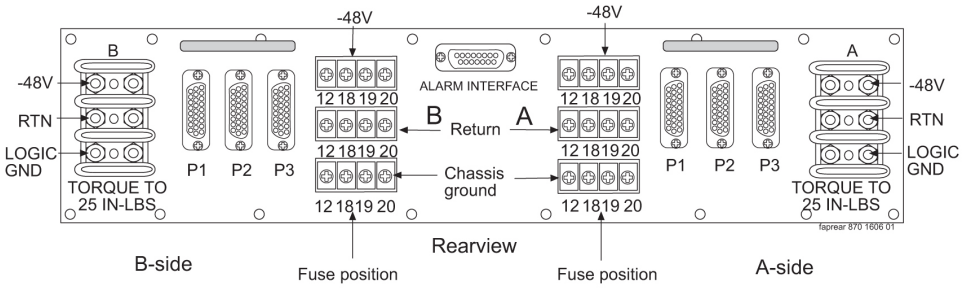


Figure 50: 3U Fuse and Alarm Panel Rear (P/N 870-2320-03))



Tighten the lugs to:

- 1U FAP, torque to 50 inch-pounds
- 3U FAP, torque to 25 inch-pounds

10. Verify correct connection with a multimeter by running continuity check.
11. Replace the clear plastic cover on the back of the fuse and alarm panel.
12. Secure the power cables to the cable rack with lacing cord.

Note: Where the cable leaves the cable rack, the cable must be protected with fiber paper throughout the system.

Frame Ground and Logic Ground Cabling Procedures

This section covers these procedures:

- *Ground Frame*
- *Connect Ground Cable to Control Frame*
- *Logic Ground Connections to the System Ground Bar*
- *Logic Ground Cables*

Grounding Requirements

DANGER: Strictly observe all grounding requirements to reduce the risk of electric shock.

The system operates as a digital isolated ground plane system in a central office environment and requires a single connection to the central office ground window. The system's ground cables must provide the sole grounding connection between the entire system and the central office grounding.

Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses
- Power knife
- Cable cutters
- Cable stripper
- Flush cutters
- Crimping tool with embossing dies (test before using)
- Socket wrench set, 1/4-inch or 3/8-inch drive or open-end wrenches
- Non oxidizing grease

  Note: It is a requirement that when mating dissimilar metals non oxidizing grease is used between them as a corrosion inhibitor.
- Lacing cord and nylon cable ties
- Heat-shrink gun (hot air blower)
- Torque wrench
- Fiber paper

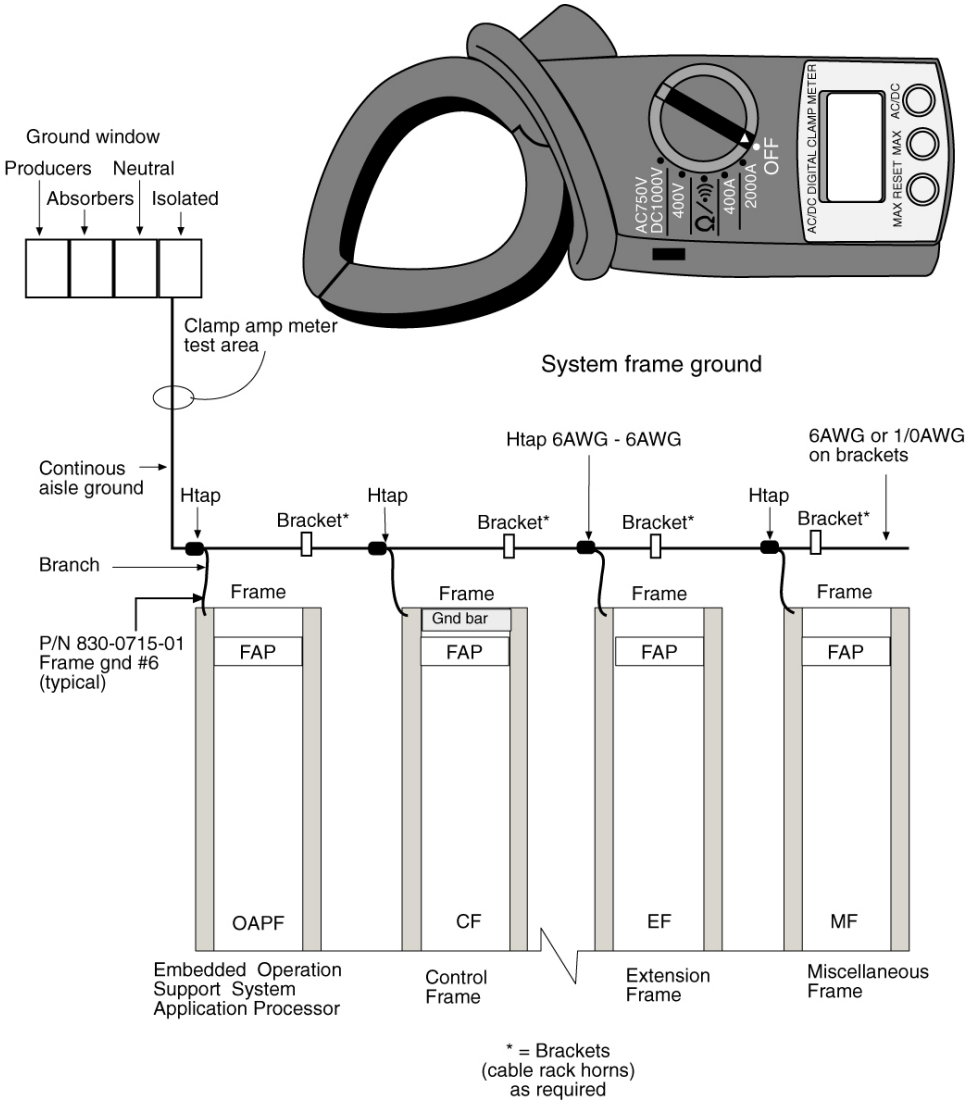
Ground Frame

1. Install the continuous ground conductor to the Ground Window. Run the conductor the length of the equipment lineup (see the figure below).

   The separate #6 American Wire Gauge (AWG) cable ground that runs to each frame will allow removal of a frame from the lineup without interrupting the grounding of other frames in the lineup.
2. Install the branch ground conductor to the frame using screws and washers.

   The continuous aisle ground conductor will be H-tapped to the branch (see the figure below). Torque screws to 45 inch-pounds.

   Figure 51: System Frame Grounding



3. Secure the cable to the cable brackets with lacing cord.
4. Cables must be labeled, 145P tags should have "TO" and "FROM" location information.
   Example: FROM MGB (Main Ground Bar), TO system ground bar Control Frame, CF00.
5. DO NOT "double lug": The practice of using one bolt through a lug and the ground bar, and through another lug on the other side of the ground bar, held in place by one nut.
6. A bolt through any nut must show at least two threads beyond the nut but no more than four threads should be showing.

Connect Ground Cable to Control Frame

CAUTION: This equipment has a connection between the earthed conductor of the DC supply circuit and the earthing conductor.

Note: It is a requirement that when mating dissimilar metals non oxidizing grease is used between them as a corrosion inhibitor.

1. Run the 1/0 ground cable from the central office Main Ground Bar (MGB) over the cable rack horns to the system Control Frame, CF-00.
2. At the control frame end of the cable:
   a) Cut the 1/0 Green Ground Cable (P/N 690-0108-R07) to length and strip the end.
   b) Slide the clear heat-shrink (P/N 804-0229-01) on the cut and stripped end of the cable.

      Move the heat-shrink past the stripped portion of the cable to allow access to the uncovered wire.

   c) Apply a thin coat of non oxidizing grease to the stripped end of the cable.
   d) Slide the 1/0 pink lug (P/N 804-0977-R01) to the stripped cable.

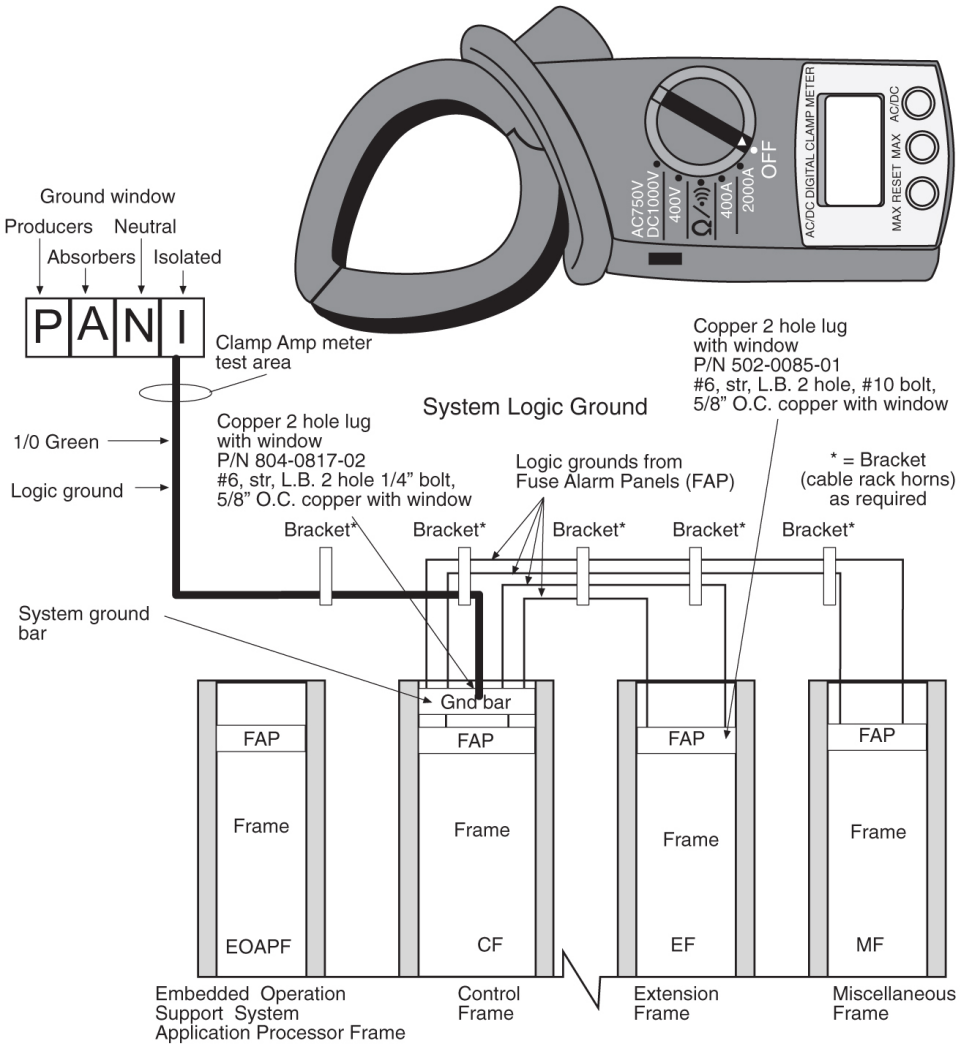
      Secure the lug to the cable by double crimping the barrel of the lug using a crimping tool with embossing dies. The stripped cable must fill lug completely to the end of the barrel of the lug and be visible in the end window of the lug.

   e) Slide the heat-shrink down over the barrel of the lug and the cable.
   f) Use a Heat-shrink gun (hot air blower) to shrink the clear heat-shrink to the barrel of the lug and cable.
3. Secure the cable to the cable rack horns with lacing cord.

   Note: Tie-wraps are not allowed on the top frame horn or above. On the top horn/bracket and above use only lacing cord.
4. Apply a small amount of non oxidizing grease to the mounting holes on a copper system ground bar where the lug contacts the ground bar; on a tinned ground bar non oxidizing grease is not needed.
5. Install the ground cable lug using the 3/8-inch # 6 copper-plated hardware provided.

   Use the attachment sequence shown in *Figure 52: System Logic Grounding*.

   Figure 52: System Logic Grounding



.

6. Tighten the bolts to 15.5 foot-pounds of torque.
7. Use the lacing cord to secure a "DO NOT DISCONNECT LEAD" tag at each end of the cable, just beyond the lug.

   Note: System Ground: 1/0 cable from the system ground bar to the "I" section of the ground window. If no ground window exists, the customer will designate the termination point.

   Note: Frame Ground: A cable #6 AWG from a frame is H-tapped into another #6 cable or 1/0 cable and also terminates on the "I" section of the ground window.

   Note: The size of the cable is determined by the overall length of the cable run. Refer to the Site File Book.

Logic Ground Connections to the System Ground Bar

Note: It is a requirement that when mating dissimilar metals non oxidizing grease is used between them as a corrosion inhibitor.

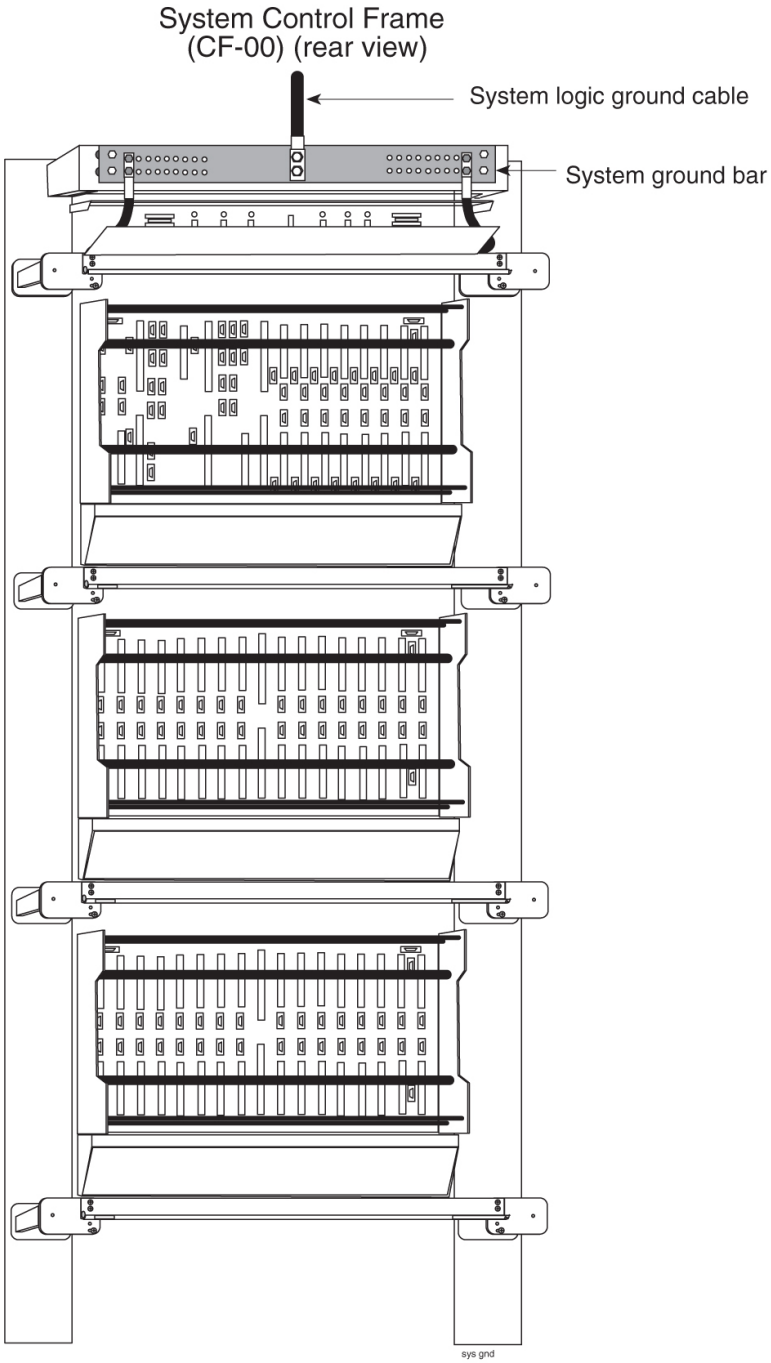
1. Place a clear heat-shrink on the cable.
2. Butt, strip the end of the cable, and apply a small amount of non oxidizing grease to the conductor.

   The stripped cable must fill lug completely to the end of the barrel of the lug and be visible in the end window of the lug.
3. Crimp #6 American Wire Gauge (AWG) lug with window on the cable, using an embossing crimper.
4. Apply a small amount of non oxidizing grease to the mounting holes on a copper system ground bar, *Non oxidizing grease is not needed on a tin ground bar*, where the lug contacts the ground bar.
5. Crimp a #6 AWG lug with a window on the cable.

   Use an embossing crimper. The stripped cable must fill lug completely to the end of the barrel of the lug and be visible in the end window of the lug.

WARNING: All logic ground connections *must* be made to the system ground bar.

Figure 53: System Logic Ground Bar and Cable

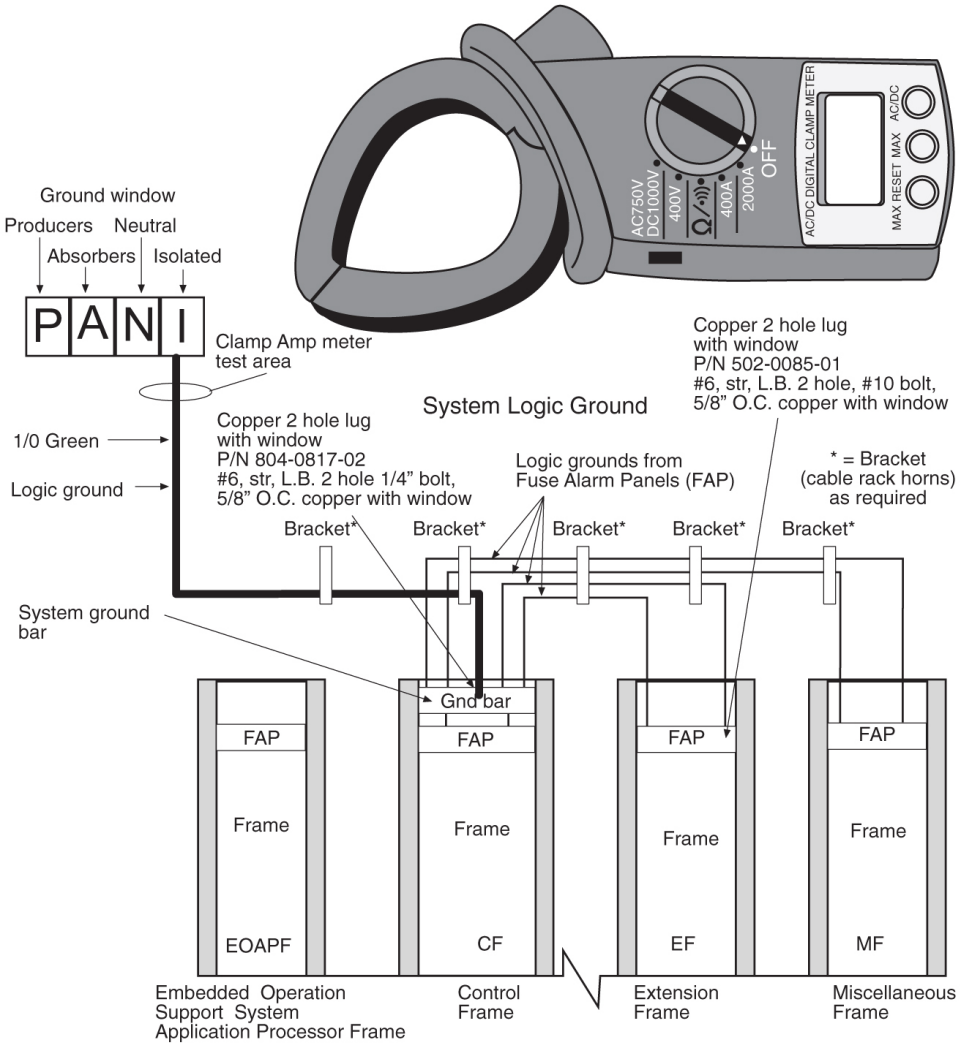


Note: It may be necessary to drill the central office ground window bar to accept the 3/8-inch bolts on one-inch centers. Apply the 145P cable tags (see *Figure 57: Ground Bar and Logic Ground Installation*) provided to both ends of the ground cable, including the "Do Not Disconnect".

6. Install the logic ground cable lugs P/N 804-0817-R02 using the 1/4-inch 20 copper-plated hardware provided (refer to *Figure 53: System Logic Ground Bar and Cable*).

Tighten the bolts to 68 inch-pounds.

Figure 54: System Logic Grounding



Note: The only ground cables that are terminated to the system ground bar are the logic grounds from the fuse and alarm panel.

Note: DO NOT run Logic Ground or Power Cables on the cable horns in the top middle of a frame. The horn is for Row Alarm Cables only.

WARNING

WARNING: All logic ground connections *must* be made to the system ground bar.

7. Repeat *Step 2*, *Step 3*, and *Step 4*, on the fuse and alarm panel end.

   Note: 1U FAP: On the frame, use straight, two hole lugs, 1/4-inch hole on 5/8-inch centers, long barrel with window (P/N 804-0817-02). The FAP Chassis GND and Logic GND use 90-degree, 2-hole lug, 1/4" hole on 5/8-inch centers, long barrel with window (P/N 502-0081-02).

Note: All other FAPs: #6-gauge lug (P/N 502-0085-R01) must be used on the fuse and alarm panel end of the cable.

8. Terminate the fuse and alarm panel end of the cable on the terminal strip at the position marked LOGIC GROUND.

Figure 55: 1U Fuse and Alarm Panel Rear (P/N 870-2804-01)

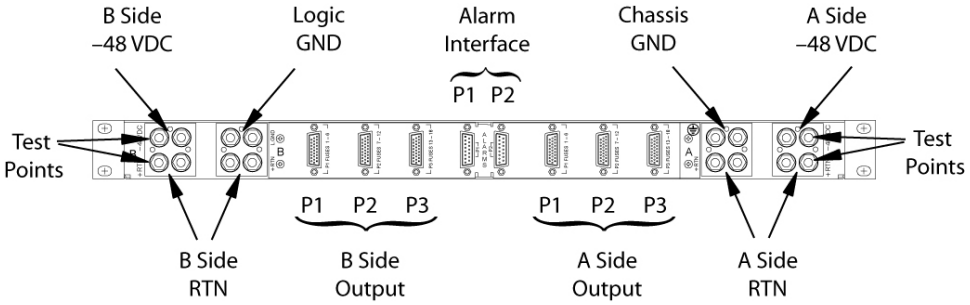
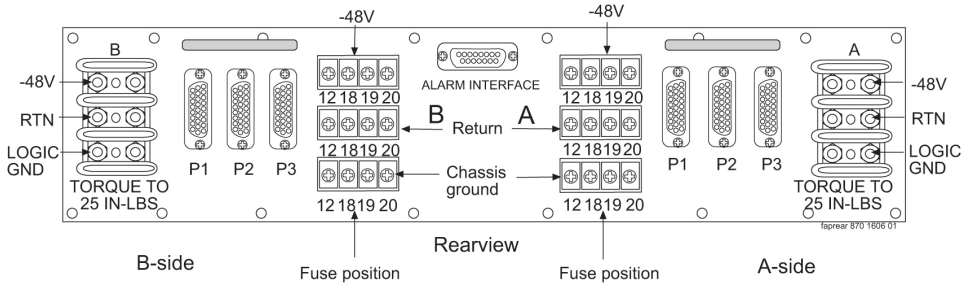


Figure 56: 3U Fuse and Alarm Panel Rear (P/N 870-2320-03))



9. Tighten the nuts on the fuse and alarm panel.

   Tighten the lugs to:

   - 1U FAP, torque to 50 inch-pounds.
   - 3U FAP, torque to 25 inch-pounds.

Logic Ground Cables

The logic ground cables are a part of the internal power distribution. They provide a ground connection between the backplane of each system shelf and the system ground bar in the Control Frame (CF). The logic ground is connected from each shelf to the fuse and alarm panel by the consolidated power cables, cable #6 AWG (P/N 690-0131-R01), terminal lug (P/N 804-0817-R02), and heat-shrink (P/N 804-0228-01).

Note: It is a requirement that when mating dissimilar metals non oxidizing grease is used between them as a corrosion inhibitor.

1. Run green cable, #6 AWG (P/N 690-0131-R01).
2. Butt, strip, and apply non oxidizing grease to conductor.

   The stripped cable must fill lug completely to the end of the barrel of the lug and be visible in the end window of the lug.

3. Place clear heat-shrink on butted end of wire below stripped end.
4. Place lug onto the stripped end of the cable and crimp the lug using embossing dies.

   The stripped cable must fill lug completely to the end of the barrel of the lug and be visible in the end window of the lug.

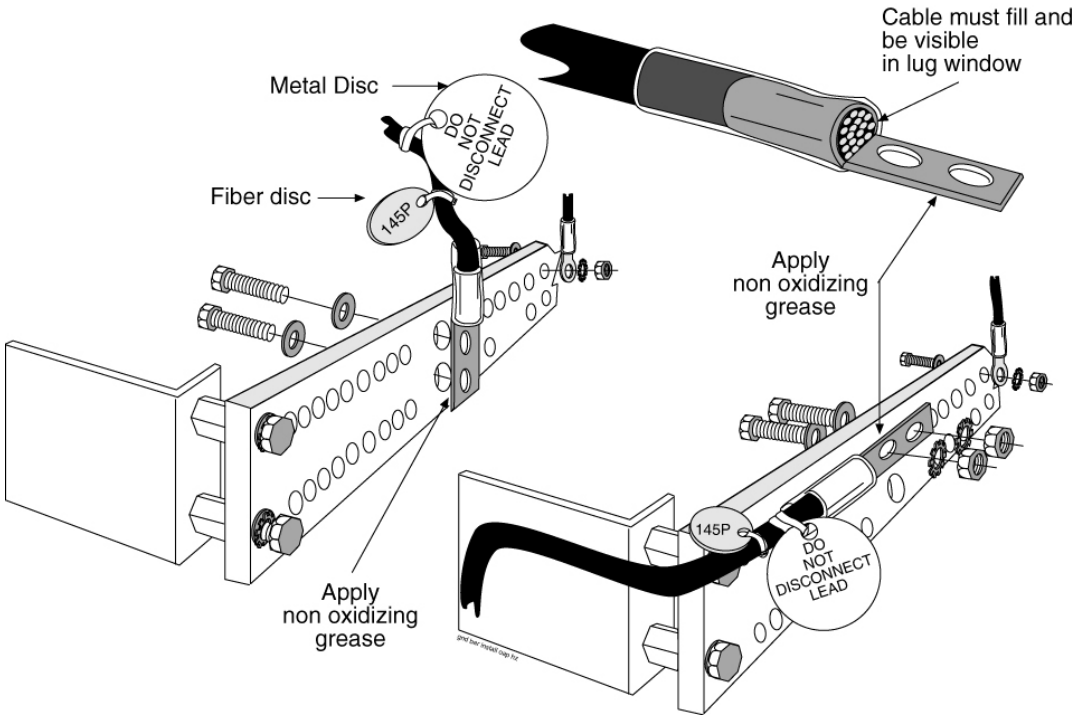
   Note: Terminal lug (P/N 804-0817-R02) must have two holes and with a window. The stripped cable must fill lug completely to the end of the barrel of the lug and be visible in the end window of the lug.

   a) To install the cable on the system ground bar, wipe a small amount of non oxidizing grease at the mounting hole.

      Attach the lug with the 1/4-inch #20 copper-plated hardware provided. Torque to 68 inch-pounds.

   b) Secure the cable to cable rack horn using lacing cord.
   c) Label each cable TO ____ and FROM _____ for later use.

Figure 57: Ground Bar and Logic Ground Installation



5. Cables must be labeled: 145P tags should have “TO” and “FROM” location information.

   Example: TO system ground bar Control Frame, CF00 FROM MGB (Main Ground Bar),.

6. DO NOT “double lug”: The practice of using one bolt through a lug and the ground bar, and through another lug on the other side of the ground bar, held in place by one nut.

   A bolt through any nut must show at least two threads beyond the nut but no more than four threads should be showing.

Figure 58: System Logic Ground Connection

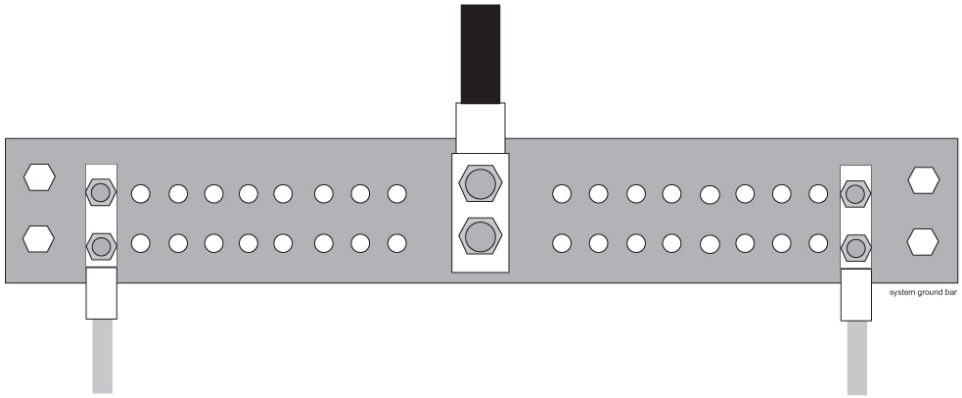
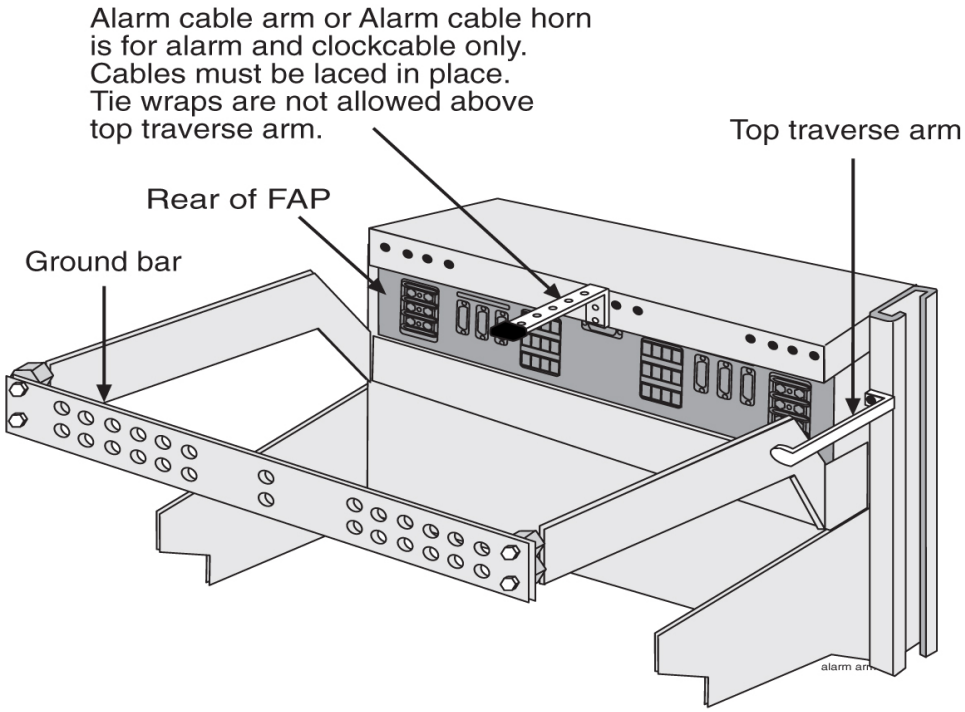


Figure 59: Alarm Cable Arm



Note: The alarm cable arm is for alarm cable which maybe a clock cable.

Fuse Verification

For each fuse location, verify that individual fuse failures affect only the circuits assigned to the specific fuse location.

For those fuse locations that do not yet have circuit cards assigned, use fuses and circuit cards assigned to other locations for the test procedure and then remove them.

Verify each fuse using the following tools:

- The steps in this procedure to perform the verification.

WARNING: Use the antistatic wrist strap connected to the wrist strap grounding point on the frame when performing these procedures.

- *Fuse and Card Locations* to determine fuse and card locations.

  Note: The card location numbers in the table indicate the shelf and the slot for that card. The left two digits indicate the shelf and the right two digits indicate the card slot in that shelf. For example, a location of 1215 indicates a card in shelf 12, slot 15.

- *Figure 36: Fuse and Alarm Panel - Front View (P/N 870-2804-xx)* and *Figure 42: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Front* to physically locate the fuse holders.
- *Fuse and Card Locations* to physically locate a card in a shelf.

Table 17: Fuse Color Codes of Alarm Flags

Fuse Amp	Fuse Flag Color		Fuse Amp	Fuse Flag Color
0.18A	Orange-Red		2A	Orange
0.2A	Black-Red		2.5A	White-Orange
0.25A	Violet		3A	Blue
0.33A	Yellow-Green		3.5A	White-Blue
0.375A	White-Green		4A	White -Brown
0.5A	Red		5A	Green
0.65A	Black		7.5A	Black-White
0.75A	Brown		10A	Red-White
1A	Gray		12A	Yellow-Green
1.33A	White		15A	Red-Blue
1.5A	White-Yellow			

Procedure - Verify Individual Fuse Positions

1. Ensure that all fuses have been removed.
2. Ensure that all circuit cards have been removed.
3. Confirm that the system is receiving power from the –48VDC power source.

(Ensure that voltage is present by checking it with a volt ohm meter.)

4. Install a fuse of the rating specified for that position.
5. Install circuit cards appropriate for the slots powered by that fuse.
6. Check that LEDs of the applicable cards are on.

   Note: For each fuse position, perform Steps 7 through 16.

7. Pull the fuse for the A-side position.
8. Check that the Fuse Alarm LED for the A-side is red.
9. Check that the LEDs of the cards in the specified locations are illuminated after the removal of the fuse.
10. Replace the fuse for the A-side position.
11. Check that the Fuse Alarm LED for the A-side is green.
12. Check that the LEDs of the cards in the specified locations are illuminated.
13. Pull the fuse for the B-side position.
14. Check that the Fuse Alarm LED for the B-side is red.
15. Check that the LEDs of the cards in the specified locations are illuminated after the removal of the fuse.
16. Pull the fuse for the A-side position.
17. Check that the Fuse Alarm LED for the A-side is red.
18. Check that the LEDs of the cards in the specified locations are not illuminated after the removal of the fuse.
19. Replace the fuse for the A-side and B-side position.
20. Check that the Fuse Alarm LED for the A-side and B-side is green.
21. Check that the LEDs of the cards in the specified locations are illuminated after the replacing of the fuses.

This completes individual fuse position testing of the FAP. Return the frame to service.

Verification of Fuse Alarm Function

This procedure verifies that appropriate fuse alarms are generated by the system.

WARNING: Use the antistatic wrist strap connected to the wrist strap grounding point when performing these procedures.

1. Ensure that all fuses have been removed.
2. Use a multi-meter to ensure that each frame has –48VDC power, see *Figure 37: Fuse and Alarm Panel Rear (P/N870-2804-01).* and *Figure 43: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Rear*.
3. Insert a blown fuse, see *Figure 36: Fuse and Alarm Panel - Front View (P/N 870-2804-xx)* and *Figure 42: Fuse and Alarm Panel (P/N 870-1606-xx/870-2320-xx) Front*, into fuse bank A of the Fuse and Alarm Panel (FAP) on the control frame.

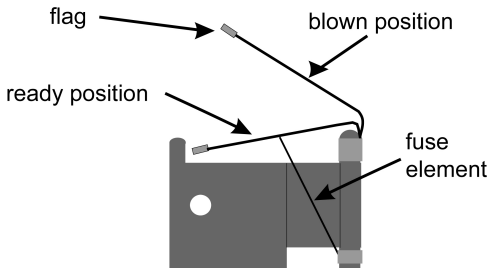
Fuse alarm and major alarm Light Emitting Diodes (LEDs) of that frame should light and an audible alarm should sound.

4. Remove the blown fuse.

   The fuse alarm should immediately go out, the major alarm should go out after a few seconds, and the audible alarm should stop.

5. Repeat *Step 3* and *Step 4* for fuse bank B of the control frame and for fuse banks A and B of each extension frame, and EOAP frame.

Figure 60: Fuse (GMT Brand Name)



FAP Alarm System Test

The following procedure describes system wide fuse alarm testing of the FAP.

1. Issue the command to login to the STP terminal 1.

   `login:uid=eagle`

2. Enter the password.
3. Press the F11 key for KSR mode. The following command response is displayed.

```
Command Accepted - Processing

    tekelecstp 00-05-31 06:55:22 EST Rel XX.X.X-XX.X.X
    LOGIN:UID=EAGLE
    Command entered at terminal #1.
;
    tekelecstp 00-05-31 06:55:23 EST Rel XX.X.X-XX.X.X
    NOTICE: This is a private computer system.
    Unauthorized access or use may lead to prosecution.
    0 LOGIN failures since last successful LOGIN
    Last successful LOGIN was on port 1 on 00-05-31 @ 06:46:46
```

4. Issue the command to change the terminal security features to "ALL = YES" for terminal 2.

   `> chg-secu-trm:all=yes:trm=2`

5. The following command response is displayed.

```
Command Accepted - Processing

    channel 00-05-31 06:10:28 EST Rel XX.X.X-XX.X.X
    CHG-SECU-TRM:ALL=YES:TRM=2
    Command entered at terminal #1.
;
```

```
    channel 00-05-31 06:10:29 EST Rel XX.X.X-XX.X.X
    CHG-SECU-TRM: MASP A - COMPLTD
```

6. Issue the command to set the system monitoring feature for the terminal you are logged into.

```
> chg-trm:all=no:sys=yes:trm=1
```

```
Command Accepted - Processing

    tekelecstp 12-12-23 08:52:15 EST Rel XX.X.X-XX.X.X
    chg-trm:all=no:sys=no:trm=1
    Command entered at terminal #1.
;
    tekelecstp 12-12-23 08:52:16 EST Rel XX.X.X-XX.X.X
    CHG-TRM: MASP A - COMPLTD
```

7. Remove a fuse from the first position of A-side fuse bank on the FAP and insert a blown fuse in its place. This will be done on the A-side then the B-side of the FAP

   The FUSE ALM LED for that side and the Major LED should illuminate RED after the blown fuse has been inserted indicating the presence of a blown fuse.

8. The VT terminal of the STP should report the presence of a blown fuse.

```
Tekelecstp 00-05-31 11:18:42 EST Rel XX.X.X-XX.X.X
**  5050.0082 ** FUSE PANEL 11xx       Alarm in Fuse Panel
```

9. Enter the command to display the system alarms.

```
> rept-stat-trbl
```

10. The following command response is displayed.

    Verify that the alarm condition appears in the rept-stat-trbl screen.

```
Command Accepted - Processing

    tekelecstp 00-05-31 11:15:38 EST Rel XX.X.X-XX.X.X
    rept-stat-trbl
    Command entered at terminal #1.
;
    tekelecstp 00-05-31 11:15:38 EST Rel XX.X.X-XX.X.X
    Searching devices for alarms...
;
    tekelecstp 00-05-31 11:15:38 EST Rel XX.X.X-XX.X.X
    SEQN UAM  AL  DEVICE    ELEMENT     TROUBLE TEXT
    5012.0048  *  TERMINAL     2       Terminal failed
    5014.0048  *  TERMINAL     3       Terminal failed
    5016.0048  *  TERMINAL     4       Terminal failed
    5042.0082  ** FUSE PANEL 11xx      Alarm in Fuse Panel
    5043.0308  *C SYSTEM               Node isolated due to SLK
failures
    Command Completed.
```

11. Re-insert the good fuse and verify that the alarm clears. FAP light should return to its normal state GREEN.

```
tekelecstp 00-05-31 11:18:55 EST Rel XX.X.X-XX.X.X
    5051.0083    FUSE PANEL 11xx       Fuse Panel alarm has
cleared
```

12. Repeat Steps 7 - 11 for FAP sides A and B for each fuse location.

This completes fuse alarm testing of the FAP. Return the frame to service.

Fuse Assignments

Refer to the *Installation Manual*, "Fuse and Card Locations" section for information on the fuse assignments for the Control Frame, CF-00 and five Extension Frames, EF-00 through EF-04.

The power distribution for the control frame and the extension frame are shown in the following figures:

- Control frame, *Figure 61: Control Frame FAP (P/N 870-0243-08 and P/N 870-1606-xx)*
- Extension frame, *Figure 62: Extension Frame FAP (P/N 870-0243-08 and P/N 870-1606-xx)*

Figure 61: Control Frame FAP (P/N 870-0243-08 and P/N 870-1606-xx)

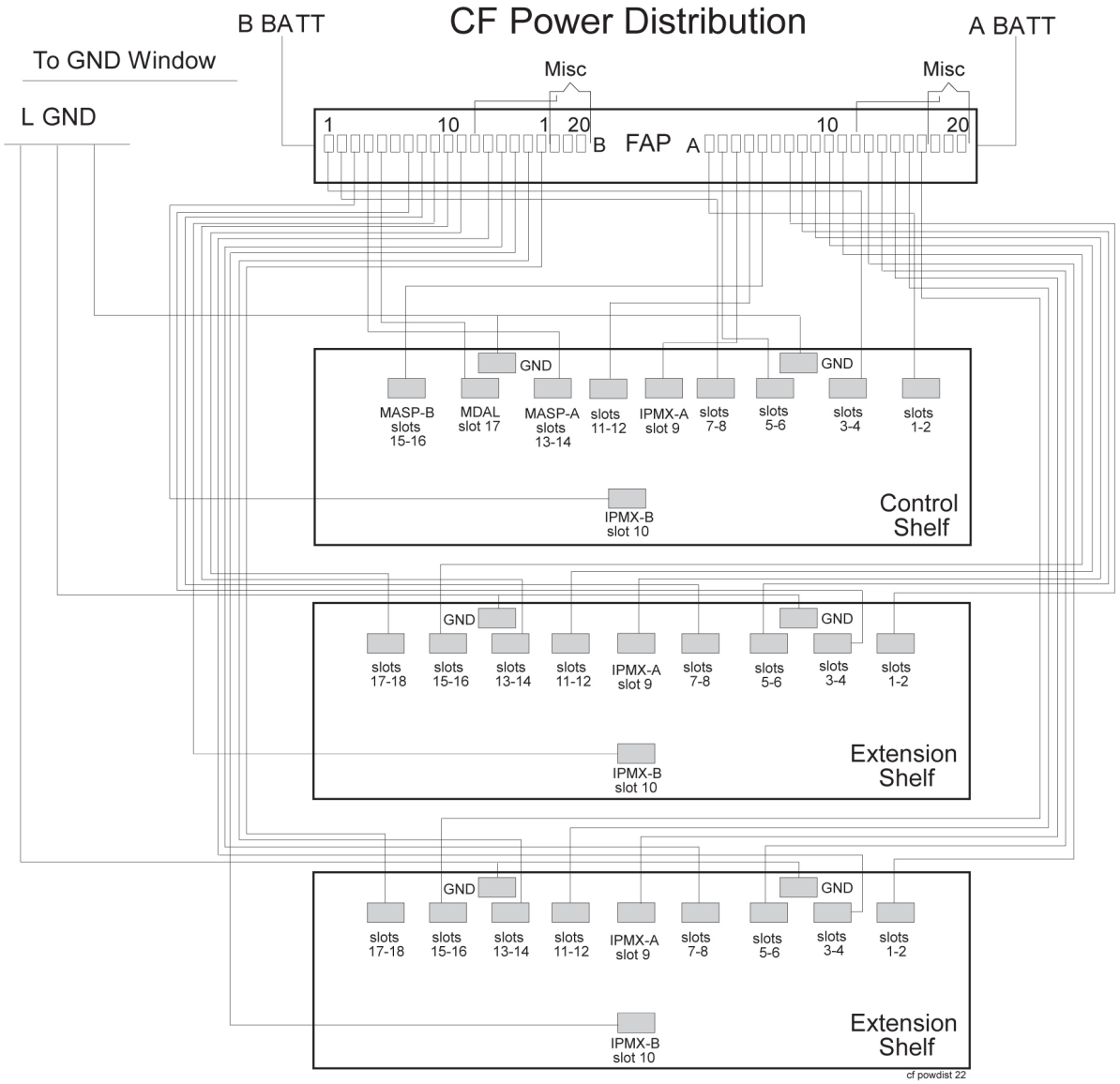
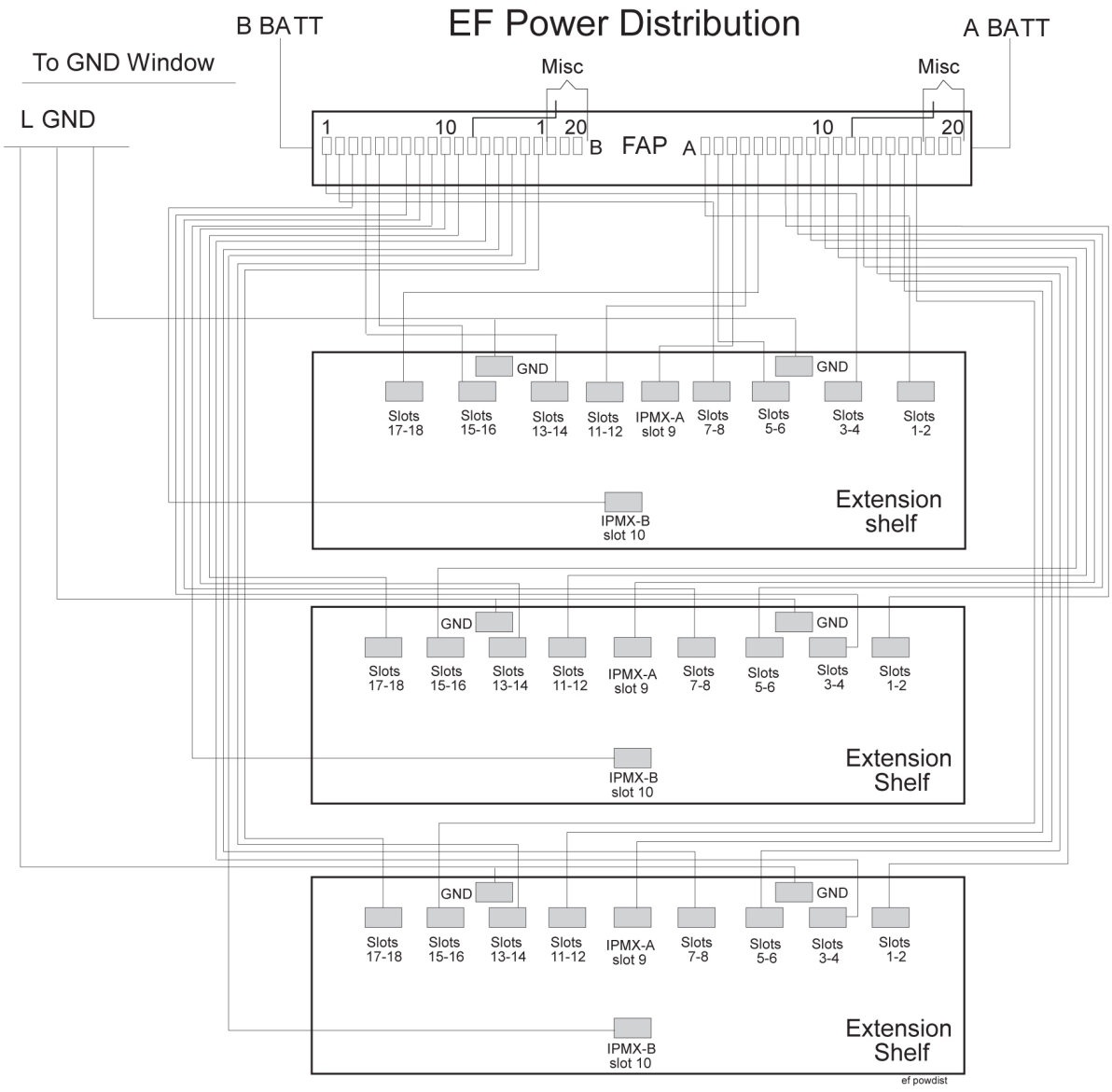


Figure 62: Extension Frame FAP (P/N 870-0243-08 and P/N 870-1606-xx)



Fuse and Card Locations

This section describes fuse assignments for the Control Frame (CF-00) and five Extension Frames (EF-00 through EF-04) are shown.

Table 18: Fuses and Card Locations

Fuse Location/Capacity	Card Location/Type
Control Frame 00 (CF-00) Fuse and Alarm Panel side A (refer to *Figure 63: Control Frame CF-00 Numbering Plan*)	
Fuse 1A/3Amp	1101, 1102/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2A/3Amp	1105, 1106/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3A/Amp	1109/HMUX
Fuse 4A/3Amp	1111, 1112/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5A/3Amp	1115, 1116/MASP - B, TDM, and MCAP
Fuse 6A/dummy fuse	Designated for FAN 3 Amp
Fuse 7A/3Amp	1201, 1202/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 8A/3Amp	1205, 1206/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 9A/1Amp	1209/HMUX
Fuse 10A/3Amp	1211, 1212/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11A/3Amp	1215, 1216/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 12A/dummy fuse	Designated for FAN 3 Amp
Fuse 13A/3Amp	1301, 1302/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14A/3Amp	1305, 1306/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15A/1Amp	1309/HMUX
Fuse 16A/3Amp	1311, 1312/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17A/3Amp	1315, 1316/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II

Fuse Location/Capacity	Card Location/Type
Fuse 18A/dummy fuse	Designated for FAN 3 Amp
Fuse 19A/dummy fuse	OPEN
Fuse 20A/dummy fuse	OPEN
Control Frame 00 (CF-00) Fuse and Alarm Panel side B (refer to *Figure 63: Control Frame CF-00 Numbering Plan*)	
Fuse 1B/3Amp	1103, 1104/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2B/3Amp	1107, 1108/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3B/1Amp	1110/HMUX
Fuse 4B/3Amp	1113, 1114/MASP - A, TDM, and MCAP
Fuse 5B/3Amp	1117, 1118/MDAL
Fuse 6B/dummy fuse	Designated for FAN 3 Amp
Fuse 7B/3Amp	1203, 1204/LIM, MPL, E1-T1, TSM, DCM*, or EDCM
Fuse 8B/3Amp	1207, 1208/LIM, MPL, E1-T1, TSM, DCM*, or EDCM
Fuse 9B/1Amp	1210/HMUX
Fuse 10B/3Amp	1213, 1214/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11B/3Amp	1217, 1218/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II

Fuse Location/Capacity	Card Location/Type
Fuse 12B/dummy fuse	Designated for FAN 3 Amp
Fuse 13B/3Amp	1303, 1304/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14B/3Amp	1307, 1308/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15B/1Amp	1310/HMUX
Fuse 16B/3Amp	1313, 1314/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17B/3Amp	1317, 1318/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 18B/dummy fuse	Designated for FAN 3 Amp
Fuse 19B/dummy fuse	OPEN
Fuse 20B/dummy fuse	OPEN
Extension Frame 00 (EF-00) Fuse and Alarm Panel side A (refer to *Figure 64: Extension Frame EF-00 Numbering Plan*)	
Fuse 1A/3Amp	2101, 2102/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2A/3Amp	2105, 2106/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3A/1Amp	2109/HMUX
Fuse 4A/3Amp	2111, 2112/ LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5A/3Amp	2115, 2116/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II

Fuse Location/Capacity	Card Location/Type
Fuse 6A/dummy fuse	Designated for FAN 3 Amp
Fuse 7A/3Amp	2201, 2202/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 8A/3Amp	2205, 2206/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 9A/1Amp	2209/HMUX
Fuse 10A/3Amp	2211, 2212/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11A/3Amp	2215, 2216/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 12A/dummy fuse	Designated for FAN 3 Amp
Fuse 13A/3Amp	2301, 2302/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14A/3Amp	2305, 2306/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15A/1Amp	2309/HMUX
Fuse 16A/3Amp	2311, 2312/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17A/3Amp	2315, 2316/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 18A/dummy fuse	Designated for FAN 3 Amp
Fuse 19A/dummy fuse	OPEN
Fuse 20A/dummy fuse	OPEN

Fuse Location/Capacity	Card Location/Type
Extension Frame 00 (EF-00) Fuse and Alarm Panel side B (refer to *Figure 64: Extension Frame EF-00 Numbering Plan*)	
Fuse 1B/3Amp	2103, 2104/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2B/3Amp	2107, 2108/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3B/1Amp	2110/HMUX
Fuse 4B/3Amp	2113, 2114/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5B/3Amp	2117, 2118/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 6B/dummy fuse	Designated for FAN 3 Amp
Fuse 7B/3Amp	2203, 2204/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 8B/3Amp	2207, 2208/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 9B/1Amp	2210/HMUX
Fuse 10B/3Amp	2213, 2214/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11B/3Amp	2217, 2218/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 12B/dummy fuse	Designated for FAN 3 Amp
Fuse 13B/3Amp	2303, 2304/ LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14B/3Amp	2307, 2308/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15B/1Amp	2310/HMUX
Fuse 16B/3Amp	2313, 2314/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17B/3Amp	2317, 2318/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II

Fuse Location/Capacity	Card Location/Type
Fuse 18B/(dummy fuse)	Designated for FAN 3 Amp
Fuse 19B/dummy fuse	OPEN
Fuse 20B/dummy fuse	OPEN
Extension Frame 01 (EF-01) Fuse and Alarm Panel side A (refer to *Figure 65: Extension Frame EF-01 Numbering Plan*)	
Fuse 1A/3Amp	3101, 3102/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2A/3Amp	3105, 3106/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3A/1Amp	3109/HMUX
Fuse 4A/3Amp	3111, 3112/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5A/3Amp	3115, 3116/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 6A/dummy fuse	Designated for FAN 3 Amp
Fuse 7A/3Amp	3201, 3202/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 8A/3Amp	3205, 3206/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 9A/1Amp	3209/HMUX
Fuse 10A/3Amp	3211, 3212 /LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11A/3Amp	3215, 3216/LIM, MPL, E1-T1, TSM, DCM*, or EDCM

Fuse Location/Capacity	Card Location/Type
Fuse 12A/dummy fuse	Designated for FAN 3 Amp
Fuse 13A/3Amp	3301, 3302/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14A/3Amp	3305, 3306/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15A/1Amp	3309/HMUX
Fuse 16A/3Amp	3311, 3312/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17A/3Amp	3315, 3316/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 18A/(dummy fuse)	Designated for FAN 3 Amp
Fuse 19A/dummy fuse	OPEN
Fuse 20A/dummy fuse	OPEN
Extension Frame 01 (EF-01) Fuse and Alarm Panel side B (refer to *Figure 65: Extension Frame EF-01 Numbering Plan*)	
Fuse 1B/3Amp	3103, 3104/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2B/3Amp	3107, 3108/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3B/1Amp	3110/HMUX
Fuse 4B/3Amp	3113, 3114/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5B/3Amp	3117, 3118/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II

Fuse Location/Capacity	Card Location/Type
Fuse 6B/dummy fuse	Designated for FAN 3 Amp
Fuse 7B/3Amp	3203, 3204/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 8B/3Amp	3207, 3208/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 9B/1Amp	3210/HMUX
Fuse 10B/3Amp	3213, 3214/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11B/3Amp	3217, 3218/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 12B/(dummy fuse)	Designated for FAN 3 Amp
Fuse 13B/3Amp	3303, 3304/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14B/3Amp	3307, 3308/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15B/1Amp	3310/HMUX
Fuse 16B/3Amp	3313, 3314/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17B/3Amp	3317, 3318/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 18B/dummy fuse	Designated for FAN 3 Amp
Fuse 19B/dummy fuse	OPEN
Fuse 20B/dummy fuse	OPEN

Fuse Location/Capacity	Card Location/Type
Extension Frame 02 (EF-02) Fuse and Alarm Panel side A (refer to *Figure 66: Extension Frame EF-02 Numbering Plan*)	
Fuse 1A/3Amp	4101, 4102/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2A/3Amp	4105, 4106/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3A/1Amp	4109/HMUX
Fuse 4A/3Amp	4111, 4112/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5A/3Amp	4115, 4116/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 6A/dummy fuse	Designated for FAN 3 Amp
Fuse 7A/3Amp	4201, 4202/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 8A/3Amp	4205, 4206/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 9A/1Amp	4209/HMUX
Fuse 10A/3Amp	4211, 4212/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11A/3Amp	4215, 4216/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 12A/dummy fuse	Designated for FAN 3 Amp
Fuse 13A/3Amp	4301, 4302/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14A/3Amp	4305, 4306/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15A/1Amp	4309/HMUX
Fuse 16A/3Amp	4311, 4312/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17A/3Amp	4315, 4316/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II

Fuse Location/Capacity	Card Location/Type
Fuse 18A/dummy fuse	Designated for FAN 3 Amp
Fuse 19A/dummy fuse	OPEN
Fuse 20A/dummy fuse	OPEN
Extension Frame 02 (EF-02) Fuse and Alarm Panel side B (refer to *Figure 66: Extension Frame EF-02 Numbering Plan*)	
Fuse 1B/3Amp	4103, 4104/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2B/3Amp	4107, 4108/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3B/1Amp	4110/HMUX
Fuse 4B/3Amp	4113, 4114/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5B/3Amp	4117, 4118/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 6B/(dummy fuse)	Designated for FAN 3 Amp
Fuse 7B/3Amp	4203, 4204/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 8B/3Amp	4207, 4208/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 9B/1Amp	4210/HMUX
Fuse 10B/3Amp	4213, 4214/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11B/3Amp	4217, 4218/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II

Fuse Location/Capacity	Card Location/Type
Fuse 12B/(dummy fuse)	Designated for FAN 3 Amp
Fuse 13B/3Amp	4303, 4304/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14B/3Amp	4307, 4308/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15B/1Amp	4310/HMUX
Fuse 16B/3Amp	4313, 4314/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17B/3Amp	4317, 4318/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 18B/dummy fuse	Designated for FAN 3 Amp
Fuse 19B/dummy fuse	OPEN
Fuse 20B/dummy fuse	OPEN
Extension Frame 03 (EF-03) Fuse and Alarm Panel side A (refer to *Figure 67: Extension Frame EF-03 Numbering Plan*)	
Fuse 1A/3Amp	5101, 5102/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2A/3Amp	5105, 5106/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3A/1Amp	5109/HMUX
Fuse 4A/3Amp	5111, 5112/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5A/3Amp	5115, 5116/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II

Fuse Location/Capacity	Card Location/Type
Fuse 6A/(dummy fuse)	Designated for FAN 3 Amp
Fuse 7A/3Amp	5201, 5202/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 8A/3Amp	5205, 5206/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 9A/1Amp	5209/HMUX
Fuse 10A/3Amp	5211, 5212/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11A/3Amp	5215, 5216/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 12A/(dummy fuse)	Designated for FAN 3 Amp
Fuse 13A/3Amp	5301, 5302/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14A/3Amp	5305, 5306/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15A/1Amp	5309/HMUX
Fuse 16A/3Amp	5311, 5312/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17A/3Amp	5315, 5316/LIM, MPL, E1-T1, TSM, DCM*, or EDCM
Fuse 18A/(dummy fuse)	Designated for FAN 3 Amp
Fuse 19A/dummy fuse	OPEN
Fuse 20A/dummy fuse	OPEN

Fuse Location/Capacity	Card Location/Type
Extension Frame 03 (EF-03) Fuse and Alarm Panel side B (refer to *Figure 67: Extension Frame EF-03 Numbering Plan*)	
Fuse 1B/3Amp	5103, 5104/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2B/3Amp	5107, 5108/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3B/1Amp	5110/HMUX
Fuse 4B/3Amp	5113, 5114/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5B/3Amp	5117, 5118/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 6B/(dummy fuse)	Designated for FAN 3 Amp
Fuse 7B/3Amp	5203, 5204/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 8B/3Amp	5207, 5208/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 9B/1Amp	5210/HMUX
Fuse 10B/3Amp	5213, 5214/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 11B/3Amp	5217, 5218/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 12B/(dummy fuse)	Designated for FAN 3 Amp
Fuse 13B/3Amp	5303, 5304/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 14B/3Amp	5307, 5308/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 15B/1Amp	5310/HMUX
Fuse 16B/3Amp	5313, 5314/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 17B/3Amp	5317, 5318/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II

Fuse Location/Capacity	Card Location/Type
Fuse 18B/(dummy fuse)	Designated for FAN 3 Amp
Fuse 19B/dummy fuse	OPEN
Fuse 20B/dummy fuse	OPEN
Extension Frame 04 (EF-04) Fuse and Alarm Panel side A (refer to *Figure 68: Extension Frame EF-04 Numbering Plan*)	
Fuse 1A/3Amp	6101, 6102/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2A/3Amp	6105, 6106/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3A/1Amp	6109/HMUX
Fuse 4A/3Amp	6111, 6112/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5A/3Amp	6115, 6116/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 6A/dummy fuse	
Fuse 7A/dummy fuse	
Fuse 8A/dummy fuse	
Fuse 9A/dummy fuse	
Fuse 10A/dummy fuse	

Fuse Location/Capacity	Card Location/Type
Fuse 11A/dummy fuse	
Fuse 12A/dummy fuse	
Fuse 13A/dummy fuse	
Fuse 14A/dummy fuse	
Fuse 15A/dummy fuse	
Fuse 16A/dummy fuse	
Fuse 17A/dummy fuse	
Fuse 18A/dummy fuse	
Fuse 19A/dummy fuse	
Fuse 20A/dummy fuse	
Extension Frame 04 (EF-04) Fuse and Alarm Panel side B (refer to *Figure 68: Extension Frame EF-04 Numbering Plan*)	

Fuse Location/Capacity	Card Location/Type
Fuse 1B/3Amp	6103, 6104/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 2B/3Amp	6107, 6108/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 3B/1Amp	6110/HMUX
Fuse 4B/3Amp	6113, 6114/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 5B/3Amp	6117, 6118/LIMs, E/DCM*, MPL, E1-T1, TSM, or GPSM-II
Fuse 6B/dummy fuse	
Fuse 7B/dummy fuse	
Fuse 8B/dummy fuse	
Fuse 9B/dummy fuse	
Fuse 10B/dummy fuse	
Fuse 11B/dummy fuse	
Fuse 12B/dummy fuse	
Fuse 13B/dummy fuse	
Fuse 14B/dummy fuse	

Fuse Location/Capacity	Card Location/Type
Fuse 15B/dummy fuse	
Fuse 16B/dummy fuse	
Fuse 17B/dummy fuse	
Fuse 18B/dummy fuse	
Fuse 19B/dummy fuse	
Fuse 20B/dummy fuse	
Fuse 2A	
Fuse 3A/dummy fuse	
Fuse 4A/dummy fuse	
Fuse 5A/dummy fuse	
Fuse 6A/dummy fuse	
Fuse 7A/dummy fuse	
Fuse 8A/dummy fuse	

Fuse Location/Capacity	Card Location/Type
Fuse 9A/dummy fuse	
Fuse 10A/dummy fuse	
Fuse 11A/dummy fuse	
Fuse 12A/dummy fuse	
Fuse 13A/dummy fuse	
Fuse 14A/dummy fuse	
Fuse 15A/dummy fuse	
Fuse 16A/dummy fuse	
Fuse 17A/dummy fuse	
Fuse 18A/dummy fuse	
Fuse 19A	(10 A) EOAP-A, A power (FAP P/N 870-2320-03 for heavy duty frame)
Fuse 20A	(10 A) EOAP-B, A power (FAP P/N 870-2320-03 for heavy duty frame)

Fuse Location/Capacity	Card Location/Type
Fuse 3B/dummy fuse	
Fuse 4B/dummy fuse	
Fuse 5B/dummy fuse	
Fuse 6B/dummy fuse	
Fuse 7B/dummy fuse	
Fuse 8B/dummy fuse	
Fuse 9B/dummy fuse	
Fuse 10B/dummy fuse	
Fuse 11B/dummy fuse	
Fuse 12B/dummy fuse	
Fuse 13B/dummy fuse	
Fuse 14B/dummy fuse	

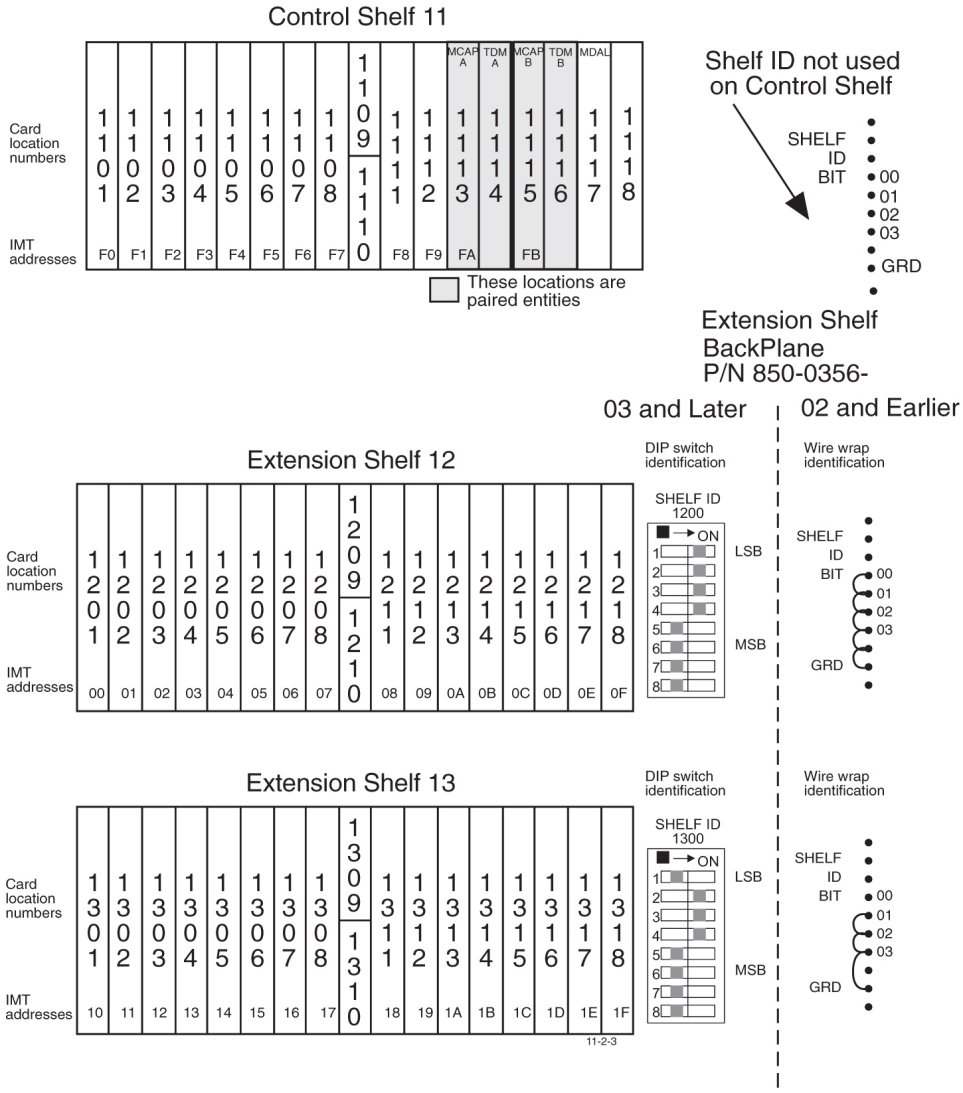
Fuse Location/Capacity	Card Location/Type
Fuse 15B/dummy fuse	
Fuse 16B/dummy fuse	
Fuse 17B/dummy fuse	
Fuse 18B/dummy fuse	
Fuse 19B	(10 A) EOAP-A, B power (FAP P/N 870-2320-03)
Fuse 20B	(10 A) EOAP-B, B power (FAP P/N 870-2320-03)

Card Locations in Control and Extension Shelves

Figure 63: Control Frame CF-00 Numbering Plan through *Figure 68: Extension Frame EF-04 Numbering Plan* show the card locations in Control and Extension shelves.

Figure 63: Control Frame CF-00 Numbering Plan shows the numbering of the shelves, with the shelf identification DIP switch settings and backplane wiring, and card locations on theControl Frame (CF) and Extension Frame (EF).

Figure 63: Control Frame CF-00 Numbering Plan



The Extension Frame (EF) accommodates up to three extension shelves, each shelf capable of supporting up to 16 Link Interface Module (LIMs) or Translation Service Module (TSMs) in any combination.

The system is delivered with customer-specific locations for the Database Communications Module (DCM and EDCM) cards.

Note: For EAGLE 5 ISS only, the insertion of a DCM card requires an odd-numbered slot.

The entire system can have up to five Extension Frames, EF-00 to EF-04. EF-04 supports only one extension shelf.

Figure 64: Extension Frame EF-00 Numbering Plan through *Figure 68: Extension Frame EF-04 Numbering Plan* show the numbering of the card locations on the extension frames. Along with shelf DIP switch settings and ID wire wrap.

Figure 64: Extension Frame EF-00 Numbering Plan

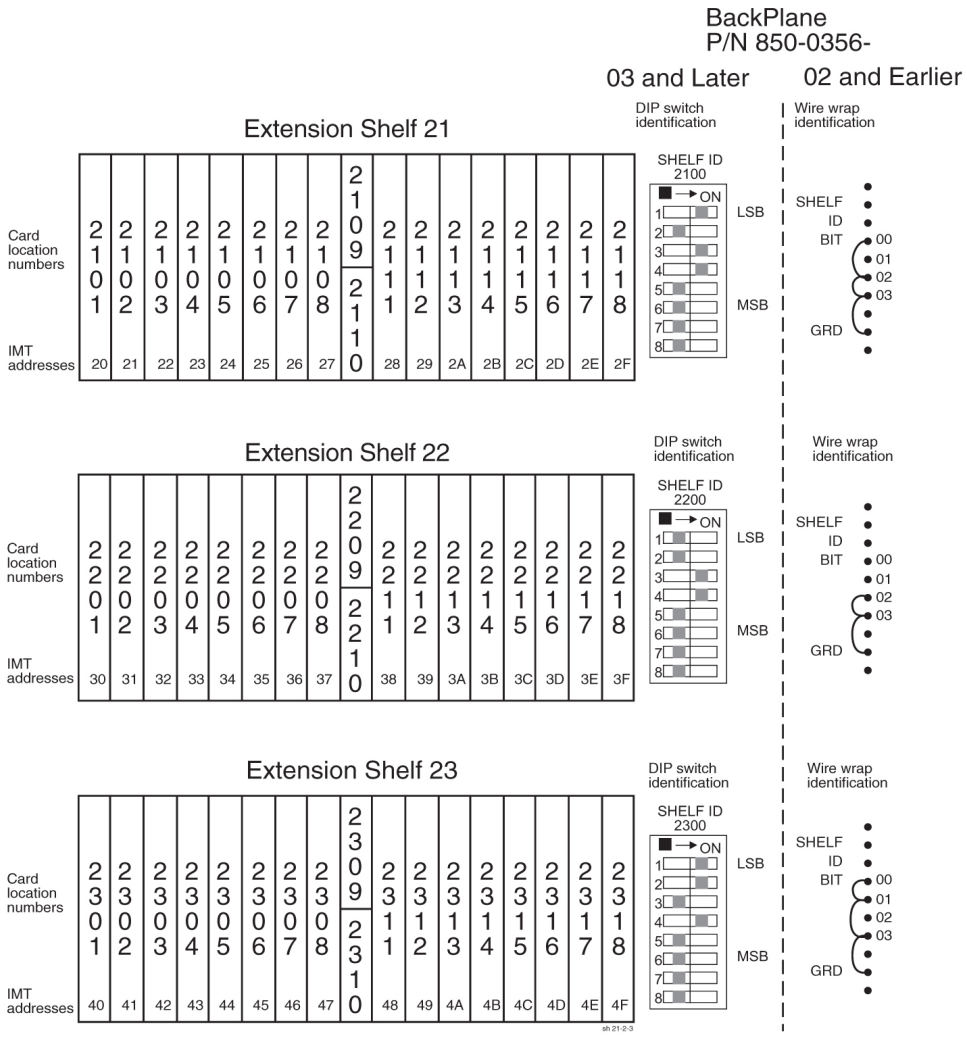


Figure 65: Extension Frame EF-01 Numbering Plan

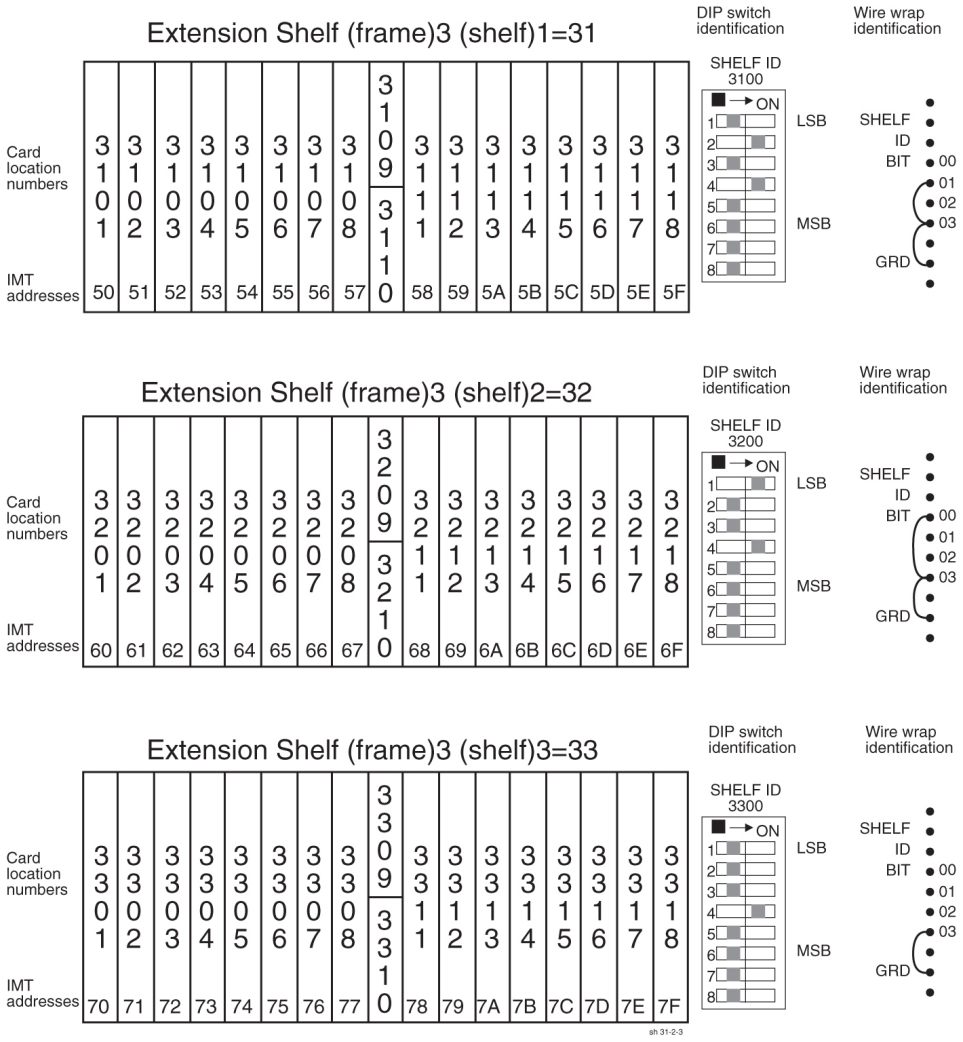


Figure 66: Extension Frame EF-02 Numbering Plan

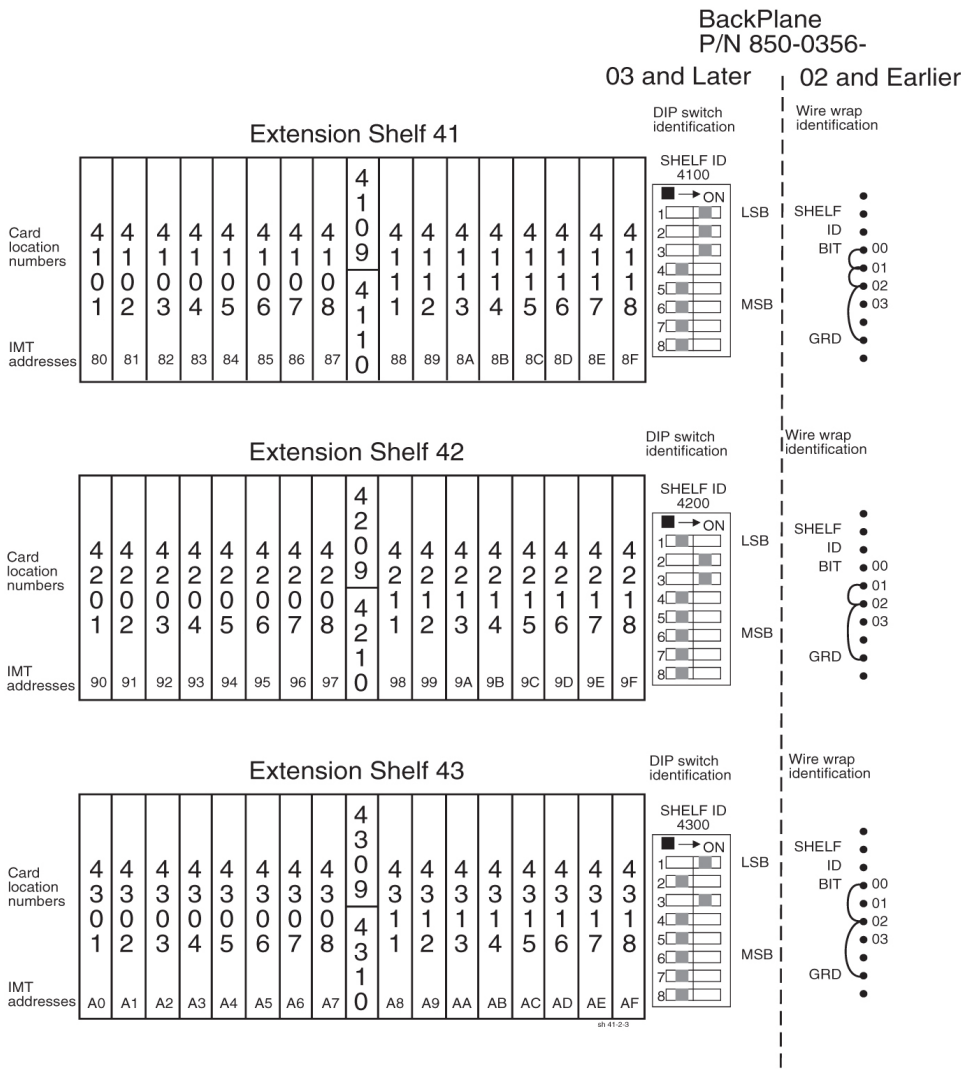


Figure 67: Extension Frame EF-03 Numbering Plan

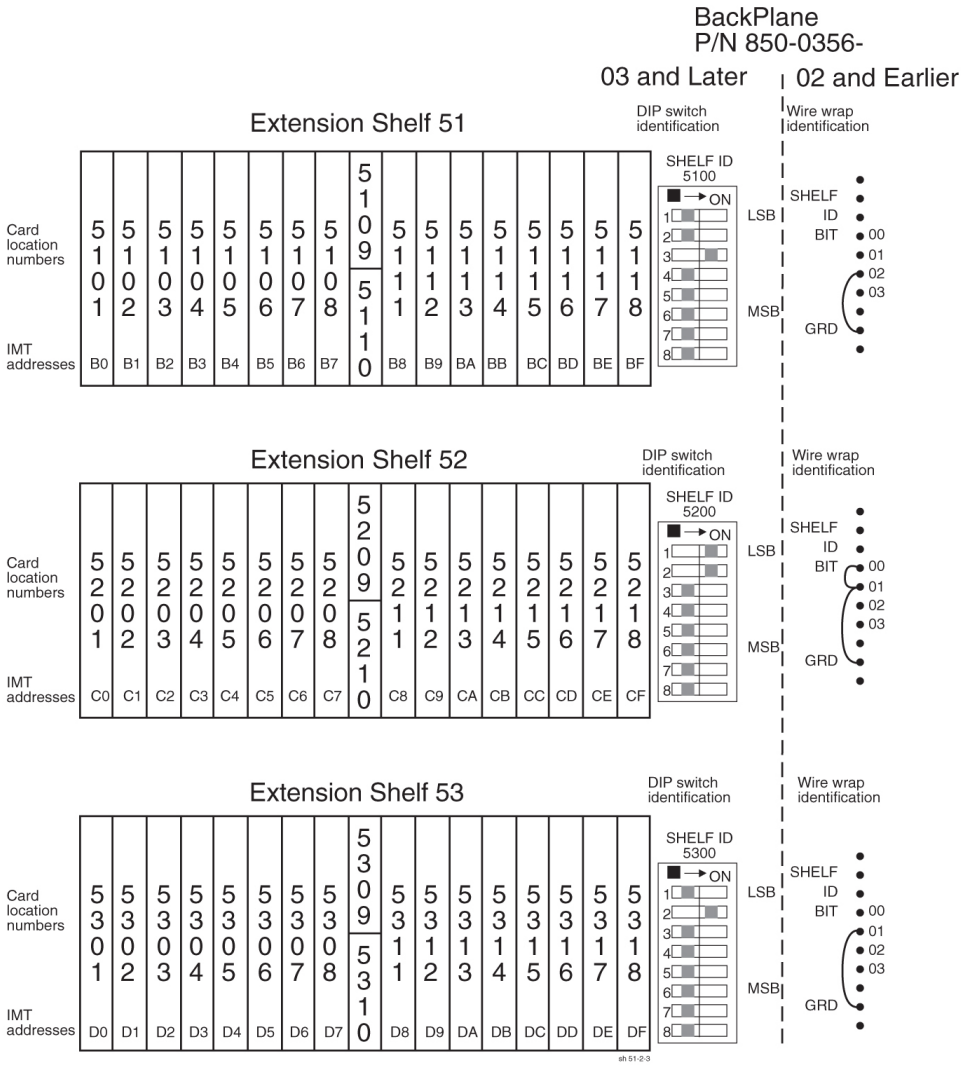
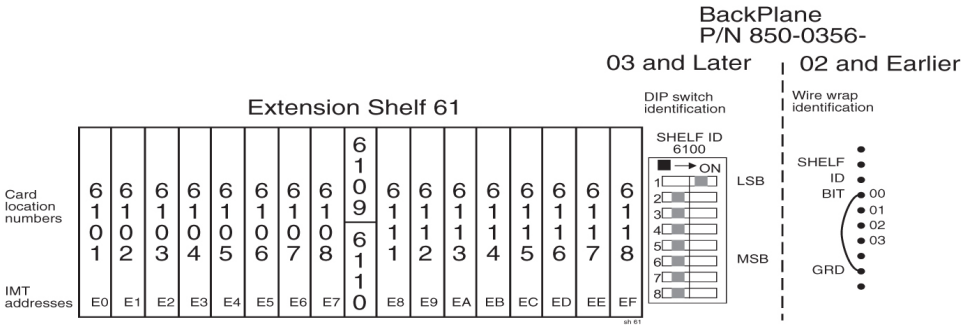


Figure 68: Extension Frame EF-04 Numbering Plan



Chapter 6

Assemblies

Topics:

- *Intra-system Cable Installation.....143*
- *DCM and Fan Option, EDCM, EDCM-A, DSM Cabling.....157*
- *TDM and DSM (MCPM) Upgrade Procedures.....161*
- *Fan Assembly Installation and Cabling.....174*
- *Master Timing.....195*
- *A Clock and B Clock Cable Replacement.....215*
- *Termination of Alarm, Clock Supply, and Terminal Cables.....225*
- *Holdover Clock Installation.....228*
- *E1-T1 Interface.....235*
- *Multi-Port LIM with Taxi Component (MPLT).....246*
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Intra-system Cable Installation

This section covers the installation of cables that run within frames and between frames in a multiple frame installation. The cables covered in this section have been connected at one end in the factory and have connectors and are labeled at the other end for ease of installation. Consult the *Equipment Specification* for this installation and the label at the unconnected end of each cable to determine its connection point.

WARNING: The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the Outside Plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

The cables covered in this section are:

- Interprocessor Message Transport (IMT) cables
- Clock/Alarm cables
- Interface cables

For additional information concerning cables and cable replacement, see *Cables and Adapters*.

Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses
- Tie-wrap tool
- Flush cutters
- Slotted screwdriver, 1/8-inch blade with 8-inch shank preferred
- Phillips screwdrivers #2 and #3
- Wrist strap

Install IMT Cables

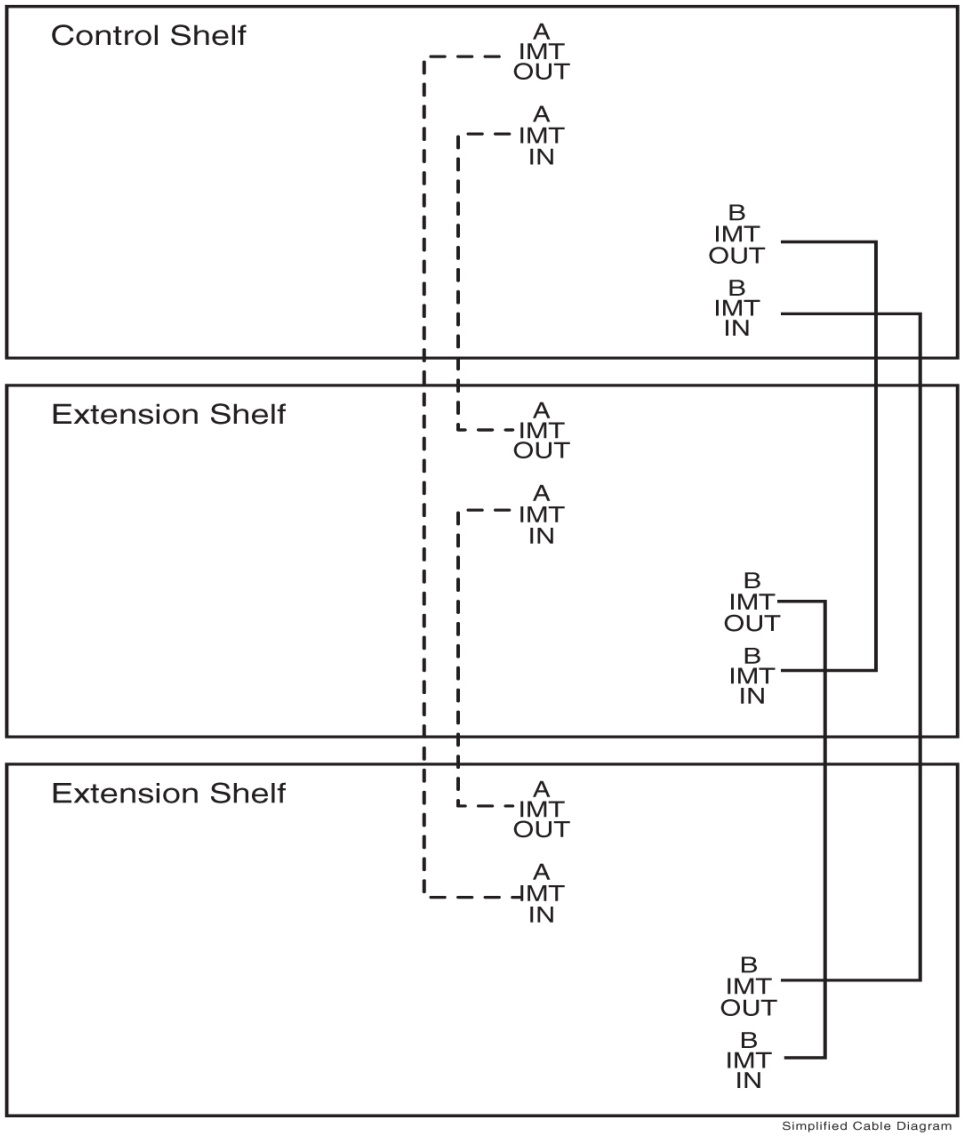
The Interprocessor Message Transport (IMT) cables are specific lengths, based on their application. Termination information is furnished on the cable labels. Refer to *Cables and Adapters* and .*Part Numbers*

DANGER: Always wear a wrist strap or other electrostatic protection when handling printed circuit cards and other electrostatic-sensitive devices.

Procedure — Install IMT Cables

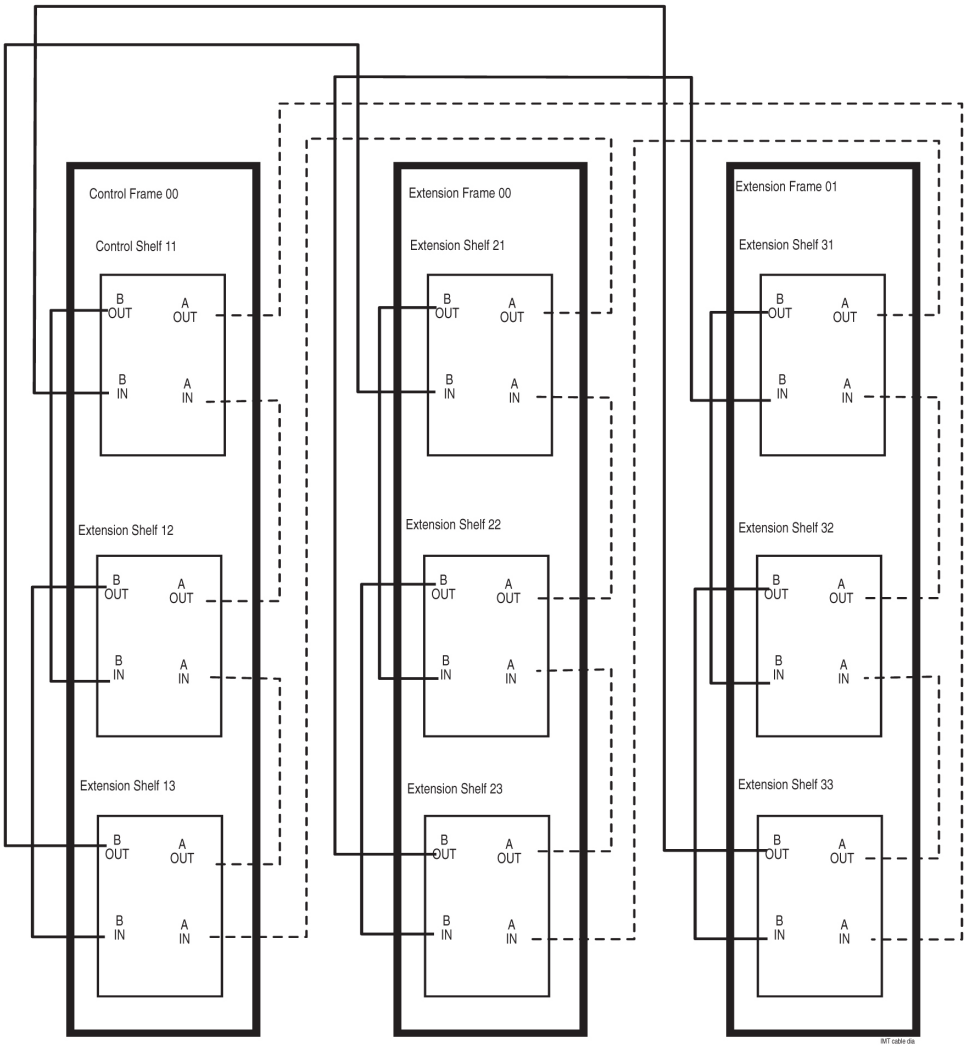
1. Route the cable and connect to the backplane connector specified on the cable label.
   The IMT cables route down the left side of the frames, see *Figure 72: Control Shelf Cabling*.
2. For the IMT cables, tighten the barrel securely on each connector.

