Event 09 – DMS-100 Equipment Cabling

DMS-100 Physical Handbook
Installation Method – 03-9059

July 5, 2002

Pkgid: 0000007

NORTEL NETWORKS™

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1.0 General Information

1.1 Description

This event covers the installation instructions for power and switchboard cabling for the DMS-100 7 ft. frames and C21, C28 Model B, and C42 Cabinets.

1.2 Sequence

This event must be performed after Event 06 (Method 03-9056), "Grounding."

1.3 Reason for Reissue

Updates are indicated by change bars.

Updated Subsection 6.1, for CPCE bundled cable forming.

Added NTAX78BA to Subsection 6.1, Figure 42

Updated Subsection 11.4 for MIS bundled cable forming.

Updated Subsection 25.2. Added refernce to 1400 spec and bottom fed installations and resequenced paragraphs 10 to 13.

Updated Subsection 25.4 for bundled DSX cable forming.

Updated Subsection 31.5, for Model B bundled cable forming.

Updated Subsection 33.2, for Model B Remote bundled cable forming.

Closes Alert(s): None

Closes CR(s): Q00430243, Q00460743 and Q00416586

Replaces IM 03-9059 dated April 19, 2002

2.0 Material Requirements

2.1 Required Documents

Installation Safety Manual (ISM/IMO) - on CDs for U.S. and Canadian markets. U.S. (ISM) also on Installation Safety homepage.

2.2 Tools and Supplies

Figure 1 lists the tools required for completion of this event.

Figure 1 – DMS-100 Tools

U.S.Tools	Canadian Tools	Description
T-1000	N/A	Supervisor Tool Kit 1
T-2000	N/A	Supervisor Tool Kit 2
1025	E-7282	Ammeter, Volt-Ohm, Clamp-on
T-1514	R1514	Cable Slicer
T-1785	N/A	Twist Drill Bit, 5/16"
T-2878	N/A	Stripper, Cable PVC Sheathing
T-3777	N/A	Wire Wrap Gun, Electric
T-7229	N/A	Multimeter, Digital
T-8441D2	A8441D	Crimper, 14 ton, #8 awg to 750MCM
T-8448	A8448	Crimper, WT-1300
T-8702	A8702	Cutter, Hydraulic
T-8508	A8508	Ladder, Platform, Fiberglass, 8 ft.
T-9936	N/A	Crimper, Hand, DMS-100 (WT-117S) Accessory
T-9909	R3642	Pliers, cutting miniature
T000560	A8893	Cable Cutter, Ratchet Type
T000886	N/A	Black plane Tarp
T000884	N/A	Patlon protective cover
K001356	N/A	Insulated tool kit

Note: that the dimensions of the ty-raps are approximate and not actual. Where the ty-rap part numbers are used in this event, substitute the appropriate part numbers for your market.

Figure 2 lists the supplies required for the completion of this event.

Figure 2 – DMS-100 Supplies			
U.S.	**Canadian**	**Qty.**	**Description**
P0590550	N/A	1	15" Ty-rap
P0567232	RE80105		7.5" Ty-rap
P0567226	RE80109		4" Ty-rap
N/A	RE80102		11" X 5mm Ty-rap
P0633713	N/A		Marking Ty-rap
R0112478	R0112478	1	Compound, N0-OX-ID-A
R0112611	N/A		Twine, Wax
S0007	N/A		Pen for Marking Ty-raps, Black
GS-105	N/A		Pen, Venus Sharpie
R0054458	R0054458	1	Tape, Black Electrical
S0002	S5198	3	Safety Signs Package

Note: The dimensions of the ty-raps are approximate and not actual. Where the ty-rap part numbers are used in this event, substitute the appropriate part number for your market.

No other materials are required to perform this event.

2.3 Software

1 To determine the current Base load that the switch is running on, type the following at the CI prompt:

>**IMAGENAME**

The current load information will be displayed. The Base load can be determined by examining the line containing LAYER: BAS.XX.Y.ZZ (XX = Base Load Number)

The following is an example display.

PRODUCT: LEC0.011
LOAD: LEC00.011
LAYER: BAS.12.0.BA
LAYER: TL.11.0.BA
LAYER: SHR.11.0.AA
LAYER: CCM.11.0.BG
LAYER: CNA.11.0.BG

This example is at Base Load 12.

3.0 Precautions and Preparations

3.1 Precautions

Observe the general safety precautions against personal injury and equipment damage outlined in the ISM/IM0 at all times.

Caution: Unseat 6X50s prior to wire wrapping (DSI) leads on the backplane. Only unseat the 6X5s from the slots being wire wrapped. After wire wrapping is complete, re-seat the 6X50s.

Caution: Prior to powering up the PDC/CDC, all power feeds between the PDC/CPDC and the customer power source must be verified. Verify the power feeds per Subsection 5.4

3.2 Preparations

Prior to starting the operations presented in this event; arrange all materials, tools, and test equipment at the work location to minimize fatigue and inconvenience.

4.0 Procedures

4.1 Overview

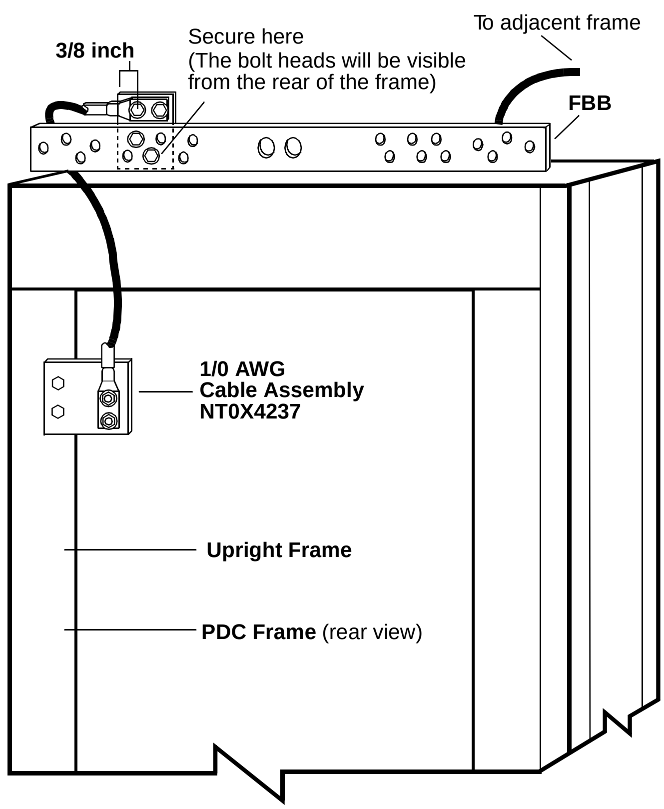
This event covers DMS-100 power and switchboard cabling activities.

5.0 Power Distribution Frame

5.1 Power Distribution Center (PDC) Frame Assembly

1 Terminate the frame ground and aisle ground to the FBB at the top of the frame. Refer to Figure 3 for the PDC frame ground connection.

Figure 3 – PDC Frame Ground Connection



2 Install the NT0X4237 Cable Assembly bolts that secure the #1/0 cable to the adapter plate so that the head of the bolts will be inserted through the adapter plate and then through the cable assembly. The hex nut will be visible from the rear of the frame. Bottom fed configuration requires the NT0X4237 Ground Cable Assembly to be installed at the bottom of the frame.

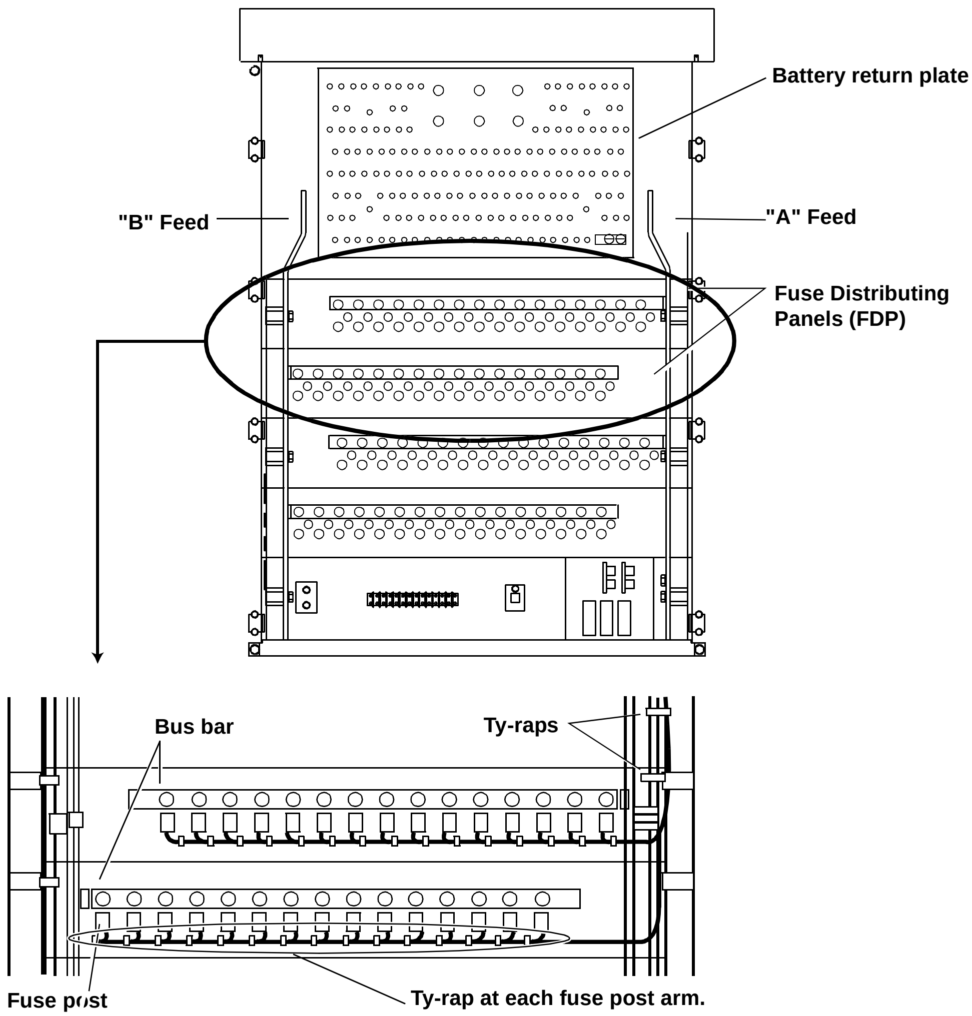
3 The battery and return cables may require protection in the area where the NT0X4237 Ground Cable Assembly is installed. Install protection around the cables if the adapter plate securing hardware comes in contact with the battery and return leads. Refer to Event 7 for acceptable types of material used to protect cables from sharp edges/areas.

4 Install fuse designations on frame designation strip, per the D640 job drawing and refer to Event 02 (Method 03-9052), "Floor Preparations."

5 DC power is connected through two separate feeders and return cables from the -48V office batteries or the Remote Distribution Bay (RDB) to the PDC. Fuse panels in the PDC provides dc power by way of feeders and return cables to the Frame Supervisory Panels (FSP), inverters, and magnetic tape drives in IOE frames.

6 The equipment battery returns are terminated to the copper plate mounted in each PDC frame. Refer to Figure 4.

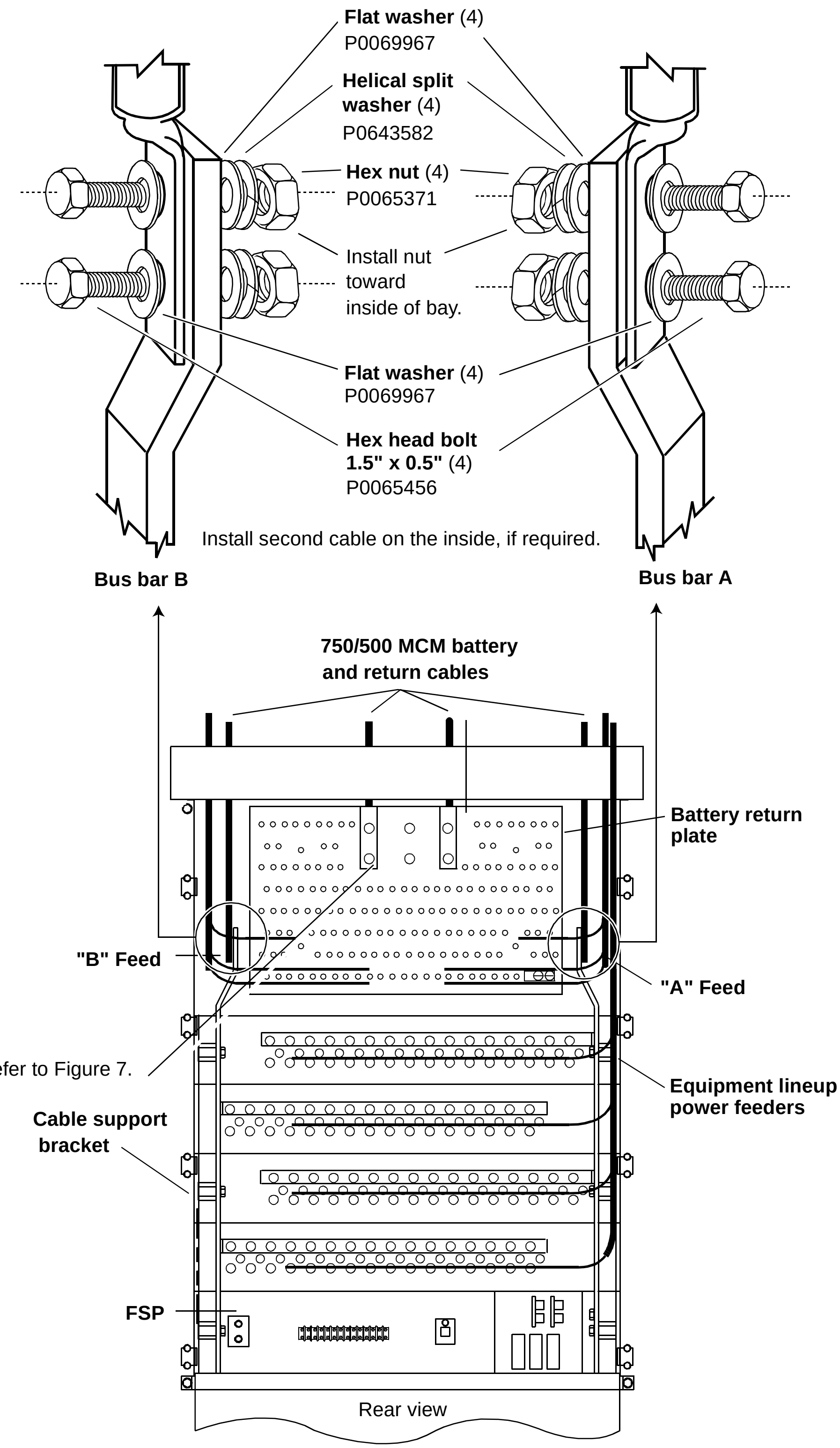
Figure 4 – Power Distribution Center (Rear View)



7 Check all torque settings at the inspection torque setting; any screw or bolt found loose must be torqued to the initial torque setting. Any new connection must be torqued to the initial torque setting. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for the correct torque measurements.

5.2 Top Mounted - Top Feed PDC

Figure 5 – Forming and Terminating a Top-Feed PDC



1 Figure 5 illustrates forming and running cables for a top feed PDC.

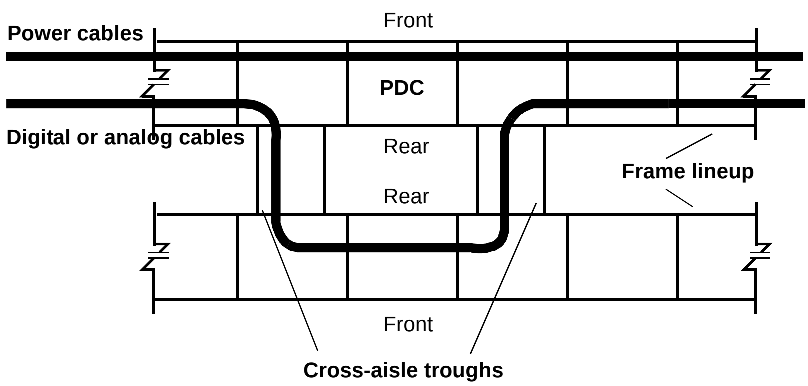
Two battery return plates are available for this application:

B0232700 128 positions
B0232703 164 positions

2 Drop the power cable into the frame through shields 2, 3, and 4 on a top feed PDC. When the PDC is located in the middle of a lineup, only shield one will be left open for analog or digital cables.

If the cable build up is heavy, it may be necessary to install cross-aisle cable troughs and route analog and/or digital cables around the PDC, as shown in Figure 6. Verify routing with Engineering.

Figure 6 – Cable Routing Example for PDC in Middle of Lineup



3 When a PDC is installed in the middle of a lineup, plastic protection strips (B0231978, enough for one PDC) must be placed on the trough to protect the cables from sharp edges.

These strips are to be cut to length and installed along the inside edges of the troughs. When installing cables in an existing PDC, ensure that this protection is in place. If not, contact Engineering about obtaining plastic protection strips.

4 Terminate the *A* and *B* battery feeders to their respective bus bars. (*A* battery on right, *B* battery on left as viewed from rear of PDC.) Refer to Figure 5 for *TOP* feed PDC terminations of *A* and *B* battery feeders.

5 A reference sheet is enclosed with each T&B connector package. This reference sheet gives detailed installing information and should be referenced before beginning any crimping operations. The correct strip length and the proper number of compressions (crimps) are included in the information. For more information, refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements."

6 Some customers require the use of long barrel lugs with Super Flex cable. Refer to Specification 484 for the correct lugs. These lugs will have the number of crimps, location, and die to be used marked on the lug.

If long and short-barrel lugs are provisioned, use the long-barrel lugs on the chandelier end. Short-barrel lugs can be used in the frame where there is no movement of the cable.

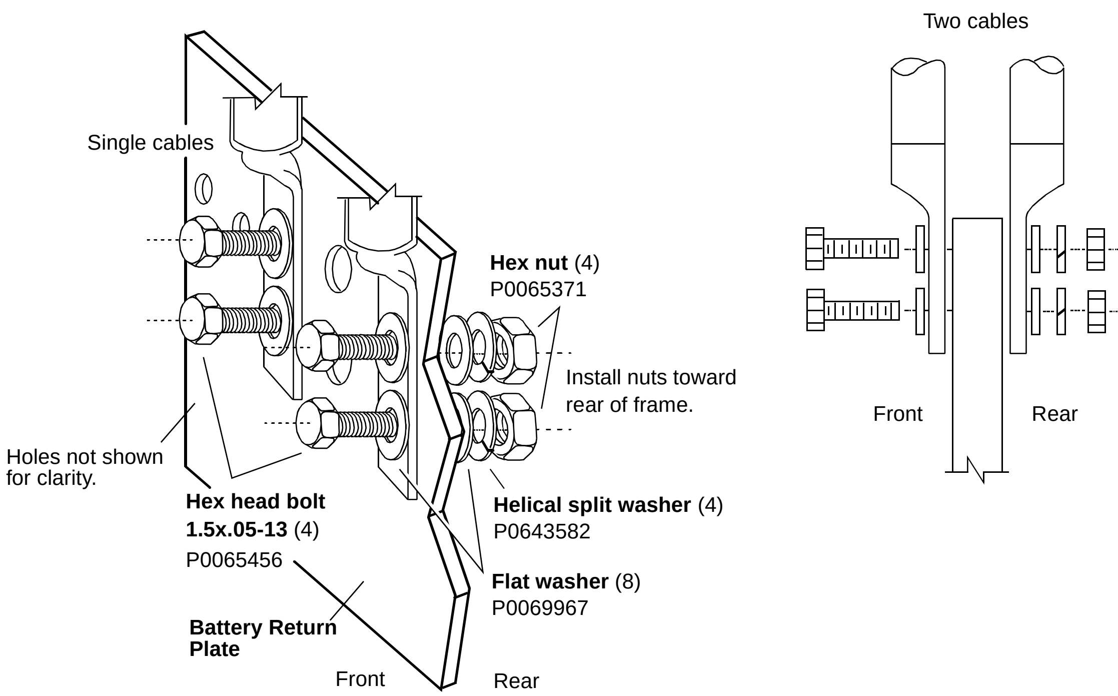
The hardware used to secure the cables to the chandelier is to be installed with the head of the hex head bolt towards the center of the earth. The hardware is to be installed in the same direction as the FBE/LRE cables. Refer to Event 06, "FBE/LRE Assembly

Installation" subsection for additional instructions.

7 Secure the lug to the bus bar as shown in Figure 5 or Figure 8. If two cables are installed, the cables should be on opposite sides of the bus bar.

8 For top mounted, top feed, battery return plates, secure the 750/500 MCM ground return cables to the battery return plate as shown in Figure 7. If only one cable is installed per mounting hole, install the cable to the inside of the frame. Install the mounting hardware so that the nut is facing the rear of the frame.

Figure 7 – Secure Cables to Battery Return Plate



9 Take care when crimping to ensure that no shiners are present between the cable butt and the lug. The space between the cable insulation and the body of the lug shall not exceed 1/16 inch.

10 For non-tinned bus bars only, the bus bar and the battery return plate are to be cleaned on both sides at point of connection of 750/500 MCM cables using aluminum oxide sandpaper or wire brush.

11 Use a thin coat of NO-OX-ID-A Special on both sides of the bus bars and the battery return plate at the point of connection of these 750/500 MCM cables.

Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for further information on cleaning bus bars and applying NO-OX-ID-A compound.

12 Battery return cables to the equipment lineups must be identified at the PDC battery return plate and at the equipment on which they originate.

Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

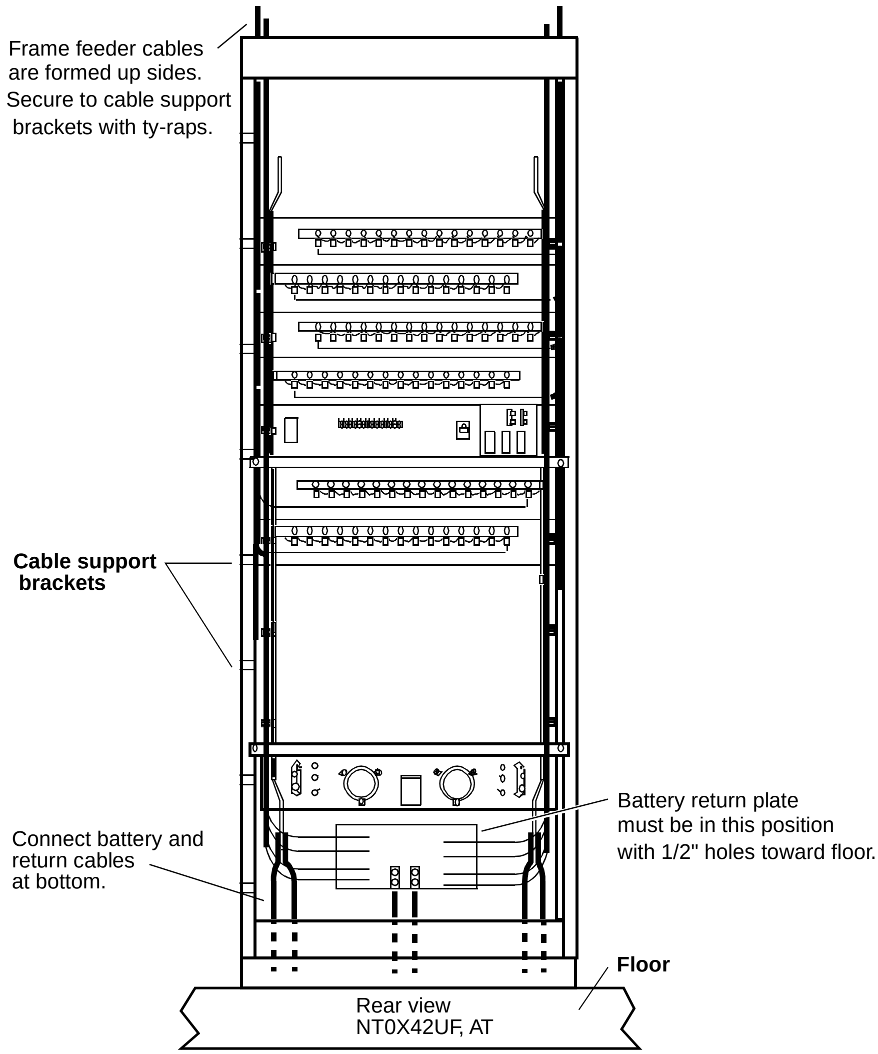
5.3 Bottom Mounted - Bottom Feed PDC

1 There are sites that require the PDC to be fed from the bottom. The battery return plate will be mounted at the bottom of the PDC in a reversed position from a top feed PDC. (The 1/2 inch holes will be turned toward the bottom of the frame.) Refer to Figure 8.

Two battery return plates are available for this application:

B0232700 128 positions
B0232703 164 positions

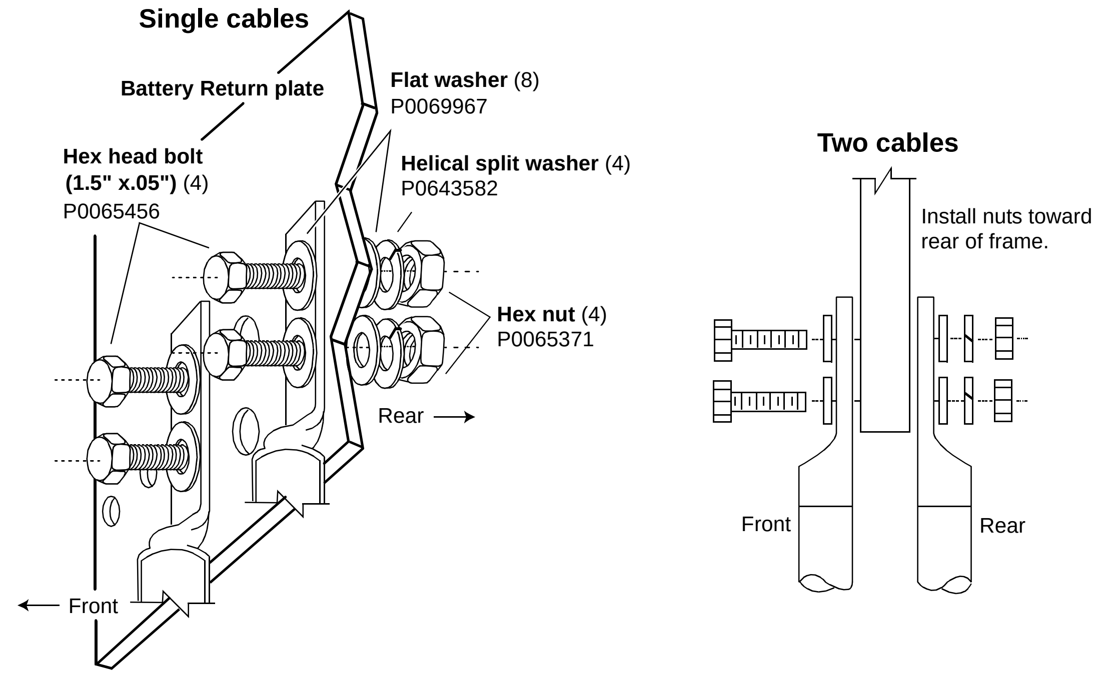
Figure 8 – Forming Cables - Bottom-Mounted Plate



2 For bottom mounted, bottom feed, battery return plates, secure the 750/500 MCM battery return cables to the battery return plate as shown in Figure 9. If only one cable is installed per mounting hole, install the cable to the inside of the frame.

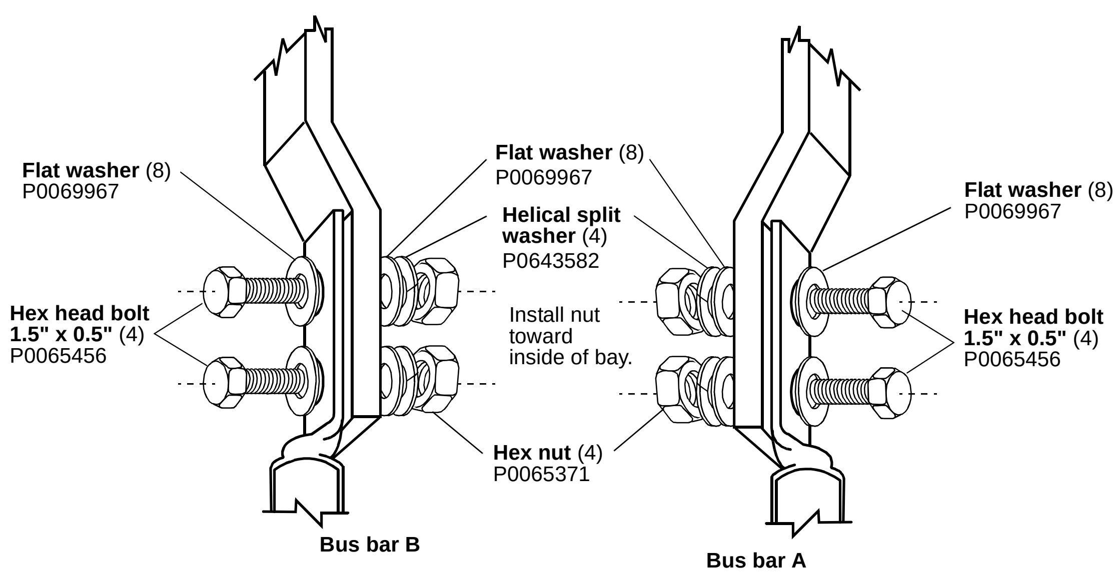
Install the mounting hardware so the nut is facing the rear of the frame. Apply NO-OX-ID-A Special as outlined in Subsection 5.2, paragraph 11.

Figure 9 – Connecting Cables - Bottom Mounted Battery Return Plate



3 Terminate the A and B battery feeders to their respective bus bars. (A battery on right, B battery on left viewed from rear of PDC.) Refer to Figure 10 for BOTTOM feed PDC terminations of A and B battery feeders.

Figure 10 – Terminate Feeders - Bottom Feed PDC



4 The remaining cables are dressed in the same manner as a top feed PDC.

5.4 Cable Verification

1. Verify that the cables between the PDC and the power plant are not terminated. If cables are terminated, disconnect the cables before proceeding with this method.
2. All cables between the PDC and the power plant must be labeled.
3. Verify using a multimeter that the cabled designated as A feed is designated and labeled as A feed.
4. Once this cable is verified and labeled correctly, this cable should be terminated immediately to the appropriate termination at the PDC and the power plant.
5. Verify using a multimeter that the cabled designated as A Return is designated and labeled.
6. Once this cable is verified and labeled correctly, this cable should be terminated immediately to the appropriate termination at the PDC and the power plant.
7. Verify using a multimeter that the cabled designated as B feed is designated and labeled as B feed.
8. Once this cable is verified and labeled correctly, this cable should be terminated immediately to the appropriate termination at the PDC and the power plant.
9. Verify using a multimeter that the cabled designated as B Return is designated and labeled.
10. Once this cable is verified and labeled correctly, this cable should be terminated immediately to the appropriate termination at the PDC and the power plant.
11. Repeat the above steps for each A and B feed running between the PDC and the power plant.
12. Prior to powering up the PDC, using a multimeter check the terminations at the power plant.

5.5 Forming Bundle Power Cables at the PDC Frame

Note: Skip this subsection if Bundle Power Cables are not being installed.

1 Power cables are bundled together and shipped to site with one end pre-lugged. The lugged end is to be terminated at the FSP/MSPs of the equipment frames. The non-lugged end of the cables are to be terminated in the PDC. The cable ends that terminates on the PDC is secured in place by heat shrink. The heat shrink is to be removed when the cables are terminated in the PDC.

2 **DO NOT** terminate bundled power cables in the PDC until the pre-lugged ends have been terminated.

3 Bundled power cables should be run from the equipment frames to the PDC with the slack being formed into the PDC frame. Once the correct length is determined, the slack is to be cut off and discarded in a safe manner. Storage of cable slack may become an issue if the PDC end of the power cables are terminated first.

4 Each individual cable has a cable tags attached.

5 Form the slack towards the PDC frame.

6 The bundled power cables will be shipped to site in unique bundles for each frame being installed. The bundled power cables will be either 10 Ga., 8 Ga., or 6 Ga. There will be 2 bundles per frame. One bundle will contain all of the battery return leads and the other bundle will contain the power feeders.

7 Cables are to be terminated and formed in the PDC is indicated in subsections 5.5, Forming Feeders at the PDC Frame.

5.6 Forming Feeders at the PDC Frame

1 Form the frame power feeders first. Do *not* tighten the nut closest to the insulator prior to connecting cables at the fuse stud in the rear of the PDC frame. This action will cause damage to the fuse stud or cause the stud to separate from the fuse clips in the front of the frame. If the nut is visibly loose, tighten the nut to 5 in-lbs. using a torque screwdriver. Do *not* tighten nut with any other type of wrench.

2 Route the frame feeders down the right-rear upright for the fuse panels mounted in fuse positions 62, 58, 54, and 50. Route the frame power feeders for fuse positions below shelf 45 down the left-rear upright.

PDC Forming Tool (T0145) is used as a template to provide uniformity in the power feeder form into each fuse position and to eliminate cable cross-overs. The tool is available in the Regional Tool Facility.

3 Form the feeders horizontally across the fuse panels.

4 Secure the form with ty-raps at every cable breakout or four inches apart (*example:* fuse position at 1 and 9). Place cable ty-rap at cable breakout for 1 and 8, and four inches apart between the two.

5 Form each individual power feeder out of the main form to each fuse position. The length is to be four inches +/- 1/2 inch. The length is measured from the connecting point to the inside of the main form. Ensure that the length of power feeder is sufficient to prevent the 90-degree lug from straightening out.

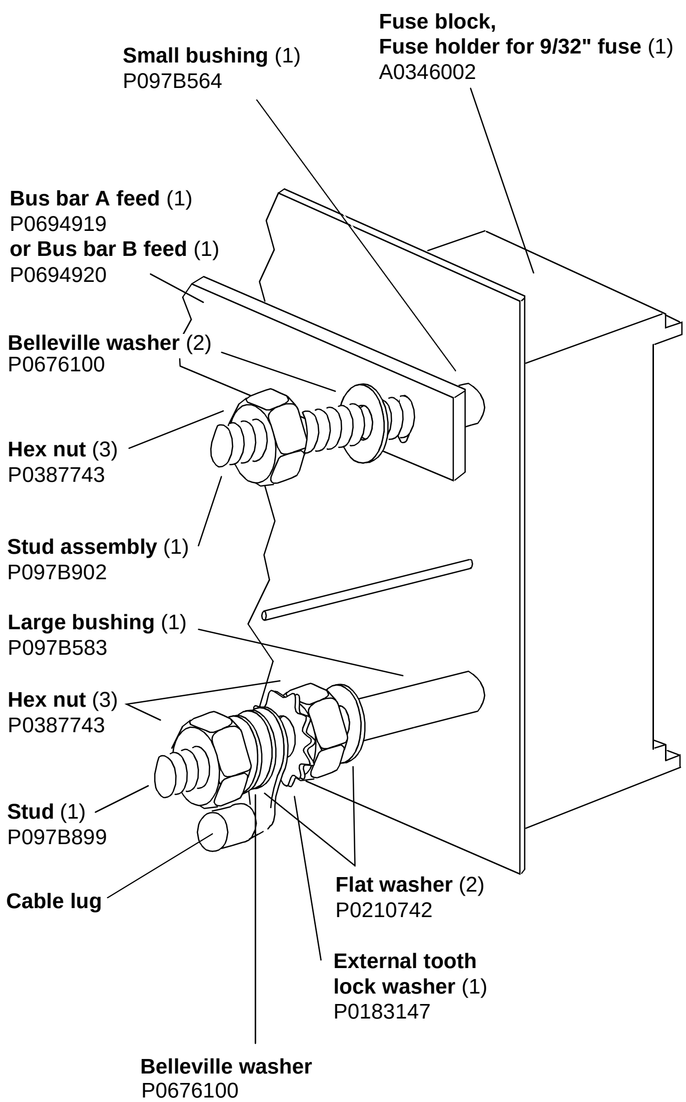
6 Butt and strip each power feeder cable to install a crimping lug. Ninety degree lugs are to be used. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for proper lugs and crimping information.

7 Refer to Figure 11 for the hardware stackup for fuse positions found in the UL approved fuse panels. UL approved fuse blocks are NT0X42UB/UC.

8 Power feeder cables to the equipment lineups must be identified at the PDC fuse panel and at the equipment on which they originate.

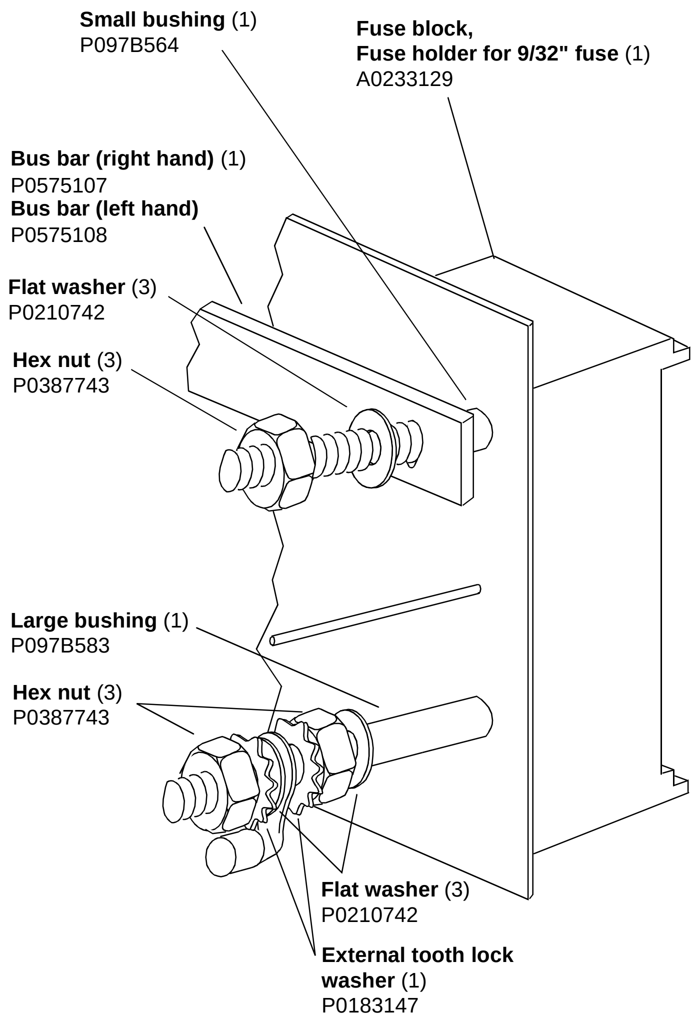
Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

Figure 11 – Fuse Block Hardware (UL-Approved)



9 Refer to Figure 12 for the hardware stackup for fuse positions found in the non-UL approved fuse panels. Non-UL approved fuse blocks are NT0X42AB/AC.

Figure 12 – Fuse Block Hardware (Non-UL Approved)



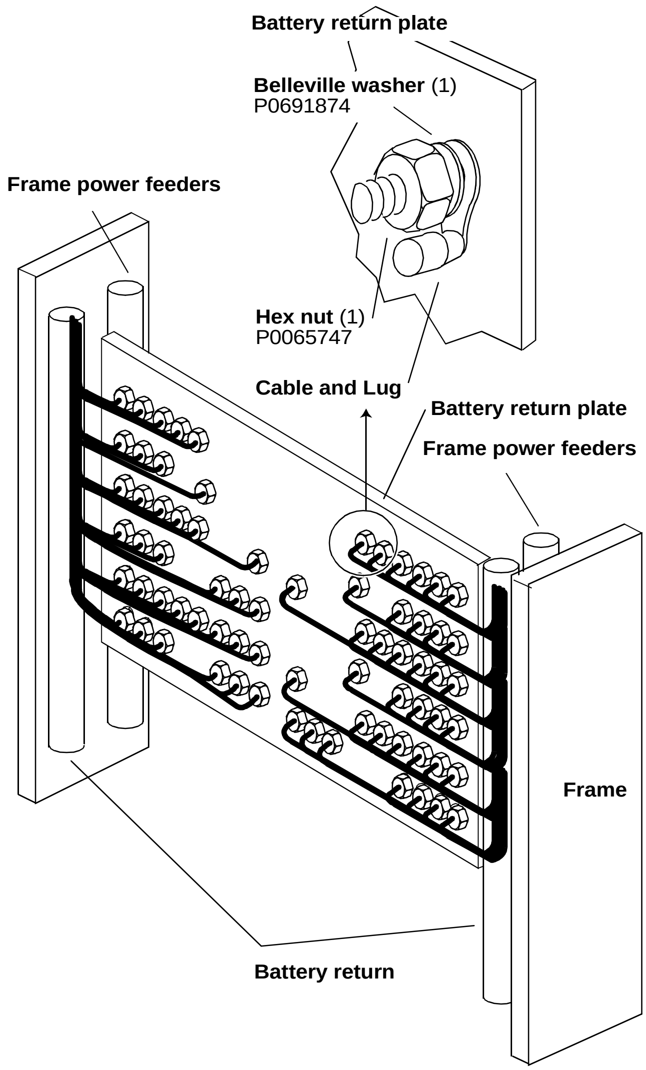
10 Torque the connection made at the fuse stud and ABS terminal strip. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for correct torque values and tools.

11 Do *not* tighten the hex nut located next to the insulator on the fuse stud in the rear of the PDC frame. If this nut appears loose, use (T0008) torque screwdriver and tighten to 5 in-lbs.

12 Form the battery returns after the frame power feeders have been formed. The hardware build up is shown in Figure 13.

13 PDC Ground Bus Bar Assembly B0232700 and B0232703 is equipped with studs. Refer to Figure 13 for method of terminating on the battery return plate.

Figure 13 – Method of Terminating at Battery Return Plate and Forming Battery Returns at Return Plate



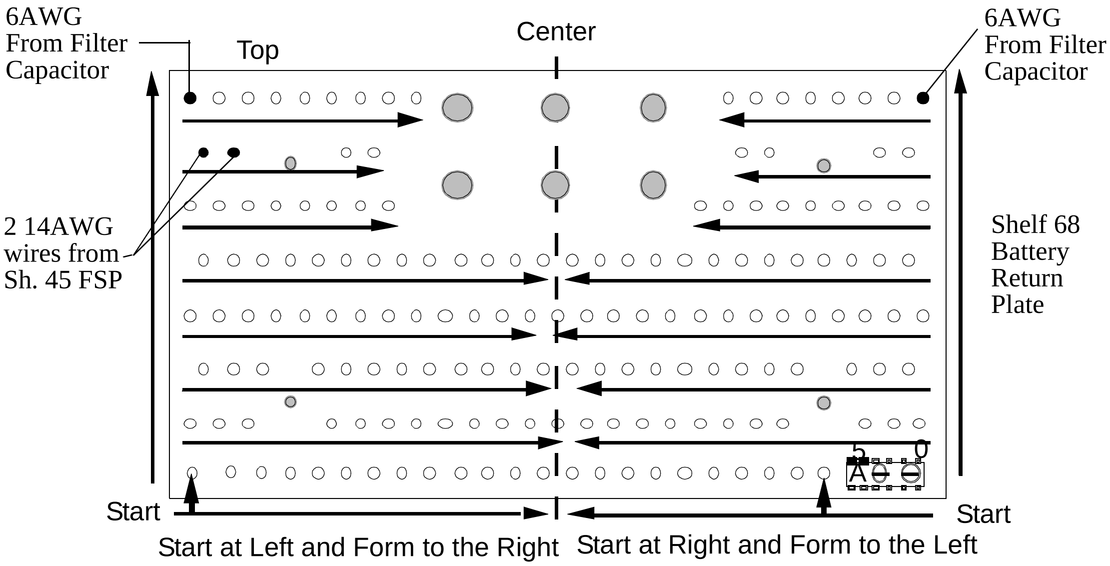
Note: For extension jobs, 90 degree lugs are preferred. Straight lugs may be used if requested by the customer or if 90 degree lugs are not supplied. Refer to Figure 16 for Alternate Extension Applications.

14 Route half of the battery returns down the right, rear upright and half down the left, rear upright. Use separate forms for battery returns and battery feeders, per Figure 13.

15 Form the battery returns horizontally across the battery return plate. Individual returns are to be formed out of the main form to each battery return stud. This method is similar to forming the frame power feeders and should be three inches +/- 1/2 inch, measured from the connecting point to the inside of the main form.

16 Form the battery returns starting with the bottom horizontal row of studs. Begin with the outside stud and form the returns toward the center of the frame and up. Do *not* skip studs. Form one row at a time. Refer to Figure 14.

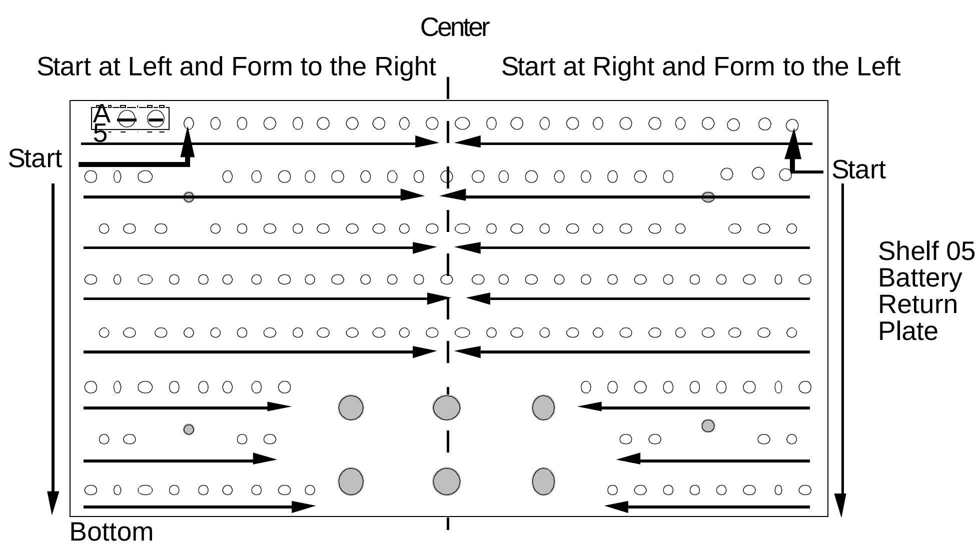
Figure 14 – Method of Terminating at Battery Return Plate (Top Feed)



○ 1/4” bolts available for connecting equipment return cables
● 1/4” bolts connecting cables from filter panel and FSP
1/4” bolts that secure battery return plate to front panel
1/2” bolts for connecting primary return cables (350, 500, 750 MCM)

17 Refer to Figure 15 for bottom feed PDC.

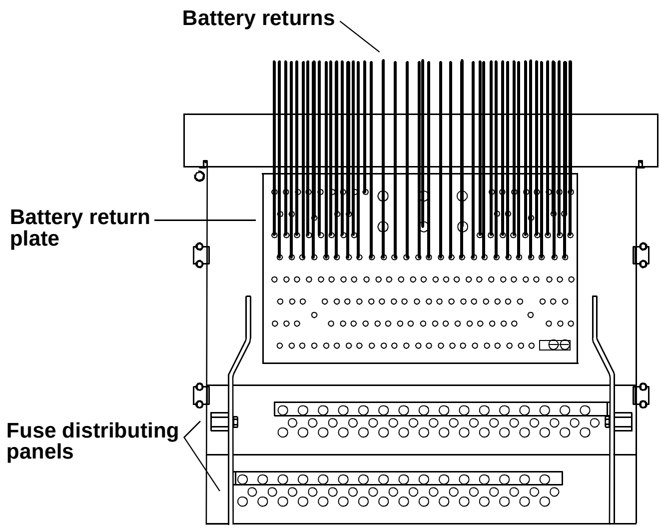
Figure 15 – Method of Terminating at Battery Return Plate (Bottom Feed)



○ 1/4” bolts available for connecting equipment return cables
● 1/4” bolts connecting cables from filter panel and FSP
1/4” bolts that secure battery return plate to front panel
1/2” bolts for connecting primary return cables (350, 500, 750 MCM)

18 **Alternate Extension Applications:** Route the battery returns straight down through the PDC cable trough with as few crosses as possible. Terminate on the PDC battery return plate beginning with the top row of terminating studs. Refer to Figure 16.

Figure 16 – Forming Battery Returns at Return Plate (Canadian/International Applications)



19 Each battery return cable must be butted and stripped to install a crimping lug. For U.S. Applications, 90-degree lugs are to be used. Add a thin coat of NO-OX-ID "A" Special to #8 AWG and larger leads before adding lugs.

20 Secure the battery returns with ty-raps at each return.

21 Secure the battery return forms to the side of the frame in the same manner as the power feeder returns.

22 Use 90-degree lugs for 1/4" studs to terminate on the battery return plate.

5.7 PDC Frame Alarm Battery Supply (ABS) Cabling

1 Run the frame aisle multiple cables between adjacent frames with the slack secured to cable brackets in the vertical. Secure the slack to the traverse arms on the right side of the left frame viewed from the rear. Do not store the slack between two adjacent frames traverse arms. This may cause damage to the cables.

2 Route the frame aisle alarm multiple cables directly across the back of the frame for all adjacent frames without entering the cable trough. Secure the cables to the traverse arms where available. Slack is to be stored in the vertical. Do not store the cables between (inside of) 2 traverse arms. This may damage the cables.

3 Route the frame aisle alarm multiple cables up the right, rear upright and through the cable troughs to non-adjacent frames. Secure the cables with ty-raps to the cable bracket along with other switchboard cables.

4 Route the ABS leads directly across the back of adjacent frames without entering the cable trough.

5 Use 90-degree sweep turns to terminating point on top row of terminals. Use ty-raps around form to hold in place between vertical form and terminating point. If the assigned terminating points already has 2 lugs, use another top location that has less than 2 lugs in the TB1-7 to TB1-10 area. If all top terminating points have 2 lugs, use

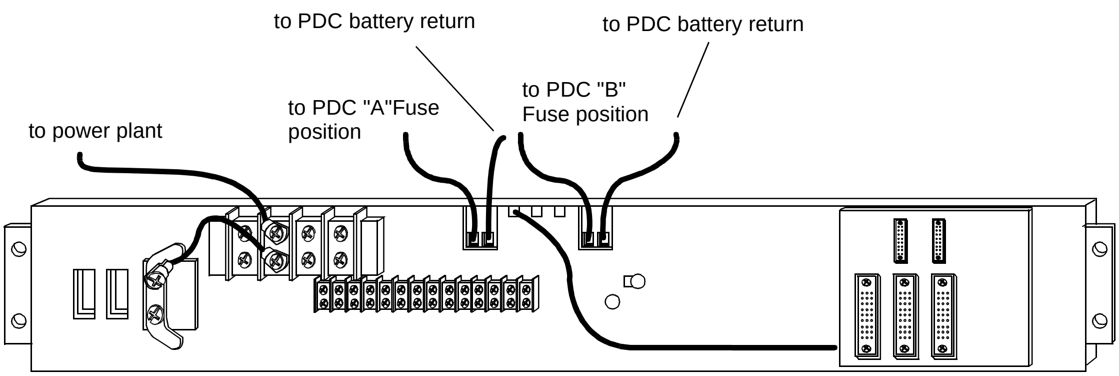
the bottom rows of terminals in the TB1-7 to TB1-10 area. Mark the D640 Drawings when this activity is completed to indicate the change.

6 ABS cables to the equipment lineups and their multiples in equipment lineups must be identified at both ends.

Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

7 For Enhanced Alarm System (EAS) Upgrade or PDCs equipped with EAS, refer to Method 65-1385, "Enhanced Alarm System (EAS) Upgrade." Once the Upgrade is complete ensure the FSP is updated to the current release. Refer to Figure 17 for a rear view of the FSP equipped with EAS.

Figure 17 – Rear View of PDC FSP with EAS



5.8 Label Battery and Battery Returns on PDC Frame

1 The 750/500 MCM battery and return leads are to be labeled at the PDC frame and the power source equipment. The label should describe where the cable is terminated at both ends.

2 Use 145C number plate tags (A0024293) (U.S. applications) or E-8014/E-8015 cable tie markers (Canadian/International applications) for this purpose. A black Venus sharpie pen should be used. Use lacing cord to secure the 145C number plate to the battery and battery returns.

3 On one side of the tag, 145C for U.S. applications or E-8014/E-8015 for Canadian/ International applications, the battery feeders should be marked PDC # BATT *A* or PDC # BATT *B.* The battery returns should be marked PDC # *A* RTN or PDC # *B* RTN.

4 If a chandelier is used between the PDC and power source, tags should be used on the cables only if both cable ends are not visible for inspection.

5 The other side of the tag, 145C for U.S. applications or E-8014/E-8015 for Canadian/ International applications, should indicate where the cable is terminated at the power source. If Nortel Networks terminates leads in power boards, the field technician shall label per the termination points such as PWR BD 01, F3 or PWR BD 01, Battery Return bar or customer requested method. (Generally, Nortel does not terminate these cables in the power room and does not have this information readily available.)

5.9 Extension Battery Return Panel Installation (ISG)

1 Extreme ***caution*** must be observed when performing this subsection on an inservice office. Temporarily cover the -48V supply bus bars with fiber or tape for protection.

2 Remove the four screws securing the filler panel to the PDC frame. Retain the screws for later use.

3 Carefully pull the filler panel straight out of the PDC frame avoiding contact with the A and B -48V power supply bus bars.

4 Remove the four screws securing the spare fuse holder onto the filler panel. Remove the spare fuse holder and save the mounting screws for later use.

5 Store or discard the filler panel per the customer's instructions.

6 Remove the two side screws which secure the extension battery return plate onto the panel and install the spare fuse holder into the panel's existing holes using the original mounting screws.

7 The spare fuse holder should be mounted on the right side of the panel (viewed from front), so the position (up or down) of the large cable termination holes on the battery return plate must be taken into consideration before re-mounting the spare fuse holder. Refer to Figure 10.

8 The extension battery return plate should be installed with the large cable termination holes facing down for ease of routing and terminating the 500 MCM Super Flex cable. Alternate methods are acceptable and may be used. Do not mix methods within the same office. Refer to Figure 18 and Figure 19.

9 Carefully guide the extension battery return plate straight into the PDC frame avoiding contact with the A and B -48V supply bus bars.

10 Secure the extension battery return plate onto the PDC frame using four self tapping screws (P097F813) supplied with the panels. Be sure to install a star washer (P0183220) and a flat washer (P0284154) at the lower left mounting position of the panel.

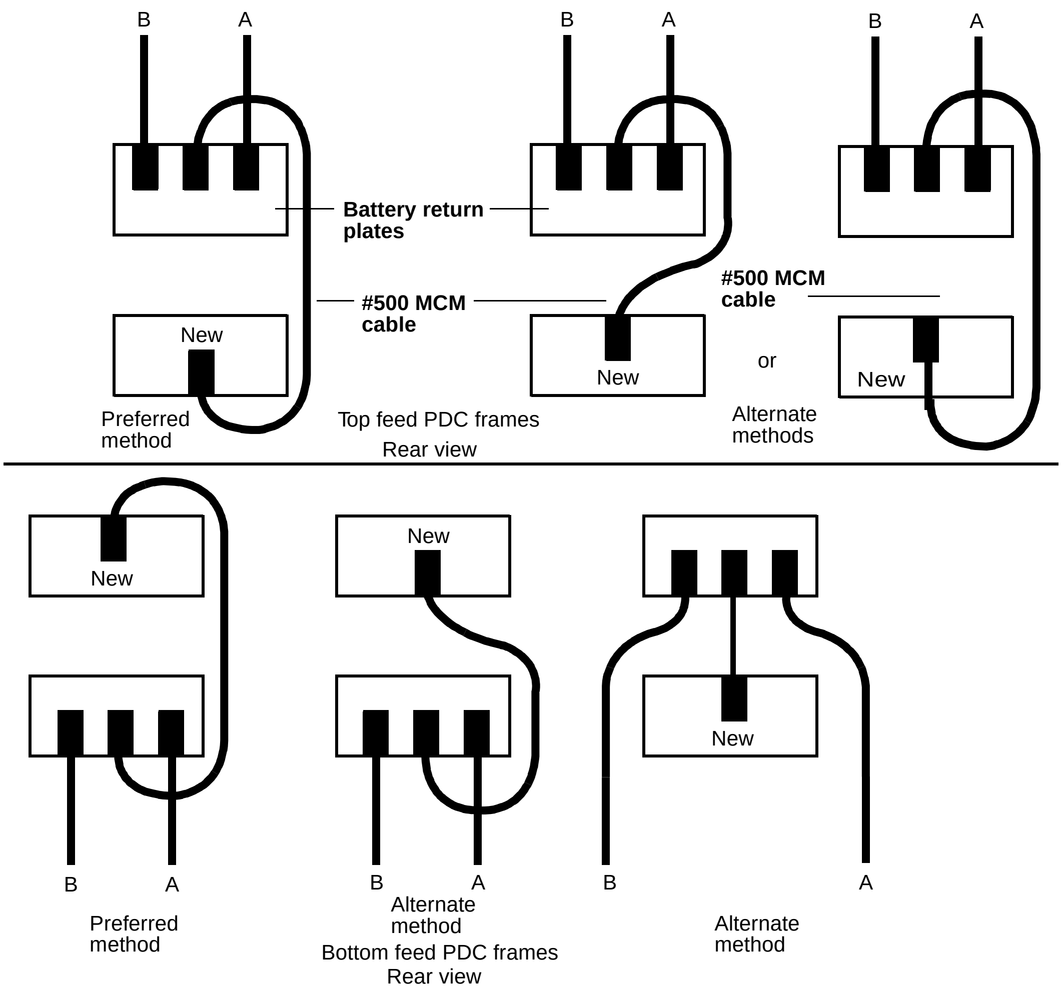
11 Assemble the hardware stackup as follows: screw, flat washer, star washer, return panel, then frame upright. Ensure that each return panel is fully secured before adding more panels.

12 Prepare the 500 MCM Super Flex cable for termination between the existing battery return ground plate and extension battery return plate by cutting to the required length and crimping the proper lugs on each end. Refer to Figure 19.

13 Apply a thin coat of NO-OX-ID-A Special to the battery return plates where the 500 MCM Super Flex lugs are to be terminated.

14 With one of the lugs taped for protection, terminate the other cable lug to the front (viewed from rear of frame) of the extension battery return plate and secure with the hardware provided. If the cable cannot be terminated to the front of the battery return plate due to space restrictions, etc., it may be terminated to the rear. Refer to Figure 19 for hardware stackup.

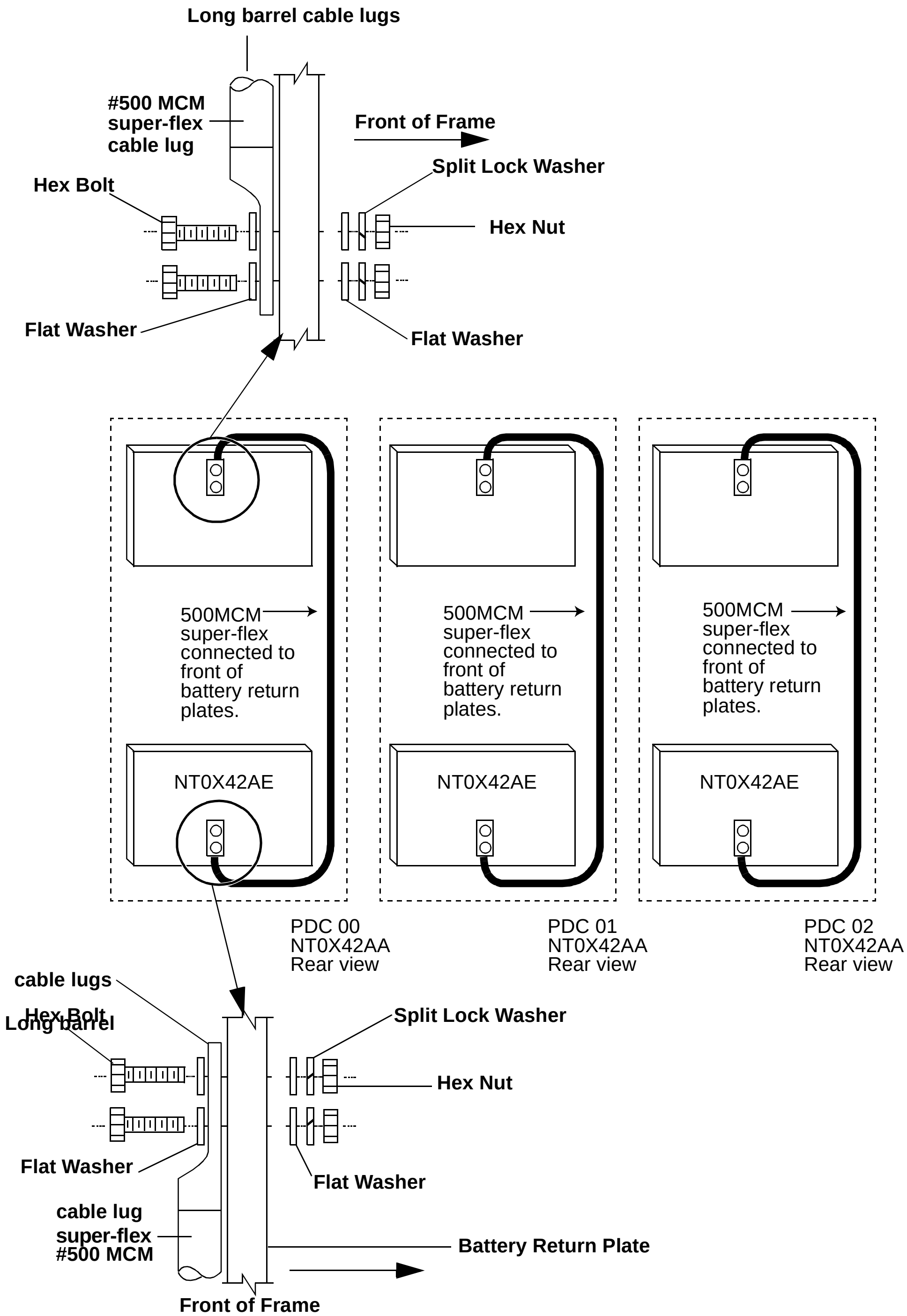
Figure 18 – 500 MCM Cable Configurations



15 Route the 500 MCM Super Flex cable along one side of the PDC frame as conveniently and neatly as possible. Ty-rap the cable to the PDC cable brackets (P0575110). Protect the cable at ty-rap points as outlined in Event 07 (Method 03-9057), "General Cabling and Torque Requirements."

16 Remove the tape from the cable lug and terminate it to the front (viewed from rear) of the existing battery return plate and secure with the hardware provided.
If the cable cannot be terminated to the front of the battery return plate due to space restrictions, etc., it may be terminated to the rear. Refer to Figure 19 for hardware stackup.

Figure 19 – PDC Cable Routes for ISG Offices



17 Repeat for each PDC frame requiring an extension battery return plate in ISG offices.

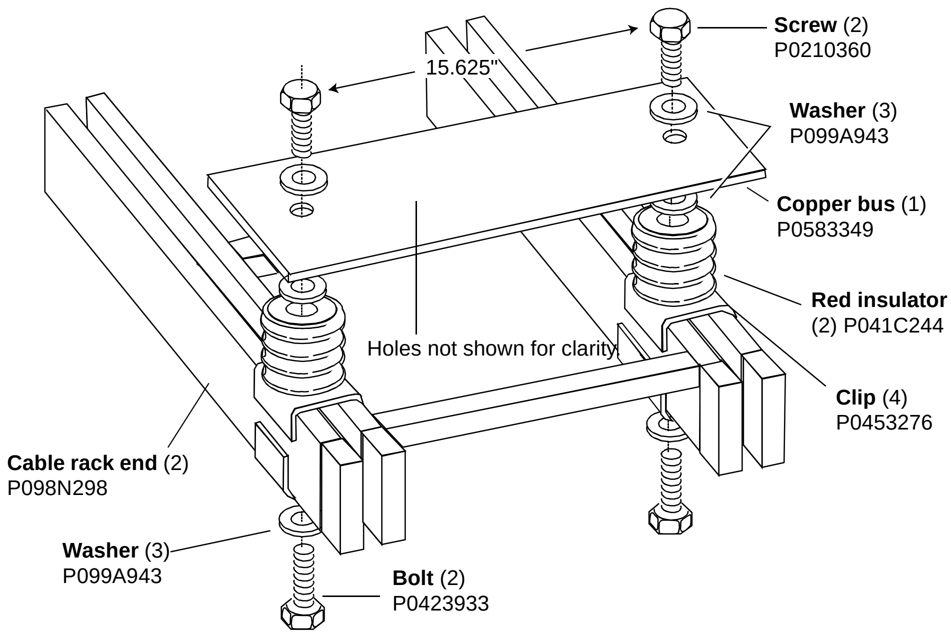
5.10 Extension Battery Return Plate Installation (Non-ISG)

1 A battery return, equalizer bus bar mounted on ladder rack is considered a *splice bus* and is required for non-ISG offices so that a cable termination position can be made available for the connection of the 500 MCM Super Flex cable on the existing battery return plate in the PDC frame.

2 This bus bar must be installed above each PDC frame requiring modification, even if a cable termination position is available, to allow for possible future office growth.

3 Install one battery return equalizer bus bar above (or in close proximity to) each PDC frame to be modified. The battery return equalizer bus bar may be mounted above or below the ladder rack, as required. Refer to Figure 20.

Figure 20 – Battery Return Equalizer Bus Bar Assembly



Note: Mount this assembly above each PDC Frame requiring modification. This assembly may be mounted above or below the ladder rack.

4 Connect the battery return equalizer bus bars together with the 750 MCM cable, lugs, and securing hardware provided. Route and lace the cable. Refer to Figure 19 for hardware stackup.

5 Extreme ***caution*** must be observed when performing this subsection on an inservice office. Temporarily cover the -48V supply bus bars with fiber or tape for protection.

6 Remove the four screws securing the filler panel to the PDC frame. Retain the screws for later use.

7 Carefully pull the filler panel straight out of the PDC frame avoiding contact with the *A* and *B* -48V power supply.

8 Remove the four screws securing the spare fuse holder onto the filler panel. Remove the spare fuse holder and retain the mounting screws for later use.

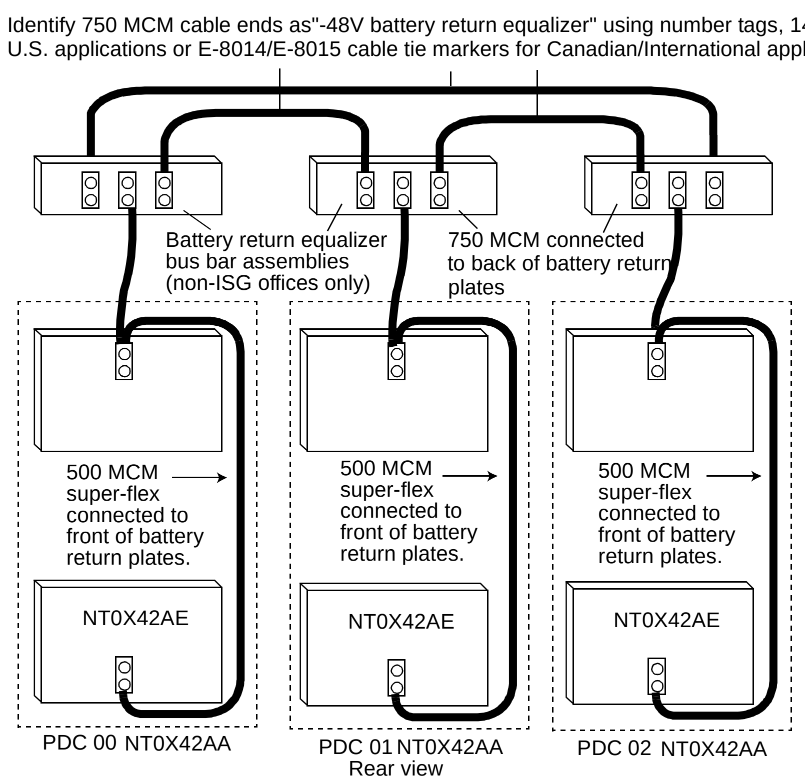
9 Store or discard the filler panel per the customer's instructions.

10 Remove the two side screws which secure the extension battery return ground plate onto the panel and install the spare fuse holder into the panel's existing holes using the original mounting screws.

11 The spare fuse holder should be mounted on the right side of the panel (viewed from front), so the position (up or down) of the large cable termination holes on the battery return plate must be taken into consideration before remounting the spare fuse holder. Refer to Figure 19.

12 The extension battery return plate should be installed with the large cable termination holes facing down for ease of routing and terminating the 500 MCM Super Flex cable. However, the holes may face up, if required. Refer to Figure 18 and Figure 21.

Figure 21 – PDC Cable Routes for Non ISG Offices



13 Carefully guide the extension battery return plate straight into the PDC frame avoiding contact with the *A* and *B* -48V supply bus bars.

14 Secure the extension battery return plate onto the PDC frame using four self tapping screws (P097F813) supplied with the panels. Be sure to install a star washer (P0183220) and a flat washer (P0284154) at the lower left mounting position of the panel.

Assemble the hardware stackup as follows: screw, flat washer, star washer, return panel then frame upright. Ensure that each return panel is fully secured before adding more panels.

15 Perform paragraphs 3 through 14 for each PDC frame requiring modification before proceeding to paragraph 16.

Reconfiguring the battery return equalizer cables, install the extension battery return plate and the battery return equalizer bus bars (all equalizer bus bars must be connected together with 750 MCM cables) for all PDC frames requiring modification. Refer to Figure 22, step 1.

16 Make two temporary 1/0 AWG jumper cables with sufficient length to reach the battery return plate in adjacent PDC frames (i.e., PDC 00 and PDC 01, and PDC 01 and PDC 02). Crimp single hole lugs on each end. Keep the jumper cables as short as possible.

17 Attach the jumper cables between the PDC frames by connecting each end to a ground stud on the battery return plate by means of *double lugging*. Temporarily secure the jumper cables to the ground studs with lock washers (P0183028) and hex nuts (P0065747). Refer to Figure 22, step 2.

18 Unbolt and remove the existing 750 MCM equalizer cables from the battery return ground plates in the PDCs. Tape the exposed ends to prevent accidental contact with other objects when removing. Refer to Figure 22, step 3.

19 Clean the front and back portions of the battery return ground plate from which the equalizer cable was removed and apply a thin coat of NO-OX-ID-A Special.

20 Prepare to connect the PDCs existing battery return plate to the battery return equalizer bus bar with a 750 MCM cable by cutting to the required length and crimping the proper lugs on each end.

21 Terminate one end of the cable to the battery return equalizer bus bar and secure with the hardware provided. Refer to Figure 19 for hardware stackup.

22 Prepare to terminate the other end of the cable by aligning the lug holes with the back (viewed from rear of frame) of the existing battery return ground plate. Do *not* terminate the cable at this time.

23 Route and lace the 750 MCM equalizer cable.

24 Prepare the 500 MCM Super Flex cable for termination between the existing battery return plate and extension battery return plate by cutting to the required length and crimping the proper lugs on each end. Refer to Figure 19 and Figure 21.

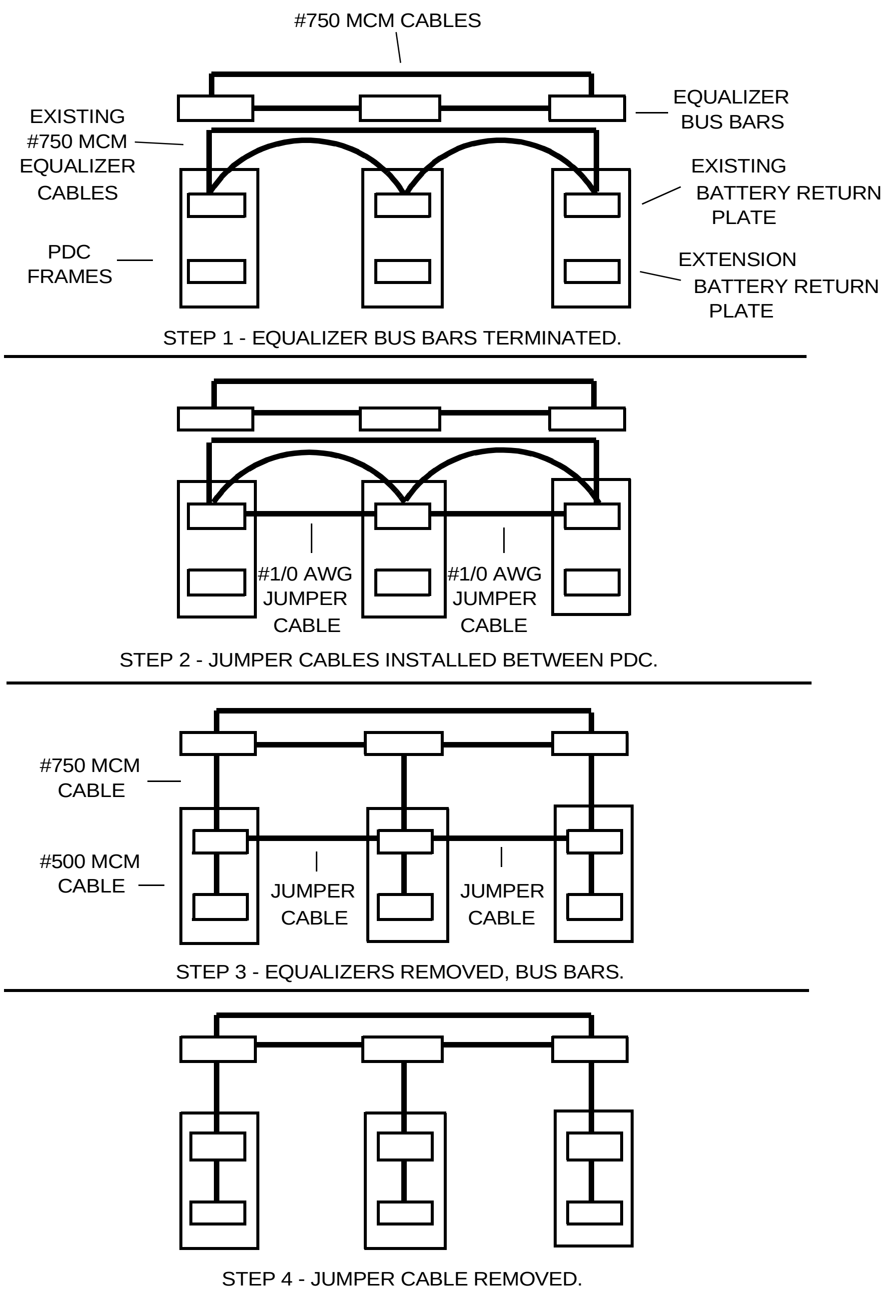
25 Apply a thin coat of NO-OX-ID-A Special to the battery return plates where the 500 MCM Super Flex lugs are to be terminated.

26 With one of the lugs taped for protection, terminate the other cable lug to the front (viewed from rear of frame) of the extension battery return plate and secure with the hardware provided. If the cable cannot be terminated to the front of the battery return plate due to space restrictions, etc., it may be terminated to the rear. Refer to Figure 19 for hardware stackup.

27 Route the 500 MCM Super Flex cable along one side of the PDC frame as conveniently and neatly as possible. Ty-rap the cable to the PDC cable brackets.

28 Terminate the 750 MCM equalizer cable that is routed from the battery return equalizer bus bar to the back (viewed from rear of frame) and the 500 MCM Super Flex cable routed from the extension battery return plate to the front of the existing battery return plate. Secure with the hardware provided. Refer to Figure 19 for hardware stackup.

Figure 22 – Reconfiguring Equalizer Cables



29 Disconnect and remove the 1/0 AWG jumper cables from between the PDC frames' battery return ground plates. Tape the exposed cable ends to prevent accidental contact with other objects when removing. Refer to Figure 22, step 4.

30 Identify the 750 MCM cable ends that are terminated to the equalizer bus bars with laced number tags, 145C for U.S. applications or E-8014/E-8015 cable tie markers for Canadian/International applications. Indicate the cables are -48V Battery Return Equalizer.

5.11 Installing Fuse Panels into a PDC Frame

1 Ensure all necessary precautions are taken to protect both personnel and equipment when adding fuse panels in an inservice office.

2 Live PDC frames contain high levels of dc current that pass through exposed and unprotected bus bars. Wrap the *A* and *B* bus bars with rubber mats and sheet fiber.

3 Cover the lower capacitors with a rubber mat. Use only insulated tool kit K001356.

4 Remove all rings, watches, chains, and other metallic objects. Ensure at least two field technicians are present throughout this procedure.

5 Remove the fuse panel lamp from the front of the new panel by gently pulling on it while applying a back and forth turning motion. Store this in a safe location until the panels are installed and wired.

6 Remove all the fuse holders form the new panels and store in a safe location. Inspect the fuse holders and cartridges for damage. Repair or replace them, as required.

7 Before installing the fuse panels, pre-wire the *Fuse Panel Alarm* and the *Frame Fail Alarm* multiples of the new panels.

8 a. Wire the Fuse Panel Alarm. Solder a length of #22 AWG wire to top stud of the rear of the fuse panel lamp. The wire must be long enough to reach the TB strip located on the lower, right side of the battery return panel (located on shelf 68).

9 b. Wire the Frame Fail Alarm. Solder a length of #22 AWG wire to the right pin of the terminal marked *B* for the NT0X42UB or NT0X42AB *A Feed* panel or the terminal marked *C* for the NT0X42UC or NT0X42AC *B Feed* panel.

10 This wire is used to multiple panels that are supplied by the same feed, and therefore must be long enough to reach the previous same feed panel (approximately two feet). Tape the exposed wire ends.

11 Prepare the area of the *A* and *B* feeds where the new panels will terminate by removing the oxidation with a non-scratching abrasive material, such as a green 3M scouring pad, and applying a thin coat of NO-OX-ID-A Special.

12 Verify the fuse panels to be added are correct using Figure 23 and Figure 24.

Figure 23 – NT0X42UA - U.L. Listed Power Distribution Center

Shelf Position	Fuse Panel	Description	Subsection	Procedure
41	NT0X42UB NT0X42AD	Fuse Panel ‘A’ Feed Filler Panel Assembly	5.11	#3
37	NT0X42UC NT0X42AD	Fuse Panel ‘B’ Feed Filler Panel Assembly	5.11	#4
33	NT0X42UB NT0X42AD	Fuse Panel ‘A’ Feed Filler Panel Assembly	5.10	#1
29	NT0X42UC NT0X42AD NT0X42AU	Fuse Panel ‘B’ Feed Filler Panel Assembly ISDN Fuse Panel Assembly	5.10	#2

25	NT0X42UB NT0X42AD	Fuse Panel ‘A’ Feed Filler Panel Assembly	5.10	#1
21	NT0X42UC NT0X42AD NT0X42AU	Fuse Panel ‘B’ Feed Filler Panel Assembly ISDN Fuse Panel Assembly	5.10	#2

Figure 24 – NT0X42AA - Power Distribution Center

Shelf Position	Fuse Panel	Description	Subsection	Procedure
41	NT0X42AB NT0X42AD	Fuse Panel ‘A’ Feed Filler Panel Assembly	5.11	#3
37	NT0X42AC NT0X42AD	Fuse Panel ‘B’ Feed Filler Panel Assembly	5.11	#4
33	NT0X42AB NT0X42AD	Fuse Panel ‘A’ Feed Filler Panel Assembly	5.10	#1
29	NT0X42AC NT0X42AD NT0X42AU	Fuse Panel ‘B’ Feed Filler Panel Assembly ISDN Fuse Panel Assembly	5.10	#2
25	NT0X42AB NT0X42AD	Fuse Panel ‘A’ Feed Filler Panel Assembly	5.10	#1
21	NT0X42AC NT0X42AD NT0X42AU	Fuse Panel ‘B’ Feed Filler Panel Assembly ISDN Fuse Panel Assembly	5.10	#2

5.12 Addition of “A” Feed Fuse Panel (Procedure 1)

This procedure is used when adding an "A" feed fuse panel NT0X42AB or NT0X42UB to shelf 33 or 25 into the NTOX42AA or NTOX42UA PDC frames.

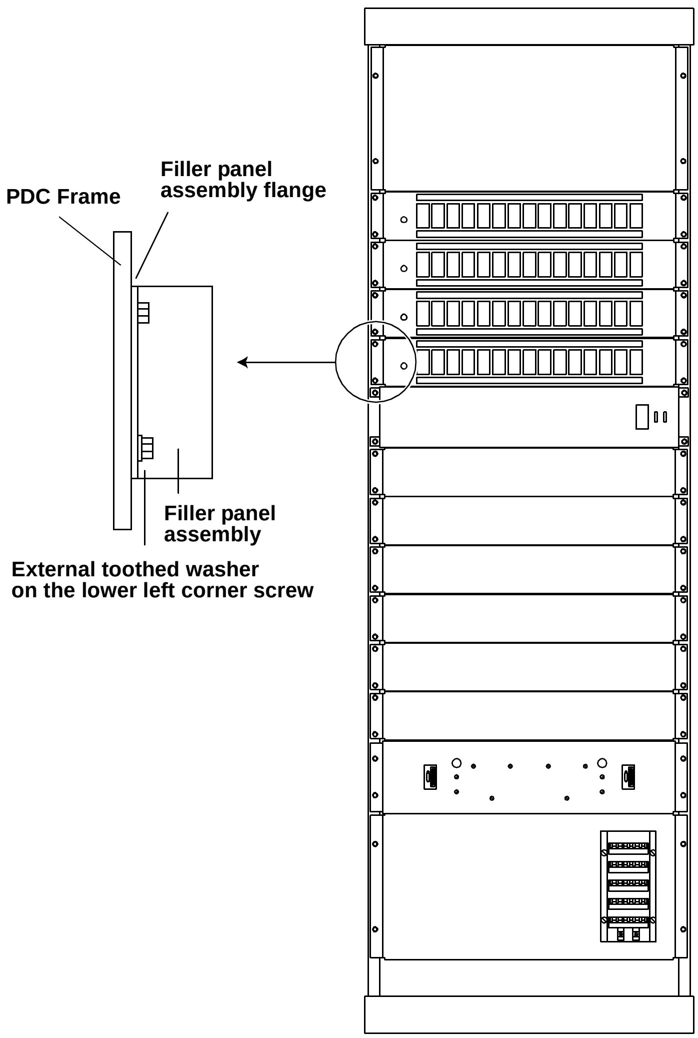
1. Open and remove the doors on the Power Distribution Center (PDC) which will be retrofitted.
2. Remove the trim panels from the front of the PDC to be retrofitted.
3. Locate and carefully remove the filler panels (NTOX42AD) that will be replaced with the new fuse panels.
4. From the front of the PDC, carefully remove the four 5/16" self tapping screws (P097F813) from the filler panel assembly flanges.

   Note: Bottom left screw has an external toothed star washer in place for frame grounding specifications. Refer to Figure 25.
5. Carefully remove the filler panel assembly from the PDC.

6 Insert the new NT0X42UB or NT0X42AB fuse panel into the vacant shelf position of the PDC.

Note: Ensure that the fuse panel bus bar is positioned correctly while inserting the fuse panel.

Figure 25 – Front View of the NT0X42AA/UA PDC



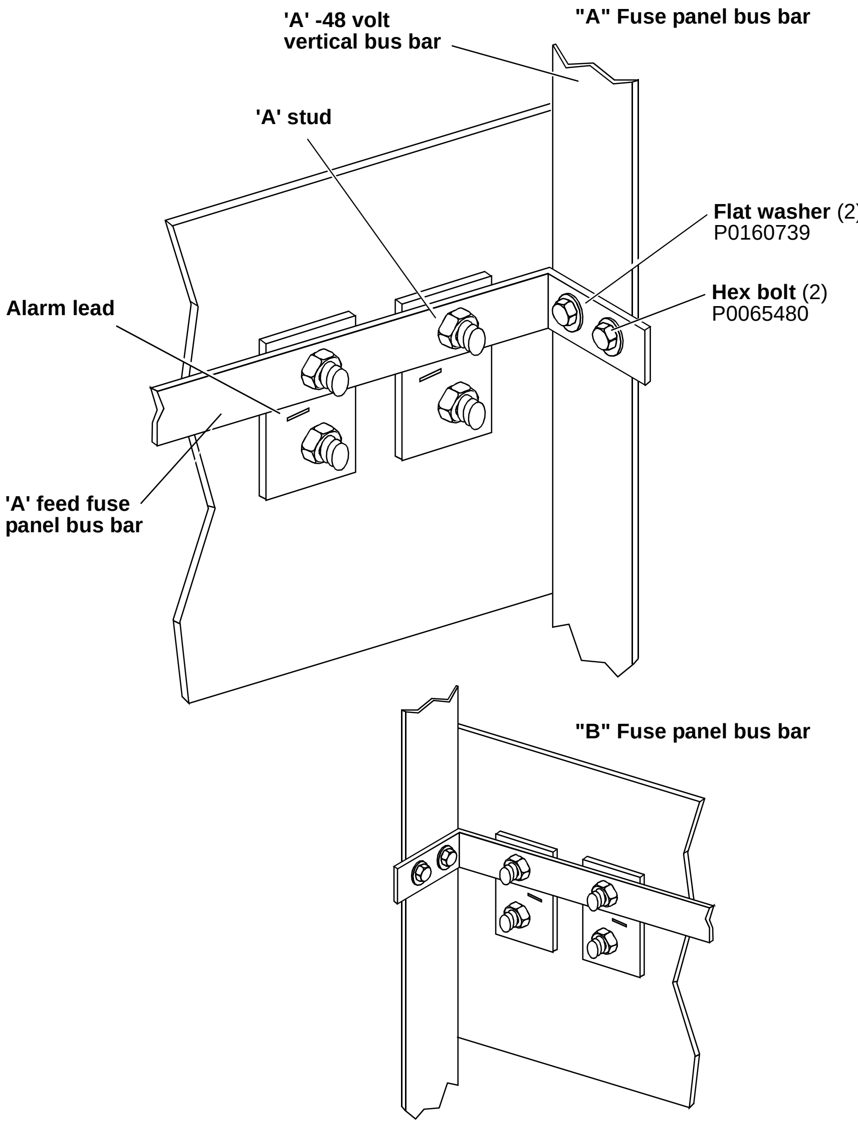
7 Secure the fuse panel in place with the four 5/16" self tapping screws which were previously removed from the filler panel assembly. Use 1/4" drive torque wrench (T0179) to torque the screws to 50 in-lbs. Refer to Event 07 (Method 03-9057), “General Cabling and Torque Requirements.”

Note: The bottom left 5/16" self tapping screw has an external star washer which must be in place to satisfy grounding specifications.

8 Use two 1/4" bolts (P0065480) with flat washers (P0160739) to fasten the fuse panel's bus bar to the -48 volt vertical bus bar. Use insulated torque wrench (T001366) to torque these two bolts to a value of 6.5 ft-lbs. Refer to Figure 26.

9 Use insulated torque screwdriver (T001368) to torque all factory installed fuse block bus bar connections to the inspection value for 8-32 terminal block screws. Refer to Event 07 (Method 03-9057), “General Cabling and Torque Requirements.”

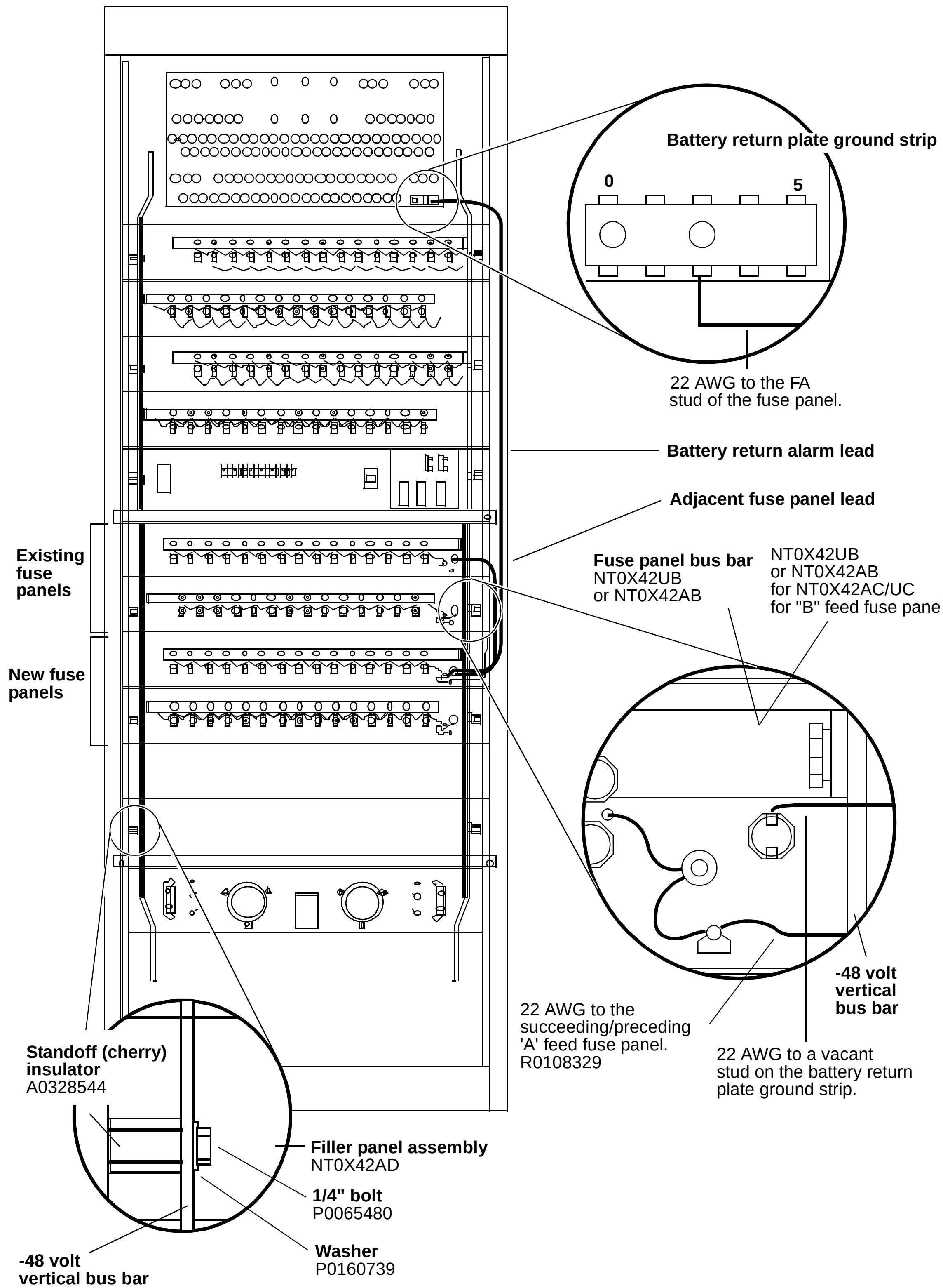
Figure 26 – "A" and "B" Fuse Panel Bus bar



10 On the back of the new fuse panel, a # 22 AWG (black) wire will be connected between the frame alarm lamp and the battery return ground plate. Use the wire wrap gun to connect the wire to the battery return ground strip and the frame alarm lamp pin. Refer to Figure 27.

11 Use the solder gun to solder the connections which were just made to the frame alarm lamp and the battery return ground strip.

Figure 27 – Rear View of NT0X42AA/UA and Alarm Cabling for the NT0X42AB/UB "A" and the NT0X42AC/UC "B" Feed Fuse Panel



12 A #22 AWG (black) wire will be run from the terminal block pin (A0041080), of the fuse panel being added, to the same pin of the adjacent "A" feed fuse panel. Use the wire wrap gun to connect the ends of this wire to the terminal block pins (A0041080). Refer to Figure 27.

13 Use the solder gun to solder the connections which were just made to the terminal block pins (A0041080).

5.13 Addition of “B” Feed Fuse Panel (Procedure 2)

This procedure is used when adding an "B" feed fuse panel NT0X42AC or NT0X42UC to shelf 29 or 21 into the NT0X42AA or NT0X42UA PDC frames.

1 At the rear of the PDC, locate the standoff (cherry) insulators located between the -48 volt bus bars and the NT0X42AD filler panel assembly. Use a fully insulated socket to remove the 1/4" bolts which are attached through the -48 volt vertical bus bars to the cherry insulators on each side of the filler panel assembly. Refer to Figure 27.

2 From the front of the PDC, carefully remove the four 5/16" self tapping screws (P097F813) from the filler panel assembly flanges.

Note: Bottom left screw has an external toothed star washer in place for frame grounding specifications. Refer to Figure 26.

3 Carefully remove the filler panel assembly from the PDC.

4 Remove the cherry insulators from the filler panel assembly, which was previously removed. Install both insulators onto the new fuse panel (NT0X42UC or NT0X42AC) which is to be installed in the PDC.

5 Insert the new NT0X42UC or NT0X42AC fuse panel into the vacant shelf position of the PDC.

Note: Ensure that the fuse panel bus bar is positioned correctly while inserting the fuse panel.

6 Secure the fuse panel in place with the four 5/16" self-tapping screws which were previously removed from the filler panel assembly. Use 1/4" drive torque wrench (T0179) to torque screws to 50 in-lbs. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements."

Note: The bottom left 5/16" self-tapping screw has an external star washer which must be in place for grounding specifications. Refer to Figure 26.

7 Use the 1/4" hardware to secure the cherry insulators through the -48 volt vertical bus bars. Use insulated torque wrench (T001366) to torque the two bolts to a value of 6.5 ft-lbs.

8 Use two 1/4" bolts (P0065480) with flat washers (P0160739) to fasten the fuse panel's bus bar to the "B" Feed -48 volt vertical bus bar. Use insulated torque wrench (T001366) to torque these two bolts to a value of 6.5 ft-lbs.

9 Use insulated torque screwdriver (T001368) to torque all factory installed fuse block bus bar connections to the inspection value for 8-32 terminal block screws. Refer to Event 07 (Method 03-9057), “General Cabling and Torque Requirements.”

10 On the back of the new fuse panel, a #22 AWG (black) wire will be connected between the frame alarm lamp and the battery return ground strip. Use the wire wrap gun to connect the wire to the battery return ground strip and the frame alarm lamp pin. Refer to Figure 27.

11 Use the solder gun to solder the connections which were just made to the frame alarm lamp and the battery return ground strip.

12 A #22 AWG (black) wire will be run from the terminal block pin (A0041080), of the fuse panel being added, to the same pin of the adjacent "B" feed fuse panel. Use the wire wrap gun to connect the ends of this wire to the terminal block pins (A0041080). Refer to Figure 27.

13 Use the solder gun to solder the connections which were just made to the terminal block pins (A0041080).

14 Use the TY28M ty-raps to properly secure the new fuse panel alarm wires along the sides of the PDC frame.

15 Replace the trim panels and doors onto the PDC.

5.14 Addition of "A" Feed Fuse Panel (Procedure 3)

1 Open and remove the doors on the Power Distribution Center (PDC) which will be retrofitted.

2 Remove the trim panels from the front of the PDC to be retrofitted.

3 Locate the Filler Panel Assembly (NTOX42AD) which will be changed out during this procedure. Verify that this filler panel assembly is at shelf position 41. If the filler panel assembly is on shelf positions 33 or 25, then use Procedure 1 of this section.

4 From the front of the PDC, carefully remove the four 5/16" self tapping screws (P097F813) from the filler panel assembly flanges.

Note: Bottom left screw has an external tooth star washer in place for frame grounding specifications. Refer to Figure 28.

5 Carefully remove the filler panel assembly from the PDC.

6 Insert the new NT0X42UB or NT0X42AB fuse panel into the vacant shelf position of the PDC.

Note: Ensure that the fuse panel bus bar is positioned correctly while inserting the fuse panel.

7 Secure the fuse panel in place with the four 5/16" self tapping screws which were previously removed from the filler panel assembly. Use 1/4" Drive Torque Wrench (T0179) to torque screws to 50 in-lbs. Refer to Event 07 (Method 09-9057), "General Cabling and Torque Requirements."

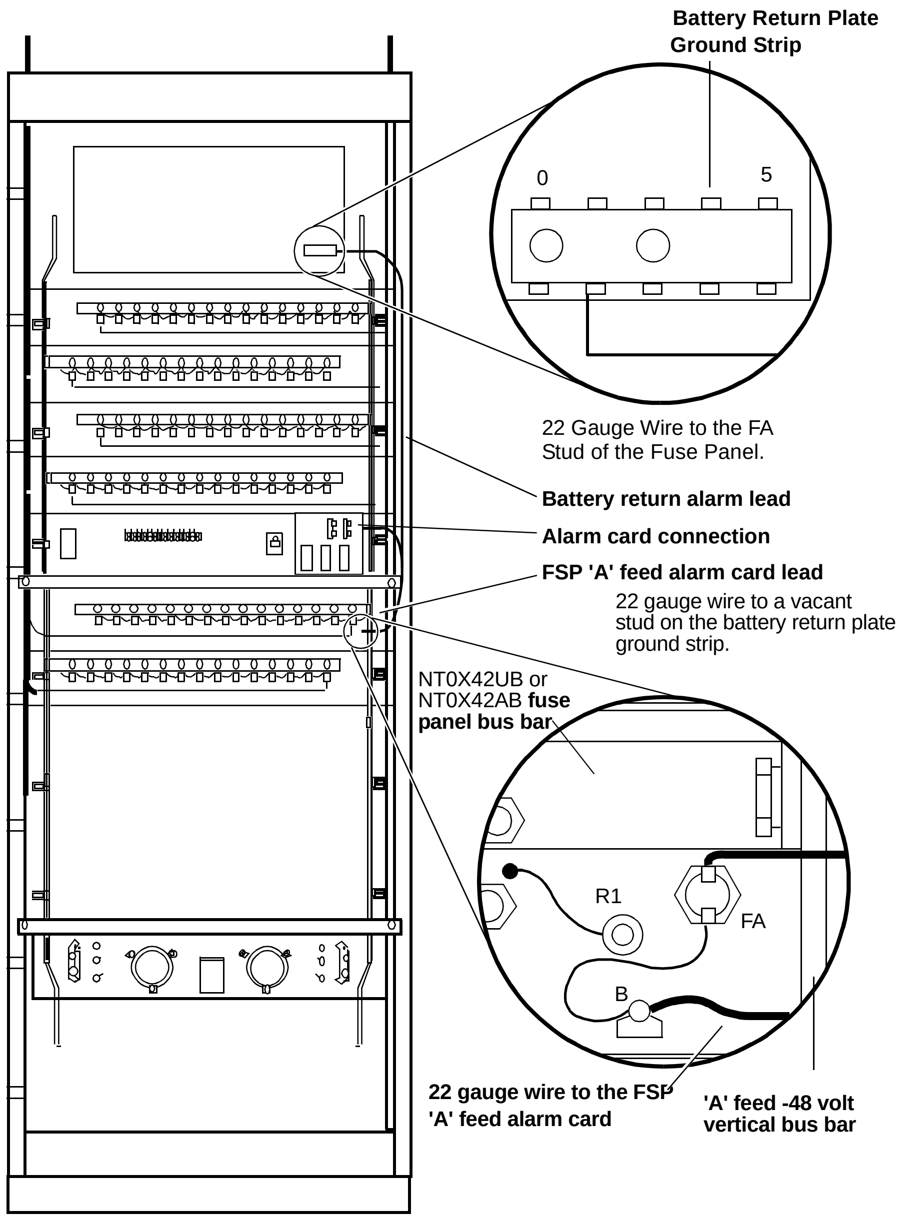
Note: The bottom left 5/16" self tapping screw has an external star washer which must be in place for grounding specifications.

8 Use two 1/4" bolts (P0065480) with flat washers (P0160739) to fasten the fuse panel's bus bar to the -48 Volt vertical bus bar. Use insulated torque wrench (T001366) to torque these two bolts to a value of 6.5 ft-lbs.

9 Use insulated torque screwdriver (T001368) to torque all factory installed fuse block bus bar connections to the inspection value for 8-32 terminal block screws. Refer to Event 07 (Method 03-9057), “General Cabling and Torque Requirements.”

10 On the back of the new fuse panel, a 22 AWG (black) wire will be connected between the frame alarm lamp and the battery return ground strip. Use the wire wrap gun to connect the wire to the battery return ground strip and the frame alarm lamp pin. Refer to Figure 28.

Figure 28 – Rear View of NT0X42AA/UA PDC



11 Use the solder gun to solder the connections which were just made to the frame alarm lamp and the battery return ground strip.

12 A 22 AWG (black) wire will be run from the terminal block pin (A0041080), of the fuse panel being added, to the correct pin on the rear of the "A" feed alarm card at the FSP. Use the wire wrap gun to connect the ends of this wire to the A0041080 terminal block pin (A0041080) and the "A" feed alarm card pin. Refer to Figure 30 for correct alarm card pin location 13.

13 Use the solder gun to solder the connections which were just made to the terminal block pin (A0041080) and the alarm card pin 3. For addition of 'B' Feed Fuse Panel (Procedure 2), locate the filler panel assembly (NTOX42AD) which will be changed out during this procedure. Verify that this filler panel assembly is at shelf positions 29 or 21. If the filler panel assembly is on shelf position 37, refer to Subsection 5.13.

5.15 Addition of "B" Feed Fuse Panel (Procedure 4)

1 Locate the filler panel assembly (NTOX42AD) which is to be changed out during this subsection. Verify that this filler panel assembly is located at shelf positions 37. This procedure will only be used for shelf 37.

2 At the rear of the PDC, locate the standoff (cherry) insulators assembly. Use a fully insulated socket to remove the 1/4" bolts which are attached through the -48 volt vertical bus bars to the cherry insulators on each side of the filler panel assembly.

3 From the front of the PDC carefully remove the four 5/16" self tapping screws (P097F813) from the filler panel assembly flanges.
Note: Bottom left screw has an external toothed star washer in place for frame grounding specifications. Refer to Figure 25.

4 Carefully remove the filler panel assembly from the PDC.

5 Remove the cherry insulators from the filler panel assembly, which was previously removed. Install both insulators onto the new fuse panel (NT0X42UC or NT0X42AC) which is to be installed in the PDC.

6 Insert the new NT0X42UC or NT0X42AC fuse panel into the vacant shelf position of the PDC.
Note: Ensure that the fuse panel bus bar is positioned correctly while inserting the fuse panel.

7 Secure the fuse panel in place with the four, 5/16" self tapping screws which were previously removed from the filler panel assembly. Use 1/4" drive torque wrench (T0179) to torque screws to 50 in-lbs. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements."
Note: The bottom left 5/16" self tapping screw has an external star washer which must be in place for grounding specifications. Refer to Figure 22.

8 Use the 1/4" hardware to secure the cherry insulators through the -48 volt vertical bus bars. Use insulated torque wrench (T001366) to torque the two bolts to a value of 6.5 ft-lbs.

9 Use two 1/4" bolts (P0065480) with flat washers (P0160739) to fasten the fuse panel's bus bar to the "B" feed -48 volt vertical bus bar. Use insulated torque wrench (T001366) to torque these two bolts to a value of 6.5 ft-lbs.

10 Use insulated torque screwdriver (T001368) to torque all factory installed fuse block bus bar connections to the inspection value for 8-32 terminal block screws. Refer to Event 07 (Method 03-9057), “General Cabling and Torque Requirements.”

11 On the back of the new fuse panel, a 22 AWG (black) wire will be connected between the frame alarm lamp and the battery return ground strip. Use the wire wrap gun to connect the wire to the battery return ground strip and the frame alarm lamp pin. Refer to Figure 28.

12 Use the solder gun to solder the connections which were just made to the frame alarm lamp and the battery return ground strip.

13 A 22 AWG (black) wire will be run from the terminal block pin (A0041080), of the fuse panel being added, to the correct pin on the rear of the "B" feed alarm card at the FSP. Use the wire wrap gun to connect the ends of this wire to the terminal block pin (A0041080) and the 'A' Feed alarm card pin.

14 Use the solder gun to solder the connections which were just made to the terminal block pins (A0041080).

15 Use the TY28M ty-raps to properly secure the new fuse panel alarm wires along the sides of the PDC frame.

16 Replace the trim panels and doors onto the PDC.

5.16 Wiring Fuse Panel Alarms in a PDC Frame

1 Each fuse panel's Alarm Lamp will be directly wired to the terminal strip of the return panel at shelf 68. The terminal strip wiring will begin at the top left and continue to the right, with the terminations alternating from the top to the bottom (i.e., wire Top 1, then Bottom 1; then Top 2, then Bottom 2, etc.).

The field technician is required to wrap the wire around the TB pin at least two times and then apply an even coat of solder to the wire. Each fuse panel requires only termination to this terminal strip.

2 Route the alarm wire along the bottom of the terminal strip, and dress it with the other alarm leads down the side of the frame to the fuse panel. Replace the factory stitches with ty-raps, as required.

3 There is a maximum of ten fuse panels that can be installed in a PDC frame. The Frame Fail Alarm for these panels will be wired in the following way. All NT0X42UB panels below shelf 45 will have their *B* terminals multipled together, and all the NT0X42UC panels below shelf 45 will have their *C* terminals multipled together.

Also, all NT0X42UB panels above shelf 45 will have their *B* terminals wired together, and all the NT0X42UC panels above shelf 45 will have their *C* terminals multipled together. No fuse panels below shelf 45 are directly multipled to any fuse panels above shelf 45. Refer to Figure 29 and Figure 30.

4 Dress these alarm multiples along the upright with the other alarm wires.

5 All *B terminal* and *C terminal* multiples eventually terminate to the alarm cards located at the rear of the PDCs FSP. The termination points on these cards are accessed by removing the two left-side screws on the black metal plate that holds the cards, and opening the panel.

Note: This panel is meant to hinge, and it is not necessary to remove all the screws in order to lift off the panel.

6 Once the panel is open, the field technician will see that each card is designated as either "PDC Alarm A" and "PDC Alarm B". Only the NT0X42UB fuse panels located at shelf positions 41 and 54 will have their *B* terminals connected to the "PDC Alarm A" circuit pack.

7 Also, only the NT0X42UC fuse panels located at shelf positions 37 and 50 will have their *C* terminals connected to the "PDC Alarm B" circuit pack. All terminations to both alarm cards will be made from the rear of the card, on the fourth pin from the bottom. Refer to Figure 30.

8 The fuse panels are now installed and need to be tested. From the front of the PDC, install the pilot fuse in each fuse cartridge of each new fuse panel added.

Using a paper clip or other similar object, push the pilot indicator in to activate the fuse fail alarm. Ensure that an alarm appears at the following places: the fuse alarm at the fuse panel, the PDC FSP frame fail lamp, both end aisle lamps, and at the MAP.

9 Remove all the protection installed in the frame and clean up the area.

Figure 29 – Fuse Alarm and Frame Fail Alarm Multiple

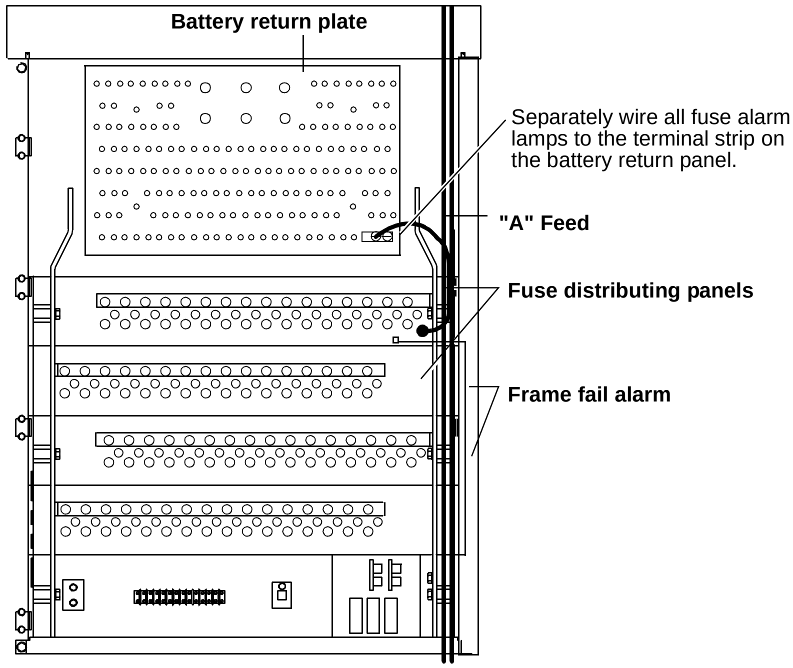
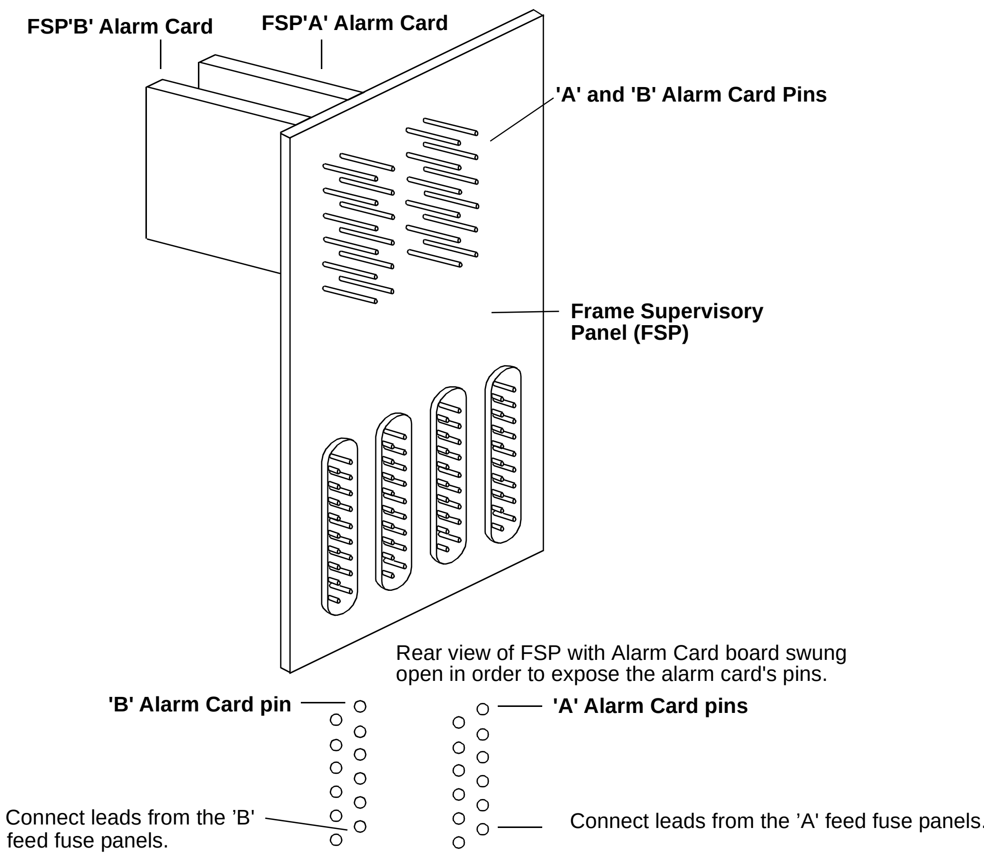


Figure 30 – FSP Alarm Cards



6.0 Common Peripheral Controller Equipment (CPCE) Frame

6.1 CPCE Power Cabling

1 If bundled power cables have been spec'd, there will be one (1) run of bundled -48 Vdc cables and one (1) run of bundled Battery Return cables. Refer to Figure 31. The cables will continue to be formed and terminated as illustrated in Figure 32 and Figure 33. The bundled cable end(s) equipped with lugs terminate at the CPCE, the unlugged cable end(s) terminate at the PDC. The PDC end will require lugging prior to terminating.

Note: Do *not* remove insulators from either cable end until just prior to lugging and termination.

Figure 31 – CPCE Bundled Cables

CPC	PEC	Description
B0254543 B0254546	NTY750AA NTY750AD	CPCE Power Cable 10 Ga. (-48V) CPCE Power Cable 10 Ga. (BR)
B0254544 B0254547	NTY750AB NTY750AE	CPCE Power Cable 8 Ga. (-48V) CPCE Power Cable 8 Ga. (BR)
B0254545 B0254548	NTY750AC NTY750AF	CPCE Power Cable 6 Ga. (-48V) CPCE Power Cable 6 Ga. (BR)

2 If pre-lugged logic return cables (NTY750BY) have been spec'd, the pre-lugged cable end terminates at the CPCE, the unlugged cable end terminates at the PDC battery return plate. The PDC end will require lugging prior to terminating.

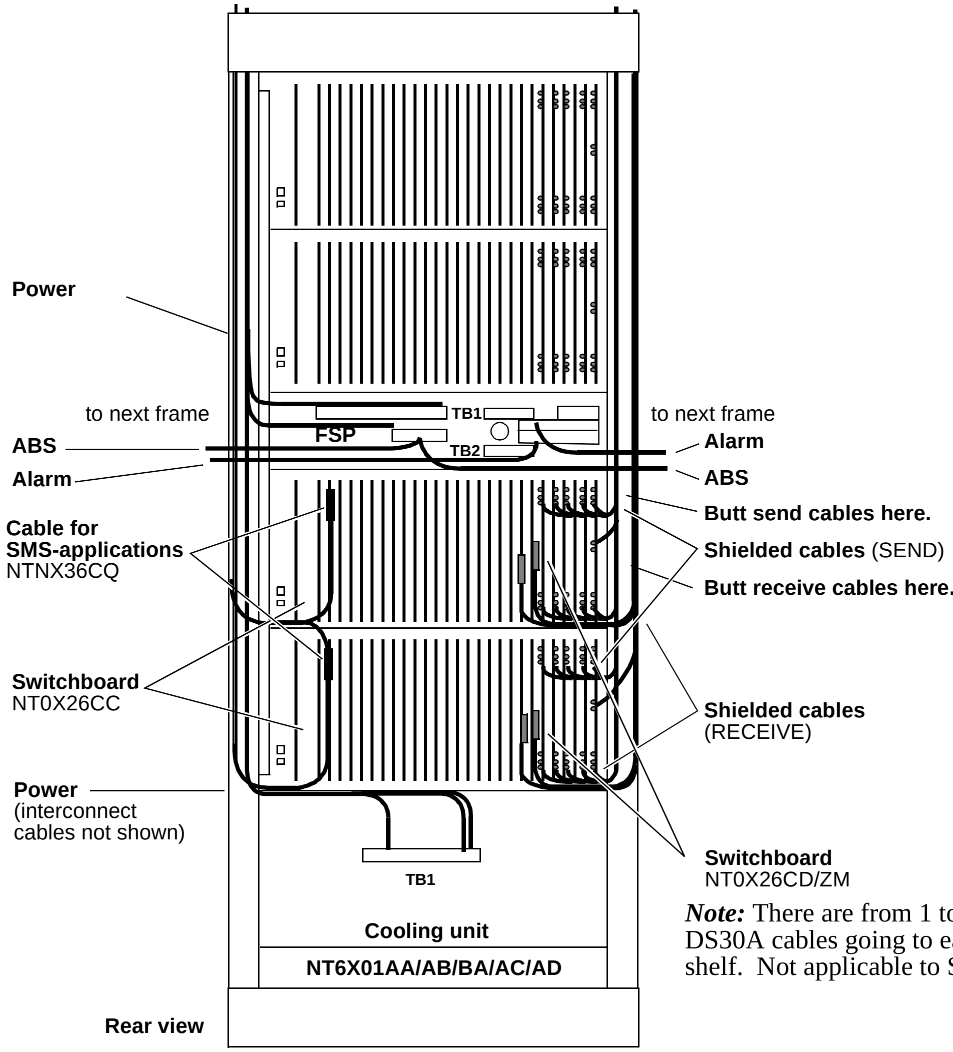
3 Terminate and form the pre-lugged cables to the CPCE prior to terminating the cables in the PDC. The slack is to be formed in the direction of the PDC

4 Run the power cables (-48V and BAT RTN) down the left frame upright (rear view). When the -48V and BAT RTN cables reach the FSP they should be separated into two horizontal bundles. The -48V cables are to be run even with the TOP of TB-1 and the BAT RTN cables are to be run even with the BOTTOM of TB-1. Refer to Figure 32 and Figure 33. Power cables are to be routed through the access holes in the base of the frame for bottom fed installations. .

Figure 32 – Power Connections

-48V	BAT RTN
TB1-1, 2, 3, 4	TB1-5, 6, 7, 8

Figure 33 – Power, ABS, DS30, DS30A, and DS1/PCM30 and Alarm Cable Routing



Note: There are from 1 to 30 DS30A cables going to each shelf. Not applicable to SMS-R.

5 Do *not* secure cable(s) to frame or form with ty-raps until all crimping has been completed.

6 Run the power cables for the cooling units down the left frame upright (rear view) terminating them on the terminal strip, TB1, which is centrally located on the rear cover of the cooling unit. Note that the cooling unit numbering is from right to left.

The NT6X01AA CPCE or NT6X01BA ICPCE frame can be equipped with either an NT3X90AA, NT3X90AB, or NT3X90AC cooling unit. The NT6X01AB/AD frame and NT6X01AC frame can only be equipped with the NT3X90AC cooling unit.

7 Run the cooling unit interconnect cables between two adjacent frames straight across on the rear of the cooling units just above the TB1 terminal block.

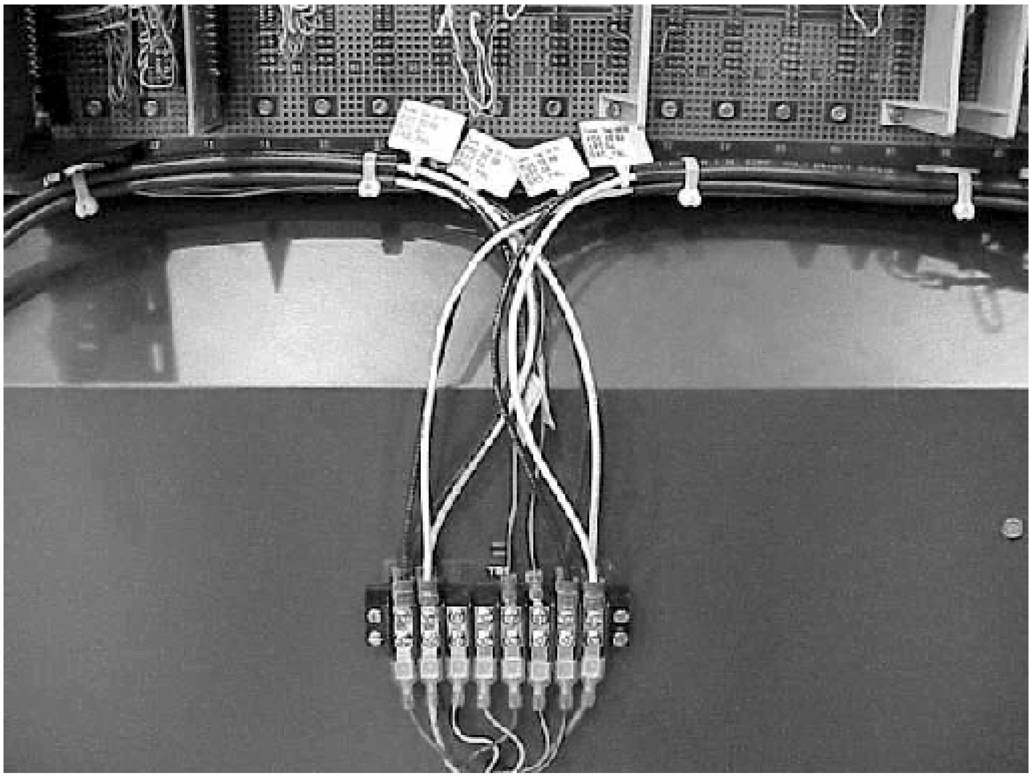
> ***Caution:*** On extension installations, interconnecting cables must be connected during the low traffic period. Also, while connecting the new cooling unit to an existing one, the existing cooling unit must be powered down and then powered up as soon as connecting is complete.

8 If pre-lugged cables (NTY750BX) have been spec'd for the cooling units, the the pre-lugged end should first be terminated at the cooling unit as indicated on the cable tags. The un-lugged end should then be formed to the termination point as indicated on the cable tags then lugged and terminated.

9 Field installed cables are to be formed with shop installed green wires, only if they are in the same locations. Shop-installed green wires that are run behind the vertical ground bar are not to be redressed by field personnel

10 Refer to Figure 34 for the forming of cables at the cooling units.

Figure 34 – Battery and Battery Returns at Cooling Unit



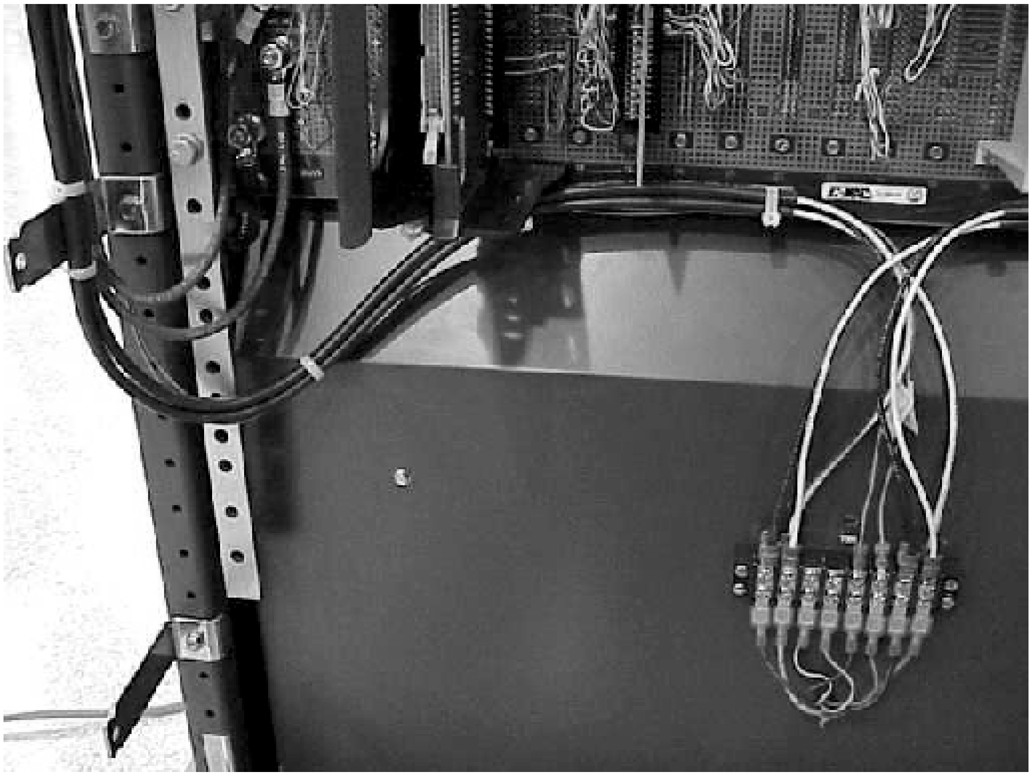
11 Connect the cables to the appropriate terminals. Refer to Figure 35 or cable tags for the connections.