Figure 69: Interprocessor Message Transport Cables



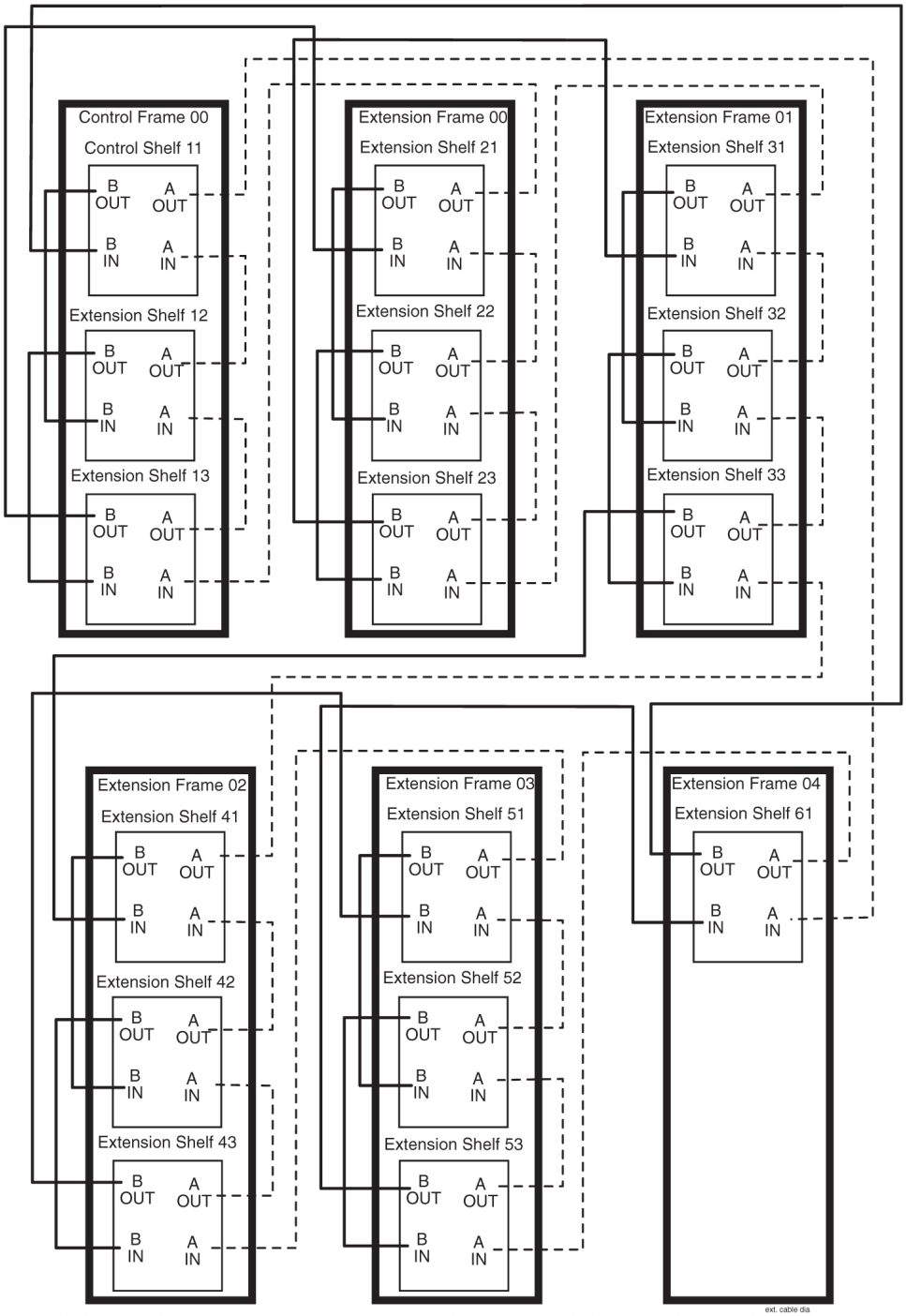
3. Dress each cable and secure with cable ties.
   Ensure that each cable tie strap is cut flush with the cable tie head so that no sharp edges are exposed.

Figure 70: Three-Frame Configuration



Note: This is not a cable routing diagram, this is a high-level diagram.

Figure 71: Six-Frame Configuration



Note: This is not a cable routing diagram, this is a high-level diagram.

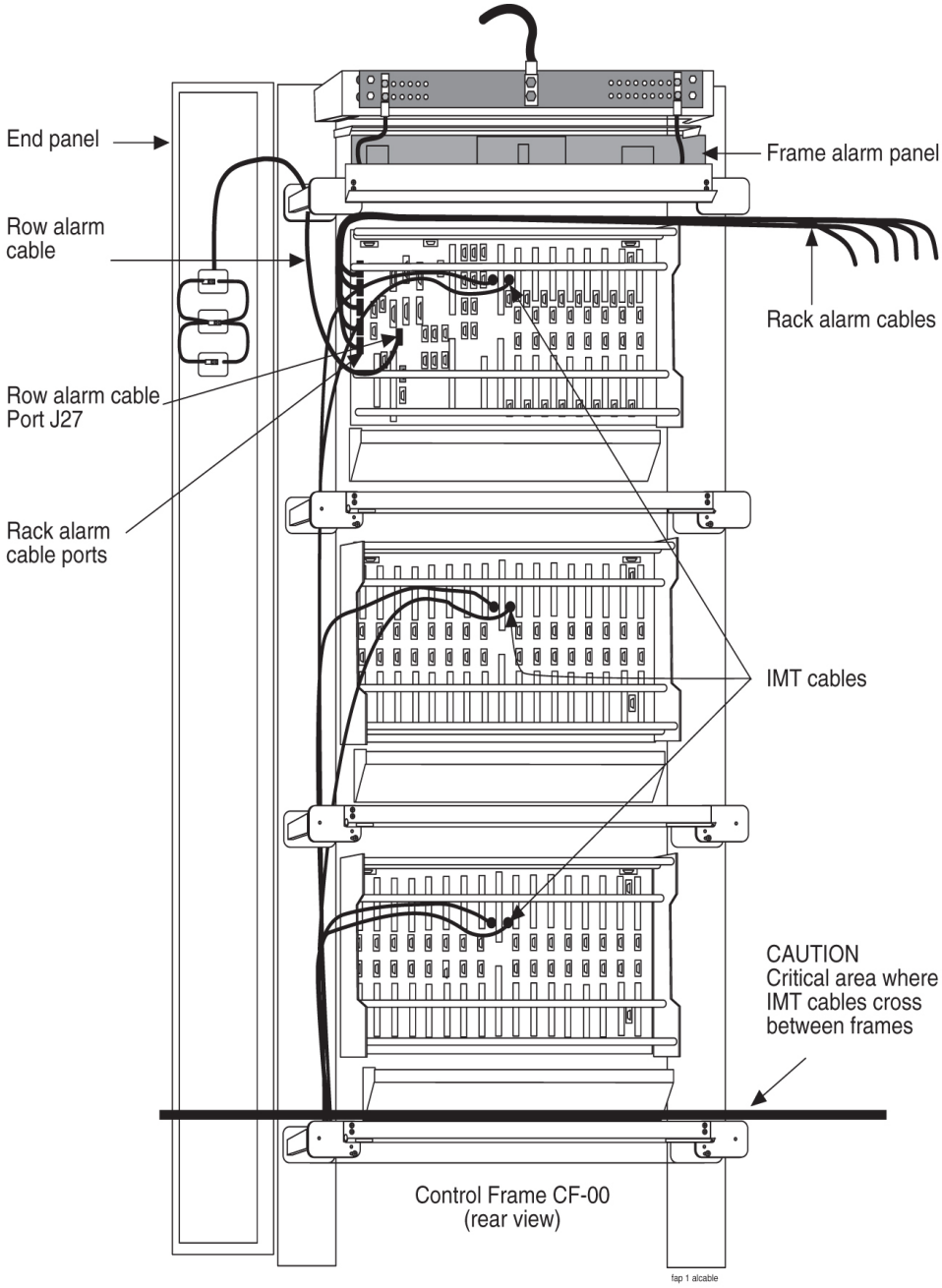
Rack Alarm and Row Alarm Cable Routing

The rack alarm cable leads from ports in the control backplane and connects up to six frames in the row. See *Figure 72: Control Shelf Cabling* and *A Clock and B Clock Cable Replacement*.

The row alarm cable leads from J34 on backplane 850-0330-06 or -07 on the control shelf backplane and terminates in the control frame end panel.

Note: The clocking and fan control signals used to support frame 6 and frame 7 are eliminated in the 850-0330-06 or -07 version and later of the Control Shelf Backplane because those frames are no longer supported in the EAGLE 5 ISS STP system.

Figure 72: Control Shelf Cabling



Interface Cable Installation

The procedure in this section is used to install the interface cables. The interface cables, one per signaling link, contain solid conductor twisted pairs for both directions of transmission in a single shield. They have connectors at one end for connection to the system backplanes.

Note: Run Link Interface Module (LIM) cables on traverse arms, behind IMT and clock cables.

The ends without connectors are normally terminated on a DSX cross-connect panel with wire-wrap terminals.

1. Secure the connector to the designated receptacle on the DSX panel.
2. Plug the connector in and turn one of the connector screws to start the screw into the threaded hole.
3. Start the other screw into the other threaded hole.

   With both screws started alternate tightening the screws until both screws are snug, finger tight. Complete tightening to **FIVE** inch-pounds only, **NO MORE** or the screws will twist off and the connection can be broken.

   Note: Tightening must be done in an alternating pattern.

   Termination information is furnished in the *Cable Running List* in the *Equipment Specification* for the site. See the *Interface Cable Installation Order* for a typical interface cable cross-connect panel connection.

   Note: All cable ends must be labeled "TO" and "FROM" location information from Port to Backplane.

Interface Cable Installation Order

Interface cables should be installed in the following order.

Control Frame CF-00 Backplane

(P/N 850-0330-04) or (P/N 850-0330-06 or -07)

Control shelf 11

1101 A through 1108 A (P/N 850-0330-06 or -07 connectors J45 through J38)

1101 B through 1108 B (P/N 850-0330-06 or -07 connectors J59 through J52)

1111 A through 1112 A (P/N 850-0330-06 or -07 connectors J37 and J36)

1111 B through 1112 B (P/N 850-0330-06 or -07 connectors J51 and J50)

Extension shelf 12

1201 A through 1208 A (connectors J24 through J17)

1201 B through 1208 B (connectors J40 through J33)

1211 A through 1218 A (connectors J16 through J9)

1211 B through 1218 B (connectors J32 through J25)

Extension shelf 13 Backplane (P/N 850-0356-03)

1301 A through 1308 A (connectors J24 through J17)

1301 B through 1308 B (connectors J40 through J33)

1311 A through 1318 A (connectors J16 through J9)

1311 B through 1318 B (connectors J32 through J25)

Extension Frame EF-00

Extension shelf 21

2101 A through 2108 A (connectors J24 through J17)

2101 B through 2108 B (connectors J40 through J33)

2111 A through 2118 A (connectors J16 through J9)

2111 B through 2118 B (connectors J32 through J25)

Extension shelf 22

2201 A through 2208 A (connectors J24 through J17)

2201 B through 2208 B (connectors J40 through J33)

2211 A through 2218 A (connectors J16 through J9)

2211 B through 2218 B (connectors J32 through J25)

Extension shelf 23

2301 A through 2308 A (connectors J24 through J17)

2301 B through 2308 B (connectors J40 through J33)

2311 A through 2318 A (connectors J16 through J9)

2311 B through 2318 B (connectors J32 through J25)

Extension Frame EF-01

Extension shelf 31

3101 A through 3108 A (connectors J24 through J17)

3101 B through 3108 B (connectors J40 through J33)

3111 A through 3118 A (connectors J16 through J9)

3111 B through 3118 B (connectors J32 through J25)

Extension shelf 32

3201 A through 3208 A (connectors J24 through J17)

3201 B through 3208 B (connectors J40 through J33)

3211 A through 3218 A (connectors J16 through J9)

3211 B through 3218 B (connectors J32 through J25)

Extension shelf 33

3301 A through 3308 A (connectors J24 through J17)

3301 B through 3308 B (connectors J40 through J33)

3311 A through 3318 A (connectors J16 through J9)

3311 B through 3318 B (connectors J32 through J25)

Extension Frame EF-02

Extension shelf 41

4101 A through 4108 A (connectors J24 through J17)

4101 B through 4108 B (connectors J40 through J33)

4111 A through 4118 A (connectors J16 through J9)

4111 B through 4118 B (connectors J32 through J25)

Extension shelf 42

4201 A through 4208 A (connectors J24 through J17)

4201 B through 4208 B (connectors J40 through J33)

4211 A through 4218 A (connectors J16 through J9)

4211 B through 4218 B (connectors J32 through J25)

Extension shelf 43

4301 A through 4308 A (connectors J24 through J17)

4301 B through 4308 B (connectors J40 through J33)

4311 A through 4318 A (connectors J16 through J9)

4311 B through 4318 B (connectors J32 through J25)

Extension Frame EF-03

Extension shelf 51

5101 A through 5108 A (connectors J24 through J17)

5101 B through 5108 B (connectors J40 through J33)

5111 A through 5118 A (connectors J16 through J9)

5111 B through 5118 B (connectors J32 through J25)

Extension shelf 52

5201 A through 5208 A (connectors J24 through J17)

5201 B through 5208 B (connectors J40 through J33)

5211 A through 5218 A (connectors J16 through J9)

5211 B through 5218 B (connectors J32 through J25)

Extension shelf 53

5301 A through 5308 A (connectors J24 through J17)

5301 B through 5308 B (connectors J40 through J33)

5311 A through 5318 A (connectors J16 through J9)

5311 B through 5318 B (connectors J32 through J25)

Extension Frame EF-04

Extension shelf 61

6101 A through 6108 A (connectors J24 through J17)

6101 B through 6108 B (connectors J40 through J33)

6111 A through 6118 A (connectors J16 through J9)

6111 B through 6118 B (connectors J32 through J25)

Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses
- Tie-wrap tool
- Diagonal cutters
- Flush cutters
- Slotted screwdriver, 1/8-inch blade with 8-inch shank
- 3/8-inch shrink-wrap
- Heat-shrink gun (hot air blower)
- Torque screwdriver
- Wire-wrap gun
- 22-gauge wire-wrap bit
- 24-gauge wire-wrap bit

Interface Cable Installation

Examine the labels on the ends of the interface cables to determine the system backplane connection location "FROM" information on label and DSX cross-connect panel location "TO" information on label for each cable.

Run the cables on the cable rack to the cross-connect panel on the Miscellaneous Frame in groups of eight. There are four groups per extension shelf and groups per control shelf (a total of 20 per control shelf). The jack numbering on the cross-connect panel determines which side of the frame to run the cable. Viewing the frame from the rear, cables going to jacks #1 through #32 are run on the right side of the frame and cables #33 through #64 are run on the left side of the frame.

Procedure — Install Interface Cable

1. Secure connector to its respective receptacle on the backplanes. See *Interface Cable Installation*.
2. Tie cables to the shelf cable tie bar at the rear of the shelf.
3. Pull slack from each cable towards the cross-connect panel.
4. Dress cable bundles neatly and tie to the cable tie bars at the side of the frame.
5. Lace the bundles to the cable rack.

   Note: All cables must be laced onto the top traverse arms of each frame. Only lacing is used from the top traverse arms and above, on the frame and on the cable rack.

   Note: Where the cable leaves the cable rack, the cable must be protected with fiber paper through out the system.

Procedure — Preparing Cables for Wire-Wrap

1. Remove the insulation from the cable where it is even with the bracket of the associated cross-connect panel as shown in *Figure 73: Interface Cable Cross-Connect Panel Connection*.

   Note: *Do not* remove the inner sheath.

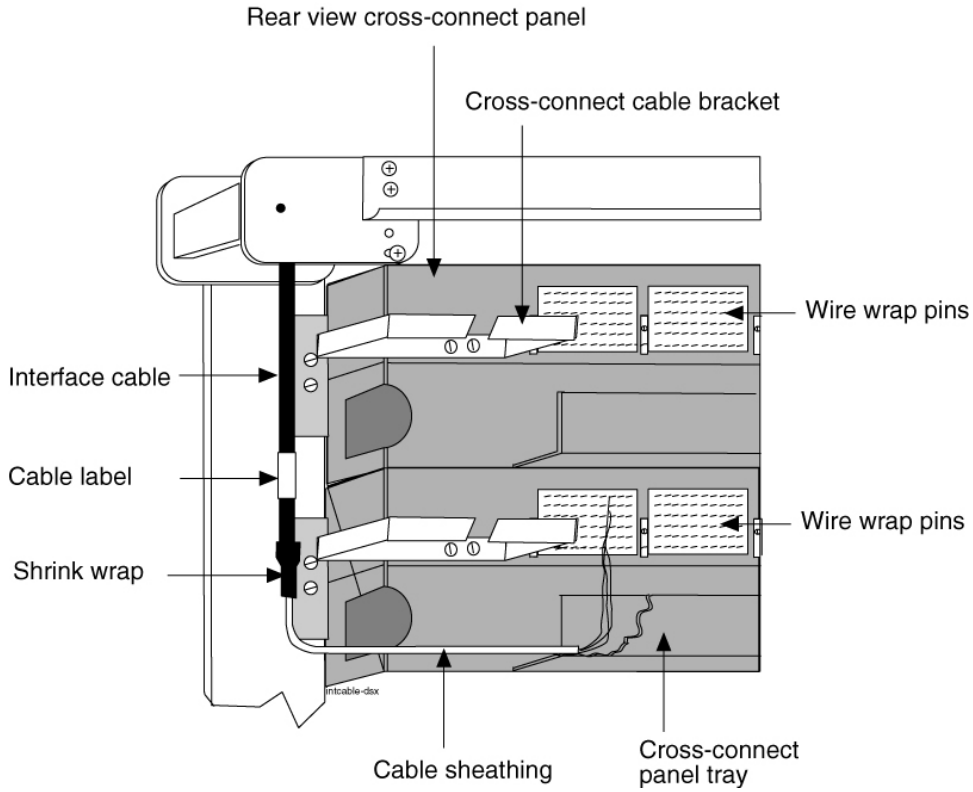
2. Attach the label for the cross-connect end of the cable approximately two inches above the end of the insulation.
3. Apply a 1-1/2-inch length of 1/4-inch shrink-wrap tubing, taking care to center the tubing on the end of the cable insulation.

   Use heat gun to shrink tubing.

   Note: *Do not* overheat the cable.

4. Run the interface cable wires through the cross-connect panel cable tray.
5. Remove the cable sheathing directly below the cross-connect jack.
6. Cut the wires to length, strip and wire-wrap to the cross-connect panel.
7. Cut the cable tie strap flush with the cable tie head.

   Figure 73: Interface Cable Cross-Connect Panel Connection



8. Label DSX panel

LAN Ethernet Cable Installation for ACM

This section contains the procedures for installing the Local Area Network (LAN) Ethernet cable, see *Figure 75: LAN Ethernet Cable Installation* for the location of equipment. The LAN provides selected

data to a remote host system through an Ethernet network. In the system, communications with the host is interfaced through an Application Communication Module (ACM). Communications with the ACM is accomplished through:

- The system backplane interface connector associated with that particular ACM
- A 15-pin to 26-pin adapter
- A single port Ethernet transceiver Media Access Unit (MAU)
- A 10BASE-2 Thin net coax connection or 10BASE-T twisted pair connection to the Ethernet network

Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses
- Diagonal cutters
- Coax crimping tool
- Tie-wrap tool
- Flush cutters
- Slotted screwdriver with 1/8-inch blade with 8-inch shank
- Multimeter

LAN Ethernet Cable Installation

1. Run each 10BASE-2 Thin net coax cable or 10BASE-T twisted pair cable from the Ethernet network onto the cable rack.
2. Run each cable down the respective side of the system, outside the cable tie bars, and around the top or bottom edge of the terminating shelf.

   Note: Use *Table 19: ACM Card and Backplane Interface* to locate the ACM backplane interface connector for each Ethernet connection.

   The ACM location number in *Table 19: ACM Card and Backplane Interface* consists of the shelf (left two digits) and the slot (right two digits) that contain the ACM. For example, an ACM location of 1108 indicates slot 08 of the Control Shelf (shelf 11). For ACMs located in an Extension Shelf, replace "XX" in the ACM location number with the number for that shelf (12, 13, 21, 22, 23, 31, 32, or 33).

Table 19: ACM Card and Backplane Interface

Shelf	ACM Location	Backplane (P/N 850-0330-03/04/06) Connector
Control Shelf	1101	J45
	1102	J44
	1103	J43

Shelf	ACM Location	Backplane (P/N 850-0330-03/04/06) Connector
	1104	J42
	1105	J41
	1106	J40
	1107	J39
	1108	J38
	1111	J37
	1112	J36
		Backplane (P/N 850-0356-03) Connector
Extension Shelves (XX is shelf location)	XX01	J24
	XX02	J23
	XX03	J22
	XX04	J21
	XX05	J20
	XX06	J19
	XX07	J18
	XX08	J17
	XX11	J16
	XX12	J15
	XX13	J14
	XX14	J13

Shelf	ACM Location	Backplane (P/N 850-0330-03/04/06) Connector
	XX15	J12
	XX16	J11
	XX17	J10
	XX18	J9

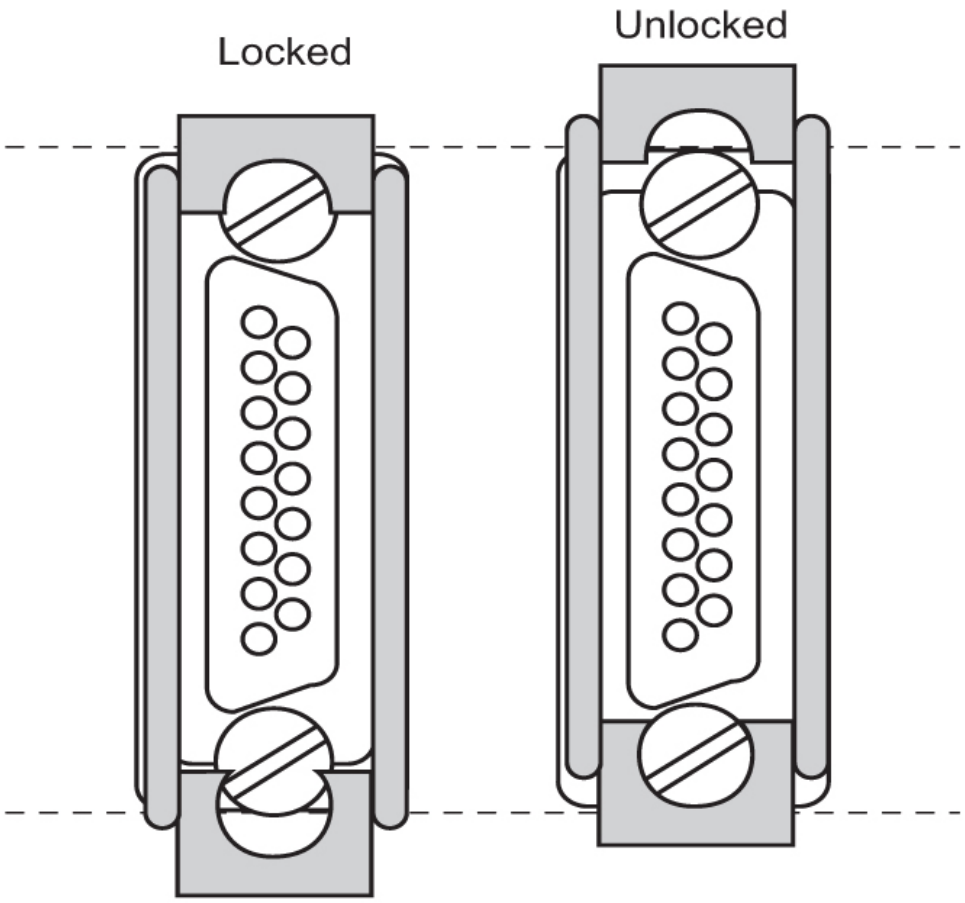
3. Attach a BNC connector to the end of the 10BASE-2 coax cable.

   If necessary, attach an RJ45 type connector to the end of the 10BASE-T twisted pair cable.

4. Secure each cable, see *Figure 75: LAN Ethernet Cable Installation* to its respective connector on the system backplane as follows:
   a) Plug the 26-pin side of the adapter into the backplane interface connector.
   b) Start one of the adapter connector screws, and then alternately tighten the two adapter screws.
   c) Ensure the adapter slide latch is in the unlocked (up) position see to *Figure 74: Adapter Slide Latch*.
   d) Plug the single port MAU into the adapter.
   e) Move the adapter slide latch to the locked (down) position.
   f) For the 10BASE-2 MAU, push the BNC connector on the coax cable onto the MAU and lock the connector in place by twisting the connector clockwise.

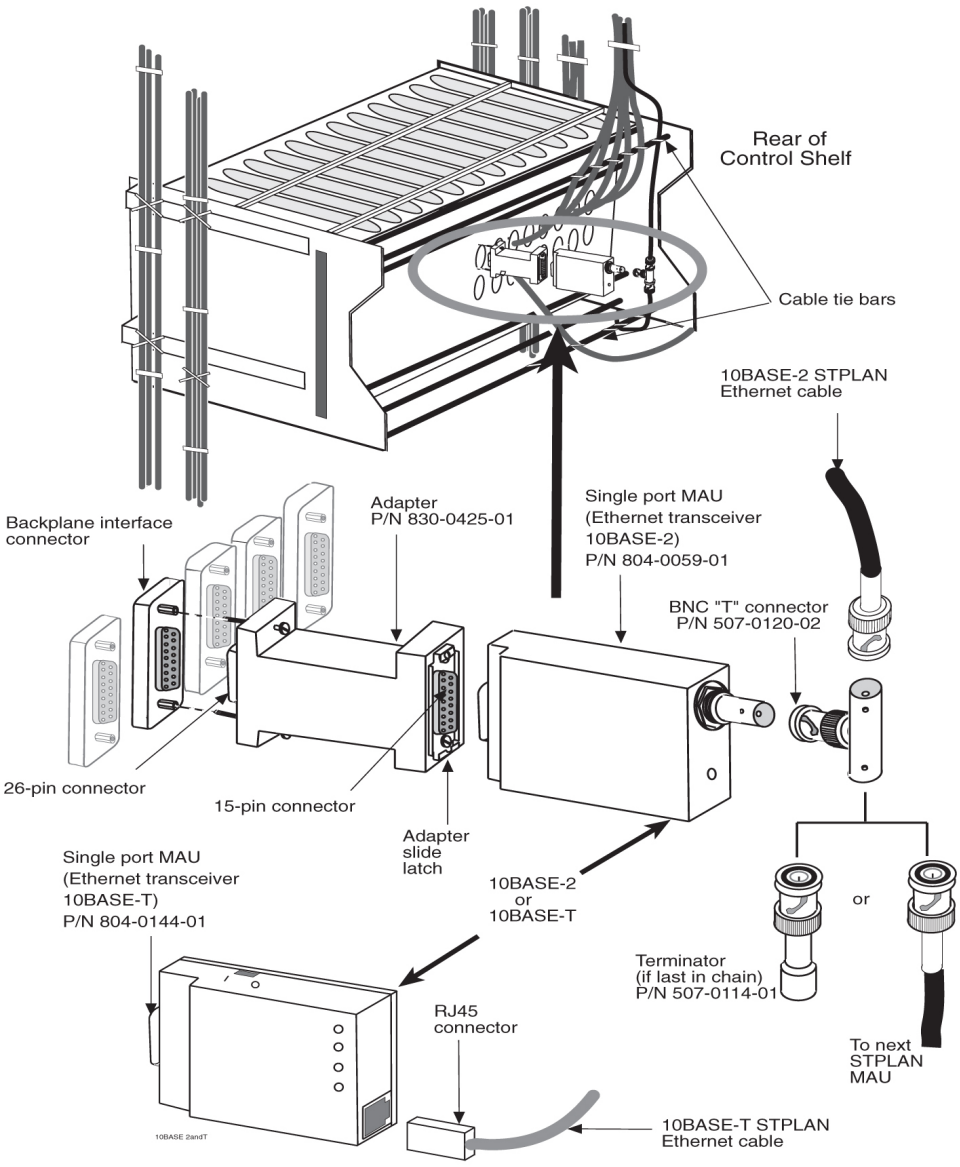
      For a 10BASE-T MAU, push the RJ45 connector into the MAU until it snaps into place.

      Figure 74: Adapter Slide Latch



5. Tie-wrap each cable to the cable tie bar at the rear of the shelf and then to the cable tie bars at the side of the frame.
6. Pull the slack back toward the other end of the cables and lace to the cable rack.
7. Ensure that each tie-wrap strap is cut flush with the tie-wrap heads so that no sharp edges are exposed.

Figure 75: LAN Ethernet Cable Installation



DCM and Fan Option, EDCM, EDCM-A, DSM Cabling

DCM, EDCM-A, and EDCM Modules

The following cabling procedures apply to DCM,EDCM, EDCM-A and DSM cards in the latest EAGLE 5 ISS.

1. When the Database Communications Module (DCM) cards have been configured in the system, run the Ethernet cables straight through.
2. The Ethernet cables have a DB26 connector on the system end, and a RJ45 on the other end of the cable.

One cable is required for each DCM card.

3. On the system end (DB26), if the card is in slots 1,3,5, or 7, the cable is run down the right side of the frame (as seen from the back of the frame).

   If DCM cards are in slots 11,13,15, or 17, the cables is run down the left side of the frame (as seen from the back of the frame).

4. Run the cable off the side of the cable rack on the correct side of the frame.

   Route the cable down the traverse arms to the correct shelf location.

5. Route the cable around the top edge of the shelf and connect it to the A connector, of the odd numbered card slot where the DCM card is located, see *Figure 76: DCM Family Cabling, Enhanced Bulk Download*.

   CAUTION: Always trim tie-wrap flush and turn the trimmed tie-wrap to the rear of the cable bundle when facing the rear of the frame.

6. All cable ends must be labeled “TO” and “FROM” location information on both ends.

Figure 76: DCM Family Cabling, Enhanced Bulk Download

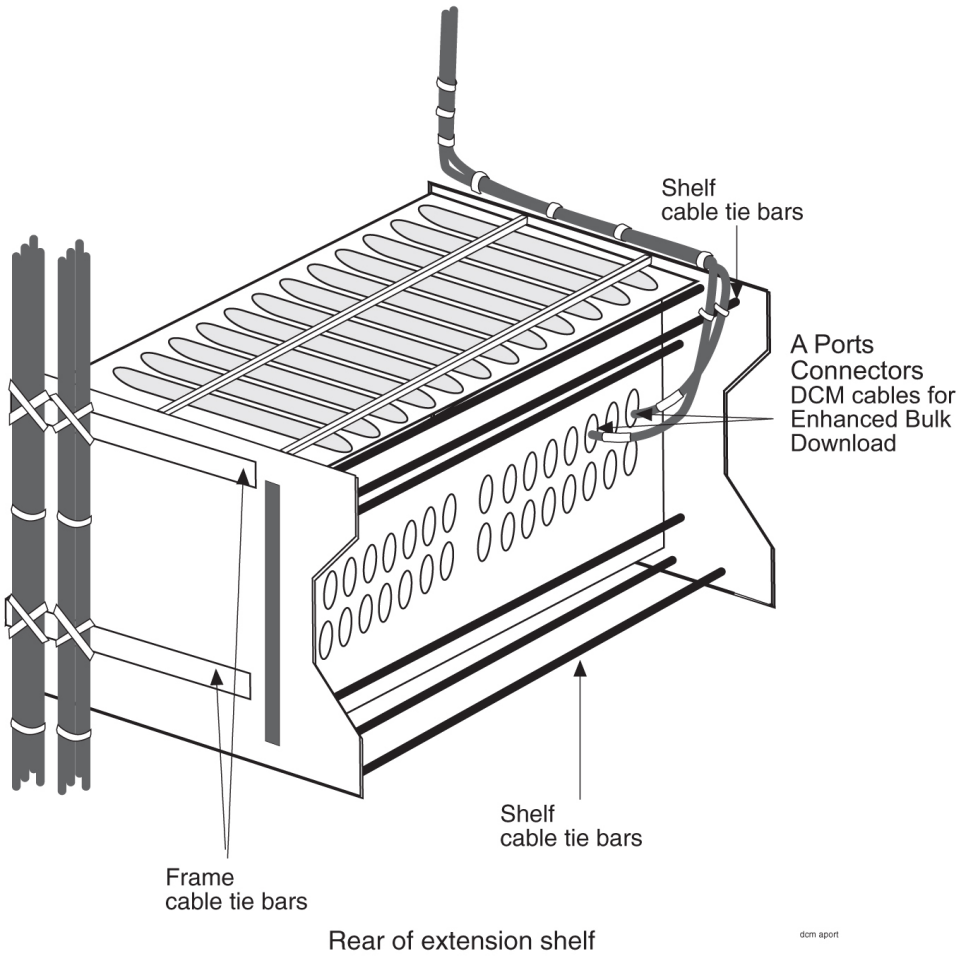


Figure 77: Interface Cable Routing, Control Shelf

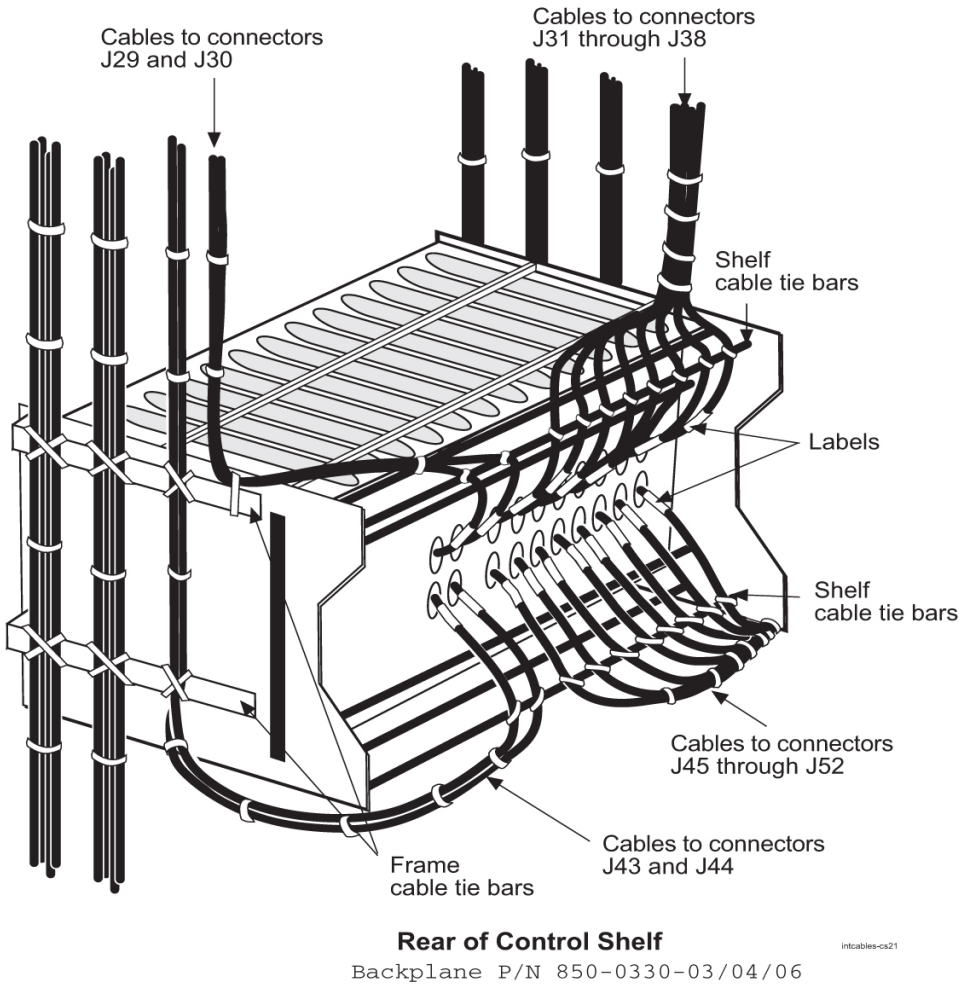
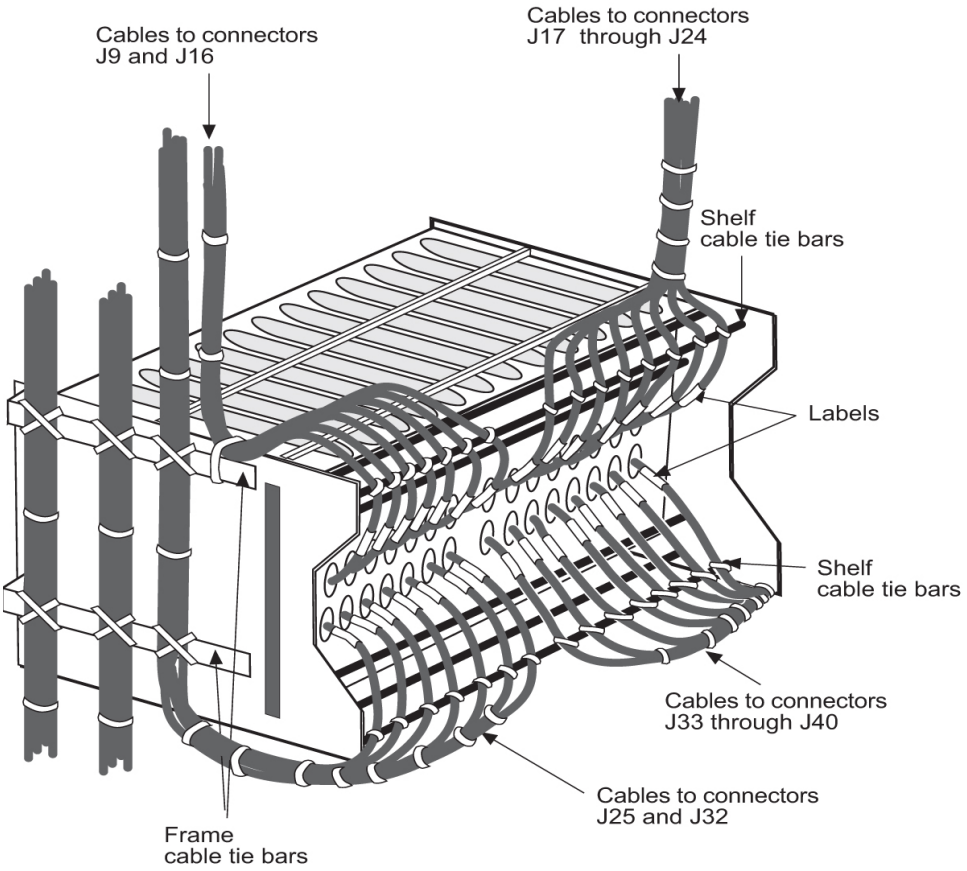


Figure 78: Interface Cable Routing, Extension Shelf



Rear of Extension Shelf
Backplane P/N 850-0356-XX

TDM and DSM (MCPM) Upgrade Procedures

This section describes procedures for upgrading your ASM and TDM cards, and your DSM cards loaded with the MCPM application.

Note:

DSM and EDSM cards loaded with the MCPM application will be referred to as "MCPM cards."

Terminal Disk Module (TDM) Upgrade

This procedure upgrades a Terminal Disk Module (TDM) to a TDM with Global Timing Interface support (TDM-GTI; -15 or later). This procedure should be performed for all TDM cards in the system.

The TDM contains the fixed disk drive, the terminal processor for the 16 serial I/O ports, and an interface to the maintenance disk and alarm (MDAL) card.

1. Before beginning this procedure, make sure there is a copy of the current release GPLs on a removable cartridge on-hand.
2. Insert the removable cartridge with the current release GPLs into the MDAL.

   Create a backup of the database on the removable cartridge (see Backup the Database (Daily) in the *Maintenance Manual* for procedures).
3. Enter the following command to display the card status:

   `rept-stat-card`

   The following is an example of the possible output.

```
RLGHNCXA03W 03-08-18 12:57:21 EST EAGLE 31.6.0
CARD  VERSION       TYPE    APPL      PST       SST       AST
1101  xxx-xxx-xxx   TSM     SCCP      IS-NR     Active    -----
1102  xxx-xxx-xxx   TSM     SCCP      IS-NR     Active    -----
1103  xxx-xxx-xxx   TSM     GLS       XXXXX     Fault     -----
1104  xxx-xxx-xxx   TSM     GLS       XXXXX     Fault     -----
1105  xxx-xxx-xxx   LIMDS0  SS7GX25   IS-NR     Active    -----
1113  xxx-xxx-xxx   GPSM    EOAM      IS-NR     Active    -----
1114  -----------   TDM     --------  IS-NR     Active    -----
1115  xxx-xxx-xxx   GPSM    EOAM      IS-NR     Standby   -----
1116  -----------   TDM     --------  IS-NR     Standby   -----
1117  -----------   MDAL    --------  IS-NR     Active    -----
1205  xxx-xxx-xxx   LIMDS0  CCS7ITU   IS-NR     Active    -----
1206  xxx-xxx-xxx   DCM     SS7IPGW   IS-NR     Active    -----
1207  xxx-xxx-xxx   DCM     IPGWI     IS-NR     Active    -----
1218  xxx-xxx-xxx   TSM     GLS       IS-NR     Active    -----
Command Completed.
```

4. From the output in *Step 3*, determine the MASP activity.

   Record which GPSM is Active and Standby. Record the card locations of both sets of GPSMs and TDMs.

   a) Active GPSM _____
   b) Active TDM _____
   c) Standby GPSM _____
   d) Standby TDM _____

   In the sample output from *Step 3* 1113/1114 are active and 1115/1116 are standby.
5. Check that the database status is OK.

   Enter the following command to verify that the databases in the current (FD CRNT) and the backup (FD BKUP) partitions of the active MASP match:

   `rept-stat-db:display=version`

   The following is an example of the possible output.

```
RLGHNCXA03W 03-08-27 03:46:39 EST  EAGLE 31.4.0
DATABASE STATUS: >> OK <<
        TDM 1114 ( ACTV )                 TDM 1116 ( STDBY)
        C   LEVEL    TIME LAST BACKUP     C   LEVEL    TIME LAST BACKUP
        - -------- ---------------------- - --------   ------------------
FD BKUP Y       43 03-08-14 03:02:18 EST  Y       43   03-08-14 03:02:18
EST
FD CRNT Y       43                        Y       43
       MDAL 1117
       - --------
RD BKUP Y        1     -        -
```

```
CARD/APPL  LOC   C  T  LEVEL       TIME LAST UPDATE   VERSION STATUS
---------  ----  -  -  ----------  -----------------  ------------------
TDM-CRNT   1114  Y  N  43          03-08-27 00:56:30  121-000-000  NORMAL
TDM-BKUP   1114  Y  -  43          03-08-14 01:10:46  121-000-000  NORMAL
TDM-CRNT   1116  Y  N  43          03-08-27 00:56:30  121-000-000  NORMAL
TDM-BKUP   1116  Y  -  43          03-08-14 01:10:46  121-000-000  NORMAL
MDAL       1117  Y  -  43          03-08-27 00:56:30  121-000-000  NORMAL
```

6. Verify card to be replaced is STBY before continuing.

   Enter the following command on the active GPSM-II card to force it to become standby if the TDM to be replaced is not STBY:

   ```
   init-card:loc=x
   ```

   where **x** is the card location (1113 or 1115) from *Step 3*.

7. If *Step 6* was performed, repeat *Step 3*to display card status.

   Note: *Step 8* through *Step 10* are only necessary for OAP equipped EAGLE 5 ISSs.

8. Enter the following command to retrieve the terminal types and terminal numbers:

   ```
   rtrv-trm
   ```

9. Enter the following command to inhibit each OAP terminal displayed in the output from *Step 8*:

   ```
   inh-trm:trm=x
   ```

   where x is the terminal number.

10. Enter the following command for each terminal inhibited in *Step 9* to temporarily change the terminal type from OAP to *none*:

    ```
    chg-trm:trm=x:type=none
    ```

    where x is the terminal number.

11. Enter the following command to verify that the databases in the current (FD CRNT) and the backup (FD BKUP) partitions of the active MASP match:

    ```
    rept-stat-db:display=version
    ```

    The following is an example of the possible output.

```
RLGHNCXA03W 03-08-27 03:46:39 EST  EAGLE 31.6.0
DATABASE STATUS: >> OK <<
        TDM 1114 ( ACTV )                 TDM 1116 ( STDBY)
        C   LEVEL    TIME LAST BACKUP     C   LEVEL    TIME LAST BACKUP
        - -------- ---------------------- - --------   ------------------
FD BKUP Y       43 03-08-14 03:02:18 EST  Y       43   03-08-14 03:02:18
EST
FD CRNT Y       43                        Y       43
       MDAL 1117
       - --------
RD BKUP Y        1     -        -

CARD/APPL  LOC   C  T  LEVEL       TIME LAST UPDATE   VERSION STATUS
---------  ----  -  -  ----------  -----------------  ------------------
TDM-CRNT   1114  Y  N  43          03-08-27 00:56:30  121-000-000  NORMAL
TDM-BKUP   1114  Y  -  43          03-08-14 01:10:46  121-000-000  NORMAL
TDM-CRNT   1116  Y  N  43          03-08-27 00:56:30  121-000-000  NORMAL
```

```
TDM-BKUP   1116  Y  -  43          03-08-14 01:10:46  121-000-000  NORMAL
MDAL       1117  Y  -  43          03-08-27 00:56:30  121-000-000  NORMAL
```

12. Compare the `VERSION STATUS` of the TDM cards in the output of the previous step.

    If they are identical, continue to the next step. If they are not the same, contact the *Customer Care Center*.

13. Enter the following command to show the version numbers of the GPLs stored on each fixed disk (TDM).

    `rtrv-gpl`

    The following is an example of the possible output.

```
RLGHNCXA03W 03-08-27 03:46:48 EST  EAGLE 31.6.0
    GPL Auditing  ON

    APPL      CARD  RELEASE      APPROVED         TRIAL        REMOVE TRIAL
    EOAM      1114  121-002-000  121-002-000      121-002-000  121-002-000
    EOAM      1116  121-002-000  121-002-000      121-002-000  -----------
    SS7ANSI   1114  121-002-000  121-002-000      121-002-000  121-002-000
    SS7ANSI   1116  121-002-000  121-002-000      121-002-000  -----------
    SCCP      1114  121-002-000  074-002-005      121-002-000  121-002-000
    SCCP      1116  121-002-000  121-002-000      121-002-000  -----------
    GLS       1114  121-002-000  121-002-000      121-002-000  121-002-000
    GLS       1116  121-002-000  121-002-000      121-002-000  -----------
    MPLG      1114  121-002-000  121-002-000      121-002-000  151-002-000
    MPLG      1116  121-002-000  121-002-000      121-002-000  -----------
```

14. Examine the output of the previous step.

    If any card shows an alarm (ALM), call the *Customer Care Center*. If no alarms are displayed, continue with ***Step 15***

15. Issue the command to retrieve measurement collection setup:

    `rtrv-meas-sched`

    The following is sample output:

```
tekelecstp YY-MM-DD hh:mm:ss TTTT PPP  XX.x.x-YY.y.y
COLLECT        = on
SYSTOT-STP     = (off)
SYSTOT-TT      = (off)
SYSTOT-STPLAN  = (off)
COMP-LNKSET    = (off)
COMP-LINK      = (off)
MTCD-STP       = (on)
MTCD-LINK      = (on)
MTCD-STPLAN    = (on)
MTCD-LNKSET    = (on)
```

    If measurement collection is off (COLLECT=off), go to ***Step 17*** . If it is on, go to ***Step 16***

16. Enter the following command to turn off measurement collection:

    `chg-meas:collect=off`

    The system returns the output similar to the following:

```
tekelecstp 00-01-07 07:29:18 EST Rel 31.6.0
CHG-MEAS: MASP A - COMPLTD.
```

17. Enter the following command to verify that the security log on the standby MASP contains no entries that must be copied to the FTA area of the fixed disk:

    `rept-stat-seculog`

    The following is an example of the possible output.

```
RLGHNCXA03W 96-10-04 15:59:06 EDT EAGLE 31.6.0
            -- SINCE LAST UPLOAD --  OLDEST   NEWEST   LAST
LOC  ROLE    ENTRIES %FULL OFLO FAIL  RECORD   RECORD   UPLOAD
1114 Active  8312    84    No   No    95-08-12 96-01-04 96-12-16
                                     11:23:56 15:59:06 14:02:22

1116 Standby 693     7     No   No    95-09-12 95-09-30 95-09-30
                                       11:24:12 14:00:06 14:02:13
```

    If the number shown in the ENTRIES field for the standby MASP (shown with the entry *Standby* in the ROLE field) is 0, go to ***Step 22*** . If the number shown in the ENTRIES field for the standby MASP is greater than 0, these entries must be copied to the FTA area of the fixed disk. To copy these entries, go to ***Step 18*** .

18. Copy the security log entries on the standby MASP to the FTA area on the fixed disk.

    For this example, enter the following to copy the security log entries:

    `copy-seculog:slog=stb:dfile=upg.procC`

    The following is an example of the message that should appear.

```
tekelecstp YY-MM-DD hh:mm:ss TTTT PPP  XX.x.x-YY.y.y
Security log on TDM 111X copied to file upg28.procC on TDM 111Y
;
tekelecstp YY-MM-DD hh:mm:ss TTTT PPP  XX.x.x-YY.y.y
0468.0177    SECULOG 111X          Security log exception cleared
;
```

19. Issue the following command to display the FTA directory:

    `disp-fta-dir`

    The following is sample output:

```
tekelecstp YY-MM-DD hh:mm:ss TTTT PPP  XX.x.x-YY.y.y
File Transfer Area Directory of fixed disk 1114
FILENAME                     LENGTH   LAST MODIFIED       LBA
YYMMDDs.log                2560256  99-01-03 10:18:44  388769
YYMMDDa.log               2560256  99-01-03 10:19:20 393770
m60_lnp.csv                     0       99-01-03 13:10:38   398771
3 File(s) 21093376 bytes free;
```

    If there are any files that need to be saved, they need to be removed by means of a file transfer. If this is necessary, contact the *Customer Care Center* for further information.

20. Enter the following command to delete all files in the FTA area:

    `dlt-fta:all=yes`

    The system returns output similar to the following:

```
tekelecstp 00-01-07 07:26:18 EST Rel 31.6.0
dlt-fta:all=yes
Command entered at terminal #2.
```

21. Inhibit the standby GPSM-II card by entering the following command:

```
inh-card:loc=xxxx
```

where *xxxx* is the location of the standby GPSM-II.

22. Replace the Standby TDM.

See *Removing a Card in an Existing EAGLE 5 ISS System* for replacement procedures.

a) Unseat the standby GPSM card determined in *Step 4*.

b) Remove the standby TDM card determined in *Step 4*.

- If you are upgrading the standby or active TDM, place the removed TDM card into an ESD container; do not put it into the spare card storage shelf.
- If you are upgrading the spare TDM, place the previously upgraded TDM into the spare storage shelf.

c) Insert the upgrade standby TDM-15 card.

d) Re-seat the standby GPSM card.

Note: UAMs are generated during this step. An audible alarm is generated. Wait for the standby GPSM/spare TDM to come up to standby mode.

23. Enter the following command to display the status of the standby GPSM:

```
rept-stat-card:loc=xxxx
```

where xxxx is the standby GPSM from the output recorded in *Step 4*. The following is an example of the possible output.

```
RLGHNCXA03W 03-08-18 13:10:21 EST EAGLE 31.6.0
CARD  VERSION       TYPE    APPL      PST       SST       AST
xxxx  xxx-xxx-xxx   GPSM    EAOM      IS-NR     Standby   DB-DIFF
  ALARM STATUS       = No Alarms.
  IMT    VERSION     = 025-015-000
  PROM   VERSION     = 023-002-000
  IMT BUS A          = Conn
  IMT BUS B          = Conn
Command Completed.
```

Note: Verify that backup goes to IS-NR status.

24. Enter the following command to retrieve GPL versions:

```
rtrv-gpl
```

The following is an example of the possible output.

```
RLGHNCXA03W 03-08-27 03:46:48 EST  EAGLE 31.6.0
    GPL Auditing  ON

    APPL      CARD  RELEASE      APPROVED         TRIAL        REMOVE TRIAL
    EOAM      1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
    EOAM      1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
    SS7ANSI   1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
    SS7ANSI   1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
    SCCP      1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
    SCCP      1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
    GLS       1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
    GLS       1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
    MPLG      1114  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  -----------
    MPLG      1116  xxx-xxx-xxx  xxx-xxx-xxx      xxx-xxx-xxx  xxx-xxx-xxx
```

25. Copy the database from the active TDM to the upgraded standby TDM.

    Enter the following *copy-disk* command along with the card location of the standby TDM (shown by the indicator STDBY in the *rept-stat-db* command output in *Step 5*) that the data is being copied to. This command can take from 33 minutes to 1 hour 46 minutes to execute. It can take even longer depending on other system activity in progress when this command is entered.

    ```
    copy-disk:dloc=xxxx:format=no:force=yes
    ```

    Where *xxxx* is the card location of the standby TDM. The following is an example of the message that should appear when the command has executed and completed. For this example, the *copy-disk:dloc=1116* command was entered.

    ```
    Copy-disk (fixed): from active (1114) to standby (1116) started.
    Extended processing required, please wait.


    Copy-disk (fixed): from active (1114) to standby (1116) completed.
    Measurements collection may be turned on now if desired.
    ```

    The standby MASP is rebooted to load the data when the command completes successfully.

    Note: While this command is executing, commands that affect the database configuration cannot be executed. Any attempt to execute such a command will be rejected.

26. Enter the following command to verify that the databases of both MASPs are coherent:

    ```
    rept-stat-db
    ```

    The following is an example of the possible output.

    ```
    RLGHNCXA03W 03-08-27 03:46:39 EST  EAGLE 31.6.0
    DATABASE STATUS: >> OK <<
            TDM 1114 ( ACTV )                  TDM 1116 ( STDBY)
            C   LEVEL    TIME LAST BACKUP     C   LEVEL    TIME LAST BACKUP
            - -------- ---------------------- - --------   -------------------
    FD BKUP Y       43 03-08-14 03:02:18 EST  Y       43   03-08-14 03:02:18
    EST
    FD CRNT Y       43                        Y       43
           MDAL 1117
           - --------
    RD BKUP Y        1     -        -
    ```

27. After the card has been reloaded (a message appears to confirm completion of the load), enter the following command to verify the database is consistent (same level as the other cards in the system).

    ```
    rept-stat-card
    ```

    This step completes the upgrade of the standby TDM.

28. If you want to upgrade a spare TDM, repeat ***Step 13*** through ***Step 27*** using the same card slot that was used to upgrade the standby card. Once the upgraded standby TDM is replaced by the spare TDM, the removed upgraded standby card can become the upgraded spare TDM, and the inserted spare will become the upgraded standby card. If you do not want to upgrade a spare TDM, go to ***Step 29***

29. To upgrade the active TDM, first allow the standby GPSM-II by entering the following command:

    ```
    alw-card:loc=xxxx
    ```

    where *xxxx* is the standby GPSM-II card location as determined in ***Step 3*** .

30. Enter the following command on the active GPSM-II card to force it to become standby:

```
init-card:loc=xxxx
```

where xxxx is the active card location (1113 or 1115) from *Step 3* . Ater the active card is changed to standby, the previously standby GPSM-II and TDM cards will become active. Repeat *Step 2* through *Step 27* to upgrade the active TDM.

31. If all TDMS have been upgraded, turn on measurment collection by entering the following command:

```
chg-meas:collect=on
```

The system returns output similar to the following:

```
tekelecstp 00-01-07 15:25:36 EST Rel 31.6.0
CHG-MEAS: MASP A - COMPLTD.
```

Note: *Step 32* and *Step 33* are only necessary for OAP equipped EAGLE 5 ISSs.

32. Enter the following command to restore the OAP terminals changed in *Step 10* :

```
chg-trm:trm=x:type=oap
```

where x is the terminal number.

33. Enter the following command to return the OAP terminals inhibited in *Step 9* to the in-service state:

```
alw-trm:trm=x
```

where x is the terminal number.

Measurement Collection and Polling Module (MCPM)

This procedure upgrades DSM cards loaded with the MCPM application (870-2371-03) to EDSM cards with 32 MB FSRAM and 2 GB RAM loaded with the MCPM application (870-2372-03).

Note: DSM and EDSM cards loaded with the MCPM application will be referred to as "MCPM cards."

The Primary MCPM card performs all measurements collection and reporting functions and provides on-card RAM storage for collected data and scheduled reports. The Secondary MCPM provides a redundant backup for the Primary module, and assumes collection and reporting responsibilities on the loss of the Primary. TCP/IP connections are used to deliver measurement reports from the Primary MCPM card to the customer via an FTP client. The FTP configuration can be customized to support automatic transfer of scheduled reports from the client to the server.

1. Enter the following command to determine the status and number of the MCPM cards.

```
rept-stat-meas
```

The following is an example of the possible output.

```
                                  PST      SST      AST
MEAS SS                           OOS-MT   Fault    -----
    ALARM STATUS =          ** 0516  MEAS degraded with card out of service
CARD        VERSION         TYPE     PST      SST      AST
1107        P 101-9-000     MCPM     IS-NR    Active   -----
    IP LInk A                        IS-NR    Active   Available
1109        101-9-000       MCPM     OOS-MT   Fault    -----
    IP Link A                        OOS-MT   Fault    Unavailable
CARD 1107 ALARM STATUS = No Alarms
CARD 1109 ALARM STATUS = Card is isolated from the system
Command Completed.
```

```
;
```

2. Verify the location of the primary and secondary MCPM.

   The primary is noted by the P beside the location in the output of rept-stat-meas. Upgrade the secondary MCPM first.

3. Enter the following command to remove the secondary MCPM card from service.

   Do not use the force command unless this is the only MCPM card in service; MCPM collection and reporting service should be maintained at all times.

   Note: Removing the last MCPM or only MCPM from service will cause loss of measurements data.

   If there is more than one MCPM card in service, enter:

   `inh-card:loc=xxxx`

   where xxxx is the secondary MCPM card location.

   If there is only one MCPM card in service, enter:

   `inh-card:loc=xxx:force=yes`

   where xxxx is the secondary MCPM card location.

4. Remove the MCPM card.

   See *Removing a Card in an Existing EAGLE 5 ISS System* for removal procedures. Place the removed MCPM card into an ESD container; do not put it into the spare card storage shelf. Place the new MCPM (EDSM) card into its place. Be sure the revision numbers of the card is compatible with the EAGLE 5 ISS software release. If they are not, go to ***Step 5*** to flash the card to the software release level of the EAGLE 5 ISS system. If your card is compatible with the EAGLE 5 ISS software relelease level, go to ***Step 7*** . If in doubt about the compatibility of your new hardware, call the *Customer Care Center*.

5. Enter the following command to flash the card:

   `init-flash:loc=xxxx:code=appr`

   Where xxxx is the location of the card.

   The following is sample output.

```
rlghncxa03w 01-03-02 13:05:05 EST Rel 28.1.0
FLASH Memory Downloading for card 1105 Started.
rlghncxa03w 01-03-02 13:05:05 EST Rel 28.1.0
BPDCM Downloading for card 1105 Complete.
rlghncxa03w 01-03-02 13:05:05 EST Rel 28.1.0
Command Completed.
;
```

6. Enter the following command to activate the FLASH GPL on the card:

   `act-flash:loc=xxxx`

   Where xxxx is the location of the card.

   The following is sample output:

```
rlghncxa03w 04-02-04 13:05:05 EST EAGLE 31.3.0
FLASH Memory Activation for card 1105 Started.
;
rlghncxa03w 04-02-04 13:05:05 EST EAGLE 31.3.0
FLASH Memory Activation for card 1105 Completed.
```

```
;
rlghncxa03w 04-02-04 13:05:05 EST EAGLE 31.3.0
Command Completed.
;
```

7. Enter the following command to return the upgraded MCPM card into service.

   This causes the MASP to begin downloading tables to the new MCPM card.

   `alw-card:loc=xxxx`

   Where *xxxx* is the MCPM card location.

   When the card has been successfully loaded (there will be a response on the terminal that downloading is complete).

   This can take up to 10 minutes.

8. Enter the following command to verify the card is operational (IS-NR).

   `rept-stat-meas`If the secondary MCPM card is operational, go to ***Step 9*** . If it is not, call the *Customer Care Center*.

9. If you want to upgrade a spare MCPM, go to ***Step 10*** .

   Otherwise, got to ***Step 16*** .

10. Remove the spare MCPM card from the spare card storage shelf and place it into an ESD container.

    Next, enter the following command to remove the previously upgraded secondary MCPM card from service. This card will become the spare. Do not use the force command unless this is the only MCPM card in service; MCPM collection and reporting service should be maintained at all times.

    Note: Removing the last MCPM or only MCPM from service will cause loss of measurements data.

    If there is more than one MCPM card in service, enter:

    `inh-card:loc=xxxx`

    where xxxx is the secondary MCPM card location.

    If there is only one MCPM card in service, enter:

    `inh-card:loc=xxx:force=yes`

    where xxxx is the secondary MCPM card location.

11. Remove the MCPM card.

    See *Removing a Card in an Existing EAGLE 5 ISS System* for removal procedures. Place the removed MCPM card into the spare card storage shelf. Place the new MCPM (EDSM) card into its place. Be sure the revision numbers of the card is compatible with the EAGLE 5 ISS software release. If they are not, go to ***Step 12*** to flash the card to the software release level of the EAGLE 5 ISS system. If your card is compatible with the EAGLE 5 ISS software relelease level, go to ***Step 14*** . If in doubt about the compatibility of your new hardware, call the *Customer Care Center*.

12. Enter the following command to flash the card:

    `init-flash:loc=xxxx:code=appr`

    Where xxxx is the location of the card.

    The following is sample output.

```
rlghncxa03w 01-03-02 13:05:05 EST Rel 28.1.0
FLASH Memory Downloading for card 1105 Started.
rlghncxa03w 01-03-02 13:05:05 EST Rel 28.1.0
BPDCM Downloading for card 1105 Complete.
rlghncxa03w 01-03-02 13:05:05 EST Rel 28.1.0
```

```
Command Completed.
;
```

13. Enter the following command to activate the FLASH GPL on the card:

    `act-flash:loc=xxxx`

    Where xxxx is the location of the card.

    The following is sample output:

```
rlghncxa03w 04-02-04 13:05:05 EST EAGLE 31.3.0
FLASH Memory Activation for card 1105 Started.
;
rlghncxa03w 04-02-04 13:05:05 EST EAGLE 31.3.0
FLASH Memory Activation for card 1105 Completed.
;
rlghncxa03w 04-02-04 13:05:05 EST EAGLE 31.3.0
Command Completed.
;
```

14. Enter the following command to return the upgraded MCPM card into service.

    This causes the MASP to begin downloading tables to the new MCPM card

    `.alw-card:loc=xxxx`

    Where *xxxx* is the MCPM card location.

    When the card has been successfully loaded (there will be a response on the terminal that downloading is complete). This can take up to 10 minutes.

15. Enter the following command to verify the card is operational (IS-NR).

    `rept-stat-meas`If the secondary MCPM card is operational, go to *Step 16*. If it is not, call the *Customer Care Center*.

16. Enter the following command to remove the primary MCPM card from service.

    Do not use the force command unless this is the only MCPM card in service; MCPM collection and reporting service should be maintained at all times.

    Note: Removing the last MCPM or only MCPM from service will cause loss of measurements data.

    If there is more than one MCPM card in service, enter:

    `inh-card:loc=xxxx`

    where xxxx is the primary MCPM card location.

    If there is only one MCPM card in service, enter:

    `inh-card:loc=xxx:force=yes`

    where xxxx is the primary MCPM card location.

17. Remove the MCPM card.

    See *Removing a Card in an Existing EAGLE 5 ISS System* for removal procedures. Place the removed MCPM card into an ESD container; do not put it into the spare card storage shelf. Place the new MCPM (EDSM) card into its place. Be sure the revision numbers of the cards are compatible with the EAGLE 5 ISS software release. If they are not compatible, you should go to *Step 18* to flash the card to the software release level of the EAGLE 5 ISS system. If your card is compatible with the EAGLE 5 ISS software release level, proceed to *Step 20*. If in doubt about the compatibility of your new hardware, call the *Customer Care Center*.

18. Enter the following command to flash the card:

    `init-flash:loc=xxxx:code=appr`

Where xxxx is the location of the card.

The following is sample output.

```
rlghncxa03w 01-03-02 13:05:05 EST Rel 28.1.0
FLASH Memory Downloading for card 1105 Started.
rlghncxa03w 01-03-02 13:05:05 EST Rel 28.1.0
BPDCM Downloading for card 1105 Complete.
rlghncxa03w 01-03-02 13:05:05 EST Rel 28.1.0
Command Completed.
;
```

19. Enter the following command to activate the FLASH GPL on the card:

    `act-flash:loc=xxxx`

    Where xxxx is the location of the card.

    The following is sample output:

```
rlghncxa03w 04-02-04 13:05:05 EST EAGLE 31.3.0
FLASH Memory Activation for card 1105 Started.
;
rlghncxa03w 04-02-04 13:05:05 EST EAGLE 31.3.0
FLASH Memory Activation for card 1105 Completed.
;
rlghncxa03w 04-02-04 13:05:05 EST EAGLE 31.3.0
Command Completed.
;
```

20. Enter the following command to return the upgraded MCPM card into service.

    This causes the MASP to begin downloading tables to the new MCPM card.

    `alw-card:loc=xxxx`

    Where xxxx is the MCPM card location.

    When the card has been successfully loaded (there will be a response on the terminal that downloading is complete). This can take up to 10 minutes.

    Note: Ensure that the primary FTP server points to the primary card.

21. Enter the following command on the primary card to return the card to the status recorded in ***Step 1*** prior to the upgrade:

    init-card:loc=xxxx

    where *xxxx* is the location of the primary card.

22. Enter the following command to verify the card is operational (IS-NR).

    rept-stat-meas

Removing a Card in an Existing EAGLE 5 ISS System

Use this procedure anytime a card is removed from a previously operational EAGLE 5 ISS system for upgrade purposes. See the *Maintenance Manual* for card replacement. Failure to use this procedure may result in equipment damage. Use the procedures at the beginning of this section before physically removing any cards.

WARNING

WARNING: Before performing any maintenance procedures on the EAGLE 5 ISS, make sure you wear a wrist strap connected to the wrist strap grounding point of the EAGLE 5 ISS System.

Before removing, reseating, or initializing a card, inhibit any OAP terminal ports that are in-service normal (IS-NR) to ensure the card loads properly. No database updates or single command line entries should be made while the card is loading.

WARNING

WARNING: This procedure may interrupt service. When possible, perform maintenance during low traffic and database provisioning periods, such as the maintenance window.

1. Locate the card to be removed.

   Note: To ensure no loss of service, be sure to check that the green LED on the card is not lit when you remove the card.

2. Push the inject/eject clamps outward from the card's faceplate (top clamp in the "UP" position, bottom clamp in the "DOWN" position). Pull the levers away from the shelf until they are parallel to the floor.

   Gently pull the card towards you until the card clears the shelf.

   Figure 79: Push Inject/Eject Clamps Outward

3. Place the card you have removed in an electrostatic discharge (ESD) protective container, or place the card in the spare card storage shelf.
4. Be sure that the replacement card has the same Tekelec part number and revision number as the card you have just removed (unless this is an upgrade).
5. Open the ejector levers on the replacement card.

   Carefully align the card's edges with the top and bottom card guides. Then push the card along the length of the card guides until the rear connectors on the card engage the mating connectors on the target shelf backplane.

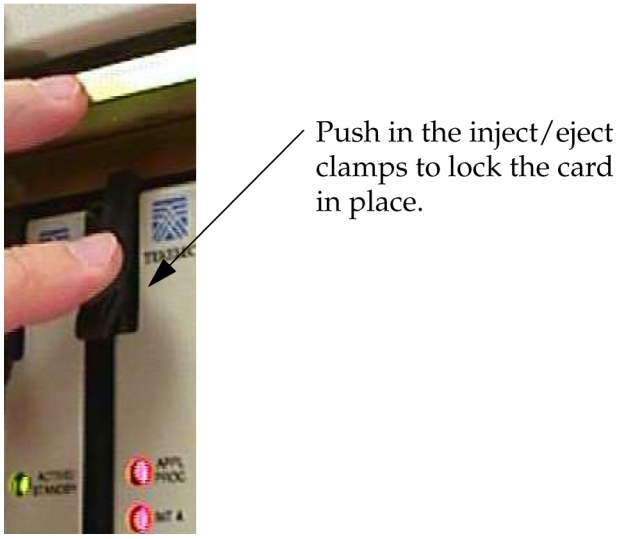
6. Press the front of the card's faceplate using constant pressure until you feel the card's progress cease.

WARNING: Do not impact the faceplate in order to mate the connectors. Any impact to the card's faceplate can damage the faceplate, the pins, or the connectors.

7. Push in the top and bottom inject/eject clamps.

   This locks the card in place and ensures a strong connection with the pins on the target shelf backplane.

   Figure 80: Push in Inject/Eject Clamps



8. Verify that both IMT bus LEDs are green.
9. Record the activity in the site maintenance log.

Fan Assembly Installation and Cabling

WARNING: *Do not* carry exposed metal keys or tools in pockets or on belts when working on or around system equipment.

WARNING: *Do not* wear metal rings, watches, or jewelry on wrists or hands when working on system equipment or other related electrostatic sensitive components. Always wear a wrist strap or other electrostatic protection when handling printed circuit cards and other electrostatic sensitive devices.

CAUTION: Be sure to install the fan assembly 890-0001-04 before installing the HCMIM card.

This section shows how to install the optional Fan Assembly 890-0001-04 and Fan Assembly 890-1038-01/890-1038-02. All of these fan assemblies can be installed in the standard frame and the Heavy Duty Frame. Be sure to determine which type of frame you have before performing these procedures.

Installing Fan Assembly 890-0001-04

Note: Beginning with EAGLE 5 ISS software release 33.0, all systems with HCMIM cards must have the 890-0001-04 fan assembly installed.

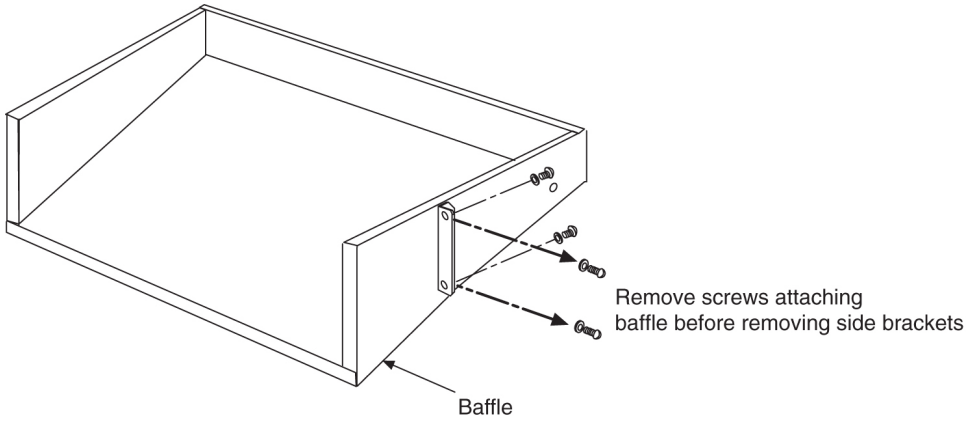
Tools needed:

- #1 Flat screwdriver
- #2 Philips screwdriver (long)
- Fiber Paper (Approximately 2' x 3')
- 5/16" ratchet socket wrench
- Tie Wraps

Procedure — Install and Retrofitting Fans

1. Determine which shelves will have HCMIM modules installed and be aware of hardware that needs to be retained or installed in a specific way.
2. Place a piece of fiber paper on the top of the shelf below where the fan is to be installed to ensure that nothing will drop into equipment below the new fan.
3. Make sure to pull both dummy fuses from the appropriate fuse locations for the A and B fan power. Use the following guidelines to determine fuse locations:
   - The fuse card located on the Fuse and Alarm Panel is marked FAN A and FAN B. Fuse positions 6, 12, and 18 are the correct locations on the FAP faceplate.
   - Fuse position 6 is for the fan unit directly below the x100 shelf.
   - Fuse position 12 is for the fan directly below the x200 shelf.
   - Fuse position 18 is for the fan directly below the x300 shelf.
   - All fans are to be fused at 3As, with blue flags, per feed. Fill out the fuse card completely.
   - Ensure the FAP fuse location for the fan is properly labeled.
4. If you are installing the fan assembly into an existing frame, remove the four screws (two on each side) that attach the air baffle to the mounting brackets. Do not remove the screws holding the side brackets to the frame at this time. Support the baffle while you remove the screws.

   Figure 81: System Air Baffle



5. Remove the baffle through the front of the frame. Then, remove the two screws holding the left and right side baffle brakets to the frame and remove the brackets.
6. Install the new side brackets for the new fan tray into the frame. The side brackes are installed from the front of the frame just below the shelf containing that cards that require the fan. Use the 12-24-x1/2 screws provided to attach the brackets to the left and right front frame rails. The top screw hole is 5/16 inch below the shelf containing the cards. Be sure not to completely tighten the brackets at this time.

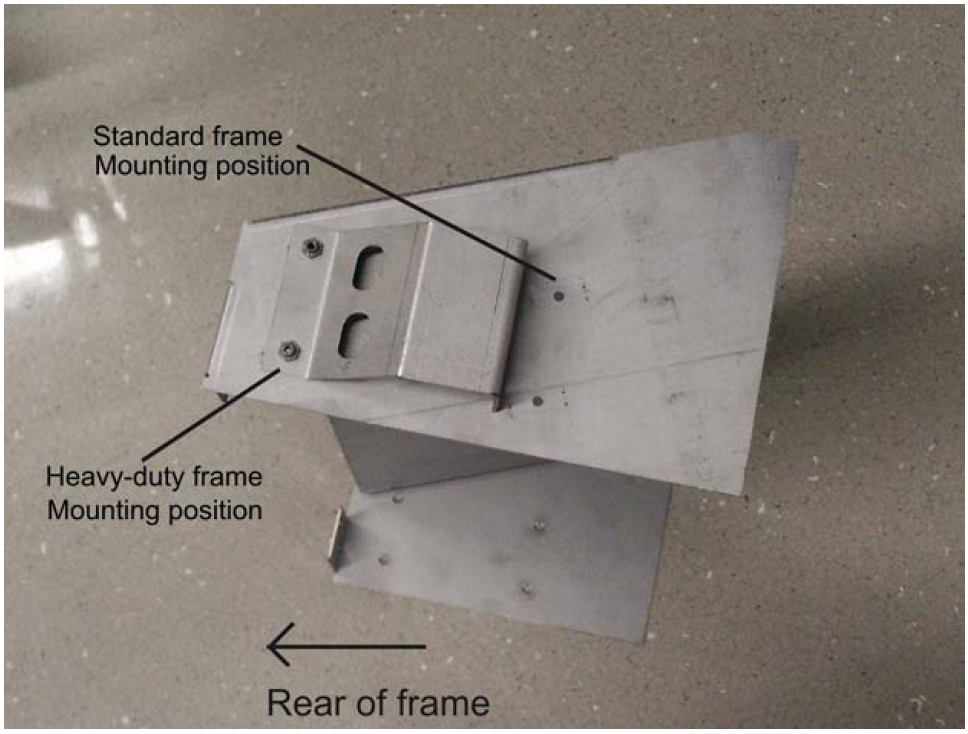
Figure 82: Attach side fan bracket to front frame rail

7. Slide the brackets in toward the center of the frame so the outside of the bracket is flush with the side of the frame as shown in *Figure 83: Slide the side fan brackets flush with the Frame*.

Figure 83: Slide the side fan brackets flush with the Frame

8. Verify whether the frame type is a standard or heavy duty so that you can ensure the fan tray bracket will be mounted correctly. Use the following mounting positions:
   - Use the side holes on the fan tray bracket that are closest to the front of the frame if you are installing in a standard frame.
   - Use the holes closest to the rear of the frame if installing in a heavy duty frame.

Figure 84: Side bracket mounting positions on fan tray bracket.



9. Insert the fan tray bracket (P/N 652-0012-01) into the space left by the baffle under the card shelf. The untightened side brackets will slide outward slightly to accomodate the fan tray bracket as it is inserted. They should remain flush against the fan tray bracket.

Figure 85: Insert fan tray bracket

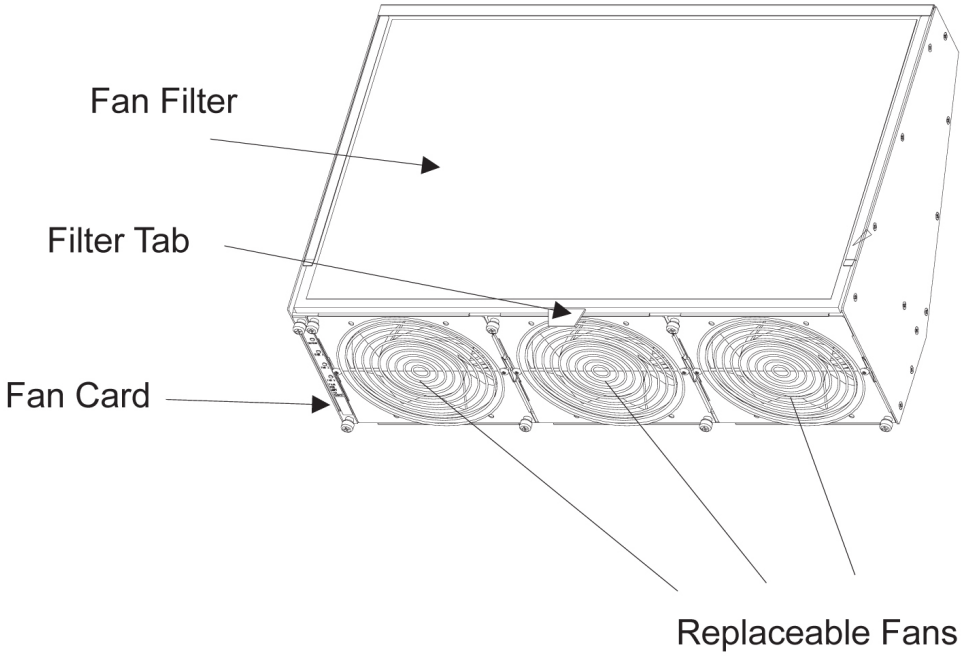
Note: When inserting the fan tray bracket, be sure not to pinch cables between the bottom of the shelf and the fan tray bracket.

10. From inside the frame, screw the fan tray bracket to the side brackets with one hand while using the other hand to support the fan tray bracket. Use two 8-32 phillips screws for each side bracket. See *Figure 86: Attaching the fan tray bracket to the side brackets - inside front*.

Figure 86: Attaching the fan tray bracket to the side brackets - inside front

11. Remove the new fan tray from the container. The fan tray is shipped with the three fans already installed.

Figure 87: Fan Ftray



12. Insert the fan tray into the the fan tray bracket. You might need to tilt the fan tray up as it is pushed in so that it is completely inserted into the bracket. After insertion, be sure the front of the fan tray is recessed in 1/2 inch with respect to the front frame rails.

Figure 88: Fan tray inserted into fan tray bracket in the frame- front view

13. When the fan tray is aligned and in place, attach the fan tray to the fan tray bracket by tightening the screws on the left and right sides of the rear of the fan tray bracket. There are two screws on each side. These screws must be tightened from the rear of the frame.

Figure 89: Tighten rear fan tray screws

14. At this time check and tighten all screws, including the screws holding the side brackets to the frame. The side bracket screws should be tightened fully from the rear of the frame. Use a long hex driver or flat head screw driver.

Figure 90: Tighten fan side bracket screws

15. Remove the piece of fiber paper on the top of the shelf below where the fan assembly was installed. This procedure is complete.

CAUTION

CAUTION: Before powering up the fans, ensure that the shelf directly above the fan does not contain any empty slots. Install an air management card in any empty slots to ensure proper air flow. These filler cards have no electrical connection to the system. See *Card Installation and Replacement* for general card installation guidelines.

Installing Fan Cables

On the control and extension shelf backplanes, the connectors are marked A FAN POWER and B FAN POWER.

- Control shelf:

  On backplane (P/N 850-0330-06 or -07) the connectors are A FAN POWER, J-9 and B FAN POWER, J-8.

  These connectors are located at the upper middle of the backplane on both the control shelf and the extension shelves.

- Extension shelf: The backplane connectors are A, J-3 and B J-2.
- For A fan power:

  The fan cable 830-1157-01 is included with the fan assembly. Plug one end of the cable into J-9 on the backplane. Route the cable to the left of the frame, faced from the rear, and to the assembly, to the connection marked FAN A POWER.

- For B fan power:

  Plug one end of the cable 830-1157-01 into J-8 on the backplane. Route the cable to the right of the frame, faced from the rear, and to the fan assembly, to the connection marked FAN B POWER. Form and dress the two cables together and check the security of all of the connections.

1. To cable the fan assembly, plug a cable onto the shelf on backplane FAN A POWER, and connector J9.

   Tighten the screws on the connector.

2. When the cable is connected to the backplane route the cable to the top tie-down rod and secure the cable with a tie-wrap.
3. Route the cable to the right side of the frame.
   Run the cable between the shelf and the traverse arms.

CAUTION: *Do not* form the cable with the LIM cables.

4. Secure the fan cables to the back side of the traverse arm using tie-wraps.
5. Plug the other end of the cable onto the fan unit connector marked FAN A POWER.
   Tighten the screws on the connector.
6. The other fan cable (P/N 830-0690-01) plugs into the backplane connector J8.
   Tighten the screws on the connector.
7. Route the cable out to the top tie down rod and secure it using a tie-wrap.
   Run the cable down between the shelf and traverse arm.

CAUTION: *Do not* form FAN POWER cables with LIM cables.

8. Secure the cables to the back side of the traverse arms using tie-wraps.
9. Plug the other end of the cable onto the fan unit connector marked FAN B POWER.
   Secure the connector.

Powering Up the Fan Assembly

All fans are fused at 3A (blue) per feed.

WARNING: Before powering up the fans, ensure that the shelf above the fan does not contain any empty slots. Install the air management card in any empty slots. See *Card Installation and Replacement* for general card installation guidelines.

Procedure — Power up Fan Assembly

1. After the fan is installed, the powering up process depends on the shelf location.
   - The fuse card located on the Fuse and Alarm Panel are marked FAN A and FAN B, fuse positions 6, 12, and 18 are marked correct locations on the FAP faceplate.
   - Fuse position 6 is for the fan unit directly below the x100 shelf.
   - Fuse position 12 is for the fan directly below the x200 shelf.
   - Fuse position 18 is for the fan directly below the x300 shelf.
   - All fans are to be fused at 3As, with blue flags, per feed.
   - Fill out the fuse card completely.
   - Ensure the FAP fuse location for the fan is properly labeled.

2. Fifteen seconds after both the A side and B side power is connected to the fan assembly all of the LEDs on the fan controller card (located on the left side of the front of the fan assembly) are green.

   Figure 91: Fan card with LEDs on front of fan assembly

3. When the fans are powered up and running, a test must be conducted to ensure proper service. Go to the system terminal.
4. Check to see if the fan feature is activated. At the terminal, enter the command:

   `rtrv-feat`

   If the fan feature is off, go to *Step 5*. Otherwise, go to *Step 6*.
5. At the terminal, enter the command:

   `chg-feat:fan=on`

   With this command the user will perform the tests beginning with *Step 7*.
6. At the terminal, enter the command:

   `rept-stat-trbl`

   Check to see that there are no fan errors. Specifically, check that there are no "#302 Cooling Fan Failure" errors. Next, perform the tests beginning with *Step 6*.
7. Fan Verification (perform *Step 7* through *Step 12* for each fan assembly).

   Move to the rear of the frame and remove the A POWER cable from the FAN unit. Result: Fan 2 and Fan 3 LEDs will blink as the fans speed up to maximum speed. This may take up to 15 seconds. Once maximum speed has been reached Fan 2 and Fan 3 LEDs on the Fan Controller card will be solid green. Fan 1 LED should be red. The controller LED should be blinking green. Fan 1 should stop running and the MINOR LED is lit.
8. At the system terminal enter the command:

   `rept-stat-trbl`

This step is repeated for each fan. Test each fan to ensure that the alarm and the units are working correctly. Result: The terminal reports:

```
# 302 Cooling Fan Normal.
```

9. Replace the A POWER cable on the back of the FAN unit and secure the connector.
   Result: All fans are running and the MINOR LED is not lit.

```
Terminal reports alarm:   # 303 Cooling Fan Normal
.
```

10. Remove the B POWER cable from the FAN unit.
    Result: Fan 1 and Fan 2 LEDs will blink as the fans speed up to maximum speed. This may take up to 15 seconds. Once maximum speed has been reached Fan 1 and Fan 2 LEDs will be solid green. Fan 3 LED should be red. The fan controller LED should be blinking. Fan 3 should stop running and the MINOR LED is lit.
11. At the system terminal enter the command:
    `rept-stat-trbl`
    Test each fan to ensure that the alarms and the unit is working correctly. Result: The terminal reports:

```
# 302 Cooling Fan Normal.
```

12. Replace the B POWER cable on the back of the FAN unit and secure the connector.
    Result: The fans are running and the MINOR LED is not lit. The terminal reports alarm:

```
# 303 Cooling Fan Normal.
```

13. Repeat *Step 7* through *Step 12* for each fan unit installed.
    This procedure is complete.

Installing Fan Assembly 890-1038-01 or 890-1038-02

Tools needed:

- #1 Flat screwdriver
- #2 Philips screwdriver (long)
- Fiber Paper (Approximately 2′ x 3′)
- Tie Wraps

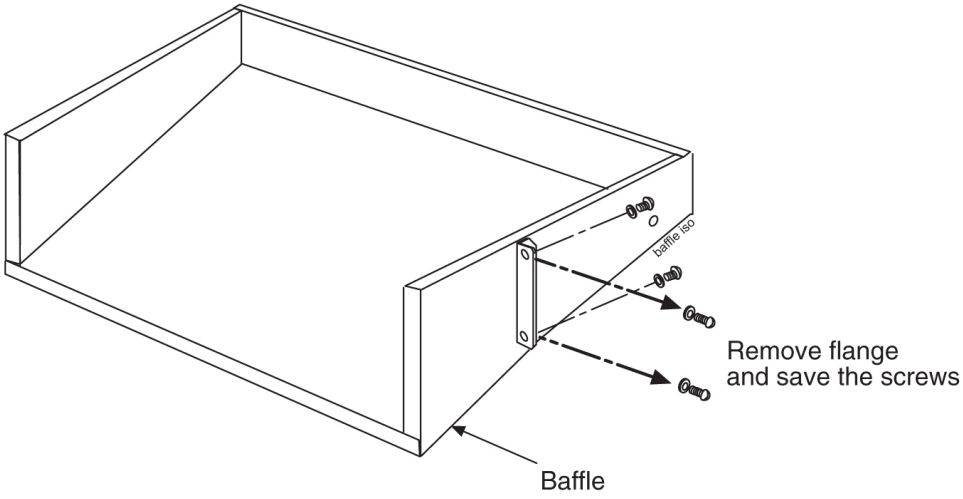
1. Determine where the fan assembly will be installed and be aware of hardware that needs to be retained or installed in a specific way, see *Figure 93: Fan Assembly with Grill and Filter*.
2. Place a piece of fiber paper on the top of the shelf below where the fan is to be installed, to ensure that nothing will drop into the area and equipment below.
   a) The fan unit is secured with the same screws that are removed from the frame holding the baffle in place.
   b) The brackets are installed from the rear of the frame using the screws provided with the brackets (standard frame).

c) When the brackets are attached, secure them to the frame using external tooth washers and four screws.

3. Remove the four screws, two on each side, from the mounting brackets on the frame that hold the baffle in place, on both sides.

   This will allow the removal of the baffle.

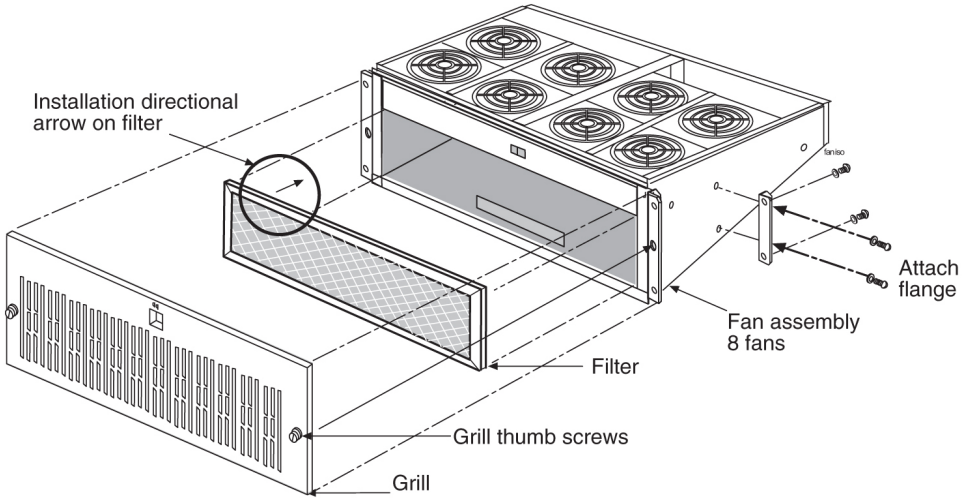
Figure 92: System Air Baffle



4. Place the screws in a safe place because they are used later in this procedure.
5. Remove the baffle through the front of the frame.
6. Remove the fan unit from the container and remove the grill and filter from the unit assembly.

   The fan is shipped with the side flange not attached. Set the grill and filter in a safe location; it will be used later in this procedure.

Figure 93: Fan Assembly with Grill and Filter



7. Install the fan unit in the space left by the baffle.

Figure 94: Installing Fan Assembly

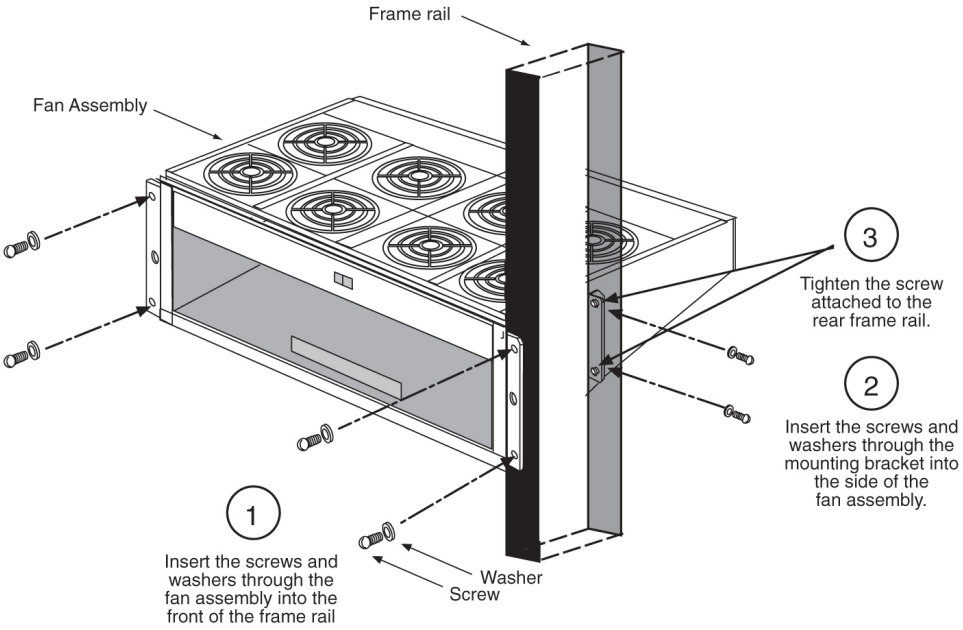
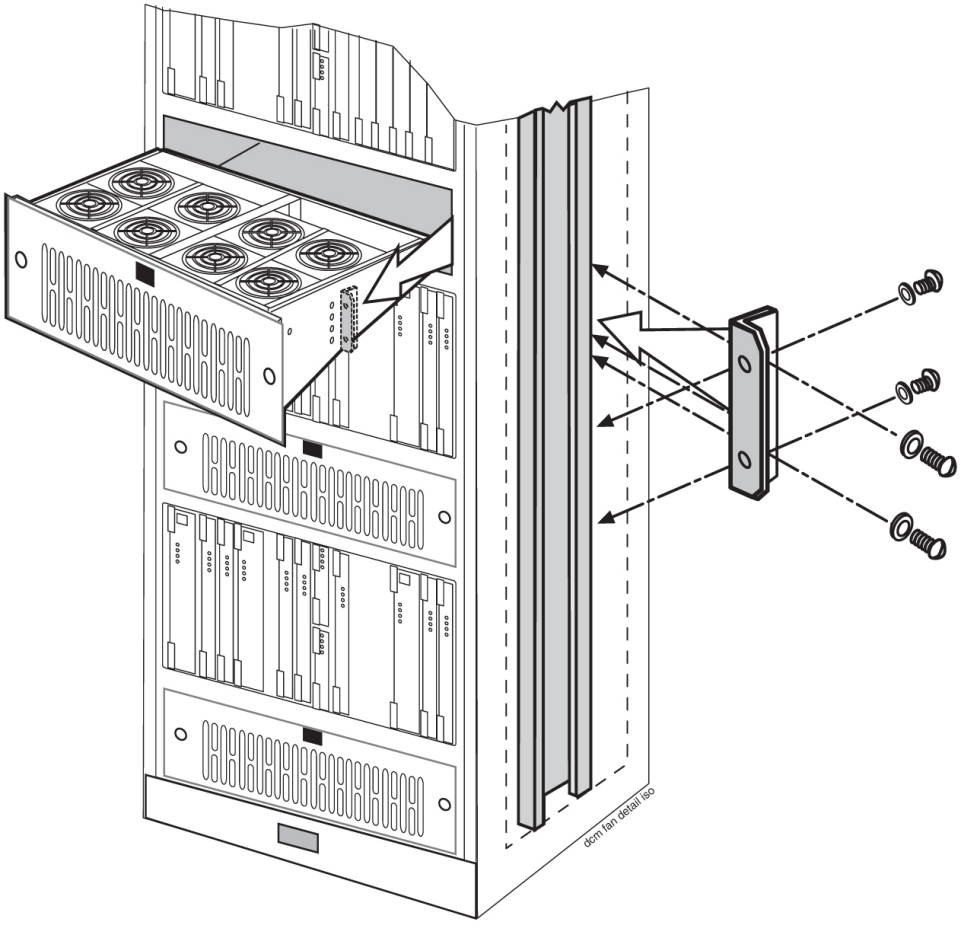


Figure 95: Fan Bracket Installation



8. Secure the fan unit with the same screws that were removed from the frame holding the baffle in place.

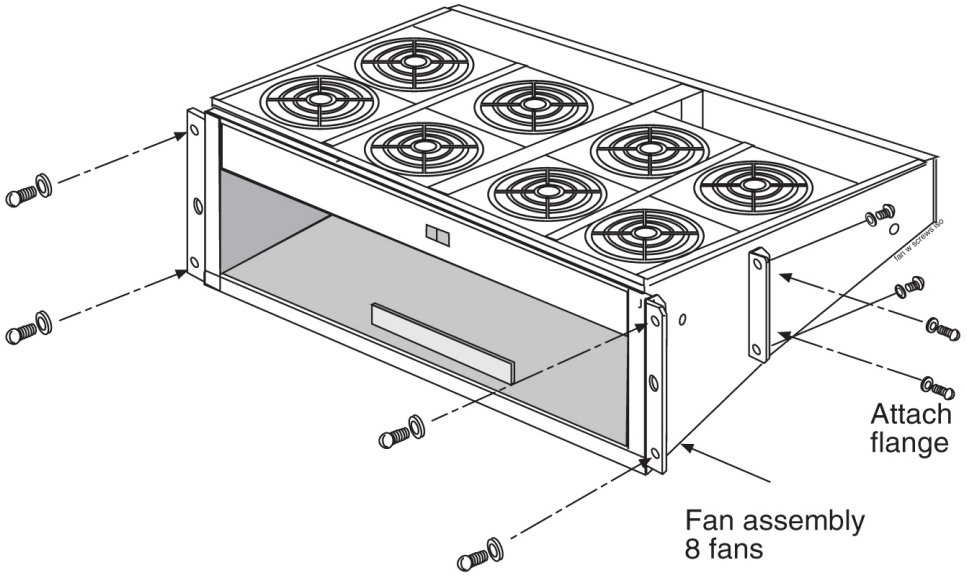
   Do not tighten the screws at this time to allow for some minor adjustment. See *Figure 95: Fan Bracket Installation*.

   Note: When mounting the fan unit, be sure not to pinch cables between the bottom of the shelf and the fan unit.

9. From the front of the frame, install the four screws and tighten.

   At this time, check and tighten all screws

   Figure 96: Fan with Brackets and Screws



10. Return to the back of the frame and tighten the screws in the mounting brackets into the side of the fan unit.
11. When the fan unit is aligned and in place, tighten the screws in the brackets on the sides of the frame.
12. Reinstall the fan filter.

    The filter has an arrow stamped on the top edge to indicate the direction of the air flow. The arrow points **toward** the fans.

13. Install the fan grill, placing it back on the front of the unit and **FINGER TIGHTEN** the thumb screws on the front of the grill.
14. Remove the piece of fiber paper on the top of the shelf below where the fan is to be installed.

Installing Fan Cables

On the control and extension shelf backplanes, the connectors are marked A FAN POWER and B FAN POWER.

- Control shelf:

On backplane (P/N 850-0330-06 or -07) the connectors are A FAN POWER, J-9 and B FAN POWER, J-8.

These connectors are located at the upper middle of the backplane on both the control shelf and the extension shelves.

- Extension shelf: The backplane connectors are A, J-3 and B J-2.
- For A fan power:

  The fan cable is included with the fan assembly. Plug one end of the cable into J-9 on the backplane. Route the cable to the left of the frame, faced from the rear, and to the assembly, to the connection marked FAN A POWER.
- For B fan power:

  Plug one end of the cable into J-8 on the backplane. Route the cable to the right of the frame, faced from the rear, and to the fan assembly, to the connection marked FAN B POWER. Form and dress the two cables together and check the security of all of the connections.

1. To cable the fan assembly, plug a cable onto the shelf on backplane FAN A POWER, and connector J9.

   Tighten the screws on the connector.
2. When the cable is connected to the backplane route the cable to the top tie-down rod and secure the cable with a tie-wrap.
3. Route the cable to the right side of the frame.

   Run the cable between the shelf and the traverse arms.

CAUTION: *Do not* form the cable with the LIM cables.

4. Secure the fan cables to the back side of the traverse arm using tie-wraps.
5. Plug the other end of the cable onto the fan unit connector marked FAN A POWER.

   Tighten the screws on the connector.
6. The other fan cable plugs into the backplane connector J8.

   Tighten the screws on the connector.
7. Route the cable out to the top tie down rod and secure it using a tie-wrap.

   Run the cable down between the shelf and traverse arm.

CAUTION: *Do not* form FAN POWER cables with LIM cables.

8. Secure the cables to the back side of the traverse arms using tie-wraps.
9. Plug the other end of the cable onto the fan unit connector marked FAN B POWER.

   Secure the connector.

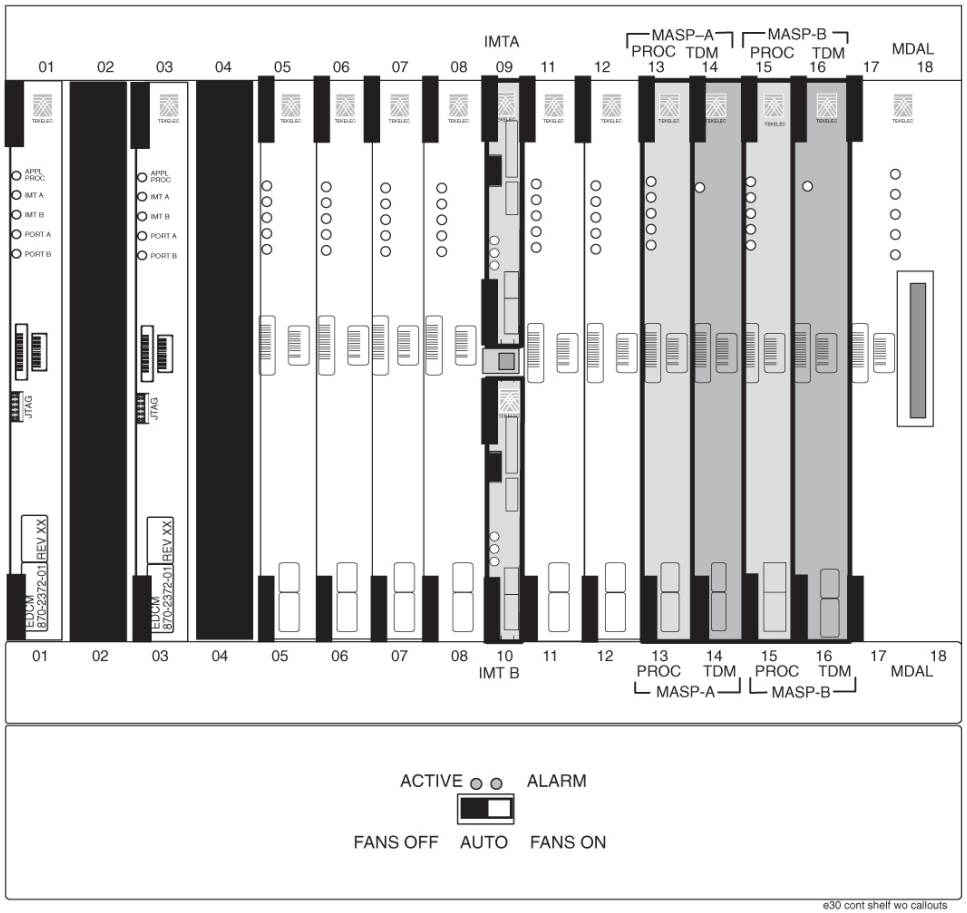
Powering Up the Fan Assembly

All fans are fused at 2A (orange) per feed (except for EOAP, where the fan is powered from the EOAP.)

1. After the fan assembly is installed, the powering up process depends on the shelf location.
   a) The fuse card located on the Fuse and Alarm Panel are marked FAN A and FAN B, fuse positions 6, 12, and 18 are marked correct locations on the FAP faceplate.
   b) Fuse position 6 is for the fan unit directly below the x100 shelf.
   c) Fuse position 12 is for the fan directly below the x200 shelf.
   d) Fuse position 18 is for the fan directly below the x300 shelf.
   e) All 890-1038-xx fans are to be fused at 2As, with orange flags, per feed.
   f) Fill out the fuse card completely.
2. When the fan units are powered up, the switch in the middle front of the fan unit must be turned to the ON position.

   Do not set the switch to the AUTO position.

   Figure 97: Front Card Suite with Fan Switch



3. When the fans are powered up and running, a test must be conducted to ensure proper service. Go to the system terminal.

4. At the terminal, enter the command:
   `chg-feat:fan=on`
   With this input this command the user will perform the tests beginning with *Step 6*.
5. At the terminal, enter the command:
   `rept-stat-trbl`
   Check to see that there are no fan errors.
6. Fan Verification (perform *Step 6* through *Step 14* for each fan assembly).
   On the front of the fan unit toggle the switch to the OFF position (switch to FANS OFF). Result: The fans stop running and the MINOR LED is lit.
7. At the terminal, type:
   `rept-stat-trbl`
   Result: The terminal will show:

   ```
   0055.0302 * SYSTEM    Cooling Fan Failure
   ```

   MINORLED is lit.
8. Fan Verification: On the front of the fan unit, toggle the fan switch to the ON position (switch to FANS ON).
   Result: The fans are running and the MINOR LED is not lit. Terminal reports alarm:

   ```
   # 303 Cooling Fan Normal
   ```

   .

   Note: The normal setting for the fan unit is ON.
9. Move to the rear of the frame and remove the A POWER cable from the FAN unit.
   Result: The fans stop running and the MINOR LED is lit.
10. At the system terminal enter the command:
    `rept-stat-trbl`
    This step is repeated for each fan. Test each fan to ensure that the alarm and the units are working correctly. Result: The terminal reports:

    ```
    # 302 Cooling Fan Normal
    ```
11. Replace the A POWER cable on the back of the FAN unit and secure the connector.
    Result: The fans are running and the MINOR LED is not lit.

    ```
    Terminal reports alarm:   # 303 Cooling Fan Normal
    .
    ```
12. Remove the B POWER cable from the FAN unit.
    Result: The B powered fans stop running and the MINOR LED is lit.
13. At the system terminal enter the command:
    `rept-stat-trbl`

Test each fan to ensure that the alarms and the unit is working correctly. Result: The terminal reports:

```
#  302 Cooling Fan Failure.
```

14. Replace the B POWER cable on the back of the FAN unit and secure the connector.
    Result: The fans are running and the MINOR LED is not lit. The terminal reports alarm:

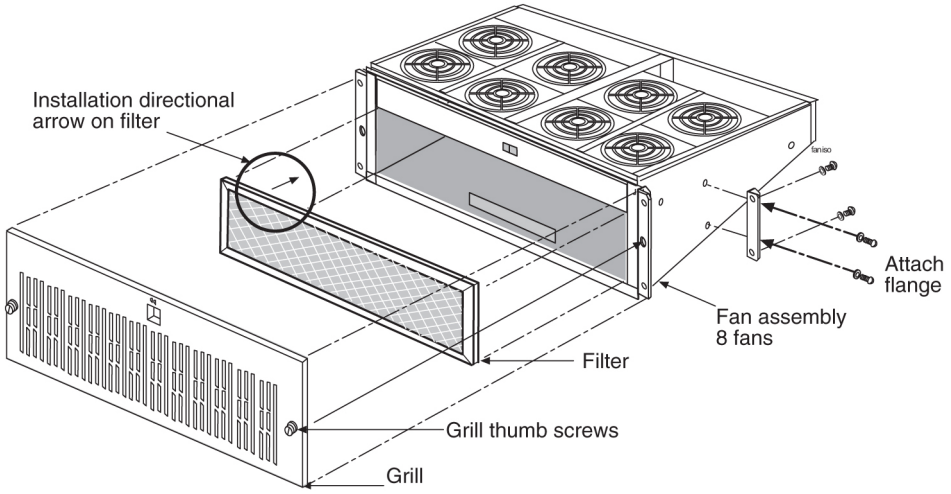
```
# 303 Cooling fan Normal.
```

15. Repeat *Step 6* through *Step 14* for each fan unit installed.

Testing the Fan Assembly

1. Log in and verify the FAN feature is on: RTRV-FEAT
2. If the FAN feature is off, turn it on using the: CHG-FEAT:FAN=ON
3. Remove the applicable fuses (one at a time) associated with each Fan (6A, 12A, 18A, 6B, 12B, and 18B).
   Verify that with each fuse pulled, the corresponding fans looses power. IE: 6A= 1st half of the 1100 fan, 12A = 1st half of the 1200 fan, 18A = 1st half of the 1300, 6B=2nd half of the 1100 fan, 12B=2nd half of the 1200 fan, and 18B=2nd half of the 1300 fan.
4. Replace the fan grill by placing it back over the filter on the front of the assembly.
   Hand-tighten the grill thumb screws.

   Figure 98: Fan Assembly with Grill and Filter



5. Turn off the 1100,1200 and 1300 shelf fans and verify the EAGLE 5 ISS and Fan unit displays the alarm.
   For the EAGLE 5 ISS use: REPT-STAT-TRBL and for the fan unit, verify the LED near the Fan switch is RED. (10x03/x04 software must be installed)

Master Timing

The EAGLE 5 ISS connects to the customer provided Building Integrated Time System (BITS) clocks through the backplane of the control shelf. The BITS clock provides a primary and secondary set of two separate clock signals; a composite (64KHz) clock signal and a high speed (2.048Mhz or 1.544Mhz) clock signal.

The section provides information about the High-Speed Master Timing feature and instructions on how to implement the feature. Procedures include the replacement of the composite clock cables.

Note: This feature does not cover the replacement of the control shelf, the control shelf backplane, or an EAGLE 5 ISS software upgrade. For these items, contact the *Customer Care Center* for assistance.

Master Timing Overview

The High-Speed (HS) Master Timing feature offers a mode of operation that allows a high speed capable (T1 or E1 rate) Link Interface Module (LIM-ATM) or E1/T1 MIM installed in an EAGLE 5 ISS STP to receive its transit timing reference directly from an external HS master clock source, instead of slaving to the timing information contained in the received data. The timing information is then encoded into the T1 or E1 transmitted data stream used to synchronize downstream equipment. The site clock sources (both HS and composite) are connected with an RS422 compatible cable to the primary and secondary clock inputs of the EAGLE 5 ISS STP.

The high-speed master clock source provides the EAGLE 5 ISS STP with a second system clock input in addition to the original composite clock. Timing signals from both system clocks is distributed within the EAGLE 5 ISS STP to all LIM card slots.

The HS Master Timing feature is integrated into the EAGLE 5 ISS Control Card set.

Implementation of the HS Master Timing feature might require the correct Control Card set , the installation or presence of at least one ATM LIM card or E1/T1 MIM, the replacement of both composite clock cables or adding new cables, and the provisioning of at least one ATM LIM card or E1/T1 MIM. ATM LIM cards or E1/T1 MIM that do not use the high-speed clock source and LIM cards that continue using the composite clock source do not require any changes to card provisioning.

OAP terminals must be inhibited before replacing the Control Card set for the HS Master Timing feature to ensure that no OAP updates are inadvertently sent to the database during the implementation.

The composite clock cables connect the site's composite (BITS) clocks with the EAGLE 5 ISS STP control shelf. Implementation of the HS Master Timing feature requires the replacement of both composite clock cables with two new HS master clock cables (RS422 compatible) on control shelf backplane (P/N 850-0330-06 or -07 and later).

Only ATM LIM cards or E1/T1 MIM can be configured or re-configured for the HS Master Timing feature. Once the baseline hardware requirements for the HS Master Timing feature have been met, see the *Master Timing Feature Requirement Matrix*, install the cards.

CAUTION: These are redundant systems to allow service during normal maintenance. When repairs require a total power disconnect, both input supply sources must be disconnected. This will cause service interruption and takes down the systems.

- Install an ATM card, add the card to the system database, and enable it for the HS Master Timing feature (ent-slk:atmtsel=external); or

- Install an E1/T1 MIM, add the card to the system database, and enable it for the HS Master Timing feature (ent-e1:e1tsel=external).

Reconfigure any existing ATM LIM card or E1/T1 MIM to use the HS Master Timing feature. LIM cards that will continue using the composite clock will not require any changes to the card provisioning.

Note: The EAGLE 5 ISS terminal output screens refer to the composite clocks as Building Integrated Timing Source (BITS) clocks. In this document, references to BITS and composite clocks are interchangeable.

Master Timing Site Requirements

Implementation of the HS Master Timing feature requires the following software and hardware baselines:

- One of the following Control Card/Software Release sets:
  - E5-based Control Cards with Software Release 40.1 or later
  - Legacy Control Cards
    - EAGLE 5 ISS software release 30.0 or later.

      Note: Earlier software loads do not support the master timing capabilities of the following required TDM/GPSM ll card pair.

      TDM card P/N 870-0774-10. Earlier versions do not support the HS Master Timing Feature.
    - All versions of GPSM II, P/N 870-2360-xx.

- Control shelves with backplane (P/N 850-0330-03 or 04), if adapter cables P/N 830-1183-01 are installed with HS clock cables P/N 830-0873-xx or P/N 830-1189-xx.

  Note: Replace the existing composite clock cables (P/N 830-0226-xx) with RS422 compatible HS master and composite clock cables P/N 830-0873-xx or P/N 830-1189-xx. For control shelves with backplane (P/N 850-0330-06 or -07 or later), connect the cables to J48 and J49 (primary and secondary BITS) and connect the other ends to the site clock sources.

  Note: For control shelves with backplane (P/N 850-0330-03 or 04), connect the adapter cables (P/N 830-1183-01) between connectors J57 and J56 (ACLK3 and ACLK4) on the backplane and to the site HS clock source using HS clock cables. Leave the existing composite clock cables connected to J42 and J41 (Primary and Secondary BITS).

- Control shelves with backplane P/N 850-0330-06 or -07 or later using HS master and composite clock cables P/N 830-0873-xx or P/N 830-1189-xx.

  Note: Replace the existing composite clock cables (P/N 830-0226-xx) with RS422 compatible HS master and composite clock cables P/N 830-0873-xx or P/N 830-1189-xx. For control shelves with backplane (P/N 850-0330-06 or -07 or later), connect the cables to J48 and J49 (primary and secondary BITS) and connect the other ends to the site clock sources.

  Note: Control shelf backplane (P/N 850-0330-05) cannot be used with the HMUX card required to implement the Large System feature.

- ATM LIM card(s) or E1/T1 MIM(s)
- High-speed clock source (T1 or E1)
  - T1 clock source (RS422 compatible), 1.544 MHz ± 200 Hz square wave output.

- E1 clock source (RS422 compatible), 2.048 MHz ± 103 Hz square wave output.
- ITU G.703 Sec 5 UnFramed T1
- T1-T1.101 /T1-T1.102 Framed T1
- E1-G.703-sec. 9 Framed E1
- E1-G.703-sec. 13 Unframed E1

Master Timing Feature Requirement Matrix

Use *Table 20: Feature Requirement Matrix* to identify the hardware or software that is required to prepare your EAGLE 5 ISS STP for the HS Master Timing feature. Perform the procedures in the order listed. Skip any procedure that does not apply.

Note: Perform the procedures mentioned in this document during a maintenance window.

Table 20: Feature Requirement Matrix

If you do not have...	do this...	using procedures...	Notes
Control shelf backplane P/N 850-0330-06 or -07 or later	Replace the backplane	Contact *Customer Care Center* for assistance.	
	If you have a control shelf with backplane P/N 850-0330-03 /04, install adapter cable (P/N 830-1183-01) and HS clock cable (P/N 830-0873-xx)	See *HS Master and Composite Clock Cables on Backplane P/N 850-0330-03/04*.	
HS master and composite clock cables (P/N 830-0873-xx) installed	Replace composite clock cables with HS master and composite clock cables and adapter cable if necessary	See *HS Master and Composite Clock Cables on Backplane P/N 850-0330-06/07* or *A Clock and B Clock Cable Replacement*.	Replace one cable at a time.
In an EAGLE 5 ISS using legacy Control Cards: GPSM ll cards (P/N 870-2360-01) TDM (P/N 870-0774-10 or later). **Note:** Beginning with EAGLE 5 ISS Software Release 31.6 TDM cards must be P/N 870-0774-18 to support Global Timing Interface (TDM-GTI).	Replace MASP (GPSM ll/ TDM 10 or later as needed)	Contact *Customer Care Center* for assistance replacing the MASP.	Always start with standby MASP

If you do not have...	do this...	using procedures...	Notes
In an EAGLE 5 ISS using E5-based Control Cards: E5-MASP cards (P/N 870-2900-01)	Replace legacy MASP (GPSM ll/TDM 10 or later as needed)	Contact *Customer Care Center* for assistance replacing the MASP.	Always start with standby MASP
ATM LIM card or E1/T1 MIM installed	Install ATM LIM card or E1/T1 MIM	Refer to the Maintenance Manual or the Database Administration Manual - SS7.	
ATM LIM card or E1/T1 MIM configured	Configure ATM LIM card or E1/T1 MIM	Adding an SS7 Signaling Link or Provisioning the E1/T1 MIM in the Database as described in the Database Administration Manual - SS7.	

Tools and Equipment

Have the following tools and equipment ready for the cable replacement:

- Two high speed master and composite clock cables (P/N 830-0873-xx)
- Two adapter cables (P/N 830-0846-01) if using control shelf backplane (P/N 850-0330-03/04) with HS cables (P/N 830-0873-xx).
- T1 or E1 LIM card(s)
- ESD safe slotted screw driver
- Cable ties

HS Master and Composite Clock Cables on Backplane P/N 850-0330-06/07

On systems with backplane (P/N 850-0330-06/07) the HS master and composite clock cable (P/N 830-0873-xx) is used to transmit the clock outputs from the customer HS master and composite clock sources to the EAGLE 5 ISS control shelf backplane, providing the EAGLE 5 ISS with a second synchronized system clock. The EAGLE 5 ISS connects to the site master clock through two DB 15 style connectors (J49 and J48) on the backplane of the control shelf for primary and secondary clock signals. The two connectors are labeled *Primary BITS* and *Secondary BITS*. Both primary and secondary clock signals are sent to each terminal disk module (TDM). The TDM cards select between the primary and secondary clock signals to provide A and B system clocks to the rest of the EAGLE 5 ISS.

This procedure replaces the existing composite clock cables (P/N 830-0226-xx) with RS422 compatible cables (P/N 830-0873-xx or P/N 830-1189-xx) connected to the customer HS and composite clock sources.

CAUTION: A system with DS0A links cannot run without a composite clock source. Take extreme caution when replacing the composite clock source cables. Remove one cable at a time and confirm between removals that the other composite clock source is active.

CAUTION

CAUTION: Perform this procedure during a maintenance window.

CAUTION

CAUTION: Prior to adding or replacing the high-speed master and composite clock cables, perform an EAGLE 5 ISS system health check.

CAUTION

CAUTION: HS clock alarms are only generated if an external BITS clock source is being used.

CAUTION

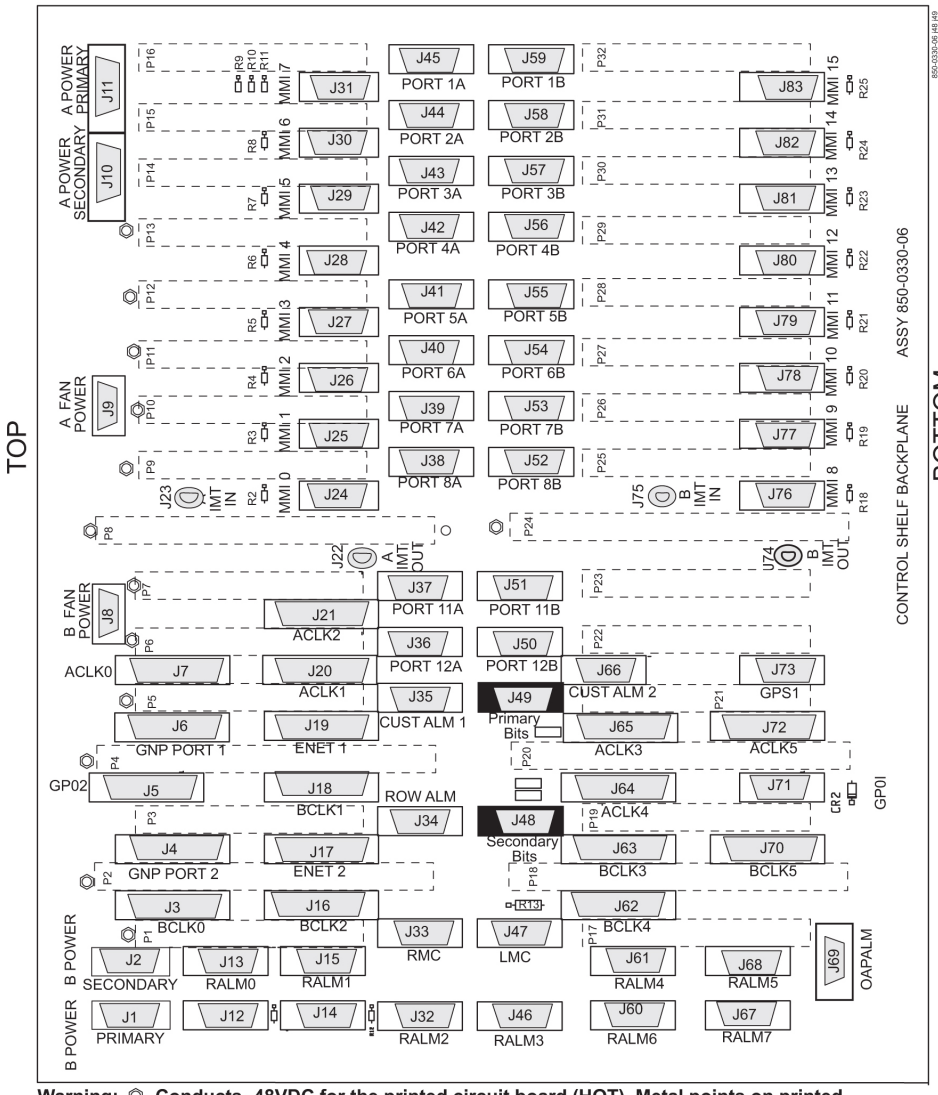
CAUTION: Always replace the IDLE clock cable first, whether it is the primary or secondary cable position. After the replacement of the first (IDLE) cable position, ensure the system reports the clock status properly with an ACTIVE and IDLE clock output. If the output reports the correct status the ACTIVE cable can be disconnected for replacement. Disconnecting the ACTIVE cable will transition the previously IDLE clock to the ACTIVE clock forcing the system to use the new clock cable that was installed.

Note: In this procedure, the high-speed clock status indicated in the output of the `rept-stat-clk` command reflects the presence of at least one ATM LIM card or E1/T1 MIM in the system. The status fields remain empty until the card is configured to use the high-speed clock.

Procedure — Replace or Add HS Master Timing Clock Cables with backplane (P/N 850-0330-06/07)

1. Before starting the cable replacement, physically locate the:
   - primary and secondary composite clock and high-speed clock connections at the backplane of the customer composite clock source (customer will provide positions).
   - existing composite clock cables (P/N 830-0226-xx) that are routed from the primary and secondary composite clock connections of the customer clock source to the *Primary BITS* and *Secondary BITS* clock connectors J49 and J48 on the control shelf. *Figure 99: Control Shelf (P/N 850-0330-06 or -07) BITS Connectors* shows the location of these connectors on the control shelf backplane.

Figure 99: Control Shelf (P/N 850-0330-06 or -07) BITS Connectors



Warning: ⏣ **Conducts -48VDC for the printed circuit board (HOT). Metal points on printed circuit boards conducts -48VDC and can cause shorts, shocks, and damage if not handled properly.**

2. Obtain the two new primary and secondary high-speed master and composite clock cables (P/N 830-0873-xx or P/N 830-1189-xx). Cut out the cable ties along the route of the existing composite clock cables (P/N 830-0226-xx).
3. Route the new primary and secondary high-speed master and composite clock cables (P/N 830-0873-xx or P/N 830-1189-xx) to the frame using new cable ties. .

   Note: Route but do not connect the new cables to the backpanel at this time to avoid any accidental pull on cable connectors that could disconnect them from the composite clock source. Always route clock cables on separate cable racks, if provided, for redundancy.

4. Prior to cable replacement, check your system for any troubles. At the EAGLE 5 ISS terminal, enter:

   `rept-stat-trbl`

   Record any troubles and ensure that no clock problems exist.

   Note: If clock errors exist that cannot be resolved, contact the *Customer Care Center* for assistance before starting the cable replacement.

5. Generate a clock status report to ensure that the current primary and secondary composite clock sources are running and determine which MASP is active or on standby; enter:

   `rept-stat-clk`

   The output displays the card status and the presence of the primary and secondary clocks, the number of cards that use clocks A and B, and the number of cards using bad clocks.

```
tekelecstp 00-12-10 11:35:15 EST Rel 26.0.0
CARD LOC = 1114 (Active )  CARD LOC  = 1116 (Standby)
PRIMARY BITS     = Active  PRIMARY BITS      = Active
SECONDARY BITS   = Idle    SECONDARY BITS    = Idle

       PSTSSTAST
       SYSTEM CLOCKIS-NRActive-----
# Cards using CLK A = 11   # Cards with bad CLK A = 0
# Cards using CLK B = 3    # Cards with bad CLK B = 0
# Cards using CLK I = 0
       PSTSSTAST
Command Completed.
```

   where:

   - `CARD LOC` is the TDM card location and the status of the MASP ·
   - `PRIMARY BITS` is the status of the primary composite clock
     - `Idle` indicates that the present clock source is valid but not selected as active clock source
     - `Active` indicates that the present clock source is valid and selected as active clock source
     - `Fault` indicates that no clock source is present ·
   - `SECONDARY BITS` is the status of the secondary composite clock
     - `Idle` indicates that the present clock source is valid but not selected as active clock source
     - `Active` indicates that the present clock source is valid and selected as active clock source
     - `Fault` indicates that no clock source is present ·
   - `# Cards using CLK A, B, I` is the number of cards using clocks A, B, and I. ·
   - `# Cards using CLK A, B` is the number of cards using clock A or clock B, when clock A or B is bad. NOTE: If any card indicates a bad clock, troubleshoot the card using the rept-stat-trbl command. Replace the card if necessary. If the bad clock error cannot be resolved, contact the *Customer Care Center* for assistance before starting the cable replacement.

   Note: There should be no cards using bad clocks. If any card indicates a bad clock, troubleshoot the card using the rept-stat-trbl command. Replace the card if necessary. If the bad clock error cannot be resolved, contact the *Customer Care Center* for assistance before starting the cable replacement.

6. From the output in *Step 5*, determine the IDLE clock cable.

   CAUTION: Always replace the IDLE clock cable first, whether it is the primary or secondary cable position. After the replacement of the first (IDLE) cable position, ensure the system reports the clock status properly with an ACTIVE and IDLE clock output. If the output reports the correct status the ACTIVE cable can be disconnected for replacement. Disconnecting the ACTIVE cable will transition the previously IDLE clock to the ACTIVE clock forcing the system to use the new clock cable that was installed.

7. Perform the following to prepare the open end of the new IDLE high-speed master and composite clock cable (P/N 830-0873-xx or P/N 830-1189-xx) for connection to the customer's high-speed and composite clock sources.
   a) Remove the outer insulation to expose the wires.
   b) Cut back any unused wires as shown in *Figure 100: Wire Coding of High-Speed Master and Composite Clock Cable (P/N 830-0873-xx or P/N 830-1189-xx)* .
   c) Slide on a 1-1/2 inch length of shrink-wrap tubing.
   d) Center the tubing on the end of the cable insulation before shrinking tubing with a heat gun.
   e) Ensure that each tie-wrap strap is cut flush with the tie-wrap head so that no sharp edges are exposed.

   CAUTION **CAUTION:** A system with DS0A links cannot run without a composite clock source. Take extreme caution when replacing the composite clock source cables. Remove one cable at a time and confirm between removal that the other composite clock source is active.

8. Remove the IDLE clock cable on the control shelf by removing the IDLE composite clock connector of cable (P/N 830-0226-xx) from the appropriate connector (J48 or J49) on the control shelf backplane.

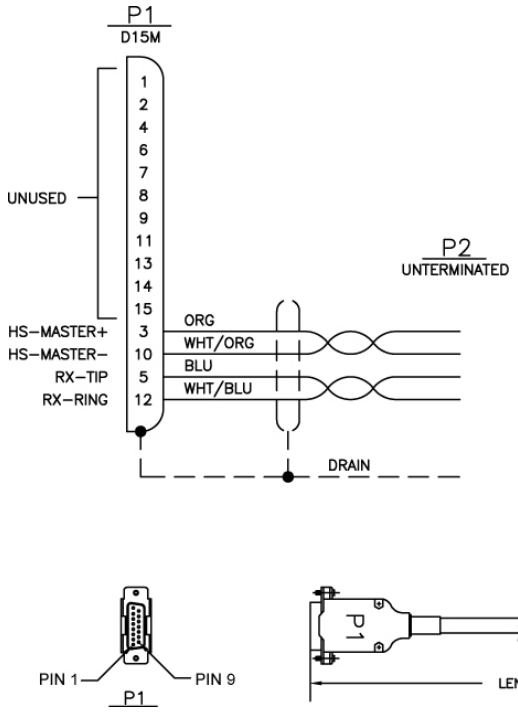
   At the terminal, the EAGLE 5 ISS displays the following alarms:

```
    tekelecstp 00-12-10 12:17:10 EST Rel 26.0.0
*   4306.0167  * CLOCK SYSTEM          1114-S clock failed
    tekelecstp 00-12-10 12:17:10 EST Rel 25.0.0-26.0.0
**  4307.0169 ** CLOCK SYSTEM          1114-S, 1116-S clocks failed
    tekelecstp 00-12-10 12:05:04 EST Rel 25.0.0-26.0.0
*   4276.0161  * CLOCK SYSTEM          1116-S clock failed
Legend: minor (*), major (**), critical (C*), and inhibited (I) alarms.
```

   CAUTION **CAUTION:** If Both PRIMARY BITS and SECONDARY BITS clocks show FAULT condition, reconnect the cable (P/N 830-0226-xx) to the appropriate connector (J48 or J49) and abort this procedure. Contact the *Customer Care Center* for assistance.

9. At the output panel of the customer composite clock source, locate the end of the composite/BITS clock cable (P/N 830-0226-xx) that was disconnected in *Step 8* and remove all wires.
10. Connect the new high-speed master clock and composite cable (P/N 830-0873-xx or P/N 830-1189-xx) to the site HS clock source.
    a) Cut the wires to length and strip.
    b) Wire-wrap to the appropriate IDLE (primary or secondary) clock connections on the customer clock source. Refer to the cable wire coding (P/N 830-0873-xx or P/N 830-1189-xx) shown in *Figure 100: Wire Coding of High-Speed Master and Composite Clock Cable (P/N 830-0873-xx or P/N 830-1189-xx)* for connection information.
       - Connect the HS clock source to the orange and white/orange wires.
       - Connect the composite clock source to the blue and white/blue wires.

Figure 100: Wire Coding of High-Speed Master and Composite Clock Cable (P/N 830-0873-xx or P/N 830-1189-xx)



Part Number		Length
North American	International	
830-0873-01	830-1189-01	50 FT
830-0873-02	830-1189-02	75 FT
830-0873-03	830-1189-03	100 FT
830-0873-04	830-1189-04	125 FT
830-0873-05	830-1189-05	150 FT
830-0873-06	830-1189-06	175 FT
830-0873-07	830-1189-07	200 FT
830-0873-08	830-1189-08	250 FT
830-0873-09	830-1189-09	300 FT
830-0873-10	830-1189-10	500 FT
830-0873-11	830-1189-11	600 FT
830-0873-12	830-1189-12	700 FT
830-0873-13	830-1189-13	800 FT
830-0873-14	830-1189-14	900 FT
830-0873-15	830-1189-15	1000 FT

11. Connect P1 of the high-speed master and composite clock cable (P/N 830-0873-xx or P/N 830-1189-xx) connector end to the appropriate IDLE ckock connector(J48 or J49). Tighten the connector with a slotted screw driver.

After the cable (P/N 830-0873-xx or P/N 830-1189-xx) wires are attached correctly to the site clock sources and connected to the control shelf (J48 or J49), the EAGLE 5 ISS terminal returns the message that alarms have been cleared:

```
tekelecstp 99-12-10 12:05:04 EST Rel 25.0.0-26.0.0
 4277.0113    CLOCK SYSTEM          Clock alarm(s) cleared
```

12. At the EAGLE 5 ISS terminal, reenter the clock status command to ensure that both primary and secondary BITS clocks are available again, enter:

```
rept-stat-clk
```

The output indicates whether the BITS clocks are running.

```
tekelecstp 00-12-10 11:35:15 EST Rel 25.0.0-26.0.0
CARD LOC = 1114 (Active )  CARD LOC  = 1116 (Standby)
PRIMARY BITS     = Active  PRIMARY BITS      = Active
SECONDARY BITS   = Idle    SECONDARY BITS    = Idle

       PSTSSTAST
       SYSTEM CLOCKIS-NRActive-----
# Cards using CLK A = 11   # Cards with bad CLK A = 0
# Cards using CLK B = 3    # Cards with bad CLK B = 0
# Cards using CLK I = 0
       PSTSSTAST
Command Completed.
```

Refer to *Step 5* for output legend

Note: There should be no bad clocks present in the output of the rept-stat-clk command. If bad clocks are present, contact the *Customer Care Center* for assistance.

13. Verify that you don't have any new alarms, refer to the recorded output obtained in *Step 4*. If you check the system for clock alarms, the output should show no clock errors; enter:

    ```
    rept-stat-trbl
    ```

    Note: There should be no clock error messages present in the output of the rept-stat-trbl command. If clock error messages are present, contact the *Customer Care Center* for assistance.

14. Perform the following to prepare the open end of the second new high-speed master and composite clock cable, currently the ACTIVE, (P/N 830-0873-xx or P/N 830-1189-xx) for connection to the customer's high-speed and composite clock sources.

    a) Remove the outer insulation to expose the wires.
    b) Cut back any unused wires as shown in *Figure 100: Wire Coding of High-Speed Master and Composite Clock Cable (P/N 830-0873-xx or P/N 830-1189-xx)* .
    c) Slide on a 1-1/2 inch length of shrink-wrap tubing.
    d) Center the tubing on the end of the cable insulation before shrinking tubing with a heat gun.
    e) Ensure that each tie-wrap strap is cut flush with the tie-wrap head so that no sharp edges are exposed.

    CAUTION: A system with DS0A links cannot run without a composite clock source. Take extreme caution when replacing the composite clock source cables. Remove one cable at a time and confirm between removal that the other composite clock source is active.

15. Remove the ACTIVE clock cable on the control shelf by removing the ACTIVE composite clock connector of cable (P/N 830-0226-xx) from the appropriate connector (J48 or J49) on the control shelf backplane.

    At the terminal, the EAGLE 5 ISS displays the following alarms:

    ```
        tekelecstp 00-12-10 12:17:10 EST Rel 26.0.0
    *   4306.0167  * CLOCK SYSTEM          1114-P clock failed
        tekelecstp 00-12-10 12:17:10 EST Rel 25.0.0-26.0.0
    **  4307.0169 ** CLOCK SYSTEM          1114-P, 1116-P clocks failed
        tekelecstp 00-12-10 12:05:04 EST Rel 25.0.0-26.0.0
    *   4276.0161  * CLOCK SYSTEM          1116-P clock failed
    Legend: minor (*), major (**), critical (C*), and inhibited (I) alarms.
    ```


    CAUTION: If Both PRIMARY BITS and SECONDARY BITS clocks show FAULT condition, reconnect the cable (P/N 830-0226-xx) to the appropriate connector (J48 or J49) and abort this procedure. Contact the *Customer Care Center* for assistance.

16. If you check the system for clock alarms, the output will show clock errors; enter:

    ```
    rept-stat-trbl
    ```

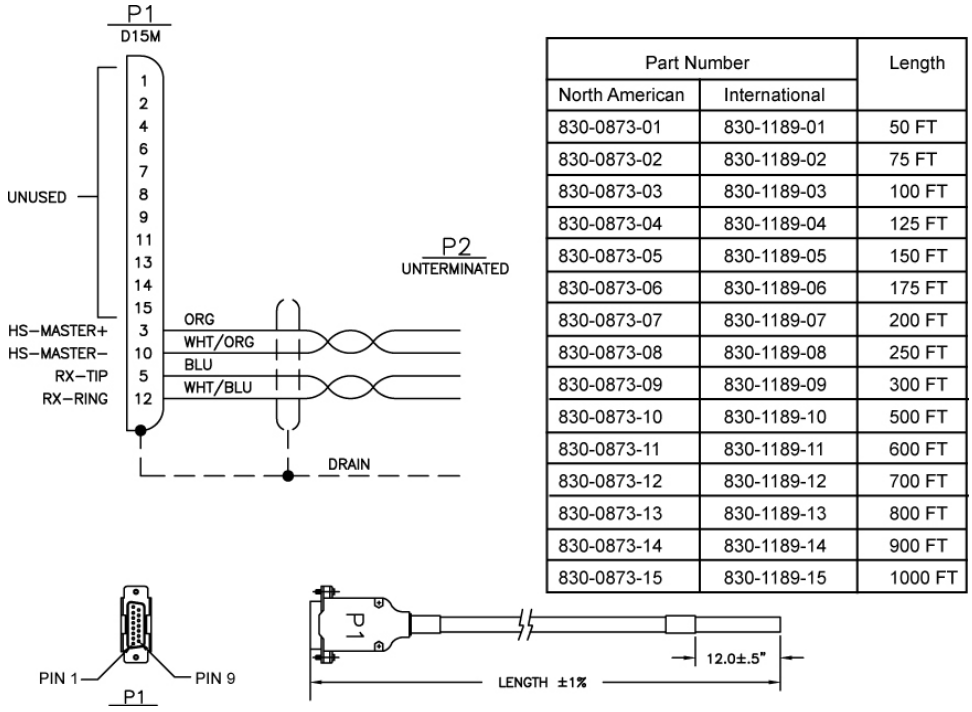
    The output will show any minor (*), major (**), critical (C*), and inhibited (I) alarms. The following display shows possible error messages with their alarm indicators:

    ```
    * 0014.0021 *   CARD 1116 OAM Clock A for card failed, Clock B normal
    * 0014.0022 *   CARD 1116 OAM Clock B for card failed, Clock A normal
    * 0014.0023 *   CARD 1116 OAM Clocks A and B for card failed
    **0046.0023  * CARD 1201 ATMANSI Clocks A and B for card failed
    **4307.0164 ** CLOCK SYSTEM  1114-P, 1116-P clocks failed
    Legend: minor (*), major (**), critical (C*), and inhibited (I) alarms.
    ```

17. At the output panel of the customer composite clock source, locate the end of the composite/BITS clock cable (P/N 830-0226-xx) that was disconnected in *Step 15* and remove all wires.

18. Connect the new high-speed master clock and composite cable (P/N 830-0873-xx or P/N 830-1189-xx) to the site HS clock source.
    a) Cut the wires to length and strip.
    b) Wire-wrap to the appropriate IDLE (primary or secondary) clock connections on the customer clock source. Refer to the cable wire coding (P/N 830-0873-xx or P/N 830-1189-xx) shown in *Figure 100: Wire Coding of High-Speed Master and Composite Clock Cable (P/N 830-0873-xx or P/N 830-1189-xx)* for connection information.
        - Connect the HS clock source to the orange and white/orange wires.
        - Connect the composite clock source to the blue and white/blue wires.

Figure 101: Wire Coding of High-Speed Master and Composite Clock Cable (P/N 830-0873-xx or P/N 830-1189-xx)



Part Number		Length
North American	International	
830-0873-01	830-1189-01	50 FT
830-0873-02	830-1189-02	75 FT
830-0873-03	830-1189-03	100 FT
830-0873-04	830-1189-04	125 FT
830-0873-05	830-1189-05	150 FT
830-0873-06	830-1189-06	175 FT
830-0873-07	830-1189-07	200 FT
830-0873-08	830-1189-08	250 FT
830-0873-09	830-1189-09	300 FT
830-0873-10	830-1189-10	500 FT
830-0873-11	830-1189-11	600 FT
830-0873-12	830-1189-12	700 FT
830-0873-13	830-1189-13	800 FT
830-0873-14	830-1189-14	900 FT
830-0873-15	830-1189-15	1000 FT

19. Connect P1 of the high-speed master and composite clock cable (P/N 830-0873-xx or P/N 830-1189-xx) connector end to the appropriate ckock connector(J48 or J49). Tighten the connector with a slotted screw driver.

    After the cable (P/N 830-0873-xx or P/N 830-1189-xx) wires are attached correctly to the site clock sources and connected to the control shelf (J48 or J49), the EAGLE 5 ISS terminal returns the message that alarms have been cleared:

```
tekelecstp 99-12-10 12:05:04 EST Rel 25.0.0-26.0.0
 4277.0113    CLOCK SYSTEM          Clock alarm(s) cleared
```

20. At the EAGLE 5 ISS terminal, reenter the clock status command to ensure that both primary and secondary BITS clocks are available again, enter:

```
rept-stat-clk
```

The output indicates whether the BITS clocks are running.

```
tekelecstp 00-12-10 11:35:15 EST Rel 25.0.0-26.0.0
CARD LOC = 1114 (Active )  CARD LOC  = 1116 (Standby)
PRIMARY BITS     = Idle      PRIMARY BITS      = Idle
SECONDARY BITS   = Active    SECONDARY BITS    = Activee

       PSTSSTAST
       SYSTEM CLOCKIS-NRActive-----
# Cards using CLK A = 11   # Cards with bad CLK A = 0
# Cards using CLK B = 3    # Cards with bad CLK B = 0
# Cards using CLK I = 0
       PSTSSTAST
Command Completed.
```

Refer to *Step 5* for output legend

Note: There should be no bad clocks present in the output of the rept-stat-clk command. If bad clocks are present, contact the *Customer Care Center* for assistance.

21. Verify that you don't have any new alarms, refer to the recorded output obtained in *Step 4*. If you check the system for clock alarms, the output should show no clock errors; enter:

```
rept-stat-trbl
```

Note: There should be no clock error messages present in the output of the rept-stat-trbl command. If clock error messages are present, contact the *Customer Care Center* for assistance.

You have completed the cable replacement procedure for the high-speed master and composite clock cables on EAGLE 5 ISS systems with backplane (P/N 850-0330-06/07).

HS Master and Composite Clock Cables on Backplane P/N 850-0330-03/04

On systems with control shelf backplane (P/N 850-0330-03/04), the high-speed master clock cable (P/N 830-0873-xx or P/N 830-1189-xx) sends only high-speed clock signals to the EAGLE 5 ISS. The existing composite clock cables (P/N 830-0226-xx) continue to provide the low-speed clock connections to connectors J42 and J41 (Primary BITS and Secondary BITS) on the backplane. The HS cables (P/N 830-0873-xx or P/N 830-1189-xx) send the HS primary and secondary clock signals through adapter cables (P/N 830-0846-01) to connectors J57 and J56 on the backplane. The two connectors are labeled ACLK3 and ACLK4.

This procedure describes the steps required to install the HS clock cables on the EAGLE 5 ISS with control shelf backplane (P/N 850-0330-03/04) using adapter cable (P/N 830-0846-01).

CAUTION: A system with DS0A links cannot run without a composite clock source. This procedure requires removing and replacing the ACLK3 cables to frame 3 (shelves 4100, 4200, 4300) and frame 4, ACLK4 (shelves 5100, 5200, 5300). Take extreme caution when removing and replacing the ACLK cables. Remove one cable at a time and confirm before removal that the BCLK clock source is active to that frame.

CAUTION: Perform this procedure during a maintenance window.

CAUTION: Prior to adding or replacing the high-speed master and composite clock cables, perform an EAGLE 5 ISS system health check.

CAUTION: HS clock alarms are only generated for ATM LIM cards and E1/T1 MIM if the card is provisioned to use the HS clock.

CAUTION: Always replace the IDLE clock cable first, whether it's the primary or secondary cable position. After the replacement of the first (Idle) cable position, ensure the system reports the clock status properly with an active and idle clock output. If the output reports the correct status you are know able to replace the active cable which will force the system to use the new clock cable (idle) position and it will transition state to active.

CAUTION: Connectors ACLK3 and ACLK4 propagate system A clocks to frame 3 (shelves 4100, 4200, and 4300) and frame 4 (shelves 5100, 5200, 5300). System A clock signals to cards in these shelves will be lost during this procedure. If the EAGLE 5 ISS contains these shelves with cards installed the cards switch automatically to the system B clock sources when the A clock sources are removed.

Note: In this procedure, the high-speed clock status indicated in the output of the `rept-stat-clk` command reflects the presence of at least one ATM LIM card or E1/T1 MIM in the system. The status fields remain empty until the card is configured to use the high-speed clock.

Procedure — Replace or Add HS Master Timing Clock Cables with:backplane (P/N 850-0330-03/04)

1. Prior to cable replacement, check your system for any troubles. At the EAGLE 5 ISS terminal, enter:

   `rept-stat-trbl`

   Record any troubles and ensure that no clock problems exist.

   Note: If clock errors exist that cannot be resolved, contact the *Customer Care Center* for assistance before starting the cable replacement.

2. Generate a clock status report to ensure that the current primary and secondary composite clock sources are running and determine which MASP is active or on standby; enter:

   `rept-stat-clk`

   The output displays the card status and the presence of the primary and secondary clocks, the number of cards that use clocks A and B, and the number of cards using bad clocks.

```
tekelecstp 00-12-10 11:35:15 EST Rel 26.0.0
CARD LOC = 1114 (Active )  CARD LOC  = 1116 (Standby)
PRIMARY BITS     = Active  PRIMARY BITS      = Active
SECONDARY BITS   = Idle    SECONDARY BITS    = Idle

       PSTSSTAST
       SYSTEM CLOCKIS-NRActive-----
# Cards using CLK A = 11   # Cards with bad CLK A = 0
# Cards using CLK B = 3    # Cards with bad CLK B = 0
# Cards using CLK I = 0
       PSTSSTAST
Command Completed.
```

   where:

   - `CARD LOC` is the TDM card location and the status of the MASP ·
   - `PRIMARY BITS` is the status of the primary composite clock
     - `Idle` indicates that the present clock source is valid but not selected as active clock source

- `Active` indicates that the present clock source is valid and selected as active clock source
- `Fault` indicates that no clock source is present ·

- `SECONDARY BITS` is the status of the secondary composite clock
  - `Idle` indicates that the present clock source is valid but not selected as active clock source
  - `Active` indicates that the present clock source is valid and selected as active clock source
  - `Fault` indicates that no clock source is present ·
- `# Cards using CLK A, B, I` is the number of cards using clocks A, B, and I. ·
- `# Cards using CLK A, B` is the number of cards using clock A or clock B, when clock A or B is bad. NOTE: If any card indicates a bad clock, troubleshoot the card using the `rept-stat-trbl` command. Replace the card if necessary. If the bad clock error cannot be resolved, contact the *Customer Care Center* for assistance before starting the cable replacement.

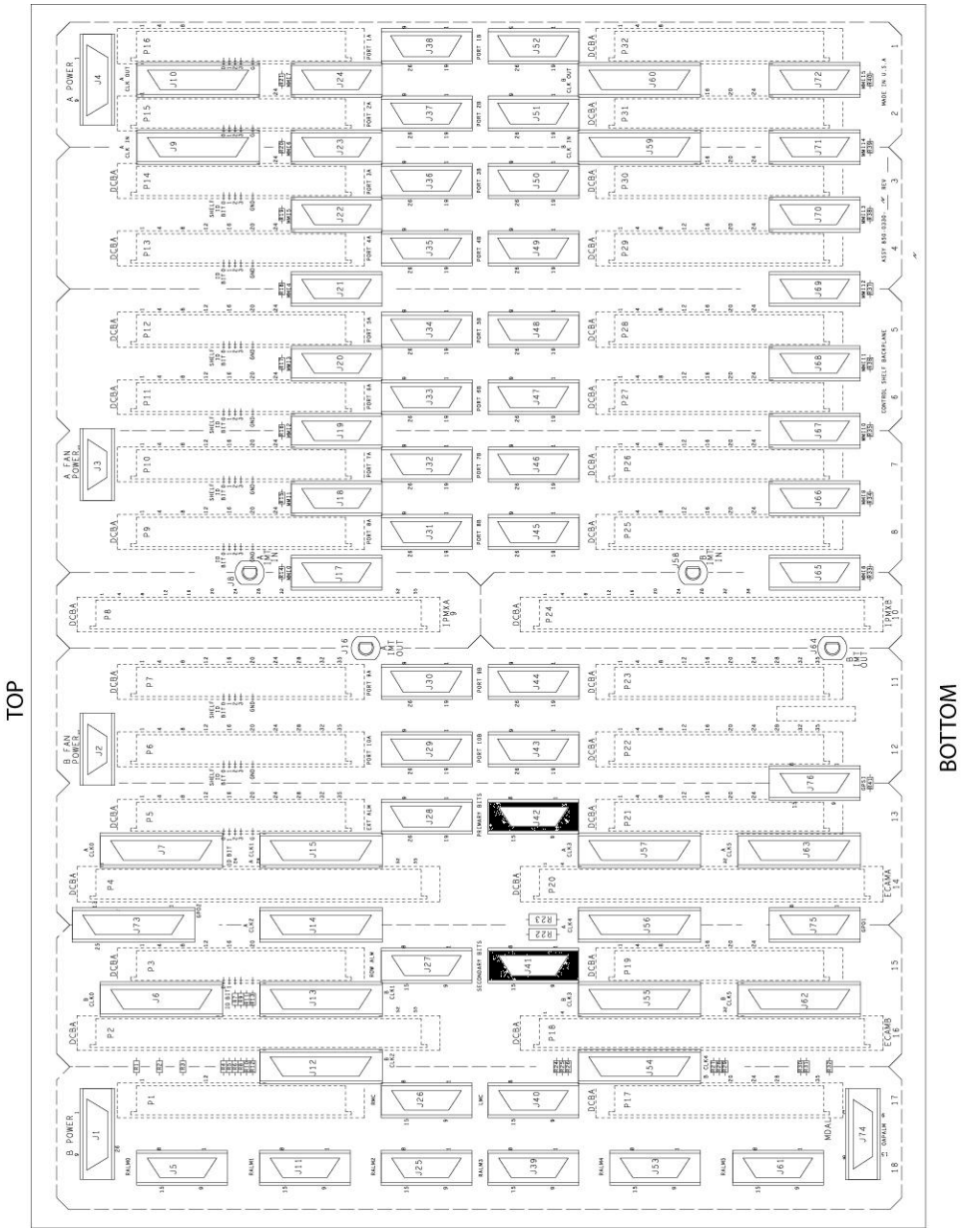
Note: There should be no cards using bad clocks. If any card indicates a bad clock, troubleshoot the card using the `rept-stat-trbl` command. Replace the card if necessary. If the bad clock error cannot be resolved, contact the *Customer Care Center* for assistance before starting the cable replacement.

3. Before starting the cable replacement, physically locate the:
   - two new HS clock cables (P/N 830-0873-xx) to be connected to the customers HS clock source ·
   - adapter cables (P/N (830-0846-01) ·
   - the existing composite clock cables (P/N 830-0226-xx) connected to the primary and secondary BITS clock sources and connectors (J42 and J41) on the control shelf backplane. ·
   - any existing ACLK cables connected to ACLK3 and ACLK4 (J57 and J56) on the control shelf backplane

     Note: Depending on the amount of extension shelves in the system the cables connecting ACLK3 and ACLK4 to extension frames may not be installed. If these cables are not installed the P2 (DB25) end of the adapter cables (P/N 830-0846-01) are not used. Secure the unused P2 end of the adapter cables with tie-wraps.

Figure 102: Control Shelf (P/N 850-0330-03 or -04) BITS Connectors shows the location of these connectors on the control shelf backplane.

Figure 102: Control Shelf (P/N 850-0330-03 or -04) BITS Connectors



WARNING

WARNING: Metal points on the PCB conduct -48VDC and can cause shorts, shocks, and damage if not handled properly.

4. Obtain the two new primary and secondary high-speed master clock cables (P/N 830-0873-xx or P/N 830-1189-xx). Cut out the cable ties along the route of the existing composite clock cables (P/N 830-0226-xx).
5. Route the new HS master clock cables (P/N 830-0873-xx) using new cable ties. Route the primary and secondary HS clock cables from the customer's high-speed clock sources to the EAGLE 5 ISS control shelf backplane near connectors J57 and J56.

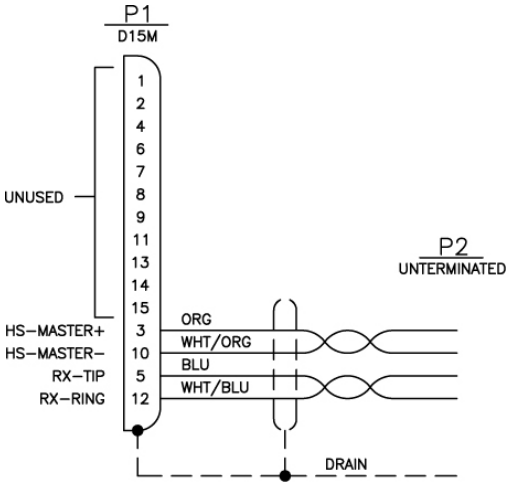
Note: Route but do not connect the new cables to the backpanel at this time to avoid any accidental pull on cable connectors that could disconnect them from the composite clock source. Always route clock cables on separate cable racks, if provided, for redundancy.

Ensure that each tie-wrap strap is cut flush with the tie-wrap head so that no sharp edges are exposed.

6. Prepare the open end of the new primary high-speed master and composite clock cable (P/N 830-0873-xx or P/N 830-1189-xx) for connection to the customer's primary clock and high-speed clock sources. Remove the outer insulation to expose the wires.
7. Slide on a 1-1/2 inch length of shrink-wrap tubing. Center the tubing on the end of the cable insulation before shrinking tubing with a heat gun.
8. Connect the open cable end wires to the site primary and secondary high-speed clock sources. Connect the primary and secondary HS master clock source cables (P/N 830-0873-xx or P/N 830-1189-xx) to the wires attached to connector P1, pins 10 and 3, on each cable.

Figure 103: Wire Coding of High-Speed Master and Composite Clock Cable (P/N 830-0873-xx or P/N 830-1189-xx) 4 shows the connector pin outs of the high-speed master clock cable adapter cable (P/N 830-0873-xx or P/N 830-1189-xx).

Figure 103: Wire Coding of High-Speed Master and Composite Clock Cable (P/N 830-0873-xx or P/N 830-1189-xx)



Part Number		Length
North American	International	
830-0873-01	830-1189-01	50 FT
830-0873-02	830-1189-02	75 FT
830-0873-03	830-1189-03	100 FT
830-0873-04	830-1189-04	125 FT
830-0873-05	830-1189-05	150 FT
830-0873-06	830-1189-06	175 FT
830-0873-07	830-1189-07	200 FT
830-0873-08	830-1189-08	250 FT
830-0873-09	830-1189-09	300 FT
830-0873-10	830-1189-10	500 FT
830-0873-11	830-1189-11	600 FT
830-0873-12	830-1189-12	700 FT
830-0873-13	830-1189-13	800 FT
830-0873-14	830-1189-14	900 FT
830-0873-15	830-1189-15	1000 FT

CAUTION

CAUTION: A system with DS0A links cannot run without a composite clock source. Take extreme caution when replacing the composite clock source cables. Remove one cable at a time and confirm between removal that the other composite clock source is active.

Note: If the ACLK3 or ACLK4 connectors did not have cables connected as indicated in *Step 3*the P2 (DB 25) end of the adapter cable is not used. Using tie-wraps secure the P2 end of the cable.

9. Start adding the primary HS clock cable (P/N 830-0873-xx) and adapter cable (P/N 830-0846-01) on the control shelf by removing the cable end at ACLK3 connector J57.

   At the terminal, the EAGLE 5 ISS displays alarms indicating loss of ACLK to cards on shelves 4100, 4200, and 4300 with BCLK normal.

10. Generate a clock status report to confirm that the secondary composite clock is now active. Enter the following command:

    ```
    rept-stat-clk
    ```

    The system returns output similar to the following:

    ```
    tekelecstp 00-12-10 11:35:15 EST Rel 26.0.0
    CARD LOC = 1114 (Active   ) CARD LOC = 1116 (Standby  )
    PRIMARY BITS     = Fault    PRIMARY BITS     = Fault
    SECONDARY BITS   = Active   SECONDARY BITS   = Active
           PSTSSTAST
           SYSTEM CLOCKIS-NRActive-----
    # Cards using CLK A = 11   # Cards with bad CLK A = 0
    # Cards using CLK B = 3    # Cards with bad CLK B = 0
    # Cards using CLK I = 0
           PSTSSTAST
    Command Completed.
    ```

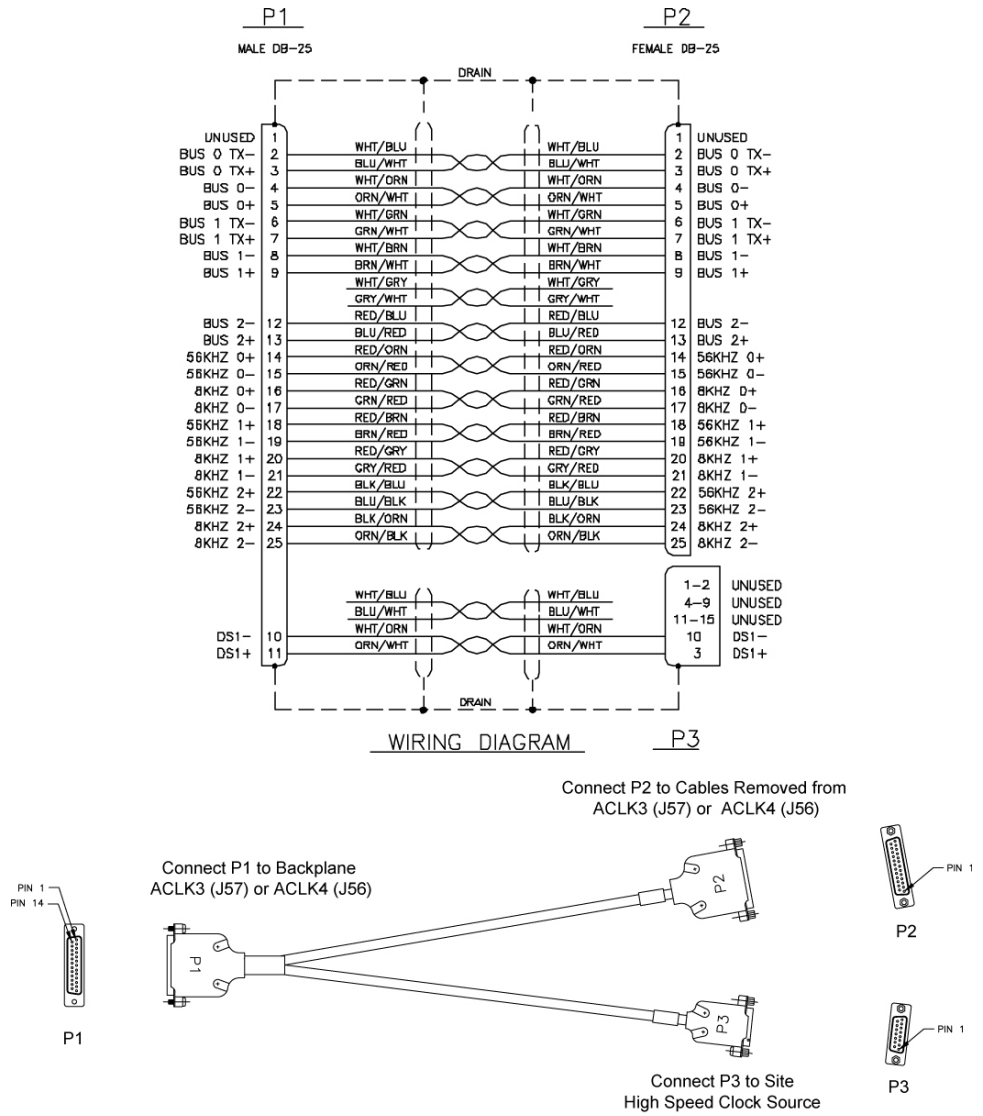
    Refer to *Step 2* for output legend.

    CAUTION: If cards on shelves 4100, 4200, and 4300 indicate bad ACLK and BCLK reconnect the ACLK3 cable to connector J57 and abort this procedure. Contact the *Customer Care Center* for assistance.

    Note: In the following steps reference *Figure 104: High-Speed Master Timing Adapter Cable (P/N 830-0846-01)* for cabling connections.

11. Connect the adapter cable (P/N 830-0846-01) P1 (DB25) to ACLK3 connector J57 on the control shelf backplane. Tighten the connector with a slotted screw driver.

    Figure 104: High-Speed Master Timing Adapter Cable (P/N 830-0846-01)



12. Connect the adapter cable (P/N 830-0846-01) P2 (DB25) to the end of the ACLK cable removed in Step\ Tighten the connector with a slotted screw driver.

This step reconnects the ACLK3 signals to shelves 4100, 4200, 4300.

At the terminal, the EAGLE 5 ISS displays messages indicating return of ACLK to cards on shelves 4100, 4200, and 4300 with BCLK normal.

13. Connect the primary HS master clock cable (P/N 830-0873-xx) connector end to adapter cable (P/N 830-0846-01) P3 (DB15). Tighten the connector with a slotted screw driver.

This step connects the customer primary HS clock source to the TDM card through the unused contacts of the ACLK3 connector J57.

After the wires are attached correctly, the EAGLE 5 ISS terminal returns the following message:

```
tekelecstp 00-12-10 12:05:04 EST Rel 26.0.0
 4277.0113    CLOCK SYSTEM          Clock alarm(s) cleared
```

14. At the EAGLE 5 ISS terminal, reenter the clock status command to ensure that both primary and secondary BITS clocks are available again, enter:

    `rept-stat-clk`

    The output indicates whether the BITS clocks are running. In this example, the secondary BITS clock is still active and the primary BITS clock is running but in standby mode.

```
tekelecstp 00-12-10 11:35:15 EST Rel 25.0.0-26.0.0
CARD LOC = 1114 (Active  ) CARD LOC = 1116 (Standby)
PRIMARY BITS     = Idle    PRIMARY BITS     = Idle
SECONDARY BITS   = Active  SECONDARY BITS   = Active

       PSTSSTAST
       SYSTEM CLOCKIS-NRActive-----
# Cards using CLK A = 11   # Cards with bad CLK A = 0
# Cards using CLK B = 3    # Cards with bad CLK B = 0
# Cards using CLK I = 0
       PSTSSTAST
Command Completed.
```

    Refer to *Step 2* for output legend

    Note: There should be no bad clocks present in the output of the rept-stat-clk command. If bad clocks are present, contact the *Customer Care Center* for assistance.

15. Verify that you don't have any new alarms, refer to the recorded output obtained in *Step 1*. If you check the system for clock alarms, the output should show no clock errors; enter:

    `rept-stat-trbl`

    Note: There should be no clock error messages present in the output of the rept-stat-trbl command. If clock error messages are present, contact the *Customer Care Center* for assistance.

16. To continue this procedure to add the secondary HS clock cables go to *Step 13*.

    CAUTION: A system with DS0A links cannot run without a composite clock source. Take extreme caution when replacing the ACLK to extension shelf cables. Remove one cable at a time and confirm between removal that the other composite clock source on that shelf is active.

17. Start adding the secondary HS clock cable the cable (P/N 830-0873-xx) and adapter (P/N 830-0846-01) on the control shelf by removing the cable end at ACLK4 connector J56.

    At the terminal, the EAGLE 5 ISS displays alarms indicating loss of ACLK to cards on shelves 5100, 5200, and 5300 and BCLK normal.

18. Generate a clock status report to confirm that cards on shelves 5100, 5200, and 5300 are using the BCLK. Enter the following command:

    `rept-stat-clk`

    The output indicates whether the BITS clock is running again. In this example, the primary BITS clock is active and the secondary BITS clock has failed.

```
tekelecstp 00-12-10 11:35:15 EST Rel 26.0.0
CARD LOC = 1114 (Active   )CARD LOC = 1116 (Standby  )
PRIMARY BITS     = Active  PRIMARY BITS     = Active
SECONDARY BITS   = Fault   SECONDARY BITS   = Fault
       PSTSSTAST
       SYSTEM CLOCKIS-NRActive-----
# Cards using CLK A = 11   # Cards with bad CLK A = 0
# Cards using CLK B = 3    # Cards with bad CLK B = 0
```

```
# Cards using CLK I = 0
       PSTSSTAST
Command Completed.
```

Refer to Step 2 for output legend.

CAUTION: If cards on shelves 5100, 5200, and 5300 indicate bad ACLK and BCLK, reconnect the ACLK3 cable to connector J57 and abort this procedure. Contact the *Customer Care Center* for assistance.

19. Connect the adapter cable (P/N 830-0846-01) P1 (DB25) to ACLK4 connector J56 on the control shelf backplane. Tighten connector with slotted screw driver.

    Note: If the ACLK3 and ACLK4 connectors did not have cables connected as indicated in *Step 3* the P2 (DB 25) end of the adapter cable is not used. Using tie-wraps secure the P2 end of the cable.

20. Connect the adapter cable (P/N 830-0846-01) P2 (DB25) to the end of the ACLK cable removed in *Step 3*. Tighten the connector with a slotted screw driver. This step reconnects the ACLK4 signals to shelves 5100, 5200, 5300.

    At the terminal, the EAGLE 5 ISS displays messages indicating return of ACLK to cards on shelves 5100, 5200, and 5300 and BCLK normal.

21. Connect the secondary HS master clock cable (P/N 830-0873-xx) connector end to adapter cable (P/N 830-0846-01) P3 (DB15). Tighten the connector with a slotted screw driver.

    This step connects the customer secondary HS clock source to the TDM card through the unused contacts of the ACLK4 connector J56.

    After the cables are attached correctly, the EAGLE 5 ISS terminal returns the following message:

```
tekelecstp 00-12-10 12:05:04 EST Rel 26.0.0
  4277.0113    CLOCK SYSTEM          Clock alarm(s) cleared
```

22. At the EAGLE 5 ISS terminal, reenter the clock status command to ensure that both primary and secondary BITS clocks are available again, enter:

    ```
    rept-stat-clk
    ```

    The output indicates whether the BITS clocks are running. In this example, the secondary BITS clock is still active and the primary BITS clock is running but in standby mode.

```
tekelecstp 00-12-10 11:35:15 EST Rel 26.0.0
CARD LOC = 1114 (Active   )CARD LOC = 1116 (Standby  )
PRIMARY BITS     = Active  PRIMARY BITS     = Active
SECONDARY BITS   = Fault   SECONDARY BITS   = Fault
       PSTSSTAST
       SYSTEM CLOCKIS-NRActive-----
# Cards using CLK A = 11   # Cards with bad CLK A = 0
# Cards using CLK B = 3    # Cards with bad CLK B = 0
# Cards using CLK I = 0
       PSTSSTAST
Command Completed.
```

    Refer to *Step 2* for output legend.

    Note: There should be no bad clocks present in the output of the rept-stat-clk command. If bad clocks are present, contact the *Customer Care Center* for assistance.

23. Verify that you don't have any new alarms, refer to the recorded output obtained in *Step 1*. If you check the system for clock alarms, the output should show no clock errors; enter:

```
rept-stat-trbl
```

Note: There should be no clock error messages present in the output of the rept-stat-trbl command. If clock error messages are present, contact the *Customer Care Center* for assistance.

You have completed the cable replacement procedure for the high-speed master clock cables on EAGLE 5 ISS systems with control shelf backplane (P/N 850-0330-03/04.

A Clock and B Clock Cable Replacement

Proper support for HMUX and alarm reporting require that all A and B clock cables be of P/N 830-0398-xx (domestic) or P/N 830-1150-xx (international). Clock cables of P/N 830-0404-xx must be replaced. The A and B clock cables typically are from the control shelf and those coming in from an extension shelf. These cables contain proper alarm alert capabilities and support HMUX. See *Figure 105: Cable (P/N 830-0404-xx)* and *Figure 106: Cable 830-0398-xx or 830-1150-xx*.

This procedure can also be used for regular clock cable replacement.

Perform the replacement during a maintenance window and prior to fan assembly installation.

Figure 105: Cable (P/N 830-0404-xx)

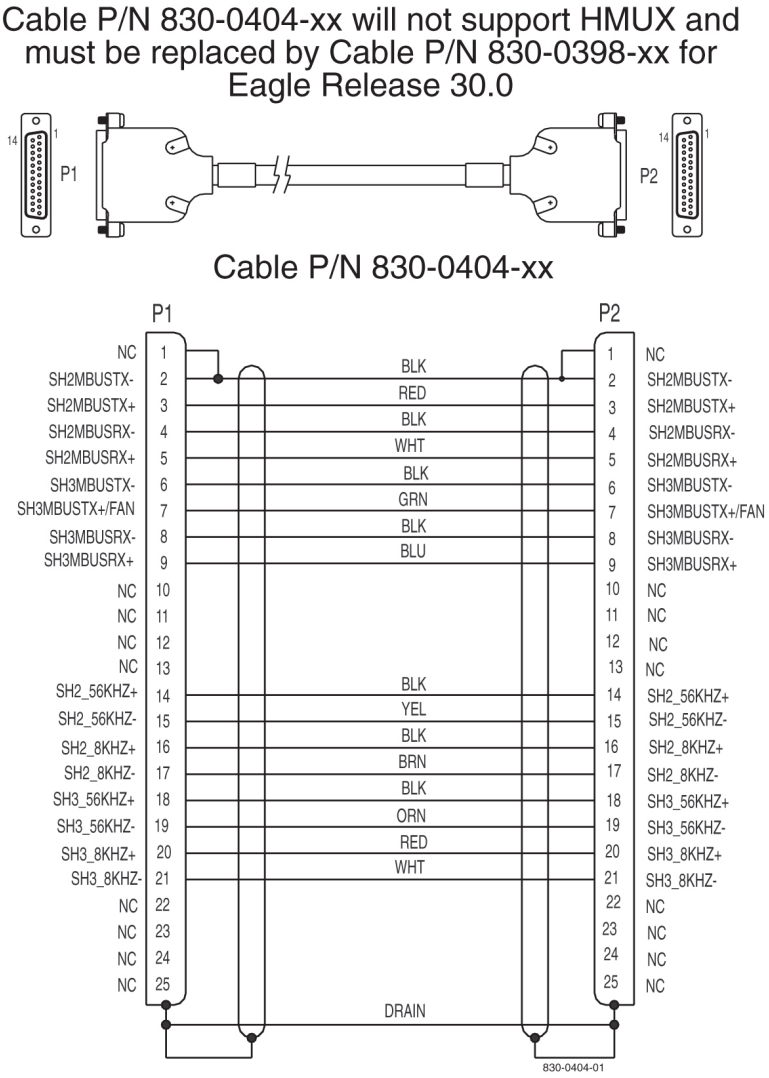
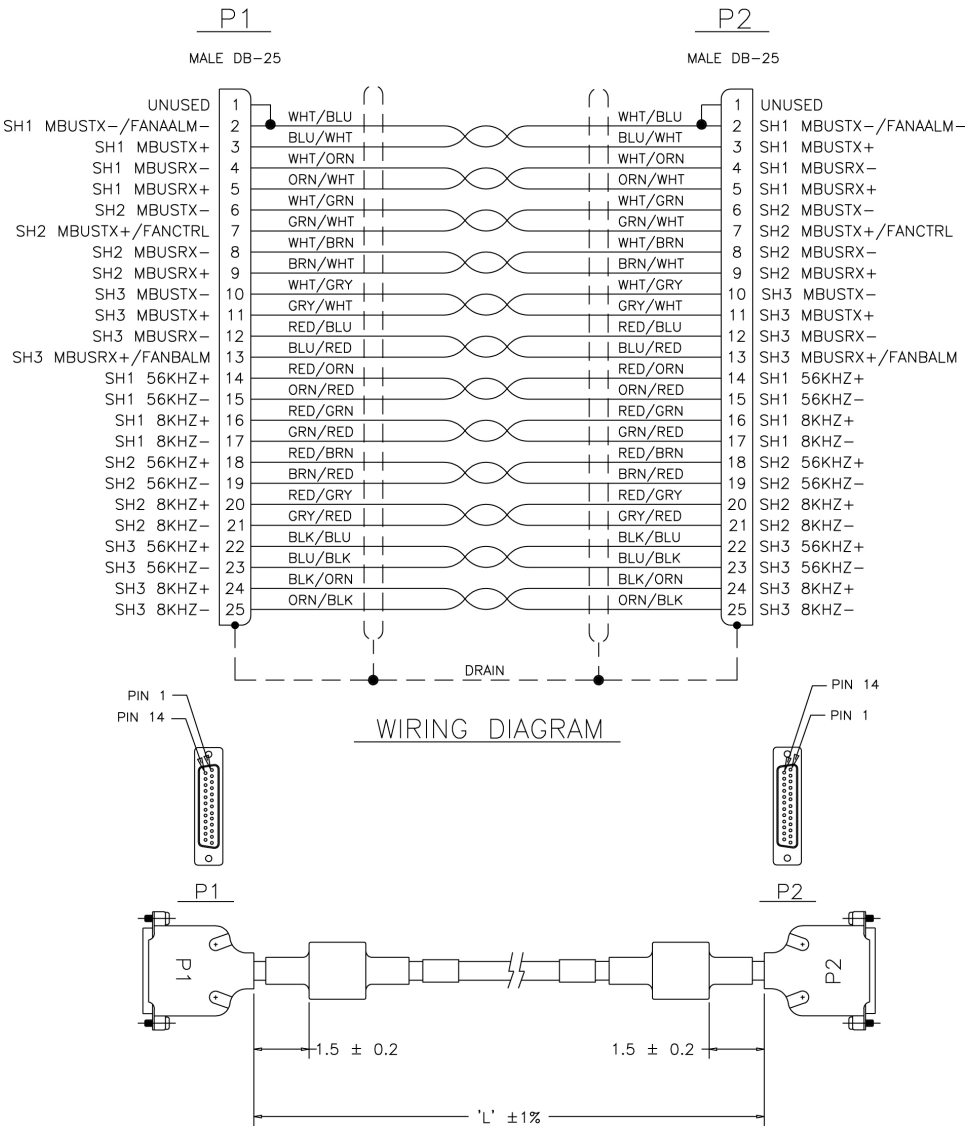


Figure 106: Cable 830-0398-xx or 830-1150-xx



Procedure — Replacing A Frame Clock Cables

This procedure explains the replacement of one A frame clock cable. The steps show the replacement of one frame clock cable and are repeated for every frame clock cable that is to be replaced.

1. Remove the plastic panels from the back of all shelves that require the frame clock cables be replaced.
2. Install Pin Protector Assembly on all shelves that require the frame clock cables be replaced.

   The pin protectors are placed over the ID pins directly to the right and left of the A CLK IN cables connectors on each shelf. Shelf ID pins must be covered with pin protectors. If contact is made with the ID pins, the shelf may lose its identity.
3. Connect a laptop or access by way of a monitor, the EAGLE 5 ISS system and start a terminal emulator program such as ProComm.
4. Open a captured file by simultaneously pressing the **Alt** and **F1** keys

Name the file the last four digits of the *[*NT#*]xxyyzz*.CAP

Example: `2641E1T1_A.cap`

5. Issue the command to report clock status.

   `rept-stat-clk`

   Response to the clock status command is displayed.

```
tekelecstp 03-02-10 05:34:03 HST Rel XX.x.x-XX.x.x
   rept-stat-clk
   Command entered at termoinal #1.
;
   tekelecstp 03-02-10 05:34:03 HST Rel XX.x.x-XX.x.x
   CARD LOC= 1114 (Standby)    CARD LOC= 1116 (Active)
   PRIMARY BITS     = Active PRIMARY BITS       = Active
   SECONDARY BITS   = Idle    SECONDARY BITS     = Idle
   HS PRIMARY CLK   = Active HS PRIMARY CLK     = Active
   HS SECONDARY CLK = Idle









    HS SECONDARY CLK   = Idle
                         PST           SST       AST
   SYSTEM CLOCK          IS-NR         Active    -----
   # Cards using CLK A = 7    # Cards with bad CLK A = 000
   # Cards using CLK B = 0    # Cards with bad CLK B = 000
   # Cards using CLK I = 0
   Command Completed.
                         PST           SST       AST
   HS SYSTEM CLOCK       IS-NR         Active    -----
   # Cards using HS CLK A = 1   # Cards with bad HS CLK A = 0
   # Cards using HS CLK B = 0   # Cards with bad HS CLK B = 0
   # Cards using HS CLK I = 0

   Command Completed.
;
```

6. Verify that both BITS clocks are either in IDLE or ACTIVE state on both ACTIVE and STANDBY MASP

   All underlined cards-with-bad-CLK values should equal zero.

7. For the A frame clock cable being replaced remove all tie wraps or lacing cord securing the cable in the frame.
8. Remove the A frame clock cable from the shelf's A CLK OUT connector.

   Figure 107: Backplane P/N 850-0330-06 or -07 Control Shelf

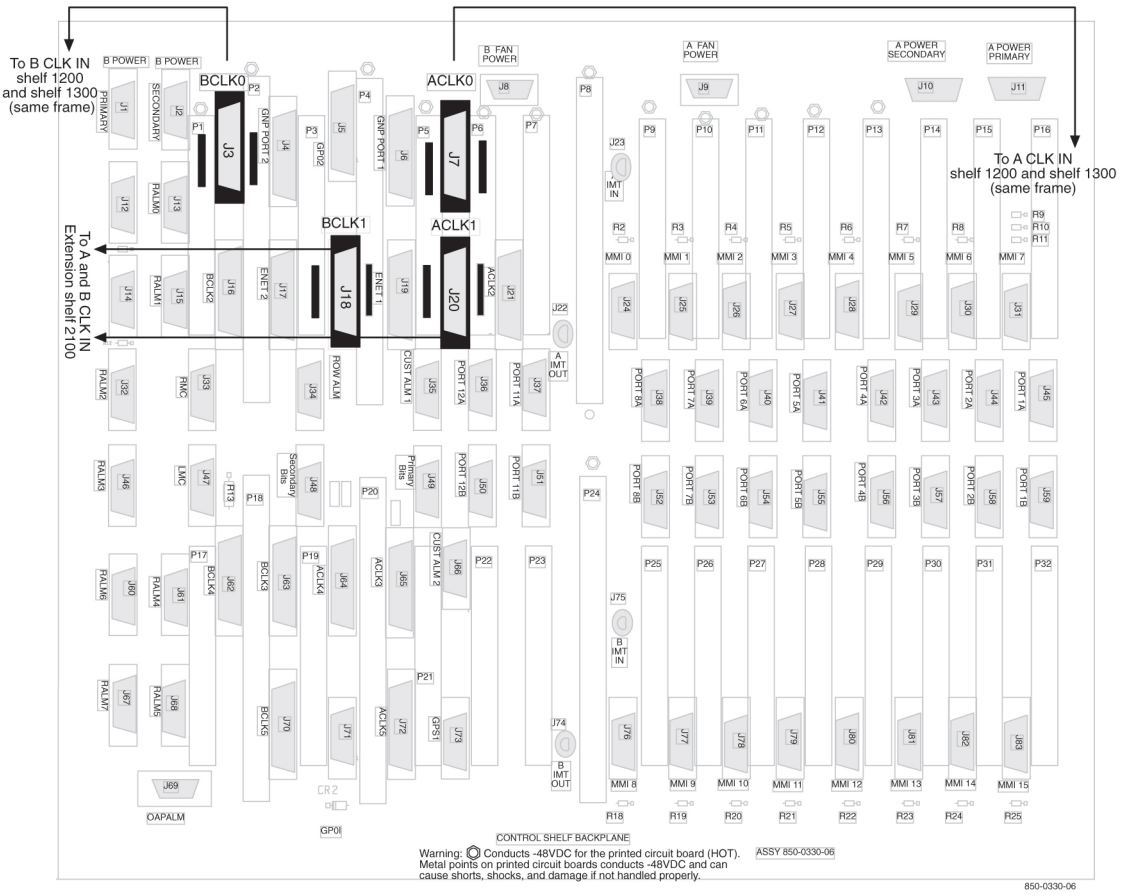
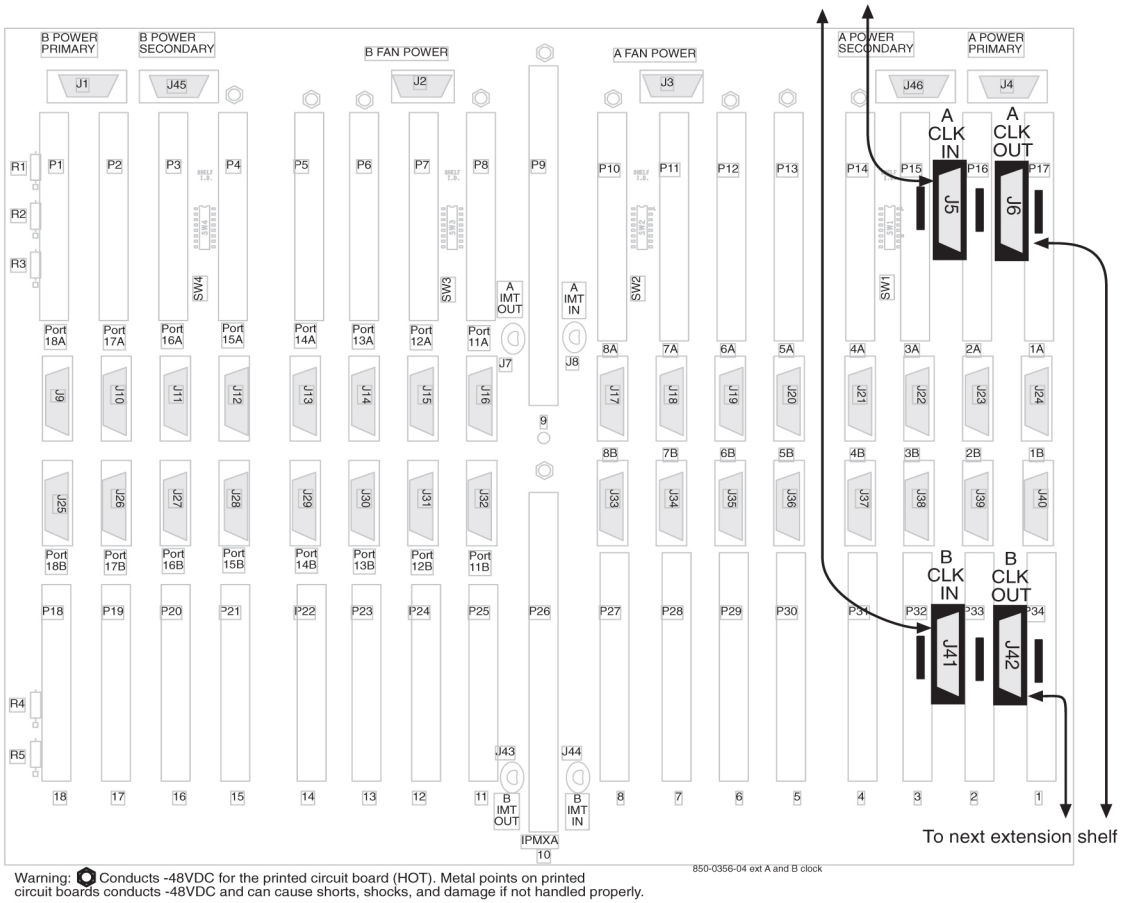


Figure 108: Backplane P/N 850-0356-04 Extension Shelf



9. Remove the other end of the frame clock cable from the next shelf's A CLK IN connector.
10. Select the new frame clock cable (P/N 830-0398-xx or P/N 830-1150-xx) and connect it to the A CLK OUT connector, refer to *Step 8*
11. Route the clock cable in the frame following the routing directions in this manual.
12. Connect the other end of the new frame clock cable (P/N 830-0398-xx or P/N 830-1150-xx) from A CLK OUT, refer to *Step 10*, to the next shelf's A CLK IN connector.
13. Issue the command to report clock status.

    `rept-stat-clk`

    Response to the clock status command is displayed.

```
tekelecstp 03-02-10 05:34:03 HST Rel XX.x.x-XX.x.x
   rept-stat-clk
   Command entered at termoinal #1.

;
   tekelecstp 03-02-10 05:34:03 HST Rel XX.x.x-XX.x.x
   CARD LOC= 1114 (Standby)    CARD LOC= 1116 (Active)
   PRIMARY BITS     = Active PRIMARY BITS       = Active
   SECONDARY BITS   = Idle    SECONDARY BITS     = Idle
   HS PRIMARY CLK   = Active HS PRIMARY CLK     = Active
   HS SECONDARY CLK = Idle
```

```
    HS SECONDARY CLK   = Idle
                            PST           SST       AST
   SYSTEM CLOCK             IS-NR         Active    -----
   # Cards using CLK A = 7    # Cards with bad CLK A =
000
   # Cards using CLK B = 0    # Cards with bad CLK B =
000
   # Cards using CLK I = 0
   Command Completed.
                            PST           SST       AST
   HS SYSTEM CLOCK          IS-NR         Active    -----
   # Cards using HS CLK A = 1   # Cards with bad HS CLK A = 0
   # Cards using HS CLK B = 0   # Cards with bad HS CLK B = 0
   # Cards using HS CLK I = 0

   Command Completed.
;
```

14. Verify that both BITS clocks are either in IDLE or ACTIVE state on both ACTIVE and STANDBY MASP

    All underlined cards-with-bad-CLK values should equal zero.

15. If any other A frame clock cables need to be replaced in the system repeat *Step 5* through *Step 14*
16. After all the A frame clock cables in the system are replaced secure the cables with tie wraps or lacing cord according to specifications.
17. If any B frame clock cables need to be replaced move to the next Procedure **Replacing B Frame Clock Cables** in this document
18. If no other frame clock cables are to be replaced and if the pin protectors are needed remove the ID pin protectors.
19. If no other frame clock cables need replacing, return the plastic panels that were removed for this procedure to original locations. Put all plastic panels back in place.

Procedure — Replacing B Frame Clock Cables

This procedure explains the replacement of one B frame clock cable. The steps show the replacement of one frame clock cable and are repeated for every frame clock cable that is to be replaced.

1. Remove any plastic panels from the back of all shelves that require the frame clock cables replaced.
2. Install pin protectors on all shelves that require the frame clock cables to be replaced.

   The pin protectors are placed over the ID pins directly to the right and left of the B CLK IN cables connectors on each shelf. Shelf ID pins must be covered with pin protectors. If contact is made with the ID pins, the shelf may lose its identity.

3. Connect a laptop or access by way of a monitor, the EAGLE 5 ISS system and start ProComm or a terminal emulator program.
4. Open a captured file by simultaneously pressing the **Alt** and **F1** keys.