Figure 35 – Cooling Unit Power Connections	
-- First Unit --	
NT3X90AB	TB1-1 (-48V), TB1-2 (BR) to PDC
	TB1-17(-48V), TB1-18 (BR) to PDC
* Interconnect cables TB1-5 to TB1-9 (SUCC) TB1-11 to TB1-15 (SUCC)	
-- Successive Units --	
NT3X90AA	TB1-1 (-48V), TB1-2 (BR) to PDC
* Interconnect cables TB1-5 to TB1-9 (SUCC) TB1-11 to TB1-15 (SUCC)	
*(SUCC) is always NT3X09AA	
NT3X90AC	TB1-1T (-48V), TB1-2T (BR) to PDC
	TB1-7T (-48V), TB1-8T (BR) to PDC
Interconnect cables TB1-1T to TB1-7T (SUCC) & TB1-2T to TB1-8T (SUCC) TB1-7T to TB1-1T (SUCC) & TB1-8T to TB1-2T (SUCC	

12 Horizontal form should be ty-rapped approximately every four inches to the first breakout. Event 07 (Method 03-9057), "General Cabling and Torque Requirements," will be the controlling document with regards to ty-rapping.

13 Secure the cables to the cable brackets on the frame upright Refer to Figure 36.

Figure 36 Cooling Unit Cable Forming



14 Ensure that all of the power connections are tight. If power cables encounter a sharp edge, place protective fiber over the edge.

6.2 CPCE Frame Alarm and ABS Cabling

Refer to Figure 37 for routing.

Figure 37 – Frame Alarm and ABS Connections
C01 to C02 on preceding FSP C02 to C01 on successive FSP
TB2-2 to TB2-1 on preceding FSP TB2-1 to TB2-2 on succeeding FSP

6.3 CPCE Frame Switchboard Cabling (DS30 and DS30A)

DS30 Cabling

1 There are four NT0X26CC switchboard cables (connectorized on both ends) going to each shelf.

Note: There are no DS30 cabling for SMS-R installations. The SMS-R is unique in that the C-side connection is by way of DS30A links to the RCC of an RSC. Refer to Figure 38 for a system diagram of an SMS-R configuration.

For SMS-R installations, terminate the cables on backplane slot 22, pins 10A/B to

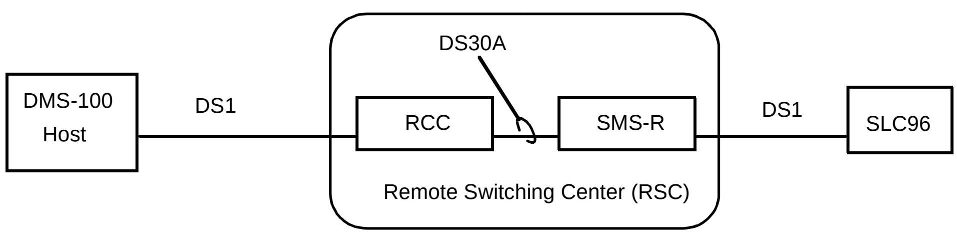
25A/B.
NTNX36CQ cable,
Connector A corresponds to signaling link Unit 0;
Connector B is the speech link for Unit 0;
Connector C corresponds to signaling link Unit 1;
Connector D is the speech link for Unit 1.
Connector A attaches to port A,
Connector B attaches to port B of unit 0.
Connector C attaches to port A,
Connector D attaches to port B of unit 1.
In addition, there are 3 straps present in the backplane of the SMS-R. These straps should be in slot position 12 and should be on pins 73B to 78B, 74B to 76A, and 75B to 76B. If these straps are not present, they should be wire wrapped in order for the SMS-R to be able to communicate to the RCC.
Note that pins 56 through 71 in slot 22 are not used for SMS-R applications.

2 Using a P0633713 ty-rap marker, identify the NT0X26CC cable connector at the end with the one connector. The cable/connector is to be identified giving position on the backpanel and the first pin with which the connector is to mate.

Example: POS 22
PIN 10

This marker shall be around the cable only and not used to fasten the cable connector to the connector key bracket.

Figure 38 – SMS-R System Configuration

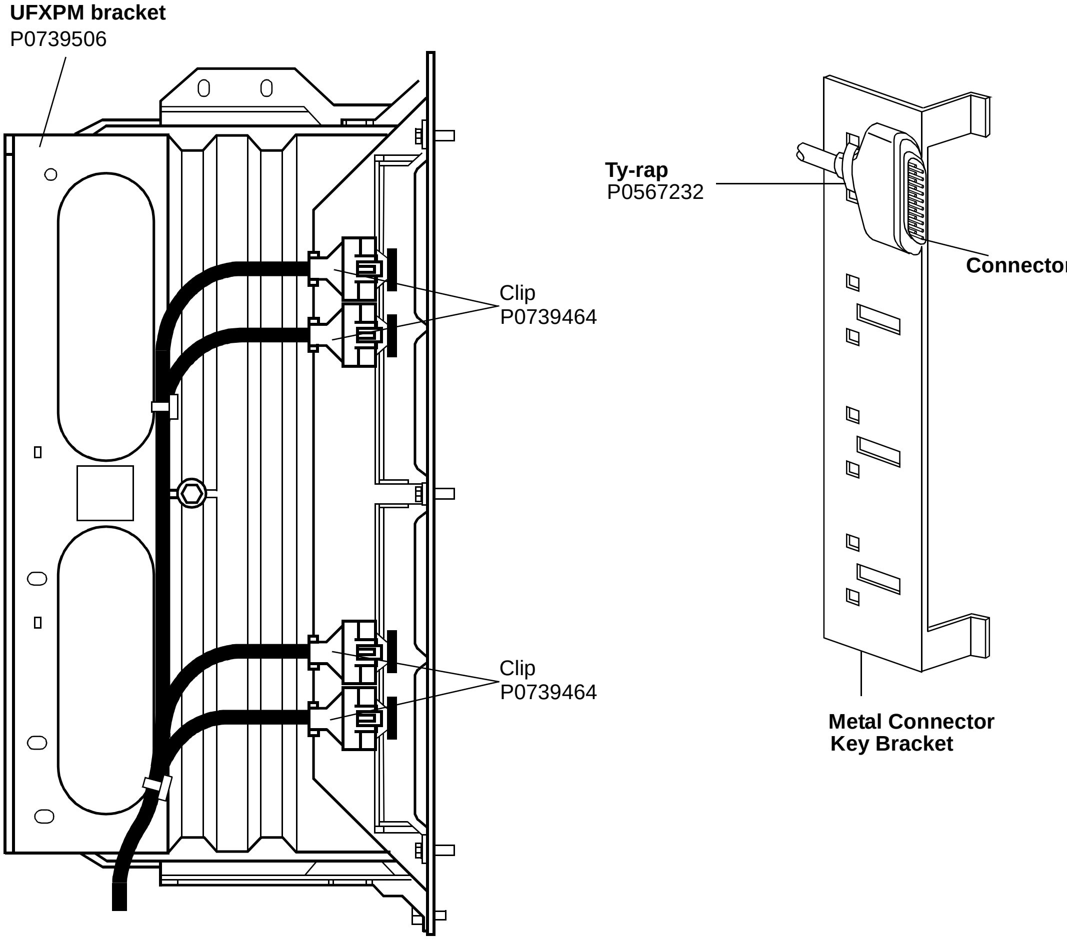


3 Refer to Figure 40 for Connector Key Bracket and ty-raps.

Figure 39 – Circuit Pack Positions and Pin Numbers

Connector Shelf	Domestic/ISDN 6X01AA/AB/AD Shelf	Offshore 6X01AC Shelf	International 6X01BA	Pins
A	22	22	23	10A/B TO 17A/B
B	22	22	23	18A/B TO 25A/B
C	22	22	23	56A/B TO 63A/B
D	22	22	23	64A/B TO 71A/B

Figure 40 – UFXPM with Copper DS-30 Links



4 CPCE frames are being shipped to the field with the UFXPM bracket. Some earlier releases of the CPCE frame use the "metal" connector key bracket. Refer to Figure 40 for a view of both type of brackets. When using the metal connector key bracket, the head of the ty-rap used to secure the cable to the bracket is to be located on the side of the bracket opposite from the cable connector. The head of the ty-rap is to be located towards the top of the bracket.

DS30A Cabling

For the NT0X26CD, the end going to the (I)CPCE frame is split into three connectors. For the NT0X26ZM, the end going to the CPEI is split into ten connectors.

* Ensure that these cables do *not* exceed the maximum allowable length of 15.2m (50.7 ft.) in order to prevent commissioning problems.

5 The connectors for the NT0X26CD cable are designated A, B, and C. The connectors for the NT0X26ZM cables are designated from P00 to P09. The connector pins (1, 4, 5, and 8) are also labeled.

The connectors for the NTNX36CQ cable are designated A, B, C, and D. Be careful when mating the connectors on the cable with the pins on the backpanel.

6 Using P0633713 ty-rap markers, identify all NT0X26CD/ZM and NTNX36 cable connectors. The cables/connectors are to be identified giving position on the backpanel and the first pin with which the connector mates.

Example: POS 07
PIN 15

Note: Connector P00 must always be connected to one of the ports. Connectors P01 to P08 are assigned on an optional basis. Connector P09 provided in the cable shall not be used. Unused connectors are to be tied back. Refer to CA0X06 for additional information on connections.

7 Form and secure the cable(s) to the cable brackets with ty-raps. Do not remove the existing small ty-rap from the cable connector hood on the ship loose cable.

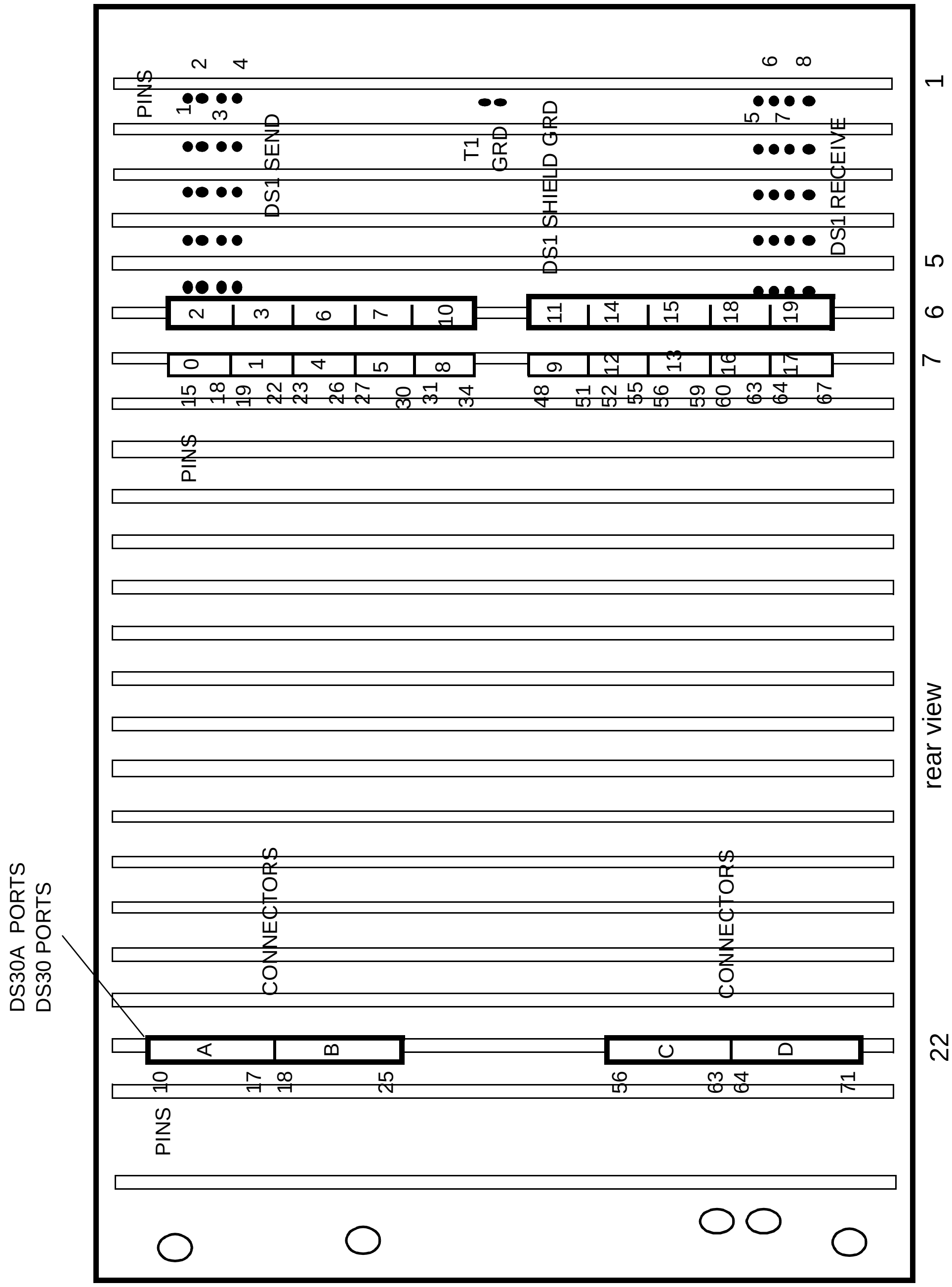
8 Use ty-rap P0567232 to secure the cable connector to the connector key brackets.

Thread the ty-rap through the holes in the connector key bracket and secure the cable connector hood to the key bracket. Refer to Figure 40.

The head of the ty-rap is to be located on the opposite side of the bracket as the cable connector. The head of the ty-rap is to be located at the TOP of the connector. Cut the ty-rap flush. Ensure there are no sharp edges on the ty-rap when complete. Refer to Figure 40.

9 Tie back all unused connectors with ty-raps.

Figure 41 – Shelf Layout - Domestic and ISDN



10 Refer to Figure 42 for DS30A Connections.

Figure 42 – DS30A Connections

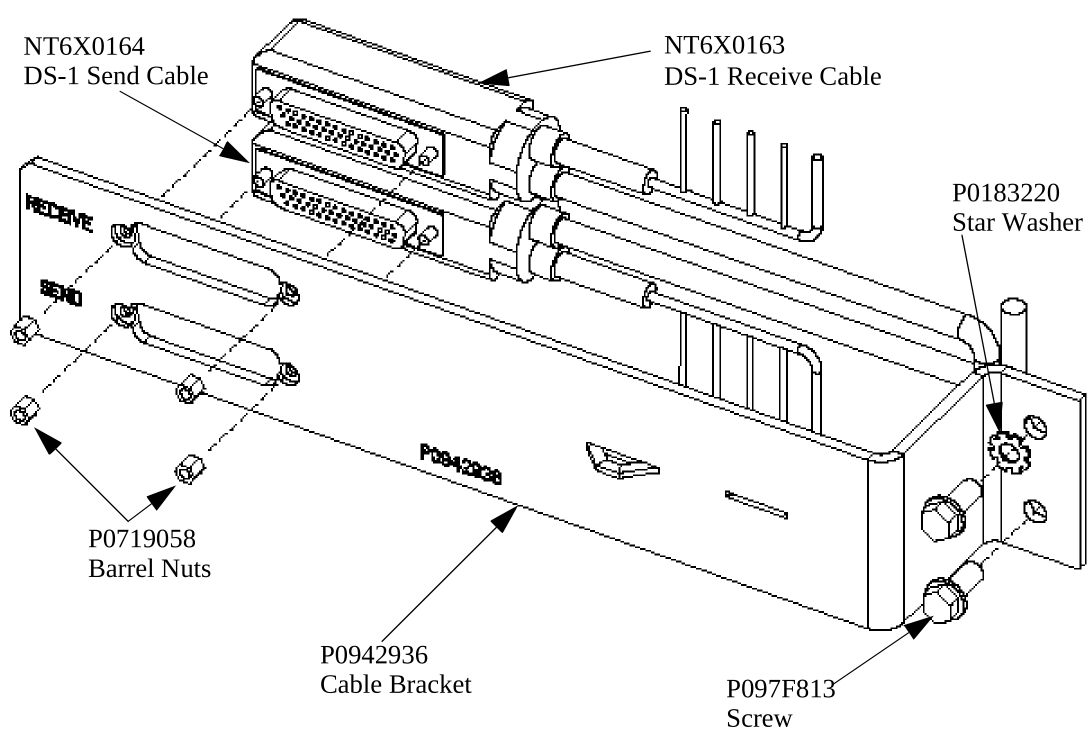
DS30A ports		Slots				Pins
	AX78BA Logical Port	ISDN AX78BA	ISDN/ Domestic 6X01AA/ AB/AD	Offshore 6X01AC	International 6X01BA	
0	20	7	7	7	6	15, 16, 17, 18
1	21	7	7	7	6	19, 20, 21, 22
2	22	6	6	6	5	15, 16, 17, 18
3	23	6	6	6	5	19, 20, 21, 22
4	24	7	7	7	6	23, 24, 25, 26
5	25	7	7	7	6	27, 28, 29, 30
6	26	6	6	6	5	23, 24, 25, 26
7	27	6	6	6	5	27, 28, 29, 30
8	28	7	7	7	6	31, 32, 33, 34
9	29	7	7	7	6	48, 49, 50, 51
10	30	6	6	6	5	31, 32, 33, 34
11	31	6	6	6	5	48, 49, 50, 51
12	32	7	7	7	6	52, 53, 54, 55
13	33	7	7	7	6	56, 57, 58, 59
14	34	6	6	6	5	52, 53, 54, 55
15	35	6	6	6	5	56, 57, 58, 59
16	36	7	7	7	6	60, 61, 62, 63
17	37	7	7	7	6	64, 65, 66, 67
18	38	6	6	6	5	60, 61, 62, 63
19	39	6	6	6	5	64, 65, 66, 67

6.4 DS-1 to DSX Cable Bracket Assembly Kit NT6X0165

The following is for a upgrade or reinstall of an existing frame.

1. Unseat NT6X50s and remove old DSX cables from DTC and DSX panel.
2. Cable brackets on the right rear of the NT6X01 frame need to be relocated to mounting positions 75, 66, 60, 52, 42, 33, 27, 19 and 08.
3. DS-1 to DSX Cable Bracket Assembly Kit NT6X0165 is to be installed on the frame.
4. Cover the unshielded leads with protective material when installing the NT6X0165 kit on inservice frames. The protective material is to ensure that the unshielded leads do not come in contact with live pins on the backplane.
5. Mount the P0942936 Cable Brackets in holes 30/31 for shelf 18/32 and holes 63/64 for shelf 51/65. Install a star washer under the top mounting screw of each Cable Bracket.
6. Install the NT6X0163 Receive Cable Harness and NT6X0164 Send Cable Harness to the P0942936 Cable Brackets with the barrel nuts provided. Make sure the short cables from each connector are on the top and bottom of the bracket. The long cable will be in the middle of the bracket.
7. Secure the long cables to the lance with ty-rap. Refer to Figure 43 for an exploded view of the cable bracket and cable harnesses.

Figure 43 – Exploded view of bracket (Right Rear of NT6X01 Frame).



8. Refer to Figure 44 and Figure 45 for the wiring table for the send and receive cables for Module 0. Use modified 26 AWG bit when wiring the wires to the backplane pins.
9. Dress wires evenly up to each backplane slot that they are wired to.

Figure 44 – NT6X0164 Send Cable Terminations on Module 0 (Shelf 18/32).

Cable CPC NT6X0164	Shelf Postion Hole #	Card Position Slot	Backplane Pin#	Wire Color	Dsub Position Hole #	Dsub Pin #
Cable A	18	1	11A	W/BL	30	1
(SHORT)		1	11B	BL/W		2
		1	12A	W/O		3
		1	12B	O/W		4
		2	11A	W/G		5
		2	11B	G/W		6
		2	12A	W/BR		7
		2	12B	BR/W		8
		3	11A	W/SL		9
		3	11B	SL/W		10
		3	12A	R/BL		11
		3	12B	BL/R		12
		4	11A	R/O		13
		4	11B	O/R		14
		4	12A	R/GR		16
		4	12B	GR/R		17
		5	11A	R/BR		18
		5	11B	BR/R		19
		5	12A	R/SL		20
		5	12B	SL/R		21
Cable B	32	1	11A	W/BL	30	22
(LONG)		1	11B	BL/W		23
		1	12A	W/O		24
		1	12B	O/W		25
		2	11A	W/G		26
		2	11B	G/W		27
		2	12A	W/BR		28
		2	12B	BR/W		29
		3	11A	W/SL		31
		3	11B	SL/W		32
		3	12A	R/BL		33
		3	12B	BL/R		34
		4	11A	R/O		35
		4	11B	O/R		36
		4	12A	R/GR		37
		4	12B	GR/R		38
		5	11A	R/BR		39
		5	11B	BR/R		40
		5	12A	R/SL		41
		5	12B	SL/R		42

Note: Pins 15 and 30 have been skipped to keep parts together.
Pins 15, 30, 43, and 44 are to be left empty.

Figure 45 – NT6X0163 Receive Cable Terminations on Module 0 (Shelf 18/32).

Cable CPC NT6X0163	Shelf Postion Hole #	Card Position Slot	Backplane Pin#	Wire Color	Daub Position Hole #	Daub Pin #
Cable C	18	1	T2A	W/BL	31	1
(LONG)		1	T2B	BL/W		2
		1	T3A	W/O		3
		1	T3B	O/W		4
		2	T2A	W/G		5
		2	T2B	G/W		6
		2	T3A	W/BR		7
		2	T3B	BR/W		8
		3	T2A	W/SL		9
		3	T2B	SL/W		10
		3	T3A	R/BL		11
		3	T3B	BL/R		12
		4	T2A	R/O		13
		4	T2B	O/R		14
		4	T3A	R/G		16
		4	T3B	G/R		17
		5	T2A	R/BR		18
		5	T2B	BR/R		19
		5	T3A	R/SL		20
		5	T3B	SL/R		21
Cable D	32	1	T2A	W/BL	31	22
(SHORT)		1	T2B	BL/W		23
		1	T3A	W/O		24
		1	T3B	O/W		25
		2	T2A	W/G		26
		2	T2B	G/W		27
		2	T3A	W/BR		28
		2	T3B	BR/W		29
		3	T2A	W/SL		31
		3	T2B	SL/W		32
		3	T3A	R/BL		33
		3	T3B	BL/R		34
		4	T2A	R/O		35
		4	T2B	O/R		36
		4	T3A	R/G		37
		4	T3B	G/R		38
		5	T2A	R/BR		39
		5	T2B	BR/R		40
		5	T3A	R/SL		41
		5	T3B	SL/R		42

Note: Pins 15 and 30 have been skipped to keep parts together.
Pins 15, 30, 43, and 44 are to be left empty.

10 Refer to Figure 46 and Figure 47 for the wiring table for the send and receive cables for Module 1.

Figure 46 – NT6X0164 Send Cable Terminations on Module 1 (Shelf 51/65).

Cable CPC NT6X0164	Shelf Postion Hole #	Card Position Slot	Backplane Pin#	Wire Color	Dsub Position Hole #	Dsub Pin #
Cable A	51	1	11A	W/BL	63	1
(SHORT)		1	11B	BL/W		2
		1	12A	W/O		3
		1	12B	O/W		4
		2	11A	W/G		5
		2	11B	G/W		6
		2	12A	W/BR		7
		2	12B	BR/W		8
		3	11A	W/SL		9
		3	11B	SL/W		10
		3	12A	R/BL		11
		3	12B	BL/R		12
		4	11A	R/O		13
		4	11B	O/R		14
		4	12A	R/G		16
		4	12B	G/R		17
		5	11A	R/BR		18
		5	11B	BR/R		19
		5	12A	R/SL		20
		5	12B	SL/R		21
Cable B	65	1	11A	W/BL	63	22
(LONG)		1	11B	BL/W		23
		1	12A	W/O		24
		1	12B	O/W		25
		2	11A	W/G		26
		2	11B	G/W		27
		2	12A	W/BR		28
		2	12B	BR/W		29
		3	11A	W/SL		31
		3	11B	SL/W		32
		3	12A	R/BL		33
		3	12B	BL/R		34
		4	11A	R/O		35
		4	11B	O/R		36
		4	12A	R/G		37
		4	12B	G/R		38
		5	11A	R/BR		39
		5	11B	BR/R		40
		5	12A	R/SL		41
		5	12B	SL/R		42

Note: Pins 15 and 30 have been skipped to keep parts together.
Pins 15, 30, 43, and 44 are to be left empty.

Figure 47 – NT6X0163 Receive Cable Terminations on Module 1 (Shelf 51/65).

Cable CPC NT6X0163	Shelf Postion Hole #	Card Position Slot	Backplane Pin#	Color Color	Daub Position Hole #	Daub Pin #
Cable C (LONG)	51	1	72A	W/BL	64	1
		1	72B	BL/W		2
		1	73A	W/O		3
		1	73B	O/W		4
		2	72A	W/G		5
		2	72B	G/W		6
		2	73A	W/BR		7
		2	73B	BR/W		8
		3	72A	W/SL		9
		3	72B	SL/W		10
		3	73A	R/BL		11
		3	73B	BL/R		12
		4	72A	R/O		13
		4	72B	O/R		14
		4	73A	R/GR		16
		4	73B	GR/R		17
		5	72A	R/BR		18
		5	72B	BR/R		19
		5	73A	R/SL		20
		5	73B	SL/R		21
Cable D (SHORT)	65	1	72A	W/BL	64	22
		1	72B	BL/W		23
		1	73A	W/O		24
		1	73B	O/W		25
		2	72A	W/G		26
		2	72B	G/W		27
		2	73A	W/BR		28
		2	73B	BR/W		29
		3	72A	W/SL		31
		3	72B	SL/W		32
		3	73A	R/BL		33
		3	73B	BL/R		34
		4	72A	R/O		35
		4	72B	O/R		36
		4	73A	R/GR		37
		4	73B	GR/R		38
		5	72A	R/BR		39
		5	72B	BR/R		40
		5	73A	R/SL		41
		5	73B	SL/R		42

Note: Pins 15 and 30 have been skipped to keep parts together.
Pins 15, 30, 43, and 44 are to be left empty.

Figure 48 – SEND Field Terminations at Backplane (Shelf 32/65).

NT0X96RD DSX SYSTEM CABLE (20 PAIR 22AWG)

ORIGINATING					TERMINATING		
CABLE DESIG.	**CONN DESIG.**	**PIN NO.**	**SIGNAL NAME**	**COLOUR**	**SIGNAL NAME**	**COLOUR**	**CONNECTION**
CP0R05	SEND	18	LSENDT0	W/BL	LSENDT0	W/BL	CUSTOMER DSX
		19	LSENDR0	BL/W	LSENDR0	BL/W	CUSTOMER DSX
	D-SUB	20	LSENDT1	W/O	LSENDT1	W/O	CUSTOMER DSX
	CONNECTOR	21	LSENDR1	O/W	LSENDR1	O/W	CUSTOMER DSX
	EQPT LOC	39	LSENDT2	W/G	LSENDT2	W/G	CUSTOMER DSX
	POS. 30	40	LSENDR2	G/W	LSENDR2	G/W	CUSTOMER DSX
	OR	41	LSENDT3	W/BR	LSENDT3	W/BR	CUSTOMER DSX
	POS. 63	42	LSENDR3	BR/W	LSENDR3	BR/W	CUSTOMER DSX
		13	LSENDT4	W/SL	LSENDT4	W/SL	CUSTOMER DSX
		14	LSENDR4	SL/W	LSENDR4	SL/W	CUSTOMER DSX
		16	LSENDT5	R/BL	LSENDT5	R/BL	CUSTOMER DSX
		17	LSENDR5	BL/R	LSENDR5	BL/R	CUSTOMER DSX
		35	LSENDT6	R/O	LSENDT6	R/O	CUSTOMER DSX
		36	LSENDR6	O/R	LSENDR6	O/R	CUSTOMER DSX
		37	LSENDT7	R/GR	LSENDT7	R/GR	CUSTOMER DSX
		38	LSENDR7	GR/R	LSENDR7	GR/R	CUSTOMER DSX
		9	LSENDT8	R/BR	LSENDT8	R/BR	CUSTOMER DSX
		10	LSENDR8	BR/R	LSENDR8	BR/R	CUSTOMER DSX
		11	LSENDT9	R/SL	LSENDT9	R/SL	CUSTOMER DSX
		12	LSENDR9	SL/R	LSENDR9	SL/R	CUSTOMER DSX
		31	LSENDT10	BK/BL	LSENDT10	BK/BL	CUSTOMER DSX
		32	LSENDR10	BL/BK	LSENDR10	BL/BK	CUSTOMER DSX
		33	LSENDT11	BK/O	LSENDT11	BK/O	CUSTOMER DSX
		34	LSENDR11	O/BK	LSENDR11	O/BK	CUSTOMER DSX
		5	LSENDT12	BK/G	LSENDT12	BK/G	CUSTOMER DSX
		6	LSENDR12	G/BK	LSENDR12	G/BK	CUSTOMER DSX
		7	LSENDT13	BK/BR	LSENDT13	BK/BR	CUSTOMER DSX
		8	LSENDR13	BR/BK	LSENDR13	BR/BK	CUSTOMER DSX
		26	LSENDT14	BK/SL	LSENDT14	BK/SL	CUSTOMER DSX
		27	LSENDR14	SL/BK	LSENDR14	SL/BK	CUSTOMER DSX
		28	LSENDT15	Y/BL	LSENDT15	Y/BL	CUSTOMER DSX
		29	LSENDR15	BL/Y	LSENDR15	BL/Y	CUSTOMER DSX
		1	LSENDT16	Y/O	LSENDT16	Y/O	CUSTOMER DSX
		2	LSENDR16	O/Y	LSENDR16	O/Y	CUSTOMER DSX
		3	LSENDT17	Y/G	LSENDT17	Y/G	CUSTOMER DSX
		4	LSENDR17	G/Y	LSENDR17	G/Y	CUSTOMER DSX
		22	LSENDT18	Y/BR	LSENDT18	Y/BR	CUSTOMER DSX
		23	LSENDR18	BR/Y	LSENDR18	BR/Y	CUSTOMER DSX
		24	LSENDT19	Y/SL	LSENDT19	Y/SL	CUSTOMER DSX
		25	LSENDR19	SL/Y	LSENDR19	SL/Y	CUSTOMER DSX

NOTES:
1- Reference CA drawing CA0X06 (IEAR) and (IEAS) for additional information.
2- Ground is passed through connector to the metal bracket assembly. No drain wire is required.

Figure 49 – RECEIVE Field Terminations at Backplane (Shelf 32/65).

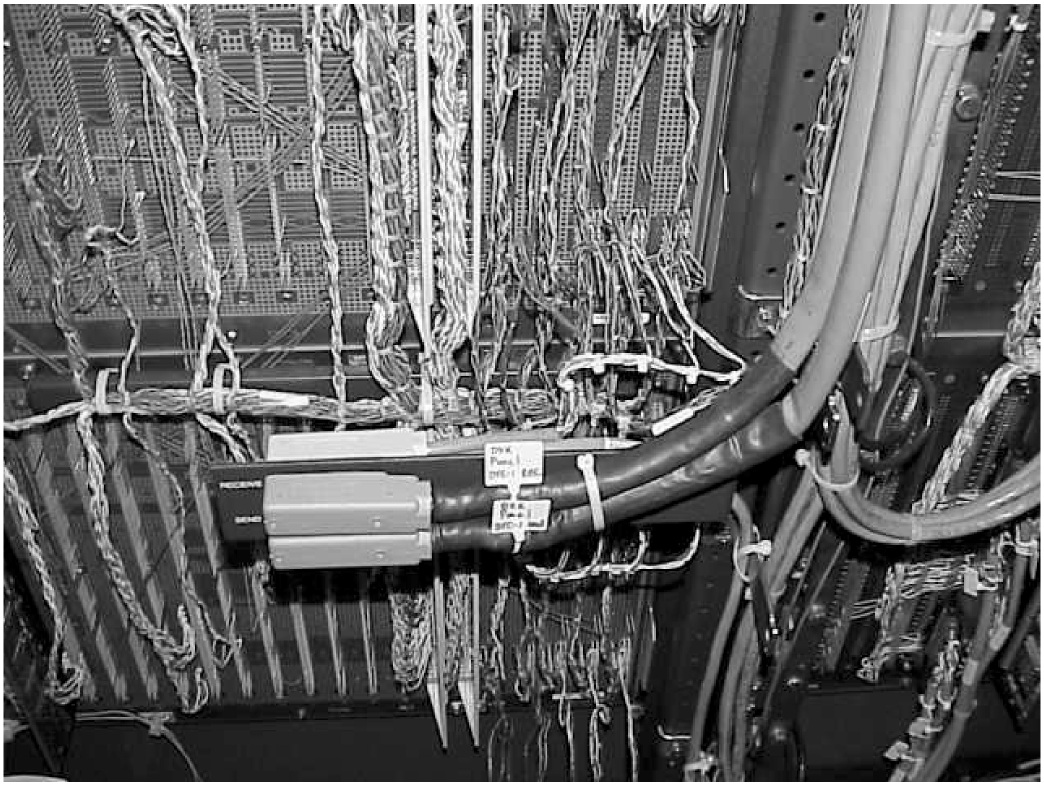
NT0X96RD DSX SYSTEM CABLE (20 PAIR 22AWG)

ORIGINATING					TERMINATING		
CABLE DESIG.	**CONN DESIG.**	**PIN NO.**	**SIGNAL NAME**	**COLOUR**	**SIGNAL NAME**	**COLOUR**	**CONNECTION**
CP0R06	RECEIVE	18	LRECT0	W/BL	LRECT0	W/BL	CUSTOMER DSX
		19	LRECR0	BL/W	LRECR0	BL/W	CUSTOMER DSX
	D-SUB	20	LRECT1	W/O	LRECT1	W/O	CUSTOMER DSX
	CONNECTOR	21	LRECR1	O/W	LRECR1	O/W	CUSTOMER DSX
	EQPT LOC.	39	LRECT2	W/G	LRECT2	W/G	CUSTOMER DSX
	POS. 31	40	LRECR2	G/W	LRECR2	G/W	CUSTOMER DSX
	OR	41	LRECT3	W/BR	LRECT3	W/BR	CUSTOMER DSX
	POS. 64	42	LRECR3	BR/W	LRECR3	BR/W	CUSTOMER DSX
		13	LRECT4	W/SL	LRECT4	W/SL	CUSTOMER DSX
		14	LRECR4	SL/W	LRECR4	SL/W	CUSTOMER DSX
		16	LRECT5	R/BL	LRECT5	R/BL	CUSTOMER DSX
		17	LRECR5	BL/R	LRECR5	BL/R	CUSTOMER DSX
		35	LRECT6	R/O	LRECT6	R/O	CUSTOMER DSX
		36	LRECR6	O/R	LRECR6	O/R	CUSTOMER DSX
		37	LRECT7	R/GR	LRECT7	R/GR	CUSTOMER DSX
		38	LRECR7	GR/R	LRECR7	GR/R	CUSTOMER DSX
		9	LRECT8	R/BR	LRECT8	R/BR	CUSTOMER DSX
		10	LRECR8	BR/R	LRECR8	BR/R	CUSTOMER DSX
		11	LRECT9	R/SL	LRECT9	R/SL	CUSTOMER DSX
		12	LRECR9	SL/R	LRECR9	SL/R	CUSTOMER DSX
		31	LRECT10	BK/BL	LRECT10	BK/BL	CUSTOMER DSX
		32	LRECR10	BL/BK	LRECR10	BL/BK	CUSTOMER DSX
		33	LRECT11	BK/O	LRECT11	BK/O	CUSTOMER DSX
		34	LRECR11	O/BK	LRECR11	O/BK	CUSTOMER DSX
		5	LRECT12	BK/G	LRECT12	BK/G	CUSTOMER DSX
		6	LRECR12	G/BK	LRECR12	G/BK	CUSTOMER DSX
		7	LRECT13	BK/BR	LRECT13	BK/BR	CUSTOMER DSX
		8	LRECR13	BR/BK	LRECR13	BR/BK	CUSTOMER DSX
		26	LRECT14	BK/SL	LRECT14	BK/SL	CUSTOMER DSX
		27	LRECR14	SL/BK	LRECR14	SL/BK	CUSTOMER DSX
		28	LRECT15	Y/BL	LRECT15	Y/BL	CUSTOMER DSX
		29	LRECR15	BL/Y	LRECR15	BL/Y	CUSTOMER DSX
		1	LRECT16	Y/O	LRECT16	Y/O	CUSTOMER DSX
		2	LRECR16	O/Y	LRECR16	O/Y	CUSTOMER DSX
		3	LRECT17	Y/G	LRECT17	Y/G	CUSTOMER DSX
		4	LRECR17	G/Y	LRECR17	G/Y	CUSTOMER DSX
		22	LRECT18	Y/BR	LRECT18	Y/BR	CUSTOMER DSX
		23	LRECR18	BR/Y	LRECR18	BR/Y	CUSTOMER DSX
		24	LRECT19	Y/SL	LRECT19	Y/SL	CUSTOMER DSX
		25	LRECR19	SL/Y	LRECR19	SL/Y	CUSTOMER DSX

NOTES:
1- Reference CA drawing CA0X06 (IEAR) and (IEAS) for additional information.
2- Ground is passed through connector to the metal bracket assembly. No drain wire is required.

11 Designate cables with flag ty-raps or thermal printed labels. Refer to Figure 50 for a view of the forming and routing of the cable assemblies.

Figure 50 – NT6X0165 Cable Bracket Kit Assembly Cable Forming.



6.5 CPCE Frame Switchboard Cabling (Unconnectorized)

DS1/PCM30 Cabling

> ***Caution:*** Unseat 6X50s prior to wire wrapping (DSI) leads on the backplane. Only unseat the 6X50s from the slots being wire wrapped. After wire wrapping is complete, re-seat the 6X50s.

Grounding Cables Immediately

> ***Caution:*** If you are working on an Inservice office you must attach the Ground Cable immediately, before continuing to the next cable. This will keep the exposed ground from touching any Inservice pins and possibly causing an E1 outage.

Connector Key Brackets

Caution: The rear of the NT6X01AF ISDN Ready Frame is equipped with Connector Key Brackets (P0890551) in Slots 1-5. These Connector Key Brackets are new and are standard equipment on these frames. These brackets should not be removed. If these brackets are removed for any reason, they must be re-installed. In addition to the new Connector Key Brackets, sixteen (16) additional pins were added per slot (slots 1-5 only) to support the IPG card.

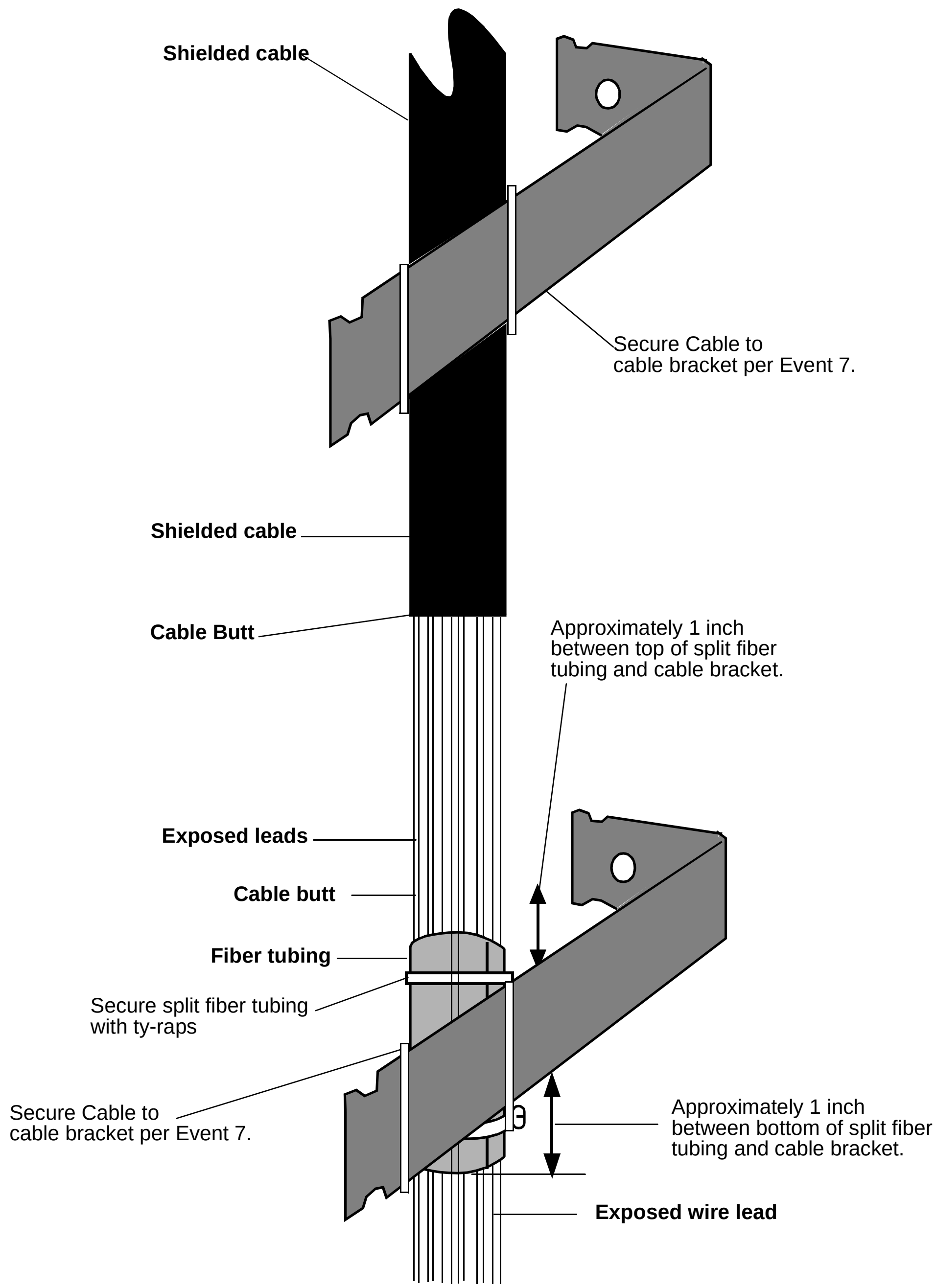
1 There are two shielded cables (SEND and RECEIVE) going to each module, if the frame is so provisioned. Each cable is split between the two shelves. On Domestic and ISDN frames, use two (25-pair #22 AWG) NE-ABAM cables per module. On International and Offshore frames, use two (120 ohm 18-pair #22 AWG) DMS Interface cables per module. Refer to Figure 33.

2 Butt the cable below the cable bracket from the point where the cable is split going to the two shelves.
Note: For Canadian applications, twist the wire leads with two twists per inch from the point of the cable butt to the terminal connection (this applies to both the DSX and the common peripheral ends).

3 Run the leads down the frame upright and form them across the cable bracket to their termination point. Refer to Figure 33 and Figure 52. Ensure that the spare leads are left with enough slack to reach the farthest termination point served by that cable.

Form these spares in the vertical form of that cable at the side of the shelf. Use fiber tubing to protect exposed wire leads at the cable support brackets and any other securing point. They should be protected wherever they are secured. The fiber tubing is to extend approximately 1 inch above and 1inch below the traverse arm. Secure the fiber tubing with ty-raps. Refer to Figure 51.

Figure 51 – Split Tubing Installation at Cable Bracket



Right side of frame
when viewed from rear of frame

4 Use loose fitting ty-raps spaced approximately 2 inches apart along the horizontal forms of the cables from the breakout at the frame upright to the last point where individual leads are run vertically to backplane termination points.

5 Spares are to be formed inside fiber tubing. The spare leads are to be formed in the vertical but not secured under protective fiber tubing with ty-raps. Form spare leads so that they can be accessed without removing the protective tubing at the cable tie brackets.

6 Ensure that the SEND and RECEIVE leads extend from separate SEND and RECEIVE cables. SEND and RECEIVE must run on separate cables from the (I)CPCE/CPEI/CPEO frame to the DSX.

Note: When shielded cables (i.e., ABAM, etc.) are run to the DACS 4 cross-connect panel instead of the DSX, these terminals will terminate on a common "Meet-Me" Bay. The shielded receive cable is connected on the "Meet-Me" Bay tip to tip and ring to ring. The shielded send cable is connected on the "Meet-Me" Bay tip to tip 1 and ring to ring 1.

Note: Exposed leads of the send and receive cables are to be formed in separate bundles to their respective termination points.

7 Strip and wrap the leads to the correct pins leaving about 8 cm (about three inches) of slack for a service loop.

8 Ground the cable according to the Event 07 (Method 03-9057), "General Cabling and Torque Requirements."

Figure 52 – DS1/PCM30 Connections								
DS1/ PCM30 PORTS	**Domestic/ISDN 6X01AA/AB/AD Shelf/Slot**		**Offshore 6X01AC Shelf/Slot**		**International 6X01BA**		**PINS**	
							Send	**Receive**
0	X	5	X	5	X	4	1, 2	5, 6
1	X	5	X	5	X	4	3, 4	7, 8
2	X+14	5	X+14	5	X+14	4	1, 2	5, 6
3	X+14	5	X+14	5	X+14	4	3, 4	7, 8
4	X	4	X	4	X	3	1, 2	5, 6
5	X	4	X	4	X	3	3, 4	7, 8
6	X+14	4	X+14	4	X+14	3	1, 2	5, 6
7	X+14	4	X+14	4	X+14	3	3, 4	7, 8
8	X	3	X	3	X	2	1, 2	5, 6
9	X	3	X	3	X	2	3, 4	7, 8
10	X+14	3	X+14	3	X+14	2	1, 2	5, 6
11	X+14	3	X+14	3	X+14	2	3, 4	7, 8
12	X	2	X	2	X	1	1, 2	5, 6
13	X	2	X	2	X	1	3, 4	7, 8
14	X+14	2	X+14	2	X+14	1	1, 2	5, 6
15	X+14	2	X+14	2	X+14	1	3, 4	7, 8
16	X	1					1, 2	5, 6
17	X	1					3, 4	7, 8
18	X+14	1					1, 2	5, 6
19	X+14	1					3, 4	7, 8
Where X can be 18 or 51								

6.6 UFXPM Fiber Cabling to Peripherals

1 Fiber and switchboard cables are to be routed separately. Begin forming the cables from the ENET cabinet to the Peripherals.
For Fiber Cable Bending radius, refer to Event 07 (Method 03-9057) "General Cabling and Torque Requirements,".
(For upgrade or extension jobs, refer to Method 23-9957, “XPM Fiber Loopback Test,” for information concerning when to make the fiber cable connections and refer to Method 23-9960, “Integration of DS30 5-Link Remote Switchboxes", for the copper cable connections. Utilize the NT6X0251 Fiber cable conversion kit when upgrading from copper to Fiber.)

2 Loosely secure the fiber cables together to aid in running cables. Fiber cables should be separated from the existing cables by utilizing sheet fiber and lacing cord.

3 Route the fiber cables per the cable tags. The fiber cables are to be formed on the left, rear upright of the peripheral frame. Refer to job specifications to determine if the cabling is top or bottom feed. Secure the cables to the frame upright utilizing sheet fiber and lacing cord.

4 There is a maximum of two quad fiber cables per Peripheral: one quad cable for Plane 0 and one quad cable for Plane 1.

5 Form the cables to the side of the UFXPM brackets. Retain (loosely secure) the butt of the sheathed fiber cable to the bottom of the plastic UFXPM bracket with a lacing cord and sheet fiber. One cable is to be secured at the UFXPM shelf bracket position 18 and the other cable is to be secured at the UFXPM shelf bracket 32

6 The spiral wrap (R0111833) shall be installed between shelves 32 and 51 protecting the fibers that cross over the FSP.

7 Fiber optic cables have special requirements for securing. The optical glass conductor within the cable is very sensitive and may be damaged if excessive tension is applied. Therefore, the proper procedures for securing fiber cables are as follows:

a. Wrap the fiber optic cable with one layer of sheet fiber at the securing point.
b. Use twine to secure the fiber optic cable. Stitches in the twine shall not be so tight as to deform the cables.
c. When applying two band stitches above top transverse arm, ensure sheet fiber is used at each band stitch location prior to stitching.

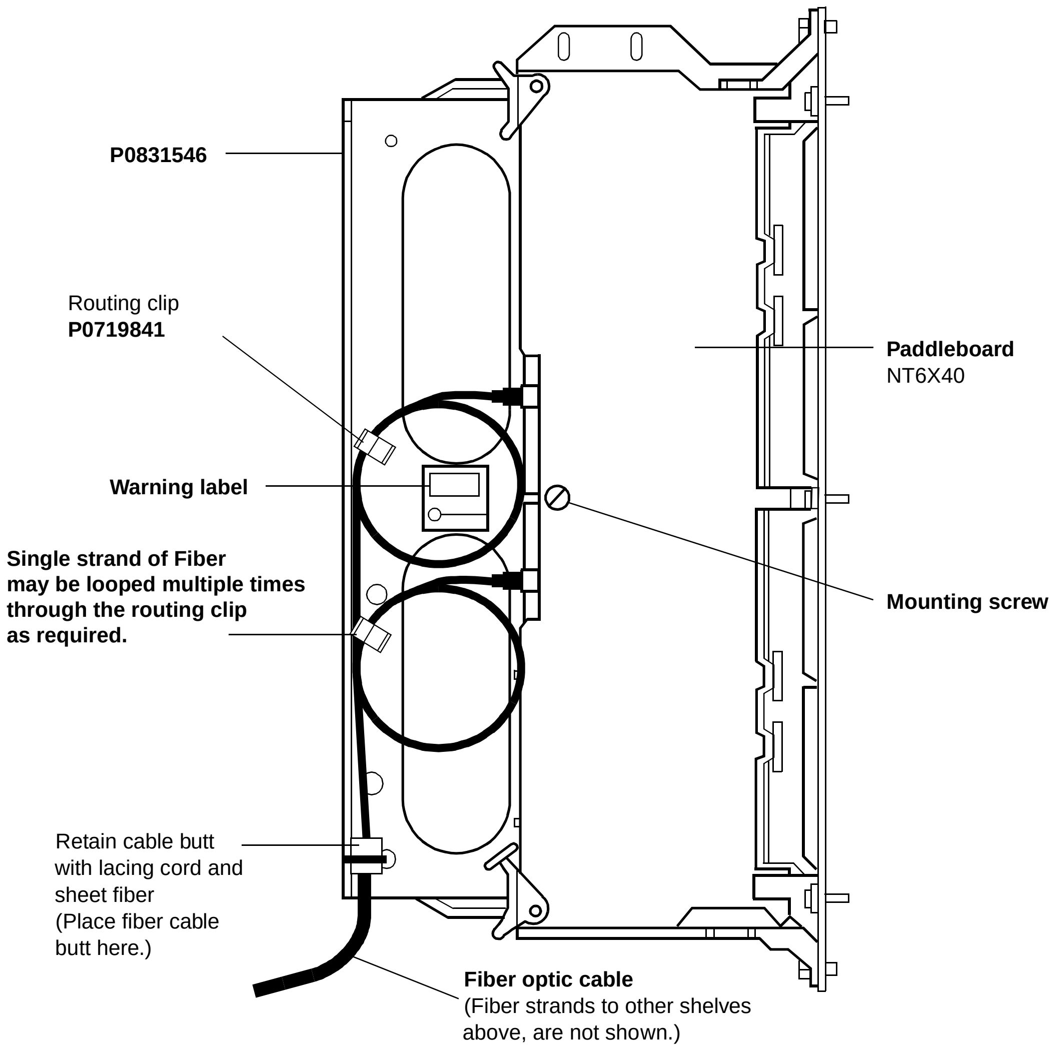
8 Connect the single strands of the fiber cable to the NT6X40DA paddleboard at shelf positions 18, 32, 51, and 65. Form a loop(s) to take up the extra slack of fiber. It may be necessary to adjust the exact position of the butt of the sheathed fiber cable to ensure sufficient slack to obtain the minimum bend radius as defined in Event 7.

Two quad single fiber strand leads, which originate from shelf position 18 and terminate at shelf 51, must be secured at UFXPM bracket position 32.

Two quad single fiber strand leads, which originate from shelf position 32 and terminate at shelf 65, must be secured at UFXPM bracket position 51.

Retain the loop of the single fiber cable strand to the UFXPM bracket by utilizing the RYCO fiber clip P0719841. There may be multiple loops under the clip but only from a single strand of fiber. The fiber clip must be installed per Figure 53 or the optical glass conductor may become damaged.

Figure 53 – Securing Fiber Cable to UFXPM Bracket



It may be necessary to adjust the exact position of the butt of the sheathed fiber cable to ensure sufficient slack is available to obtain the minimum bend radius as defined in Event 07, 03-9057, subsection on Fiber Optic Cables.

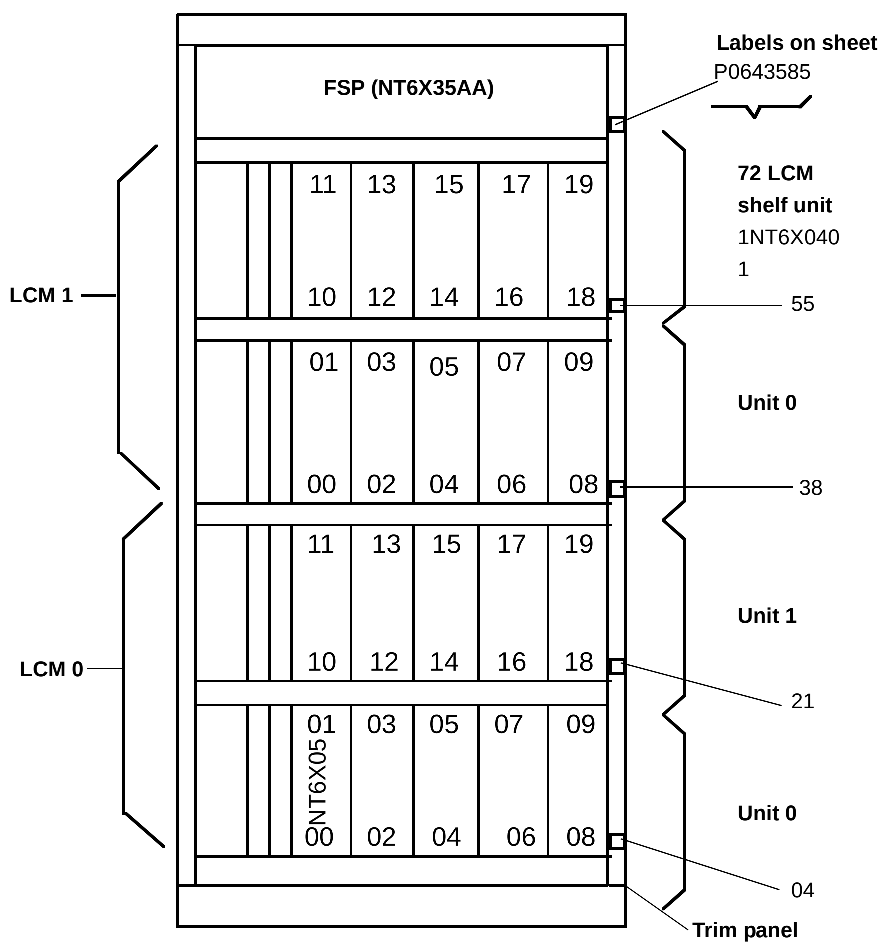
9 Form any access cable out of the top of the frame and secure it to the cable tie brackets at the left rear side of the frame utilizing sheet fiber and lacing cord.

7.0 Line Concentrating Equipment (LCE) Frame

7.1 LCE Frame Assembly

1. The LCE frame is a single bay frame consisting of a Frame Supervisory Panel (FSP) and two Line Concentrating Modules (LCM) with two shelves each. Each shelf has five Line Drawers (LD) subdivided into ten Line Subgroups (LSG).
2. If provisioned, each line drawer has a bracket mounted by the shop near the bottom of each drawer. This is to control the cable protruding to the rear of the drawer. These brackets should be left on the frame. If these brackets are removed to form the cable, there will be a problem remounting due to cable buildup. It is suggested to form the cable with the brackets on the frame.
3. If the rear covers are provisioned for the LCE, attach the mounting brackets to the frame before any cabling operation is started. Refer to Subsections 7.12 and 7.13.
4. The line drawers are shipped in individual cartons and must be installed in the field by the field technician.
5. Refer to Figure 54 for NT6X03AA configuration.

Figure 54 – LCE Configuration (NT6X03AA) Front View



***Note*:** For regular LCEs, the trim panel labels are found on sheet P0643585.

7.2 LCE Frame Line Drawer Handling

1 This procedure explains the proper way of handling the line drawers after they have been installed in their respective positions.

The procedure concerns fully retracting (pulling out of shelf) the drawer to gain an access to all line cards.

2 Each line drawer has a "hanging" system built into it. To fully understand the procedure, first locate the notch at the bottom, left corner on the rear of the line drawer.

3 To fully retract the drawer out of the shelf, pull the drawer out until it is stopped by the top stop latch. Ensure that the latch is engaged.

4 Gently lift the front and shift the drawer bottom about 1/4" to the right until the notch on the drawer "finds" the "lip" on the bottom plate rail; then let the drawer rest against the "lip."

5 The drawer in this position does not exert any pressure onto the top and bottom shelf plates and provides an access to all line cards.

6 It is not recommended that the drawers are left in this position for an extended period of time. Retract the drawers only when necessary; replace them as soon as completing the work.

7.3 LCE Frame Power and Alarm Cabling

1 There has been a design change consisting of a reduced number of power feeder cables and elimination of RG multiples. Field technicians are instructed to observe the strapping on the frame's FSP.

2 If bundled cables have been spec'd, there will be one (1) run of -48 Vdc cables and one (1) run of Battery Return cables. Refer to Figure 55 and Figure 56 for the codes of the bundle power cables and their terminations for the LCE frame. The cables will continue to be formed and terminated as illustrated in Figure 57. The bundled cable end(s) equipped with lugs terminate at the LCE, the unlugged cable end(s) terminate at the PDC. The PDC end will require lugging prior to terminating.

Note: Do *not* remove insulators from cable ends until just prior to lugging and termination.

Figure 55 – LCE Bundled Cables

CPC	PEC	Description
B0254549 B0254552	NTY750AG NTY750AK	LCE Power Cable 10 Ga. (-48V) LCE Power Cable 10 Ga. (BR)
B0254550 B0254553	NTY750AH NTY750AL	LCE Power Cable 8 Ga. (-48V) LCE Power Cable 8 Ga. (BR)
B0254551 B0254554	NTY750AJ NTY750AM	LCE Power Cable 6 Ga. (-48V) LCE Power Cable 6 Ga. (BR)

3 Refer to Figure 57 for the terminations at the FSP on the LCE frame.

Figure 56 – LCE Power Connections

-48V	BAT RTN
TB1-1, 2, 7, 8	TB2-1, 4, 6, 9

4 A number of straps should have been added (in manufacturing) to the FSP to tie together the following punchings:

a. TB1-1T to TB1-3T (-48VA) LCM 0/1 LCA 0 RG0

b. TB1-3T to TB1-5T (-48VA) LCM 0/1 LCA 0 RG0

c. TB1-2T to TB1-4T (-48VB) LCM 0/1 LCA 1 RG1

d. TB1-4T to TB1-6T (-48VB) LCM 0/1 LCA 1 RG1

e. TB1-9T to TB1-11T (BR A)

f. TB1-11T to TB2-3T (BR A)

g. TB1-10T to TB1-12T (BR B)

h. TB1-12T to TB2-4T (BR B)

i. TB1-11B to TB4-2T (RGR 0)

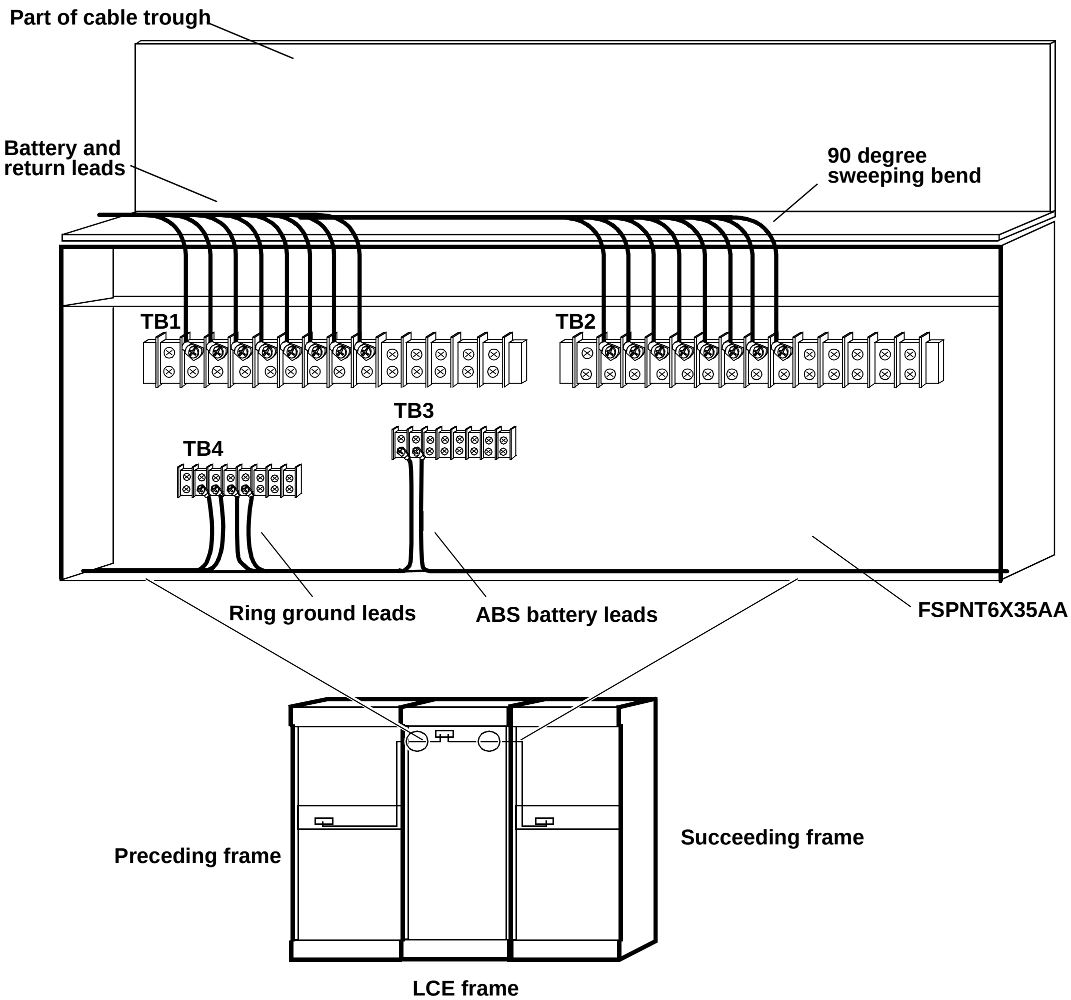
j. TB1-10B to TB4-4T (RGR 1)

5 The previous straps are optional. However, all LCE frames should have been shipped to the field wired in this manner. The straps may have to be removed in the field in a situation where the distance from the LCE frame(s) to PDC is greater than 61'.

6 The cable tags for the job will reflect this deviation. If the power cable runs are less than 61', then for running and connecting, use the CA0X04 (issue 50 or higher) items 4AFM-4AFU. If the cable runs are over 61', then remove only straps 1 through 8 listed above and use the CA0X04 items 4HV-4JM, the old way.

7 If by chance the frame(s) are *not* equipped with these straps, issue an Installation Requisition (IR) ordering the two strapping kits, NT6X0342 LCE FSP BUS BARS and NT6X0338 DOMESTIC WIRING KIT FOR LCE RINGING RETURNS, and install them as specified previously. Run in only four -48V and four BR cables, no ringing return multiple. Connect the power feeders as per CA0X04 items 4AFM-4AFU. Mark up -D640 accordingly for submission with closing papers and for the customer use. Refer to Figure 57.

Figure 57 – Forming at FSP – Top of Frame



8 When the job is cabled the "new" way, a number of new labels are available for designating the PDC fuse panels. The P numbers and the contents of these labels are listed below:

a. P0746992	LCM## 0 - 1 LCA 0 RG0	(LCM00 to LCM99)
b. P0747111	LCM## 0 - 1 LCA 1 RG1	(LCM00 to LCM99)
c. P0747112	ILCM## 0 - 1 ILCA 0 RG0	(ILCM00 TO ILCM99)
d. P0747113	ILCM## 0 - 1 ILCA 1 RG1	(ILCM00 TO ILCM99

9 Refer to Figure 58 and Figure 59 for Power cabling.

Figure 58 – Power Cabling (Less than 61 feet to source)

Cable Designation	Cable Connection Designation	Terminal Strip Designation	Notes
LCPD36	-48V (A)	TB1-1	LCM 0-1, LCA 0, RG0
LCPD37	BAT RTN	TB1-9	LCM 0-1, LCA 0, RG0
LCPD38	-48V (B)	TB1-2	LCM 0-1, LCA 1, RG1
LCPD39	BAT RTN	TB1-10	LCM 0-1, LCA 1, RG1
	-48V (A)	TB1-3	Strapped to TB1-1
	BAT RTN	TB1-11	Strapped to TB1-9
	-48V (B)	TB1-4	Strapped to TB1-2
	BAT RTN	TB1-12	Strapped to TB1-10
	-48V (A)	TB1-5	Strapped to TB1-3
	BAT RTN	TB2-3	Strapped to TB1-9
	-48V (B)	TB1-6	Strapped to TB1-4
	BAT RTN	TB2-4	Strapped to TB1-12
LCPD40	-48V (A) TLK	TB1-7	
LCPD41	BAT RTN TLK	TB2-1	
LCPD42	-48V (B) TLK	TB1-8	
LCPD43	BAT RTN TLK	TB2-6	
	Ring 0 RTN	TB4-2	Strapped to TB1-11
	Ring 1 RTN	TB4-4	Strapped to TB1-10

Figure 59 – Power Cabling (More than 61 feet to power source)			
Cable Designation	**Cable Connection Designation**	**Terminal Strip Designation**	**Notes**
LCPD00	-48V (A)	TB1-1	For Equipment Position 4
LCPD01	BAT RTN	TB1-9	
LCPD02	-48V (B)	TB1-2	
LCPD03	BAT RTN	TB1-10	
LCPD04	-48V (A)	TB1-3	For Equipment Position 39
LCPD05	BAT RTN	TB1-11	
LCPD06	-48V (B)	TB1-4	
LCPD07	BAT RTN	TB1-12	
LCPD08	-48V (A)	TB1-5	Provide when frame is equipped with Ringing Generator 0 and 1.
LCPD09	BAT RTN	TB2-3	
LCPD10	-48V (B)	TB1-6	
LCPD11	BAT RTN	TB2-4	
LCPD12	-48V (A)	TB1-7	
LCPD13	BAT RTN	TB2-1	
LCPD14	-48V (B)	TB1-8	
LCPD15	BAT RTN	TB2-6	
LCPD16	First Ring 0 RTN	TB4-2	Provide one terminal lug each, A0288148 Terminal Strip TB4 and A0288184. associated with LCE frame and TB3 with LCEI frame.
		TB3-11	
LCPD16	Last Ring 0 RTN	TB4-1	
		TB3-11	
LCPD17	First Ring 1 RTN	TB4-4	
		TB3-12	
LCPD17	Last Ring 1 RTN	TB4-3	
		TB3-12	
The following are the originating terminals for preceding FSP ringing generators. Terminal strip TB4 is associated with LCE frame, and TB3 with LCEI frames.			
LCPD18	Ring Gen 0	TB4-2	Provide two terminal lugs A0288148.
		TB3-11	
LCPD19	Ring Gen 1	TB4-4	
		TB3-12	
The following are the terminating terminals for succeeding FSP ringing generators. Completion of designation TB4 is associated with LCE frame, and TB3 with LCEI frames.			
LCPD18	Ring Gen 0	TB4-1TB3-11	Provide two terminal lugs A0288148.
LCPD19	Ring Gen 1	TB4-3	

7.4 LCE Frame Switchboard Cables NT0X26CE or CF (LD to MDF)

Note: There are two types of cables available for line drawer to MDF. NT0X26CE or CF (CF is connectorized on DF end) is a 32-pair cable. NT0X96BB/BC is a 64-pair cable. Refer to Subsection 7.5 for 64-pair cable.

Note: Using the RE-80105 cable tie marker, label the individual subgroup cables indicating the LCM number and the line subgroup number on each 32 pair cable (NT0X26CE/CF. This does not apply to the US installed jobs.

Note: The cable bracket mounted adjacent to TB2 at position 75 is not to be used for securing cables. All cables formed on the right rear of the frame are to be formed to the right of this cable bracket viewed from the rear of the frame. This bracket is intended to ensure cables do not cover or route over TB2. Do not secure cables to this bracket.

1 Switchboard cables (NT0X26CE/CF) are sent to the field in boxes of five cables.

Run each bundle of five cables down verticals of the LCE bay with line subgroups 00, 01, 02, 03, 10, 11, 12, and 13 down the right upright (rear view) and line subgroups 04, 05, 06, 07, 08, 09, 14, 15, 16, 17, 18, and 19 down the left upright.

Therefore, there are six line subgroup cables which are run down the left, rear frame upright and four-line subgroup cables which are run down the right, rear-frame upright for each LCM shelf.

2 The line subgroup cables run down the left, rear frame upright and terminate on the three-line drawers on the left-hand side of the frame.

The line subgroup cables run down the right, rear frame upright terminating on the two line drawers on the right-hand side of the frame. This applies to each line drawer shelf.

3 Each line drawer has one local cable and two switchboard (MDF) cables. Each switchboard cable is split and equipped with two connectors (A and B).

4 Form the cables horizontally inside the U-channel at the top of each shelf with the shop cable, and drop them down to each line drawer.

The length of the local control cable is to be 32 inches from the U-channel to the end of the connector.

This measurement is taken after the line cables are secured as shown in Figure 60. Use seven ty-raps through the holes in the channel to hold shop and switchboard cables in the channel. The left most ty-rap must be routed through the top hole in the U-channel to secure cables before they sweep to the vertical left side of the frame. The subgroup cables will be formed such that the cable butt will be at least a 1/2" from the top of the control spring.

5 There are 7 small holes in the back of the "U" channel. The holes are to be used to secure the line cables to the "U" channel. Insert a ty-rap through the small holes in the back of the "U" channel. The ty-rap is to be routed over the cables and looped back around the cables and under the edge of the channel. Ensure that the ty-rap does not pass through any cables or pinches any wires. The head of the ty-rap is to be located towards the bottom edge of the channel. This will pull the cables towards the rear of the channel. Refer to Figure 60 View A-A.

Note: The two furthest right cable ties should be installed as shown in the bottom of Figure 63 so that the plastic cable protector is secured to the frame.

6 At shelf positions 04 and 38, begin with line subgroups 08 and 09 and work to the right. The last line subgroups to be formed will be 00 and 01.

At shelf positions 21 and 55, begin with line subgroups 18 and 19 and work to the right. The last line subgroups to be formed will be 10 and 11.

Once all cables are formed, any excess control cable resulting from this procedure shall be pushed back toward the backplane. This is the area at the top, right rear of the shelf.

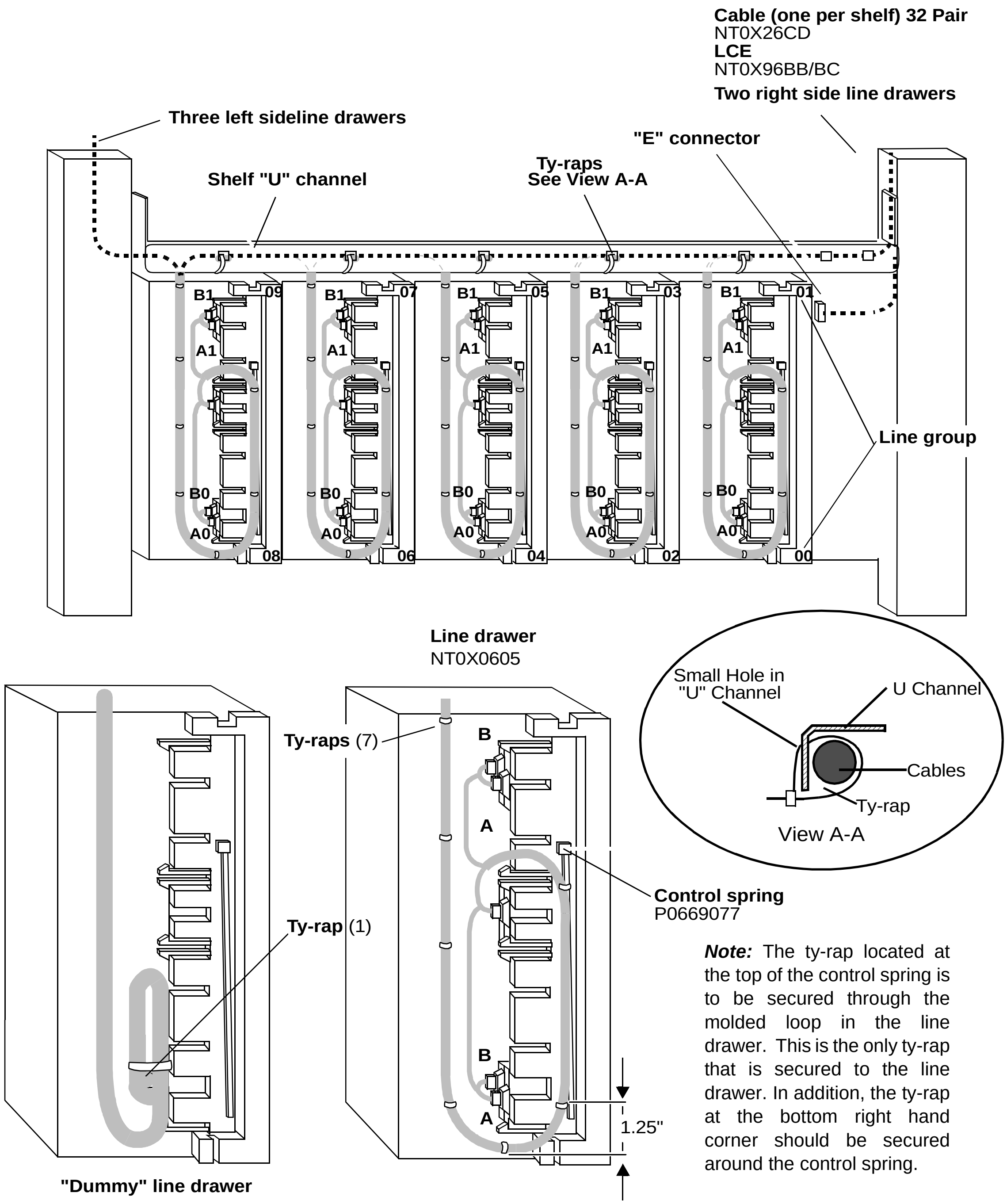
7 Dress local cable on top of the MDF cables. The MDF cable(s) should be dressed against the control spring. Dress the local cables on top of the MDF cables. This will give additional protection to local cables.

8 Do *not* connect MDF cables to unequipped and/or partially equipped line drawers until cables have been tested.

Note: The ty-rap located at the top of the control spring, reflected in Figure 60, is to be secured through the molded loop in the line drawer. This is the only ty-rap that is secured to the line drawer. In Addition, the ty-rap at the bottom right hand corner should be secured around the control spring.

9 Designate cables at line drawer and MDF ends with upper permanent peel-off label from P0866901 cable tag. Refer to event 07 (method 03-9057) for details. The connectorized end of the cable should already be identified by the cable manufacturer.

Figure 60 – 32-Pair Cable (NT0X26CE/CF) Forming



Note: The ty-rap located at the top of the control spring is to be secured through the molded loop in the line drawer. This is the only ty-rap that is secured to the line drawer. In addition, the ty-rap at the bottom right hand corner should be secured around the control spring.

10 If MDF cables are supplied for unequipped line drawers, store the cables with sufficient slack in the cable trough above the LCE to which they terminate. Ensure enough slack is present for the cable forming at the rear of the drawer.

11 Prior to K-date (maximum of two days), check all A and B connectors at the rear of the line drawers to ensure they are properly seated.

7.5 LCE Frame Switchboard Cables NT0X96BB/BC (LD to MDF)

Note: Using the RE-80105 cable tie marker, label the individual subgroup cables indicating the LCM number and the line subgroup number on each 32 pair cable (NT0X26CE/CF. This does not apply to the US installed jobs.

1 Each line drawer has one local cable and one 64-pair switchboard cable. The switchboard cable (NT0X96BB/BC) is split into four connectors numbered A0, B0, A1, and B1. Connectors A0 and B0 serve lower or even numbered line subgroups, and connectors A1 and B1 serve top or odd numbered line subgroups.

Refer to Figure 60 for 64-Pair Cable (NT0X96BB/BC) Forming.

2 Form the cables horizontally inside the U-channel at the top of each shelf with the shop cable, and drop them down to each line drawer. The length of the local control cable is to be 32 inches from the U-channel to the end of the connector. This measurement is taken after the line cables are secured as shown in Figure 60. Use seven ty-raps through holes in the channel to hold shop and switchboard cables in the channel. Refer to Figure 60.

3 At shelf positions 04 and 38, begin with line subgroups 08 and 09 and work to the right. The last line subgroups to be formed will be 00 and 01. At shelf positions 21 and 55, begin with line subgroups 18 and 19 and work to the right. The last line subgroups to be formed will be 10 and 11. Once all cables are formed, any excess control cable resulting from this method shall be pushed back toward the backplane. This is the area at the top, right rear of the shelf.

Ensure that ty-raps do *not* interfere with the movement of the drawer and/or cables. Failure to dress all cables, as outlined in paragraph 7, could result in the line drawers being pulled out of the frame when the drawer is fully extended.

4 Dress and secure the cables at the "Dummy" line drawers as shown in Figure 60. Do not secure the cables to the control spring.

5 Form all line drawers on the shelf and then work the slack back to the cable trough. Cables are formed and secured with ty-raps to cable brackets.

6 For 64-pair cable, the shorter connector length should be the same length as the local cable from the point where the line subgroup cable meets the local on the upper U-channel. The shorter connector pair is used for the upper line drawer subgroup, and the longer connector pair is for the lower line drawer subgroup. The MDF cable(s) should be dressed against the control spring. Dress the local cables on top of the MDF cables. This will give additional protection to the local cables.

7 Referring to Figure 60, the upper subgroup cable will be formed such that the cable butt will be approximately 1/2"from the top of the control spring.

8 After all cables are connected, slide the drawers in and out of the shelf to ensure the line cards do *not* touch the back of adjacent drawer. If they are found to be scraping, keep redressing the cables until there is sufficient clearance between two adjacent drawers.

9 Designate cables at line drawer and MDF ends with upper permanent peel-off label from P0866901 cable tag. Refer to event 07 (method 03-9057) for details. The connectorized end of the cable should already be identified by the cable manufacturer.

10 Do *not* connect MDF cables to unequipped and/or partially equipped line drawers until cables have been tested.

11 Loop control cables for unequipped line drawer positions up to the U-channel and back down to the line drawer bracket. Secure the cables with a ty-rap at the top of the loop and to the line drawer bracket. Do *not* remove the anti static protection supplied on the connectors; they should remain in place.

12 If MDF cables are supplied for unequipped line drawers, store the cables with sufficient slack in the cable trough above the LCE to which they terminate. Ensure enough slack is present for the cable forming at the rear of the drawer.

13 Prior to K-date (maximum of two days), check all A and B connectors at the rear of the line drawers to ensure they are properly seated.

7.6 LCE Frame Switchboard Cables for Metallic Test Access (MTA)

1 There are two switchboard cables for MTA. The cables run down the right rear frame upright and are formed across the lower shelf on the FSP to the termination point which are connectors C03 and C04.

2 The cables are secured to the cable brackets with ty-raps.

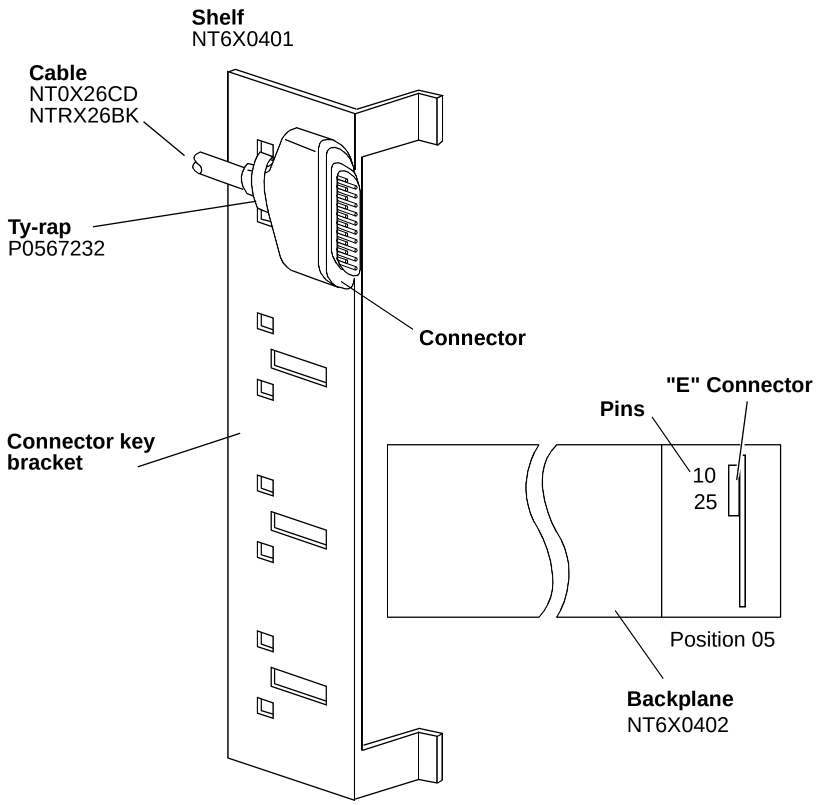
7.7 NT0X26CD Switchboard Cables (From LCE to CPCE)

1 There are four NTOX26CD switchboard cables per frame (one for each (I)LCM shelf). These cables run vertically down the right, rear frame upright and are secured with ty-raps to the cable brackets.

2 The cables are formed horizontally across each shelf to the termination point.

3 The cable terminates on the backpanel, position 5, on pins #10 to #25. Refer to Figure 61.

Figure 61 – NT6X0401 Backplane



Note: The connector on the backpanel and the connector on the cable are designated E. Ensure that pin #1 on the cable connector mates with pin #10 on the backpanel.

4 A second ty-rap is used to secure the cable connector to the connector key bracket. Do not remove the existing small ty-rap from the cable connector hood on the ship loose cables.

5 The head of the ty-rap is to be located on the opposite side of the bracket as the cable connector. The head of the ty-rap is to be located at the TOP of the connector. Cut the ty-rap flush.

7.8 NT0X26DV Switchboard Cables (From LCE to CRSC/CIPE)

1 The NTRX26DV cable assembly connects between the LCE and the CRSC. The cable has 2 connectors on one end and a single connector on the opposite end.

2 The 2 connectors are stamped "A" and "B". Secure connector "A" to LCA 0 and connector "B" to LCA 1. Refer to cable tags for the termination locations and routing.

3 The opposite end of the cable terminates on the CRSC bulkhead connector numbers C00-C09 on shelf 05 as per cable tags.

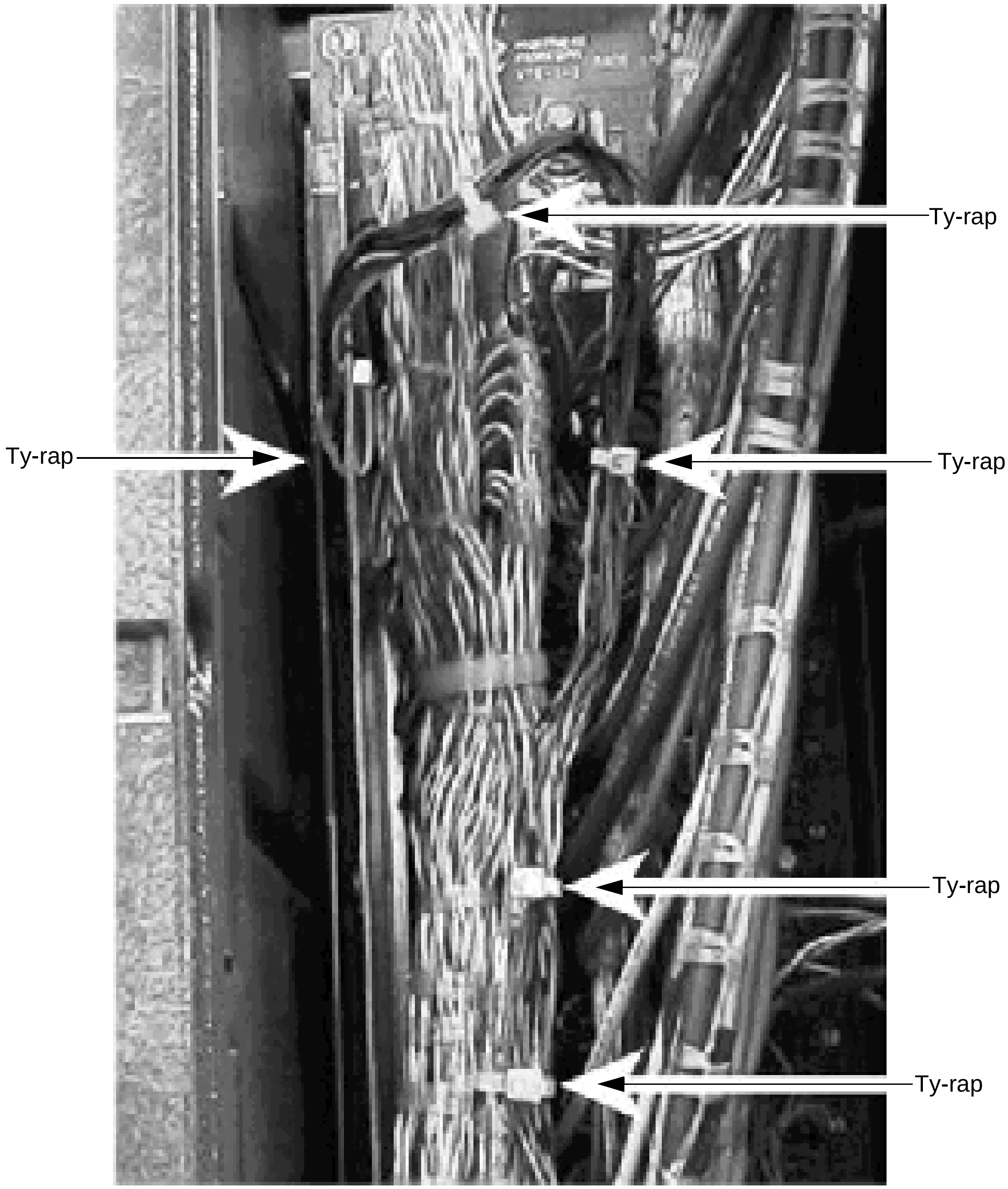
4 Route the NTRX26DV cable down the right rear upright (drop side S0). Secure the cable to the cable brackets where possible. Dress the cables in with existing forms to their respective terminations points. The cables are to be secured to the existing signal cable bundle using ty-raps. Do not bundle with power cables. Do not remine ty-raps from existing cable bundle.

5 The cable connectors are to be secured to the connector key bracket using a ty-rap. Use the widest possible ty-rap to secure the connector to the connector key bracket. Locate the head of the ty-rap at the "top" of the connector on the opposite side of the bracket.

6 Care must be taken when securing and forming the cable with connector "B". This lead is 2 feet long and requires extra ty-raps. Secure this part of the cable with ty-raps approximately 4 inches apart along the form.

7 Verify that the line drawer opens and closes without making any type of contact with NTRX26DV cable assembly. If contact is observed, add additional ty-raps alone the cable form until the cable does not interfere with he operation of the line drawer. Refer to Figure 62, Figure 63, and Figure 64 for cable forming of the NTRX26DV cable assembly.

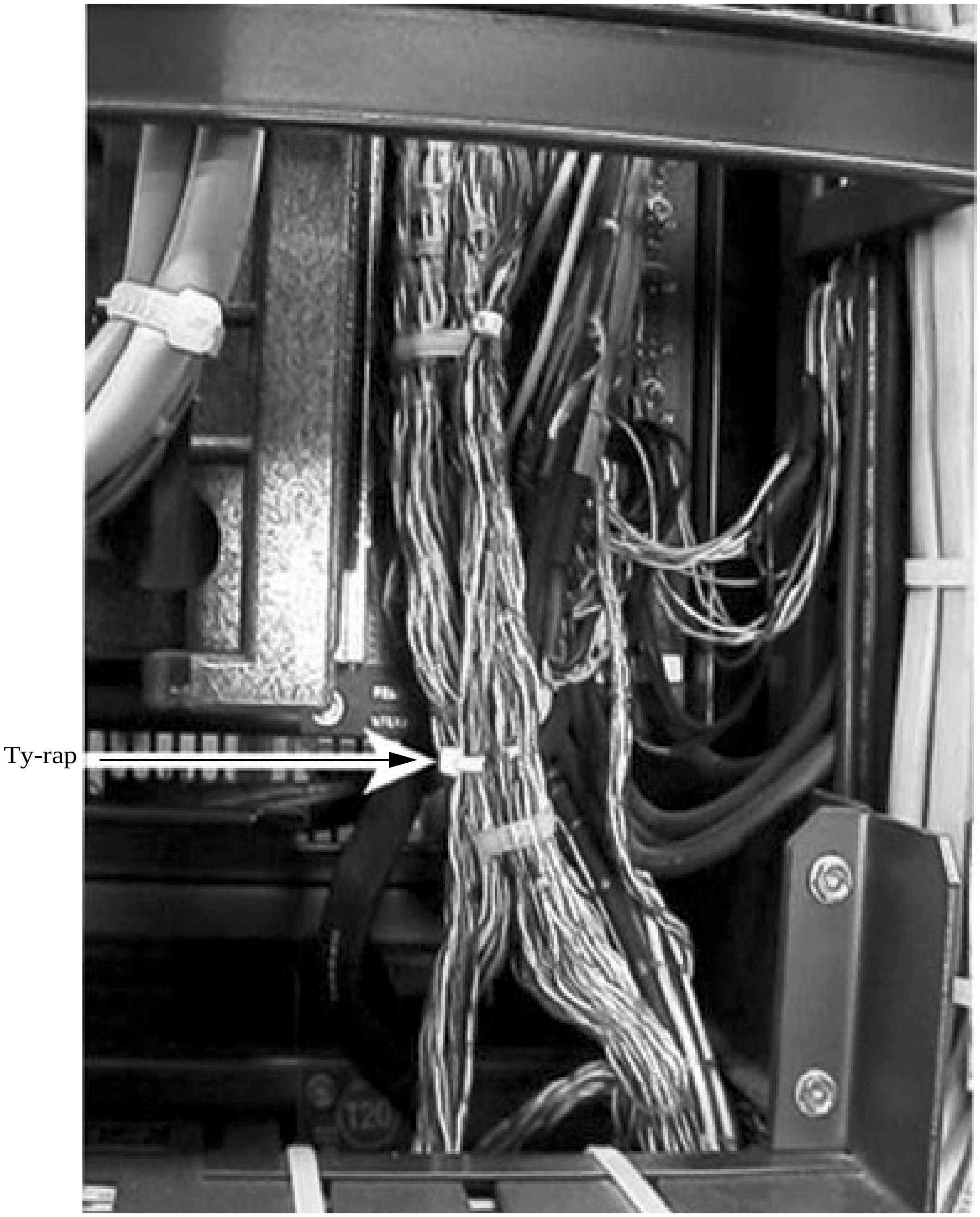
Figure 62 – NT0X26DV Cable Forming Part 1 of 3



Continued on Figure 63.

Figure 63 – NT0X26DV Cable Forming Part 2 of 3

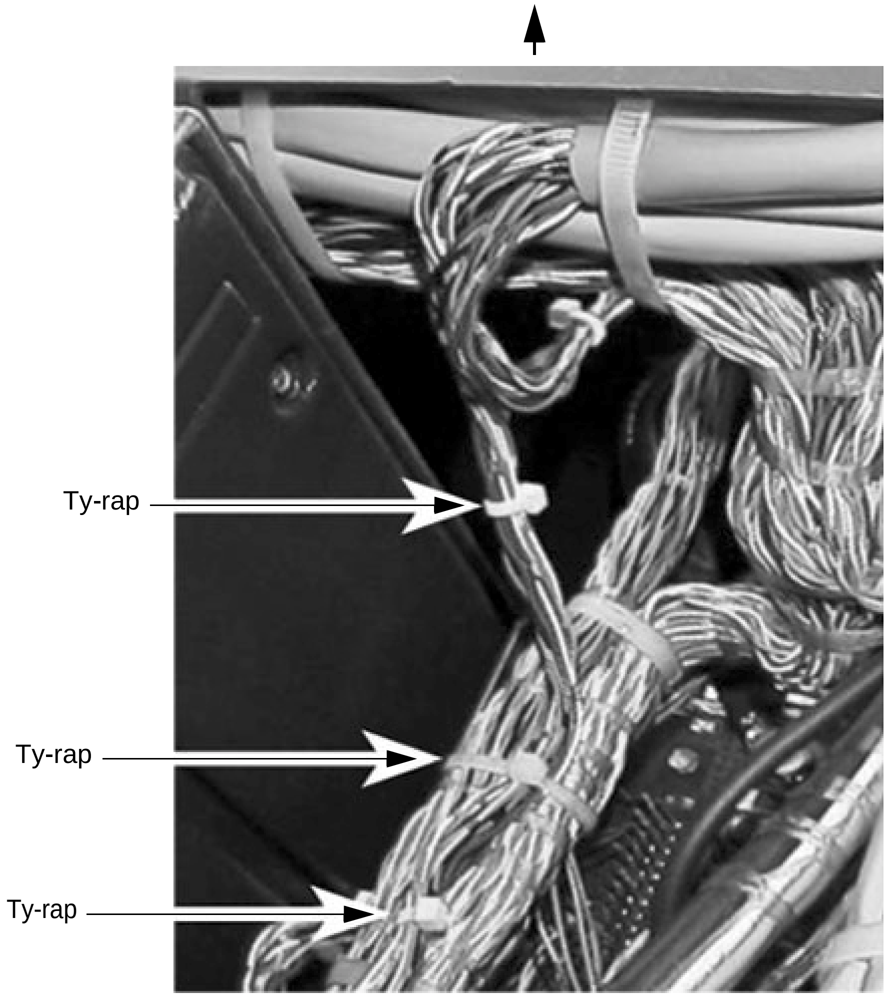
Continued from Figure 62.



Continued on Figure 64.

Figure 64 – NT0X26DV Cable Forming Part 3 of 3

Continued from Figure 63.



7.9 (I)LCE Frame PCM-30 Line Drawer Installation

1 Certain steps refer to installations where coax cable is used. Ignore these steps if twisted pair is used. If the coax cable at the line drawer end has not been assembled with a line drawer connector and twisted pair assembly, refer to Subsection 7.10, "Line Drawer Connector - Coax Termination Assembly 1."

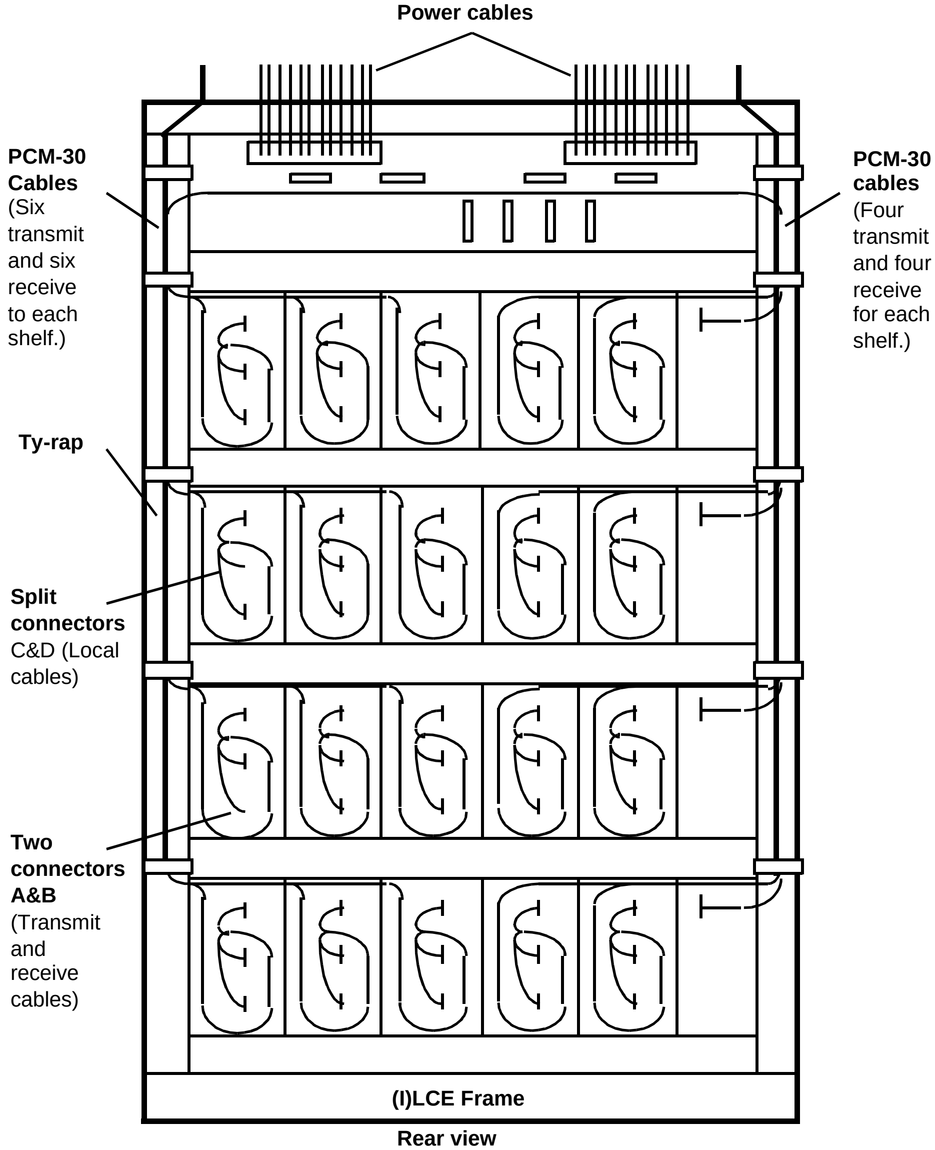
2 The cable must be run from the DDF to the LCM frame.

3 As viewed from the rear of the LCM frame, twelve cables run down the left rear frame upright and eight cables run down the right frame upright for each LCM shelf. The cables which run down the left rear frame upright terminate on the three line drawers on the left - hand side (rear view) of the frame on each shelf. The cables which run down the right rear frame upright terminate on the two line drawers on the right hand side (rear view) of the frame. Refer to Figure 65.

4 Table LCMINV, Field DRWRTYPE lists whether the drawers in the LCM are PLD or STD. Ensure when forming the cables that they are being formed to the proper drawers.

5 The cables are formed across on the inside of the "U" channel on the upper part of each shelf and looped to the line drawer. The cables for the upper subgroup on the drawer must be the same length as the local cable from the point where the line subgroup cables meet the local on the upper U channel. The lower subgroup cables should be 4 inches (15cm) longer. The TRANSMIT EVEN and RECEIVE EVEN coax pair are to be attached to the upper line drawer subgroup (TR1) and the TRANSMIT ODD and RECEIVE ODD coax pair are to be attached to the lower drawer subgroup (TR0). Be aware that on the PLD, the even numbered subgroup is the upper part of the drawer, and the odd numbered subgroup is the lower part of the drawer. This is opposite to a standard line drawer.

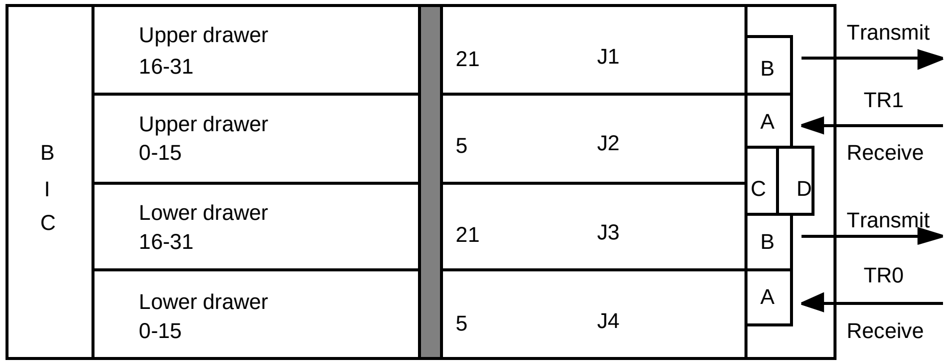
Figure 65 – (I)LCE Cabling and Wiring for PCM-30 Line Drawer Installation



6 Complete all the line drawer end cable assemblies for each line drawer. Do *not* attach the cables to the line drawers until cable continuity test are completed in step 22. Dress the cables to the back of the line drawer as in Figure 67. The ty-raps are to be added in the order numbered on Figure 67.

7 Install the NT6X54CA PCM-30 BIC cards and the NT6X27AC Line Interface Cards in the Line Drawers. The BIC cards go in the front of the line drawer. The Line Interface Card occupies the entire width of the drawer in slot numbers 5 / 21. Refer to Figure 66.

Figure 66 – Coax Cable Connections to PCM-30 Line Drawer



8 The green frame ground leads must be ran back from the line drawer to the LCM bay upright (refer to Figure 67). Viewing from the rear, six leads from the three left hand drawers return to the left hand side and four leads from the two right drawers return to the right. Notice that the leads must be looped backed and dressed to the back of the line drawer as the coax cables are in Figure 67. Cut these leads to length at the termination with the U-channel attaching screws, allowing adequate slack to install the A0346856 termination lug to the lead.

9 Strip 1/4" from the end of each ground lead. Solder the frame ground leads together, and crimp the leads into the termination lug. With a star washer, attach the termination lug to the lower U-channel bracket screw as shown in Figure 67. Using a ohmmeter, ensure the lower U-channel bracket screw has zero resistance between it and the frame ground point located at the top of the frame upright.

10 Ty-rap ground leads with the coax cables underneath the U-channel. They may be run above the U-channel and ty-rapped if no room is available underneath the U-channel.

11 At the DDF end, for each coax cable, attach the coax connector as outlined in steps 12 through 20.

12 Trim the cable to the dimensions shown taking care not to nick the outer braid or center conductor. Slide the crimp ferrule over the cable. Refer to Figure 68.

13 Insert the trimmed cable into the back end of the rear body and slide the knurled crimp barrel under the cable braid. Position the rear body so that 0.8 mm to 1.0 mm of cable insulation protrudes from the front of the rear body. Refer to Figure 69.

Figure 67 – Frame Grounding and Assembly for PCM-30 Line Drawer Cable

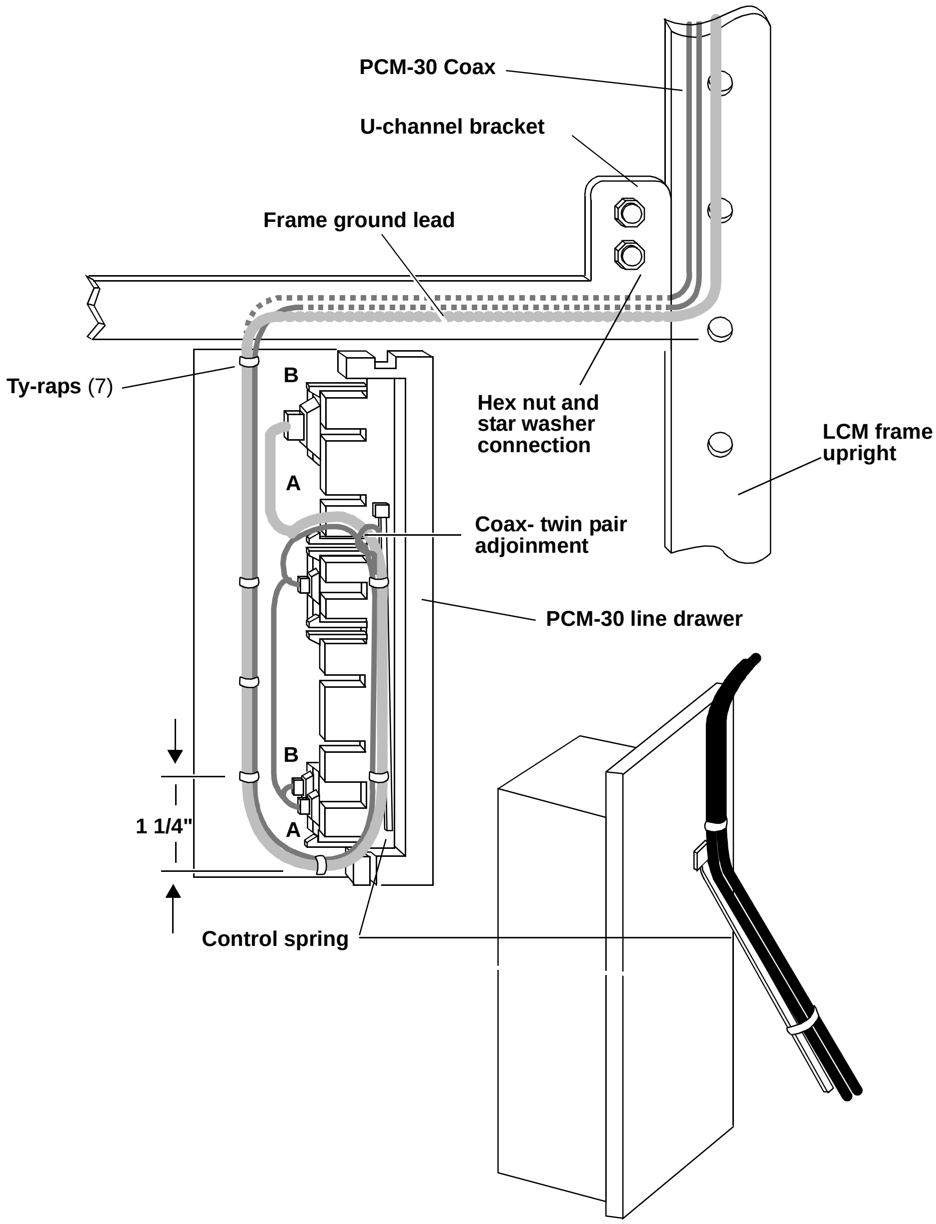


Figure 68 – Prepared Coax Cable for Coax Connector Installation

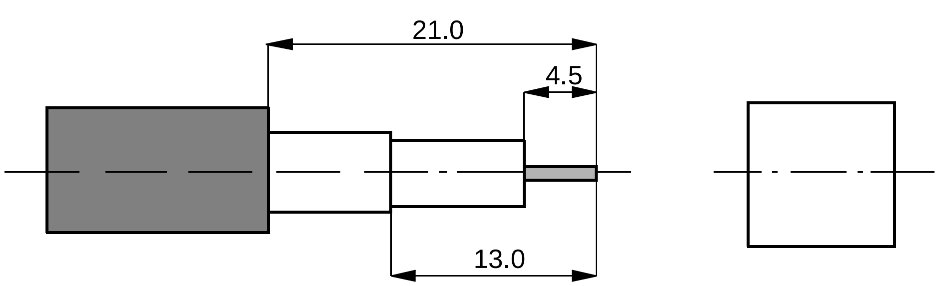
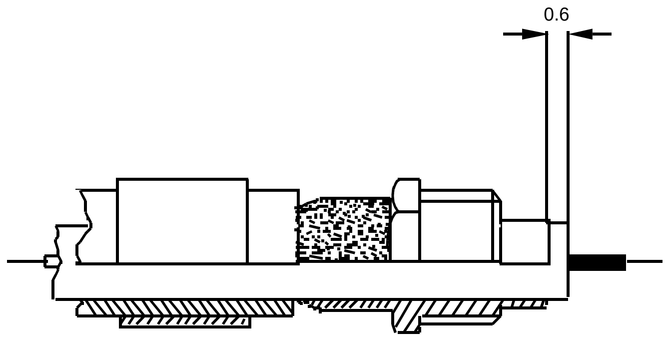
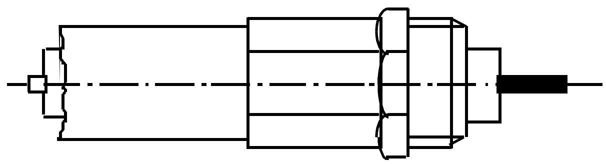


Figure 69 – Crimp Barrel added to Coax



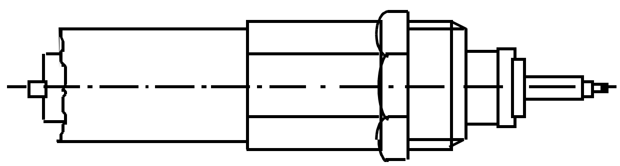
14 Slide the crimp ferrule over the cable braid so that it abutts the hexagonal flange on the rear body and crimp using the Leetec outer crimp tool with the outer crimp die. Refer to Figure 70.

Figure 70 – Coax with Crimp Ferrule Installed



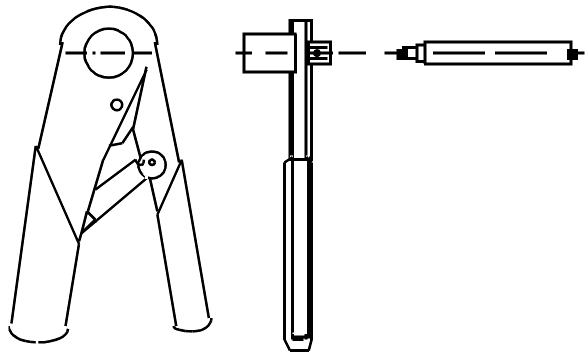
15 Place the rear insulator over the cable conductor, locating it on the cable insulation until it abutts the front face of the rear body. Fit the connector center contact over the cable conductor so that the crimp barrel shoulder abutts the rear insulator. Ensure that the cable conductor is visible through the contact inspection hole. Figure 71 shows the assembled structure.

Figure 71 – Assembly with Rear Insulator and Connector Contact



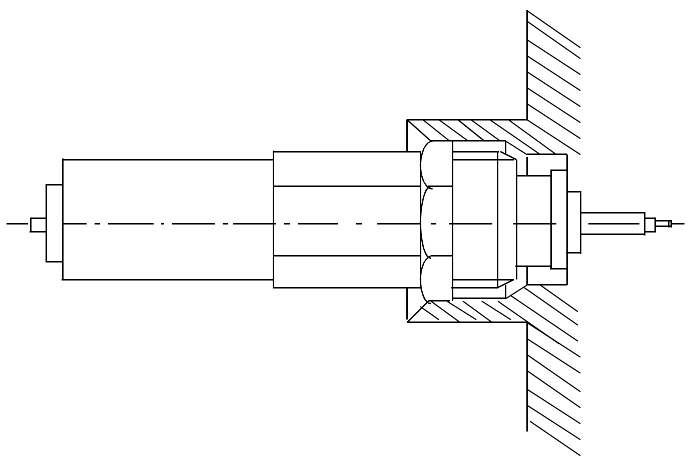
16 Insert the assembly into the center contact crimp tool and locate the hexagonal flange on the rear body into the guide provided on the tool. Refer to Figure 72.

Figure 72 – Crimp Tool Usage



17 Push the assembly fully home, taking up the light spring pressure in the tool and close the tool to crimp the contact in place. Figure 73 shows the assembly as positioned in the Crimping Tool.

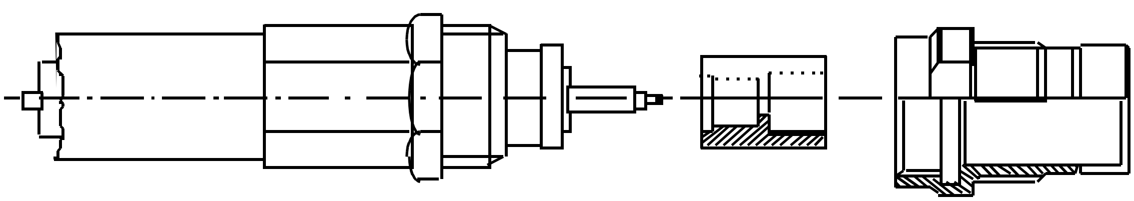
Figure 73 – Coax Connector Assembly Positioned in the Crimping Tool



18 Remove the assembly from the tool and check the integrity of the crimped joint using the test gauge L12-43-1000. Follow the instructions supplied with the gauge.

19 Place the front insulator over the center contact and screw on the front body. Tighten to a torque of 65-75 Ncm using spanner L99-9916. Refer to Figure 74 for assembly positioning.

Figure 74 – Final Connector Assembly



20 Attach the coax to the appropriate coax connector at the DDF. Ty-wrap all cables for a common line drawer together at 20" intervals. The finalized cable assembly should appear as shown in Figure 75.

21 Perform continuity test on the completed cable assembly. Use a piece of bared wire at the line drawer end, inserted into the line drawer connector, to connect the two lead appearances. At the DDF end, use an ohmmeter to check for continuity between the coax shield and signal appearances.

22 Once continuity testing has been successfully completed, remove the bared wire lead at the line drawer connector end, and connect the line drawer connectors to the line drawers. Ensure the cables are installed as in Figure 75.

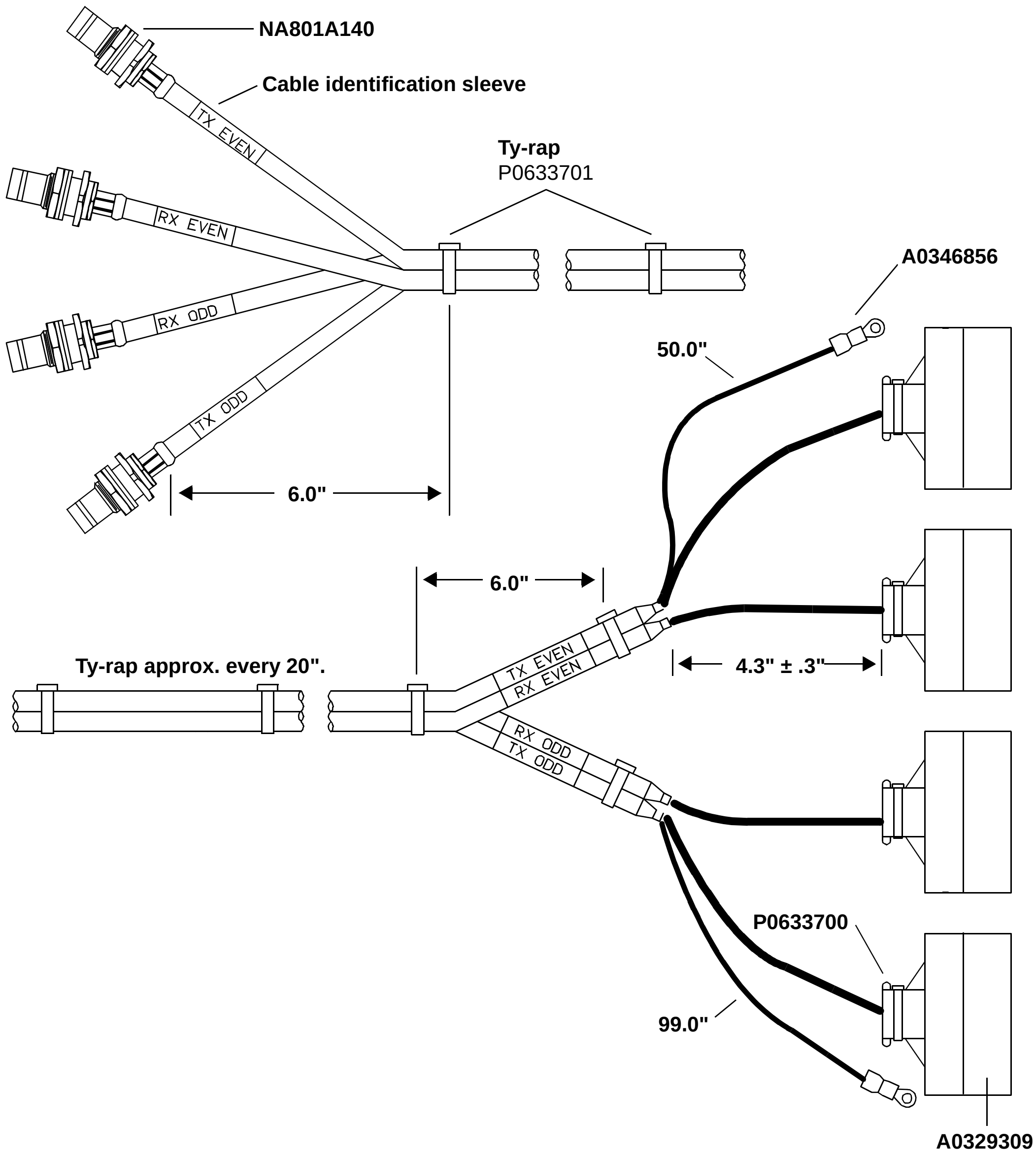
23 Obtain copies of the following data tables:

- LNINV
- LCMINV

24 Ensure that the tuple DRWRTYPE in Table LCMINV is properly datafilled. The drawer types are either STD for a standard line drawer or PLD for a PCM-30 line drawer. If changes are required to the tuple, the XPM (i.e., PLGC) attached to the LCM will have to have a WARMSWACT performed on it to update the static data. A WARMSWACT will also be required to update changes to table LNINV.

25 Ensure that the (I)LCM has NT6X51AB and NT6X52AB cards installed on each shelf.

Figure 75 – NT6X0508 Final Cable Assembly



7.10 Line Drawer Connector - Coax Termination Assembly 1

1 The Coax Cable comes assembled at the Line Drawer end with a twisted pair-line drawer connector assembly. The following instructions describe the assembly of the cable at the line drawer end. This is to be used as a reference if the cable operates improperly or if re-assembly is required.

2 Prepare the coax by stripping the coax as shown in Figure 76.

3 Insert the white lead of the twisted pair lead into the inner sleeve of the Raychem solder sleeve. Insert the blue lead of the twisted pair into the outer solder sleeve. Also, insert the frame ground wire in the outer sleeve if the cable is a transmit cable. Snap the two sleeves together. The lead of the inner solder sleeve must be brought through the rear of the outer solder sleeve and pulled through till they snap in place. Refer to Figure 77.

4 Insert the stripped coax into the solder sleeve assembly such that the inner coax connector slides into the inner solder sleeve connector, and is completely surrounded by solder insert. Likewise, the outer braided conductor should be completely surrounded by the solder insert of the outer sleeve. The thick blue part of the outer solder sleeve should be around the outer sleeve on the coax and the thick blue part of the inner sleeve should be around the coax dielectric.

Figure 76 – Stripped Coax Prepared for Solder Sleeve

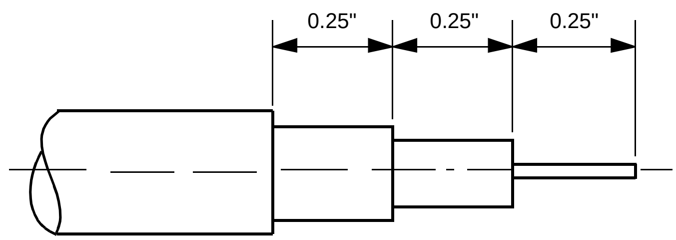
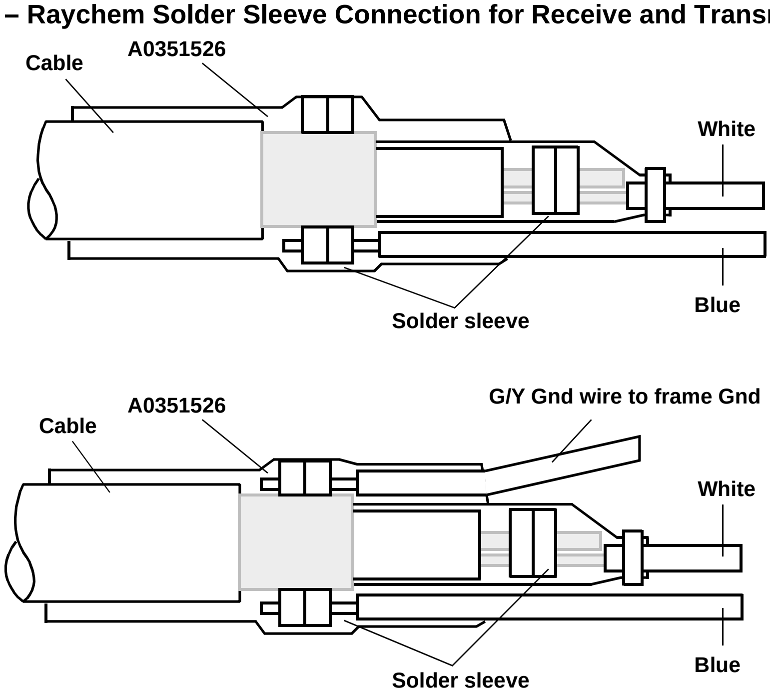


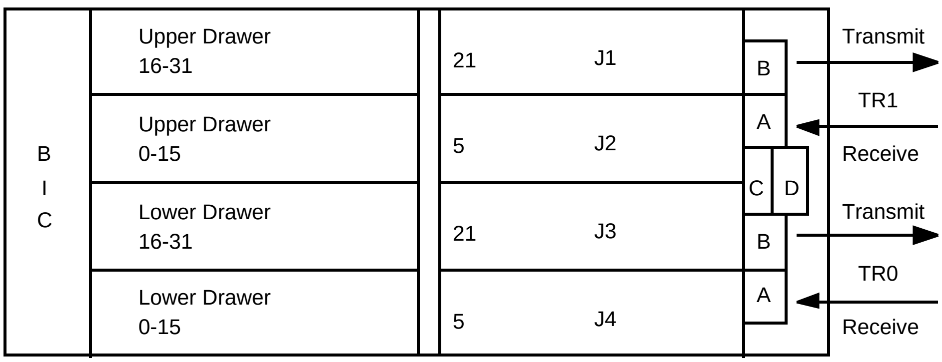
Figure 77 – Raychem Solder Sleeve Connection for Receive and Transmit Cable



5 Heat the outside of the solder sleeve assembly evenly using the Mini-Gun heating tool. Heat until the tubing shrinks and the solder inserts melt and flow. Inspect the completed connection through the transparent outer insulation.

6 Connect the twisted pair to the line drawer connector. The twisted pair length should be 4.3 inches from the coax cable to the connector. For this explanation, the lead connected to the inner coax lead will be referred to as Tip, and the lead connected to the outer coax connector will be referred to as Ring. Figure 78 shows the position of the leads in the line drawer connectors.

Figure 78 – Lead to Connector Placement Chart



Signal	Row	Connector	Connector Pin	Coax Lead
Transmit Tip	J1	TR1 B	5	Signal
Transmit Ring	J1	TR1 B	6	Shield
Receive Tip	J2	TR1 A	27	Signal
Receive Ring	J2	TR1 A	28	Shield
Transmit Tip	J3	TR0 B	5	Signal
Transmit Ring	J3	TR0 B	6	Shield
Receive Tip	J4	TR0 A	27	Signal
Receive Ring	J4	TR0 A	28	Shield

7 To connect the leads to the connector, insert the connector into the AMP Manual Pistol Grip Tool. The connector is inserted into the guns slide with the wire inserts of the connector feeding up. The connector is inserted into the gun from the left. Slide the connector over to the desired pin in front of the gun head. Insert an unstripped wire into the wire slot until the wire bottoms. Figure 78 gives the locations of where the leads should be placed for each connector. Figure 79 shows the operation of the AMP connecting tool.

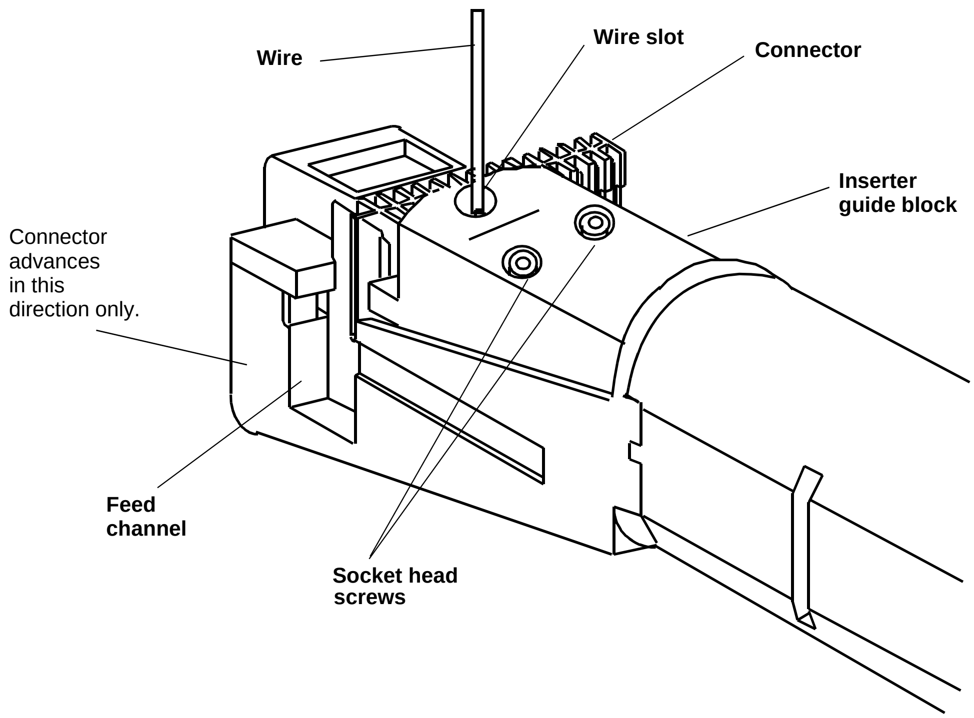
8 Center the wire in the wire slot. Squeeze tool trigger until the crimp ratchet releases.

9 Release the trigger. The wire inserter will retract and the connector will advance to the next contact position. If another lead is to be connected, proceed as in paragraphs 7 and 8.

10 Remove the connector upon completion by sliding it out of the gun to the right.

11 Proceed with the assembly of the cable to the rear of the line drawer.

Figure 79 – Operation of AMP Connecting Tool



7.11 LCM Subgroup Cable Verification

1 When looking at the back of the LCE to be tested, each drawer has three "snap-on" covers located on the side opposite from the LCM subgroup cable connections. These thin slot covers protect the back appearance of the pins to which the cables will be connected. The middle cover is more rectangular in shape; it protects the control cable pins and should *not* be removed.

2 The other two slot covers should be removed carefully with a screwdriver by first prying one end and then finishing by hand. Use ***caution*** when prying with the screwdriver. If care is not taken, the blade can crush and bend pins that have to be connected to for testing. This step only applies if slot covers are already in place; eventually, slot covers will be shipped loose and pushed in after this procedure is performed. Remove the covers for all drawers in the LCE being tested.

3 Mount the TAS Non-Res tape on an idle mag tape drive. Issue the following commands at a MAP position to load the LMCUT program:

>MOUNT <tape drive #>
>TLIST T<tape drive #>
>COPY LMCUTSUB$FC SFDEV
>READ LMCUTSUB$FC
>DEMOUNT T<tape drive#>

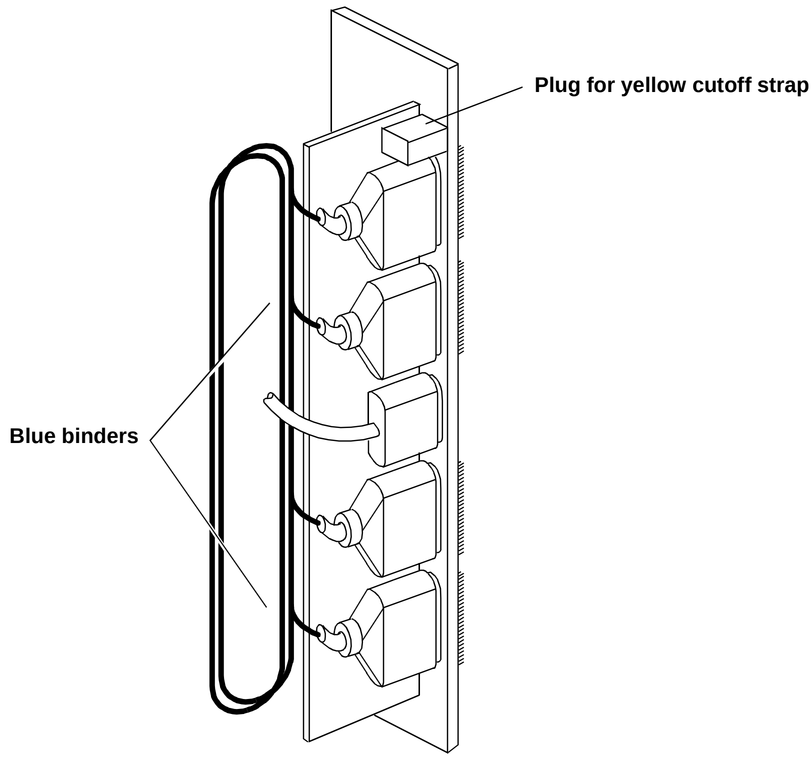
The LMCUT program is now loaded.

Note: For NA009 (BAS10) and above, the TAS NON-RES tools needed for this verification are available on the Commissioning Tape only. Contact regional TAC or next level of support for access or assistance with these tools.

4 The LCE will be placed in cut state by using the cut-off straps (jumpers) and software program LMCUT.

5 Obtain the yellow cutoff straps (A0285591) and install them into each line drawer of the entire LCE. The strap will plug into the back of the line drawer near the top on the left (cable side) of the line drawer. Refer to Figure 80 for a general location of where these should be installed. Install these straps in every drawer of the LCE.

Figure 80 – Installation of Yellow Cutoff Straps and Blue Binder Connection



6 At the MAP, issue the following command to initiate the LMCUT program:

>LMCUT

7 Issue the following commands for each drawer. Since each drawer has two subgroups, use the **EVEN** subgroup number to represent the entire drawer. The first command is a software execution that opens the relays on each provisioned card in the drawer.

>CUTOFF <frame #> <LCM unit #> <drawer #>

The following command releases software status of cutoff from the line cards. Disregard messages and reply "yes," if warned.

>CUTOVER <frame #> <LCM unit #> <drawer #>

The following command releases the relays of the line cards; the yellow straps in place will continue to hold all line cards for the drawer in cut state (open relays).

>RLSCO <frame #> <LCM unit #> <drawer #>

8 Cut the entire LCE, drawer by drawer, in this manner.

9 Before continuing, it is important to *visually* inspect the back of the LCE frame for the following:

Cable reversals: Inspect each subgroup cable tag and ensure that even subgroup cables are connected to the bottom subgroup of the drawer and odd cables are connected to the top of the drawer.

Binder reversals: Inspect each subgroup cable to ensure that the "B" connector is plugged in above the "A" connector. This can be verified without pulling these connectors by assuring that the *blue* binder is plugged into the bottom portion of each subgroup. Figure 80 illustrates how to inspect for this fault.

Loose connections: In many cases, these connectors are not securely locked into position, if these loose connectors are not pushed in securely, the detector will indicate open connections.

10 Following is a description of each part designated by its respective detail number. Inspect the contents and locate all needed parts. Refer to Figure 81 for an illustration of each part and SCATs typical hook up.

D1) Main unit	*Large brown metal box approximately 13X5X1 with a headset cord attached.*
D2) Detector unit	*Small box with buttons and LEDs on the front; this should also have a headset cord attached to it.*
D3) Power supply	*One wall mount power supply; black unit similar to the type used to charge calculators.*
D4) Control cord	*One cable with a circular, 8 contact plug at one end and the other with female sleeves also called Barrel Connectors.*
D5) Headsets	*There should be two telephone headsets.*
D6) Probe	*Cord with banana plug at one end and probe at the other.*
D7) Cable	*Four cables with AMP connectors at each end.*
D8) Connectors	*Two, male to male, 2X32 connectors which connect cables to the Main unit.*
D9) Interface connector	*2X16 connectors that are attached to the cable (D7), allow connection to the back of the line drawer.*

11 After all parts have been identified, assemble SCAT. Refer to Figure 82.

Figure 81 – Part Identification

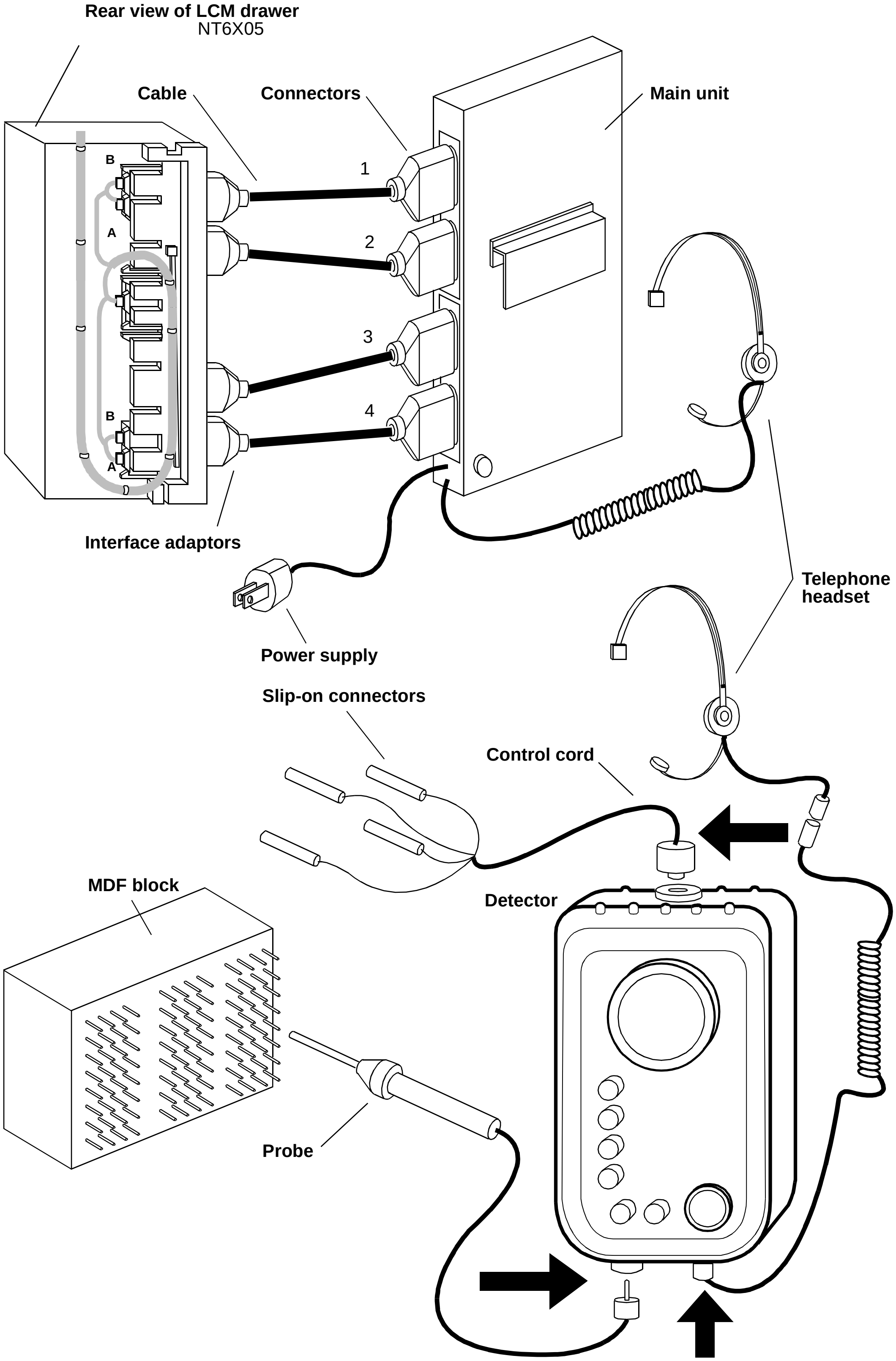
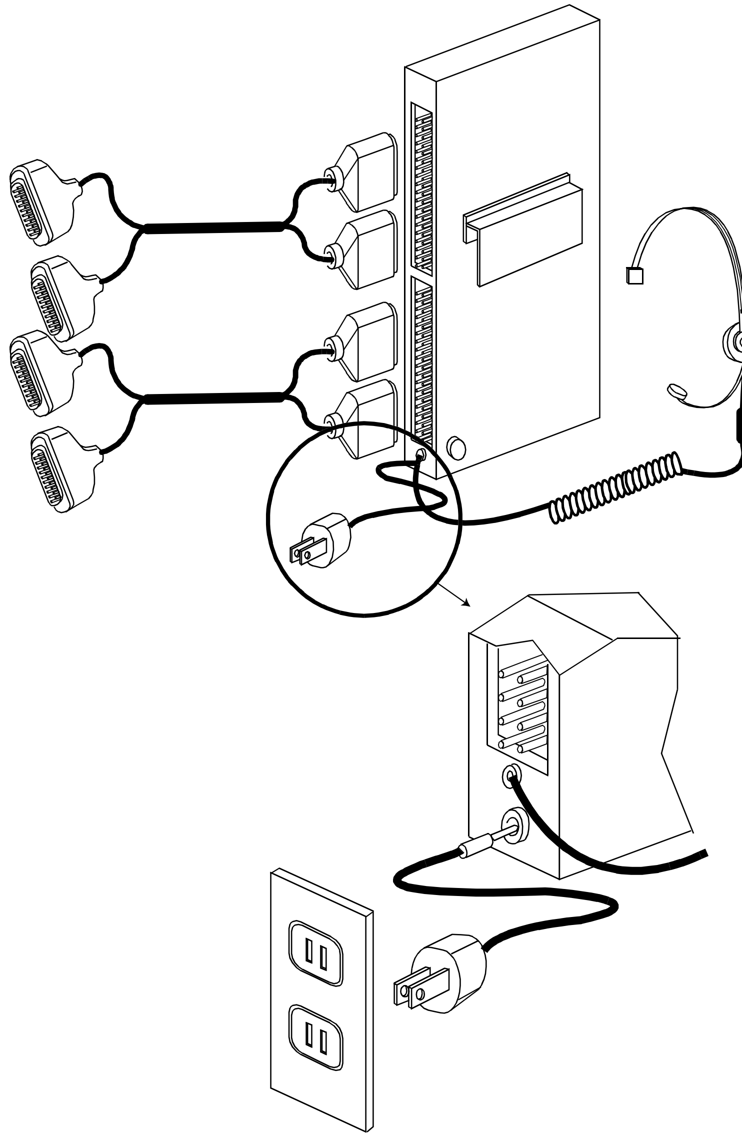


Figure 82 – SCAT Main Unit (D1) Connections



12 Each cable is designated by a number, 1, 2, 3, and/or 4. These labels should be facing you, not the frame. Also, there is a special adaptor on one end of the cable (Detail 9). Do *not* connect this end to the SCAT unit. This adaptor is designed to plug into the back of the line drawer. Remember, this allows testing through the connection of the A and B cables into the line drawer

13 Figure 81 illustrates the required connections to assemble the detector which will be located at the MDF. Make all three connections indicated by the arrows.

14 In some cases, it is necessary to hook up and test *directly* connected to LCM subgroup cables when, for some reason, the cables are not yet plugged into the line drawer. This method is mentioned in this procedure and there are no restrictions regarding line card state. However, there are restrictions when hooking up to the back of the line drawer and testing through backplane pins. For each LEN tested, going through backplane pins, ***the line card MUST be in LMCUT or the Line Equipment Number (LEN) must not have a line card provisioned.*** These requirements are taken care of in this procedure.

15 Place the detector unit next to the main unit and connect the barrel connectors to pins 17, 18, 19, and 20 as follows:

Pin 17 connect to the barrel connector label (G).

Pin 18 connect to the barrel connector label (7).

Pin 19 connect to the barrel connector label (L).

Pin 20 connect to the barrel connector label (T).

16 After all connection are made and with power applied, ensure that communication between the headsets is possible.

17 To test the detector unit, take the probe connected to the detector unit, make contact with the bottom pin on the left column of the upper set of pins, and push the reset button. The preset button is only needed on the first pin.

A *beep* should be heard; continue touching each pin in an upper direction, testing the fifteen pins.

18 If the audible beep is *not* heard, the unit may not be working properly. Check all connections and repeat this test three times before a conclusion is made regarding the functionally of the unit. If the unit failed the functional test three times, return it to the Regional Tool Facility.

19 Tester A will be located at the MDF with the Detector unit; the field technician is solely responsible for test control and interpretation. Tester B is located behind the LCE and moves the cables between the Main Unit of SCAT and the back of the line drawer. The field technician moves from drawer to drawer upon indication from Tester A that testing is finished with the current drawer. The talk circuit allows this communication.

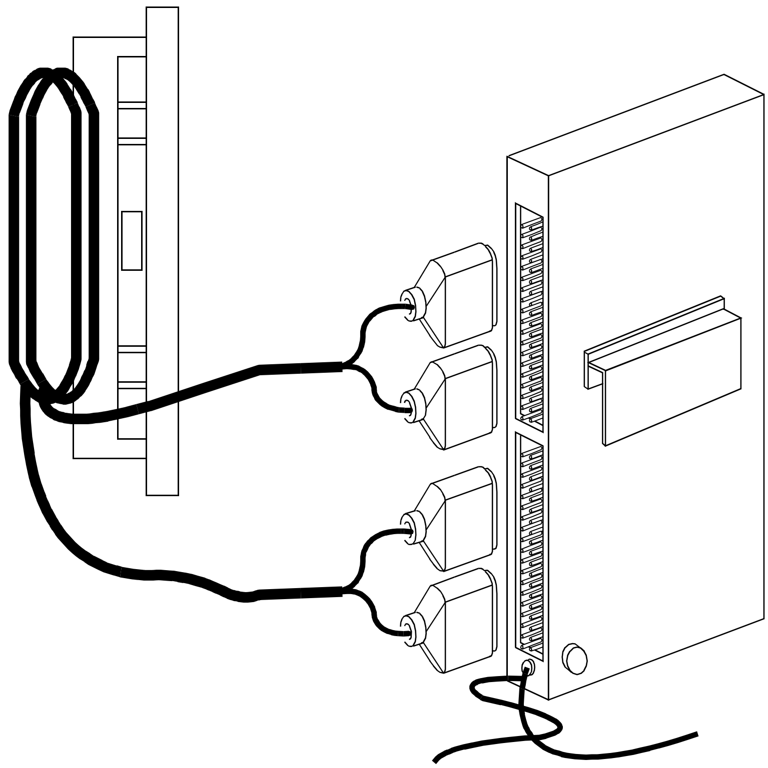
20 Tester A and Tester B should determine which drawer they intend to start with and how they intend to sequence through drawers. Establishing this is important; communication is lost during transition between drawers.

If continuity verification is to be accomplished directly hooked to subgroup cables and not through the back of the line drawer, the cable that connects SCAT to the back of the line drawer (part D7) will not be used. Instead, the Main Unit can be connected directly to subgroup cables, as illustrated in Figure 83. The SCAT unit has the exact pin translation as the back of the line drawer; hook the subgroup cables into the SCAT just as they are plugged into the line drawer.

21 Figure 81 represents the typical hookup configuration.

22 Tester A should locate the "wire wrap" appearance of the drawer that is to be tested at the MDF and connect the detector unit to the first two circuits (four wires) of the ***EVEN subgroup of the drawer under test****.* For a bifurcated block, each appearance has two pins as illustrated in the lower portion of Figure 84. The first circuit is for power and ground respectively; the second circuit is for talk and logic. These four leads supply power (7), ground (G), communication (T), and control (L) between the two units; 7, G, T and L are labels on the control cable that identify the barrel connectors. The control cable with the barrel connectors on one end and round, 8 pin plug at the other, connects the detector to these circuits. These two circuits are bypassed during testing; it is implied that the first two tip ring appearances (also referred to as first two circuits) are connected correctly if the unit functions properly. Figure 84 is an illustration of this connection.

Figure 83 – Tester B, Connection of Main Unit Directly to Subgroup Cables



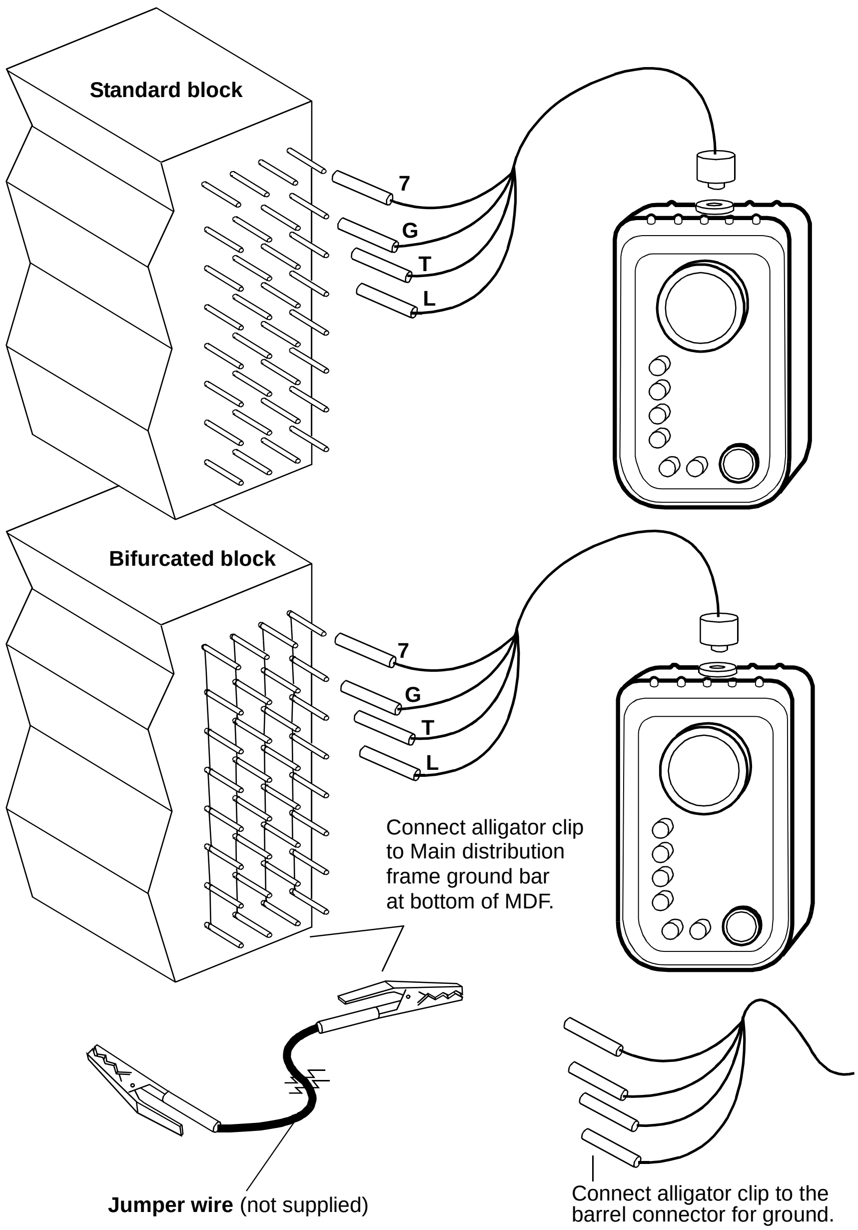
23 Tester A should locate two loose alligator clips that came with the unit. These alligator clips have to be connected with jumper wire (not supplied); one alligator clip should connect to the ground bar of the MDF and the other should be connected to the ground (G) barrel connector on the control cable (D4). Figure 84 illustrates this connection. The length of jumper wire that is cut will be up to the field technician. Cut enough so the alligator clip connected to the MDF will only have to be relocated every couple of LCMs.

24 After both testers have made appropriate connections, communication should be possible and testing is ready to begin.

25 If the unit does not function as expected, check the following; it may assist in getting the unit working.

- Check for tip/ring reversals on the first two circuits that carry 7, G, T, and L.
- Check for a binder or cable reversal on the MDF side.
- Check and ensure that you are connected to the even subgroup at the MDF side.
- Check connections at the LCE side and ensure that the main unit is connected to the back of the line drawer properly; the pins on the Main Unit have identical translations as the backplane pins in the line drawer just as if you were to connect the subgroup cables directly to the SCAT Main Unit. The cable between the main unit and the back of the line drawer should be a "straight through" translation.
- Check that there are no cable or binder reversals. Also, ensure that the connections to the back of the line drawer are secure.

Figure 84 – Tester A, Connection of Detector Unit Tester A, Connection of Alligator Clips to MDF Ground



26 Connected to the detector unit is a probe. The probe is used to touch each tip/ring appearance in sequence.

27 To start testing, place the probe on the first wire of the next circuit just after the connection of power, ground, talk, and logic. While the probe is in contact, press the preset button (preset option) relatively hard and assertively for about one second; the unit should give an audible "beep". Remove the probe.

28 At this point, detection is known. Tester A can now start testing through the entire drawer by finishing the even subgroup and proceeding directly to the first appearance of the odd subgroup. While testing, as each lead is touched with the probe, an audible beep is heard and the unit automatically advances to the next lead as long as the lead previously tested was good.

It is recommended to start at the first appearance of the third circuit on the even subgroup; however, repeating paragraph 26 on any appearance and continuing from there in the same order allows the field technician to start from any appearance desired.

29 While testing, the preset option is a strong tool. For instance, if during testing the field technician happens to lose position, pick the last lead that was good, preset there, and continue. This alleviates the need to preset at the beginning and start over if the field technician becomes lost. Also, when testing, if a problem arises, the audible tone will not be heard and the detector will indicate an open, short, or wrong lead. To double, or triple check quickly, preset a few leads before the suspected problem and retest over these leads.

30 Below is a troubleshooting guide that may assist in interpreting results from the detector.

Initial unit hook up, no power or communication: Check for tip/ring reversals on the first two circuits. Check for binder reversals and/or cable reversals at MDF and LCE sides.

Annoying "buzz" in the talk circuit: Press the reset button on the main unit near where the power cord plugs in.

Detector indicates open when an appearance is touched: Check the cable plug and ensure it is securely locked in behind the LCE. Check the tip ring pair at the MDF appearance; tip and ring may be wrapped together on one pin. Inspect the wrap around the pin and ensure that the wire did not break off the wrap.

Detector indicates a short: Check the tip ring pair at the MDF appearance; tip and ring may be wrapped together on one pin.

Detector indicates a wrong lead: This is a common signal, tip ring reversal, binder reversal, or cable reversal could be the case. Check for these problems at both the LCE and MDF sides.

31 Ensure that copies of the S.C.A.T. Trouble Record Sheet have been made. Use this sheet to list troubles found during S.C.A.T. testing and when the trouble was cleared. Refer to Figure 85.

32 After the LCE has been verified, pull the yellow cut-off straps that were holding the line card relays open. Do this for the entire LCE.

33 Push in the line drawer backplane slot covers. The cover will only snap in on one of its edges, if it is difficult to snap on, flip the cover and try the other edge.

34 After *all* subgroup cable testing is finished, execute the following commands at the MAP to dump the LMCUT program out of store file (SFDEV).

>LISTSF ALL
>ERASESF LMCUTSUB$FC
>UNLOAD LMCUTZD
>UNLOAD LMCUTUTL

Figure 85 – S.C.A.T. Trouble Record

S.C.A.T. TROUBLE RECORD

LEN	TROUBLE DESCRIPTION	TROUBLE FOUND	CLEARED BY
1	2	3	4

1. Line Equipment Number
2. Test Symptom Description
3. Specific Trouble Found
4. Trouble Cleared By (Last Name)

7.12 Installation of Rear Plastic Covers to a LCE Frame

1 To install the NT8T5055 LCE bay rear cover kit, obtain and assemble the piece parts shown in Figure 86 and Figure 87.

2 Do *not* install the rear panels on the LCE bays until all cables have been run and neatly formed in each bay.

3 Install the metal framework for the rear panels on all LCE bays after the installation of all other cosmetic trim hardware has been completed.

4 Install the bracket assemblies on the bottom of the frame. Refer to Figure 86 for a diagram of how to install the left and right bracket assemblies.

5 Insert the bottom of the vertical rail left into the bottom left bracket assembly. Refer to Figure 86.

6 Place the top right bracket assembly on the vertical rail left and install the right bracket assembly to the top of the bay.

7 Insert the bottom of the vertical rail right into the bottom right bracket assembly.

8 Place the top left bracket assembly on the vertical rail right and install the left bracket assembly to the top of the bay.

9 Install the 9.5" panel in the top position of the vertical rail assembly.

10 Install the 17" panels in the remaining four positions.

11 Refer to Figure 88 for an example of the rear panels installed on a LCE bay.

Figure 86 – NT8T5055, 27" Bay Rear Cover Assembly Kit

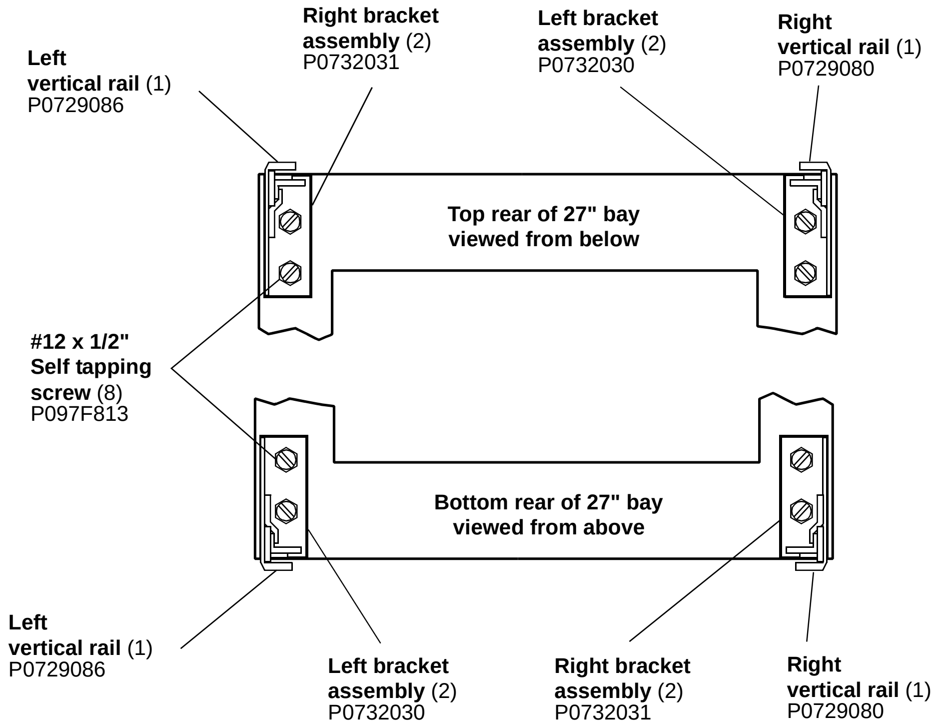
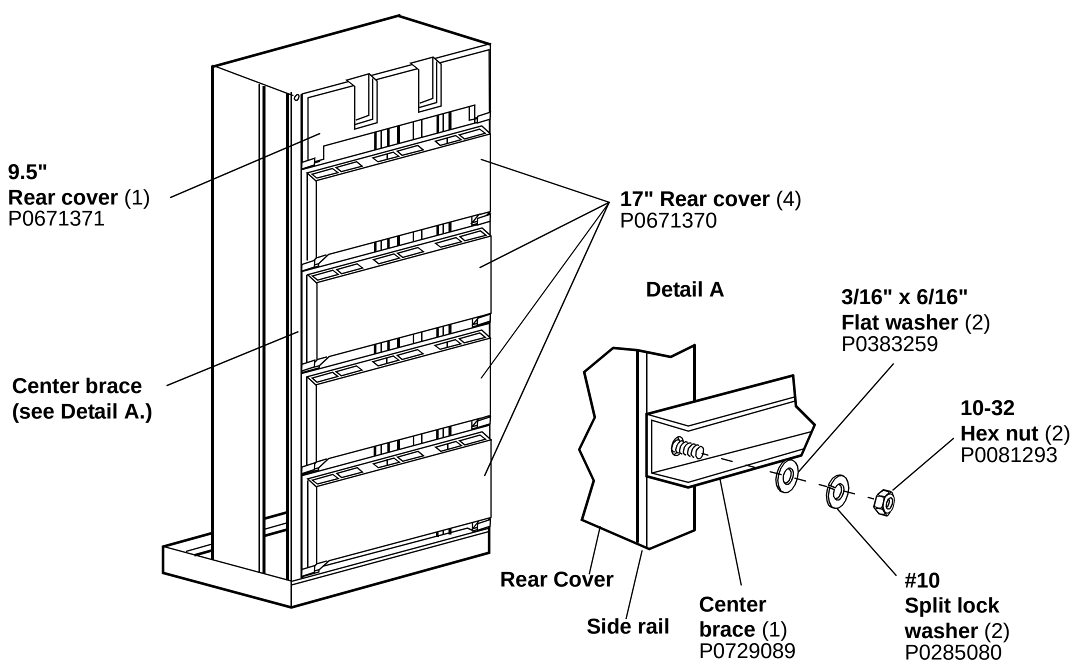
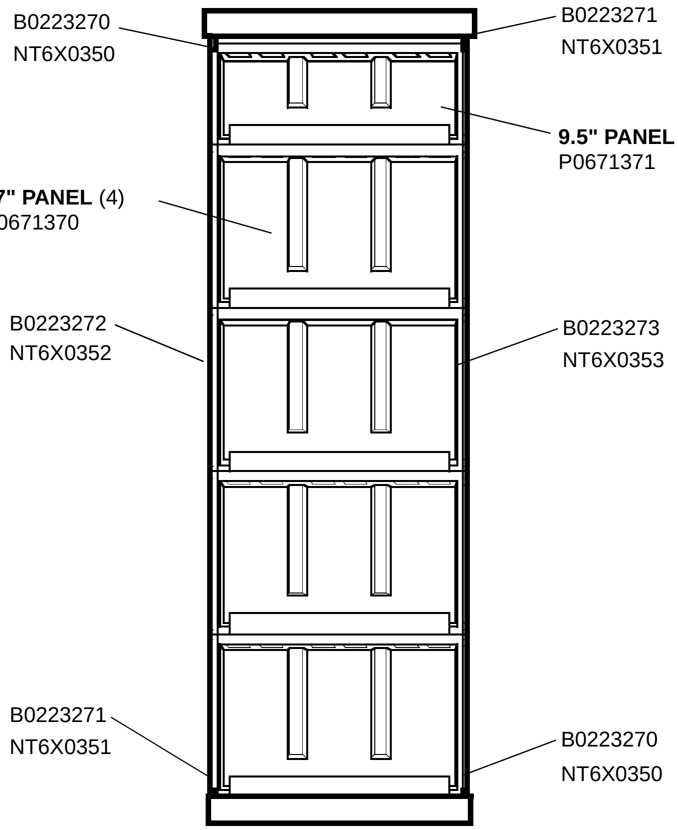


Figure 87 – NT8T5055, Rear Panel Cover Assembly on 27" Bay



12 Center Brace P0729089 is to be installed as indicated in Figure 87. Split Fiber Tubing P0401296 is to be placed around the Center Brace to protect the local cables where they pass the sharp edges of the center brace. Hold the split fiber tubing in place by securing both ends of the tubing with lacing cord.

Figure 88 – Rear Plastic Cover Assembly



Rear view

7.13 Installation of Rear Cable Protection Brackets to a LCE Frame

1 The cable protection brackets (P0664837) are now a provisional item and are ordered only when purchased by the customer.

2 If the brackets are ordered for a job, four brackets (P0664837) and eight mounting screws (P097F813) will be shipped loose. These brackets should be mounted on the rear frame uprights at hole locations: 07, 24, 41, and 58. This should be done before starting system cabling activities.

7.14 Wiring of 64-pair Linecable to NE66QN DF Connector Blocks

1 In most cases, 64-pair cable will be used between the LCM and MDF with the cabling being connected to a 96-pair block at the MDF. Due to the mismatching of cable size and block size, it will be necessary to split some of the cables between adjacent blocks on the MDF. Typically, three of ten cables from each LCM will be split over adjacent blocks.

This procedure can be used on zoned MDFs of 2, 5, and 10 zones as the splitting of cables does not necessitate going from one zone to another. However, this procedure cannot be used on 4 zone MDFs. As a result, all 4 zone MDFs will be provisioned with 32-pair cable.

2 When cables are split over adjacent blocks, the cable should be run down the left vertical and split over to the right-hand block. The cables should always be split left to right and not right to left.

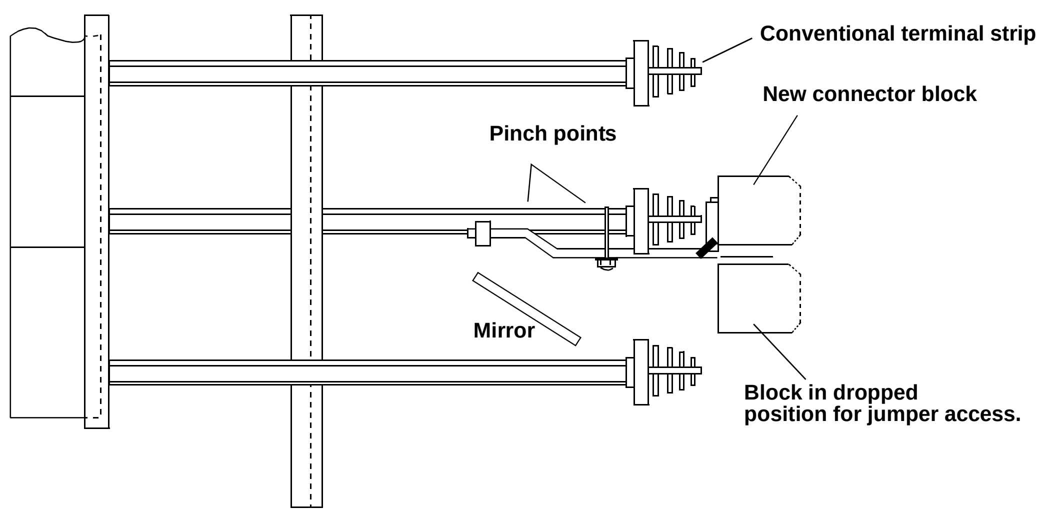
3 Extreme care must be taken when installing extender arms on the Main Distribution Frame (MDF). Loss of service to individual line(s) may result when installing the arms if any wires are pinched.

4 Ensure that no wires are pinched anywhere on the MDF during the installation of the extender arms by:

a. Removing the cable tie on the cross member to provide slack for the cable running out to the terminal block.

b. Using a mirror, ensure no wires are pinched between the extender arm and the frame prior to tightening. Refer to Figure 89.

Figure 89 – Mounting the Extender Arm



5 Butt and strip the line cable in the normal fashion and separate the blue and orange binders from the green and brown binders.

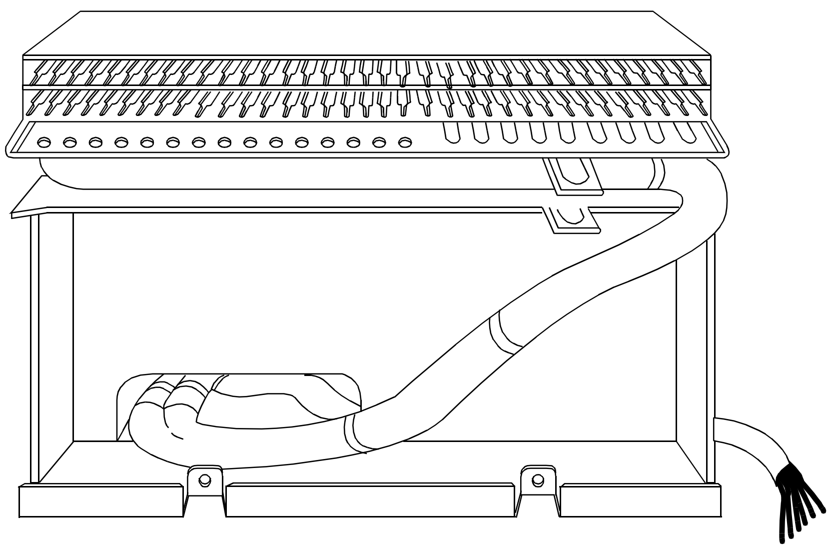
6 Cut a 1" length of P-43280 sleeving, and slide it over all the leads in the blue and orange binders (taping the ends of the leads with scotch tape makes the process easier). The sleeving should be slid all the way up to where the cable is butted. As an alternative, an unsplit piece of the cable sheathing may be used in place of the sleeving.

7 Cut a 9 inch length of P-43280 sleeving, and slide it over all the leads in the green and brown binders (taping the ends of the leads with scotch tape makes the process easier). The sleeving should be slid all the way up to where the cable is butted. As an alternative, an unsplit piece of the cable sheathing may be used in place of the sleeving.

8 The blue and orange binders can now be fed into the connector block along with the other 64-pair cables assigned to the connector block. The cables can now be secured at the block entrance using the cable tie and bracket supplied. The sleeving should be secured in this cable tie.

9 The green and brown binders can now be routed behind the mounting bar, under the transverse arm and fed into the adjacent block. This cable, along with the 64-pair cable assigned to the connector block, can now be secured at the block entrance using the cable tie and bracket supplied. The sleeving should be secured in this cable tie. Refer to Figure 90 for the proper configuration.

Figure 90 – MDF Block Wiring Diagram



7.15 PCM-30 Line Drawer Testing

1 Perform diagnostics test as follows on the PCM-30 Line Drawers. Refer to paragraph 2 for troubleshooting guide.

Procedure 1–Testing the PCM-30 Line Drawer

Step	Action	Observation
1	Post the LCM hosting the Line Drawers at the MAP. **>MAPCI;MTC;PM** **>POST ILCM <site> <frame> <bay>**	
2	If the drawers are in an offline state, put them in a ManBsy state. **>BSY DRWR <drwr_no>**	A 'M' will replace the 'O' in the status field. If the status field has a '-' in it, no lines are datafilled in table LNINV for the drawer and it will not be possible to busy the drawer.
3	Test each PCM-30 line drawer on the posted LCM. Remember that each drawer tested at the MAP represents one subgroup, or one half, of each physical drawer. **>TST DRWR <drwr_no>**	OSvce Tests Initiated OK If there is a problem with the 6X27 card, the MAP will return the following message: ILCM <frame> <bay> Drwr <no> Tst Failed: PCM30 Line Drawer Failure. If there is a BIC problem, the MAP will return the following message. ILCM <frame> <bay> Drwr <no> Tst Failed: BIC Looparound.
4	If the drawer test pass, return the drawer to service. **>RTS DRWR <drwr_no>**	The 'M' in the status field will change to a '•'. The drawer will then go to a system busy state, signified by a 'S' unless it is connected to a multiplexer. If it is not connected to a multiplexer, it will return to a normal '•' state after a few minutes.
5	Connect the PCM-30 coax cables to a test multiplexer at the site. The multiplexer must be hooked up to several phone lines to allow for test calls.	If the drawer is in a system busy state ('S'), it will immediately return to a normal operating state ('•').
6	Busy out unit 1 on the LCM. **>BSY UNIT 1**	

-continued-

Procedure 1–Testing the PCM-30 Line Drawer

Step	Action	Observation
7	Place several test calls from different phones through PCM-30 Line Drawer subgroups 0 to 5 and 10 to 13. Each drawer's subgroup should have at least one test call placed and one received through it. Be aware of any LOG messages generated. Disconnect and reconnect to the PCM-30 coax cables as necessary to test all the drawers.	PLD Alarms reported from the PM: PM179 <date> <time> <no> TRBL PM HW REPORT ILCM <frame> <bay> Unit <no> PCM30 Line Drawer <no> Failure: PLD Alarms Cleared PLD Card Out PLD AIS Alarm PLD LLFA Alarm PLD LLMA Alarm PLD RFAI Alarm PLD RMAI Alarm PLD Reset
8	Return to service Unit 1 on the LCM and Busy Unit 0. **>RTS UNIT 1** **>BSY UNIT 0**	
9	Repeat step 7, performing call processing test on drawer subgroups 6 to 9 and 14 to 19.	
10	Return to service unit 0. **>RTS UNIT 0**	

2 Troubleshooting Guide

<u>Line Drawer Diagnostics: BIC Failure</u>

If the MAP during line drawer diagnostics returns with the message:

ILCM <site> <frame> <bay> DRWR <drwr> Tst Failed: BIC Looparound

Replace the BIC card and test again. If it fails again, check the connection between the line drawer and the control cable at the rear of the line drawer.

<u>Line Drawer Diagnostics: PCM-30 Line Drawer Failure</u>

If the MAP during line drawer diagnostics returns with the message:

ILCM <site> <frame> <bay> DRWR <drwr> Tst Failed: PCM30 Line Drawer Failure

Replace the PCM-30 Line Interface Card and test again. If it fails again, check for bent pins in the line drawer. If it continues to fail, replace the whole line drawer and test again.

<u>Test Failure: Call Processing Failure</u>

If a call cannot be placed through the PCM-30 Line Drawer using the test multiplexer and a pair of test phones, perform the following in order until the problem is resolved:

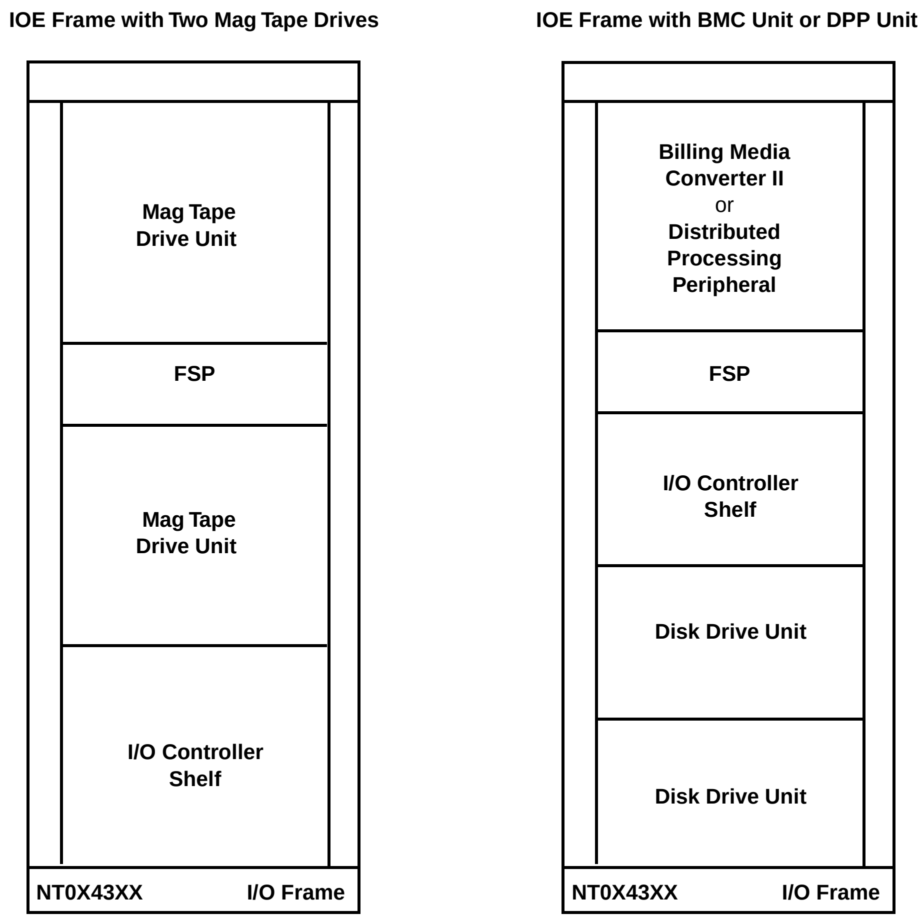
- Replace the line card in the test multiplexer and repeat the test call.
- Check in Table LCMINV that the line drawer is datafilled as a PLD line drawer.
- Check in Table LNINV that the lines are datafilled as either T1ERTH or T1LOOP.
- Check at the LTP level of the MAP that the lines have the proper directory numbers assigned.
- Recheck the coax cable for continuity between the DDF and the line drawer. Also check for continuity between the DDF and the multiplexer. Also ensure that the PCM-30 lead appearances are connected to the line drawer connectors in the right pin connections.
- Replace the PCM-30 Line Interface card in the line drawer.
- Check to ensure the multiplexer is working properly on other line drawers.

8.0 Input/Output Equipment (IOE) Frame

8.1 IOE Frame Assembly

1 The Input/Output Equipment (IOE) frame is a single bay frame. The frame can be provisioned with one or two Cook or Hewlett Packard Mag Tape Drive units, a Frame Supervisory Panel (FSP), a Distributed Processor Peripheral (DPP) or Billing Media Converter (BMC), Input/Output Controller Shelf, and Disk Drive unit. Refer to Figure 91.

Figure 91 – Configuration - IOE Frames



Note 1: Mounting positions can vary, see specific procedure for details.
Note 2: BMC II simplex has only one chassis, which takes up one shelf.

8.2 IOE Frame Grounding

1 Frame ground links (cable braid assembly) and required mounting hardware are supplied with each frame.

Note: This is for non-ISG offices. For ISG grounding, a #6 Lead will be run from the vertical logic ground bar to the LRB.

2 The first holes from the ends on the frame bonding bar (on the cable trough) are used for installing cable braids from adjoining frames. This applies to frames in the middle of a lineup.

3 If the frame is first or last in a lineup, the cable braid should be routed either to a frame in another lineup or to the FBE bar.

4 The third hole on the frame bonding bar, on the left-hand side (looking at the rear of the frame), is used to connect the cable from the left frame upright.

5 In non-ISG offices, the fourth hole on the frame bonding bar is used to connect ground lead from vertical logic bar. In ISG offices, a #6 cable shall run from the vertical logic bar to the LRB bar in the same lineup.

This lead must be identified with a P0633713 (U.S.) marker ty-rap. The marker will show the terminating point of this cable on the opposite end.

8.3 Power and Alarm Cabling - I/O Frame

1 The battery and return power cables terminate on the rear of the FSP terminal strip designated TB1. Terminals as assigned per FSP schematic drawings. The ABS supply terminates on TB2 terminal strip.

2 The cables run down the left-rear frame upright and are formed horizontally across the FSP.

3 Form cables and secure to cable brackets using ty-raps. The horizontal cables shall be secured together with ty-raps at approximately every four inches to breakoff point and at every other breakoff. Refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements."

4 Frame aisle alarm multiple cables are to be run between adjacent frames with the slack secured to a traverse arm between the frames. Secure the slack in the vertical. Route the frame aisle multiple cables up the right rear of the frame and through the cable trough to non-adjacent frames.

Secure these cables with ty-raps to the traverse arms along with other cable.

8.4 Switchboard Cabling I/O Frame

1 Cables to the I/0 controller shelf should come down right-rear upright of frame and form horizontally across the bottom of the shelf and vertically to connectors C00 to C39. Secure horizontal and vertical form with ty-raps approximately every two inches and at breakout points.

2 The field technician should identify all cables going from the I/0 controller to the VDUs and printers. Use P0633713 marker ty-rap. Attach marker on both ends of the I/0 device cable.

3 Using a sharpie pen, identify the cables as follows: IOC number, Card number, CKT number, and printer or VDU. Refer to as follows:
Example: I0C-0 Card 2
CKT-1 MAP 0 PRT

4 Connections to the I/O Controller shelf are made either through screw-on type connectors (NT1X61AB/AD Backplane) or AMP Level 5 type connectors (NT1X61AG). Refer to Figure 92, Figure 93, and Figure 94.

5 Ensure that the cable connectors are seated into the connector key brackets when cabling the 1X61AG I/O Shelf. Form the cables along the bottom of the shelf securing the cables to the Cable Support Bracket. Refer to Figure 93 for an illustration of the backplane, and Figure 94 for an illustration of the connector key bracket.

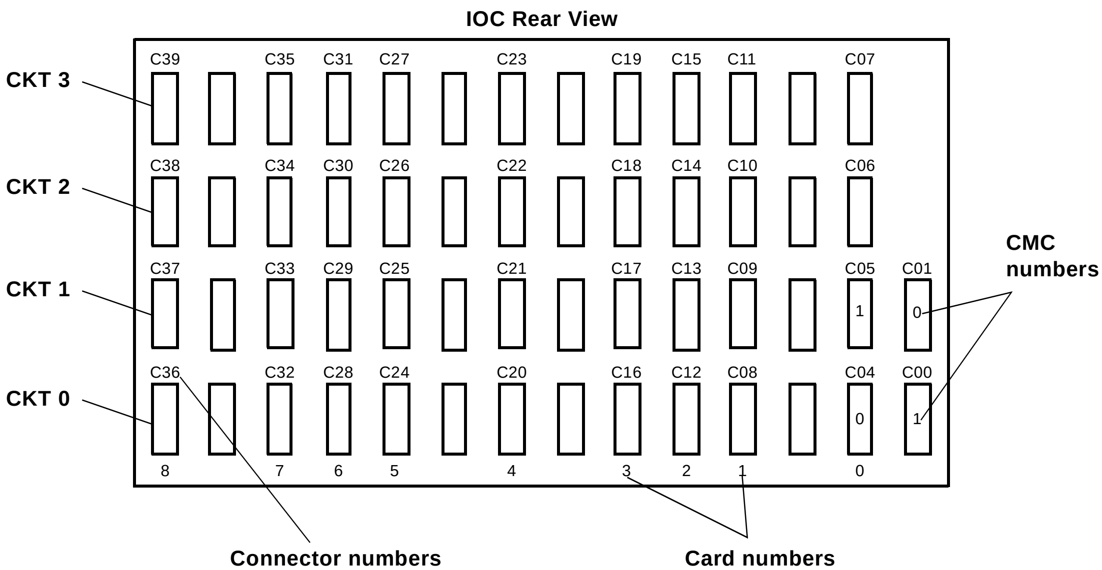
Note: Do *Not* remove the existing small ty-rap from the cable connector hood on the ship loose cable.

6 The controller cables for the 1X61AG I/O shelf are connected to the CMC/MS as follows:

Cable C000 connects to CMC/MS-0.

Cable C001 connects to CMC/MS-1.

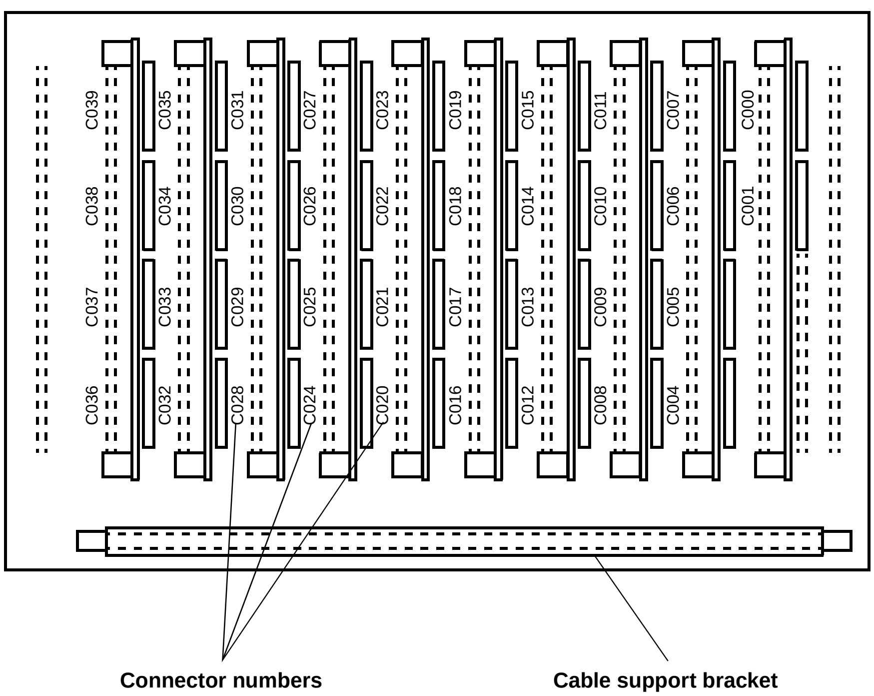
Figure 92 – Connecting Plan - I/O Controller Shelf - NT1X61AD



7 Note that cables provisioned for use in the 1X61AB/AD I/O shelf cannot be transferred onto the 1X61AG I/O controller shelf. The following is a list of cable PEC codes for the two different types of I/O shelves:

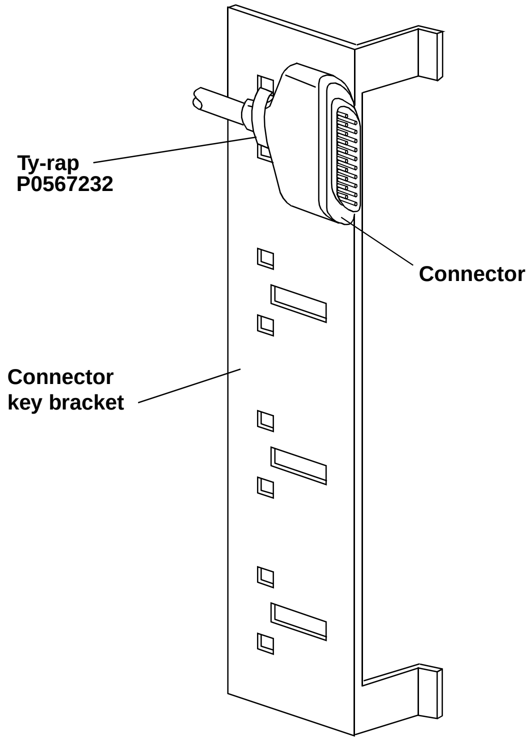
1X61AB/AD Cables	1X61AG Cables
NT0X62A	NT0X96HK
NT0X26AK	NT0X96HL
NT0X26BA	NT0X96HM
NT0X26BU	NT0X96GQ
NT0X26HY	NT0X96GR
NT0X26LY	NT0X96GS
NT0X26SQ	NT0X96GT
NT0X26SS	NT0X96GU
NT0X26XG	NT0X96GV
NT0X26ZV	NT0X96GW
NT0X26ZW	NT0X96GX
NT0X96AA	NT0X96GY
NT0X96AB	NT0X96GZ
NT0X96AC	NT0X96HA
NT0X96AD	NT0X96HB
NT0X96BK	NT0X96HC
NT0X96DB	NT0X96HD
NT0X96DC	NT0X96HE
NT0X96DD	NT0X96HF
NT0X96EF	NT0X96HG
NT0X96EG	NT0X96HH
NT0X96EH	NT0X96HJ

Figure 93 – Connecting Plan - I/O Controller Shelf - NT1X61AG



8 The head of the ty-rap is to be located on the opposite side of the bracket as the cable connector. The head of the ty-rap is to be located at the TOP of the connector. Cut the ty-rap flush.

Figure 94 – Connector key Bracket for 1X61AG I/O Shelf



8.5 Power and Alarm Connections FSP to IOE Mounted Equipment

From:	IOC POS 04	Term	To:	FSP POS 45	Term.	Signal
	76A			PWR & ALM 1	10	DRIVE
	76B			PWR & ALM 1	10	DRIVE
	68A			PWR & ALM 1	33	RESET
	69A			PWR & ALM 1	26	BAT RTN
	75A			PWR & ALM 1	35	POWER ON/OFF
	60A			PWR & ALM 1	06	CONV FAIL
	-48 LUG			TB 1	12T	-48V
	BR LUG			TB 1	09T	BR
From:	IOC POS 18	Term	To:	FSP POS 45	Term.	Signal
	76A			PWR & ALM 2	37	DRIVE
	76B			PWR & ALM 2	37	DRIVE
	68A			PWR & ALM 2	32	RESET
	69A			PWR & ALM 2	26	BAT RTN
	75A			PWR & ALM 2	36	POWER ON/OFF
	60A			PWR & ALM 2	06	CONV FAIL
	-48 LUG			TB 1	10T	-48V
	BR LUG			TB 1	08T	BR
From:	IOC POS 32	Term	To:	FSP POS 45	Term.	Signal
	76A			PWR & ALM 1	37	DRIVE
	76B			PWR & ALM 1	37	DRIVE
	68A			PWR & ALM 1	32	RESET
	69A			PWR & ALM 1	26	BAT RTN
	75A			PWR & ALM 1	36	POWER ON/OFF
	60A			PWR & ALM 1	06	CONV FAIL
	-48 LUG			TB 1	11T	-48V
	BR LUG			TB 1	06T	BR

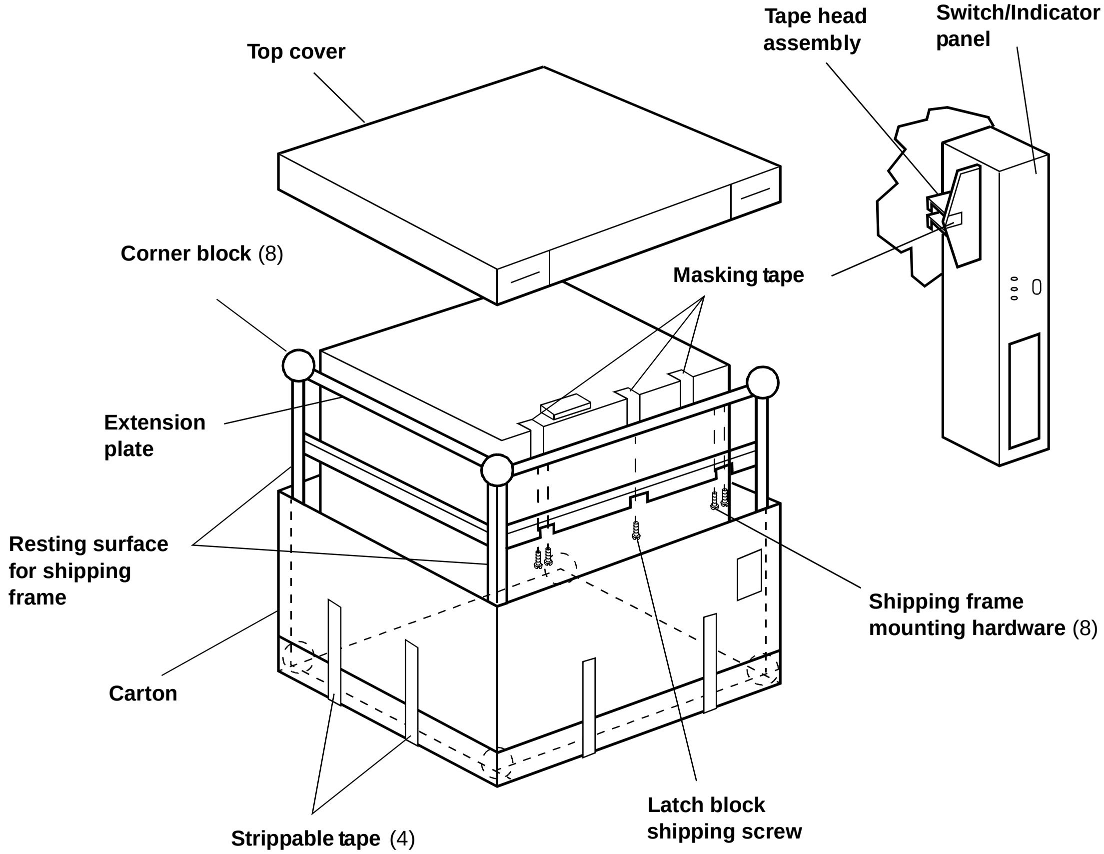
8.6 Unpacking and Physical Inspection – Cook Digital Magnetic Tape Drive (MTD) Units

1. Normally, Magnetic Tape Drives (MTDs) are frame-mounted and wired in the factory. In this the situation, the shipping brackets should be removed after the frame has been mounted to the floor.

   If this unit is shipped separately, proceed with the following paragraphs.

2. The tape drive unit is shipped in a special shipping/checkout frame within the shipping carton. Refer to Figure 95.

Figure 95 – Shipping Carton - Cook Mag Tap Drive



3 To unpack the tape drive, first cut the strapping and remove the top cover.

4 Using the shipping frame, lift the tape drive unit out of the carton and place it on a suitable surface in the upright position.

> ***Caution:*** The unit weighs approximately 140 lbs. (63.56 kg.). Two people are required to lift the unit from the shipping container.

5 Do *not* allow the weight of the tape drive unit to bear on the servo-regulator card. Support the tape drive unit under the front panel and under the card rack or heat sink structure.

6 Place tape drive unit and shipping frame on a suitable surface in an upright position.

7 Remove the tape holding the front dust cover closed. Open the dust cover and remove the tape holding the head flux gate closed.

8 Remove the latch block shipping screw securing the latch block to the shipping frame. Refer to Figure 95.

9 Open the front door of the MTD, by using the NR1324 or T1324 screwdriver. Insert the screwdriver in the securing hole, and turn the screw counter-clockwise until fully withdrawn. Do not leave the front panel open, only unlatched.

8.7 Mounting Cook Tape Drive Units into IOE Frame

1 Using an Allen wrench, remove the safety block from the edge of the front panel, just below the upper hinge pin.

2 Using a Phillips screwdriver, remove the two screws holding the door stay to the front panel.

3 With the dust cover closed, swing tape drive unit out. Lift tape drive unit up and off the hinges and place aside.

Caution: Retain the bronze hinge washer under top hinge.

4 Using a socket wrench, remove the eight nuts holding the rear cover (housing) and hinge blocks to the shipping frame.

5 Remove rear cover (housing) from shipping frame and remove the eight screws from the rear cover.

6 Install mounting brackets to rear cover, using the previously mentioned screws and nuts.

7 Install the P0731561 bracket (the wider one) on the left-hand side of the rear cover looking from the front and install the P0731562 (the narrower one) on the right-hand side. Refer to Figure 96.

8 Install the rear cover with mounting brackets on the designated frame using mounting screws supplied.

9 Lay the bronze washer on the top hinge block, then remount the tape drive unit on the hinge.

10 Re-install the hinge safety block and the front panel door stay.

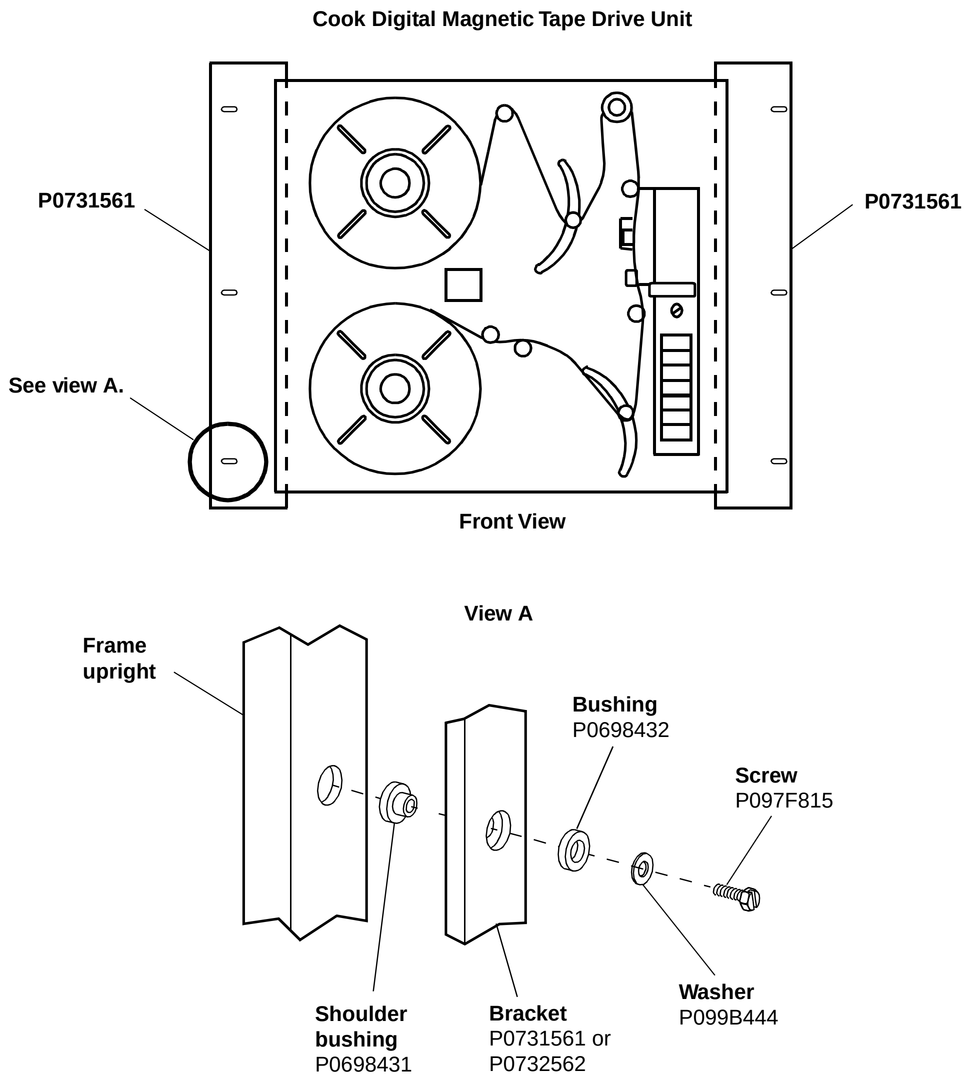
11 Use three people, two in front of frame to lift unit and one in rear to hold it in place. After lifting and placing the unit at the proper location, one person in front and one in rear should hold it while the third person installs the mounting screws to the frame upright. Refer to D410 drawing for the mounting location.

12 The Cook Magnetic Tape drive must be isolated from the frame work. The isolation and mounting hardware is supplied in NT0X44AD (B0213601) kit consisting of the following material:

6	P0698431	Shoulder bushing
6	P0698432	Bushing
6	P097F815	Screw
6	P099B444	Washer
1	B0214797	NT0X2837 Cable
1	B0215012	NT0X4404 Cable
1	P0731561	Bracket (left)
1	P0731562	Bracket (right)

13 Refer to Figure 96 for isolation material stackup.

Figure 96 – Mounting and Isolating the Cook Mag Tape Drive



8.8 Power Cables – Cook Magnetic Tape Drive

1 Power connections to the power supply are made by way of a terminal strip on the bottom edge of the power supply, PS1TB1. Refer to Figure 97, Figure 99, and Figure 100.

2 Remove metal jumper clip from the terminal strip PS1TB1-5 and PS1TB1-6 located at the rear of the unit before connecting cables.

3 Terminal strip assignments is shown in Figure 97 for ISG and Non-ISG locations. Use #14 gauge wire with suitable lugs as required for terminations. Refer to Figure 98 for ground terminations at the vertical ground bar.

4 These power leads should run from FSP up or down left upright of frame (facing rear) to mag tape drive unit and enter through cable cutout at top left side. Go to the front of frame and open mag tape drive front cover.

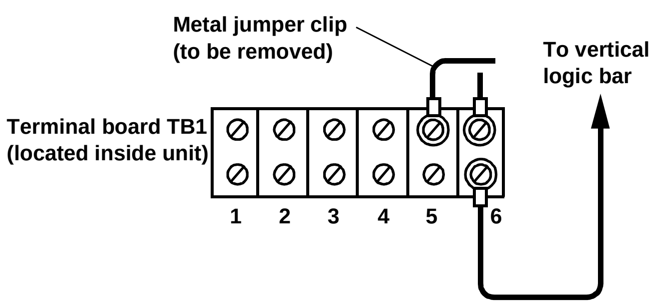
5 Use a screwdriver to release the latch and open the unit all the way to your left. Add adhesive mounting base for ty-raps at three places to support power leads inside the back cover.

6 Leave approximately six inches of slack between last support and terminating point so unit can be opened without putting pressure on cable.

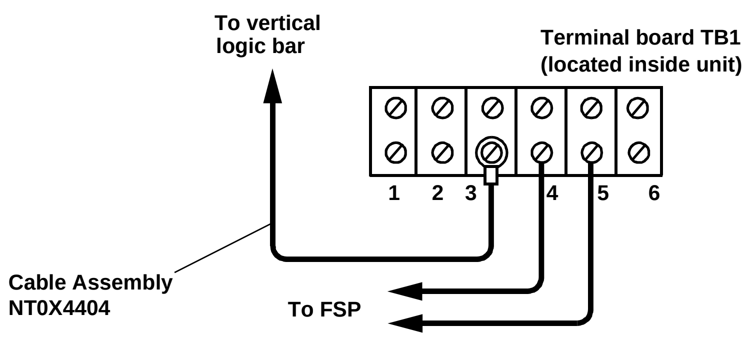
7 Dress the cable so it will not rub against bottom of grating when opening and closing the unit. Refer to Figure 101 and Figure 102.

Figure 97 – ISG and Non-ISG Grounding - Cook Mag Tape Drive

NON-ISG MAG TAPE (COOK) CONFIGURATION



ISG MAG TAPE (COOK) CONFIGURATION



Note: **Designations for both configurations**

TB1-3	**Signal Gnd.**
TB1-4	**FSP -48V Bat. Sup.**
TB1-5	**FSP Bat. Return**
TB1-6	**Chassis Gnd.**

Figure 98 – Ground Terminations at Vertical Logic Bar for Mag Tape Drive

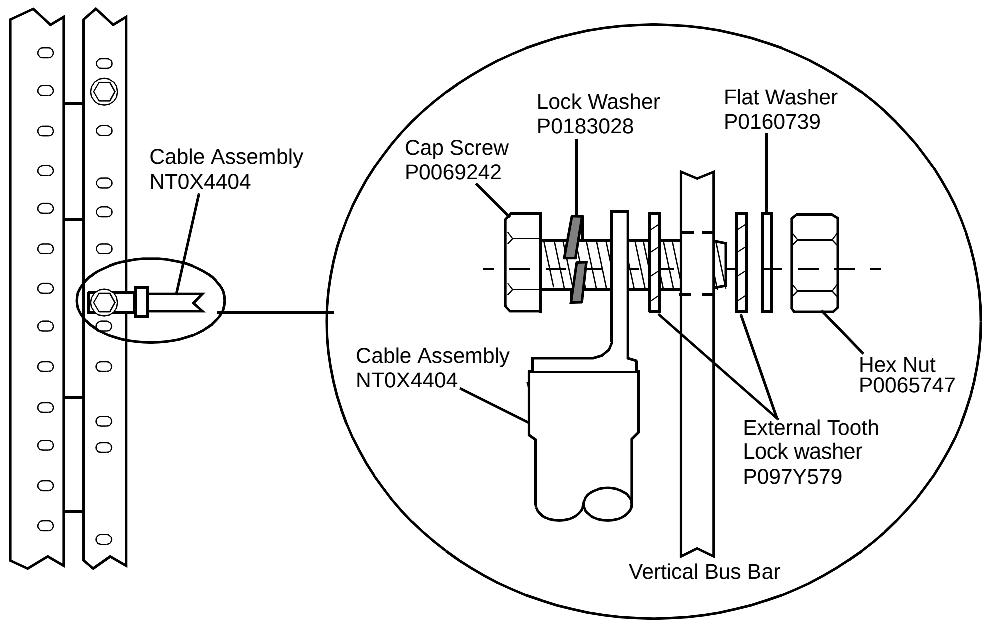
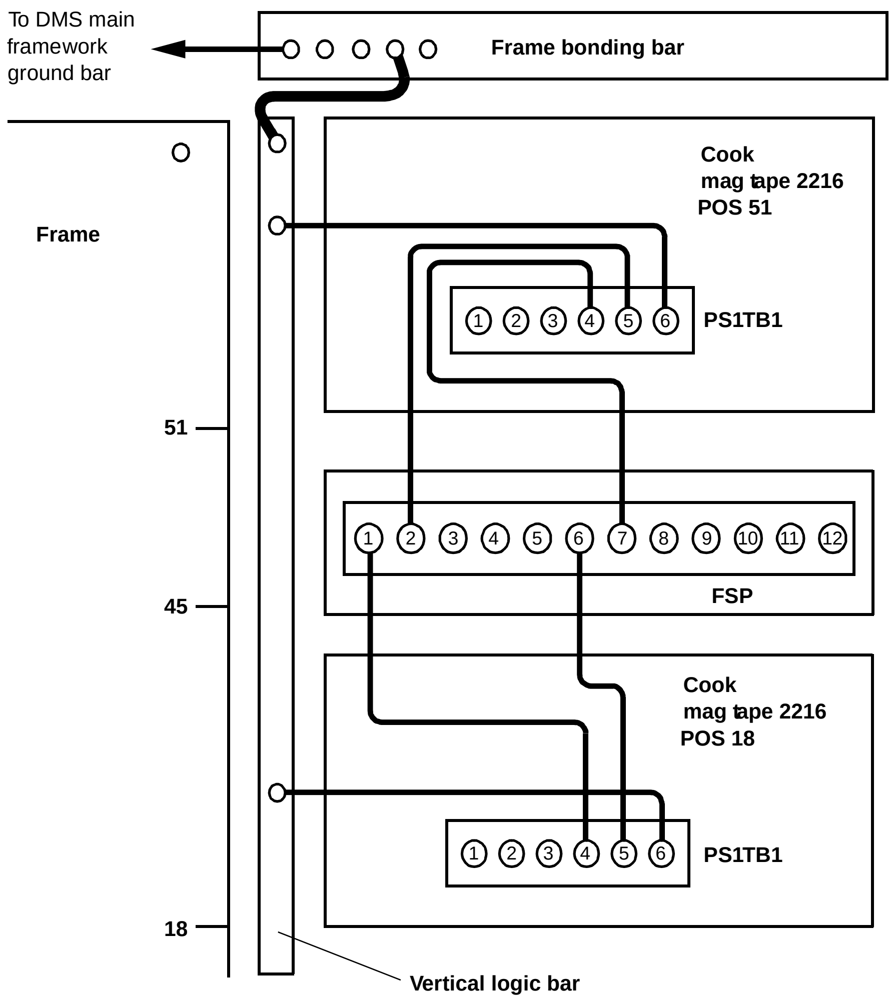


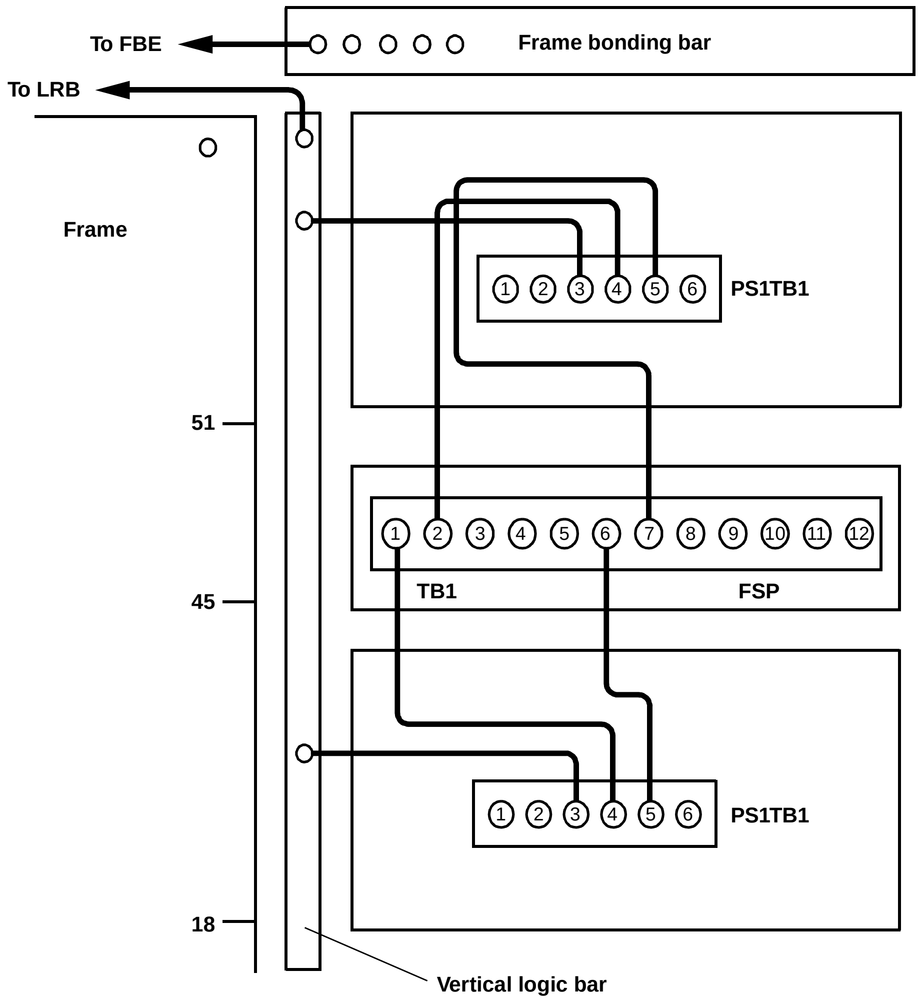
Figure 99 – Power Wiring and Grounding - Non-ISG Cook Mag Tape Drive



Note 1: Remove the strap between pins 5 and 6 on PS1 TB1.

Note 2: FSP termination points may vary depending on type FSP provisioned.

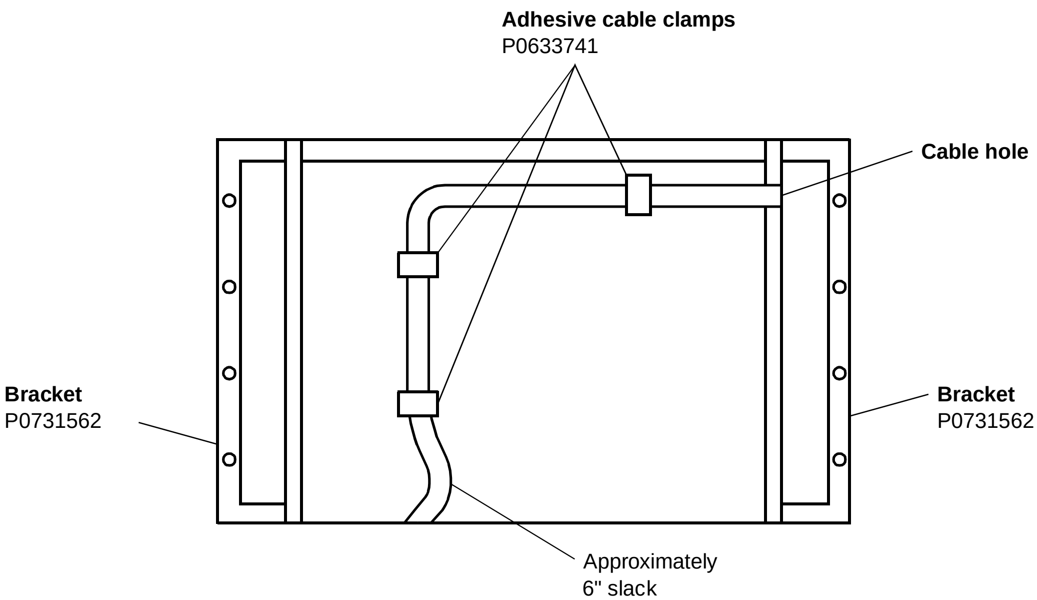
Figure 100 – Power Wiring and Grounding - ISG Cook Mag Tape Drive



Note 1: Remove the strap between pins 5 and 6 on PS1 TB1.

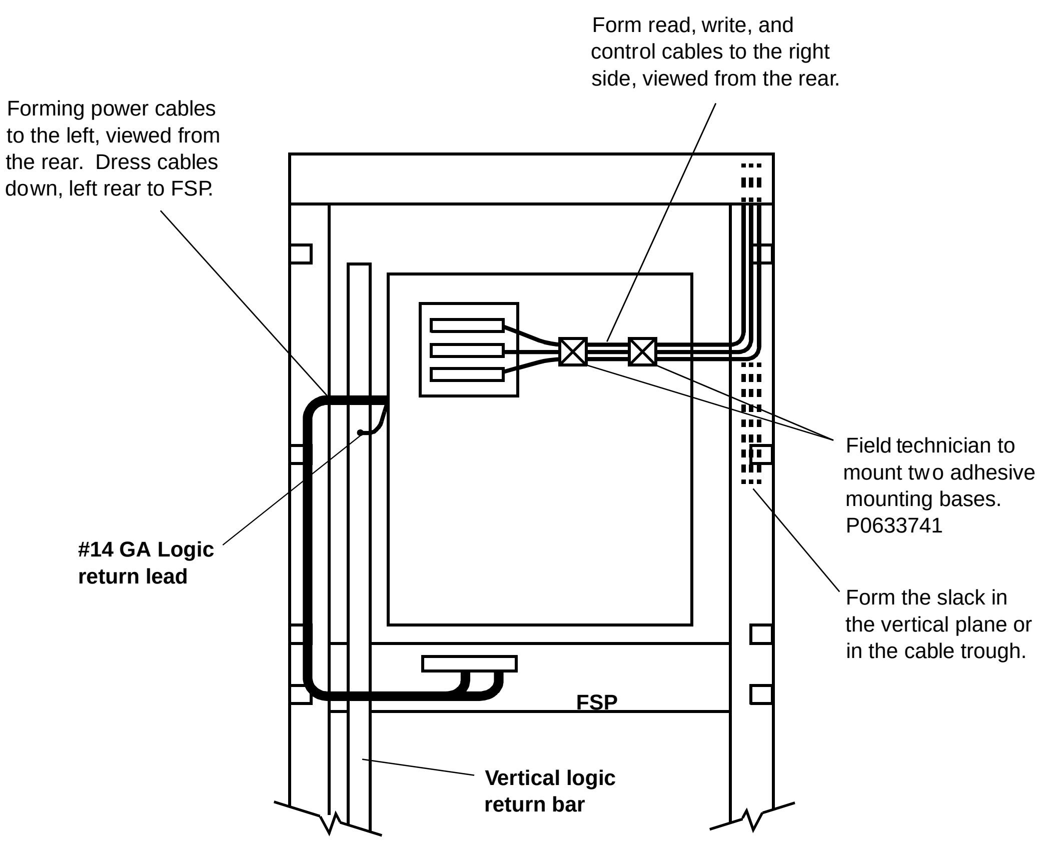
Note 2: FSP termination points may vary depending on type FSP provisioned.

Figure 101 – Inside Power Wiring - Cook Mag Tape Drive



Front View - Looking at back cover, unit open

Figure 102 – Dressing of Power and Switchboard Cable - Cook Mag Tape Drive



Rear View

8.9 Switchboard Cables – Cook Magnetic Tape Drive

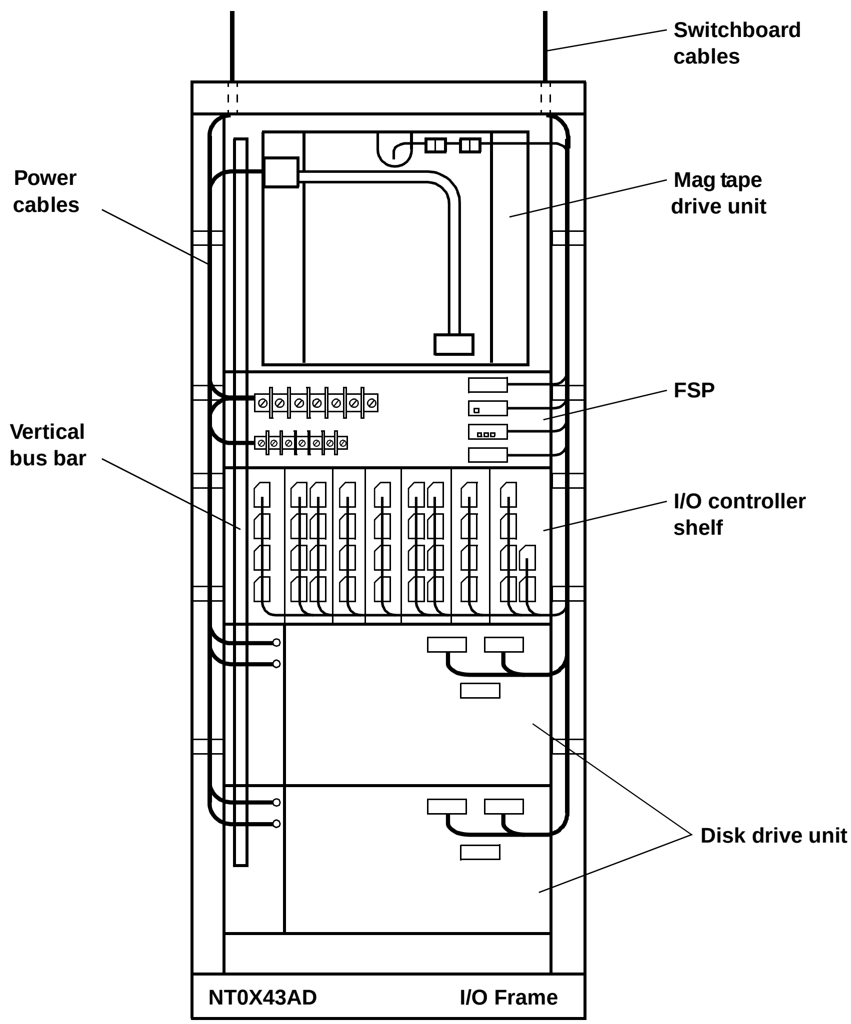
1. Connection to the tape drive unit control status and data function is made with three switchboard cables with appropriate connectors supplied with the unit.

2. The maximum length of each switchboard cable is fifteen feet between the MAG tape unit and its associated controller.

3. These switchboard cables are identified as NT0X96AA Read, NT0X96AB Write, and NT0X96AC Control. They should run horizontally along the right rear upright and down or up to I/0 shelf. Use two adhesive mounting bases on outside of case for ty-raps to hold cable.

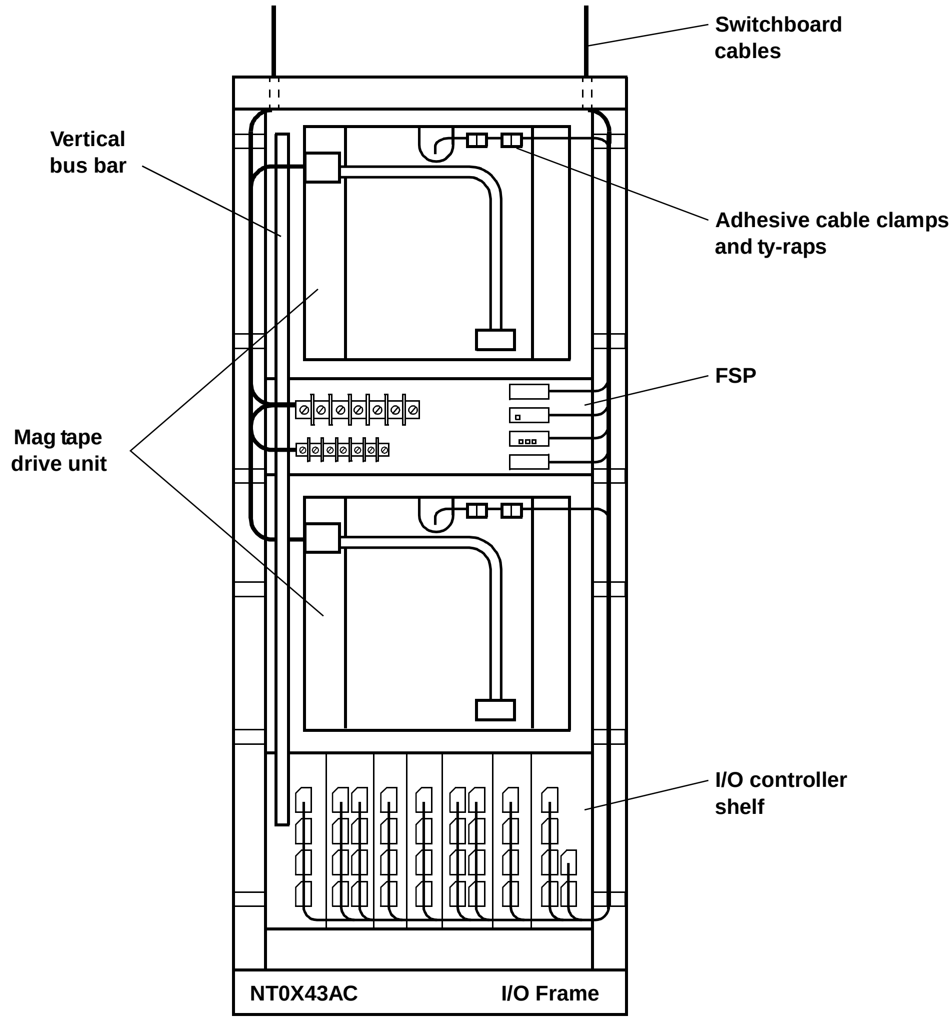
   The slack can be stored in the vertical or cable trough. Use shields 2 or 3 with digital cable. These cables can run in trough (shields 2 or 3 digital) to adjacent frame. Refer to Figure 102, Figure 103, and Figure 104.

Figure 103 – Cabling Plan - MTD and Two DDUs



Rear View

Figure 104 – Cabling Plan - Two MTDs



Rear View

8.10 Unpacking and Physical Inspection – Hewlett Packard Digital Magnetic Tape Drive (Canada Only)

1. The Hewlett Packard tape drive unit is packed in a special shipping carton and strapped to a wooden skid.
2. Remove the strapping, and open the carton. Remove the box with the findings from the top of the tape drive unit.
3. Remove the carton padding from around the tape drive unit and lift the tape drive unit from the container and place it on a suitable surface.

⚠	***Caution:*** The unit weighs approximately 140 lbs. (64.0 kg.). Two people are required to lift the tape drive unit from the shipping container.

8.11 Mounting Hewlett Packard Tape Drive Unit

1 Using an NR3110 screwdriver, remove the two screws from the right hand side of the tape drive unit door casting to the housing.

2 Open the cover door, then using an NR1324 screwdriver, release the main casting door by turning the latch screw counter-clockwise. Refer to Figure 105.

The screw for the panel is located through the hole in the panel on the right-hand side. Refer to Figure 105.

> ***Caution:*** Before opening the panel, care must be taken to prevent the unit from tipping forward.

3 From the equipment specification, ascertain mounting location of HP tape drive unit.

4 Using mounting brackets (P0687395 (left-hand side) and P0687394 (right-hand side)), mark the mounting stud locations on the frame uprights. Refer to Figure 105.

5 Assemble LH mounting brackets (P0687395 and 0797061100) using flat head screws, nuts, flat washer, and lock washer.

The HP mounting bracket (0797061100) is supplied in the same container as the mag tape unit.

If the NT0X44AA is ordered, it comes equipped with mounting hardware. If the hardware is lost or damaged, replacement hardware can be bought from Hewlett Packard as 7970E-151-148.

6 Install the assembled mounting bracket on the left side of the housing, just behind the hinges. The flanges of 0797061100 must face to the inside of the housing. Refer to Figure 105.

7 Install mounting bracket (P0687394 (right-hand side)), to the tape drive unit using PHMS, washers, and nuts. Refer to Figure 105.

8 To mount any new HP tape drive unit on a frame, always use the NT0X0013 isolation hardware, even in non-ISG offices. Previously installed units may have been mounted using frame mounting screws (P097F813) and brackets (P0575258 and P0575257).

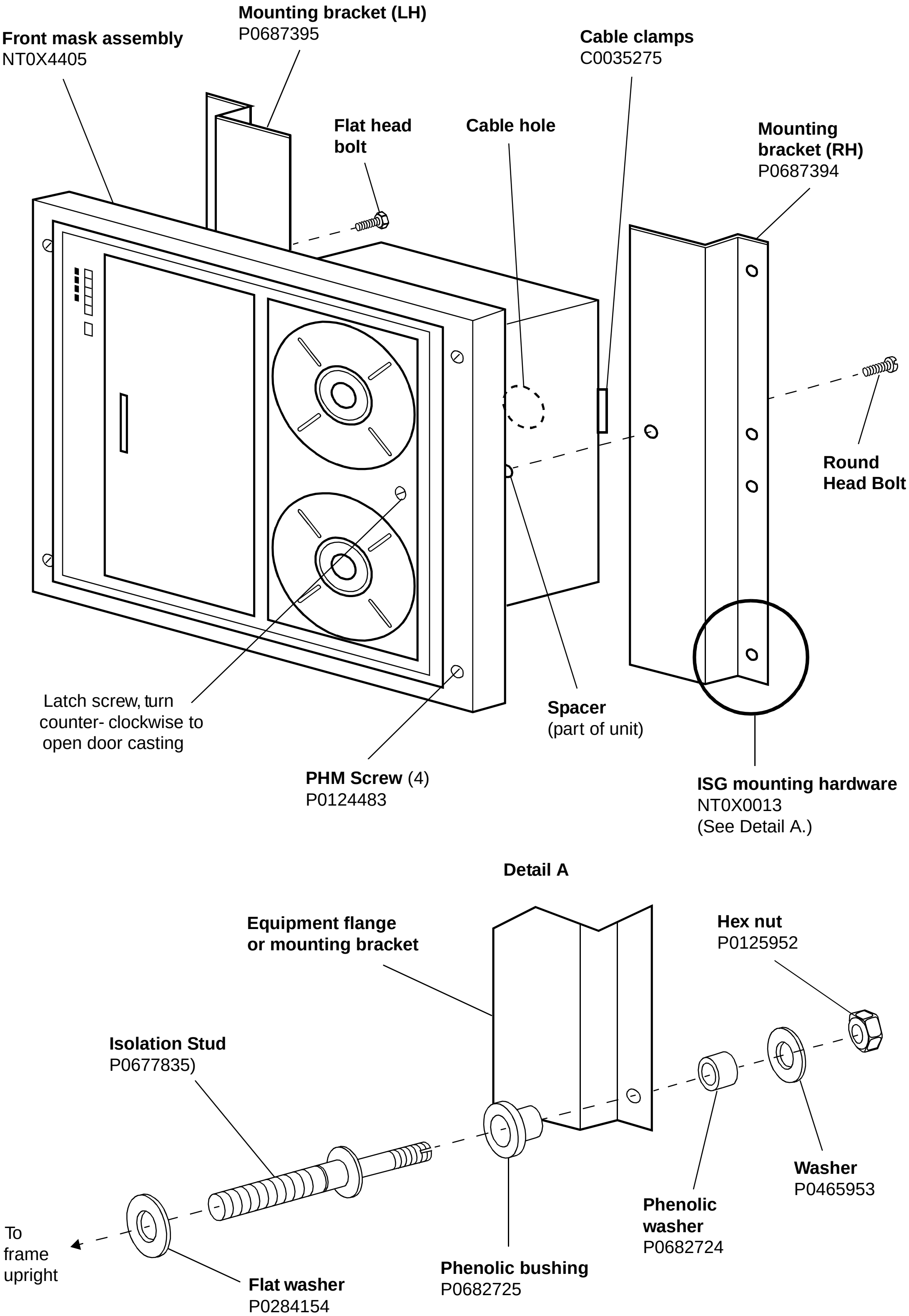
This is acceptable in non-ISG applications but must be replaced with NT0X0013 hardware and mounting brackets P0687395 and P0687394, if office is changing to ISG. Refer to Figure 105 and Figure 106.

9 Screw the studs (P0677835) with washers (P0284154) into the marked locations on the frame uprights.

The stud (P0677835) is not self tapping; therefore, you must use a self-tapping screw (P097F813) to pre-thread holes as required.

10 Place Phenol Fiber bushing over studs as shown in Figure 105 and then install tape drive unit onto frame.

Figure 105 – Hewlett Packard Magnetic Tape Mounting Brackets



11 Use a Phenol Fiber washer (P0682724) plus 8 steel washers (P0465953) and nuts (P0125952) to secure HP tape unit. Refer to Figure 105.

12 Use ITA9995 Torque Screwdriver to tighten nuts to 10 ft-lbs. Do *not* over tighten as studs are brittle and could break off.

13 Install mask (NT0X4405) on the front of tape drive unit by securing it to the mounting brackets (P0687395 and P0687394) using four PHM screws (P0124483). Refer to Figure 105.

14 Mask (NT0X4401) may have been mounted on previously installed units. This is acceptable in non-ISG offices. Mask (NT0X4401) must be replaced with mask (NT0X4405), if the office is changing to ISG.

8.12 Power Cables – Hewlett Packard Magnetic Tape Drive

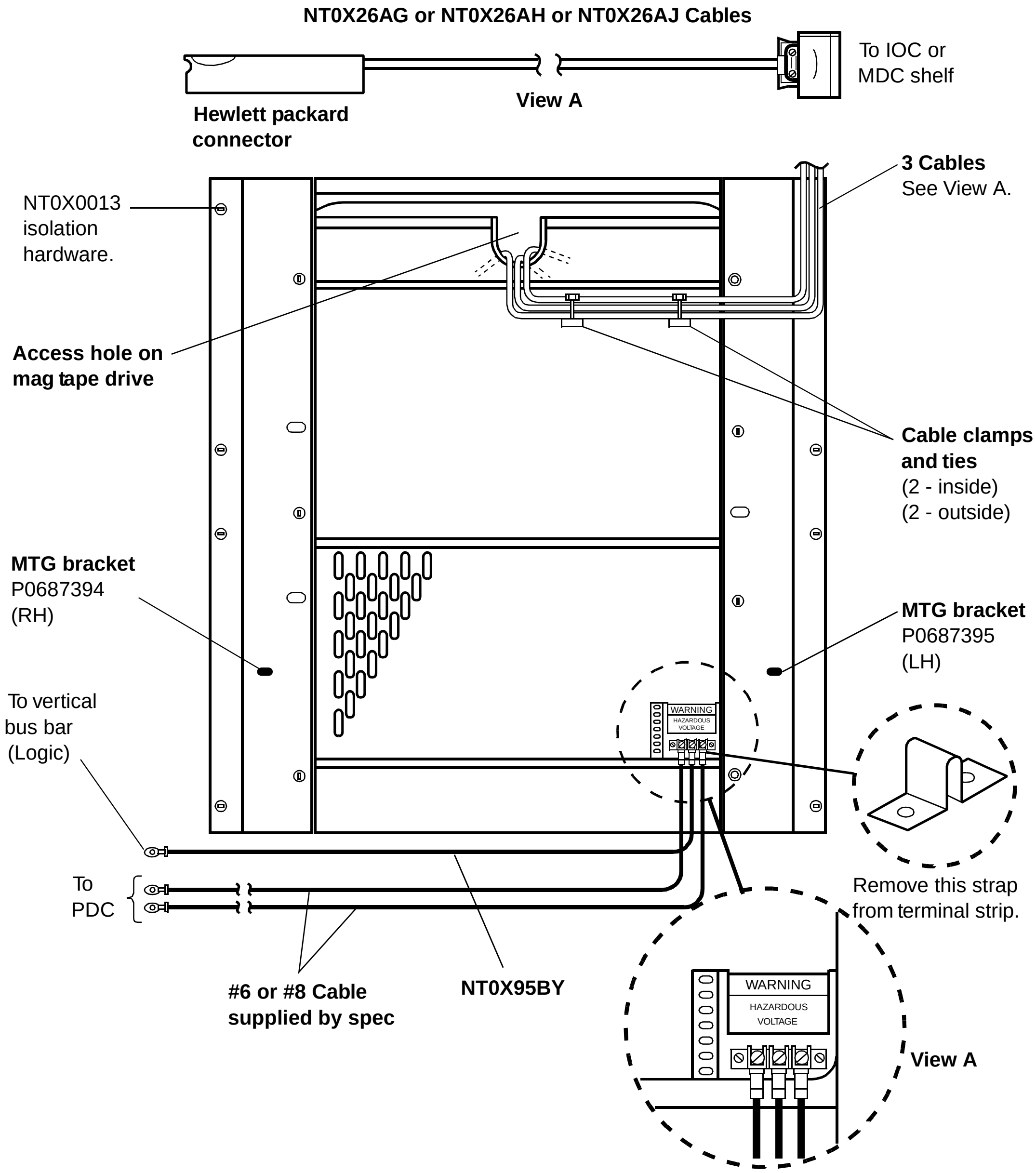
1 Power connections to the power supply are made by way of a terminal strip located at the right-hand corner of the rear cover (PS1TB1). Refer to Figure 106.

2 Run a -48 lead and battery ground lead from the PDC to the terminal strip on the power supply.

Remove the strap connecting the ground return and the chassis ground. The strap is located at the rear of the unit near the power supply. Refer to Figure 106.

3 Run a #16 AWG chassis ground wire from the "GND" terminal to the vertical frame bus bar. Refer to Figure 106.

Figure 106 – Cables and Power for Hewlett Packard Mag Tape Drive



8.13 IOE Frame Switchboard Cables for Hewlett Packard Mag Tape Drive

1 Connection to the tape drive unit control status and data function is made with three switchboard cables with their appropriate connectors. Cables NT0X26AG, AH, and AJ are supplied with the unit. Refer to Figure 107.

The maximum length of each switchboard cable is 15 ft. between the mag tape unit and its associated controller.

2 Install four adhesive mounting bases to the rear cover of the tape drive unit, two on the inside and two on the outside. Secure the cables to the adhesive mounting bases with ty-raps. Refer to Figure 106.

3 Install the three connectorized cable assemblies between the MTU and IOC shelf on the same or adjacent frame, left or right side.

4 Run cables along the frame uprights and secure to the cable brackets with ty-raps.

Figure 107 – Cables for Hewlett Packard Mag Tape Drive

FROM:				TO:
FRAME	**CABLE TYPE**	**CABLE DESIGNATION**	**CONN**	**FRAME**
NT0X43AC or NT0X43AD	NT0X26AG	Control	J3	IOC or MDC Shelf (see CA0X15)
	NT0X26AH	Write	J2	Engineering Notes 53 - 59
	NT0X26AJ	Read	J1	TABLE A, B, and Cable Table 1

8.14 Initial Operational Checks HP – Digital Magnetic Tape Drive Unit

1 Once the mag tape drive unit is installed, visually inspect the installation and make the operational checks listed below:

- Open and close the cover door and verify that latches hold firmly.
- Swing the cover door open and verify the hinges are free and that the door stop bracket prevents the cover door from opening.
- Press upper control panel push buttons and verify that the mechanical interlocks are working properly. On each assembly, each switch should lock *On* when depressed and as the next switch is depressed, the previous switch should release and return to *Off*.
- Release the transport latch and swing the main casting door out.
- Slowly open and close the main casting door and note that wire harnesses, cables, and ribbon cables fold properly.
- Verify that all cable connectors are seated securely.
- Verify that all motion and data cards are securely seated.
- Verify that there is unobstructed air flow for instrument cooling.
- Verify that unit select jumper on control status PCA is connected to the proper pin.
- Close and lock the main casting door.
- Open/close the cover door and note that it rests snug against rubber seal.

8.15 Unpacking and Physical Inspection – DPP /BMC II

1 Before unpacking the DPP (NT8X48AD) or BMCII (NT8M04), remove the "Unpacking Instruction Sheet" and "System Packing List" from the top shipping carton. As the DPP/BMC II is unpacked from the shipping cartons, check each received item so that any material shortages can be identified as early as possible. Any critical shortages identified should be reported, as discovered, to Nortel.

2 The DPP/BMC II is drop-shipped to site on a pallet and is enclosed in a heavy cardboard box. The DPP/BMC II consists of two chassis that are attached together and bolted to a self-standing metal shipping frame.

DPP: A space located beneath the lower shipping pad contains the hardware, cables, and miscellaneous parts required for installation. Manuals and documentation are also located here along with the defect tracking map for each disk (provided and required for the 140 MB disk only).

BMC II: A space located beneath the lower shipping pad contains the hardware, cables, and miscellaneous parts required for installation. Manuals and documentation are also located here along with the defect tracking map for each disk except for the 380 MB and 760 MB disks which have this data programmed onto them at the factory.

When unpacking, ensure that all individual items are removed from boxes, especially under lower shipping pad.

3 An additional box may be provided, depending on the spare parts ordered with the DPP/BMC II.

In the event that a return of any units is required, it is suggested that the shipping boxes be saved until the DPP is installed and is operating properly.

General Precautions: Use extra care when working with DPP/BMC II cables to avoid contact with live equipment. Refer to ISM/IM0 for guidelines.

ESD Precautions: Observe all anti-static handling precautions when installing and performing maintenance on the DPP/BMC II. Utilize anti-static wrist grounding straps, T9908 (U.S.) or ITA9813 (Can.), and anti-static heel strap (ITA9857) for Canadian installations.

A socket is provided for strap attachment on the DPP/BMC II chassis. Refer to Figure 108.

4 Cover all equipment in the IOE frame below the mounting position of the DPP/BMC II with canvas. By providing this protection, the equipment will not be damaged electrically if anything is dropped.

5 Position the DPP/BMC II so that its front covers face the ceiling. The DPP/BMC II is attached to the shipping frame with four brackets and eight screws. Remove and discard.

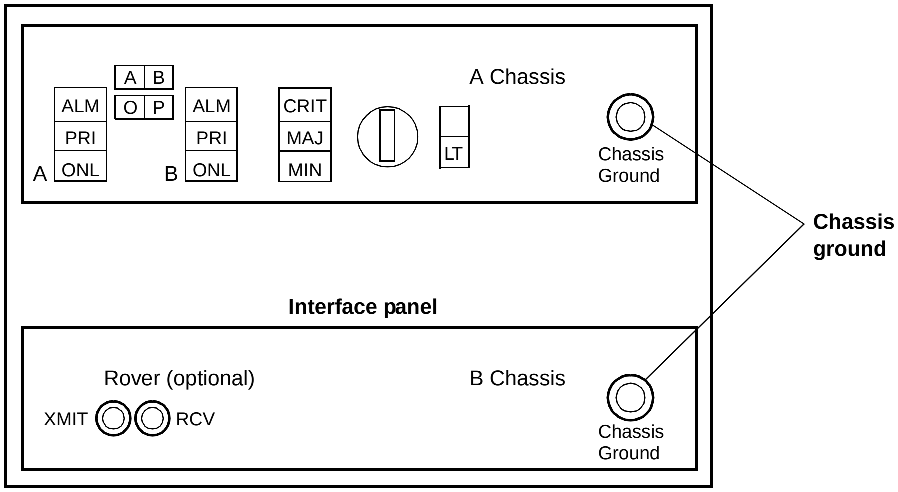
6 Remove the DPP/BMC II front covers by first removing any packing tape and then loosening the four thumb screws.

7 Remove the BMC II front covers by first removing any packing tape and then loosening the four thumb screws. Remove any packing material or tape used to protect the internal parts during shipping. For redundant BMCs, repeat for both chassis.

8 Using a screwdriver, remove the rear panel assemblies. Remove all packing material while performing a visual inspection of all internal cabling and mating connectors.

9 Remove the IOE frame side trim assembly and IOE rear doors.

Figure 108 – Chassis Ground Jack Locations



10 Attach the DPP/BMC II mounting brackets, one to each side of the unit, using the screws provided. The brackets should be mounted so the offset of the brackets brings the DPP front panel flush with the remainder of the IOE bay.

Caution: The DPP/BMC II unit weighs approximately 80 lbs. and requires at least two people to mount and bolt into position.

11 With the brackets securely fastened, carefully lift the DPP/BMC II and bolt it into its appropriate mounting position as stated in Job Specification.

Note: Isolation Hardware is not required and should not be used to mount the DPP/ BMC II or Data Stream Interface (DSI) box.

12 Mount the DSI Box (NT6M98AA) above the DPP/BMC II using the DSI box brackets, ensuring that the designations on the rear of the box are right-side up.

13 Replace the IOE frame side trim.

14 Carefully inspect all card, rack-mounted PCBs to verify that the correct packfill has been shipped. Refer to Figure 109.

15 Each DPP/BMC II chassis is equipped with a power supply in the upper, left corner (viewing chassis from front). The power supply is fully connectorized with three multi-pin connector plugs (P8, P9, and P10), which mate with the corresponding J8, J9, and J10 connector sockets.

Ensure that these connections are mated and inspect the power supply for any shipping damage. Refer to Figure 110 and Figure 111.

16 Check the single slotted-head screw on the power supply's lower front flange to ensure that it is firmly tightened.

17 Verify that the correct GMT type fuses are installed in the power supplies as follows:

-48V dc - 10 amp (red/white tab)A0109762

18 Each DPP chassis is equipped with a Disk Drive assembly installed immediately beneath the power supply. The Disk Drive assembly consists of one Hard Disk Drive and one Disk Controller PCB, with factory installed ribbon cabling beneath these units.

Figure 109 – DPP/BMC II Circuit Pack Locations

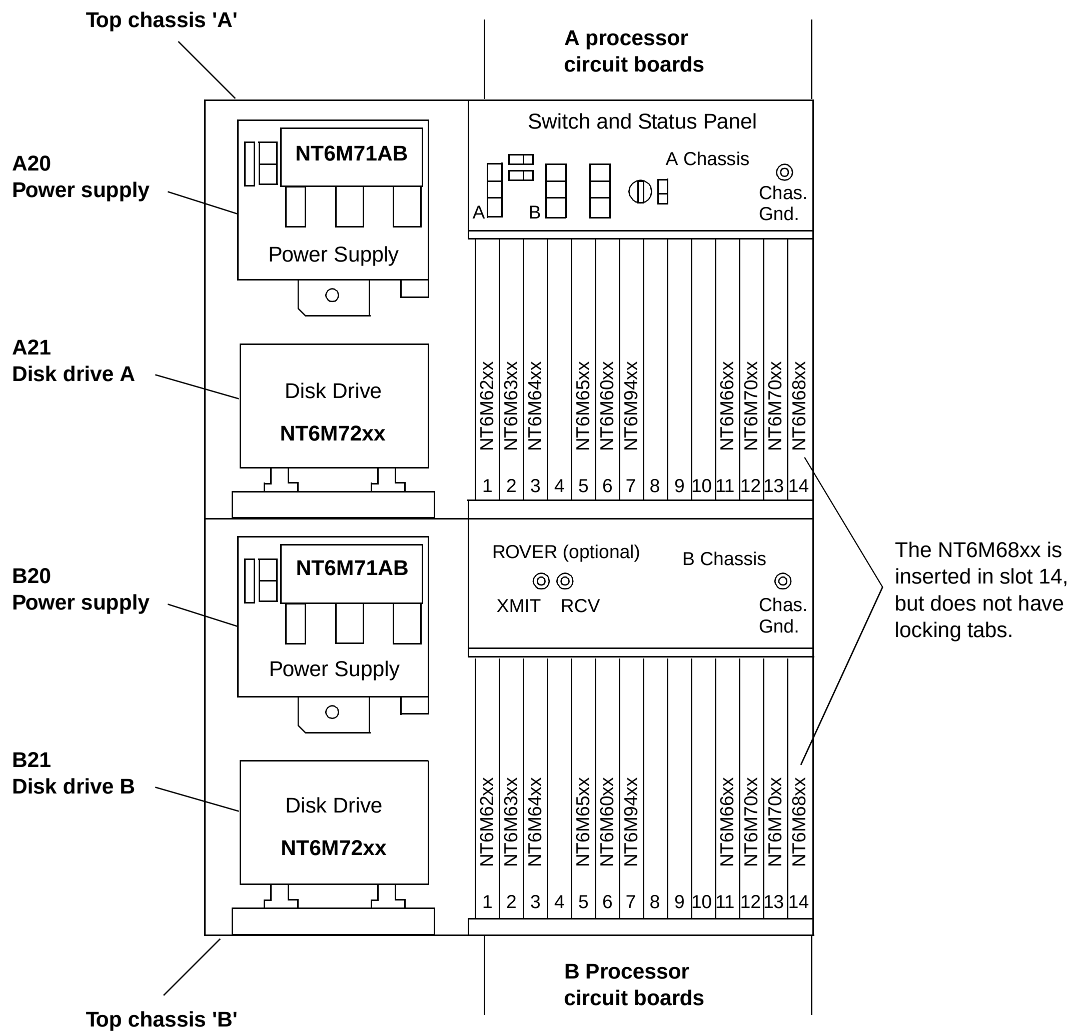
TOP CHASSIS (PROCESSOR A)

1	CPU LOGIC PCB
2	EPROM PCM
3	MEMORY EXPANSION PCB
4	
5	ERROR CONTROL II PCB
6	QUAD SIO PCB
7	56K INTERFACE PCB (OPT.)
8	
9	
10	
11	DISK INTERFACE PCB
12	DATA STREAM INTERFACE PCB
13	DATA STREAM INTERFACE PCB
14	BUS TERMINATOR PCB

BOTTOM CHASSIS (PROCESSOR B)

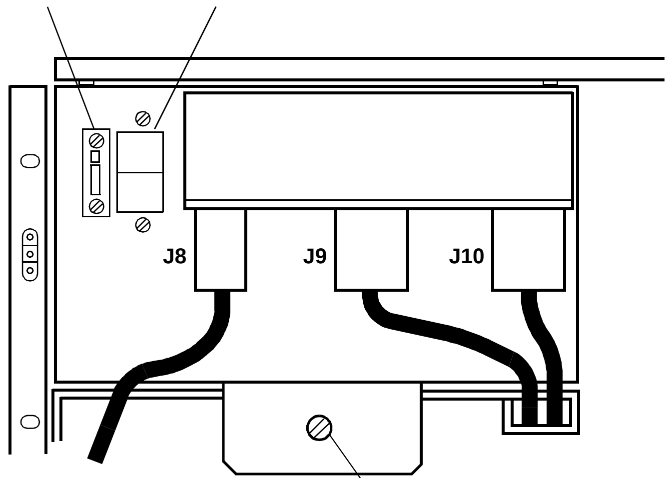
1	CPU LOGIC PCB
2	EPROM PCM
3	MEMORY EXPANSION PCB
4	
5	ERROR CONTROL II JUMPER PCB
6	QUAD SIO PCB
7	56K INTERFACE PCB (OPT.)
8	
9	
10	
11	DISK INTERFACE PCB
12	DATA STREAM INTERFACE PCB
13	DATA STREAM INTERFACE PCB
14	BUS TERMINATOR PCB

Figure 110 – DPP/BMC II Cabinet Subassemblies Front View (Covers Removed)



Note: The 56K Interface circuit packs are noted with an asterisk.

Figure 111 – DPP Power Supply



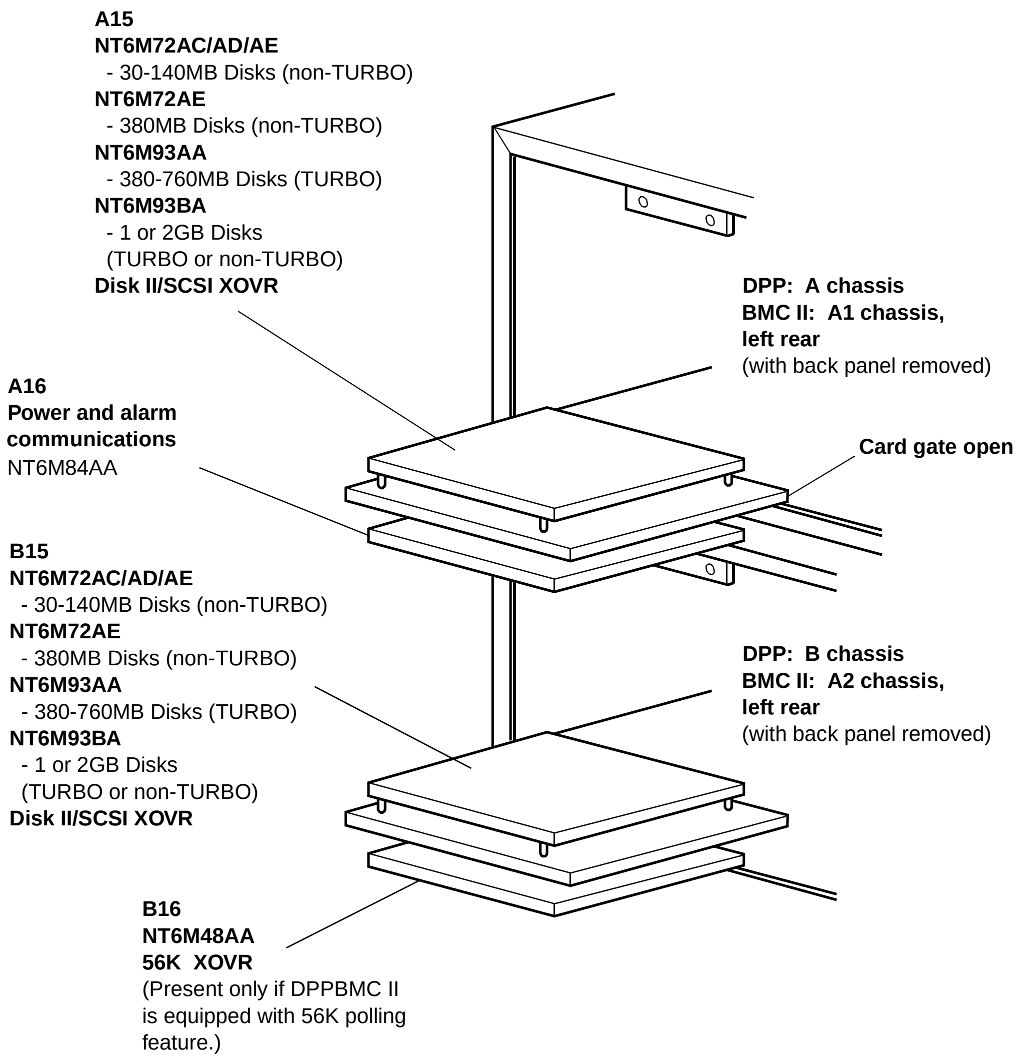
19 Remove the rear panels of the A and B chassis by first loosening the thumb screws.