   Name the file the last four digits of the *[*NT#*]xxyyzz*.CAP

   Example: 2641E1T1_A.cap

5. Issue the command to report clock status.

   ```
   rept-stat-clk
   ```

   Response to the clock status command is displayed.

```
tekelecstp 03-02-10 05:34:03 HST Rel XX.x.x-XX.x.x
   rept-stat-clk
   Command entered at termoinal #1.
;
   tekelecstp 03-02-10 05:34:03 HST Rel XX.x.x-XX.x.x
   CARD LOC= 1114 (Standby)    CARD LOC= 1116 (Active)
   PRIMARY BITS     = Active PRIMARY BITS       = Active
   SECONDARY BITS   = Idle    SECONDARY BITS     = Idle
   HS PRIMARY CLK   = Active HS PRIMARY CLK     = Active
   HS SECONDARY CLK = Idle









    HS SECONDARY CLK   = Idle
                         PST           SST       AST
   SYSTEM CLOCK          IS-NR         Active    -----
   # Cards using CLK A = 7    # Cards with bad CLK A =
000
   # Cards using CLK B = 0    # Cards with bad CLK B =
000
   # Cards using CLK I = 0
   Command Completed.
                         PST           SST       AST
   HS SYSTEM CLOCK       IS-NR         Active    -----
   # Cards using HS CLK A = 1   # Cards with bad HS CLK A = 0
   # Cards using HS CLK B = 0   # Cards with bad HS CLK B = 0
   # Cards using HS CLK I = 0

   Command Completed.
;
```

6. Verify that both BITS clocks are either in IDLE or ACTIVE state on both ACTIVE and STANDBY MASP

   All underlined cards-with-bad-CLK values should equal zero.

7. For the B frame clock cable being replaced remove all tie wraps or lacing cord securing the cable in the frame.
8. Remove the B frame cable from the shelf's B CLK OUT connector.

   Figure 109: Backplane P/N 850-0330-06 or -07 Control Shelf

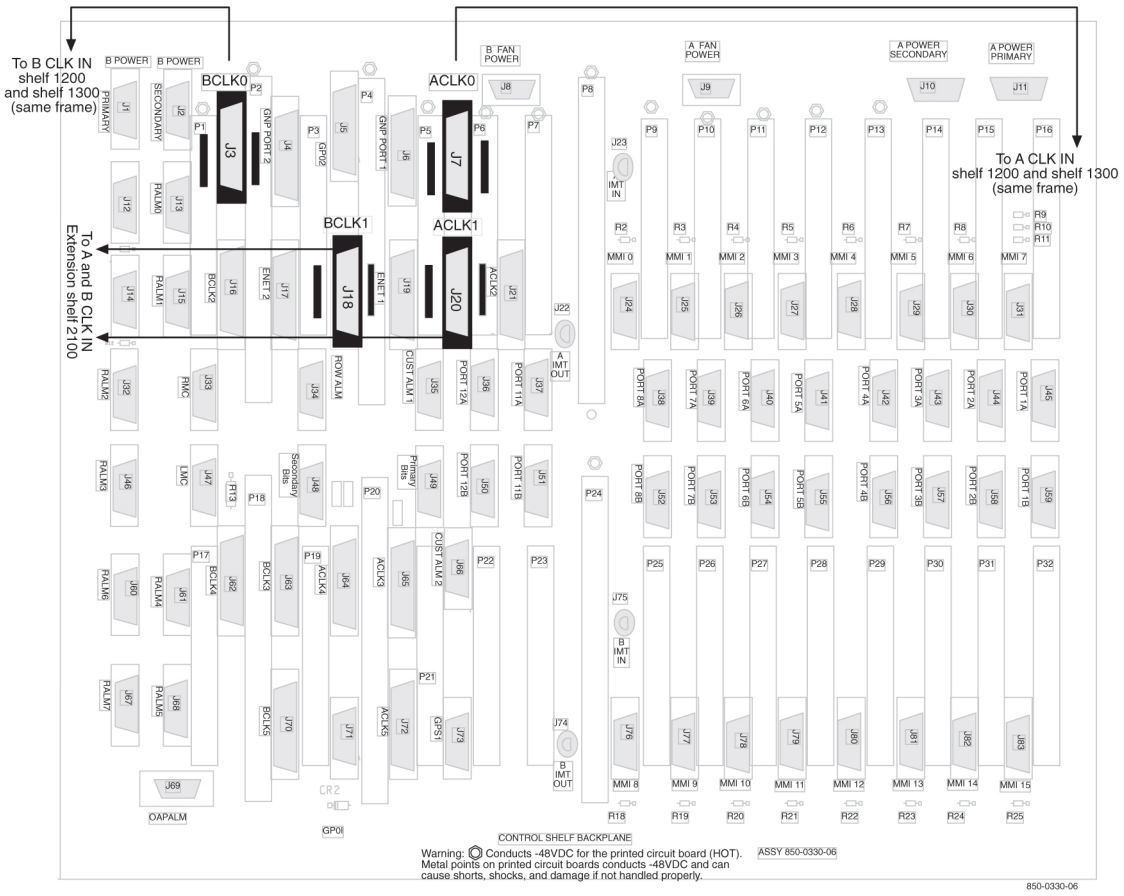
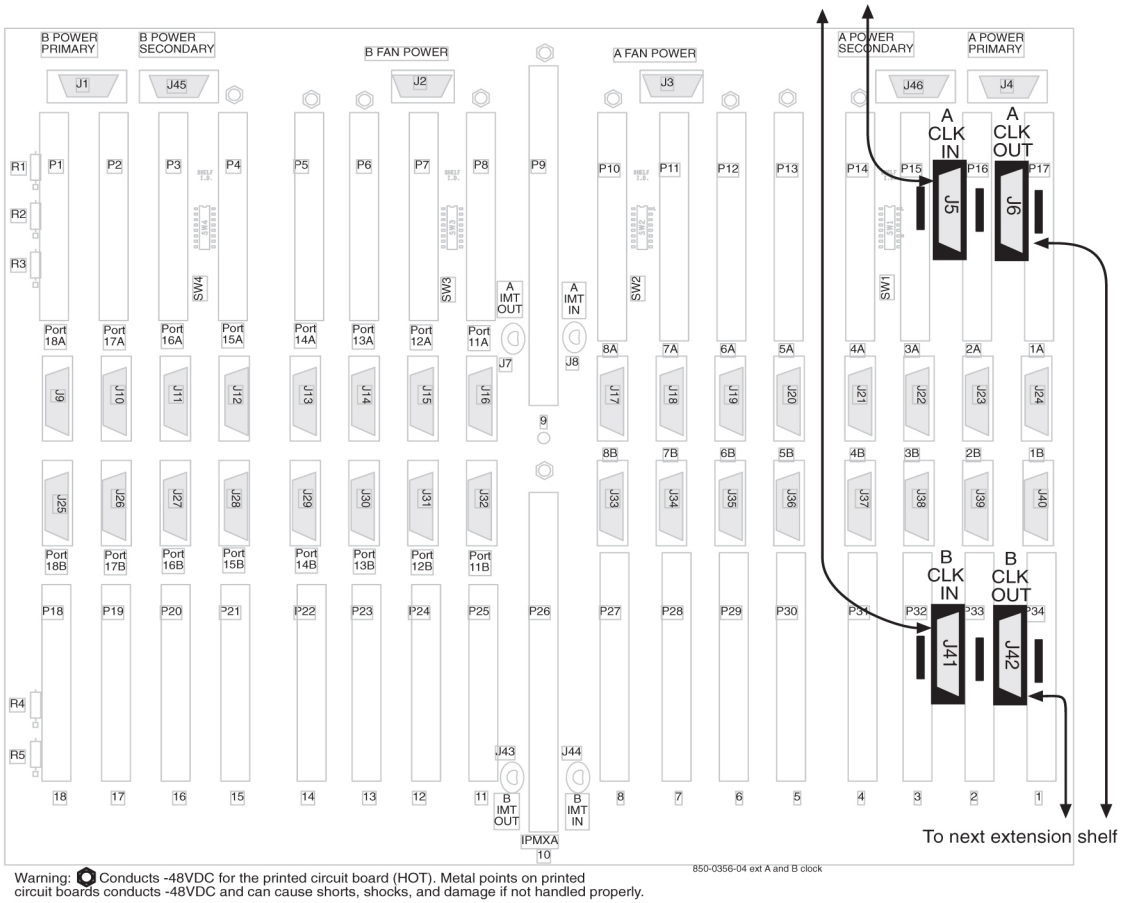


Figure 110: Backplane P/N 850-0356-04 Extension Shelf



9. Remove the other end of the frame clock cable from the next shelf's B CLK IN connector.
10. Select a new frame clock cable and connect it to the B CLK OUT connector, refer to *Step 8*.
11. Route the clock cable in the frame following the routing directions in this manual.
12. Connect the other end of the new frame clock cable from B CLK OUT, refer to *Step 10*, to the next shelf's B CLK IN connector.
13. Issue the command to report clock status.

    `rept-stat-clk`

    Response to the clock status command is displayed.

```
tekelecstp 03-02-10 05:34:03 HST Rel XX.x.x-XX.x.x
   rept-stat-clk
   Command entered at termoinal #1.

;
   tekelecstp 03-02-10 05:34:03 HST Rel XX.x.x-XX.x.x
   CARD LOC= 1114 (Standby)    CARD LOC= 1116 (Active)
   PRIMARY BITS     = Active PRIMARY BITS       = Active
   SECONDARY BITS   = Idle    SECONDARY BITS     = Idle
   HS PRIMARY CLK   = Active HS PRIMARY CLK     = Active
   HS SECONDARY CLK = Idle
```

```
    HS SECONDARY CLK   = Idle
                          PST           SST       AST
   SYSTEM CLOCK           IS-NR         Active    -----
   # Cards using CLK A = 7    # Cards with bad CLK A =
000
   # Cards using CLK B = 0    # Cards with bad CLK B =
000
   # Cards using CLK I = 0
   Command Completed.
                          PST           SST       AST
   HS SYSTEM CLOCK        IS-NR         Active    -----
   # Cards using HS CLK A = 1   # Cards with bad HS CLK A = 0
   # Cards using HS CLK B = 0   # Cards with bad HS CLK B = 0
   # Cards using HS CLK I = 0

   Command Completed.
;
```

14. Verify that both BITS clocks are either in IDLE or ACTIVE state on both ACTIVE and STANDBY MASP

    All underlined cards-with-bad-CLK values should equal zero.

15. If any other B frame clock cables need to be replaced in the system, repeat *Step 5* through *Step 14*.
16. After all the B frame clock cables in the system are replaced, secure the cables with tie wraps or lacing cord according to specifications.
17. If no other frame clock cables are to be replaced and if the pin protectors are needed, remove the ID pin protectors.
18. If no other frame clock cables need replacing, return the plastic panels that were removed for these procedures to original locations. Put all plastic panels back in place.

Termination of Alarm, Clock Supply, and Terminal Cables

Termination information for the alarm, Building Integrated Timing System (BITS), and terminal cables is furnished in the "Cable Running List" in the *Equipment Specification* for the site.

All of the alarm and clock supply cables are shielded and contain wires with solid conductors. They are intended for wire-wrap terminations at the customer end. The terminal cables have connectors on both ends.

DANGER: Always wear a wrist strap or other electrostatic protection when handling printed circuit cards and other electrostatic-sensitive devices.

Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses

- Tie-wrap tool
- Diagonal cutters
- Flush cutters
- Wire-wrap gun and bit
- Slotted screwdriver with 1/8-inch blade and 8-inch shank
- Stripper
- Heat gun

Alarm Cable Termination

The rack alarm cable for the control frame may be factory installed at both ends or the row alarm cable may come from the factory installed at the alarm end-panel only.

DANGER: Always wear a wrist strap or other electrostatic protection when handling printed circuit cards and other electrostatic-sensitive devices.

WARNING: Always trim tie-wraps flush and turn the trimmed tie-wraps to the rear of the cable bundle, when facing the back of the frame.

The rack alarm cables lead from ports in the system control backplane and connect with other frames in the row.

The backplane alarm ports are:

- FAP (Frame and Alarm Panel) in the control frame J13 on 850-0330-06 or -07
- FAP extension frame 00 J15 on P/N 850-0330-06 or -07
- FAP extension frame 01 J32 on P/N 850-0330-06 or -07
- FAP extension frame 02 J46 on P/N 850-0330-06 or -07
- FAP extension frame 03 J61 on P/N 850-0330-06 or -07
- FAP extension frame 04 J68 on P/N 850-0330-06 or -07
- End panel J34 on P/N 850-0330-06 or -07 (use cable row alarm cable 830-1145-01)
- J35 and J66 o 850-0330-06 or -07 to holdover clock
- J69 on 850-0330-06 or -07 to OAPF
- LMC J47 on850-0330-06 or -07
- RMC J33 on 850-0330-06 or -07

From the rear of the frame these cables should be routed from the connector around the left side of the frame. Route the cables up the side of the frame to the FAP and secure the cables with lacing cord to the cross arms on the side of the frame. Across the top of the frame secure the cables to the cross arms above the FAP with lacing cord also.

Note: Alarm cables should not be formed with power cables and should have a lacing cord approximately every three inches. There should be no less than two lacing cord ties between frames.

Note: If the end panel does not mount on the control frame, the cable will route the same as alarm rack cables, from port J34 on backplane 850-0330-06 or -07 from the rear of the frame, up the left side of the frame, across the top of the FAP, and formed and dressed with the alarm rack cables to the end panel.

The following cables have connectors for termination on the control shelf. The cables listed below are cross-referenced for additional connector information:

- *Remote Maintenance Center Alarm Connector* and *Remote Maintenance Center Cable* (RMC)
- *Local Maintenance Center Alarm Connector* and *Local Maintenance Center Cable* (LMC)
- *Rack Alarm Connectors* (RALM0 - RALM5)
- *Row Alarm Connector* and *Row Alarm Cable* (ROW ALARM)
- *External Alarm Cable (Custom)* and *External Alarm Connector* (XALM)

Cables are supplied as follows:

- With the exception of the rack alarms and the row alarm, one of each type of alarm cable is supplied for each system.
- One rack alarm cable is supplied for each Control, Extension, or OAP Frame present in the system.
- One row alarm cable for each system equipped with an alarm end panel containing alarm indicator lamps.

Terminate Clock Supply Cables

The Building Integrated Timing System (BITS) clocks come directly from the central office BITS clock source or indirectly from an optional holdover clock installed in the system.

See *Holdover Clock Installation* for optional holdover clock installation information.

Refer to *BITS Clock Connectors* for cable connector information.

Terminal Cables

There are 16 I/O ports on the control shelf backplane that are used to support external printers, terminals, or modems.

Use terminal/printer cable 830-0535-xx or 830-1154-xx. Different combinations of adapters are possible, see *Table 21: Holdover Clock Wire Colors and Connections*.

Refer to *Cables and Adapters* for detailed cable and adapter connector information.

1. See the "Cable Running List" in the *Equipment Specification* to determine how to connect the external cables.

   All cable ends must be labeled with "TO" and "FROM" location information from Port to Backplane.

2. Place the cables on the cable rack.

   Feed the cable ends (with connectors) down the side of the system, outside the cable tie bars, around the top or bottom edge of the control shelf and fan out to the connectors.

3. Secure each connector to the designated receptacle on the control shelf backplane.

   Plug the connector in, start one of the connector screws, fully tighten the second screw, then fully tighten the first screw.

4. Tie-wrap each cable to the cable tie bar at the rear of the shelf.
5. Dress the cables neatly and tie-wrap to the cable tie bars at the side of the frame.

   Pull the slack in the cable back toward the other end of the cables and lace to the cable rack.
6. Ensure that each tie-wrap strap is cut flush with the tie-wrap head so sharp edges are not exposed.
7. Attach any necessary adapter to the end of the cable, see *Step 1* of this procedure; then attach cable or cable plus adapter to the device.

   Connect terminal cable adapter 830-0535-xx or 830-1154-xx to modem adapter 830-0535-xx or 830-1153-04.

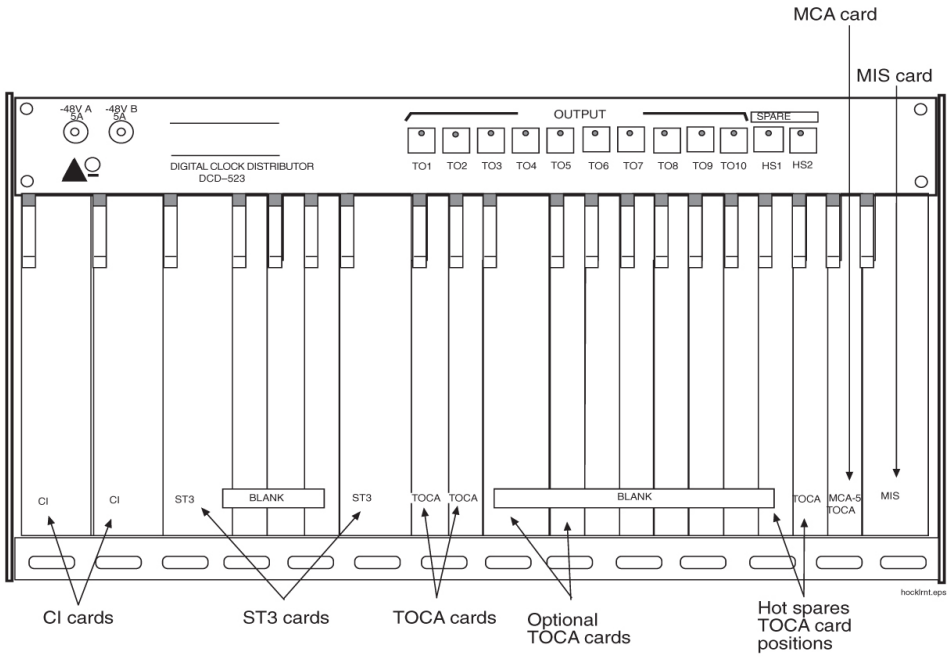
Holdover Clock Installation

The holdover clock option and its associated output panel are normally factory installed in a miscellaneous frame. Use the following procedures to complete the holdover clock installation.

Card Placement

The holdover clock cards must be installed in the positions illustrated in *Figure 111: Holdover clock*. Check that the proper cards are installed in the indicated locations.

Figure 111: Holdover clock



Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses

- Wire-wrap tool and bit
- Diagonal cutters
- Flush cutters
- Slotted screwdriver with 1/8-inch blade and 8-inch shank, preferred.
- Phillips screwdrivers, #2 and #3
- 3/8-inch shrink-wrap
- Heat-shrink gun (hot air blower)

Output Panel Connections

The following output panel connections are factory installed and should be checked during installation.

TOCA Ribbon Cables

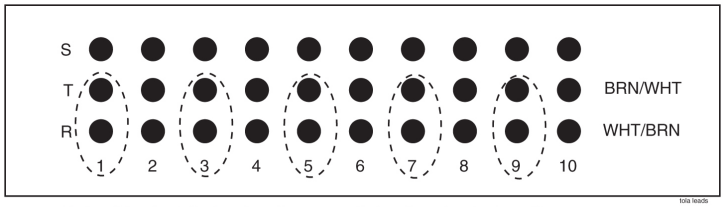
Timing Output Composite Clock Automatic (TOCA) ribbon cable; check to insure that the ribbon cables connecting the holdover clock with the output panel are connected as shown in *Figure 114: Holdover Clock and Output Panel, Rear*. OUT 1 on the holdover clock to J1 on the output panel and OUT 2 on the holdover clock to J2 on the output panel

Note: These cables connect the clock outputs from the TOCA cards to the output panel.

TOLA Card

When Using a Timing Output Logic Clock Automatic (TOLA) card; only terminate the clock cable leads to the odd pin positions 1, 3, 5, 7, and 9. Set DIP switch settings to the OFF position. Once switches are set, seat the card.

Figure 112: TOLA Master Timing Leads



Note: Master Timing leads can only be terminated on the ODD ports on the Holdover Clock Interface Panel. Do not wire on the sleeve pin.

Output Panel Frame Ground

Check that the output panel frame ground cable is installed between TB2 on the output panel and an output panel mounting screw, see *Figure 114: Holdover Clock and Output Panel, Rear*.

Note: This cable (P/N 690-0009) consists of black #16 AWG and a terminal ring.

Power Connections

Check that the holdover clock power connections are installed according to *Table 21: Holdover Clock Wire Colors and Connections* for holdover clock and fuse and alarm panel connections.

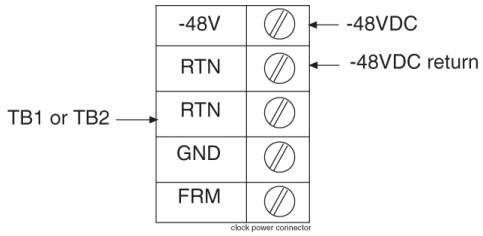
See *Figure 113: Holdover Clock Power Connector* and *Figure 114: Holdover Clock and Output Panel, Rear* for holdover clock connector locations.

See *Figure 115: Holdover Clock FAP Connections* and *Figure 116: Holdover Clock FAP Connections* for fuse and alarm panel connector locations.

Table 21: Holdover Clock Wire Colors and Connections

Holdover Clock Connector	Wire Color	FAP Connection
TB1 –48VDC	Red	B side –48VDC #1
TB1 RTN	Black	B side –48VDC return #1
TB2 –48VDC	Red	A side –48VDC #1
TB2 RTN	Black	A side –48VDC return #1
TB1 GND	White	A side Chassis GND
TB2 GND	White	B side Chassis GRD

Figure 113: Holdover Clock Power Connector



Holdover Clock Switch Settings

Set the switches on the back of the holdover clock to the following positions, see *Clock Input DIP Switch Settings*:

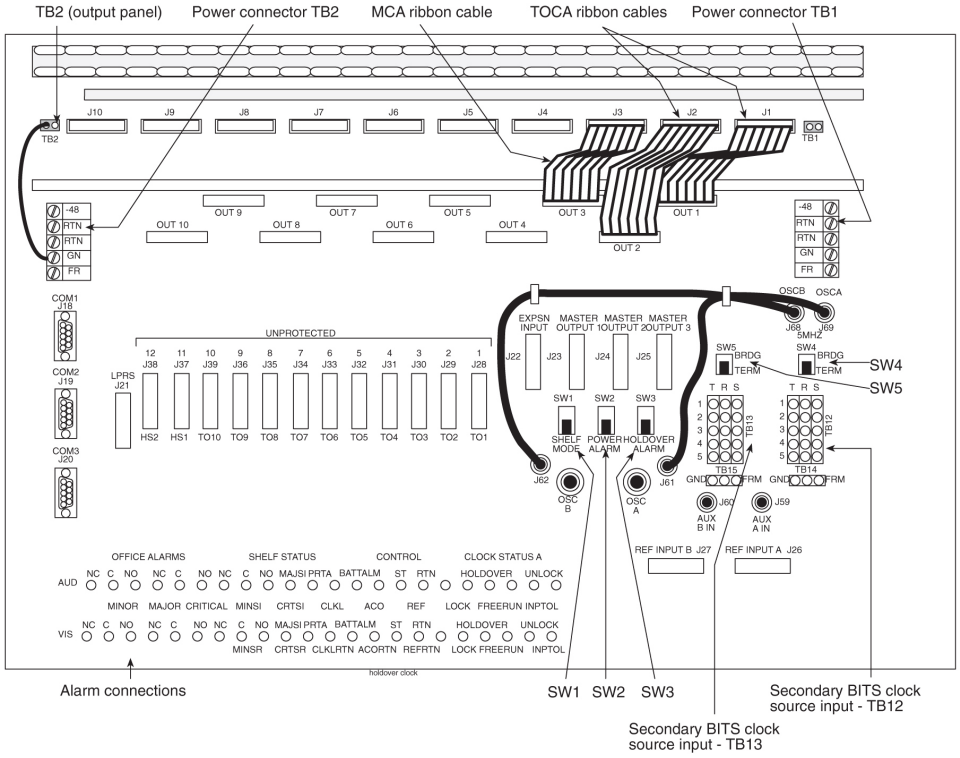
- SHELF MODE (SW1) - ST3 (down)
- POWER ALARM (SW2) - MAJ (down)
- HOLDOVER ALARM (SW3) - MAJ (down)
- REFA (SW4) - TERM (down)
- REFB (SW5) - TERM (down)

Clock Input DIP Switch Settings

The Dual In-line Package (DIP) switch settings for the Clock Input are:

- Transmission 1.544 mb -TI (On)
- Composite Clock - CC (Off)
- Extended Superframe Format - ESF (On)
- Bipolar 8Bit Zero Substitution - B8ZS (On)

Figure 114: Holdover Clock and Output Panel, Rear



The Fuse and Alarm Panel connections for the Holdover Clock are shown in *Figure 115: Holdover Clock FAP Connections*.

Figure 115: Holdover Clock FAP Connections

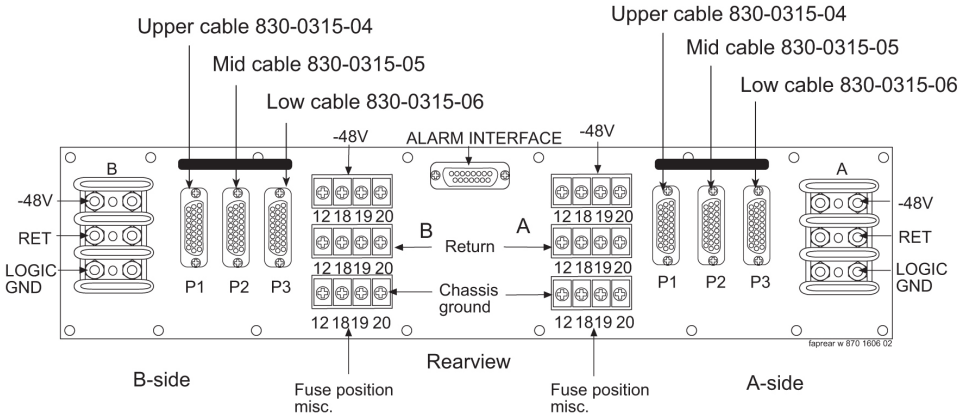
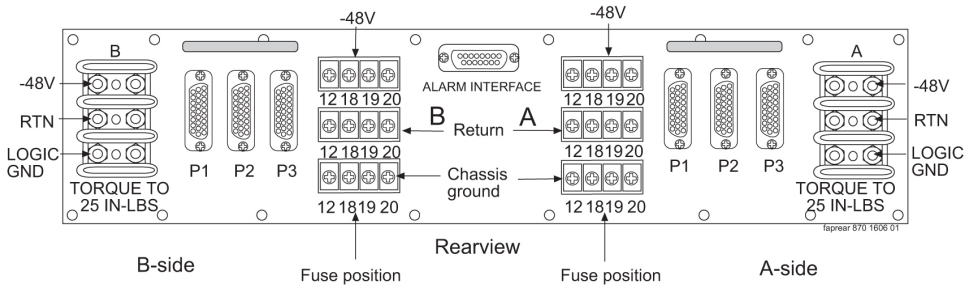


Figure 116: Holdover Clock FAP Connections



Output Panel Connections

The following output panel connections are made during installation.

Connections on the system backplane:

- First Building Integrated Timing System (BITS) clock cable to Primary BITS connector on J42, and connector J49 on backplane (P/N 850-0330-06 or -07), J49.
- Second BITS clock cable to the SECONDARY BITS connector J48 on backplane (P/N 850-0330-06 or -07).

Clock Output Connections

The BITS clock cables are used to transmit the clock outputs from the holdover clock output panel to the control shelf backplane.

Holdover Clock Alarm Connections

The installation connections are shown in the wiring layouts in *Figure 118: Holdover Clock Alarm Connections* and *Figure 119: BITS Clock Source Connections*.

A holdover clock alarm cable is used to send alarms from the holdover clock to the control shelf backplane.

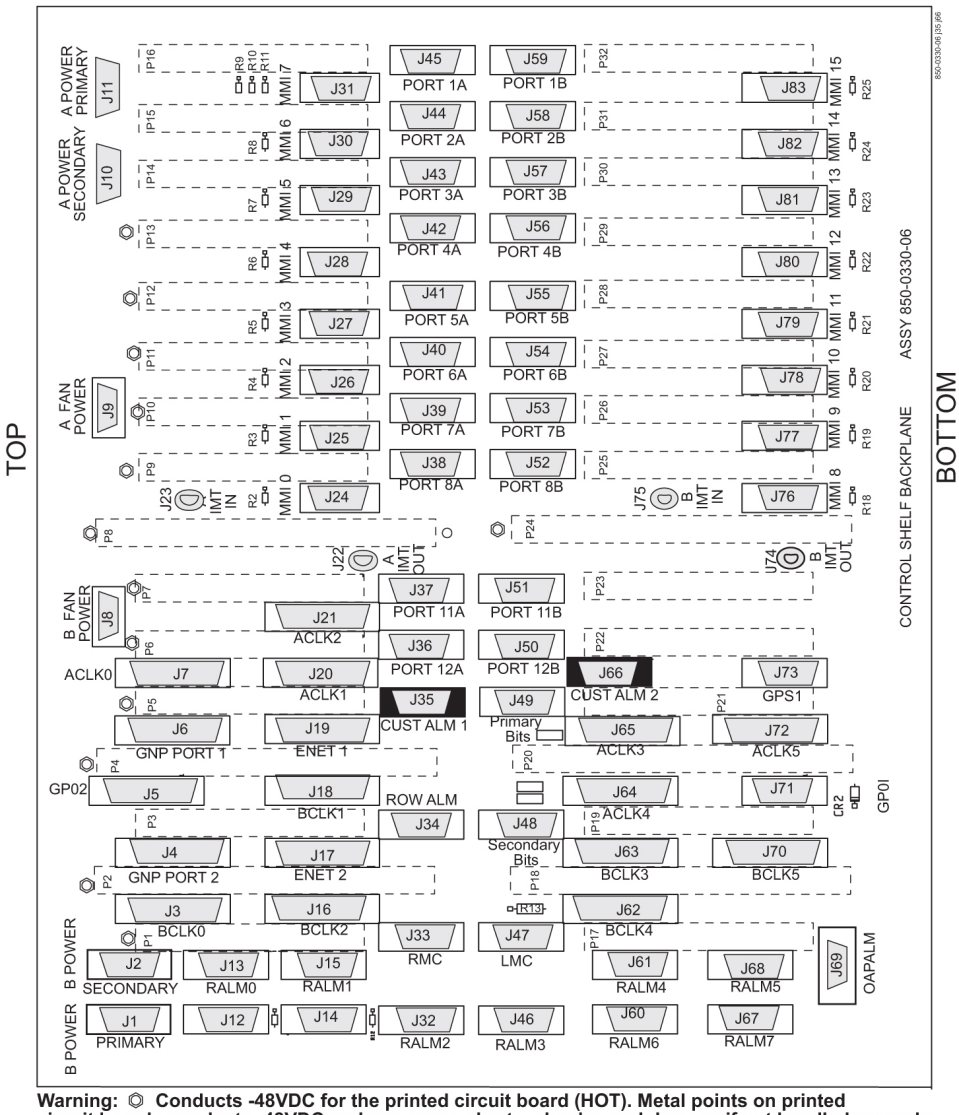
1. Before using the following procedures, loosen the screws holding the clear plastic cover on the back of the holdover clock and remove the cover by lifting it off of the screws
2. Connect the DB26 connector of the holdover clock alarm cable to the EXT ALM connector and CUST ALM 1 connector J35, J66 on backplane (P/N 850-0330-06 or -07) on the system control shelf backplane, see *Figure 117: CUST ALM 1 J35 and (not supported) CUST ALM 2 J66 Connectors on Control Shelf Backplane -06 or -07*.

   Secure connector screws.
3. EXT ALM cable connects directly to the Holdover clock.

   The external alarm cable is an optional cable that may go from the EXT ALM to a terminal block see *Figure 118: Holdover Clock Alarm Connections*.

WARNING: Metal points on Printed Circuit Boards conducts -48VDC and can cause shorts, shocks, and damage if not handled properly.

Figure 117: CUST ALM 1 J35 and (not supported) CUST ALM 2 J66 Connectors on Control Shelf Backplane -06 or -07



Warning: ⏣ **Conducts -48VDC for the printed circuit board (HOT). Metal points on printed circuit boards conducts -48VDC and can cause shorts, shocks, and damage if not handled properly.**

4. Route the cable up the left side of the control frame, viewed from the rear, over to the miscellaneous frame containing the holdover clock, and down the left side of the miscellaneous frame to the cable tie bar next to the alarm connections, see *Figure 114: Holdover Clock and Output Panel, Rear*.
5. Tie-wrap the cable to the control shelf cable tie bar at the rear of the shelf.
6. Pull the slack out of the cable towards the holdover clock.
7. Dress the cable neatly and tie-wrap to the cable tie bars at the side of the frames.

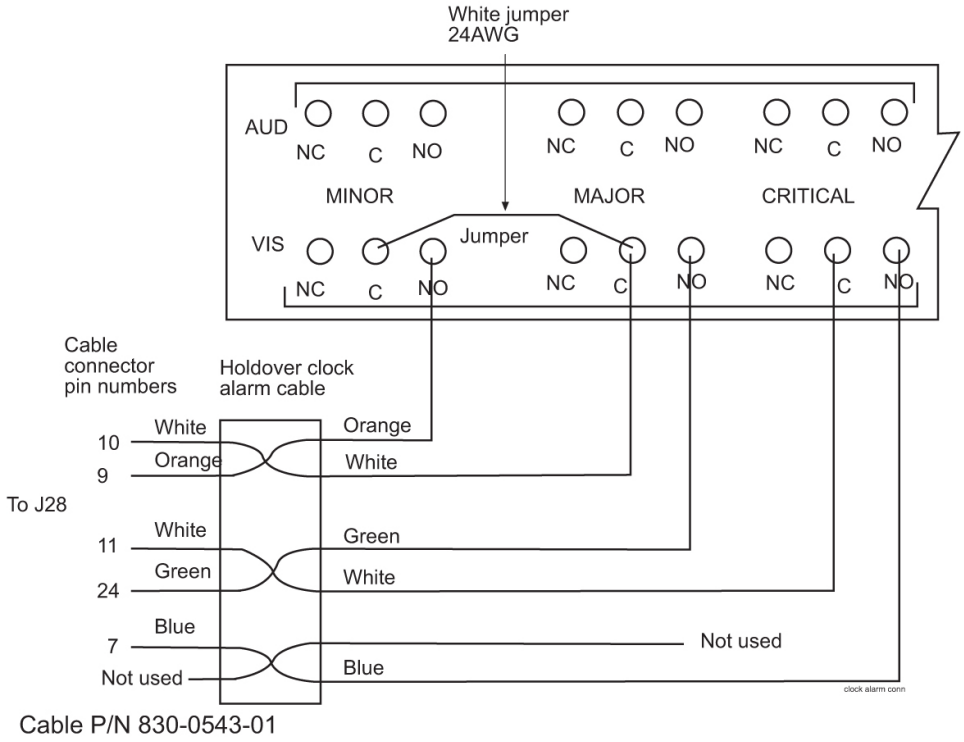
   Note: All cables must be laced (no tie-wraps) to the top traverse arms and above to the cable rack.

8. Prepare the cable for wire-wrapping by removing the outer insulation of the cable even with a point two inches from the left end of the lower holdover clock cable tie bar.
9. Apply a 1-1/2-inch length of shrink-wrap tubing.

   Center the tubing on the end of the cable insulation before shrinking tubing with a heat gun.

10. Wire-wrap a 24-gauge jumper-wire between the minor and major common alarm connector pins as shown in *Figure 118: Holdover Clock Alarm Connections*.
11. Cut the wires to length, strip, and wire-wrap to the holdover clock at the locations shown in *Figure 118: Holdover Clock Alarm Connections*.

Figure 118: Holdover Clock Alarm Connections



12. Tie-wrap the alarm cable to the lower holdover clock cable tie bar.
13. Ensure that each tie-wrap strap is cut flush with the tie-wrap head so that no sharp edges are exposed.

BITS Clock Source Cables

This cable connects the holdover clock to the central office Building Integrated Timing System (BITS) clock sources.

1. Connect the cables to the primary and secondary central office BITS clock sources.
2. Route the cables to the system's miscellaneous frame containing the holdover clock.
3. Route the cables down the right side (viewed from the rear) of the frame.
4. Pull the slack out of the cable towards the holdover clock.
5. Dress the cable neatly and tie-wrap to the cable tie bars at the side of the frame.

   Note: All cables must be laced (no tie-wraps) onto the top traverse arm and above to the cable rack.

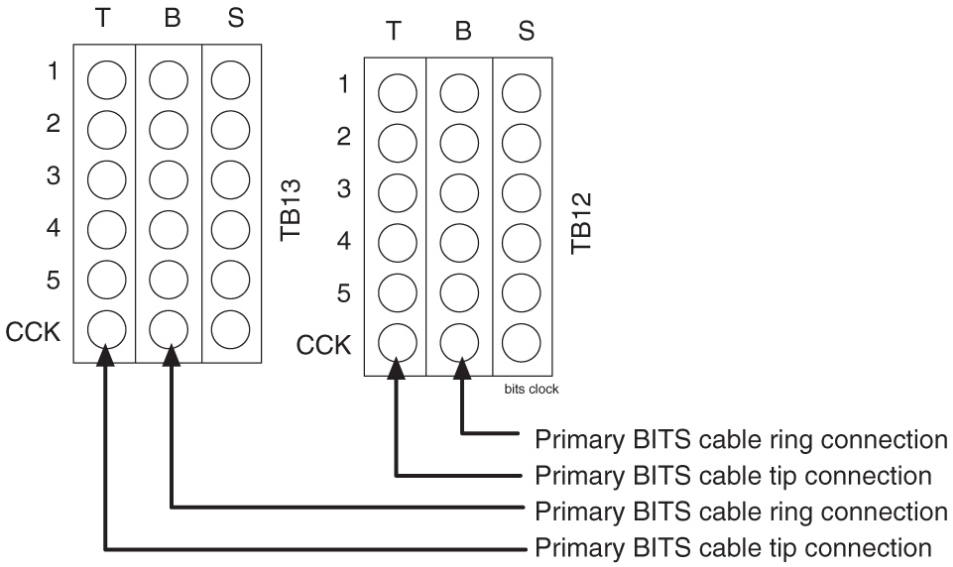
6. Remove the outer insulation of each cable even with the top of the output panel.
7. Apply a 1-1/2-inch length of shrink-wrap tubing.

Center the tubing on the end of the cable insulation before shrinking tubing with a heat gun.

8. Cut the wires to length, strip, and wire-wrap to the holdover clock at the locations, TB12 and TB13, see *Figure 119: BITS Clock Source Connections*.

   See *Clock Input DIP Switch Settings* for locations of these connectors.

   Figure 119: BITS Clock Source Connections



9. Ensure that each tie-wrap strap is cut flush with the tie-wrap head and turned to the rear of the cable so that no sharp edges are exposed.

Replacing Holdover Clock Rear Cover

When all connections are complete, slide the holdover clock rear cover back onto its mounting screws and then tighten the screws.

Install Holdover Clock Fuses

Install 7.5A (black and white flag) GMT fuses in positions A1 and B1 of the miscellaneous frame fuse and alarm panel that contains the holdover clock.

E1-T1 Interface

CAUTION: All personnel associated with the installation of these systems must adhere to all safety precautions and use required protection equipment, to avoid the possibility of injury to personnel, service degradation, and/or service interruption.

CAUTION

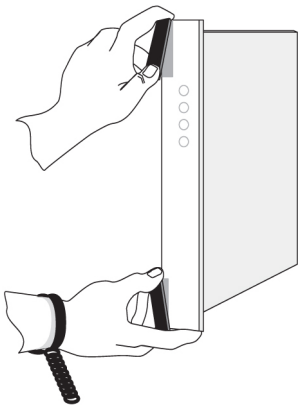
CAUTION: These are redundant systems to allow service during normal maintenance. When repairs require a total power disconnect, both input supply sources must be disconnected. This will cause service interruption and take down the system.

CAUTION

CAUTION: After the frame has been shipped, or moved remove all cards prior to applying power. Reseat all cards carefully to avoid possible faulty connections.

To remove or install a card, use the module locking tabs at the top and bottom of the card faceplate. See the following figure.

Figure 120: Removing a Card



Note: The E1-T1 MIM Interface is an option and is not available on all installations. This information is provided in the event the E1-T1 MIM Interface is added to an existing installation. If systems are upgraded; older cards may have dip switches that need to be addressed for the system to function properly.

E1 Introduction

This section describes the general procedure for the installation of the hardware necessary to support the E1 Interface application. Systems ordered with the E1 Interface will have this hardware installed at the factory. If DIP switches are needed, the switches are under the applique viewed from the top of the card.

The E1/Channel applique provides a physical interface to the system. The applique terminates or distributes E1 facility signals to process the SS7 signaling links carried by the E1 carrier. The applique can be configured as a channel card.

Configured as a Channel Card

In an extension shelf equipped with an E1 interface backplane, an E1 configured card terminates one or two E1 inputs and connects the E1 port 1 input to one of the available buses on the E1 interface backplane. Other E1/Channel appliques configured as Channel cards also connected to the E1 cabling backplane are able to extract any two 64-Kbit/sec. signaling channels from the same E1 port 1 input. In this manner, up to 31 E1 channels can be used for signaling with the 32nd channel reserved for E1 synchronization.

E1/T1 MIM

European and North American standard for signaling and channels MIM (Multi-channel Interface Module) Release 30.0 and later.

- E1 Interface patch cables, see *Figure 124: E1/T1 Backplane Patch Cables*
- E1 Interface backplanes, see *Figure 126: E1 Interface Backplane Connections*

Table 22: E1/T1 MIM and Channel Cards

Card	Function
E1	• Connectivity of both E1 interfaces to a 120 Ohms or 75 Ohms E1 interface. An external adapter is required for the 75 Ohm interface. • Processing of a total of two time slots from the E1 interfaces • Interface E1 port 1 through an external backplane to Channel cards for processing of additional time slots
Channel	• Processing of two time slots from the E1 interface • Interface through an external backplane to an E1 card to process up to two time slots

Installing E1 Interface Module Kit

Recommended Tools

Tekelec tools should be labeled "Property of TEKELEC" with either a press-on Field Tool Identification label or Field Tool Identification wrap.

- Safety glasses
- Tie-wrap tool
- Diagonal cutter
- Slotted screwdriver
- ESD wrist strap
- #2 Phillips screw driver

WARNING: Use the antistatic wrist strap connected to the wrist strap grounding point when handling electronic card components.

WARNING: *Do not* use tie-wraps on or above the top traverse arm on a frame. Use lacing cord. Contact Site Supervisor for site specific customer information.

WARNING

WARNING: Always trim tie-wraps flush and turn the trimmed tie-wraps to the rear of the cable bundle, when facing the back of the frame.

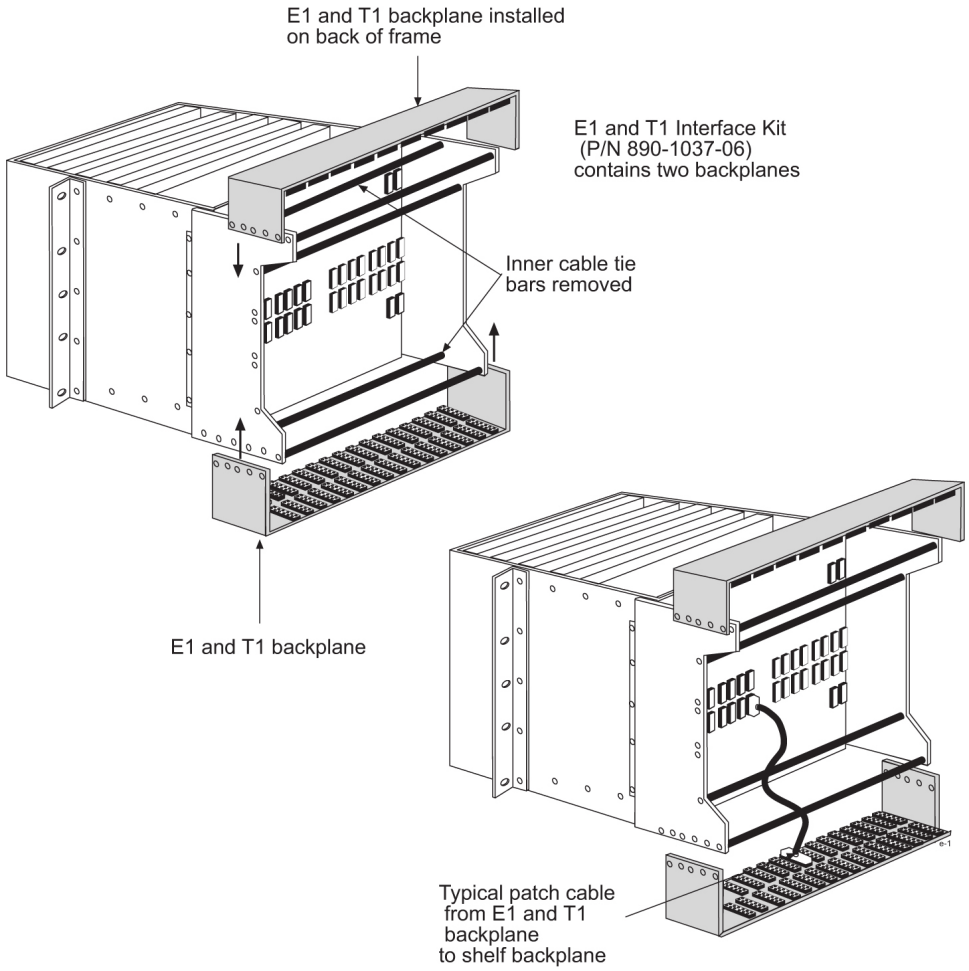
WARNING

WARNING: –48VDC is present on the backplane. Use caution when working on the equipment.

If the site does not require more than two E1 channels in any E1 interface, the E1 Interface kit may not need to be installed. The E1 Interface Kit consists of 16 E1 patch cables, two backplanes, and attaching hardware.

The E1 Interface Backplane shown is as it would be installed on an extension shelf, see *Figure 121: E1/T1 Interface Kit*. Notice that the upper and lower backplanes are identical. The E1 patch cables shown connect the port B on the extension shelf backplane to the appropriate connectors on the E1 interface B.

Figure 121: E1/T1 Interface Kit



Design Considerations for E1

External Interface Descriptions

The E1 Interface Backplane provides a method for extending individual E1 channels from the E1-configured cards to any channel-configured cards in use. Note the following issues regarding the E1 backplane:

- Only one E1-configured card can be plugged into each bus on the backplane.
- When installing non-E1 cards on the shelf equipped with the E1 Interface Backplane, ensure that none of the slots to be used are cabled to the backplane. If a non-E1 card is installed in a slot that is connected to the E1 backplane, all E1 cards on that bus may fail.

The E1 backplane is impedance-controlled for 120 Ohm and is designed for use with RS-485 transmission characteristics.

Possible Configurations

The E1 Interface Backplane is designed to allow the maximum number of possible customer setups. It allows the customer to choose between several levels of diversity and convenience. Configurations depend on the number of cards configured as E1 cards versus the number of cards configured as channel cards. The level of diversity required by the customer also affects the configuration requirements. Sample configurations are provided see *Figure 126: E1 Interface Backplane Connections*. All signals labeled “E1 input” may be one or two E1 ports depending on the cable used.

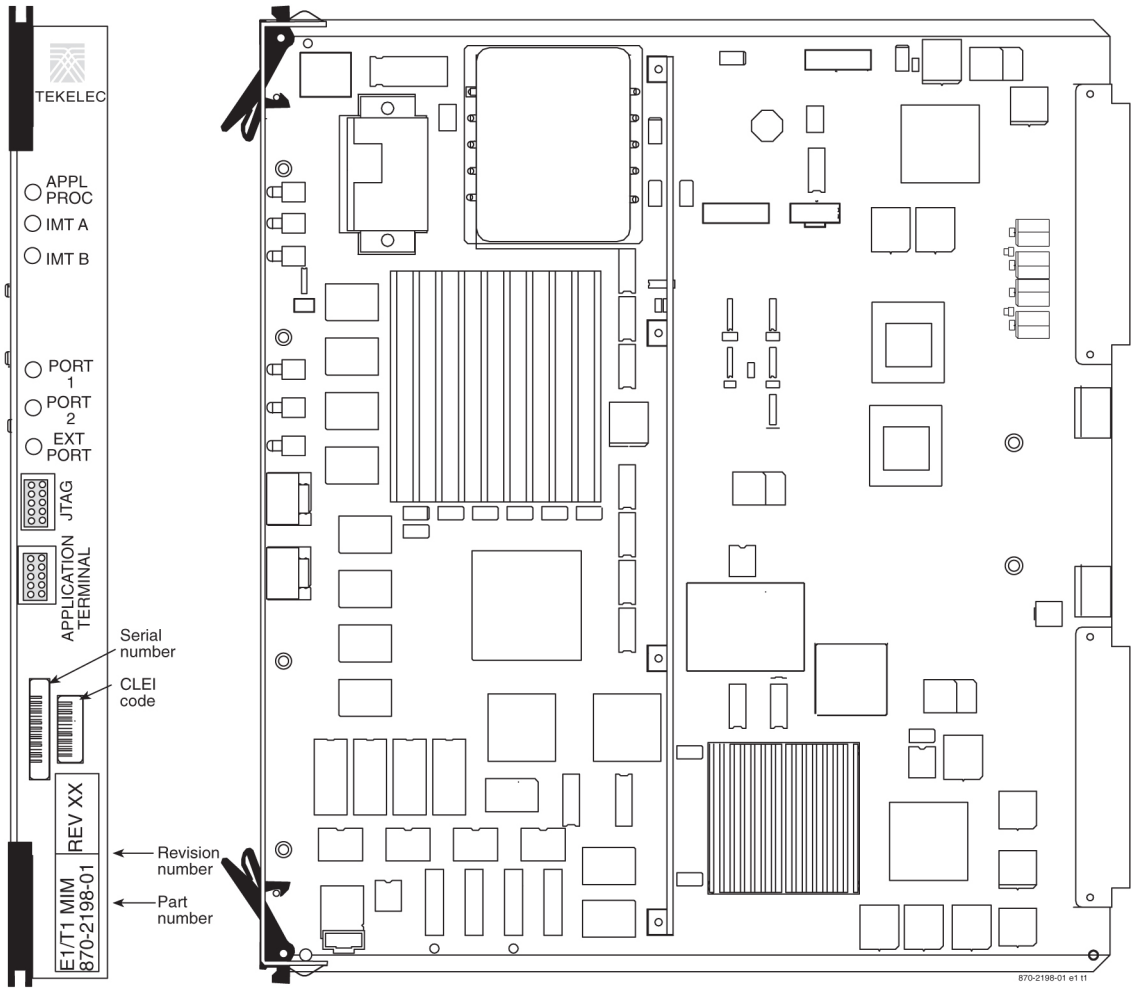
High Level Functional Description

The E1 Interface Backplane provides a connection point from the backplane to an external E1 interface. The backplane is populated with 64 high density connectors and 64 terminating resistors. Note that each row is bused together and each column lines up with an system slot. Also note that there are always two E1 backplanes available at the rear of the shelf, the upper E1 backplane and the lower E1 backplane. The upper and lower backplanes are identical.

E1/T1 MIM,

European (E1) and North American (T1) standard for signaling and channels Multi-channel Interface Module (MIM)

Figure 122: E1/T1 MIM



The E1/T1 channel provides a physical interface to the system. The interface terminates or distributes E1/T1 facility signals for the purpose of processing the SS7 signaling links carried by the E1/T1 carrier. The E1/T1 MIM can be configured as an E1/T1 master card or as a channel card. The implementation is configured by way of provisioning.

Tekelec has developed a T1 LIM to MPL adapter that will reverse the Port 2 pin addresses for those customers that choose to maintain the Multi-port LIM cabling. The customer may choose the new cable T1 MIM (100 Ohms) cable. These options are provide for the customers and will be designated by the site survey.

Table 23: E1/T1 and Channel Cards

Cables	Part Number	Function
E1	830-0622-xx	120 Ohm cable
T1	830-0894-xx	100 Ohm cable

Cables	Part Number	Function
PORT 2 Adapter	830-0895-01	Reverse PORT 2 Transmit and Receive pins

Table 24: E1/T1 MIM and Channel Cards provides an overview of the functions of the E1/T1 MIM card and the Channel card.

Table 24: E1/T1 MIM and Channel Cards

Card	Function
E1/T1 MIM	• Connectivity of both E1 and T1 interfaces by way of dual ports (either an T1 network or an E1 network, but not both at the same time). External adapter P/N 830-0895-01 is required on specific configurations. • SS7 processing of 8 time slots per card in any combination across both ports. • Interface E1/T1 PORT 1 provides an extension capability to E1/T1 MIM cards configured as Channel cards through an external backplane for processing additional time slots.
Channel	• Processing of up to 8 additional time slots from the Master card • Interface through an external backplane provides Master card connectivity

Table 25: E1/T1 LEDs provides an overview of the PORT 1, PORT 2, and EXT PORT Amber, Light Emitting Diodes (LEDs) of the E1/T1 MIM card.

The PORT 1, PORT 2, Amber LEDs indicate the Cards is being use as a Channel Card or the EXT PORT Amber LED indicates a Master Card. The card cannot be used as a channel card and a master card at the same time. The Use of the card is determined by the way the card is provisioned.

Table 25: E1/T1 LEDs

LED	Function
PORT 1	AMBER – Card is an E1-T1 Channel Card GREEN – All channels provisioned =ISNR AMBER BLINKING – Any channels provisioned = OOS RED BLINKING – All channels provisioned = OOS RED – No channels are provisioned
PORT 2	AMBER – Card is an E1-T1 Channel Card GREEN – All channels provisioned =ISNR

LED	Function
	AMBER BLINKING – Any channels provisioned = OOS RED BLINKING – All channels provisioned = OOS RED – No channels are provisioned
EXT PORT	AMBER – Card is an E1-T1 Master Card GREEN – All channels provisioned =ISNR AMBER BLINKING – Any channels provisioned = OOS RED BLINKING – All channels provisioned = OOS RED – No channels are provisioned
OOS	Out of service

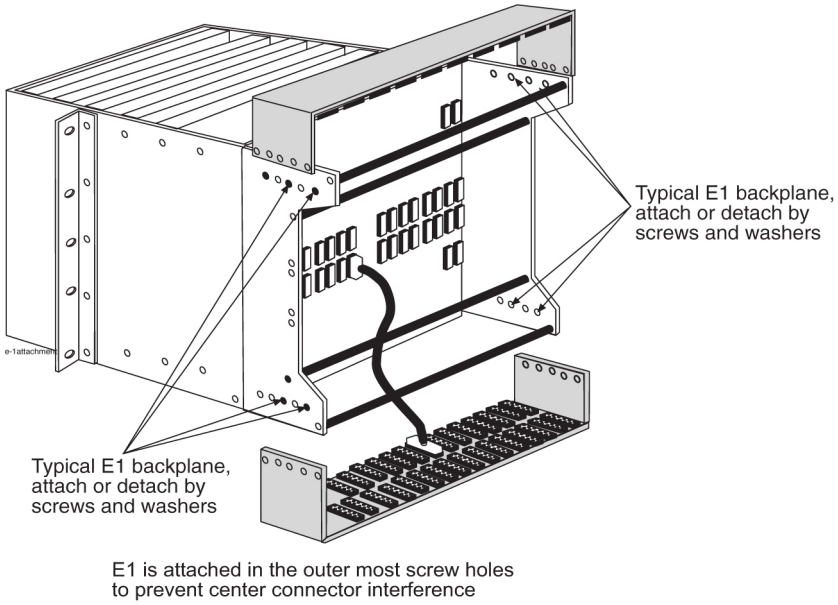
Procedure — Install E1/T1 Cables

When the interface is provisioned, the E1/T1 cards have hot-swap capabilities.

The rear of the shelf is prepared by removing the inner cable tie-wrap bars located at the top and the bottom rear of the shelf.

1. Use diagonal cutters to remove any tie-wraps used to secure cables to the tie-wrap bars. Be careful to limit the movement of cables and avoid damaging the cables. Re-tie the cables to one of the existing tie-wrap bars.
2. Remove both the upper and lower inner tie-wrap bars by removing the flat-head Phillips screws holding the tie-wrap bars to the shelf.
3. To position the E1/T1 backplane marked Lower and its bracket assembly, see *Figure 123: E1/T1 Backplane* and install the bracket assembly to the Extension Shelf using six Phillips screws and six lock washers.
4. Position the E1/T1 backplane marked Upper and the bracket assembly and install the bracket assembly to the Extension Shelf using six Phillips screws and six lock washers.

Figure 123: E1/T1 Backplane



Installing E1/T1 Patch Cables

The E1/T1 Interface patch cables (*Figure 124: E1/T1 Backplane Patch Cables*) are installed in the locations specified on the "Installers Cable Running List" in the Equipment Specification specific to this site. The E1/T1 Patch cables are connected to the E1/T1 backplane connectors J1 through J64 and the backplane port B per provisioning instructions.

Note: Cabling for T1 is identical to the cabling for E1.

Note: Cable configuration E1/T1 Backplanes Patch Cables

Figure 124: E1/T1 Backplane Patch Cables

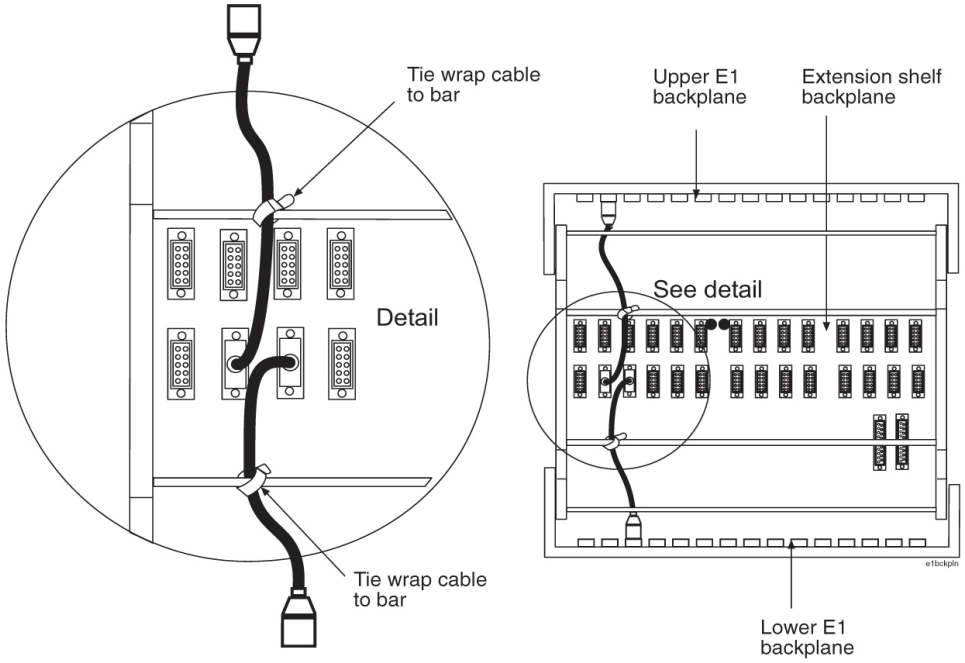
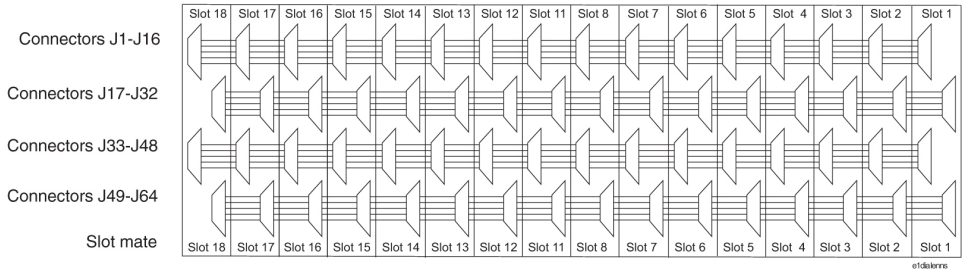


Figure 125: E1/T1 Interface Backplane Connector Diagram



When mounting E1/T1 backplanes be aware that the connectors are marked on the board as J1-J16, J17-J32, J33-J48, and J49-J64 should be connected so that the E1/T1 board card slot numbers match the shelf card slot number on both the top and bottom boards. For this to be accomplished, the top E1/T1 board must be turned 180 degrees from the bottom board, see *Figure 126: E1 Interface Backplane Connections* for E1 connections and see *Figure 127: T1 Interface Backplane Connections* for T1 connections.

Figure 126: E1 Interface Backplane Connections

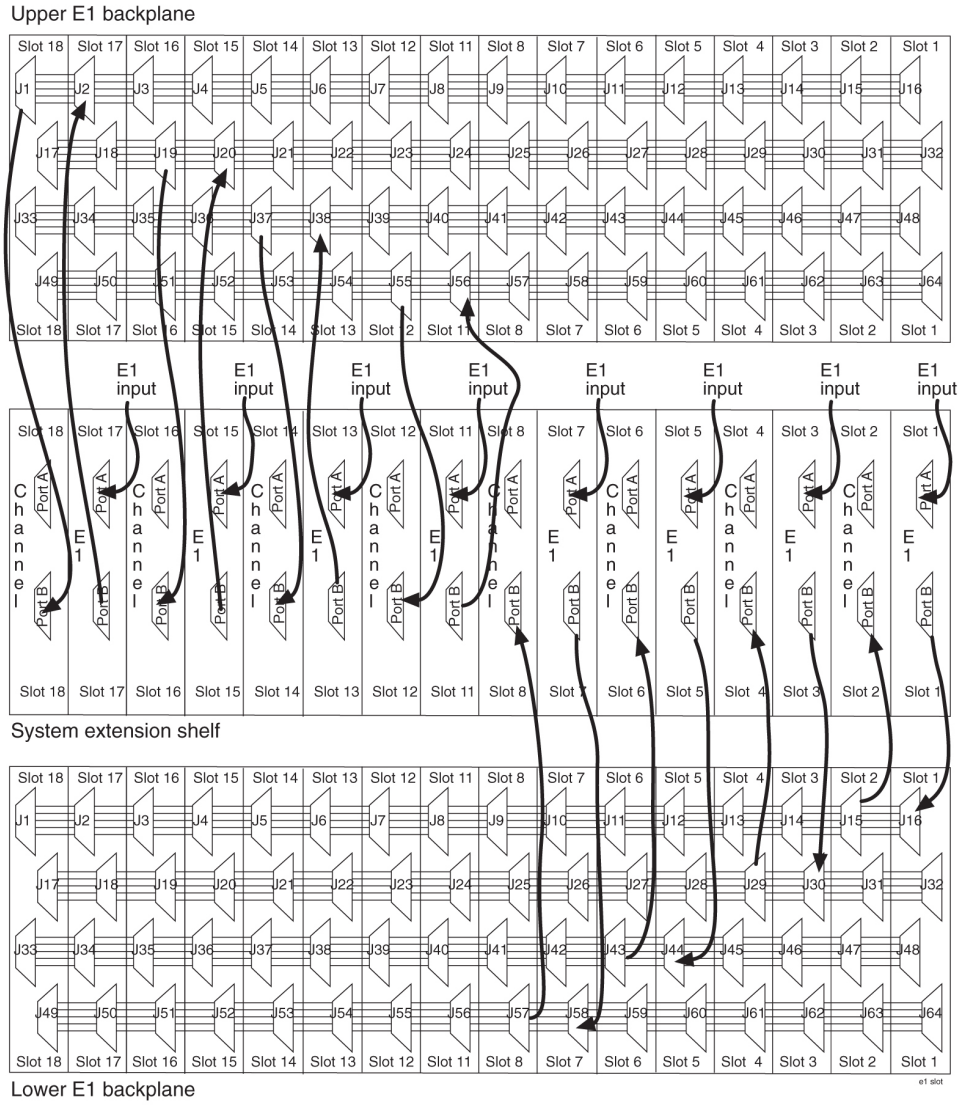
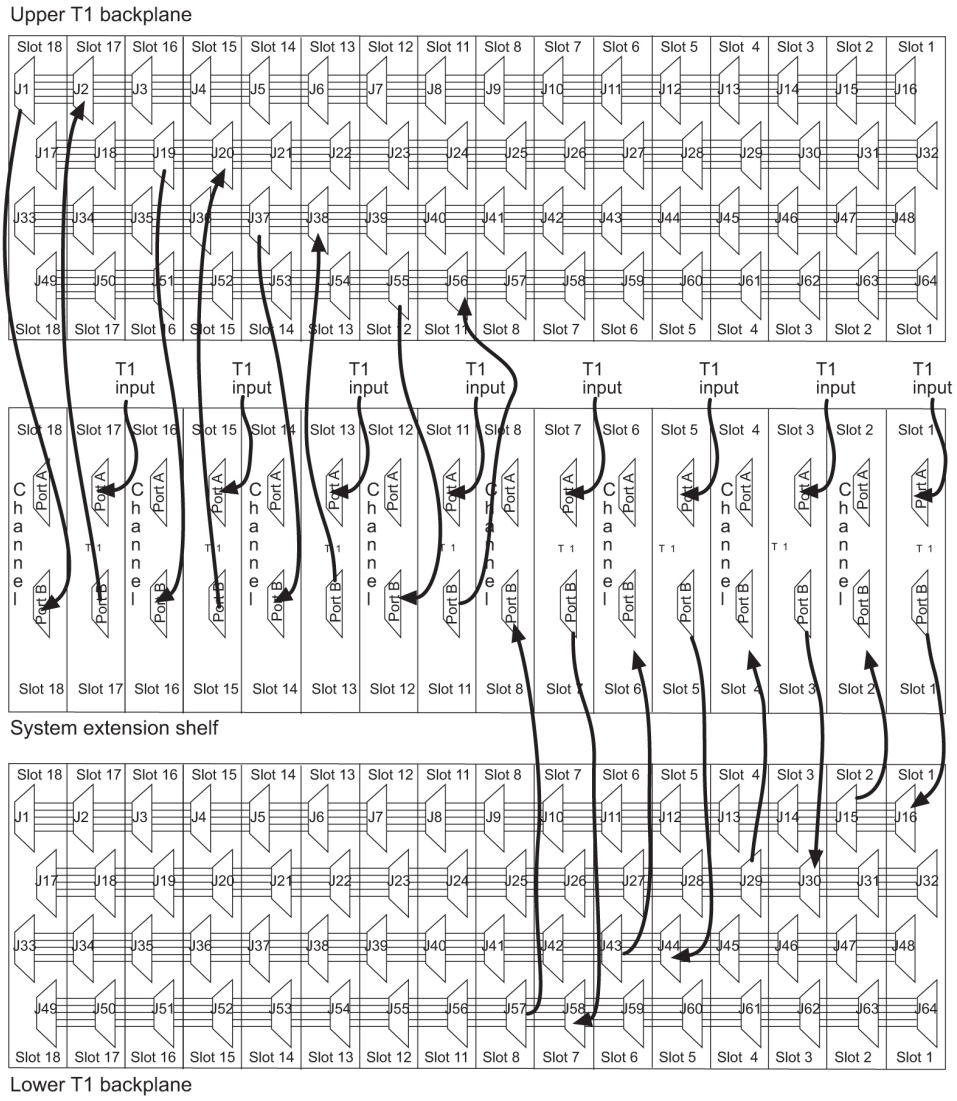


Figure 127: T1 Interface Backplane Connections



Multi-Port LIM with Taxi Component (MPLT)

Multi-Port Link Interface Module with Taxi Component (MPLT) provides eight DS0 ports, transporting SS7 traffic, in a single EAGLE 5 ISS card slot. Link Fault Sectionalization (LFS) logic on the MPL provides diagnostic capabilities through network interfaces on ports A and B.

Table 26: Summary of Ranges for Port Parameters

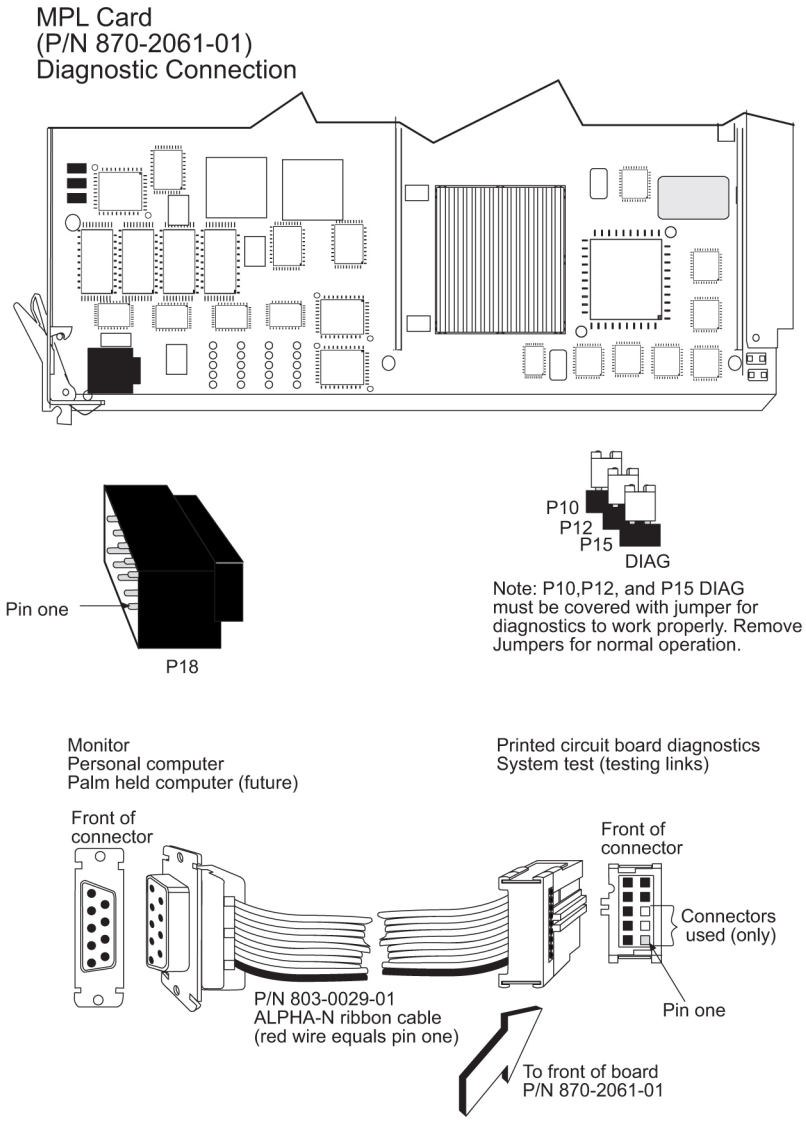
Card	Port	Supported Application
Multi-port LIM	A, B A1, B1	The `ss7ml` GPL with DS0 interface at 56Kb running the `ss7ansi` application only.

Card	Port	Supported Application
	A2, B2 A3, B3	

MPL Card Diagnostic Cable

The MPL Diagnostic Cable provides a terminal interface for on board diagnostic tests of the Multi-Port Link Interface Module (MPL) card. The MPL card supports eight Digital Signal Level-0 (DS0) ports/links per module.

Figure 128: MPL Card Diagnostic Cable



Ohms Converter International Market

The ohms converter is use mostly outside of North America. The converter Super Multiple-Interface Cross-Connect (SuperMIX) is a modular device for cross-connecting, patching, and monitoring these digital signal rates:

- E1 (2.048 Mb/s at 120 Ohms impedance)
- DS1 (1.544 Mb/s at 100 Ohms impedance)
- DS1C (3.152 Mb/s at 100 Ohms impedance)

The SuperMIX modules backplanes will be configured to accommodate a variety of input/output (I/O) termination connector types. Any combination or "mix" of backplanes in one chassis is acceptable. Refer to Telect® "SUPER MULTIPLE-INTERFACE CROSS-CONNECT (SUPERMIX) USER MANUAL" 110339 issue A Rev. 1

Figure 129: Miscellaneous Frame with 120 Ohm Converter

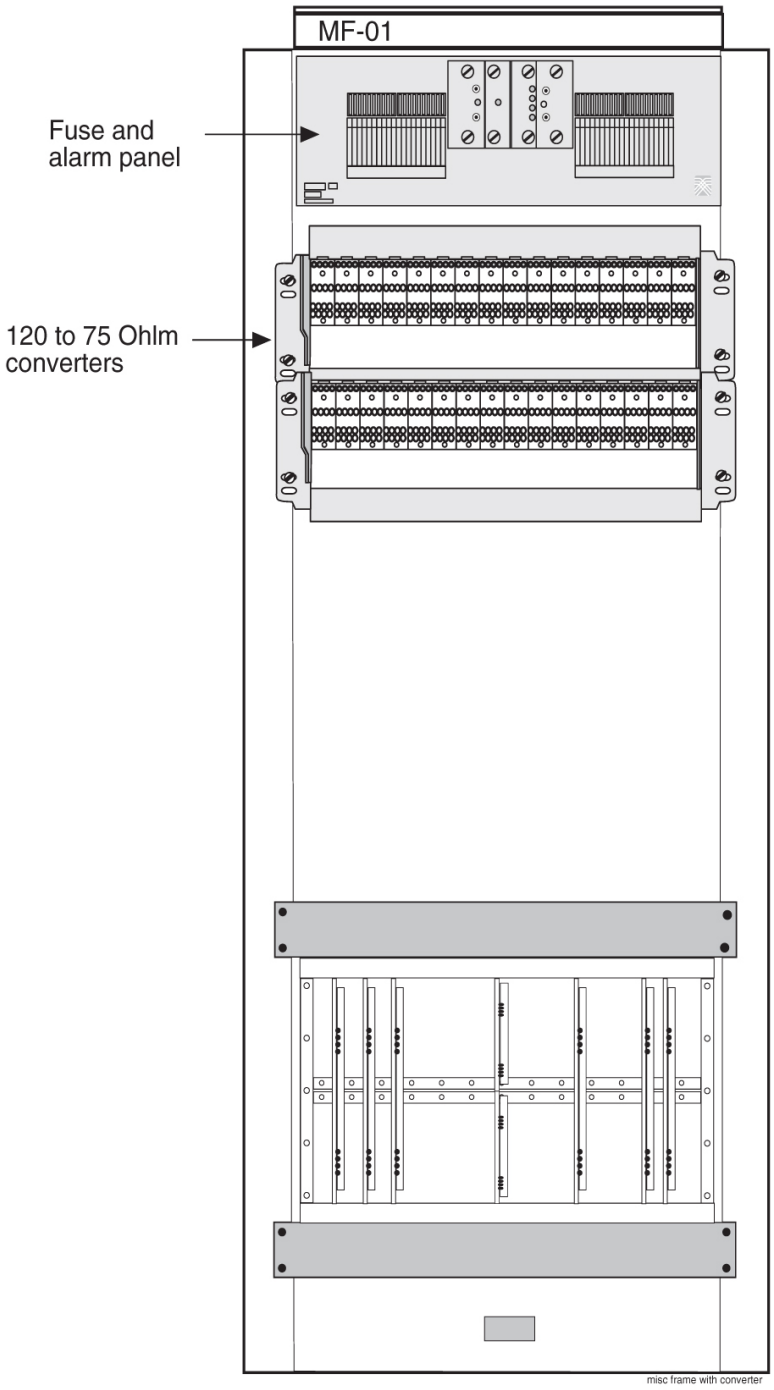


Table 27: Part Numbers

Tekelec Part Numbers	OEM part numbers	Description
804-0982-01 or 804-0982-R01	010-0000-2701	Chassis

Tekelec Part Numbers	OEM part numbers	Description
804-0983-01 or 804-0983-R01	010-2704-1100	Wire-wrap
804-0984-01 or 804-0984-R01	010-2704-1200	Bayonet Connector (BNC)

Figure 130: 120 Ohms Converter and Shelf

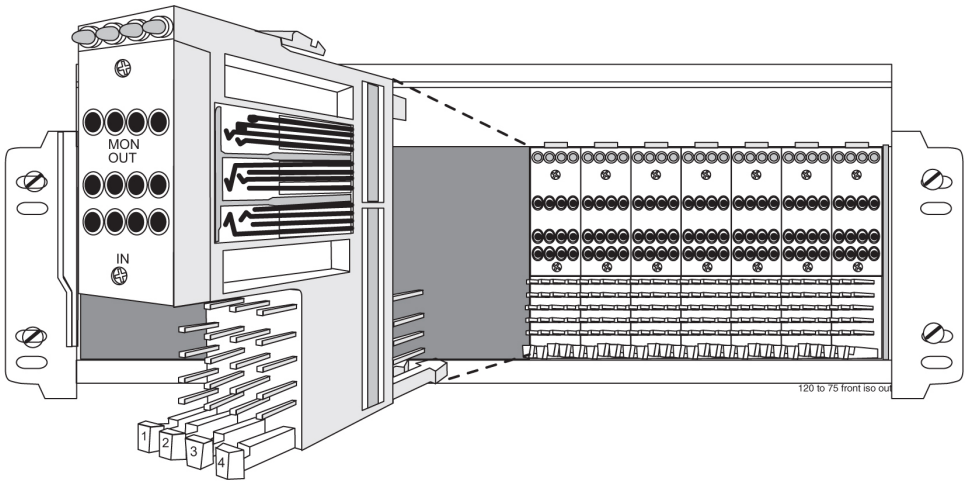
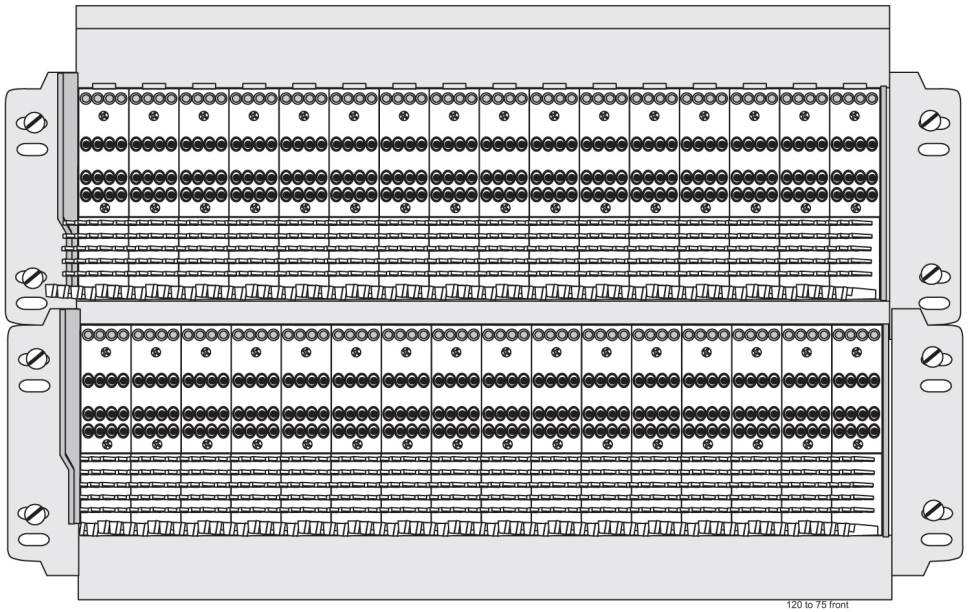


Figure 131: 120 Ohms Converter Front

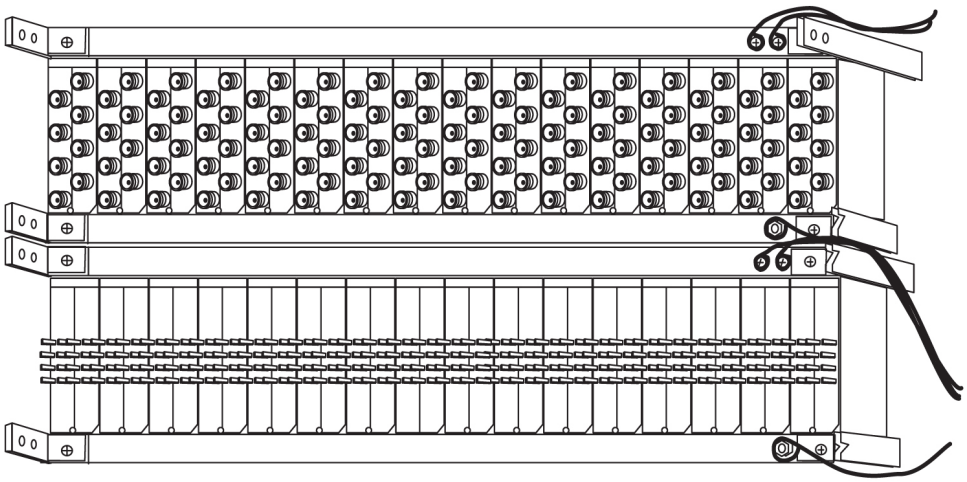


120 Ohms to 75 Ohms converter

Table 28: Physical Conditions

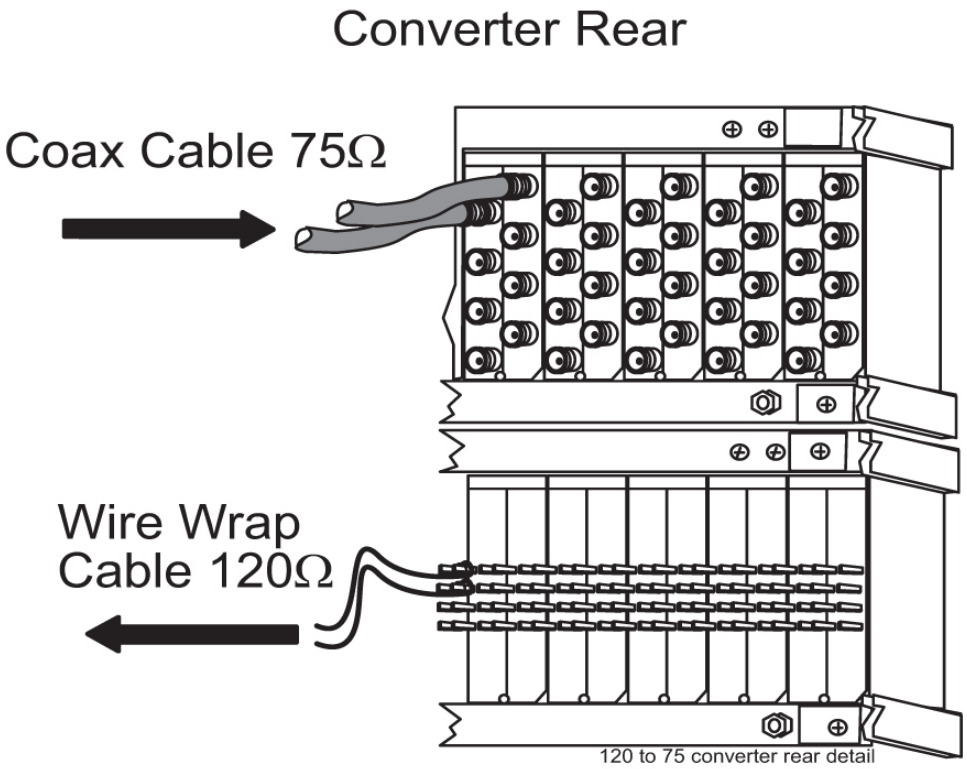
Mechanical	
Insertion force	4.17lb (1.9kg) average
Withdrawal force	5.21lb (2.4kg) average
Life	Minimum 20,000 insertion/withdrawal cycles
Environmental	
Humidity	To 95% (operating an non-operating)
Moisture Resistance	Per MIL-STD-202F, Method 201A
Salt Spray	Per MIL-STD-202F, Method 101D
Temperature	–40 to 149˚F (–40 to 65˚C) operating –67 to 185˚F (–55 to 85˚C) non-operating
Thermal Shock	Per MIL-STD-202F, Method 107Ds

Figure 132: 120 Ohms Converter Rear



Rear 120 ohms to 75 ohms converter

Figure 133: Converter Rear Detail



Hardware Acceptance

This section is intended for installation and test personnel. This section describes an inspection of the general system installation but does not attempt to cover testing of the system software.

DANGER

DANGER: No commercially AC powered equipment may be used or placed within 7 ft. of –48V equipment. This may create a shock or current loop that can be severely hazardous to personnel and equipment.

Hardware operational testing is designed to verify the functionality of the finalized construction of the hardware at the customer site. The demarcation line for the testing is up to and including the patch panel directly connected to the system. The ability to route traffic through this system is verified using a Message Generator Traffic Simulator (MGTS). All cabling, alarm output, clock input, and other Tekelec equipment is also verified operational per the *Hardware Operational Test Manual* provided with the test equipment.

CAUTION

CAUTION: All personnel associated with the installation of this system must adhere to all safety precautions and use required protection equipment, to avoid the possibility of injury to personnel, service degradation, and/or service interruption.

CAUTION: This is a redundant system, to allow service during normal maintenance. When repairs require a total power disconnect, both input supply sources must be disconnected. This will cause service interruption and takes down the system.

The customer frame layout is site specific, however the most typical frame layout is constructed with Extension Frames to the right of the Control Frame when viewed from the front. The OAP Frame is normally on the left of the Control Frame. Other frames (Miscellaneous and other support or feature specific frames) are lined up to the left of the Control Frame. General Inspection.

Procedure — Perform General Installation Inspection

Verify the following:

1. All items listed in the Equipment Specification have been installed.
2. Cabling is neatly installed and the labels are correct and easily readable.
3. Power cabling does not run through a cable rack.
4. Power cabling is not routed together with any other cables and has at least six inches of clearance.
5. Racks have Nomex paper between the rack and any power cables that would otherwise touch the rack.
6. The main central office ground is correctly labeled and has the "Do Not Remove" tag installed on the central office grounding bar. No "double lugs" are allowed. Any bolt through a nut must show at least two threads beyond the nut but no more than four threads should be showing.
7. The –48VDC power feeds are correctly labeled at the central office power distribution panel. There should be an A feed and a B feed for each frame.
8. The –48VDC returns are correctly labeled. There should be an A return and a B return for each frame.
9. Frames are level.
10. Earthquake bracing, if any, is properly installed.
11. Adequate floor clearances have been maintained.
12. Rear panels are installed.
13. Cable connections are tight at the backplane connections.
14. Cable sheets are properly marked and located in door pocket.
15. All documentation has been received and is available.
16. Terminals and printers connected to the system are operational.
17. Data cartridges have been received and are properly stored.
18. Any attached modems are operational.
19. Any attached MAUs are operational with power indicator on.
20. Shipping container is properly packed with ramp and frame dollies prepared for shipment.
21. The area is clean and unused material has been properly disposed of.

–48VDC Power Source

This section verifies that the –48VDC Power Source has been labeled and connected correctly to the corresponding system frame's Fuse and Alarm Panels (FAPs). Your system may not include all of the frames described.

DANGER: No commercially AC powered equipment may be used or placed within 7 ft. of –48V equipment. This may create a shock or current loop that can be severely hazardous to personnel and equipment.

WARNING: *Do not* carry exposed metal keys or tools in pockets or on belts when working on or around electronic equipment. *Do not* wear metal rings, watches, or jewelry on wrists or hands when working on any electronic equipment or other related electrostatic sensitive components. Always wear a wrist strap or other electrostatic protection when handling printed circuit cards and other electrostatic sensitive devices.

WARNING: Before beginning any of the following procedures, ensure that all breakers that provide power to the system are open.

WARNING: Before performing the following procedures do the following:

- Ensure that no power is being provided to the system from the –48VDC power source, such as a power board
- Ensure that no circuit cards are installed in the shelves
- Remove all fuses from the fuse and alarm panels
- Recheck wiring and connections for proper polarity

CAUTION: All personnel associated with the installation of this system must adhere to all safety precautions and use required protection equipment, to avoid the possibility of injury to personnel, service degradation, and/or service interruption.

CAUTION: This is a redundant system, to allow service during normal maintenance. When repairs require a total power disconnect, both input supply sources must be disconnected. This will cause service interruption and takes down the system.

Verify -48VDC

The following procedure verifies –48VDC.

1. Turn on breaker, or insert fuse for control frame A side –48VDC power source.
2. Check for nominal –48VDC at the control frame fuse and alarm panel A side test point.

   For test points used see *Figure 134: Test Points 1U FAP (P/N 870-2804-01)* and *Figure 135: Test Points 3U FAP (P/N 870-2320-03)*.

Note: Input voltage range is -40 VDC to -57.5 VDC.

Figure 134: Test Points 1U FAP (P/N 870-2804-01)

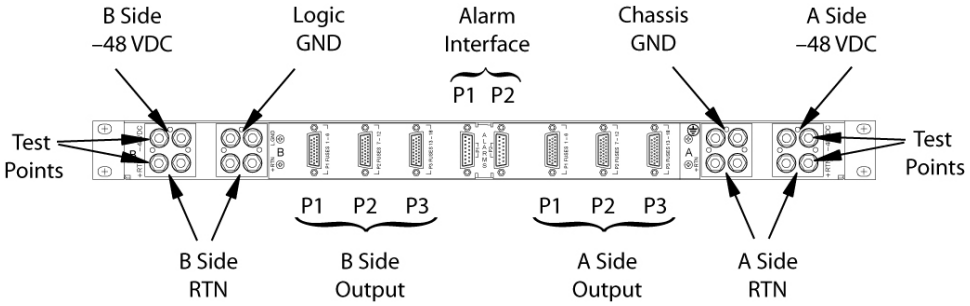
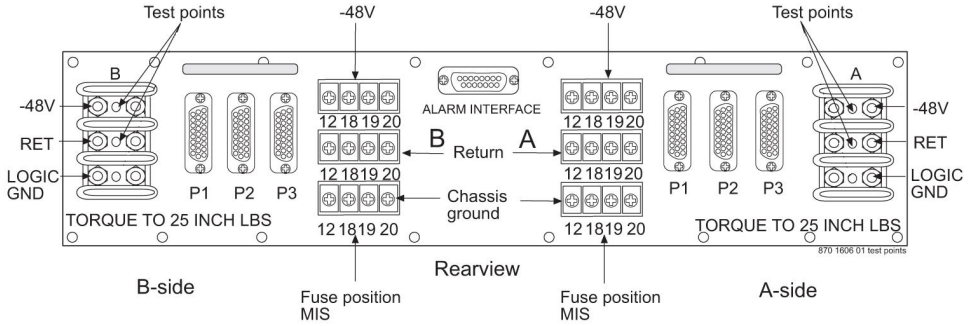


Figure 135: Test Points 3U FAP (P/N 870-2320-03)



3. Repeat *Step 1* and *Step 2*for the control frame B side –48VDC power source.
4. Repeat *Step 1* and *Step 2*for each –48VDC A side and B side power source for all extension and miscellaneous frames.

This completes the procedure.

Appendix A

LED Information

Topics:

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- *DCM, Database Communications Module; DSM, Database Service Module.....259*
- *E1 ATM Link Interface Module.....259*
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- *MIS, Maintenance Interface System, Holdover Clock.....281*

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- *TOCA, Timing Output Composite Automatic, Holdover Clock.....289*

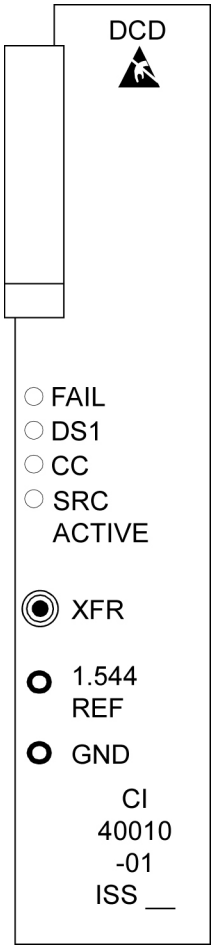
Introduction

This section shows the card face plates and describes the Light Emitting Diodes (LEDs) for each card. This section assists maintenance personnel in troubleshooting.

EAGLE 5 ISS frames are configured with modules (cards) that provide specific functions and services. LEDs together with part numbers, text and bar codes are located on the faceplates of the cards. The cards are listed in alphabetical order of the full card name. Each card is identified by its acronym first, then by the full name of the card.

CI, Clock Interface Card, Holdover Clock

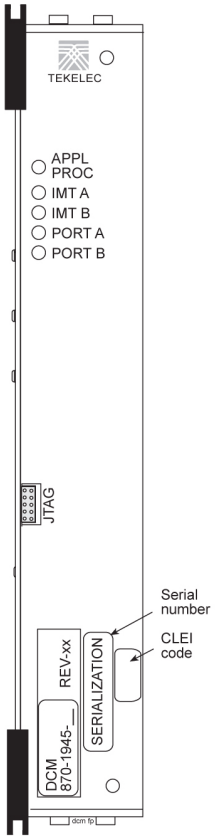
Figure 136: Holdover Clock CI Card LEDs



LEDs	Descriptions
FAIL	RED - this card or its input has failed. The card's output is disabled and a minor alarm is generated. BLANK - no card or input failure detected.
DS1	GREEN - DS1 source is present. BLANK - DS1 source is not present.
CC	GREEN - CC (composite clock) source is present. BLANK - CC source is not present.
SRC ACTIVE	GREEN - the card is on-line providing a DCD reference to ST3 and output cards. BLANK - card is in standby mode.

DCM, Database Communications Module; DSM, Database Service Module

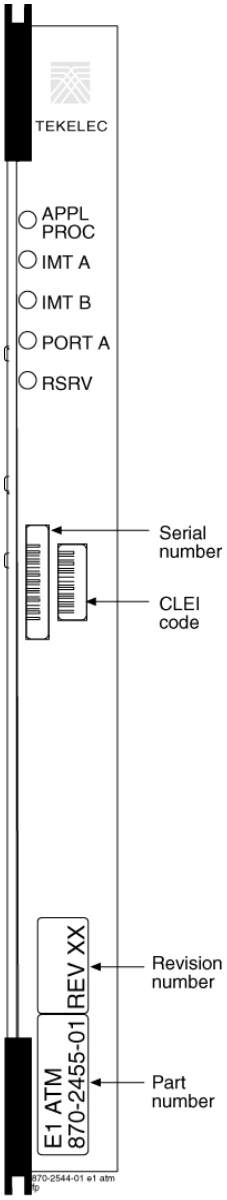
Figure 137: DCM and DSM LEDs



LEDs	Descriptions
APPL PROC	RED – Critical alarm condition detected. GREEN – No alarm
IMT A	RED – Major alarm condition detected. GREEN – No alarm
IMT B	AMBER – Minor alarm condition detected. GREEN – No alarm
PORT A	GREEN – PORT A is the active PORT. RED – PORT A is inactive
PORT B	GREEN – PORT B is the active PORT. RED – PORT B is inactive.

E1 ATM Link Interface Module

Figure 138: E1 ATM LEDs

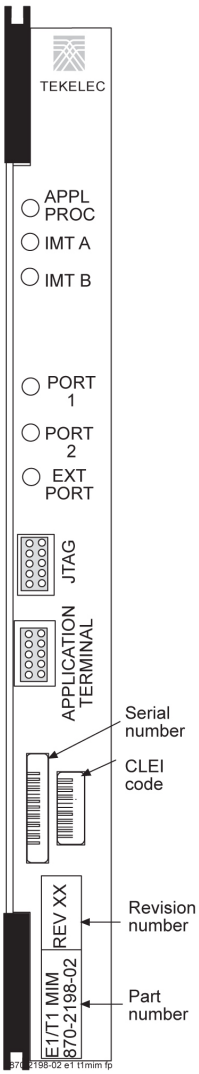


LED	Descriptions
APPL PROC - Applications Processor Status	**RED** - Application processor is not running or is failing diagnostics. **AMBER** - Card is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). **GREEN** - Card is running an application.
IMT A	**RED** – Card is off IMT bus A. **AMBER** – Card is on IMT bus A, but testing is not complete. **GREEN** – Card is on IMT bus A. **BLANK** – Communication processor is not operating.
IMT B	**RED** – Card is off IMT bus B. **AMBER** – Card is on IMT bus B, but testing is not complete. **GREEN** – Card is on IMT bus B. **BLANK** – Communication processor is not operating.
PORT A	**RED** – Link is out of service. **GREEN** – Link is aligned and in service.
RSRV – Reserved	Not currently used.

E1/T1 MIM, E1/T1 Multichannel Interface Module

European and North American standard for signaling and channels MIM (Multi-channel Interface Module).

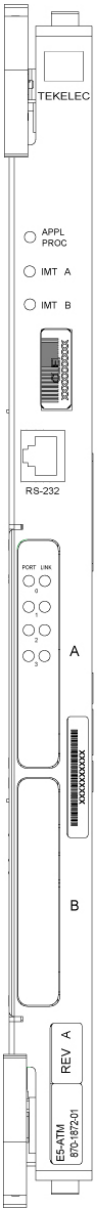
Figure 139: E1/T1 MIM



LEDs	Descriptions
APPL PROC	RED – Critical alarm condition detected GREEN – No alarm
IMT A	RED – Major alarm condition detected GREEN – No alarm
IMT B	AMBER – Minor alarm condition detected GREEN – No alarm
PORT 1	AMBER – Card is an E1-T1 Channel Card GREEN – All channels provisioned =ISNR AMBER BLINKING – Any channels provisioned = OOS RED BLINKING – All channels provisioned = OOS RED – No channels are provisioned
PORT 2	AMBER – Card is an E1-T1 Channel Card GREEN – All channels provisioned =ISNR AMBER BLINKING – Any channels provisioned = OOS RED BLINKING – All channels provisioned = OOS RED – No channels are provisioned
EXT PORT	AMBER – Card is an E1-T1 Master Card GREEN – All channels provisioned =ISNR AMBER BLINKING – Any channels provisioned = OOS RED BLINKING – All channels provisioned = OOS RED – No channels are provisioned
OOS - Out of service ISNR - In service normal	

E5-ATM Interface Module

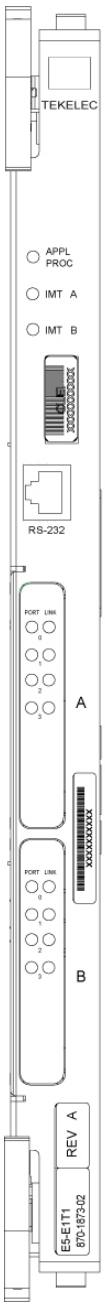
Figure 140: E5-ATM Interface Module



LED	Color	Description
APPL PROC	RED	Transitioning or Error
	AMBER	Not Active
	GREEN	Active
IMT (A/B)	RED	Card is not attached to IMT bus
	GREEN	Card is attatched to IMT bus
PORT (1/2)	RED	Port not provisioned
	RED blinking	Loss of signal
	AMBER	Remote alarm condition or loss of cell delineation
	AMBER blinking	Loss of Frame Synchronization
	GREEN	E1/T1 framing is established
LINK (1/2)	RED	Signaling Link is not provisioned
	RED blinking	Signaling Link Out Of Service
	AMBER	Signaling Link is ready to start alignment
	AMBER blinking	Signaling Link alignment in progress
	GREEN blinking	Signaling Link alignment successful, awaiting far end INSV
	GREEN	Signaling Link is aligned
PORT (3/4)	OFF	Not used
LINK (3/4)	OFF	Not used

E5-E1T1, E5-E1T1 Interface Module

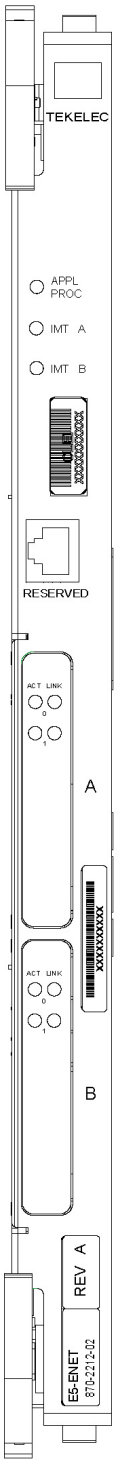
Figure 141: E5-E1T1 Interface Module



LED	Color	Description
APPL PROC	RED	Application processor is not running or is failing diagnostics.
	AMBER	Card is loading an application or is being polled (may be prevented from loading by maintenance out of service condition).
	GREEN	Card is running an application.
IMT	RED	Card is off IMT bus.
	AMBER	Card is on IMT bus, but testing is not complete.
	GREEN	Card is on IMT.
	BLANK	Communication processor is not operating.
PORT	RED	Port not provisioned.
	RED blinking	Loss of signal and remaining errors.
	AMBER	Remote alarm condition.
	AMBER blinking	Loss of Frame Synchronization.
	GREEN	No alarms, port has acquired timing and framing synchronization.
LINK	RED	No channels are provisioned.
	RED blinking	All channels provisioned = OOS.
	AMBER	Indicates port is the "reflected" port in Channel Bridging mode of operation. Applies only to "even" numbered ports
	AMBER blinking	Any channels provisioned = OOS.
	GREEN	All channels provisioned =ISNR.

E5-ENET, E5 -ENET Interface Module

Figure 142: E5-ENET Interface Module



Front Faceplate LED Indicators

LED	Status	Description
APPL PROC	Off	No power
	Red	Card is booting
	Amber	Card is loading
	Green	Card is running
IMT A	Red	Not connected to bus
	Amber	Testing not complete
	Green	Active and connected to the bus
IMT B	Red	Not connected to bus
	Amber	Testing not complete
	Green	Active and connected to the bus

EROUTE/SLAN

LED	ACT	LINK
Red	Signaling links inactive, or 1 or more active links are out-of-service	N/A
Green	All active links are in-service	Ethernet signal detected
Off	Card nonfunctional	No Ethernet signal detected

ACT Status LED states for IPLIMx/IPSG

SLK States (Port A or Port B)	ACT Status LED
None configured	Red
All are OOS-MT-DSBLD	Red
None are OOS-MT and at least one is IS-NR or IS-ANR	Green
At least 1 is OOS-MT	Red

ACT Status LED states for IPGWx

IPGWx SLK PST	ACT Status LED	
	A0	B0
None configured (card must be inhibited)	Red	Red
OOS-MT-DSBLD	Red	Green
IS-NR or IS-ANR	Green	Green

Note: Must be used with the E5-MASP card.

Note: The E5-ENET is provisionable for multiple functions, but does not support multiple functions on a single card simultaneously.

E5-IPSM Module

Figure 143: E5-IPSM Module

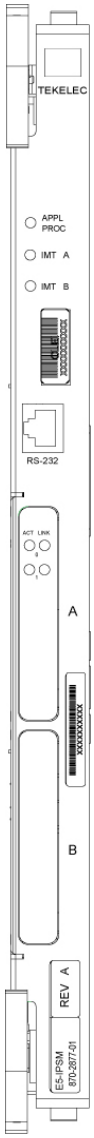


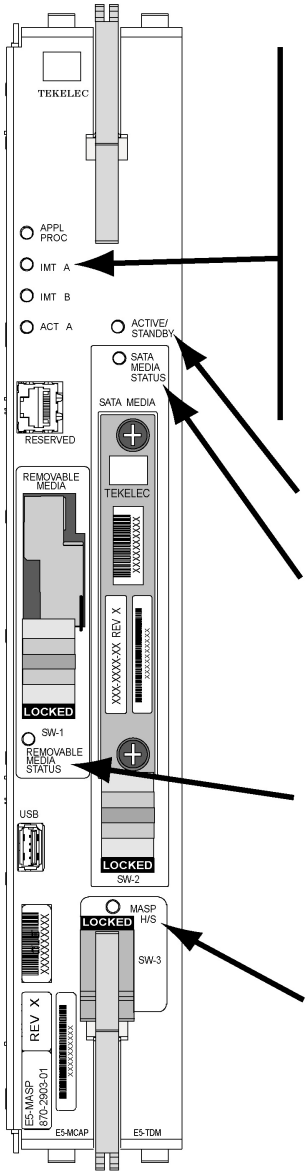
Table 29: E5-IPSM Module LEDs

LED	Color	Descriptions
APPL PROC	Red	Application processor is not running or is failing diagnostics.

LED	Color	Descriptions
	Amber	Card is loading an application or is being polled (may be prevented from loading by maintenance-out-of-service condition)
	Green	Card is running an application.
IMT	Red	Card is off IMT bus
	Amber	Card is on IMT bus, but testing is not complete.
	Green	Card is on IMT bus
	Blank	Communication processor is not operating.
ACT	Red	No signal detected.
	Green	Signal detected.
	Off	Port nonfunctional.
LINK	Red	Data link inactive.
	Green	Data link active.
	Off	Port nonfunctional.

E5-MASP Card

Figure 144: E5-MASP Card



E5-MASP LEDs

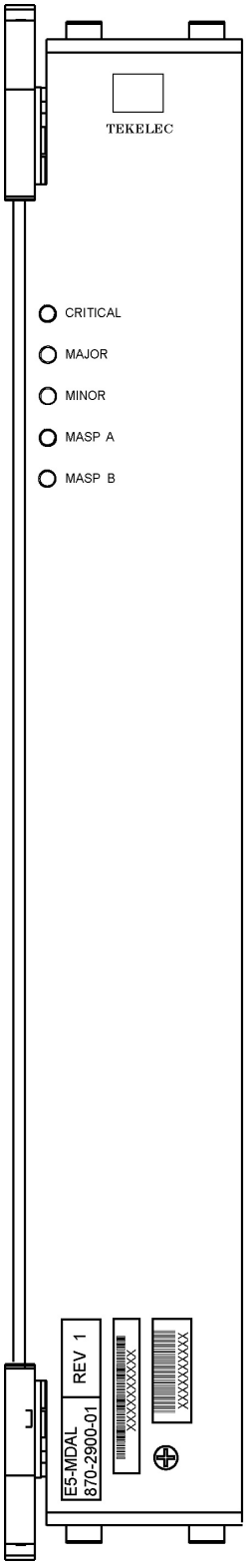
LED	Status	Description
APPL PROC	Off	No power
	Red	Card is booting
	Amber	Card is loading
	Green	Card is running
IMT A	Red	Not connected to bus
	Amber	Testing not complete
	Green	Active and connected to the bus
IMT B	Red	Not connected to bus
	Amber	Testing not complete
	Green	Active and connected to the bus
ACT A	Off	Card not functioning
	Red	No signal detected
	Green	Signal detected
ACTIVE/ STANDBY	Green	This card is the Active MASP
	* Blinking Green/Amber	This card is the Standby MASP
SATA MEDIA STATUS	Off	Media is LOCKED and operating
	Blinking Blue	WAIT Media is UNLOCKED and in process of shutting down OR Media is LOCKED and in process of coming online
	Steady Blue	Media is UNLOCKED, turned off, and ready for removal
REMOVABLE MEDIA STATUS	Off	Media is LOCKED and operating
	Blinking Blue	WAIT Media is UNLOCKED and in process of shutting down OR Media is LOCKED and in process of coming online
	Steady Blue	Media is UNLOCKED, turned off, and ready for removal
MASP H/S	Off	E5-MASP is LOCKED and operating
	Blinking Blue	WAIT - E5-MASP is UNLOCKED and in process of shutting down OR E5-MASP is LOCKED and in process of coming online
	Steady Blue	E5-MASP is UNLOCKED, turned off, and ready for removal

* The LED blinks Green/Amber at a rate of 3 Green to 1 Amber.

Note: Must be used with the E5-MASP card.

E5-MDAL Card

Figure 145: E5-MDAL Card



E5-MDAL LEDs

LED	Status	Description
CRITICAL	Red	A critical system alarm has been detected
	Green	No Alarm
MAJOR	Red	A major system alarm has been detected
	Green	No Alarm
MINOR	Amber	A minor system alarm has been detected
	Green	No Alarm
MASP A	Green	This is the master MASP
	Off	This is the standby MASP
MASP B	Green	This is the master MASP
	Off	This is the standby MASP

Note: Must be used with the E5-MASP card.

E5-SM4G Module

Figure 146: E5-SM4G Interface Module

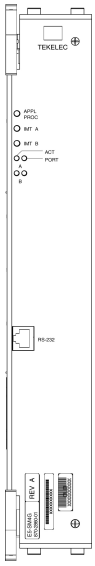


Table 30: E5-SM4G Interface Module LEDs

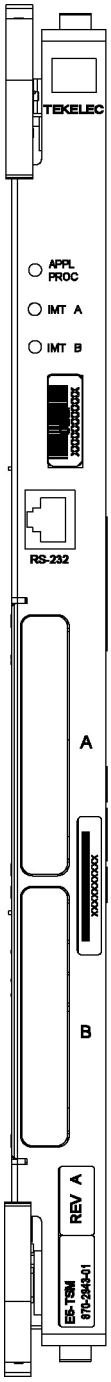
LED	Color	Descriptions
APPL PROC	Red	Application processor is not running or is failing diagnostics.
	Amber	Card is loading an application or is being polled (may be prevented from loading by maintenance-out-of-service condition)
	Green	Card is running an application.
IMT	Red	Card is off IMT bus
	Amber	Card is on IMT bus, but testing is not complete.
	Green	Card is on IMT bus
	Blank	Communication processor is not operating.
ACT	Red	No signal detected
	Green	Signal detected

LED	Color	Descriptions
	Off	Card nonfunctional
PORT	Amber	Data link active operating at 1 Gbps
	Green	Data link active operating at 10/100 Mbps
	Off	Card non-functional

E5-TSM LEDs

The E5-TSM includes three front panel indicators (LEDs) for APPL Proc operation, IMT A, and IMT B status.

Figure 147: E5-TSM LEDs



LED	Status	Description
APPL	Red	Not provisioned
	Amber	Provisioned but not loaded
	Green	Loaded
IMT (A or B)	Red	Card is not attached to IMT
	Green	Card is attached to IMT

EDCM(Double-Slot), Enhanced Database Communications Module (Double-Slot),

Figure 148: EDCM (Double-Slot) LEDs

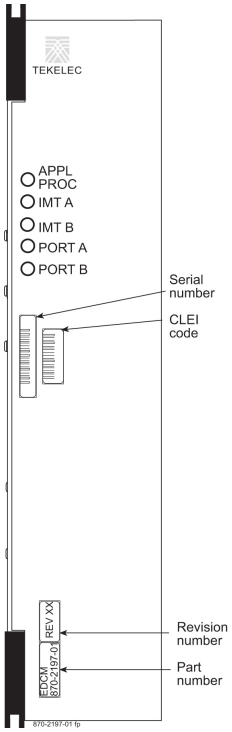
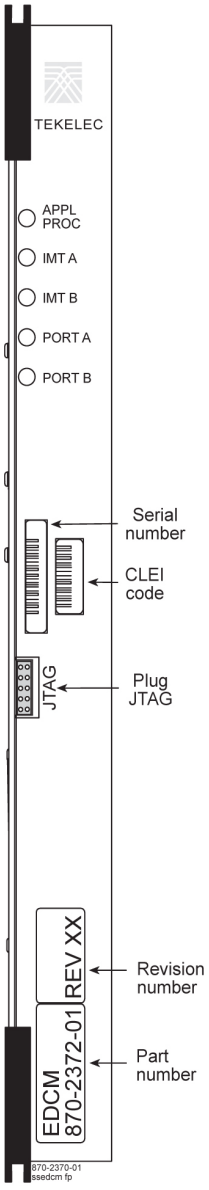


Table 31: EDCM LEDs

LEDs	Descriptions
APPL PROC	RED – Critical alarm condition detected. GREEN – No alarm
IMT A	RED – Major alarm condition detected. GREEN – No alarm
IMT B	AMBER – Minor alarm condition detected. GREEN – No alarm
PORT A	GREEN – PORT A is the active PORT. RED – PORT A is inactive
PORT B	GREEN – PORT B is the active PORT. RED – PORT B is inactive.

EDCM and EDCM-A (Single-Slot), Enhanced Database Communications Module (Single-Slot)

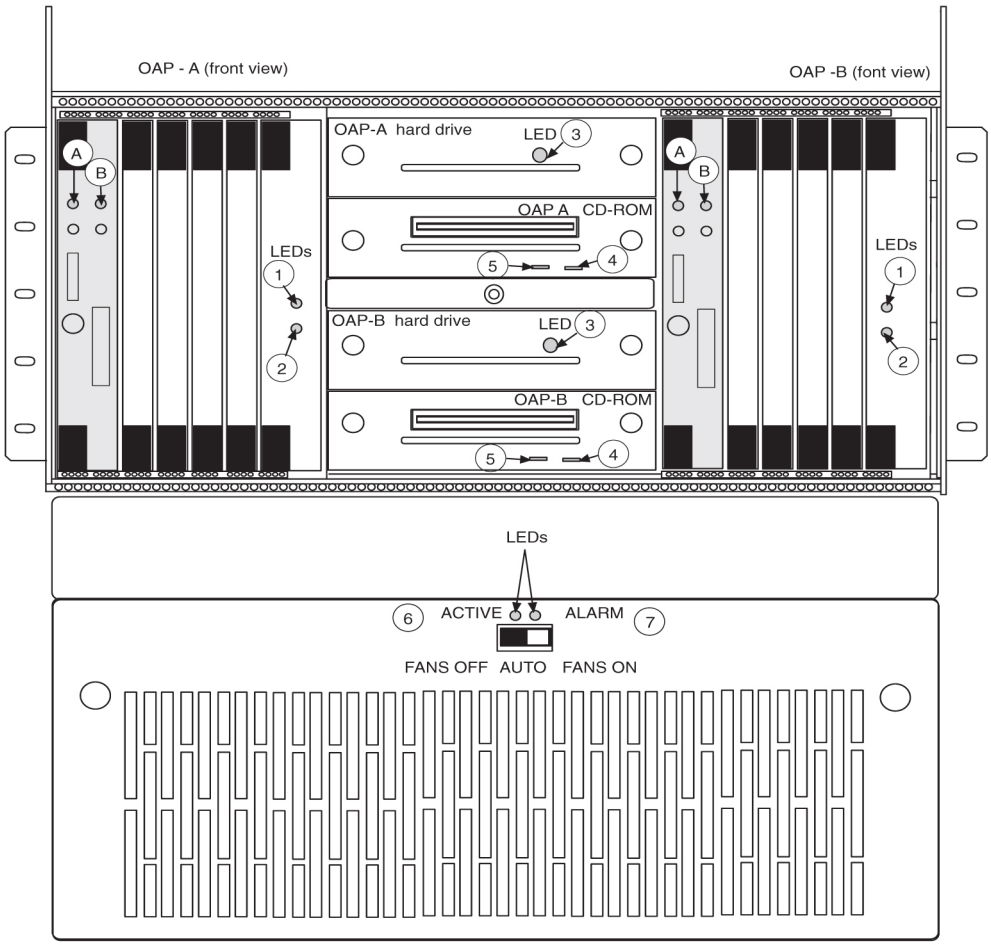
Figure 149: EDCM and EDCM-A Single-Slot LEDs



LEDs	Descriptions
APPL PROC	RED – Critical alarm condition detected. GREEN – No alarm
IMT A	RED – Major alarm condition detected. GREEN – No alarm
IMT B	AMBER – Minor alarm condition detected. GREEN – No alarm
PORT A	GREEN – PORT A is the active PORT. RED – PORT A is inactive
PORT B	GREEN – PORT B is the active PORT. RED – PORT B is inactive.

EOAP, Embedded OAP

Figure 150: EOAP LEDs

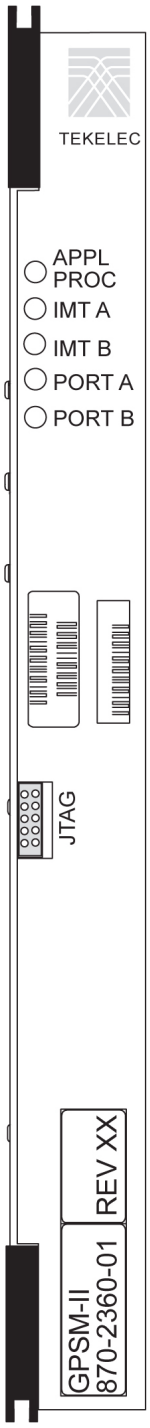


A	Power	GREEN processor card has power RED is processor card failure
B	Activity	GREEN flashing when communicating over Compact PCI bus
C	OFF	Not used
1	Power	GREEN - Input power is on
2	Alarm	AMBER - Power supply failure
3	Power	GREEN - Hard drive card is powered
4	Power	AMBER - CD-ROM Drive is powered AMBER flashing - CD-ROM is being accessed
5	Status	GREEN - CD-ROM disk is inserted
6	ACTIVE	GREEN - Fan is powered
7	ALARM	RED - Power supply failure

Eoapfrnt detail led

GPSM-II, General Purpose Service Module

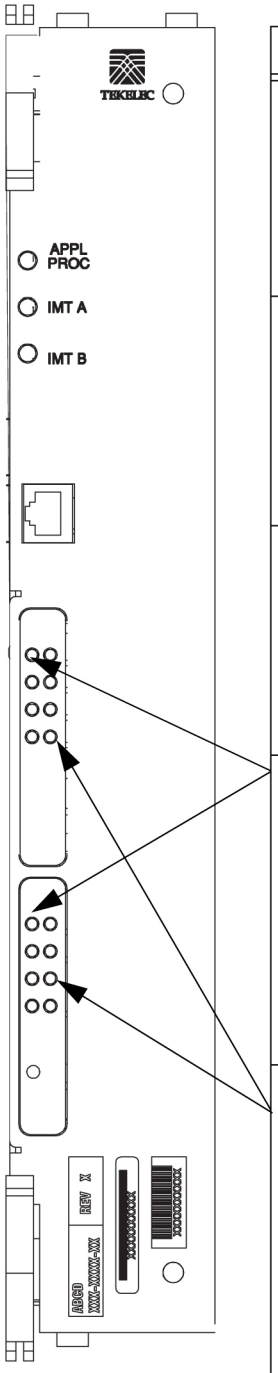
Figure 151: GPSM-II LEDs



LEDs	Descriptions
APPL PROC	RED – Critical alarm condition detected. GREEN – No alarm
IMT A	RED – Major alarm condition detected. AMBER – Minor alarm condition detected. GREEN – No alarm
IMT B	RED – Major alarm condition detected. AMBER – Minor alarm condition detected. GREEN – No alarm
PORT A	GREEN – PORT A is the active PORT. RED – PORT A is inactive
PORT B	GREEN – PORT B is the active PORT. RED – PORT B is inactive.

HC MIM, High Capacity Multi-channel Interface Module

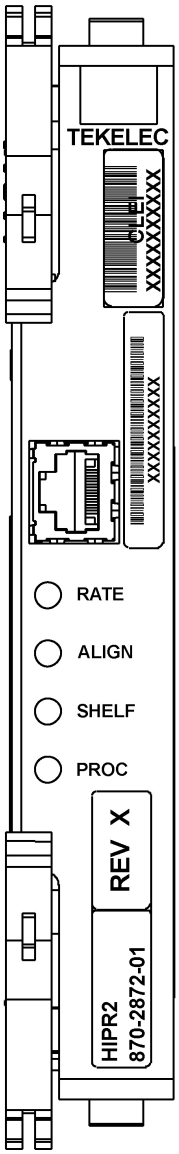
Figure 152: HC MIM LEDs



LEDs	Descriptions
APPL PROC	RED – Application processor is not running or is failing diagnostics. AMBER – MPL is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN – MPL is running an application.
IMT A	RED – MPL is off IMT bus A. AMBER – MPL is on IMT bus A, but testing is not complete. GREEN – MPL is on IMT bus A. BLANK – Communication processor is not operating.
IMT B	RED – MPL is off IMT bus B. AMBER – MPL is on IMT bus B, but testing is not complete. GREEN – MPL is on IMT bus B. BLANK – Communication processor is not operating.
PORT (all LEDs on left side)	RED – Port not provisioned. RED BLINKING – Loss of signal and remaining errors. AMBER – Remote alarm condition AMBER BLINKING – Loss of Frame Synchronization. GREEN – No alarms, port has acquired timing and framing synchronization
Link (Aggregated Channel Status; all LEDs on right side)	RED – No channels are provisioned. RED BLINKING – All channels provisioned = OOS. AMBER – Indicates port is the “reflected” port in Channel Bridging mode of operation. Applies only to “even” numbered ports AMBER BLINKING – Any channels provisioned = OOS. GREEN – All channels provisioned =ISNR.

HIPR2, High-Speed IMT Packet Router 2 Module

Figure 153: HIPR2 LEDs



HIPR2 State	LED			
	RATE	ALIGN	SHELF	PROC
No power	Off	Off	Off	Off
Power on (cold start)	Off	Off	Off	RED
Reset (warm start)	Off	Off	AMBER	RED
Programming (cold start)	Off	Off	Off	AMBER
Programming (warm start)	Off	Off	AMBER	AMBER
Programming Complete	---	AMBER	AMBER	GREEN
Shelf Address Capture: Timer Started Successful Unsuccessful	 --- --- ---	 AMBER GREEN RED	 AMBER AMBER AMBER	 GREEN GREEN GREEN
Code Running	---	GREEN	Note 2	GREEN
IMT is operational at: low-rate (1 Gbps) high-rate (2.5 Gbps)	 GREEN GREEN Blinking			
IMT is rate negotiating or in proving period	AMBER			
IMT is not operational	RED			

Notes:

1. ALIGN and SHELF LEDs are not accessible to software until the FPGA has been programmed. So for the same point in the HIPR bootstrap sequence, the state of these two LEDs can be different depending on whether a warm or cold start is in progress.

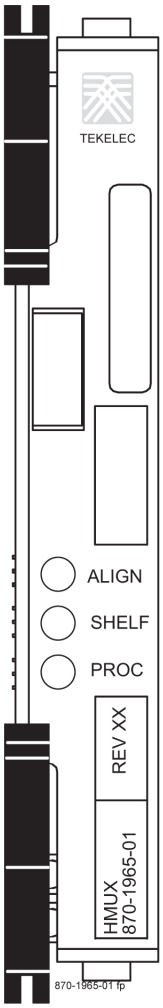
2. State depends on the address received from OAM and written to Assigned Shelf Address Register and compared to the value previously read from the Assigned Shelf Address Register.
   - RED - Does Not Match
   - GREEN - Matches

HIPR, High-Speed IMT Packet Router Module

Figure 154: HIPR LEDs

HMUX, High-Speed Multiplexer

Figure 155: HMUX LEDs



LEDs	Descriptions
ALIGN	AMBER – Programming XILINX complete GREEN – Complete code initialization (stays Amber until the first valid Shelf ID is received from MASP), Code running
SHELF ID	AMBER – Programming XILINX complete, Complete code initialization RED – While code running if ID address received from OAM **does not** match the on-board stored address read from the assigned shelf address register (see first note below) GREEN – While code running if ID address received from OAM matches the on-board stored address read from the assigned shelf address register (see second note below)
PROC Health	RED – Power on Reset AMBER – Programming XILINX GREEN – Programming XILINX complete, Complete code initialization, Code running

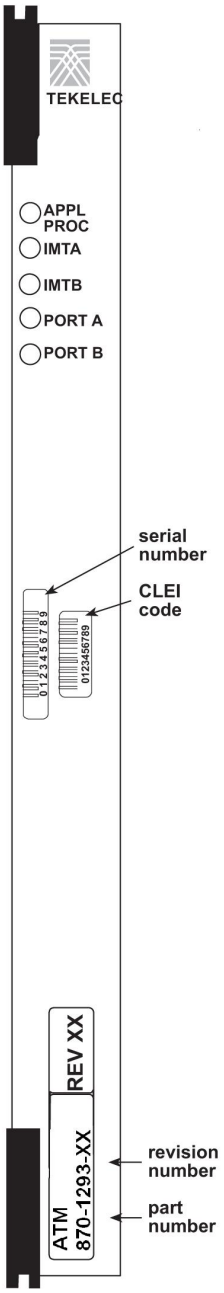
NOTE: The LED color state change during power up and reset happens within one second. To determine operating status, wait until reset is over.

NOTE: At start up, each HMUX card receives an ID address from the OAM. The HMUX card stores this address in on-board memory, in register FF. Every five seconds, the OAM re-sends the same addresses to the HMUX cards, which compare the re-send with the address they previously received and stored in memory. If the address sent to an HMUX card by OAM does not match the stored address, the HMUX Illegal Address Error alarm will cause the Shelf LED color to change to RED.

LIM-ATM

ATM Link Interface Module.

Figure 156: LIM LEDs



LEDs	Descriptions
APPL PROC	RED – Application processor is not running or is failing diagnostics. AMBER – LIM is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN – LIM is running an application. RED/GREEN – Operational, no communication with MASP
IMTA	RED – LIM is off IMT bus A. AMBER – LIM is on IMT bus A, but testing is not complete. GREEN – LIM is on IMT bus A. BLANK – Communication processor is not operating.
IMTB	RED – LIM is off IMT bus B. AMBER – LIM is on IMT bus B, but testing is not complete. GREEN – LIM is on IMT bus B. BLANK – Communication processor is not operating.
PORT A	RED – Link is out of service. AMBER – Link is attempting to align GREEN – Link is aligned and in service.
PORT B	RED – Link is out of service. AMBER – Link is attempting to align GREEN – Link is aligned and in service.

MDAL, Maintenance Disk and Alarm Card

Figure 157: MDAL LEDs

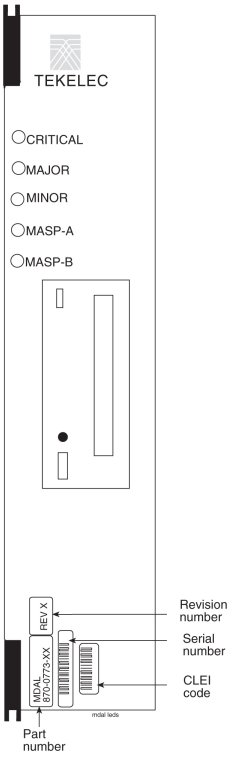


Table 32: MDAL LEDs

LEDs	Descriptions
CRITICAL	RED – Critical alarm condition detected GREEN – No alarm
MAJOR	RED – Major alarm condition detected GREEN – No alarm
MINOR	AMBER – Minor alarm condition detected GREEN – No alarm
MASP-A	GREEN – MASP-A is the active MASP OFF – MASP-A is the standby MASP or is not present
MASP-B	GREEN – MASP-B is the active MASP OFF – MASP-B is the standby MASP or is not present

MIS, Maintenance Interface System, Holdover Clock

Figure 158: Holdover Clock MIS Card LEDs

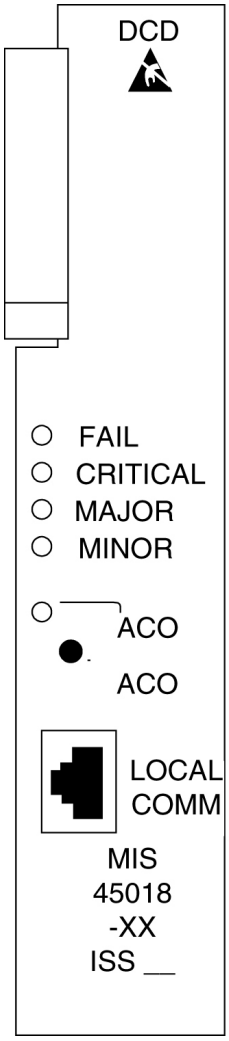


Table 33: MIS LEDs

LEDs	Descriptions
FAIL	RED – This card or its power supply has failed. BLANK – No card or power supply failure detected.
CRITICAL	RED – Holdover clock system has failed. BLANK – No holdover clock system failure detected.

LEDs	Descriptions
MAJOR	RED – Holdover clock system or any holdover clock card has a major alarm. BLANK – No major alarm detected.
MINOR	YELLOW – Holdover clock system or any holdover clock card has a minor alarm. BLANK – No minor alarm detected.
ACO	GREEN – The ACO push button has been pressed to silence the alarm during an alarm state.

MCA, Matrix Controller Assembly Card, Holdover Clock

Figure 159: Holdover Clock MCA Card LEDs

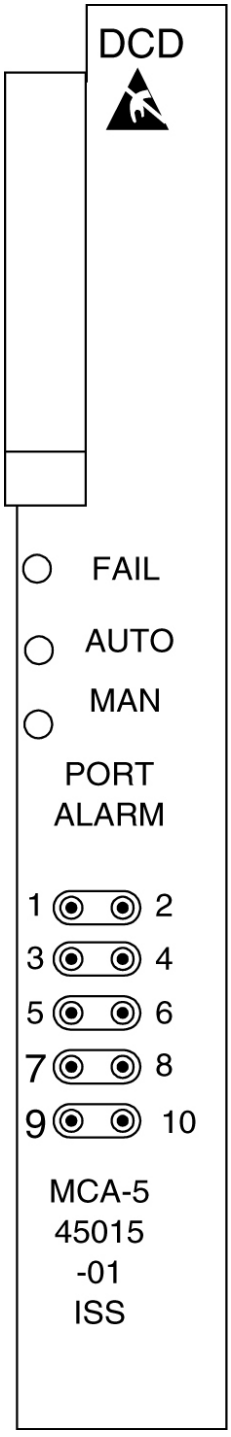
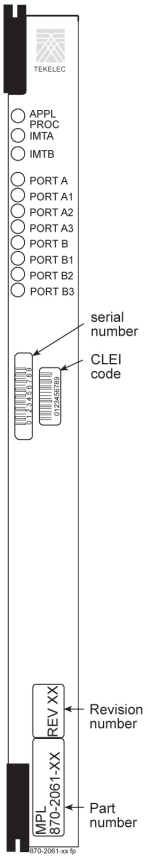

DCD
FAIL
AUTO
MAN
PORT
ALARM
1
2
3
4
5
6
7
8
9
10
MCA-5
45015
-01
ISS

Table 34: MCA LEDs

LEDs	Descriptions
FAIL	RED – This card has failed or there is a loss of all input references to this card. BLANK – No card or input reference failure detected.
AUTO	GREEN – Indicates output failure was protected automatically. BLANK – No failures detected.
MAN	GREEN – Indicates output failure was protected manually. BLANK – No failures detected.

MPL LIM, Multi-Port Link Interface Module

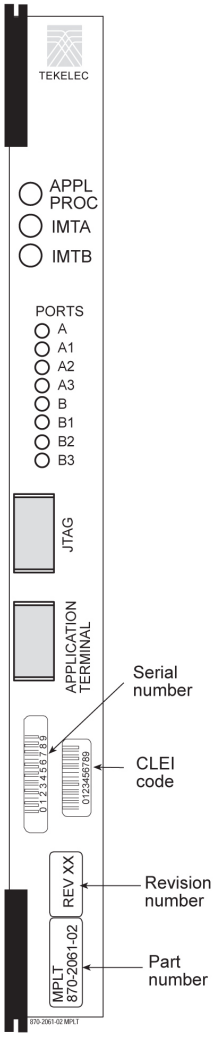
Figure 160: MPL LEDs



LEDs	Descriptions
APPL PROC	RED – Application processor is not running or is failing diagnostics. AMBER – MPL is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN – MPL is running an application. RED/GREEN (Alternating) Operational but no communication with MASP
IMTA	RED – MPL is off IMT bus A. AMBER – MPL is on IMT bus A, but testing is not complete. GREEN – MPL is on IMT bus A. BLANK – Communication processor is not operating.
IMTB	RED – MPL is off IMT bus B. AMBER – MPL is on IMT bus B, but testing is not complete. GREEN – MPL is on IMT bus B. BLANK – Communication processor is not operating.
PORT A	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT A1	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT A2	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT A3	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT B	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT B1	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT B2	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.
PORT B3	RED – Link is out of service. AMBER – Link attached to Port is attempting to align GREEN – Link is aligned and in service. RED/GREEN (alternating) – Link attached to Port is in a loop-back condition.

MPLT, Multi-Port LIM with Taxi Component

Figure 161: MPLT LEDs



LEDs	Descriptions
APPL PROC	RED – Application processor is not running or is failing diagnostics. AMBER – MPL is loading an application or is being polled (may be prevented from loading by maintenance out of service condition). GREEN – MPL is running an application.
IMTA	RED – MPL is off IMT bus A. AMBER – MPL is on IMT bus A, but testing is not complete. GREEN – MPL is on IMT bus A. BLANK – Communication processor is not operating.
IMTB	RED – MPL is off IMT bus B. AMBER – MPL is on IMT bus B, but testing is not complete. GREEN – MPL is on IMT bus B. BLANK – Communication processor is not operating.
PORT A	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT A1	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT A2	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT A3	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT B	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT B1	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT B2	RED – Link is out of service. GREEN – Link is aligned and in service.
PORT B3	RED – Link is out of service. GREEN – Link is aligned and in service.

ST3, Stratum-3 Clock Card, Holdover Clock

Table 35: ST3 LEDs

LEDs	Descriptions
FAIL	RED – This card has failed. BLANK – No card failure detected.
LOCK	RED – Input has failed. BLANK – No input failure detected.

LEDs	Descriptions
REF A	GREEN – Card is tracking the output of clock input card A. BLANK – Not tracking output of clock input card A.
REF B	GREEN – Card is tracking the output of clock input card B. BLANK – Not tracking output of clock input card B.

Note:

If the FAIL and LOCK LEDs are both illuminated, the ST3 is in holdover mode and the card has not failed. Holdover Clock ST3 Card LEDs

TDM-GTI, Terminal Disk Module-Global Timing Interface

The Terminal Disk Module supports Global Timing Interface (TDM-GTI)

Figure 162: TDM LED

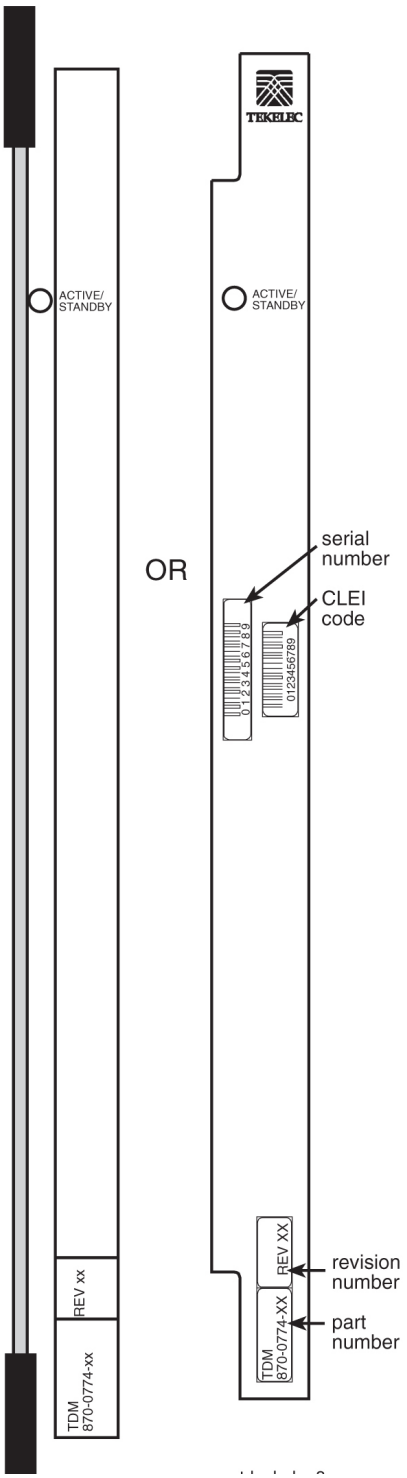

ACTIVE/
STANDBY
REV xx
TDM
870-0774-xx
OR
TEKELEC
ACTIVE/
STANDBY
serial
number
CLEI
code
0123456789
0123456789
REV XX
revision
number
TDM
870-0774-XX
part
number

Table 36: TDM-GTI LEDs

LED	Descriptions
STATUS	RED – Card is resetting, hardware and software are not currently configured. GREEN – OAM application is running and this MASP is primary. GREEN/AMBER – OAM application is running and this MASP is in standby mode.

Note: LED state is not defined if the associated GPSM ll is resetting, is not installed, or has failed.

TOCA, Timing Output Composite Automatic, Holdover Clock

Table 37: TOCA LEDs

LEDs	Descriptions
FAIL	RED – This card has failed or there is a loss of all input references to this card. BLANK – No card or input reference failure detected.
PORT ALM	RED – One to five outputs have failed or have been externally shorted. BLANK – No output failures detected.
ST	GREEN – An active clock is supplying the input reference for this card. BLANK – No active clock detected.
INPUT	GREEN – Card is receiving a reference signal from one or more of the following: clock input A, clock input B, clock card A, clock card B. BLANK – Card is not receiving a reference signal from any of the above sources.
500′	Not used
1000′	Not used

Appendix B

Backplane Connectors

Topics:

- *Control Shelf Connectors.....291*
- *Extension Shelf.....345*

Control Shelf Connectors

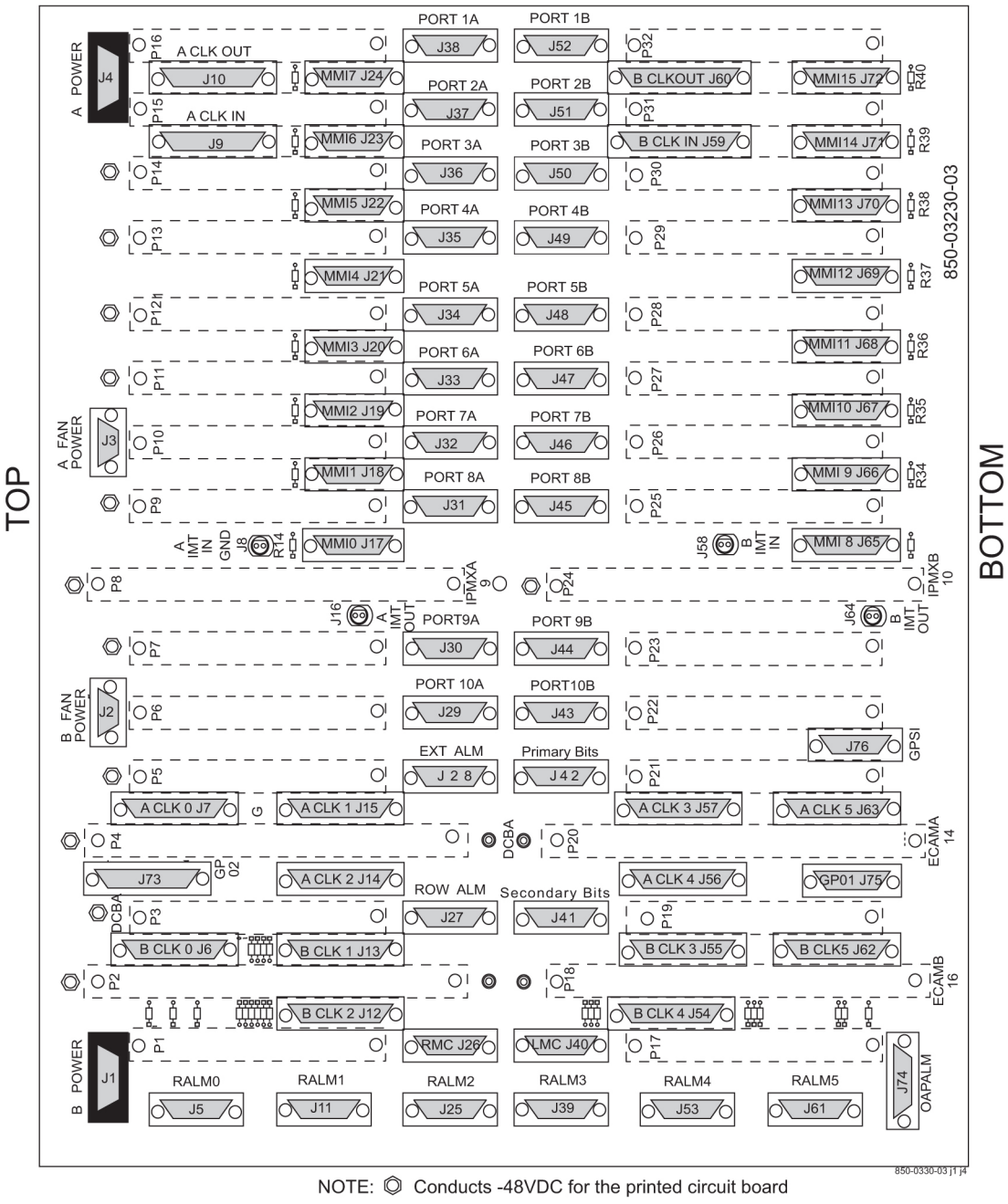
This section describes the Control shelf backplanes and their connectors. The control shelf backplane provides connectors for the system circuit cards. These connectors are four column High Density Interconnect (HDI) male headers with shrouds of varying pin quantities, depending on card position.

The control shelf backplane provides –48VDC power and ground to all card positions. The power is distributed into two parts, A and B. Power is brought to the shelf from the Fuse and Alarm Panel (FAP) using two cables. The connectors on the control shelf backplane are DB-26 high density connectors. The power is distributed over two separate pins per power connection to handle the current load.

- Power connectors
  - Fuse and Alarm Panel (FAP) connectors
  - Fan Power connectors
- Alarm connectors
  - Remote Maintenance Center Alarm connector
  - Local Maintenance Center Alarm connector
  - Rack Alarm connectors
  - Row Alarm connector
  - External Alarm connector
  - CUST Alarm 1 connector
  - CUST Alarm 2 connector
  - OAP Alarm connector
- System clock connectors
- Shelf clock connectors (850-0330-04 only)
- BITS connectors
- Serial port connectors
- Interface connectors
- IMT connectors
- General purpose relay connectors
- General purpose serial interface connectors

Control Shelf Backplane 04

Figure 163: Control Shelf Backplane 04

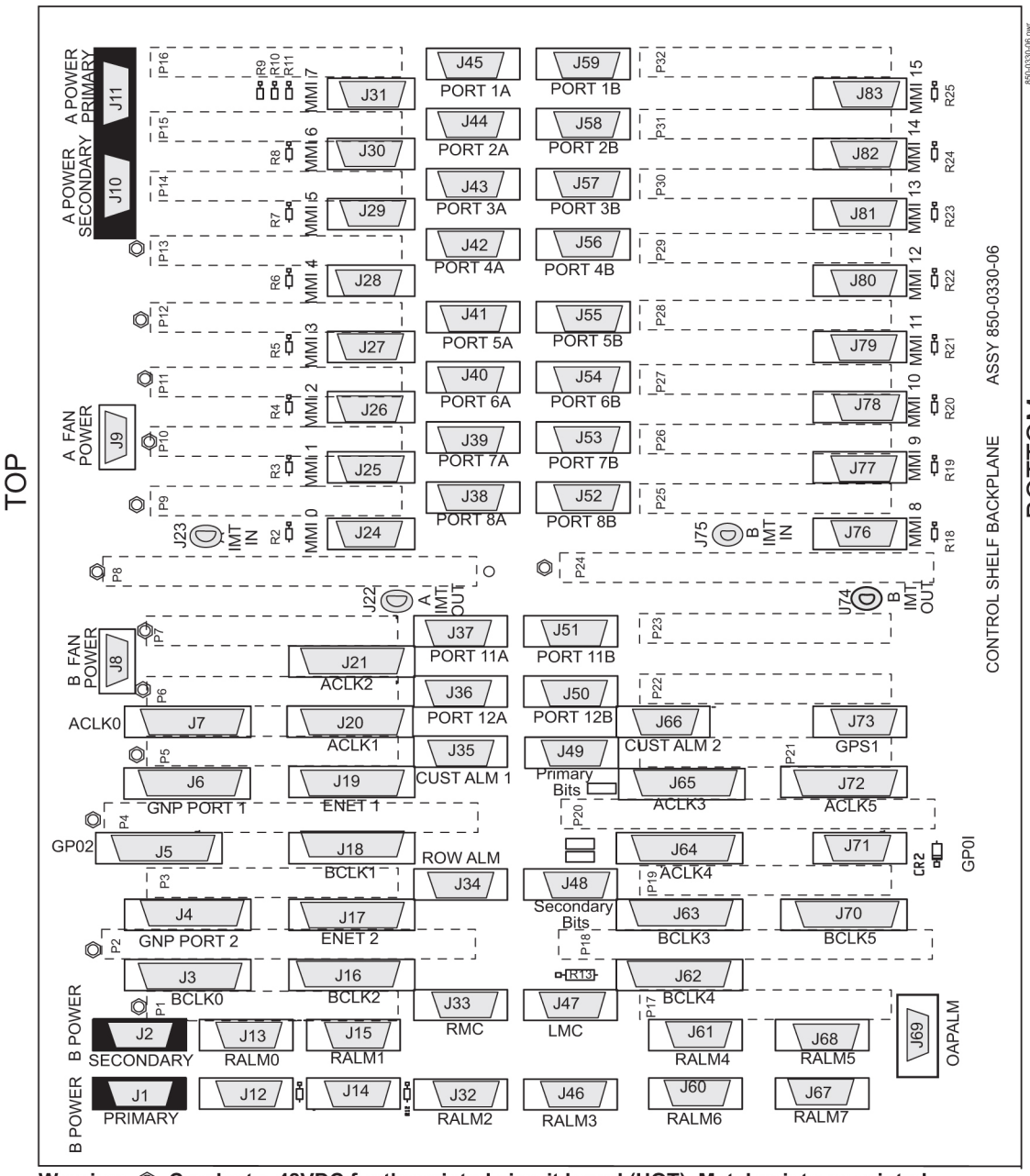


NOTE: ⬡ Conducts -48VDC for the printed circuit board

Control Shelf Backplane 06/07

The connectors on backplanes -06 and -07 are identical.

Figure 164: Control Shelf Backplane 06/07)



Warning: ⬡ Conducts -48VDC for the printed circuit board (HOT). Metal points on printed circuit boards conducts -48VDC and can cause shorts, shocks, and damage if not handled properly.

Overview of the Control Shelf Backplane Connectors

Table 38: Control Shelf Backplanes -04 and -06/07 compares the connectors of Control Shelf backplane 04 with the connectors of Control Shelf backplane 06/07.

Table 38: Control Shelf Backplanes -04 and -06/07

Control Shelf Backplane (P/N 850-0330-04)	Control Shelf Backplane (P/N 850-0330-06/07)
J-1 B POWER	J-1 B POWER PRIMARY
J-2 B FAN POWER	J-8 B FAN POWER
J-3 A FAN POWER	J-9 A FAN POWER
	J-10 A POWER SECONDARY
	J-2 B POWER SECONDARY
J-4 A POWER	J-11 A POWER PRIMARY
J-5 RALM0	J-13 RALM0
J-6 B CLK 0	J-3 B CLK 0 J-4 B CLK 6
J-7 A CLK 0	J-7 A CLK 0 J-6 A CLK 6
J-8 A IMT IN GND	J-23 A IMT IN
J-9 A CLK IN	N/A
J-10 A CLK OUT	J-14 CI
J-11 RALM 1	J-15 RALM 1
J-12 B CLK 2	J-16 B CLK 2 J-17 B CLK 7
J-13 B CLK 1	J-18 B CLK 1
J-14 A CLK 2	J-21 A CLK 2
J-15 A CLK 1	J-20 A CLK 1

Control Shelf Backplane (P/N 850-0330-04)	Control Shelf Backplane (P/N 850-0330-06/07)
J-16 A IMT OUT	J-22 A IMT OUT
J-17 MMI 0	J-24 MMI 0
J-18 MMI 1	J-25 MMI 1
J-19 MMI 2	J-26 MMI 2
J-20 MMI 3	J-27 MMI 3
J-21 MMI 4	J-28 MMI 4
J-22 MMI 5	J-29 MMI 5
J-23 MMI 6	J-30 MMI 6
J-24 MMI 7	J-31 MMI 7
J-25 RALM2	J-32 RALM2
J-26 RMC	J-33 RMC
J-27 ROW ALM	J-34 ROW ALM
J-28 EXT ALARM	J-35 CUST ALM 1 J-66 CUST ALM 2
J-29 PORT 10A	J-36 PORT 10A
J-30 PORT 9A	J-37 PORT 9A
J-31 PORT 8A	J-38 PORT 8A
J-32 PORT 7A	J-39 PORT 7A
J-33 PORT 6A	J-40 PORT 6A
J-34 PORT 5A	J-41 PORT 5A
J-35 PORT 4A	J-42 PORT 4A

Control Shelf Backplane (P/N 850-0330-04)	Control Shelf Backplane (P/N 850-0330-06/07)
J-36 PORT 3A	J-43 PORT 3A
J-37 PORT 2A	J-44 PORT 2A
J-38 PORT 1A	J-45 PORT 1A
J-39 RALM 3	J-46 RALM 3
J-40 LMC	J-47 LMC
J-41 SECONDARY BITS	J-48 SECONDARY BITS
J-42 PRIMARY BITS	J-49 PRIMARY BITS
J-43 PORT 10B	J-50 PORT 10B
J-44 PORT 9B	J-51 PORT 9B
J-45 PORT 8B	J-52 PORT 8B
J-46 PORT 7B	J-53 PORT 7B
J-47 PORT 6B	J-54 PORT 6B
J-48 PORT 5B	J-55 PORT 5B
J-49 PORT 4B	J-56 PORT 4B
J-50 PORT 3B	J-57 PORT 3B
J-51 PORT 2B	J-58 PORT 2B
J-52 PORT 1B	J-59 PORT 1B
J-53 RALM4	J-61 RALM4 J-60 RALM 6
J-54 B CLK4	J-62 B CLK 4
J-55 B CLK 3	J-63 B CLK 3

Control Shelf Backplane (P/N 850-0330-04)	Control Shelf Backplane (P/N 850-0330-06/07)
J-56 A CLK 4	J-64 A CLK 4
J-57 A CLK 3	J-65 A CLK 3
J-58 B IMT IN	J-75 B IMT IN
J-59 B CLK IN	N/A
J-60 B CLK OUT	N/A
J-61 RALM5	J-68 RALM5
J-62 B CLK 5	J-70 B CLK 5 J-71 GP01
J-63 A CLK 5	J-72 A CLK 5
J-64 B IMT OUT	J-74 B IMT OUT
J-65 MMI 8	J-76 MMI 8
J-66 MMI 9	J-77 MMI 9
J-67 MMI 10	J-78 MMI 10
J-68 MMI 11	J-79 MMI 11
J-69 MMI 12	J-80 MMI 12
J-70 MMI 13	J-81 MMI 13
J-71 MMI 14	J-82 MMI 14
J-72 MMI 15	J-83 MMI 15
J-73 GP02	J-69 OAPALM
J-74 OAPALM J-75 GP01	J-5 GP02 J-71 GP01

Control Shelf Backplane (P/N 850-0330-04)	Control Shelf Backplane (P/N 850-0330-06/07)
J-76 GPSI	J-73 GPS1
	J-67 RALM7

Power Connectors

The control shelf backplane provides –48VDC power and ground to all card positions. The power is distributed into two parts, A and B. Power is brought to the shelf from the Fuse and Alarm Panel (FAP) using two cables. The connectors on the control shelf backplane are DB-26 high density connectors. The power is distributed over two separate pins per power connection to handle the current load.

J1, J4 on Control Shelf backplane 04 J1, J11 Primary and J2, J10 Secondary on Control Shelf backplane 06/07

Figure 165: Power Connector

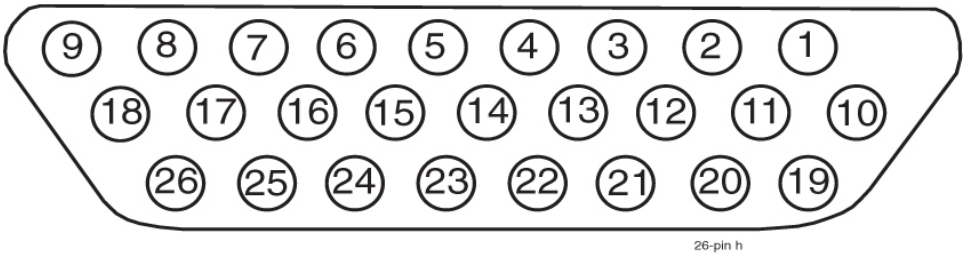


Table 39: Power Connector

Pin	Signal	Pin	Signal
1	P5$48VDC	14	LGND
2	P5$48RTN	15	P3$48RTN
3	P4$48VDC	16	P3$48VDC
4	P4$48RTN	17	P2$48RTN
5	LGND	18	P2$48VDC
6	P3$48RTN	19	P1$48RTN
7	P3$48VDC	20	P1$48RTN

Pin	Signal	Pin	Signal
8	P2$48RTN	21	P1$48VDC
9	P2$48VDC	22	P1$48VDC
10	P5$48VDC	23	PF$48RTN
11	P5$48RTN	24	PF$48RTN
12	P4$48VDC	25	PF$48VDC
13	P4$48RTN	26	PF$48VDC
$= A or B, A POWER (J4) or B POWER (J1)			

Fuse and Alarm Panel 870-2320-01/03

The FAP provides protected distribution of power to the system. Protection is provided by fuses placed in fuse holders on the front panel. The FAP contains a fuse fail alarm circuit that operates when one or more fuses fail.

Figure 166: Control/Extension FAP Rear View

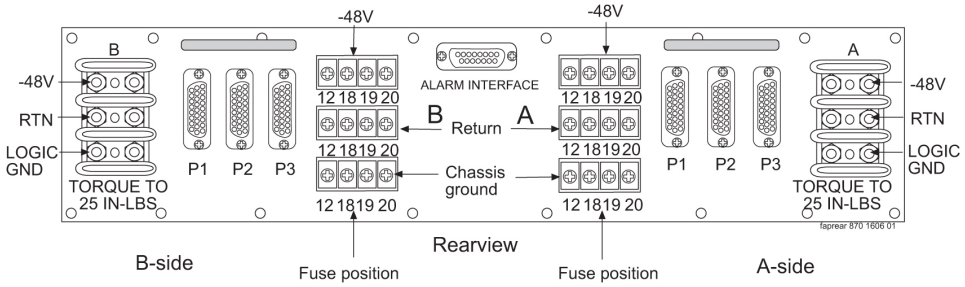


Figure 167: Alarm Interface Connector

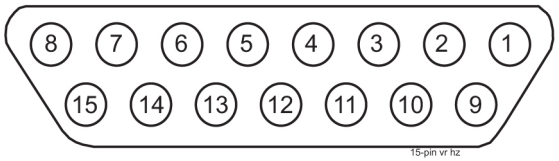


Table 40: Alarm Interface Connector

Pin	Circuit Descriptions
1 / 2 / 3 / 4	

5	Critical Alarm
6 / 7	
8	Fuse Normally Closed
9	
10	Minor Alarm
11	Major Alarm
12	Common
13	
14	Test
15	Fuse Normally Open

Shelf Power

The Fuse and Alarm Panel powers up to three shelves in the frame through the FAP connectors P1, P2, and P3.

Figure 168: Shelf Power Connector

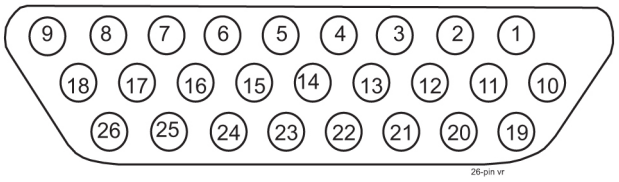


Table 41: Shelf Power Connector

Connector	Fuse Position	Pin Numbers	Circuit Descriptions
P1 (to top shelf in frame)	1	3 and 12	+48VDC
		2 and 11	48VDC return
	2	1 and 10	+48VDC
		19 and 20	48VDC return

Connector	Fuse Position	Pin Numbers	Circuit Descriptions
	3	21 and 22	+48VDC
		4 and 13	48VDC return
	4	23 and 24	+48VDC
		6 and 15	48VDC return
	5	9 and 18	+48VDC
		8 and 17	48VDC return
	6	7 and 16	+48VDC
		25 and 26	48VDC return
P2 (to middle shelf in frame)	7	3 and 12	+48VDC
		2 and 11	48VDC return
	8	1 and 10	+48VDC
		19 and 20	48VDC return
	9	21 and 22	+48VDC
		4 and 13	48VDC return
	10	23 and 24	+48VDC
		6 and 15	48VDC return
	11	9 and 18	+48VDC
		8 and 17	48VDC return
	12	7 and 16	+48VDC
		25 and 26	48VDC return
P3	13	3 and 12	+48VDC

Connector	Fuse Position	Pin Numbers	Circuit Descriptions
(to bottom shelf in frame)		2 and 11	48VDC return
	14	1 and 10	+48VDC
		19 and 20	48VDC return
	15	21 and 22	+48VDC
		4 and 13	48VDC return
	16	23 and 24	+48VDC
		6 and 15	48VDC return
	17	9 and 18	+48VDC
		8 and 17	48VDC return
	18	7 and 16	+48VDC
		25 and 26	48VDC return
P1, P2, and P3		5 and 14	logic ground
NOTES: A side and B side connectors, fuse positions, and pins are identical. All return pins are common.			

Rack Alarm (Alarm Interface)

Figure 169: Rack Alarm Connector

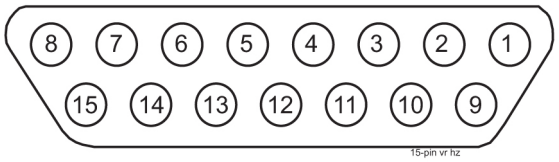


Table 42: Rack Alarm Connector

Pin	Circuit Descriptions
1 / 2 / 3 / 4	
5	Critical Alarm
6 / 7	
8	Fuse Normally Closed
9	
10	Minor Alarm
11	Major Alarm
12	Common
13	
14	Test
15	Fuse Normally Open

Fan Power

J2, J3 on Control Shelf backplane 04 and J8, J9 on Control Shelf backplane 06/07

Figure 170: Fan Power Connector

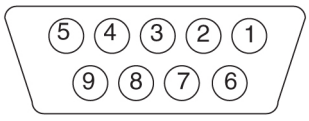


Table 43: Fan Power Connector

Pin	Signal	Pin	Signal
1	PF$48RTN	6	FAN$ALM-
2	PF$48RTN	7	

Pin	Signal	Pin	Signal
3		8	CHASSIS GND
4	PF$48VDC	9	FANCNTRL
5	PF$48VDC		
$= A or B, A fan power (J3) or B fan power (J2)			

Alarm Connectors

Local Maintenance Center Alarm Connector

Local Maintenance Center Alarm Connector connector provides the system's alarm condition indicators to the local maintenance center.

J40 on Control Shelf backplane 04 and J47 on Control Shelf backplane 06/07

Figure 171: Local Maintenance Center Alarm Connector

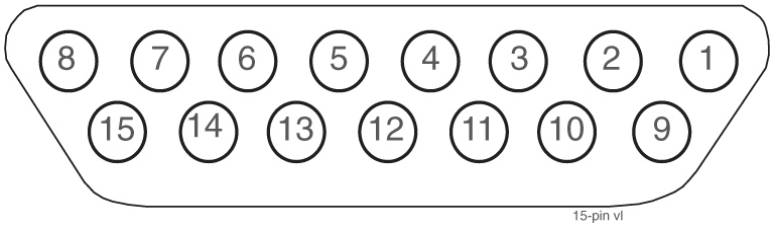


Table 44: Local Maintenance Center Alarm Connector

Pin	Signal
1, 3, 4, 5, 11, 12	Not used
2	LMCANC - Local Maintenance Center Audible Alarm, Normally Closed
6	LMCVMJNC - Local Maintenance Center Major Alarm, Normally Closed
7	LMCVMNNC - Local Maintenance Center Minor Alarm, Normally Closed
8	LMCVCRNC - Local Maintenance Center Critical Alarm, Normally Closed
9	LMCACOM - Local Maintenance Center Audible Alarm Common

Pin	Signal
10	LMCANO - Local Maintenance Center Audible alarm, normally Open
13	LMCVCOM - Local Maintenance Center Common
14	LMCVMJNO - Local Maintenance Center Major Alarm, Normally Open
15	LMCVMNNO - Local Maintenance Center Minor Alarm, Normally Open

Remote Maintenance Center Alarm Connector

The Remote Maintenance Center Alarm connector provides system alarm condition indicators to the remote maintenance center.

J26 on Control Shelf backplane 04 and J33 on Control Shelf backplane 06/07

Figure 172: Remote Maintenance Center Alarm Connector

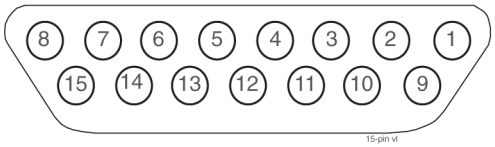


Table 45: Remote Maintenance Center Alarm Connector

Pin	Signal
1, 3, 4, 5, 9, 11, 12	not used
2	RMCANC - Remote Maintenance Center Audible Alarm, Normally Closed
6	RMCMJNC - Remote Maintenance Center Major Alarm, Normally Closed
7	RMCMNNC - Remote Maintenance Center Minor Alarm, Normally Closed
8	RMCCRNC - Remote Maintenance Center Critical Alarm, Normally Closed
10	RMCANO - Remote Maintenance Center Audible Alarm, Normally Open
13	RMCCOM - Remote Maintenance Center Common
14	RMCMJNO - Remote Maintenance Center Major Alarm, Normally Open
15	RMCMNNO - Remote Maintenance Center Minor Alarm, Normally Open

Rack Alarm Connectors

The output of the Rack Alarm Connectors control the alarm condition indicators on each control or extension frame fuse and alarm panel.

J5, J11, J25, J39, J53, J61 on Control Shelf backplane 04 and J13, J15, J32, J46, J61, J68 on Control Shelf backplane 06/07

Figure 173: Rack Alarm Connector

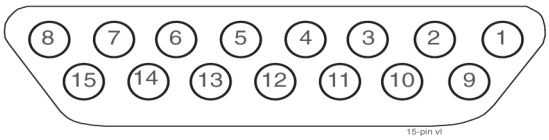


Table 46: Rack Alarm Connector

Pin	Signal
1, 2, 6, 7, 9, 13, 14	Not used
3	R$MNNC - Rack Alarm, Minor, Normally Closed
4	R$MJNC - Rack Alarm, Major, Normally Closed
5	R$CRNC - Rack Alarm, Critical, Normally Closed
8	R$FA+ - Rack Fuse Alarm (+)
10	R$MNNO - Rack Alarm, Minor, Normally Open
11	R$MJNO - Rack Alarm, Major, Normally Open
12	R$COM - Rack Alarm, Common
15	R$FA- - Rack Fuse Alarm (-)
$= 0 through 5, RALM0 through RALM5 (J5, J11, J25, J39, J53, J61 respectively)	

Row Alarm Connector

Row Alarm Connector controls the alarm condition indicators on an end panel at the end of a set of the frames.

J27 on Control Shelf backplane 04 and J34 on Control Shelf backplane 06/07

Figure 174: Row Alarm Connector

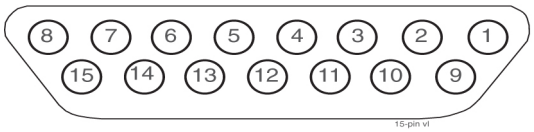


Table 47: Row Alarm Connector

Pin	Signal
1, 2, 3, 6, 7, 8, 9, 13, 14, 15	Not used
4	–48VDC
5	RACRNC - Row Alarm, Critical, Normally Closed
10	RAMNNO - Row Alarm, Minor, Normally Open
11	RAMJNO - Row Alarm, Major, Normally Open
12	48VDC return

External Alarm Connector

External Alarm Connector is also used for alarm condition inputs from an optional holdover clock.

J28 on Control Shelf backplane 04 External Alarm J35 on Control Shelf backplane 06/07 CUST ALM 1 J66 on Control Shelf backplane 06/07 CUST ALM 2 (not supported by software)

Figure 175: External Alarm Connector

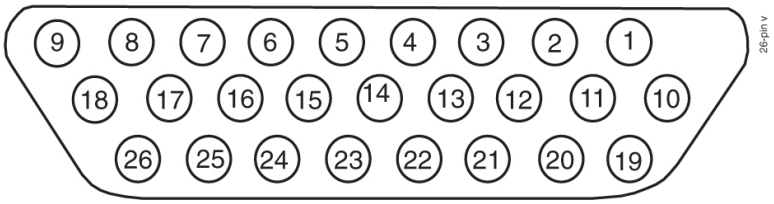


Table 48: External Alarm Connector

Pin	Signal	Description
2	CUFA13	Signals a customer defined trouble #13 to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
3	CUFA14	Signals a customer defined trouble #14 to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).

Pin	Signal	Description
4	CUFA3	Signals a customer defined critical alarm (trouble #3) to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
5	CUFA1	Reserved
6	CUFA9	Reserved
7	CUFA2	Signals a holdover clock critical alarm to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
8	CUFA4	Signals a customer defined critical alarm (trouble #4) to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
9	CUFA10	Signals a holdover clock minor alarm to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
10	P5A48RTN	Signal return path
11	P4B48RTN	Signal return path
19	CUFA8	Signals customer defined major alarm (trouble #8) to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
20	CUFA16	Signals a customer defined trouble #16 to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
21	CUFA7	Signals a customer defined major alarm (trouble #7) to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
22	CUFA15	Signals a customer defined trouble #15 to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
23	CUFA12	Signals a customer defined minor alarm (trouble #12) to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
24	CUFA6	Signals a holdover clock major alarm to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).
25	CUFA5	Reserved
26	CUFA11	Signals a customer defined minor alarm (trouble #11) to the system when connected to P5A48RTN (pin 10) or P4B48RTN (pin 11).

OAP Alarm Connector

The OAP alarm connector controls the alarm condition indicators on an OAP frame.

J74 on Control Shelf backplane 04 and J69 on Control Shelf backplane 06/07

Figure 176: OAP Alarm Connector

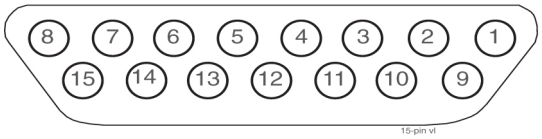


Table 49: OAP Alarm Connector

Pin	Signal
1, 2, 6, 7, 13, 14	Not used
3	OAPMNNC - OAP Alarm, Minor, Normally Closed
4	OAPMJNC - OAP Alarm, Major, Normally Closed
5	OAPCRNC - OAP Alarm, Critical, Normally Closed
8	OAPFA+ - OAP Fuse Alarm (+)*
9	OAPBNO - OAP Alarm, busy, Normally Open*
10	OAPMNNO - OAP Alarm, minor, normally Open
11	OAPMJNO - OAP Alarm, Major, Normally Open
12	OAPCOM - OAP Alarm, Common
15	OAPFA- - Row Fuse Alarm (-)*
* not currently supported	

System Clock Connectors

The control shelf backplane provides system clock output to the rest of the system from the TDMs. Redundancy is accomplished by allowing TDM A and TDM B to distribute clocks independently of each other.

A Clock 0 through A Clock 5

J7, J14, J15, J56, J57, J63 on Control Shelf backplane 04 and J7, J21, J20, J64, J65, J72 on Control Shelf backplane 06/07

Figure 177: A Clock 0 Through A Clock 5 Connectors

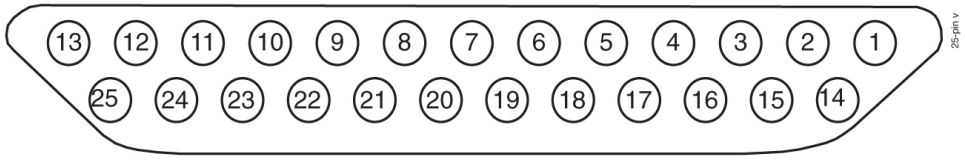


Table 50: A Clock 0 Through A Clock 5 Connectors

Connector	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
850-0330-04 J7 (CF00) (rack 0) 850-0330-06/07 J7	1		8	MBUS1RX-_50	15	A56KHZ0-_50	22	A56KHZ2+_50
	2	MBUS0TX-_50	9	MBUS1RX+_50	16	A8KHZ0+_50	23	A56KHZ2-_50
	3	MBUS0TX+_50	10	MBUS2TX-_50	17	A8KHZ0-_50	24	A8KHZ2+_50
	4	MBUS0RX-_50	11	MBUS2TX+_50	18	A56KHZ1+_50	25	A8KHZ2-_50
	5	MBUS0RX+_50	12	MBUS2RX-_50	19	A56KHZ1-_50		
	6	MBUS1TX-_50	13	MBUS2RX+_50	20	A8KHZ1+_50		
	7	MBUS1TX+_50	14	A56KHZ0+_50	21	A8KHZ1-_50		
850-0330-06/07 J64, J65, J72	not currently supported							

B Clock 0 through B Clock 5

J6, J12, J13, J54, J55, J62 on Control Shelf backplane 04 and J3, J16, J18, J62, J63, J70 on Control Shelf backplane 06/07

Figure 178: B Clock 0 through B Clock 5 Connectors

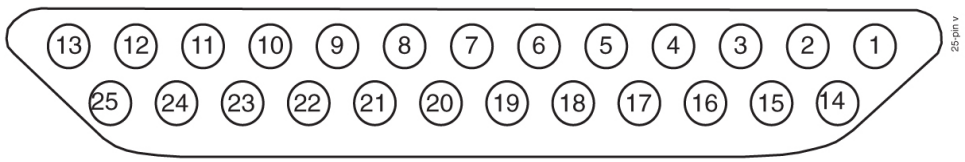


Table 51: B Clock 0 through B Clock 5 Connectors

Connector	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
850-0330-03 J6 (CF00) (rack 0) 850-0330-06/07 J3	1	R0FAALM-	8		15	B56KHZ0-_50	22	B56KHZ2+_50
	2		9		16	B8KHZ0+_50	23	B56KHZ2-_50
	3		10		17	B8KHZ0-_50	24	B8KHZ2+_50
	4		11		18	B56KHZ1+_50	25	B8KHZ2-_50
	5		12		19	B56KHZ1-_50		
	6		13	R0FBALM-	20	B8KHZ1+_50		
	7	R0FANCTRL	14	B56KHZ0+_50	21	B8KHZ1-_50		
850-0330-06/07 J62, J63, J70	not currently supported							

Shelf Clock Connectors (for Control Shelf Backplane -04 only)

Connectors for both A and B clocks are provided using 25 pin D type connectors at J9, J10, J59, and J60 on Control Shelf backplane 04.

System clock connectors are used on Control Shelf backplane 06/07.

Clock A In Connector

J9 on backplane (P/N 850-0330-04).

Figure 179: Clock A In Connector on Backplane

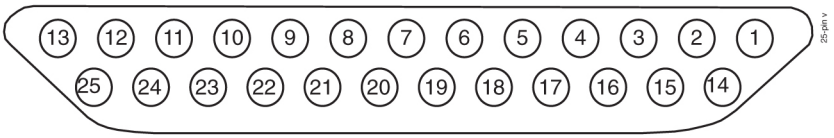


Table 52: Clock A In Connector on Control Shelf Backplane 04

Pin	Signal	Pin	Signal
1		14	MA56KHZ+_50
2	MBUSSTX-_50	15	MA56KHZ-_50

Pin	Signal	Pin	Signal
3	MBUSSTX+_50	16	MA8KHZ+_50
4	MBUSSRX-_50	17	MA8KHZ-_50
5	MBUSSRX+_50	18	SH2A56KHZ+_50
6	SH2MBUSTX-_50	19	SH2A56KHZ-_50
7	SH2MBUSTX+_50	20	SH2A8KHZ+_50
8	SH2MBUSRX-_50	21	SH2A8KHZ-_50
9	SH2MBUSRX+_50	22	SH3A56KHZ+_50
10	SH3MBUSTX-_50	23	SH3A56KHZ-_50
11	SH3MBUSTX-_50	24	SH3A8KHZ+_50
12	SH3MBUSRX-_50	25	SH3A8KHZ-_50
13	SH3MBUSRX+_50		

Clock A Out Connector

J10 on Control Shelf backplane 04.

Figure 180: Clock A Out Connector

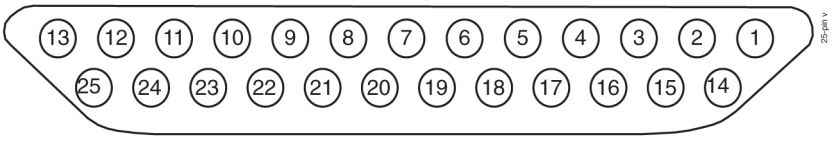


Table 53: Clock A Out Connector

Pin	Signal	Pin	Signal
1		14	SH2A56KHZ+_50
2	SH2MBUSTX-_50	15	SH2A56KHZ-_50
3	SH2MBUSTX+_50	16	SH2A8KHZ+_50

Pin	Signal	Pin	Signal
4	SH2MBUSRX-_50	17	SH2A8KHZ-_50
5	SH2MBUSRX+_50	18	SH3A56KHZ+_50
6	SH3MBUSTX-_50	19	SH3A56KHZ-_50
7	SH3MBUSTX+_50	20	SH3A8KHZ+_50
8	SH3MBUSRX-_50	21	SH3A8KHZ-_50
9	SH3MBUSRX+_50	22	
10		23	
11		24	
12		25	
13			

Clock B In Connector

J59 on Control Shelf backplane 04

Figure 181: Clock B In Connector on Backplane

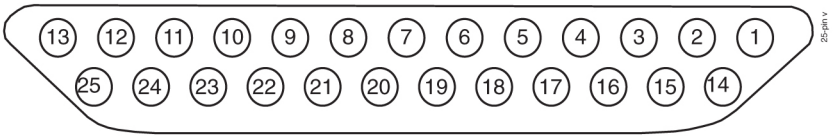


Table 54: Clock B In Connector on Control Shelf backplane 04

Pin	Signal	Pin	Signal
1	FANAALM-	14	MB56KHZ+_50
2		15	MB56KHZ-_50
3		16	MB8KHZ+_50
4		17	MB8KHZ-_50

Pin	Signal	Pin	Signal
5		18	SH2B56KHZ+_50
6		19	SH2B56KHZ-_50
7	FANCNTRL	20	SH2B8KHZ+_50
8		21	SH2B8KHZ-_50
9		22	SH3B56KHZ+_50
10		23	SH3B56KHZ-_50
11		24	SH3B8KHZ+_50
12		25	SH3B8KHZ-_50
13	FANBALM-		

Clock B Out Connector

J60 on Control Shelf backplane 04.

Figure 182: Clock B Out Connector on Backplane

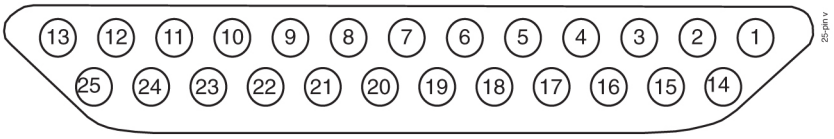


Table 55: Clock B Out Connector on Control Shelf backplane 04

Pin	Signal	Pin	Signal
1	FANAALM-	14	SH2B56KHZ+_50
2		15	SH2B56KHZ-_50
3		16	SH2B8KHZ+_50
4		17	SH2B8KHZ-_50
5		18	SH3B56KHZ+_50

Pin	Signal	Pin	Signal
6		19	SH3B56KHZ-_50
7	FANCNTRL	20	SH3B8KHZ+_50
8		21	SH3B8KHZ-_50
9		22	
10		23	
11		24	
12		25	
13	FANBALM-		

BITS Clock Connectors

The system connects to the Building Integrated Timing System (BITS) clocks using two DB-15 style connectors. The two clocks are labeled Primary and Secondary and are supplied from the central office clock. Both clocks go to both TDMs, where one is selected to provide the system clocks used to provide system timing.

J41, J42 on Control Shelf backplane 04 and J48, J49 on Control Shelf backplane 06/07

Figure 183: BITS Clock Connector

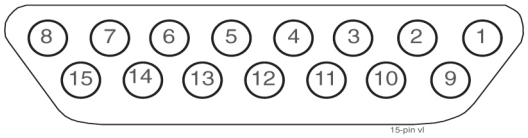


Table 56: BITS Clock Connector

Pin	Signal	Pin	Signal
1		9	
2		10	
3		11	
4		12	$BITSIN-_60

Pin	Signal	Pin	Signal
5	$BITSIN+_60	13	
6		14	
7		15	
8			
$= P for primary BITS clock (J42), S for secondary BITS clock (J41)			

Serial Port Connectors

The control shelf backplane provides an interface for 16 separate serial port connections from the TDMs. These connections provide RS-232 interfaces for terminals, printers, and modems. The system is set up as Data Terminal Equipment (DTE).

J17 - J24, J65 - J72 on Control Shelf backplane 04 and J24 - J31, J76 - J83 on Control Shelf backplane 06/07

Figure 184: Serial Port Connector

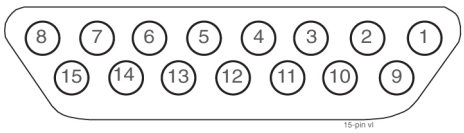


Table 57: Serial Port Connector

Pin	Signal	Pin	Signal
1		9	
2		10	
3	DCD$	11	
4	RX$	12	
5	TX$	13	CTS$
6	DTR$	14	RTS$
7	logic ground	15	

Pin	Signal	Pin	Signal
8			
$= 0 through 15, MMI0 through MMI15 respectively, J17 through J24 and J65 through J72 respectively			

Interface Connectors

For slots 1 through 8, 11, and 12 on the control shelf backplane, there are two associated DB-26 interface connectors for each slot. These provide interfacing to the outside world in the form of Ethernet networks or SS7 links networks.

J29 - J38, J43 - J52 on Control Shelf backplane 04 and J36 - J45, J50 - J59 on Control Shelf backplane 06/07

Figure 185: Interface Connector

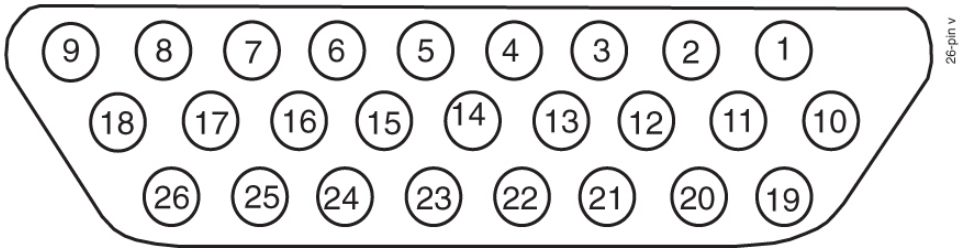


Table 58: Interface Connector Pins and Signal

DB-26 Pin	DS0A/ OCU Signal	DB-26 Pin	DS0A/OCU Signal ATM
1		14	
2		15	
3		16	
4		17	
5		18	
6		19	
7		20	TX-RING

DB-26 Pin	DS0A/ OCU Signal	DB-26 Pin	DS0A/OCU Signal ATM
8		21	TX-TIP
9		22	RX-RING
10		23	RX-TIP
11		24	
12		25	
13		26	

Table 59: Interface Connectors, Ports, and Card Slots

Card slot	Port	Connector	Port	Connector
01	1A	J38	1B	J52
02	2A	J37	2B	J51
03	3A	J36	3B	J50
04	4A	J35	4B	J49
05	5A	J34	5B	J48
06	6A	J33	6B	J47
07	7A	J32	7B	J46
08	8A	J31	8B	J45
11	9A	J30	9B	J44
12	10A	J29	10B	J43

Control Shelf Modules

This section details the backplane circuit board connectors used for

- Database Communications Modules (DCMs),
- Database Services Modules (DSMs)
- Link Interface Modules (LIMs)
- Multi-Port LIMs (MPLs)
- Translation Service Modules (TSMs).

DCM/DSM/LIM/MPL/TSM/ Control Shelf Backplane top connectors are P6, P7, and P9 through P16; bottom connectors are P22, P23, and P25 through P32.

Control Shelf Backplane Pin-Outs, Top Connector

Table 60: Control Shelf Backplane Pin-Outs, Top Connector lists pinouts for connectors P6, P7, and P9 through P16 on the control shelf.

Refer to *Table 62: Backplane Pin-Out Symbols* for signal symbol values ($, #, &, @, and ^).

Figure 186: Control Shelf Backplane Pin-Outs, Top Connector

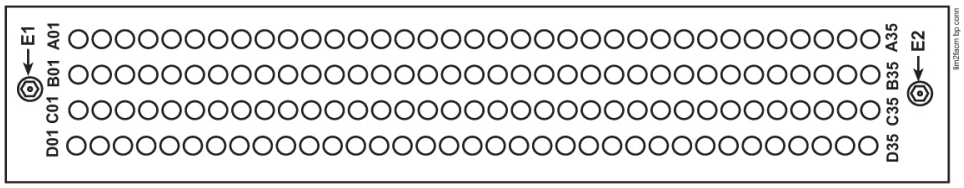


Table 60: Control Shelf Backplane Pin-Outs, Top Connector

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	LGND	B01	LGND	C01	EBI_^XA02	D01	EBI_^XA14
A02	ASERO#-_50	B02	LGND	C02	EBI_^XA03	D02	EBI_^XA15
A03	ASERO#+_50	B03	LGND	C03	EBI_^XA04	D03	EBI_^XA16
A04	LGND	B04	LGND	C04	EBI_^XA05	D04	EBI_^XA17
A05		B05	LGND	C05	EBI_^XA06	D05	EBI_^XA18
A06		B06	LGND	C06	EBI_^XA07	D06	EBI_^XA19
A07	LGND	B07	LGND	C07	EBI_^XA08	D07	EBI_^XA20
A08	ASEL#-	B08		C08	EBI_^XA09	D08	EBI_^XA21

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A09		B09		C09	EBI_^XA10	D09	EBI_^XA22
A10	AMUXIN-	B10		C10		D10	EBI_^XA23
A11	LGND	B11	AIN#-	C11		D11	EBI_^XA24
A12		B12	LGND	C12		D12	EBI_^XA25
A13		B13	LGND	C13		D13	EBI_^XA26
A14	LGND	B14	LGND	C14		D14	EBI_^XA27
A15	ASERI#-_50	B15	LGND	C15		D15	
A16	ASERI#+_50	B16	LGND	C16		D16	
A17	LGND	B17	LGND	C17		D17	
A18		B18		C18		D18	
A19	LGND	B19	MBUSSRX+_50	C19	LGND*	D19	
A20		B20	MBUSSRX-_50	C20		D20	LGND
A21	LGND	B21	MBUSSTX+_50	C21	MA56KHZ+_50	D21	
A22		B22	MBUSSTX-_50	C22	MA56KHZ-_50	D22	LGND
A23	LGND	B23		C23	MA8KHZ+_50	D23	
A24	&-IF1_60	B24		C24	MA8KHZ-_50	D24	LGND
A25	LGND	B25		C25	EBI_^XSP4	D25	EBI_^XSP5
A26	&-IF2_60	B26		C26	EBI_^XA11	D26	
A27	LGND	B27		C27	EBI_^XA12	D27	
A28	&-IF3_60	B28	&-IF10_60	C28	EBI_^XA13	D28	LGND
A29	LGND	B29	&-IF19_60	C29	EBI_^BREQ-	D29	

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A30	&-IF4_60	B30	&-IF20_60	C30	EBI_^BG-	D30	LGND
A31	&-IF5_60	B31	&-IF21_60	C31	EBI_^XIRQ-	D31	
A32	&-IF6_60	B32	&-IF22_60	C32	EBI_^HOSTSAN-	D32	LGND
A33	&-IF7_60	B33	&-IF23_60	C33	EBI_^GSTSAN-	D33	
A34	&-IF8_60	B34	&-IF25_60	C34	&-IF24_60	D34	LGND
A35	&-IF9_60	B35	&-IF18_60	C35	&-IF26_60	D35	
E2	LGND	*Connection to logic ground for slots 2 (P16), 4 (P14), 6 (P12), 8 (P10) only.					

Control Shelf Backplane Pin-Outs, Bottom Connector

Table 61: Control Shelf Backplane Pin-Outs, Bottom Connector Pinouts for DCM/DSM/LIM/MPL/TSM Control Shelf Backplane bottom connectors P22, P23, and P25 through P32

Figure 187: Control Shelf Backplane Pin-Outs, Bottom Connector

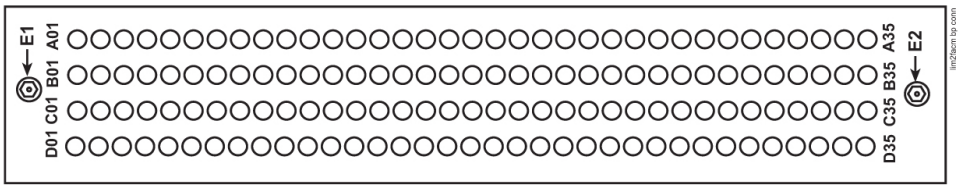


Table 61: Control Shelf Backplane Pin-Outs, Bottom Connector

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	LGND	B01	&-IF1_60	C01	&-IF10_60	D01	IN2-
A02	&-IF3_60	B02	&-IF2_60	C02	&-IF19_60	D02	LGND
A03	LGND	B03		C03	&-IF20_60	D03	LGND
A04	&-IF4_60	B04		C04	&-IF21_60	D04	LGND
A05	&-IF5_60	B05		C05	&-IF22_60	D05	LGND
A06	&-IF6_60	B06	&-IF24_60	C06	&-IF23_60	D06	LGND

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A07	&-IF7_60	B07	&-IF26_60	C07		D07	@-IF25_60
A08	&-IF8_60	B08	&-IF9_60	C08	&-IF18_60	D08	LGND
A09	LGND	B09		C09		D09	LGND
A10		B10		C10	EBI_^XSP2	D10	EBI_^XSP3
A11	LGND	B11	LGND	C11	EBI_^XBE0-	D11	EBI_^XD00
A12	BSERO@-_50	B12	LGND	C12	EBI_^XBE1-	D12	EBI_^XD01
A13	BSERO@-_50	B13	LGND	C13	EBI_^XBE2-	D13	EBI_^XD02
A14	LGND	B14	LGND	C14	EBI_^XBE3-	D14	EBI_^XD03
A15		B15	LGND	C15	EBI_^XBS8-	D15	EBI_^XD04
A16		B16	LGND	C16	EBI_^XBS16-	D16	EBI_^XD05
A17	LGND	B17	LGND	C17	EBI_^ADS0-	D17	EBI_^XD06
A18	BSEL@-	B18		C18	EBI_^ADS1-	D18	EBI_^XD07
A19		B19		C19	EBI_^XW/R	D19	EBI_^XD08
A20	BMUXIN-	B20		C20	EBI_^XM/IO	D20	EBI_^XD09
A21	LGND	B21	BIN@-	C21	EBI_^XSP1	D21	EBI_^XD10
A22		B22	LGND	C22	EBI_^XINTA-	D22	EBI_^XD11
A23		B23	LGND	C23	EBI_^XRDY-	D23	EBI_^XD12
A24	LGND	B24	LGND	C24	EBI_^XCAS0-	D24	EBI_^XD13
A25	BSERI@-_50	B25	LGND	C25	EBI_^XCAS1-	D25	EBI_^XD14
A26	BSERI@+_50	B26	LGND	C26	EBI_^XCAS2-	D26	EBI_^XD15
A27	LGND	B27	LGND	C27		D27	

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A28		B28		C28		D28	LGND
A29	LGND	B29		C29		D29	
A30		B30		C30		D30	LGND
A31	LGND	B31		C31	MB56KHZ+_50	D31	
A32		B32		C32	MB56KHZ-_50	D32	LGND
A33	LGND	B33		C33	MB8KHZ+_50	D33	
A34		B34		C34	MB8KHZ-_50	D34	LGND
A35	CHASSIS GND	B35	CHASSIS GND	C35	CHASSIS GND	D35	CHASSIS GND

Control Shelf Backplane Pin-Out Symbols

Table 62: Backplane Pin-Out Symbols lists the signal symbol values used in *Table 60: Control Shelf Backplane Pin-Outs, Top Connector* through *Table 82: Extension Shelf Backplane Pin-Out Symbols*.