20 Auxiliary Card Locations - PCBs not installed in the card rack are located inside DPP/BMC II chassis A1 and A2 on a hinged gate mounted to the rear of the backplane assembly. Refer to Figure 112.

21 Discard the shipping screw removed from the bottom of the card gate.

22 The physical inspection of the DPP/BMC II is now complete. Close the gate and replace its screws. Re-install the rear panels of both the chassis A1 and A2.

Figure 112 – Auxiliary Circuit Pack Location



8.16 Cabling – DPP/BMC II

1 Figure 113 shows a typical frame setup and cable routing.

2 Figure 115 shows a complete block diagram of all interconnections to and from the DPP unit. Figure 116 shows a complete block diagram of all interconnections to and from the BMC II unit.

3 Figure 114 shows the typical routing of the power cable from the FSP to the DPP/BMC II unit. Routing is shown for mounting above and below the FSP. Route the power cable to the right rear of the frame. If the unit is mounted above the FSP route the cable up the frame to connection J15 on the DPP/BMC II Power and Alarm Bulkhead. If the unit is mounted below the FSP route the cable down the frame to connection J15.

4 The DPP/BMC II operates on -48V dc Central Office power derived from the PDC by way of the FSP. FSP connections are terminated on the DPP/BMC II Power and Alarm bulkhead located on the right side, viewed from the rear of the DPP/BMC II. Refer to Figure 117.

Figure 113 – Typical Cabling Plan - DPPs and BMCs

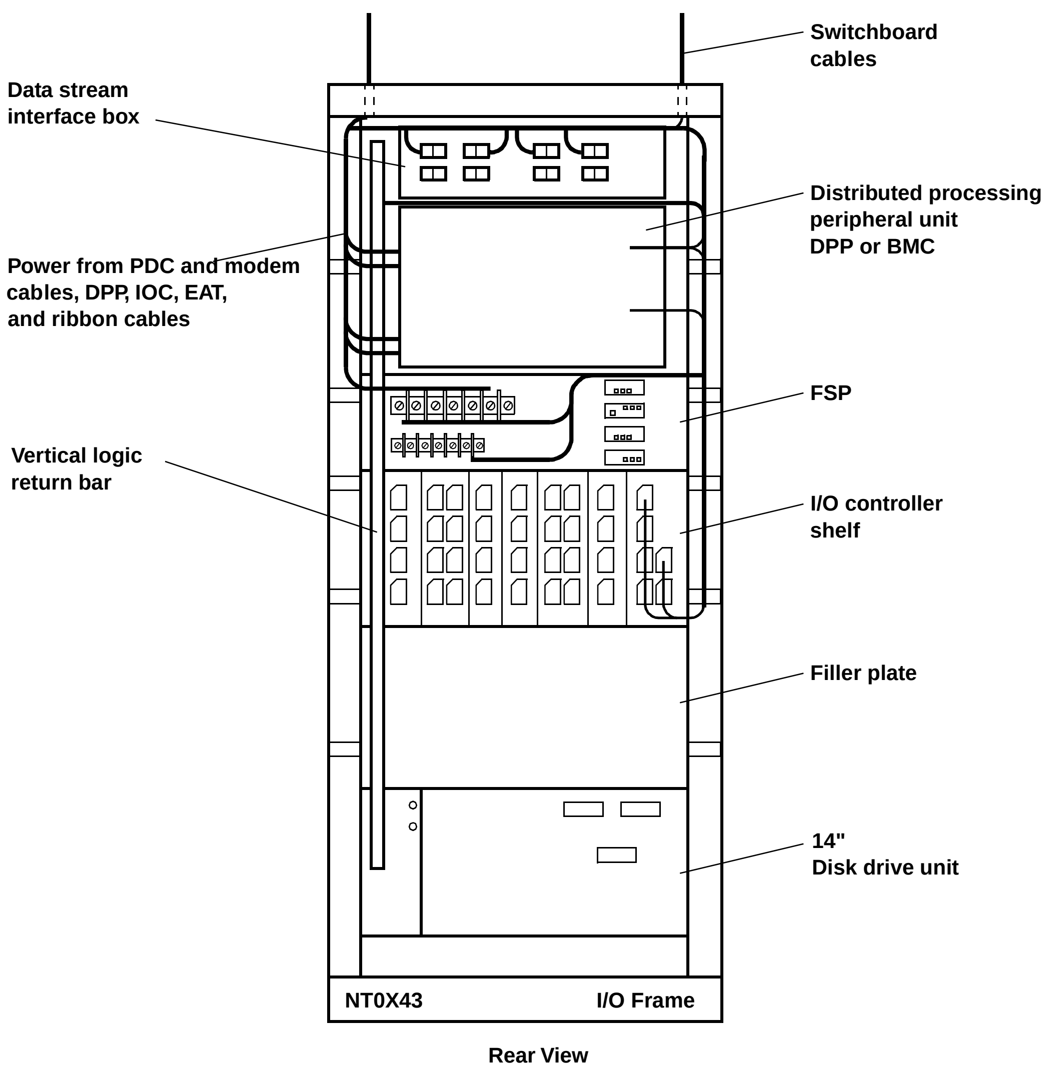


Figure 114 – Typical Power Cabling Plan - DPPs and BMC II

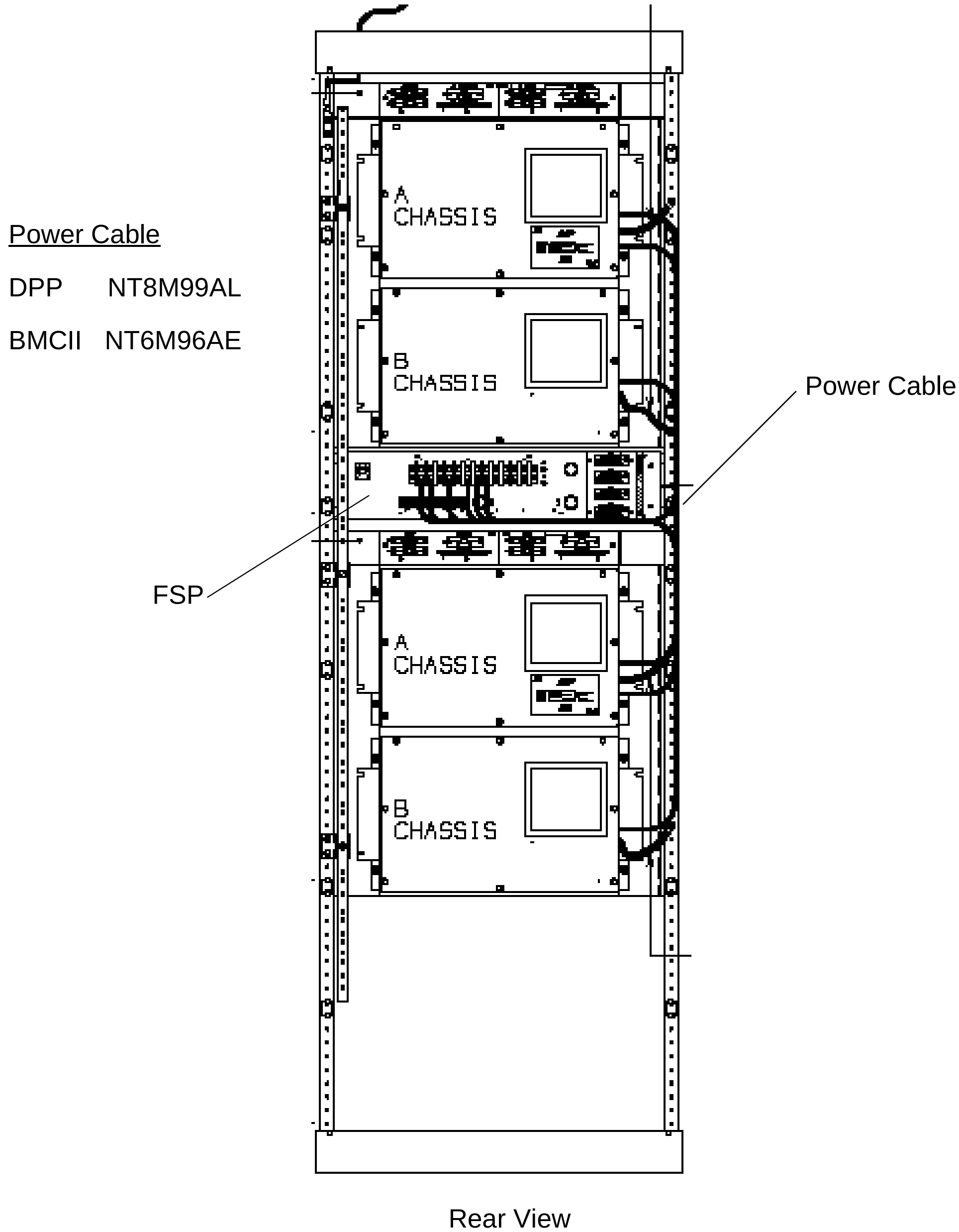
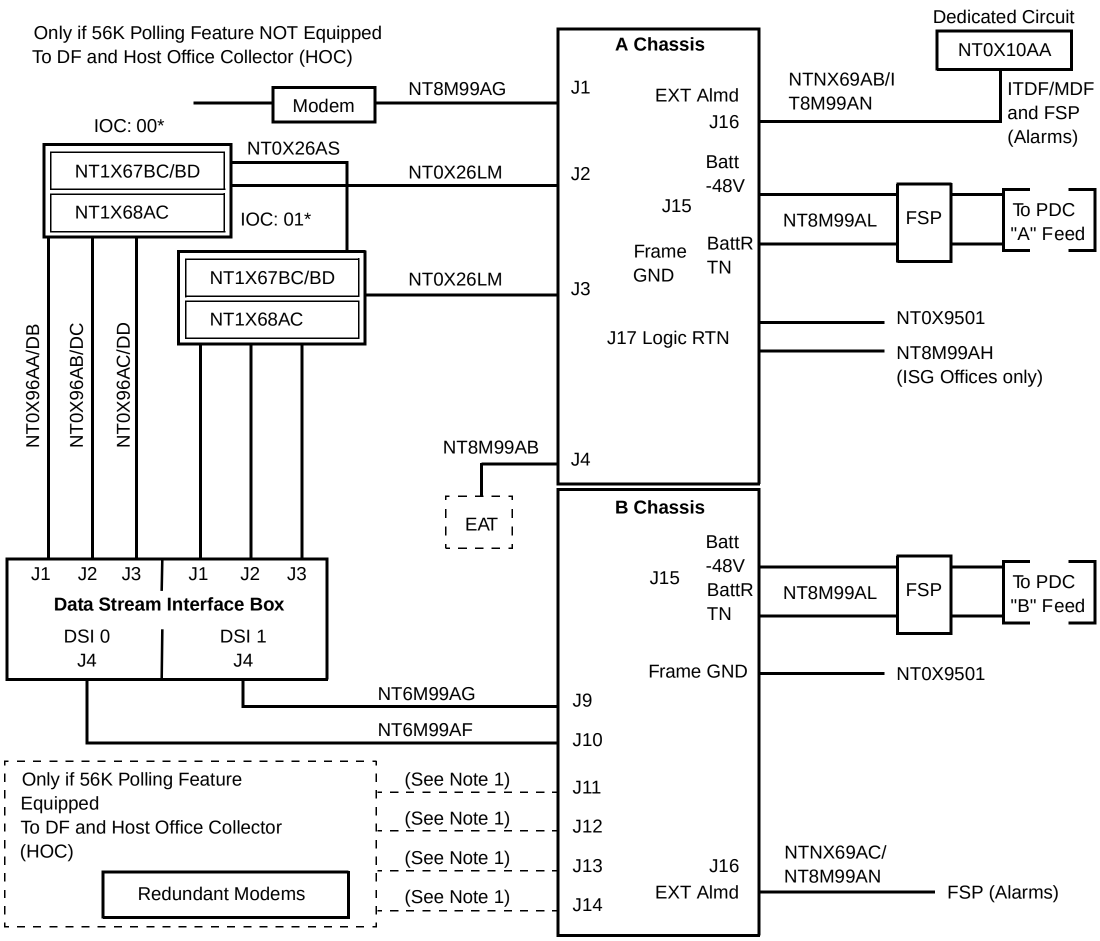


Figure 115 – Cabling Configuration - DPP



Legend

EAT	Emergency Administration Terminal (opt.)	
NT0X10AA	Scan Card	
NT0X26AS	IOC Interlock Cable	FSP-to-FSP
NT0X26LM	MMI Cable	J2 and J3 on A Chassis
NT0X9501	Frame Ground (braided)	
NT0X96AA/DB	Read Cable	J1 DSI Box
NT0X96AB/DC	Write Cable	J2 DSI Box
NT0X96AC/DD	Control Cable	J3 DSI Box
NT1X67BC/BD	I/O Terminal Controller	
NT1X68AC	Mag. Tape Controller	
NT6M99AF	DSI Ribbon Cable	J10 on B Chassis
NT6M99AG	DSI Ribbon Cable	J9 on B Chassis
NT8M99AB	Emergency Administration Terminal Cable (opt.)	J4 on A Chassis
NT8M99AG	Modem Cable (RS232)	J1 or J13. (See Note 1)
NT8M99AH	Logic Return Cable (ISG Offices only)	J17 on A Chassis
NT8M99AL	Power Cable	J15 on A and B Chassis
NTNX69AB	A Chassis Alarm Cable	J16 on A Chassis
NTNX69AC	B Chassis Alarm Cable	J16 on B Chassis
NT8M99AN	Enhanced Alarm Cable	J16 on A and B Chassis (See Note 2)

Note 1:
J11, J12, J13, and J14 are active only when the DPP is equipped with 56K hardware. Modem cable attachments to J11 and J12 will vary with modem manufacturer:

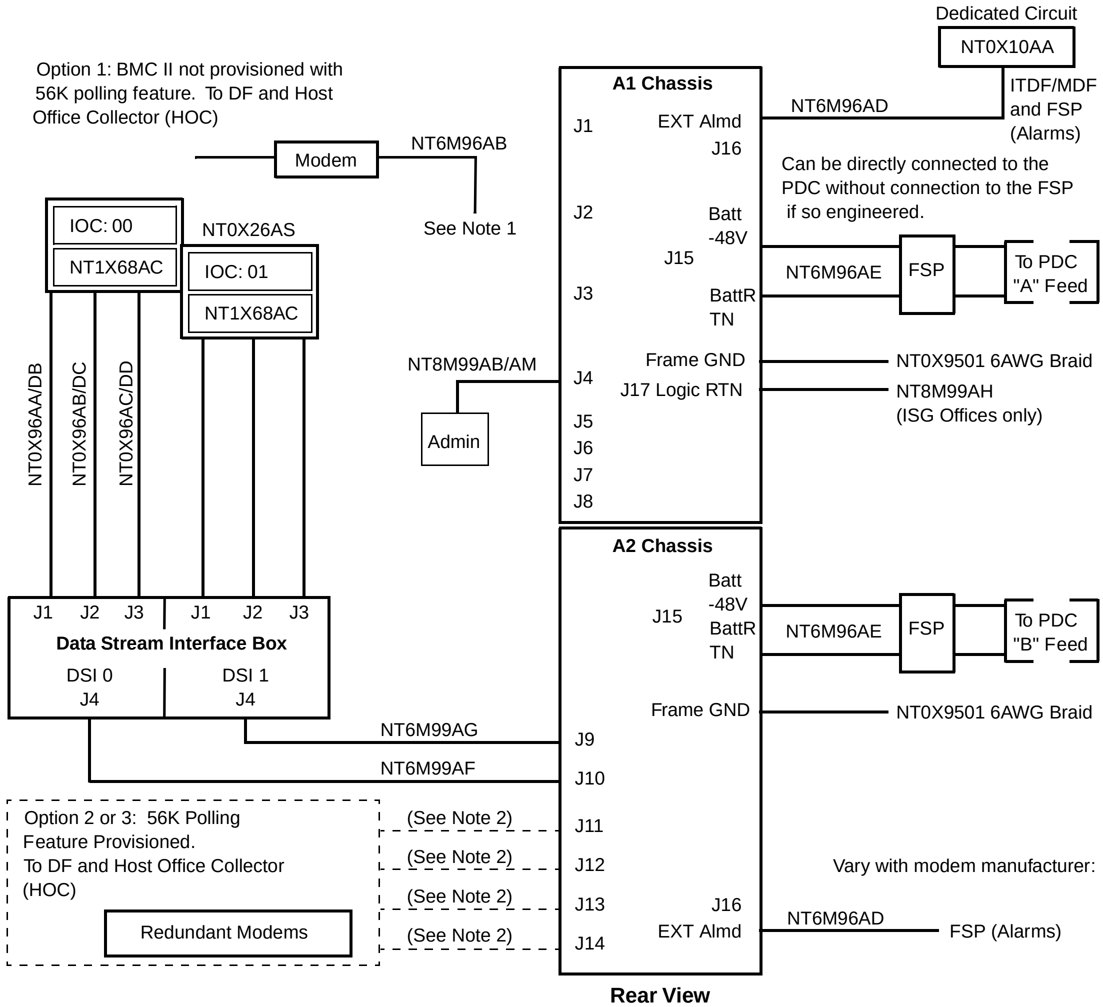
NTNX36BZ UDS 56K (Motorola)
NTNX36BZ DATATEL 56K
NTNX69AA AMDAHL SYNT II
NTNX69AD GDC (General Datacom)

When DPP is equipped with 56K option but is to be connected to RS232 modems, the NT8M99AG cable must be connected to J13.

Note 2:
Alarm cable NT8M99AN is not compatible with Non-UL Chassis DPPs (NT8X48AA/BA/AB).

Note: The NT1X68 cards must be located in IOC cabinets that are interlocked: IOC (n) and IOC (n + 1), where n is 0 or an even number. (e.g., IOC0 and IOC1 can be interlocked. Likewise, IOC2 and IOC3 can also be interlocked.)

Figure 116 – Cabling Configuration - BMC II



Legend

NT0X10AA	Scan Card	
NT0X26AS	IOC Interlock Cable	Between IOE FSPs
NT0X9501	Frame Ground (braided)	
NT0X96AA/DB	Read Cable	J1 DSI Box
NT0X96AB/DC	Write Cable	J2 DSI Box
NT0X96AC/DD	Control Cable	J3 DSI Box
NT1X68AC	Mag. Tape Controller	
NT6M99AF	DSI Ribbon Cable	J10 on A2 Chassis
NT6M99AG	DSI Ribbon Cable	J9 on A2 Chassis
NT8M99AB/AM	Admin. Terminal Cable 25 ft/50 ft (opt.)	J4 on A1 Chassis
NT6M96AE	Power Cable Kit	J15 on A1 and A2 Chassis
NT6M96AB	Modem Cable Kit(RS232)	J2 or J13 (See Note 1)
NT8M99AH	Logic Return Cable (ISG Offices only)	J17 on A1 Chassis
NTNX69AD	A1 Chassis Alarm Cable Kit	J16 on A1 Chassis
NTNX69AD	A1 Chassis Alarm Cable Kit	J16 on A2 Chassis

Note 1:

Polling modem connections for non-Turbo BMC II

BX.25 polling (001 software) J1 or J5

BiSync polling J3

HDLC J2

GTE BiP (BX.25) J5, J6, J7, J8

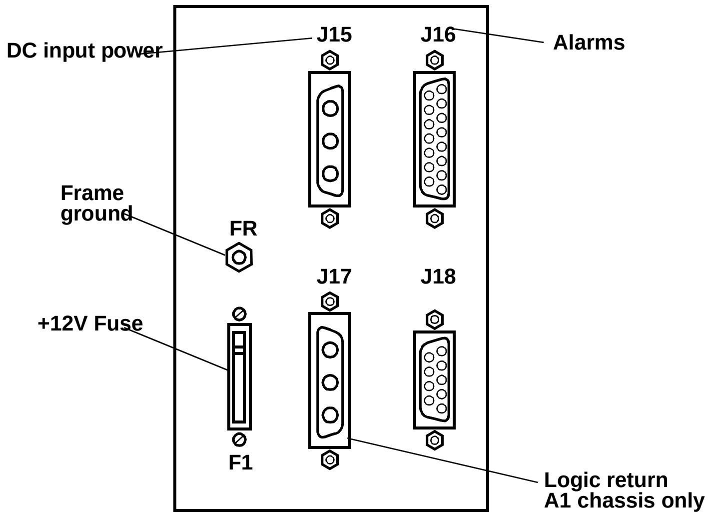
Note 2:

J11, J12, J13, and J14 are active only when the BMC II is equipped with 56K hardware. Modem cable attachments to J11 and J12 will vary with modem manufacturer:

NTNX36BG/BZ UDS 56K (Motorola)
NTNX36BG/BZ DATATEL 56K
NTNX69AD GDC (General Datacom)
NTNX69AD AT & T

When BMC II is equipped with 56K option but is to be connected to RS232 modems, the NT6M96AB cable must be connected to J13 or J14.

Figure 117 – DPP/BMC II Power and Alarm Bulkhead



5 Locate the assigned fuses in the Job Specification for -48V dc 10-amp power at the PDC for the DPP/BMC II. *Remove* the 10-amp fuses from the PDC and label these locations with the designation labels provided (DPP:A, DPP:B), (BMC II: A1, BMC II: A2).

Caution: While making the following connections, do *not* apply power to the DPP/BMC II.

6 Record the fuse locations on labels P0708015 (shown below - installed or included in the Power Label Kit NT6M96AL). These labels identify the DPP source of power, and are installed above the fan housing on DPP/BMC II chassis A and B. These labels will not be required if the power source is from the IOE frame supervisory panel.

THIS UNIT IS DIRECTLY
POWERED BY NT0X42
PDC____ PANEL____ FUSE____
(REFERENCE D-640 DRAWING)

7 DPP: Use the NT8M99AF or AL power cable assembly for the power connections to the A and B chassis. If the NT8M99AF power cable assembly is supplied, perform the following procedures. This cable is 20 feet long. Make two 10-foot lengths by cutting the cable in half. Terminate the connectorized ends onto the A and B chassis at J15.

BMC II: Use the NT6M96AE power cable assembly for the power connections to the A1 and A2 chassis. Terminate the connectorized ends onto the A1 and A2 chassis at J15. The -48V dc power and ground wires must be soldered to the correct pins of connector J15 for both BMC II chassis. Refer to the following for correct BMC II locations.

Pin 1 -48Vto RED
Pin 2 Not Used
Pin 3 +48V (GND)to Black

8 The FSP punchings are used as tie points for direct PDC-to-DPP/BMC II cabling. Tightly wrap two layers of NS 14090 black vinyl plastic electrical tape over the cable butt and terminate the loose ends at the FSP/TB1 using lugs, as follows:

CHASSIS/FEED	FSP TERM.	COLOR	SIGNAL NAME
A1	TB1-1	RED	-48 VOLT
	TB1-6	BLACK	BATTERY RETURN
A2	TB1-2	RED	-48 VOLT
	TB1-7	BLACK	BATTERY RETURN

If any of the above returns are occupied, TB1-8 and TB1-9 can be used in their place.

Note: If there is an MTD mounted in the same cabinet as a DPP, the DPP chassis B (referenced as A2) will connect to TB1-4. The MTD will connect to TB1-2.

Note: A Simplex BMC II has only one power feed and battery return from the PDC. Utilize job specifications to determine correct terminal strip termination locations.

9 If the BMC II is redundant, repeat the connections described in paragraph 6 for the A2 chassis.

After the wires have been soldered, assemble the EMI hood on the connectors following the instructions provided with the connectors and attach the connector to J15. When connecting the NT6M96AE power connector to J15, ensure that the small *D* connector is plugged into the BMC II chassis connector correctly. It is possible to force the cable connector into the BMC II upside down thus causing a short. The BMC II will not power up if this connector is installed upside down.

Caution: The former Cook Division of Nortel's standard cable color coding differs from most manufacturers. -48V dc conductor insulation is black; ground conductor insulation is red and white. Ensure this color coding is observed when making power connections.

10 Run specified power cable from the assigned fuses in the PDC to the FSP. Chassis A1 and A2 will be powered from the A and B -48V dc feed, respectively. For A and B feed terminations at the FSP, use the information provided in paragraph 6.

8.17 Ground and Logic Return Cabling – DPP/BMC II

1 The DPP/BMC II frame ground studs are located on the right side, as viewed from the rear, of both the A1 and A2 chassis. The DPP/BMC II frame ground should be connected as shown in Figure 118 and Figure 119 to the frame upright.

2 When connecting the NT8M99AH cable from logic ground to connector J17 (refer to Figure 119.) ensure that the small *D* connector is plugged into the DPP chassis connector correctly. It is possible to force the cable connector into the DPP connector upside down, thus causing the short between logic and frame ground. The DPP will not power up if this connector is installed upside down.

3 For ISG offices, the Logic Return will be connected. The Logic Return connection should be made between connector J17 on chassis A only and the Vertical Logic Return Bar. Refer to Figure 119.

Figure 118 – DPP/BMC II Frame Ground at Bulkhead

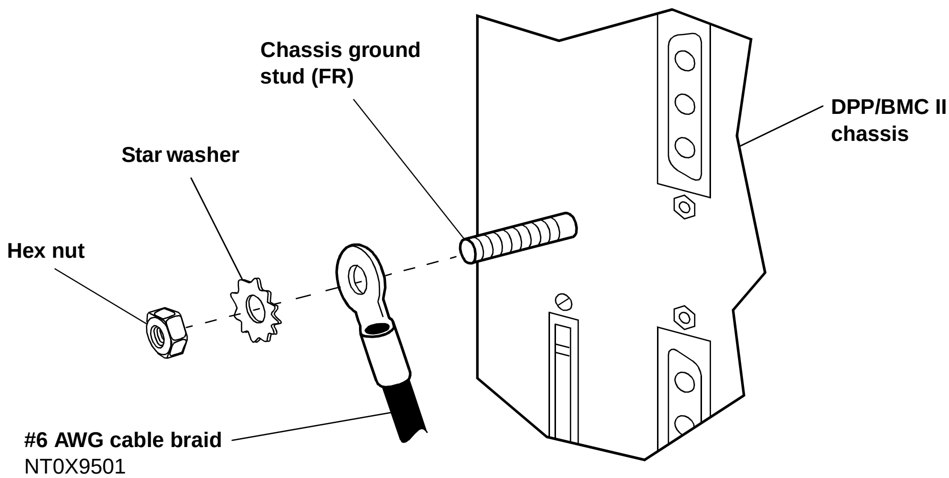
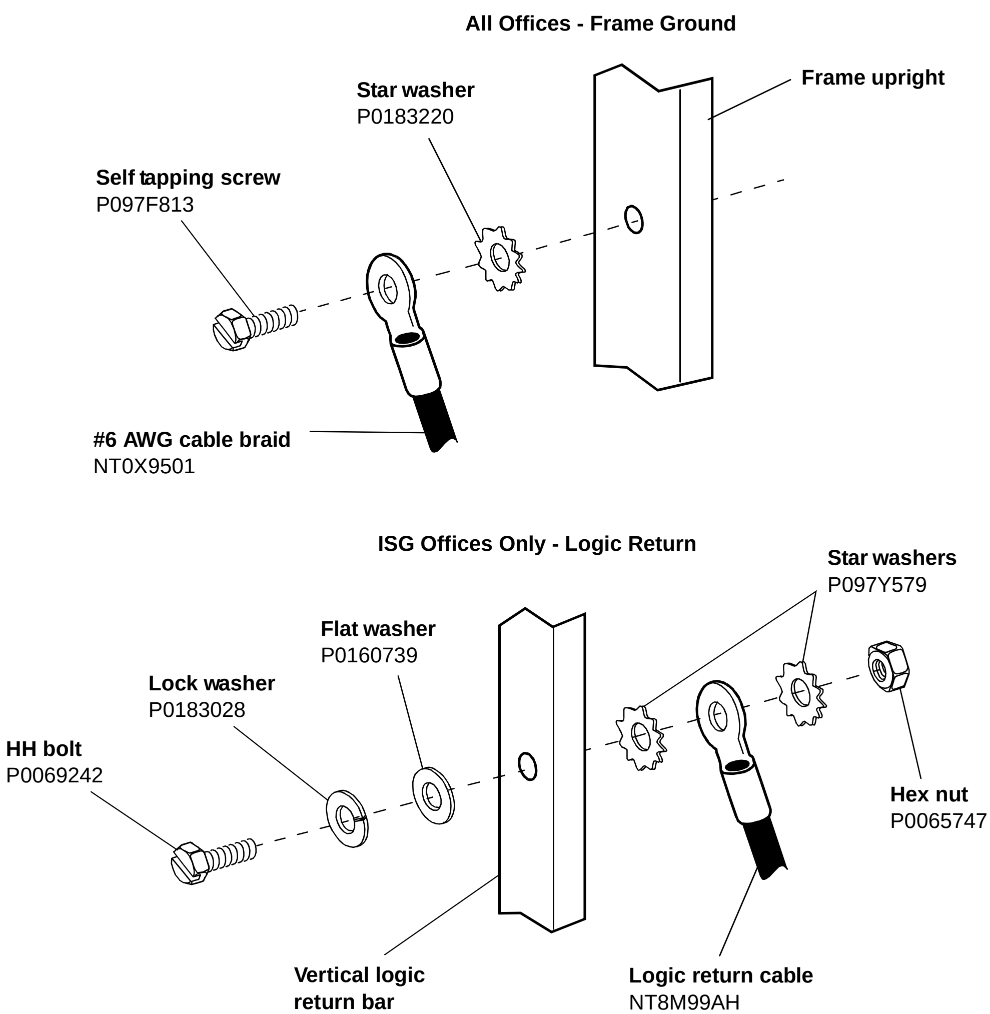


Figure 119 – DPP/BMC II Frame Ground/Logic Return at Frame



8.18 Data Stream Interface Box Cabling – DPP/BMC II

1 There are two sets of three controller cables ordered for the DPP/BMC II. They are identified as NT0X96AA/DB for Read, NT0X96AB/DC for Write, and NT0X96AC/DD for Control.

2 Attach these cables to the *J* connectors J1 Read, J2 Write, and J3 Control on DSI unit DSI-0 and DSI-1. Run them horizontally to the right rear upright and up or down upright to the IOCs identified in the Job Specification. Terminate these cables at NT1X68 IOC port 1 for Read, port 2 for Write, and port 3 for Control.

3 Store the slack along the vertical or in cable trough 2 or 3 with digital cables. Refer to Figure 113.

4 Attach the two NT0X26LM cables to chassis A connectors J2 and J3 and terminate these cables at the NT1X67 IOC ports in IOC 00 and IOC 01, or as identified in the Job Specification. The NT0X26LM connected to J2 must be cabled from the lower numbered IOC. Route these cables as in paragraphs 2 and 3. Refer to Figure 113.

Please note that the NT1X67 and NT1X68 circuit packs should not reside in the same IOCs, and that the IOCs need not be IOC 00 and IOC 01.

5 Confirm that the IOC shelves in which the two sets of NT1X67 and NT1X68 packs reside are correctly interlocked. The interlock cable NT0X26AS connects the FSPs of the IOE bays in which the DPPs duplicated IOC packs reside.

6 There are two ribbon cables provided with DPP/BMC II unit. Pin 1 on these cables is marked in white. Pin 1 should be at the *Top* when the ribbon cables are plugged into the DPP/BMC II chassis, and should be at the *Bottom* when the ribbon cables are plugged into the DSI box.

Attach the NT6M99AG to DSI-1, connector J4, and terminate at chassis B connector J9. Attach NT6M99AF to DSI-0, connector J4 and terminate at chassis B connector J10. Neatly fold and route these ribbon cables along the top of the DSI unit, behind the other DSI cables, and down the left side of DPP/BMC II to chassis A2. Refer to Figure 113.

Adhesive-backed ribbon cable clamps are provided with the DPP/BMC II unit to facilitate the routing of these cables.

7 There are two cables provided with the DPP unit- NT6M99AF/AG. In earlier model DPPs, the cables are the flat ribbon type. In later model DPPs, the standard (round) cable (Rel. 3) may be substituted in place of ribbon cable. The following provides instructions on how to cable the new round cables NT6M99AF/AG Rel. 3.

8 There are two round cables provided with DPP unit. Pin 1 on these cables is marked in white. Pin 1 should be at the Top when the cables are plugged into the DPP chassis, and should be at the Bottom when the cables are plugged into the DSI box. The connectors on the DSI interface box are mounted horizontally. On the DPP chassis, the connectors for the cables (J9 and J10) are mounted vertically.

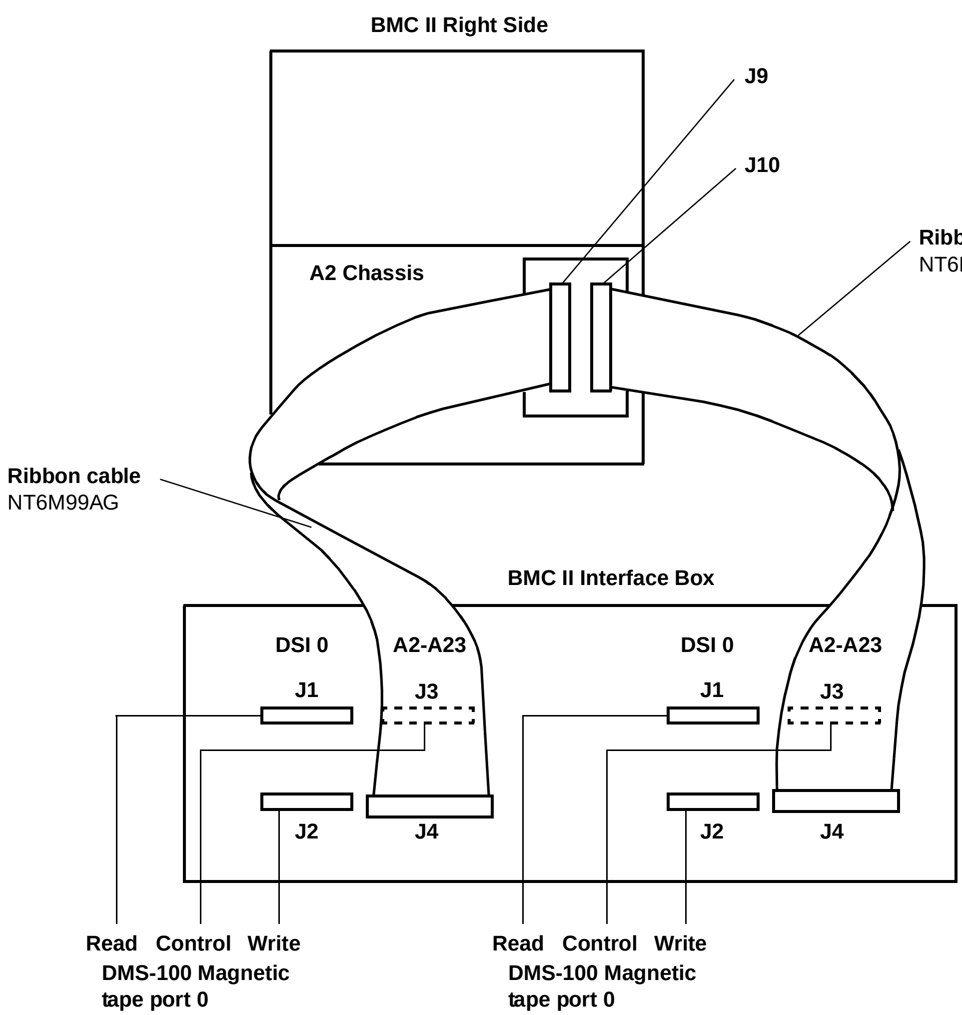
9 Attach the NT6M99AG to DSI-1, connector J4. Route the cable from J4 down to the top of the DPP. Using ty-rap and a ty-rap mounting base (with the adhesive on the back of the base), secure cable (1" after the bend radius) to the top of the DPP. This will provide stress relief on connector J4. Continue to route cable along the top of the DPP and then onto the left side of the frame/cabinet. Next, route cable down towards connector J9 on the B Chassis.

10 To connect the cable to J9, remove and discard the connector plate screw closest to the top-left corner of connector J9. Connect cable to J9 and then attach the ground lead (the longer screw supplied with the cable) to the connector plate.

11 Attach the NT6M99AF to DSI-0, connector J4. Route the cable to the DPP B Chassis, connector J10 in the same manner as the previous cable. To connect the cable to J10, remove and discard the connector plate screw closest to the top right corner of connector J10. Connect cable to J10 and then attach the ground lead (the longer screw supplied with the cable) to the connector plate.

12 Use ty-raps and ty-rap mounting brackets to secure both cables. Ty-rap both cables to the top of the DPP, 1" after the bend radius of cable NT6M99AF. Then secure both cables to the frame upright, 1" after the second bend radius of the cables. Lastly, ty-rap cables to the side of the frame 1" before the third bend radius (before cables are connected to J9 and J10 on the DPP). Verify that there is no undue strain or stress on either cable. Refer to Figure 120.

Figure 120 – BMC II Interface Box Cabling Connections



8.19 Alarm Cabling – DPP/BMC II

DPP: Two types of alarm cables exist for the DPP: DPP Models NT8X48AA/AB/BA require alarm cables NTNX69AB and NTNX69AC. All UL-chassis DPPs with 3.5" disk drives (NT8X48BD and later) have Enhanced Alarm Cable NT8M99AN. UL-chassis DPPs, NT8X48AD, may have either type of alarm cables NTNX69AB and NTNX69AC *or* NT8M99AN.

BMC II: The alarm cables should be routed along the right rear upright. The alarm connections should be made using 26 AWG 812A cable and the NT6M96AD Alarm Connector Kit. Refer to the following connector wiring and Figure 121 for pin numbering.

BMC II alarms are job dependent. Typically BMCs using the BX.25 polling protocol will use the following three levels of alarms as described below. The Alarm and Display Panel on the BMC II will have lamps for Critical, Major, and Minor alarms. BMCs using other polling protocols may only use two levels of alarms, Major and Minor. The Alarm Display Panel will have lamps for Major, Minor, and ERC (Error Control - error detected during self test procedure) alarms.

Consult job documentation including Specification 466 for correct alarm assignments. Also consult the vendor manual received with the BMC II for additional wiring information.

Alarm Cables - NTNX69AB and NTNX69AC

1 The NTNX69AB and NTNX69AC alarm cables should be routed along the right rear for chassis A1 and A2, respectively.

If the NTNX69AB and NTNX69AC cables are *not* provided, refer to the following connector wiring below and Figure 121 for pin numbering. Connections should be made using 26-AWG 812A cable and the NT6M96AD Alarm Connector Kit. After this cable is built, refer to paragraph 2 for routing.

A1 Chassis:

J16 PIN # (Color)	Alarm	X-Conn	Scan Point	NT0X10AA
1 and 3 (BLK/RED)	CRITICAL	MDF	0	LOOP DETECT
4 and 6 (BLK/WHT)	MAJOR	MDF	1	LOOP DETECT
10 and 11 (BLK/GRN)	MINOR	MDF	2	LOOP DETECT

J16 PIN # Termination on (Color) Alarm Card	Signal	Function	Power/
9 (WHT)	LV. COM	BR/ABS	Pin 26
7 (WHT)	TALM. COM	BR/ABS	Pin 26
8 (ORN)	TALM. NO	CONV. FAIL	Pin 06
13 (BLU)	LV. NO	CONV. FAIL	Pin 06

A2 Chassis:

J16 PIN # (Color)	Signal	Function	Termination	
7 (WHT)	TALM. COM	BR/ABS	Pin	26
8 (ORN)	TALM. NO	CONV. FAIL	Pin	06

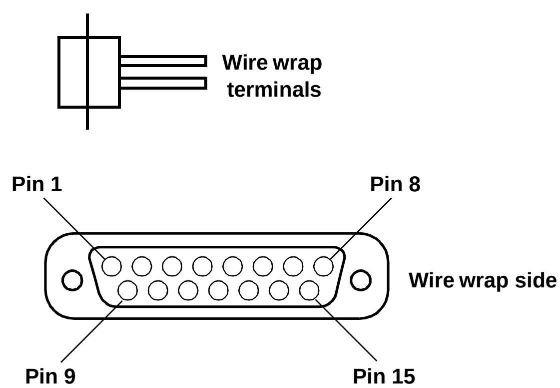
2 Run the alarm leads to FSP horizontally to right upright and down or up to FSP, along with the power leads. Leave a three-inch service loop by dropping down and coming up to connector at the DPP/BMC II.

3 DPP: Combine the TB2-5 connections from chassis A1 and A2 in 1 lug. Repeat for TB2-6 connections. Using red 16-22 AWG lugs, make the connections at the FSP. Secure with small ty-raps to hold the cable in place.

Note: At the A2 BMC II chassis, the BMC Temperature connection on pins 7 and 8 of the connector are the only connections used for the A2 chassis and are parallel connected to the A1 BMC temperature pins 7 and 8.

4 Cross-connect the NT0X10 alarms at the MDF/ITDF, as specified in the 1400 Job Specification. Refer to Figure 121 for wiring information.

Figure 121 – Wiring of Scan Card alarms - DPP/BMC II



DPP			MDF/ITDF	DMS	
DPP Alarm	Pin on J16 Connector on Chassis A	Alarm		Scan Point	NT0X10AA
Critical	1 and 3	Loop Closed	X	0	Loop Detect
Major	4 and 6	Loop Closed	X	1	Loop Detect
Minor	10 and 11	Loop Closed	X	2	Loop Detect

DPP Enhanced Alarm Cables - NT8M99AN

5 Prior to installing the Enhanced Alarm Cables, it is necessary that at least two NT0X10AA alarm scan groups are available. One dedicated scan circuit is required for each DPP. In addition, a total of three unused alarm scan points must be located. These scan points do not have to be located on the same NT0X10AA alarm scan group. Consult with your Technical Assistance Center (TAC) or job engineer to determine the scan cards and the corresponding scan points to be assigned.

Installation of the Enhanced Alarm Cables will begin at the IOE frame, terminate on the MDF for cross-connection to the NT0X10AA cards and then the cable will be attached to the DPP. Each scan point of the alarm cable will be tested prior to final termination to the frame.

6 Install NT8M99AN cable starting at the IOE frame to ensure the A1 P16 and A2 P16 connectors will reach ports J16 on both chassis of the DPP.

7 Route the 48 inch portion of the cable to the FSP of the IOE frame.

8 Wire wrap the leads of the 48 inch portion of the cable to the Power/Control and Alarm card in the FSP. Refer to Figure 122 for the termination points.

Figure 122 – Termination Points for DPP to Alarm Card

Wire Color	DPP Signal Name	FSP Signal Name	Wire Wrap Method	
			Designation	Pin Number
G(W)	A1ALM.COM	BR ABS	Power & Alarm 1 or 2	26
BL(R)	A2ALM.COM	BR ABS	Power & Alarm 1	26
W(G)	A1ALM.NO	CONV FAIL	Power & Alarm 1	6
R(BL)	A2ALM.NO	CONV FAIL	Power & Alarm 1	6

9 Route the 100-foot portion of the cable to the MDF. Figure 123 lists the cross-connections between six of the nine leads on the 100 foot end of cable NT8M99AN and the NT0X10AA scan card dedicated to the DPP. Wire-wrap the leads to the following scan points:

Figure 123 – DPP to NT0X10AA Cross-Connection

Wire Color	DPP Signal Name	Scan Point on NT0X10AA	Scan Lead	Dip Switch to be set to 'ON'
BL(W)	CALM.COM	0	SC1	1, 4
W(DL)	CALM.NO	0	SC2	
OR(W)	MJALM.COM	1	SC1	1, 4
W(OR)	MJALM.NO	1	SC2	
SL(W)	MNALM.COM	2	SC1	1, 4
W(SL)	MNALM.NO	2	SC2	

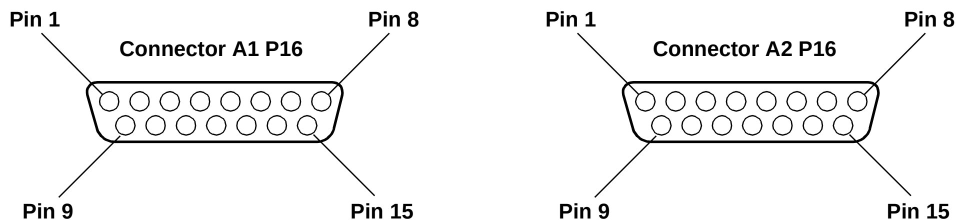
10 The remaining three leads on the cable must *not* be connected to the scan card (NT0X10AA) which is dedicated to the DPP because the remaining scan points on that card are locked out by the DMS software. These three leads can be connected to any other scan card provided that there are unused scan points. The three scan points do not need to be located on the same scan card. Check with customer or job engineer to determine the scan cards and corresponding scan points to be used. Wire-wrap the three leads as shown in Figure 124.

Figure 124 – DPP to Additional NT0X10AA Cross-Connection

Wire Color	DPP Signal Name	Scan Point on NT0X10AA	Scan Lead	Dip Switch to be set to 'ON'
W(G)	THERMAL A	3(GROUND DET)	SC2	None
R(BL)	THERMAL B	4(GROUND DET)	SC2	None
W(BR)	SYS.LOW VOLTAGE	5(GROUND DET)	SC2	None

11 The datafill for Tables ALMSCGRP must identify all of the scan groups to which leads were connected in the previous step. Alarms critical, Major and Minor are defined in Table DPP and controlled by DPP software. Alarms Thermal A, Thermal B, and Sys Low Volt are defined in Table ALMSC. Refer to Figure 123, Figure 124 and Figure 125 for the DPP Alarm Signal Names. Confirm that datafill exists in these two tables. If the datafill does not exist, coordinate with TAC/ITAS or the job engineer to determine the correct datafill for Tables ALMSCGRP and ALMSC. Refer to Figure 126 and Figure 127 for sample datafill for Tables ALMSCGRP and ALMSC.

Figure 125 – Wiring of Scan Card Alarms with Enhanced DPP Alarm Cables



Scan card NT0X10AA dedicated to DPP

DPP				MDF/ITDF	DMS	
DPP Alarm	**Connector**	**Pins**	**Alarm**		**Scan Point**	**NT0X10AA**
Critical	**A1 P16**	**1 and 3**	**Loop Closed**	**X**	**0**	**Loop Detect**
Major	**A1 P16**	**4 and 6**	**Loop Closed**	**X**	**1**	**Loop Detect**
Minor	**A1 P16**	**10 and 11**	**Loop Closed**	**X**	**2**	**Loop Detect**

For other scan card(s) NT0X10AA with available scan points

DPP				MDF/ITDF	DMS	
DPP Alarm	**Connector**	**Pin**	**Alarm**		**Scan Point**	**NT0X10AA**
Thermal A	**A1 P16**	**8**	**Ground Detect**	**X**	**3**	**Ground Detect**
Thermal B	**A2 P16**	**8**	**Ground Detect**	**X**	**4**	**Ground Detect**
Sys Low Volt	**A1 P16**	**13**	**Ground Detect**	**X**	**5**	**Ground Detect**

Figure 126 – Sample Datafill for Table ALMSCGRP

SCGROUP	TMTYPE	TMNO	TMCKTNO	CARDCODE
0	MTM	0	1	3X82AA
1	MTM	1	1	3X82AA
2	MTM	0	11	3X83AA
3	MTM	0	13	3X84AA
4	MTM	0	15	0X10AA
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
9	MTM	0	17	0X10AA

Figure 127 – Sample Datafill for Table ALMSC

FUNCTION	SCGROUP	POINT	NORMALST	RPT	ALM	LOGIC
DPP_THERMAL_A	9	3	0	Y	CR N	(CRALMAUD N N) (EXPILPWR N N) (PREFLRCR N N) (MJXFR N N) (SUCFLRCR Y N)$
DPP_THERMAL_B	9	4	0	Y	CR N	(CRALMAUD N N) (EXPILPWR N N) (PREFLRCR N N) (MJXFR N N) (SUCFLRCR Y N)$
DPP_SYS_LOW_VOLT	9	5	0	Y	CR N	(CRALMAUD N N) (EXPILPWR N N) (PREFLRCR N N) (MJXFR N N) (SUCFLRCR Y N)$

12 Perform Procedure 2 to test the alarm cable.

13 Clear all DPP alarms

14 From the rear of the IOE frame, attach the 'A1 P16' connector to the DPP *A* Chassis connector J16. Attach the 'A2 P16' connector to the DPP *B* chassis connector J16.

Procedure 2 – NT8M99AN DPP Alarm Cable Test

Step	Action	Observation
1	From the rear of the IOE frame, hold the 'A2 P16' connector. Short pins 7 and 8 to simulate a *B* Chassis thermal alarm.	a. Frame Fail Lamp illuminates on the FSP. b. Bay alarms, Lineup alarms and any other alarms related to the FSP's Frame Fail Lamp are set. c. On the MAP terminal, DPP_Thermal_B and any other alarms related to 'Scan Point 4' are displayed.
2	From the rear of the IOE frame, hold the 'A1 P16' connector. Short pins 7 and 8 to simulate an *A* Chassis thermal alarm.	a. Frame Fail Lamp illuminates on the FSP. b. Bay alarms, Lineup alarms and any other alarms related to the FSP's Frame Fail Lamp are set. c. On the MAP terminal, DPP_Thermal_A and any other alarms related to 'Scan Point 3' are displayed.

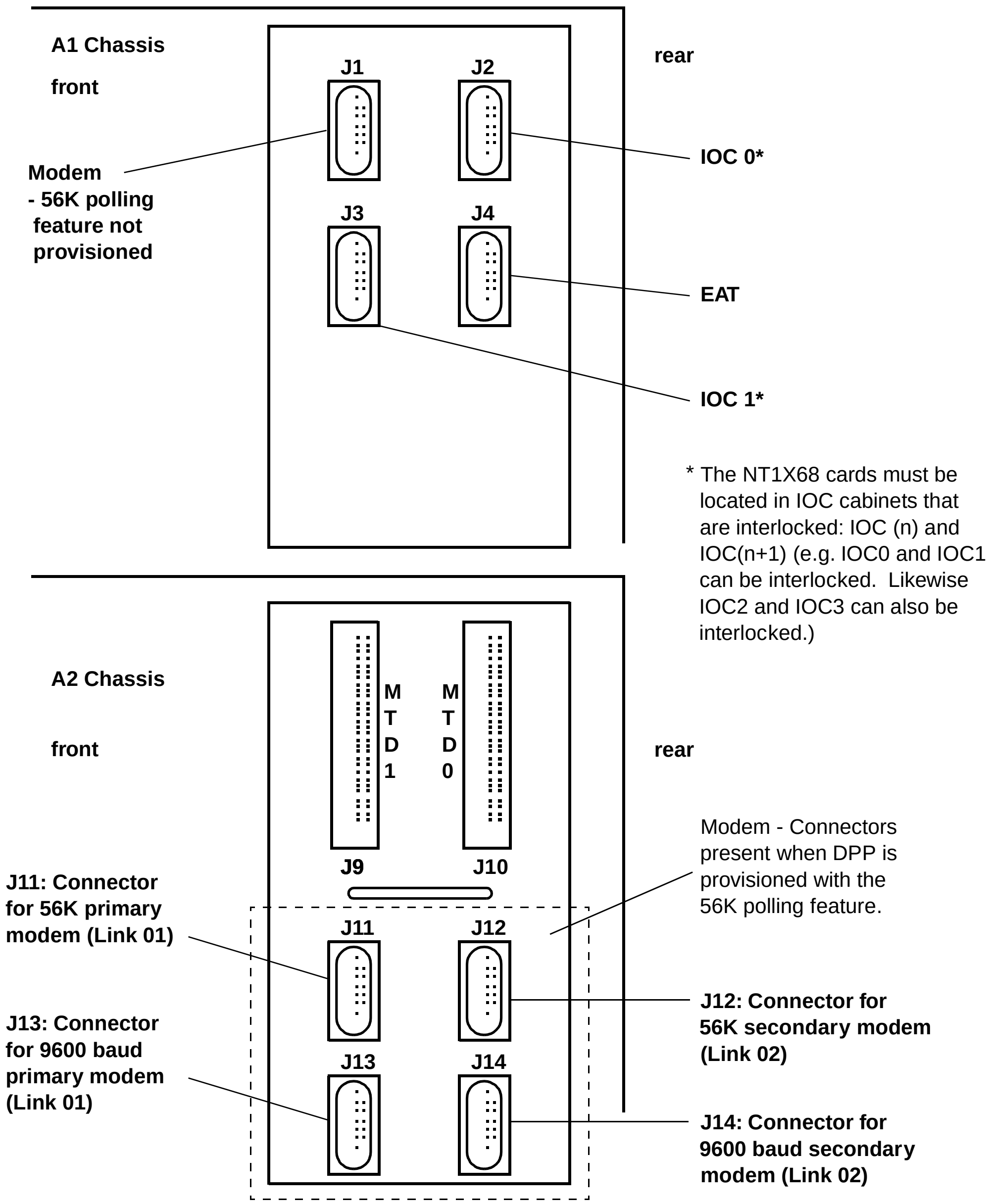
Procedure 2 – NT8M99AN DPP Alarm Cable Test (Cont'd)

3	From the rear of the IOE frame, hold the 'A1 P16' connector. Short pins 9 and 13 to simulate a Low Voltage alarm.	a. Frame Fail Lamp illuminates on the FSP. b. Bay alarms, Lineup alarms and any other alarms related to the FSP's Frame Fail Lamp are set. c. On the MAP terminal, DPP_SYS_LOW_VOLT and any other alarms related to 'Scan Point 5' are displayed.
4	From the rear of the IOE frame, hold the 'A1 P16' connector. Short pins 1 and 3.	On the MAP terminal, text for DPP_CALM and any other alarms related to 'Scan Point 0' are displayed.
5	From the rear of the IOE frame, hold the 'A1 P16' connector. Short pins 4 and 6.	On the MAP terminal, text for DPP_MJALM and any other alarms related to 'Scan Point 1' are displayed.
6	From the rear of the IOE frame, hold the 'A1 P16' connector. Short pins 10 and 11.	On the MAP terminal, text for DPP_MNALM and any other alarms related to 'Scan Point 2' are displayed.
7	END OF CABLE CONNECTIVITY TESTING.	

8.20 Connecting the Incoming Modem – DPP

1 The DPP utilizes a modem interface incorporating an incoming link conditioned to automatically receive calls from the Host Office Collector (HOC) and upon request to transmit data over the link to the host. Refer to Figure 128 for the location and designation of DPP chassis connectors.

Figure 128 – DPP NT8X48AD Left-Side Rear View Connectors



2 The method of connecting the polling modem is dependent upon the baud rate of the modem used and whether the DPP is or is not provisioned with the 56K polling feature. The DPP is equipped with the 56K polling feature if a 56K Interface PCB, NT6M94AA, is located in slots A7 and B7 (refer to Figure 128).

3 Use Option 1 for DPPs *not* provisioned with the 56K polling option. Use Option 2 for DPPs provisioned with the 56K polling hardware and using a 56K baud polling modem. Use Option 3 for DPPs provisioned with the 56K polling hardware when utilizing a 9600 baud modem.

4 Each option is intended to connect a dial-up modem which does not use a dial-back unit. The interface to dial-up modems, with an automatic call back unit, is the responsibility of the customer. The modem cable(s) should not be connected to the DPP if the incoming polling modem(s) is (are) not available; unterminated connections may cause ISG violations.

Option 1: DPPs not provisioned with the 56K polling feature.

- Locate the following supplied items:

  Modem cable NT8M99AG (provided with DPP) for connection between A1 chassis J1 connector and incoming modem (male DB-25 connector at either end).

- Attach one end of the modem cable to J1 connector on the A1 chassis. Route the other end neatly to the modem designated as the incoming call receiver, and attach to the DTE connector on the incoming modem.

Option 2: DPPs provisioned with the 56K polling feature and 56K baud modem.

- Locate the following supplied items:

  Modem cable - For Universal Data Systems modems and Datatel modems, the part number of the modem cable is NTNX36BG/BZ. For General Data Com and Amdahl Synt II modems, the modem cable part number is NTNX69AA.

- Attach one end of the modem cable to J11 (Link #1) connector on the A2 chassis. Route the other end neatly to the modem designated as the incoming call receiver, and attach to the "DTE" connector on the incoming modem.

  J12 or J14 (Link #2) can be utilized to interface a standby modem. J12 is utilized if the standby modem is 56K baud. J14 is utilized if the standby modem is 9600 baud. The standby modem can remain connected when not in use.

Option 3: DPPs provisioned with the 56K polling feature and 9600 baud modem.

- Locate the following supplied items:

  Modem cable NT8M99AG (provided with DPP) for connection between A2 chassis J13 connector and incoming modem (male DB-25 connector at either end).

- Attach one end of the modem cable to J13 (Link #1) connector on the A2 chassis. Route the other end neatly to the 9600 baud modem designated as the incoming call receiver, and attach to the DTE connector on the incoming modem.

  J14 (Link #2) can be utilized to interface a standby modem. The standby modem can remain connected when not in use.

5 Verify connection from the network to the modem.

6 Apply power to modem.

8.21 System Power Up – DPP

1 The following initial powerup procedure requires two field technicians: One to apply and remove -48V dc power and one to listen and observe initial start-up activities. Note any irregularities and be prepared to remove -48V dc power by removing the PDC fuses, if necessary.

Procedure 3 – System Powerup

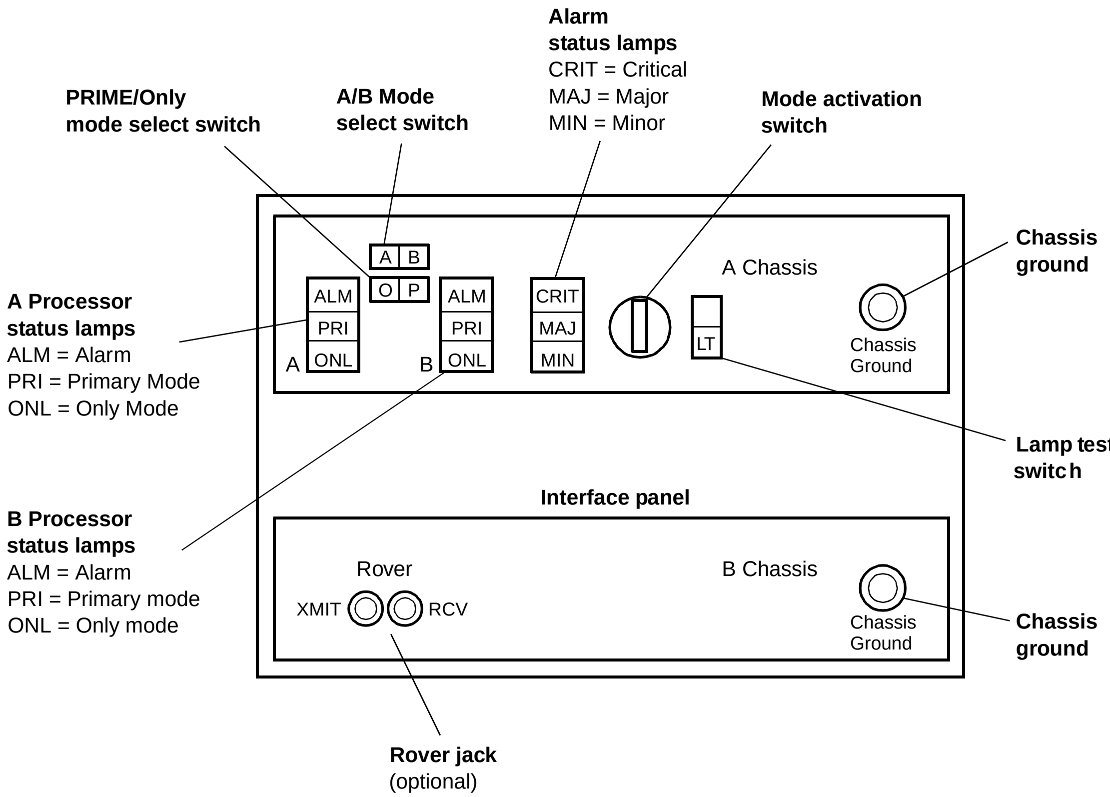
Step	Action	Observation
1	Verify that the -48V dc battery supply and ground connections are terminated properly between the DPP, FSP, and PDC.	Frame fail light on the FSP is lit.
2	Position each chassis power supply rocker switch to '0' (*OFF*) position.	
3	At the PDC, remove the 1-1/3 amp fuse from the A chassis feed fuse holder. Insert the 10-amp fuse in the fuse holder. Insert the A chassis fuse holder into the PDC to apply -48V dc power to the A chassis. Replace the 1-1/3 amp fuse in the A fuse holder.	Air is drawn in from the fan grill at the rear of the A1 chassis. Cooling fans reach a steady speed and do not vary in pitch. Disk drives "whirrs" mildly as internal disk begins to spin. Several seconds after power up, a solenoid may be heard.
4	Press the '1' (*ON*) side of the A1 chassis power supply rocker switch. Remove power, if any discrepancies are noted. Record the discrepancies and verify the installation to correct the trouble.	Some variety of status lamps on the Switch and Status Panel illuminate (refer to Figure 129). The lamp on disk drives are off or flash briefly and then turn off.
5	Press the '0' (*OFF*) side of the A1 chassis power supply rocker switch.	Lamps on the Switch and Status Panel extinguish.
6	At the PDC, remove the 1-1/3 amp fuse from the B chassis feed fuse holder. Insert the 10-amp fuse in the fuse holder. Insert the B chassis fuse holder into the PDC to apply -48V dc power to the B chassis. Replace the 1-1/3 amp fuse in the B fuse holder. Observe start-up activities as described in step 4. Remove power, if any discrepancies are noted.	

– continued –

Procedure 3 – System Powerup (Cont'd)		
7	Press the '1' (*ON*) side of the A2 chassis power supply rocker switch. Remove power, if any discrepancies are noted. Record the discrepancies and verify the installation to correct the trouble.	Some variety of status lamps on the Switch and Status Panel illuminate. The lamp on disk drives are off or flash briefly and then turn off.
8	Press the '1' (*ON*) side of the A1 chassis power supply rocker switch.	Frame fail light on the FSP extinguishes. The lamp on disk drives are off or flash briefly and then turn off. The status of the DPP is as follows: • -48V dc power is available. • Cooling fans are operating. • Some Status Panel lamps are on. • Disk drives are ready, but not operating (lamps are not on).
9	Establish an AP (A Prime) processor mode by setting the "A/B" rocker switch on the Switch and Status Panel to the *A* position and position the "O/P" rocker switch to the *P* position. Turn the mode activation switch 45 degrees clockwise and release.	

2 This completes the physical installation of the DPP. Proceed to Method 26-0459, "DPP Diagnostic and Functional Tests."

Figure 129 – DPP Switch and Status Panel



8.22 Connecting the BMC II Incoming Modem

1 The BMC II utilizes a modem interface incorporating an incoming link conditioned to automatically receive calls from the Host Office Collector (HOC) and upon request to transmit data (i.e., AMA call records) over the link to the Host billing center. Many systems are also equipped with a second (optional) modem, providing Automatic Dial-Up (ADU) which allows the BMC II to originate a call to the Host to request BMC II polling, if required, or to deliver maintenance messages.

2 The modems used must have unrestricted, direct dial phone lines for each link (modem) in the BMC II system.

3 The customer shall supply dedicated or DDD lines to each modem. Tip and ring connections will be run for each modem. For DDD lines, tag each tip/ring pair with the directory number for easy identification during later testing.

4 Modems should be located in nearest MIS bay to the IOE housing the BMC II. Modems must be located within 50-cable feet of the BMC II.

5 Modem speeds up to 56K may be used with the BMC II. Refer to Figure 130 for the location and designation of BMC II chassis connectors.

For non-56K polling applications, Rixon modems models 201, 208, and 208 A/B are recommended. Refer to Figure 131, Figure 132, and Figure 133 for appropriate modem option settings. Modems that have been factory tested and then shipped to user have these options already set.

Figure 130 – BMC II NT8M04 Left Side Rear View Connectors

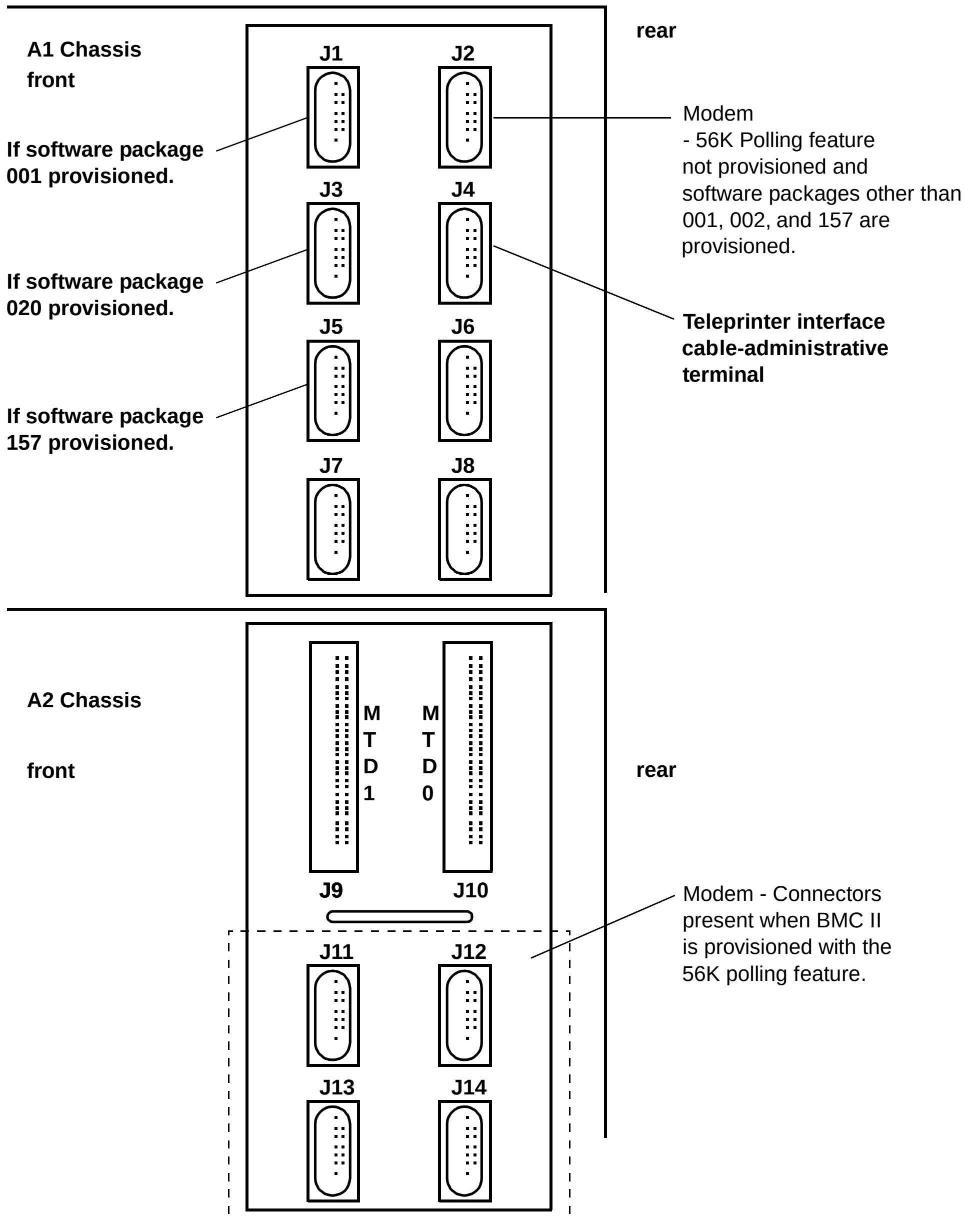


Figure 131 – Strapping Options for Rixon TA201A Modem

FEATURE DESCRIPTION	OPTION SELECTED
User Selected Options	
2-Wire DDD	
DIBIT RCV CLK to DTE Pin 18	IN
Auto Answer	Incoming Modems ENABLE/
	ADU Modems DISABLE
DSR OFF in Analog Loopback Mode	-
Abort Timer	IN
Telephone Type	500-565
CTS Delay	2-Wire Switched Carrier/
	150 msec CTS delay
Continuous Rcvr Bit Clk	IN
New Sync	Not Used
XMIT Timing	External
Anti Stream Control	Not Used
Customer Selected Options	
Satellite Option	IN
Ground Option	Closed
XMIT Line Sig. Level	0 dBm

Note: User is expected to select these options where required. Modems that have been factory tested and then shipped to user have these options already set.

Figure 132 – Strapping Options for Rixon T208 Modem

FEATURE DESCRIPTION	OPTION SELECTED
User Selected Options	
Compromise Equalizer	Amp-1+Sym
XMIT Timing	External
Remote Test Sampling	150 msec
DSR OFF in Analog Loopback Mode	-
One Second Hold Over	Enabled
New Sync	Not Used
Carrier Mode	Switched
CTS Delay	2-Wire Switched Carrier/
Data Modem Mode	B (DDD Switched Network)
Auto Answer	Incoming Modems ENABLE/
	ADU Modems DISABLE
RTS	Switched
RTS - CTS Delay	2-Wire Switched Carrier/
	150 msec CTS Delay
Abort Timer	Enabled
Telephone Type	500-565
Customer Selected Options	
XMIT Level Attenuator	0 dBm
Ground Option	Closed
Note: User is expected to select these options where required. Modems that have been factory tested and then shipped to user have these options already set.	

6 For 56K polling applications UDS DSU (D56), GDC A20-011/-014 (500C/56K) or A20/001/004(500C/56KD), and AT&T modems can be used.

Figure 133 – Strapping Options for Rixon TA208A/B Modem	
FEATURE DESCRIPTION	**OPTION SELECTED**
User Selected Options	
Modem Configuration	2-Wire DDD Switched Network
Auto Answer	Incoming Modems ENABLE/
	ADU Modems DISABLE
DSR OFF in Analog Loopback Mode	
XMIT Timing	External
Abort Timing	Enabled
Telephone Type	500-565
RTS - CTS Delay	150 msec CTS delay
New Sync	Not Used
50ms Push Button	IN
Remote Test Sampling	150 msec
Compromise Equalizer	Sym, 4db sloped
DAS Cntl of DSR	Not Used
Carrier Mode	Switched
1 Second Hold-over	Enabled
RTS	Switched
Customer Selected Options	
XMIT Level Attenuator	0 dBm
Ground Option	Closed (Connected)
Note: User is expected to select these options where required. Modems that have been factory tested and then shipped to user have these options already set.	

Note: Currently UDS modems are not compatible with the Automatic Dial-up (ADU) option and should not be used with BMC IIs that use that option.

7 Locate the following supplied items:

- Ribbon cable for connection between BMC II A1 chassis and the incoming modem (male DB-25 connector at either end).
- Female DB-25 connector and connector shell.

8 Attach one end of the ribbon cable to the appropriate bulkhead *J* connector on the right side of the A1 chassis as follows: for software packages 001, use connector J1; for software package 157, use connector J5; for software package 020, use connector J3; and for all other software packages, use connector J2. Neatly route the other end of the ribbon cable to the DTE connector on the incoming modem.

9 From the incoming phone link, attach the tip/ring pair to the female DB-25 connector, tip to pin 7 and ring to pin 8.

10 Assemble connector shell over female DB-25 connector, utilizing strain relief to assure adequate connection. Attach connector to the “TEL/LINE” connector on incoming modem.

11 Apply power to modem.

Caution: Under *no* circumstances should an unterminated modem cable be connected to the BMC II while power is *ON*. Attach wires to the modem end of the cable before connecting the BMC II end of the cable.

12 The method of connecting the polling modem is dependent upon the baud rate of the modem used and whether the BMC II is or is not provisioned with the 56K polling feature. The BMC II is equipped with the 56K polling feature if a 56K Interface PCB, NT6M94AA, is located in slot 7 of both the A1 and A2 chassis (refer to Figure 109 and Figure 110).

Use Option 1 below for BMC IIs *not* provisioned with the 56K polling option. Use Option 2 for BMC IIs provisioned with the 56K polling hardware and using a 56K baud polling modem. Use Option 3 for modems up to 9600 baud.

Each option is intended to connect a dial-up modem which does not use a dial-back unit. The interface to dial-up modems, with an automatic call back unit, is the responsibility of the customer. The modem cable(s) should not be connected to the BMC II if the incoming polling modem(s) is (are) not available; unterminated connections may cause ISG violations.

Option 1: BMC IIs not provisioned with the 56K polling feature.

Locate the following supplied items:

- J connector or modem cable kit NT6M96AB (provided with BMC II) for connection between A1 chassis J2 connector and incoming modem (male DB-25 connector at either end).
- Attach one end of the modem cable to connector J1 for software package 001, or connector J3 for software package 020, or connector J5 for software package 157, or connector J2 for all other software packages on the A1 chassis. Route the other end neatly to the modem designated as the incoming call receiver, and attach to the DTE connector on the incoming modem.

Option 2: BMC IIs provisioned with the 56K polling feature and 56K baud modem.

Locate the following supplied items:

- Modem cable - For Universal Data Systems modems and Datatel modems, the part number of the modem cable is NTNX36BG/BZ. For General Data Com and Amdahl Synt II modems, the modem cable part number is NTNX69AA. For an AT&T modem, the cable part number is NTNX69AD.
- Attach one end of the modem cable to J11 (Link #1) connector on the A2 chassis. Route the other end neatly to the modem designated as the incoming call receiver, and attach to the "DTE" connector on the incoming modem.
- J12 or J14 (Link #2) can be utilized to interface a standby modem. J12 is utilized if the standby modem is 56K baud. J14 is utilized if the standby modem is 9600 baud or lower. The standby modem can remain connected when not in use.

Option 3: BMC IIs provisioned with the 56K polling feature and a modem up to 9600 baud.

Locate the following supplied items:

- Modem cable NT8M99AG or NT6M96AB modem cable kit (provided with BMC II) for connection between A2 chassis J13 connector and incoming modem (male DB-25 connector at either end).
- Attach one end of the modem cable to J13 (Link #1) connector on the A2 chassis. Route the other end neatly to the 9600 baud modem designated as the incoming call receiver, and attach to the DTE connector on the incoming modem.
- J14 (Link #2) can be utilized to interface a standby modem. The standby modem can remain connected when not in use.

13 Verify connection from the network to the modem.

14 Apply power to modem.

> ***Caution:*** Under *no* circumstances should an unterminated modem cable be connected to the BMC II while power is *ON*. Attach wires to the modem end of the cable before connecting the BMC II end of the cable.

8.23 Connecting ADU (Optional) Modem Interface

If the BMC II system is being installed is equipped with the ADU option, install the ADU modem as follows:

1 Locate the following supplied items:

- Ribbon cable for connection between the BMC II A1 chassis and the ADU modem (male DB-25 connector either end).
- ADU control cable for connection between the BMC II A1 chassis and the ADU modem (female DB-25 connector on one end and male on the other).
- Male Db-25 connector and connector shell.

2 Attach one end of ribbon cable to J1 connector of bulkhead of BMC II A2 chassis. Route ribbon cable neatly to the modem designated as the originating (or ADU) modem and attach it to DTE connector.

3 Using the ADU control cable, attach the male DB-25 connector end to J6 on the bulkhead (right side) of the BMC II A1 chassis. Neatly route this cable to the ADU modem and attach the female DB-25 end to the "TEL/LINE" connector.

4 Apply power to the modem.

5 Using the male DB-25 connector provided, attach the tip/ring pair so that TIP is connected to pin 7 and RING to pin 8.

6 Using the connector shell provided, assemble the shell over the DB-25 connector. Utilize strain relief devices for proper connection. Attach the connector to J5 of the right side of the bulkhead of the BMC II A1 chassis.

8.24 Connecting the Maintenance Terminal

1 The BMC II has a single maintenance printer to provide Human-Machine communications. Communications with the BMC II include entering or changing site dependent data, requesting certain system operations, output of statistical reports, and providing maintenance and log messages that indicate system operation.

2 Interface for testing and maintenance of the BMC II is achieved by way of a TI-820 or compatible model 43/53 terminal printer. Regardless of which printer is used, it must be of EIA RS232 operation and located within 50 feet of the BMC II.

3 The dedicated printer will connect to J4 of the bulkhead connector plate on the right side (front view) of the A1 BMC II chassis. Refer to Figure 130.

4 If a TI-820 printer is used, run the supplied NT8M99AB/AM cable from J4 of the A1 BMC II chassis to the TTY connector on the printer and secure. Route the cable neatly and safely to avoid possible disconnection during testing.

5 Ensure the following terminal keys are depressed: CAPS LOCK, PARITY, and DUPLEX.

6 Prior to testing either printer or modems, set the Baud rate selector switches on the QUAD SIO circuit packs in both BMC II chassis as outlined in Method 26-0453, "BMC II Functional Tests."

7 After connecting the printer to the BMC II, refer to the user's manual for power up, initial setting, and testing of TI-820 KSR printer.

8 If a model 43 or 53 teletype is used, attach the end of the EIA cable supplied with the BMC II labeled "XOVR," to J4 of the A1 chassis bulkhead.

9 Neatly route the other end of the EIA cable labeled TTY to the corresponding connector at the rear of the local printer.

10 After local terminal cabling is completed, test the 43/54 terminal as follows:

a. Assemble printer stand, if supplied, and mount printer.

b. Load paper and test in a local mode according to manufacturer's instructions.

c. Ensure the following terminal keys are depressed: CAPS LOCK, PARITY, and DUPLEX.

d. Depress DATA key. Normally DATA and INTERRUPT lamps are *ON*. However, in some cases the INTERRUPT lamp may be *OFF*.

8.25 System Powerup – BMC II

1 The following initial powerup procedure requires two persons: One to apply and remove -48V dc power and one to listen and observe initial start-up activities. Note any irregularities and be prepared to remove -48V dc power by removing the PDC fuses, if necessary.

Caution: Power up sequence requires approximately twenty-five to thirty seconds before system accepts user entry. When power down is necessary, disk drives must be left untouched for at least thirty seconds; vibration during power down may damage disk assembly.

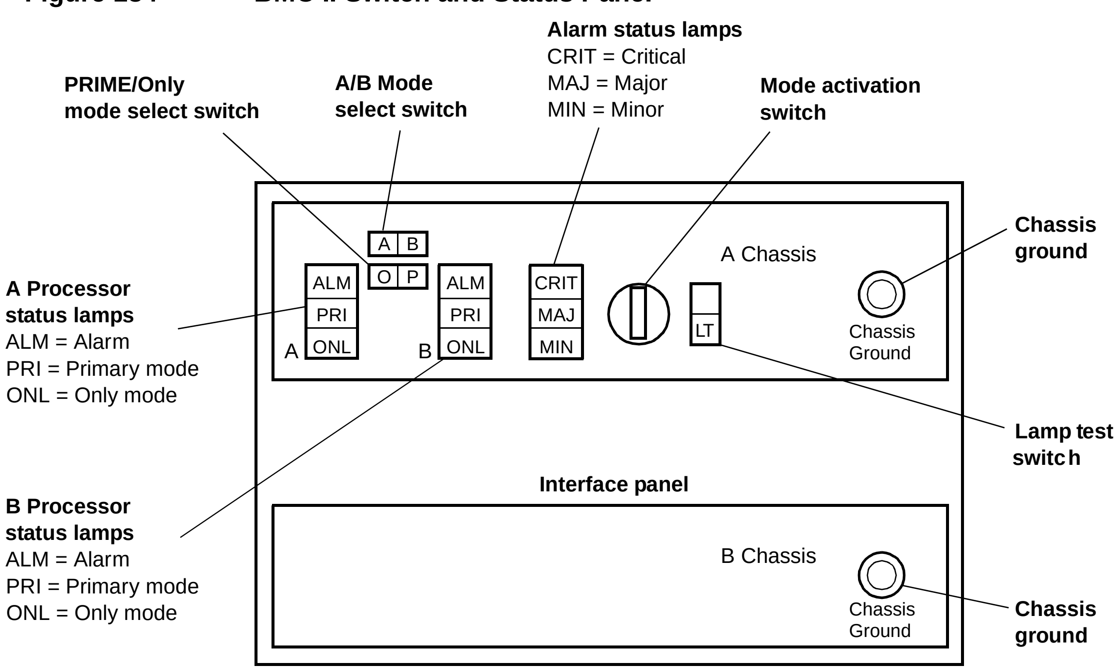
Procedure 4 – System Powerup

Step	Action	Observation
1	Verify that the -48V dc battery supply and ground connections are terminated properly between the BMC II, FSP, and PDC.	Frame fail light on the FSP is lit.
2	Position each chassis power supply rocker switch to '0' (*OFF*) position.	
3	At the PDC, remove the 1-1/3 amp fuse from the *A* chassis feed fuse holder. Insert the 10-amp fuse in the fuse holder. Insert the *A* chassis fuse holder into the PDC to apply -48V dc power to the *A* chassis. Replace the 1-1/3 amp fuse in the *A* fuse holder.	Air is drawn in from the fan grill at the rear of the A1 chassis. Cooling fans reach a steady speed and do not vary in pitch. Disk drives "whirs" mildly as internal disk begins to spin. Several seconds after power up, a solenoid may be heard.
4	Press the '1' (*ON*) side of the A1 chassis power supply rocker switch. Remove power, if any discrepancies are noted. Record the discrepancies and verify the installation to correct the trouble.	Some variety of status lamps on the Switch and Status Panel illuminate (refer to Figure 134). The lamp on disk drives are off or flash for several seconds and then turn off.
5	Press the '0' (*OFF*) side of the A1 chassis power supply rocker switch.	Lamps on the Switch and Status Panel extinguish.
6	At the PDC, remove the 1-1/3 amp fuse from the *B* chassis feed fuse holder. Insert the 10-amp fuse in the fuse holder. Insert the *B* chassis fuse holder into the PDC to apply -48V dc power to the *B* chassis. Replace the 1-1/3 amp fuse in the *B* fuse holder. Observe start-up activities as described in step 4. Remove power, if any discrepancies are noted.	

Procedure 4 – System Powerup (Cont'd)

7	Press the '1' (*ON*) side of the A2 chassis power supply rocker switch. Remove power, if any discrepancies are noted. Record the discrepancies and verify the installation to correct the trouble.	Some variety of status lamps on the Switch and Status Panel illuminate. The lamp on disk drives are off or flash and then turn off.
8	Press the '1' (*ON*) side of the A1 chassis power supply rocker switch.	Frame fail light on the FSP extinguishes. The lamp on disk drives are off or flash briefly and then turn off. The status of the BMC II is as follows: • -48V dc power is available. • Cooling fans are operating. • Some Status Panel lamps are on. • Disk drives are ready, but not operating (lamps are not on).
9	Establish an A Prime (AP) processor mode by setting the "A/B" rocker switch on the Switch and Status Panel to the *A* position and position the "O/P" rocker switch to the *P* position. Turn the mode activation switch 45 degrees clockwise and release.	

Figure 134 – BMC II Switch and Status Panel



2 This completes the physical installation of the BMC II. Proceed to Method 26-0453, "BMC II Functional Tests."

9.0 Speech Link Connecting and Digital Network Interconnect (SLC/DNI) Frame

9.1 Assembly of SLC and DNI Frame

1. NT0X31AE or NT0X31AK cable troughs are required on the SLC and DNI frames. Refer to job specifications for the cable trough to be used.

2. Connect the frame ground cable from the frame to the horizontal frame ground bar located on the cable trough.

9.2 Cabling of SLC Frame

Caution: A static charge will build up in cables when they are run along the cable rack and/or in cable troughs. When such a cable is connected to a working circuit, the charge in the cable will damage the circuit and also damage the adjacent circuit pack.

If a new peripheral is being added to an office with the links to an inservice 8X11 network during an extension, the following ESD precautions must be taken:

a. Before connecting new cables to the PSL connector, ensure that the new patchcord for the assigned port is not installed yet or that the old one, if present, has been removed.

b. During the PM redistribution, strictly adhere to the procedure described in Method 70-5090, "PM Redistribution," Subsection 3.1, paragraph 8.

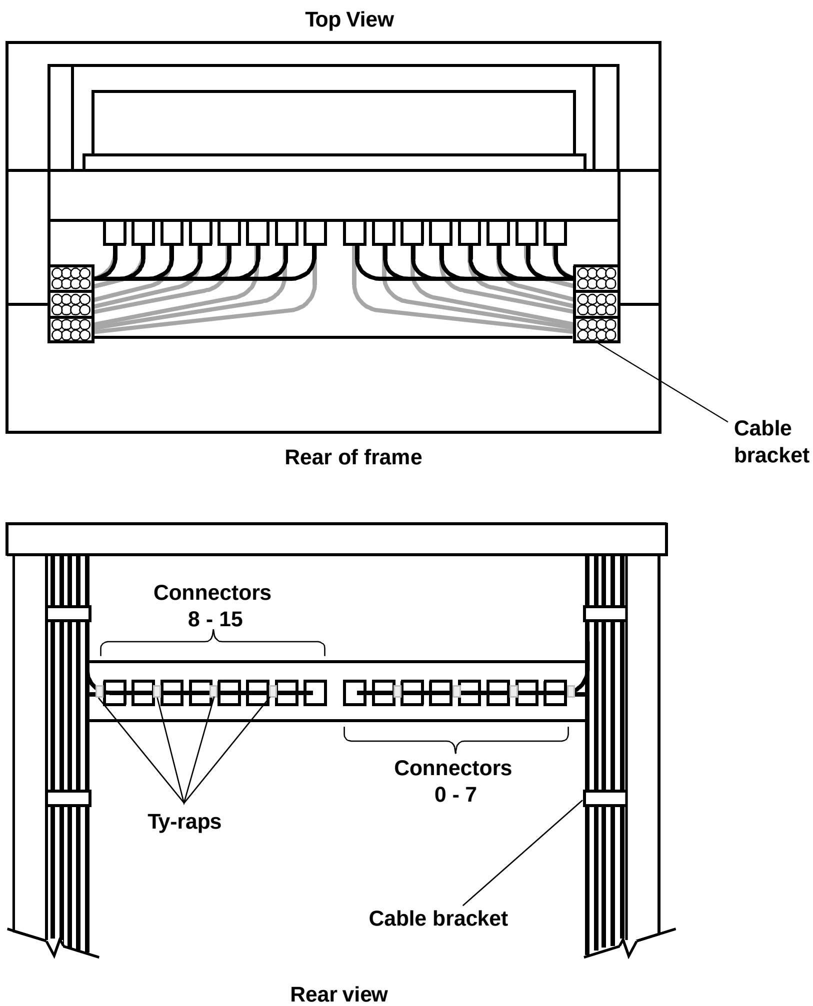
1. Route the cables down the right, rear upright for cables going to connectors 0 through 7. Route cables down the left, rear upright for cables going to connectors 8 through 15.

2. Use ty-raps and secure the cables to the cable bracket. The very first (top) bracket on the upright should be sewn using twine.

3. The cable bracket is separated into three sections. Route cables going to the top third of the frame in the inside section (closest to the front), cables going to the middle third of the frame in the middle section, and cables going to the bottom third in the outside section (closest to the rear of the frame).

4. Dress and form cables across the network and peripheral units using ty-raps at alternate breakouts. Refer to Figure 135 for routing of cables.

Figure 135 – SLC Frame Cabling

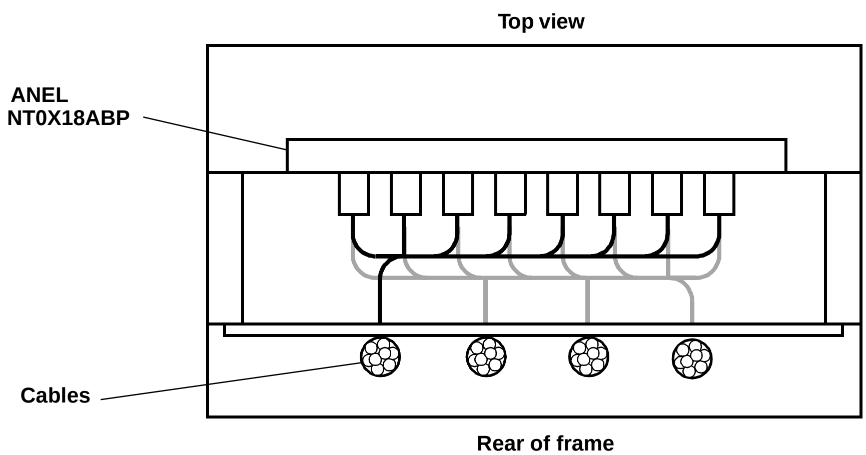


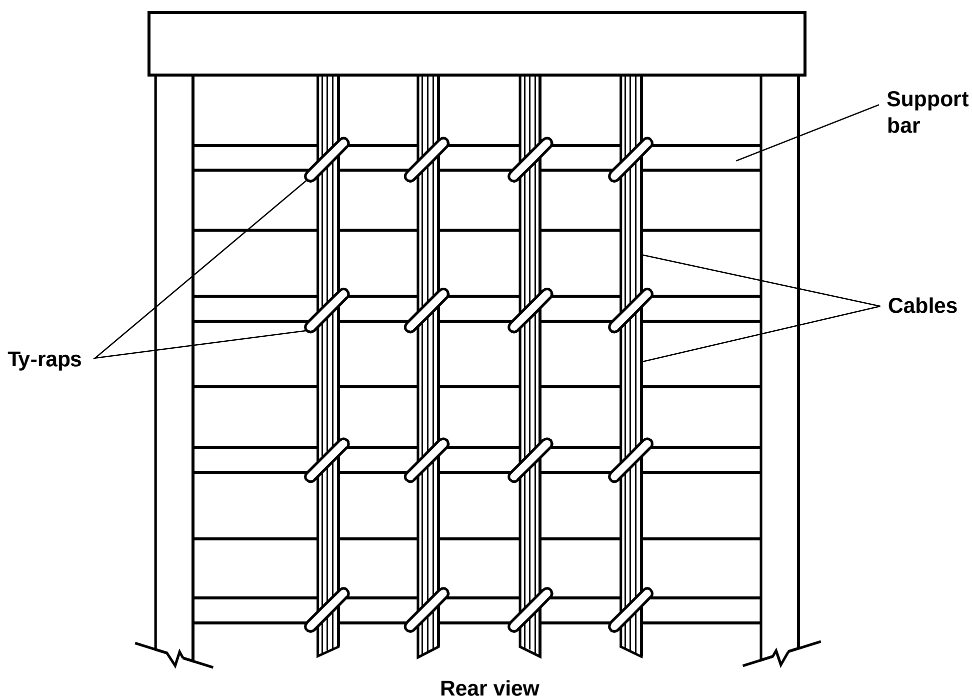
9.3 Cabling of DNI Frame

1 The cables are to be formed into four groups of cables. Each group of cables will serve eight connectors per panel.

2 Two groups are to be routed from the left side of the bay and two groups from the right side of the bay. Form the cables under the cable trough and down to their respective connectors. The cables are to be routed on the outside of the support bars. Secure the cables to the support bars with ty-raps. If the DNI bay is at the end of the lineup, all four groups of cables enter from the side opposite the end guard. Refer to Figure 136 for routing of cables.

Figure 136 – DNI Frame Cabling





9.4 Patchcords

1 Patchcords are used on the front of the frame and may be run to the left or to the right. Patch cord slack should be stored horizontally. Do *not* re-form slack.

2 The following table provides the list of SLC patchcords for cross-connecting from NSL panel NT0X56AB to PSL panel NT0X56AC. These would be found in the older offices.

ITEM NO.	LENGTH	CONNECTOR COLOR	ENGIN. CODE	CPC CODE	ITEM NO.	LENGTH	CONNECTOR COLOR	ENGIN. CODE	CPC CODE
1	0.15M	BLUE	NE-P4QE	A0265763	31	4.72M	RED	NE-P4QAP	A0265793
2	0.30M	YELLOW	NE-P4QF	A0265764	32	4.88M	ORANGE	NE-P4QAR	A0265794
3	0.46M	BLACK	NE-P4QG	A0265765	33	5.03M	BLUE	NE-P4QAS	A0265795
4	0.61M	RED	NE-P4QH	A0265766	34	5.18M	GREEN	NE-P4QAT	A0265796
5	0.76M	GREEN	NE-P4QJ	A0265767	35	5.33M	WHITE	NE-P4QAU	A0265797
6	0.91M	WHITE	NE-P4QK	A0265768	36	5.49M	VIOLET	NE-P4QAW	A0265798
7	1.07M	ORANGE	NE-P4QL	A0265769	37	5.64M	YELLOW	NE-P4QAX	A0265799
8	1.22M	BLUE	NE-P4QM	A0265770	38	5.79M	BROWN	NE-P4QAY	A0265800
9	1.37M	VIOLET	NE-P4QN	A0265771	39	5.94M	BLACK	NE-P4QBA	A0265801
10	1.52M	YELLOW	NE-P4QP	A0265772	40	6.10M	RED	NE-P4QBB	A0265802
11	1.68M	BROWN	NE-P4QR	A0265773	41	6.25M	ORANGE	NE-P4QBC	A0265803
12	1.83M	BLACK	NE-P4QS	A0265774	42	6.40M	BLUE	NE-P4QBD	A0265804
13	1.98M	RED	NE-P4QT	A0265775	43	6.55M	GREEN	NE-P4QBE	A0265805
14	2.13M	ORANGE	NE-P4QU	A0265776	44	6.71M	WHITE	NE-P4QBF	A0265806
15	2.29M	BLUE	NE-P4QW	A0265777	45	6.86M	VIOLET	NE-P4QBG	A0265807
16	2.44M	GREEN	NE-P4QX	A0265778	46	7.01M	YELLOW	NE-P4QBH	A0265808
17	2.59M	WHITE	NE-P4QY	A0265779	47	7.16M	BROWN	NE-P4QBJ	A0265809
18	2.74M	VIOLET	NE-P4QAA	A0265780	48	7.32M	BLACK	NE-P4QBK	A0265810
19	2.90M	YELLOW	NE-P4QAB	A0265781	49	7.47M	RED	NE-P4QBL	A0265811
20	3.05M	BROWN	NE-P4QAC	A0265782	50	7.62M	ORANGE	NE-P4QBM	A0265812
21	3.20M	BLACK	NE-P4QAD	A0265783	51	7.77M	BLUE	NE-P4QBN	A0265813
22	3.35M	RED	NE-P4QAE	A0265784	52	7.92M	GREEN	NE-P4QBP	A0265814
23	3.51M	GREEN	NE-P4QAF	A0265785	53	8.08M	WHITE	NE-P4QBR	A0265815
24	3.66M	WHITE	NE-P4QAG	A0265786	54	8.23M	VIOLET	NE-P4QBS	A0265816
25	3.81M	ORANGE	NE-P4QAH	A0265787	55	8.38M	YELLOW	NE-P4QBT	A0265817
26	3.96M	BLUE	NE-P4QAJ	A0265788	56	8.53M	BROWN	NE-P4QBU	A0265818
27	4.11M	VIOLET	NE-P4QAK	A0265789	57	8.69M	BLACK	NE-P4QBW	A0265819
28	4.27M	YELLOW	NE-P4QAL	A0265790	58	8.84M	RED	NE-P4QBX	A0265820
29	4.42M	BROWN	NE-P4QAM	A0265791	59	8.99M	ORANGE	NE-P4QBY	A0265821
30	4.57M	BLACK	NE-P4QAN	A0265792	60	9.14M	BLACK	NE-P4QCA	A0265822

3 The following table provides the list of SLC patchcords required to make cross-connections from NSL panel NT0X56AB/BB to PSL panel NT0X56BC/AC respectively. These also will be used on extension jobs.

ITEM NO.	LENGTH	CONNECTOR COLOR	ENGINEERING CODE	CPC CODE
1	0.61M	WHITE	NE-P4QEH	A0289630
2	0.91M	YELLOW	NE-P4QEJ	A0289631
3	1.22M	ORANGE	NE-P4QEK	A0289632
4	1.52M	RED	NE-P4QEL	A0289633
5	1.98M	GREEN	NE-P4QEM	A0289634
6	2.44M	BROWN	NE-P4QEN	A0289635
7	3.05M	WHITE	NE-P4QEP	A0289636
8	4.57M	YELLOW	NE-P4QER	A0289637
9	6.10M	ORANGE	NE-P4QES	A0289638
10	7.62M	RED	NE-P4QET	A0289639
11	9.14M	GREEN	NE-P4QEU	A0289640

4 The following table lists patchcords for making cross-connections from NSL panel NT0X56BB to PSL panel NT0X56BC. These the most current patchcords available.

ITEM NO.	LENGTH	CONNECTOR COLOR	ENGINEERING CODE	CPC CODE
1	0.61M	WHITE	NE-P4QDK	A0289611
2	0.91M	YELLOW	NE-P4QDL	A0289612
3	1.22M	ORANGE	NE-P4QDM	A0289613
4	1.52M	RED	NE-P4QDN	A0289614
5	1.98M	GREEN	NE-P4QDP	A0289615
6	2.44M	BROWN	NE-P4QDR	A0289616
7	3.05M	WHITE	NE-P4QDS	A0289617
8	4.57M	YELLOW	NE-P4QDT	A0289618
9	6.10M	ORANGE	NE-P4QDU	A0289619
10	7.62M	RED	NE-P4QDW	A0289620
11	9.14M	GREEN	NE-P4QDX	A0289621

5 The DNI patchcords listed in the following table are used when cross-connecting from NJC panel NT0X18CA/CC to NJC panel NT0X18CA/CC, respectively. The cords will be used on extension installations.

ITEM NO.	LENGTH	CONNECTOR COLOR	ENGINEERING CODE	CPC CODE
1	0.15M	BLUE	NE-P4QCB	A0273266
2	0.30M	YELLOW	NE-P4QCC	A0273267
3	0.46M	BLACK	NE-P4QCD	A0273268
4	0.61M	RED	NE-P4QCE	A0273269
5	0.76M	GREEN	NE-P4QCF	A0273270
6	0.91M	WHITE	NE-P4QCG	A0273271
7	1.07M	ORANGE	NE-P4QCH	A0273272
8	1.22M	BLUE	NE-P4QCJ	A0273273
9	1.37M	VIOLET	NE-P4QCK	A0273274
10	1.52M	YELLOW	NE-P4QCL	A0273275
11	1.68M	BROWN	NE-P4QCM	A0273276
12	1.83M	BLACK	NE-P4QCN	A0273277
13	1.98M	RED	NE-P4QCP	A0273278
14	2.13M	ORANGE	NE-P4QCR	A0273279
15	2.29M	BLUE	NE-P4QCS	A0273280
16	2.44M	GREEN	NE-P4QCT	A0273281
17	2.59M	WHITE	NE-P4QCU	A0273282
18	2.74M	VIOLET	NE-P4QCW	A0273283
19	2.90M	YELLOW	NE-P4QCX	A0273284
20	3.05M	BROWN	NE-P4QCY	A0273285
21	3.20M	BLACK	NE-P4QDA	A0273286
22	3.35M	RED	NE-P4QDB	A0273287
23	3.51M	GREEN	NE-P4QDC	A0273288
24	3.66M	WHITE	NE-P4QDD	A0273289

6 The DNI patchcords listed in the following table below are used when cross-connecting from NJC panel NT0X18CA/CC to NJC panel NT0X18DB/DC/DD. These are cords that would be used on extension installations.

ITEM NO.	LENGTH	CONNECTOR COLOR	ENGINEERING CODE	CPC CODE
1	0.61M	WHITE/BLACK	NE-P4QEW	A0289641
2	0.91M	YELLOW/BLACK	NE-P4QEX	A0289642
3	1.22M	ORANGE/BLACK	NE-P4QEY	A0289643
4	1.52M	RED/BLACK	NE-P4QFA	A0289644
5	1.98M	GREEN/BLACK	NE-P4QFB	A0289645
6	2.44M	BROWN/BLACK	NE-P4QFC	A0289646
7	3.05M	WHITE/BLACK	NE-P4QFD	A0289647
8	4.57M	YELLOW/BLACK	NE-P4QFE	A0289648

7 The following DNI patchcords are the most recent and are used for cross-connecting from NJC panel NT0X18DB/DC/DD to NJC panel NT0X18DB/DC/DD. These will be used on the initial installations.

ITEM NO.	LENGTH	CONNECTOR COLOR	ENGINEERING CODE	CPC CODE
1	0.61M	WHITE/BLACK	NE-P4QDY	A0289622
2	0.91M	YELLOW/BLACK	NE-P4QEA	A0289623
3	1.22M	ORANGE/BLACK	NE-P4QEB	A0289624
4	1.52M	RED/BLACK	NE-P4QEC	A0289625
5	1.98M	GREEN/BLACK	NE-P4QED	A0289626
6	2.44M	BROWN/BLACK	NE-P4QEE	A0289627
7	3.05M	WHITE/BLACK	NE-P4QEF	A0289628
8	4.57M	YELLOW/BLACK	NE-P4QEG	A0289629

10.0 Double Shelf Network Equipment (DSNE) Frames

10.1 DNSE Overview

1 The information contained in this section covers requirements and procedures for the installation of Double Shelf Network Equipment (DSNE) Frames.

2 Information is also provided which describes the installation of a second network module pair to a DSNE frame, which was previously installed with only one network module pair. The requirements covered in this section shall be followed, except as modified, by applicable specifications and/or drawings.

3 The DSNE frame is a standard DMS-100 style frame. NT8X11 shelves occupy this frame.

10.2 DSNE Specific Precautions and Preparations

1 Install all network and PM cabling and SLC patchcords with the new networks and PMs powered down.

2 The addition of a second network module pair in a live DSNE frame should be performed during a low traffic period. Use ***Caution*** when performing wiring operations to avoid a service outage.

3 When installing a second network module pair, check each of the terminal connectors on the new NT8X1101 shelves (DSNE Frame) for proper torque (refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements") before each shelf is installed in the frame.

4 Also, check that all associated battery and battery return power cables between the PDC and the DSNE FSP are installed per the D640 drawing for the DSNE frame receiving the new shelves. The fuse positions in the PDC associated with the DSNE shelf locations should not be fused.

5 Use ***Caution*** when performing wiring operations to avoid a service outage.

6 Observe all precautions when working on live equipment, as outlined in Method 02-0802, "Extension Precautions and Emergency Contacts."

7 Consult the ETAS Warning Bulletin Index, the DMS-100 Family Installation Alert Index (NTI jobs), and the DMS Bulletin Index (NTC jobs) for any special instructions and warnings related to network extensions.

8 Refer to Event 06 (Method 03-9056), "Grounding," for DSNE frame grounding.

10.3 DSNE Configuration and Power Cabling

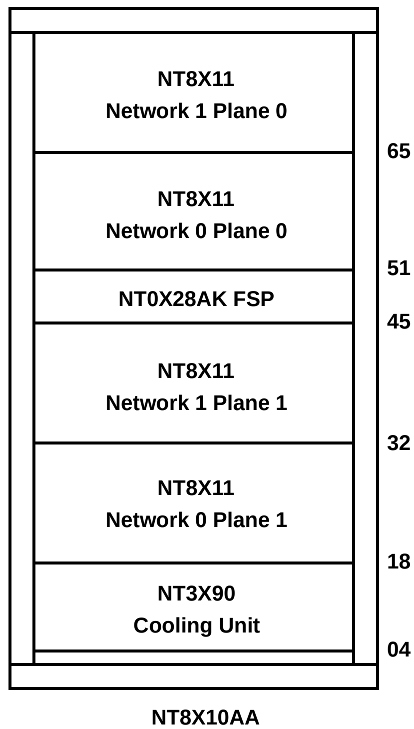
1 The Double Shelf Network Equipment Frame (NT8X10AA) is a single bay. The frame can be equipped with one network or two networks; the upper pair of shelves is designated as Plane 0 and the lower pair of shelves is designated as Plane 1.

2 There is an FSP (NT0X28AK) which is common to both planes. Route the cables from PDC down and secure to the left upright to FSP, viewed from rear. Form them into the FSP as per Event 7 (Method 03-9057), "General Cabling and Torque Requirements."

Form and secure -48V cables along the top of FSP and BR along the bottom of FSP. Install the lugs after all forming and securing is completed. Connect -48V cables to TB1 terminals 1-4, top screw. Connect BR cables to TB1 terminals 5-8, bottom screw.

3 An NT3X90 Fan is located in position 04. Refer to Figure 137 for an illustration of the DSNE frame.

Figure 137 – DSNE Frame Configuration



10.4 Addition of Second Network Module

1. If a second network module pair NT8X11AB is to be added to a previously installed DSNE frame, continue with this subsection; otherwise, skip ahead to the next subsection.

2. Remove the filler panels located in shelf positions 32 and 65 of the DSNE frame, and the bay doors at the rear of the frame.

3. Locate the three logic ground terminals on the left side of the backplane of each NT8X1101 shelf to be added. Refer to Figure 141.

   Connect three NT0X9538 ground straps to the shelf for position 32. Connect two NT0X9538 ground straps to the bottom and center logic ground terminals to the shelf for position 65. Connect one NT0X9501 ground strap to the top logic ground terminal to the shelf for position 65.

   Torque each ground strap connection to its proper torque value with the torque screwdriver tool. Refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements." Tape all exposed ends of the NT0X95xx ground straps to be mounted to the logic ground bar.

4. Carefully insert the NT8X1101 shelf into shelf position 32 and secure it with four 5/16" screws. Use a star washer on the lower left corner 5/16" mounting screw.

5. Carefully insert and secure the second NT8X1101 shelf into position 65. Use a star washer on the lower left corner mounting 5/16" screw.

6 Connect each ground terminal to the vertical logic bus bar with an NT0X95 ground strap. Ensure electrical tape has been removed at this time. Torque each ground strap connection to its proper torque value with the torque screwdriver tool. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements." Do *not* drop any washers, nuts, or tools into the backplane of the inservice network module.

10.5 Power Cabling of Additional Network Module

1 Ensure power converters are not installed in shelves requiring wiring.

2 With green 26 gauge wire, connect the converter drive and alarm leads from pins at slot position 25 of the shelf to pins on TS1 and TS2 on the FSP. Refer to Figure 147 for Network Shelf to FSP Connections, for connectivity tables for each shelf. Run the wires vertically, just to the left of slot position 25, and form horizontally across to the FSP.

3 When adding a second network module to a live DSNE frame, with a digital voltmeter ensure there is no battery potential on TB1-9 and 12 with respect to ground.

If, for some reason, the top terminal on TB1-5 and 8 are occupied with a battery return lead running to the PDC ground panel, it is necessary to move these connections to the bottom terminal of TB1. A temporary connections must be made that will ensure continuity of the ABS return prior to moving the cable. Refer to paragraphs 4 through 7.

The battery return stud of each existing shelf must be strapped temporarily to the logic return bar. Use two 6 inch jumper cables with insulated clips, and connect one end to PC BR stud of the shelf and the other to logic return bar.

4 There are two versions of ABS multiples:

a. The older where the -48V and BR #14 cables are multiplied from PDC and from frame to frame, TB2-1, 2 (-48V) and TB2-3, 4 (BR) to the end of the lineup and then looped back to PDC.

b. The newer where only the -48V (TB2-1, 2) is multiplied from PDC and from frame to frame to the end of the lineup then looped back to PDC, the BR (TB2-3) is strapped to TB1-8.

5 If paragraph 4a version is encountered, there is no need for ABS back up strap.

However, in the case of paragraph 4b version, perform the following:

a. Use a C001444 80 foot cable and tape both ends. Route the cable by way of the cable troughs or cable racks from the DSNE frame to the closest available and undisturbed ground plate or if necessary to the PDC ground plate.

b. At the ground plate, remove the tape, and connect the 90 degree 1/4" terminal lug to the vacant ground bolt position. Make a good tight connection.

c. At the frame end, remove the tape and connect the forked lug to one of the vacant ABSBR terminals TB2-3B or 4B. Make a good tight connection.

d. Ensure that the cable is not in the way, and if necessary, secure the cable in places where it may become a safety hazard.

6 Remove the PDC battery return lead from the top terminal of TB1-8, and reconnect it to the bottom terminal of TB1-8.

7 Remove the PDC battery return lead from the top terminal of TB1-5, and reconnect it to the bottom terminal of TB1-5.

8 Using 8 gauge cables, refer to Figure 147 for the cable code number, connect the battery supply and return leads for each shelf (refer to Figure 141) to the appropriate top terminal of TB1 on the FSP. Refer to Figure 147 for connectivity tables for each shelf.

Run the battery and return power cables along the left rear frame up-right and form horizontally across the FSP to the termination point. Field installed power cables are to be formed with factory installed power cables. Torque each power connection to its proper torque value with the torque screwdriver tool. Refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements." Do *not* drop any washers, nuts, or tools into the backplane of the inservice network module.

Once these cables have been moved and new ones connected, remove the temporary straps A8896 from the shelves and the ABS BR back-up cable C001444.

9 Do not secure cables to the frame or form with ty-raps until all crimping has been completed. Follow Event 7 (Method 03-9057), "General Cabling and Torque Requirements," for crimping procedures and dressing of leads.

10 Form and secure cables to the cable brackets with ty-raps. Secure cables, as specified in Event 7 (Method 03-9057), "General Cabling and Torque Requirements."

11 Refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements," for wiring of the cooling unit.

10.6 Securing Switchboard Cables to Connector Key Brackets

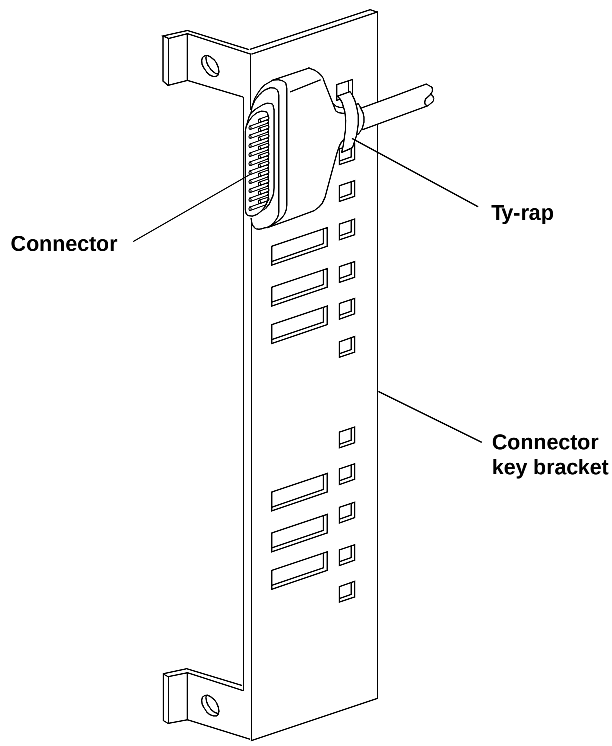
1 A ty-rap (P0567226) is used to secure the cable connector to the connector key brackets. There are 2 types of connector key brackets used on this frame, metal and plastic. Use ty-rap P0567232 on the metal connector key brackets and ty-rap P0567226 on the plastic connector key brackets. Refer to Figure 138. Note, this figure reflects the metal connector key bracket only.

Note: Do not remove the existing small ty-rap from the cable connector hood on the ship loose cables.

2 The head of the ty-rap is to be located on the opposite side of the bracket as the cable connector. The ty-rap is to be located at the TOP of the connector.

3 Cut the ty-rap flush. Be certain that there are no sharp edges on the ty-rap when complete.

Figure 138 – Connector Key Bracket and Ty-raps



10.7 CMC/MDC or MS Switchboard Cables

1 For SuperNode offices, one each of switchboard cables NT0X26XH and NT0X26XJ are required to originate from each shelf of the DSNE frame and terminate onto each MS (i.e., one cable of NT0X26XH to MS 0 and one cable of NT0X26XJ to MS 1). Refer to Figure 139.

When connecting switchboard cables from the network to the MS, the MS must be powered down to avoid damaging the NT9X23AA cards. Connections are to be made to one MS at a time. If more than one network is being added to the office, they may be connected at the same time to the MS that is powered down. For instructions on powering down and reloading the MS, refer to Method 35-5618, "Addition of Port Cards to the Message Switch."

2 For NT40 offices, one each of switchboard cables NT0X26TA and NT0X26TB are required to originate from each shelf of the DSNE frame and terminate onto each CMC/MDC Module (i.e., one cable of NT0X26TA to CMC/MDC 0 and one cable of NT0X26TB to CMC/MDC 1). Refer to Figure 139. Refer to Method 35-5617, "Addition of Port Cards to the CMC," for making connections at the CMC/MDC.

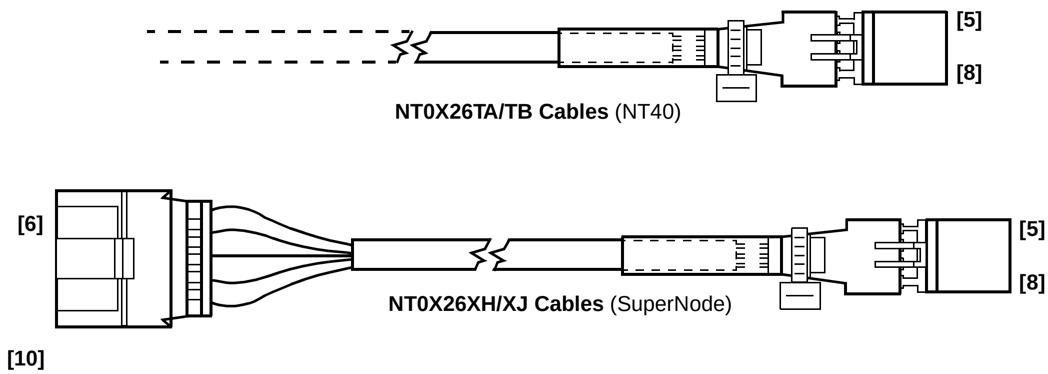
3 Cable NT0X26TA/XH terminates on slot 23, pins 73 through 76. Cable NT0X26TB/XJ terminates on slot 23, pins 77 through 80. Refer to Figure 142.

4 For Plane 0, these cables are run down the rear of the frame between slots 17 and 23, as shown in Figure 142. For Plane 1, these cables are run down the left rear (rear view) of the frame upright and are formed along the bottom of each shelf, then up to the termination point.

5 The cables are to be secured to the cable brackets and cable forms with ty-raps. Ensure

that each cable connector is secured to the connector key bracket with a ty-rap.

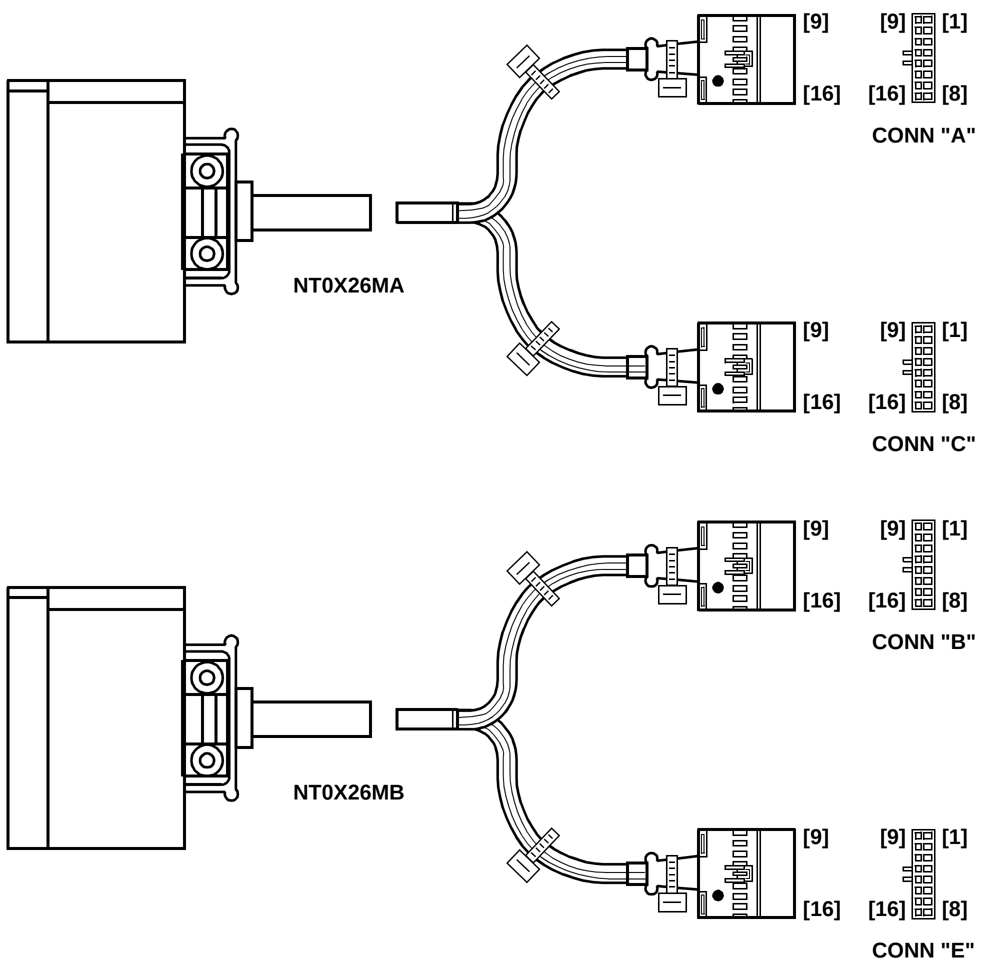
Figure 139 – DSNE Cables to CMC or MS



10.8 Speech Link Switchboard Cables

1 There are eight speech link cables required on each shelf of the DSNE. There are four 0X26MA and four 0X26MB cables. Refer to Figure 140.

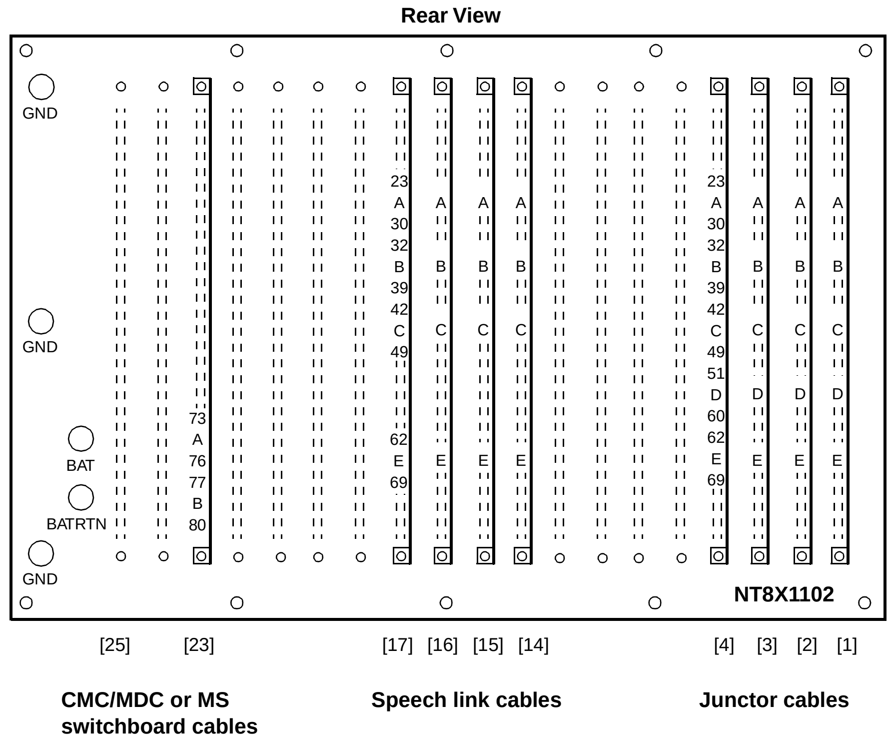
Figure 140 – SLC and DNI Cables Connector Designations



2 The 0X26MA cables are equipped with two connectors designated as "A" and "C". (Refer to Figure 140.) These terminate to slot positions 14, 15, 16, and 17. Ensure that pin 1 of connector A mates with pin #23A on the backpanel, and that pin 1 of connector C mates with pin #42A on the backpanel. Refer to Figure 141.

3 The 0X26MB cables are equipped with two connectors designated as "B" and "E" (Refer to Figure 139). These terminate to slot positions 14, 15, 16, and 17. Ensure that pin 1 of connector B mates with pin #32A on the backpanel, and that pin 1 of connector E mates with pin #62A on the backpanel. Refer to Figure 141.

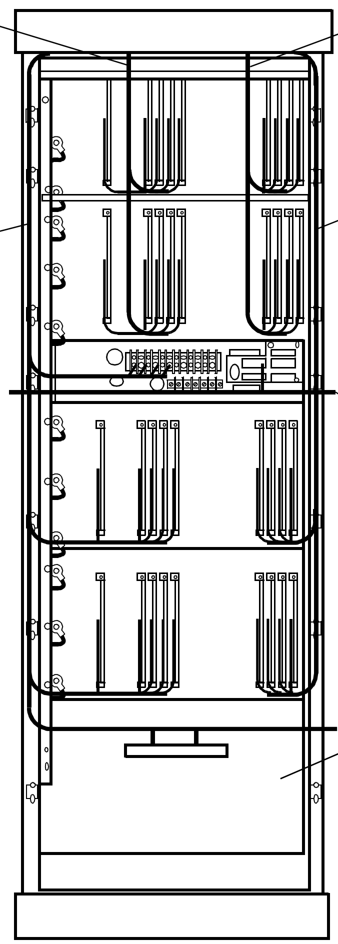
Figure 141 – NT8X1101 Backpanel - Connector Positions



4 For Plane 0, these cables are run down the rear of the frame between slots 17 and 23 as shown in Figure 142. For Plane 1, these cables are run down the left rear (rear view) of the frame upright and are formed along the bottom of each shelf, then up to the termination point.

5 The cables are to be secured to the cable brackets and cable forms with ty-raps. Ensure that each cable connector is secured to the connector key bracket with a ty-rap. Refer to Subsection 10.6.

Figure 142 – Cabling for Fully Equipped DSNE Frame



10.9 Junctor Switchboard Cables

1 The provisioning of junctors depends on the configuration of the DSNE. The junctoring for the different configurations are detailed in the following paragraphs. Note the following information:

Pin 1 of connector A mates with pin 23A of the backplane.
Pin 1 of connector B mates with pin 32A of the backplane.
Pin 1 of connector C mates with pin 42A of the backplane.
Pin 1 of connector D mates with pin 51A of the backplane.
Pin 1 of connector E mates with pin 62A of the backplane.