Table 62: Backplane Pin-Out Symbols

Slot/Connector	Interface Port	Address	Signal Symbol Values				
			$	#	&	@	^
1 top / P16	0A	0	1A	L	0A		0
1 bottom / P32	0B	0	1A		0B	A	0
2 top / P15	1A	1	1A	K	1A		0
2 bottom / P31	1B	1	1A		1B	B	0
3 top / P14	2A	2	1B	J	2A		2
3 bottom / P30	2B	2	1B		2B	C	2
4 top / P13	3A	3	1B	I	3A		2

Slot/Connector	Interface Port	Address	Signal Symbol Values				
			$	#	&	@	^
4 bottom / P29	3B	3	1B		3B	D	2
5 top / P12	4A	4	2A	H	4A		4
5 bottom / P28	4B	4	2A		4B	E	4
6 top / P11	5A	5	2A	G	5A		4
6 bottom / P27	5B	5	2A		5B	F	4
7 top / P10	6A	6	2B	F	6A		6
7 bottom / P26	6B	6	2B		6B	G	6
8 top / P9	7A	7	2B	E	7A		6
8 bottom / P25	7B	7	2B		7B	H	6
11 top/P7	8A	8	4A	D	8A		8
11 bottom/P23	8B	8	4A		8B	I	8
12 top/P6	9A	9	4A	C	9A		8
12 bottom/P22	9B	9	4A		9B	J	8

Maintenance Disk and Alarm Connector

MDAL Pin-Outs, Top Connector

Table 63: MDAL Backplane, Top Table 63: MDAL Backplane, Top lists pinouts for connectors P1on the control shelf.

Figure 188: Maintenance Disk and Alarm Connector, Top

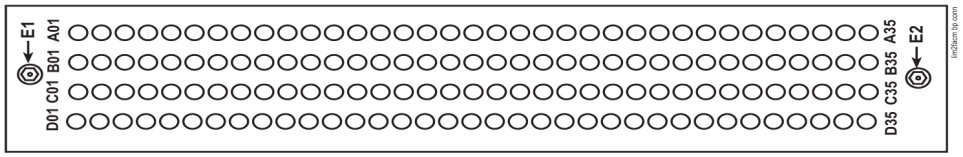


Table 63: MDAL Backplane, Top

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	BALMEN0-	B01	BALMD0-	C01		D01	LGND
A02	BALMEN1-	B02	BALMD1-	C02	LGND	D02	LGND
A03	BALMEN2-	B03	BALMD2-	C03	LGND	D03	
A04	BALMEN3-	B04	BALMD3-	C04	LGND	D04	
A05	BALMEN4-	B05	BALMD4-	C05		D05	LGND
A06	BALMCK-	B06	BALMD5-	C06		D06	
A07	BALMD7-	B07	BALMD6-	C07	R0CRNC	D07	LGND
A08	R0FANCTRL	B08	LGND	C08	R0MJNC	D08	R0COM
A09	AALMEN0-	B09	AALMD0-	C09	R0MNNC	D09	R0MJNO
A10	AALMEN1-	B10	AALMD1-	C10	R0BNC	D10	R0MNNO
A11	AALMEN2-	B11	AALMD2-	C11		D11	R0BNO
A12	AALMEN3-	B12	AALMD3-	C12	LGND	D12	LGND
A13	AALMEN4-	B13	AALMD4-	C13		D13	LGND
A14	AALMCK-	B14	AALMD5-	C14	LGND	D14	LGND
A15	AALMD7-	B15	AALMD6-	C15		D15	LGND
A16	CHASSIS GND	B16	CHASSIS GND	C16	CHASSIS GND	D16	CHASSIS GND
A17		B17	LGND	C17		D17	
A18	LGND	B18	LGND	C18	LGND	D18	
A19	LGND	B19	LGND	C19		D19	
A20	R0FBALM-	B20		C20	R1FBALM-	D20	

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A21	R0FAALM-	B21	LGND	C21	R1FAALM-	D21	
A22	LGND	B22	R2FBALM-	C22		D22	
A23	LGND	B23	R2FAALM-	C23	R1CRNC	D23	R1COM
A24	LGND	B24		C24	R1MJNC	D24	R1MJNO
A25	R1FANCTRL	B25	LGND	C25	R1MNNC	D25	R1MNNO
A26	R2FANCTRL	B26	LGND	C26	R1BNC	D26	R1BNO
A27	LGND	B27		C27		D27	
A28	RACRNC	B28	RACOM	C28	R2CRNC	D28	R2COM
A29	RAMJNC	B29	RAMJNO	C29	R2MJNC	D29	R2MJNO
A30	RAMNNC	B30	RAMNNO	C30	R2MNNC	D30	R2MNNO
A31	RABNC	B31	RABNO	C31	R2BNC	D31	R2BNO
A32	RMCANC	B32		C32		D32	LGND
A33	RMCBNC	B33		C33	LGND	D33	RMCANO
A34	RMCMJNC	B34	RMCMNNC	C34	RMCCOM	D34	RMCBNO
A35	RMCCRNC	B35		C35	RMCMNNO	D35	RMCMJNO
E2	LGND						

MDAL Pin-Outs, Bottom Connector

Table 64: MDAL Backplane, Bottom lists pinouts of the bottom connector P17 on the control shelf.

Figure 189: MDAL Backplane, Bottom

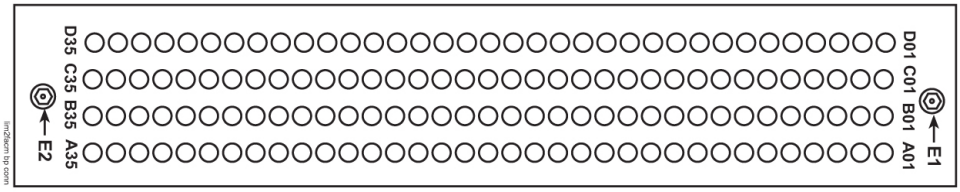


Table 64: MDAL Backplane, Bottom

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	LMCANO	B01		C01	LMCACOM	D01	LMCANC
A02	LMCVMJNC	B02		C02		D02	LMCVCOM
A03	LMCVCRNC	B03	LMCVMNNC	C03	LMCVMJNO	D03	LMCVMNNO
A04	R3FANCTRL	B04		C04	LGND	D04	
A05	R4FANCTRL	B05	R4FBALM-	C05	R3CRNC	D05	R3COM
A06		B06	R4FAALM-	C06	R3MJNC	D06	R3MJNO
A07	R3FBALM-	B07		C07	R3MNNC	D07	R3MNNO
A08	R3FAALM-	B08		C08	R3BNC	D08	R3BNO
A09	LGND	B09	LGND	C09		D09	LGND
A10		B10		C10	R4CRNC	D10	R4COM
A11	LGND	B11	LGND	C11	R4MJNC	D11	R4MJNO
A12		B12		C12	R4MNNC	D12	R4MNNO
A13	LGND	B13	LGND	C13	R4CRNC	D13	R4BNO
A14		B14		C14		D14	
A15	TPWR	B15	LGND	C15		D15	
A16	AUDCTOFF-	B16		C16	LGND	D16	
A17	ALMITRANS-	B17	LGND	C17	R5FBALM-	D17	
A18	AMS/BMS-	B18	SDB0-_100	C18	R5FAALM-	D18	
A19	MASBSAN-	B19	SDB1-_100	C19		D19	
A20	MASASAN-	B20	SDB2-_100	C20		D20	

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A21	LGND	B21	SDB3-_100	C21		D21	LGND
A22		B22	SDB4-_100	C22		D22	
A23		B23	SDB5-_100	C23		D23	
A24		B24	SDB6-_100	C24		D24	
A25		B25	SDB7-_100	C25		D25	
A26		B26	SDBP-_100	C26		D26	
A27		B27	SBSY-_100	C27		D27	
A28		B28	SATN-_100	C28	R5CRNC	D28	R5COM
A29		B29	SACK-_100	C29	R5MJNC	D29	R5MJNO
A30	LGND	B30	SRST-_100	C30	R5MNNC	D30	R5MNNO
A31	LGND	B31	SMSG-_100	C31	R5CRNC	D31	R5BNO
A32	R5FANCTRL	B32	SSEL-_100	C32		D32	
A33		B33	SI/O-_100	C33		D33	
A34		B34	SC/D-_100	C34		D34	
A35	LGND	B35	SREQ-_100	C35		D35	
E2 P5B48RTN							

Terminal Disk Module

Terminal Disk Module P2, P4, P18, P20

TDM Pin-Outs, Top Connectors

TDM, Top Connectors P2, P4

Figure 190: TDM, Top

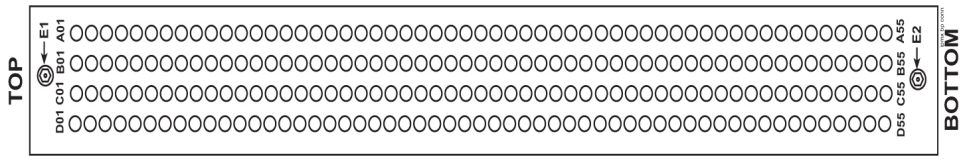


Table 65: TDM Backplane, Top

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	LGND	B01	R0FA+	C01	$ALMEN0-	D01	$ALMD0-
A02	LGND	B02	R0FA-	C02	$ALMEN1-	D02	$ALMD1-
A03	CUFA1	B03		C03	$ALMEN2-	D03	$ALMD2-
A04	CUFA2	B04	LGND	C04	$ALMEN3-	D04	$ALMD3-
A05	MBUS2RX+_50	B05	LGND	C05	$ALMEN4-	D05	$ALMD4-
A06	MBUS2RX-_50	B06	$8KHZ2-_50	C06	$ALMCK-	D06	$ALMD5-
A07	MBUS2TX+_50	B07	$8KHZ2+_50	C07	$ALMD7-	D07	$ALMD6-
A08	MBUS2TX-_50	B08	$56KHZ2-_50	C08	EBI_$XA02	D08	EBI_$XA14
A09	MBUS1RX+_50	B09	$56KHZ2+_50	C09	EBI_$XA03	D09	EBI_$XA15
A10	MBUS1RX-_50	B10	$8KHZ1-_50	C10	EBI_$XA04	D10	EBI_$XA16
A11	MBUS1TX+_50	B11	$8KHZ1+_50	C11	EBI_$XA05	D11	EBI_$XA17
A12	MBUS1TX-_50	B12	$56KHZ1-_50	C12	EBI_$XA06	D12	EBI_$XA18
A13	MBUS0RX+_50	B13	$56KHZ1+_50	C13	EBI_$XA07	D13	EBI_$XA19
A14	MBUS0RX-_50	B14	$8KHZ0-_50	C14	EBI_$XA08	D14	EBI_$XA20
A15	MBUS0TX+_50	B15	$8KHZ0+_50	C15	EBI_$XA09	D15	EBI_$XA21
A16	MBUS0TX-_50	B16	$56KHZ0-_50	C16	EBI_$XA10	D16	EBI_$XA22
A17		B17	$56KHZ0+_50	C17	CUFA13	D17	EBI_$XA23

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A18	LGND	B18		C18	CUFA14	D18	EBI_$XA24
A19	CUFA3	B19	CUFA9	C19	HST/GST	D19	EBI_$XA25
A20	CUFA4	B20	CUFA10	C20		D20	EBI_$XA26
A21	LGND	B21	LGND	C21	LGND	D21	EBI_$XA27
A22	CUFA5	B22	CUFA11	C22		D22	MBUS8RX+_50
A23	CUFA6	B23	CUFA12	C23	LGND	D23	$8KHZ8-_50
A24	LGND	B24	LGND	C24	CUFA15	D24	MBUS8RX-_50
A25	CUFA7	B25	LGND	C25	CUFA16	D25	$8KHZ8+_50
A26	CUFA8	B26	LGND	C26	MBUS8TX+_50	D26	$56KHZ8-_50
A27	LGND	B27		C27	MBUS8TX-_50	D27	$56KHZ8+_50
A28	EBI_$XSP5	B28	R1FA+	C28	MBUS7RX+_50	D28	$8KHZ7-_50
A29	EBI_$XSP4	B29	R1FA-	C29	MBUS7RX-_50	D29	$8KHZ7+_50
A30	EBI_$XA11	B30	EBI_$XA12	C30	MBUS7TX+_50	D30	$56KHZ7-_50
A31	EBI_$XA13	B31	EBI_$BREQ-	C31	MBUS7TX-_50	D31	$56KHZ7+_50
A32	EBI_$BG-	B32	EBI_$XIRQ-	C32	MBUS6RX+_50	D32	$8KHZ6-_50
A33	EBI_$HOSTSAN-	B33	EBI_$GSTSAN-	C33	MBUS6RX-_50	D33	$8KHZ6+_50
A34	MBUS5RX+_50	B34	$8KHZ5-_50	C34	MBUS6TX+_50	D34	$56KHZ6-_50
A35	MBUS5RX-_50	B35	$8KHZ5+_50	C35	MBUS6TX-_50	D35	$56KHZ6+_50
A36	MBUS5TX+_50	B36	$56KHZ5-_50	C36	RTS0	D36	RTS4
A37	MBUS5TX-_50	B37	$56KHZ5+_50	C37	CTS0	D37	CTS4
A38	MBUS4RX+_50	B38	$8KHZ4-_50	C38	TX0	D38	TX4

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A39	MBUS4RX-_50	B39	$8KHZ4+_50	C39	RX0	D39	RX4
A40	MBUS4TX+_50	B40	$56KHZ4-_50	C40	DCD0	D40	DCD4
A41	MBUS4TX-_50	B41	$56KHZ4+_50	C41	RTS1	D41	RTS5
A42	MBUS3RX+_50	B42	$8KHZ3-_50	C42	CTS1	D42	CTS5
A43	MBUS3RX-_50	B43	$8KHZ3+_50	C43	TX1	D43	TX5
A44	MBUS3TX+_50	B44	$56KHZ3-_50	C44	RX1	D44	RX5
A45	MBUS3TX-_50	B45	$56KHZ3+_50	C45	DCD1	D45	DCD5
A46		B46		C46	RTS2	D46	RTS6
A47		B47		C47	CTS2	D47	CTS6
A48	LGND	B48	LGND	C48	TX2	D48	TX6
A49		B49	LGND	C49	RX2	D49	RX6
A50		B50		C50	DCD2	D50	DCD6
A51	LGND	B51	LGND	C51	RTS3	D51	RTS7
A52		B52		C52	CTS3	D52	CTS7
A53	RAFA+	B53		C53	TX3	D53	TX7
A54	RAFA-	B54	R2FA+	C54	RX3	D54	RX7
A55		B55	R2FA-	C55	DCD3	D55	DCD7
E1	P#$48VDC	$= A or B, for TDM connectors P4 and P2 respectively # = 4 or 5, for TDM connectors P4 and P2 respectively					
E2	P#$48RTN						

TDM Pin-Outs, Bottom Connector

TDM, Bottom Connectors P18, P20 Control Shelf Backplane

Figure 191: TDM Backplane Pin-outs, Bottom

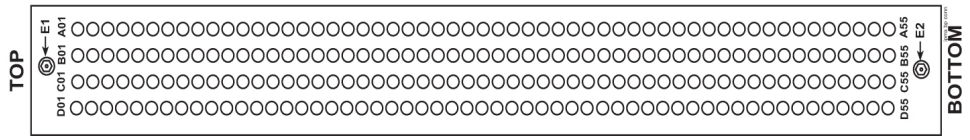


Table 66: TDM Backplane Pin-outs, Bottom

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	CHASSIS GND	B01	CHASSIS GND	C01	CHASSIS GND	D01	CHASSIS GND
A02		B02		C02	LGND	D02	
A03	PBITSIN+_60	B03	LGND	C03	SBITSIN+_60	D03	LGND
A04	PBITSIN-_60	B04		C04	SBITSIN-_60	D04	
A05	LGND	B05	LGND	C05		D05	
A06	LGND	B06		C06		D06	SPARE1
A07		B07	LGND	C07	LGND	D07	R3FA+
A08		B08		C08		D08	R3FA-
A09		B09		C09		D09	R4FA+
A10	LGND	B10	LGND	C10	LGND	D10	R4FA-
A11	MBUS1IRX+_50	B11	$8KHZ1I-_50	C11	MBUS4RX+_50	D11	
A12	MBUS1IRX-_50	B12	$8KHZ1I+_50	C12	MBUS4RX-_50	D12	$8KHZ14-_50
A13	MBUS1ITX+_50	B13	$56KHZ1I-_50	C13	MBUS4TX+_50	D13	$8KHZ14+_50
A14	MBUS1ITX-_50	B14	$56KHZ1I+_50	C14	MBUS4TX-_50	D14	$56KHZ14-_50
A15		B15		C15	MBUS3RX+_50	D15	$56KHZ14+_50

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A16	MBUS10RX+_50	B16	$8KHZ10-_50	C16	MBUS13RX-_50	D16	$8KHZ13-_50
A17	MBUS10RX-_50	B17	$8KHZ10+_50	C17	MBUS13TX+_50	D17	$8KHZ13+_50
A18	MBUS10TX+_50	B18	$56KHZ10-_50	C18	MBUS13TX-_50	D18	$56KHZ13-_50
A19	MBUS10TX-_50	B19	$56KHZ10+_50	C19	MBUS12RX+_50	D19	$56KHZ13+_50
A20	MBUS9RX+_50	B20	$8KHZ9-_50	C20	MBUS12RX-_50	D20	$8KHZ12-_50
A21	MBUS9RX-_50	B21	$8KHZ9+_50	C21	MBUS12TX+_50	D21	$8KHZ12+_50
A22	MBUS9TX+_50	B22	$56KHZ9-_50	C22	MBUS12TX-_50	D22	$56KHZ12-_50
A23	MBUS9TX-_50	B23	$56KHZ9+_50	C23		D23	$56KHZ12+_50
A24	EBI_$XD00	B24	EBI_$XBE0-	C24	EBI_$XSP2	D24	EBI_$XSP3
A25	EBI_$XD01	B25	EBI_$XBE1-	C25		D25	LGND
A26	EBI_$XD02	B26	EBI_$XBE2-	C26		D26	
A27	EBI_$XD03	B27	EBI_$XBE3-	C27	LGND	D27	SPARE2
A28	EBI_$XD04	B28	EBI_$XBS8-	C28	LGND	D28	TPWR
A29	EBI_$XD05	B29	EBI_$XBS16-	C29		D29	AUDCTOFF-
A30	EBI_$XD06	B30	EBI_$ADS0-	C30		D30	ALMTRANS-
A31	EBI_$XD07	B31	EBI_$ADS1-	C31	SDB0-_100	D31	AMS/BMS
A32	EBI_$XD08	B32	EBI_$XW/R	C32	SDB1-_100	D32	MASASAN-
A33	EBI_$XD09	B33	EBI_$XM/IO	C33	SDB2-_100	D33	MASBSAN-
A34	EBI_$XD10	B34	EBI_$XSP1	C34	SDB3-_100	D34	R5FA+
A35	EBI_$XD11	B35	EBI_$XINTA-	C35	LGND	D35	R5FA-
A36	EBI_$XD12	B36	EBI_$XRDY-	C36	RTS8	D36	RTS12

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A37	EBI_$XD13	B37	EBI_$XCAS0-	C37	CTS8	D37	CTS12
A38	EBI_$XD14	B38	EBI_$XCAS1-	C38	TX8	D38	TX12
A39	EBI_$XD15	B39	EBI_$XCAS2-	C39	RX8	D39	RX12
A40	LGND	B40		C40	DCD8	D40	DCD12
A41		B41		C41	RTS9	D41	RTS13
A42	LGND	B42	SDB4-_100	C42	CTS9	D42	CTS13
A43		B43	SDB5-_100	C43	TX9	D43	TX13
A44	LGND	B44	SDB6-_100	C44	RX9	D44	RX13
A45	MBUS15RX+_50	B45	SDB7-_100	C45	DCD9	D45	DCD13
A46	$8KHZ15-_50	B46	SDBP-_100	C46	RTS10	D46	RTS14
A47	MBUS15RX-_50	B47	SBSY-_100	C47	CTS10	D47	CTS14
A48	$8KHZ15+_50	B48	SATN-_100	C48	TX10	D48	TX14
A49	MBUS15TX+_50	B49	SACK-_100	C49	RX10	D49	RX14
A50	$56KHZ15-_50	B50	SRST-_100	C50	DCD10	D50	DCD14
A51	MBUS15TX-_50	B51	SMSG-_100	C51	RTS11	D51	RTS15
A52	$56KHZ15+_50	B52	SSEL-_100	C52	CTS11	D52	CTS15
A53	+12VB	B53	SI/O-_100	C53	TX11	D53	TX15
A54	SIG GND	B54	SC/D-_100	C54	RX11	D54	RX15
A55	SIG GND	B55	SREQ-_100	C55	DCD11	D55	DCD15

Interprocessor Message Transport Connectors

Inter-processor Message Transport (IMT) connectors on the control shelf backplane provide connections between the system shelves as part of the two high speed IMT buses.

J8, J16, J58, J64 on Control Shelf backplane 04 and J23, J22, J75, J74 on Control Shelf backplane 06/07

Figure 192: IMT Connector

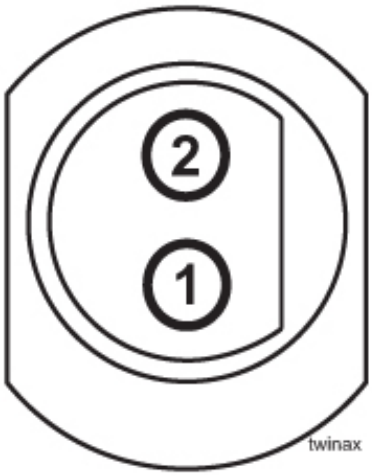


Table 67: IMT Connector Pins

Connector	Pin	Signal
A IMT IN backplane (P/N 850-0330-04)(J8) A IMT IN backplane (P/N 850-0330-06/07)(J23)	1	AIMTIN+_78
	2	AIMTIN-_78
A IMT OUT backplane (P/N 850-0330-04)(J16) A IMT OUT backplane (P/N 850-0330-06/07)(J22)	1	AIMTOUT+_78
	2	AIMTOUT-_78
B IMT IN backplane (P/N 850-0330-04)(J58) B IMT IN backplane (P/N 850-0330-06/07)(J75)	1	BIMTIN+_78
	2	BIMTIN-_78
B IMT OUT backplane (P/N 850-0330-04)(J64) B IMT OUT backplane (P/N 850-0330-06/07)(J74)	1	BIMTOUT+_78
	2	BIMTOUT-_78

High Speed Message Multiplexer

The High-Speed Multiplexer card supports requirements for more than 1024 linksl.

J8, J24 on Control Shelf backplane 04 and J23, J31 on Control Shelf backplane 06/07

HMUX A, P8

Figure 193: Control Shelf HMUX A Pin-Outs

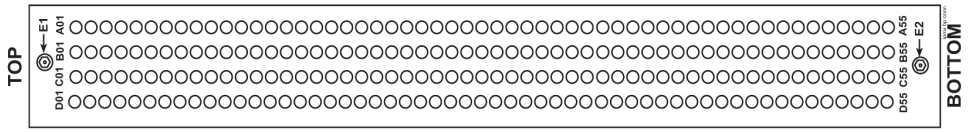


Table 68: Control Shelf HMUX A Backplane Pin-Outs

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	LGND	B01	LGND	C01	LGND	D01	LGND
A02	ASEROD-_50	B02	LGND	C02	ASEROE-_50	D02	LGND
A03	ASEROD+_50	B03	LGND	C03	ASEROE+_50	D03	LGND
A04	LGND	B04	ASELD-	C04	LGND	D04	ASELE-
A05	ASERID-_50	B05	LGND	C05	ASERIE-_50	D05	LGND
A06	ASERID+_50	B06	LGND	C06	ASERIE+_50	D06	LGND
A07	LGND	B07	AIND-	C07	LGND	D07	AINE-
A08	ASEROC-_50	B08	LGND	C08	ASEROF-_50	D08	LGND
A09	ASEROC+_50	B09	LGND	C09	ASEROF+_50	D09	LGND
A10	ABMUXIN-	B10	ASELC-	C10	LGND	D10	ASELF-
A11	ASERIC-_50	B11	LGND	C11	ASERIF-_50	D11	LGND
A12	ASERIC+_50	B12	LGND	C12	ASERIF+_50	D12	LGND
A13	LGND	B13	AINC-	C13	LGND	D13	AINF-
A14	ASEROB-_50	B14	LGND	C14	ASEROG-_50	D14	LGND

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A15	ASEROB+_50	B15	LGND	C15	ASEROG+_50	D15	LGND
A16	LGND	B16	ASELB-	C16	LGND	D16	ASELG-
A17	ASERIB-_50	B17	LGND	C17	ASERIG-_50	D17	LGND
A18	ASERIB+_50	B18	LGND	C18	ASERIG+_50	D18	LGND
A19	LGND	B19	AINB-	C19	LGND	D19	AING-
A20		B20	LGND	C20	ASEROH-_50	D20	LGND
A21		B21	LGND	C21	ASEROH+_50	D21	LGND
A22	LGND	B22		C22	LGND	D22	ASELH-
A23		B23	LGND	C23	ASERIH-_50	D23	LGND
A24		B24	LGND	C24	ASERIH+_50	D24	LGND
A25	LGND	B25		C25	LGND	D25	AINH-
A26	ASEROA-_50	B26	LGND	C26	ASEROI-_50	D26	LGND
A27	ASEROA+_50	B27	LGND	C27	ASEROI+_50	D27	LGND
A28	LGND	B28	ASELA-	C28	LGND	D28	ASELI-
A29	ASERIA-_50	B29	LGND	C29	ASERII-_50	D29	LGND
A30	ASERIA+_50	B30	LGND	C30	ASERII+_50	D30	LGND
A31	LGND	B31	AINA-	C31	LGND	D31	AINI-
A32		B32	LGND	C32	ASEROJ-_50	D32	LGND
A33		B33	LGND	C33	ASEROJ+_50	D33	LGND
A34	LGND	B34		C34	LGND	D34	ASELJ-
A35		B35	LGND	C35	ASERIJ-_50	D35	LGND

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A36		B36	LGND	C36	ASERIJ+_50	D36	LGND
A37	LGND	B37		C37	LGND	D37	AINJ-
A38		B38	LGND	C38	ASEROK-_50	D38	LGND
A39		B39	LGND	C39	ASEROK+_50	D39	LGND
A40	LGND	B40		C40	LGND	D40	ASELK-
A41		B41	LGND	C41	ASERIK-_50	D41	LGND
A42		B42	LGND	C42	ASERIK+_50	D42	LGND
A43	LGND	B43		C43	LGND	D43	AINK-
A44		B44	LGND	C44	ASEROL-_50	D44	LGND
A45		B45	LGND	C45	ASEROL+_50	D45	LGND
A46	LGND	B46		C46	LGND	D46	ASELL-
A47		B47	LGND	C47	ASERIL-_50	D47	LGND
A48		B48	LGND	C48	ASERIL+_50	D48	LGND
A49	LGND	B49		C49	LGND	D49	AINL-
A50	AIN-_78	B50	LGND	C50	AIMTOUT-_78	D50	LGND
A51	AIMTIN+_78	B51	LGND	C51	AIMTOUT+_78	D51	LGND
A52	LGND	B52	LGND	C52	LGND	D52	LGND
A53		B53	MBUSSRX-_50	C53	MBUSSRX+_50	D53	
A54		B54	MBUSSTX-_50	C54	MBUSSTX+_50	D54	LGND
A55	CHASSIS GND	B55	CHASSIS GND	C55	CHASSIS GND	D55	CHASSIS GND
E2	P3A48RTN						

HMUX B, P24

Figure 194: Control Shelf HMUX B Pin-Outs

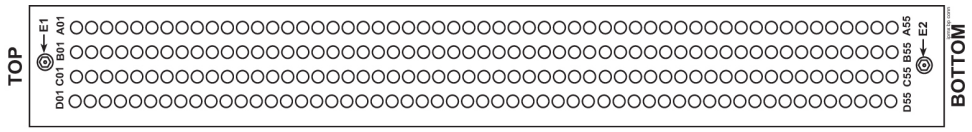


Table 69: Control Shelf HMUX B Backplane Pin-Outs

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	LGND	B01	LGND	C01	LGND	D01	LGND
A02	BSEROH-_50	B02	LGND	C02	BSEROI-_50	D02	LGND
A03	BSEROH+_50	B03	LGND	C03	BSEROI+_50	D03	LGND
A04	LGND	B04	BSELH-	C04	LGND	D04	BSELI-
A05	BSERIH-_50	B05	LGND	C05	BSERII-_50	D05	LGND
A06	BSERIH+_50	B06	LGND	C06	BSERII+_50	D06	LGND
A07	LGND	B07	BINH-	C07	LGND	D07	BINI-
A08	BSEROG-_50	B08	LGND	C08	BSEROJ-_50	D08	LGND
A09	BSEROG+_50	B09	LGND	C09	BSEROJ+_50	D09	LGND
A10	BMUXIN-	B10	BSELG-	C10	LGND	D10	BSELJ-
A11	BSERIG-_50	B11	LGND	C11	BSERIJ-_50	D11	LGND
A12	BSERIG+_50	B12	LGND	C12	BSERIJ+_50	D12	LGND
A13	LGND	B13	BING-	C13	LGND	D13	BINJ-
A14	BSEROF-_50	B14	LGND	C14	BSEROK-_50	D14	LGND
A15	BSEROF+_50	B15	LGND	C15	BSEROK+_50	D15	LGND
A16	LGND	B16	BINF-	C16	LGND	D16	BSELK-

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A17	BSERIF-_50	B17	LGND	C17	BSERIK-_50	D17	LGND
A18	BSERIF+_50	B18	LGND	C18	BSERIK+_50	D18	LGND
A19	LGND	B19	BINF-	C19	LGND	D19	BINK-
A20	BSEROE-_50	B20	LGND	C20		D20	LGND
A21	BSEROE+_50	B21	LGND	C21		D21	LGND
A22	LGND	B22	BSELE-	C22	LGND	D22	
A23	BSERIE-_50	B23	LGND	C23		D23	LGND
A24	BSERIE+_50	B24	LGND	C24		D24	LGND
A25	LGND	B25	BINE-	C25	LGND	D25	
A26	BSEROD-_50	B26	LGND	C26	BSEROL-_50	D26	LGND
A27	BSEROD+_50	B27	LGND	C27	BSEROL+_50	D27	LGND
A28	LGND	B28	BSELD-	C28	LGND	D28	BSELL-
A29	BSERID-_50	B29	LGND	C29	BSERIL-_50	D29	LGND
A30	BSERID+_50	B30	LGND	C30	BSERIL+_50	D30	LGND
A31	LGND	B31	BIND-	C31	LGND	D31	BINL-
A32	BSEROC-_50	B32	LGND	C32		D32	LGND
A33	BSEROC+_50	B33	LGND	C33		D33	LGND
A34	LGND	B34	BSELC-	C34	LGND	D34	
A35	BSERIC-_50	B35	LGND	C35		D35	LGND
A36	BSERIC+_50	B36	LGND	C36		D36	LGND
A37	LGND	B37	BINC-	C37	LGND	D37	

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A38	BSEROB-_50	B38	LGND	C38		D38	LGND
A39	BSEROB+_50	B39	LGND	C39		D39	LGND
A40	LGND	B40	BSELB-	C40	LGND	D40	
A41	BSERIB-_50	B41	LGND	C41		D41	LGND
A42	BSERIB+_50	B42	LGND	C42		D42	LGND
A43	LGND	B43	BINB-	C43	LGND	D43	
A44	BSEROA-_50	B44	LGND	C44		D44	LGND
A45	BSEROA+_50	B45	LGND	C45		D45	LGND
A46	LGND	B46	BSELA-	C46	LGND	D46	
A47	BSERIA-_50	B47	LGND	C47		D47	LGND
A48	BSERIA+_50	B48	LGND	C48		D48	LGND
A49	LGND	B49	BINA-	C49	LGND	D49	
A50	BIMTIN-_78	B50	LGND	C50	BIMTOUT-_78	D50	LGND
A51	BIMTIN+_78	B51	LGND	C51	BIMTOUT+_78	D51	LGND
A52	LGND	B52	LGND	C52	LGND	D52	LGND
A53		B53	MBUSSRX-_50	C53	MBUSSRX+_50	D53	
A54		B54	MBUSSTX-_50	C54	MBUSSTX+_50	D54	LGND
A55	CHASSIS GND	B55	CHASSIS GND	C55	CHASSIS GND	D55	CHASSISGND
E2	P3B48RTN						

General Purpose Relay Connectors

General Purpose Relay connectors provide software controlled, general purpose outputs for the system. Currently, Generic Program (GP01) provides reset signals for any optional OAPs that may be present in the system.

GP01

J75 on Control Shelf backplane 04 and J71 on Control Shelf backplane 06/07

Figure 195: General Purpose Relay Connector 01

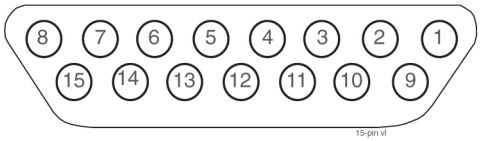


Table 70: General Purpose Relay Connector 01

Pin	Signal
4, 8, 10, 15	not used
1	GPRNO0 - General Purpose Relay 0, Normally Open
2	GPRCOM0 - General Purpose Relay 0, Common
3	GPRNC0 - General Purpose Relay 0, Normally Closed
5	GPRNO1 - General Purpose Relay 1, Normally Open
6	GPRCOM1 - General Purpose Relay 1, Common
7	GPRNC1 - General Purpose Relay 1, Normally Closed
9	Logic ground
11	OAP1_RST+ - OAP 1 reset, +
12	OAP1_RST- - OAP 1 reset, -
13	OAP2_RST+ - OAP 2 reset, +
14	OAP2_RST- - OAP 2 reset, -

GP02

J73 on Control Shelf backplane 04 and J75 on Control Shelf backplane 06/07

Figure 196: General Purpose Relay Connector 02

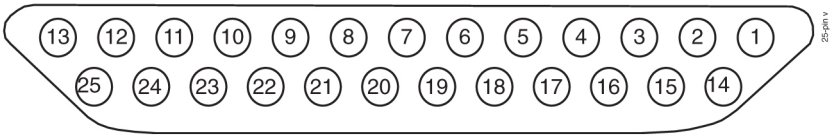


Table 71: General Purpose Relay Connector 02

Pin	Signal
1, 2, 13, 14, 18, 25	not used
3	GPRNC2 - General Purpose Relay 2, Normally Closed
4	GPRCOM2 - General Purpose Relay 2, Common
5	GPRNO2 - General Purpose Relay 2, Normally Open
6	GPRNC2 - General Purpose Relay 3, Normally Closed
7	GPRCOM2 - General Purpose Relay 3, Common
8	GPRNO2 - General Purpose Relay 3, Normally Open
9	GPRNC2 - General Purpose Relay 4, Normally Closed
10	GPRCOM2 - General Purpose Relay 4, Common
11	GPRNO2 - General Purpose Relay 4, Normally Open
12	Logic ground
15	GPRNC2 - General Purpose Relay 5, Normally Closed
16	GPRCOM2 - General Purpose Relay 5, Common
17	GPRNO2 - General Purpose Relay 5, Normally Open
19	GPRNC2 - General Purpose Relay 6, Normally Closed

Pin	Signal
20	GPRCOM2 - General Purpose Relay 6, Common
21	GPRNO2 - General Purpose Relay 6, Normally Open
22	GPRNC2 - General Purpose Relay 7, Normally Closed
23	GPRCOM2 - General Purpose Relay 7, Common
24	GPRNO2 - General Purpose Relay 7, Normally Open

General Purpose Serial Interface Connectors

The General Purpose Serial Interface connector provides a General Purpose Serial Interfaces (GPSI) for the system. The GPSI also provides communications between an optional holdover clock system and the rest of the system.

J76 on Control Shelf backplane 04 and J73 on Control Shelf backplane 06/07

Figure 197: General Purpose Serial Interface Connector 01, GPSI

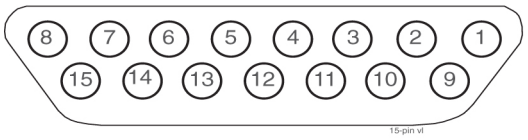


Table 72: General Purpose Serial Interface Connector 01, GPSI

Pin	Signal
1, 2, 3, 8, 9, 10, 11, 12, 13, 14, 15	Not used
4	RX_HO - Holdover Clock Receive Data
5	TX_HO - Holdover Clock Transmit Data
6	DTR_HO - Holdover Clock Data Terminal Ready
7	Logic ground

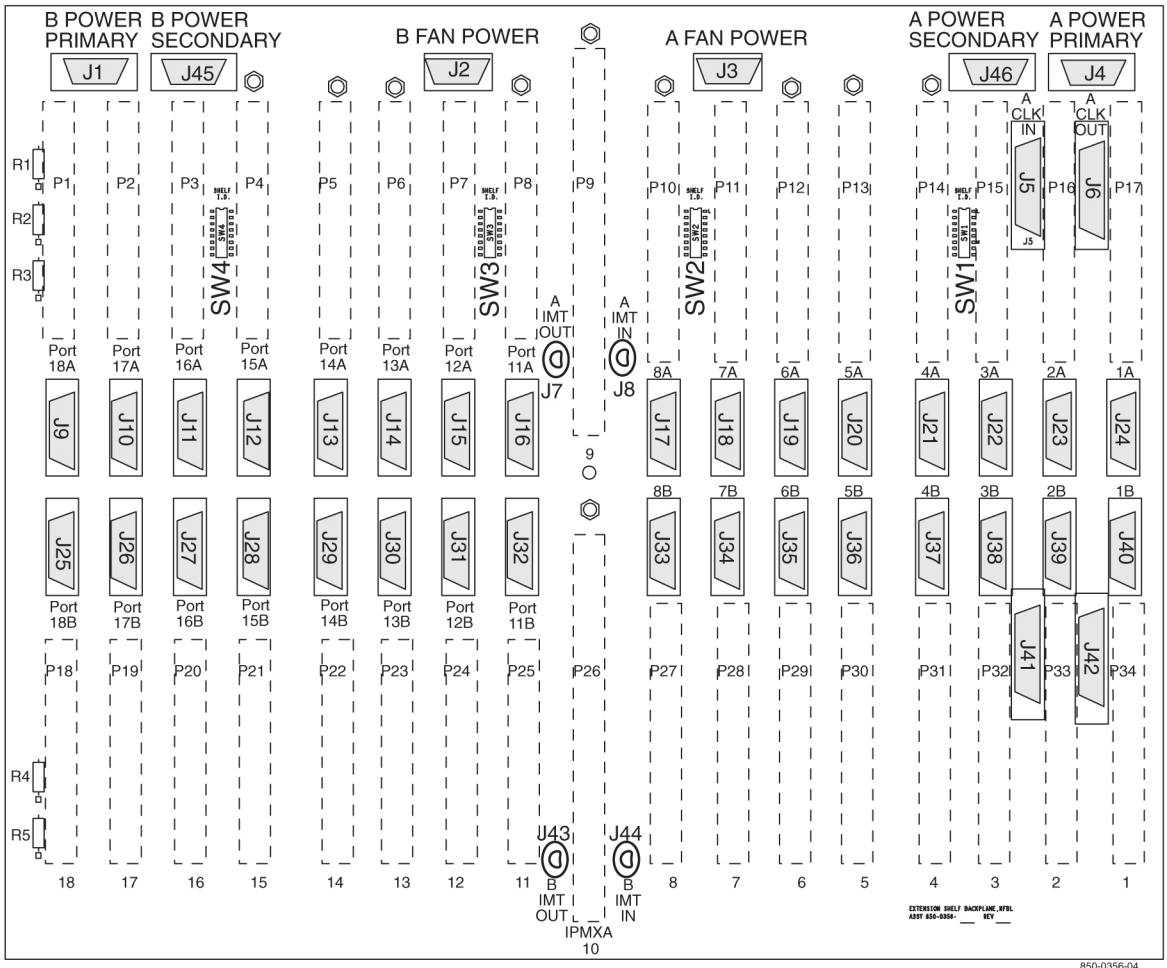
Extension Shelf

The extension shelf backplane provides connectors for 18 circuit cards. These connectors are four column High Density Interconnect (HDI) male headers with shrouds of varying pin quantities depending on card position. The reverse or component side of the backplane contains DB style connectors for interfacing to the rest of the system.

- Power connectors
- System clock connectors
- Interface connectors
- IMT connectors

Extension Shelf Backplane 04

Figure 198: Extension Shelf Backplane 04



NOTE: ⬡ Conducts -48VDC for the printed circuit board (HOT)

Power Connectors

The extension shelf backplane provides –48VDC power and return to all card positions. The power is divided into parts A and B and brought to the shelf from the Fuse and Alarm Panel (FAP) using two cables. The power connectors on the extension shelf backplane are DB-26 high density connectors with two pins per power connection to handle the current load.

J1, J4 on Extension Shelf backplane 01

J1, J4, Primary and J45, J46 Secondary on Extension Shelf backplane 03

Figure 199: Power Connector

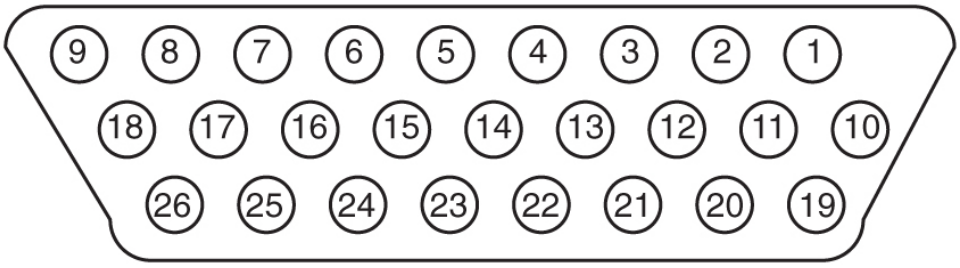


Table 73: Power Connector

Pin	Signal	Pin	Signal
1	P5$48VDC	14	LGND
2	P5$48RTN	15	P3$48RTN
3	P4$48VDC	16	P3$48VDC
4	P4$48RTN	17	P2$48RTN
5	LGND	18	P2$48VDC
6	P3$48RTN	19	P1$48RTN
7	P3$48VDC	20	P1$48RTN
8	P2$48RTN	21	P1$48VDC
9	P2$48VDC	22	P1$48VDC
10	P5$48VDC	23	PF$48RTN
11	P5$48RTN	24	PF$48RTN

Pin	Signal	Pin	Signal
12	P4$48VDC	25	PF$48VDC
13	P4$48RTN	26	PF$48VDC
$= A or B, A POWER (J4) or B POWER (J1)			

System Clock Connectors

Each extension shelf receives and passes along Clock signals A (J5 and J6) and B (J41and J42).

Clock A In Connector J5

Figure 200: Clock A In Extension Shelf Connector

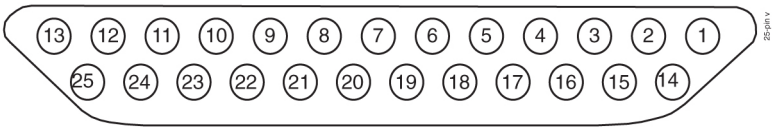


Table 74: Clock A In Extension Shelf Connector

Pin	Signal	Pin	Signal
1		14	MA56KHZ+_50
2	MBUSSTX-_50	15	MA56KHZ-_50
3	MBUSSTX+_50	16	MA8KHZ+_50
4	MBUSSRX-_50	17	MA8KHZ-_50
5	MBUSSRX+_50	18	SH2A56KHZ+_50
6	SH2MBUSTX-_50	19	SH2A56KHZ-_50
7	SH2MBUSTX+_50	20	SH2A8KHZ+_50
8	SH2MBUSRX-_50	21	SH2A8KHZ-_50
9	SH2MBUSRX+_50	22	SH3A56KHZ+_50
10	SH3MBUSTX-_50	23	SH3A56KHZ-_50

Pin	Signal	Pin	Signal
11	SH3MBUSTX-_50	24	SH3A8KHZ+_50
12	SH3MBUSRX-_50	25	SH3A8KHZ-_50
13	SH3MBUSRX+_50		

Clock A Out Connector J6

Figure 201: Clock A Out Extension Shelf Connector

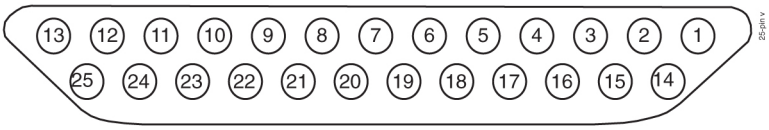


Table 75: Clock A Out Extension Shelf Connector

Pin	Signal	Pin	Signal
1		14	SH2A56KHZ+_50
2	SH2MBUSTX-_50	15	SH2A56KHZ-_50
3	SH2MBUSTX+_50	16	SH2A8KHZ+_50
4	SH2MBUSRX-_50	17	SH2A8KHZ-_50
5	SH2MBUSRX+_50	18	SH3A56KHZ+_50
6	SH3MBUSTX-_50	19	SH3A56KHZ-_50
7	SH3MBUSTX+_50	20	SH3A8KHZ+_50
8	SH3MBUSRX-_50	21	SH3A8KHZ-_50
9	SH3MBUSRX+_50	22	
10		23	
11		24	
12		25	

Pin	Signal	Pin	Signal
13			

Clock B In Extension Shelf Connector J41

Figure 202: Clock B In Extension Shelf Connector

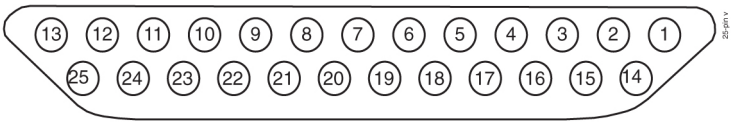


Table 76: Clock B In Extension Shelf Connector

Pin Number	Signal	Pin Number	Signal
1	FANAALM-	14	MB56KHZ+_50
2		15	MB56KHZ-_50
3		16	MB8KHZ+_50
4		17	MB8KHZ-_50
5		18	SH2B56KHZ+_50
6		19	SH2B56KHZ-_50
7	FANCNTRL	20	SH2B8KHZ+_50
8		21	SH2B8KHZ-_50
9		22	SH3B56KHZ+_50
10		23	SH3B56KHZ-_50
11		24	SH3B8KHZ+_50
12		25	SH3B8KHZ-_50
13	FANBALM-		

Clock B Out Extension Shelf Connector J42

Figure 203: Clock B Out Extension Shelf Connector

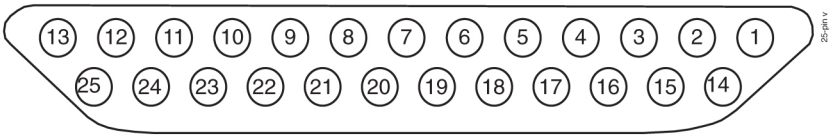


Table 77: Clock B Out Extension Shelf Connector

Pin Number	Signal	Pin Number	Signal
1	FANAALM	14	SH2B56KHZ+_50
2		15	SH2B56KHZ-_50
3		16	SH2B8KHZ+_50
4		17	SH2B8KHZ-_50
5		18	SH3B56KHZ+_50
6		19	SH3B56KHZ-_50
7	FANCNTRL	20	SH3B8KHZ+_50
8		21	SH3B8KHZ-_50
9		22	
10		23	
11		24	
12		25	
13	FANBALM		

Interface Connectors

Behind each slot on the extension shelf backplane are two DB-26 connectors. These provide connection to the outside world in the form of TCP/IP networks or SS7 links networks. The interface connectors are designated as J9 through J40.

Extension Shelf Interface Connectors J9 through J40

Figure 204: Extension Shelf Interface Connector

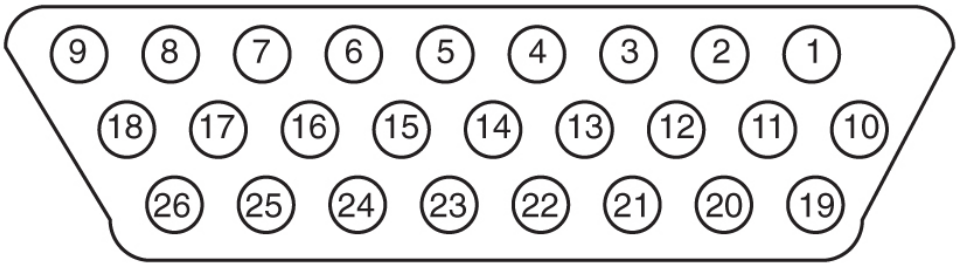


Table 78: Extension Shelf Interface Connector Pins and Signals

Pin	DS0A/OCU Signal ATM	Pin	DS0A/OCU Signal ATM
1		14	
2		15	
3		16	
4		17	
5		18	
6		19	
7		20	TX-RING
8		21	TX-TIP
9		22	RX-RING
10		23	RX-TIP
11		24	
12		25	
13		26	

Table 79: Connectors, Ports, and Card Slots

Card Slot	Port	Connector	Port	Connector
01	1A	J24	1B	J40
02	2A	J23	2B	J39
03	3A	J22	3B	J38
04	4A	J21	4B	J37
05	5A	J20	5B	J36
06	6A	J19	6B	J35
07	7A	J18	7B	J34
08	8A	J17	8B	J33
11	9A	J16	9B	J32
12	10A	J15	10B	J31
13	11A	J14	11B	J30
14	12A	J13	12B	J29
15	13A	J12	13B	J28
16	14A	J11	14B	J27
17	15A	J10	15B	J26
18	16A	J9	16B	J25

Extension Shelf Modules

This section details the Extension Shelf backplane circuit board pin-outs used for

- Database Communications Modules (DCMs),
- Database Services Modules (DSMs)
- Link Interface Modules (LIMs)
- Multi-Port LIMs (MPLs)

- Translation Service Modules (TSMs).

Refer to *Table 82: Extension Shelf Backplane Pin-Out Symbols* for signal symbol values ($, #, &, @, and ^).

Extension Shelf Backplane Pin-Outs, Top Connector

Table 80: Extension Shelf Backplane Pin-Outs, Top Connector lists pinouts for DCM/DSM/LIM/MPL/TSM Extension Shelf Backplane Top Connectors P1 through P8 and P10 through P17.

Figure 205: Extension Shelf Backplane Pin-Outs, Top Connector

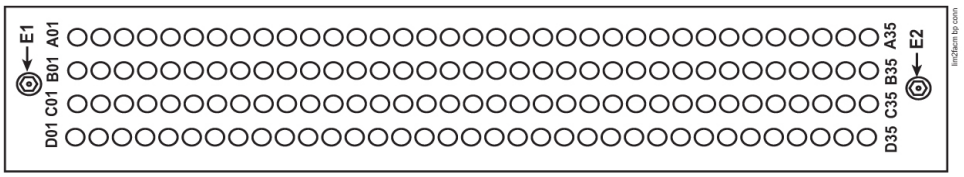


Table 80: Extension Shelf Backplane Pin-Outs, Top Connector

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	LGND	B01	LGND	C01	EBI_^XA02	D01	EBI_^XA14
A02	ASERO#-_50	B02	LGND	C02	EBI_^XA03	D02	EBI_^XA15
A03	ASERO#+_50	B03	LGND	C03	EBI_^XA04	D03	EBI_^XA16
A04	LGND	B04	LGND	C04	EBI_^XA05	D04	EBI_^XA17
A05		B05	LGND	C05	EBI_^XA06	D05	EBI_^XA18
A06		B06	LGND	C06	EBI_^XA07	D06	EBI_^XA19
A07	LGND	B07	LGND	C07	EBI_^XA08	D07	EBI_^XA20
A08	ASEL#-	B08		C08	EBI_^XA09	D08	EBI_^XA21
A09		B09		C09	EBI_^XA10	D09	EBI_^XA22
A10	AMUXIN-	B10		C10		D10	EBI_^XA23
A11	LGND	B11	AIN#-	C11		D11	EBI_^XA24
A12		B12	LGND	C12		D12	EBI_^XA25
A13		B13	LGND	C13		D13	EBI_^XA26

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A14	LGND	B14	LGND	C14		D14	EBI_^XA27
A15	ASERI#-_50	B15	LGND	C15		D15	
A16	ASERI#+_50	B16	LGND	C16		D16	
A17	LGND	B17	LGND	C17		D17	
A18		B18		C18		D18	
A19	LGND	B19	MBUSSRX+_50	C19	LGND*	D19	
A20		B20	MBUSSRX-_50	C20		D20	LGND
A21	LGND	B21	MBUSSTX+_50	C21	MA56KHZ+_50	D21	
A22		B22	MBUSSTX-_50	C22	MA56KHZ-_50	D22	LGND
A23	LGND	B23		C23	MA8KHZ+_50	D23	
A24	&-IF1_60	B24		C24	MA8KHZ-_50	D24	LGND
A25	LGND	B25		C25	EBI_^XSP4	D25	EBI_^XSP5
A26	&-IF2_60	B26		C26	EBI_^XA11	D26	
A27	LGND	B27		C27	EBI_^XA12	D27	
A28	&-IF3_60	B28	&-IF10_60	C28	EBI_^XA13	D28	LGND
A29	LGND	B29	&-IF19_60	C29	EBI_^BREQ-	D29	
A30	&-IF4_60	B30	&-IF20_60	C30	EBI_^BG-	D30	LGND
A31	&-IF5_60	B31	&-IF21_60	C31	EBI_^XIRQ-	D31	
A32	&-IF6_60	B32	&-IF22_60	C32	EBI_^HOSTSAN+	D32	LGND
A33	&-IF7_60	B33	&-IF23_60	C33	EBI_^GSTSAN-	D33	
A34	&-IF8_60	B34	&-IF25_60	C34	&-IF24_60	D34	LGND

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A35	&-IF9_60	B35	&-IF18_60	C35	&-IF26_60	D35	
E2 LGND *Connection to logic ground for slots 2 (P16), 4 (P14), 6 (P12), 8 (P10) only.							

Extension Shelf Backplane Pin-Outs, Bottom Connector

Table 81: Extension Shelf Backplane Pin-Outs, Bottom Connector lists Pinouts for DCM/DSM/LIM/MPL/TSM Extension Shelf Backplane Bottom Connectors P18 through P25, and P27 through P34.

Figure 206: Extension Shelf Backplane Pin-Outs, Bottom Connector

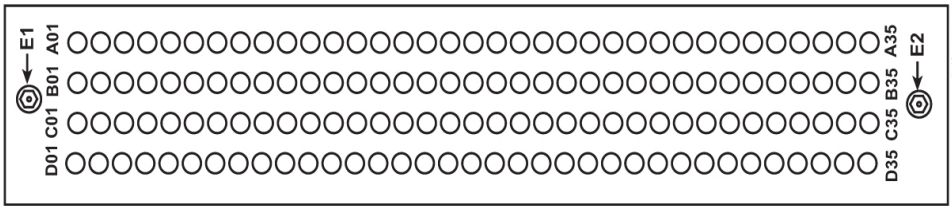


Table 81: Extension Shelf Backplane Pin-Outs, Bottom Connector

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A01	LGND	B01	&-IF1_60	C01	&-IF10_60	D01	IN2-
A02	&-IF3_60	B02	&-IF2_60	C02	&-IF19_60	D02	LGND
A03	LGND	B03		C03	&-IF20_60	D03	LGND
A04	&-IF4_60	B04		C04	&-IF21_60	D04	LGND
A05	&-IF5_60	B05		C05	&-IF22_60	D05	LGND
A06	&-IF6_60	B06	&-IF24_60	C06	&-IF23_60	D06	LGND
A07	&-IF7_60	B07	&-IF26_60	C07		D07	@-IF25_60
A08	&-IF8_60	B08	&-IF9_60	C08	&-IF18_60	D08	LGND
A09	LGND	B09		C09		D09	LGND
A10		B10		C10	EBI_^XSP2	D10	EBI_^XSP3

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A11	LGND	B11	LGND	C11	EBI_^XBE0-	D11	EBI_^XD00
A12	BSERO@-_50	B12	LGND	C12	EBI_^XBE1-	D12	EBI_^XD01
A13	BSERO@-_50	B13	LGND	C13	EBI_^XBE2-	D13	EBI_^XD02
A14	LGND	B14	LGND	C14	EBI_^XBE3-	D14	EBI_^XD03
A15		B15	LGND	C15	EBI_^XBS8-	D15	EBI_^XD04
A16		B16	LGND	C16	EBI_^XBS16-	D16	EBI_^XD05
A17	LGND	B17	LGND	C17	EBI_^ADS0-	D17	EBI_^XD06
A18	BSEL@-	B18		C18	EBI_^ADS1-	D18	EBI_^XD07
A19		B19		C19	EBI_^XW/R	D19	EBI_^XD08
A20	BMUXIN-	B20		C20	EBI_^XM/IO	D20	EBI_^XD09
A21	LGND	B21	BIN@-	C21	EBI_^XSP1	D21	EBI_^XD10
A22		B22	LGND	C22	EBI_^XINTA-	D22	EBI_^XD11
A23		B23	LGND	C23	EBI_^XRDY-	D23	EBI_^XD12
A24	LGND	B24	LGND	C24	EBI_^XCAS0-	D24	EBI_^XD13
A25	BSERI@-_50	B25	LGND	C25	EBI_^XCAS1-	D25	EBI_^XD14
A26	BSERI@+_50	B26	LGND	C26	EBI_^XCAS2-	D26	EBI_^XD15
A27	LGND	B27	LGND	C27		D27	
A28		B28		C28		D28	LGND
A29	LGND	B29		C29		D29	
A30		B30		C30		D30	LGND
A31	LGND	B31		C31	MB66KHZ+_50	D31	

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A32		B32		C32	MB56KHZ_50	D32	LGND
A33	LGND	B33		C33	MB8KHZ+_50	D33	
A34		B34		C34	MB8KHZ-_50	D34	LGND
A35	CHASSIS GND	B35	CHASSIS GND	C35	CHASSIS GND	D35	CHASSIS GND
E1	P$48VDC						
E2	LGND						

Extension Shelf Backplane Pin-Out Symbols

Table 82: Extension Shelf Backplane Pin-Out Symbols lists the signal symbol values used in *Table 60: Control Shelf Backplane Pin-Outs, Top Connector* through *Table 82: Extension Shelf Backplane Pin-Out Symbols*.

Table 82: Extension Shelf Backplane Pin-Out Symbols

Slot/Connector	Interface	Address	Signal Symbol Values				
			$	#	&	@	^
1 top / P17	0A	0	1A	P	0A		0
1 bottom / P34	0B	0	1A	P	0B	A	0
2 top / P16	1A	1	1A	O	1A		0
2 bottom / P33	1B	1	1A	O	1B	B	0
3 top / P15	2A	2	1B	N	2A		2
3 bottom / P32	2B	2	1B	N	2B	C	2
4 top / P14	3A	3	1B	M	3A		2
4 bottom / P31	3B	3	1B	M	3B	D	2
5 top / P13	4A	4	2A	L	4A		4

Slot/Connector	Interface	Address	Signal Symbol Values				
			$	#	&	@	^
5 bottom / P30	4B	4	2A	L	4B	E	4
6 top / P12	5A	5	2A	K	5A		4
6 bottom / P29	5B	5	2A	K	5B	F	4
7 top / P11	6A	6	2B	J	6A		6
7 bottom / P28	6B	6	2B	J	6B	G	6
8 top / P10	7A	7	2B	I	7A		6
8 bottom / P27	7B	7	2B	I	7B	H	6
11 top / P8	8A	8	4A	H	8A		8
11 bottom / P25	8B	8	4A	H	8B	I	8
12 top / P7	9A	9	4A	G	9A		8
12 bottom / P24	9B	9	4A	G	9B	J	8
13 top / P6	10A	A	4B	F	10A		A
13 bottom / P23	10B	A	4B	F	10B	K	A
14 top / P5	11A	B	4B	E	11A		A
14 bottom / P22	11B	B	4B	E	11B	L	A
15 top / P4	12A	C	5A	D	12A		C
15 bottom / P21	12B	C	5A	D	12B	M	C
16 top / P3	13A	D	5A	C	13A		C
16 bottom / P20	13B	D	5A	C	13B	N	C
17 top / P2	14A	E	5B	B	14A		E

Slot/Connector	Interface	Address	Signal Symbol Values				
			$	#	&	@	^
17 bottom / P19	14B	E	5B	B	14B	O	E
18 top / P1	15A	F	5B	A	15A		E
18 bottom / P18	15B	F	5B	A	15B	P	E

Interprocessor Message Transport Connectors

The extension shelf backplane provides connections for the two high speed Inter-processor Message Transport (IMT) buses. The connections use twin-axial type connectors at J7, J8, J43, and J44.

Figure 207: IPMX Connector

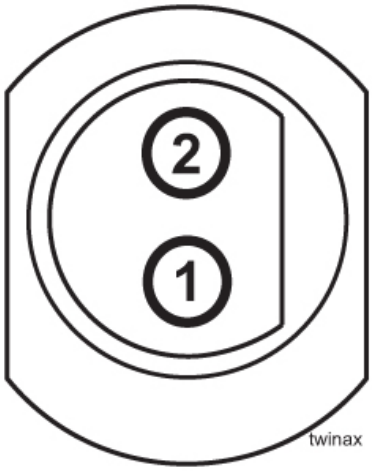


Table 83: IPMX Connector

Connector	Pin	Signal
A IMT IN J8	1	AIMTIN+_78
	2	AIMTIN+_78
A IMT OUT J7	1	AIMTOUT+_78
	2	AIMTOUT+_78
B IMT IN J44	1	BIMTIN+_78

	2	BIMTIN+_78
B IMT OUT J43	1	BIMTOUT+_78
	2	BIMTOUT+_78

High Speed Message Multiplexer Extension Shelf

HMUX Extension Shelf Backplane Pin-Outs P9, P26

Figure 208: HMUX Extension Shelf Backplane Connector P9

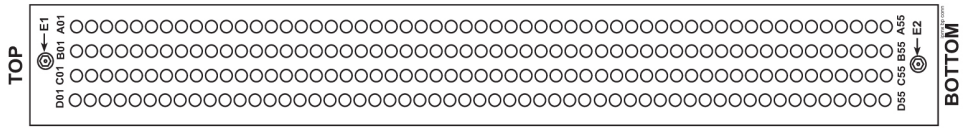


Table 84: HMUX Extension Shelf Backplane Pin-Outs P9 and P26

Pin #	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
A01	LGND	B01	LGND	C01	LGND	D01	LGND
A02	$SEROH-_50	B02	LGND	C02	$SEROI-_50	D02	LGND
A03	$SEROH+_50	B03	LGND	C03	$SEROI+_50	D03	LGND
A04	LGND	B04	$SELH-	C04	LGND	D04	$SELI-
A05	$SERIH-_50	B05	LGND	C05	$SERII-_50	D05	LGND
A06	$SERIH+_50	B06	LGND	C06	$SERII+_50	D06	LGND
A07	LGND	B07	$INH-	C07	LGND	D07	$INI-
A08	$SEROG-_50	B08	LGND	C08	$SEROJ-_50	D08	LGND
A09	$SEROG+_50	B09	LGND	C09	$SEROJ+_50	D09	LGND
A10	$BMUXIN-	B10	$SELG-	C10	LGND	D10	$SELJ-
A11	$SERIG-_50	B11	LGND	C11	$SERIJ-_50	D11	LGND

Pin #	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
A12	$SERIG+_50	B12	LGND	C12	$SERIJ+_50	D12	LGND
A13	LGND	B13	$ING-	C13	LGND	D13	$INJ-
A14	$SEROF-_50	B14	LGND	C14	$SEROK-_50	D14	LGND
A15	$SEROF+_50	B15	LGND	C15	$SEROK+_50	D15	LGND
A16	LGND	B16	$INF-	C16	LGND	D16	$SELK-
A17	$SERIF-_50	B17	LGND	C17	$SERIK-_50	D17	LGND
A18	$SERIF+_50	B18	LGND	C18	$SERIK+_50	D18	LGND
A19	LGND	B19	$INF-	C19	LGND	D19	$INK-
A20	$SEROE-_50	B20	LGND	C20	$SEROL-_50	D20	LGND
A21	$SEROE+_50	B21	LGND	C21	$SEROL+_50	D21	LGND
A22	LGND	B22	$SELE-	C22	LGND	D22	$SELL-
A23	$SERIE-_50	B23	LGND	C23	$SERIL-_50	D23	LGND
A24	$SERIE+_50	B24	LGND	C24	$SERIL+_50	D24	LGND
A25	LGND	B25	$INE-	C25	LGND	D25	$INL-
A26	$SEROD-_50	B26	LGND	C26	$SEROM-_50	D26	LGND
A27	$SEROD+_50	B27	LGND	C27	$SEROM+_50	D27	LGND
A28	LGND	B28	$SELD-	C28	LGND	D28	$SELM-
A29	$SERID-_50	B29	LGND	C29	$SERIM-_50	D29	LGND
A30	$SERID+_50	B30	LGND	C30	$SERIM+_50	D30	LGND
A31	LGND	B31	$IND-	C31	LGND	D31	$INM-

Pin #	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
A32	$SEROC-_50	B32	LGND	C32	$SERON-_50	D32	LGND
A33	$SEROC+_50	B33	LGND	C33	$SERON+_50	D33	LGND
A34	LGND	B34	$SELC-	C34	LGND	D34	$SELN-
A35	$SERIC-_50	B35	LGND	C35	$SERIN-_50	D35	LGND
A36	$SERIC+_50	B36	LGND	C36	$SERIN+_50	D36	LGND
A37	LGND	B37	$INC-	C37	LGND	D37	$INN-
A38	$SEROB-_50	B38	LGND	C38	$SEROO-_50	D38	LGND
A39	$SEROB+_50	B39	LGND	C39	$SEROO+_50	D39	LGND
A40	LGND	B40	$SELB-	C40	LGND	D40	$SELO-
A41	$SERIB-_50	B41	LGND	C41	$SERIO-_50	D41	LGND
A42	$SERIB+_50	B42	LGND	C42	$SERIO+_50	D42	LGND
A43	LGND	B43	$INB-	C43	LGND	D43	$INO-
A44	$SEROA-_50	B44	LGND	C44	$SEROP-_50	D44	LGND
A45	$SEROA+_50	B45	LGND	C45	$SEROP+_50	D45	LGND
A46	LGND	B46	$SELA-	C46	LGND	D46	$SELP-
A47	$SERIA-_50	B47	LGND	C47	$SERIP-_50	D47	LGND
A48	$SERIA+_50	B48	LGND	C48	$SERIP+_50	D48	LGND
A49	LGND	B49	$INA-	C49	LGND	D49	$INP-
A50	$IMTIN-_78	B50	LGND	C50	$IMTOUT-_78	D50	LGND
A51	$IMTIN+_78	B51	LGND	C51	$IMTOUT+_78	D51	LGND

Pin #	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
A52	LGND	B52	LGND	C52	LGND	D52	LGND
A53		B53	MBUSSRX-_50	C53	MBUSSRX+_50	D53	
A54		B54	MBUSSTX-_50	C54	MBUSSTX+_50	D54	LGND
A55	CHASSIS GND	B55	CHASSIS GND	C55	CHASSIS GND	D55	CHASSIS GND
E2	P3$48RTN						

Appendix C

Cables and Adapters

Topics:

- *Labeling Cables.....365*
- *Cables and Adapters.....366*

Labeling Cables

This section provides general labeling instructions for cables.

Before installing any cable use this procedure to label the cables to ensure connection to the proper ports and ease of future maintenance.

WARNING: The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the Outside Plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

Recommended Tools

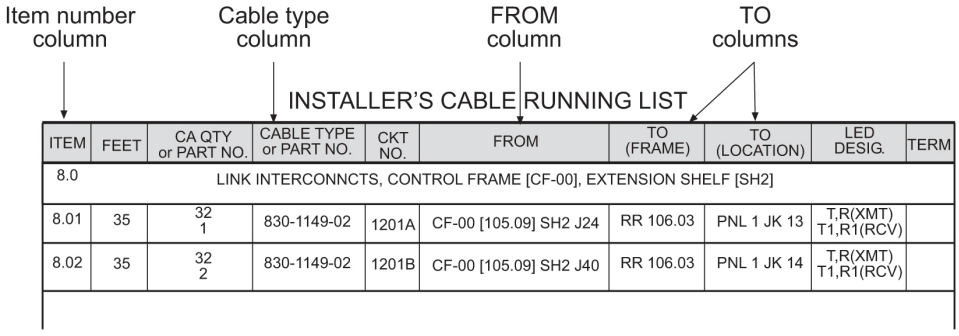
- Installer's Cable Running List
- All cables listed in Installer's Cable Running List
- Any non-Tekelec cables
- Cable labels (including blank labels for non-Tekelec cables)
- Fine point marker

Procedure - Cable Labeling

Perform this procedure to label cables.

1. Locate the Installer's Cable Running List in the *Equipment Specification* for the site.
   Refer to *Figure 209: Installer's Cable Running List Example* for an example.

   Figure 209: Installer's Cable Running List Example



ITEM	FEET	CA QTY or PART NO.	CABLE TYPE or PART NO.	CKT NO.	FROM	TO (FRAME)	TO (LOCATION)	LED DESIG.	TERM
8.0	LINK INTERCONNCTS, CONTROL FRAME [CF-00], EXTENSION SHELF [SH2]								
8.01	35	32 1	830-1149-02	1201A	CF-00 [105.09] SH2 J24	RR 106.03	PNL 1 JK 13	T,R(XMT) T1,R1(RCV)	
8.02	35	32 2	830-1149-02	1201B	CF-00 [105.09] SH2 J40	RR 106.03	PNL 1 JK 14	T,R(XMT) T1,R1(RCV)	

2. Locate the labels included with the cable shipment.
3. Take one cable and identify the cable's part number in the *Cable Type* column of the cable running list.
4. Match the cable with its corresponding pair of labels:

a) Go to the cable's *From* column of the cable running list.
b) Match the *From* column information to the *From* information on one label.
c) Match the *From* column information to the *To* information on the other label.

Note: The label for the connector end of these cables can be identified by the presence of a "J" number, for example: J32, that appears in the "From" area of the label.

Note: Make sure that all cables specific to an A or B side are clearly labeled as A cable and B cable.

5. Repeat *Step 4* for each cable to ensure that all labels are present and that originations and destinations of all cables are clearly identified.
6. For cables that come from the factory with connectors already installed, apply the appropriate label onto each end of the cable approximately two inches from the connector.

   Note: Ensure that the labels are positioned so they are still readable after the cables are installed.

7. For cables that need to be cut to the appropriate length: After the cable is cut to the appropriate length, affix labels with the item number approximately two inches from the end of the cable insulation.
8. For cables not ordered through Tekelec, confirm source, part number, and origination/destination points before labeling them.

   Note: All cables must be labeled with "TO" and "FROM" destinations

   After you have labeled all cables, you are ready for cable installation.

Cables and Adapters

Cables and adapters are listed in alphabetical order.

The words NOT TERMINATED or UNTERMINATED refers to the end of the cable that is not equipped with a connector in manufacturing and the wires must be cut, dressed, and connected at the site specific location.

Cable and Adapter Use

Table 85: Cable/Adapter Use - New Installation shows the cables and adapters used for E5-type cards in new installations in a vacant uncabled slot in a shelf.

Table 85: Cable/Adapter Use - New Installation

Card P/N	Application	Adapter	Qty	Cable	Qty
E5-ENET 870-2212-xx	IPLIM IPGW IPSG	830-1102-XX	2	830-1174-XX or non-ROHS 870-0724-XX	2

Card P/N	Application	Adapter	Qty	Cable	Qty
	SLAN STC	830-1103-XX	2	830-1204-XX or non-ROHS 830-0978-XX Step 2	2
	FAST COPY	830-1343-01 Step 3	1	830-1204-XX or non-ROHS 830-0978-XX	1
				830-1174-XX or non-ROHS 870-0724-XX	1
		830-1343-02 Step 4	1	830-1204-XX or non-ROHS 830-0978-XX	1
				830-1174-XX or non-ROHS 870-0724-XX	1
		830-1102-XX	2	830-1174-XX or non-ROHS 870-0724-XX	4
E5-SM4G 870-2860-01	ELAP EPAP	830-1104-XX	2	830-1174-XX or non-ROHS 870-0724-XX	2
	GTT	No adapters required			
E5-IPSM 870-2877-01	IPSM	830-1102-XX	1	830-1174-XX or non-ROHS 870-0724-XX	1

Card P/N	Application	Adapter	Qty	Cable	Qty
		830-1103-XX	1	830-1204-XX or non-ROHS 830-0978-XX	1
E5-SEAS 870-2877-01	IPSM	830-1102-XX	1	830-1174-XX or non-ROHS 870-0724-XX	1
		830-1103-XX	1	830-1204-XX or non-ROHS 830-0978-XX	1
E5-ATM 870-1872-01	ATM-T1	No adapters required		830-1197-XX or non-ROHS 830-0949-XX Step 5	1
	ATM-E1	No adapters required		830-1132-XX or non-ROHS 830-0011-XX Step 5	1
	ATM-T1	830-1342-05	1	830-1197-XX or non-ROHS 830-0949-XX Step 6	2
	ATM-E1	830-1342-05	1	830-1132-XX or non-ROHS 830-0011-XX Step 6	2
HCMIM 870-2671-xx E5-E1T1	E1/T1	No adapters		830-1197-XX or non-ROHS 830-0949-XX	2

Card P/N	Application	Adapter	Qty	Cable	Qty
870-1873-xx					

Table 86: Cable/Adapter Use - Card Replacement shows the cables and adapters used when a card type is replaced with an E5-type card.

Table 86: Cable/Adapter Use - Card Replacement

Card type	Card P/N	Application	Adapter	Qty	Existing Cables	Qty
SSEDCM or DCM 870-2372-xx	E5-ENET 870-2212-xx	IPLIM IPSGW	830-1103-XX	2	830-1204-XX or non-ROHS 830-0978-XX *Step 2*	2
DSM-4G 870-1984-xx TSM 870-1289-xx	E5-SM4G 870-2860-xx	ELAP EPAP *Step 7*	830-1104-XX	2	830-1204-XX or non-ROHS 830-0978-XX *Step 2*, *Step 8*	2
		GTT only	No adapters required			
IPSM 870-2371-xx	E5-IPSM 870-2877-xx	IPSM	830-1103-XX	1	830-1204-XX or non-ROHS 830-0978-XX *Step 2*	1
	E5-SEAS 870-2877-xx	IPSM	830-1103-XX	1	830-1204-XX or non-ROHS 830-0978-XX *Step 2*	1

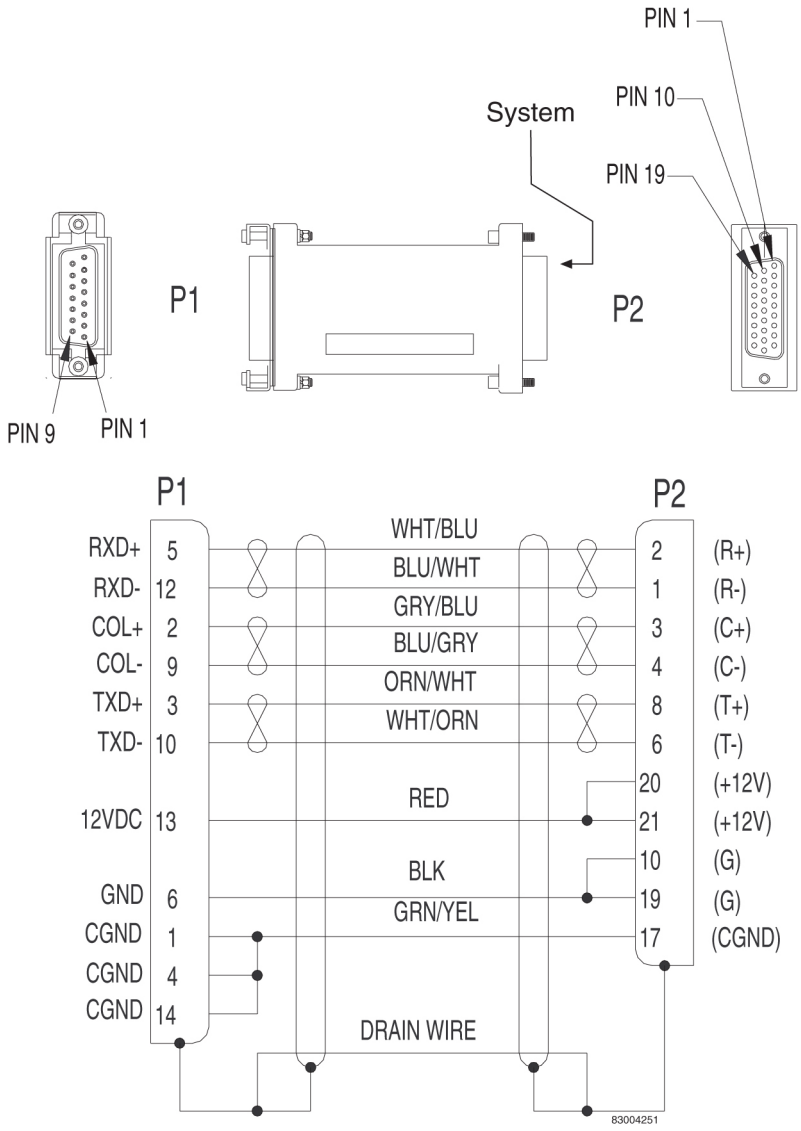
Card type	Card P/N	Application	Adapter	Qty	Existing Cables	Qty
ATM E1 870-2455-xx T1 870-1293-xx	E5-ATM 870-1872-xx	ATM-E1	830-1342-05	1	830-1132-XX or non-ROHS 830-0011-XX *Step 6*, *Step 9*	1
		ATM-T1	830-1342-05	1	830-1184-XX or non-ROHS 830-0849-XX *Step 6*, *Step 10*	1
MPL 870-2061-xx	E5-E1T1 870-1873-xx	MPL	830-0895-01	2	830-1197-XX or non-ROHS 830-0949-XX	2

Notes:

1. All references to ROHS are ROHS 5/6 compliant.
2. If these older cables exist, they may be used in lieu of newer cables.
   - Non-ROHS 830-0788-XX/ROHS 830-1177-XX DB26 – RJ45 (Straight thru Shielded)
   - Non-ROHS 830-0789-XX/ROHS 830-1178-XX DB26 – RJ45 (Crossover Shielded)
3. Backplane connector A (must be used with adapter 870-1343-02)
4. Backplane connector B (must be used with adapter 870-1343-01)
5. This configuration is used if both ATM links in one cable
6. This configuration is used if the A and the B port to carry the ATM links over 2 cables
7. LNP Node 384 Million or ELAP 8.0
8. Existing cables must be replaced with 830-1174-XX or non-ROHS 870-0724-XX
9. ADD 830-1132-xx cable to drop the second physical port to the B port.
10. ADD 830-1184-xx or 830-1197-XX to drop the second physical port to the B port

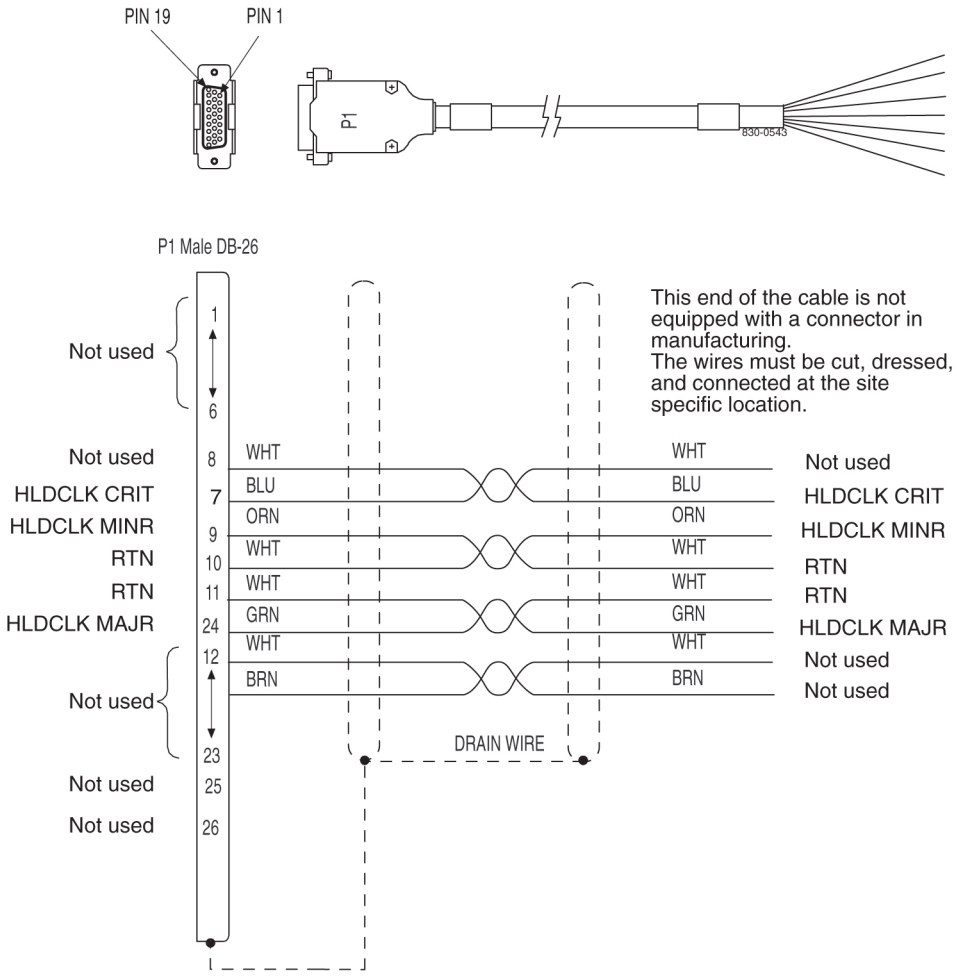
15-Pin to 26-Pin Adapter

Figure 210: Adapter 15 Pin to 26 Pin



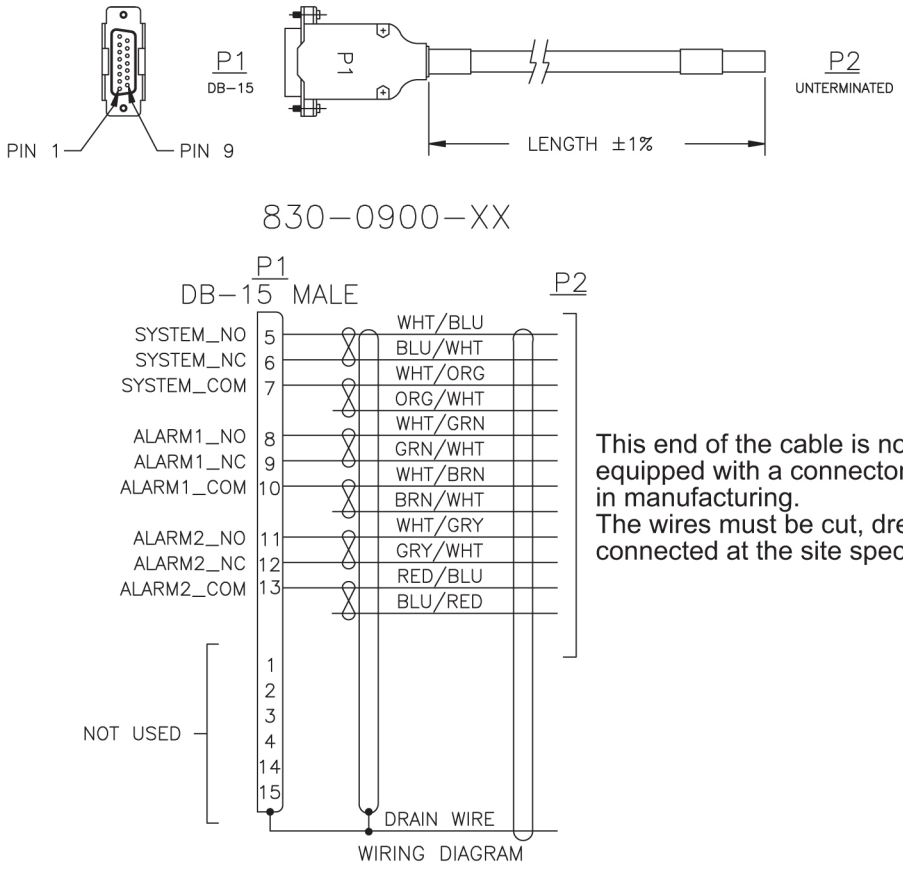
Alarm Cable (Holdover Clock)

Figure 211: Holdover Clock Alarm Cable



Alarm NETRA Server Cable

Figure 212: Alarm NETRA Server Cable



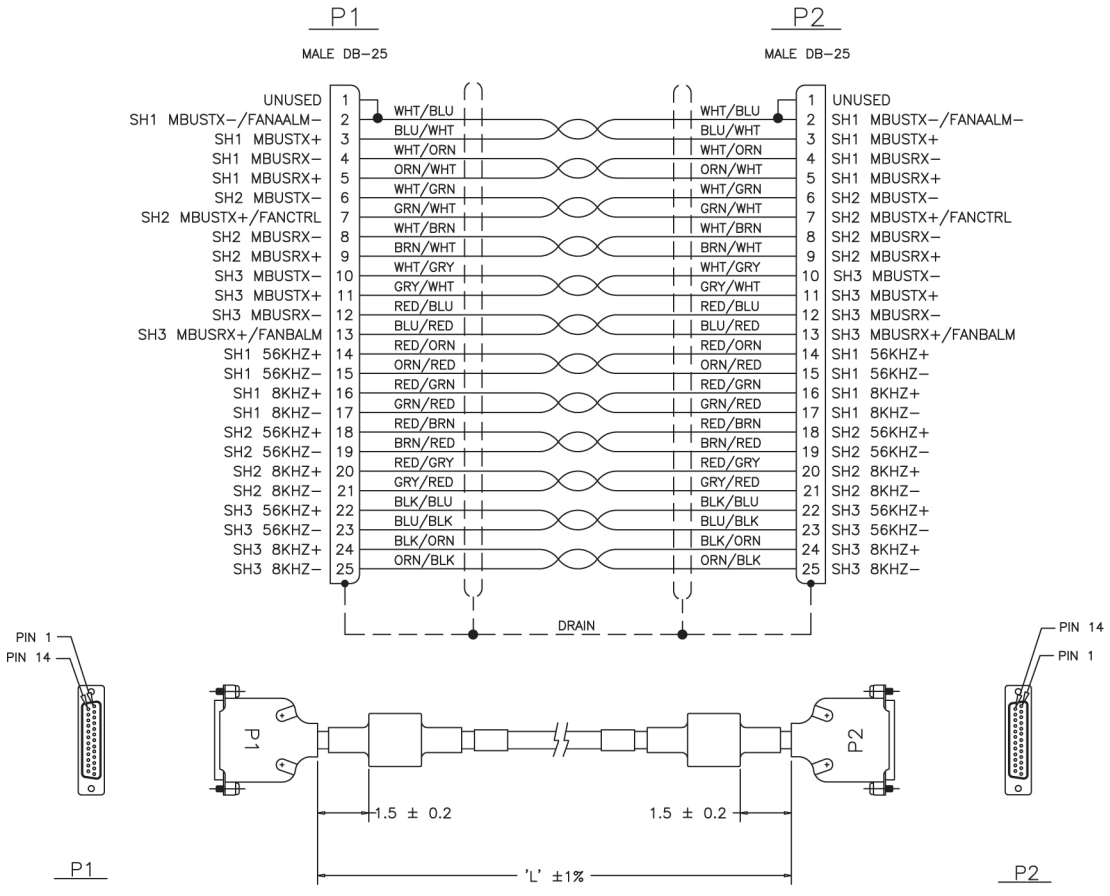
B-Clock Cable

Table 87: Clock Cable

Part Number		Length (inches)	Part Number		Length (inches)
North American	International		North American	International	
830-0398-01	830-1150-01	96	830-0398-12	--	164
830-0398-02	--	144	830-0398-13	830-1150-13	176
830-0398-03	--	192	830-0398-14	830-1150-14	208
830-0398-04	830-1150-04	240	830-0398-15	--	224
830-0398-05	--	288	830-0398-16	--	232
830-0398-06	830-1150-06	360	830-0398-17	830-1150-17	252

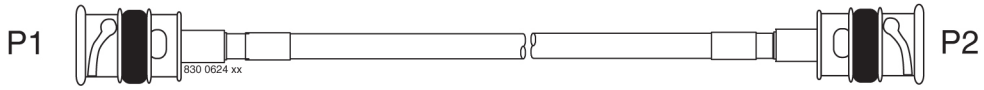
Part Number		Length (inches)	Part Number		Length (inches)
North American	International		North American	International	
830-0398-07	--	18	830-0398-18	--	272
830-0398-08	--	48	830-0398-19	830-1150-19	284
830-0398-09	--	84	830-0398-20	830-1150-20	52
830-0398-10	830-1150-10	116	830-0398-21	830-1150-21	78
830-0398-11	830-1150-11	132			

Figure 213: Clock Cable



BNC- to-BNC Cable Assembly

Figure 214: ,BNC to BCN Cable Assembly



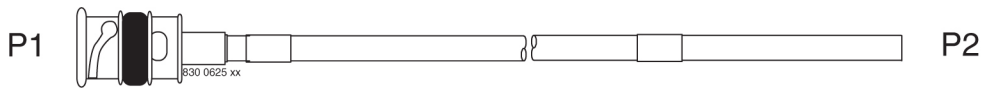
BNC/Open End Cable

Table 88: BNC/Open End Cable

Part Number		Length	
North American	**International**	**feet**	**meters**
830-0625-01	830-1161-01	15	4.57
830-0625-02	830-1161-02	25	7.62
830-0625-03	830-1161-03	50	15.24
830-0625-04	830-1161-04	75	22.86
830-0625-05	830-1161-05	100	30.48
830-0625-06	830-1161-06	125	38.10
830-0625-07	830-1161-07	150	45.72
830-0625-08	830-1161-08	175	53.34
830-0625-09	830-1161-09	200	60.96
830-0625-10	830-1161-10	250	76.2
830-0625-11	830-1161-11	300	91.44
830-0625-12	830-1161-12	500	152.4
830-0625-13	830-1161-13	1000	304.8

.