Refer to Figure 143.

The 8X1104 cable is 10" long and has 2 by 10 pin connectors.
The 8X1001 cable is 34.5" long and has 2 by 8 pin connectors.
The 8X1002 cable is 30" long and has 2 by 8 pin connectors.

2 For offices with only one network, no junctor cables to the DNI are required and no NT8X12 junctor cards are required in slots 1, 2, 3, and 4. An NT8X1104 cable is required in the D position between slots 1 and 2 on the backplane, and between slots 3 and 4.

Figure 143 – One Network Configuration

(No DNI. All junctors are internal)

Shelf	Connector	Card Position						
	A	4		3	2		1	
18	B							Network
and	C							0
51	D	8X1104	----------	8X1104	8X1104	----------	8X1104	
	E							

3 For offices with only two networks, no NT8X12 junctor cards are required in slots 3 and 4. An 8X1104 cable is required between slots 3 and 4 on the backplane of each shelf in position 'D.'

4 For offices with two DSNs and no DNI, 8X1001 and 8X1002 cables are used to junctor points on shelf 32 to shelf 18 and to junctor shelf 65 to 51. Refer to Figure 144 for schematic of junctoring. The 8X1101/02 cables are run along the right rear of the frame.

Figure 144 – Two DSN Networks/No DNI

(Plane 0 and Plane 1 are tinctured the same.)

Shelf	Connector	Card Position					
		4		3	2	1	
	A				8X1001a	8X1001b	
32	B				8X1002a	8X1002b	Network
or	C				8X1001c	8X1001d	1
65	D	8X1104	----------	8X1104			
	E				8X1002c	8X1002d	1
		4		3	2	1	
Shelf	A				8X1002b	8X1002a	
18	B				8X1001b	8X1001a	Network
or	C				8X1002d	8X1002c	0
51	D	8X1104	----------	8X1104			
	E				8X1001d	8X1001c	

Note: 8X1001a, shelf 32 goes to 8X1001a, shelf 18.8X1001a, shelf 65 goes to 8X1001a, shelf 51, etc.

5 In offices with only one or two networks (when the 8X1104 cables are providing parallel junctoring between slots 1 and 2, or 3 and 4), no junctor cables to the DNI are required. If extra 0X26MA/MB cables are provided, they may be used in a future network extension. Run and connect the 0X26MA/MB cables to the DNI, but do not connect them to the DSNE. Instead, secure the DSNE end of the cable to the rack above the frame.

6 In offices with two DSN networks with a DNI or one DSN plus one other non-DSN network, 8X1104 cables are used between connector positions D of slots 3 and 4 on all shelves. 0X26MA/MB cables to the DNI are run from connector positions A, B, C, and E of slots 1 and 2 of all DSN shelves. Refer to Figure 145.

Figure 145 – Two Network Office Using a DNI

(All shelves are tinctured the same.)

Connector	Card Position 4		3	2	1	
A				0X26MA	0X26MA	
B				0X26MB	0X26MB	0X26 Cables
C				0X26MA	0X26MA	to DNI
D	8X1104	----------	8X1104			
E				0X26MB	0X26MB	

7 For offices with three or more networks, the location of the junctor switchboard cabling to the DNI is shown in Figure 146.

8 In offices with cables run to the DNI, the 0X26MA/MB cables for Plane 0 are run down the rear of the frame to the left of slot 4. For Plane 1, the cables are run down the right rear of the frame and are formed along the bottom of the shelf, then up to the termination point. Refer to Figure 142.

Figure 146 – Three or More Networks

(DNI is always required. All shelves are tinctured the same.)

Connector	Card Position 4	3	2	1	
A	0X26MA	0X26MA	0X26MA	0X26MA	
B	0X26MB	0X26MB	0X26MB	0X26MB	0X26 Cabls
C	0X26MA	0X26MA	0X26MA	0X26MA	to DNI
D					
E	0X26MB	0X26MB	0X26MB	0X26MB	

9 The cables are to be secured to the cable brackets and cable forms with ty-raps. Ensure that each cable connector is secured to the connector key bracket with a ty-rap. Refer to Subsection 10.6.

10.10 Frame Aisle Alarm Multiple Cables

1 Frame aisle alarm multiple cables are to be run between adjacent frame FSPs and secured to local cable forms with ty-raps. The cables are run across the rear of the bays without entering the cable trough. Secure the slack vertically between the frames.

2 To non-adjacent frames, route the frame aisle alarm multiple cables up the right rear of the frame and through the cable trough to the next frame. Secure these cables with ty-raps to the cable brackets and to other cable forms.

10.11 Miscellaneous Connection and Shelf Information

1 Refer to Figure 147, Figure 148, and Figure 149 for additional DSNE frame information.

Figure 147 – Network Shelf to FSP Connections

	MODULE: 0			FSP			Power
FRAME	Shelf Position: 18			Shelf Position: 45			Cable
SIGNAL	SIGNAL	CP/ CONN	PIN	SIGNAL	CP/ CONN	PIN	PEC #
B.R.2	ABS-RTN	25	69A	B.R.	TS1	12	
RESET01	RESET	25	68A	RESET	TS1	9	
CNVFAL01	CNVFAIL	25	60A	CNVFAIL	TS1	11	
DRIVE01	DRIVE	25	76A	DRIVE	TS1	10	
DRIVE01	DRIVE	25	76B	DRIVE	TS1	10	
ON/OFF01	ON/OFF	25	75A	ON-OFF	TS2	3	
-48V 01	-48V	SC01	1	-48V SW	TB1	11	NT0X95BG
BATRTN01	BR	SC02	1	BATRTN B	TB1	6	NT0X95BF
	MODULE: 1			FSP			Power
FRAME	Shelf Position: 32			Shelf Position: 45			Cable
SIGNAL	SIGNAL	CP/ CONN	PIN	SIGNAL	CP/ CONN	PIN	PEC #
B.R.1	ABS-RTN	25	69A	B.R.	TS1	4	
RESET11	RESET	25	68A	RESET	TS1	1	
CNVFAL11	CNVFAIL	25	60A	CNVFAIL	TS1	3	
DRIVE11	DRIVE	25	76A	DRIVE	TS1	2	
-continued-							
SIGNAL	SIGNAL	CP/ CONN	PIN	SIGNAL	CP/ CONN	PIN	PEC #
DRIVE11	DRIVE	25	76B	DRIVE	TS1	2	
ON/OFF11	ON/OFF	25	75A	ON-OFF	TS2	1	

Figure 147 – Network Shelf to FSP Connections (Cont'd)							
-48V 11	-48V	SC01	1	-48V SW	TB1	12	NT0X95BA
BATRTN11	BR	SC02	1	BATRTN B	TB1	8	NT0X95BA
	MODULE: 0			**FSP**			**Power**
FRAME	**Shelf Position: 51**			**Shelf Position: 45**			**Cable**
SIGNAL	**SIGNAL**	**CP/ CONN**	**PIN**	**SIGNAL**	**CP/ CONN**	**PIN**	**PEC #**
B.R.1	ABS-RTN	25	69A	B.R.	TS1	4	
RESET00	RESET	25	68A	RESET	TS1	5	
CNVFAL00	CNVFAIL	25	60A	CNVFAIL	TS1	7	
DRIVE00	DRIVE	25	76A	DRIVE	TS1	6	
DRIVE00	DRIVE	25	76B	DRIVE	TS1	6	
ON/OFF00	ON/OFF	25	75A	ON-OFF	TS2	2	
-48V 00	-48V	SC01	1	-48V	TB1	10	NT0X95BC
BATRTN00	BATRTN B	SC02	1	BATRTN A	TB1	7	NT0X95BB
	MODULE: 1			**FSP**			**Power**
FRAME	**Shelf Position: 65**			**Shelf Position: 45**			**Cable**
SIGNAL	**SIGNAL**	**CP/ CONN**	**PIN**	**SIGNAL**	**CP/ CONN**	**PIN**	**PEC #**
B.R.2	ABS-RTN	25	69A	B.R.	TS1	12	
RESET10	RESET	25	68A	RESET	TS1	13	
CNVFAL10	CNVFAIL	25	60A	CNVFAIL	TS1	15	
DRIVE10	DRIVE	25	76A	DRIVE	TS1	14	
DRIVE10	DRIVE	25	76B	DRIVE	TS1	14	
ON/OFF10	ON/OFF	25	75A	ON-OFF	TS2	4	
-48V 10	-48V	SC01	1	-48V SW	TB1	9	NT0X95BA
BATRTN10	BATRTN B	SC02	1	BATRTN A	TB1	5	NT0X95BD

Figure 148 – DSNE Shelf Layout

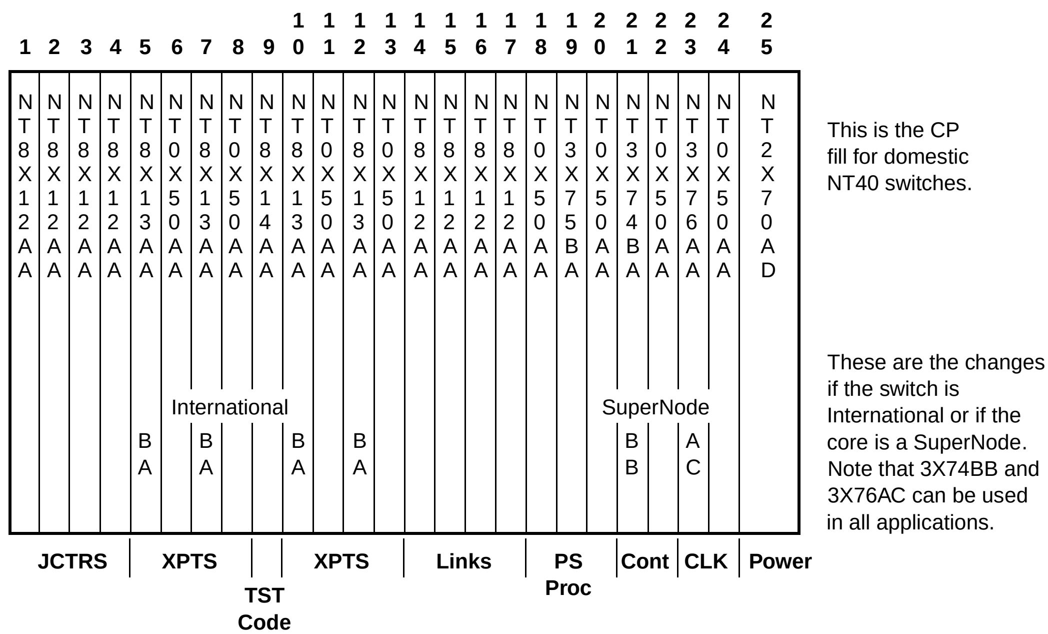


Figure 149 – NT8X12 Card Association

Junctors			Links		
Card	**Slot**	**Junctor**	**Card**	**Slot**	**Link**
0	1	0-15	0	17	0-15
1	2	16-31	1	16	16-31
2	3	32-47	2	15	32-47
3	4	48-63	3	14	48-63

11.0 Miscellaneous Equipment (MIS) Frame

11.1 MIS Frame Layout

1 Miscellaneous equipment frames (NT0X02AB) are provisioned to each job and can be equipped with a variety of equipment.

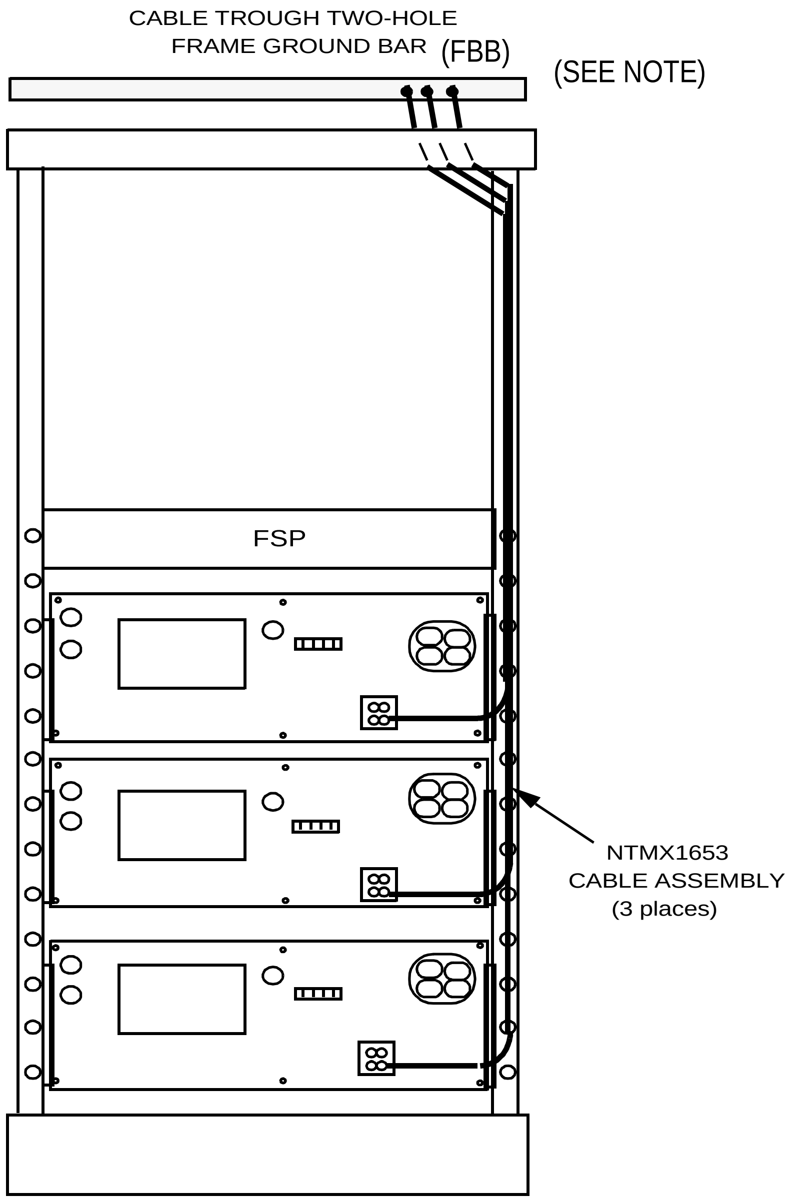
2 In general, this frame is equipped with inverters that serve pac poles at Maintenance Administrative Position (MAP) locations.

3 Various vendor equipment can mounted in this frame. Refer to Event 2 (Method 03-9052), "Floor Preparations," for the different equipment types. Installation instructions are provided with the equipment types.

4 NTRX31DH LaMarche Inverter can be installed in the MIS frame. Refer to Method 26-1346 for information related to the installation and cabling of the NTRX31DH LaMarche Inverter when field installation is required. Refer to Figure 150 for an

example of the NT0X02AB frame with inverters installed.

Figure 150 – NT0X02AA Configuration



***Note*:** For raised floor applications in which frame mounted cable troughs and FBB are not installed.

11.2 Frame Grounding

1. Frame ground links (cable braid assembly) and required mounting hardware are supplied with each frame.
2. The first holes from the ends on the horizontal bus bar (on the cable trough) are used for installing cable braids from adjoining frames.
3. The second holes on the horizontal bus bar are used for mounting the horizontal bus bar on the cable trough.
4. The third hole on the horizontal bus bar on the left-hand side (looking at the rear of the frame) is used to connect the cable from the left frame upright.
5. This frame normally does not have a logic ground bar furnished as inverters serve pac poles only.

11.3 Switchboard Cabling

1. Various equipment may be provisioned for this frame requiring switchboard cabling. Follow cable tag information, if furnished, for left or right side of frame. Form across bottom of units and up to terminating point. If information is not supplied on the cable tag, use termination point to determine drop side of frame.
2. Some vendor units such as Rixon have sixteen cables. Bring eight cables down the left upright and eight cables down the right upright.
3. Frame Aisle Alarm Multiple cables are to be run between adjacent frames with the slack secured to a traverse arm between the frames. Secure the slack in the vertical. Route the Frame Aisle Multiple cables up the right rear of the frame and through the cable trough to non-adjacent frames. Secure these cables with ty-raps to the traverse arms along with other cable.

11.4 Power and Alarm Cabling

1. The battery and return power cables terminate on the rear of the Frame Supervisory Panel (FSP) terminal strip designated TB1. Terminals as assigned per FSP schematic drawings. The Alarm Battery Supply (ABS) terminates on TB2 terminal strip.
2. The cables are run down the left rear frame upright and are formed horizontally across to the FSP.
3. Horizontal form should be ty-rapped approximately every four inches to the first breakout. Event 07 (Method 03-9057), "General Cabling and Torque Requirements," will be the controlling document with regards to ty-rapping.
4. When bundled cables are spec'd, there will be one (1) run of -48 VDC cables and one (1) run of Battery Return cables. The cable end(s) equipped with lugs terminate at the FSP, the unlugged cable end(s) terminate at the PDC. The PDC end will require lugging prior to terminating.
5. Bundled power cables are to be routed as indicated on the cable tags. Route, secure and form the cables in the same manner as individual leads. Refer to Figure 151 for the bundled cable codes.

   Note: Do *not* remove insulators from either cable end until just prior to lugging and termination.
6. Terminate and form the pre-lugged power cables to the FSP prior to terminating the

cables in the PDC. The slack is to be formed in the direction of the PDC.

Figure 151 – MIS Bundled Cables

CPC	PEC	Description
B0262182 B0262185	NTY750BR NTY750BU	MIS Power Cable 10 Ga. (-48V) MIS Power Cable 10 Ga. (BR)
B0262183 B0262186	NTY750BS NTY750BV	MIS Power Cable 8 Ga. (-48V) MIS Power Cable 8 Ga. (BR)
B0262184 B0262187	NTY750BT NTY750BW	MIS Power Cable 6 Ga. (-48V) MIS Power Cable 6 Ga. (BR)

7 The battery and return power cables to inverters are run down the left rear upright and are formed horizontally from upright to TB1 terminal strip. Use 90-degree sweep to termination point. Use ty-rap at breakout point. Use 90-degree lugs to terminate.

8 When NTY750BZ pre-lugged cables are spec'd for the Lamarche Inverter, there will be one (1) -48 VDC cable and one (1) Battery Return cable. Cables are to be routed as indicated on the cable tags. The cable end(s) equipped with lugs terminate at the inverter, the unlugged cable end(s) terminate at the PDC. The PDC end will require lugging prior to terminating.

Note: Do *not* remove insulators from either cable end until just prior to lugging and termination.

9 Terminate and form the pre-lugged power cables to the inverter prior to terminating the cables in the PDC. The slack is to be formed in the direction of the PDC

11.5 NT0X87AA Inverter Installation

Note: The NT0X87AA Inverter has been Md'ed and no longer the inverter of choice. The following information applies to the NT0X87AA Inverters that are part of a Telco inventory or are being relocated from existing equipment.

1 The inverters are normally mounted by the shop. They will have two orange colored support brackets below each inverter. The field technician should remove and discard these brackets.

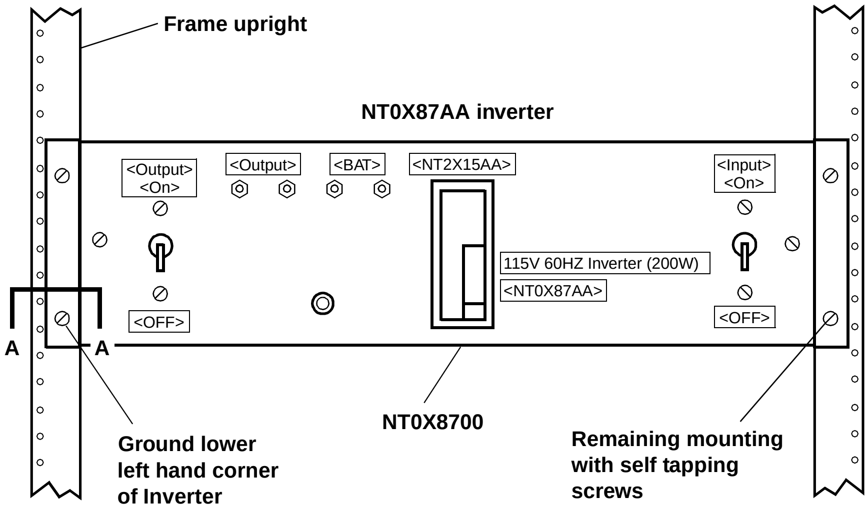
2 If inverters are shipped separate, the field technician should remove inverter from shipping carton and check for any visible damage.

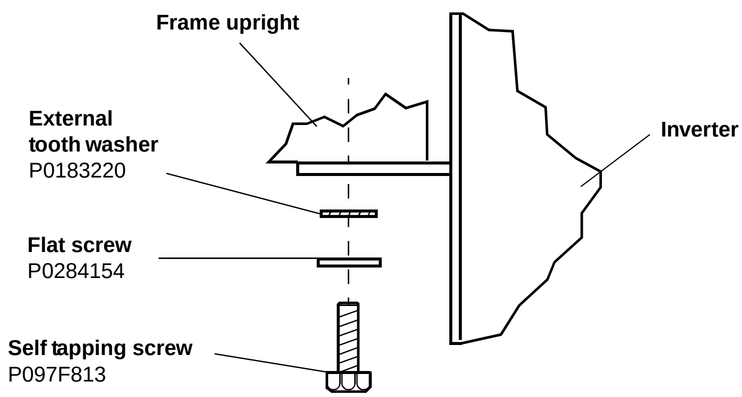
Caution: Each unit weights approximately 75 lbs. Two people are required to remove the unit from the shipping carton and install the unit onto the frame.

3 Mount inverters per engineering information as shown on D410 equipment layout. Refer to Figure 152.

4 Inverters mounted by the field technician must have alarm leads added by the field technician. These leads are 22 ga. stranded, colored green and red. The green lead goes on TB2 "NO" terminal and the red lead goes on TB2 "C" terminal. These leads can be multipled to existing inverter or if no inverter exists they must be run to FSP TS1-14 (green) and TS1-15 (red). These leads must be wrapped and soldered on FSP end.

Figure 152 – Mounting and Grounding NT0X87AA





View A-A
Method of Grounding Card Cage or Unit

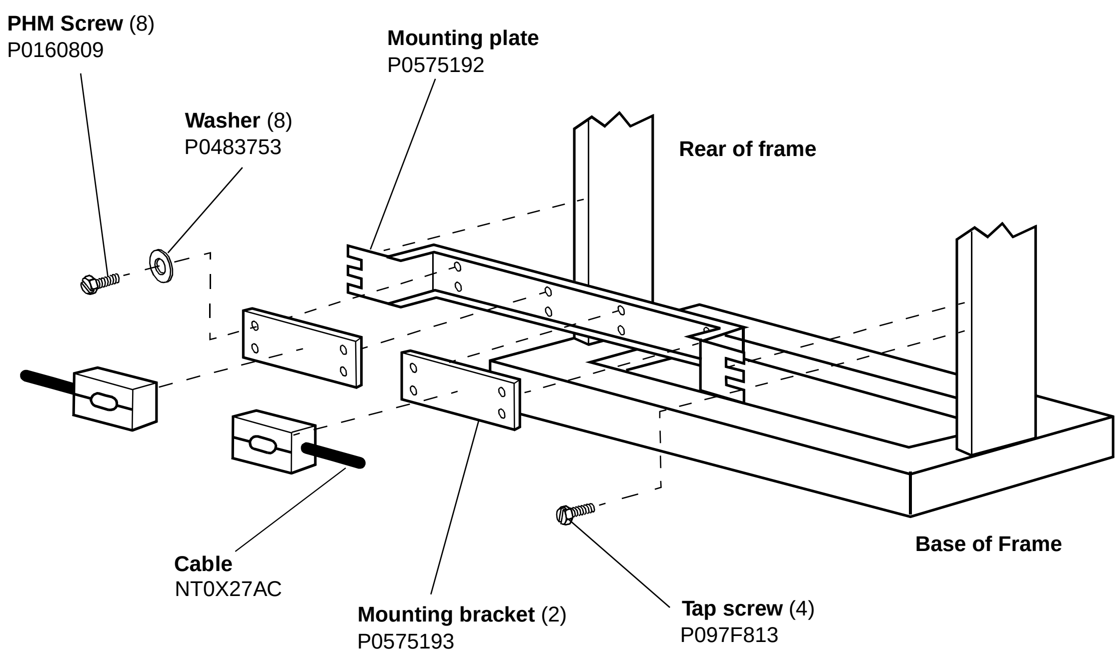
11.6 NT0X07AU Mounting Plate For Inverters

1 NT0X07AU is a mounting plate for supporting two "TECH 90" NT0X27AC cables (recessed male plug end). This plate is normally mounted by the shop.

2 If this plate is shipped separate, the field technician must mount as directed by engineer on D410 equipment layout. Refer to Figure 153.

If this plate is not shipped to site, refer to Subsection 11.7 for procedure for prepping the "TECH 90" cable.

Figure 153 – Mounting NT0X07AU Mounting Plate



11.7 AC TECH 90 Cabling NT0X27AC

1 Engineer will provision a metallic rubber covered cable (NT0X27AC) with a single outlet on MAP pac pole end and recessed male plug on inverter end. Refer to Figure 154 for mounting alternating current (ac) outlet to cable rack.

2 The field technician should run the first NT0X27AC cable (recessed male plug) down left rear upright facing rear of frame, and mount on left lower mounting bracket of NT0X07AU (Frame position 09). The field technician should run the second NT0X27AC cable (recessed male plug) down the right rear upright, facing rear of frame, and mount on right lower mounting bracket of NT0X07AU frame position 09.

All "TECH 90" cables may be routed down the right rear frame upright if ROTL/DTH is installed in MIS 01 in order to keep the analog cables separated from the ac.

3 An easy way to do this is to run cables to the left mountings (facing rear of frame) down left upright, and cables to the right mountings down right upright of frame.

4 These "TECH 90" cables should run in shield 4 to pickup racks going to MAP area.

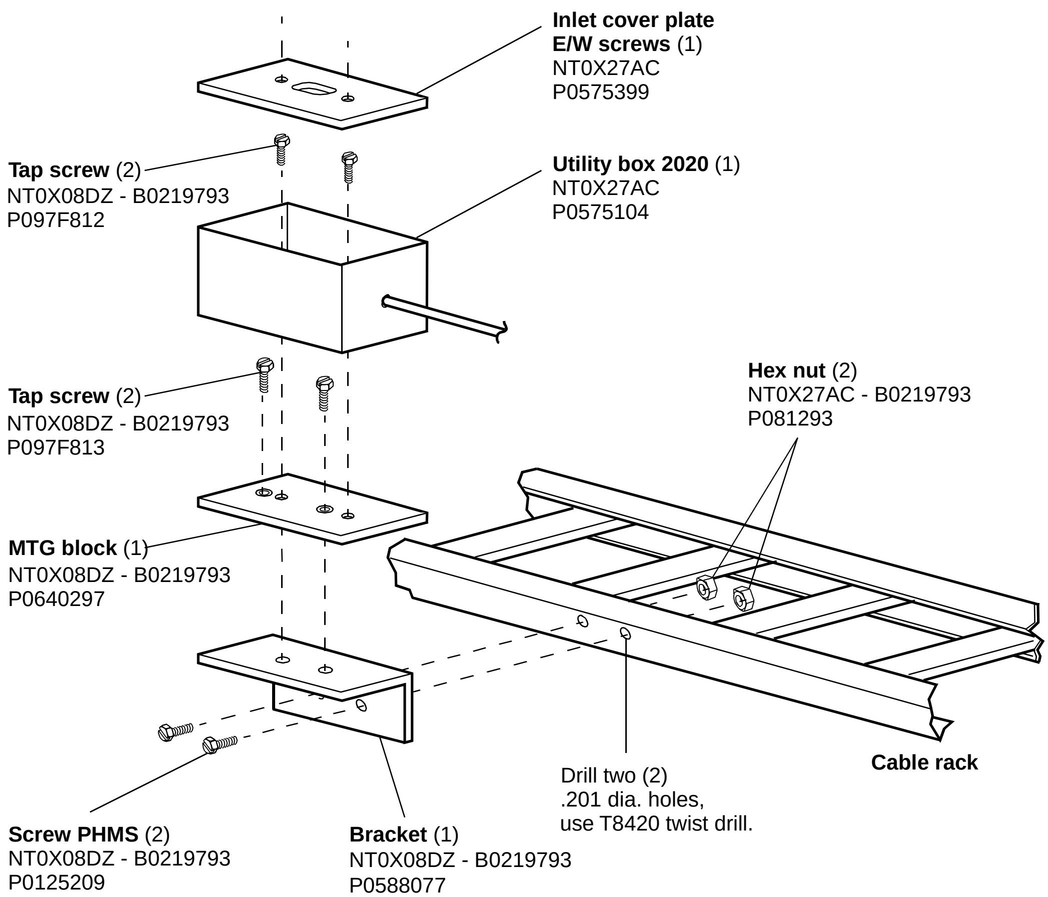
The "TECH 90" cables are to be routed on L-brackets to the pac poles in the MAP area. The rack going into the MAP room carries signal cables (power and signal cables must be separated). Engineering drawings should be updated to include L-brackets for the "TECH 90 cables.

Note: In order to terminate the “TECH 90” cable to the rear of the inverter, a portion of the metal shielding must be removed.

Strip back eight inches (8”) of the insulation from the “TECH 90” cable. Remove the excess material (BX steel armor) with hacksaw or tin snips. (***Caution:*** Do *not* nick the inner insulation with hacksaw or tin snips.)

Remove any sharp edges with file. Uncoil eight inches (8”) of the steel armor from the cable. Use electrical tape to protect any exposed steel armor material.

Figure 154 – Securing AC Outlet to Cable Rack



11.8 AC Cable NT0X27AB

1 NT0X27AB cables should run from inverter plug J2, 3, or 4 to the recessed male plug of "TECH 90" cable. Slack in this cable should be coiled and ty-rapped.

12.0 Dedicated MIS/Modem Frame for ISG

12.1 MIS/Modem Frame Cabling

1 The Dedicated MIS/Modem frame is provisioned only in offices with Isolated System Grounding (ISG).

2 All equipment that is to be field installed into the Dedicated MIS/Modem frame must be tested for ISG compliance per Event 6 (Method 03-9056), "Grounding." These tests must be performed before the equipment is installed into the frame.

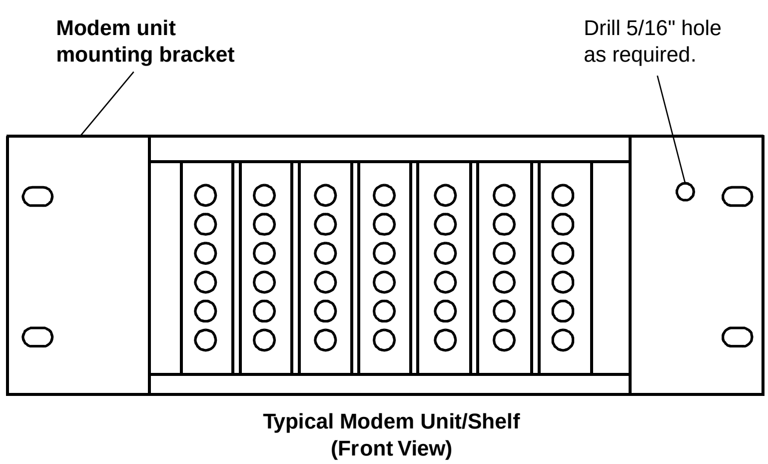
12.2 Installing Modem Units And Modem Shelves

1 If the modem units, modem shelves, NT3X25 common equipment shelves, DAS units, etc., are not pre-installed in the frame from the factory, install them using the NT0X0050 Modem Isolation Kit. This kit includes all of the hardware and cable assemblies necessary to properly mount the units.

2 If the unit does not have a factory mounted ground screw, one will have to be installed. This must be done before the unit is mounted onto the frame, if drilling a hole is necessary.

3 Some units will have a hole provided from the manufacturer for installing a ground screw. When it is not provided, a 5/16" hole must be drilled into the side mounting bracket of the unit. Refer to Figure 155.

Figure 155 – Installing Modem Units And Modem Shelves



4 To prevent damage from metal shavings or mishaps, do not drill any holes in the casing of the units. Holes are only to be drilled into the mounting brackets that support the units.

5 Install and secure all units with the NT0X0013 isolation hardware provided with the NT0X0050 Modem Isolation Kit. Refer to Figure 156.

6 If the unit is too heavy for the NT0X0013 isolation hardware, it can be installed with red insulators and "Z" brackets. Refer to Figure 157.

7 After the unit is mounted onto the frame, use a digital ohm meter to check for shorts between the chassis of the units and the frame. Refer to Figure 156.

Figure 156 – Installing NT0X0013 Isolation Hardware

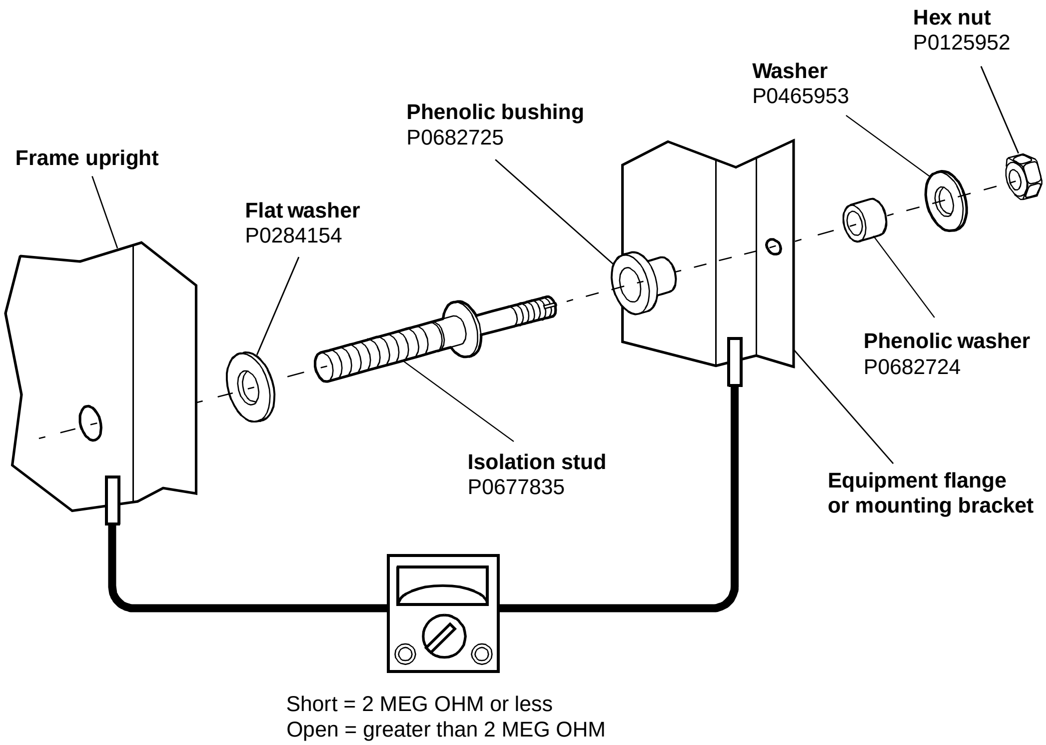
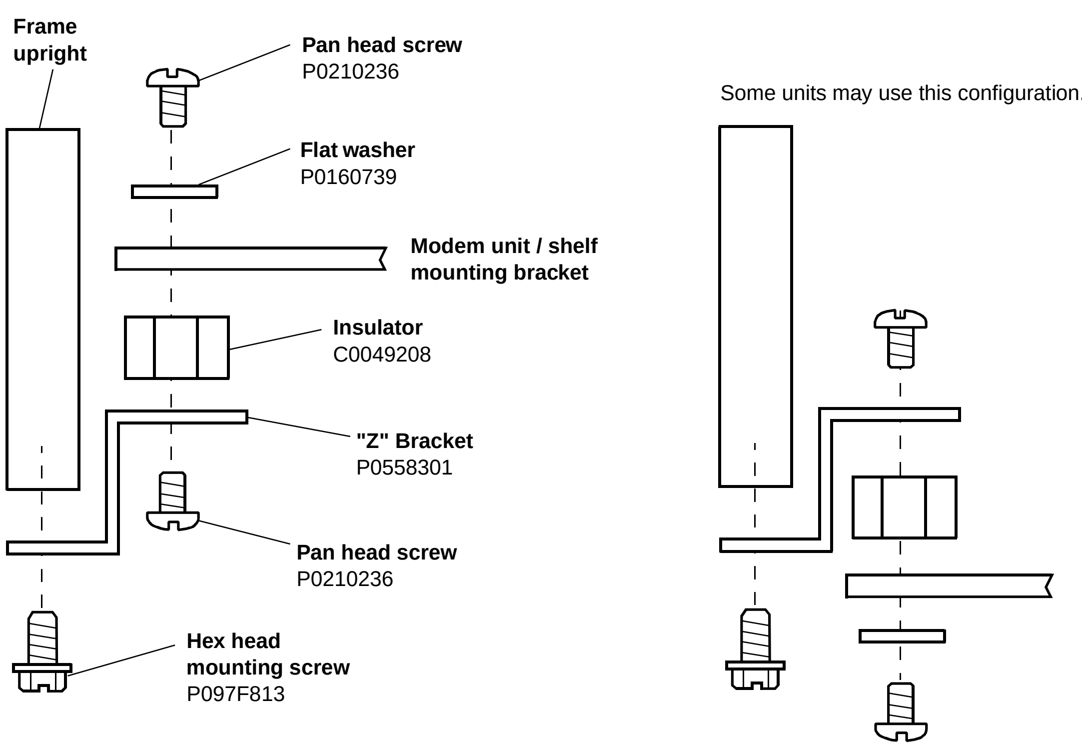


Figure 157 – Alternative Isolation Installation Method



8 The digital ohm meter should read greater than 2.0 Meg ohm to infinity (open).

9 If a short reading is obtained (2.0 Meg ohm or less), check and repair the isolation hardware until an acceptable reading is obtained.

12.3 Modem Unit Chassis Ground

Refer to Event 6 (Method 03-9056), "Grounding."

1 Generally, most ac modem units will have their chassis grounded to the vertical logic bar in the Dedicated MIS/Modem frame with a #6 AWG cable.

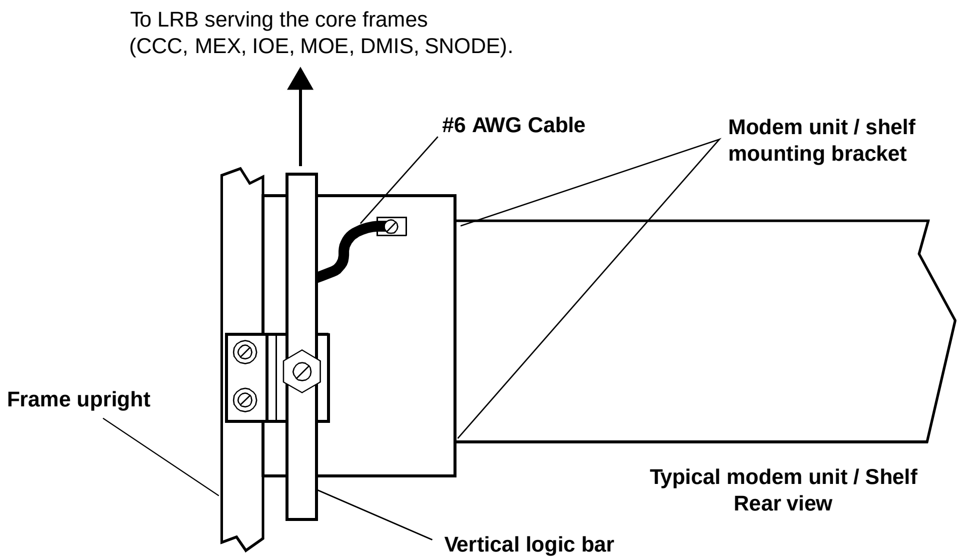
2 Some dc modem units do not require this connection because their chassis is common (shorted) with the battery return of the unit and it is considered to be grounded through the battery return conductor. Therefore, do *not* ground dc modem units to the vertical logic bar if their chassis is common with the battery return of the unit.

3 No other chassis grounds are required for the units (i.e., from FR GND terminals on back of the units) other than those as described above.

4 Before grounding the chassis of any unit to the vertical logic bar, it must be tested for ISG compliance.

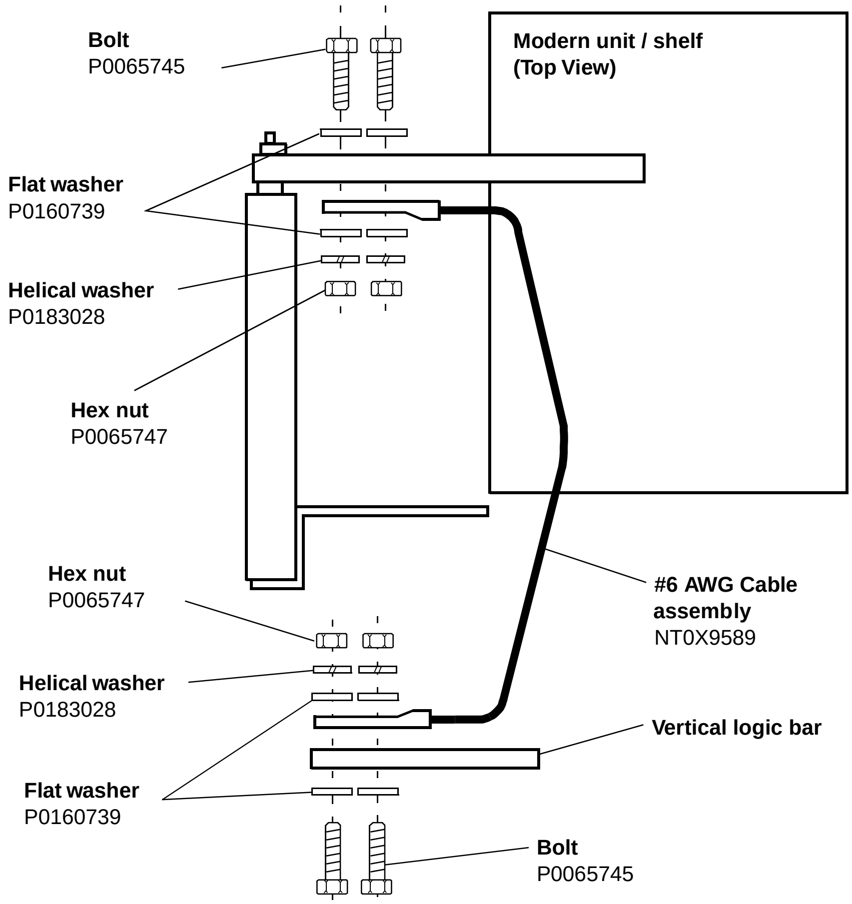
5 When required, connect the chassis of the unit to the vertical logic bar with a #6 AWG cable. Refer to Figure 158 and Figure 159.

Figure 158 – Modem Unit Chassis Ground



Note: Refer to Event 06 (Method 03-9056), "Grounding."

Figure 159 – Modem Ground Hardware Configuration



Note: Refer to Event 06 (Method 03-9056), "Grounding."

12.4 Installing Inverter Units

Note: Inverters installed in a Dedicated MIS/Modem Frame must be isolated from the frame as stated in this subsection. DO NOT apply this subsection to inverters not installed in a Dedicated MIS/Modem Frame. Inverters installed in a MIS frame not identified as a Dedicated MIS/Modem Frame do not require isolation. Do not dismount any inverter from a frame until contacting your job engineer or TAC Center to verify isolation hardware is required.

1. If the inverters are not pre-installed in the frame from the factory, install them using the NT0X0053 Inverter Isolation Kit. This kit includes all of the hardware and cable assemblies necessary to properly mount the units.

2. Install and secure all inverters with the NT0X0013 isolation hardware provided with the NT0X0053 Inverter Isolation Kit. Refer to Figure 156.

3. After the inverter is mounted onto the frame, use a digital ohm meter to check for shorts between the inverter chassis and the frame.

4. The digital ohm meter should read greater than 2.0 Meg ohm to infinity (open).

5. If a short reading is obtained (2.0 Meg ohm or less), check and repair the isolation hardware until an acceptable reading is obtained.

12.5 Inverter Unit Chassis Ground

1 The chassis of each inverter unit is to be grounded to the vertical logic bar in the Dedicated MIS/Modem frame. Refer to Figure 160 and Figure 161. Do not remove the ground termination from the vertical logic bar if the inverter is installed in the factory. Figure 161 reflects the ground terminations when installed in the field.

Figure 160 – Inverter Unit Chassis Ground

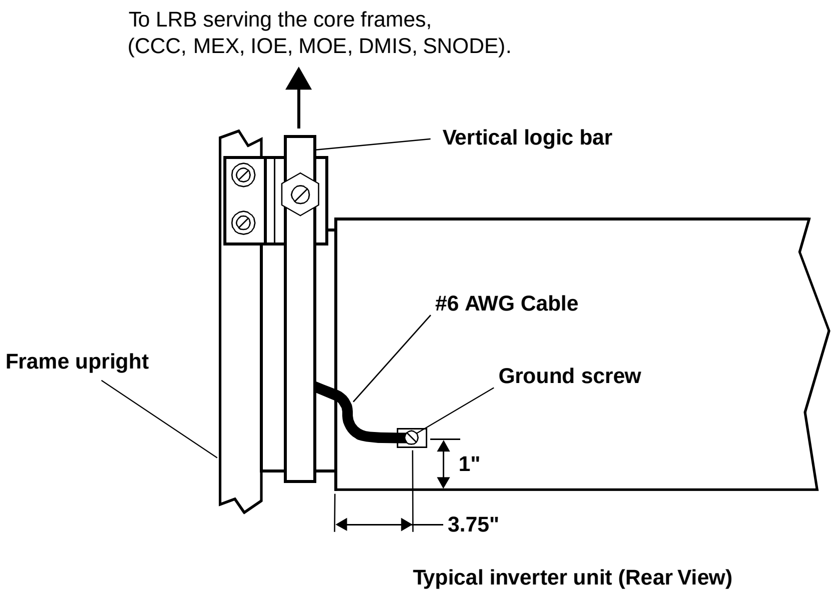
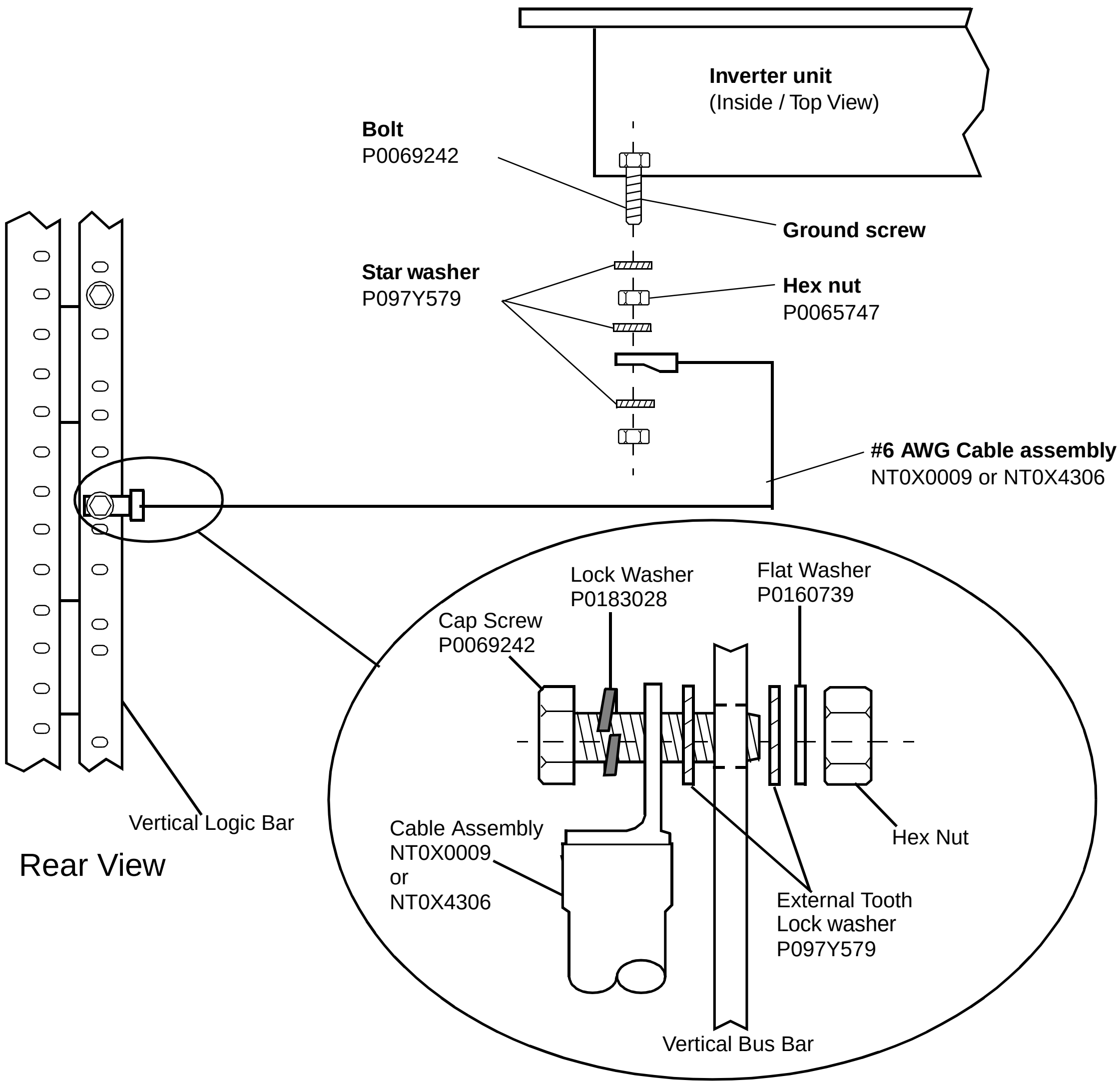


Figure 161 – Inverter Ground Hardware Configuration



12.6 Frame Horizontal Ground Bar Connection

1. The #6 AWG ground cables with mounting hardware are shipped with each frame and are located on the top left frame upright.
2. The first holes from the ends on the horizontal bus bar (on the cable trough) are used for installing the #6 AWG cables from adjoining frames.
3. The second holes are to be used for mounting the horizontal bus bar on to the cable trough.
4. The third hole on the horizontal bus bar on the left hand side (rear view) is used to connect the #6 AWG cable from the left frame upright.

12.7 Frame Vertical Logic Bar Connection

1 Connect a #6 AWG cable from the vertical logic return bar in the Dedicated MIS/Modem frame to the LRB that is serving the IOE frames. Only the Core frames (CCC, MEX, IOE, MOE, DMIS, and/or SuperNode) can be cabled to this particular LRB. The maximum cable length from the Dedicated MIS/Modem frame's vertical logic bar to this LRB is 50 feet.

2 The IOE frames at which the LRB is located are not always in the same lineup as the Dedicated MIS/Modem frame. When this is the case, the #6 AWG cable must be routed from the LRB in cross-aisle troughs to the vertical logic bar.

3 The hole located at the top of the vertical logic bar is used to connect the #6 AWG cable coming from the LRB.

12.8 Frame Power Cabling

1 The battery and return cables are run down the left rear frame up right (rear view) and formed across the FSP and inverter units to the terminal strips.

2 The cables terminate on the terminal strips as assigned per FSP schematic drawings.

3 The cables are secured to the cable brackets and to cable forms using ty-raps.

12.9 Frame Switchboard Cabling

1 Due to the many different types of modem units available, the forming of modem cables will be left to the field technician's discretion. However, cables should be evenly divided on the right and left frame uprights and formed neatly. Ty-raps are to be used as required.

2 Secure all cables to the cable brackets and cable forms with ty-raps.

12.10 Current Loop and EIA Cabling

1 Only 20 mA Current Loop (CL) cables can be interconnected from the Dedicated MIS/Modem frame to VDUs or printers in the MAP area.

2 All VDUs or printers must be CL or connected through back to back modems.

3 Only EIA (RS232) cables can be interconnected from IOE frames to Dedicated MIS/Modem frames.

4 EIA cables cannot be interconnected from one Dedicated MIS/Modem frame to another.

5 Any EIA polling device must be provisioned in a Dedicated MIS/Modem frame.

13.0 Miscellaneous Equipment Frame (MIS - Canadian Market Specific)

13.1 MIS Frame Description

This section contains the common requirements and information applicable to the procedures for installing the Modem Equipment NT0X43BA frame (MOE).

The Modem Equipment frame is a standard DMS-100 type 7' frame and includes associated equipment (NT5X09AA/BA Data Set Shelf, NT3X25AA Equipment Shelf Assembly, NT4X25DH Data Unit, NT0X87AA/AB, and LaMarche inverters) mounted on the frame.

Caution: There is no service impact when installing the MOE frame on an initial job; however, on extensions, use caution when working around inservice (hot) equipment to avoid service outage.

13.2 Frame Configuration

1 The Modem Equipment frame (NT0X43BA) can be equipped as shown in Figure 162.

2 These are standard configurations of the frame and should be followed by the Customer Engineer. If there are any discrepancies on the job, contact your Job Engineer to clarify.

13.3 Frame Grounding

1 Each frame comes equipped with the ground strap attached to the upright of the frame. Connect this strap to the ground bar located on the rear of the cable trough. For this and other ground connections, refer to applicable grounding method(s).

2 The logic ground bar on the frame is connected to the nearest LRE bar in the lineup.

3 Mounting, isolating, and grounding of individual pieces of equipment on the frame is explained in this section.

13.4 Mounting the Equipment with ISG Isolation Hardware

1 ISG Isolation hardware will be used on all the equipment that requires isolation from the framework, NT0X28AF FSP and the NT0X4303 connector housing assembly are the exceptions. Figure 163 and Figure 164 illustrate the stack up of two different isolation types hardware.

2 The NT0X0013 isolation hardware, Figure 163 is used with the equipment where the mounting holes on the equipment can not accommodate the normal mounting screw.

Figure 162 – Configurations

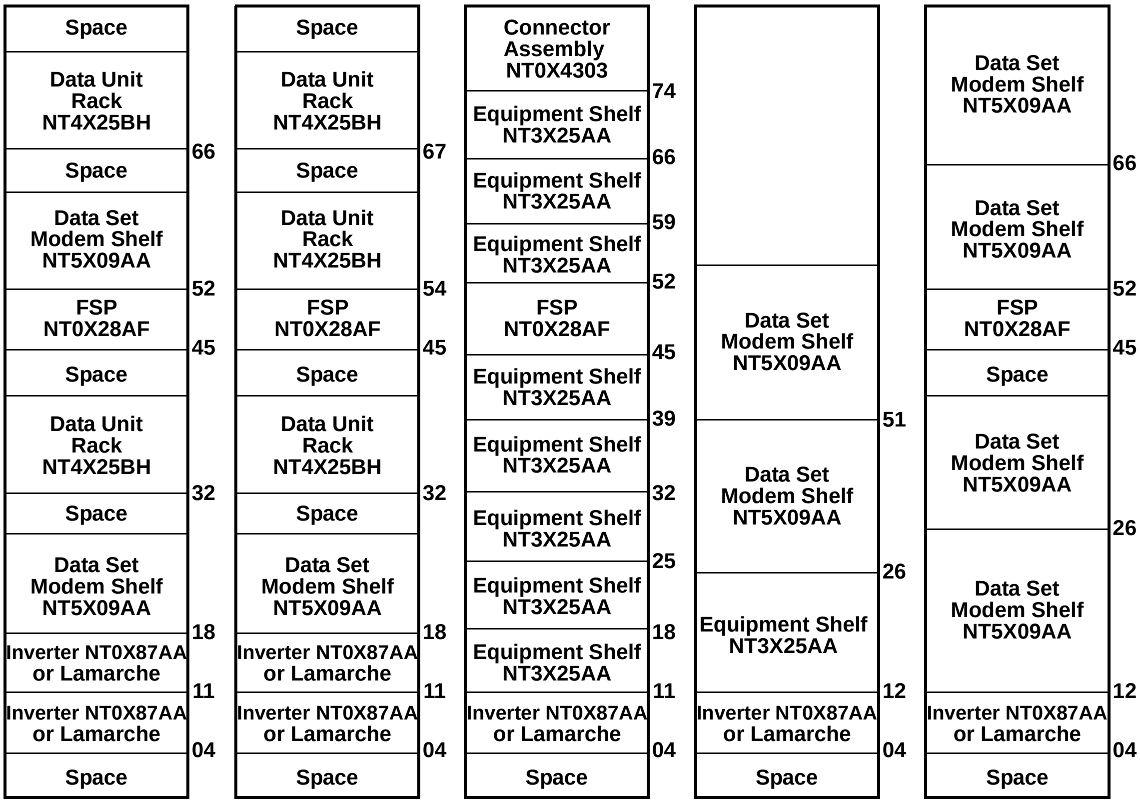
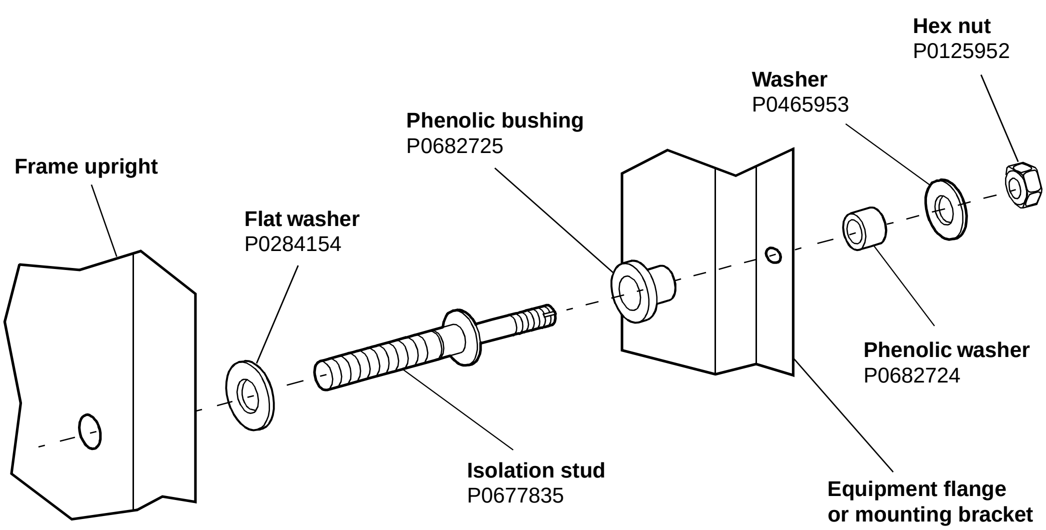
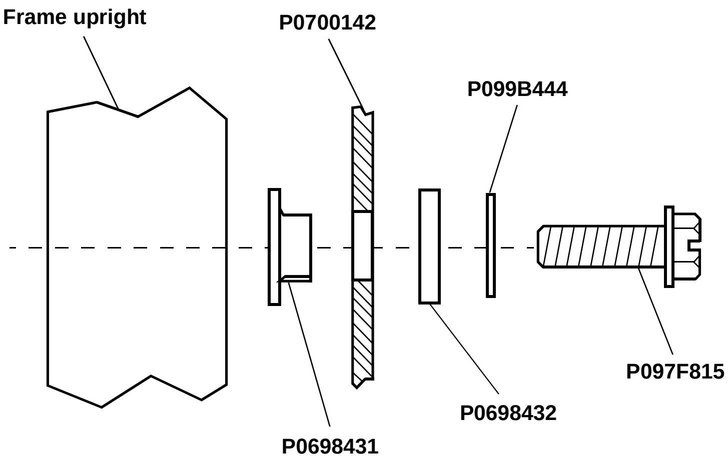


Figure 163 – Isolation Hardware NT0X0013



3 Figure 164 shows the mounting hardware for the modified equipment where the normal mounting screw can be used with the isolation hardware.

Figure 164 – Isolation Mounting Hardware



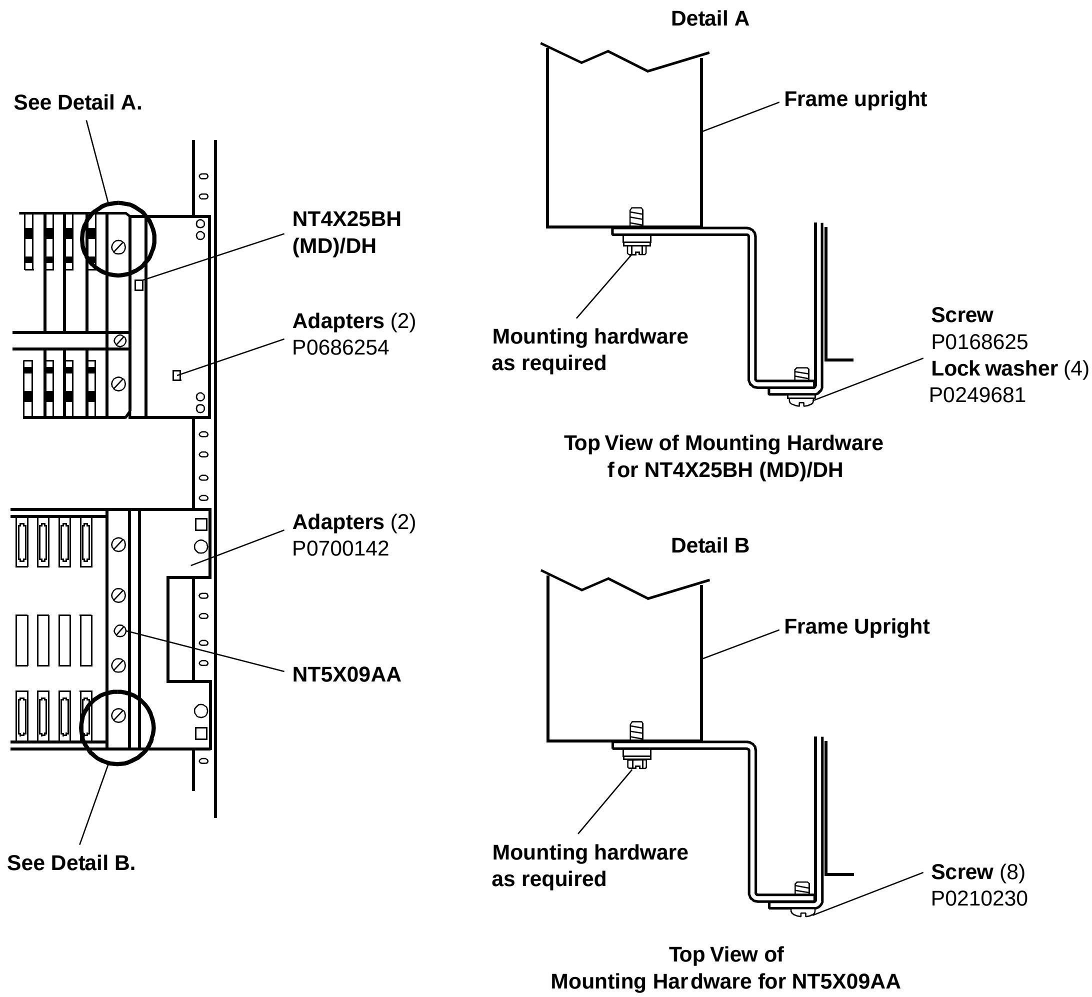
13.5 Installation of Inverters

1. For the installation of NT0X87AA/BA and LaMarche inverters, refer to Method 16-8200, "OEM and Inverter Isolation and Grounding," and Method 26-1346,"LaMarche NTRX59AZ and NT0X87AA Inverter Installation." When the inverter is required on the frame, a default position is always shelf 04. If required, a second inverter is mounted in position 11.
2. The alarms for the inverter(s) shall be run from the first bottom inverter punching TB2-C (red 22AWG lead) to FSP terminal TB1-5. The green 22AWG lead shall be run from the inverter TB2-NO to FSP terminal TB1-6.
3. If there are more inverters and/or shelves requiring alarms on the frame, the alarm leads shall be multipled from the very first inverter at the bottom of the frame.

13.6 Installation of Equipment Shelves

1. The equipment shelves NT5X09AA and NT4X25BH (MD)/DH are usually shop mounted; however, sometimes shelves are shipped loose to the job site.
2. Remove the shelf from the carton and check for any visible damage. All mounting hardware is shipped with the units. If the units are damage-free, attach the adapter brackets to the units as illustrated in Figure 165, if not already done.
3. The NT3X25AA equipment shelf does not need adapter brackets, it is mounted directly onto the frame. Shelves NT3X25AA, NT4X25BH (MD)/DH, and NT5X09AA must always be isolated from the framework.
4. Mount all shelves in their job assigned positions, refer to Figure 162. If there are any discrepancies, contact your Job Engineer for the correct assignments.
5. For assembly of isolation hardware refer to Figure 163 and Figure 164. The NT5X09AA shelf requires 8 mounting isolation assemblies. The NT4X25BH (MD)/DH requires 4 mounting isolation assemblies while NT3X25AA needs 6 mounting isolation assemblies. The NT0X4303 Connector Mounting Assembly requires only 4 mounting screws.

Figure 165 – Mounting the Equipment Shelves



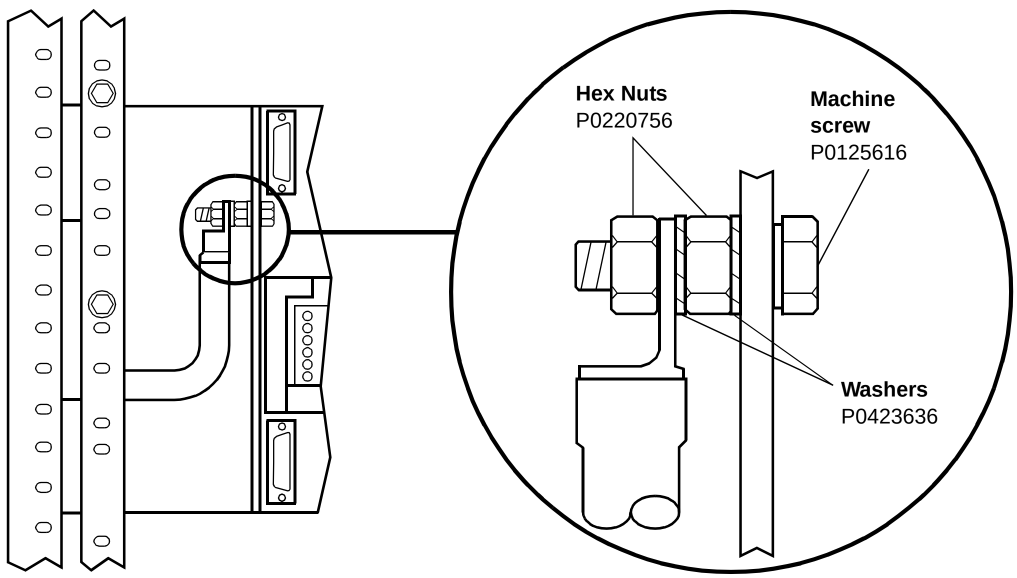
13.7 Grounding the Shelves

1 When a shelf is mounted and isolated from the framework, connect the ground strap(s) provided with the shelf and mounting hardware.

2 Connections for ground straps to the shelves are shown in Figure 166 and Figure 167. Connection of the straps to the vertical ground bar is illustrated in Figure 168.

3 Mounting and grounding hardware for NT4X25DH shelves can be ordered using number NT4X2591.

Figure 166 – Ground Connections for NT5X09AA Shelf



4 Once the shelves are grounded, perform the grounding test. (Canadian market refer to Method 16-8200, "OEM and Inverter Isolation and Grounding.")

Figure 167 – Ground Connections for NT4X25BH (MD)/DH

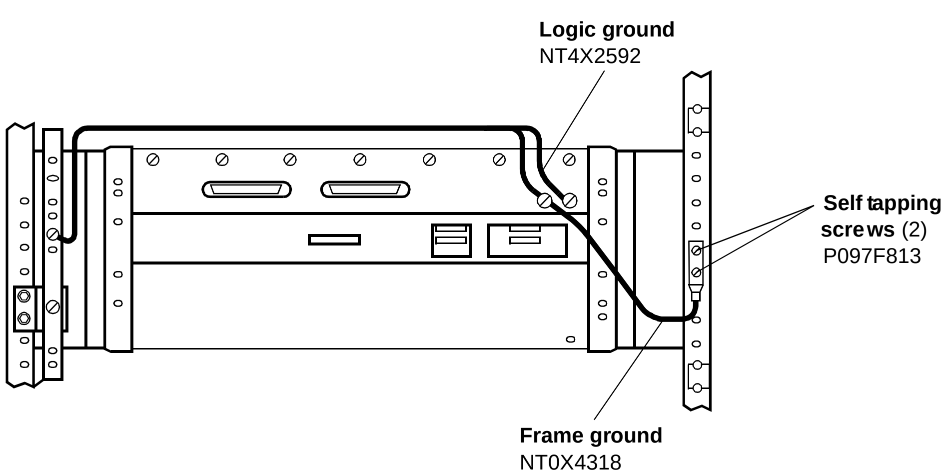
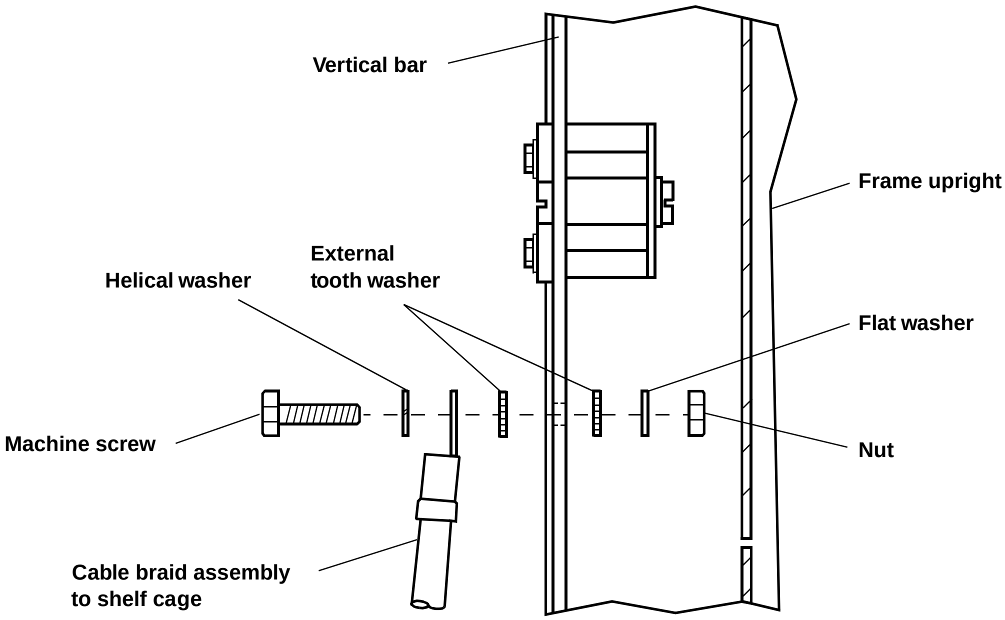


Figure 168 – Connection to the Vertical Ground Bar



13.8 Frame ABS, Alarm, and Power Cabling

1 The battery and battery return power cables terminate on the rear of FSP. Terminations are assigned per the FSP schematic drawings.

2 The cables are run down the left side of the frame and then across the bottom of FSP. There are four feeds coming into the frame from PDC.

3 The ABS cable is run from frame to frame on the rear of the frame at the level of the FSP's bottom.

4 If the frame is first or last in the lineup, the end aisle pilot cable connections are made at the FSP. Connections are made to TB2-11 (-48V) and TB2-12 (AISALM2).

5 ABS cable must be identified at both ends. Refer to event 09 (method 03-9059) subsection 5.7 and event 07 (method 03-9057) for details.

6 Run alarm multiple cable along the rear bottom of FSP. Cable NT0X26AE leaves the preceding frame on C02 and connects on a succeeding to C01, and so on down the lineup. Multiple ends at the last frame in the lineup.

13.9 Frame Power Distribution for NT5X09AA Shelves

1 There is a number of different configurations of the MOE frame. The job engineer is to provide the wiring drawings for every extension job.

2 Figure 169, Figure 170, Figure 171, and Figure 172 illustrate a few examples of power distribution interconnecting on the frame.

3 The power cable assemblies are to be supplied to the job every time the shelf is installed in the field. The following listing provides the PEC numbers of each of these assemblies.

4 For configurations shown in Figure 169, Figure 170, Figure 171, and Figure 172, the required power cable assemblies are listed below:

SH	Figure 169	Figure 170	Figure 171	Figure 172
04	NT0X4312 NT8X4802 NT0X4310 NT0X4313	NT0X4312 NT0X4309 NT0X4308 NT0X8849	NT0X4312 NT0X4310	NT0X4312 NT0X4310
26		NT8X4801 NT0X4309 NT0X4308 NT0X8849	NT8X4801 NT0X4309 NT0X4308 NT0X8849	NT0X4309 NT0X8849
52			NT0X4313 NT0X4316	NT0X4313 NT0X4316
66				NT0X4307 NT0X4307

5 In addition to the above cable assemblies, in Figure 171 there are four over barrier straps and in Figure 172 there are eight over barrier straps required. The CPC number for these straps is A0324131.

6 Run these cables along the right upright, rear view, from each shelf to FSP. Follow the bus numbers for each cable to connect correctly at the FSP. Form the cables first, then check for the locations of each cable, then terminate to the FSP and the shelf.

7 For methods of running, forming, securing and crimping, refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements." Leave about 5 inches of slack at point of connecting, but form that slack flat against the rear plate of the shelf.

8 Mapping of power through the FSP to the shelves is shown in Figure 175.

Figure 169 – NT5X09AA Single Shelf Power Distribution

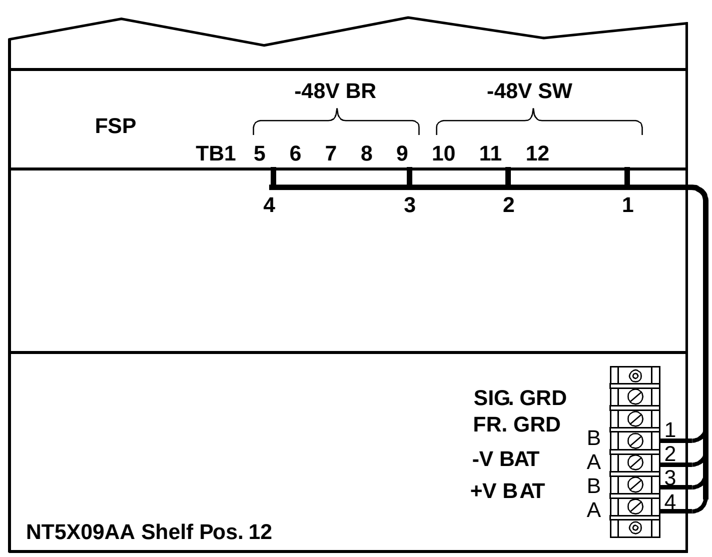


Figure 170 – NT5X09AA Two Shelf Power Distribution

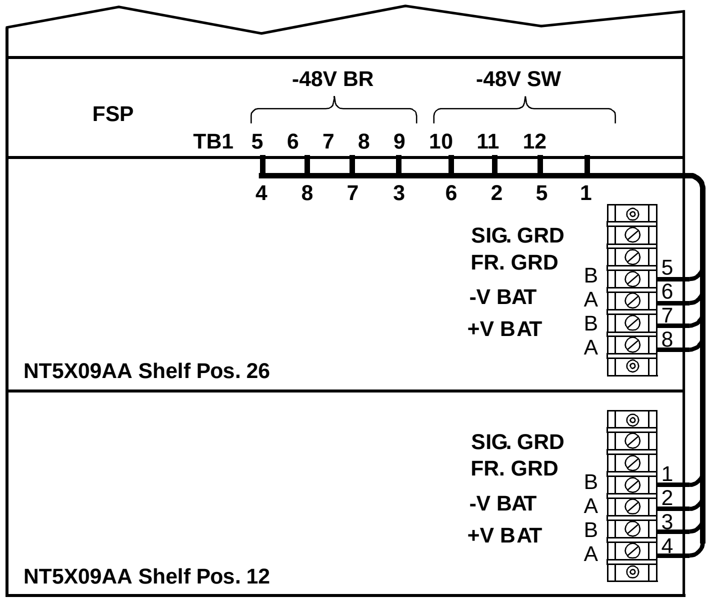


Figure 171 – NT5X09AA Three Shelf Power Distribution

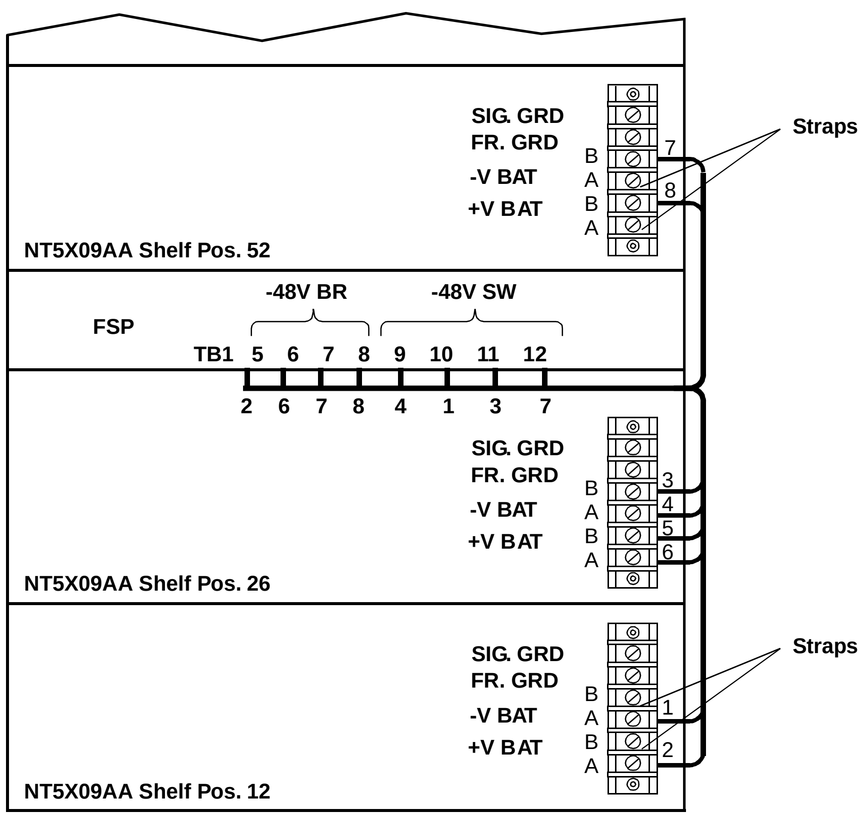
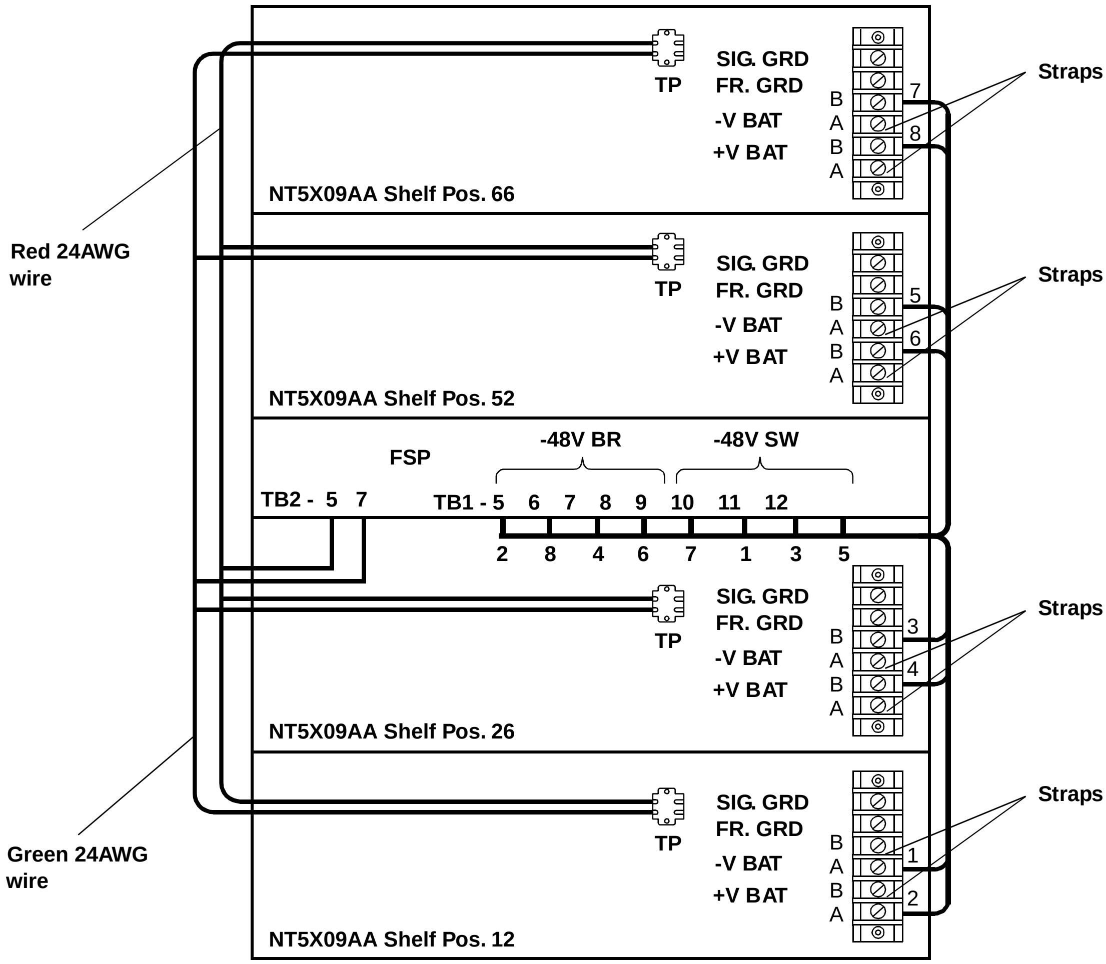


Figure 172 – NT5X09AA Four Shelf Power Distribution



13.10 Frame Power Distribution for NT4X25DH Shelves

1 The MOE frame can be equipped with up to five Data Unit NT4X25DH shelves. For dc operation, these shelves must be provisioned with the NT4X25DL power supplies.

2 Figure 173 shows connectivity for power cables within the frame.

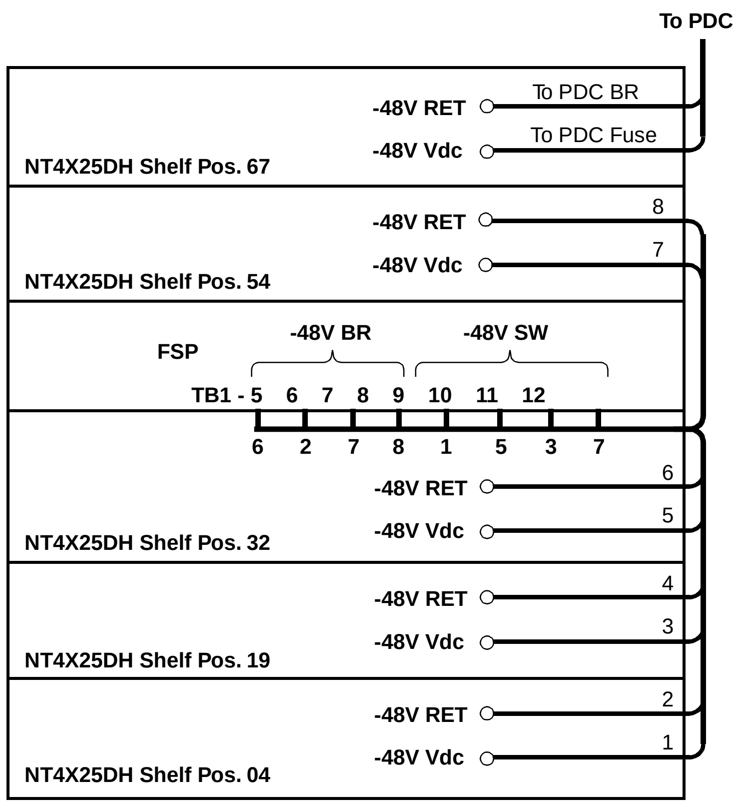
3 Run and form these power cables along the right upright using the methods described in Event 7 (Method 03-9057), "General Cabling and Torque Requirements." Leave about 5 inches of slack at the point of connecting, but form the cables against the rear plate of the shelf.

4 Prefabricated power cable assemblies are not provided with the job. The job engineer is to provide for every NT4X25DH shelf the following:

Material	Qty.	CPC#
Power cable 10AWG	10 ft.	R0103145
Compression Lug	1	A0292996
Compression Lug	1	A0288183

5 Figure 173 shows the mapping of power through FSP for this configuration.

Figure 173 – NT4X25DH Five Shelves Power Distribution



13.11 Modem Pooling Power Distribution

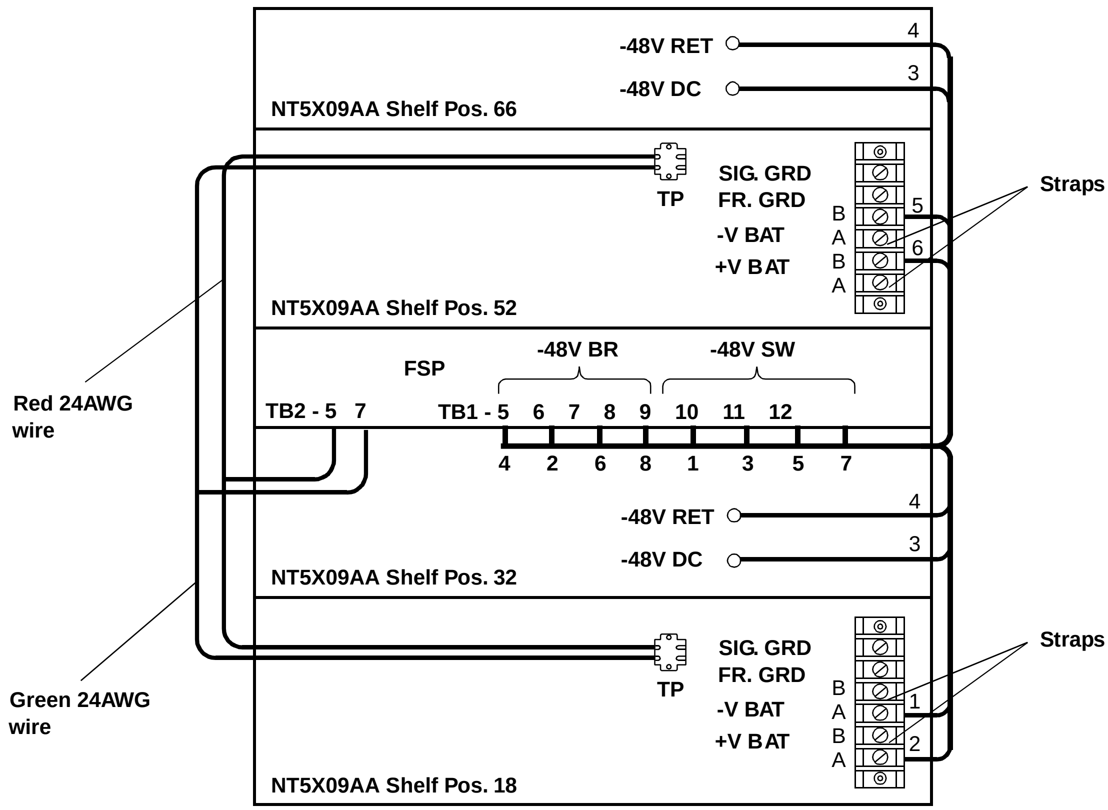
1 This is a configuration of two types of shelves. Figure 174 shows the distribution of power for Modem Pooling. This is a special arrangement and not every job will be equipped with this type of configuration.

2 Run and secure these cables along the right upright of the frame. Form the cables along the bottom of each shelf, then up to their respective terminals. Leave about 5 inches of slack at point of connecting, but form them flat against the rear plate of the shelf.

3 Run and secure the alarm wires along the left upright of the frame, then along the bottom of the shelf and up to the terminal punch. Leave about 5 inches of slack on each wire at the point of connecting.

4 Figure 174 shows the mapping of power through the FSP for this configuration.

Figure 174 – Modem Pooling Power Distribution



13.12 Installing NT3X25AA Equipment Shelves

1. This item is usually mounted in the shop. However, it may be necessary to install it in the field.
2. A maximum of eight shelves can be mounted on a frame. Positions 10, 17, 24, 31, 38, 52, 59, and 66 are used when a frame is fully equipped. When other shelves are furnished on the frame, the number of equipment shelves is reduced accordingly.
3. Run and secure, with ty-raps, the ac cords down the upright to the inverter(s) and plug them into outlets J2, J3, and J4. Do not use outlet J1 since that outlet output is 170V square ac for driving the old mechanical teletype.
4. The NT0X4303 Connector Housing Assembly is a shop mounted item and does not require isolation from the frame.

13.13 MOE Frame Switchboard Cabling

1. In general, there are a number of cables run from the MOE frame to different locations in the office. Cable tags for these cables have all pertinent information about terminating.
2. Cable tags also indicate what side of the frame the cables should be run into the frame. Recommended practice is to divide the total number of cables over two uprights. Bring the cables for each half of a shelf down the same side upright.

3 Secure the cables with ty-raps to cable brackets along the upright to the point of entry to the shelf, be that top or bottom of shelf. Form the cables along the shelf top or bottom and break the cables off at each connector termination point.

4 Connect the cables to their respective connectors, then secure the cables in a bundle at every second break off or every 4 inches from the center of the shelf towards the upright. Any left over slack shall be pulled up and dispersed in the cable trough.

5 For modem pooling applications, the same logic shall apply. Usually these shelves are mounted one above each other. Connect the cables to their respective connectors and secure the same as in paragraph 4.

6 Refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements," for the common cabling operations.

13.14 Work Inspection

1 Before moving on to the next task, inspect the workmanship on the frame by checking the following:

a. Power connection location (installation) and quality (installation and shop)

b. Switchboard cabling location and connectors' connections

c. Securing of cables - no loose cables hanging off the uprights and the overall appearance of the frame.

13.15 FSP Power Mapping for Shelves

1 Refer to Figure 175, Figure 176, and Figure 177 for FSP mapping for unique shelves.

Figure 175 – FSP Power Mapping for NT5X09AA Shelves

FSP in terminal	Fuse # and feed	FSP out terminal	Shelf pos. #
TB1-1	F03 (A)	TB1-10	12
TB1-2	F01 (A)	TB1-9	66
TB1-3	F02 (B)	TB1-11	26
TB1-4	F04 (B)	TB1-12	52

Figure 176 – FSP Power Mapping for NT4X25DH Shelves

FSP in terminal	Fuse # and feed	FSP out terminal	Shelf pos. #
N/A	PDC fuse	N/A	67
TB1-1	F03 (A)	TB1-10	32
TB1-2	F01 (A)	TB1-9	04
TB1-3	F02 (B)	TB1-11	19
TB1-4	F04 (B)	TB1-12	54

Figure 177 – FSP Power Mapping for NT5X09AA and NT4X25DH Shelves (Modem pooling)

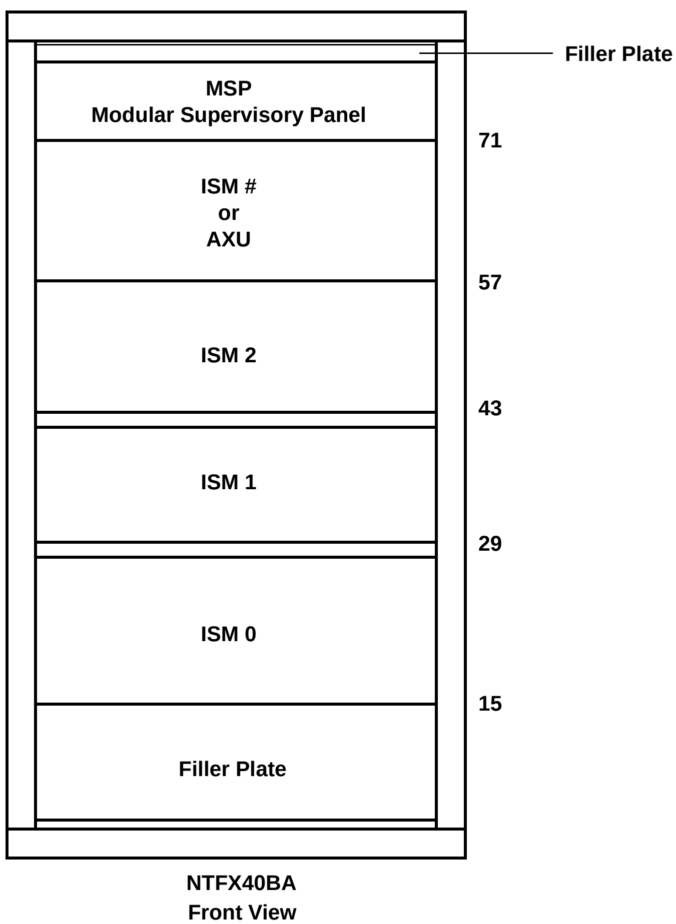
FSP in terminal	Fuse # and feed	FSP out terminal	Shelf PEC	Shelf pos. #
TB1-1	F03 (A)	TB1-10	NT4X25DH	32
TB1-2	F01 (A)	TB1-9	NT5X09AA	18
TB1-3	F02 (B)	TB1-11	NT5X09AA	52
TB1-4	F04 (B)	TB1-12	NT4X25DH	66

14.0 Integrated Services Module Equipment (ISME) Frame

14.1 ISME Assembly

1 The Integrated Services Module Equipment (ISME) frame is provisionable and (NTFX40BA) can be equipped as shown in Figure 178.

Figure 178 – Integrated Services Module Equipment Frame



14.2 ISME Frame Grounding

1 Logic ground at the TB1-7 terminal is connected by way of the bridge to TB1-2 and TB1-5 terminals. This bridge is shop installed. Verify that the bridge has been installed. External logic ground reference cable is not required. If that cable was run and connected, disconnect and remove it.

2 If the bridge is not there, order P0805295 and install it when received. The bridge terminations shall be done under the cable lugs on the top row of TB1 terminals. As a temporary measure, make the straps from #8AWG with appropriate lugs.

14.3 ISME Power Cable Connections

1 Run the power as specified in the 4851 spec or 1400 spec.

2 When bundled cables are spec'd, there will be one (1) run of bundled -48 VDC cables and one (1) run of bundled Battery Return cables. The bundled cable end(s) equipped with 90-degree lugs terminate at the ISME, the unlugged cable end(s) terminate at the PDC. The PDC end will require lugging prior to terminating.

Note: When Enhanced Alarm System (EAS) feature is required for the ISME frame equipped with an Alarm Cross-connect Unit (AXU) shelf, all power leads will originate from the power plant. This cabling information will be provided by the power group. All other ISME frames (without AXU) will be powered by the PDC.

EAS feature is a standard requirement for the U.S. market and optional for all other markets. For non-EAS applications, ISME equipped with or without AXU will be powered from the PDC. (Refer to CA0X04.)

3 Terminate and form the power cables to the MSP prior to terminating the cables in the PDC. The slack is to be formed in the direction of the PDC.

4 ***Note:*** Do *not* remove insulators from either cable end until just prior to lugging and termination. Refer to Figure 179 and Figure 180 for the bundled cable codes and terminations at the MSP.

Figure 179 – ISME Bundled Cables

CPC	PEC	Description
B0261182 B0261185	NTY750AN NTY750AR	ISME Power Cable 10 Ga. (-48V) ISME Power Cable 10 Ga. (BR)
B0261183 B0261186	NTY750AP NTY750AS	ISME Power Cable 8 Ga. (-48V) ISME Power Cable 8 Ga. (BR)
B0261184 B0261187	NTY750AQ NTY750AT	ISME Power Cable 6 Ga. (-48V) ISME Power Cable 6 Ga. (BR)

Figure 180 – ISME Power Connections

-48V	BAT RTN
TB2-1, 2, 3, 4, 5, 6	TB1-1, 2, 3, 4, 5, 6

5 Horizontal form should be ty-rapped approximately every four inches to the first breakout. Event 07 (Method 03-9057), "General Cabling and Torque Requirements," will be the controlling document with regards to ty-rapping.

6 There are two main power feeds for power converter inputs. The A1 feed provides the power for ISM shelves 0 and 2. The B1 feed provides the power for ISM shelves 1 and 3.

7 When installing bulk power cables, connect the cables with the appropriate one-hole, insulated lug found in the hardware kit as follows.

Cable Ordered	PEC code of Lug
6 ga.	A0288176 (90-degree)
8 ga.	A0288178 (90-degree)
10 ga.	A0298616 (90-degree)

For both top and bottom feeds, 90-degree lugs are to be used for both the top and bottom of TB1 and TB2.

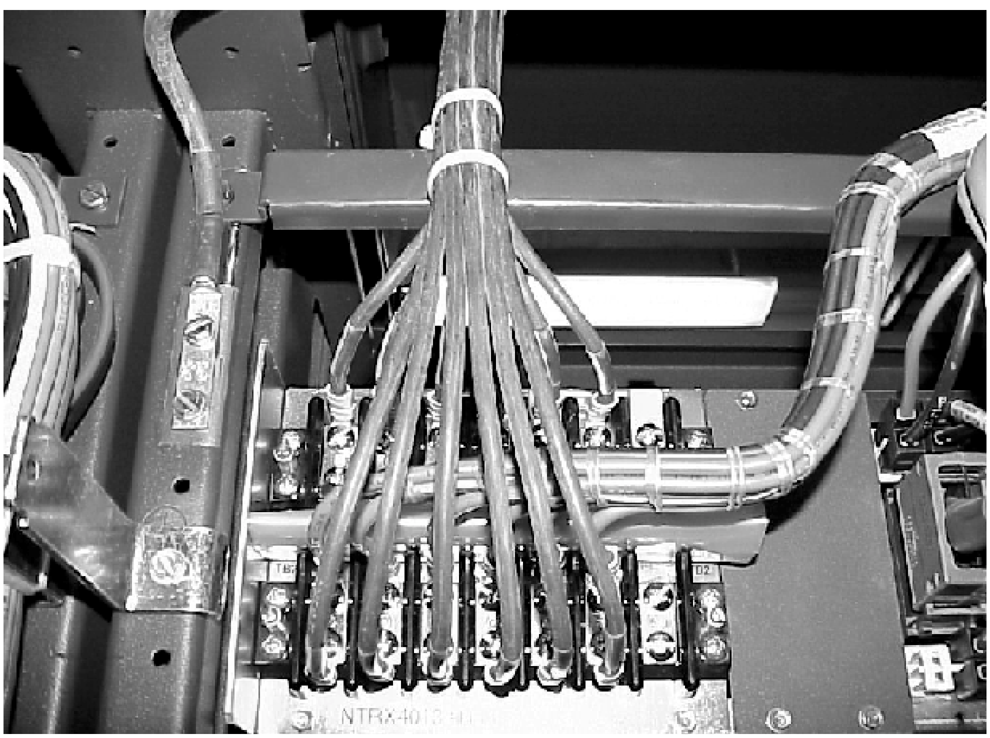
8 Remove safety covers from terminal strips TB01 and TB02. Save this hardware for reassembly.

9 Power cables are to be routed through the power shields of the cable troughs. Route the power cables across the top of the MSP and form them down at drop location S5 of the MSP and back towards the terminal blocks. The power cables may be secured to the cable support bracket on top of the MSP. Refer to Figure 181

10 After all power and ground connections (bundled or bulk) have been made to the MSP, add the removed safety covers to terminal strips TB01 and TB02.

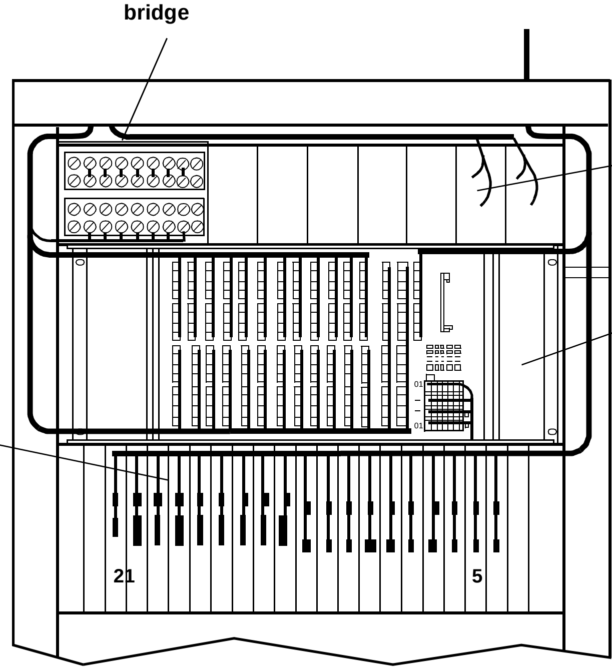
11 For torquing power connections on terminal strips, refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements."

Figure 181 – Power Cable Forming



12 Refer to Figure 182 for a view of the AXU cabling.

Figure 182 – AXU Cabling



13 Filtered and Special Battery Connection power cables are also terminated at the TB1 and TB2 terminal blocks. Filtered A2/B2 (Talk Battery) and SP A3/B3 (Special Battery) are distributed over all equipped shelves.

14 Form and connect these cables as shown in Figure 182. For torquing the power connections on terminal strips, refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements."

14.4 ISME ABS and Alarm Cabling

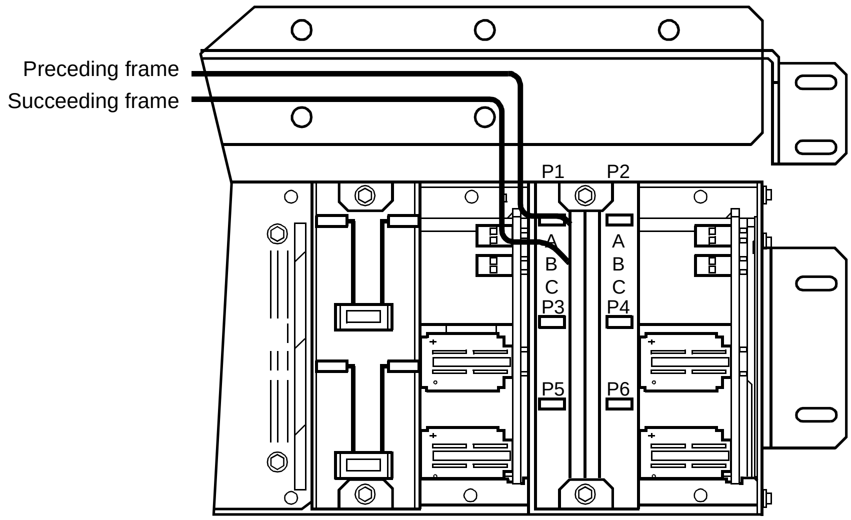
ABS Multiple

1 The ABS multiple consists of a single cable (L-ABS) running from a PDC or preceding frame into MSP. Figure 183 shows the location of these connections.

2 Move the P0737433 terminal cover on MSP TB02 so that it covers section P1 terminal C and section P2 terminal C. Run the ABS cable from frame to frame at the rear of the frames along the cable bracket at the top of the MSP to the right side of the MSP. The cable from the preceding frame or the PDC connects to TB02 section P1 terminal A. If the preceding frame is equipped with an FSP, the cable will be equipped with a ring terminal at the FSP end. The cable to the succeeding frame connects to TB02 section P1 terminal B. If the succeeding frame is equipped with an FSP, the cable will have a ring terminal at the FSP end.

3 ABS cable must be identified at both ends. Refer to event 09 (method 03-9059) subsection 5.5 and event 07 (method 03-9057) for details.

Figure 183 – L-ABS Multiple Connections



14.5 ISME End-Aisle Pilot Cabling

1. If the frame is first or last in the lineup, the end-aisle pilot cable connection is made with fixed length cable NT0X96KS. Connect the O2W wire of the cable to the gold (bottom) terminal of the end aisle pilot light. Connect the O1W wire to the silver (top) terminal of the end aisle pilot light. Run the cable from the end guard to the frame by way of the cable trough. At the ISME MSP, locate cable NTRX4052 which originates at MSP module 05 connector P6C. Locate the tied back O1R and O2R leads of this cable which terminate in insulated male push-on terminals. Free these leads and using the female push-on terminals on the NT0X96KS cable, connect NT0X96KS O2W lead to NTRX4052 O2R. Connect NT0X96KS 01W to NTRX4052 01R. Refer to Figure 184 for the origination of the NTRX4052 cable on the MSP. Secure the joined cables to the cable bracket above the MSP.

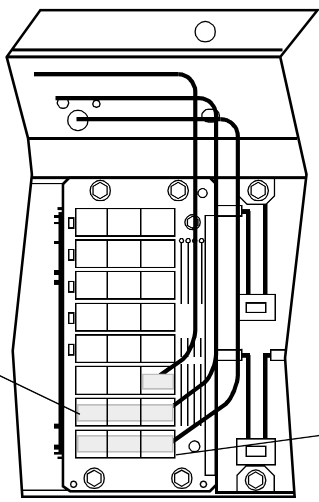
2. If the ISME frame happens to be in a lineup by itself, four A0288182 ring terminal lugs and lengths of R0106540 (red) and R0106542 (black) wire will be supplied as well as the NT0X96KS cable. Install the NT0X96KS cable to the aisle pilot light in one end guard as per the first/last frame method. Then run the red and black wires to the end guard on the other side of the frame by way of the cable trough.

3. The red and the black wires have to be double connected at the lamp. To do this, cut the lugs off the NT0X96KS cable. Using the lugs (A0288192), crimp the Red wire to O2W and Black to O1W and connect them to the lamp to their respective terminals. Crimp the same code lugs at the other end of the Red and Black wires and connect them to their respective terminals.

   Note: Some NT0X96KS cables have been made with a 2x4 pin connector at the MSP end. Cut this connector off and crimp two insulated female push-on terminals (A0297938) on the O1W and O2W leads. Cut back unused leads and tape cable butt with insulating tape.

   Note: Due to manufacturing substitutions, some end guards may be equipped with end aisle pilot lights having push-on rather than the standard screw terminals. In this case it will be necessary to replace the ring terminals on the pilot light end of the cable with insulated female push-on terminal lugs (A0297938).

Figure 184 – Aisle Pilot and Alarm Connection



14.6 ISME Alarm Multiple

1 The alarm multiple cables are terminated on the MSP module in position 05. Cable from PDC or preceding frame connects at connector P7. The cable to the succeeding frame connects to P8. These two connectors are located at the bottom of the module. Pin 1 on these connectors is in the upper right corner when viewed from the rear of the connected connector. Refer to Figure 184 for the location of these connectors.

Cable codes for these cables are as follows:

a. from MSP to MSP NT0X96HT

b. from MSP to FSP NT0X96HU

c. from MSP to 42" cabinet NT0X96HV (25 pin)

d. from MSP to 42" cabinet NT0X96HW (37 pin)

e. from MSP to AXU NT0X96HU

Note: There has been a contingent of the above cables built to the outdated specs. The aisle alarms will not function in this case. If the aisle alarms will not work, take the hoods off the connectors at the MSP end, 2x10 level 5 connectors, and re-assemble them after turning the hoods 180 degrees. The design group responsible has been notified of this deficiency and the corrective action has been taken.

2 If a cable is run from/to the adjacent frame, there is no need to run it inside the cable trough. Run, form, and secure the cable, as required, depending on a configuration of the lineup (from MSP to MSP, from FSP to MSP, etc.).

3 If the alarm multiple must be run in the cable trough, bridging the gap in the lineup or some other reason; then each end of cable has to be tagged showing the far end termination.

14.7 ISME Switchboard Cabling

1 All switchboard cables are connected directly to the back panel of each shelf or MSP module. Each termination location is equipped with a plastic retaining clip. Connection is made by simply inserting the cable connector into this clip until it is fully seated inside the clip. All in-line (2x4, 2x8, 2x10, 2x20) connectors are polarized with a connector key protrusion on the side of the cable connector which mates with a slot on the plastic retaining clip.

2 Exercise ***caution*** while connecting these connectors.Be careful not to disturb any other connectors on the module or backpanel. Also, when making a connection, line up the cable connector with the receptacle and push the connector in straight to prevent damage to the pins.

DS-30, MDF/WTA Cabling (Analog Trunks)

3 Looking at the rear view of a ISME frame, the switchboard cables are run vertically down the right and left, rear uprights and secured with ty-raps to the cable brackets. Refer to Figure 185 for example only.

Refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements," for rules about common cabling operations.

4 The ISME frame may be configured in a few different ways. Refer to Figure 185. Configuration of each shelf may vary greatly within the frame and definitely from job to job. Always consult your job drawings for the configuration of each frame/shelf.

5 The ISME frame may house up to four ISM shelves. One frame per initial office will be equipped with three or less ISM shelves and the NT3X89CA Alarm X-connect unit (AXU).

6 Each shelf may be configured for a number of digital trunks and a number of analog/service trunks. Also, the whole shelf may be configured for either digital or analog trunks. This will depend on the customer's requirements.

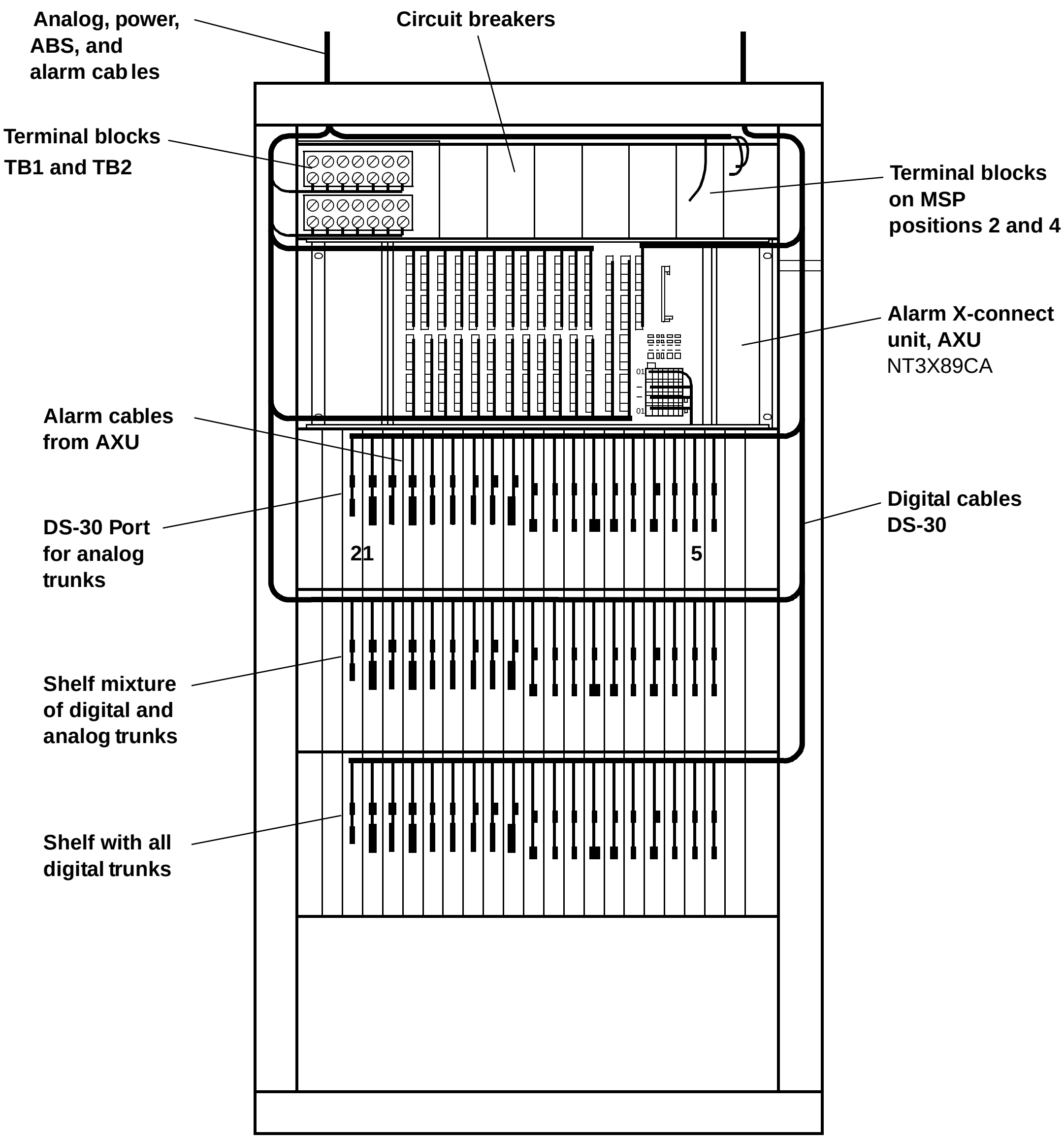
7 As shown in Figure 185, run all analog cables from MDF and/or WTA panel down the left upright to their respective shelf positions. Since all cables are connectorized at this end (MDF/WTA cables NT0X26LZ/NT0X96GL), connect them to their assigned locations. Butts of these cables will be staggered along the cable bar above the shelf.

8 Cables on the back of the shelf for analog trunks have two connectors A/B, CP positions 5 through 20. Ensure that connector A, Pin 1 mates with backplane pin 2A and connector B, pin 1 mates with backplane pin 16A.

Secure cables to the bracket on top of the shelf horizontally with ty-raps. Secure the cables to brackets vertically up the frame upright with ty-raps.

9 Figure 186 illustrates the positions of switchboard cable connectors exactly the way they are to be connected to the backpanel pins.

Figure 185 – ISME Frame Cabling

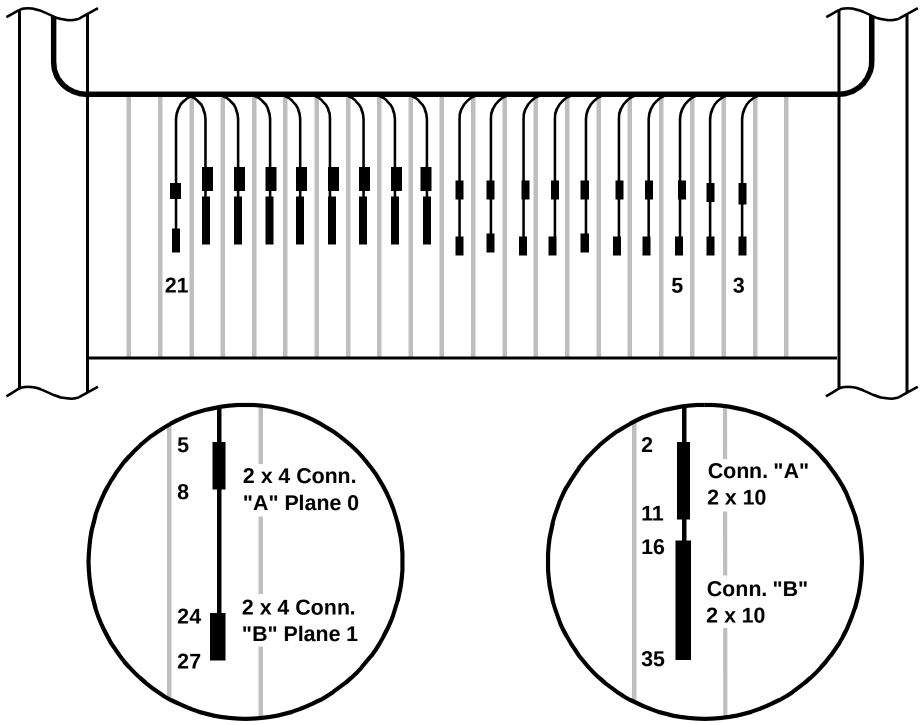


Rear View
NTFX40BA

10 DS30 port cables NT0X96JG (ENET) or NT0X96HX/JB (SLC) for analog trunks connect to CP position 21 pins 5-8 for connector A (plane 0) and pins 24-27 for connector B (plane 1). Run this cable(s) into the shelf down the right side of the frame upright.

11 Ensure all connectors are well seated in their respective positions and no pins are misaligned or bent when connections are made. Connector key must always be on the right hand side of the connector.

Figure 186 – Connectivity on Backpanel



14.8 ISME DS30 Cabling to ENET/SLC

1. DS30 port cables NT0X96JG (ENET) or NT0X96HX/JB (SLC) for analog trunks connect to CP position 21 pins 5-8 for connector A (plane 0) and pins 24-27 for connector B (plane 1). Run this cable(s) into the shelf down the right side of the frame upright.
2. Ensure all connectors are well seated in their respective positions and no pins are misaligned or bent when connections are made. Connector key must always be on the right hand side of the connector.
3. DS30 cable connections for CP positions 3 through 17 equipped with digital trunks are made at every CP position. Every one of these trunks requires a DS30 port. Run these cables down to the shelves along the right side upright of the frame.
4. Cables NT0X96JG from ENET or NT0X96HX/JB from SLC connect to every provisioned position pins 5-8 (plane 0) and pins 24-27 (plane 1). These connectors will plug into the large plastic connector retaining clips with connector key always on the right hand side. ***Caution*** is advised when counting the pins. Avoid misaligning and bending the pins on backpanel.
5. Once all cables are connected, secure them with ty-raps to the cable bar located along the top of the shelves and then to the cable brackets on the upright of the frame.

14.9 ISME Test Access (TA) Cabling

1 Test access cabling is a multiple within the frame. The Test Access (TA) is required only in a TM8 and DMS300 applications. The multiple starts at the ISM3, bottom shelf, where it's cabled from MDF by way of the cable NT0X96JJ.

2 The multiple ends at the last equipped shelf. If the shelf is configured as a TM8 and the test multiple is not required, then the 2X4 loop connector NTFX40DF must be plugged in the TA-A receptacle between CP positions 20 and 21.

If the office is using the NT2X90AD trunks for Improved Loop Test Access or VER-90 applications, ISM shelves in positions 53 and/or 39 will be equipped with NTFX44AA circuit packs. Each NTFX44AA pack will be cabled to up to four NT2X90AD circuit packs. For ILTA testing, each group of packs is connected by way of a shop installed NTFX40DW cable.

For ILTA VER-90 NTFX40DX, cables are supplied.

14.10 ISME Alarm System Cabling

1 When the NTFX40BA frame is provisioned with an NT3X89CA Alarm X-connect Unit, the cables from other alarm equipment are run horizontally on top and bottom of the AXU panel from the left upright.

Note: When the ISME frame is equipped with an AXU, the ISM shelves in positions 39 (Primary Alarm ISM) and 21 (Secondary Alarm ISM) are provided by the shop as a group with interconnecting cables.

Each vertical run of cables will serve two connectors, top and bottom. Secure the cables to the panel using ty-raps already provided on the panel. Refer to Figure 182 for the example of how to form the cables on the rear of AXU.

2 The alarm leads to the TB1 terminal block shall be formed from the butt location just below the block up the right side of the block, then horizontally to the left to each row of terminals. Use small ty-raps to make these forms.

3 Terminal rings shall be used on terminal block TB1. This is the cable from the audible alarm panels. Crimp with the crimper (one crimp) and terminate under the screw. Soldering is not required. The wire wrap pins should be left open for cross-connections, if required.

4 Cables from the AXU to the shelf directly below, to alarm system circuit packs, are installed in manufacturing. Position of these circuit packs will remain standard and so will the datafill for the alarms.

5 The new AXU is very much the same as the previous one. The appearance is different. It still contains connectors designated the same way as on the previous one, but these are smaller.

14.11 ISME Designating

1 The designation labels are provided, on a job basis, to each job as required. Notes and instructions on Spec 112, MS0X60AA and Event 11 (Method 03-9061), "Miscellaneous Trim and Designation," Section 9.0, "Designating DMS Family Equipment," shall be used as a guide for locating field-installed label locations and for designating the equipment.

14.12 ISME Work Inspection

1 Before moving on to the next task, inspect the workmanship on the frame by checking the following:

a. Power connection location (installation) and quality (installation and shop)

b. Switchboard cabling location and connectors' connections

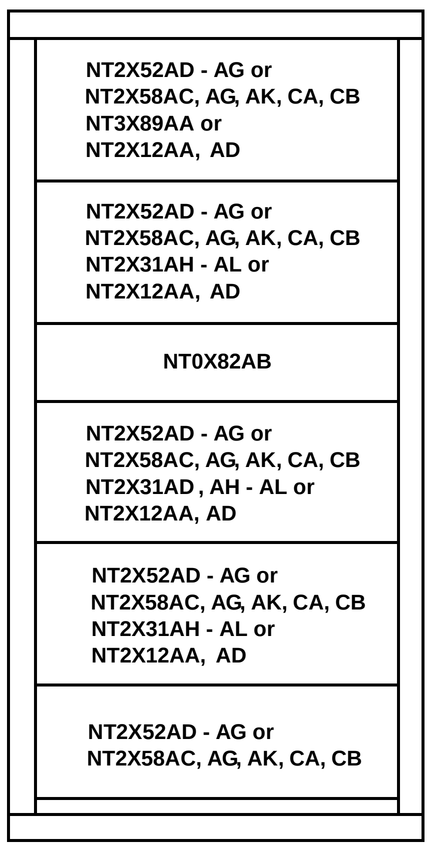
c. Securing of cables – no loose cables hanging off the uprights and the overall appearance of the frame.

15.0 Trunk Module Equipment (TME) Frame

15.1 TME Frame Layout

1 The Trunk Module Equipment (TME) frames (NT0X46AB) are provisionable and can be equipped with a variety of combinations. Refer to Figure 187.

Figure 187 – Trunk Module Equipment Frame



Front View
NT0X46AB

15.2 TME Frame Grounding

1 Frame ground links (cable braid assembly) and required mounting hardware are supplied with each frame.

2 The first holes from the ends on the horizontal bus bar (on the cable trough) are used for installing cable braids from adjoining frames.

3 The second holes on the horizontal bus bar are used for mounting the horizontal bus bar on the cable trough.

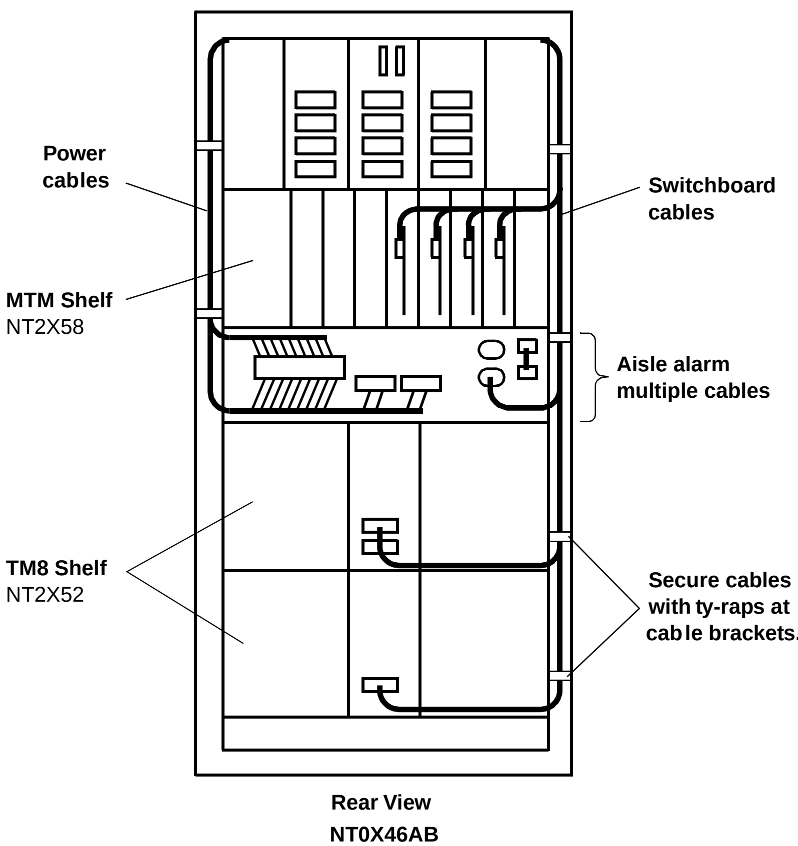
4 The third hole on the horizontal bus bar on the left-hand side (looking at the rear of the frame) is used to connect the cable from the left frame upright.

5 This frame will have a vertical logic ground bar *only* if it is provisioned with one or more DCM (NT2X31) shelves. If this is the case, the logic ground bar will cable to the LRB bar as provided by engineering. Refer to Event 6 (Method 03-9056), "Grounding."

15.3 TME Switchboard Cabling

1 Looking at the rear view of a TME frame, the switchboard cables are run vertically down the right, rear upright and secured with ty-raps to the cable brackets. Refer to Figure 188 for example only.

Figure 188 – TME Frame Cabling



2 When the NT0X46AB frame is provisioned with an NT2X52 TM8 shelf, the cables are formed horizontally across on the lower part of the shelf to the center. Form the cables vertically from the bottom of the shelf up to their respective connector locations. Refer to Figure 188.

3 When the NT0X46AB frame is provisioned with an NT2X58 MTM shelf, the cables are routed down the right, rear upright and horizontally across the top of the shelf, then vertically to the termination point.

Secure to the cable brackets vertically up the frame upright with ty-raps. Secure to the cable bracket on top of the shelf horizontally with ty-raps. Cable connectors must be secured to the connector key bracket with ty-raps. Ensure that connector A, pin 1, mates with backplane pin 2A and connector B, pin 2, mates with backplane pin 17A.

Use a ty-rap (P0567226/U.S., RE80109/Can.) to secure the cable connector to the connector key brackets.

Thread the large ty-rap through the holes in the connector key bracket and secure the cable connector hood to the key bracket.

Locate the head of the ty-rap on the opposite side of the bracket from the cable connector. Locate the ty-rap at the *Top* of the connector.

Cut the ty-rap flush. Ensure there are no sharp edges on the ty-rap when complete.

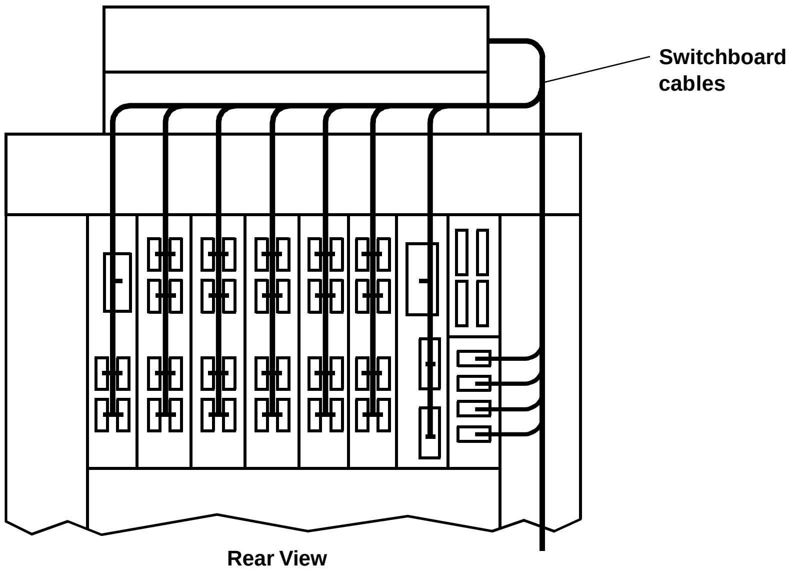
4 If NT2X58 shelf is mounted in position 32, the power feeders to FSP terminal strips TB2 and TB3 may rest on the cable bracket on top of the NT2X58 unit. If this is the case, the end of the cable bracket must be covered with sheet fiber to protect the cable.

5 For the MTM shelf, form and secure the cables with ty-raps at cable breakouts and at 4" centers on the horizontal cable arm.

6 When the NT0X46AB frame is provisioned with an NT3X89AA Alarm Cross-connect shelf assembly, the cables are run horizontally under the cable trough and then vertically to their respective drop panel. Each vertical run of cables will feed only one drop panel. Secure the cables with ty-raps at each breakout. Refer to Figure 189.

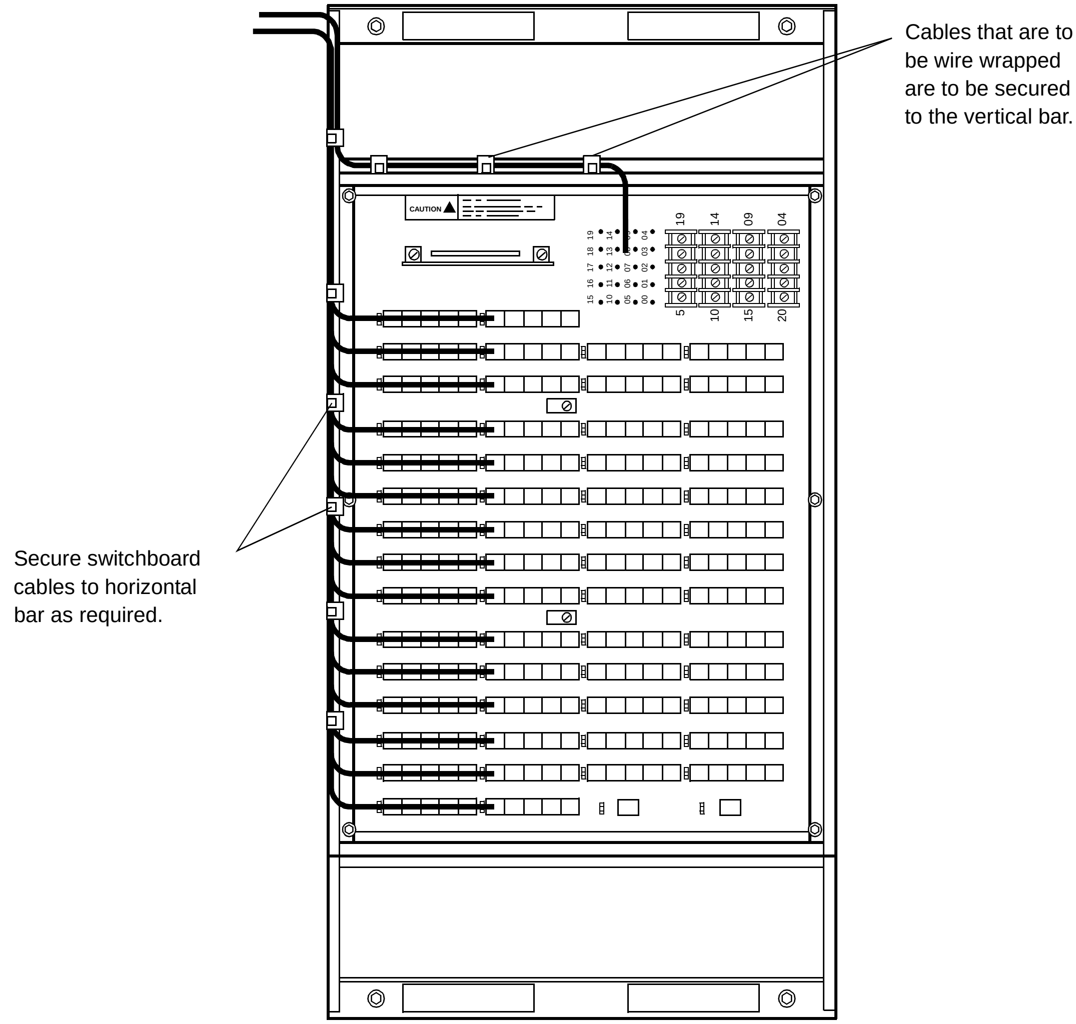
Note: Due to design, the flip plates on the NT3X89AA will not function. If, at such time, maintenance is required on rear of panel, cables would be accessed through the front of the shelf so switchboard cables would not have to be removed to gain access. If cables are entering from the bottom of the frame, use the same routing method as when top fed.

Figure 189 – Cabling an NT3X89AA Shelf



7 When the NT0X46AB frame is provisioned with an NT3X89CA Alarm Cross-connect shelf assembly, the cables are run horizontally under the cable trough and then vertically to their respective connector. Secure the cables with ty-raps at each breakout to metal bar going across top of shelf. Refer to Figure 190. If cables are entering from bottom of frame, use same routing method as when top fed.

Figure 190 – Cabling an NT3X89CA Shelf



8 The alarm leads to TB1 terminal strip shall be formed from butt location toward frame upright, then horizontally to each row of terminals. Use small ty-raps for these forms.

T&B RA857 (CPC A0288192) terminal rings shall be used. Crimp with T8132 crimper (one crimp) and terminate under screw. Soldering is not required. The wire wrap lugs should be left open for cross-connections, as required.

9 When NT0X96xx cables (from ENET) are connected to C05 and C06 on TME FSP, form the cable as follows:

- Secure the cable bundle down the right rear of the frame.
- The pigtails must be staggered along the form to ensure that they do not interfere with the operation of the doors.

15.4 TME Power and Alarm Cabling

1 The battery and return power cables terminate on the rear of the FSP terminal strip designated TB1. Terminals are assigned per FSP schematic drawings. The ABS supply terminate on TB2 terminal strip.

2 The cables are run down the left, rear frame upright and are formed horizontally across to the FSP. Form cables and secure to cable brackets using ty-raps. The horizontal cables shall be secured together with ty-raps at approximately every four inches to break off point and at every other break off. Refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements."

3 Do *not* secure cable(s) to frame or form until all crimping has been completed.

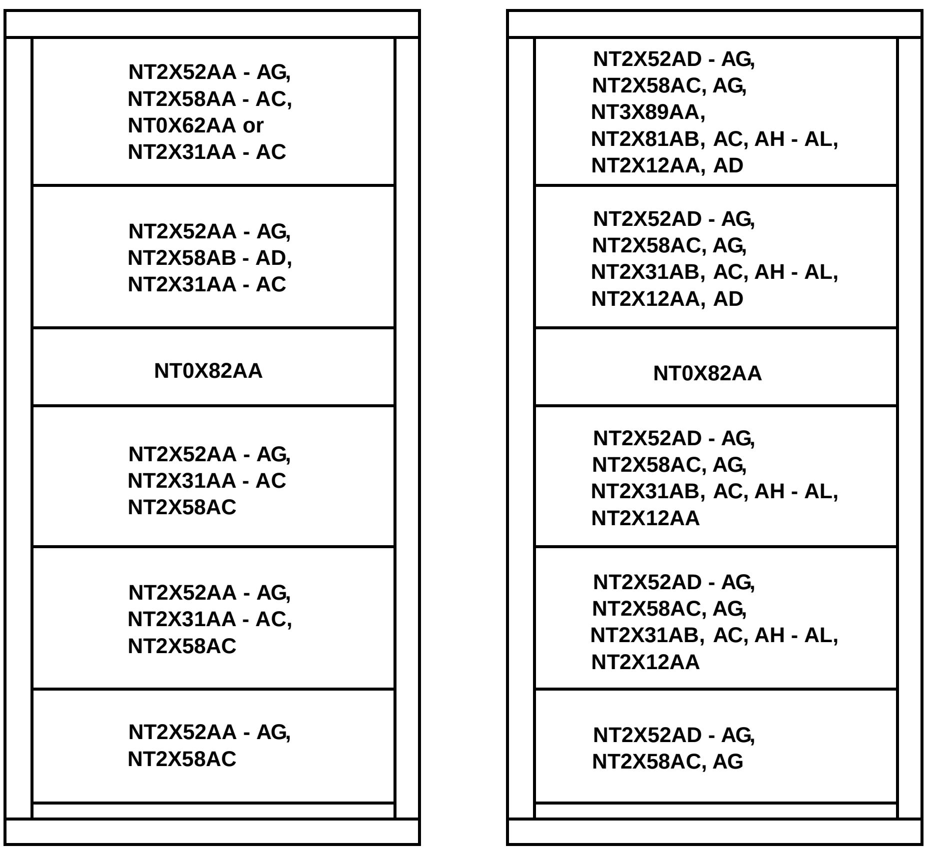
16.0 Digital Carrier Equipment (DCE) Frames (NT0X46AA/AB)

16.1 Digital Carrier Equipment (DCE) Overview

1 This section provides information about frame grounding, switchboard cabling, shielded cables, and power cabling the Digital Carrier Equipment (DCE) Frame equipment.

2 The Digital Carrier Equipment Frames (NT0X46AA and AB) are provisioned to each job condition and can be equipped with a variety of combinations. Refer to Figure 191.

Figure 191 – DCE Frame Configuration



NT0X46AA Front View **NT0X46AB Front View**

16.2 DCE Frame Grounding

1. Frame ground links (cable braid assembly) and required mounting hardware are supplied with each frame.
2. The first holes from the ends on the horizontal bus bar (to be located on the cable trough) are used for installing cable braids from adjoining frames.
3. The second holes on the horizontal bus bar are used for mounting the horizontal bus bar on the cable trough.
4. The third hole on the horizontal bus bar, on the left-hand side (looking at the rear of the frame), is used to connect the cable from the left frame upright.
5. For non-ISG grounding, the fourth hole on the horizontal bus bar is used to connect the cable for the vertical bus bar. Refer to Event 6 (Method 03-9056), "Grounding," for ISG grounding procedures.

16.3 DCE Switchboard Cabling

1. Most switchboard cables are connectorized, some on both ends, others on one end only.
2. Looking at the rear view of a DCE frame, the switchboard cables are run vertically down the right rear upright and secured with ty-raps to the cable brackets.
3. The cables are then formed horizontally across on the lower part of the shelf and then up vertically to the termination point and dressed. Refer to Figure 192.
4. Form and secure cables with ty-raps at cable breakouts and at 4" centers on the horizontal cable arm.
5. Frame aisle alarm multiple cables are to be run between adjacent frames, unsecured.

16.4 Shielded Cables

1. The shielded cables are run vertically down the right rear upright and secured with ty-raps to the cable brackets.
2. At breakout, butt cable 1/2" (+/- 1/4") below cable bracket. Refer to Event 7 (Method 03-9057), "General Cabling and Torque Requirements."
3. The transmit and receive cables are formed separate from butt location to termination point. Leads shall form horizontally across bottom of unit and dress 90 degrees into fanning strip. Refer to Figure 193.
4. Form spares separate and store vertically. Ensure leads are long enough to reach farthest point served by cable. Exposed leads must be protected at cable brackets. Use split fiber tube around leads. Secure with ty-raps.

   Leads cannot feed from top, as panel must be open to reach backplane.
5. Shield ground of transmit and receive cable terminate on ground pin 40. These leads must be soldered using a low wattage soldering iron. Use 22 gauge bit and sleeve to wrap these leads onto terminal.

Figure 192 – Cabling and Wiring of the DCE Frame

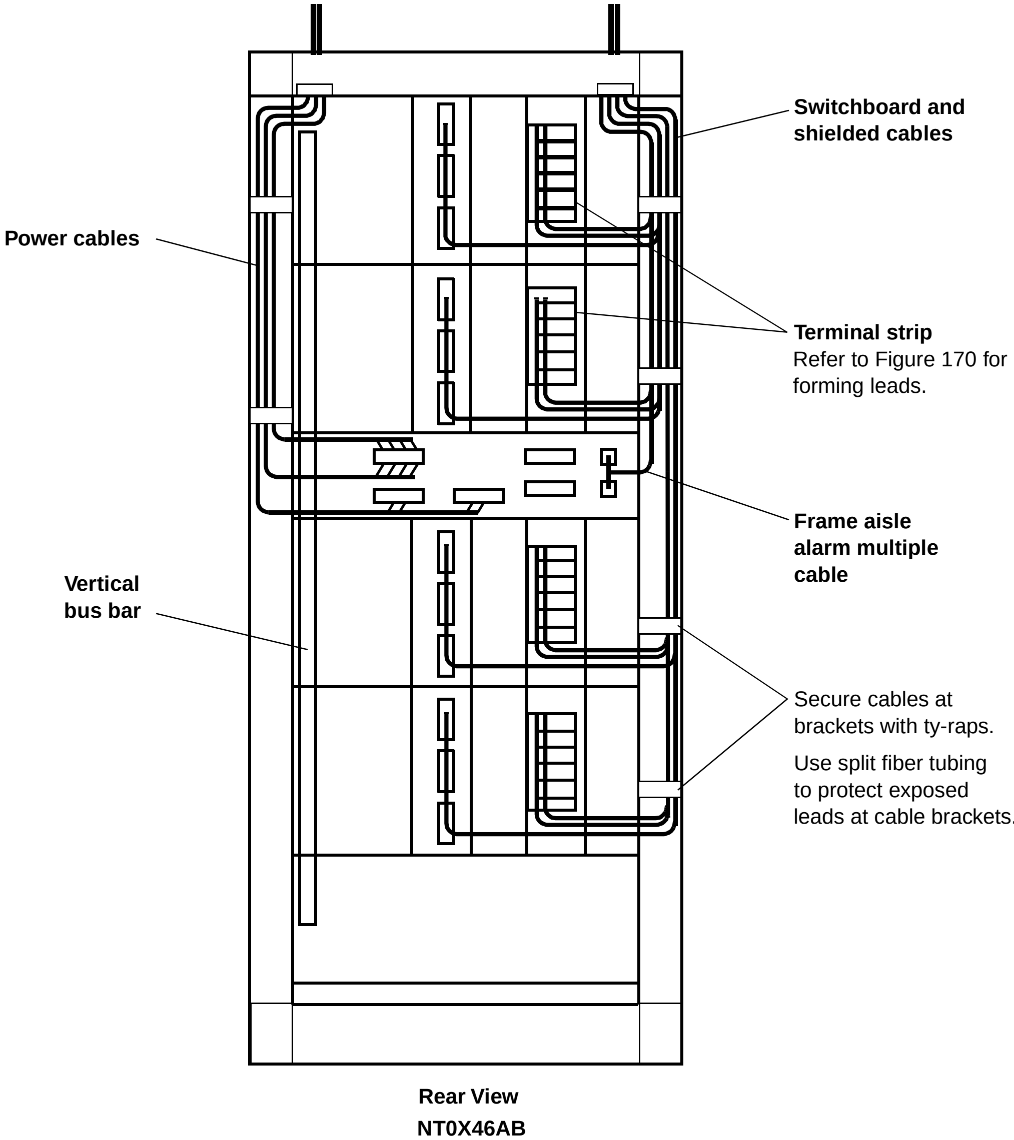
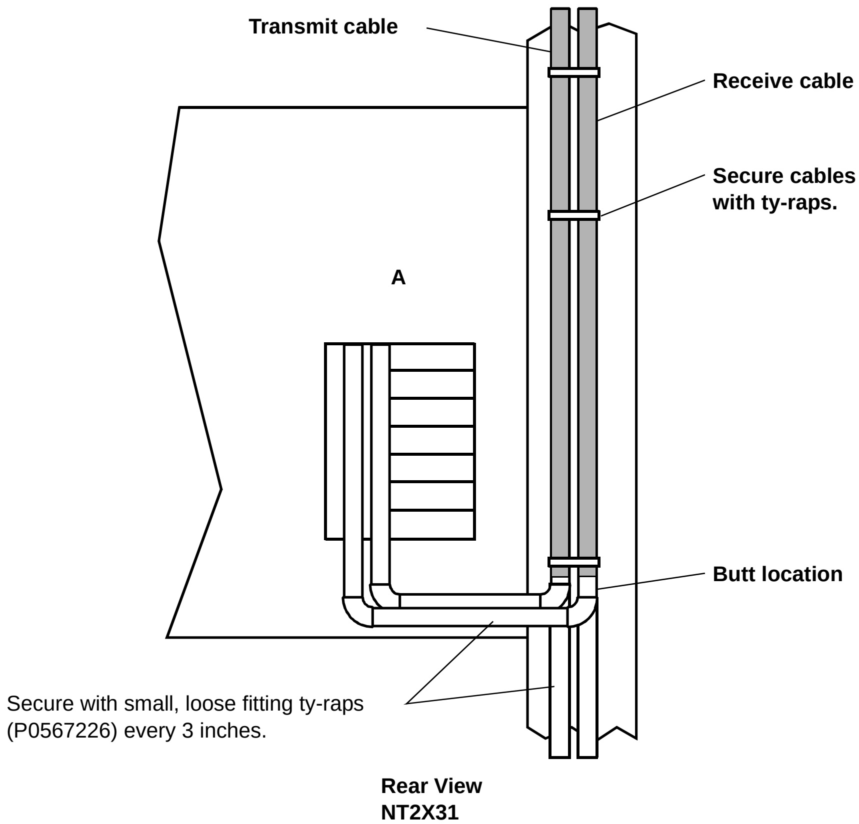


Figure 193 – DSX Cables to DCM



16.5 Power Cabling

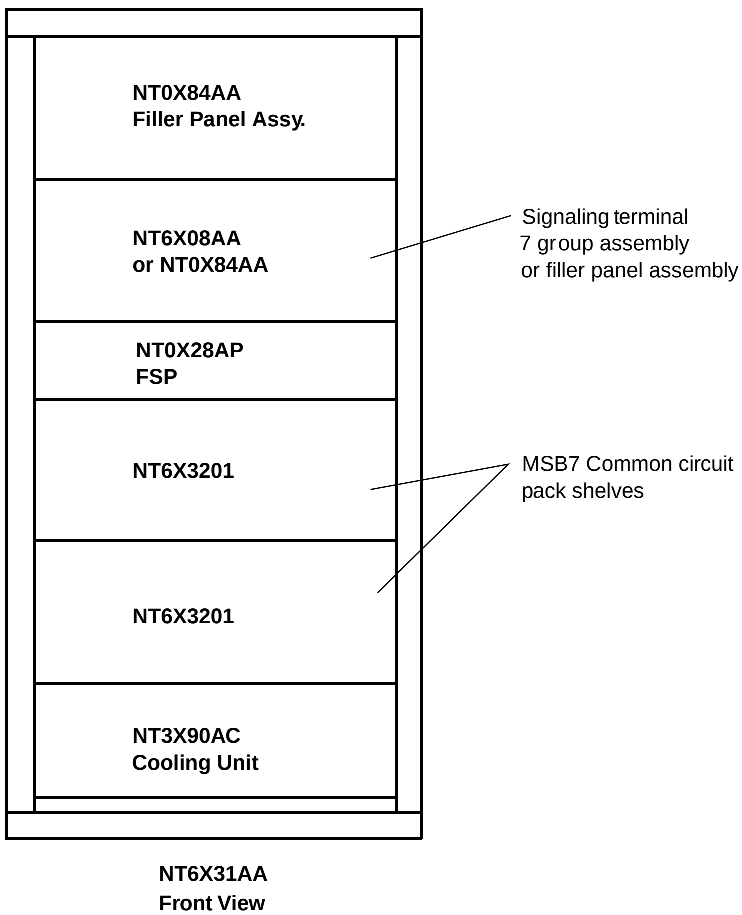
1. The battery and return power cables terminate on the rear of the FSP terminal strip designated TB1. Terminals as assigned per FSP schematic drawings. The ABS supply terminate on TB2 terminal strip.
2. The cables are run vertically down the left rear frame upright and are formed horizontally across to the FSP. Refer to Figure 192.
3. Form cables and secure to cable brackets using ty-raps. The horizontal form shall be secured together with ty-raps approximately every four (4) inches to first breakout point. Ty-raps at every other breakout at terminal strip.
4. Do *not* secure cables to frame or form until all lug crimping has been completed.

17.0 Message Switching #7 Equipment (MS7E) Frame

17.1 Message Switching #7 Equipment (MS7E) Assembly

1 The Message Switching #7 Equipment (MS7E) frame is a single bay frame. The frame is equipped with one signaling Terminal 7 group shelf assembly, one FSP, two MSB7 common circuit pack shelves, one cooling unit shelf, and one filler panel assembly.

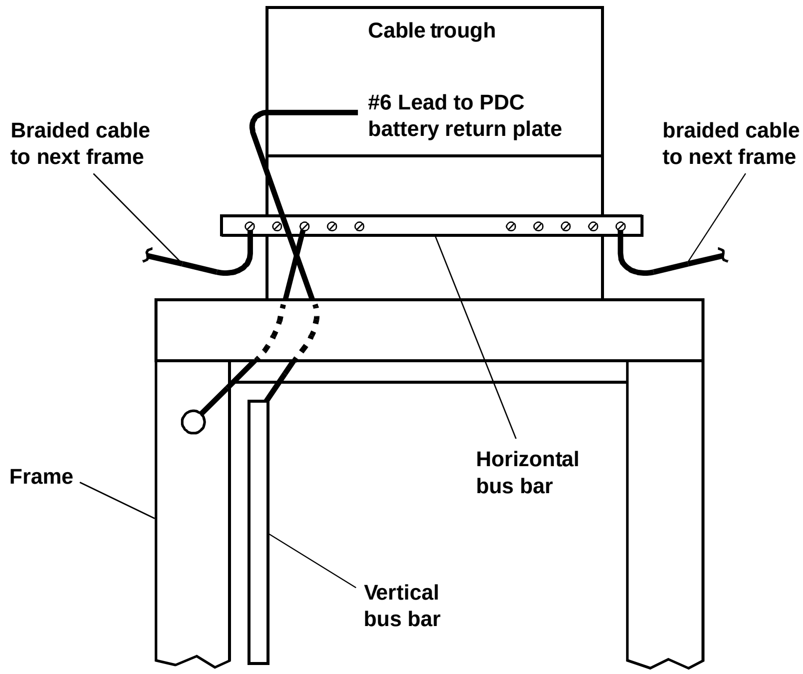
Figure 194 – MS7E Frame Configuration



17.2 Frame Grounding

1 Frame grounding link (cable braid assembly) and mounting hardware are shipped with each frame. Refer to Figure 195 for ISG Grounding. Additional ISG and non-ISG Grounding information can be found in Event 6 (Method 03-9056), "Grounding."

Figure 195 – Frame Grounding



17.3 NT0X26GD Switchboard Cables

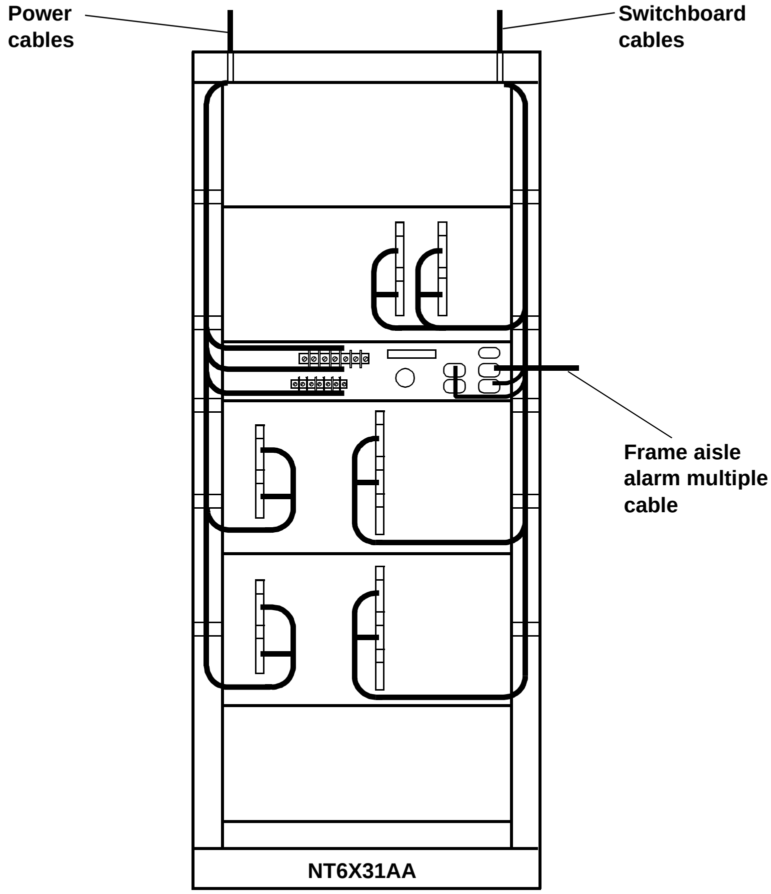
1 There are four NT0X26GD switchboard cables (connectorized on both ends) originating on the Signaling Terminal 7 Equipment Frame and terminating on the Signaling Terminal 7 Group Shelf Assembly on the MS7E frame. Refer to Figure 196.

2 The cables are run down the right rear (rear view) frame upright. The cables are then formed horizontally along the bottom of the shelf and up to the connector on the backpanel. These cables go to adjacent ST7E frame. They do *not* run in cable trough. Store slack in vertical and ty-rap to cable brackets.

3 The cable terminates on the NT6X0802 backpanel, Positions 12 and 13, Pin #1 on Connector "A/B" mates with Pin #41 on the backpanel and Pin #1 on Connector "B/C" mates with Pin #61 on the backpanel. Refer to Figure 197 for an example of a NT6X0802 backpanel.

4 The cables are secured to the cable brackets and cable form with ty-raps.

Figure 196 – Frame Cabling



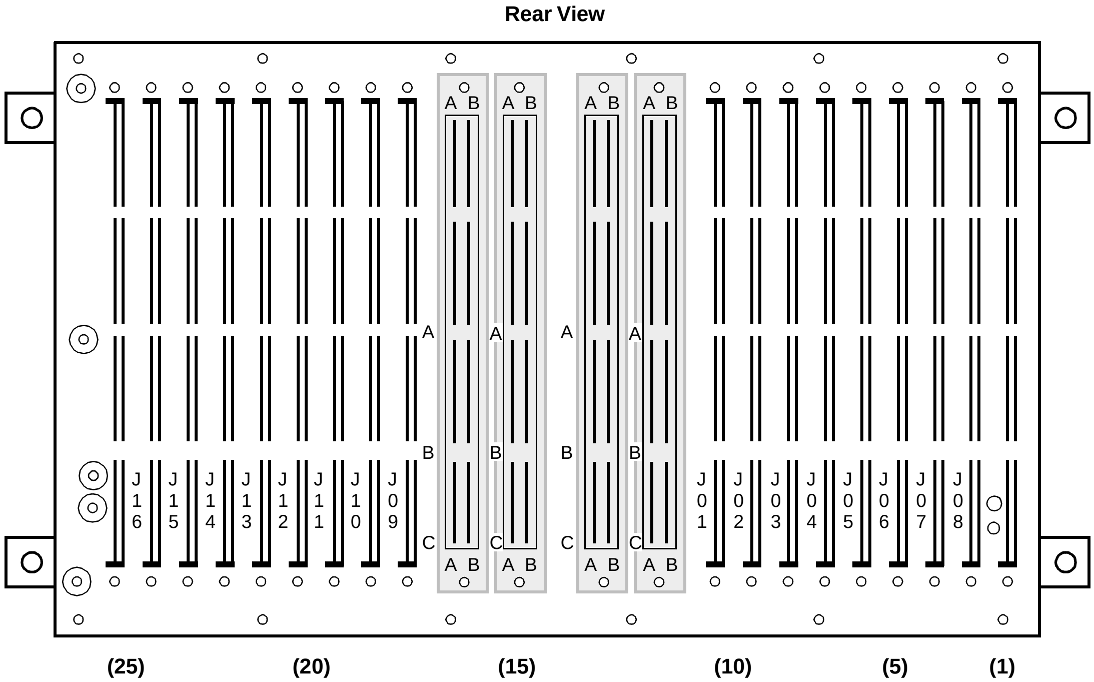
Rear View

17.4 NT0X26GV Switchboard Cables

1. There are six NT0X26GV switchboard cables (connectorized on both ends) originating on the Signaling Terminal #7 Equipment Frame and terminating on the MSB7 common circuit pack shelves, on the MS7E frame.
2. The cables are run down the right rear (rear view) frame upright. The cables are then formed horizontally along the bottom of the shelf up to the connectors on the backpanel. These cables go to the adjacent ST7E frame. They are 61" long and do *not* run in the cable trough. Store slack in vertical riser and ty-rap to cable brackets.
3. Cables terminating on NT6X3202 backpanel, shelf position 18 Pin #1 on cable connector "G" mate with Pin #31 on the backpanel position #17. Pin #1 on cable connector "H" mates with Pin #47 on the backpanel position #17.
4. Cables terminating on NT6X3202 backpanel, shelf position 32 Pin #1 on cable connector "J", mate with Pin #52 on the backpanel position #17. Pin #1 on cable connector "K" mates with Pin #56 on the backpanel position #17. Pin #1 on cable connector "L" mates with Pin #60 on the backpanel position #17. Pin #1 on cable connector "M" mates with Pin #64 on the backpanel position #17.

5 Secure cable connectors to the connector key bracket with ty-raps. Do *not* remove shop ty-rap around cable connector.

Figure 197 – NT6X0802 Backpanel



17.5 NT0X26GX Switchboard Cables

1 There are four NT0X26GX switchboard cables (connectorized on both ends) originating on the Signaling Terminal #7 Equipment Frame and terminating on the MSB7 Common Circuit Pack shelves on the MS7E frame.

2 The cables are run down the right rear (rear view) frame upright. The cables are then formed horizontally along the bottom of the shelf and up to the connectors on the backpanel. These cables run to the adjacent ST7E frame they are 70" long and do *not* run in cable trough. Store slack in vertical riser and ty-rap to cable the brackets.

3 Cables terminating on NT6X3202 backpanel, shelf position #18, Pin #1 on cable connector "J", mate with Pin #52 on the backpanel, position #17. Pin #1 on cable connector "K" mates with Pin #56 on the backpanel, position #17.

4 Cables terminating on NT6X3202 backpanel, shelf position #32, Pin #1 on the cable connector "G", mate with Pin #31 on the backpanel position #17. Pin #1 on cable connector "H" mates with Pin #47 on the backpanel, position #17.

5 Secure cable connectors to the connector key bracket with ty-raps. Do *not* remove shop ty-rap around cable connector.

17.6 NT0X26GY Switchboard Cables

1 There are two NT0X26GY switchboard cables (connectorized on both ends) originating on the Signaling Terminal #7 Equipment Frame and terminating on the MSB7 Common Circuit Pack Shelf, on the MS7E frame.

2 The cables are run down the right, rear (rear view) frame upright. The cables are then formed horizontally along the bottom of the shelves and up to the connectors on the back-panel. These cables run to adjacent ST7E frame. They are 87" long and do *not* run in cable trough. Store slack in vertical and ty-rap to cable brackets.

3 Cables terminating on NT6X3202 backpanel, shelf position #18, Pin #1 on cable connector "L", mate with Pin #60 on the backpanel, position #17. Pin #1 on the cable connector "M" mates with Pin "64" on the backpanel, position #17.

4 Secure cable connectors to the connector key bracket with ty-raps. Do *not* remove shop ty-rap around the cable connector.

17.7 NT0X26CC Switchboard Cables

1 There are four NT0X26CC switchboard cables (connectorized on both ends) originating on the Message Switching #7 Equipment Frame and terminating on the SLC Frame.

2 The cables are run down the left, rear (rear view) frame upright. The cables are then formed horizontally along the bottom of the shelves and up to the connectors on the backpanel.

3 The cables are originating on NT6X3202 backpanel, shelf positions #18 and 32, Pin #1 on cable connector "A", mate with Pin #10 on the backpanel, position 24. Pin #1 on cable connector "B" mates with Pin #18 on the backpanel, position 24.

There are two NT0X26CC cables originating on each shelf.

4 Secure cable connectors to the connector key bracket with ty-raps. Do *not* remove shop ty-rap around the cable connector.

17.8 Power Cabling

1 The battery and battery return cables are run down the left, rear frame upright (rear view) and formed across the FSP to the terminal strip.

2 Cables to the FSP terminate on the terminal strip TB-1. Terminals are assigned as per FSP schematic drawing.

Do *not* secure cable(s) to the frame or form until all crimping has been completed.

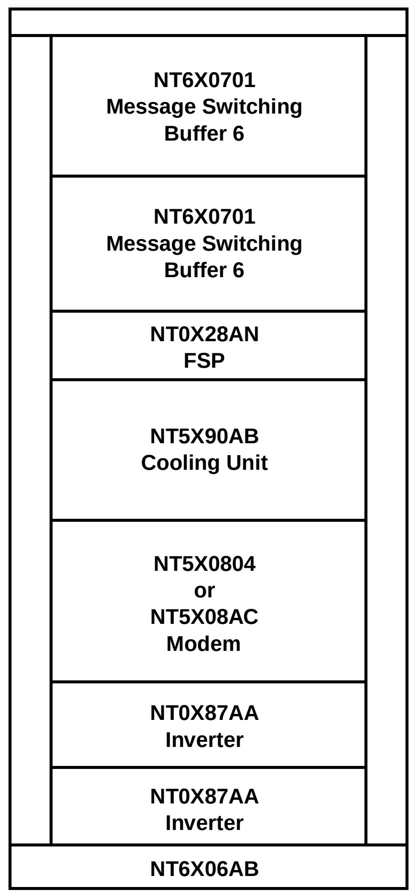
3 Form cables and secure to cable brackets with ty-raps. The horizontal cables shall be secured together with ty-raps at approximately every four inches.

18.0 Message Switching #6 Equipment (MS6E) Frame

18.1 Message Switching #6 Equipment (MS6E) Frame Assembly

1 The Message switching #6 Equipment (MS6E) frame is a single bay frame. The frame is equipped with two message switching buffer 6 shelves, one FSP, a cooling unit, a modem, and two inverter units. Refer to Figure 198.

Figure 198 – Frame Configuration



2 The inverter units are not shipped mounted on the frame. They are shipped separately and must be installed onto the frame by the field technician once the frame is in its final place.

18.2 MS6E Installing Inverter Units

1 Each unit weighs approximately 75 lbs. (34.05 kg.). Two persons are required to remove the unit from carton and install the units on the frame.

2 Remove inverter units from shipping cartons and install on frame with screws provided with each unit (Positions 04 and 11).

18.3 MS6E Frame Grounding

1 Frame ground link (cable braid assembly) and mounting hardware are shipped with each frame.

2 The first holes from the ends on the horizontal busbar (on the cable trough) are used for installing cable braids from adjoining frames.

3 If the frame is first or last in a lineup, the cable is routed either to a frame in another lineup or to the building ground.

4 The second holes are used for mounting the horizontal busbar onto the cable trough.

5 The third hole on the horizontal busbar on the left hand side (rear view) is used to connect the cable from the left frame up right.

18.4 MS6E NT0X26CC Switchboard Cables

1 There are two NT0X26CC switchboard cables (connectorized on both ends) going to each Message Switching Buffer #6 Shelf, Position 23. Refer to Figure 199.

2 The cables are run between the MS6E frame and the SLC.

3 The switchboard cables are run down the left rear frame upright (rear view) and then formed horizontally along the bottom of each shelf and up to the termination point (connector).

4 The connectors on the backpanel and the connectors on the cable are designated "A" and "B". Ensure that pin #1 on the cable connector "A" mates with the pin #10 on the backpanel, and pin #1 on cable connector "B" mates with the pin #18 on the backpanel. Refer to Figure 199. Refer to Figure 200.

Figure 199 – NT6X0701 Backpanel Pin Connection

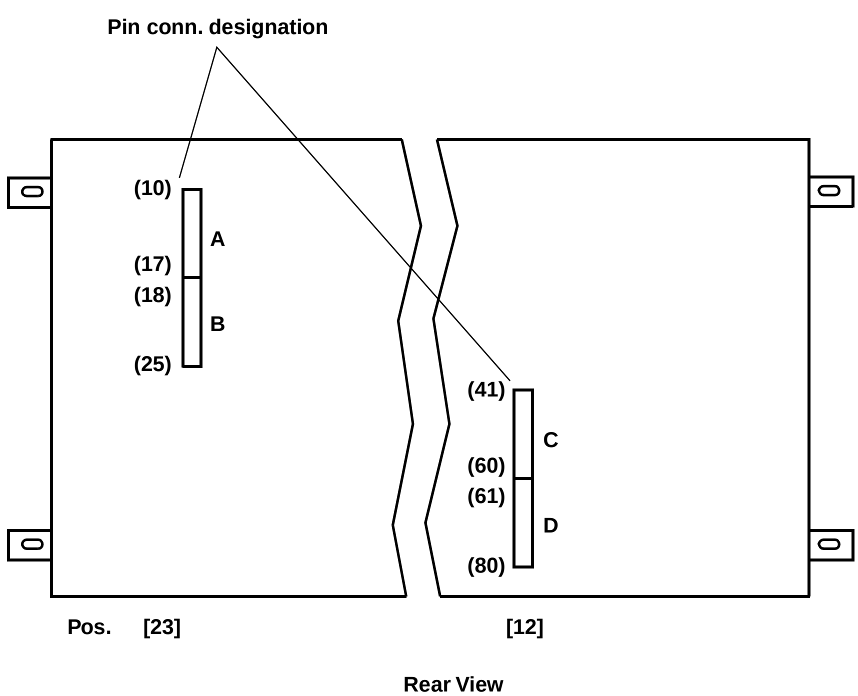
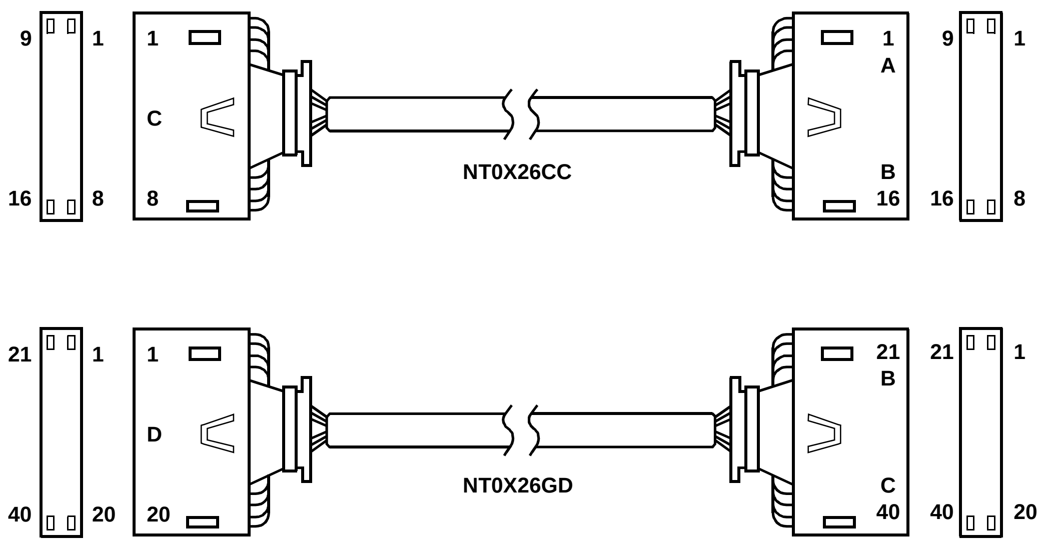


Figure 200 – NT0X26CC and NT0X26GD Switchboard Cables



5 The cables are secured to the cable brackets and cable form with ty-raps.

6 The cable connectors are secured to the connector key bracket with ty-raps.

18.5 MS6E NT0X26GD Switchboard Cables

1 There are two NT0X26GD switchboard cables (connectorized both ends) going to each Message Switching Buffer #6 Shelf, Position #12. Refer to Figure 199.

2 The cables are run between the MS6E frame and the ST frame.

3 The switchboard cables are run down the right rear frame upright (rear view) and then formed horizontally along the bottom of each shelf and up to the termination point.

4 The cables terminate on each backpanel position #12. Pin #1 on cable connector designated "C" mates with pin #41 on the backpanel and pin #1 on cable connector designated "D" mates with pin #61 on the backpanel. Refer to Figure 199 and Figure 200.

5 The cable connectors are secured to the connector key bracket with ty-raps.

18.6 MS6E NT0X26AC Switchboard Cabling

1 There is one NT0X26AC switchboard cable (connectorized on one end, the end going to the modem shelf) going to the modem unit.

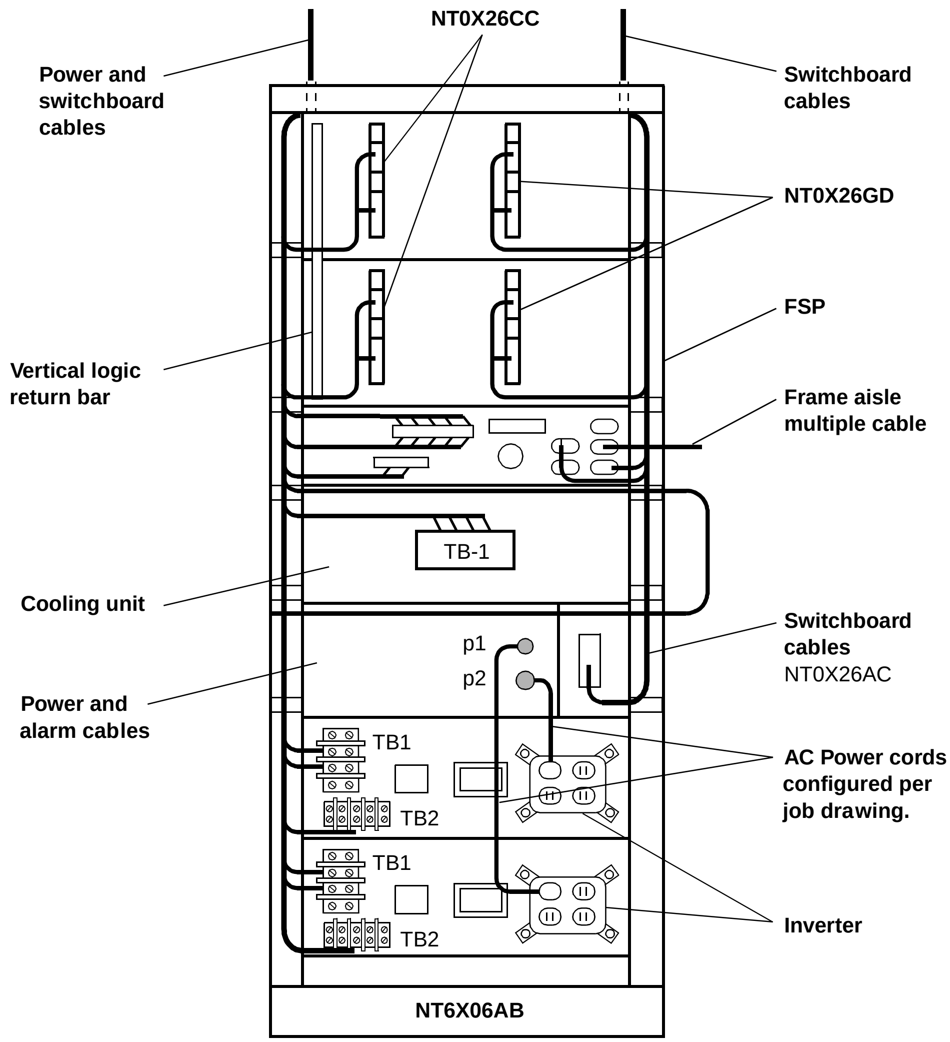
2 The cable is run down the right rear frame upright (rear view) and then formed horizontally along the bottom of the modem shelf and up to the termination point.

3 The cable is secured to the cable brackets and cable form with ty-raps.

18.7 MS6E Power and Alarm Cabling

1 Refer to Figure 201 for MS6E Frame Cabling.

Figure 201 – MS6E Frame Cabling



Rear View

2 The battery and return power cables are run down the left rear frame upright (rear view of frame).

3 Cables to the FSP terminate on terminal strips designated TB-1 and TB-2. Terminals are assigned per FSP schematic drawings.

4 Power cable to the inverter units terminate on the terminal strip designated TB-1 (the terminal strip is located on the rear top left hand corner of the units).

5 The alarm cable for the inverter units terminate on terminal strip designated TB-2 (the terminal strip is located on the rear bottom left hand corner of the unit).

6 Power cables to the cooling unit terminate on the terminal strip TB1 which is centrally located on the rear cover of the unit.

7 Do *not* secure cable(s) to frame or form with ty-raps until all crimping is completed.

8 Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for crimping procedures.

9 Form cables and secure to cable brackets with ty-raps. The horizontal cables shall be secured together with ty-raps at approximately every six inches.

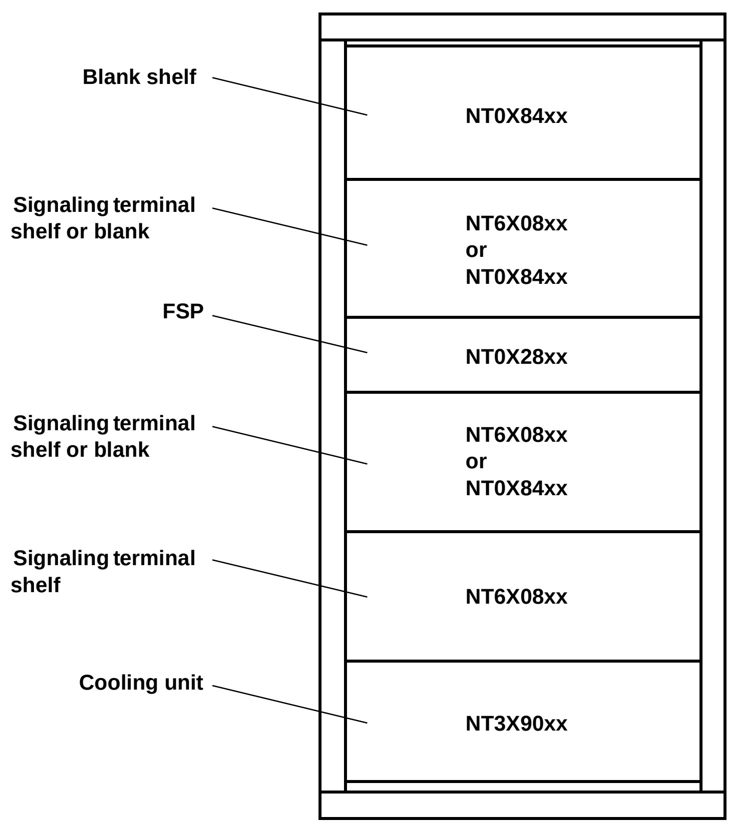
10 The ac power cords from the modem to the inverter units are connected (plugged-in) per job drawing.

19.0 Signaling Terminal (ST) Frame

19.1 Signaling Terminal (ST) Assembly

1 The Signaling Terminal (ST) frame is a single frame. The frame can be provisioned with the following: four (4) signaling terminal shelves, Frame Supervisory Panel (FSP), and a cooling unit. Refer to Figure 202.

Figure 202 – Signaling Terminal Frame



Front View
NT6X09xx

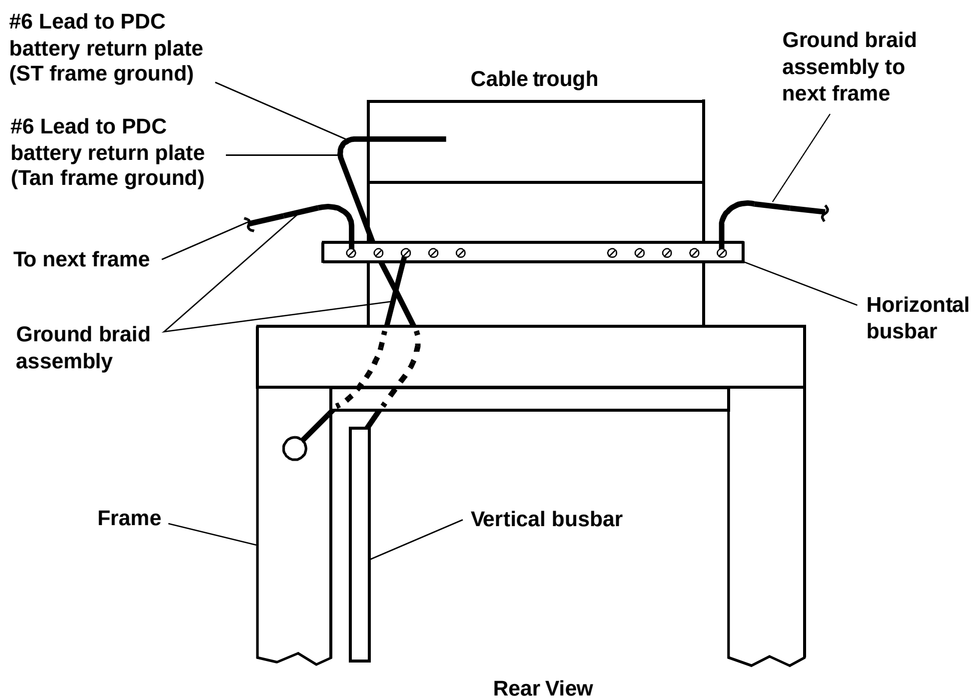
Note: The NT6X09AA frame can be provisioned as:

a. ST6E: Signaling Terminal 6 Equipment
b. ST7E: Signaling Terminal 7 Equipment

19.2 Signaling Terminal (ST) Frame Ground

1 Frame grounding link (cable braid assembly.) and mounting hardware are supplied with each frame. Refer to Figure 203.

Figure 203 – Frame Grounding



19.3 NT0X26GE Switchboard Cables on a Signaling Terminal (ST) Frame

1 Sixteen (16) NT0X26GE switchboard cables can be provisioned per shelf.

2 Cables from shelf positions #18 and #32 are run down the right rear frame upright. Cables from shelf positions #51 and #56 are run down the left rear frame upright (rear view). The cables are then formed horizontally along the bottom of each shelf and up to the connector on the backpanel. Refer to Figure 204.

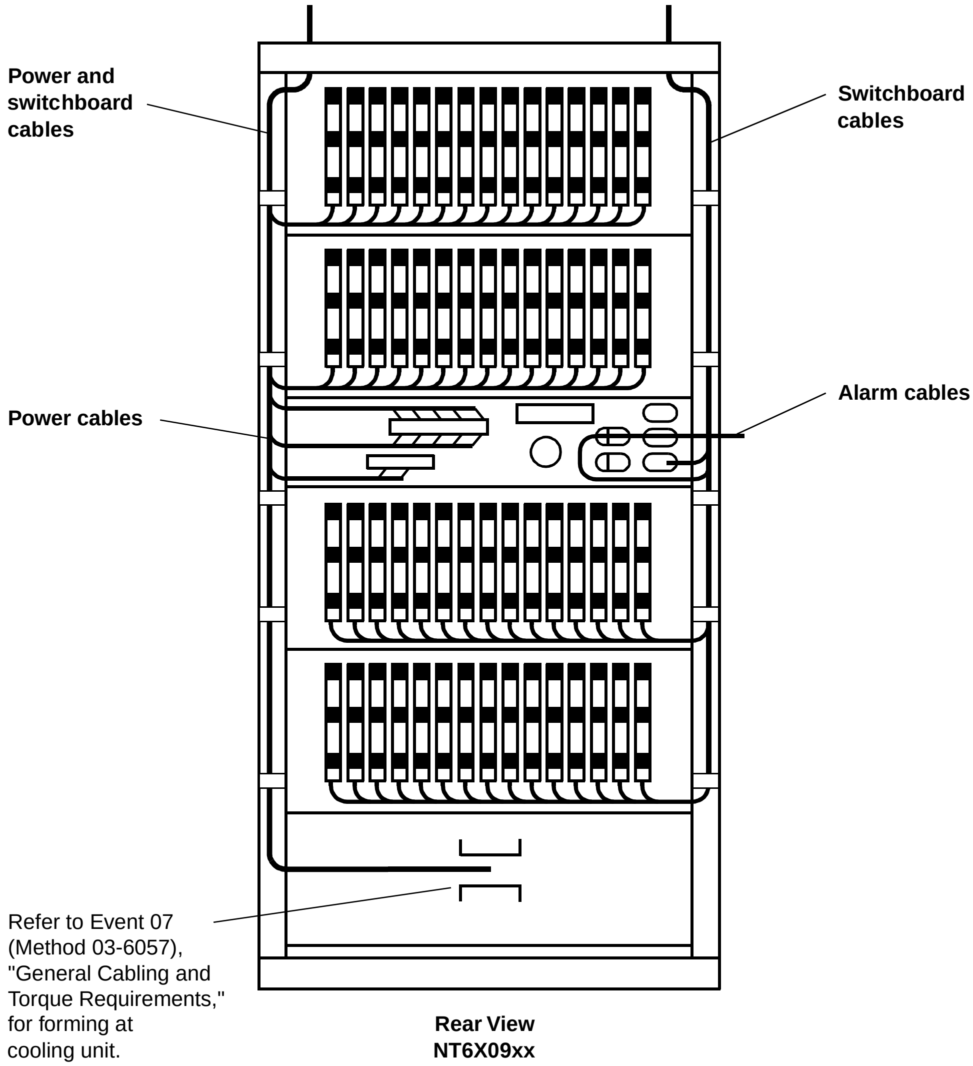
3 The cables terminate on the backpanel position #4 to #11 and #17 to #24 and pins #65 to #79.

Note: Ensure that pin #1 on the cable connector mates with pin #65A on the backpanel.

4 Secure cable connector(s) to the connector key bracket(s) with ty-raps. Do *not* remove shop ty-rap.

5 The cables are secured to the cable brackets and cable form with ty-raps.

Figure 204 – Frame Cabling



19.4 NT0X26GD Switchboard Cables on a Signaling Terminal (ST) Frame

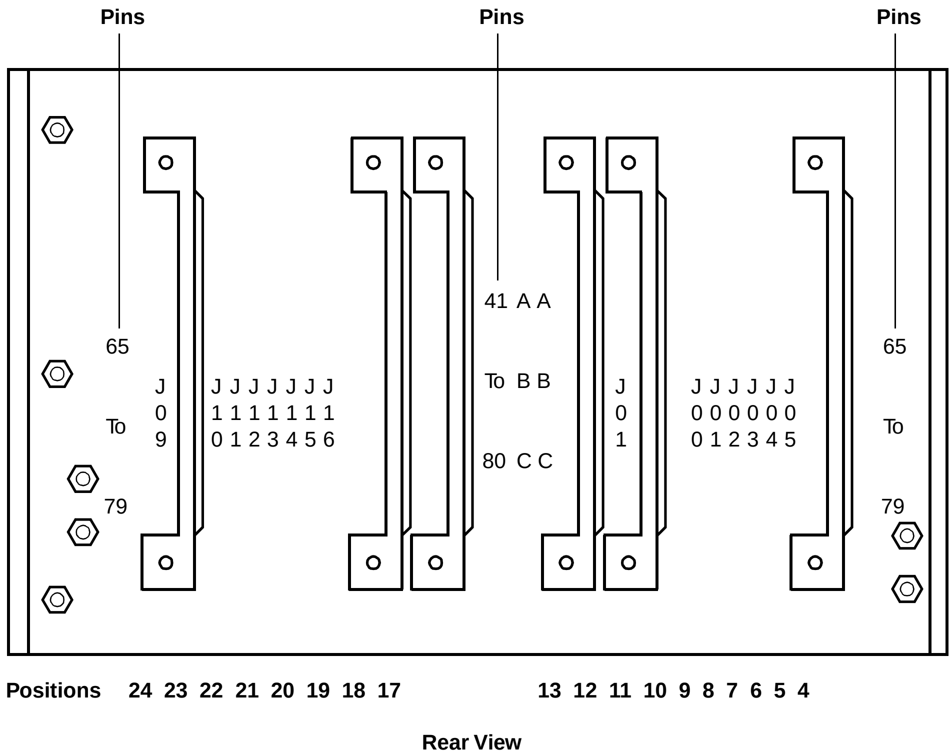
1. There are four NT0X26GD switchboard cables (connectorized on both ends) originating on the ST frame. These cables run directly across back of frame and do *not* go in cable rack. Store slack in vertical between frames and fasten to cable bracket with ty-raps.

2. Cables from shelf position #18 are run down the right rear frame upright (rear view). The cables are then formed horizontally along the bottom of the shelf and up to the connector on the backpanel.

3. The cables originate on shelf #18 backpanel, in position #12 and #13 (refer to cable tags for provisioning). Pin #1 on connector A-B mates with pin #41 on the backpanel and pin #1 on connector B-C mates with pin #61 on the backpanel. Refer to Figure 205.

4. Secure cable connectors to the connector key brackets with ty-raps. Do *not* remove shop ty-rap.

Figure 205 – NT6X0801 Backpanel



19.5 Signaling Terminal (ST) Frame Power and Alarm Cables

1 The battery and return cables run down the left rear frame upright (rear view) and formed across the FSP to the terminal strips.

2 Cables to the FSP terminate on terminal strips designated TB-1 and TB-2. Terminals as assigned per FSP schematic drawings.

Note: Do *not* secure cables to frame or form with ty-raps until all crimping has been completed.

3 Power cables to the cooling unit terminate on the terminal strip TB-1 which is centrally located on the rear cover of the unit. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements."

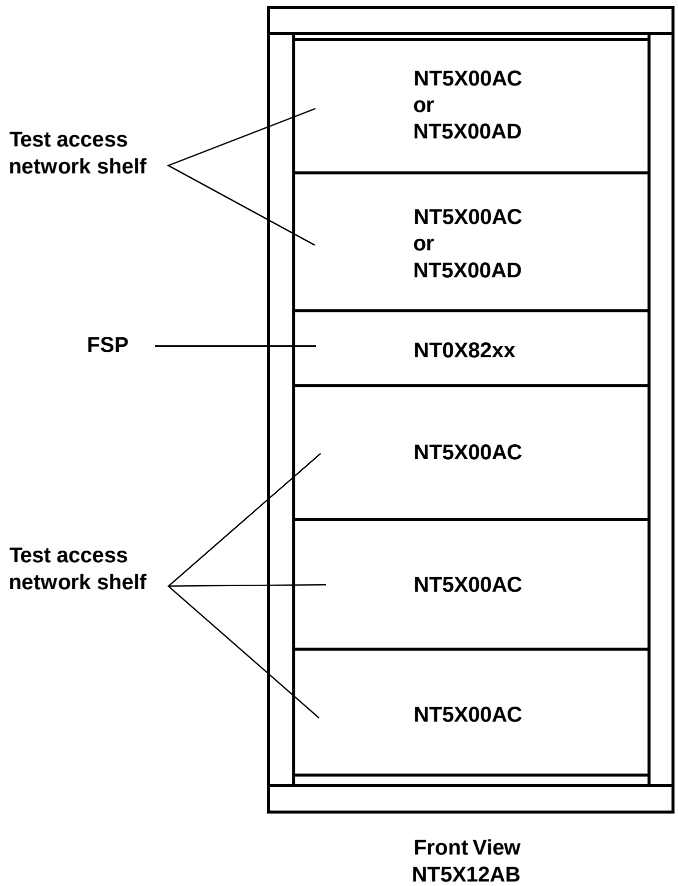
4 Form and secure cables to the cable brackets with ty-raps. The horizontal cables shall be secured together with ty-raps approximately every four inches.

20.0 Test Access Network (TAN) Frame

20.1 Assembly of Test Access Network (TAN) Frame

1 The Test Access Network (TAN) frame is a single frame. The frame is provisionable. Refer to Figure 206.

Figure 206 – Test Access Network (TAN) Frame Configuration



20.2 Frame Grounding of Test Access Network (TAN) Frame

1 Frame grounding links (cable braid assembly) and required mounting hardware are supplied with each frame. Refer to Figure 203.

20.3 NT0X26AB Switchboard Cable (TAN to MDF)

1 There are a maximum of three (3) NT0X26AB switchboard cables (connectorized on one end) originating on each TAN shelf and terminating on the MDF.

2 The switchboard cables are run down the right rear frame up right (rear view), then formed horizontally along the bottom of each shelf and up to the termination point.

3 The cables are secured to the cable brackets and cable forms with ty-raps.

4 Dress, form, and secure cables so that the flip plate can be accessed.

20.4 NT0X25AE Switchboard Cable (TAN to TAN)

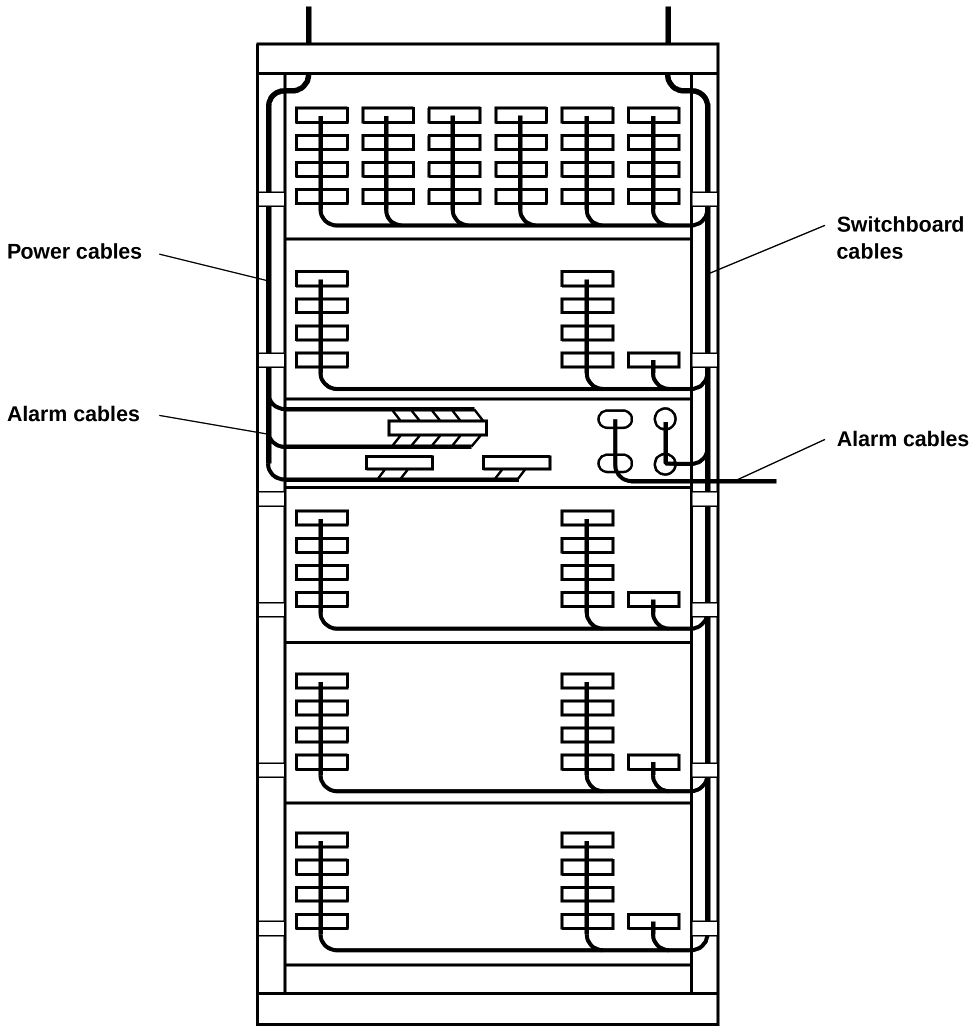
1 The NT0X26AE switchboard cable is used to interconnect shelves on a TAN frame. The cable is connectorized on both ends.

2 The cable from the originating end connector is vertically run down to the bottom of the shelf, then run horizontally along the bottom of the shelf to the frame upright. Then route vertically along the right rear frame upright, then run horizontally along the bottom of the terminating shelf, and up to the connector. Refer to Figure 207.

3 The cable is secured to the cable bracket and cable forms with ty-raps.

4 Ensure flip plate can be accessed.

Figure 207 – Frame Cabling



Rear View
NT5X12AB

20.5 NT0X26AD Switchboard Cable (TAN to TAN)

1. The NT0X26AD switchboard cable is used to interconnect shelves on a TAN frame. The cables are connectorized on both ends.
2. The cables from the originating shelf connector are run down to the bottom of the shelf, then run horizontally along the bottom of the shelf to the right rear frame upright. Then route along the frame upright, then run horizontally along the bottom of the terminating shelf and up to the connector.
3. Ensure flip plate can be accessed.

20.6 Test Access Network (TAN) Frame Power And Alarm Cabling

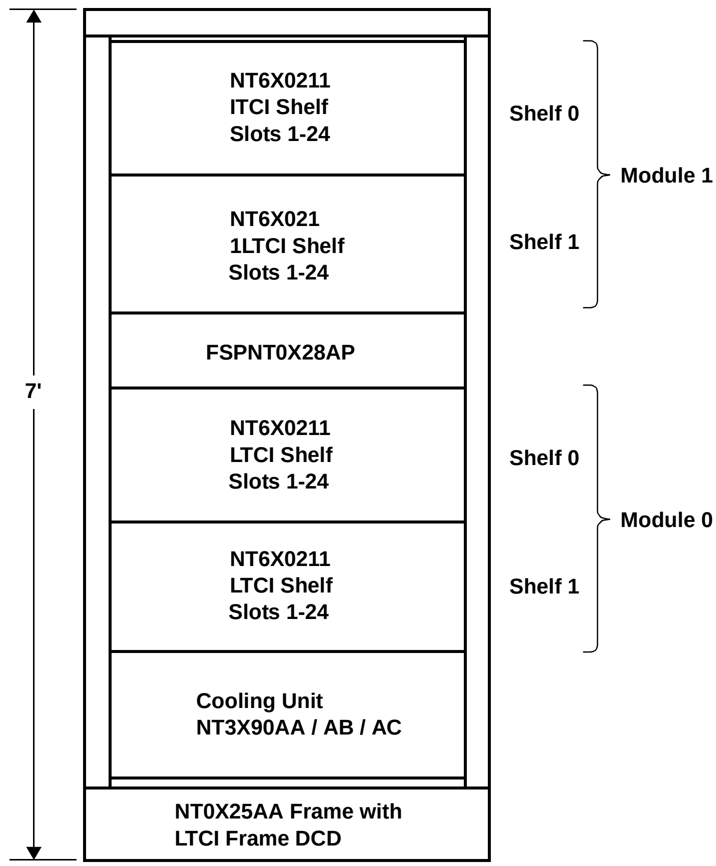
1. The battery and return cables are run down the left rear frame upright (rear view) and formed across the FSP to the terminal strips.
2. The cables terminate on the terminal strips as assigned per Job Specifications.
3. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for crimping procedures.
4. Do *not* secure cables to frame or forms with ty-raps until all crimping has been completed.
5. Form cables and secure to cable brackets with ty-raps. The horizontal cables shall be secured together with ty-raps at approximately every six inches.

21.0 (TOPS Message Switch) LTCI-TMS

21.1 TOPS Message Switch (TMS) Frame Installation

Refer to Figure 208 for Tops Message Switch (TMS) frame layout.

Figure 208 – TOPS Message Switch (TMS) Frame Layout



Front View
TMS Frame Layout

21.2 TOPS Message Switch (TMS) Frame Power and Grounding

Frame Grounding:

1 Frame grounding link (cable braid assembly) and mounting hardware are supplied with each frame. Refer to Figure 203.

2 Install the cable braids from the adjoining frames to the first holes from the ends of the horizontal busbar on the cable trough. On the first or last frame in a lineup, route the cable either to another frame lineup or to the building ground.

21.3 TOPS Message Switch (TMS) Frame Power Cabling

1 Run the power cables (-48V and BAT RTN) down the left, frame upright (rear view) and temporarily form them across the bottom of the FSP onto the terminal block designated TB-1. Refer to Figure 209 and Figure 210.

Figure 209 – Power, ABS, and Alarm Cable Routing

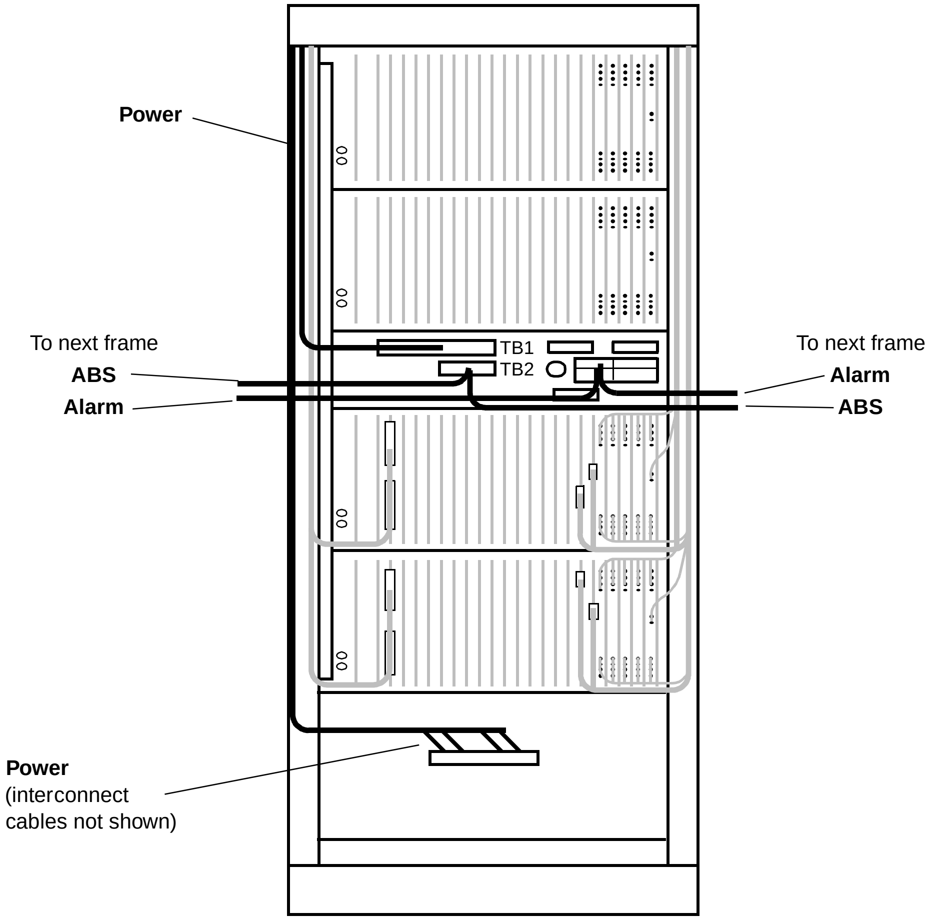


Figure 210 – Power Connections	
-48V	**BAT RTN**
TB1-1, 2, 3, 4	TB1-5, 6, 7, 8

2 Do *not* secure cable(s) to frame or form with ty-raps until all crimping has been completed.

3 Run the power cables for the cooling units down the left, frame upright (rear view) terminating them on the terminal strip, TB1, which is centrally located on the rear cover of the unit. Note that the cooling unit numbering is from right to left.

The NT6X01AA CPCE or NT6X01BA ICPCE frame can be equipped with either a NT3X90AA, NT3X90AB, or NT3X90AC cooling unit. The NT6X01AB frame can only be equipped with the NT3X90AC cooling unit.

4 Figure 211 shows the power requirements for individual cards on the TMS LTCI:

Figure 211 – TMS LTCI Power Requirements

PEC	Description	AMPS
NT6X69AB	Message & Tone CP	4.00
NT6X50AB	DS-1 CP	0.50
NTBX02AA	DCH (DCH has onboard power converter)	0.00
NTBX01AA	ISP	5.71
NT6X40AC	DS-30 Interface	2.12
NT6X41AA	Speech Bus Formatter	2.80
NT6X42AA	Channel Supervision CP	3.65
NT6X44AA	Time Switch CP	3.94
NT6X46BA	SP Memory CP	1.97
NT6X47AB	MP Memory CP	1.68
NT6X45BA	New MP/SP Processor CP	2.91

The total -48V dc power supply requirement for a fully-equipped TMS LTCI is a maximum of 36 Amps.

21.4 TOPS Message Switch (TMS) Frame Switchboard Cabling

DS30 Cabling:

1 There are four NT0X26CC switchboard cables (connectorized on both ends) going to each shelf.

2 Run the switchboard cables down the left, rear frame upright (rear view) then form them horizontally along the bottom of each shelf and up to the termination points. Refer to Figure 212 for DS30 cable routing.

3 On domestic frames, the cables terminate on the backpanel position 22, connectors A, B, C, D on the pins 10A/B to 17A/B. Refer to Figure 213.

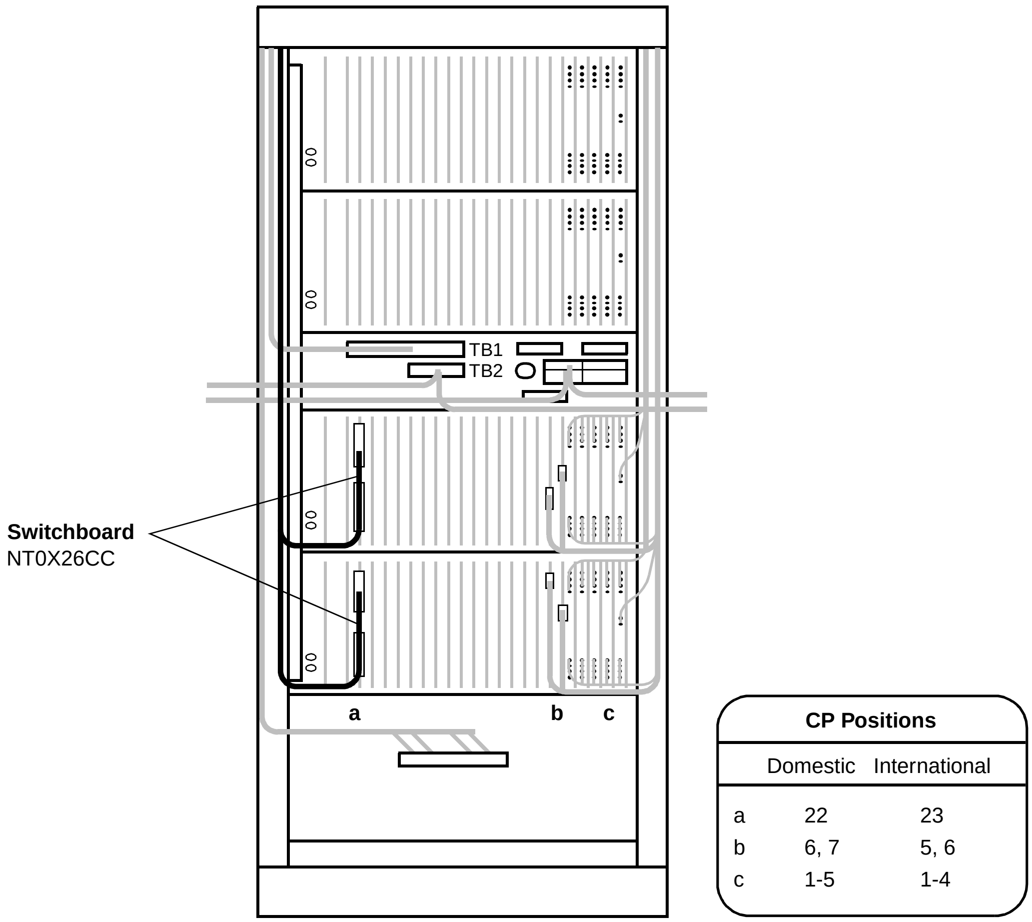
On international frames, the cables terminate on the backpanel position 23, connectors A, B, C, D on the pins 10A/B to 17A/B. Refer to Figure 213.

4 Using ty-rap markers (P0633713), identify all NT0X26CC cable connectors at the end with the three connectors. The cables/connectors are to be identified giving pin position on the backpanel and the first pin with which the connector is to mate.

Example: POS 07
PIN 15

This marker shall be around cable only and not used to fasten cable connector to connector key bracket.

Figure 212 – DS30 Cable Routing



(only lower module cabling shown for clarity)

Figure 213 – DS30 Connections

CONNECTOR	DOMESTIC 6X01AA/AB SHELF	INTERNATIONAL 6X01BA SHELF	PINS
A	22	23	10A/B TO 17A/B
B	22	23	18A/B TO 25A/B
C	22	23	56A/B TO 63A/B
D	22	23	64A/B TO 71A/B

DS30A Cabling:

5 There are from one to ten NT0X26CD/ZM switchboard cables going to each shelf (if frame is so provisioned). These cables are connectorized on both ends. For the NT0X26CD, the end going to the (I)CPCE frame is split into three connectors. For the NT0X26ZM, the end going to the CPEI is split into ten connectors.

6 Run the switchboard cables down the right, rear frame upright (rear view), then form them along the bottom of each shelf and up to the termination point.

7 On domestic jobs, terminate the cables on the backpanel positions 6 and 7, pins 15A/B to 67A/B. Refer to Figure 214 for connections and shelf layout.

8 On international jobs, terminate the cables on the backpanel positions 5 and 6, pins 15A/B to 67A/B. Refer to Figure 214 for connections and shelf layout.

Figure 214 – DS30A Connections

DS30A PORT	SLOT DOMESTIC 6X01AA/AB	SLOT INTERNATIONAL 6X01BA	PINS
0	7	6	15,16,17,18
1	7	6	19,20,21,22
2	6	5	15,16,17,18
3	6	5	19,20,21,22
4	7	6	23,24,25,26
5	7	6	27,28,29,30
6	6	5	23,24,25,26
7	6	5	27,28,29,30
8	7	6	31,32,33,34
9	7	6	48,49,50,51
10	6	5	31,32,33,34
11	6	5	48,49,50,51
12	7	6	52,53,54,55
13	7	6	56,57,58,59
14	6	5	52,53,54,55
15	6	5	56,57,58,59
16	7	6	60,61,62,63
17	7	6	64,65,66,67
18	6	5	60,61,62,63
19	6	5	64,65,66,67
Valid on shelves 18, 32, 51, and 65.			

9 The connectors for the NT0X26CD cable are designated A, B, and C. For the NT0X26ZM, they are designated P00 to P09. The connectors are also labeled as the connector pins (1, 4, 5, and 8). Be careful when mating the connectors on the cable with the pins on the backpanel.

10 Using P0633713 ty-rap markers, identify all NT0X26CD/ZM cable connectors. The cables/connectors are to be identified giving pin position on the backpanel and the first pin with which the connector mates.

Example: POS 07
PIN 15

11 Secure the cable(s) to the cable brackets and form them with ty-raps.

12 Secure the connector to the connector key bracket with a ty-rap.

13 Tie back all unused connectors with ty-raps.

21.5 TOPS Message Switch (TMS) Frame Shielded Cabling

DS1 Cabling:

1 There are two shielded cables (SEND and RECEIVE) going to each module, if the frame is so provisioned. Each cable is split between the two shelves. On domestic, use two (25-pair 22 AWG) NE-ABAM cables per module. On international, use two (120 Ohm 18-pair 22 AWG) DMS interface cables per module.

2 Run the cables down the right, rear frame upright (rear view) and secure them to the cable brackets with ty-raps.

3 Run the leads down the frame upright and form them across from the cable bracket to the termination point.

4 Ensure that the SEND and RECEIVE leads extend from separate SEND and RECEIVE cables. SEND and RECEIVE must run on separate cables from the CPCE frame to the DSX.

5 Form unused DS1/PCM30 leads vertically along the cable and tie.

6 Refer to Figure 215.

Figure 215 – DS1/PCM30 Connections

DS1/PCM30 PORT	Domestic 6X01AA/AB SHELF/SLOT		International 6X01BA SHELF/SLOT		PINS SEND RECEIVE	
0	X	5	X	4	1,2	5,6
1	X	5	X	4	3,4	7,8
2	X+14	5	X+14	4	1,2	5,6
3	X+14	5	X+14	4	3,4	7,8
4	X	4	X	3	1,2	5,6
5	X	4	X	3	3,4	7,8
6	X+14	4	X+14	3	1,2	5,6
7	X+14	4	X+14	3	3,4	7,8
8	X	3	X	2	1,2	5,6
9	X	3	X	2	3,4	7,8
10	X+14	3	X+14	2	1,2	5,6
11	X+14	3	X+14	2	3,4	7,8
12	X	2	X	1	1,2	5,6
13	X	2	X	1	3,4	7,8
14	X+14	2	X+14	1	1,2	5,6
15	X+14	2	X+14	1	3,4	7,8
16	X	1			1,2	5,6
17	X	1			3,4	7,8
18	X+14	1			1,2	5,6
19	X+14	1			3,4	7,8
	X can be 18 or 51.					

21.6 TOPS Message Switch (TMS) Configurations

1 One TMS can support up to 96 positions of any type (Toll and Assist, Directory Assistance, or Operator Reference Database). Four D Channel Handlers (DCH) are required per TMS. Each DCH supports up to 6 TPCs which accommodate 24 positions.

2 The TOPS LTCI (Module 0 and 1) has 10 DS 1 slots which are not used for common equipment. DCHs occupy four of these slots. One DS 1 is required per increment of four TPCs.

3 One Channel Bank is required per four TPCs connected to a TMS. Two (2) 56K DSUs are needed per TPC. One HSDA is required per TPC connected to the TMS. The following configuration describes a fully-equipped TMS:

Number of Operators:96
Number of TPCs:24
Number of DSUs:48
Number of Channel Banks:6
Number of TOPS LTCI (TMS):1
Number of DCHs:4
Number of DS1 cards:6 (2 for database interface,
3 for TPC interface, or
1 for inter-DCH communication for ORDB)

4 There are two (2) DS30 cards in the TMS providing the capacity for sixteen (16) duplicated DS30 C-side links. Ports 0 and 21 must be used since they are required for messaging and maintenance information.

Sixty (60) voice channels are available for Ports 0 and 2. Each operator, supported by the TMS, communicates with the CC by way of nailed-up channels through the TMS. For configurations serving more than sixty operators, additional DS30 ports are required per the following table:

# of OPERATORS	DS30 PORTS REQ'D	PORT ASSIGN.
1 to 60	2	0, 2
61 to 92	3	As required
93 to 96	4	As required

5 Module 0 and Module 1 are equipped identically to provide redundancy, except for slots 1-5, which are equipped with DS-1s and DCHs. The DCHs and DS1s needed for the various configurations are listed below:

90-Operator Configuration

Four (4) NTBX02AA DCH Packs
-TMS Module 0 Slot 1
-TMS Module 0 Slot 2
-TMS Module 1 Slot 1
-TMS Module 1 Slot 2

Six (6) NT6X50 DS-1 Packs
-TMS Module 0 Slot 3
-TMS Module 0 Slot 4
-TMS Module 0 Slot 5
-TMS Module 1 Slot 3
-TMS Module 1 Slot 4
-TMS Module 1 Slot 5

60-Operator Configuration

Three (3) NTBX02AA DCH Packs
-TMS Module 0 Slot 1
-TMS Module 0 Slot 2
-TMS Module 1 Slot 1

Five (5) NT6X50AB DS-1 Packs
-TMS Module 0 Slot 3
-TMS Module 0 Slot 4
-TMS Module 0 Slot 5
-TMS Module 1 Slot 3
-TMS Module 0 Slot 4

32-Operator Configuration

Two (2) NTBX02AA DCH Packs
-TMS Module 0 Slot 1
-TMS Module 1 Slot 1

Three (3) NT6X50AB DS-1 Packs
-TMS Module 0 Slot 2
-TMS Module 0 Slot 3
-TMS Module 1 Slot 2

6 Refer to Figure 216 for TMS packfill.

Figure 216 – TMS Packfill

	Shelf 18 or 15 TMS -0	**Shelf 32 or 65 TMS -0**
1	DS1 (NT6X50AB) or DCH (NTBX02AA)	DS1 (NT6X50AB) or DCH (NTBX02AA)
2	DS1 (NT6X50AB) or DCH (NTBX02AA)	DS1 (NT6X50AB) or DCH (NTBX02AA)
3	DS1 (NT6X50AB) or DCH (NTBX02AA)	DS1 (NT6X50AB) or DCH (NTBX02AA)
4	DS1 (NT6X50AB) or DCH (NTBX02AA)	DS1 (NT6X50AB) or DCH (NTBX02AA)
5	DS1 (NT6X50AB) or DCH (NTBX02AA)	DS1 (NT6X50AB) or DCH (NTBX02AA)
6	Filler	Filler
7	Filler	Filler
8	Master Processor (NT6X45BA)	Master Processor (NT6X45BA)
9	MP Memory (NT6X47AB)	MP Memory (NT6X47AB)
10	MP Memory (NT6X47AB)	MP Memory (NT6X47AB)
11	Signaling Proc. Memory (NT6X46BA)	Signaling Proc. Memory (NT6X46BA)
12	Signaling Proc. Memory (NT6X46BA)	Signaling Proc. Memory (NT6X46BA)
13	Filler	Filler
14	Timeswitch (NT6X44AA)	Timeswitch (NT6X44AA)
15	Filler	Filler
16	ISP (NTBX01AA)	ISP (NTBX01AA)
17	Filler	Filler
18	Message/Tone Card (NT6X42AA)	Message/Tone Card (NT6X42AA)
19	Filler	Filler
20	Channel Supervision Module (NT6X42AA)	Channel Supervision Module (NT6X42AA)
21	Formatter (NT6X41AA)	Formatter (NT6X41AA)
22	DS-30 Card (NT6X40AC/CA)	DS-30 Card (NT6X40AC/CA)
23	Filler	Filler
24	Filler	Filler
25	Power Converter (NT2X70AD)	Power Converter (NT2X70AD)

22.0 BIX SYSTEMS ASSEMBLY AND CABLING

22.1 Distribution Frame BIX System

1 Customer Premises Distribution Frames are shipped to the site unassembled in two packages.

2 Contents of the packages are listed in Figure 217, and list and ordering numbers for individual parts are specified in Figure 236.

Figure 217 – Contents of QFBIX24A / QFBIX29A/(A0275511)/(A0276683)

Description	Quantity
Vertical Upright	1
Horizontal Shelves	4/3
Distribution Rings	24/18
Ground Bar	1
Junction Bar	1
Cable Rack Support Bracket	2
J-bolts With Nuts	4

3 In addition to the frames' components, there are End Kits for each frame to protect the cabling and wiring from being damaged. The contents of these shipments are shown in Figure 218.

Figure 218 – Contents of QKBIX25A / QKBIX30A/(A0275512)/(A0276684)

Description	Quantity
Guards	8/6
Distribution Rings	8/6
Mounting Screws	16/12

4 Figure 219 lists other material required to perform this section.

Figure 219 – Other Required Material

Description	Quantity
QMBIX10A Mounts	As required
Distribution Rings	8/6 per frame
Mounting Screws	16/12 per frame

5 Unpack all equipment and check against these lists. Ensure all equipment is accounted for; if anything is missing, order replacements.

6 Safely place unpacked components near the work area where the frame will be installed. Ensure that the floor under the unpacked equipment is protected

.

Caution: Never leave the frame's upright(s) standing up before it is ready to be anchored.

22.2 BIX Frame Floor Preparation

1 Hold down material is supplied with the frame.

Note: When the frame is being installed on the raised floor, it is the customer's responsibility to prepare the floor and anchor the frame to the floor. The customer may have a special method for anchoring.

If the frame is being anchored to the concrete floor through the floor tiles, then the customer shall cut and drill holes in tiles. The Nortel field technician anchors the frame to the floor.

2 Referring to the floor plan, determine where the frame is to be installed.

3 Use walls, pillars, or whatever is marked on the floor plan for reference points. Make a mark, with an erasable marking device, in two places slightly passed the beginning and the end of the frame. Refer to Figure 220.

4 Obtain the frame's upright and position in the marked corner as shown in Figure 220.

5 For the very first frame, mark all four anchoring holes in the base of the frame. Also, make a line at the end of the frame in the direction of growth.

6 When installing more than one frame, move the upright over the newly made line and mark the next location. For every subsequent location, mark only two diagonal holes as shown in Figure 220’s shaded circles.

For example, if installing five frames the first and the fifth frame require 4 anchor holes. Second, third, and fourth require only two anchor holes.

7 When marking is completed, securely store the upright out of the way. Do *not* leave the upright standing up, always lay it down flat on protected floor.

8 Anchors for the frame arrive at the site with the frame(s) four for each section.

9 To drill holes and install anchors refer to Event 04 (Method 03-9054), "Level, Align, and Secure Equipment." This event provides the procedures for installing and setting anchors of all types used by Nortel.

10 Once all the holes are drilled and anchors set, erect the upright(s) of the frame. Do *not* insert the anchor rods yet.

11 Before positioning the upright in its place, install the distribution rings, 3/4 respectively, on each side of the frame

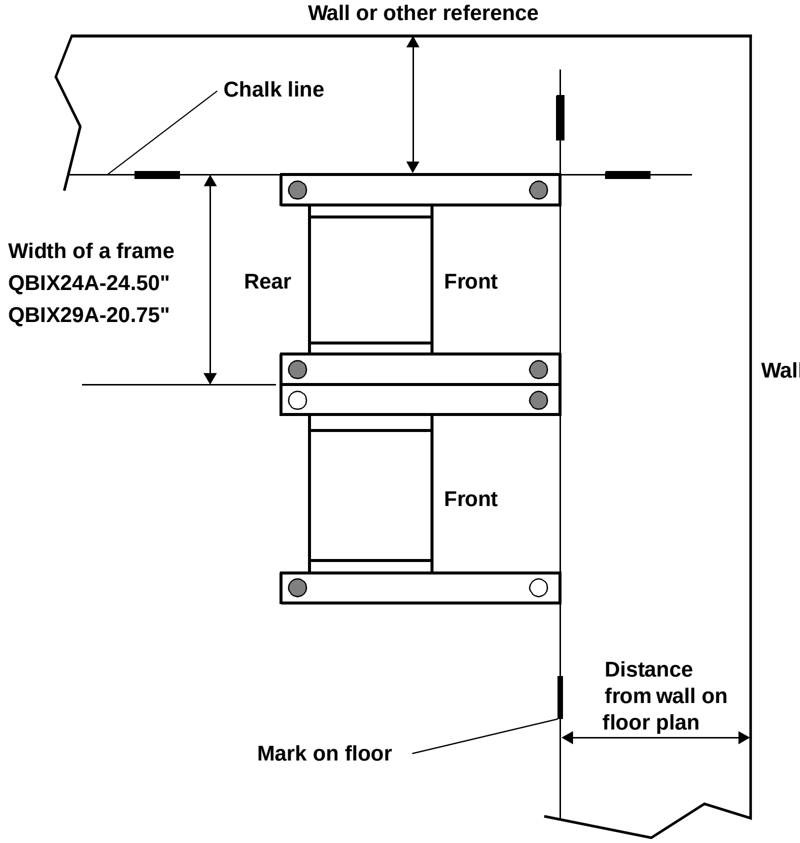
12 Obtain one frame (upright) and position it over the anchors. Line up the holes in the base with the anchor holes and the markings on the floor.

13 Insert the required number of anchor rods into anchors. Drive the rods into the anchors so that only about 1" of the rod is left exposed out over the base of the frame.

14 Obtain the nuts and washers for the anchors and place them on the anchors rods.

15 Install all the material on the rods and screw the nuts only finger tight.

Figure 220 – Marking Frame and Anchor Locations



16 Level the frame side to side and front to back. If necessary, use the large washers to achieve the level. Tighten and torque the anchor nuts as per information in Event 07 (Method 03-9057), "General Cabling Torque Requirements."

17 If there is a cable rack above the frame, install the "J" bolts to support the top of the first frame. Refer to Figure 221.

18 If installing more frames, repeat paragraphs 11 through 17 for the remainder of frames. Do *not* tighten the hold down hardware.

22.3 Assembly of BIX Frame

1 Anchor nuts on a multiframe installations were left finger tight for easier mounting of shelves.

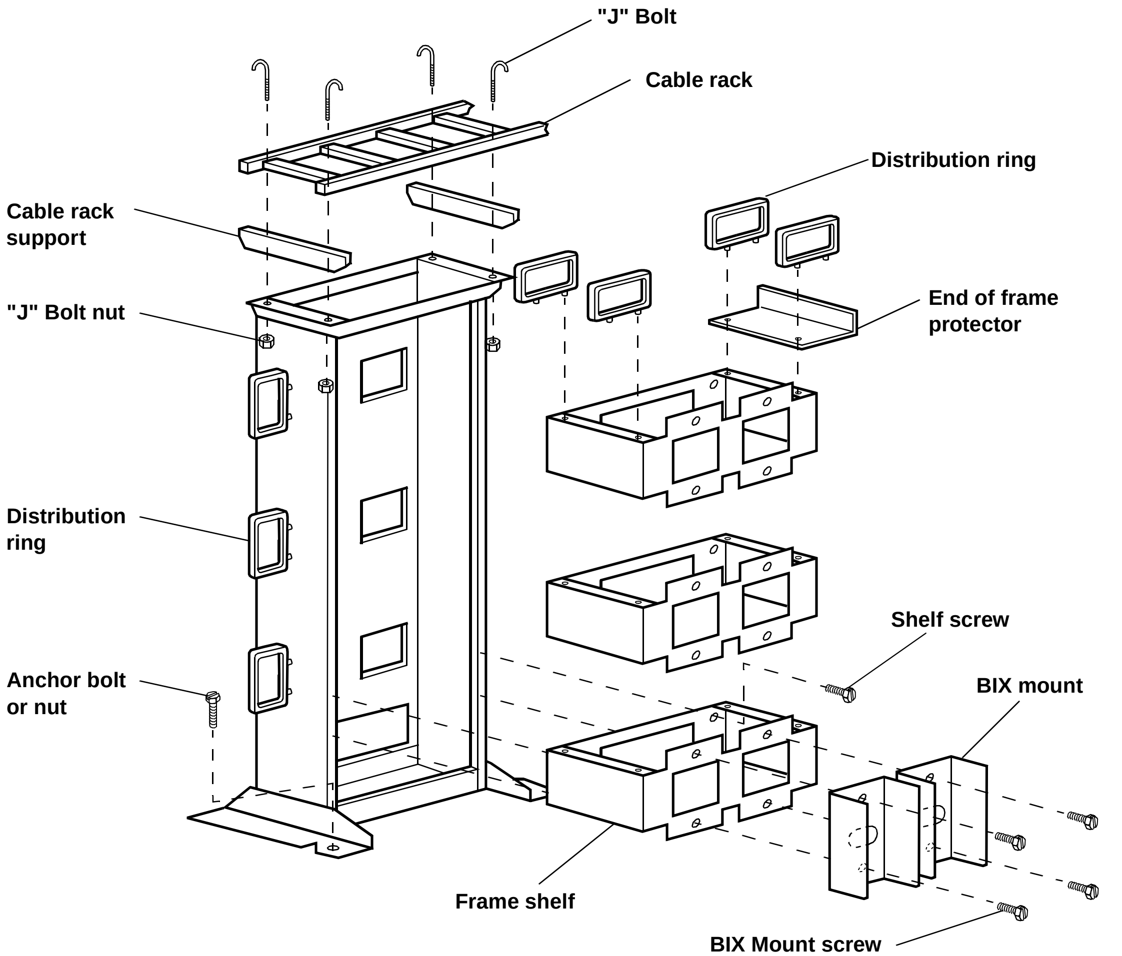
2 Using four screws, mount a shelf in the lowest position as shown in Figure 221. Do *not* tighten the screws completely, just enough to hold the shelf securely in place.

3 Repeat paragraph 2 for the remainder of shelves in upward direction. These frames come with 3/4 shelves, respectively.

4 Repeat paragraphs 2 and 3 for the remaining frames.

5 With the shelves and the frames still loose, the next step is to install the distribution rings between all frames. Install two distribution rings per shelf using four screws as shown in Figure 221. The rings span from the end of one shelf to the shelf on the next frame. Do *not* tighten the rings, just snug them up so they hold the shelves together.

Figure 221 – Assembly of CPDF



6 Repeat paragraph 2 for all frames installed until all the rings are in place, but still not tightened.

7 Once all the rings are in place, start tightening them from the very first frame (upright), the leveled and tight one, toward the end of the line of frames.

8 As the rings are being tightened, ensure that all frames go in level with the first frame. In some cases, it may be necessary to use large washers for supporting the frame to remain in level on uneven floors.

9 Once all rings are tight, frames in level, and shimmed where necessary, tighten the frames' anchor bolts. Tighten the anchor bolts using torquing information in Event 07 (Method 03-9057), General Cabling and Torque Requirements."

10 The QMBIX10A mounts are mounted on each shelf (2) for the horizontal side of the frame. They are also mounted directly onto the frame's upright on the opposite, vertical, side of the frame.

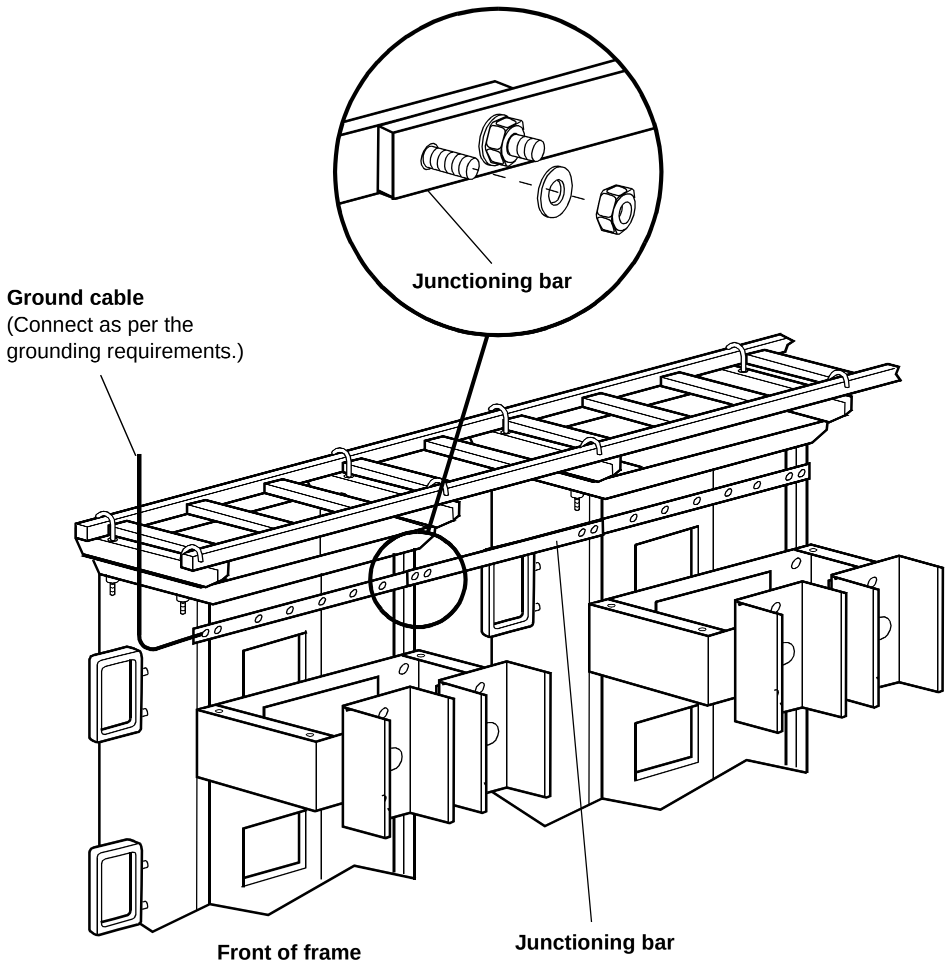
11 Each mount has two key slotted holes. Drive the screws for the mounts halfway into each position where the mounts will be secured. Refer to Figure 221.

12 Position the mounts to hang on the top screw and place the second screw in the bottom hole of the mount. Tighten all screws for the mounts, keeping the mounts straight vertically.

13 Grounding the frame is done by the ground bar located near the top of the frame. The bar for each section of the frame has to be joined by a junctioning bar. Refer to Figure 222.

14 When all ground bars are joined, run and connect the ground cable to the closest building ground window. Consult the customer for the location of their building ground window for that floor.

Figure 222 – Grounding the Frame



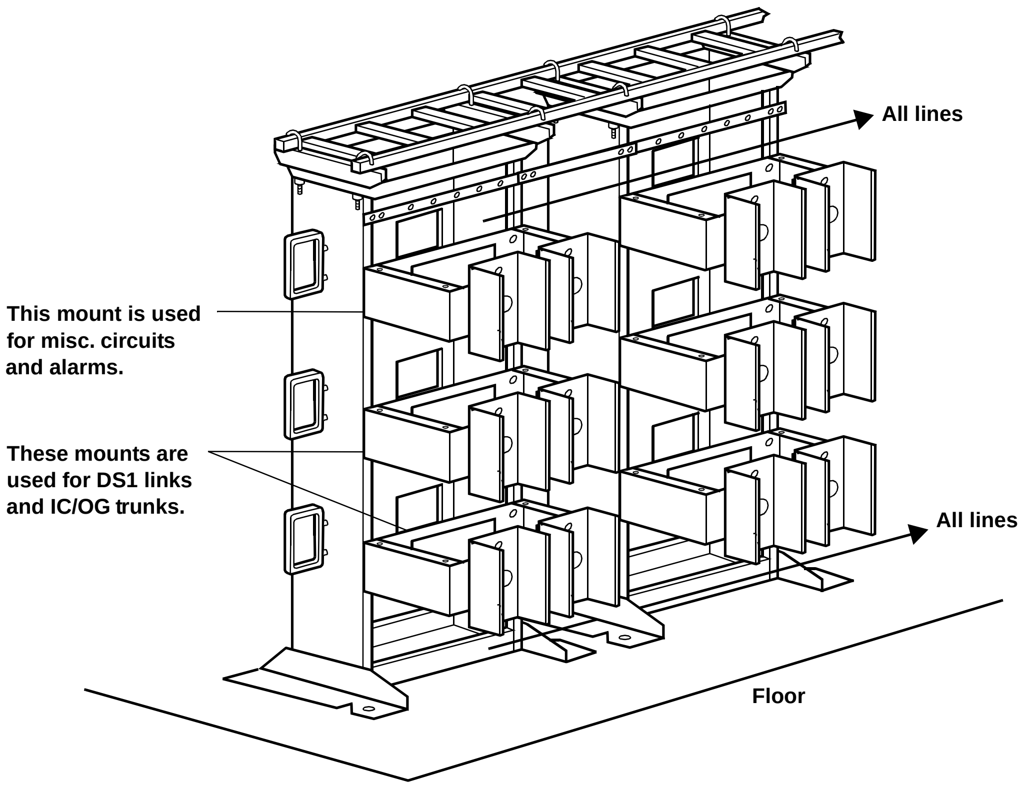
22.4 Layout of the BIX Frame

1 Information in this subsection pertains to the frame layout so that the field technician will know where to run the equipment cables. This is a recommended configuration of the frame and shall be followed unless modified by the customer specifications and/or drawings.

2 The very first mount, upper left corner of the frame, will be used for MISC circuits or MTA cards, SD cards, SC cards, test trunks, and any of the alarm equipment. If the beginning of the frame is on the right-hand side, this mount will be located in the upper right-hand corner.

3 The very next two/three mounts directly below the first one shall be used for DS1 links and/or other interoffice trunking. Refer to Figure 223. Remaining mounts shall be used for lines.

Figure 223 – Layout of the Frame



4 Typical layouts of the mounts are shown in Figure 223 and Figure 224. Each job will receive a set of typical and detailed stamping documents -B158.

Note: Some customers may have different requirements for the layout of the frame. Any deviations from the layout presented in this subsection should have been agreed upon between the customer and the Nortel Customer Engineer.

22.5 Cabling the BIX Frame

1 Typically, there can be two different procedures of cabling the frames, overhead and under the floor. The only difference between the two is the entry into the frame. The rest of the forming and dressing of the cables should remain the same.

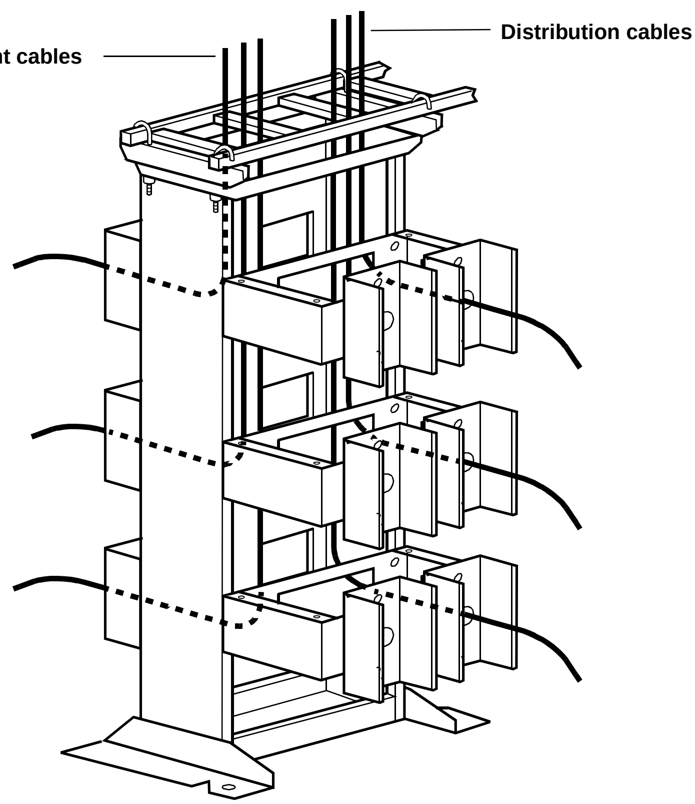
2 The cables coming into the frame, should be run in on per upright basis. Refer to Figure 224. All cables terminating on the blocks on that upright should be brought in down/up behind the shelves, for both vertical (equipment cabling) and horizontal (Customer distribution cabling) sides of the frame.

3 For cabling earthquake applications leave 3 feet of slack from the cable rack edge to the first point of securing on the frame.

4 Run the cables in to their respective positions through the openings in the upright and the BIX mounts, for the vertical side, and through the openings in the shelves and the BIX mounts, for the horizontal side. Leave enough slack, so that the cable makes a loop all the way to the top of the mount and across the mount from one end to the other and back.

5 Once all cables have been run into the frame(s), start securing the cables from the point of entry (overhead or under floor cabling) towards their individual terminating destinations.

Figure 224 – Cabling the Frame



6 On the uprights of the frame there are little loops provided for the ty-raps for securing cables. There are a number of them on each side of the openings in the upright. Secure the cables for the horizontal side of the frame on the right side of the frame. Run and secure the cables for the vertical side on the left side of the frame. Left and right when viewed from the horizontal side of the frame.

7 Once the BIX block mounts are reached, fan the cables into their respective cable openings. Make a sweeping turn from the mount opening to the left of the mount. At the left of the mount, ty-rap the cables to hold the loop in that position.

8 Make a sweeping loop in cables from the center of the mount (up or down) to their connecting strip in the mount.

9 Using ty-raps, secure the cables into one solid harness heading towards each individual termination point (connecting strip).

10 Butt the cables at the level of each connecting strip where the cables are to be terminated. Ensure that the cable butts are in correct places as per the job assignments.

11 Leave enough slack so that the stripped portion of the cable reaches from the left side of the mount all the way to the right side and then back to the left, with enough slack to connect the wires to the connecting strip.

12 Connecting of wires to the connecting strips is explained in Subsection 22.7 and in the IBDN installation manual.

22.6 Wall Mounted BIX System

Mounting the Board on the wall

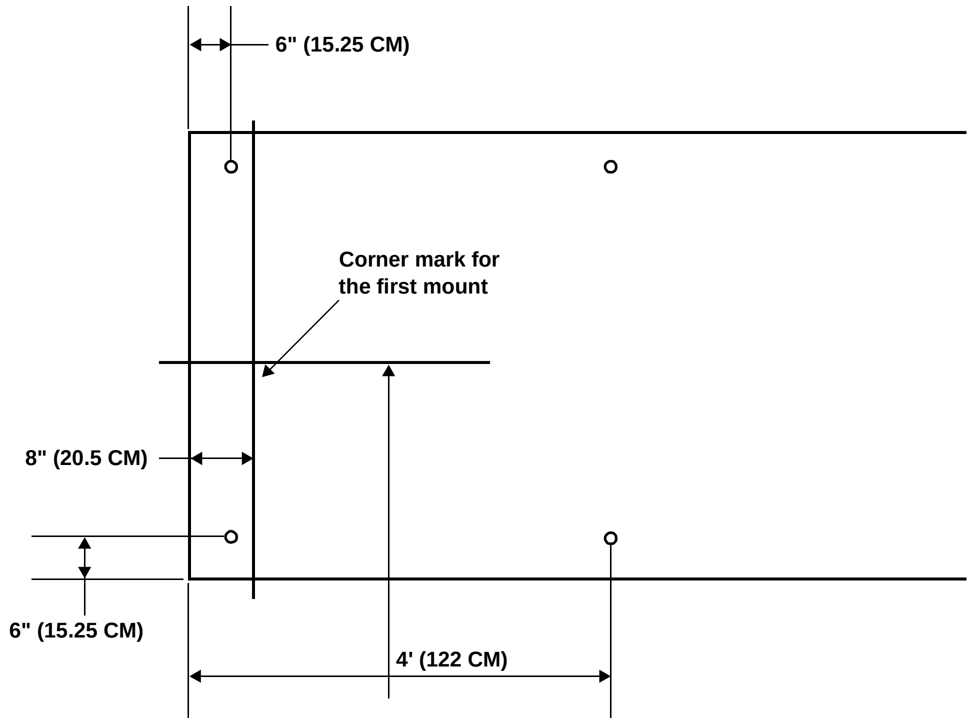
1 The wall mounted systems are usually comprised of a 1 inch thick plywood board that is anchored to the wall and a number of BIX mounts that are fastened onto the board. Purchase appropriate anchors and screws for the board. The board(s) is provided as previously determined by the Nortel engineer and the customer.

Note: Procedures for mounting the board should be followed as described in this subsection unless changed by the Customer specifications, drawings, and/or site conditions. Any Customer changes to this procedure must be documented on a hard copy of a drawing for record purposes.

2 Marking of the wall space is done according with the job specifications. If no job specifications are available, then mark the wall as shown in Figure 225.

3 The board requires mounting holes, drill the holes in the board for that purpose. Refer to Figure 225 for the location of holes. Mark the holes and drill them with the appropriate size of drill bit to fit the purchased screws.

Figure 225 – Preparing the Board



4 Once the wall and the board are marked, mark the locations for the wall anchors using the board as a template and the measurements given in Figure 226.

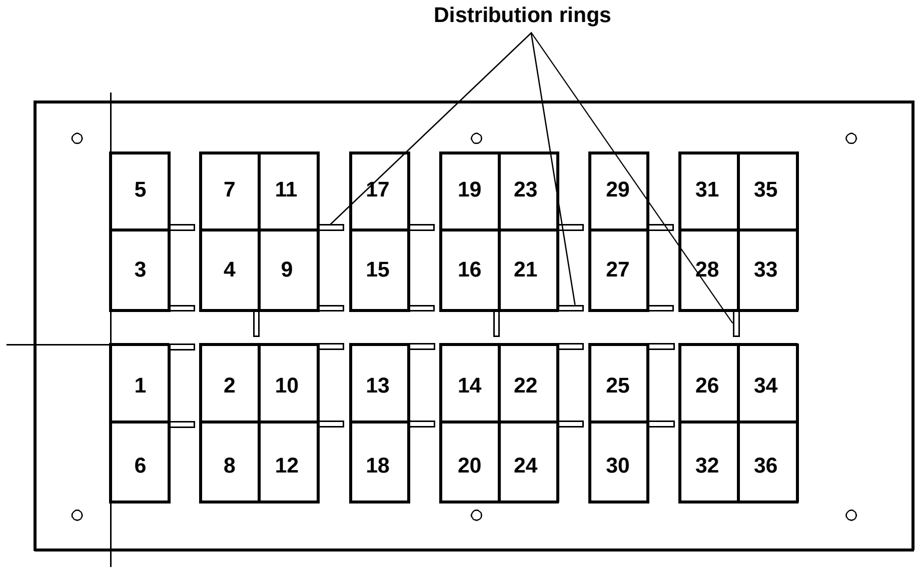
5 Drill the holes and install the anchors that were purchased for the job. Information for installing the anchors is provided in Event 04 (Method 03-9054), "Level, Align, and Secure Equipment." This event provides the information for installing and setting all types of anchors used in the DMS system. If Event 04 (Method 03-9054) does not provide the information for your particular type of anchors, refer to the documentation that comes with the anchors for the hole drilling and anchor setting requirements.

6 Mount the board on the wall using the screws purchased for that purpose.

Mounting the BIX Mounts

7 The BIX block mounts are mounted on the board in a particular pattern. Refer to Figure 226.

Figure 226 – Installing the BIX mounts



8 Mark the board with an erasable marking tool by making a corner mark according to the measurements made in the previous paragraph. Line up the edges of the mount, top left corner, with the lines on the board and mark the mounting holes. Use the narrow slot of the hole for marking the holes.

9 Mount all BIX block mounts in their locations as per the job specs. The screws for mounting the BIX block mounts are provided with the mounts. Use the distribution rings for positioning and spacing after the first mount is in place.

10 As the mounts are being installed, install the distribution rings in places shown in Figure 227. While mounting the mounts and distribution rings, notice that there is a sort of locking system for installing the rings between the mounts and for stacking the mounts on top of each other.

11 The important rule is that one should always plan for the expansion of the system, so keep the mounts in a particular pattern for easier expansion in the future.

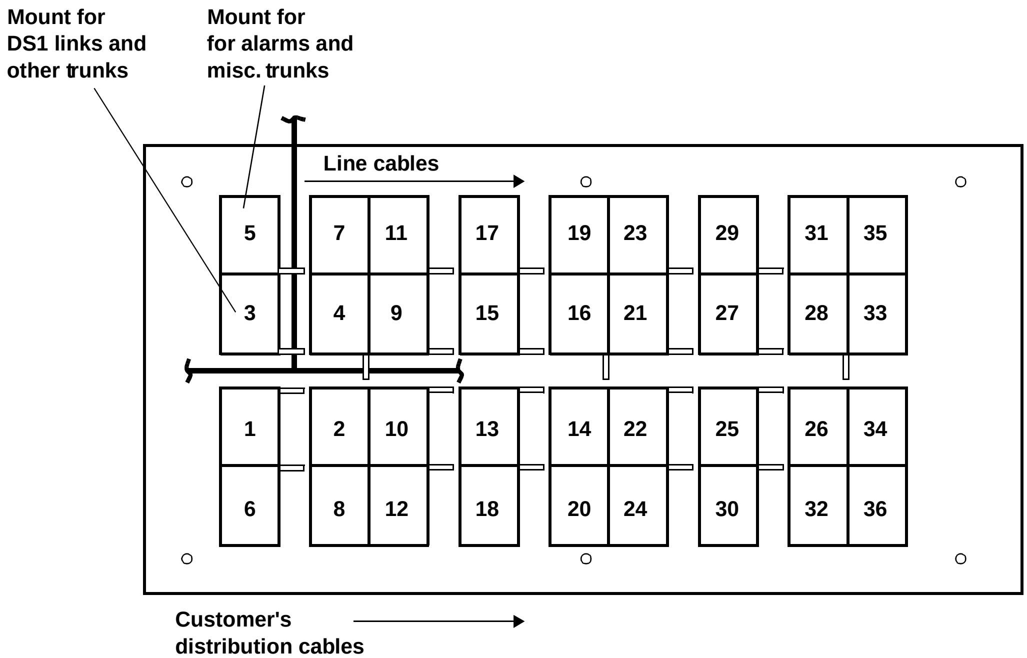
12 The wall mounted system is slightly different than the CPDF layout. In this case all cabling is on the same side, on the surface of the plywood board.

13 Again, the very first mount, in upper left corner, is used for the alarms, MTA, test trunks, and other MISC equipment. The mount just below is used for DS1 links and other interoffice trunks.

14 The remaining mounts on the top of the board are used for line cables. If the mounts will grow from right to left, then reverse the order of laying out the board.

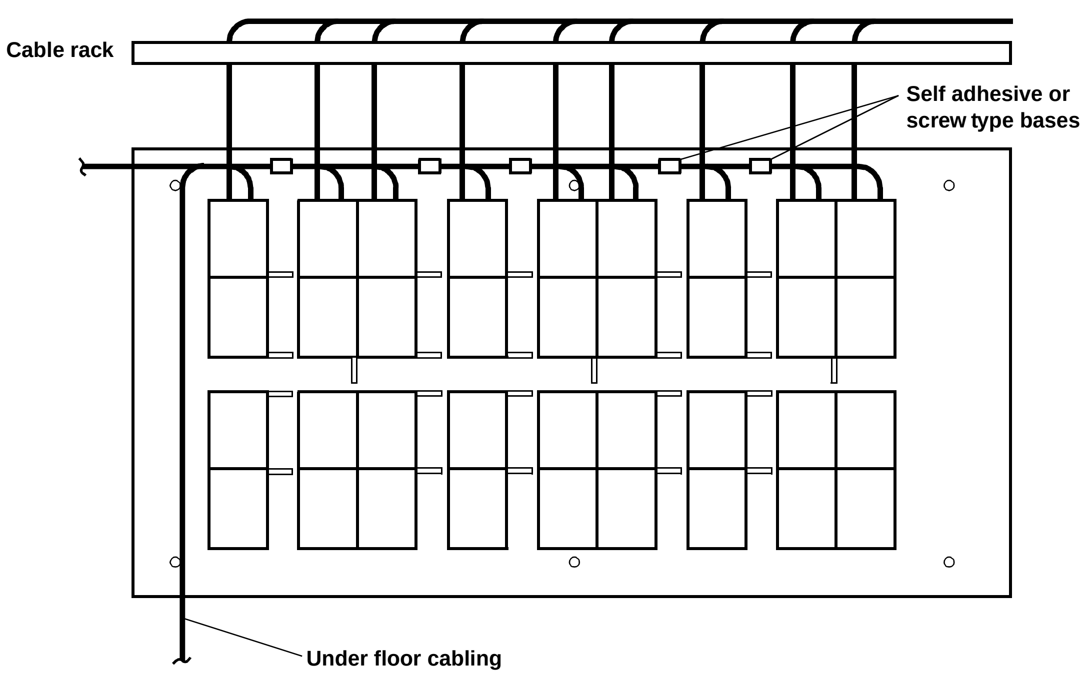
15 All mounts on the bottom shall be used for distribution cables (customer's cables). This portion of the job is a customer responsibility, unless otherwise ordered by the customer.