Figure 215: BNC/Open End Cable

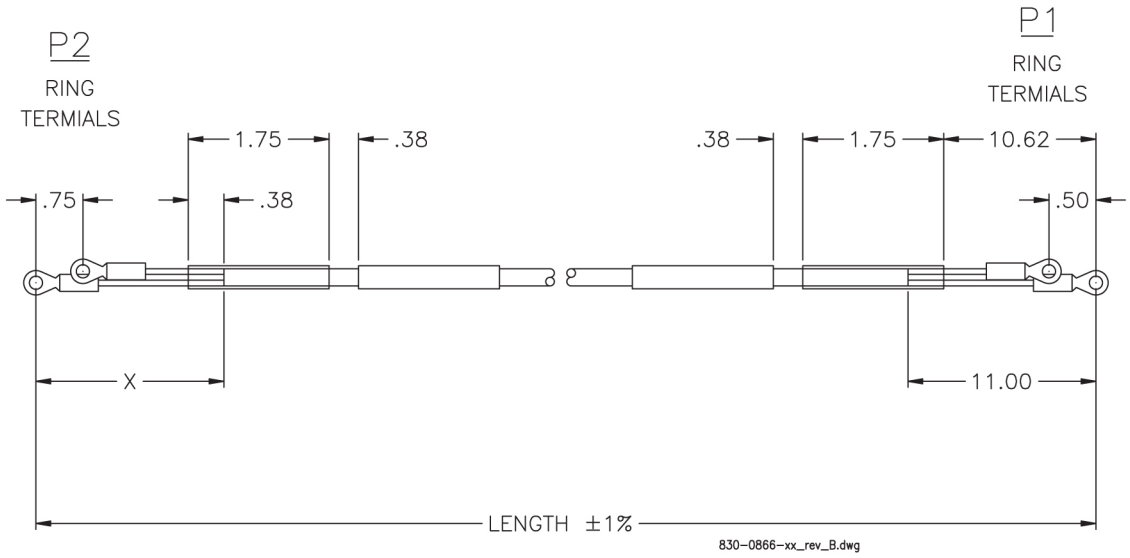


Breaker-to-Terminal Strip Power Cable

Table 89: Power Cable to Breaker Strip

Part Number		Length		P1 Long Lead	P2 Long Lead	Label "A" usage	Label "B" usage
North American	International	Inches	Meters				
830-0866-01	830-1236-01	48.5	14.78	Black	Red	BP-1, POS 1B	TB1, POS 3 and 4
830-0866-02	830-1236-02	51.5	15.69	Black	Black	BP-2, POS 1B	TB2, POS 3 and 4
830-0866-03	830-1236-03	53.5	16.30	Black	Red	BP-1, POS 1A	TB3, POS 3 and 4
830-0866-04	830-1236-04	46.5	14.17	Black	Black	BP-2, POS 1B	TB4, POS 3 and 4
830-0866-05	---	86.0	26.21	Black	Red	BP-2, POS 3B	TB2, POS 3 and 4
830-0866-06	---	88.0	88.0	Black	Black	BP-1, POS 3A	TB3, POS 3 and 4

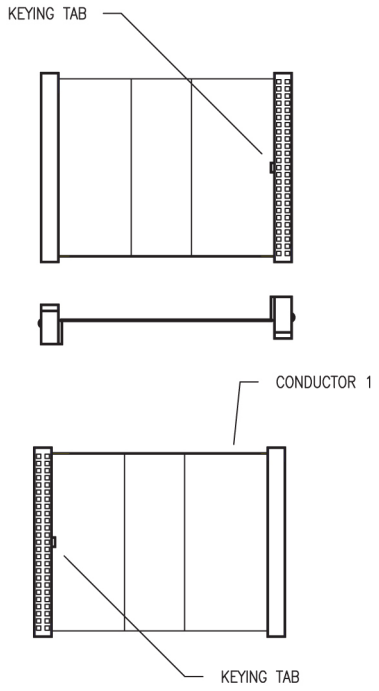
Figure 216: Power Cable to Breaker Strip



CD ROM Cable

Figure 217: CD ROM Cable

PART NUMBER	LENGTH	
	INCHES	CENTIMETERS
830-0421-01	3.50	8.87
830-0421-02	2.50	6.33



830–0421–XX

Clock Connection Cable

Use one EOAP clock connection cable to connect the EOAP shelf (backplane P/N 850-0488-xx) to the last EAGLE 5 ISS extension shelf backplane in the control frame.

CAUTION: Do Not connect this cable to the EAGLE 5 ISS until both sides of the EOAP have been integrated into the system. Refer to the procedure.

Connect the clock connection cable to port BCLKIN-A of the EOAP backplane and to port BCLKOUT (J42) located at the lower right side of the last extension shelf backplane in the control frame. Tighten the cable connectors.

Note: If no extension shelf is present, cable to connector B CLK 5 (J70) on control shelf backplane P/N 850-0330-04 or connector B CLK 7 (J17) on control shelf backplane P/N 850-0330-06/-6.

Converter

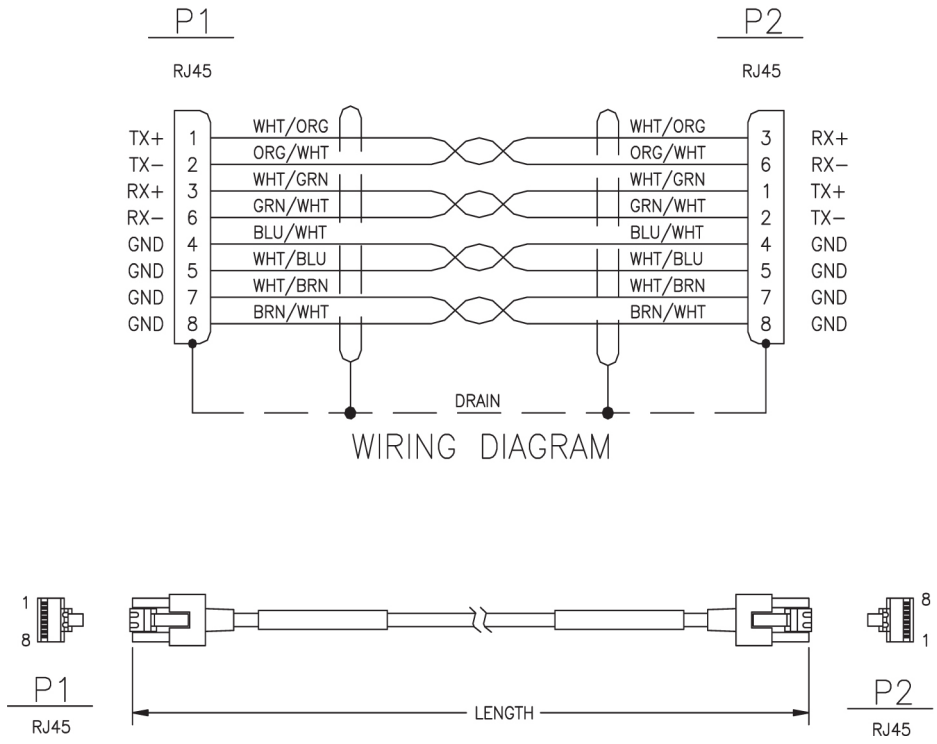
This straight through converter is a purchased part. There is no illustration or wiring diagram.

Crossover (CAT-5) Cable

Table 90: Crossover CAT-5 Cable

Part Number		Length	
North American	**International**	**meters**	**feet**
830-0723-01	830-1173-01	0.30	1
830-0723-02	830-1173-02	0.90	3
830-0723-03	830-1173-03	1.37	4.5
830-0723-xx	830-1173-xx	available in many more lenghts	

Figure 218: Crossover CAT-5 Cable

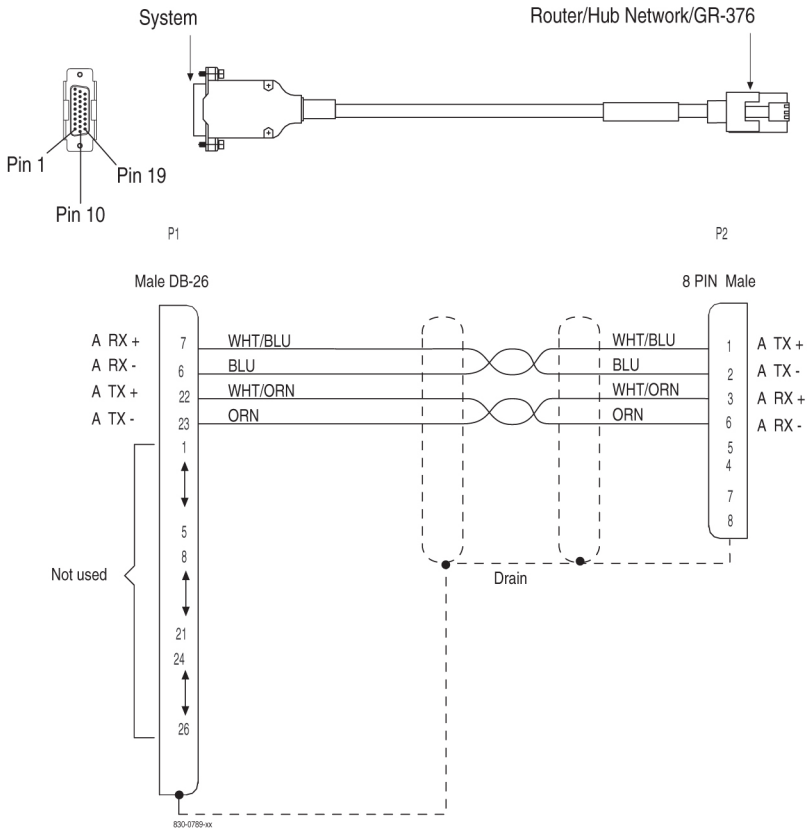


Crossover DCM Patch Panel Cable

Table 91: Crossover DCM Patch Panel Cable

Part Number		Length	
North American	International	feet	meters
830-0789-01	830-1178-01	15	4.57
830-0789-02	830-1178-02	25	7.62
830-0789-03	830-1178-03	35	10.67
830-0789-04	830-1178-04	50	15.25
830-0789-05	830-1178-05	75	45.75
830-0789-06	830-1178-06	100	30.50
830-0789-07	830-1178-07	150	45.75
830-0789-08	830-1178-08	200	60.10
830-0789-09	830-1178-09	250	76.25
830-0789-10	830-1178-10	328	107.54

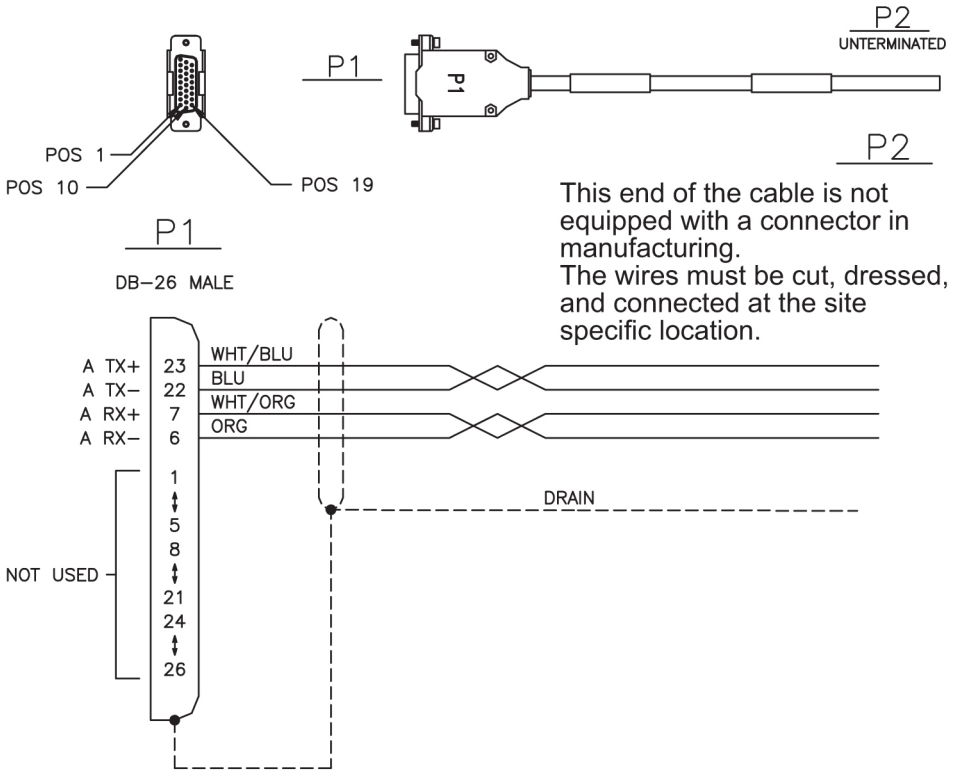
Figure 219: Crossover DCM Patch Panel Cable



DCM, 100-BASE TX Interface

Figure 220: DCM, 100-BASE TX Interface

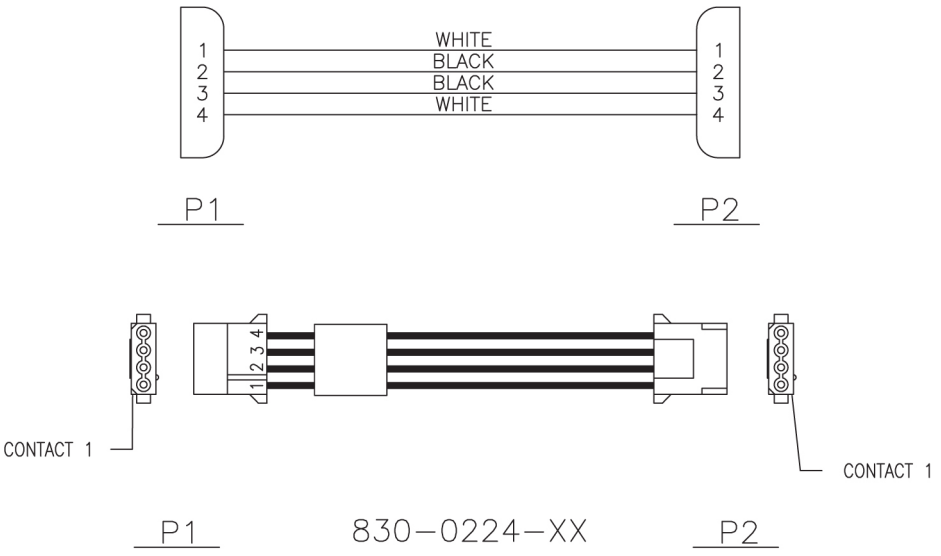
DASH NUMBER	LENGTH	
	FEET	METERS
830–0711–01	15	4.57
830–0711–02	25	7.62
830–0711–03	35	10.66
830–0711–04	50	15.24
830–0711–05	75	22.86
830–0711–06	100	30.48
830–0711–07	150	45.72
830–0711–08	200	60.96
830–0711–09	250	76.2
830–0711–10	328	99.99



Drive Power Cable

Figure 221: Drive Power Cable

PART NUMBERS	INCHES	CENTIMETERS
830-0224-01	4.50	11.41
830-0224-02	3.50	8.87



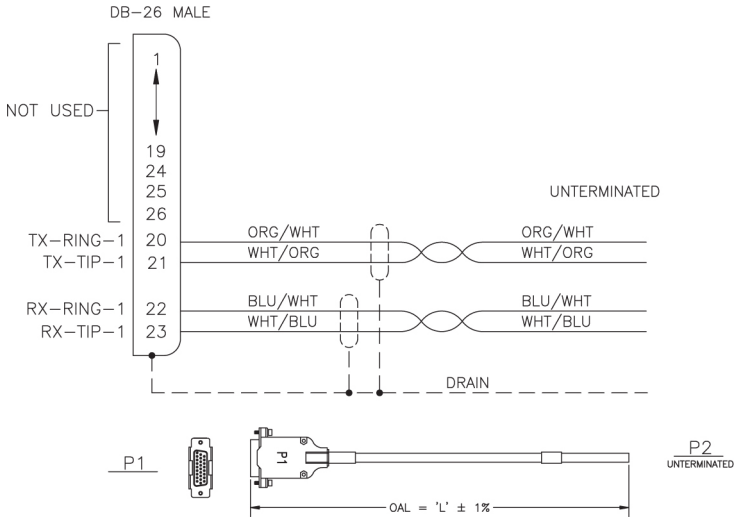
DS1 Cable

Table 92: DS1 Cable

Part Number		Length	
North American	**International**	**feet**	**meters**
830-0849-01	830-1184-01	15	4.57
830-0849-02	830-1184-02	20	6.09
830-0849-03	830-1184-03	25	7.62
830-0849-04	830-1184-04	30	9.14
830-0849-05	830-1184-05	35	10.66
830-0849-06	830-1184-06	50	15.24
830-0849-07	830-1184-07	75	22.86
830-0849-08	830-1184-08	100	30.48

Part Number		Length	
North American	International	feet	meters
830-0849-09	830-1184-09	125	38.10
830-0849-10	830-1184-10	150	45.72
830-0849-11	830-1184-11	175	53.34
830-0849-12	830-1184-12	200	60.96
830-0849-13	830-1184-13	250	76.20
830-0849-14	830-1184-14	300	91.44
830-0849-15	830-1184-15	500	152.40
830-0849-16	830-1184-16	650	198.12

Figure 222: DS1 Cable DS1 Cable

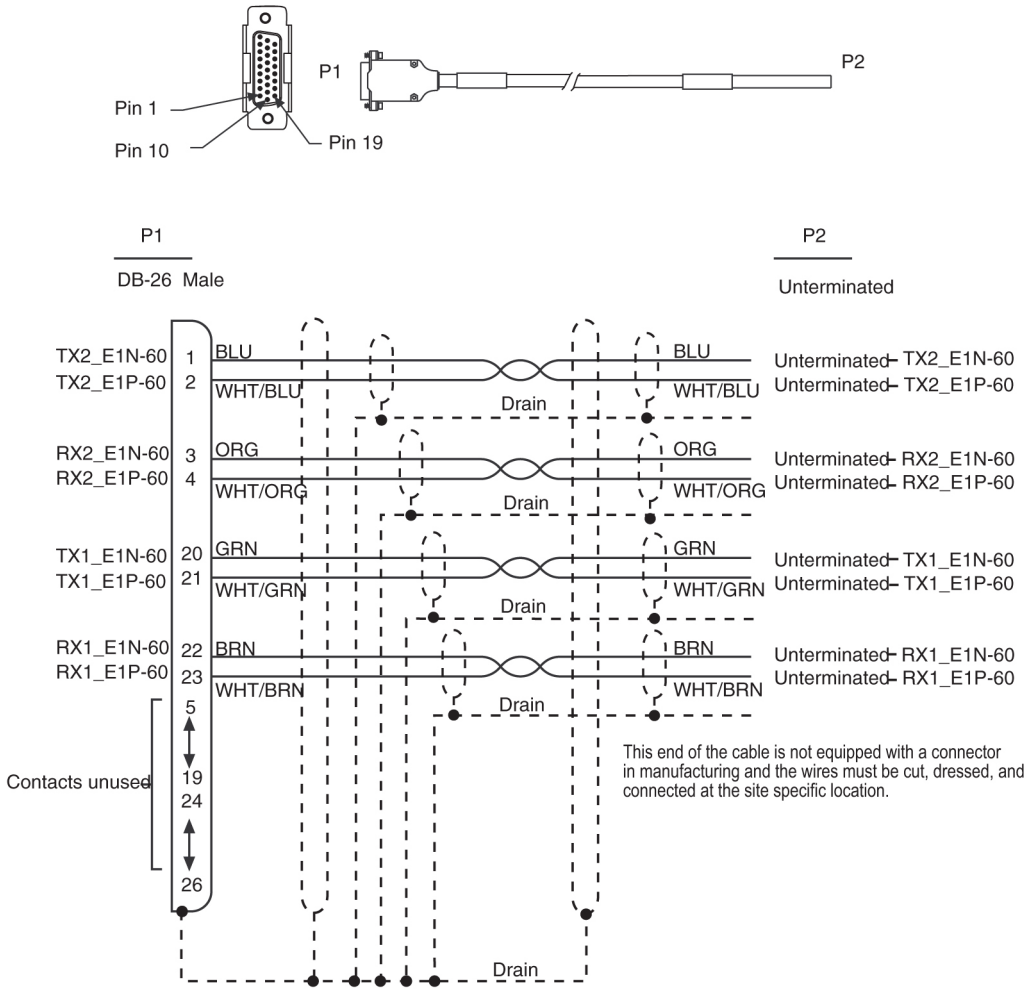


E1 Cable

Table 93: E1 Cable

Part Number		Length		Part Number		Length	
North American	International	feet	meters	North American	International	feet	meters
830-0622-01	830-1233-01	15	4.57	830-0622-08	830-1233-08	175	53.34
830-0622-02	830-1233-02	25	7.62	830-0622-10	830-1233-09	200	60.96
830-0622-03	830-1233-03	50	15.24	830-0622-11	830-1233-10	250	76.20
830-0622-04	830-1233-04	75	22.86	830-0622-12	830-1233-11	300	91.44
830-0622-05	830-1233-05	100	30.48	830-0622-13	830-1233-12	500	152.40
830-0622-06	830-1233-06	125	38.10	830-0622-14	830-1233-13	1000	304.8
830-0622-07	830-1233-07	150	45.72	830-0622-15	830-1233-15	400	121.92

Figure 223: E 1 Cable

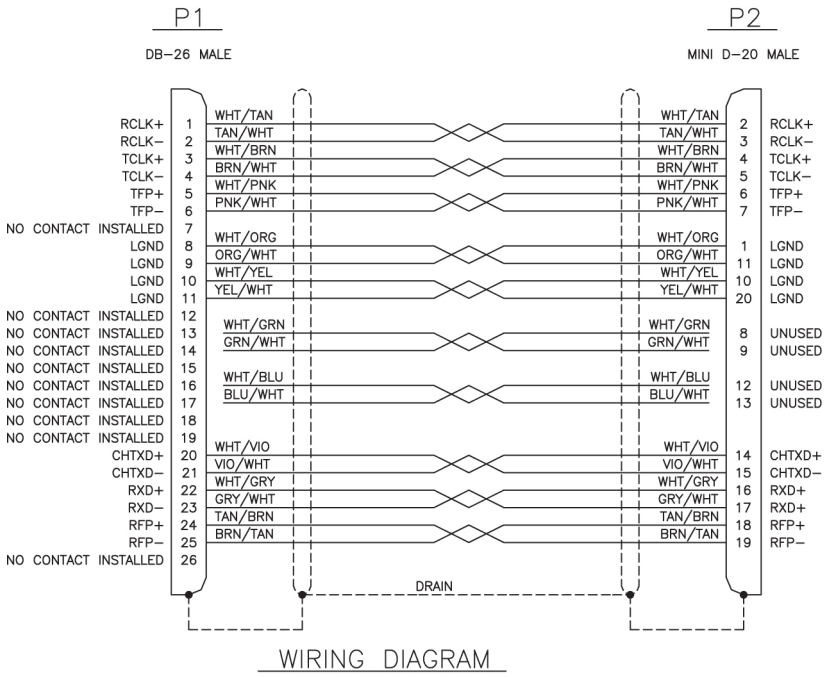


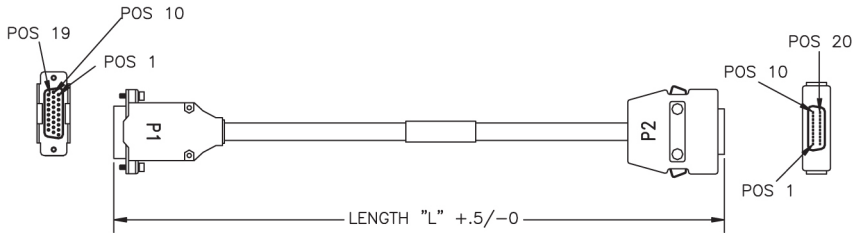
E1 Patch Cable

Table 94: E1 Patch Cable

Part Number		Length	
North American	**International**	**Inches**	**Centimeters**
830-0605-01	--	12	30.48
830-0605-02	830-1116-02	15	38.1

Figure 224: E1 Patch Cable





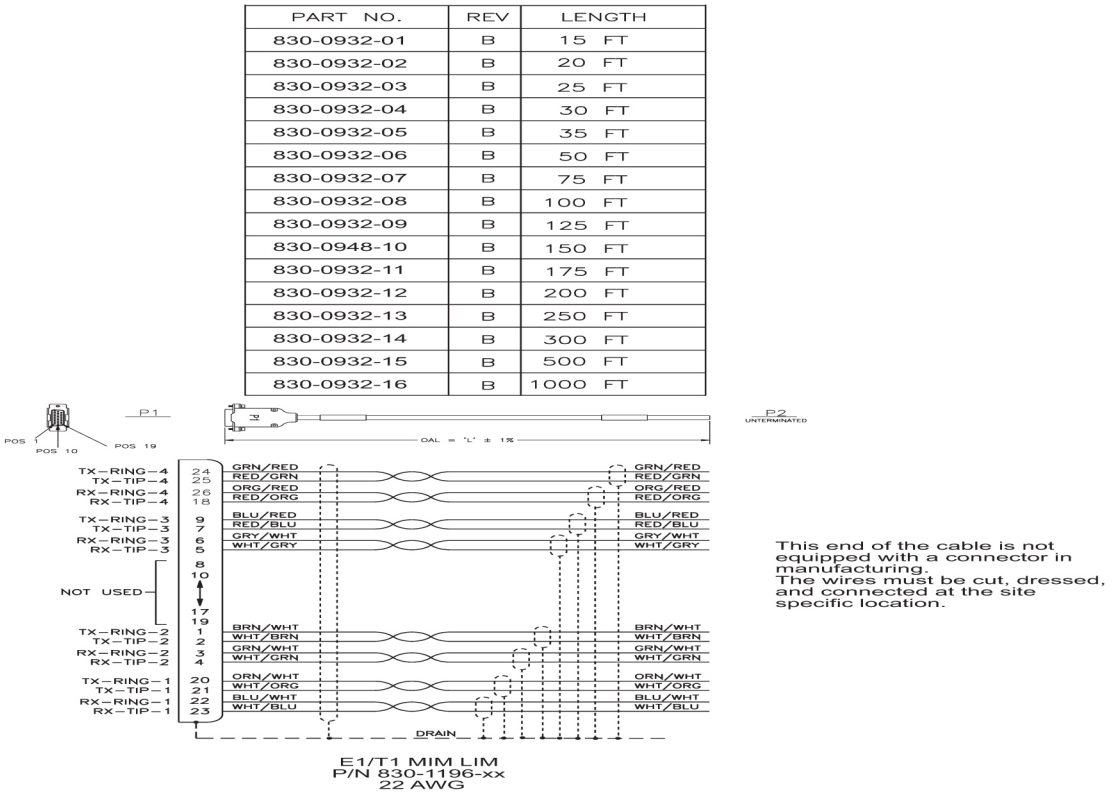
E1-T1 MIM (22 AWG)

Table 95: E1/T1 MIM (22 AWG) Cable

Part Number		Length		Part Number		Length	
North American	International	Feet	Meters	North American	International	Feet	Meters
830-0932-01	830-1196-01	15	4.57	830-0932-09	830-1196-09	125	38.10
830-0932-02	830-1196-02	20	6.09	830-0932-10	830-1196-10	150	45.72
830-0932-03	830-1196-03	25	7.62	830-0932-11	830-1196-11	175	53.34
830-0932-04	830-1196-04	30	9.14	830-0932-12	830-1196-12	200	60.96

Part Number		Length		Part Number		Length	
North American	International	Feet	Meters	North American	International	Feet	Meters
830-0932-05	830-1196-05	35	10.66	830-0932-13	830-1196-13	250	76.20
830-0932-06	830-1196-06	50	15.24	830-0932-14	830-1196-14	300	91.44
830-0932-07	830-1196-07	75	22.86	830-0932-15	830-1196-15	500	152.40
830-0932-08	830-1196-08	100	30.48	830-0932-16	830-1196-16	1000	304.80

Figure 225: E1-T1 MIM 22 AWG

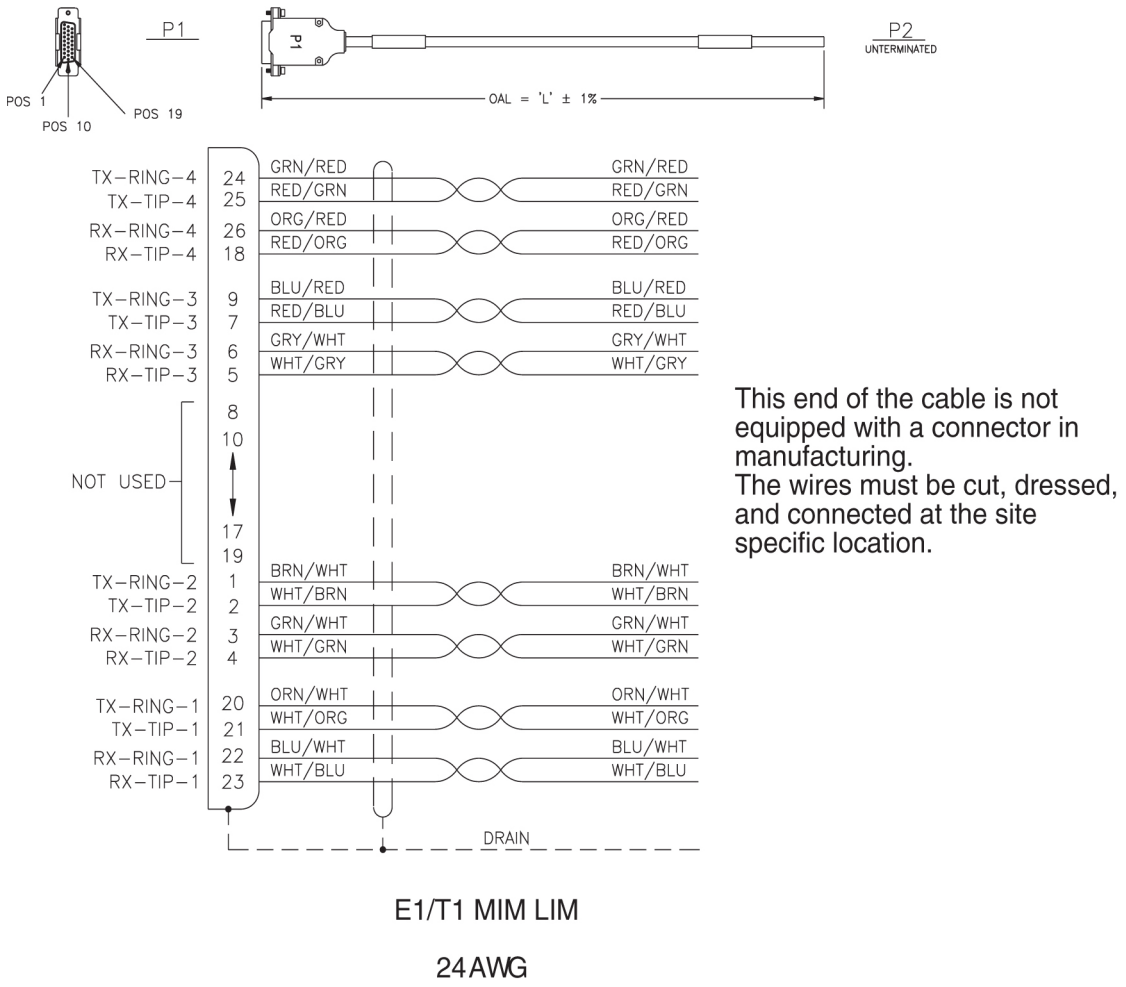


E1/T1 MIM LIM Cable

Table 96: E1/T1 MIM LIM Cable

Part Number		Rev	Length		Part Number		Rev	Length	
North American	International		Feet	Meters	North American	International		Feet	Meters
830-0948-01	830-1197-01	B	15	4.57	830-0948-09	830-1197-09	B	125	38.10
830-0948-02	830-1197-02	B	20	6.09	830-0948-10	830-1197-10	B	150	45.72
830-0948-03	830-1197-03	B	25	7.62	830-0948-11	830-1197-11	B	175	53.34
830-0948-04	830-1197-04	B	30	9.14	830-0948-12	830-1197-12	B	200	60.96
830-0948-05	830-1197-05	B	35	10.66	830-0948-13	830-1197-13	B	250	76.20
830-0948-06	830-1197-06	B	50	15.24	830-0948-14	830-1197-14	B	300	91.44
830-0948-07	830-1197-07	B	75	22.86	830-0948-15	830-1197-15	B	500	152.40
830-0948-08	830-1197-08	B	100	30.48	830-0949-16	830-1197-16	B	1000	304.80

Figure 226: E1/T1 MIM LIM Cable



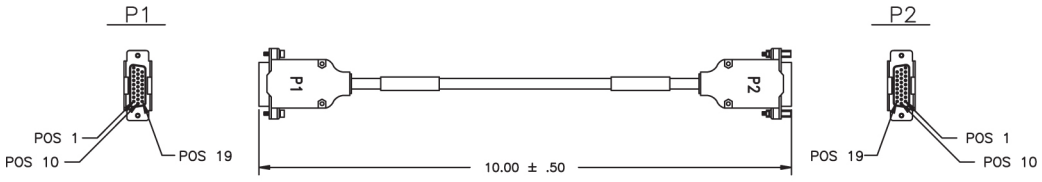
E1/T1 MIM LIM-to-MPL Adapter

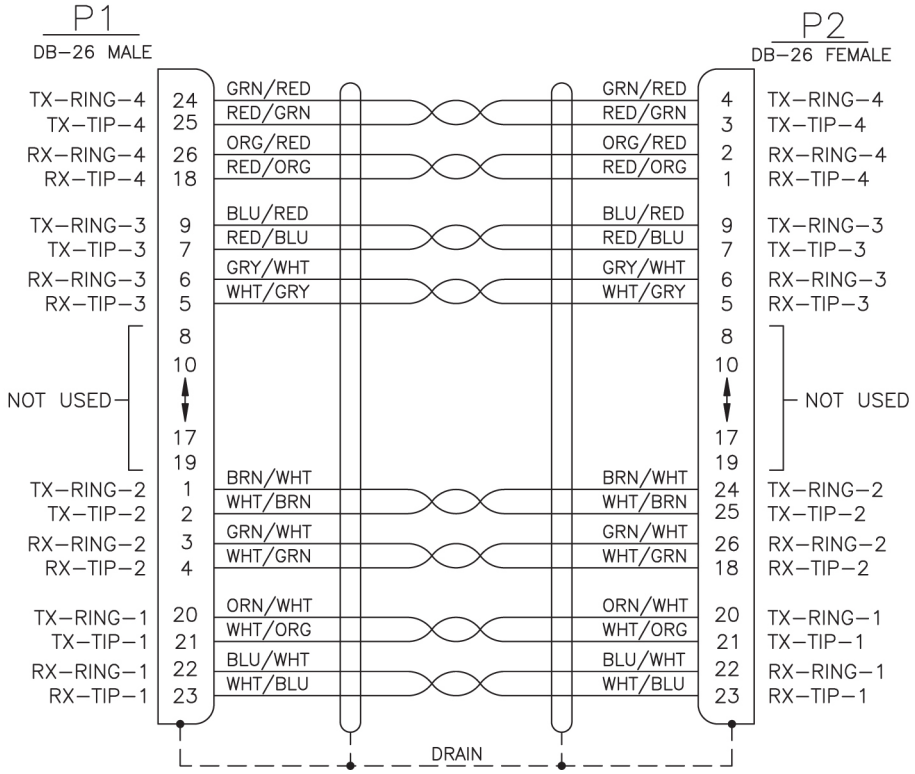
Table 97: E1/T1 MIM LIM To MPL Adapter

Part Number		Rev	Length		Part Number		Rev	Length	
North American	International		Feet	Meters	North American	International		Feet	Meters
830-0949-01	830-1198-01	B	15	4.57	830-0949-09	--	B	125	38.10
830-0949-02	--	B	20	6.09	830-0949-10	--	B	150	45.72
830-0949-03	--	B	25	7.62	830-0949-11	--	B	175	53.34
830-0949-04	--	B	30	9.14	830-0949-12	--	B	200	60.96

Part Number		Rev	Length		Part Number		Rev	Length	
North American	International		Feet	Meters	North American	International		Feet	Meters
830-0949-05	--	B	35	10.66	830-0949-13	--	B	250	76.20
830-0949-06	--	B	50	15.24	830-0949-14	--	B	300	91.44
830-0949-07	--	B	75	22.86	830-0949-15	--	B	500	152.40
830-0949-08	--	B	100	30.48	830-0949-16	--	B	1000	304.80

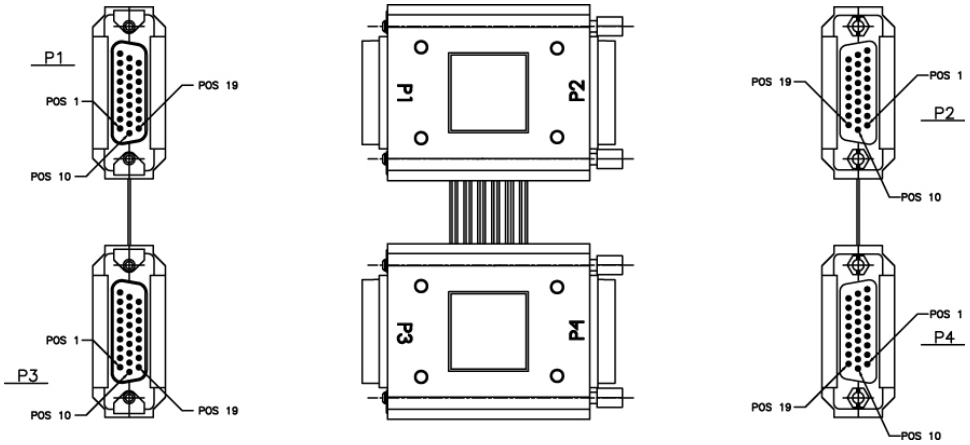
Figure 227: E1/T1 MIM LIM To MPL Adapter





E5-ATM Adapter

Figure 228: E5-ATM Adapter

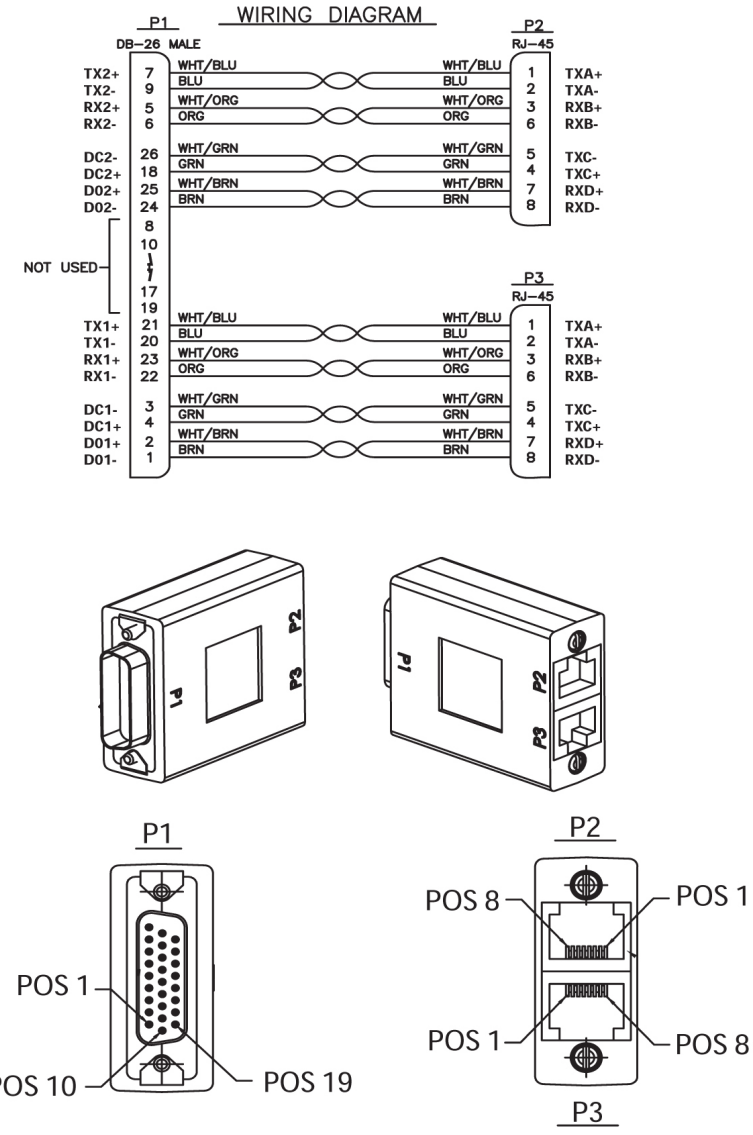


E5-ENET ADAPTER (DB26 Male-to-Dual RJ45)

The Ethernet cable pinouts differ between the E5-ENET card and the DCM or single-slot EDCM cards.

Adapter 830-1102-02 is required for installation of the E5-ENETwhen the DCM cable is replaced with a CAT5 straight-through cable 830-0724-xx. The adapter is connected to the backplane and the CAT5 straight-through cable cable is connected from the other side of the adapter to a switch, or a hub, or a patch panel (same place the DCM cable was terminated). If the card inserted into the slot does not match the backplane connector, the interface will not function.

Figure 229: DB26 Male to Dual RJ45 Adapter

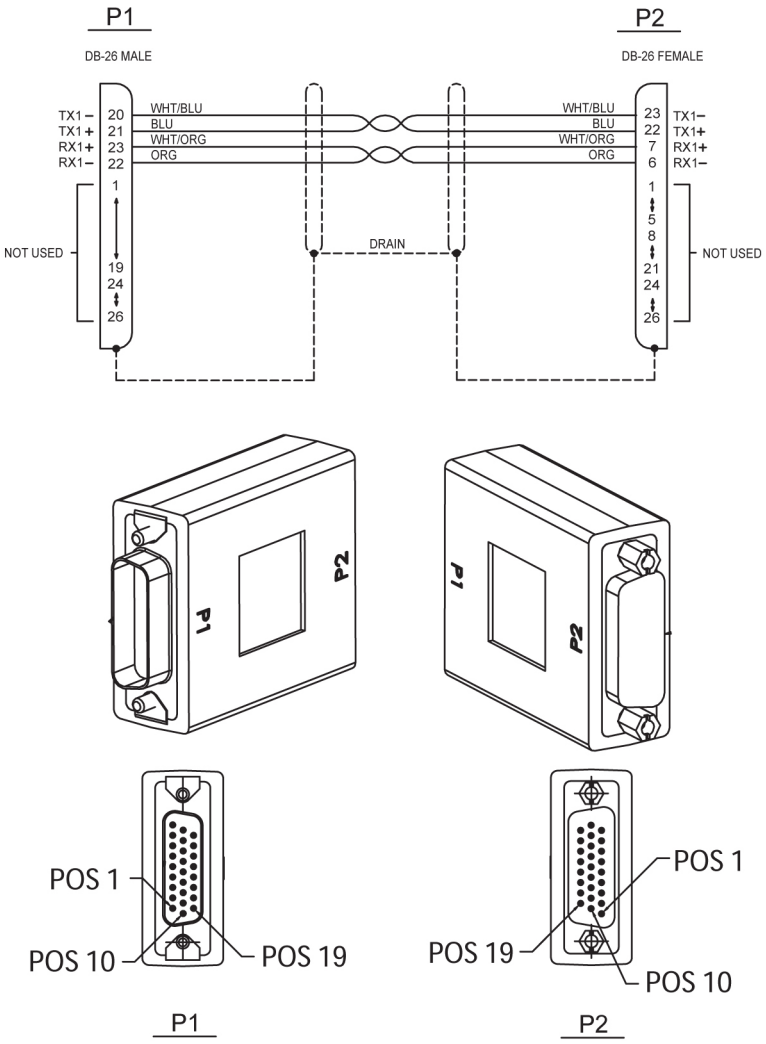


E5-ENET ADAPTER (DB26 Male-to-DB26 Female)

The Ethernet cable pinouts differ between the E5-ENET card and the DCM or single-slot EDCM cards.

Adapter 830-1103-02 is required for each E5-ENET interface used when using the existing DCM cable 830-0978-xx. The adapter is connected between the backplane connector and the existing DCM cable for the card.

Figure 230: DB26 Male-to-DB26 Female Adapter

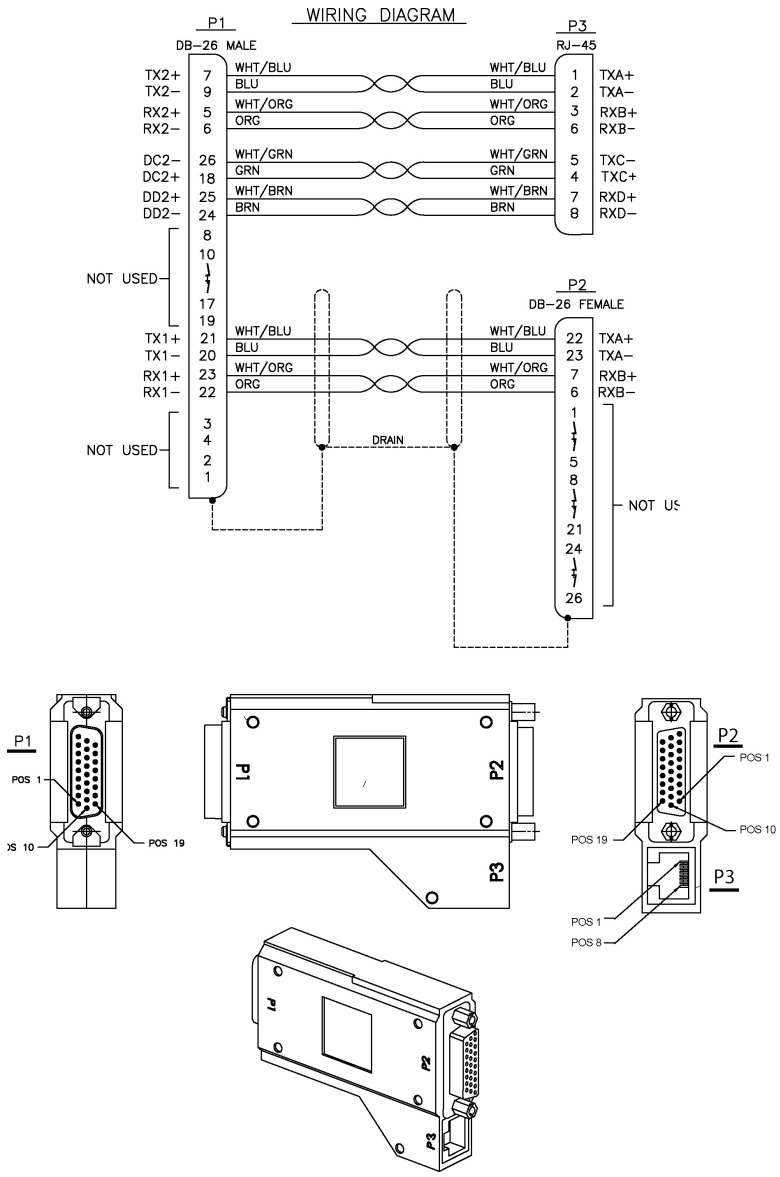


E5-ENET FAST COPY ADAPTER, LOWER

The Ethernet cable pinouts differ between the E5-ENET card and the DCM or single-slot EDCM cards.

Adapter P/N 830-1343-02 is required for each E5-ENET interface used when using the FAST COPY feature. The adapter is connected between the backplane connector and the existing DCM cable for the card.

Figure 231: E5-ENET FAST COPY ADAPTER, LOWER, P/N 830-1343-02

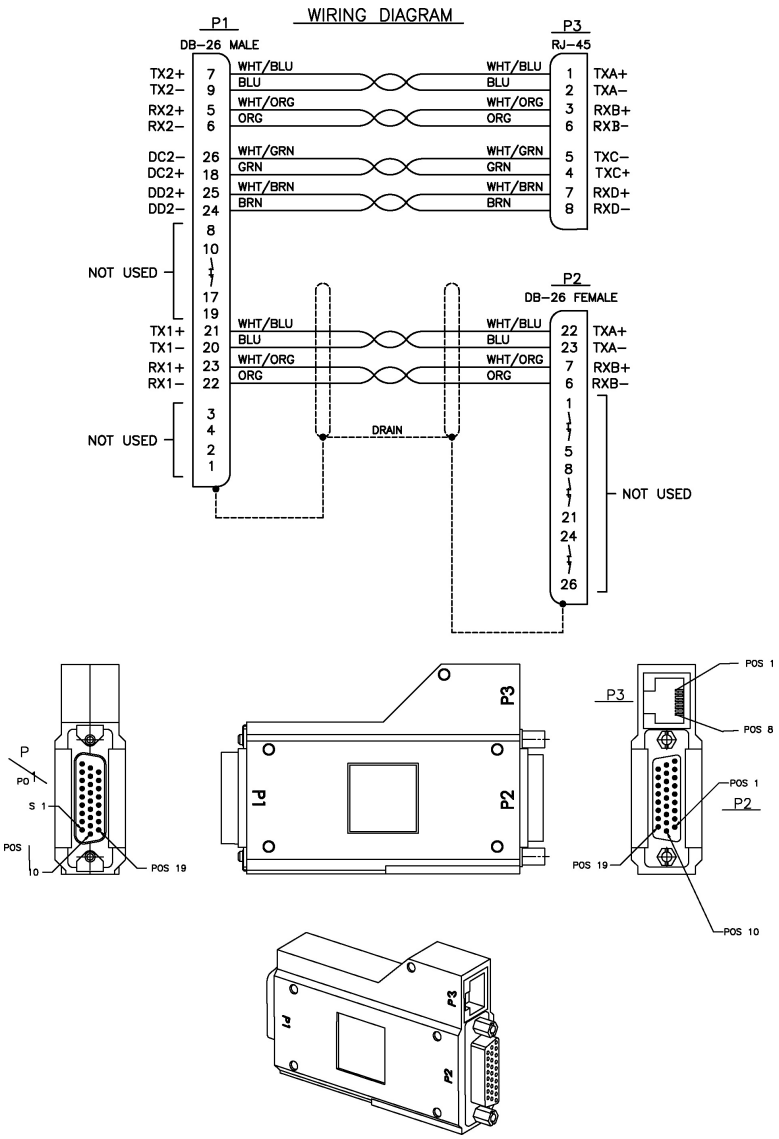


E5-ENET FAST COPY ADAPTER, UPPER

The Ethernet cable pinouts differ between the E5-ENET card and the DCM or single-slot EDCM cards.

Adapter P/N 830-1343-01 is required for each E5-ENET interface used when using the FAST COPY feature. The adapter is connected between the backplane connector and the existing DCM cable for the card.

Figure 232: E5-ENET FAST COPY ADAPTER, UPPER, P/N 830-1343-01



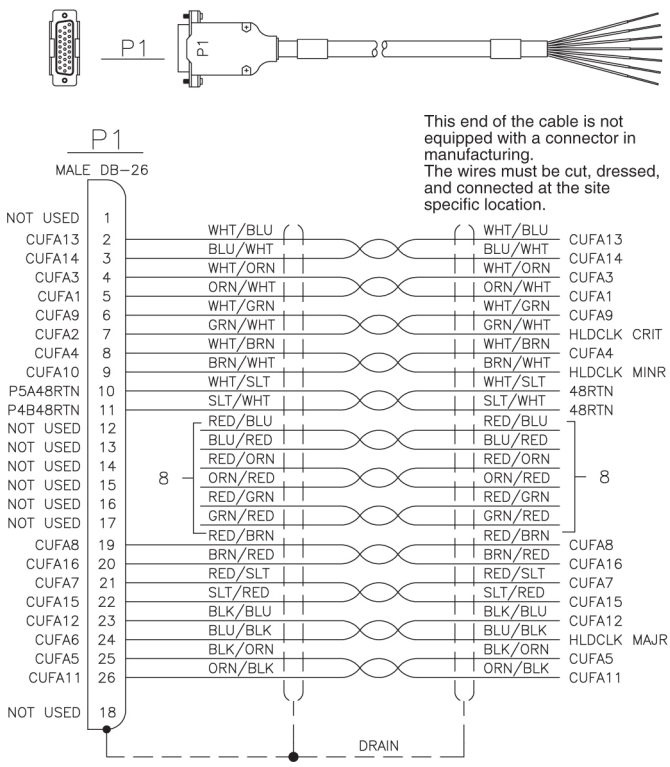
External Alarm Cable (Custom)

Table 98: External Alarm Cable (Custom)

Part Number		Length	
North American	International	feet	meters
830-0435-01	830-1151-01	50	15.24
830-0435-02	830-1151-02	75	22.86

Part Number		Length	
North American	International	feet	meters
830-0435-03	830-1151-03	100	30.48
830-0435-04	830-1151-04	125	38.10
830-0435-05	830-1151-05	150	45.72
830-0435-06	830-1151-06	175	53.34
830-0435-07	830-1151-07	200	61.96
830-0435-08	830-1151-08	250	76.20
830-0435-09	830-1151-09	300	91.40
830-0435-10	830-1151-10	500	152.40
830-0435-11	830-1151-11	1000	304.80

Figure 233: External Alarm Cable (Custom)



Fan Power and Alarm Cable

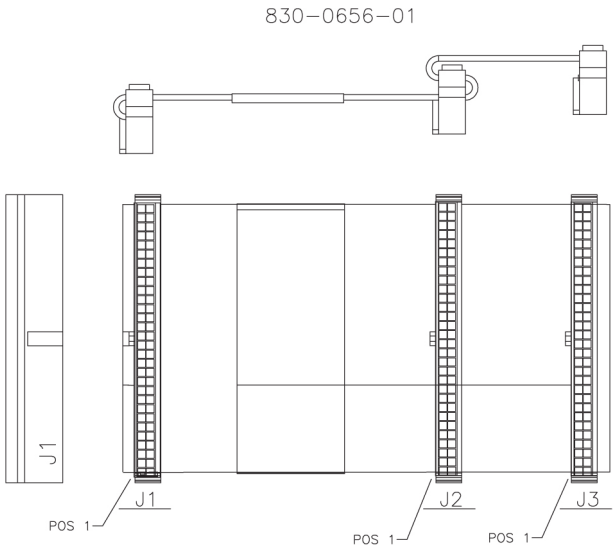
The fan power and alarm cable is part of the fan assembly.

For A fan power, plug one end of the cable into J-9 on backplane 850-0330-06. Route the cable to the left of the frame, faced from the rear, and to the assembly, to the connection marked FAN A POWER.

For B fan power, plug one end of the cable into J-8 on the backplane 850-0330-06. Route the cable to the left of the frame, faced from the rear, and to the fan assembly, to the connection marked FAN B POWER. Form and dress the two cables together and check the security of all of the connections.

Fifty Position Hard Drive I/O Cable

Figure 234: Fifty Position/Hard Drive I/O Cable

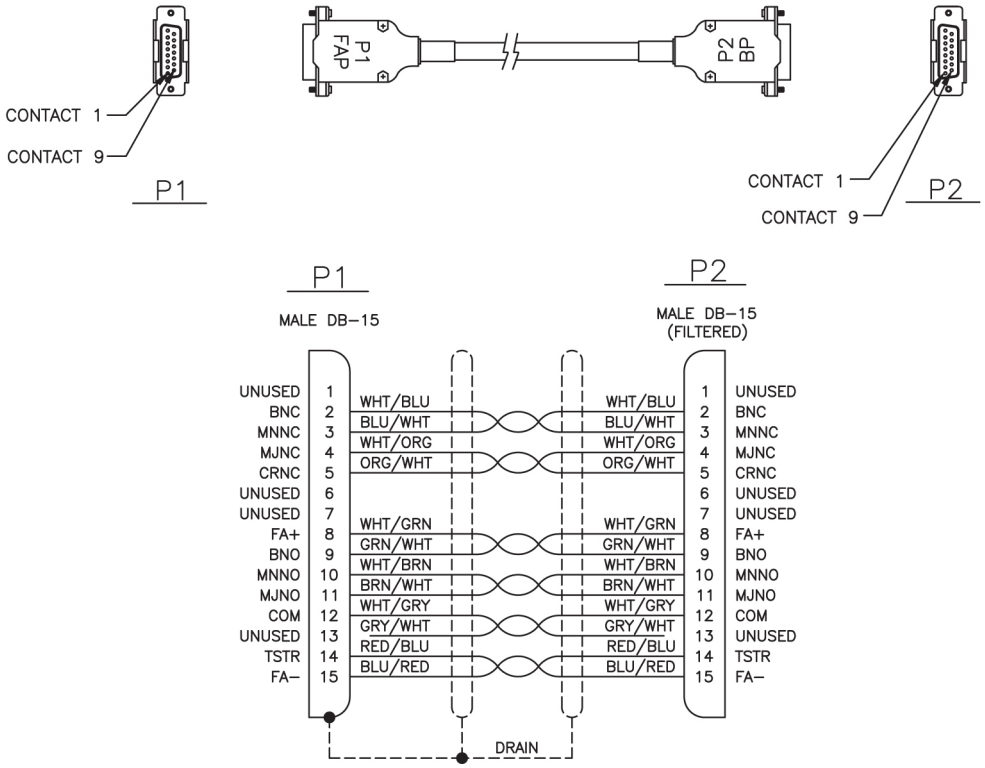


Filter Rack Alarm Cable

Table 99: Filter Rack Alarm Cable

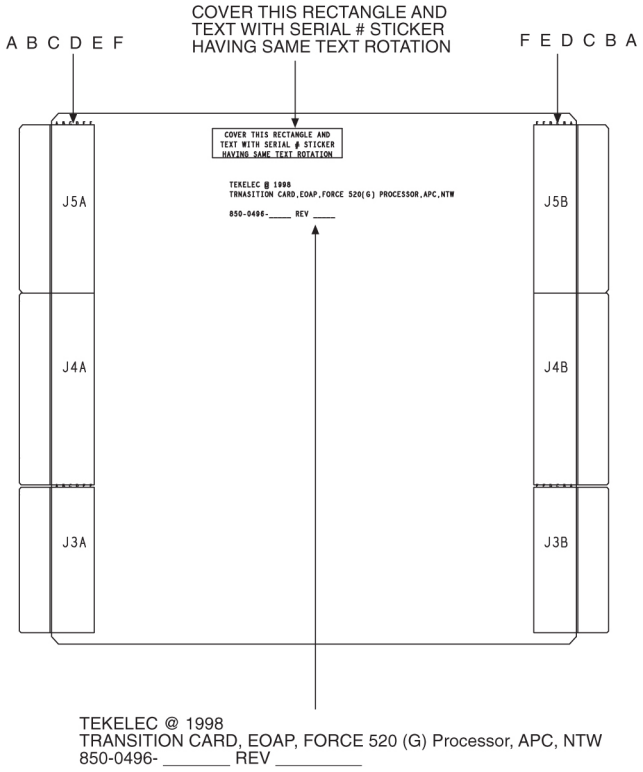
Part Number		Length	
North American	International	feet	meters
830-0638-01	830-1163-01	5.0	1.524
830-0638-02	830-1163-02	8.0	2.438
830-0638-03	830-1163-03	11.0	3.352
830-0638-04	830-1163-04	14.0	4.267
830-0638-05	830-1163-05	17.0	5.182
830-0638-06	830-1163-06	20.0	6.069
830-0638-07	830-1163-07	21.5	6.553
830-0638-08	830-1163-08	27.5	8.382

Figure 235: Filter Rack Alarm Cable



Force Transition Card

Figure 236: Force Transition Card

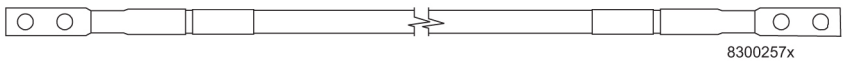


Hazard Ground Cable

Table 100: Hazard Ground Cable

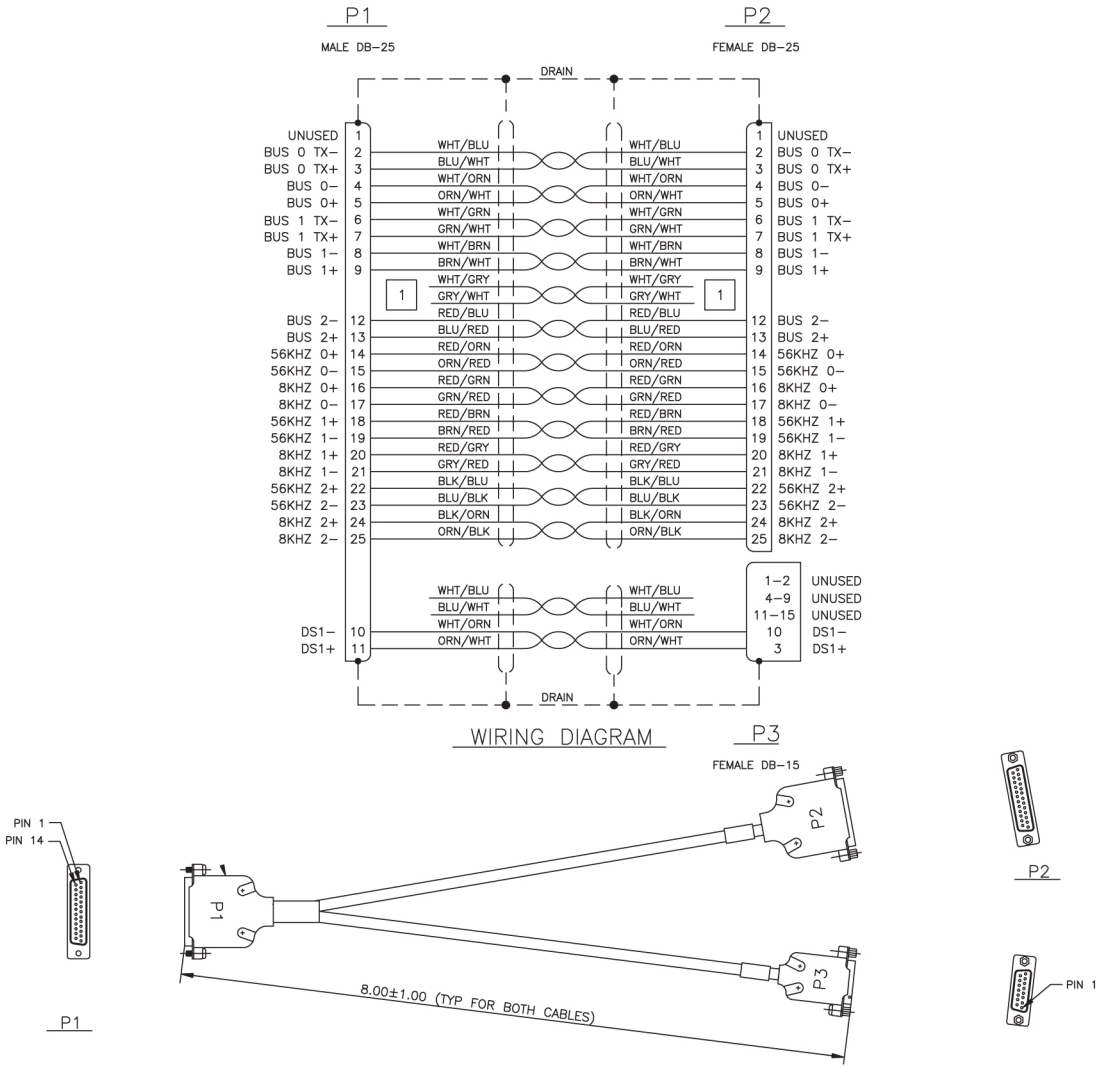
Part Number	Length		Part Number	Length	
	inches	centimeters		inches	centimeters
830-0257-01	15	38.1	830-0257-03	36	91.4
830-0257-02	24.75	62.9	830-0257-04	36	91.4

Figure 237: Hazard Ground Cable



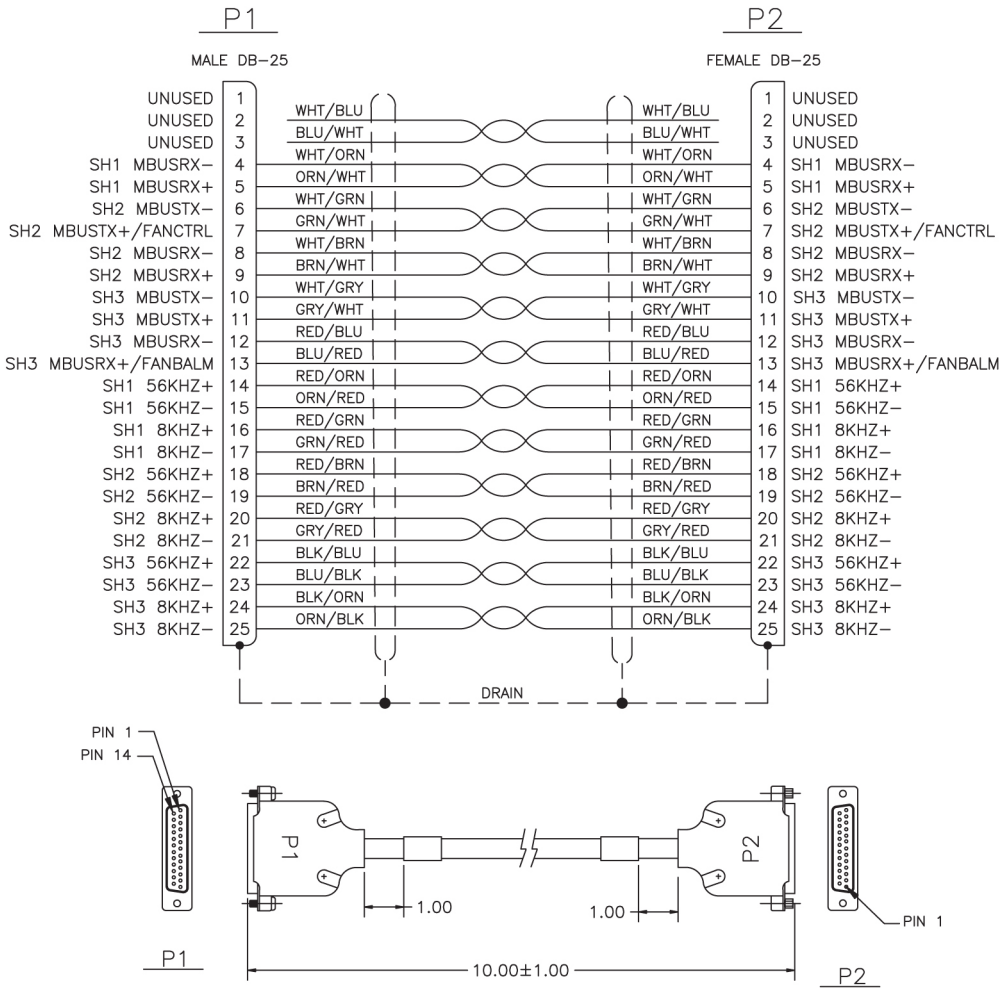
High Speed Master Timing Adapter

Figure 238: High Speed Master Timing Adapter



HMUX Adapter

Figure 239: HMUX Adapter



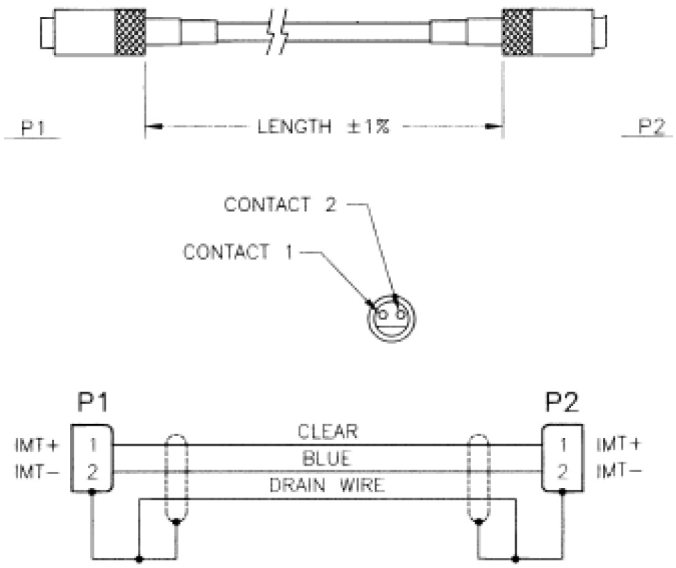
IMT Cable

Table 101: Interface Cable

Part Number		Length	
North American	**International**	**feet**	**meters**
830-0221-01	830-1141-01	5.75	1.75
830-0221-02	830-1141-02	7.67	2.34
830-0221-03	830-1141-03	10.0	3.05
830-0221-04	830-1141-04	0.5	0.15

Part Number		Length	
North American	International	feet	meters
830-0221-05	830-1141-05	14.0	4.27
830-0221-06	830-1141-06	12.0	3.66
830-0221-07	830-1141-07	13.0	3.96
830-0221-08	830-1141-08	16.0	4.88
830-0221-09	830-1141-09	19.0	5.79
830-0221-10	830-1141-10	21.0	6.4
830-0221-11	830-1141-11	23.0	7.01
830-0221-12	830-1141-12	25.0	7.62
830-0221-13	830-1141-13	8.5	2.59
830-0221-14	830-1141-14	12.5	3.81
830-0221-15	830-1141-15	11.0	3.35
830-0221-17	830-1141-17	27.0	8.23

Figure 240: IMT Cable



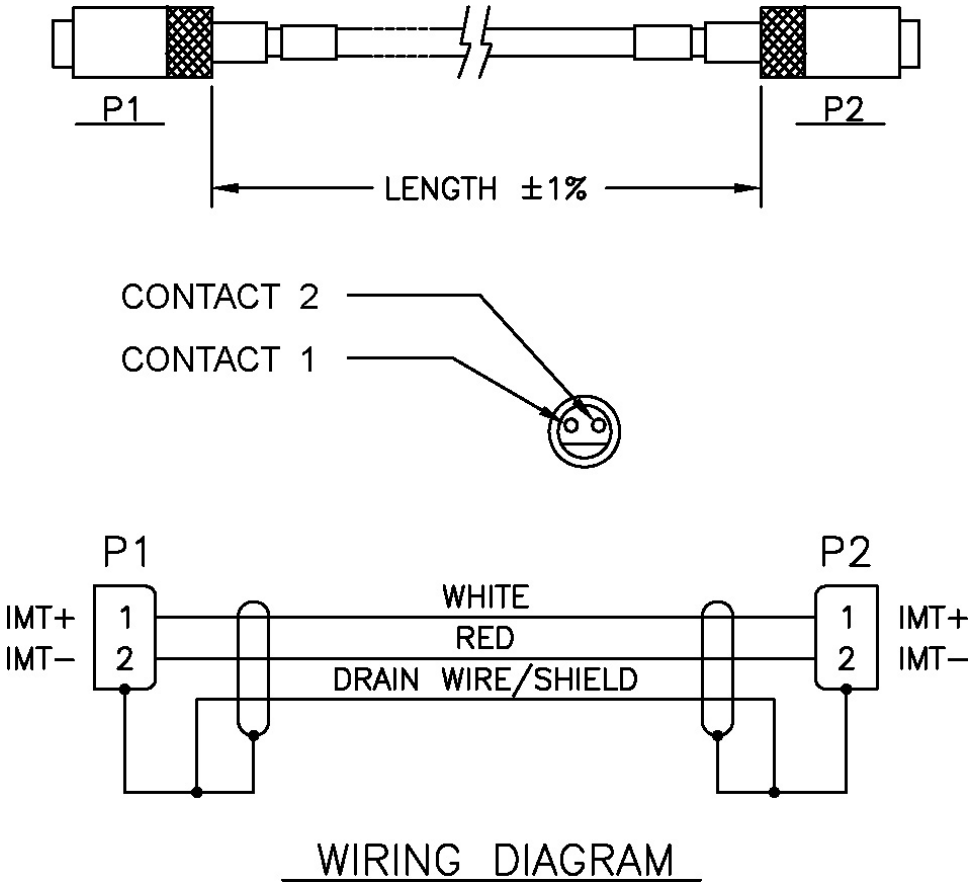
IMT Cable High Speed

Table 102: Interface Cable High Speed

Part Number	Length	
International	feet	meters
830-1344-01	5.75	1.75
830-1344-02	7.67	2.34
830-1344-04	0.5	0.15
830-1344-05	14.0	4.27
830-1344-06	12.0	3.66
830-1344-07	13.0	3.96
830-1344-08	16.0	4.88
830-1344-09	19.0	5.79
830-1344-10	21.0	6.4

Part Number	Length	
International	feet	meters
830-1344-11	23.0	7.01
830-1344-12	25.0	7.62
830-1344-15	11.0	3.35
830-1344-17	27.0	8.23

Figure 241: IMT Cable

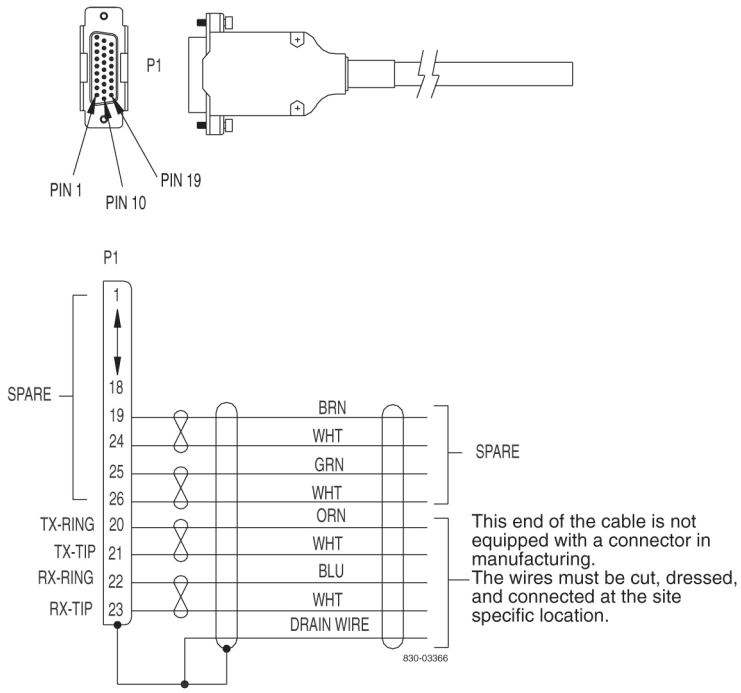


Interface Cable

Table 103: Interface Cable

Part Number		Length	
North American	International	feet	meters
830-0366-01	830-1149-01	25	7.63
830-0366-02	830-1149-02	35	10.68
830-0366-03	830-1149-03	50	15.25
830-0366-04	830-1149-04	75	22.88
830-0366-05	830-1149-05	100	30.50
830-0366-06	830-1149-06	125	38.13
830-0366-07	830-1149-07	150	45.75
830-0366-08	830-1149-08	175	53.38
830-0366-09	830-1149-09	200	61.00
830-0366-10	830-1149-10	250	76.25
830-0366-11	830-1149-11	300	91.50
830-0366-12	830-1149-12	500	152.50
830-0366-13	830-1149-13	1000	305.00
830-0366-14	830-1149-14	15	4.58
830-0366-15	830-1149-15	20	6.10
830-0366-16	830-1149-16	30	9.15

Figure 242: Interface Cable



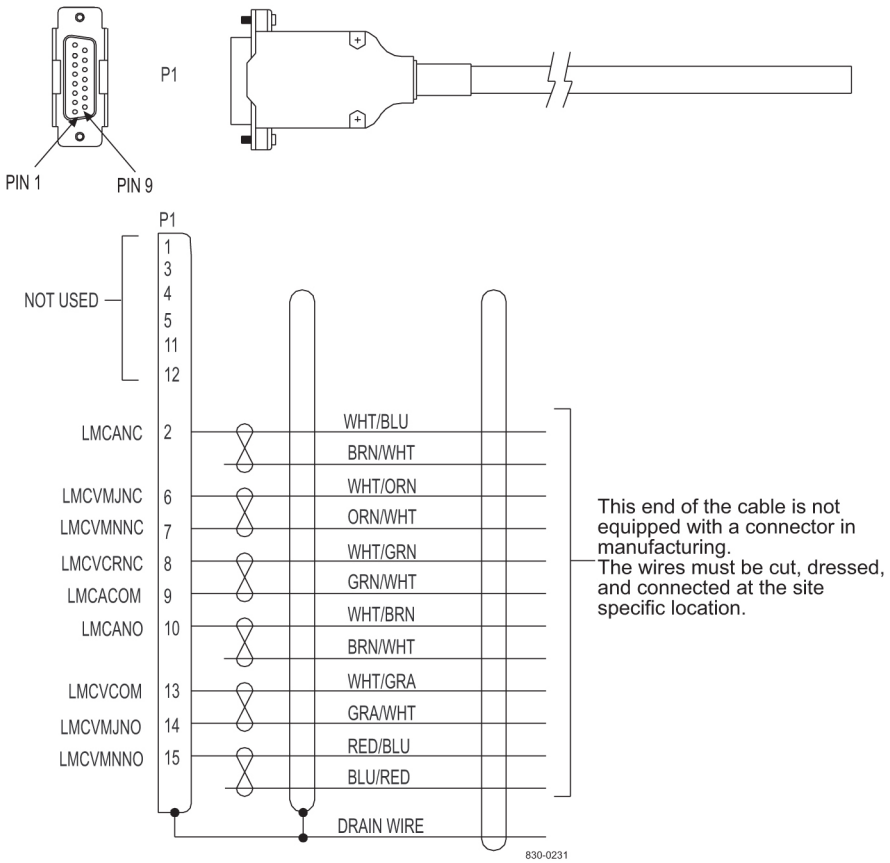
Local Maintenance Center Cable

Table 104: Local Maintenance Center Cable

Part Number		Length	
North American	International	feet	meters
830-0231-01	830-1144-01	50	15.25
830-0231-02	830-1144-02	75	22.88
830-0231-03	830-1144-03	100	30.50
830-0231-04	830-1144-04	125	38.13
830-0231-05	830-1144-05	150	45.75
830-0231-06	830-1144-06	175	53.38
830-0231-07	830-1144-07	200	61.00
830-0231-08	830-1144-08	250	76.25

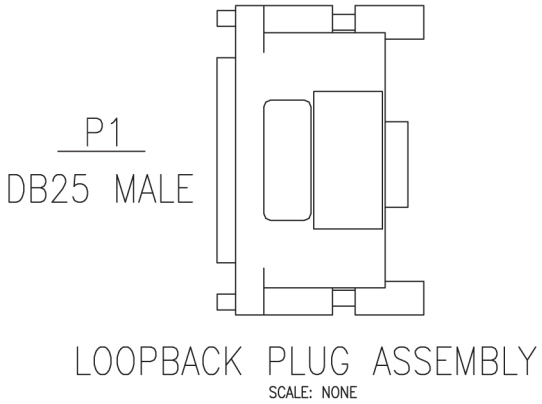
Part Number		Length	
North American	International	feet	meters
830-0231-09	830-1144-09	300	91.50
830-0231-10	830-1144-10	500	152.50
830-0231-11	--	1000	305.00

Figure 243: Local Maintenance Center Cable



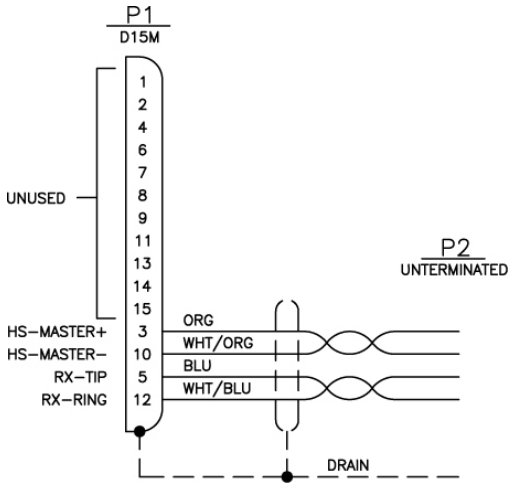
Loop Back Cable Adapter

Figure 244: Loop Back Cable Adapter

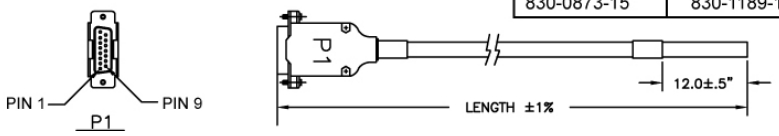


Master Clock Cable (BITS/High-speed)

Figure 245: Master Clock Cable (BITS/High-speed)

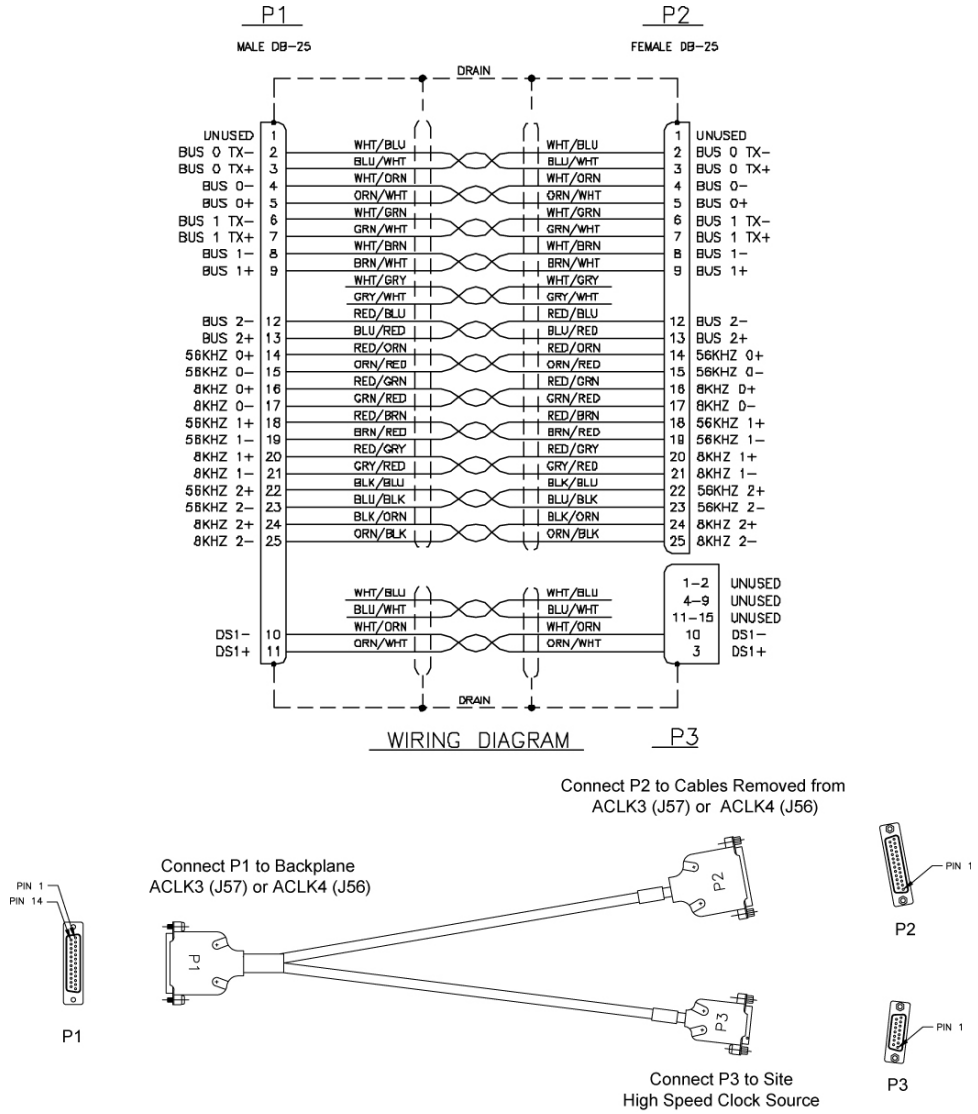


Part Number		Length
North American	International	
830-0873-01	830-1189-01	50 FT
830-0873-02	830-1189-02	75 FT
830-0873-03	830-1189-03	100 FT
830-0873-04	830-1189-04	125 FT
830-0873-05	830-1189-05	150 FT
830-0873-06	830-1189-06	175 FT
830-0873-07	830-1189-07	200 FT
830-0873-08	830-1189-08	250 FT
830-0873-09	830-1189-09	300 FT
830-0873-10	830-1189-10	500 FT
830-0873-11	830-1189-11	600 FT
830-0873-12	830-1189-12	700 FT
830-0873-13	830-1189-13	800 FT
830-0873-14	830-1189-14	900 FT
830-0873-15	830-1189-15	1000 FT



Master High Speed Clock Adapter

Figure 246: Master High Speed Clock Adapter



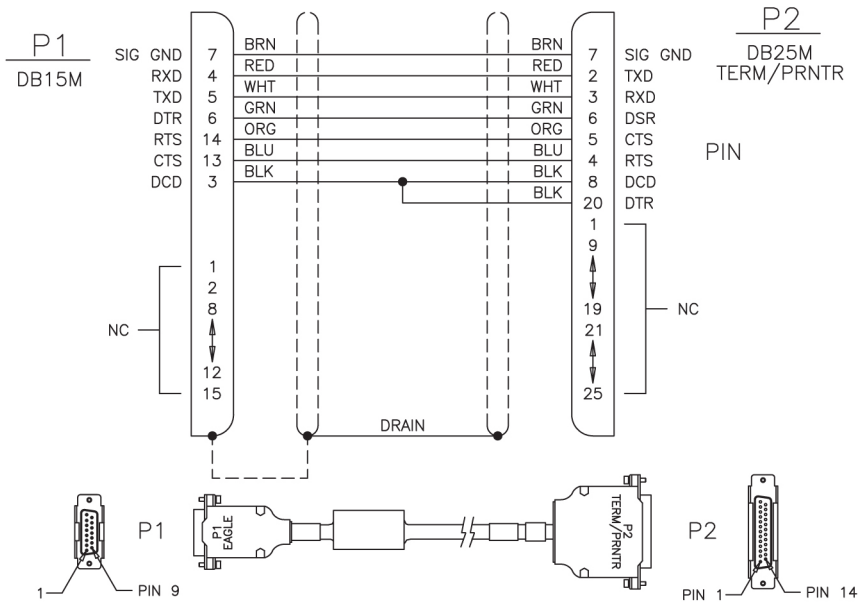
MMI Port Cable

Table 105: MMI Port Cable

Part Number		Length		Part Number		Length	
North American	International	feet	meters	North American	International	feet	meters
830-0708-01	830-1169-01	25	7.62	830-0708-14	830-1169-01	350	106.68
830-0708-02	830-1169-01	15	4.57	830-0708-15	830-1169-01	400	121.92

Part Number		Length		Part Number		Length	
North American	International	feet	meters	North American	International	feet	meters
830-0708-03	830-1169-01	50	15.24	830-0708-16	830-1169-01	450	137.16
830-0708-04	830-1169-01	75	22.86	830-0708-17	830-1169-01	550	167.64
830-0708-05	830-1169-01	100	30.48	830-0708-18	830-1169-01	600	182.88
830-0708-06	830-1169-01	125	38.10	830-0708-19	830-1169-01	650	198.12
830-0708-07	830-1169-01	150	45.72	830-0708-20	830-1169-01	700	213.36
830-0708-08	830-1169-01	175	53.34	830-0708-21	830-1169-01	750	228.60
830-0708-09	830-1169-01	200	60.96	830-0708-22	830-1169-01	800	243.84
830-0708-10	830-1169-01	250	76.20	830-0708-23	830-1169-01	850	259.08
830-0708-11	830-1169-01	300	91.40	830-0708-24	830-1169-01	900	274.32
830-0708-12	830-1169-01	500	152.40	830-0708-25	830-1169-01	950	289.56
830-0708-13	830-1169-01	1000	304.80				

Figure 247: Man-Machine Interface Port Cable

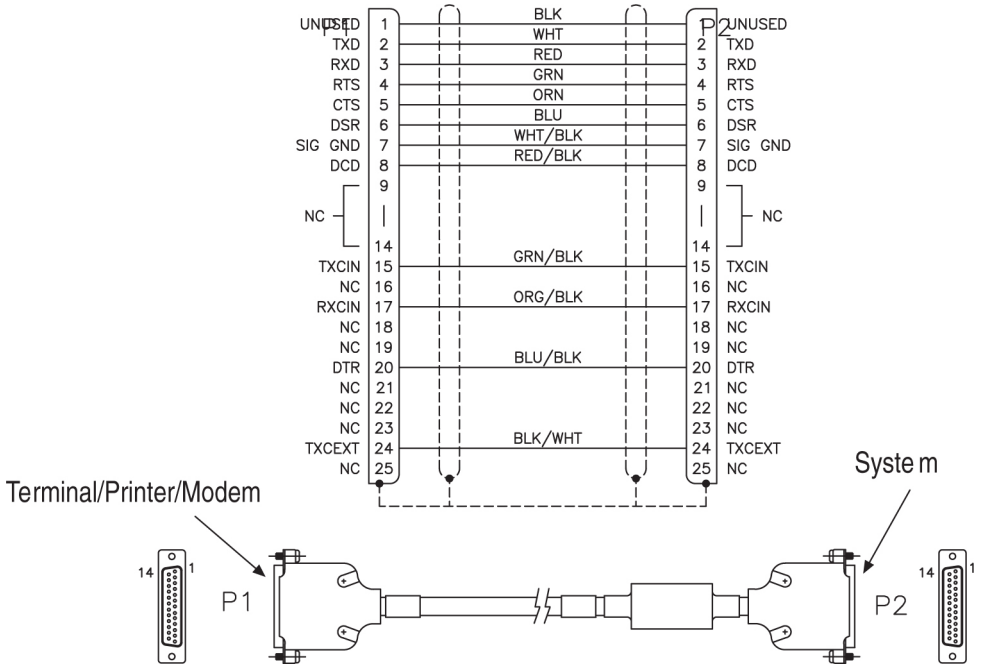


Modem/Terminal Cable

Table 106: Modem/Terminal Cable

Part Number		Length	
North American	**International**	**inches**	**centimeters**
830-0709-01	830-1170-01	180.0 +/- 1.8	457.2
830-0709-02	830-1170-02	300.0 +/- 3.0	762.0
830-0709-03	830-1170-03	600.0 +/- 6.0	1524.0
830-0709-04	830-1170-04	900.0 +/- 9.0	2286.0
830-0709-05	830-1170-05	1200.0 +/- 12.0	3048.0
830-0709-06	830-1170-06	1500.0 +/- 15.0	3810.0
830-0709-07	830-1170-07	1800.0 +/- 18.0	4572.0

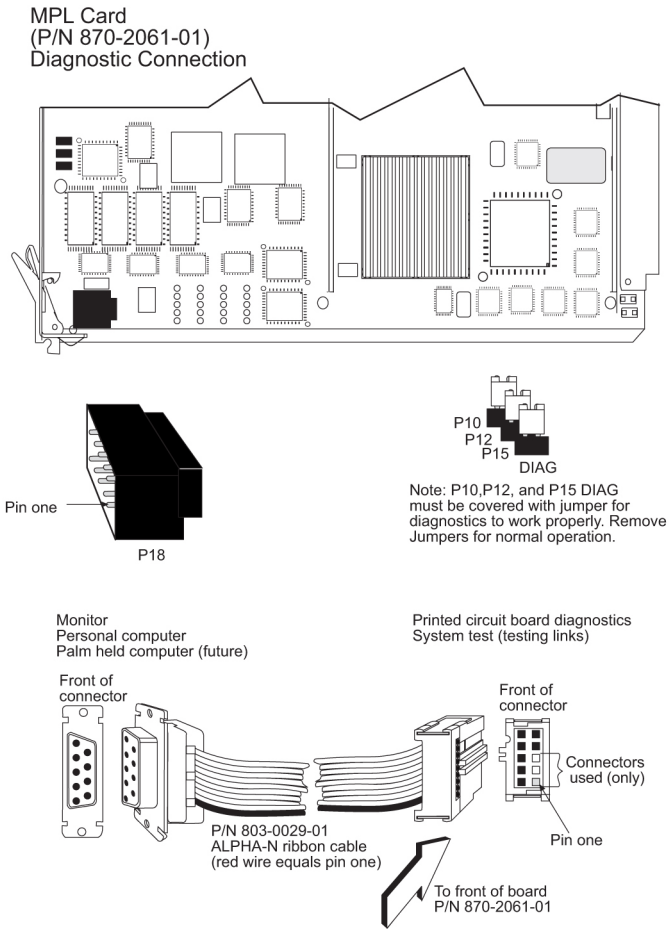
Figure 248: Modem/Terminal Cable



Multi-Port LIM Card Diagnostic Cable

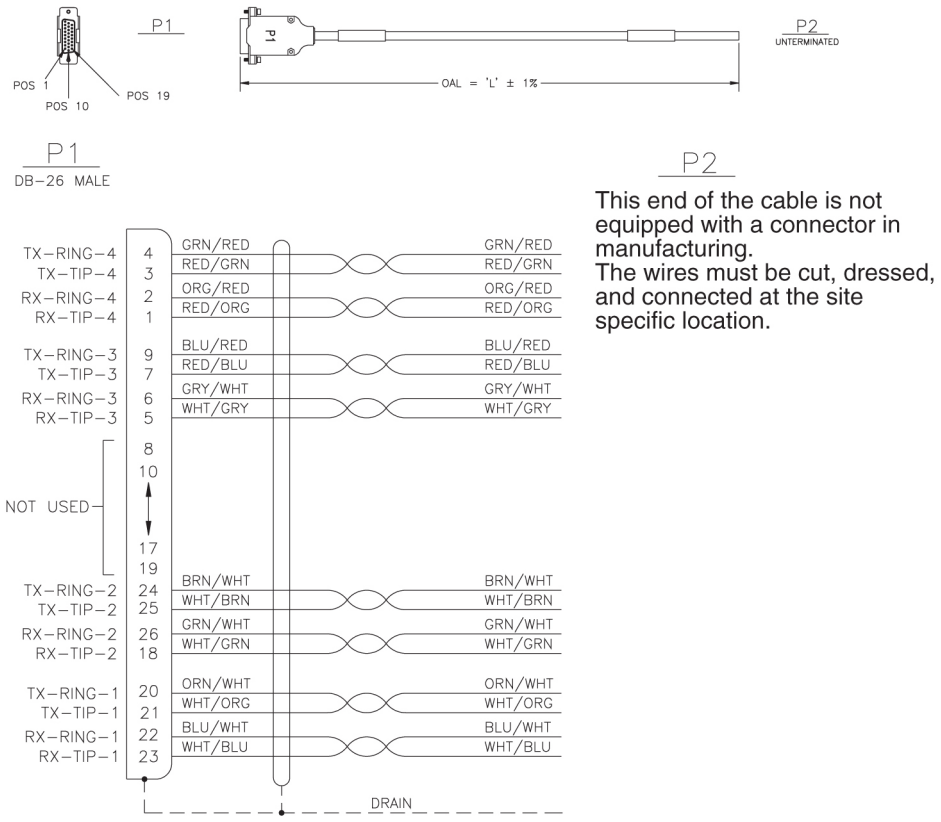
The MPL Diagnostic Cable provides a terminal interface for on board diagnostic tests of the Multi-Port Link Interface Module (MPL) card. The MPL card supports eight Digital Signal Level-0 (DS0) ports/links per module.

Figure 249: MPL Card Diagnostic Cable



Multi-Port LIM DS0 Cable (26 AWG)

Figure 250: Multi-Port LIM DS0 Cable



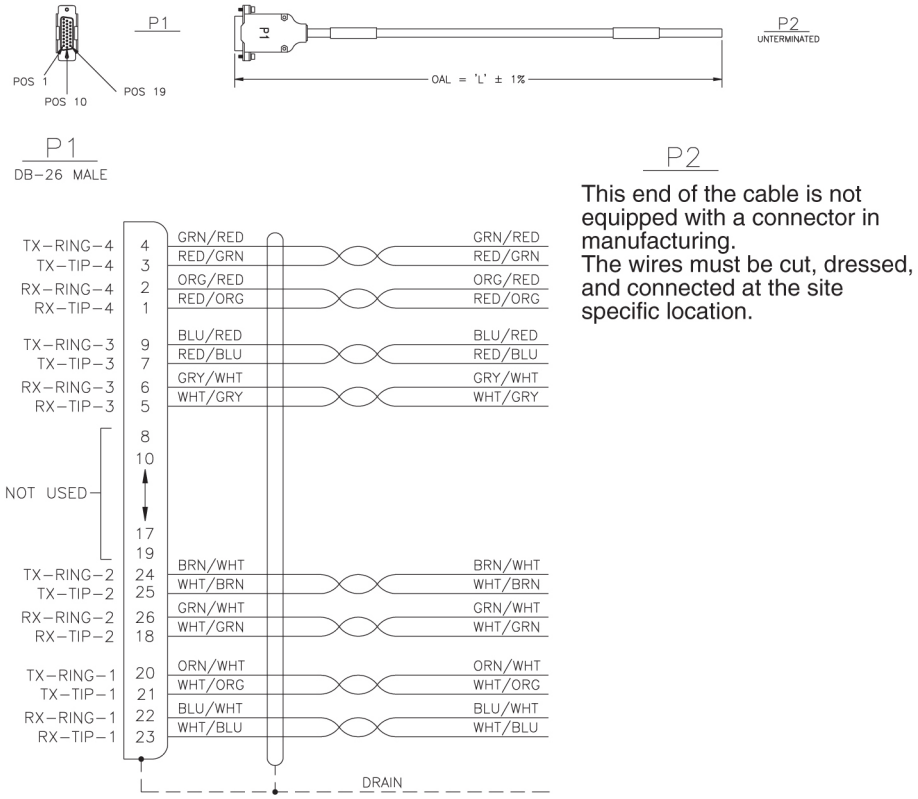
Multi-Port LIM DS0 Cable (24 AWG)

Table 107: DS1 Cable

Part Number		Length		Part Number		Length	
North American	International	feet	meters	North American	International	feet	meters
830-0892-01	830-1194-01	15	4.57	830-0892-09	830-1194-09	125	38.10
830-0892-02	830-1194-02	20	6.09	830-089210	830-1194-10	150	45.72
830-0892-03	830-1194-03	25	7.62	830-0892-11	830-1194-11	175	53.34
830-0892-04	830-1194-04	30	9.14	830-0892-12	830-1194-12	200	60.96
830-0892-05	830-1194-05	35	10.66	830-0892-13	830-1194-13	250	76.20
830-0892-06	830-1194-06	50	15.24	830-0892-14	830-1194-14	300	91.44

Part Number		Length		Part Number		Length	
North American	International	feet	meters	North American	International	feet	meters
830-0892-07	830-1194-07	75	22.86	830-0892-15	830-1194-15	500	152.40
830-0892-08	830-1194-08	100	30.48	830-0892-16	830-1194-16	1000	198.12

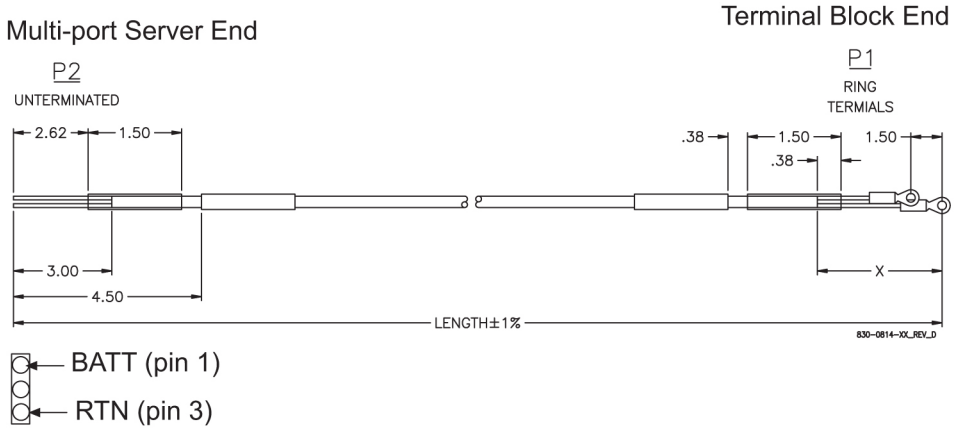
Figure 251: Multi-Port LIM DS0



Multi-Port Power Cable

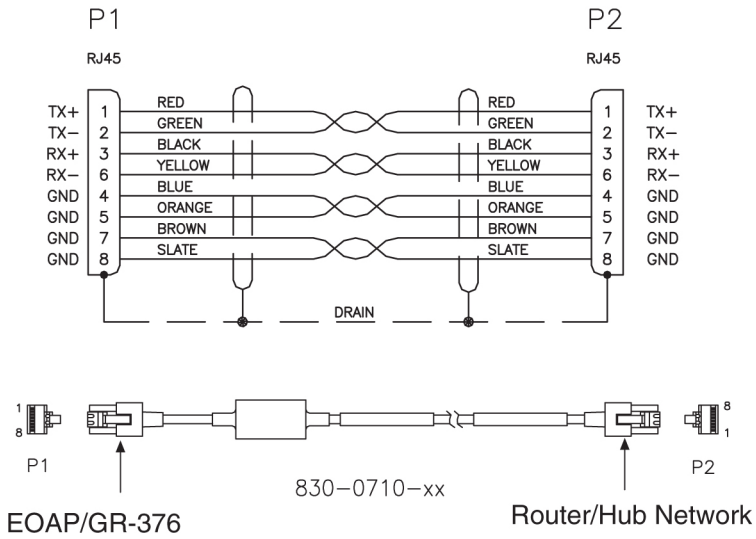
Figure 252: Multi-Port Power Cable

TABULATION BLOCK				
DASH NUMBER	LENGTH (IN)±1%	X (IN)±.12	LABEL "A" USAGE	LABEL "B" USAGE
−01	64.0	6.0	TB1, POS 1&4	SERVER B, PS1B
−02	70.5	6.5	TB1, POS 2&5	SERVER B, PS2B
−03	77.0	7.0	TB1, POS 3&6	SERVER B, PS3B
−04	64.0	6.0	TB4, POS 1&4	SERVER B, PS3A
−05	70.5	6.5	TB4, POS 2&5	SERVER B, PS2A
−06	77.0	7.0	TB4, POS 3&6	SERVER B, PS1A
−07	44.5	11.5	TB2, POS 1&4	SERVER A, PS1B
−08	51.0	12.0	TB2, POS 2&5	SERVER A, PS2B
−09	57.5	12.5	TB2, POS 3&6	SERVER A, PS3B
−10	44.5	11.5	TB3, POS 1&4	SERVER A, PS3A
−11	51.0	12.0	TB3, POS 2&5	SERVER A, PS2A
−12	57.5	12.5	TB3, POS 3&6	SERVER A, PS1A



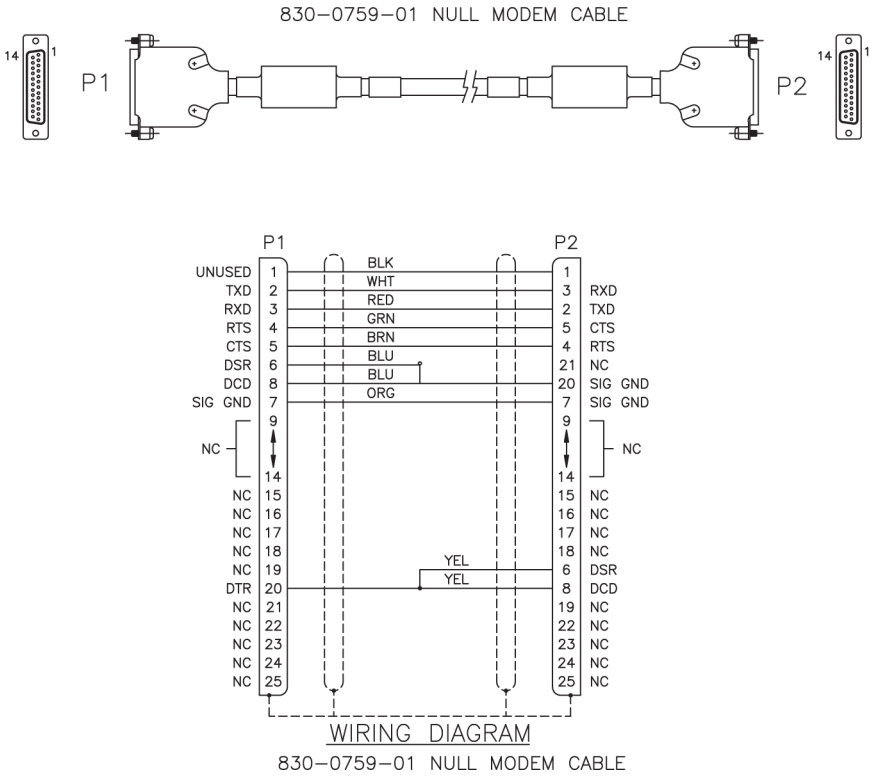
Network Cable

Figure 253: Network Cable



Null Modem Cable

Figure 254: Null Modem Cable



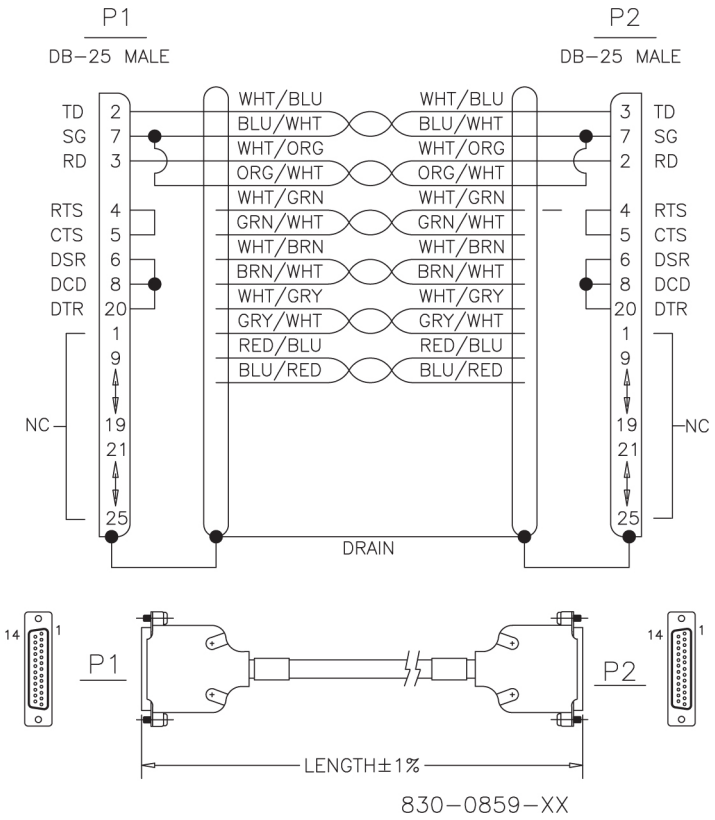
Null-Modem for Terminal Cable

Table 108: Null-MODEM for Terminal

Part Number		Length			Rev Level
North American	International	feet	inches	meters	
830-0859-01	830-1186-01	.5	6	0.152	A
830-0859-02	830-1186-02	10	120	3.48	A
830-0859-03	830-1186-03	15	180	4.57	A
830-0859-04	830-1186-04	20	240	6.96	A
830-0859-05	830-1186-05	25	300	7.62	A

Part Number		Length			Rev Level
North American	International	feet	inches	meters	
830-0859-06	830-1186-06	30	360	9.14	A
830-0859-07	830-1186-07	35	420	10.66	A
830-0859-08	830-1186-08	50	600	15.24	A
830-0859-09	830-1186-09	75	900	22.86	A
830-0859-10	830-1186-10	100	1200	30.48	A
830-0859-11	830-1186-11	125	1500	38.10	A
830-0859-12	830-1186-12	150	1800	45.72	A
830-0859-13	830-1186-13	200	2400	60.96	A
830-0859-14	830-1186-14	6.0	72	1.82	A
830-0859-15	830-1186-15	7.0	84	2.13	A

Figure 255: Null-MODEM for Terminal

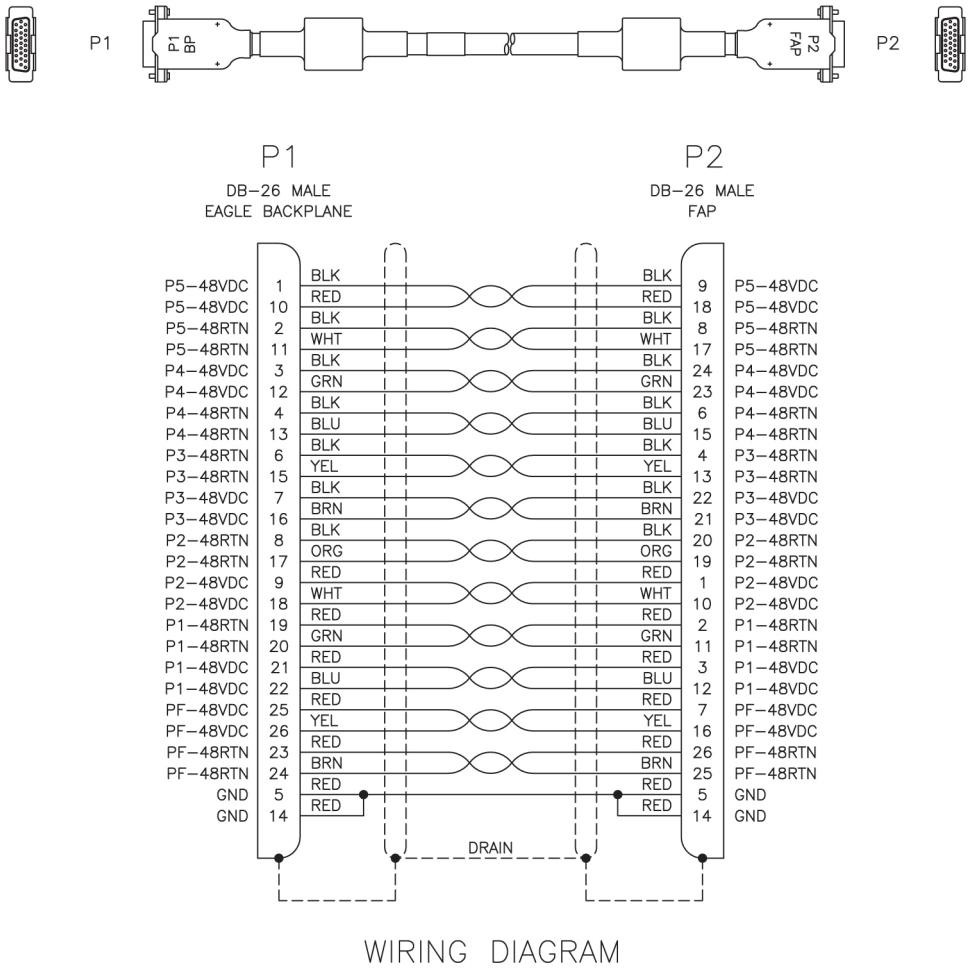


Power Cable

Table 109: Power Cable

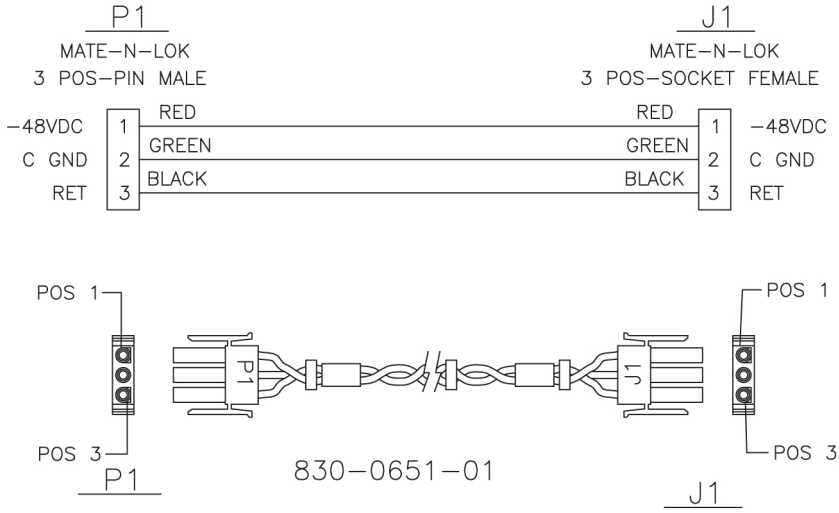
Part Number		Length	
North American	International	feet	meters
830-0315-01	--	4.0	1.07
830-0315-02	--	6.0	1.07
830-0315-03	--	8.0	2.29
830-0315-04	830-1147-04	4.5	1.22
830-0315-05	830-1147-05	6.5	1.98
830-0315-06	830-1147-06	8.5	2.58

Figure 256: Power Cable



Power Cable, –48V

Figure 257: –48V Power Cable

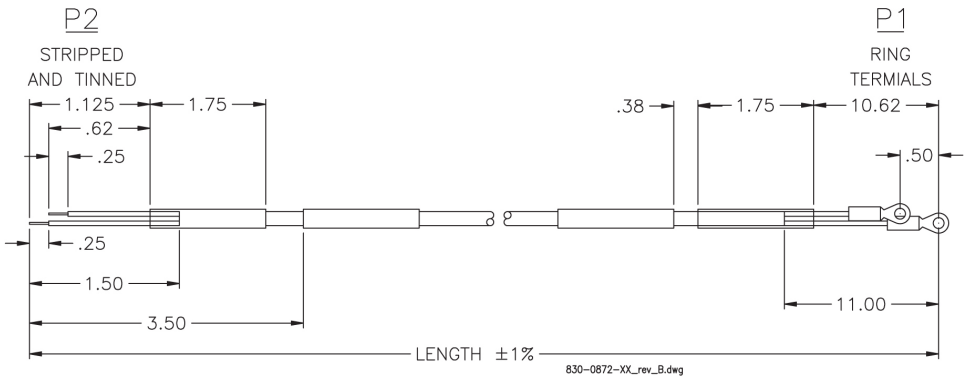


RAID Power Cable

Table 110: RAID Power Cable

Part Number	Length		P1 Long Lead	P2 Long Lead	Label "A" usage	Label "B" usage
	inches	meters				
830-0872-01	91.0	27.73	Black	Red	BP-1, POS 3A	RAID A, PS A
830-0872-02	89.5	27.27	Black	Black	BP-2, POS 3B	RAID A, PS B
830-0872-03	95.0	28.95	Black	Red	BP-2, POS 3A	RAID B, PS A
830-0872-04	93.5	28.49	Black	Black	BP-1, POS 3B	RAID B, PS B
830-0872-05	95.0	28.95	Black	Red	Input Power	PS A
830-0872-06	93.5	28.49	Black	Black	Input Power	PS B
830-0872-07	49.0	14.93	Black	Red	BP-1, POS 5A	RAID A, PS A
830-0872-08	47.5	14.47	Black	Black	BP-2, POS 5B	RAID A, PS B
830-0872-09	79.5	24.23	Black	Red	BP-2, POS 5A	RAID B, PS A
830-0872-10	78.0	23.77	Black	Black	BP-1, POS 5B	RAID B, PS B

Figure 258: RAID Power Cable

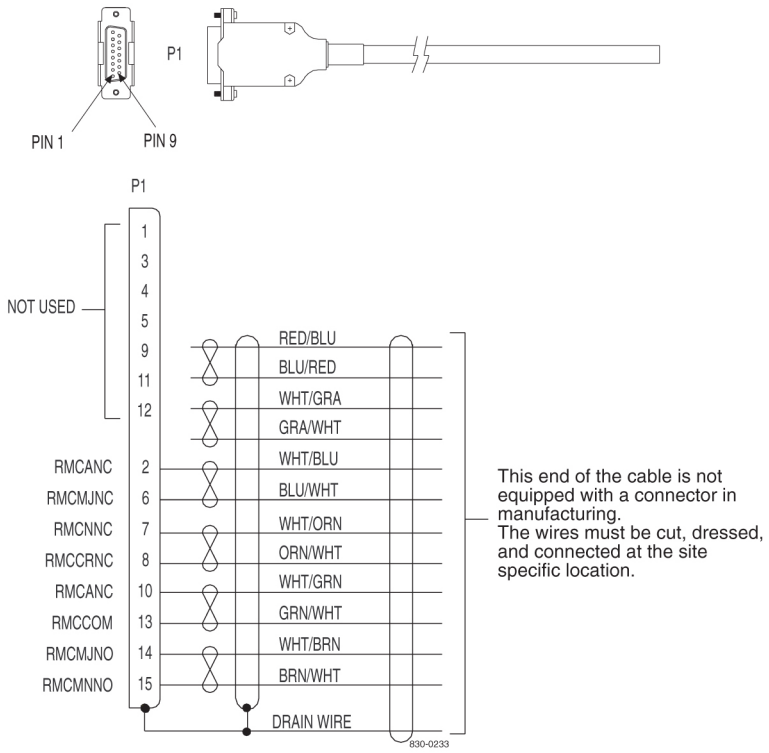


Remote Maintenance Center Cable

Table 111: Remote Maintenance Center Cable

Part Number		Length	
North American	International	feet	meters
830-0233-01	830-1146-01	50	15.25
830-0233-02	830-1146-02	75	22.88
830-0233-03	830-1146-03	100	30.50
830-0233-04	830-1146-04	125	38.13
830-0233-05	830-1146-05	150	45.75
830-0233-06	830-1146-06	175	53.38
830-0233-07	830-1146-07	200	61.00
830-0233-08	830-1146-08	250	76.25
830-0233-09	830-1146-09	300	91.50
830-0233-10	830-1146-10	500	152.50
830-0233-11	830-1146-11	1000	305.00

Figure 259: Remote Maintenance Center Cable



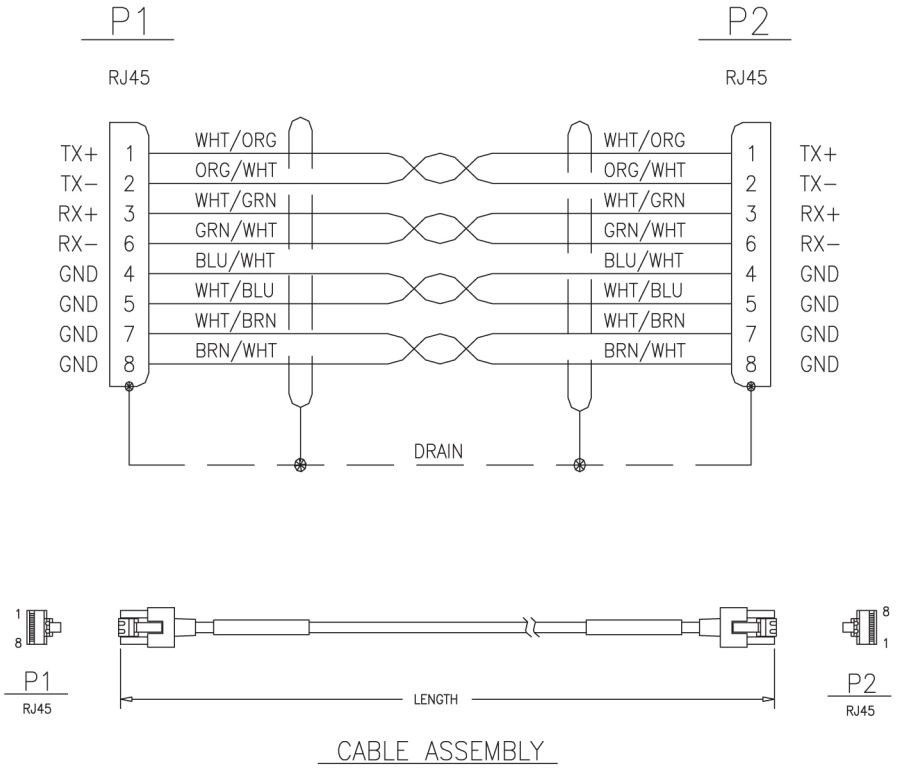
RJ45/RJ45 Cable (CAT-5) (Yellow)

Table 112: RJ45/RJ45 Cable (CAT-5)

Part Number		Length	
North American	International	feet	meters
830-0888-01	--	1.0	.304
830-0888-02	--	5.5	1.67
830-0888-03	830-1191-03	6.0	1.82
830-0888-04	830-1191-04	6.5	1.98
830-0888-05	830-1191-05	7.0	2.13
830-0888-06	830-1191-06	8.0	2.43
830-0888-07	830-1191-07	10.0	3.04

Part Number		Length	
North American	International	feet	meters
830-0888-08	--	12.0	3.65
830-0888-09	--	15.0	4.57
830-0888-10	--	16.0	4.87
830-0888-11	830-1191-11	3.0	.91

Figure 260: RJ45/RJ45 Cable (CAT-5)

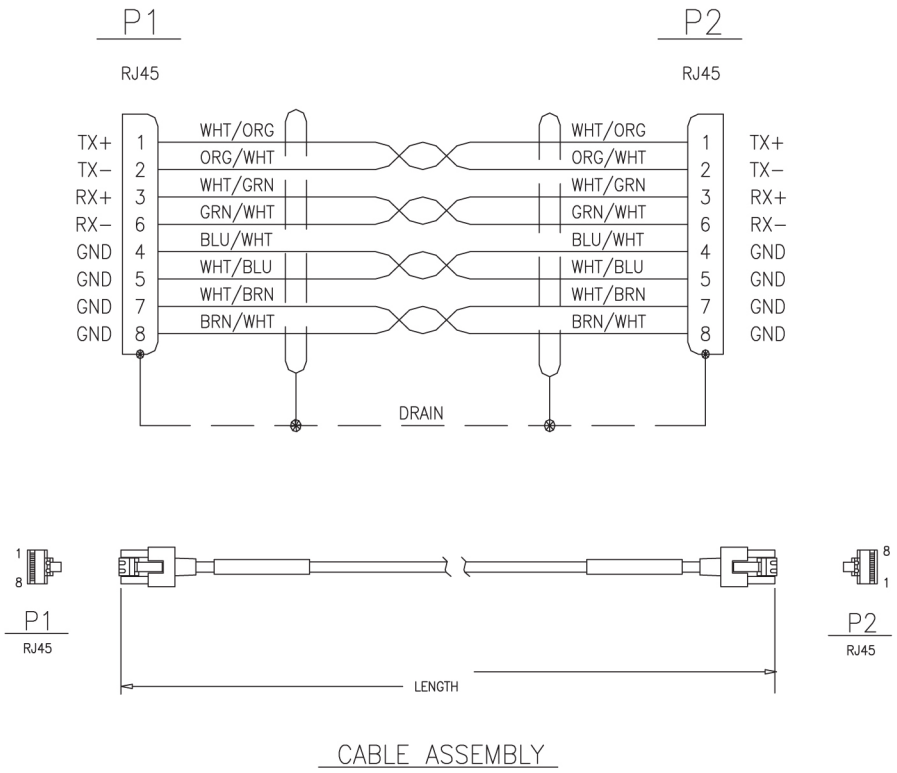


RJ45/RJ45 Cable (CAT-5) (Blue)

Table 113: RJ45/RJ45 Cable (CAT-5)

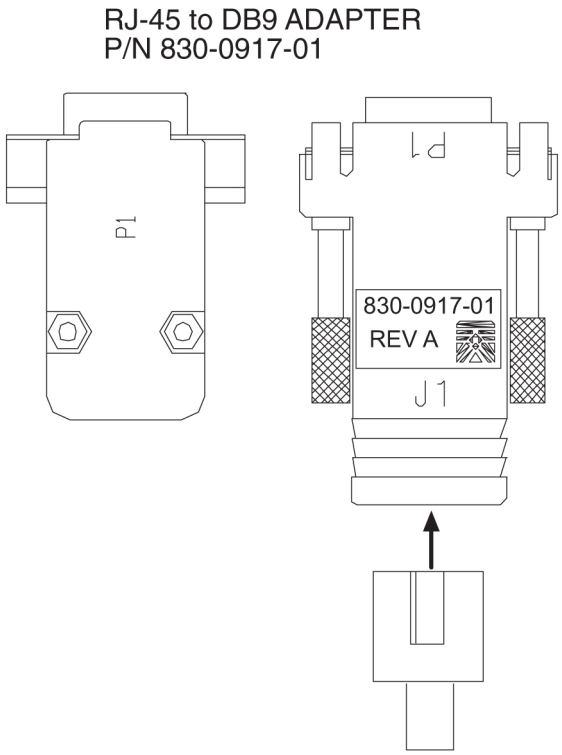
Part Number		Length	
North American	International	feet	meters
830-0889-01	--	1.0	.304
830-0889-02	830-1192-02	5.5	1.67
830-0889-03	830-1192-03	6.0	1.82
830-0889-04	830-1192-04	6.5	1.98
830-0889-05	830-1192-05	7.0	2.13
830-0889-06	830-1192-06	8.0	2.43
830-0889-07	830-1192-07	10.0	3.04
830-0889-08	--	12.0	3.65
830-0889-09	--	15.0	4.57
830-0889-10	--	16.0	4.87

Figure 261: RJ45/RJ45 Cable (CAT-5)



RJ45-to-9 Pin Adapter

Figure 262: RJ 45 to 9 Pin Adapter



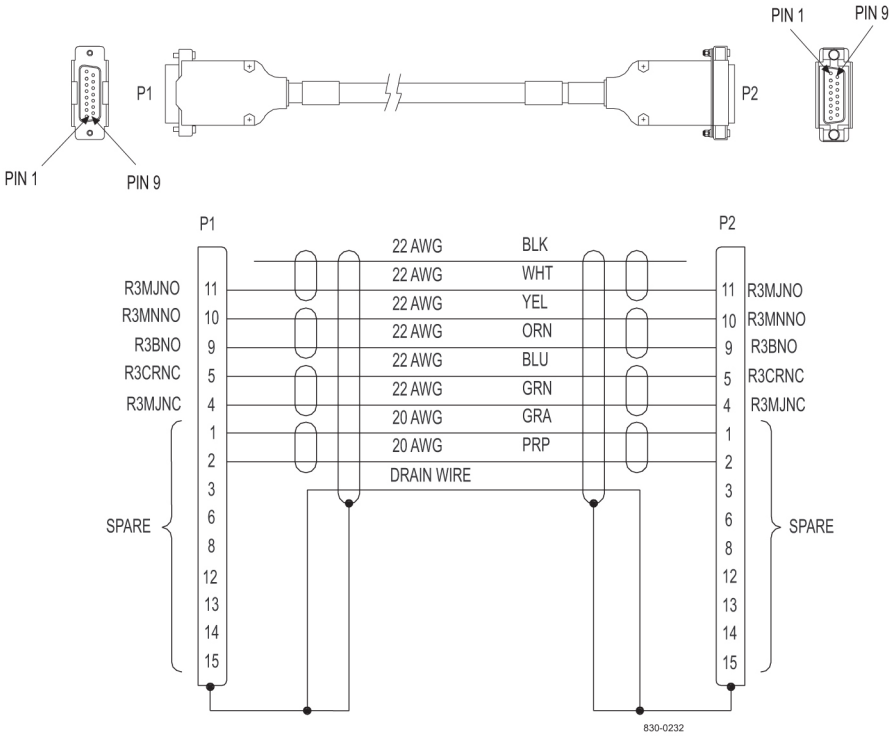
Row Alarm Cable

Table 114: Row Alarm Cable

Part Number		Length	
North American	**International**	**feet**	**meters**
830-0232-01	830-1145-01	5	1.53
830-0232-02	830-1145-02	8	2.44
830-0232-03	830-1145-03	10	3.05
830-0232-04	830-1145-04	12	3.66
830-0232-05	830-1145-05	14	4.27
830-0232-06	830-1145-06	175	53.38
830-0232-12	830-1145-12	20	6.1

Part Number		Length	
North American	International	feet	meters
830-0232-13	830-1145-13	30	9.25
830-0232-14	830-1145-14	40	12.2
830-0232-15	830-1145-15	50	15.25

Figure 263: Row Alarm Cable



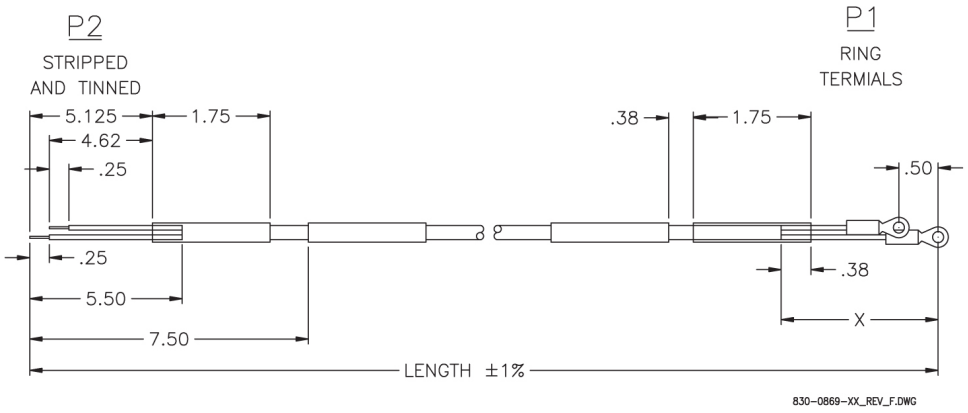
Router Power Cable

Table 115: Router Power Cable

Part Number		Rev Level	Length (inches)	X (inches)	P1 Long Lead	P2 Long Lead	Label "A" usage	Label "B" usage
North American	International							
830-0869-01	--	C	72	11	Black	Red	BP-1, POS 3A	ISO Router A

Part Number		Rev Level	Length (inches)	X (inches)	P1 Long Lead	P2 Long Lead	Label "A" usage	Label "B" usage
North American	International							
830-0869-02	--	C	79	17	Black	Red	BP-1, POS 3B	Dial-in Router
830-0869-03	830-1188-03	C	78	17	Black	Red	BP-2, POS 3B	ISO Router B
830-0869-04	830-1188-04	C	78	17	Black	Red	BP-1, POS 6B	Dial-in Router
830-0869-05	--	C	72	11	Black	Red	BP-1, POS 5A	ISO Router A
830-0869-06	--	C	78	17	Black	Red	BP-1, POS 5B	ISO Router B
830-0869-07	830-1188-07	A	82	22	Black	Red	To BP-1, POS 6B from Router YEL	To Router YEL from BP-1 POS 6A
830-0869-08	830-1188-08	A	74	14	Black	Red	To BP-1, POS 6B from Router BLU	To Router BLU from BP-1 POS 6A
830-0869-09	--	A	38	11	Black	Red	BP-2, POS 4A	Dial-in Router

Figure 264: Router Power Cable



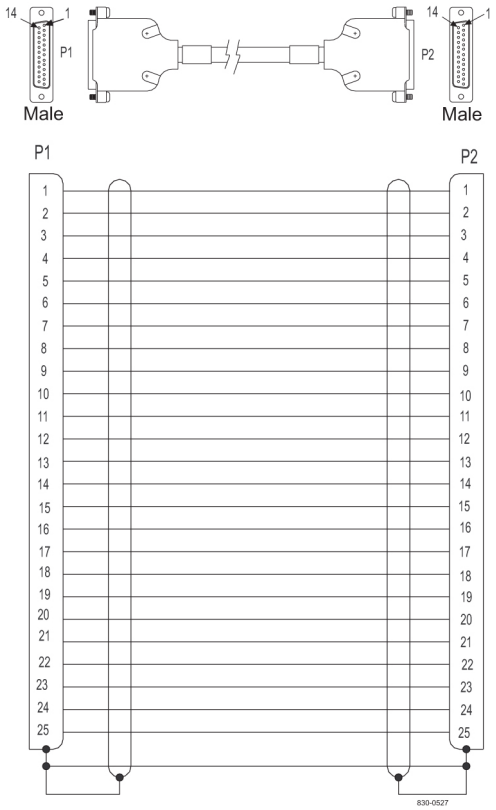
RS232

Standard Purchased part. Serial port connected to an optional second asynchronous maintenance modem and connections between the TTYA and a VT-520 terminal.

Table 116: RS232

Part Number		Length	
North American	International	feet	meters
830-0527-01	830-1152-01	15	4.57
830-0527-02	830-1152-02	25	7.62
830-0527-03	830-1152-03	50	15.24
830-0527-04	830-1152-04	75	22.86
830-0527-05	830-1152-05	100	30.48
830-0527-06	830-1152-06	125	38.10
830-0527-07	830-1152-07	150	45.72

Figure 265: RS232

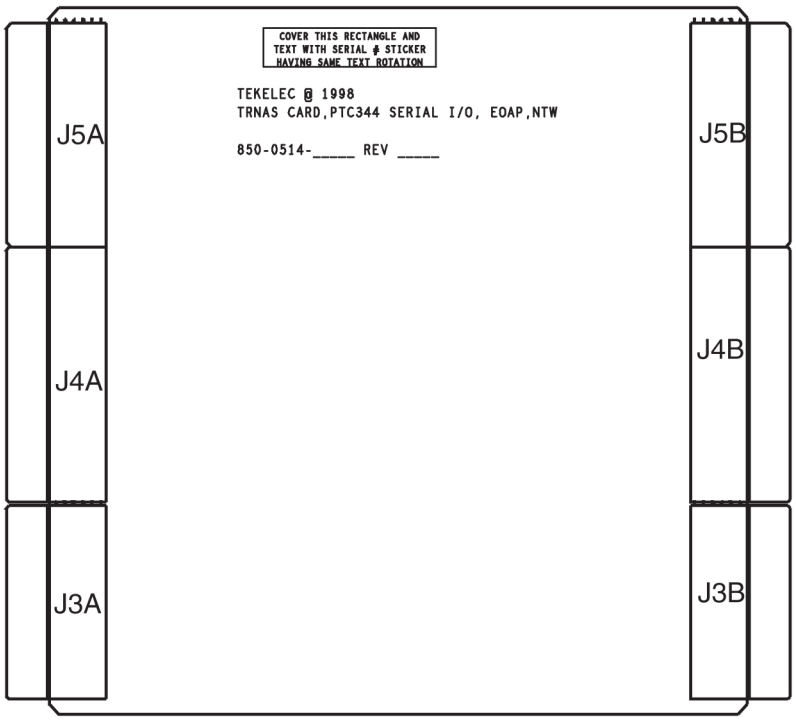


Serial I/O Transition Card

Table 117: Serial I/O Transition Card

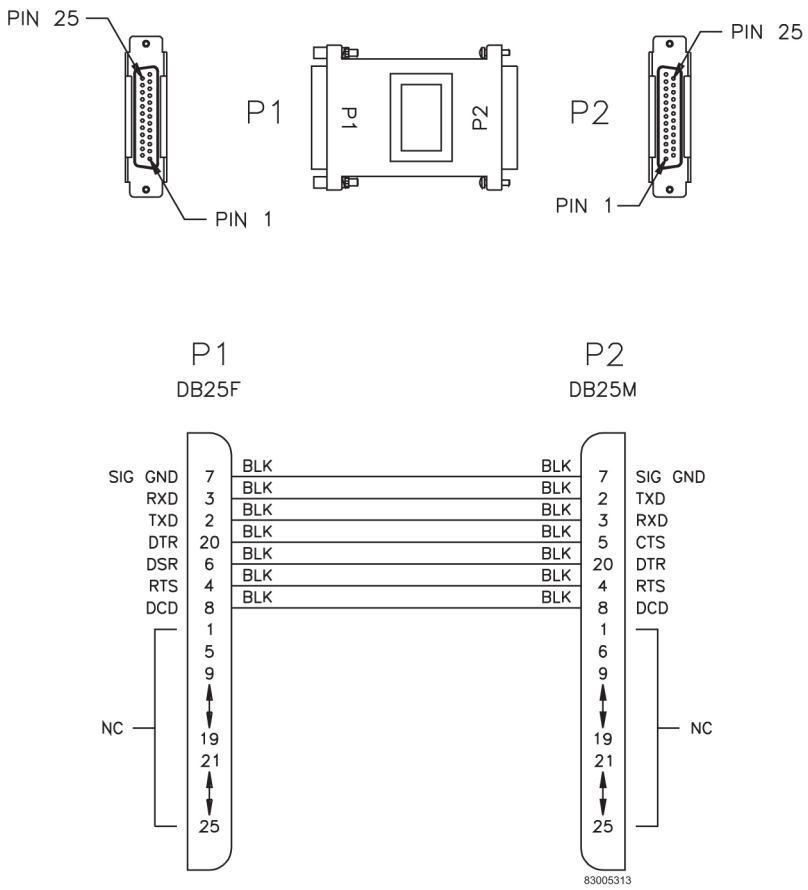
Part Number		Length	
North American	International	feet	meters
830-0514-01	---	5	1.53
830-0514-02	---	10	3.05
830-0514-03	---	15	4.57
830-0514-04	---	20	6.1
830-0514-05	---	25	7.62

Figure 266: Serial I/O Transition Card



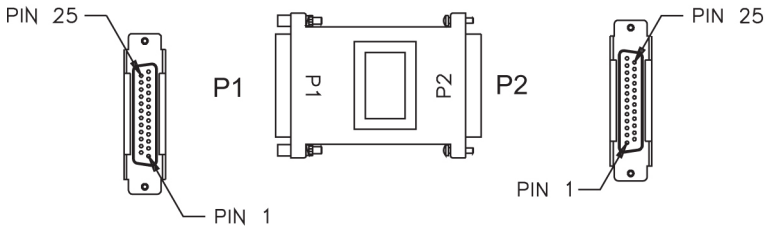
Serial Interface/Modem Adapter

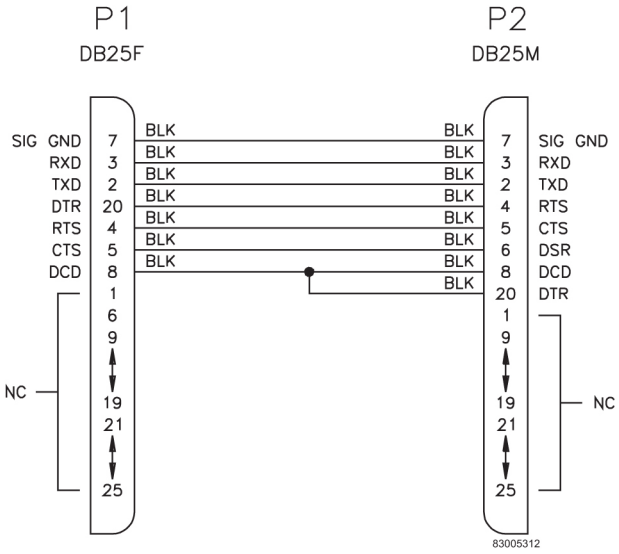
Figure 267: Serial Interface/Modem Adapter



Serial Interface, Terminal, and Printer Adapter

Figure 268: Serial Interface, Adapter





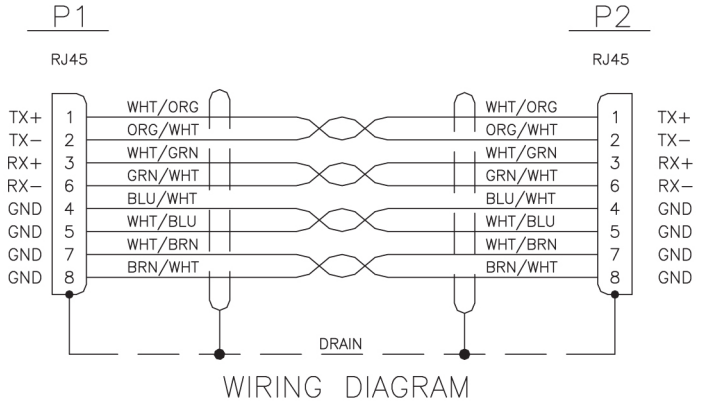
Straight Through Cable (CAT-5)

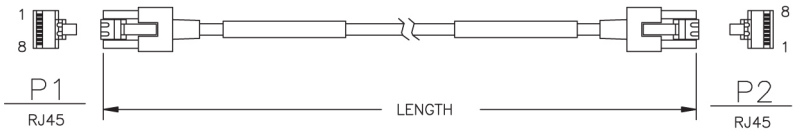
Table 118: Straight Through Cable (CAT-5)

Part Number		Length	
North American	**International**	**meters**	**feet**
830-0724-01	830-1174-01	0.15	0.5
830-0724-02	830-1174-02	3.28	10.0
830-0724-03	830-1174-03	4.5	15.0
830-0724-04	830-1174-04	7.5	25.0
830-0724-05	830-1174-05	0.30	1.0
830-0724-06	830-1174-06	1.8	6.0

Part Number		Length	
North American	International	meters	feet
830-0724-07	830-1174-07	2.13	7.0
830-0724-08	--	0.52	1.6
830-0724-09	830-1174-09	15.24	50.0
830-0724-10	830-1174-10	30.48	100.0

Figure 269: Straight Through Cable (CAT-5)

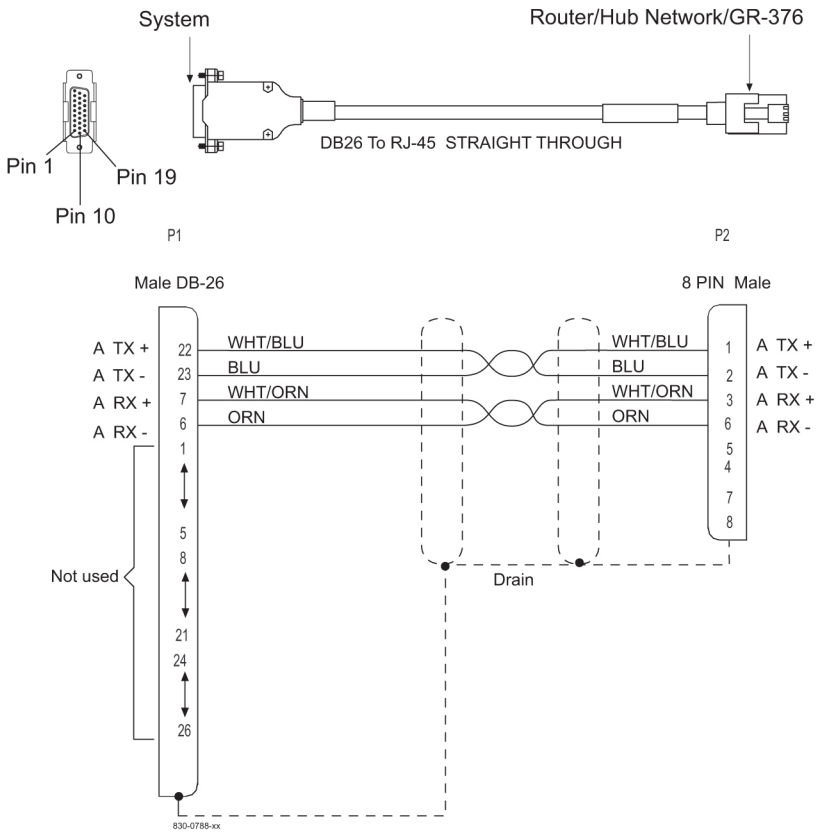




Straight-Through Patch-Panel Cable

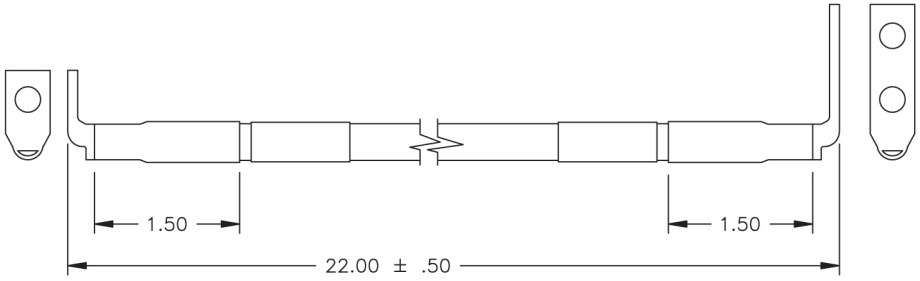
DB26 to RJ-45

Figure 270: Straight Through Patch Panel Cable



Switch-to-Frame Ground Cable

Figure 271: Switch to Frame Ground Cable



PART NUMBER	LENGTH (IN) ±.50	LABEL 'A' USAGE	LABEL 'B' USAGE	APPLICATION
830–0884–01	22.00	FRAME	SWITCH	CABLE GROUND, SWITCH TO FRAME, NTW

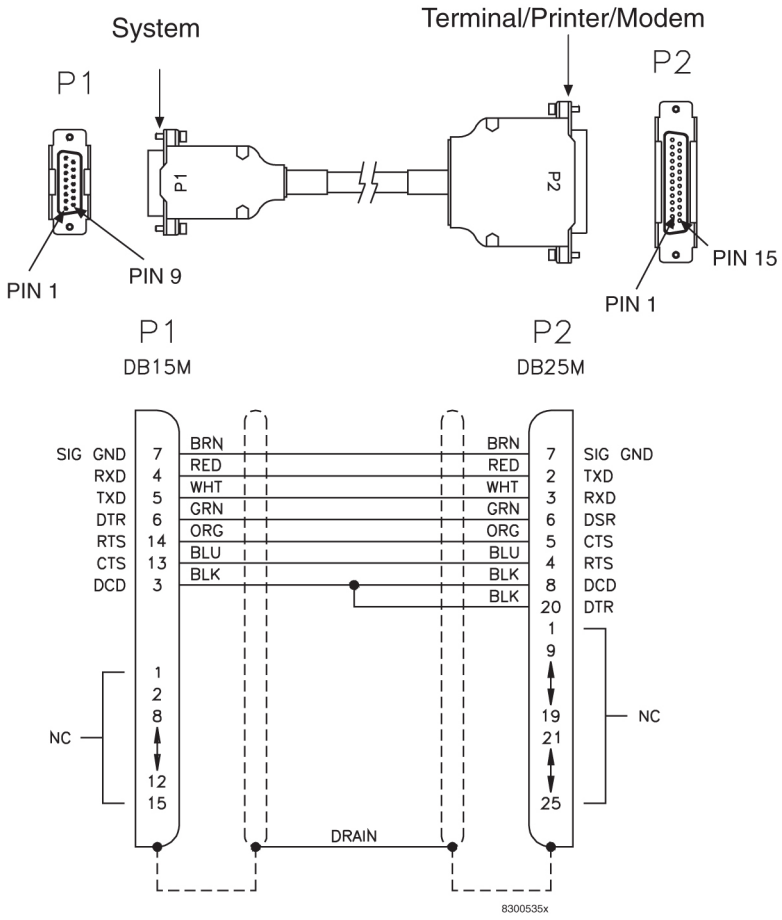
830-0884-01gnd

Terminal/Converter Cable

This converter is a purchased part and the pin-out is that of a straight through converter. The cable is 2 ft long. There is no illustration or wiring diagram.

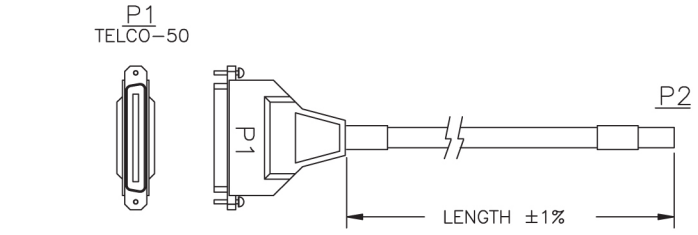
Terminal/Printer Cable

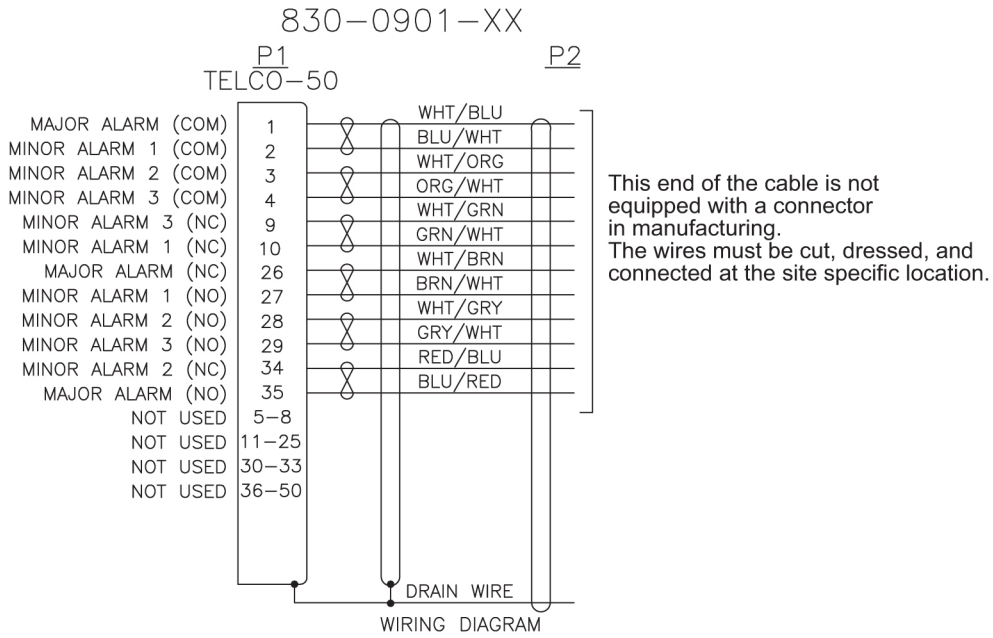
Figure 272: Terminal/Printer Cable



Tone and Announcement Server Alarm Cable

Figure 273: TAS Alarm Cable





This end of the cable is not equipped with a connector in manufacturing.
The wires must be cut, dressed, and connected at the site specific location.

Appendix D

Part Numbers

Topics:

- *Overview.....441*
- *Cables, Adapters.....441*
- *Components.....448*
- *Frames, Backplanes, FAPs, and Fans.....450*
- *Labels.....453*
- *Miscellaneous Parts.....455*
- *Power Cords for Peripherals.....457*

Overview

This chapter lists the part numbers of Tekelec equipment, components, cables, and miscellaneous parts described in this manual.

Each table provides the item name, part number, and related notes. Items are listed by their name (as described in this manual) in alphabetical order. Shaded part numbers indicate that the item is obsolete or no longer shipped. Unless the item is indicated as obsolete, the item is still supported in the field.

Note: Tekelec reserves the right to ship compatible part numbers or revisions for new installations and replacements. Always check the latest Hardware Baseline for your release. The latest hardware baseline can be found in the Feature Notice of your release.

RoHS 5/6 - As of July 1, 2006, all products that comprise new installations shipped to European Union member countries will comply with the EU Directive 2002/95/EC "RoHS" (Restriction of Hazardous Substances). The exemption for lead-based solder described in the Annex will be exercised. RoHS 5/6 compliant components will have unique part numbers and are identified as the International part number in this manual.

Note: International part numbers will eventually replace North American part numbers to make all part numbers RoHS compliant. The items of either part number are of equivalent function or quality otherwise.

WEEE - All products shipped to European Union member countries comply with the EU Directive 2002/96/EC, Waste Electronic and Electrical Equipment. All components that are WEEE compliant will be appropriately marked. For more information regarding Tekelec's WEEE program, contact your sales representative.

Cables, Adapters

Table 119: EAGLE 5 ISS Cables, Connectors, and Power Cords

Name	Part Numbers		Note
	North America	International	
Adapter, 15-Pin to 26-Pin	830-0425-01	---	
Adapter cables	830-0846-01	830-1183-01	backplanes -03 and -04 for master timing and HS clock cable 830-0873-xx

Name	Part Numbers		Note
	North America	International	
Alarm cable	830-0543-01	---	Holdover Clock
Alarm cable	830-0638-xx	830-1163-xx	see Filtered Rack Alarm cable
Alarm NETRA Server Cable	830-0900-xx	---	
ATM Cable	830-0987-xx	---	SCSI/DB44
ATM E1/T1 cable	830-0959-xx	---	EMS; DB-44 to RJ45 4 Port
B Clock Cable	830-0404-xx	---	replaced by 830-0398-xx (NA) or 830-1150-xx (I) both are for HMUX
B Clock Cable	830-0398-xx	830-1150-xx	
A and B Frame Clock cable	---	---	see B Clock Cable
BITS clock cable	830-0226-xx	830-1146-xx	Backplanes -03 and -04
BITS clock cable	830-0873-xx	---	Backplane -06
BNC pen end cable	830-0625-xx	830-1161-xx	
BNC to BNC cable assembly	830-0624-xx	830-1160-xx	
Breaker-to-Terminal Strip Power Cable	830-0866-xx	830-1236-xx	
CD-ROM Cable	830-0421-xx	---	
Frame Ground cable	830-0715-xx	830-1171-xx	ESP
Clock Connection cable	830-0657-xx	830-1164-xx	Fan, alarm, control EOAP to Control shelf
Composite clock cable	---	---	See BITS clock cable

Name	Part Numbers		Note
	North America	International	
Converter	804-0176-01	---	
Crossover (CAT-5) Cable	830-0723-xx	830-1173-xx	
Crossover Patch Panel Cable	830-0789-xx	830-1178-xx	DCM
DB-26 to RJ-45	830-1102-02	830-1102-02	for new installations, with shielded Cat 5E cable; E5-ENET
DB-26 to DB-26	830-1103-02	830-1103-02	for current installations that use DCM cable, 830-0978-xx. Does not support Gigabit Ethernet; E5-ENET
DCM, 100-BASE TX Interface to unterminated -xx	830-0711-xx	---	
DCM_100 BASE TX Interface_DB26 to Non-shielded RJ45	830-0978-xx	---	
DCM 100BASE TX Interface_DB26 to RJ45 Plus to Minus	830-0788-xx	830-1177-xx	
Drive Power Cable	830-0224-xx	---	
DS1 Cable	830-0849-xx	830-1184-xx	
E1 cable	830-0622-xx	830-1233-xx	
E1 patch cable	830-0605-02	830-1116-02	
E1-T1 MIM 22 AWG	830-0932-01	830-1106-xx	
E1/T1 MIM LIM Cable	830-0948-01	830-1197-xx	4 Port 24 AWG
E1/T1 MIM LIM to MPL Adapter	830-0949-01	830-1197-01	

Name	Part Numbers		Note
	North America	International	
E5-ENET Fast Copy Adapter - Lower	830-1343-01		
E5-ENET Fast Copy Adapter - Upper	830-1343-02		
Ethernet cable	830-0788-xx	830-1177-xx	DCM, DSM, EDCM-A, and EDCM
External alarm cable	830-0435-xx	830-1151-xx	
Fan cable	830-0690-01	---	AC power
Fan power/alarm cable	830-0609-01	830-1157-01	incl. with fan assembly
Fifty Position Cable Hard Drive I/O	830-0656-01	---	
Filter Rack Alarm Cable	830-0638-xx	830-1163-xx	
Force Transition Card	850-0496-01	---	
Frame Ground cable	830-0715-xx	830-1171-xx	ESP
Ground Breaker Panel-to-Frame cable	830-0830-01	830-1181-01	ESP
Ground Hub-to-Frame cable	830-0822-xx	---	ESP
Hazard Ground Cable	830-0257-xx	---	
High Speed (BITS) Clock Cable	830-0873-xx	830-1189-xx	
High Speed Master Timing Adapter	830-0846-01	830-1183-01	
HMUX Adapter Cable	830-0857-01	830-1185-01	
1/0 Green Ground Cable	690-0108-07	690-0108-R07	

Name	Part Numbers		Note
	North America	International	
IMT Cable	830-0221-xx	830-1141-xx	
Interface Cable	830-0366-xx	830-1149-xx	
Local Maintenance Center Cable	830-0231-xx	830-1144-xx	
Loop Back Cable Adapter	830-0763-01	830-1176-xx	
MMI Port Cable	830-0708-xx	830-1169-xx	
Modem/Terminal Cable	830-0709-xx	830-1170-xx	
Multi-port LIM Diagnostic Cable	803-0029-0	---	
Multi-port LIM DS0 cable	830-0772-xx	---	26 AWG, inacctive
Multi-port LIM DS0 cable	830-0892-xx	830-1194-xx	24 AWG, inacctive
Multi-Port Power Cable	830-0814-xx	830-1282-xx	
Network Cable	830-0710-xx	830-1257-xx	
Null Modem Cable	830-0759-xx	---	
Null-Modem for Terminal Cable	830-0859-xx	830-1186-xx	
Output panel frame ground cable	690-0009	---	
Pin Protector Assembly	830-0880-01	---	use with clock cable replacement (66 min for 6 shelves)
Power Cable	830-0315-xx	830-1147-xx	
Power Cable, –48V	830-0651-xx	---	

Name	Part Numbers		Note
	North America	International	
Power Cable, DC, BP to Hub	830-0868-xx	830-1235-xx	
Power Cable, DC, Netra 1400	830-0814-xx	830-1282-xx	
Power Cable, MPS	830-0965-xx		
Power Ring	830-0908-xx	---	AXi
Rack Alarm Cable	---	---	see Filtered Rack Alarm cable
RAID Power Cable	830-0872-xx	---	DC
Remote Maintenance Center Cable	830-0233-xx	830-1146-xx	
RJ45/RJ45 Cable (CAT-5) (Yellow)	830-0888-xx	---	
RJ45/RJ45 Cable (CAT-5) (Blue)	830-0889-xx	830-1192-xx	
RJ45 to 9 Pin Adapter	830-0917-01	---	
Row Alarm Cable	830-0232-xx	830-1145-xx	
Router Power Cable	830-0869-xx	830-1188-xx	DC
RS232 Cable	830-0527-xx	830-1152-xx	
ATM Cable	830-0987-xx	---	SCSI/DB44
Serial I/O Transition Card	850-0514-01	---	
Serial Interface Converter Cable	830-0531-01	---	inactive
Serial Interface/Modem Adapter	830-0531-03	830-1153-03	use with 830-0394-xx

Name	Part Numbers		Note
	North America	International	
Serial Interface/Modem Adapter	830-0531-04	830-1153-04	use with 830-0535-xx
Serial DB44 to DB9 (X4) cable	830-0972-01	830-1231-01	36-inch T1x00 AS
Serial Interface, Terminal, Printer Adapter	830-0531-02	830-1153-02	use with 830-0394-xx
Straight Through Cable (CAT-5)	830-0724-xx	---	RJ-45 CAT-5E
Straight Through Cable (Patch Panel)	---	---	see DCM 100BASE TX Interface_DB26 to RJ45 Plus to Minus
Switch-to-Frame Ground Cable	830-0884-01	---	
Terminal/Converter Cable	830-0528-01	---	
Terminal/Printer Cable	830-0535-xx	830-1154-xx	
Tone and Announcement Server Alarm Cable	830-0901-xx	---	
T1 LIM-to-MPL Cable Adapter	830-0895-01	---	
T1 MIM cable	830-0894-xx	---	
Terminal cable adapter	---	---	see Terminal/Printer cable

Components

Table 120: EAGLE 5 ISS Components

Acronym	Name	Part Numbers		Note
		North America	International	
---	Air Management Card	870-1824-01	870-1824-02	single slot, eeded for empty slots when using Fan Tray 890-0001-02
---	Breaker Panel Alarm Card	804-1489-01	804-1489-R01	
CI	Clock Interface Card (Holdover Clock)	804-0165-01	---	
DCM	Database Communications Module	870-1945-038	---	K6-lll, 200 TPS STC card
DCMX	Expandable Database Communications Module	870-1984-01	---	
DSM	Database Service Module	870-1984-07 870-1984-09	870-1984-13 870-1984-15	4GB 1GB
DSM	Database Service Module	870-2371-08	870-2371-13	1GB
E1/T1 MIM	E1-T1 Multichannel Interface Module 02	870-2198-01	870-2198-02	European equivalent of the North American T1
E5-ATM	E5-ATM Interface Module	870-1872-01	---	
E5-E1T1	E5-E1T1 Interface Module	870-1873-02	870-1873-03	
E5-ENET	E5-ENET Interface Module	870-2212-02	870-2212-03	
E5-IPSM	IPSM Module	870-2877-01	---	

Acronym	Name	Part Numbers		Note
E5-MASP	E5 Maintenance Administration Subsystem Processor Card	870-2903-01		
E5-MDAL	E5 Maintenance Disk and Alarm Card	870-2900-01		
E5-SM4G	E5-SM4G DSM Module	870-2860-02	---	
E5-TSM	E5-TSM (Translation Service Module running GLS)	870-2943-03	---	Replaces TSM-256 as of 40.0
EDCM	Enhanced Database Communications Module	870-2197-01	---	double-slot Pre-IP^7 SG 4.0
EDCM	Enhanced Database Communications Module	870-2372-08 870-2372-09	870-2372-13 870-2372-14	single-slot
EDCM-A	Enhanced Database Communications Module A	870-2508-01	870-2508-02	single-slot
EOAP	Embedded Operations Support System Applications Processor	890-1050-01 890-1050-03	---	singke dual
GPSM-II	General Purpose Service Module	870-2360-06	870-2360-07	Replaces MCAP as of 30.0
HC MIM	High Capacity Multi-channel Interface Module	870-2671-01	870-2574-02	Replaces IPMX
HIPR	High-Speed IMT Packet Router Module	870-2574-01	870-2574-02	Replaces IPMX
HIPR2	High-Speed IMT Packet Router 2 Module	870-2872-01	870-2872-01	Replaces IPMX, HMUX, HIPR
HMUX	High-Speed Multiplexer	870-1965-01	870-1965-03	Replaces IPMX
IPMX	Interprocessor Message Transport Power and Multiplexer	870-1171-01	---	replaced by HMUX
LIM-ATM	Link Interface Module - Asynchronous Transfer Module	870-1293-10	870-1293-13	

Acronym	Name	Part Numbers		Note
MCA	Matrix Controller Automatic (Holdover Clock)	000-0028-xx	---	
MCAP	Maintenance Administration Subsystem (MAS) Communications Applications Processor	870-1013-xx 870-1307-xx	---	Replaced by GPSM-II as of 30.0
MDAL	Maintenance Disk and Alarm Card	870-0773-10	870-0773-10	
MIS	Maintenance Interface System Card (Holdover Clock)	804-0175-xx	---	
MPL	Multi-Port Link Interface Module	870-2061-04	870-2061-06	
MPS	Multi-purpose Server	890-1287-xx 890-1374-xx	--- ---	OEM Open System
TDM-GTI	Terminal Disk Module - Global Timing Interface	870-0774-15	870-0774-18	As of 31.6 (NA) 35.0 (I)
TOCA	Timing Output Composite Automatic (Holdover Clock)	804-0166-xx	---	
TSM	Translation Service Module	870-1289-04 870-1291-xx 870-1292-xx	870-1289-06 --- ---	TSM-1G TSM-3G TSM-4G

Frames, Backplanes, FAPs, and Fans

Table 121: EAGLE 5 ISS Frames, Backplanes, FAPs, and Fans

Acronym	Name	Part Numbers		Note
		North America	International	
BP	Breaker Panel	804-1423-01	804-1423-R01	

Acronym	Name	Part Numbers		Note
		North America	International	
BP	Breaker Panel	870-1814-01	---	
	Control Shelf Backplane -02	850-0330-02	---	inactive
	Control Shelf Backplane -03	850-0330-03	---	inactive
	Control Shelf Backplane -04	850-0330-04	---	
	Control Shelf Backplane -05	850-0330-05	---	not active
	Control Shelf Backplane -06	850-0330-06	850-0330-07	shelves 6 and 7 no longer supported
	E1 Backplane	850-0459-01	850-0459-02	
	Extension Shelf Backplane	850-0356-01	---	inactive
	Extension Shelf Backplane	850-0356-02	---	inactive
	Extension Shelf Backplane	850-0356-03	---	inactive
	Extension Shelf Backplane	850-0356-04	850-0356-06	
EOAP	Embedded Operations Support System Applications Processor	890-1050-01 890-1050-03	---	singke dual
	Fan Assembly	890-0001-02	890-0001-04	All systems with HCMIMs EAGLE 33.0

Acronym	Name	Part Numbers		Note
		North America	International	
	Fan Assembly	890-1038-01	890-1038-03 890-1038-04	Standard frame Heavy Duty frame
	Filter, fan tray	551-0032-01	---	
	Fan filter	551-0022-01	---	
FAP	Fuse and Alarm Panel	860-0434-01	860-0434-03 860-0434-04	Heavy Duty Frame
FAP	Fuse and Alarm Panel	870-1606-02 Rev C	---	Standard Frame 60 Amp feeds
FAP	Fuse and Alarm Panel	870-1606-02 Rev B	---	Standard 40 Amp feeds
FAP	Fuse and Alarm Panel	870-2320-028 Rev J	870-2320-04	Heavy Duty Frame 60 Amp feeds
FAP	Fuse and Alarm Panel	870-2320-01 Rev A - I	870-2320-03	Heavy Duty Frame 40 Amp feeds
FAP	Fuse and Alarm Panel	870-0243-08 Rev C	---	Control/ Extension Frame
FAP	Fuse and Alarm Panel	870-0243-09 Rev C	---	Misc Frame
	FAP Jumper Board	870-1641-01	---	
	FAP Jumper Board	870-1641-02	---	
	Heavy Duty Frame	860-0434-01	---	
	MPS Server	870-2640-01	870-2640-03	T1000 AS
FAP	Fuse and Alarm Panel	870-2804-01	870-2804-01	Control/ Extension Frame

Acronym	Name	Part Numbers		Note
		North America	International	
	FAP Shorting Board	870-2805-01	870-2805-01	
	FAP Jumper Board	870-2806-01	870-2806-01	

Labels

Table 122: EAGLE 5 ISS Labels

Name	Part Numbers
Label, Control frame	658-0486-01
Label, Extension frame 00	658-0486-02
Label, Extension frame 01	658-0486-03
Label, Extension frame 02	658-0486-04
Label, Extension frame 03	658-0486-05
Label, Extension frame 04	658-0486-06
Label, Miscellaneous frame 00	658-0374-01
Label, Miscellaneous frame 01	658-0374-02
Label, OAP frame	658-0486-08
Label, Heavy Duty Frame	658-0374-01
Label, CF-00, Shelf 1	658-0490-01
Label, CF-00, Shelf 2	658-0490-02
Label, CF-00, Shelf 3	658-0490-03

Name	Part Numbers
Label, EF-00, Shelf 1	658-0490-04
Label, EF-00, Shelf 2	658-0490-05
Label, EF-00, Shelf 3	658-0490-06
Label, EF-01, Shelf 1	658-0490-07
Label, EF-01, Shelf 2	658-0490-08
Label, EF-01, Shelf 3	658-0490-09
Label, EF-02, Shelf 1	658-0490-10
Label, EF-02, Shelf 2	658-0490-11
Label, EF-02, Shelf 3	658-0490-12
Label, EF-03, Shelf 1	658-0490-13
Label, EF-03, Shelf 2	658-0490-14
Label, EF-03, Shelf 3	658-0490-15
Label, EF-04, Shelf 1	658-0490-16
Label, EOAP	658-0499-05
Label, Field Tool Identification	658-0941-01
Label, Field Tool Identification wrap	658-0941-02

Miscellaneous Parts

Table 123: EAGLE 5 ISS Miscellaneous Part Numbers

Name	Part Numbers		Note
	North America	International	
Drives			
Dual CD-RW\DVD-ROM	870-2746-01	870-2746-02	T1x00 AS
Disk Drive, 120GB	804-1804-01	804-1804-R01	ULTRA ATA/100/133_7200RPM
Panels			
Alarm side panel	870-0259-02	---	
Alarm indicator lamps	525-0067-R01	---	
Blank side panel	840-0017-02	---	
Gray tinted plastic rear covers	654-0075-01	654-0075-R01	
Brackets, unit separation	652-0609-01	652-0609-02	
Bracket	652-0954-01	652-0954-02	Fan
Kits			
Cable Rack Mounting Kit	804-1571-01	---	Heay duty frame
Cable Rack Mounting Kit	804-0219-01 804-0219-02	804-0219-R01 804-0219-R02	raised floor
External tooth washers	606-0062-01	---	fan bracket
Diode Board A	870-1608-01	---	
Diode Board A	870-1608-03	---	

Name	Part Numbers		Note
	North America	International	
Diode Board B	870-1608-02	---	
Diode Board B	870-1608-04	---	
Diode Upgrade kit	870-1831-01	---	For 870-1606-02
Diode Upgrade kit	870-1831-02	---	For 870-2320-01
E1 Interface Kit	890-1037-01	890-1037-06	
Mounting hardware kit	840-0092-01	840-0092-03	For heavy duty frame. South America/India only
Brackets, Screws, and other small items			
Brackets, unit separation	652-0609-01	652-0609-02	
Bracket	652-0954-01	652-0954-02	Fan
Bracket, fan tray	652-0012-01	652-0012-02	Fan tray
Bracket, side, fan tray	652-0015-01	652-0015-02	Fan tray
Heat-shrink	804-0229-01	---	
Heat-shrink	804-0228-01	---	
Lugs, # 6 two-hole	502-0085-01	502-0085-R01	FAP connector
#6 AWG	690-0131-01	690-0131-R01	
1/0 pink lug	804-0977-01	804-0977-R01	
Pin Protector Assembly	830-0880-01		
Screws (12)	601-0010-01	---	
Screws	600-0193-01	---	12x24 .500 cs zinc fan bracket

Name	Part Numbers		Note
	North America	International	
Terminal lug	804-0817-02	804-0817-R02	
Terminating resistor	104-0032-01	---	E1 backplane

Power Cords for Peripherals

Table 124: Power Cords for Peripherals

Country	Part Number		
USA	Cord provided	Latvia	804-1185-R01
Argentina	804-1185-R02	Liechtenstein	804-1185-R11
Australia	804-1185-R02	Lithuania	804-1185-R01
Austria	804-1185-R01	Luxembourg	804-1185-R01
Belgium	804-1185-R01	Malaysia	804-1185-R03
Brazil	804-1185-R01	Malta	804-1185-R03
Bulgaria	804-1185-R01	Mexico	Cord provided
Canada	Cord provided	Monaco	804-1185-R01
Chile	804-1185-R01	Netherlands	804-1185-R01
China	804-1185-R09	New Zealand	804-1185-R02
Columbia	Cord provided	Norway	804-1185-R01
Cyprus	804-1185-R03	Peru	804-1185-R01
Czech Republic	804-1185-R01	Philippines	Cord provided
Denmark	804-1185-R04	Poland	804-1185-R01

Country	Part Number		
Egypt	804-1185-R01	Portugal	804-1185-R01
Estonia	804-1185-R01	Romania	804-1185-R01
Finland	804-1185-R01	Russia	804-1185-R01
France	804-1185-R07	Saudi Arabia	Cord provided
Germany	804-1185-R01	Singapore	804-1185-R03
Greece	804-1185-R01	Slovakia	804-1185-R01
Hong Kong	804-1185-R03	South Africa	804-1185-R06
Hungary	804-1185-R01	South Korea	804-1185-R01
Iceland	804-1185-R01	Spain	804-1185-R01
India	804-1185-R06	Sweden	804-1185-R01
Ireland	804-1185-R03	Switzerland	804-1185-R11
Israel	804-1185-R12	Taiwan	Cord provided
Italy	804-1185-R07	Turkey	804-1185-R01
Ivory Coast	804-1185-R01	United Kingdom	804-1185-R03
Japan	804-1185-R10	United Arab	804-1185-R03

Glossary

A

AC	Alternating Current Application Context Authentication Center
ACM	Application Communications Module A card in the EAGLE 5 ISS that provides a communications interface to a remote host across an Ethernet LAN.
ACT	Activate
AIN	Advanced Intelligent Network A dynamic database used in Signaling System 7. It supports advanced features by dynamically processing the call based upon trigger points throughout the call handling process and feature components defined for the originating or terminating number.
AINF	Application Interface Appliqué An integrated appliqué that supports the DS0A, DSCS and V.35 interfaces on the same appliqué. The AINF appliqué can be configured as either a DS0A, OCU, or V.35 interface from the user terminal.
ALM	Alarm Card
AMS	Active Message Store

A

	Provides store-and-forward functionality for SMS messages.
ANSI	American National Standards Institute An organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system. ANSI develops and publishes standards. ANSI is a non-commercial, non-government organization which is funded by more than 1000 corporations, professional bodies, and enterprises.
AS	Application Server A logical entity serving a specific Routing Key. An example of an Application Server is a virtual switch element handling all call processing for a unique range of PSTN trunks, identified by an SS7 DPC/OPC/CIC_range. Another example is a virtual database element, handling all HLR transactions for a particular SS7 DPC/OPC/SCCP_SSN combination. The AS contains a set of one or more unique Application Server Processes, of which one or more normally is actively processing traffic. Application Simulator Test tool that can simulate applications and/or SMSCs.
ASM	Application Services Module A card in the EAGLE 5 ISS that provides additional memory to store global translation tables and screening data used for applications such as Global Title Translation

A

	(GTT) and Gateway Screening (GWS). This card is obsolete as of Release 31.6. The TSM card is used.
ATM	Asynchronous Transfer Mode A packet-oriented transfer mode that uses an asynchronous time division multiplexing technique to multiplex information flow in fixed blocks, called cells. A high-bandwidth, low-delay switching, and multiplexing technology to support applications that include high-speed data, local area network interconnection, multimedia application and imaging, and residential applications such as video telephony and other information-based services.

B

BITS	Building Integrated Timing System The Building Integrated Timing System (BITS) clocks come directly from the central office BITS clock source or indirectly from an optional holdover clock installed in the system.
BP	Board Prom

C

CAP	Communication & Application Processor
CAT	Cell Attribute Table
CC	Country Code

C

CD	Carrier Detect Compact Disk
CF	Control Frame
Channel	A single Time-Division-Multiplexed (TDM) timeslot within a channelized E1/T1 port. Generically, channels can be used for transporting signaling, digitized voice, or data information. Unused channels typically are filled with defined idle codes designed to maintain sufficient ones density to ensure frame-level synchronization.
CI	Clock Interface Card
Control Shelf	The shelf in the EAGLE 5 ISS that contains the Maintenance and Administration Subsystem. The Maintenance and Administration Subsystem contains 5 cards: 2 CAM cards, 2 TDMs (Terminal Disk Modules), and 1 MDAL (Maintenance Disk and Alarm) card. This shelf is designated as Shelf 1100 and cannot be added or removed from the database.
CTS	Clear to Send

D

Database	All data that can be administered by the user, including cards, destination point codes, gateway screening tables, global title translation tables, links, LNP services, LNP service providers, location routing numbers, routes, shelves, subsystem applications, and 10 digit telephone numbers.

D

DB	Database Daughter Board Documentation Bulletin
DC	Direct Current
DCM	Database Communication Module The DCM provides IP connectivity for applications. Connection to a host is achieved through an ethernet LAN using the TCP/IP protocol.
DIP	Dual In-Line Package Used more to refer to a type of switch. A DIP switch is a series of tiny switches whose housing has the same shape as a chip.
DO	Derived Object
DS0	Digital Signal Level-0 (64 Kbits/sec or 56 Kbits/sec) A basic digital signaling rate of 64 Kbits/sec, corresponding to the capacity of one voice-frequency-equivalent channel.
DS0A	Digital Signal Level - 0 The interface used with the LIMDS0 card.
DS1	Digital Signal Level-1 (1.544Mbits/sec) A widely used standard in telecommunications in North America and Japan to transmit voice and data between devices. The data transmitted over a physical T1 line.

D

DSM	Database Service Module. The DSM provides large capacity SCCP/database functionality. The DSM is an application card that supports network specific functions such as EAGLE Provisioning Application Processor (EPAP), Global System for Mobile Communications (GSM), EAGLE Local Number Portability (ELAP), and interface to Local Service Management System (LSMS).
DTE	Data Terminal Equipment The equipment associated with the entering and retrieving data from a computer system or a data communications system. A video display terminal is an example of data terminal equipment.
DTR	Data Terminal Ready
DVD	Digital Versatile Disk

E

E1	The European equivalent of T1 that transmits digital data over a telephone network at 2.048 Mbps.
E5-E1T1	EPM-based E1/T1 Multi-Channel Interface Module An EPM-based card that provides E1 and T1 connectivity. The E5 indicates the card is for existing EAGLE 5 control and extension shelves. E1T1 is an abbreviation for the ITU E1 and ANSI T1 interfaces. Thus the nomenclature defines the shelves where the card can be used and the physical interface that it provides.

E

E5-ENET	EPM-based Ethernet card A high capacity single-slot IP signaling card (EPM card plus Gig Ethernet PMC cards).
EBI	Extended Bus Interface A local bus and not connected to the IMT bus. This allows every two card locations to communicate with each other without going over the IMT bus.
EDCM	Enhanced Database Communication Module
EF	Extension Frame
ELAP	EAGLE Local Number Portability Application Processor
EMS	Element Management System The EMS feature consolidates real-time element management at a single point in the signaling network to reduce ongoing operational expenses and network downtime and provide a higher quality of customer service.
EOAP	Embedded Operation Support System Applications Processor Also, Enhanced OSS Application Process.
EPAP	EAGLE Provisioning Application Processor
ESD	Electro-Static Discharge

E

ESF	Extended Super Frame
ESP	Expanded Services Platform The Sentinel system with the hardware and software platform that provides the interface to the Integrated EAGLE and Sentinel monitoring system. The ESP hardware and software platform runs on the model 120 server.
Extension Shelf	See ES.

F

FA	Framework Advisory Formatting Action FAs determine how the outgoing digit string is formatted.
FAN	Command for cooling fan feature. The EAGLE 5 ISS will report on the alarm conditions of the fan assemblies. Once you have turned on the feature, you cannot turn it off. The feature applies to any and all fans installed within the system. When replacing a fan assembly, the feature should already be turned on.
FAP	Fuse and Alarm Panel
FD	Feature Description File Descriptor File Duplicator Fixed Disk
FTA	File Transfer Area

F

	A special area that exists on each OAM hard disk, used as a staging area to copy files to and from the EAGLE 5 ISS using the Kermit file-transfer protocol.
FTP	File Transfer Protocol A client-server protocol that allows a user on one computer to transfer files to and from another computer over a TCP/IP network.

G

GB	Gigabyte — 1,073,741,824 bytes
GMT	Greenwich Mean Time
GPF	General Purpose Frame
GPL	Generic Program Load Software that allows the various features in the system to work. GPLs and applications are not the same software.
GPSM	General Purpose Service Module
GTI	Global Title Indicator

H

HDI	High Density Interconnect
High-Speed Multiplexer	See HMUX.
HIPR	High-Speed IMT Packet Router A card that provides increased system throughput and traffic

H

	capacity. HIPR moves EAGLE from an intra-shelf ring topology to an intra-shelf switch topology. HIPR acts as a gateway between the intra-shelf IMT BUS, running at 125Mbps, and the inter-shelf operating at 1.0625Gbps. The HIPR card will seat in the same slot as an HMUX card (slots xx09 & xx10 of each shelf).
HMUX	High-Speed Multiplexer A card that supports the requirements for up to 1500 links, allowing communication on IMT buses between cards, shelves and frames. HMUX cards interface to 16 serial links, creating a ring from a series of point to point links. Each HMUX card provides a bypass multiplexer to maintain the ring's integrity as cards are removed and inserted into an operational shelf. High-Speed IMT Multiplexer, a replacement card for the IPMX.
HS	High Speed

I

ID	Identity, identifier
IE	Information Element
IMT	Inter-Module-Transport The communication software that operates the inter-module-transport bus on all cards except the LIMATM, DCM, DSM, and HMUX.
IN	Intelligent Network

I

A network design that provides an open platform for developing, providing and managing services.

INA Information Network Architecture

INE Intelligent Network Entity

Interrogating Network Entity

INF Information

INH Inhibit

INN Internal Network Number

INP INAP-based Number Portability

Tekelec's INP can be deployed as a stand-alone or an integrated signal transfer point/number portability solution. With Tekelec's stand-alone NP server, no network reconfiguration is required to implement number portability. The NP server delivers a much greater signaling capability than the conventional SCP-based approach.

Intelligent Network (IN) Portability

IP Internet Protocol

IP specifies the format of packets, also called datagrams, and the addressing scheme. The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and

I

	re-assembly through the data link layer.
IPMX	IMT Power and Multiplexer card
IS-NR	In Service - Normal
ISO	International Standards Organization
ISS	Integrated Signaling System

L

LAN	Local Area Network A private data network in which serial transmission is used for direct data communication among data stations located in the same proximate location. LAN uses coax cable, twisted pair, or multimode fiber. See also STP LAN.
LED	Light Emitting Diode An electrical device that glows a particular color when a specified voltage is applied to it.
LFS	Link Fault Sectionalization A feature in the EAGLE 5 ISS that allows the maintenance personnel to perform a series of far end loopback tests, from the EAGLE 5 ISS and identify faulty segments of an SS7 transmission path up to and including the remote network element.
LIM	Link Interface Module

L

Provides access to remote SS7, IP and other network elements, such as a Signaling Control Point (SCP) through a variety of signaling interfaces (DS0, MPL, E1/T1 MIM, LIM-ATM, E1-ATM, IPLIMx, IPGWx). The LIMs consist of a main assembly and possibly, an interface appliqué board. These appliqués provide level one and some level two functionality on SS7 signaling links.

Link

Signaling Link

Signaling Link

Carries signaling within a Link Set using a specific Association. A Link can belong to only one Link Set and one Association. There is generally one Link per Association in a Link Set.

M

MAN

Metropolitan Area Network

MAS

Maintenance and Administration Subsystem

A set of cards located in the Control Shelf, used to provide a central management point for the EAGLE 5 ISS. The MAS provides user interface, maintenance communication, peripheral services, alarm processing, system disk interface, and measurements using the following three subassemblies: GPSM-II, TDM, and MDAL.

MASP

Maintenance and Administration Subsystem Processor

The Maintenance and Administration Subsystem Processor (MASP) function is a logical pairing

M

	of the GPSM-II card and the TDM card. The GPSM-II card is connected to the TDM card by means of an Extended Bus Interface (EBI) local bus. The MDAL card contains the removable cartridge drive and alarm logic. There is only one MDAL card in the Maintenance and Administration Subsystem (MAS) and it is shared between the two MASPs.
MAU	Media Access Unit An industry standard single port Ethernet transceiver that connects the E5-ENET to the Ethernet.
MB	Megabyte — A unit of computer information storage capacity equal to 1,048, 576 bytes.
MCA	Matrix Controller Assembly
MCAP	Maintenance Communications & Applications Processor
MCPM	Measurement Collection and Polling Module The Measurement Collection and Polling Module (MCPM) provides comma delimited core STP measurement data to a remote server for processing. The MCPM is an EDSM with 2 GB of memory running the MCP application.
MDAL	Maintenance Disk and Alarm
MF	Miscellaneous Frame

M

MGTS	Message Generator and Traffic Simulator
MHz	Megahertz
MIM	Multi-Channel Interface Module
MMI	Man-Machine Interface
MODE	A parameter of the `chg-slt` command and a field in the `rtrv-slt` command output showing the mode used when sending signaling link test messages, regular or special. special - All SLTMs generated by the links in the link set associated with this SLTM record are designated "special" maintenance messages. regular - All SLTMs generated by the links in the link set associated with this SLTM record are designated "regular" maintenance messages.
MOP	Method of Procedure
MPL	Multi-port LIM
MPS	Multi-Purpose Server The Multi-Purpose Server provides database/reload functionality and a variety of high capacity/high speed offboard database functions for applications. The MPS resides in the General Purpose Frame.

N

NA	North America
NC	Network Cluster Network Code

O

OAM	Operations, Administration, and Maintenance The generic load program (application) that operates the Maintenance and Administration Subsystem which controls the operation of the EAGLE 5 ISS.
OAP	A stand-alone processor that acts as an interface between the EAGLE 5 ISS and OSS (operation support system) devices using standard interfaces and converting the communications to the EAGLE 5 ISS proprietary serial interface.
OAPF	Operations System Support / Applications Processor Frame
OCU	Office Channel Unit The interface used with the LIMOCU card.
OEM	Original Equipment Manufacturer

P

PR	Problem Report

R

RAID	Redundant Array of Independent Disks A group of disks presented to clients as one or more large virtual disks,

R

	with accesses coordinated among multiple disks concurrently to increase performance, reliability, or both.
RAM	Random Access Memory A type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed without touching the preceding bytes.
RJ	Registered Jack
RMA	Return Material Authorization
ROM	Read Only Memory
Route	A signaling path from an LSP to an RSP using a specified Link Set
RS	Requirement Specification
RTS	Ready to Send Request to Send
RX	Receive

S

SC	Site Collector
SCCP	Signaling Connection Control Part
SCSI	Small Computer System Interface There are two independent Small Computer System Interface (SCSI)

S

	buses, one to the fixed disks on TDM cards and the other to the shared administration SCSI bus that runs on the backplane between TDMs and the MDAL card. Each SCSI bus has a block of memory that allows transfers from memory to occur without delaying the application processor.
SEAS	Signaling Engineering and Administration System An interface defined by Bellcore and used by the Regional Bell Operating Companies (RBOCs), as well as other Bellcore Client Companies (BCCs), to remotely administer and monitor the signaling points in their network from a central location.
SI	Service Indicator
SS7	Signaling System #7
STC	Signaling Transport Card The Signaling Transport Card (STC) is a member of the DCM card family with an "eroute" generic program load (GPL) installed. The STCs provide the IP interface between the LIM cards on the IMT bus and the Signaling Extended Services Platform (ESP) subassembly. The STC is used for sending MSU data to the ESP/IMF.
STP	Signal Transfer Point STPs are ultra-reliable, high speed packet switches at the heart of SS7 networks, which terminate all link types except F-links. STPs are nearly always deployed in mated pairs for reliability reasons. Their primary

S

functions are to provide access to SS7 networks and to provide routing of signaling messages within and among signaling networks.

T

T1	Transmission Level 1 A T1 interface terminates or distributes T1 facility signals for the purpose of processing the SS7 signaling links carried by the E1 carrier. A leased-line connection capable of carrying data at 1,544,000 bits-per-second.
TCP/IP	Transmission Control Protocol/Internet Protocol
TDM	Terminal Disk Module Time Division Multiplexing
TO	Timing Output
TOCA	Timing Output Composite Automatic
TPS	Transactions Per Second
TRBL	Trouble
TSM	Translation Services Module Provides translation capability and Global Title Translation (GTT) implementation for the Local Number Portability (LNP) function and is used for downloading gateway screening tables to link interface modules (LIMs).

T

TX	Transmit

V

VOM	Volt Ohm Meter