Figure 227 – Layout of the Wall System



16 The equipment cables enter the BIX mounts from the top and the distribution (Customer) cables enter the BIX mounts from the bottom. Refer to Figure 228.

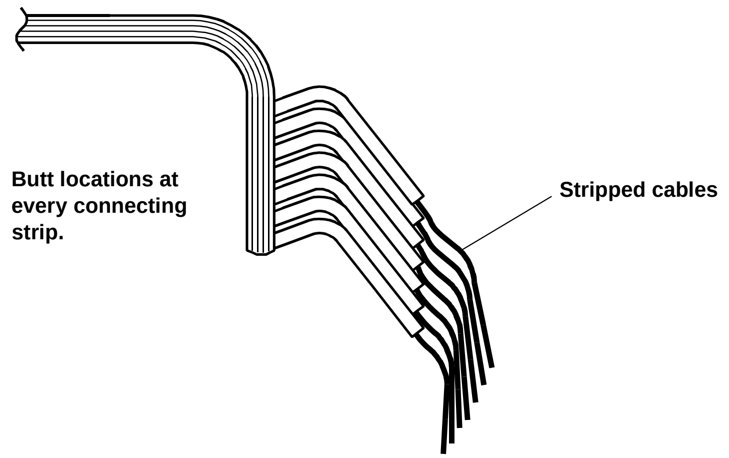
Figure 228 – Cabling the Wall System



17 Bring the equipment cables into the BIX mounts from the top. To secure the cables to the board, use available ty-rap bases in places shown in Figure 229 or position them as best suited.

18 Bring the cables to the entry of the mount, make a sweeping 90 degree loop and bring them down along the left side wall of the mount. Leave at least 30" of slack past the end of the mount.

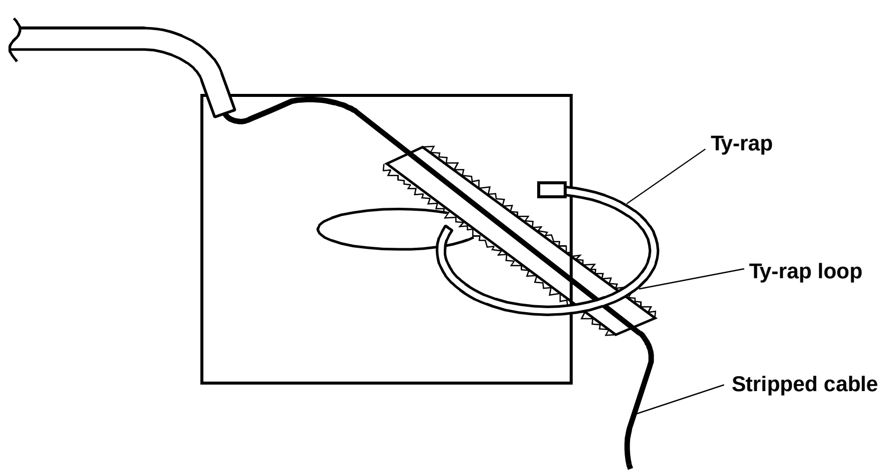
Figure 229 – Forming Cables in the Mount



19 Butt the cables in level with each connecting strip. At this point, there should be enough slack on cables to bring the stripped wires to the other end of the mount and back to the beginning of connecting strip with lots of slack to fan and connect the wires to connecting strips.

20 Secure the stripped cable to the connecting strip(s). Figure 230 illustrates how to tie the wires to the strip, only one cable shown for clarity. Ty-rap and connect one strip at a time. This operation is also explained in the IBDN manual.

Figure 230 – Securing Cable to Connecting Strip

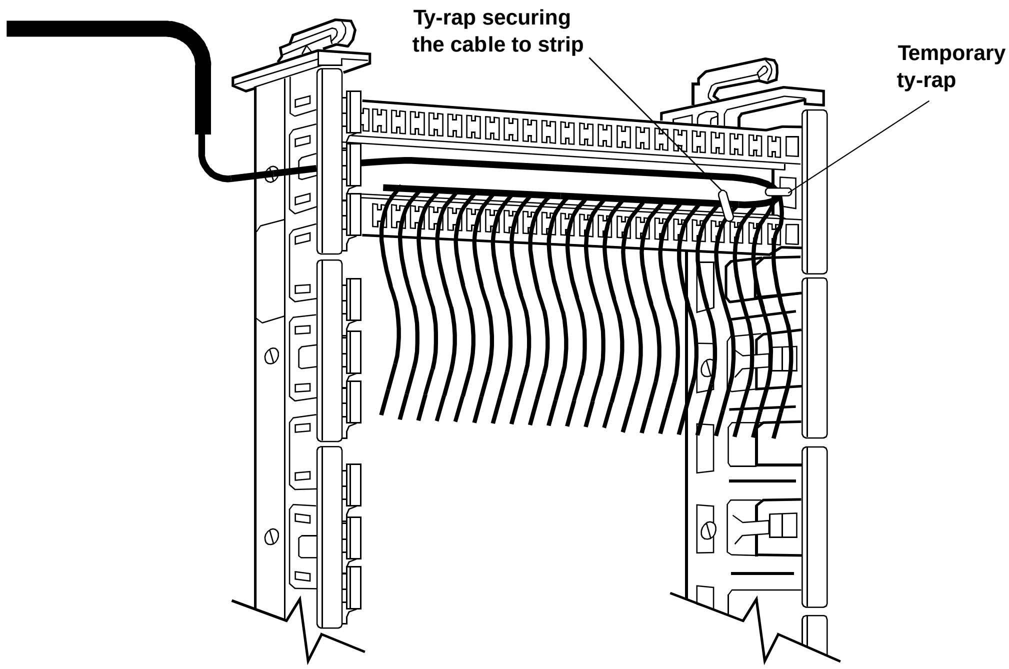


22.7 Wiring the BIX Blocks

1. Once all the wires are tied to the strip, position the strip against its location on the mount with the cable on the top of the strip. Size up the slack you will need to manipulate the strip, such as: remove, turn it upside down, and/or possible replacement of the strip.

2. Place a ty-rap into the loop on a connecting strip and around the stripped portion of the cable, refer to Figure 231.

Figure 231 – Fanning the Wires



3. Position the strip into place, click it into the BIX mount. At this point the ty-rap holding the cable on the strip is at the right hand side of the mount. Do *not* tighten this ty-rap yet.

   The strip fits into the mount between two clips on each end of the BIX mount. Temporarily, tie the loop of the cable to the side of the BIX mount to keep the slack in place while fanning the wires.

4. Start fanning the wires randomly, meaning that the first pair falling out of the bundle should run along the strip and be placed in its position.

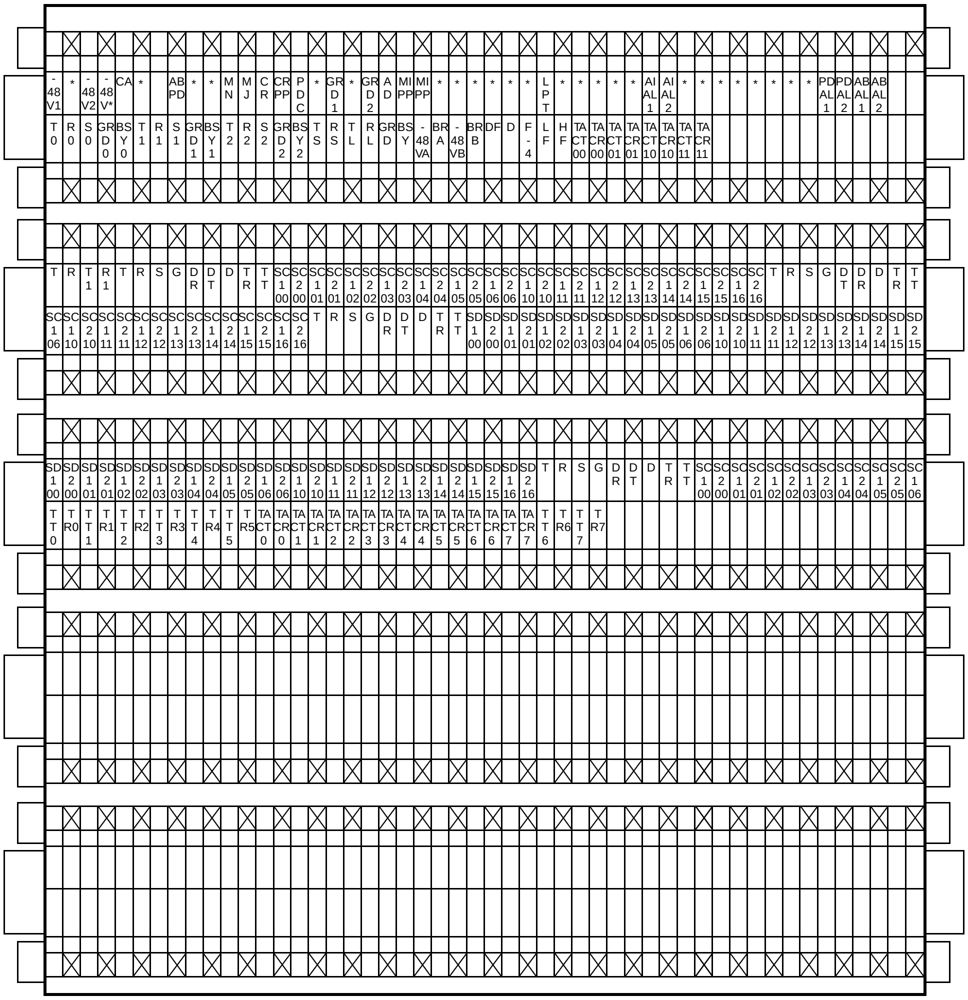
5. Fan the pairs, not individual wires. Pick a pair and position each wire over the pair splitter, just give it a slight push so that the wire ends up in the plastic cove. Do *not* try to push it all the way into the connecting metal clip. A connecting tool is needed.

6. This operation is described and illustrated in more details in the IBDN installation manual.

7. The following are the layouts of always equipped mounts. Figure 232 illustrates the layout for a MISC equipment mount. This only applies to BIX mounts QMBIX10A.

8 Jumper running methods are shown in Figure 234 and Figure 235. Route the jumpers through distribution rings, leaving enough slack that will allow tracing when necessary.

Figure 232 – BIX MISC Mount Layout



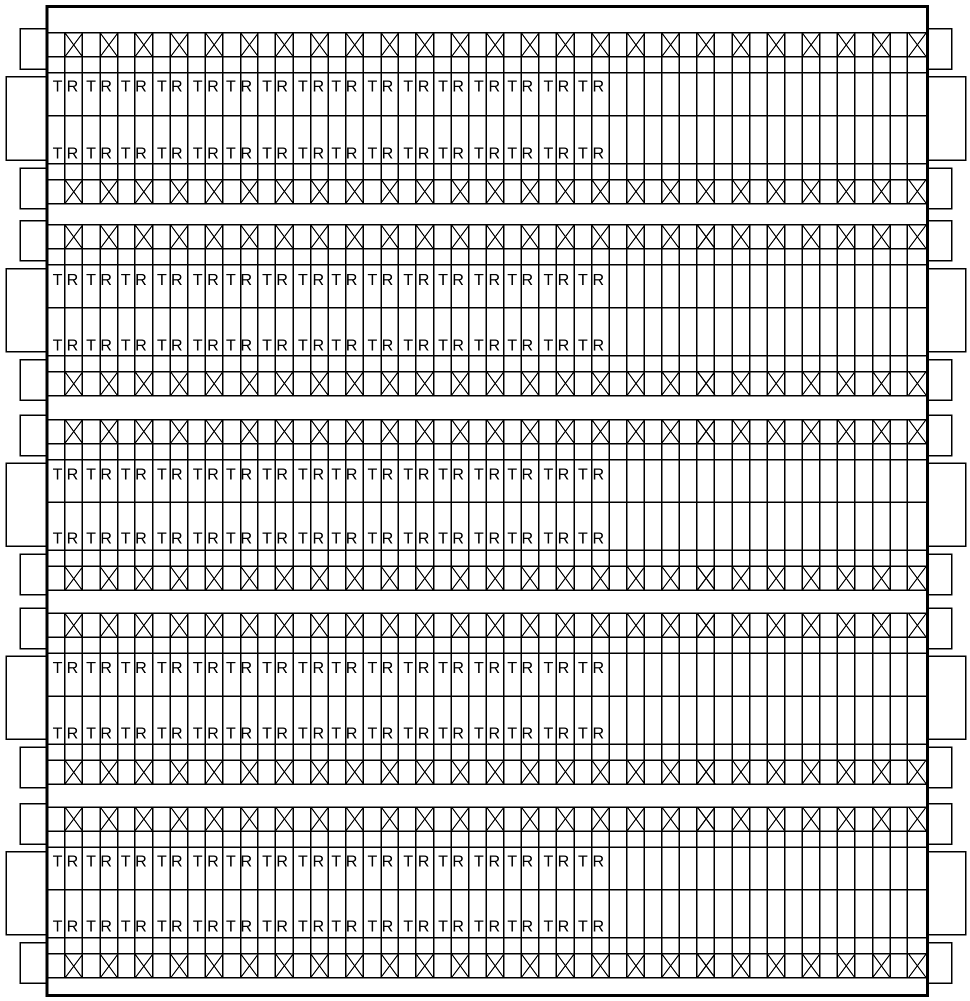
9 Run and connect the jumpers on per half connecting strip basis. Meaning that the jumper for the left side of connecting strip will be routed through the left side distribution rings and the same will apply to the right hand side. This eliminates any crossing of jumpers at the connecting strip.

10 Running jumpers on the Wall System is similar to the frame, except that instead of routing and connecting on a per half connecting strip basis, this is on per whole connecting strip basis. However, if there is only a single column of mounts, then split the connecting strip in two halves. Refer to Figure 233.

11 There is a quick connect tool specially designed for connecting the wires to the BIX connecting strips. There is a feature on the connecting tool whereby one can use the tool in a no-cut or cut position. The no-cut position will just insert the wire into the metal connecting clip but will leave the slack on the other side of connecting strip.

12 The cut position will insert the wire into the metal clip and cut the unused end of the wire flush with the connecting strip edge. These features can be selected by turning the selector button on the tool's handle.

Figure 233 – BIX Lines Mount Layout (Example)



13 When the tool is used in a cut position, the cutter (the dark metal on the tool's shaft) should be turned in the direction of the wire end to be cut off. For additional information, refer to the IBDN manual.

14 When using the tool, position the tool over the wire, hold the tool perpendicularly to the connecting strip, and give it a slight push until the wire is fully inserted.

15 After all wires are inserted and cut, inspect the wires for a proper position to make sure that all wires made a good connection. Look at the row of wires on the connecting strip from a side, ensure that all the wires are seated all the way at the end of the connecting groove. For additional information, refer to the IBDN manual.

Figure 234 – Routing Jumpers on a Frame System

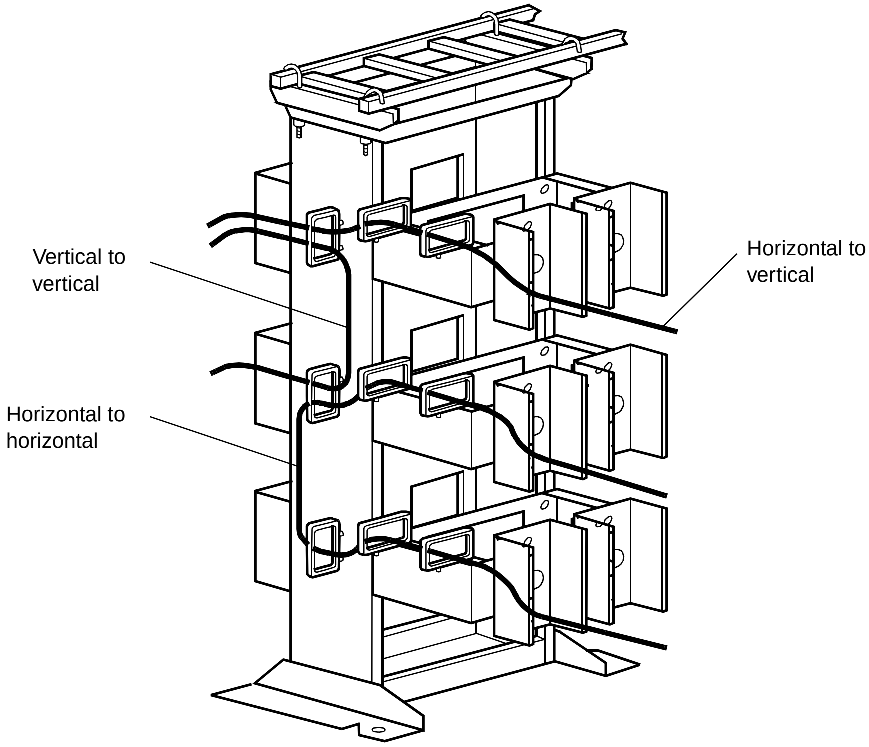
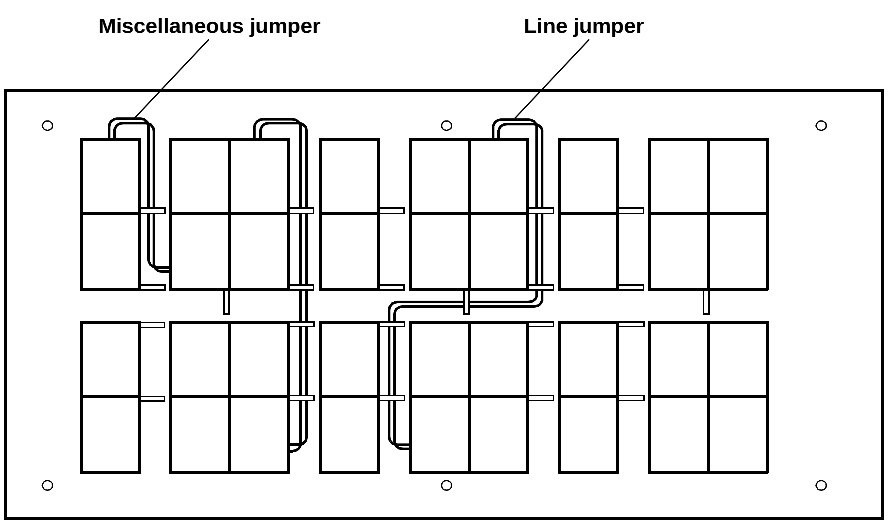


Figure 235 – Routing Jumpers on a Wall System



22.8 Designating the BIX Blocks

1. All the blocks are designated on per job basis. Job drawing 158 shows the exact location of each designation label.

2. Each job is provided with the custom made designation labels. These designation strips are simply inserted into the BIX mount by pushing them in between two clips on each side of the mount.

22.9 Parts List for Small BIX Blocks

1 Refer to Figure 236 for parts list of small BIX components.

Figure 236 – Parts List of small BIX components

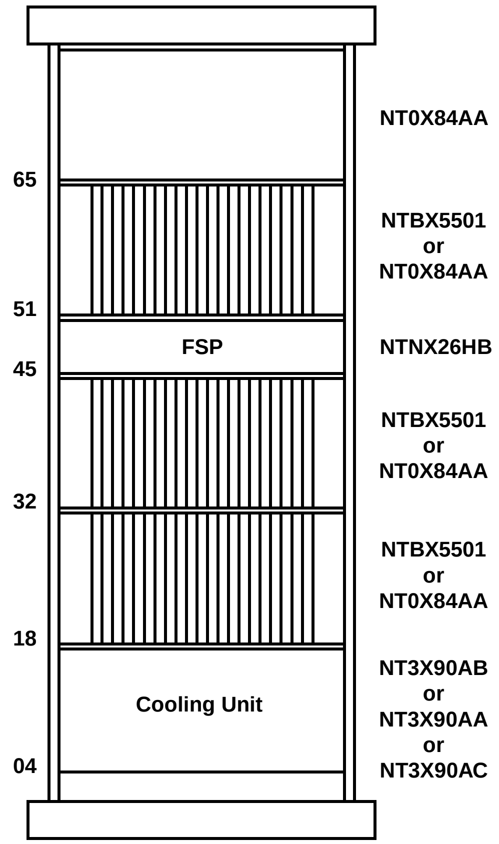
Description	**Code Name**	**CPC Number**	**Comment**
BIX Mount	QMBIX10A	A0270164	Minimum ordering 2
25 Pair Conn. Strip	QCBIX1A	A0266828	Minimum ordering 20
Distribution Ring	QRBIX19A	A0270168	Minimum ordering 10
BIX Connecting Tool	QTBIX16A	A0270165	Minimum ordering 1
Guard, Special Services	QGBIX23A	A0270172	Minimum ordering 50
BIX Mount Cover	QCABIX26A	A0276394	Minimum ordering 1
BIX Designation Strip	QSBIX20A	A0270169	Minimum ordering 50
Blank Equipment Labels	Green Yellow Red Blue Silver Purple White	P0588400 P0588401 P0588402 P0588403 P0588404 P0588405 P0588406	Minimum ordering 1 sheet, 5 labels per sheet
Blank OP Cable Labels	Green Blue Red	P0588415 P0588416 P0588418	

23.0 Host Link Interface (HLE) Frame

23.1 Host Link Interface (HLE) Frame Configuration

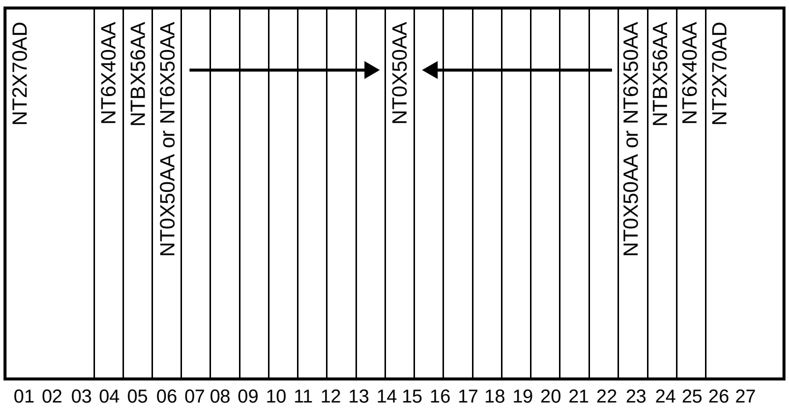
1 The Host Link Interface (HLE) is a single bay frame. A full configuration is shown in Figure 237. The frame will be provisioned according to office requirements.

Figure 237 – HLE Frame (front view)



2 An example of a HLE circuit pack fill is given in Figure 238.

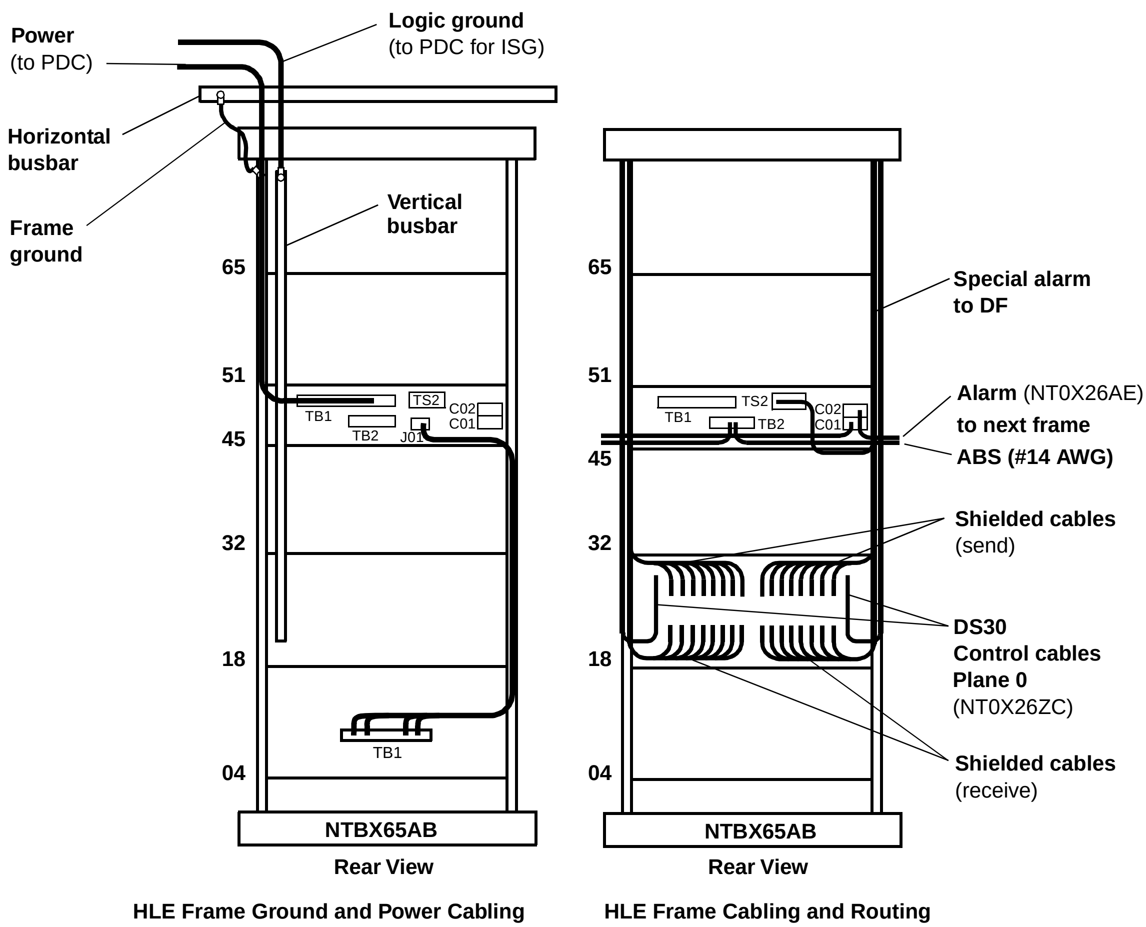
Figure 238 – HLE Circuit Pack Fill



23.2 Frame Grounding

1 Frame grounding cables and mounting hardware are supplied with each frame. All grounding connections are shown in Figure 239.

Figure 239 – HLE Frame Cabling and Routing



2 Connect the cable braid assembly from the top of the frame left upright (rear view) to the third hole from the left end (rear view) of the bar.

23.3 Power Cables

1 Run the power cables, battery (-48V), and Battery Return (BR), down the left frame upright (rear view) to the FSP onto the terminal blocks according to the following information. Refer to Figure 239 for the routing of the cables. Figure 240 gives FSP wiring information for a fully configured frame.

Do *not* form and secure until all the crimping is completed. Ensure the power cables are run in the appropriate slot in the cable trough.

2 Form the cables across the FSP and connect the cables to the appropriate terminals at the FSP and the PDC according to the job drawings (XX...-D640) and tighten the screws.

Figure 240 – HLE FSP Power Connections

Line	Signal	Position	Pin
1	-48V(A) 1	TB01	09
2	-48V(A) 2	TB01	10
3	-48V(A) 3	TB01	13
4	-48V(A) 4	TB01	14
5	-48V(B) 1	TB01	11
6	-48V(B) 2	TB01	12
7	-48V(B) 3	TB01	15
8	-48V(B) 4	TB01	16
9	BR(A) 1	TB01	01
10	BR(A) 2	TB01	02
11	BR(A) 3	TB01	05
12	BR(A) 4	TB01	06
13	BR(B) 1	TB01	03
14	BR(B) 2	TB01	04
15	BR(B) 3	TB01	07
16	BR(B) 4	TB01	08

3 Place a ty-rap at each break off point and every 6 inches (15 cm) along the harness. Then secure them to the cable brackets on the upright.

4 Ensure that all the power connections are tight. If the power cables encounter a sharp edge, protective fiber must be placed over the edge.

23.4 Alarm Cabling

1 Run the NT0X26AE and a single #14 AWG cable, with appropriate lugs, between each adjacent FSP, along the center. Ty-rap them together and secure them to the frame cables.

Refer to Figure 239 and the following for terminations:

Aisle Alarms
C01 to CO2 on preceding FSP (or OAU)
C02 to C01 on succeeding FSP

ABS Cables
TB2-1 (-48VABS) to succeeding FSP
TB2-2 (-48VABS) to preceding FSP
TB2-3 (BRABS) to succeeding FSP
TB2-4 (BRABS) to preceding FSP
TB2-12 (AISLALM2) to preceding FSP
TB2-11 (AISLALM1) to succeeding FSP

2 If the frame is the first or the last in the lineup fitted with end panels, run the end aisle alarm lamp connections as follows:

Aisle Alarm

TB2-5	aisle lamp (gold lead)
TB2-12	aisle lamp (silver lead)

3 Run the special shelf alarm cables (NPS90529-01) (HLMD00) down the right frame upright. The other end of this cable terminates at the DF.

4 Butt the HLMD00 cable at the nearest cable bracket, 1/2 inch below the bracket, above the FSP and form onto terminal strip TS02 on the FSP. The connections are made according to the following:

Pin	Wire Color	Signal	Remarks
1	BL(W)	ALM.COM0	Associated with shelf 18, slot 5
2	W(BL)	ALM.NO0	Associated with shelf 18, slot 5
3	O(W)	ALM.COM1	Associated with shelf 18, slot 23
4	W(O)	ALM.NO1	Associated with shelf 18, slot 23
5	G(W)	ALM.COM2	Associated with shelf 32, slot 5
6	W(G)	ALM.NO2	Associated with shelf 32, slot 5
7	BR(W)	ALM.COM3	Associated with shelf 32, slot 23
8	W(BR)	ALM.NO3	Associated with shelf 32, slot 23
9	S(W)	ALM.COM4	Associated with shelf 51, slot 5
10	W(S)	ALM.NO4	Associated with shelf 51, slot 5
11	BL(R)	ALM.COM5	Associated with shelf 51, slot 23
12	R(BL)	ALM.NO5	Associated with shelf 51, slot 23

23.5 Host Configuration Straps

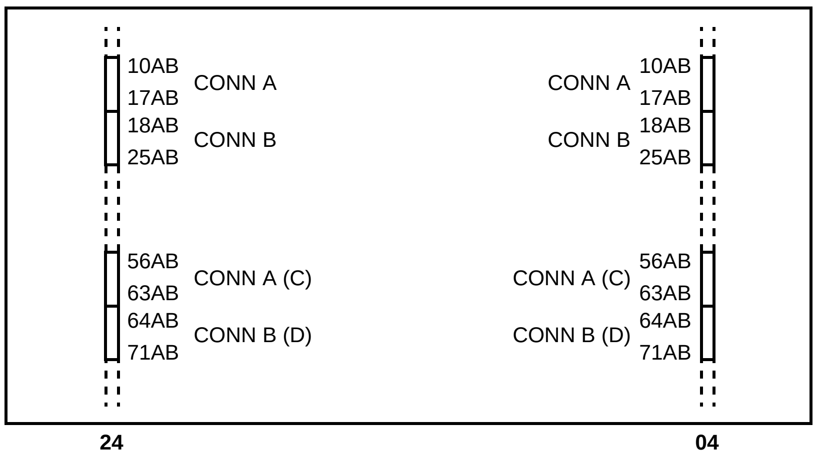
1 To configure the RLE shelf as a Host shelf, connect the following pins on the back of the RLE shelf with 26 ga. wire:

Slot 5	Slot 23
12A to 12B	12A to 12B
14A to 17A	

23.6 DS30 Control Cables

1 Run the DS30 control cables (NT0X26ZC) from each HLE shelf to the SLC frame down the left and right sides (rear view) as shown in Figure 238. Terminate these cables on the HLE shelf backplane according to Figure 239 at circuit pack positions 04 and 24. Secure the connectors to the connector key bracket with a ty-rap.

Figure 241 – HLE Shelf DS1 Connections



Shelf Pinouts

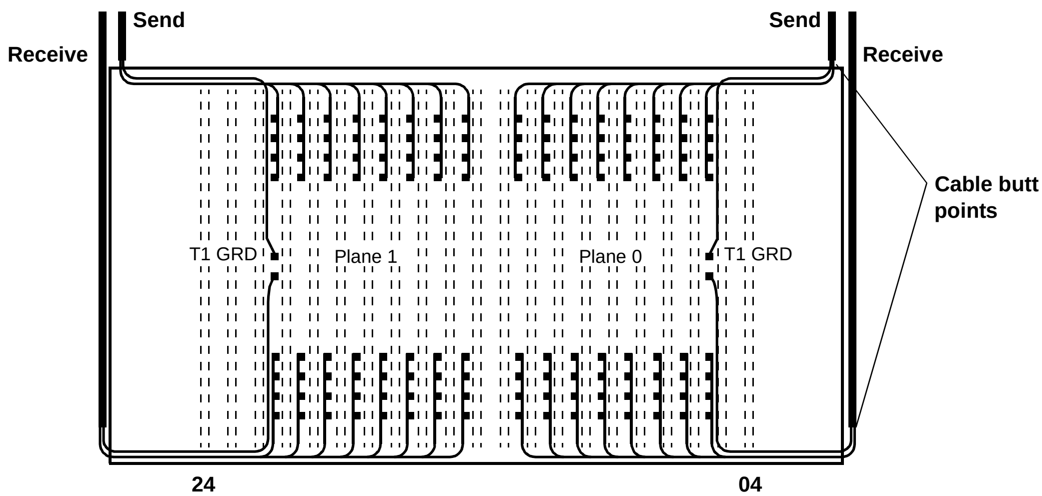
	From:			To:			
0X26		**Frame**	**Shelf-Slot**	**Pins**	**Frame**	**Plane**	**Port**
ZC	A	HLE	*X-04	10A/B-17A/B	SLC	0	0, 1
	B			18A/B-25A/B			2, 3
	A(C)			56A/B-63A/B			0, 1
	B(D)			64A/B-71A/B			2, 3
ZC	A	HLE	*X-24	10A/B-17A/B	SLC	1	0, 1
	B			18A/B-25A/B			2, 3
	A(C)			56A/B-63A/B			0, 1
	B(D)			64A/B-71A/B			2, 3
Note: *X can be one of 18, 32, or 51.							

23.7 DS1 Shielded Cables

1 There are four (4) shielded cables going to each HLE shelf (2 SEND and 2 RECEIVE). One (1) SEND and one (1) RECEIVE should be run to each side of the frame. Butt the cables as shown in Figure 242.

2 Make separate forms for SEND, along the top of the shelves, and RECEIVE, along the bottom of the shelves, and connect to the backplane at circuit pack locations 6 to 13 on the right side of the shelf and 15 to 22 on the left side, as shown in Figure 242.

Figure 242 – HLE Shelf DS30 Connections



Shelf Pinouts

From					To			
ZXAM	**Frame**	**Shelf**	**Slot**	**Pins**	**Frame**	**Slot**	**Pins**	**Plane**
Send/ Receive	HLE	*X	06/07	T/R00-T/R03	DSX/ Fiber Frame	GR1	Ports 0-3	0
			08/09	T/R04-T/R07		GR2	Ports 4-7	0
			10/11	T/R08-TR11		GR3	Ports 8-1	0
			12/13	T/R12-T/R15		GR4	Ports12-15	0
Send/ Receive	HLE	*X	06/07	T/R00-T/R03	DSX/ Fiber Frame	GR1	Ports 0-3	1
			08/09	T/R04-T/R07		GR2	Ports 4-7	1
			10/11	T/R08-TR11		GR3	Ports 8-1	1
			12/13	T/R12-T/R15		GR4	Ports 12-15	1
Note: * X can be 18, 32, or 51.								

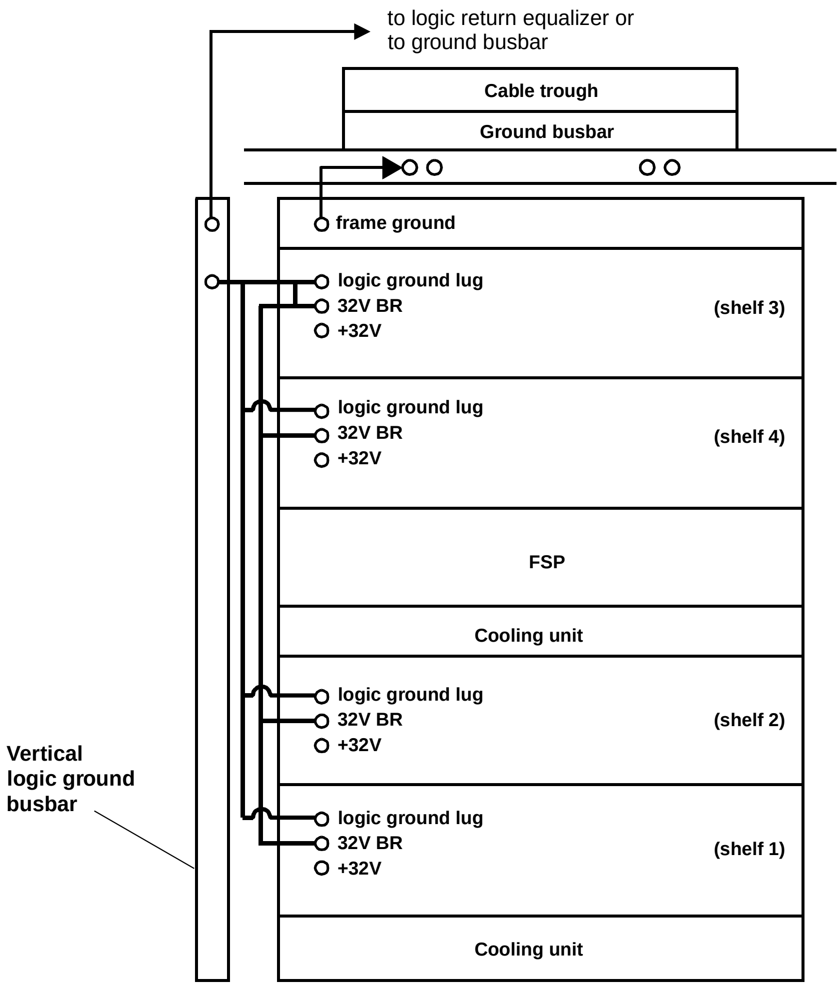
3 Ground the cable ground sheathing to the circuit pack positions 06 and 22 (T1) ground terminals on the backplane using P049Q122 ground wire assembly.

24.0 Meeting Communication System (MS-1) Frame

24.1 Meeting Communication System (MS-1) Grounding

1. If necessary, mount a horizontal busbar on the cable trough of the frame. Refer to Figure 243.
2. Refer to Event 06 (Method 03-9056), "Grounding," for information regarding general grounding principles. (If the MS-1 is a part of a DMS lineup, it should be grounded consistently with respect to the other frames.)
3. Run the MS-1 frame ground braided cable (top left rear hole in position 77) to the ground busbar. Ensure that the vertical separation between the MS-1 frame and the point of ground does not exceed one floor.
4. Use a braided ground strap to connect the vertical logic ground bar to either a Logic Return Equalizer (battery return at the Power Distribution Center), or to the ground busbar (refer to Figure 243).
5. Verify that there is a braided ground strap connected from the shelf 4 logic ground lug to the vertical logic ground bar as shown in Figure 243.

Figure 243 – Frame Grounding



NT4G53FA (rear view)

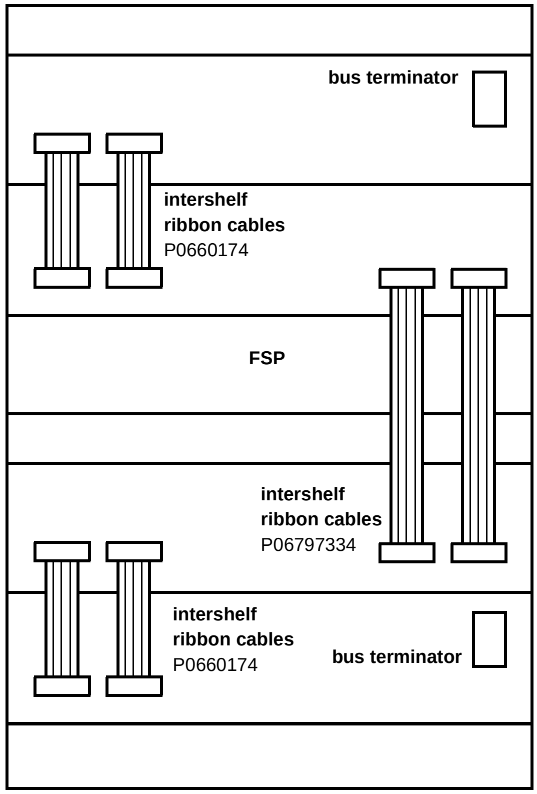
6 Verify that there is a braided ground strap connecting the Logic Ground lug of shelf 4 to the 32V BR of shelf 4 as per Figure 243.

7 Verify that all shelf Logic Ground lugs are daisy chained together as per Figure 243.

8 Verify that all shelf 32V BR are daisy chained together as per Figure 243.

9 Verify that the intershelf ribbon cables are in their proper positions as per Figure 244.

Figure 244 – Ribbon Cable Connections



NT4G53FA (rear view)

24.2 Extension Kit (NT4G53FC) Installation

1. Attach the top extension (NT0X3267) to the top rear of the frame using the 27 screws (P097F813) provided.
2. Attach the bottom extension (NT0X3268) to the bottom rear of the frame using the 27 screws (P097F813) provided.
3. Attach the cable duct cover (P0684750) to the bottom extension using the three screws (P0160171) provided.
4. Attach adaptors (P0639508 and P0639510) to the front of the frame, top and bottom, using the 27 screws (P097F813) provided for each.
5. Attach adaptors (P0639508 and P0639510) to the rear of the frame, top and bottom, using the 27 screws (P097F813) provided for each.
6. Attach the adaptor cover (P0639509) to the adaptors on the front and rear, top and bottom of the frame using the six screws (P0125949) provided for each.
7. Modify the top panel assembly (NT0X3246 /B0219999) by removing the two latches (A0300734) and replacing them with the latches (A0319495) provided in the kit.
8. Modify the bottom panel assembly (NT0X3214 /B0218735) by removing the two latches (A0300734) and replacing them with the latches (A0319495) provided in the extension kit.

9 Modify the bottom panel assembly (NT0X3214/B0218735) by installing the screen modification kit (NT4G5302) as per steps 10 through 12.

10 In the panel assembly, drill ten.128 diameter holes.

11 Install the screen using the rivets on the inside of the panel.

12 Mark and install the label on the inside of the panel.

13 Install the modified panel assemblies on the back of the extended frame.

24.3 End of Line Kit (NT4G53FB) Installation

1 Attach the mounting bracket (P0649726 X 2) to frame extensions, top and bottom, at both ends of the bay lineup using two screws (P0160171) for each.

2 Attach bracket (P0656362 X 2) to the bottom rear of the frame at both ends of the lineup using two screws (P097F813) for each bracket.

3 Attach bracket (P0640262 X 2) to the top rear of the frame at both ends of the lineup using one screw (P097F813) for each.

4 Attach the side panels (P0658020) to the frame and brackets at both ends of the lineup using 33 screws (P097F813) for each.

5 Attach the endguards (NT0X73AH/B0222690) over each side panel at both ends of the lineup using the mounting bracket and screws supplied with the endguard.

6 Attach the trim panel (NT0X72AB/B0209696) to the front of the frame at both ends of the lineup using the mounting bracket and screws supplied with the trim panel.

24.4 Miscellaneous MS-1 Rack Installation

1 Attach the cable duct front cover (NT0X3203/B0218724) to the top-front adaptor using the three screws (P097F813) provided.

2 Attach the cable duct rear cover (NT0X3204/B0218725) to the top-rear adaptor using the three screws (P097F813) provided.

3 For a single-bay system or lineup, attach the T-bar mount support bracket (P0652632) between the front and rear cable duct cover at both ends using the four screws (P0126446), four washers (P0599366), and four nuts (P0081293) provided (use the two topmost holes in the duct cover).

4 For a multi-bay lineup, attach the T-bar mount support bracket (P0652632) between the front and rear cable duct cover at both ends using the four screws (P0126446), four washers (P0599366), and four nuts (P0081293) provided (use the two topmost holes in the duct cover).

5 For a multi-bay lineup, attach the T-bar mount support bracket (P06562632) between the front and rear cable duct at each intermediate point using the eight screws (P0126446), eight washers (P0599366), and eight nuts (P0081293) provided.

6 Attach the cable trough (NT0X31AO/B0206549) to the top of the frame using the hardware supplied with the trough.

7 Attach the light fixture (NT0X49AU/B0216851) to the duct cover and top adaptor, both front and rear, using the hardware supplied with the light.

8 Attach the light end cap (NT0X49AH/B0208217) to both ends of the light lineup, both front and rear, using the hardware supplied with the end cap.

9 In a multi-bay lineup, attach the T-bar (NT7X1604/B0222973) at each intermediate point in the rear of the rack to the top and bottom extensions using the hardware supplied with the T-bar.

10 In a multi-bay lineup, attach the trim panel (NT0X72AB/B0209696) at intermediate points in the front of the rack to the frame using the hardware supplied with the trim panel.

24.5 Power Installation

Frame Power Lead Installation

1 All -48V leads must be de-energized before connections are made to the MS-1 bay. At the PDC, remove all fuses associated with the MS-1 frame being installed.

2 Run the dc power leads (eight #10 AWG cable) from the PDC or office source down the LEFT REAR of the MS-1 frame. Form the cables horizontally to the FSP:

- Two leads from -48V battery source A
- Two leads from -48V battery source B
- Two leads from source A battery return
- Two leads from source B battery return

On the faceplate of the FSP, ensure that all circuit breakers CB1 - CB4 and load sharing switches SW1 - SW4 are set to OFF.

3 On the front of the FSP, ensure that all fuses (1 to 16) have been removed.

4 Strip the cables and fit the correct size lugs to the ends.

5 Use the ITA-9939 crimper to crimp the lugs onto the cables.

6 Connect the four input -48V power leads as well as their respective battery returns as per Figure 245.

Cooling Unit Power Installation

7 Run two -48V battery leads (A and B) and two ground return leads (# 16 AWG) from the PDC down the LEFT REAR of the MS-1 frame. Form the cables horizontally to the FSP.

8 Prepare and crimp the cables as per steps 4 and 5.

9 Remove the 5 fuses from the top and bottom cooling units.

10 Connect the two -48V battery and battery return leads as per Figure 245.

Alarm/Status Lead Installation

11 If the end-aisle lamps have been equipped, connect the leads to TB2 terminals 9 and 10. If necessary, crimp lugs onto the cables.

Shelf Power Verification

12 Ensure that each shelf has a lead that runs from its +32V power lug to the +32V power lug on the FSP.

Figure 245 – Power Leads

Frame Power Leads

FSP	-48V	BR	Feed
TB1	1	9	A
TB1	2	10	A
TB1	3	11	B
TB1	4	12	B

Cooling Unit Power Leads

FSP	-48V	BR	Feed
TB2	1	5	A
TB2	3	7	B

24.6 SRU and External Cabling Installation

SRU Installation

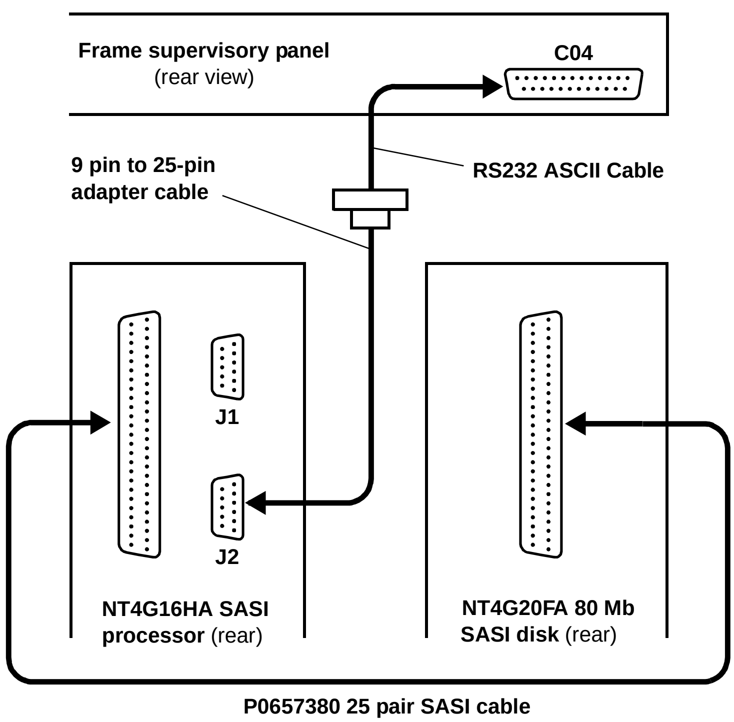
1 Install all the Shared Resource Units (SRU's), into the MS-1 frame as indicated by the Job Engineer supplied information. Follow the guidelines in Subsection 24.7, " SRU Insertion/Removal."

2 When all the SRU's have been installed, use the plastic filler plates provided to cover any open areas at the rear of the shelf cutout where there are no SRU's installed. Note that the filler plates break off in segments to match the width of the open space. They simply snap in.

SASI Processor/Disk Cabling (Release 2.1)

3 If an NT4G16HA (68010 - 5M) SASI Primary Processor has been provisioned, then follow steps 4 and 5. Otherwise, skip to step 6.

Figure 246 – SASI Prime Processor Connections



4 Connect the P0657380 SASI cable from the NT4G20FA SASI 80 Mb Storage SRU to the 50-pin connector at the rear of the Primary Processor SRU. Refer to Figure 246.

5 Plug the 9-pin to 25-pin adapter cable (supplied with the SASI Primary Processor) into J2 on the rear of the Primary Processor (refer to Figure 246). Connect a 25-pin connectorized cable from C04 on the rear of the FSP to the 9-pin to 25-pin Primary Processor adaptor cable.

This connection to the FSP allows an ACSII terminal to be connected (by way of a 25 pin ribbon cable) to C03 on the front of the FSP for access during system initialization.

SCSI Processor/Disk Cabling (Release 3.0)

6 If an NT4G16EE XP 68010 - 6M SCSI Primary Processor has been provisioned, then connect the NT4G09 SCSI cable from the SCSI port of the Processor to the RIGHT SCSI port of the NT4G20xx SCSI Disk SRU. Refer to Figure 247.

7 If an NT4G26JA 68020 - 7M Multi-Purpose Processor has been provisioned with an NT4G09 SCSI cable, then connect the cable from the Multi-Purpose Processor to the NT4G20xx SCSI Disk as per Job Engineer supplied information. Refer to Figure 248.

8 There may not be an NT4G09 SCSI cable provisioned with the NT4G26JA MPP; in which case it simply sits alone on the shelf.

9 If there are several NT4G20LA/QA SCSI Disk/Tape SRUs that have been provisioned with NT4G09 SCSI cables, interconnect them as per Job Engineer supplied information. Refer to Figure 247.

Ensure that any unused SCSI ports on NT4G20xx Disk/Tape SRUs are capped with Amphenol SCSI bus terminators. (Refer to Figure 247 and Figure 248.)

10 The tape/disk addresses of the SCSI NT4G20LA/QA disks must be configured as follows. The address switches are located under the front SRU latches. Refer to Figure 247, Figure 248, and Figure 249 (in the example in Figure 249, the SCSI disk address is set to 0 while the SCSI tape address is set to 1):

Disk	Disk	Tape
Attached to NT4G16EE PP	0	1
Attached to NT4G26JA FP	0	1
Chained from NT4G20 disk	2	5

Miscellaneous Information

11 Cables are to be routed to the LEFT-REAR side of the bay and cable troughs at the top of the bay.

12 Install a NE66QAB or NT3X25BA terminal strip into an NT0X02AB miscellaneous frame as per job engineer supplied information.

Figure 247 – SCSI Prime Processor Connections

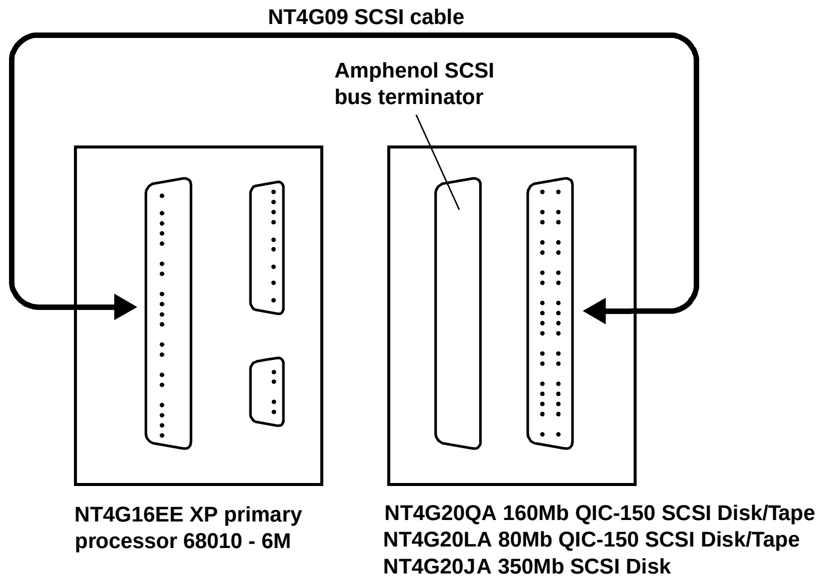


Figure 248 – SCSI Multi-Purpose Processor/Disk Connections

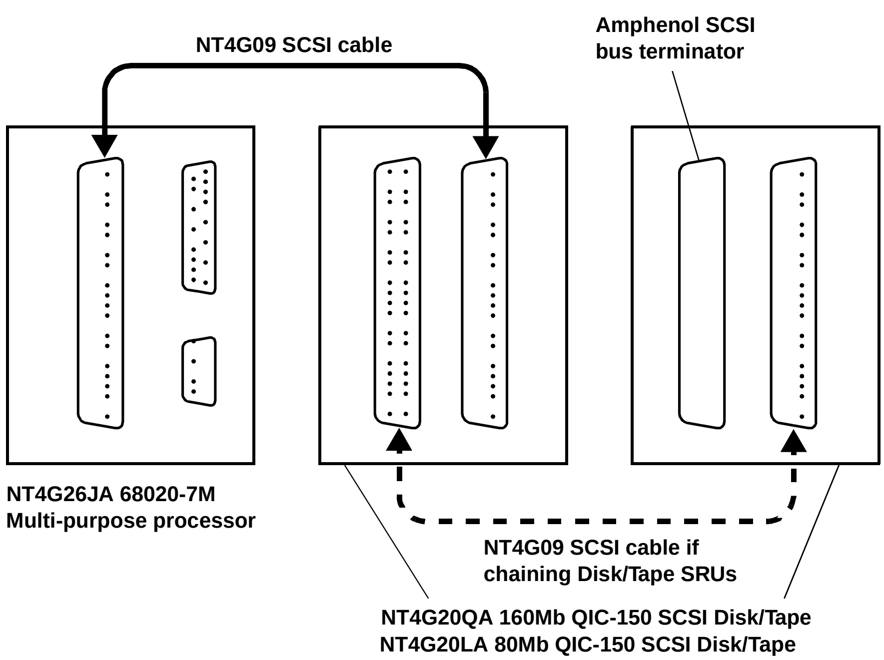
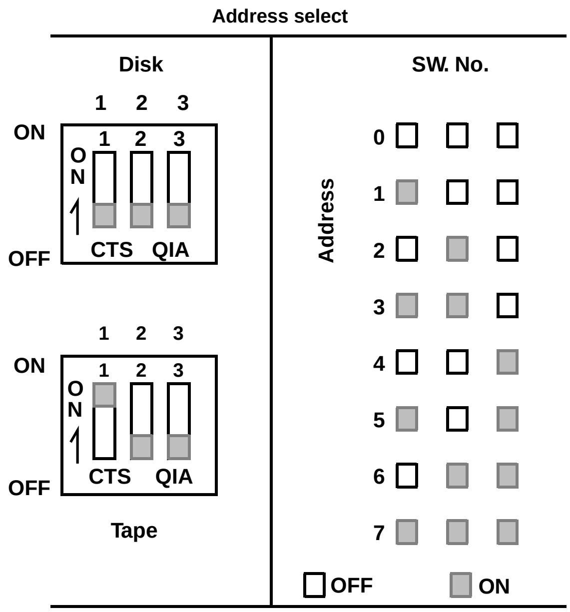


Figure 249 – SCSI Disk Address Select



LANlink Connection

13 On the rear of the NT4G14 LANlink SRU #1, connect one end of the P0679335 25-pair cable to the D-subbing connector. Connect the other end to C08 of the FSP (refer to Figure 250).

14 Route the LANlink cable from C09 of the MS-1 FSP to the designated interconnect location as per Figure 250, Figure 251, Figure 252, and Figure 253.

Figure 250 – LANlink SRU Connections

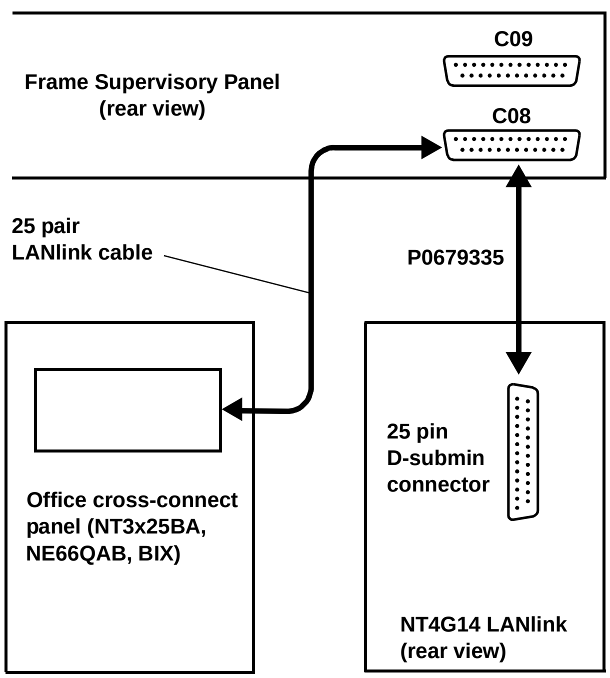


Figure 251 – Typical MS-1 Configuration for CO Application

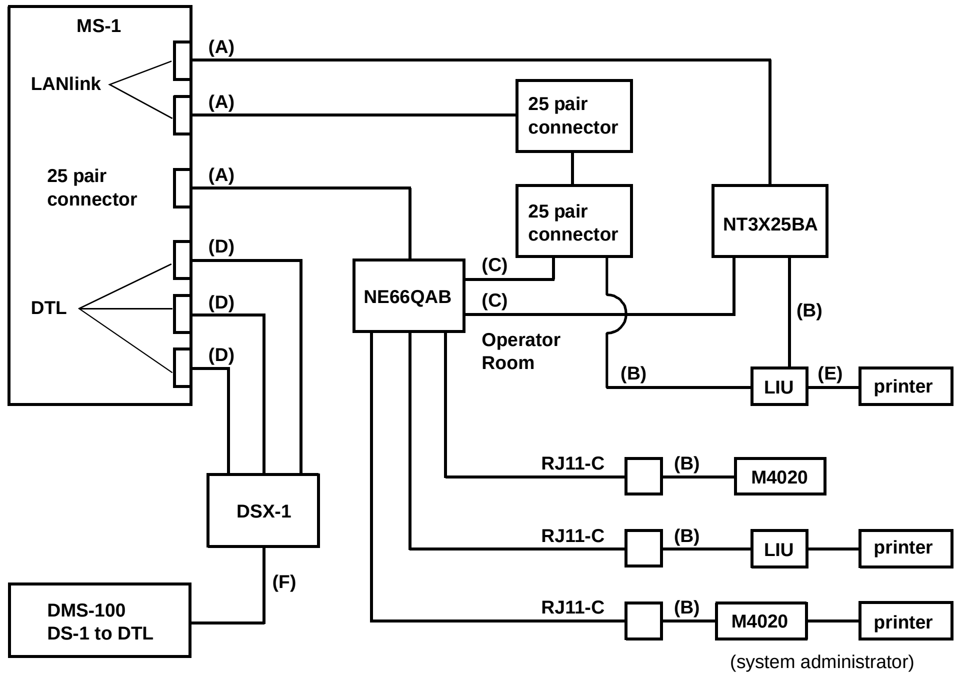


Figure 252 – Cable Type Information

Cable Types

A — Connectorized 25-pair cables. Supplied by Nortel, available in 3 lengths:

- A0101515 (30 ft/9.14m)
- A0101588 (60 ft/16.28m)
- A0101589 (100 ft/30.48m)

B — Teledapt cables 7 ft. (Nortel supplied)

C — 25-Pair cable, ordered to specified length and connectorized on location if required by a field technician (R0105555).

D — 2-Pair per digital trunk link or multiple pair for multiple digital link. Cable must be twisted pairs, shielded, and connectorized on location with a 15-pin connector at one end and a free end for connection to a DX-1. Length must not exceed 750 ft. non-repeatered (NE750A).
Connectorized cable supplied by Nortel in five lengths:
- NT4G23AD 50 ft.
- NT4G23BD 100 ft.
- NT4G23CD 250 ft.
- NT4G23DD 500 ft.
- NT4G23ED 750 ft.

E — RS-232C cable, supplied with the peripheral device.

F — 18-Pair not connectorized T1 cable (ABAM or ZXAM)

Figure 253 – Connector Block Information

Connector Blocks

NT3X25BATerminal strip interconnect located on an NT0X02AB miscellaneous frame (used to interconnect the MS-1 LANlink cable to peripheral digital devices).

NE66QABUsed to cross-connect the MS-1 LANlink cable to peripheral digital devices.

RJ-11CTeledapt jacks (6-wire) as single or double arrangement for connecting analog/digital devices.

RJ-14CTeledapt jacks (6-wire) similar to RJ-11C except intended for wall mount to connect analog/digital devices.

15 Wire wrap the LANlink cable to the NT3X25 cross-connect shelf as per Figure 254 and Figure 256.

16 For any of the other NT4G14 LANlink SRU, connect the 25-pair cable directly from the D-submin connector at the SRU to the designated interconnect locations as per job engineer supplied information (refer to Figure 254 and Figure 255).

Figure 254 – LANlink Cable Assignments Ports 1-5

LAN Port	Color Code	NT3X25BA Pin	Row
1	Blue/White Stripe	TT	21
	White/Blue Stripe	TR	21
	Orange/White Stripe	RT	21
	White/Orange Stripe	RR	21
2	Green/White Stripe	TT	22
	White/Green Stripe	TR	22
	Brown/White Stripe	RT	22
	White/Brown Stripe	RR	22
3	Slate/White Stripe	TT	23
	White/Slate Stripe	TR	23
	Blue/Red Stripe	RT	23
	Red/Blue Stripe	RR	23
4	Orange/Red Stripe	TT	24
	Red/Orange Stripe	TR	24
	Green/Red Stripe	RT	24
	Red/Green Stripe	RR	24
5	Brown/Red Stripe	TT	25
	Red/Brown Stripe	TR	25
	Slate/Red Stripe	RT	25
	Red/Slate Stripe	RR	25

Figure 255 – LANlink Cable Assignments Ports 6 - 12

LAN Port	Color Code	NT3X25BA Pin	Row
6	Blue/Black Stripe	TT	26
	Black/Blue Stripe	TR	26
	Orange/Black Stripe	RT	26
	Black/Orange Stripe	RR	26
7	Green/Black Stripe	TT	27
	Black/Green Stripe	TR	27
	Brown/Black Stripe	RT	27
	Black/Brown Stripe	RR	27
8	Slate/Black Stripe	TT	28
	Black/Slate Stripe	TR	28
	Blue/Yellow Stripe	RT	28
	Yellow/Blue Stripe	RR	28
9	Orange/Yellow Stripe	TT	29
	Yellow/Orange Stripe	TR	29
	Green/Yellow Stripe	RT	29
	Yellow/Green Stripe	RR	29
10	Brown/Yellow Stripe	TT	30
	Yellow/Brown Stripe	TR	30
	Slate/Yellow Stripe	RT	30
	Yellow/Slate Stripe	RR	30
11	Blue/Violet Stripe	TT	31
	Violet/Blue Stripe	TR	31
	Orange/Violet Stripe	RT	31
	Violet/Orange Stripe	RR	31
12	Green/Violet Stripe	TT	32
	Violet/Green Stripe	TR	32
	Brown/Violet Stripe	RT	32
	Violet/Brown Stripe	RR	32

Digital Trunk Link Connections

17 On the rear of the NT4G23 DTL SRU, connect the 15-pin receptacle of a T1 cable to the D-submin connector. Route the cable to the T1 line interface as per Job Engineer supplied information. Refer to Figure 252, Figure 253, Figure 254, and Figure 255.

18 Consult with the Job Engineer supplied information to determine the T1 cable wire wrap connections. Refer to Figure 256.

M4020 Terminal Installation

19 Unpack the M4020 terminals from their boxes.

20 Plug in the handset to the teledapt connector at the left end of the terminal base.

21 Align the video monitor neck and the terminal base together so that the two bumps on the video neck are over the one bump on the base neck.

22 Place and turn the video monitor until a 'click' is heard. The monitor is locked in place.

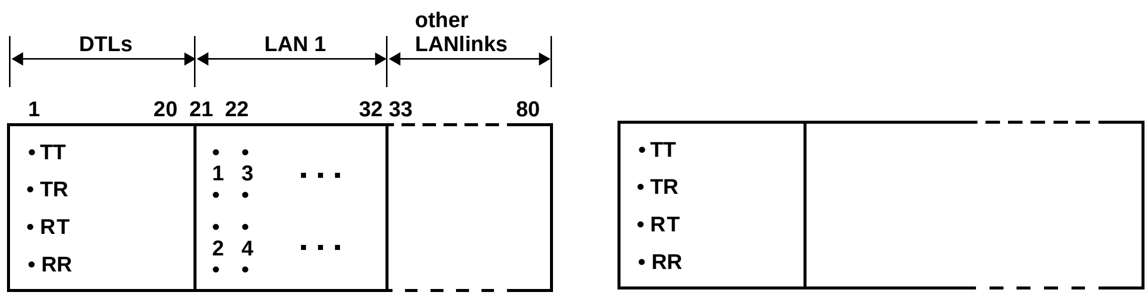
23 Plug the connector from the video monitor into the base connector (it only fits in one of them).

24 For each terminal, connect a cable pair onto the cross-connect panel as per job engineer supplied information. Refer to Figure 256.

25 Route the terminal cables to their intended destinations and terminate the cables with RJ-11C teledapt jacks.

26 Connect the M4020 terminals with the teledapt cables to the teledapt jacks.

Figure 256 – NT3X25 Digital Cross-Connect



Input Terminal Strip from MS-1

Output Terminal Strip to C.O.

Connect the LANlink wiring as per the following guidelines:

Pair	RJ-11C
1	Transmit Tip - Red
	Transmit Ring - Green
2	Receive Tip - Black
	Receive Ring - Yellow

Connect T1 wiring as per the following guidelines:

D-Submin pin	Function
3	Transmit Tip
11	Transmit Ring
1	Receive Tip
9	Receive Ring

LIU Interconnection

27 Route the LIU cables through the office cross-connect as per job engineer supplied information. Refer to Figure 256. For Release 3.0 (NSR27) systems, the NT4G26CA HDLC/RS232 LAPB LIU must be cross-connected to cabinet 1, slot 3, line 5.

28 Terminate the LIU cables with an RJ-11C teledapt jack.

29 Connect the NT4G26 LIU with the teledapt cable to the teledapt jack. The LIU must be placed on a flat surface.

30 For Release 3.0 (NSR27) systems, ensure that the customer has installed a modem to the Public Data Network through port 2 of the NT4G26CA HDLC/RS-232 LAPB LIU.

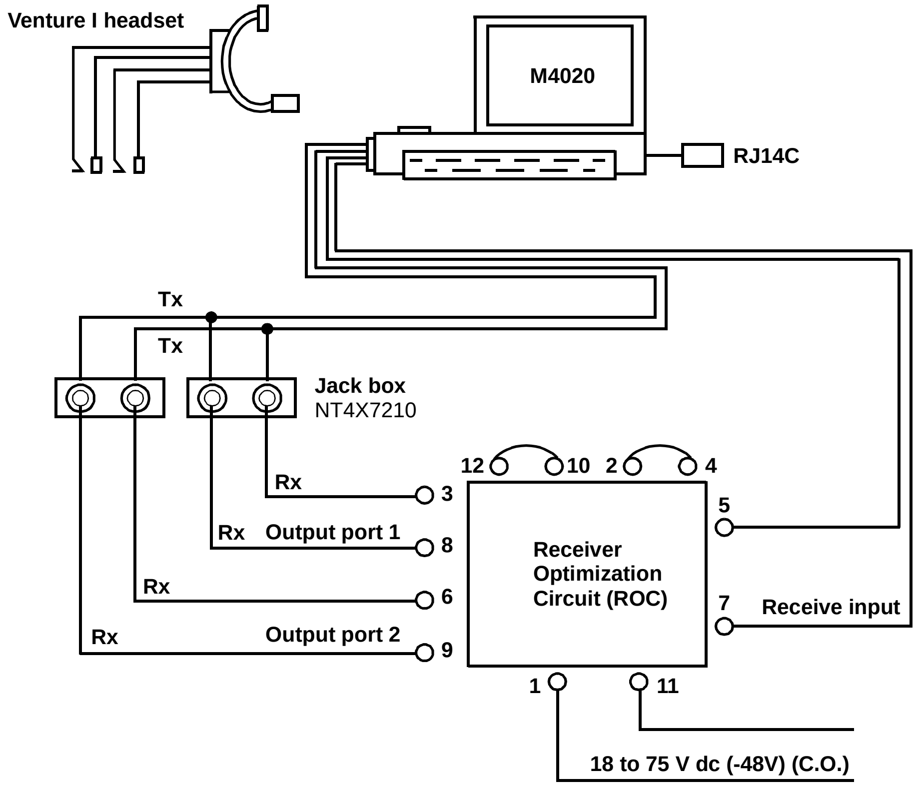
Printer Interconnection

31 Use a parallel cable to connect the printer to the LIU Centronics connector or use a RS-232C cable (null modem) to connect the printer to port #2 of the LIU or as per Job Engineer supplied information.

Receiver Optimization Circuit Installation

32 Connect the Receiver Optimization Circuit (ROC) as per Figure 257.

Figure 257 – Receiver Optimization Circuit Installation



24.7 SRU Insertion / Removal

SRU Insertion

1 Refer to the Precautions subsection of this event.

2 Grasp the faceplate of the unit with one hand, and the rear of the SRU with the other hand.

3 Guide the SRU into the grooved slot of the assigned shelf position.

4 Hold the top and bottom latch levers forward, and gently slide the unit into the shelf until contact is just made with the backplane connector. The latches must be allowed to clear the front channel.

5 Push the top and bottom latches with sufficient pressure to engage the rear backplane connector. The faceplate must be flush with the other SRU plug-in units.

SRU Removal

6 Refer to the Precautions subsection of this event.

7 Pull the latch at the bottom and top of the unit with sufficient pressure to release the unit from the backplane connector.

8 Grasp the faceplate of the disengaged unit, and gently slide the unit forward until almost clear

9 Grasp the rear of the SRU with the other hand and slide the unit from the shelf until the SRU stop prevents any further removal.

10 Reach under the SRU and disengage the SRU stop.

11 Complete the removal of the SRU.

25.0 MVIE and RSCE Frame Procedure

25.1 MVIE/MVDD and RSCE Frame Overview

1 MVIE frame is configured as follows:

- MVIE frame provides Multi Vendor Interface to a DMS host. It supports up to 96 DS1 per Remote Digital Terminal (RDT) and operates only with ENET or JNET in a DMS-100 SuperNode environment.
- The MVIE SMA2 module is defined as one CPM2 shelf and one-half of one extension shelf. Therefore, there are two SMA2 modules in a MVIE frame. SMA2 Module 00 includes CPM2 00 (shelf 16) and left side of Extension shelf 00 (shelf 30). SMA2 Module 01 includes CPM2 01(shelf 44) and right side of Extension shelf 00 (shelf 30).
- MVDD (Multi-Vendor Double Density) frames interface to a DMS-100 host. The MVDD frame is a repackaging of the MVIE Remote to allow for four, (4) CPM2 shelves per frame. CPM2 00 and 01 will be provided fully configured with circuit packs and CPM2 02 and 03, provisionable as required. All necessary equipment, except circuit packs, will be provided, including shelf mechanicals, MSP Circuit Packs and Power/Alarm wiring, within the frame.

Note: There is no Extension or Expansion shelf provisionable in the MVDD and it is not recommended for customers interested in ISDN BRI support.

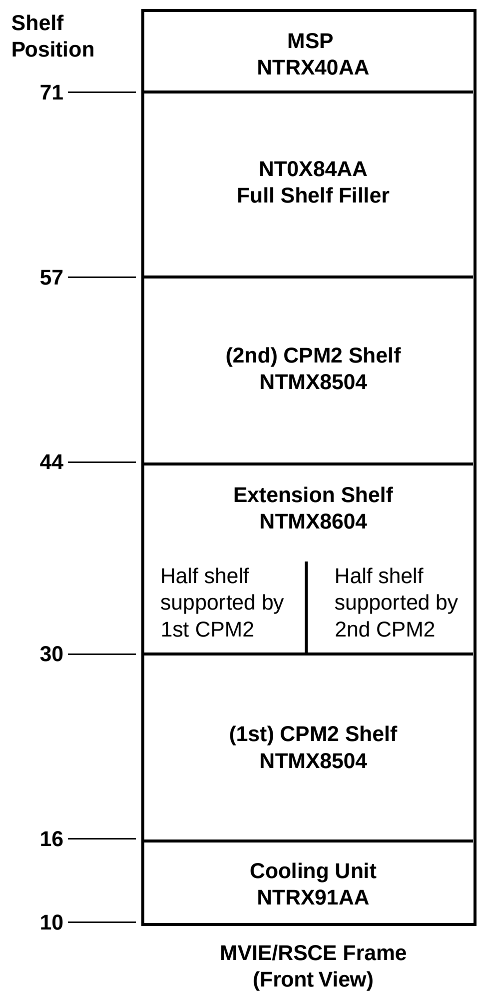
2 The Common Peripheral Module 2 (CPM2) shelf will be referenced throughout this section. The CPM2 can be either a Subscriber Carrier Module (SMA2) or a Remote Cluster Controller Shelf (RCC2), depending on the packfill and/or software load. The section will indicate if the procedure applies to SMA2 or RCC2 specifically.

3 RSCE frame provides interface to a DMS remote. It supports up to 46 DS1s per Remote Digital Terminal (RDT) and operates only with a LTC in a DMS-100 SuperNode environment.

The first RCC2 is always provided in a RSCE frame. The second RCC2 shelf and CEXT shelf are provisionable.

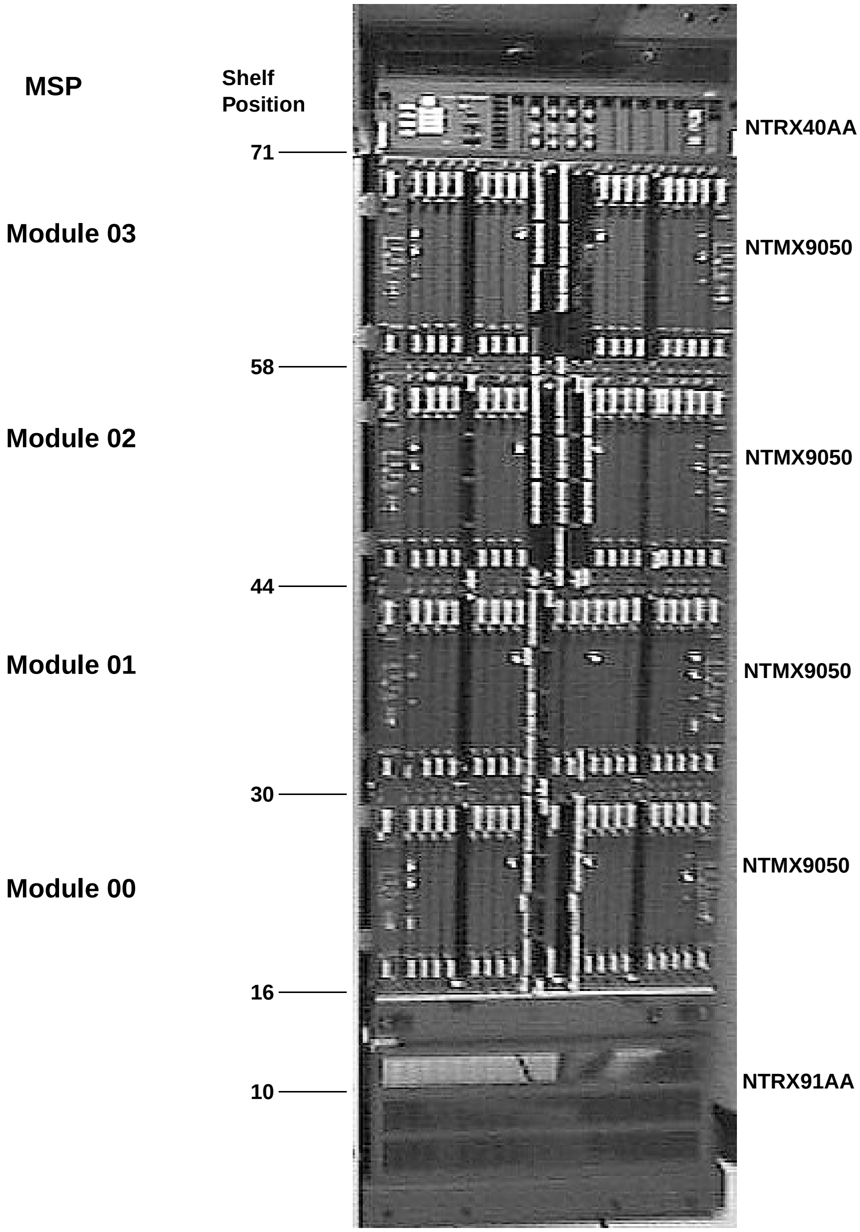
Refer to Figure 258 for the physical layout of MVIE/RSCE frame.

Figure 258 – Physical Layout of MVIE/RSCE Frame



Refer to Figure 259 for the physical layout of MVDD frame.

Figure 259 – Physical Layout of MVDD Frame



Common Peripheral Shelf 2 (CPM2)

4 The CPM2 supports 24 P-side ports which can be a mix of DS1s/PCM30s, and DCHs (RCC2) or EDCHs (SMA2). A maximum of 24 DS-1/PCM30 ports or 8 DS1s and 2 DCH (RCC2)/EDCH (SMA2) ports may be provided in various combinations. Refer to Figure 260 for the circuit pack layout in the CPM2 shelf.

The CPM2 utilizes a Quad Carrier circuit pack which mounts four DS-1 "packlets." Each packlet provides two DS-1/PCM30 interfaces. Each slot provisioned with a Quad Carrier may have up to eight DS1/PCM30s. Refer to Figure 260 and Figure 261 for Quad Carrier NTMX87 Card layout.

Figure 260 – CPM2 Shelf Provisioning

CPM2 Shelf

01/02	Power Conv.	NTMX72
03	Unified Processor	NTMX77
04	ISDN Sig. Pre-Processor (Prov.)	NTBX01 or 0X50
05	Class Modem Resource (Pro v.)	NT6X78AA/0X50AA
06	Univ ersal Tone Receiver (Prov.)	NT6X92 or NT0X50
07	Universal Tone Receiver (Prov.)	NT6X92 or NT0X50
08	Enhanced Messaging	NT6x69AC/LB/NTMX76AA
09		*
10	Matrix	NTMX75BA
11	Signaling Processor	NTMX73AA
12		**
13	DS-30A Interface	NTMX74AA
14		**
15	DS-30A Interface	NTMX74AA
16		**
17	Signaling Processor	NTMX73AA
18	Matrix	NTMX75BA
19		*
20	Enhanced Messaging	NT6X69AC/LB/NTMX76AA
21	Univ ersal Tone Receiver	NT6X92 or NT0X50
22	Universal Tone Receiver	NT6X92 or NT0X50
23	Class Modem Resource	NT6X78AA/0X50AA
24	ISDN Sig. Pre-Processor (Prov)	NTBX01 or 0X50
25	Unified Processor	NTMX77
26/27	Power Conv.	NTMX72

Unit 0 (slots 01/02–14) Unit 1 (slots 14–26/27)

Metallic Transmission Configuration

* Slot 09, 19 - Quad Carr ier (NTMX87) Always Provided - RCC2
- C-side interface (NT6X40) Always Provided - SMA2
0-3 Dual DS-1 Packlets (NTMX81) Provisionable - RCC2
0-3 Dual PCM30 Packlets (NTMX82) Provisionable - RCC2
0-3 Packlet Filler Face Plate (NTMX83) Provisionable - RCC2

** Slot 12, 14, 16 - D-Channel Handler (DCH) (NTBX02AA) Provisionable - SMA2
- Enhanced D-Channel Handler (EDCH) (NTBX02BA) Provisionable - SMA2
Quad Carrier (NTMX87) Provisionable
Filler Face Plate (NT0X50) Provisionable
0-3 Dual DS-1 Packlet (NTMX81) Provisionable
0-3 Dual PCM30 Packlet (NTMX83) Provisionable
0-3 Packlet Filler Face Plate (NTMX83) Provisionable

MVDD - SMA2/ESMA EQUIPMENT LIST (ALWAYS PROVIDED)

Equipment	PEC	Qty	Shf Pos	CP Pos
Power Converter	NTMX72AA	2	XX	01,26
Enhanced Processor	NTAX74AA	2	XX	03,25
EISP	NTBX01BA	2	XX	04,24
MSG and CSM CP	NTMX76CA	2	XX	08,20
Enhanced Matrix CP	NTMX75BA	2	XX	10,18
Signaling Processor	NTMX73BA	2	XX	11,17
Filler Faceplate	NT0X50AA	2	XX	13,15

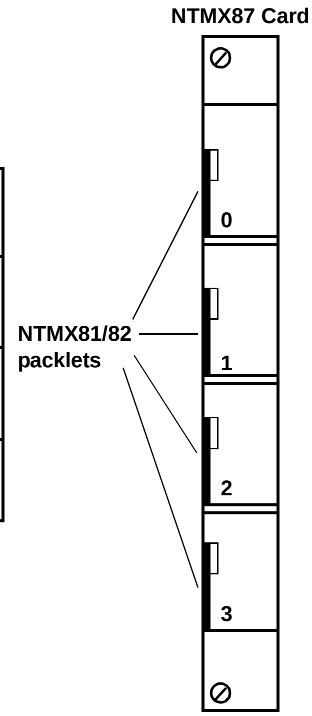
Note: For provisionable circuit packs see SMA2 above in this figure

Figure 261 – NTMX81 or NTMX82 slots in NTMX87 Card

Main shelf

P-Side

	Slot 12	**Slot 14**	**Slot 16**
0	0 1	16 17	8 9
1	2 3	18 19	10 11
2	4 5	20 21	12 13
3	6 7	22 23	14 15



EXT Shelf (Extension) – *Note:* MVDD version does not support this shelf.

5 The CPM2 shelf is linked to the EXT shelf by way of DS-60 links.

6 The EXT shelf is two functional modules on a single card cage. Slots 1 through 13 constitute module 0, and slots 14 through 26 make up Module 1. Each module is further broken down into two logical units (0 and 1) which provide redundancy.

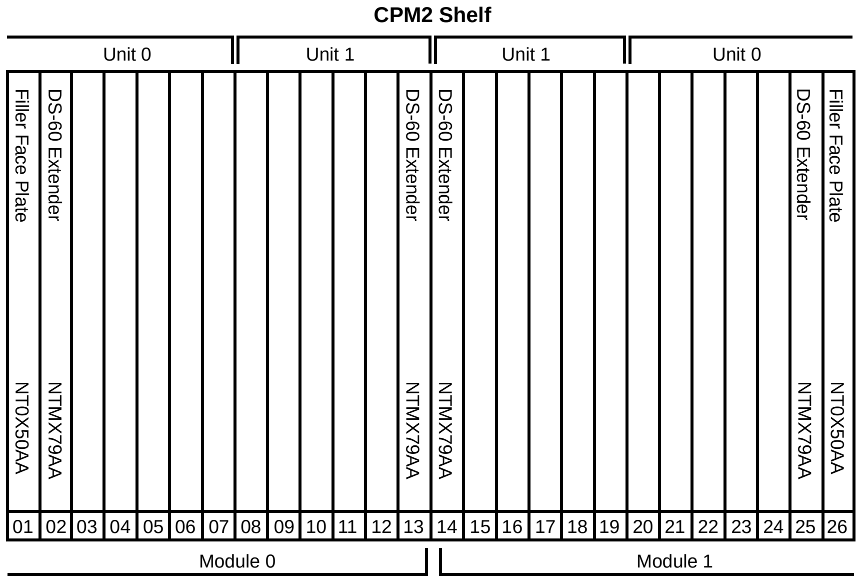
Each module on the EXT shelf is provisioned independently. The left module (as viewed from the front) is provisioned in support of the first CPM2 shelf (located in position 16) and the right module is provisioned to support the second RCC2 shelf (located in position 44).

7 Provisioning the EXT shelf enables the assignment of up to forty-eight (48) DS-1/PCM30 P side ports or up to eight (8) EDCH (SMA2)/DCH (RCC2) ports at a cost of DS-1 ports.

8 The ports for an extension shelf counts as follows:
Left side slot 4 and right side slot 23 controls ports 24 thru 31
Left side slot 6 and right side slot 21 controls ports 32 thru 39
Left side slot 8 and right side slot 19 controls ports 40 thru 87

9 Refer to Figure 262 for an example of the EXT shelf layout.

Figure 262 – EXT Shelf Provisioning



NTMX87		NTMX02	
Qty. per Unit	Slot	Qty. per Unit	Slot
0-3	4, 6, 8, 19, 21, 23	--	--
0-2	4, 6, 21, 23	1-8	* 3, 5, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 22, 24
0-1	4, 23	1-9	** 3, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21, 22, 24
0	--	1-10	*** 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 15, 16, 17, 18, 19, 20, 21, 22, 23, 24

* Slot 8 and 19 cannot be used for MX87 even if not all EDCHs/DCHs are equipped.

** Slot 6, 8, 19, and 21 cannot be used for MX87 even if not all EDCHs/DCHs are equipped.

*** Slot 4, 6, 8, 19, 21, and 23 cannot be used for MX87 even if not all EDCHs/DCHs are equipped.

25.2 MVIE/MVDD and RSCE Power Cabling

1 Run the power as specified in the 4851 spec or 1400 spec.

2 When bundled cables are spec'd, there will be one (1) run of bundled -48 VDC cables and one (1) run of bundled Battery Return cables. The bundled cable end(s) equipped with 90-degree lugs terminate at the MVIE/MVDD/RSCE, the unlugged cable end(s) terminate at the PDC. The PDC end will require lugging prior to terminating.

3 Terminate and form the power cables to the MSP prior to terminating the cables in the PDC. The slack is to be formed in the direction of the PDC.

4 ***Note:*** Do *not* remove insulators from either cable end until just prior to lugging and termination. Refer to Figure 263 and Figure 264 for the bundled cable codes and terminations at the MSP.

Figure 263 – MVIE/MVDD/RSCE Bundled Cables

CPC	PEC	Description
B0261188 B0261191	NTY750AU NTY750AX	MVIE Power Cable 10 Ga. (-48V) MVIE Power Cable 10 Ga. (BR)
B0261189 B0261192	NTY750AV NTY750AY	MVIE Power Cable 8 Ga. (-48V) MVIE Power Cable 8 Ga. (BR)
B0254545 B0261193	NTY750AW NTY750AZ	MVIE Power Cable 6 Ga. (-48V) MVIE Power Cable 6 Ga. (BR)

Figure 264 – MVIE/MVDD Power Connections

-48V	BAT RTN
TB1-1, 2, 3, 4	TB2-1, 2, 3, 4

5 Horizontal form should be ty-rapped approximately every four inches to the first breakout. Event 07 (Method 03-9057), "General Cabling and Torque Requirements," will be the controlling document with regards to ty-rapping.

6 When installing bulk power cables, connect the cables with the appropriate one-hole, insulated lug found in the following hardware kit.

Cable Ordered	PEC code of Lug
6 ga.	A0288176 (90-degree)
8 ga.	A0288178 (90-degree)
10 ga.	A0298616 (90-degree)

For both top and bottom feeds, 90-degree lugs are to be used for both the top and bottom of TB1 and TB2.

7 Remove safety covers from terminal strips TB01 and TB02. Save this hardware for reassembly.

8 Power cables are to be routed through the power shields of the cable troughs. Power cables are to be routed through the access holes in the base of the frame for bottom fed installations.

9 Route the power cables across the top of the MSP and form them down at drop location S5 of the MSP and back towards the terminal blocks. The power cables may be secured to the cable support bracket on top of the MSP. Refer to Figure 265.

Note: Form the power and return cables on the rear side of the cable support bracket (toward the rear of the frame).

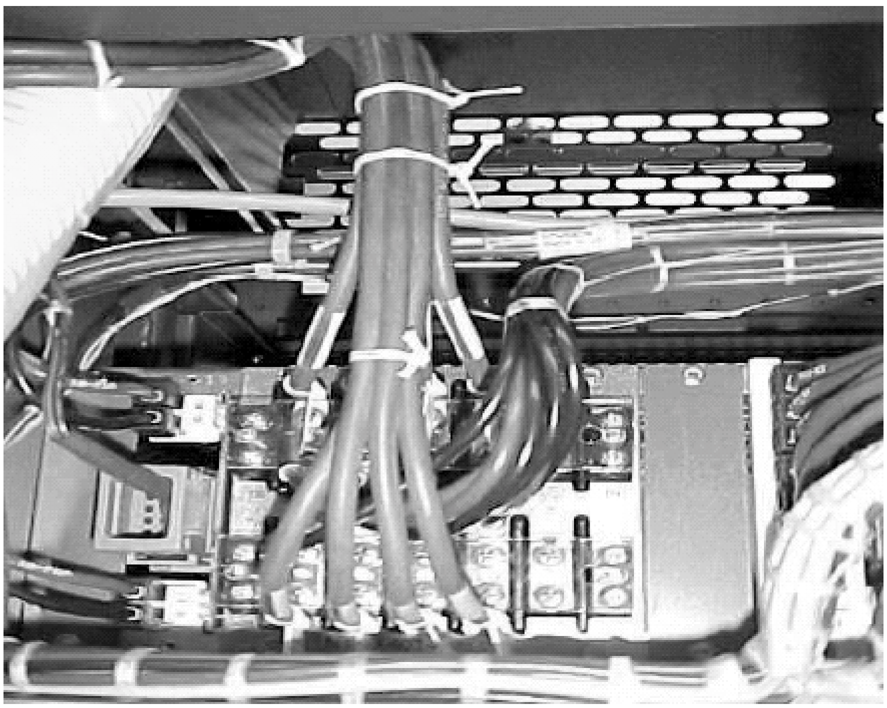
10 The cables will fan off to the TB position specified on the cable tag.

11 Terminate the lugs.

12 For torquing power connections on terminal strips, refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements."

13 After all power and ground connections have been made to the MSP, re-install the removed covers to terminal strips TB01 and TB02.

Figure 265 – MSP Power Cable Forming



25.3 MVIE/MVDD and RSCE Alarm, ABS, and Cabling

1 Run and connect the ABS cables as specified in the 4851 spec and the AISALM cables per the 1400 spec.

2 The ABS and AISALM cables will be formed with the power cables upon entering into the frame. These cables will be formed with the power cables on the cable support bracket located at the top of the MSP. Refer to Figure 265.

3 Each ABS cable will require a connector to be installed onto the MSP end of the cable. These connectors and hoods can be found in the hardware kit. Both of the following part numbers are required for each connection: **A0382703** and **A0382704**.

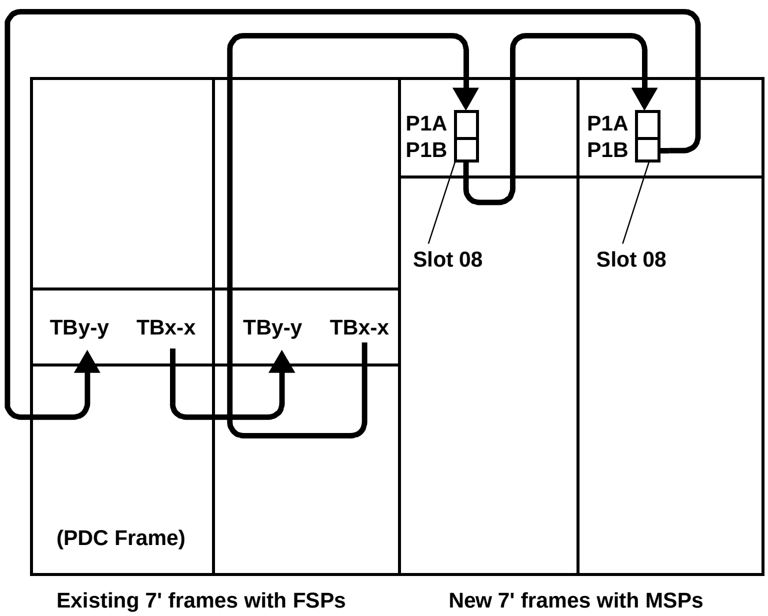
Each connector assembly must be crimped to the cable.

4 After all of the alarm cables have been added, ty-rap every other break off point on the lower bracket power cables.

5 Each frame will have an ABS cable *IN* (slot 08, connector P1A) and an ABS cable *OUT* (slot 08, connector P1B). The ABS cannot end, but must make a complete loop back to the first originating frame.

6 The ABS cables are to be routed per the cable tags and CA0X04 Note 90. "When cables are run between units in the same equipment position on adjacent frames, the finished cable length is 1.06 M. For units between positions 45 and 72 on adjacent frames the finished length is 1.46 M, otherwise the cable length is to be adjusted accordingly. These cables run directly across the back of the frame without entering the cable trough." Refer to Figure 266 for the termination points of these cables. Figure 266 does not reflect cable routing. Follow the cable tags for cable routing as stated above.

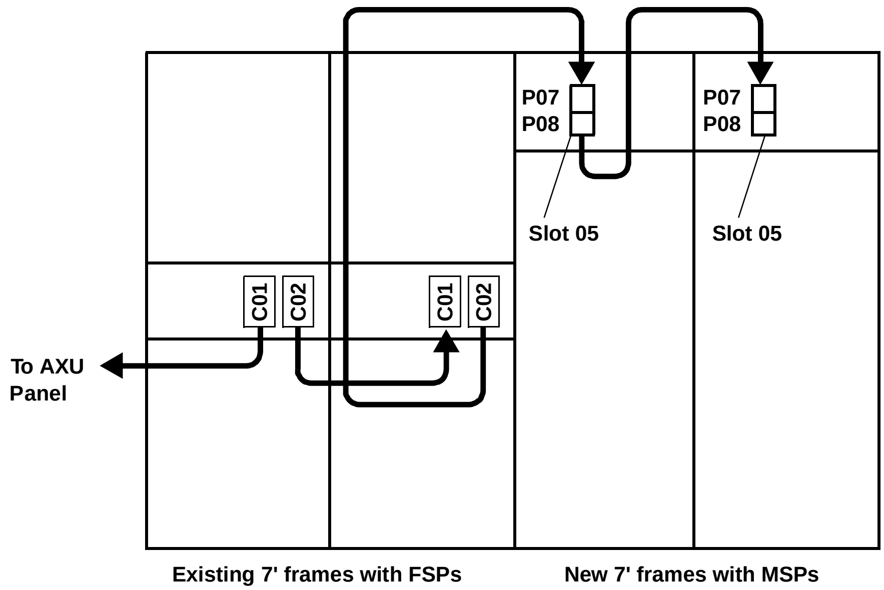
Figure 266 – ABS Cabling



Note: Reference cable tags for ABS terminations on existing frames:
TBx-x = Preceding (ABS out)
TBy-y = Succeeding (ABS in)

7 Each frame will have an AISALM cable *IN* (slot 05, connector P07) and an AISALM cable *OUT* (slot 05, connector P08). The AISALM will end not making a complete l loop. Refer to Figure 267.

Figure 267 – AISALM Cabling



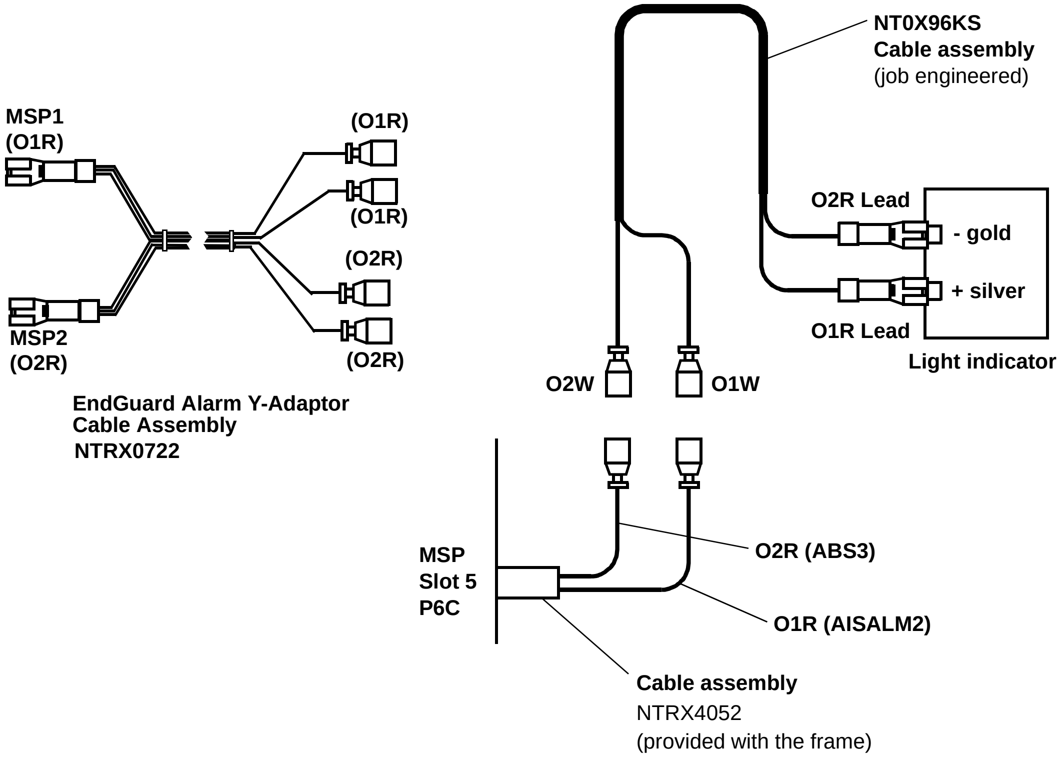
8 On each MSP, there are two loose aisle alarm connectors wrapped with plastic with a small ty-rap. The plastic must be removed on the frame to which the end aisle light will be connected. Connect the cable as shown in Figure 268.

Note: Leave the plastic protection on the frames that will not be receiving end aisle connection.

9 EndGuard Alarm Y-Adaptor Cable Assembly NTRX0722 is to be used when only one frame is being installed. The NTRX0722 cables is installed between the MSP leads and the leads from the End Guard Lamps. There will be 4 leads entering the frame, 2 leads from each End Guard Lamp.

10 Connect the two loose aisle alarm leads from the MSP to the end with two leads on the NTRX0722 cable assembly. Connect the opposite leads of NTRX0722 to the cables from the two End Aisle Lamps. Refer to Figure 268 for a view of the connections and the NTRX0722 cable assembly.

Figure 268 – End Aisle Alarm Connection



25.4 MVIE/MVDD and RSCE System Cabling

The Interbay, MDF, and DSX cables are pre-connectorized on the frame end and will plug directly on to the shelf.

All references to the right and the left are made when viewed from the rear of the frame.

Note: *A new style bundled DSX cable (NT0X96RE) replaces the old style DSX cable (NT0X96LD) on initial installations and extensions. The NT0X96RE uses 24 pair of a 25 pair cable and has 3-2x16 connectors. Each NT0X96RE cable provides connection to 24 Transmit or 24 Receive Ports. The old style NT0X96LD DSX cable uses 8 pair of a 10 pair cable and has 1-2x16 connector. Each NT0X96LD cable provides connection to 8 Transmit or 8 Receive Ports. The following steps apply to both old and new style cables unless specifically indicated otherwise.*

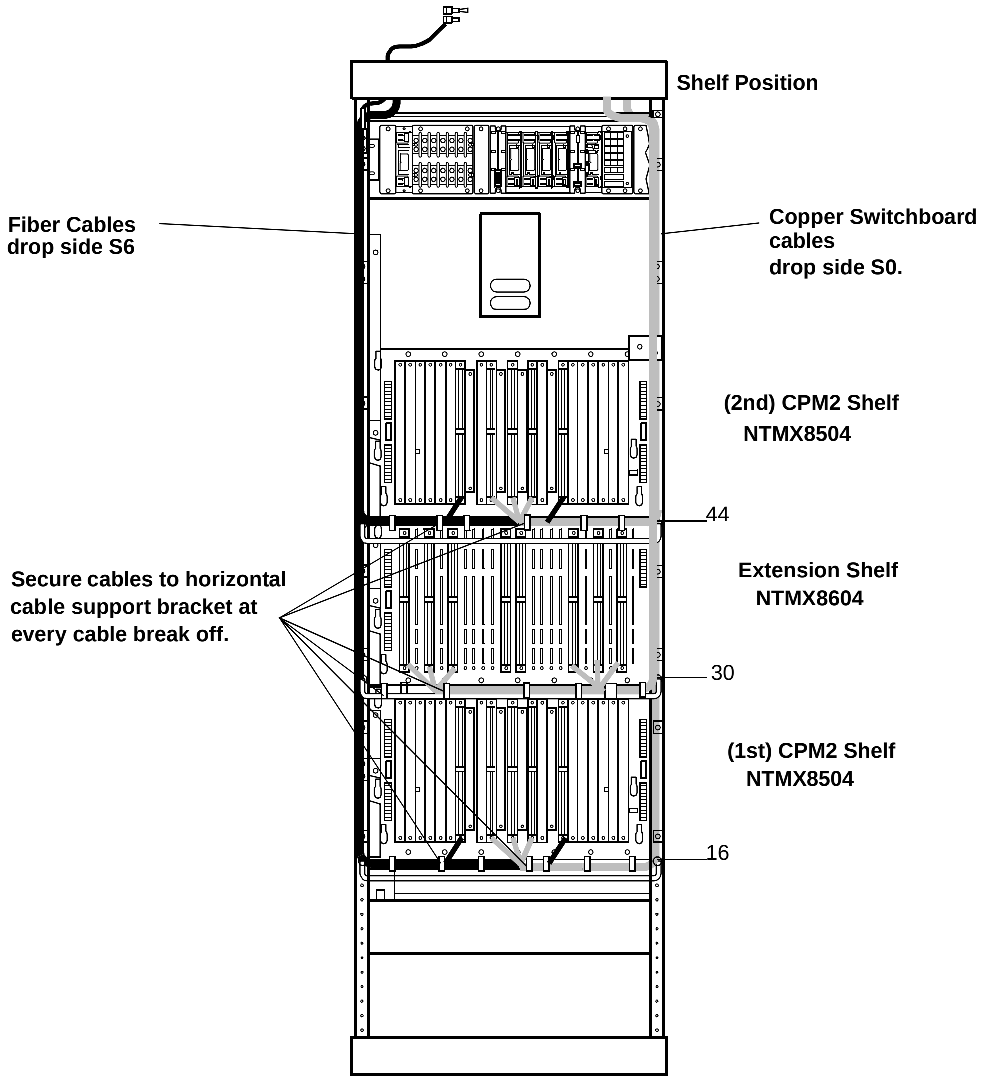
1 Refer to the cable tags to determine the correct cable trough shield and terminating location.

2 Route the cables from the top of the frame and secure with ty-raps to the cable tie brackets. All cables entering the frame must be secured at the first cable tie bracket.

3 Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for the installation of the NTNX3731 Drain Wire Kit.

4 The C-side and P-side cables are to be terminated per the cable tags. All copper switchboard cables have a drop side of S0 and all fiber cables have a drop side of S6. Refer to Figure 269 for the MVIE and RSCE or Figure 270 for the MVDD.

Figure 269 – MVIE/RSCE System Cabling



Rear View of the MVIE Frame

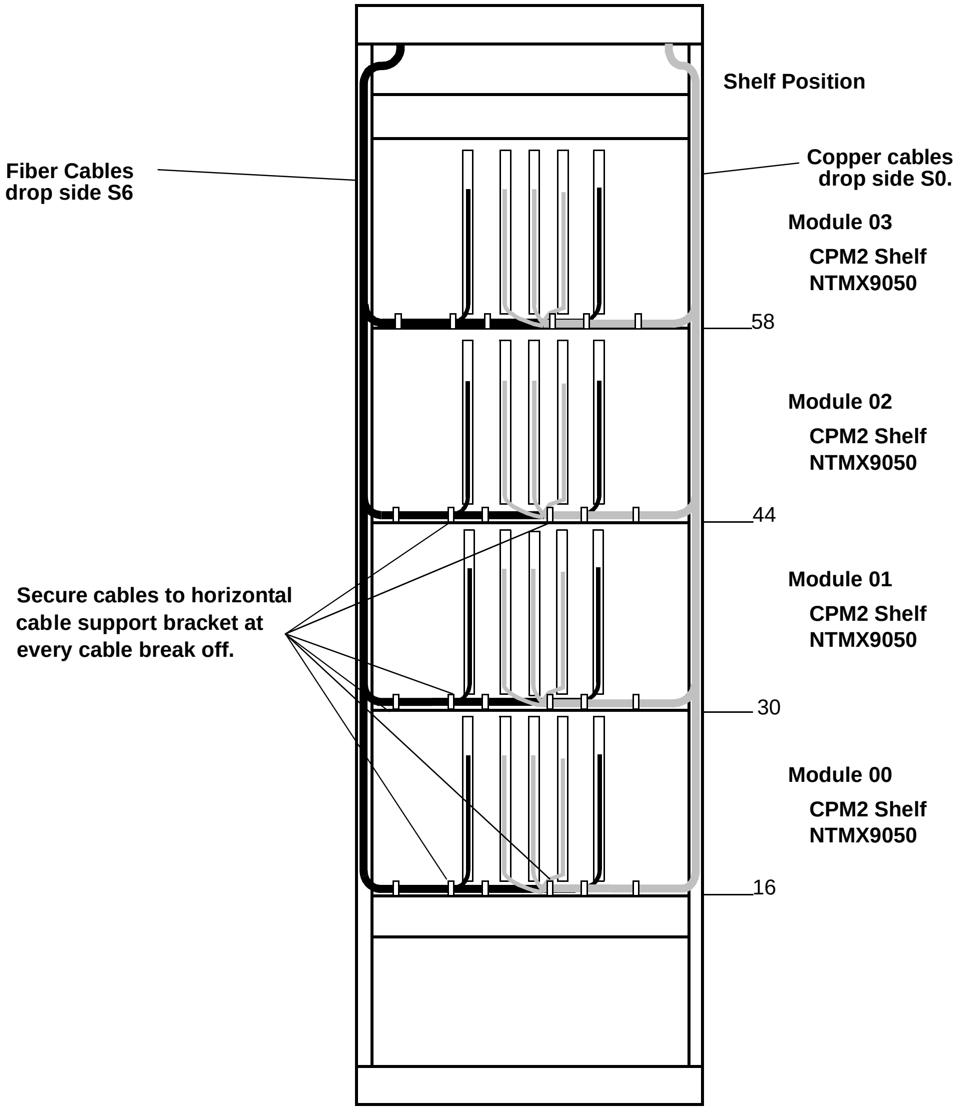
5 Switchboard, and fiber cables are to be routed through the access holes in the base of the frame for bottom fed installations.

6 Fiber cables may be run on drop side S0 on bottom fed frames if necessary.

7 Fiber optic cables are to be bundled together and secured to the horizontal cable support brackets at shelves 16, 30, 44, and 58 without securing to the traverse arms. Refer to Figure 269 (MVIE/RSCE) or to Figure 270 (MVDD). The fiber cables are to be secured to the FXPM bracket using lacing cord. Refer to Figure 271and Event 07, 03-9057, for additional information on securing fiber.

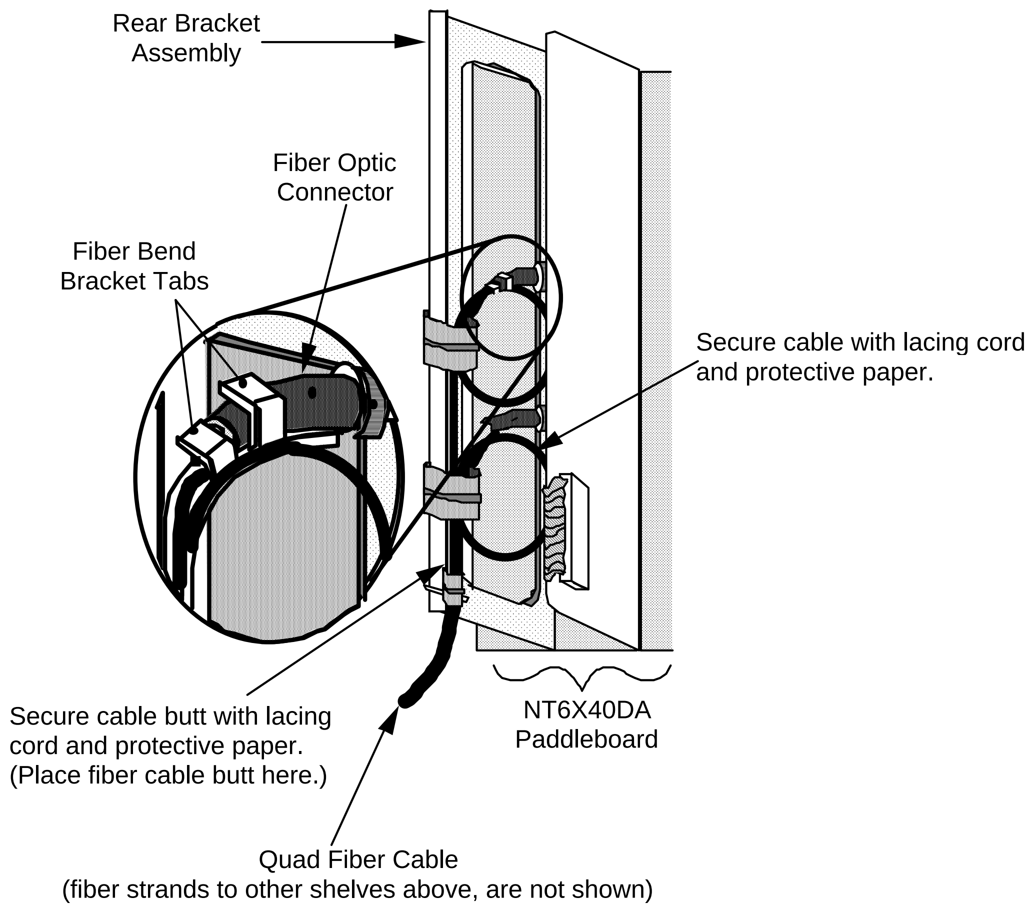
8 Starting at the bottom of the frame, arrange the fiber cables so that the cables terminating on shelf 16 are on the outside of the form and the cables terminating on the top shelf are in the inside so the cables can exit this form horizontally to their respective UFXPM bracket. Power and switchboard cables are to be secured with ty-raps.

Figure 270 – MVDD System Cabling



Rear View of the MVDD Frame

Figure 271 – Securing Fiber Cable to FXPM Bracket



25.5 CPM2 Shelf C-side Link Backplane Connections

1. Connectors provide access to sixteen (16) C-side links on the CPM2 shelf backplane. Refer to Figure 272 for the C-side link backplane connections. Refer to Cable Assignment CA0X06 for cable connectivity tables.

2. The C-side links can be installed into the MVIE frame by using one of the following options:

   - Copper: NTNX36UF DS30 system cable (CPM to SLC/JNET)
   - Fiber: NT0X97AJ DS512 Fiber Link (CPM to ENET)

3. The C-side DS-1 links back to the host are installed into the RSCE frame using the following option:

   - NT0X96KY - DS1 system cable (CPM2 to DSX)

Figure 272 – CPM2 Shelf C-side Link Backplane Connections (Copper DS-1)

CP Slot	CPM2 Unit	Backplane Pin#	Send Port	CP Slot	CPM2 Unit	Backplane Pin#	Rec. Port
9	0	10 A, B	0	9	0	56 A, B	0
		12 A, B	1			58 A, B	1
		14 A, B	4			60 A, B	4
		16 A, B	5			62 A, B	5
		18 A, B	8			64 A, B	8
		20 A, B	9			66 A, B	9
		22 A, B	12			68 A, B	12
		24 A, B	13			70 A, B	13
19	1	10 A, B	2	19	1	56 A, B	2
		12 A, B	3			58 A, B	3
		14 A, B	6			60 A, B	6
		16 A, B	7			62 A, B	7
		18 A, B	10			64 A, B	10
		20 A, B	11			66 A, B	11
		22 A, B	14			68 A, B	14
		24 A, B	15			70 A, B	15

25.6 CPM2 and EXT Shelf P-side Link Backplane Connections

1 Connectors provide access to twenty-four (24) P-side links on the SMA2 shelf, and twenty-two (22) P-side links on the RCC2 shelf backplane positions 12, 14, and 16. Connectors provide access to 48 P-side links on the EXT shelf backplane positions 4, 6, 8, 23, 21, and 19. Refer to Figure 273 and Figure 275 for the P-side link backplane connections. Refer to Cable Assignment CA0X06 for cable connectivity tables. The CPM2 shelf P-side information applies to all models. The MVDD does not support an extension shelf.

Figure 273 – MVIE/RSCE or MVDD FRAME P-SIDE LINK CABLE CONNECTOR TO BACKPLANE CONNECTIONS (CPM2 SHELF)

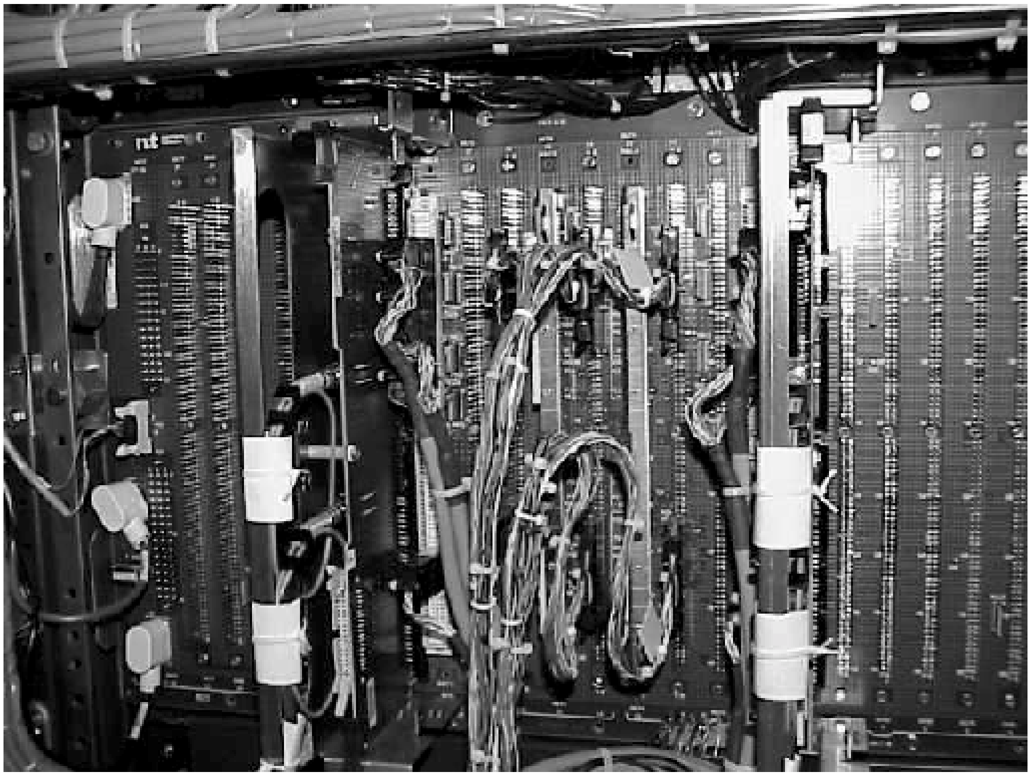
Connector (NT0X96RE only)	CP Slot	(SEND) Backplane Pin#	(RECEIVE) Backplane Pin#	Port	NTMX81AA Packlet	DSX Tip (NT0X96RE only)	DSX Ring
A	12	10 A, B	56 A, B	0	0	W/BL	BL/W
		12 A, B	58 A, B	1		W/O	O/W
		14 A, B	60 A, B	2	1	W/GR	GR/W
		16 A, B	62 A, B	3		W/BR	BR/W
		18 A, B	64 A, B	4	2	W/S	S/W
		20 A, B	66 A, B	5		R/BL	BL/R
		22 A, B	68 A, B	6	3	R/O	O/R
		24 A, B	70 A, B	7		R/GR	GR/R
B	16	10 A, B	56 A, B	8	0	R/BR	BR/R
		12 A, B	58 A, B	9		R/S	S/R
		14 A, B	60 A, B	10	1	BK/BL	BL/BK
		16 A, B	62 A, B	11		BK/O	O/BK
		18 A, B	64 A, B	12	2	BK/G	G/BK
		20 A, B	66 A, B	13		BK/BR	BR/BK
		22 A, B	68 A, B	14	3	BK/S	S/BK
		24 A, B	70 A, B	15		Y/BL	BL/Y
C	14	10 A, B	56 A, B	16	0	Y/O	O/Y
		12 A, B	58 A, B	17		Y/GR	GR/Y
		14 A, B	60 A, B	18	1	Y/BR	BR/Y
		16 A, B	62 A, B	19		Y/SL	SL/Y
		18 A, B	64 A, B	20	2	V/BL	BL/V
		20 A, B	66 A, B	21		V/O	O/V
		22 A, B	68 A, B	22	3	V/GR	GR/V
		24 A, B	70 A, B	23		V/BR	BR/V

2 The CPM2 shelf only requires 2-NT0X96RE cables per shelf or 6-NT0X96LD cables per shelf.

3 All cables run and form down right rear (S0).

4 Secure the NT0X96RE cables even with the butt at slot 14 on the horizontal securing bar. Secure each NT0X96LD cable even with the butt at its terminating slot on the horizontal securing bar.

Figure 274 DSX Cable Connection to CPM2 Shelf



5 Connector legs A, B, C on the NT0X96RE cable are the same length and will reach the furthest card slot. The receive cables will need to have a loop in the cable due to the receive termination point being closer.

6 The wires on the NT0X96RE cable, wire straight color code starting with connector A, then B, finishing with C at the customer DSX equipment. The Violet/Slate wired is dropped and is not required.

7 In some cases not all the P-side links will be wired out due to provisioning of DCH's or RMM shelf. Consult the customer to determine if DSX equipment will be fully wired or just the required circuits.

8 All unused circuits should be spared off at both ends for future use.

Figure 275 – MVIE/RSCE ONLY P-SIDE LINK CABLE CONNECTOR TO BACKPLANE CONNECTIONS (EXT SHELF)

Connector (NT0X96RE only)	CP Slot	(SEND) Backplane Pin#	(RECEIVE) Backplane Pin#	Port	NTMX81AA Packlet	DSX Tip (NT0X96RE only)	DSX Ring (NT0X96RE only)
A	04 or 23	10 A, B	56 A, B	24	0	W/BL	BL/W
		12 A, B	58 A, B	25		W/O	O/W
		14 A, B	60 A, B	26	1	W/GR	GR/W
		16 A, B	62 A, B	27		W/BR	BR/W
		18 A, B	64 A, B	28	2	W/S	S/W
		20 A, B	66 A, B	29		R/BL	BL/R
		22 A, B	68 A, B	30	3	R/O	O/R
		24 A, B	70 A, B	31		R/GR	GR/R
B	06 or 21	10 A, B	56 A, B	32	0	R/BR	BR/R
		12 A, B	58 A, B	33		R/S	S/R
		14 A, B	60 A, B	34	1	BK/BL	BL/BK
		16 A, B	62 A, B	35		BK/O	O/BK
		18 A, B	64 A, B	36	2	BK/G	G/BK
		20 A, B	66 A, B	37		BK/BR	BR/BK
		22 A, B	68 A, B	38	3	BK/S	S/BK
		24 A, B	70 A, B	39		Y/BL	BL/Y
C	08 or 19	10 A, B	56 A, B	40	0	Y/O	O/Y
		12 A, B	58 A, B	41		Y/GR	GR/Y
		14 A, B	60 A, B	42	1	Y/BR	BR/Y
		16 A, B	62 A, B	43		Y/SL	SL/Y
		18 A, B	64 A, B	44	2	V/BL	BL/V
		20 A, B	66 A, B	45		V/O	O/V
		22 A, B	68 A, B	46	3	V/GR	GR/V
		24 A, B	70 A, B	47		V/BR	BR/V

9 The EXT shelf requires 2-NT0X96RE cables per half shelf or 6-NT0X96LD cables per half shelf.

10 All cables run and form down right rear (S0).

11 Secure the NT0X96RE cables even with the butt at slot 06 or 21 on the horizontal securing bar. Secure each NT0X96LD cable even with the butt at its terminating slot on the horizontal securing bar.

12 Connector legs A, B, C on the NT0X96RE cable are the same length and will reach the furthest card slot. The receive cables will need to have a loop in the cable due to the receive termination point being closer.

13 The wires on the NT0X96LD cable, wire straight color code starting with connector A, then B, finishing with C at the customer DSX equipment. The Violet/Slate wired is dropped and is not required.

14 In some cases not all the P-side links will be wired out due to provisioning of DCH's or RMM shelf. Consult the customer to determine if DSX equipment will be fully wired or just the required circuits.

15 All unused circuits should be spared off at both ends for future use.

16 Refer to Figure 276 for RCC2 P-Side Port Assignment Options. Backplane Ground Strip (P0834651) is located at the bottom of slot 11 of each shelf (CPM and EXT) in the SMA2 and RSCE frames.

17 The drain wires of the DS1 cables are to be wire wrapped to the Backplane Ground Strip. Each Backplane Ground Strip can accommodate up to 12 termination.

Note: This is a new design and therefore some of the frames may not have the backplane Ground Strip, in which case it can be ordered. Once received, secure the backplane Ground Strip using existing screw located at the bottom of slot 11. Wire wrap the connections to the fingers. This will eliminate installations of lugs for each drain wire.

Figure 276 – RCC2 P-side Port Assignment Options

PORT	RCC2				EXT	
	Usage/Slot		Usage/Slot		Usage/Slot	
0	DS1	12:0				
1	DS1	12:0	DCH	12		
2-3	DS1	12:1				
4-5	DS1	12:2				
6-7	DS1	12:3				
8	DS1	16:0				
9	DS1	16:0	DCH	16		
10	DS1	16:1			DCH	3/24
11	DS1	16:1			DCH	5/22
12	DS1	16:2			DCH	7/20
13	DS1	16:2			DCH	8/19
14	DS1	16:3			DCH	4/23

Figure 276 – RCC2 P-side Port Assignment Options

PORT	RCC2				EXT	
	Usage/Slot		Usage/Slot		Usage/Slot	
15	DS1	16:3			DCH	6/21
16	DS1	14:0				
17	DS1	14:0	DCH	14		
18	DS1	14:1			DCH	9/18
19	DS1	14:1			DCH	10/17
20	DS1	14:2			DCH	11/16
21	DS1	14:2			DCH	12/15
22	DS30A	RMM	ONLY			
23	DS30A	RMM	ONLY			
24-25	DS30A				DS1	4/23:0
26-27	DS30A				DS1	4/23:1
28-29	DS30A				DS1	4/23:2
30-31	DS30A				DS1	4/23:3
32-33	DS30A				DS1	6/21:0
34-35	DS30A				DS1	6/21:1
– continued –						
36-37	DS30A				DS1	6/21:2
38-39	DS30A				DS1	6/21:3
40-41	DS30A				DS1	8/19:0
42-43	DS30A				DS1	8/19:1
44-45	DS30A				DS1	8/19:2
46-47	DS30A				DS1	8/19:3
48-49	DS30A					
50-51	DS30A					
52-53	DS30A					

25.7 RCC2 Shelf DS30A Link Backplane Connections

Warning: If a DCH is located in any slot where a NTMX87 can be assigned, the DS1 cables must be disconnected from the backplane.

1 DS30A connections are made by different cables depending on the type of PM. The RCC2 uses links 22 and 23 to load the provisional RMMs. The DS30A ports for other PMs begin at port 24 for the RCC2. Refer to Figure 277 for the correct DS30A connections to the RCC2 backplane. Refer to Cabling Specification 1301 and Drawing D620 for port assignment and terminating information.

2 The DS30A cables connect the LCM or LCME to the RCC2. The message links are assigned in descending order and are assigned to the same circuit pack on the RCC2. This is acceptable. *Do not reassign the message links.* The message links are redundant by having card slots 13 and 15 hard-wired together by way of copper tracks on the RCC2 backplane. Refer to the D620 for other port assignments.

3 Form the cables to the "U" channel on the lower part of the RCC2 shelf and secure with ty-raps.

4 Exercise care when mating the connectors with the pins on the backpanel. Mate the 2 x 4 connector pin #1 to the upper right backplane pin of the port to which it is assigned (as seen from the rear). Repeat for all provisioned ports.

Example: For the LCME XX Unit 0 Port 0 to RCC2 port #53 connection, align pin #1 on AMP level 5 connector "A" with pin #82D on backplane position 13.

Refer to Figure 277 for a typical DS30A link backplane pin connections.

Figure 277 – RCC2 Shelf DS30A Link Backplane Connections

RCC2 Slot 15		RCC2 Slot 13	
Rows A and B		Rows C and D	
Backplane Pin #	Port #	Backplane Pin #	Port #
9, 10, 11, 12	22	9, 10, 11, 12	24
13, 14, 15, 16	23	13, 14, 15, 16	25
17, 18, 19, 20	26	17, 18, 19, 20	28
21, 22, 23, 24	27	21, 22, 23, 24	29
25, 26, 27, 28	30	25, 26, 27, 28	32
29, 30, 31, 32	31	29, 30, 31, 32	33
33, 34, 35, 36	34	33, 34, 35, 36	36
37, 38, 39, 40	35	37, 38, 39, 40	37
54, 55, 56, 57	38	54, 55, 56, 57	40
58, 59, 60, 61	39	58, 59, 60, 61	41
62, 63, 64, 65	42	62, 63, 64, 65	44
66, 67, 68, 69	43	66, 67, 68, 69	45
70, 71, 72, 73	46	70, 71, 72, 73	48
74, 75, 76, 77	47	74, 75, 76, 77	49
78, 79, 80, 81	50	78, 79, 80, 81	52
82, 83, 84, 85	51	82, 83, 84, 85	53

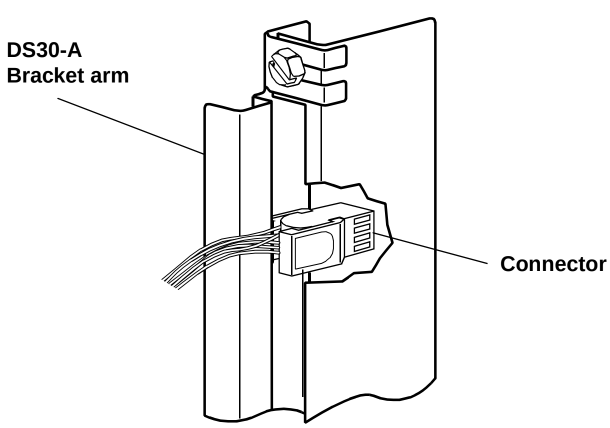
5 Use a four-inch marking ty-rap (P0633713) and a black Venus sharpie pen to identify the provisioned port connectors with the position number on the backplane and the first pin to which the connector is to mate.

Example: Pos 15
Pin 09

6 Spare off the non-assigned port connectors by forming and securing them to the cable form.

7 Each 2x4 connector is secured in place by the brackets in slot positions 13 and 15. Refer to Figure 278.

Figure 278 – DS30A Connection to Bracket



25.8 MVIE/MVDD and RSCE Switch Settings

SMA2:

1 The backplane dip switches which are located at DS1 and DS2 identify the shelf type. For SMA2 the switches are set as follows:

1	2	3	4	5	6
NA	off	off	ON	ON	ON

RSCE:

2 During the installation of the C-side DS1 cables, the dip switches for the type of signaling used will need to be set. These switches are located on the backplane of the RCC2, on the right and left side. Refer to Tables CARRMTC and LTCPSINV for the type of signaling to be used. The following is a list of the signaling types and their required switch settings.

Signaling	Switch Settings					
	1	2	3	4	5	6
SF_ZCS_RCC2	off	off	off	on	on	off
SF_B8ZS_RCC2	off	off	off	on	off	on
ESF_ZCS_RCC2	off	off	off	on	off	off
ESF_B8ZS_RCC2	off	off	off	off	on	on
ICPM_RCC2	off	off	on	on	on	off

Note: If these switches are not set, the RCC2 will not load.

26.0 Remote Service and Maintenance Equipment (RSE/RME) Frame

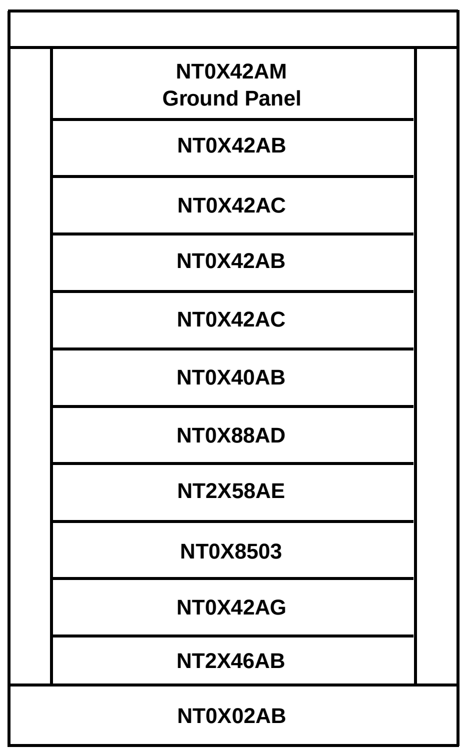
26.1 Assembly

1 The Remote Service and Maintenance Equipment (RSE/RME) Frame is a single bay frame associated with the RLM frame. This frame is generally equipped as follows:

NT0X42AM ground panel in shelf position 72
NT0X42AB fuse panel *A* feed in shelf position 59 and 67
NT0X42AC fuse panel *B* feed in shelf position 55 and 63
NT0X40AB Frame Supervisory panel (FSP) in shelf position 50
NT0X88AD Frame Supervisory panel (FSP) in position 45
NT2X58AE Remote Service Module (RSM) in position 32
NT0X8503 circuit pack storage shelf assembly in shelf position 18
NT0X42AG filter panel in shelf position 12
NT2X46AB metallic test access in shelf position 04

2 Refer to Figure 279 for frame configuration.

Figure 279 – RSE/RME Frame Configuration



Front View

26.2 RSE/RME Frame and Logic Grounding

1. Frame ground link (Cable Braid Assembly) and mounting hardware are supplied with each frame.
2. Typically, the first holes from the ends on the frame bonding bar (cable trough) are used for installing cable braids from adjoining frames. Refer to system level grounding methods.
3. The second holes are used for mounting the frame bonding bar on the cable trough.
4. The third holes on the frame bonding bar on the left-hand side (looking at the rear of the frame) is used to connect the cable from the left frame upright.
5. For Non-ISG applications only, the fourth hole on the left-hand side on the frame bonding bar is used to connect the cable from the vertical logic bar. This short vertical logic bar is used to ground the modems/modem shelves and inverters on the RME/RSE frames.
6. For ISG offices, the vertical logic bar should be tied to Battery Return Ground panel in top of the frame. This short vertical logic bar is used to ground the modems/modem shelves and inverters on the RME/RSE frames.
7. Ensure that all screws are tight.

26.3 Battery and Return Cables

1 Run the -48V feeders down the left upright rear view for the fuse panel located at positions 55 and 59. Run the -48V feeders down the right upright rear view for the fuse panel located at positions 63 and 67.

Form power feeders inside of ground returns using separate form as shown in Figure 280 (applies to U.S. Installations) and Figure 281 (applies to Canadian Installations).

Figure 280 – Forming Battery and Return Leads (U.S.)

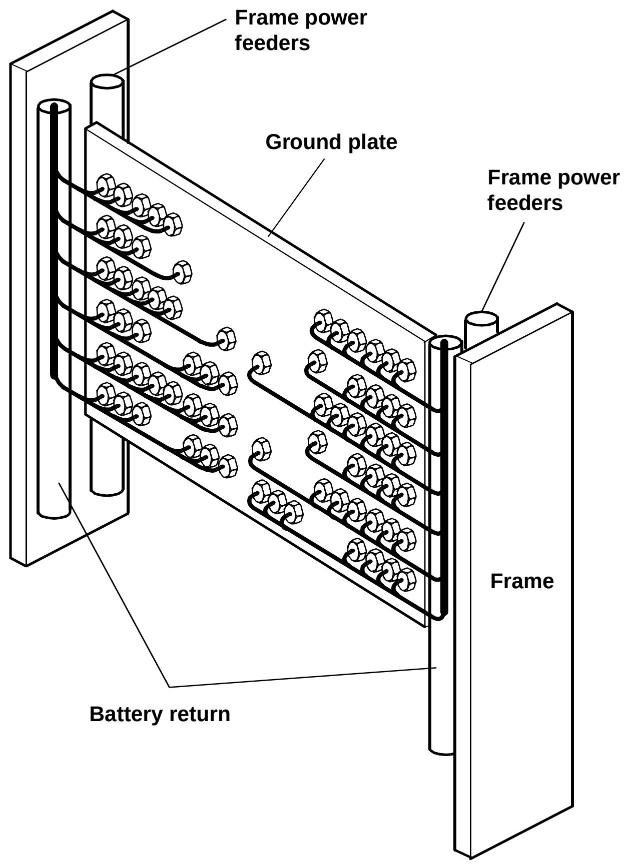
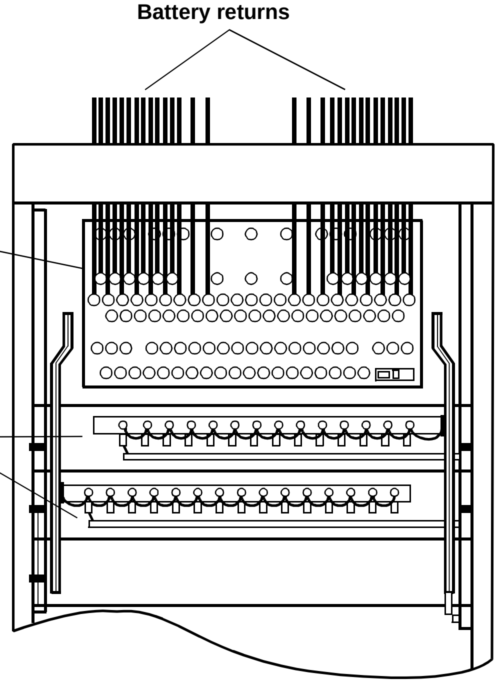


Figure 281 – Forming Battery Return Cables (Can.)



2 Form the feeders horizontally across the fuse panels. Refer to Figure 282.

3 Each individual power feeder is to be formed out of the main form to each fuse position. The length is to be approximately four inches. The length is measured from the terminated lug to the inside of the main form.

4 Each power feeder cable must be butted and stripped to install a crimped lug. Use 90-degree lugs. Apply a thin coat of N0-0X-ID "A" grease to #8 AWG and larger leads before adding lugs.

5 Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for proper lugs, crimping tools, and torque requirements.

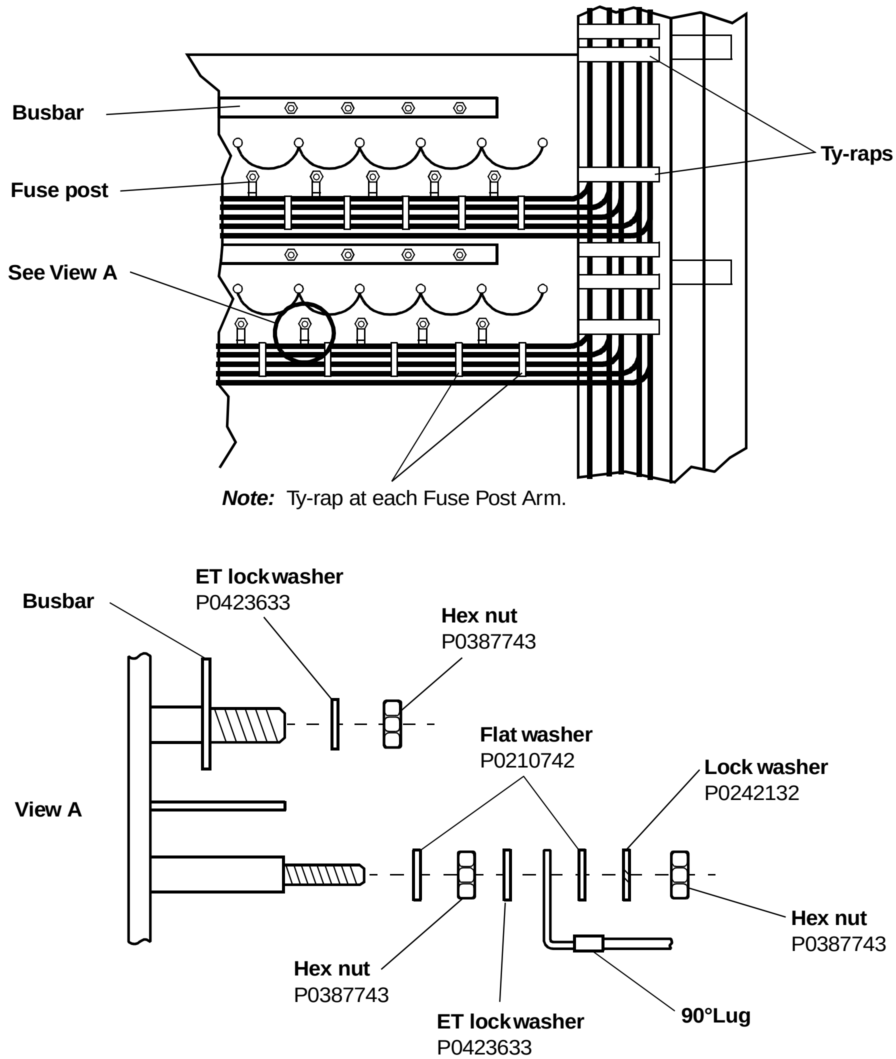
Note: 14-AWG terminal lugs do *not* come with a 90-degree bend. Connect the lug to the fuse stud with the wire on the rear side of the lug, then bend to 90-degree configuration. This will leave wire end open for inspection.

6 Secure the form with ty-raps at each fuse post location.

7 Power feeder cables to the equipment lineups must be identified at the fuse distributing panel and at the equipment on which they originate.

Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

Figure 282 – Forming and Connecting at Fuse Panel



8 The battery returns are to be formed after the frame power feeders have been formed.

Note: Before forming the battery returns, all bolts on the ground plate should be torqued to 6.5 ft-lbs.

Proceed as follows:

- Remove the front hex nut and four washers.
- Store in safe place for future use.
- Loosen the next hex nut and move away from the first nut.
- Use the deep well socket to torque the first nut, then move the socket to the second nut and torque.
- Add washers and nuts per Figure 284. As leads are added, torque front nut.

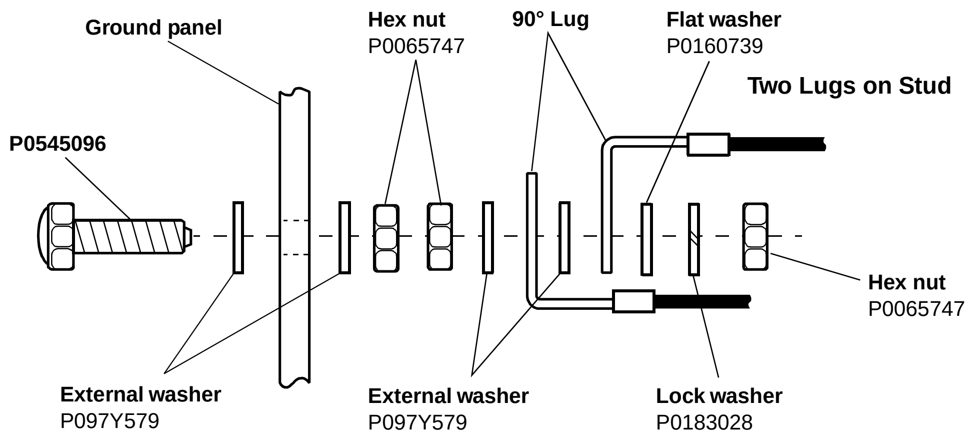
9 If all bolts or studs are not used, the washers and nuts must be placed on the bolt/stud for future use.

Figure 283 refers to the hardware stackup on the ground panels used on old vintage frames. Figure 284 refers to the hardware stackup on the NT0X42AM ground panels now being provided.

10 Battery return cables to the equipment lineups must be identified at the PDC battery return plate and at the equipment on which they originate.

Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

Figure 283 – Terminating Lugs on Ground Panel



Note: Do *not* double up unless absolutely necessary.

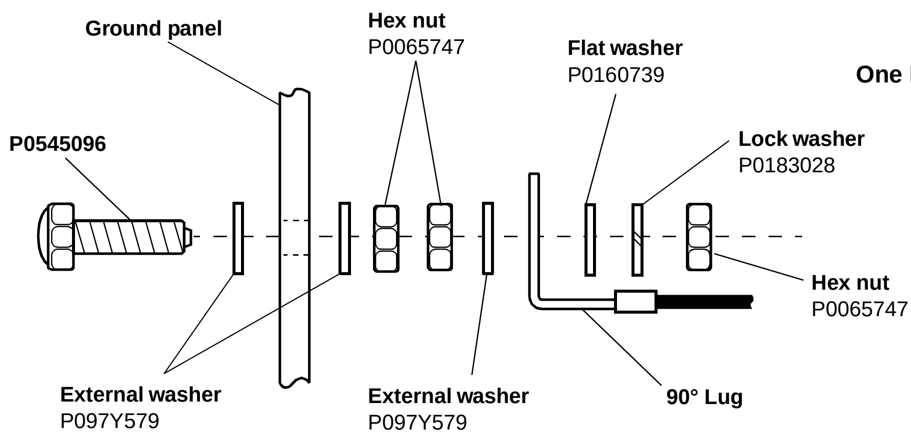
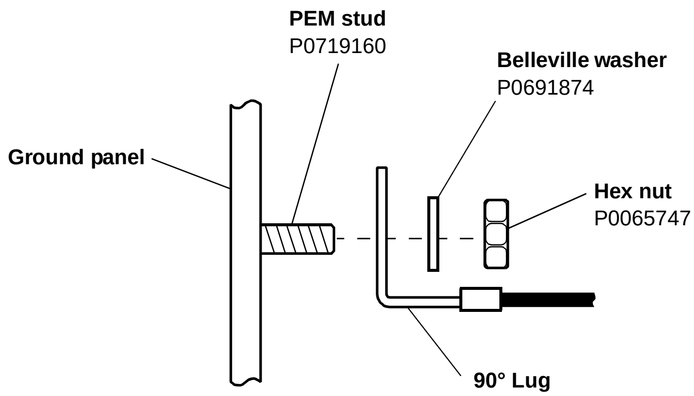


Figure 284 – Terminating Lugs on NT0X42AM Ground Panel

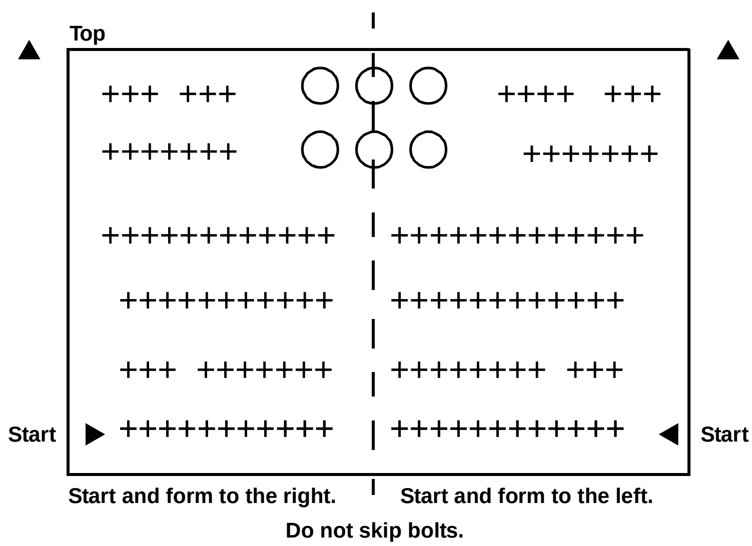


11 Route half of the battery returns down the right rear upright and half down the left rear upright. Use separate form for battery returns.

12 Form the battery returns horizontally across the ground plate. Individual returns are to be formed out of the main form to each ground stud. Measurements should be approximately three inches measured from the terminated lug to the inside of the main form.

13 The battery returns must be formed starting with the bottom horizontal row of studs. Begin with the outside stud and form the returns toward the center of the frame and up. Refer to Figure 285.

Figure 285 – Forming at Ground Panel (U.S. only)



14 Each battery return cable must be butted and stripped to install a crimped lug. Use 90-degree lugs. Add a thin coat of N0-0X-ID-A grease to #8 AWG and larger leads before installing lugs.

15 Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for proper lugs, crimping tools, and torque requirements.

16 Secure the battery return forms to the side of the frame in the same manner as the power feeder returns. Secure the battery returns with ty-raps at each break-out.

17 The ABS leads shall be routed down left rear upright along with other power cables to FSP position 50. Break these leads out of vertical form horizontally along bottom of FSP to TS TB1. Use 90-degree sweep turn to terminating point on bottom row of terminals. Use ty-raps around form to hold in place between vertical form and terminating point.

Note: ABS cables to the equipment lineups and their multiples in equipment lineups must be identified at both ends.

Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

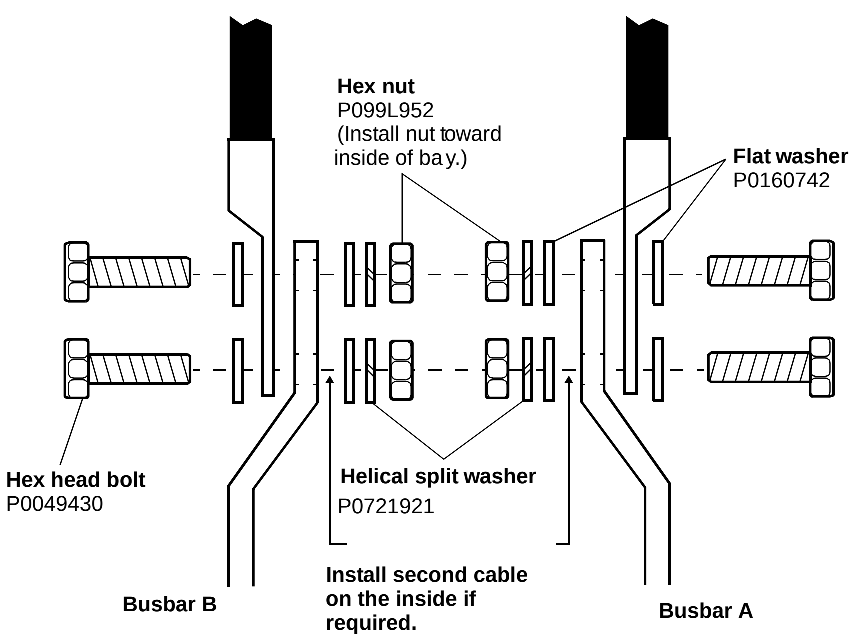
18 Terminate the *A* and *B* battery feeders to their respective busbars; *A* battery on right, *B* battery on left from rear of frame. Refer to Figure 286.

Non-Insulated Compression lugs are color coded for die size and are marked with rings around lug to indicate crimp location and number of crimps. T-8440 crimper, T & B smart tool, is approved for these lugs including super flex cable. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for lug requirements.

Note: Super Flex cable requires a different lug.

19 Secure the lug to the busbar as shown in Figure 286. Hardware is to be installed in such a manner that the nut and washer is to the inside of the frame.

Figure 286 – Terminating A and B Battery Feeds



20 Secure the ground return cables to the ground plate as shown in Figure 287. If only one cable is installed per mounting hole, install the cable to the inside of the frame from the rear. Install the mounting hardware so that the nut is facing the rear of the frame.

21 The busbar and ground bar are to be cleaned on both sides at the point of connection of cables using aluminum oxide sandpaper or wire brush.

Add a thin coat of N0-0X-ID "A" grease to both sides of T & B lug tongue before connecting.

Add a thin coat of N0-0X-ID "A" grease to cable before adding the lug.

Add a thin coat of N0-0X-ID "A" grease on both sides of the busbar and ground bar at point of connection of these cables.

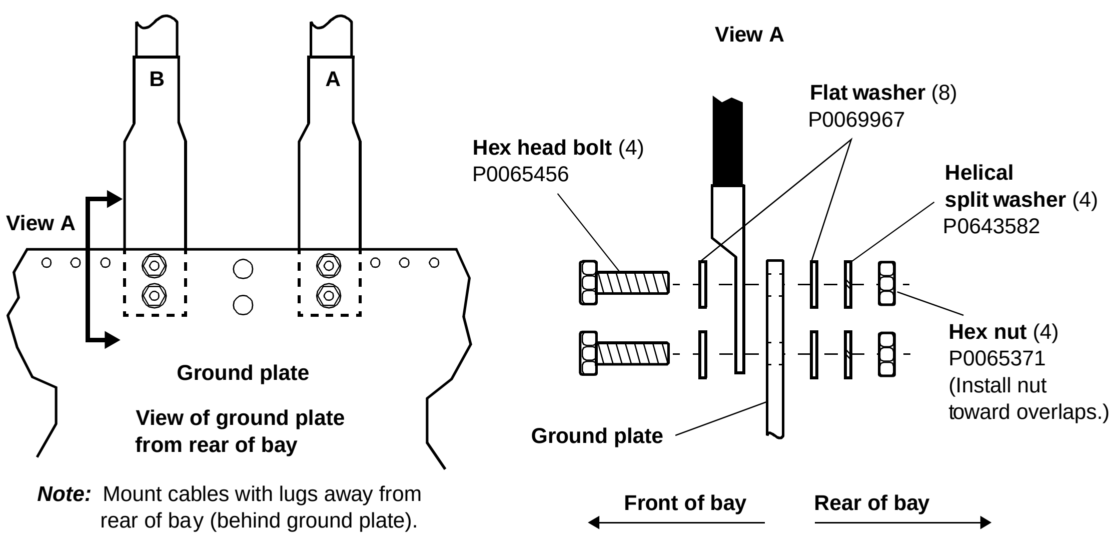
22 Battery return cables must be identified at the ground plate with the frame name and number, shelf position in frame, terminal strip, and terminal.

example:

FRAME	SHELF POS	TERMINAL STRIP and TERMINAL
RLM-00	45	TB-1–1

Using four-inch marking ty-raps (P0633713), mark this information on the cable tag with a black Venus sharpie pen.

Figure 287 – Terminating A and B Ground Returns



23 The battery and ground returns are to be labeled at the RSE/RME and power plant. Use number tags, 145C (A0024293) for U.S. applications or E-8014/E-8015 cable tie markers for Canadian/International applications. Black Venus sharpie pen can be used. Use lacing cord to secure the 145C number tags to the battery and ground returns.

24 The battery feeders shall be marked -48V BATT *A* and -48V Battery *B*. The battery returns shall be marked +48V *A* RTN and +48V *B* RTN.

Put actual termination point of the far end of the cable on these tags, such as:

PWR BD 01

F3/PWR BD 01

GRD bar/RSE 00 -48V BATT *A*.

26.4 RSE/RME Battery and Return Leads and ABS to FSP

1 -48V Battery and Return leads to FSP should be run down the left rear upright from the ground plate and fuse location. Combine ground leads to power leads and form together to FSP. Secure with ty-raps to cable brackets in the vertical run.

2 Form leads horizontally from vertical across FSP to the terminating point. The horizontal form should be secured with ty-raps at approximately every four inches to the break-off point and at every other break-off.

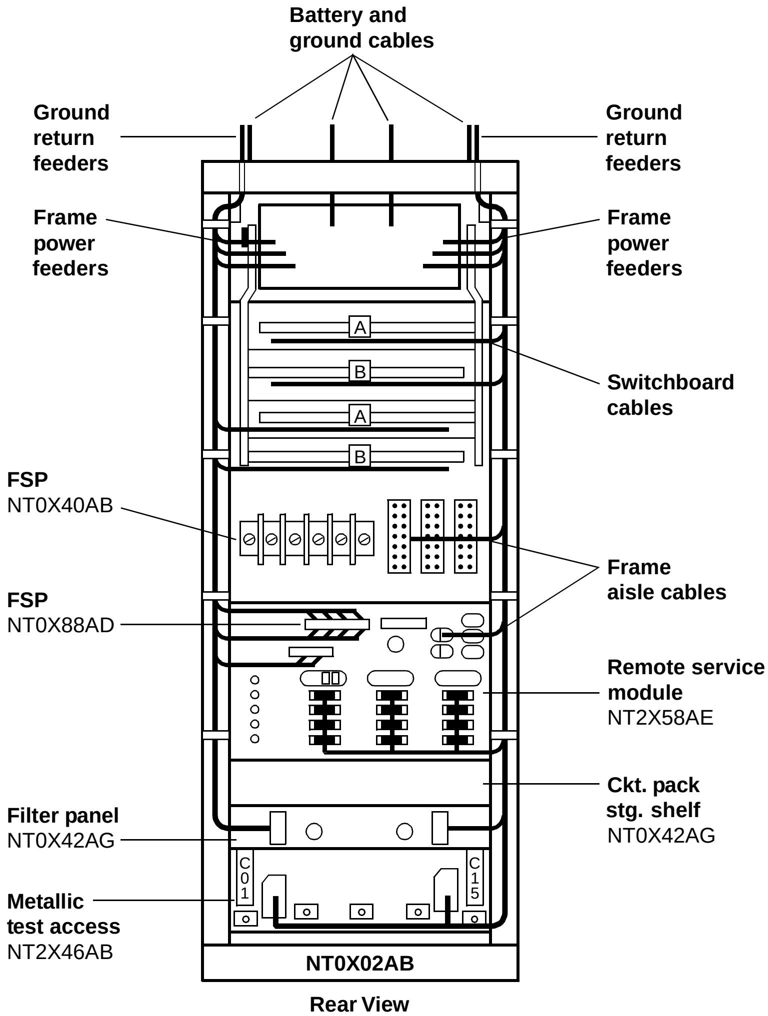
3 ABS leads should form along the bottom of the FSP to the TB2 terminal strip. Ty-rap to local wiring for support.

4 ABS lead should run directly across to adjacent frame. Ty-rap to shop cable as required to support. If the frame is not adjacent, run lead through cable trough to next frame.

26.5 RSE/RME Power and Switchboard Cabling

1 Looking at the rear view of a RSE/RME frame, the cables are run down the right frame vertical and formed horizontally to the termination point. Refer to Figure 288.

Figure 288 – RSE/RME Power and Switchboard Cabling



2 The cables are secured to the cable brackets and to each other with ty-raps.

3 Cables to FSP connectors should form horizontally to terminating point.

4 Cables to Remote Service Module should form horizontally across the bottom of the unit and vertically to the terminating point. Use ty-raps around cables at approximately four inch intervals and at break-out points.

5 Cables to Metallic Test Access unit should form horizontally across unit to break-out point. Use ty-raps at approximately four inch intervals and at break-ut points.

6 Route alarm cabling directly across the rear of the frames on adjacent frames. Slack to be stored vertically between frames. Ty-raps may be used to fasten cable-to-cable bracket. If frame is not adjacent, run cable through cable trough to next frame.

27.0 Remote Line Concentrating Module (RLCM) Frame and Remote Controller Equipment (RCE) Frame

27.1 Assembly RLCM Frame

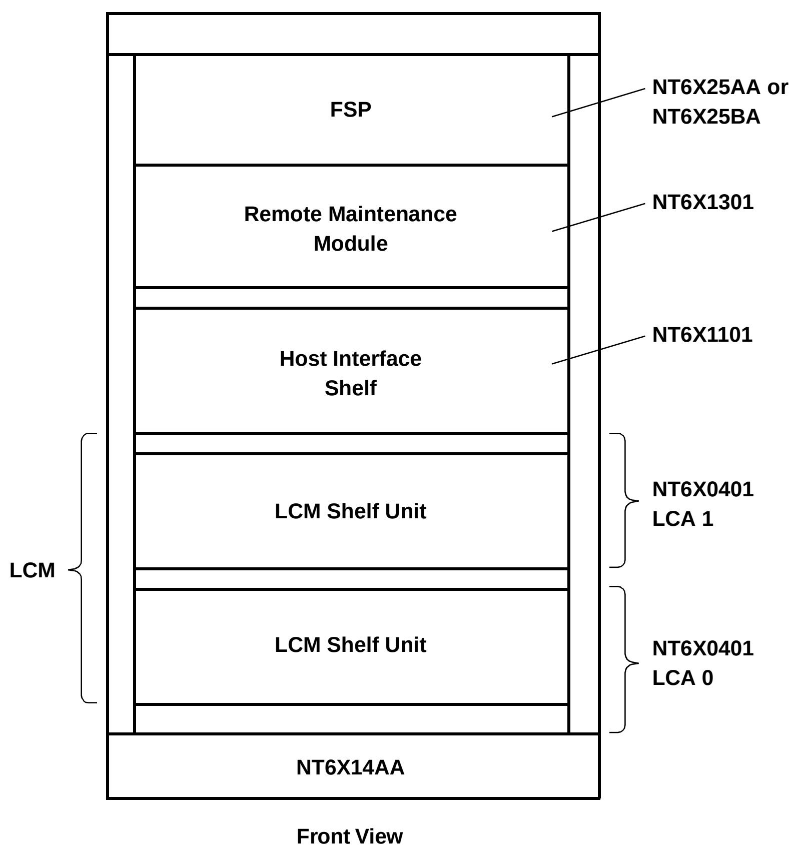
1 The Remote Line Concentrating Module (RLCM) is a single bay frame consisting of a Frame Supervisory Panel (FSP), two line drawer shelf assemblies, one remote maintenance module shelf assembly, and one host interface equipment shelf assembly.

2 The line drawers are not shipped installed in the frame; the drawers are shipped separately, each packed in its individual carton. The drawers are installed in the field by the field technician. ***Caution*** should be used to ensure line cards are seated properly in line drawers. Open and close line drawers slowly so as not to dislodge line cards. Check all line cards for proper seating before closing line drawer.

3 There are two different frame supervisory panels for the RLCM.
a. When local power distribution center or equivalent is provided, the NT6X25AA FSP is used.
b. When remote power distribution center or equivalent is provided, the NT6X25BA FSP is used.

Refer to Figure 289.

Figure 289 – Remote Line Concentrating Module Frame Configuration

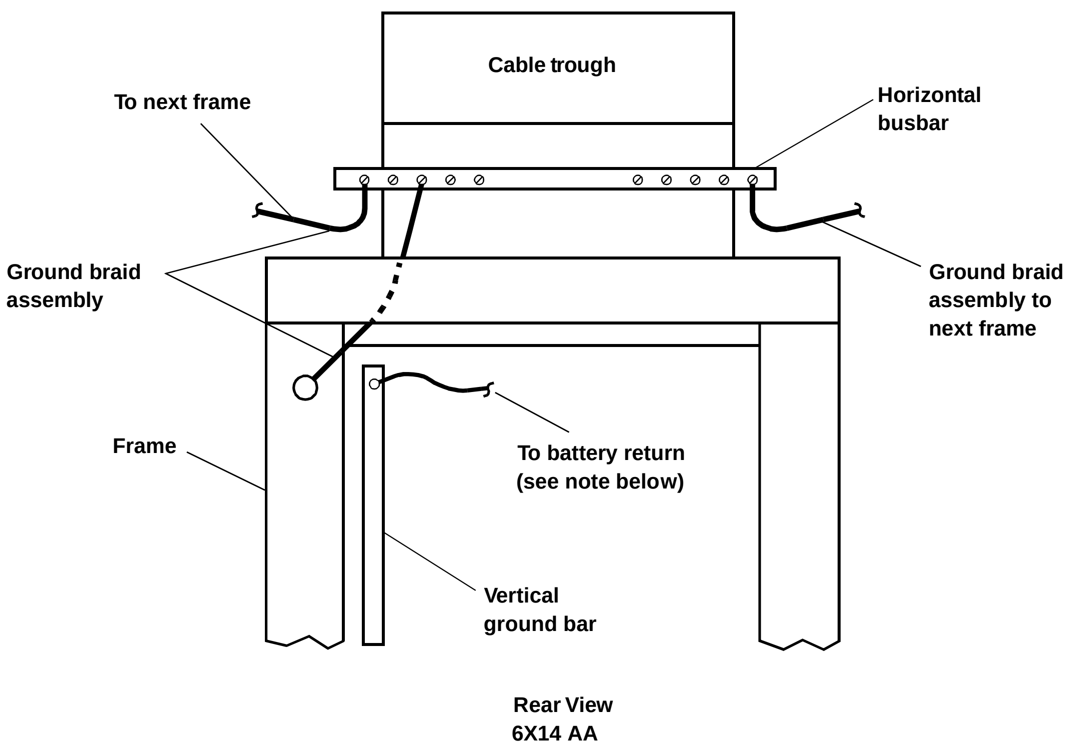


27.2 RLCM Frame Grounding

1. Frame ground link (cable braid assembly) and mounting hardware are supplied with each frame.
2. The first holes from the end on the horizontal busbar (on the cable trough) are used for installing cable braids from adjoining frames.
3. If frame is the first or last in a lineup, the cable is routed to a frame in another lineup.
4. The second holes are used for mounting the horizontal busbar on the cable trough.
5. The third hole on the horizontal busbar on the left-hand side (looking at the rear of the frame) is used to connect the cable from the left frame upright.
6. For ISG and Non-ISG grounding, the fourth hole on the horizontal bus bar (rear view) is used to connect the cable from the vertical busbar.
7. Ensure that all bolts securing the ground cables are tight. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements."
8. NO-OX-ID "A" compound is to be applied to lugs terminating to bus bars as defined in Event 7. 03-9057.
9. Follow Event 06 (Method 03-9056), "Grounding," for connecting ground leads for ISG grounding (U.S. and Canadian applications).

   Refer to Figure 290.

Figure 290 – Frame Grounding RLCM



Note: If FSP NT6X25AA, then connect to TB2-9 (left). If FSP NT6X25BA, then connect to TB1-4 (bottom). Both connections are factory installed.

27.3 Switchboard Cable (Line Drawers to MDF) NT0X26CE

1 The switchboard cables are connectorized on the line drawer end. There are two switchboard cables and one local cable terminating on each line drawer.

2 Each cable is split and is equipped with two connectors (A and B) on the end terminating on the line drawer. Care must be exercised when running and connecting the cables so as not to damage the wires, connectors, and pins.

3 Switchboard cables (NT0X26CE) are sent to the field in boxes of five cables.

Run each bundle of five cables down verticals of the LCE bay with line subgroups 00, 01, 02, 03, 10, 11, 12, and 13 down the right upright (rear view) and line subgroups 04, 05, 06, 07, 08, 09, 14, 15, 16, 17, 18, and 19 down the left upright.

Therefore, there are six line subgroup cables which are run down the left, rear frame upright and four-line subgroup cables which are run down the right, rear-frame upright for each LCM shelf.

4 The line subgroup cables run down the left, rear frame upright and terminate on the three-line drawers on the left-hand side of the frame.

The line subgroup cables run down the right, rear frame upright terminating on the two line drawers on the right-hand side of the frame. This applies to each line drawer shelf.

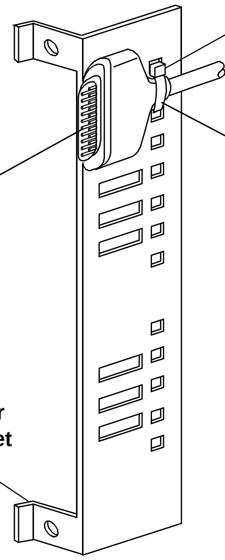
5 Cables are formed across, on the inside of the *U* channel, on the upper part of each shelf, and looped to the line drawer.

Caution: The switchboard cables must be the same length as the local cable from the point where the switchboard cables meet the local cable on the upper shelf.

6 Cables are secured with ty-raps to the cable brackets, cable clamps, upper shelf "U" channel, and to each other. Refer to Figure 291, Figure 292 and Figure 293.

Caution: Ensure that the ty-rap(s) do *not* interfere with the movement of the drawers and/or cables.

Figure 291 – Connector Key Bracket and Ty-raps



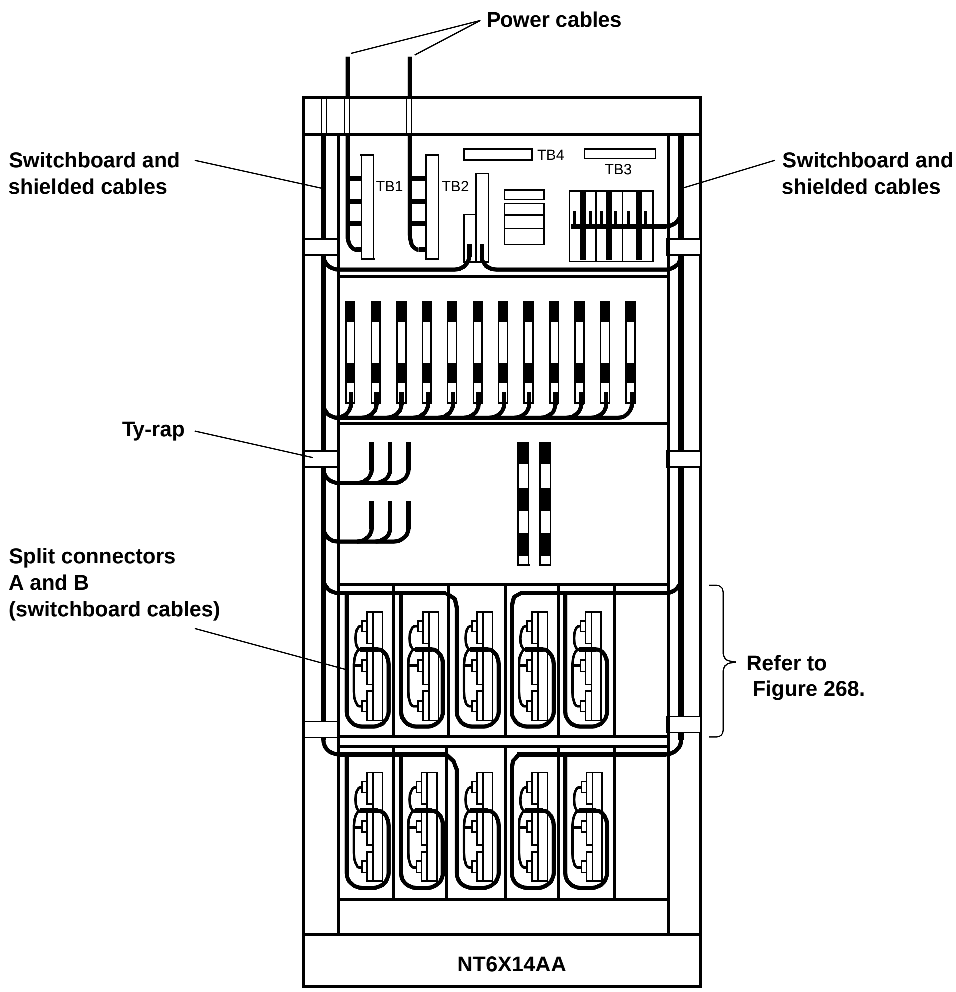
7 Do *not* connect MDF cables to unequipped and/or partially equipped line drawers until cables have been tested as outlined in Method 24-0425, "Line Appearance Test."

8 A ty-rap (P0567232) is used to secure the cable connector to the connector key brackets. Thread the large ty-rap through the holes in the connector key bracket and secure the cable connector hood to the key bracket. Refer to Figure 291.

The head of the ty-rap is to be located on the opposite side of the bracket as the cable connector. The existing small ty-rap on the cable connector should *not* be removed.

9 Cut the ty-rap flush. Ensure there are no sharp edges on the ty-rap when complete. Refer to Figure 292 and Figure 293.

Figure 292 – Connecting and Securing Cables–RLCM

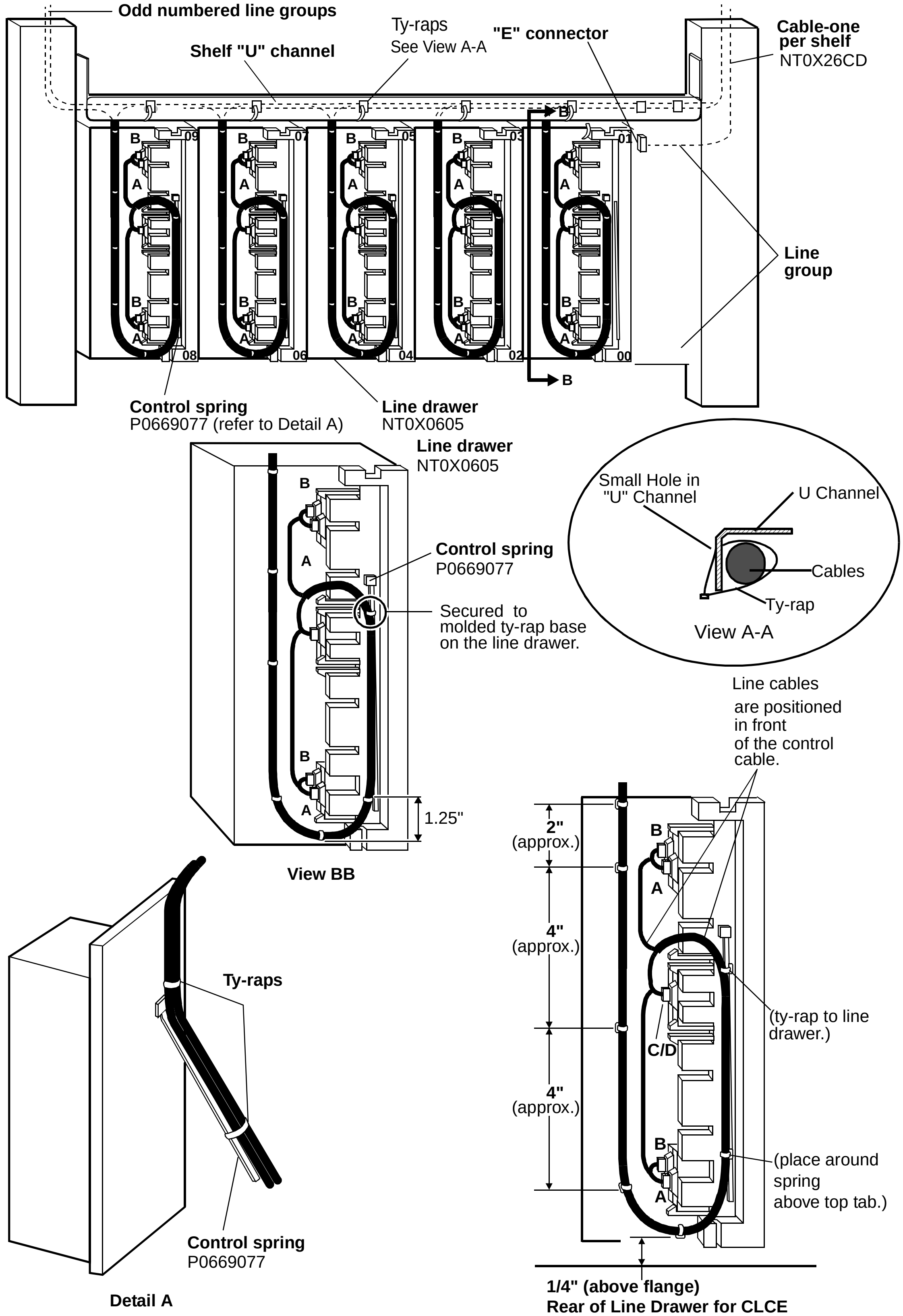


Rear View

Note: In Figure 292, FSP NT6X25AA is shown. If FSP NT6X25BA is supplied, TB-2 has been eliminated and TB-1 has been rotated 90 degrees. Power cables into TB-1 on NT6X25BA route along the bottom of TB-1.

10 There are 7 small holes in the back of the "U" channel. The holes are to be used to secure the line cables to the "U" channel. Insert a ty-rap through the small holes in the back of the "U" channel. The ty-rap is to be routed over the cables and looped back around the cables and under the edge of the channel. Ensure that the ty-rap does not pass through any cables or pinches any wires. The head of the ty-rap is to be located towards the bottom edge of the channel. This will pull the cables towards the rear of the channel. Refer to Figure 293 View A-A.

Figure 293 – Cabling LCM Shelf



27.4 RLCM NT0X26AB Switchboard Cable (FSP to MDF)

1 There is one NT0X26AB Switchboard Cable originating on the FSP CON3 and terminating on the MDF. The cable is run down the right-rear frame upright, formed across the lower shelf on the FSP, then up to the connector.

2 The cable is secured to the cable bracket and formed with the ty-raps.

3 The NT0X26AB is connectorized on the end terminating on the RLCM frame.

27.5 RLCM Shielded Cable to FSP

1 Shielded cables run vertically down the right, rear (rear view) frame upright and are secured to cable bracket with ty-raps.

2 Form leads horizontally from vertical form, and then individual vertical legs to terminating point. Secure form with loose fitting ty-raps. Leave a three inch service loop between vertical form and terminating point. Send and receive cables should be formed separately with spare leads stored in vertical form. Exposed leads must be protected at cable brackets. Use split fiber tube around leads and secure with ty-raps.

3 For Canadian applications, twist the wire leads with two twists per inch from point of cable butt to the terminal connection, at both ends of the cable.

4 The shield ground from both send and receive cables shall terminate on TS4 terminal 10. Wire wrap the 20-gauge ground lead wire to the pin.

- In the U.S., apply some solder using a low wattage soldering iron (60 watt) such as Detail 38 in the field technician's Tool Kit. Extreme care must be taken not to overheat the pin.
- In Canada, use hand wire wrapping tool (R-3278A), 20 GA bit, and sleeve (A-8876). Do *not* solder this connection.

27.6 NT0X26EZ Switchboard Cables (RMM Shelf to MDF)

1 There could be up to fourteen (14) NT0X26EZ switchboard cables (connectorized on one end) originating from the Remote Maintenance Module (RMM) shelf and terminating on the MDF, if so provisioned.

2 The cable(s) runs down the left rear frame upright (rear view), then formed horizontally along the bottom of the RMM shelf and up to the termination point.

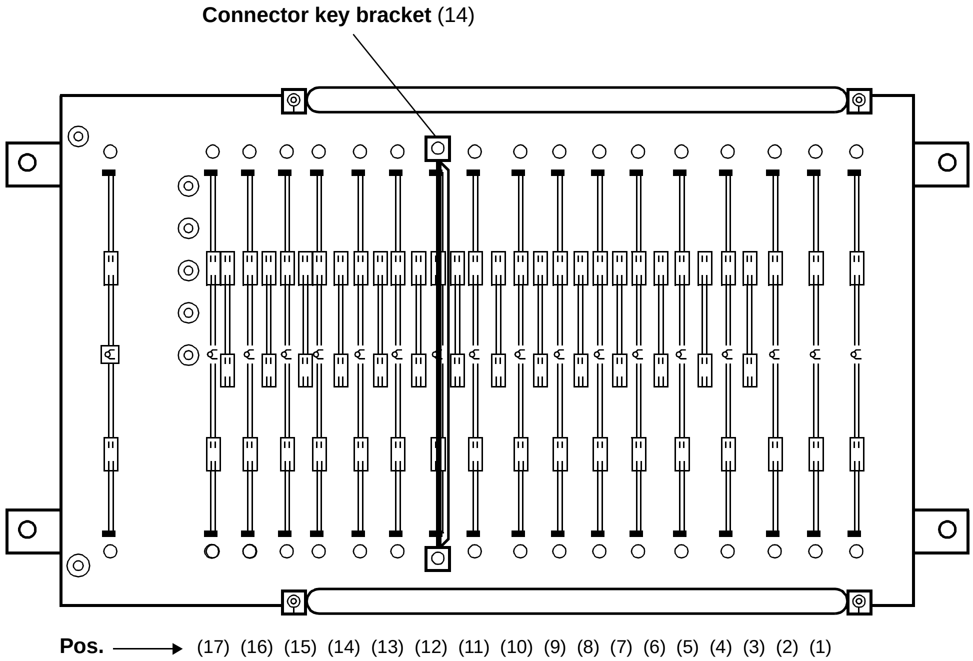
3 The cable(s) terminates on the backpanel position as specified on the job drawing and on the pins #1 to #34.

4 Ensure that pin #1 on the cable connector mates with pin #1 on the backplane.

5 The cable(s) is secured to the cable bracket and cable form with ty-raps. Secure cables at every break-out.

6 The connector(s) is secured to the connector key bracket with ty-raps (P0567232). Refer to Figure 294.

Figure 294 – NT6X1301 (RMM) Backpanel



Rear View
Backpanel NT6X1301 RMM Shelf

27.7 RLCM Shielded Cables (HIE Shelf to Office Repeater)

1 The shielded cables are run vertically down the left, rear (rear view) frame upright and secured with ty-raps to the cable brackets.

2 At break-out, butt cable 1/2" (+/- 1/4") below cable bracket.

3 For Canadian applications, twist the wire leads with two twists per inch from the point of the cable butt to the terminal connection, both ends of cable.

4 Form leads horizontally from the vertical form, then individual vertical legs to the terminating point. Secure form with loose fitting ty-raps. Leave a three-inch service loop between vertical form and the terminating point. Send and receive cables should be formed separately with spare leads stored in the vertical form.

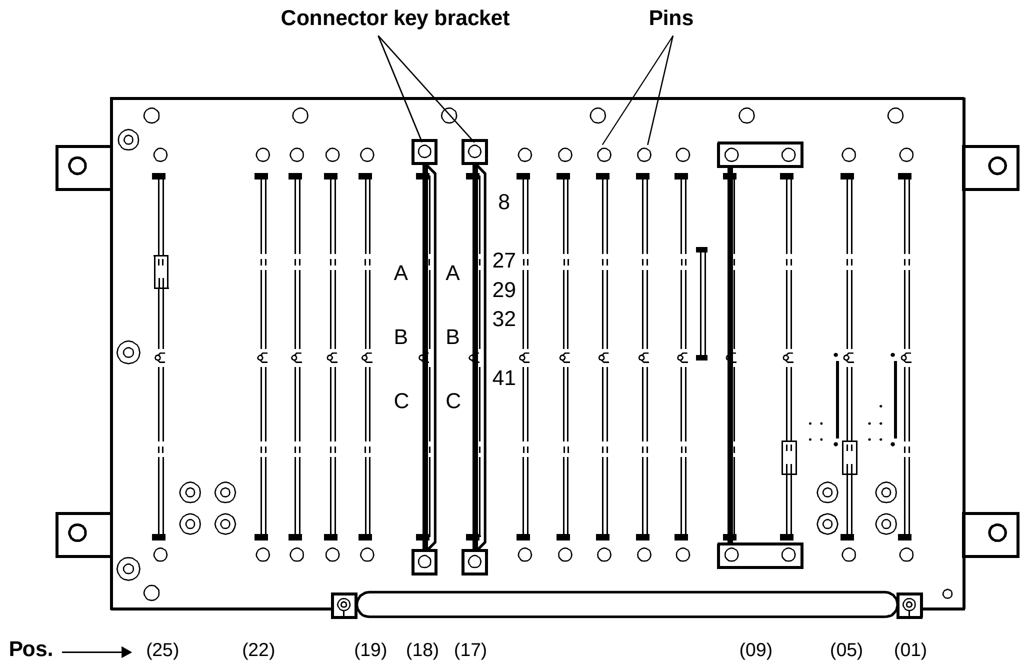
Exposed leads must be protected at the cable brackets. Use split fiber tube around leads and secure with ty-raps. The shield ground from both send and receive cables shall terminate on pin T1, located between card slots 21 and 22. Wire wrap the 20-gauge ground lead wire to the pin.

- In the U.S., apply some solder using a low wattage soldering iron (60 watt) such as Detail 38 in the field technician's Tool Kit. Extreme care must be taken not to overheat the pin.

- In Canada, use hand wire wrapping tool (R-3278A), 20 GA bit, and sleeve (A-8876). Do *not* solder this connection.

5 Fan, skin, and connect leads making solderless connections using a wire wrapping tool. Refer to Event 07 (Method 9057), "General Cabling Information and Torque Requirements," for more detail. Refer to Figure 295.

Figure 295 – NT6X1104 (HIE) Backpanel



Rear View
Backpanel NT6X1104 Host Interface Equipment (HIE) Shelf

27.8 RLCM Frame Aisle Alarm Multiple Cables

1. The frame aisle alarm multiple cables are to be run between adjacent frames.
2. Because of the FSP being located in position 70 on this frame, the cables must be run up and down the frame uprights and secured to the cable brackets. They are then formed horizontally across the frame FSPs.

27.9 RLCM Power and Alarm Cabling

1. The battery and return cables terminate on terminal strips TB1 and TB2 on rear of FSP which is located in position 70. Use 90-degree lugs with NT6X25AA FSP and straight lugs with NT6X25BA FSP. Cable tag should show termination information.
2. The Alarm Battery Supply (ABS) terminates on terminal strip TB4. The cable tag should give terminating information.
3. The power and alarm cables form horizontally under cable trough and vertically down to terminating point. Use ty-raps around the cable at approximately 4 inch intervals for support, and at every other break-out point.

27.10 Assembly of Remote Controller Equipment (RCE) Frame

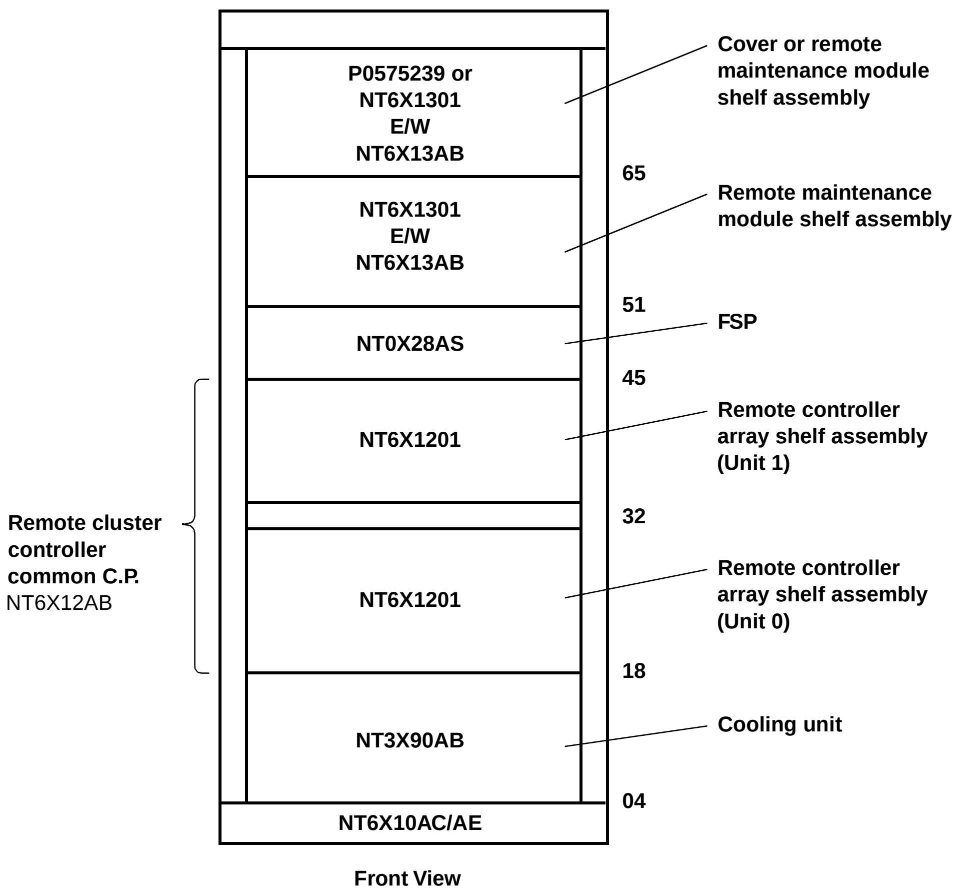
1 The Remote Controller Equipment (RCE) Frame is a single bay frame consisting of the following:

- One frame supervisory panel
- Two remote maintenance modules
- Two remote cluster control shelf assemblies
- Three baffle assemblies

This frame can be configured in several ways.

2 Refer to Figure 296.

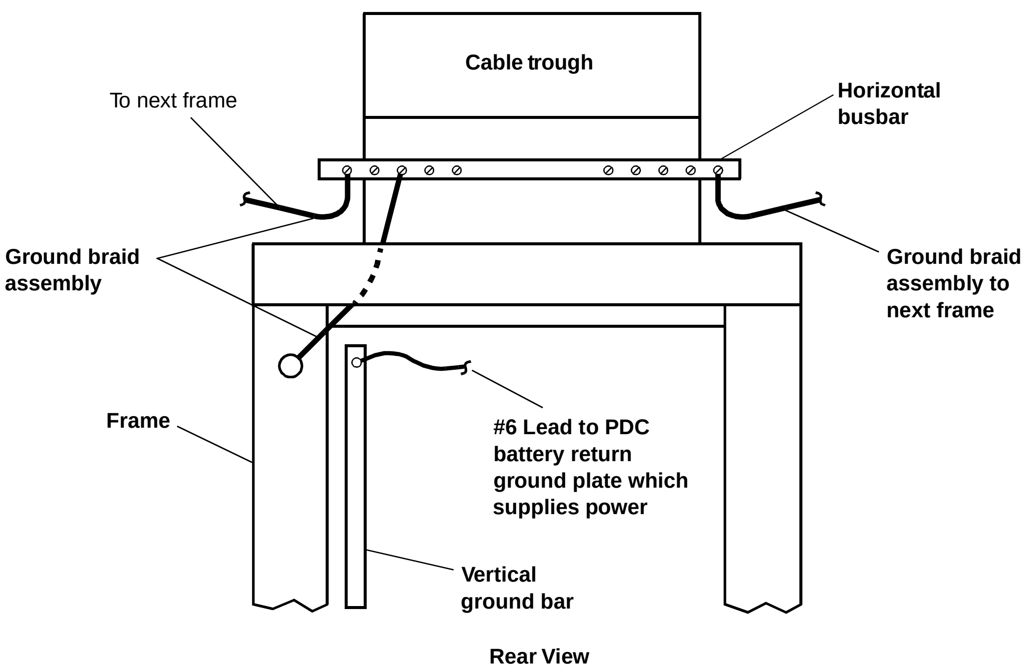
Figure 296 – RCE and RCEO Configuration



27.11 Remote Controller Equipment (RCE) Frame Grounding

1. Frame grounding links (cable braid assembly) and mounting hardware are supplied with each frame.
2. The first holes from the ends on the horizontal busbar (cable trough) are used for installing cable braids from adjoining frames.
3. If the frame is first or last in a lineup, the cable is routed to a frame in another lineup.
4. The second holes are used for mounting the horizontal busbar onto the cable trough.
5. The third hole on the horizontal busbar on the left-hand side (rear view) is used to connect the cable from the left-frame upright.
6. A #6 AWG cable runs from the Logic Grounding busbar assembly at each frame to the Power Distribution Center (PDC) battery return plate which supplies its power.
7. Follow Event 06 (Method 03-9056), "Grounding," for connecting ground leads for ISG grounding (U.S. applications) and for ISG grounding of this frame (Canadian applications).
8. NO-OX-ID "A" compound is not required on any of the frame busbars. The hardware supplied is sufficient for a proper connection. Refer to Figure 297.

Figure 297 – RCE and RCEO Frame Grounding



27.12 Remote Controller Equipment (RCE) Shielded Cables

1 The shielded cables run vertically down the left and right rear (rear view) frame uprights and secured with ty-raps to the cable brackets.

Note: Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," prior to the installation of the DSX cables.

2 The termination points for the ABAM cabling to the DSX are shown in Figure 298 and Figure 299 for Domestic installations and Figure 300 for Offshore installations. The NT6X1201/07 RCC shelves are mounted in positions 18 and 32 in the NT6X10AC/AD RCE frames. Per CA0X06, the ABAM ground wire should be attached to shelf 32. Connect the C-side and P-side ground wire.

Figure 298 – RCC C-side DS1 Backplane Pin Connections, Domestic

PIN #	SLOT 23	DS1 ASG	PIN #	SLOT 22	DS1 ASG	PIN #	SLOT 21	DS1 ASG	PIN #	SLOT 20	DS1 ASG
1	.SENDT	14	1	.SENDT	10	1	.SENDT	6	1	.SENDT	2
2	.SENDR	14	2	.SENDR	10	2	.SENDR	6	2	.SENDR	2
3	.SENDT	15	3	.SENDT	11	3	.SENDT	7	3	.SENDT	3
4	.SENDR	15	4	.SENDR	11	4	.SENDR	7	4	.SENDR	4
	.(a)										
	.(b)										
5	.RECT	14	6	.RECT	10	5	.RECT	6	5	.RECT	2
6	.RECR	14	6	.RECR	10	6	.RECR	6	6	.RECR	2
7	.RECT	15	7	.RECT	11	7	.RECT	7	7	.RECT	3
8	.RECR	15	8	.RECR	11	8	.RECR	7	8	.RECR	4
UNIT 1 (Pos. 32)											
PIN #	**SLOT 23**	**DS1 ASG**	**PIN #**	**SLOT 22**	**DS1 ASG**	**PIN #**	**SLOT 21**	**DS1 ASG**	**PIN #**	**SLOT 20**	**DS1 ASG**
1	.SENDT	12	1	.SENDT	8	1	.SENDT	4	1	.SENDT	0
2	.SENDR	12	2	.SENDR	8	2	.SENDR	4	2	.SENDR	0
3	.SENDT	13	3	.SENDT	9	3	.SENDT	5	3	.SENDT	1
4	.SENDR	13	4	.SENDR	9	4	.SENDR	5	4	.SENDR	1
	.(a)										
	.(b)										
5	.RECT	12	6	.RECT	8	5	.RECT	4	5	.RECT	0
6	.RECR	12	6	.RECR	8	6	.RECR	4	6	.RECR	0
7	.RECT	13	7	.RECT	9	7	.RECT	5	7	.RECT	1
8	.RECR	13	8	.RECR	9	8	.RECR	5	8	.RECR	1
UNIT 0 (Pos. 18)											

Figure 299 RCC P-side DS1 Backplane Pin Connections, Domestic

DS1 ASG	SHELF	SLOT	PINS	
			SEND	RECEIVE
0	18	5	1,2	5,6
1	18	5	3,4	7,8
2	32	5	1,2	5,6
3	32	5	3,4	7,8
4	18	4	1,2	5,6
5	18	4	3,4	7,8
6	32	4	1,2	5,6
7	32	4	3,4	7,8
8	18	3	1,2	5,6
9	18	3	3,4	7,8
10	32	3	1,2	5,6
11	32	3	3,4	7,8
12	18	2	1,2	5,6
13	18	2	3,4	7,8
14	32	2	1,2	5,6
15	32	2	3,4	7,8
16	18	1	1,2	5,6
17	18	1	3,4	7,8
18	32	1	1,2	5,6
19	32	1	3,4	7,8

Figure 300 – RSC C-side, PCM-30 Backplane Pin Connections, Offshore

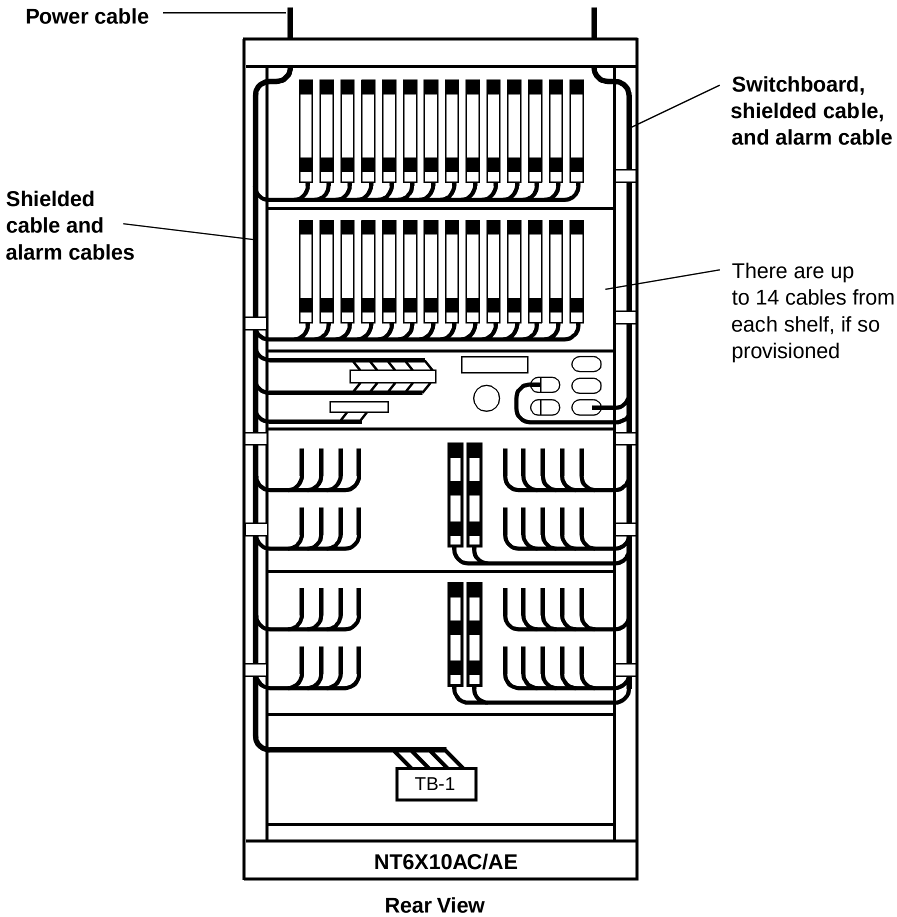
PIN #	SLOT 23	PORT #	PIN #	SLOT 22	PORT #	PIN #	SLOT 21	PORT #	PIN #	SLOT 20	PORT #
1	.SENDT	14	1	.SENDT	10	1	.SENDT	6	1	.SENDT	2
2	.SENDR	14	2	.SENDR	10	2	.SENDR	6	2	.SENDR	2
3	.SENDT	15	3	.SENDT	11	3	.SENDT	7	3	.SENDT	3
4	.SENDR	15	4	.SENDR	11	4	.SENDR	7	4	.SENDR	4
	.(a)										
	.(b)										
5	.RECT	14	6	.RECT	10	5	.RECT	6	5	.RECT	2
6	.RECR	14	6	.RECR	10	6	.RECR	6	6	.RECR	2
7	.RECT	15	7	.RECT	11	7	.RECT	7	7	.RECT	3
8	.RECR	15	8	.RECR	11	8	.RECR	7	8	.RECR	4
UNIT 1 (Pos. 32)											
PIN #	**SLOT 23**	**PORT #**	**PIN #**	**SLOT 22**	**PORT #**	**PIN #**	**SLOT 21**	**PORT #**	**PIN #**	**SLOT 20**	**PORT #**
1	.SENDT	12	1	.SENDT	8	1	.SENDT	4	1	.SENDT	0
2	.SENDR	12	2	.SENDR	8	2	.SENDR	4	2	.SENDR	0
3	.SENDT	13	3	.SENDT	9	3	.SENDT	5	3	.SENDT	1
4	.SENDR	13	4	.SENDR	9	4	.SENDR	5	4	.SENDR	1
	.(a)										
	.(b)										
5	.RECT	12	6	.RECT	8	5	.RECT	4	5	.RECT	0
6	.RECR	12	6	.RECR	8	6	.RECR	4	6	.RECR	0
7	.RECT	13	7	.RECT	9	7	.RECT	5	7	.RECT	1
8	.RECR	13	8	.RECR	9	8	.RECR	5	8	.RECR	1
UNIT 0 (Pos. 18)											

3 Secure forms with loose fitting ty-raps. Leave a three inch service loop between vertical form and terminating point. Send and receive cables should be formed separately with spare leads stored in vertical form. Exposed leads must be protected at cable brackets. Use split fiber tube around leads and secure with ty-raps. The ground leads are 20 gauge and must be wrapped on the lug with the wire wrap gun or by hand and soldered. Extreme care should be taken not to overheat the pin. Use a low wattage soldering iron.

4 Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for butting, stripping, grounding, and securing cables. For connecting, refer to CA0X06 drawing.

5 Fan, skin, and connect leads making solderless connections using a wire wrapping tool. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements." Refer to Figure 301.

Figure 301 – Connecting and Securing Cables – RCE and RCEO



27.13 Switchboard Cable NT0X26CD (RCE to LCM)

1 There are from one (1) to ten (10) NT0X26CD switchboard cables going to each NT6X1201 shelf (if frame is so provisioned). The end going to the RCE/RCEO frame has three (3) connectors, the cable being split. The LCE frame has one connector (E).

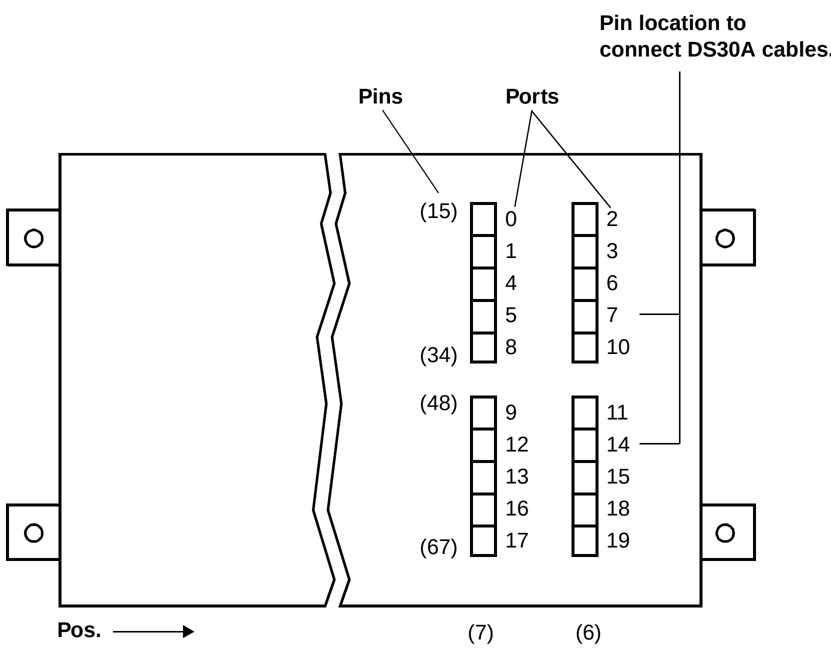
2 The switchboard cable(s) runs down the right, rear frame upright (rearview) and is formed along the bottom of each shelf and up to the termination point.

3 The cables terminate on the backpanel positions #6 and #7, port 0 to 19, and pins #15 to #67 (refer to Figure 302, Figure 303, Figure 304, and Figure 305). Refer to Figure 298 for DS1 backplane pin connections. Refer to Figure 300 for PCM-30 backplane pin connections.

4 Refer to Figure 303 for pin connections.

5 This RCC uses links 0 and 1 to load the provisionable RMMs. The DS-30a ports for the LCMs begin at port # 2. Table RCCPSINV should be data-filled as DS-30a for ports 0 and 1.

Figure 302 – NT6X1201 Backpanel



Rear View
Backpanel Pin Connection (NT6X1201)

6 The connectors on each cable are designated A, B, and C. The connectors are also designated as pin location #1, #4 and #5, #8. Care must be exercised when mating the connectors on the cable with the pins on the backpanel. (Refer to Figure 303 for DS1 backplane pin connections.)

Example: PIN #1 on connector *A* mates with pin #15 on backpanel position #7 port #0.

7 The cable(s) is secured to the cable brackets, and is formed with ty-raps.

8 The connector is secured to the connector key bracket with a ty-rap.

9 Using tie cable markers (P0633713), identify all NT0X26CD cable connectors at the end with three connectors. The cable connectors are to be identified giving pin position on the backpanel and the first pin with which the connector is to mate.

Example: POS 07

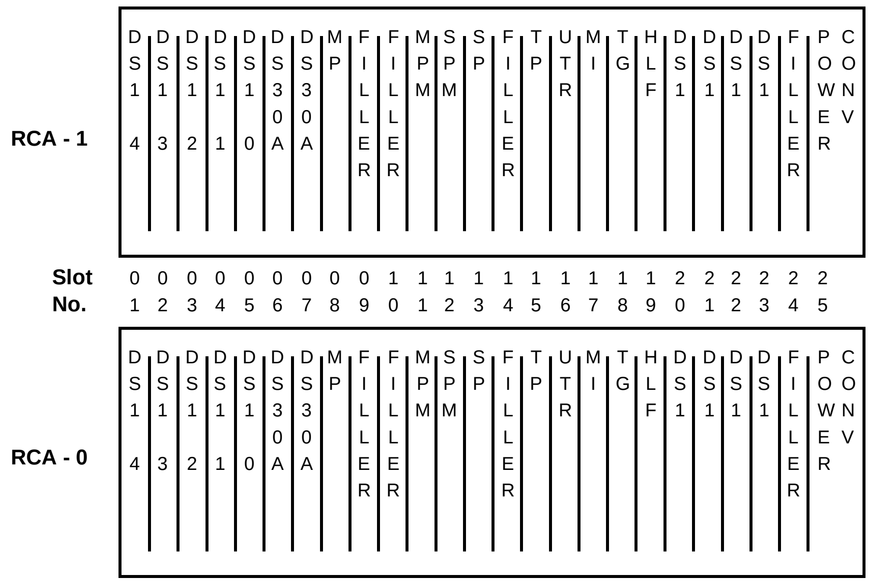
PIN 15

10 This marker shall be around cable only and not used to fasten cable connector to connector key bracket.

Figure 303 – Backpanel Pin Connections

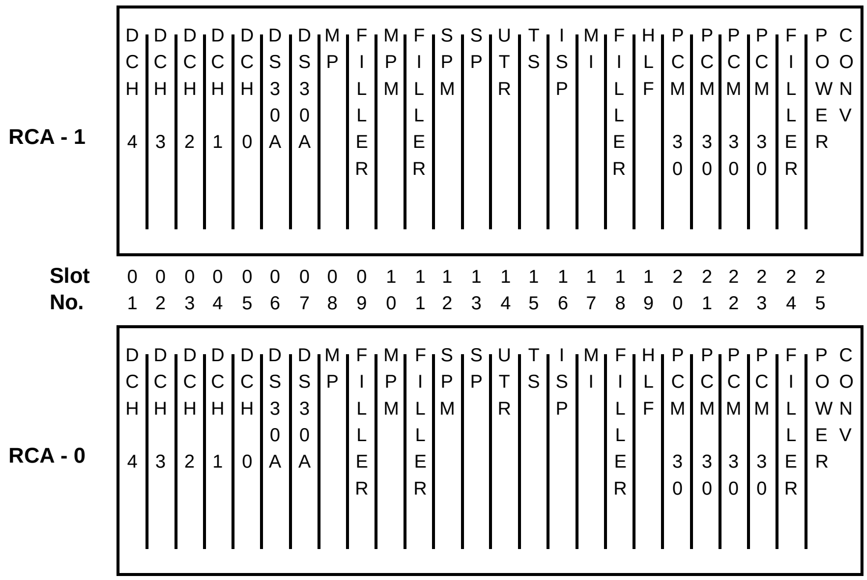
Port	Position	Pins
0	7	15, 16, 17, 18
1	7	19, 20, 21, 22
2	6	15, 16, 17, 18
3	6	19, 20, 21, 22
4	7	23, 24, 25, 26
5	7	27, 28, 29, 30
6	6	23, 24, 25, 26
7	6	27, 28, 29, 30
8	7	31, 32, 33, 34
9	7	48, 49, 50, 51
10	6	31, 32, 33, 34
11	6	48, 49, 50, 51
12	7	52, 53, 54, 55
13	7	56, 57, 58, 59
14	6	52, 53, 54, 55
15	6	56, 57, 58, 59
16	7	60, 61, 62, 63
17	7	64, 65, 66, 67
18	6	60, 61, 62, 64
19	6	64, 65, 66, 67

Figure 304 – RCC Shelf Layout and Card Complement - Domestic



SLOT	ABBR	Nortel PEC	REMARKS
01–05	DS1	6X50AA	DS1 Interfaces (PM Face)
06–07	DS30A	6X48AA	DS30A Interfaces (LCM)
08	MP	6X45AE	Master Processor
11	MPM	6X67 AB	Master Processor Memory
12	SPM	6X46AB	Signalling Processor Memory
13	SP	6X45AE	Signalling Processor
14 *	–	0X50AA	Filler Panel
15	TS	6X44AA	Time Switch
16	UTR	6X92AA	Universal Tone Receiver
17	MI	6X69AA	Message Interface
18	TG	6X79AA	Tone Generator
19	HLF	6X72AA	Host Link Formatter
20–23	DS1	6X50AA	DS1 Interfaces (Host Face)
24	–	0X50AA	Filler Panel
25	–	2X70AD	Power Converter

Figure 305 – RCCO Shelf Layout and Card Complement - Offshore



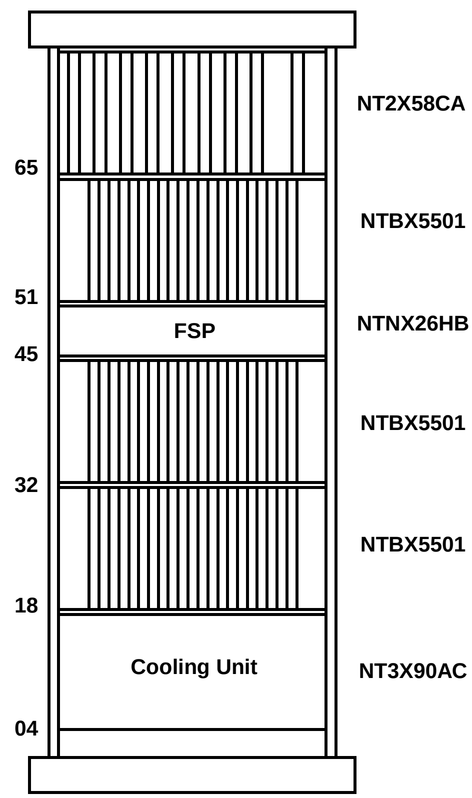
SLOT	ABBR	Nortel PEC	REMARKS
01–05	DCH	BX02AA	D - Channel Handler
06–07	DS30A	6X48AA	DS30A Interfaces (LCM)
08	MP	6X45BA	Master Processor
09	-	0X50AA	Filler Panel
10	MPM	6X47AC	Master Processor Memory
11	-	0X50AA	Filler Panel
12	SPM	6X46BA	Signalling Processor Memory
13	SP	6X45BA	Signalling Processor
14	UTR	6X92CA	Universal Tone Receiver
15	TS	6X44EA	Universal Time Switch
16	ISP	BX01AA	ISDN Signalling Processor
17	MI	6X69LA	Message Interface
18	-	0X50AA	Filler Panel
19	HLF	6X72BA	Host Link Formatter
20–23	PCM30	6X27AC	PCM - 30 (C-SIDE)
24	–	0X50AA	Filler Panel
25	–	2X70AF	Power Converter

28.0 Remote Fiber Link Extension (RFLE) Frame Installation

28.1 Remote Fiber Link Extension (RFLE) Frame Overview

1 The Remote Fiber Link Extension (RFLE) is a single bay frame. A fully configured frame is shown in Figure 306.

Figure 306 – RFLE Frame (front view)



2 The modules will be equipped with circuit packs according to job specifications and requirements. Examples of circuit pack fills are given for the MTM and Remote Line Equipment (RLE) shelves in Figure 307 and Figure 308, respectively.

Figure 307 – MTM Circuit Pack Fill

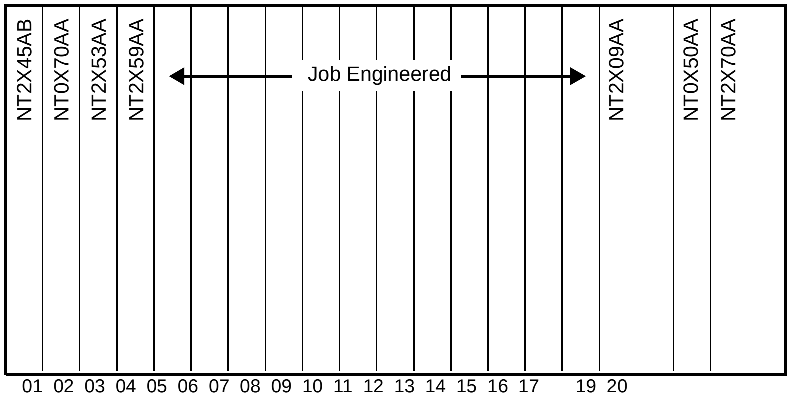
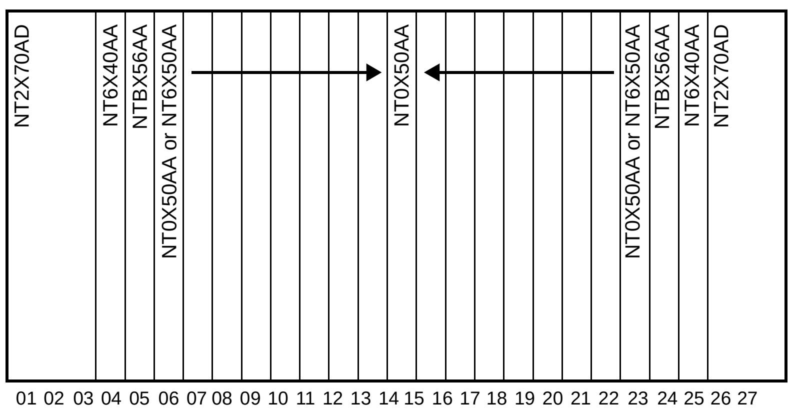


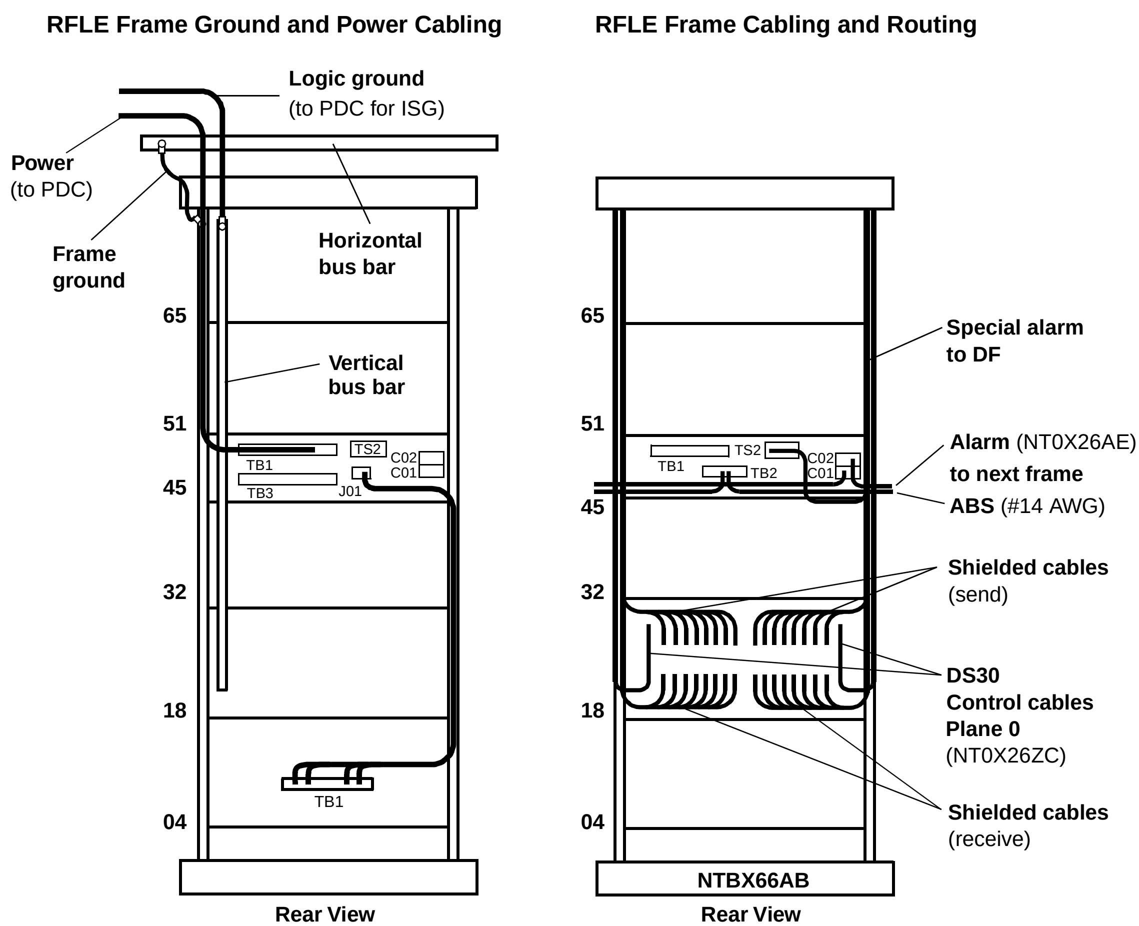
Figure 308 – Remote Line Equipment (RLE) Shelf Circuit Pack Fill



28.2 Remote Fiber Link Extension (RFLE) Frame Grounding

1 Frame grounding cables and mounting hardware are supplied with each frame. All grounding connections are shown in Figure 309.

Figure 309 – RFLE Frame Ground, Power Cabling, and Cable Routing



28.3 Remote Fiber Link Extension (RFLE) Power Cables

1 Run the power cables, battery (-48V) and return (BR), down the left frame upright (rear view) to the FSP onto the terminal blocks according to Table CAD1 of Interconnect Schematic ISNX26HB (Figure 310). Refer to Figure 309 for the routing of the cables.

Figure 310 – RFLE FSP Power Connections (TB01)

Line	Signal	Position	Pin
1	-48V(A) 1	TB01	09
2	-48V(A) 2	TB01	10
3	-48V(A) 3	TB01	13
4	-48V(A) 4	TB01	14
5	-48V(B) 1	TB01	11
6	-48V(B) 2	TB01	12
7	-48V(B) 3	TB01	15
8	-48V(B) 4	TB01	16
9	BR(A) 1	TB01	01
10	BR(A) 2	TB01	02
11	BR(A) 3	TB01	05
12	BR(A) 4	TB01	06
13	BR(B) 1	TB01	03
14	BR(B) 2	TB01	04
15	BR(B) 3	TB01	07
16	BR(B) 4	TB01	08
1	-48V(A)	TB03	01
2	BR(A)	TB03	02

2 Do *not* form and secure until all the crimping is completed. Ensure the power cables are run in the appropriate slot in the cable trough.

3 Form the cables across the FSP and connect the cables to the appropriate terminals at the frame and the PDC according to the job drawings (XX...-D640) and tighten the screws.

4 Place the ty-rap at each break off point and every six inches (15cm.) along the harness. Then secure them to the cable brackets on the upright.

5 Ensure that all the power connections are tight. If the power cables encounter a sharp edge, protective fiber must be placed over the edge.

28.4 Remote Fiber Link Extension (RFLE) Alarm and ABS Multiple

1. Run the NT0X26AE and a single #14 AWG cable with appropriate lugs, between each adjacent FSP, along the center. Ty-rap them together and secure them to the frame cables.

   TB2-1 (-48VABS) to succeeding FSP

   TB2-2 -48VABS) to preceding FSP

   TB2-3 (BRABS) to succeeding FSP

   TB2-4 (BRABS) to preceding FSP

   TB2-12 (AISLALM2) to preceding FSP

   TB2-11 (AISLALM1) to succeeding FSP

2. If the frame is the first or the last in the lineup fitted with end panels, run the end aisle alarm lamp connections as follows:

   <u>Aisle Alarm</u>
   TB2-5 aisle lamp (gold lead)
   TB2-12 aisle lamp (silver lead)

3. Run the special shelf alarm cables (NPS90529-01) down the right frame upright. The remaining ones are 5 pair 26 AWG (RFMD01/02). Not all the cables may be provisioned for a job. Figure 311 shows the wiring connections for the alarms.

Figure 311 – RFLE Alarm Connections (TS02) External Interconnect

Pin	Wire Color	Signal	Remarks
1	BL(W)	ALM.COM0	Associated with shelf 18, slot 5
2	W(BL)	ALM.NO0	Associated with shelf 18, slot 5
3	O(W)	ALM.COM1	Associated with shelf 18, slot 23
4	W(O)	ALM.NO1	Associated with shelf 18, slot 23
5	G(W)	ALM.COM2	Associated with shelf 32, slot 5
6	W(G)	ALM.NO2	Associated with shelf 32, slot 5
7	BR(W)	ALM.COM3	Associated with shelf 32, slot 23
8	W(BR)	ALM.NO3	Associated with shelf 32, slot 23
9	S(W)	ALM.COM4	Associated with shelf 51, slot 5
10	W(S)	ALM.NO4	Associated with shelf 51, slot 5
11	BL(R)	ALM.COM5	Associated with shelf 51, slot 23
12	R(BL)	ALM.NO5	Associated with shelf 51, slot 23

4 Run the RFMD01 and RFMD02 cables to the FSP down the right side (rear view). Butt the cable 1/2" below the first cable bracket above the FSP. Form the cable onto terminal strip TS02 on the FSP and connect to the terminals according to Figure 309 and Figure 311. These cables terminate at the Distribution Frame (DF).

28.5 Remote Fiber Link Extension (RFLE) Frame Remote Configuration Strap

1 To configure the Remote Line Equipment (RLE) shelf as a Remote shelf, connect the following pins on the RLE backplane with 26 ga. wire:

2 Slot 5
2B to 14A

28.6 Remote Fiber Link Extension (RFLE) Frame DS30 Control Cables

1 Run the control cables from the Remote Line Equipment (RLE) shelf to the IAE/LGEI frame down the left and right sides (rear view) as shown in Figure 309. Terminate these cables on the RLE shelf backplane according to Figure 312, Figure 313, and Figure 314. Secure the connectors to the connector key bracket with a ty-rap.

2 Ground the cable ground sheathing to the cp positions 06 and 22 (T1) ground terminals. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements".

Figure 312 – Remote Fiber Link Extension (RFLE) Remote Line Equipment (RLE) Shelf Connector Pins

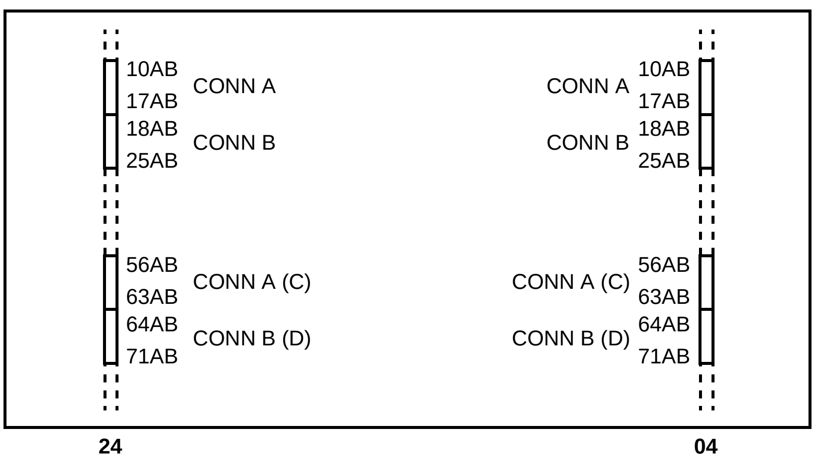
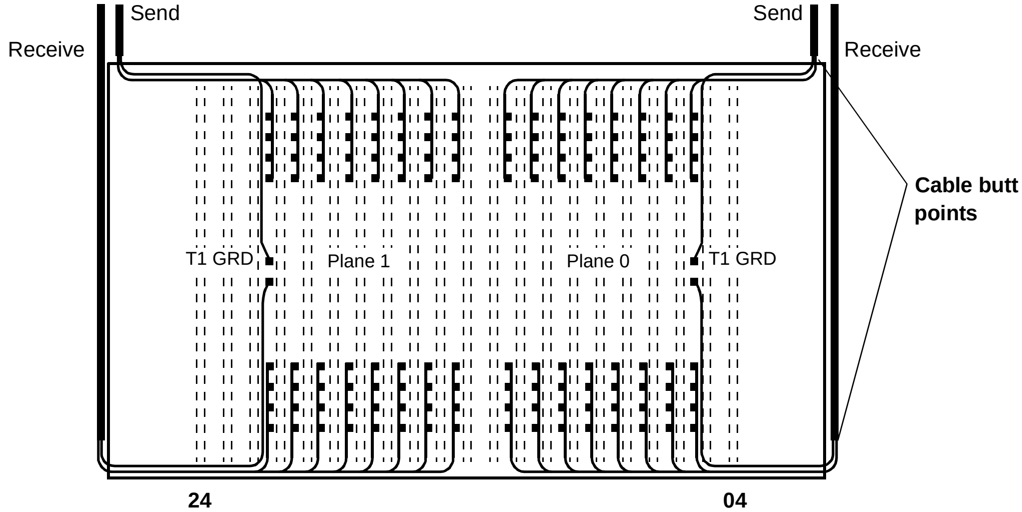


Figure 313 – RFLE Frame DS30 Control Cables										
0X26	Frame Port	Shelf	Slot	Pins	Frame	Shelf	Slot	Pins	Plane	Port
									Network	
ZH (A)	RLE	51	04/	10A/B-17A/B	IAE/	X/	22	Not e	0/1	1
(B)		24		18A/B-25A/B	LGEI	X+14				2-3

Figure 313 – RFLE Frame DS30 Control Cables

(C)				56A/B-59A/B						4
ZJ (C)				60A/B-63A/B						5
(D)				64A/B-71A/B						6-7
OR										
ZH (A)				10A/B-17A/B						1
(B)				18A/B-25A/B						2-3
(C)-	--DO NOT CONNECT---									
ZK (C)				56A/B-63A/B						4-5
(D)				64A/B-71A/B						6-7
Note: X can be 18 or 51.										
Pins can be:				10A/B-17A/B.		Ports:				0-3
				18A/B-25A/B						4-7
				56A/B-63A/B						8-11
				64A/B-71A/B						12-15
Note: Port 0 reserved for MTM.										

Figure 314 – RFLE Shelf DS1 Connections

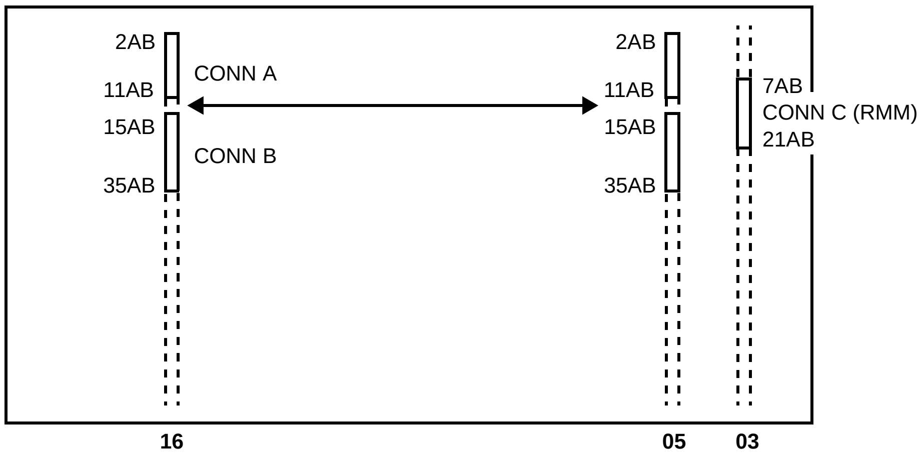


Shelf Pinouts								
From					**To**			
ZXAM	Frame	Shelf	Slot	Pins	Frame	Slot	Pins	Plane
Send/	RFLE	X	06/07	T/R00-T/R03	DSX/ Fiber Frame	GR1	Ports 0-3	0
Receive			08/09	T/R04-T/R07		GR2	Ports 4-7	0
			10/11	T/R08-TR11		GR3	Ports 8-11	0
			12/13	T/R12-T/R15		GR4	Ports 12-15	0
Send/	RFLE	X	06/07	T/R00-T/R03	DSX/ Fiber Frame	GR1	Ports 0-3	1
Receive			08/09	T/R04-T/R07		GR2	Ports 4-7	1
			10/11	T/R08-TR11		GR3	Ports 8-11	1
			12/13	T/R12-T/R15		GR4	Ports 12-15	1
Note: X can be 18, 32, or 51.								

28.7 MTM Cables in a RFLE Frame

1 Run the cables from the DF to the MTM shelf. The amount and type of the cables on this shelf are job dependent. The connector placements of these cables are shown in Figure 315.

Figure 315 – MTM Shelf DF Connections (New MTM Backplane)



29.0 C42 Cabinet Power Cabling

29.1 C42 Cabinet Power Cabling Guidelines

1 This section covers the running, forming, and securing of power cables within the C42 cabinets. These procedures are guidelines and the cable routing as defined on the cable tags (if supplied) is to be followed.

2 The C42 cabinets have the versatility to use either vertical or horizontal cable routing for the power feeds from the power source. Vertical routing is used when the lineup will not allow the routing of power cables within the faraday cage from a filtered PDC to the cabinet. An example of this is when a C42 cabinet is installed within a lineup of DMS-100 7 ft. frames.

3 Horizontal cabling is to be used when the lineup will allow the routing of power cables from a filtered CPDC to the cabinet within a faraday cage. An example of this is when the C42 cabinet is installed within a cabinetized lineup using a cabinetized PDC (CPDC).

4 The following are C42 cabinets:
Dual Plane Combined Core (SuperNode/DPCC) NT9X01JB
SuperNode SE(SuperNode SE)NT9X01MB
Enhanced Network(128K ENET)NT9X05AC
Enhanced Network Duplex(64K ENET)NT9X05AD
Link Interface Module(LIM)NT9X70BB
Application Processor Cabinet(APC)NT9X80CA
Enhanced Multipurpose Cabinet (EMC)NTEX01AB
DMS-100 Mail Service Peripheral(SPM) NTGX01AA

5 The ENET cabinet requires the installation of a CCTS (C21) cabinet. The CCTS PEC code is as follows:

Cabling Cabinet	(CCTS)	NT0X35CC

6 Power cabling is installed using individual cable runs or bundled power cables. If bundled cables have been spec'd, each fully configured C42 cabinet will require eight (8) bundles of cables. Four (4) bundles are for drop side S0, four (4) bundles are for drop side S6, and one (1) bundle is for cooling unit power cables.

7 Bundled power cables for the C42 are to be installed on a shelf by shelf basis. Forming of the cables in the bulkhead is to be consistent with the forming of individual cables.

8 Refer to Figure 316 and Figure 317 for the bundled cable codes for the C42 cabinets.

Figure 316 – C42 Cabinet Bundled Cables

CPC	PEC	Drop Side	Description
B0261203 B0261204 B0261205	NTY750BK NTY750BL NTY750BM	S0 S0 S0	C42 Shelf Power 10 AWG C42 Shelf Power 8 AWG C42 Shelf Power 6 AWG
B0261206 B0261207 B0261208	NTY750BN NTY750BP NTY750BQ	S6 S6 S6	C42 Shelf Power 10 AWG C42 Shelf Power 8 AWG C42 Shelf Power 6 AWG

Figure 317 – C42 Cooling Unit Power Connections

CPC	PEC	Drop Side	Description
B0261200	NTY750BG	S6	C42 Cooling Unit Power 10 AWG
B0261201	NTY750BH	S6	C42 Cooling Unit Power 8 AWG
B0261202	NTY750BJ	S6	C42 Cooling Unit Power 6 AWG

9 The bundled cable end(s) equipped with lugs terminate at the C42 cabinet, the unlugged cable end(s) terminate at the PDC/CPDC. The PDC/CPDC end will require lugging prior to terminating.

Note: Do *not* remove insulators from either cable end until just prior to lugging and termination.

10 Terminate and form the power cables to the MSP prior to terminating the cables in the PDC. The slack is to be formed in the direction of the PDC/CPDC.

29.2 C42 Cabinet Vertical Power Cabling

1 Vertical powering to the C42 cabinet consists of running power cables from the PDC and into the left-hand and right-hand bulkheads. Power cables are run into the bulkheads from the top by way of the cable trough and cable rack or from the bottom by way of the raised floor.

2 Bundled power cables are to be routed as indicated on the cable tags. Route, secure and form the cables in the same manner as individual leads. Bundled power cables are to be terminated in the C42 cabinet first. Slack cable is to be worked back towards the PDC/CPDC. Terminate the PDC/CPDC after the correct length is determined and the C42 connections have been made. Bundled power cables are to be routed through the opening of the cable troughs. Bottom fed cabinets with bundled power cable is to be routed, formed, and secured in the same manner as individual leads entering the bottom of the C42 cabinet.

3 The C42 cable trough has openings in shield 4 for routing power and ground cables to bulkhead termination points. The openings in the shield are to be used for routing power and ground cables out of the cable shield and down into the bulkheads. The openings are located above the bulkheads and provide direct access to the bulkhead from the cable shield.

4 Power cable (Battery and Return) is run to each individual shelf. The FSP is powered on the Right-Hand Side (RHS), the cooling unit is powered on the Left-Hand Side (LHS) and the remaining shelves are powered on both the LHS and RHS.

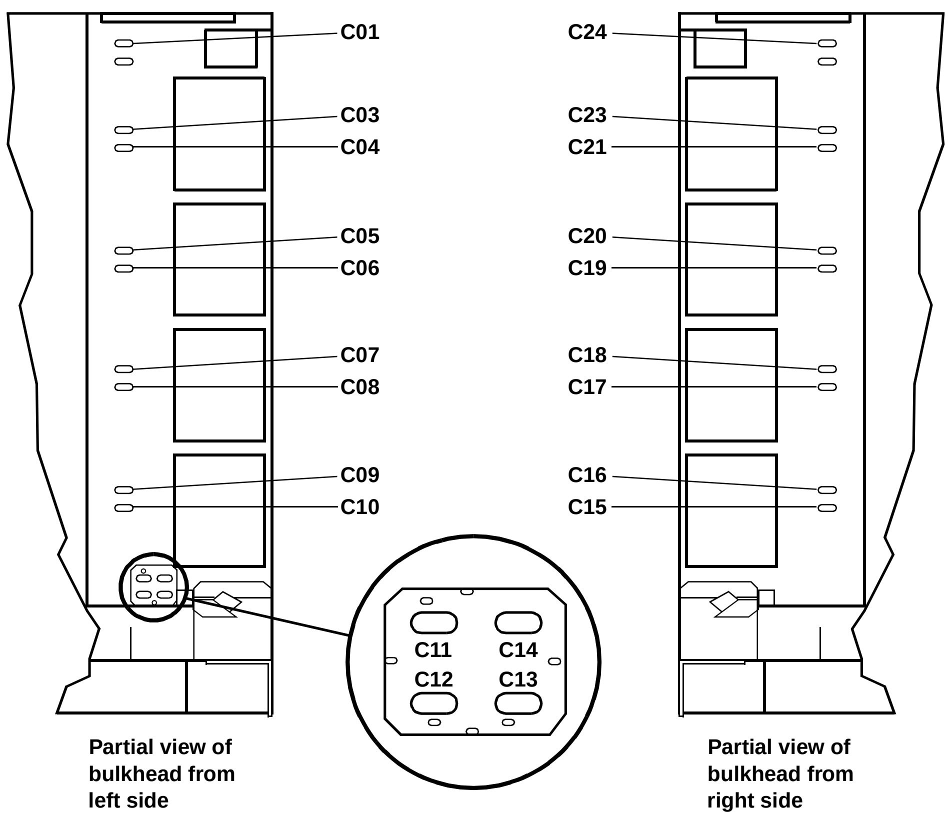
5 Filter capacitors are provided for battery and battery return for left and right shelf halves, ABS signals, cooling unit battery, and battery return.

6 Each capacitor is designated. The remaining capacitors are designated C3 through C24. Capacitors C3 through C14 are located in the left-rear bulkhead. Capacitors C15 through C24 are located in the right-rear bulkhead.

7 ABS and power cable (Battery and Return) must be identified at power source and C42 end. Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

8 Refer to Figure 318 for capacitor locations in the C42 cabinet bulkheads.

Figure 318 – Capacitor Locations in C42 Cabinet Bulkheads



Note: Cxx refers the feed thru capacitor number. Refer to the labels on the bulkhead for the product specific A or B designations.

9 Capacitor designations for the different C42 cabinets are shown in Figure 319 through Figure 322.

Figure 319 – Power Filter Connections for NT9X05AD

C42 64K ENET		
SHELF POSITION	**LEFT SIDE (REAR VIEW)**	**RIGHT SIDE (REAR VIEW)**
FSP (52)		(C24) L-ABS (C23) L+ABS
39	(C03) L-A (C04) L+A	(C22) L-A (C21) L+A
26	(C05) L-A (C06) L+A	(C20) L-A (C19) L+A
13	(C07) L-B (C08) L+B	(C18) L-B (C17) L+B
00	(C09) L-B (C10) L+B	(C16) L-B (C15) L+B
Cooling Unit	(C11) L-B, (C14) L-A, (C13) L+A, (C12) L+B	

Note: where (Cxx) is the feed-through capacitor number. "L-" is -48V and "L+" is RTN.

Figure 320 – Power Filter Connections for NT9X05AC

C42 128K ENET Plane 0		
SHELF POSITION	**LEFT SIDE (REAR VIEW)**	**RIGHT SIDE (REAR VIEW)**
FSP (52)		(C24) L-ABS (C23) L+ABS
39	(C03) L-A (C04) L+A	(C22) L-A (C21) L+A
26	(C05) L-A (C06) L+A	(C20) L-A (C19) L+A
13	(C07) L-A (C08) L+A	(C18) L-A (C17) L+A
00	(C09) L-A (C10) L+A	(C16) L-A (C15) L+A
Cooling Unit	(C11) L-(A2), (C14) L-(A1) (C12) L+(RTA2), (C13) L+(RTA1)	
C42 128K ENET Plane 1		
SHELF POSITION	**LEFT SIDE (REAR VIEW)**	**RIGHT SIDE (REAR VIEW)**
FSP (52)		(C24) L-ABS (C23) L+ABS
39	(C03) L-B (C04) L+B	(C22) L-B (C21) L+B
26	(C05) L-B (C06) L+B	(C20) L-B (C19) L+B
13	(C07) L-B (C08) L+B	(C18) L-B (C17) L+B
00	(C09) L-B (C10) L+B	(C16) L-B (C15) L+B
Cooling Unit	(C11) L-(B2), (C14) L-(B1) (C12) L+(RTB2), (C13) L+(RTB1)	
where (Cxx) is the feed-through capacitor number. "L-" is -48V and "L+" is RTN.		
Note: Cable tags for the NT9X05AC Cabinet reflect A1 and A2 or B1 and B2. Place the A1/B1 cables on the left rear and A2/B2 on the right rear.		

Figure 321 – Power Filter Connections for NTEX01AB, NT9X80CA NT9X01MB, NT9X70BB, NTGX01AA		
C42 EMC, APC, SuperNode SE, LIM, SPM		
SHELF POSITION	**LEFT SIDE (REAR VIEW)**	**RIGHT SIDE (REAR VIEW)**
FSP (52)		(C24) L-ABS (C23) L+ABS
39	(C03) L-B (C04) L+B	(C22) L-A (C21) L+A
26	(C05) L-B (C06) L+B	(C20) L-A (C19) L+A
13	(C07) L-B (C08) L+B	(C18) L-A (C17) L+A
00	(C09) L-B (C10) L+B	(C16) L-A (C15) L+A
Cooling Unit	(C11) L-B, (C14) L-A (C12) L+B, (C13) L+A	
Note: where (Cxx) is the feed-through capacitor number. "L-" is -48V and "L+" is RTN.		

Figure 322 – Power Filter Connections for NT9X01JB		
C42 EMC, APC, SuperNode SE, LIM, SPM		
SHELF POSITION	**LEFT SIDE (REAR VIEW)**	**RIGHT SIDE (REAR VIEW)**
FSP (52)		(C24) L-ABS (C23) L+ABS
39	(C03) L-A (C04) L+A	(C22) L-A (C21) L+A
26	(C05) L-B (C06) L+B	(C20) L-B (C19) L+B
13	(C07) L-B (C08) L+B	(C18) L-A (C17) L+A
00	(C09) L-B (C10) L+B	(C16) L-A (C15) L+A
Cooling Unit	(C11) L-B, (C14) L-A (C12) L+B, (C13) L+A	
Note: where (Cxx) is the feed-through capacitor number. "L-" is -48V and "L+" is RTN.		

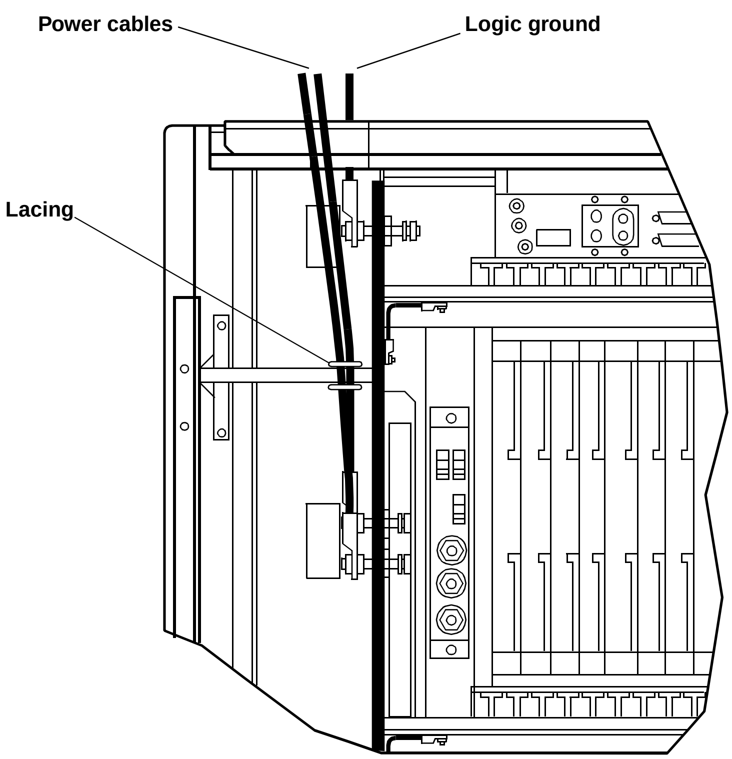
10 The power cables are to be formed to the inside of the bulkhead (side of bulkhead closest to the center of the cabinet). Refer to Event 6 (03-9056) for routing of logic and ground cables.

11 Route battery and return cables down the inside of the bulkhead and terminate. Shelf 00 is to be formed first. Form shelf 13, 26, and 39 in this order. Secure the cables with ty-raps to the cable brackets. Power cables are to be formed on top of the brackets towards the rear of the cabinet. Form the power cables to allow forming system cables towards the outside of the cabinet (closest to the sides of the cabinet).

12 Figure 323 is an example of the battery and battery-return cables at shelf 39 capacitors C3 and C4. The logic ground cable at shelf 52 capacitor C1 is shown for reference. Additional cables are not shown for clarity.

13 Figure 323 is only an example. Figure 323 is a partial view of the left rear. The power safety boot was not shown in Figure 323 for clarity. The power safety boot is required on all power and ground terminations within the C42 bulkhead except for the Logic Ground capacitor. The power cables are to be routed in the same manner for the right rear.

Figure 323 – C42 Vertical Cabling



14 Each individual power cable requires a safety boot to be installed. Slip the safety boot over the cable prior to crimping the lug. After the connection has been made, slide the safety boot over the connection.

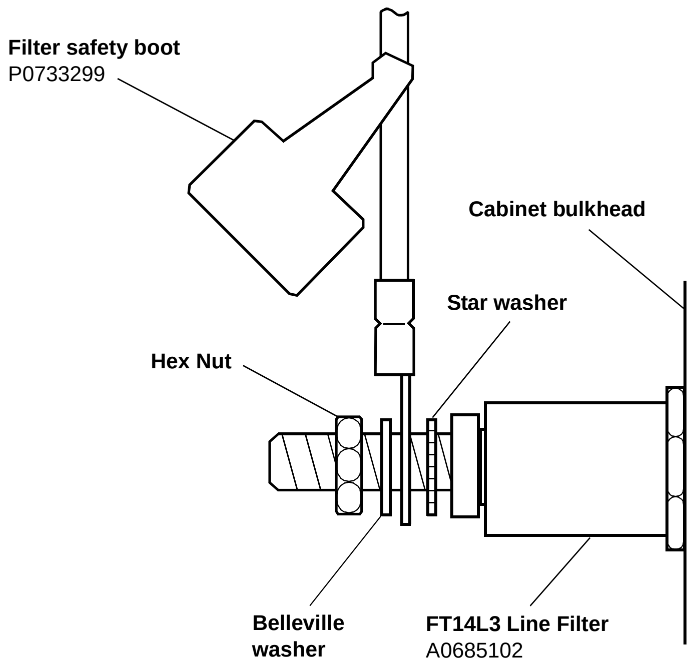
15 Safety boots are required on bundled power cables. The safety boots are to be placed over the lugged end of the cable prior to termination.

16 Refer to Figure 324 for hardware buildup at the filter.

17 Torque the connection as shown in Event 07 (Method 03-9057), "General Cabling and Torque Requirements."

18 The hardware stack-up for the power and logic cable connections in the C42 cabinet capacitors are the same.

Figure 324 – Power Cable Connection for Vertical Cabling



Note: The Filter Safety Boot is part of NT9X9545 (B0234548) consisting of 22 Safety Boots. Hex nut and washers are part of A0685102 FT14L3 line filter assembly. The hex nut and washers can only be obtained with the line filter. These parts are not available separately. P0730273 boots may be provisioned with NT9X70BB only for use with 6 or 8 AWG power feeders. When using P0730273, discard P0733299 provided as part of NT9X9545.

29.3 Horizontal Power Cabling

1 Horizontal power cabling requires the power cables to be formed through the base of the cabinet. Typically the C42 cabinet will be powered from a CPDC located at the end of the lineup.

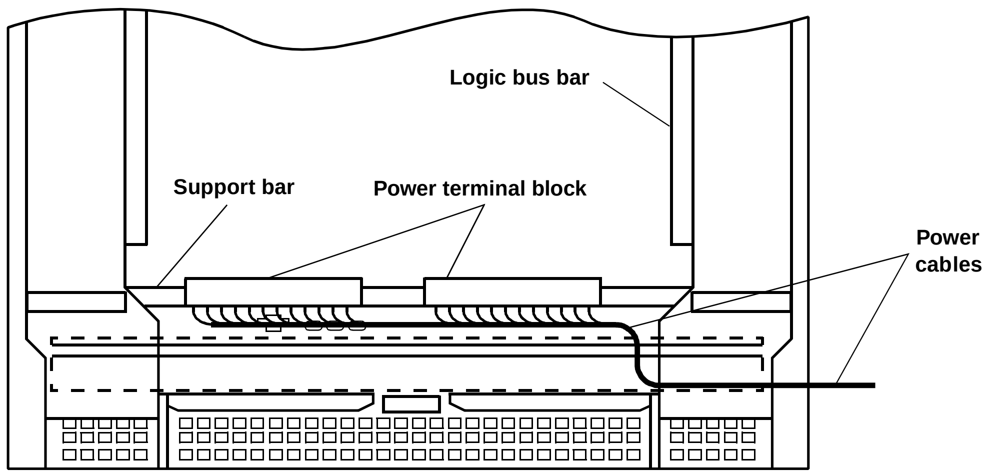
2 Route the power cables into the bottom of the cabinet from the CPDC.

3 Power cables will terminate on terminal blocks located below shelf 00.

4 Refer to terminal block designation strips and cable tags for the termination points. All connections made in the field are made to the bottom of the terminal blocks. Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

5 Secure the power cables into a single form and fan the connections into the terminal blocks. Refer to Figure 325 for an example of fanning into the terminal blocks. The number of ty-raps and the length of the breakout to the terminal blocks is not critical. Each C42 cabinet in the office is to be formed and secured in the same manner.

Figure 325 – Horizontal Power Cable Forming



Rear View of Cabinet

6 The different cabinet terminal block layouts are shown in Figure 326, Figure 327, and Figure 328. These figures are only for reference and do *not* reflect the mounting of the blocks in the base of the cabinet.

7 Typically, two NT9X05AC cabinets will be installed on a job site. One of the cabinets will be “A” feed and the other will be “B” feed. Figure 329 reflects the designation strips on TB2 and TB3 for the "A" feed cabinet only.

Figure 326 – Horizontal Power Terminations

Horizontal Power Terminations for NTEX01AB, NT9X01MB, and NTGX01AA

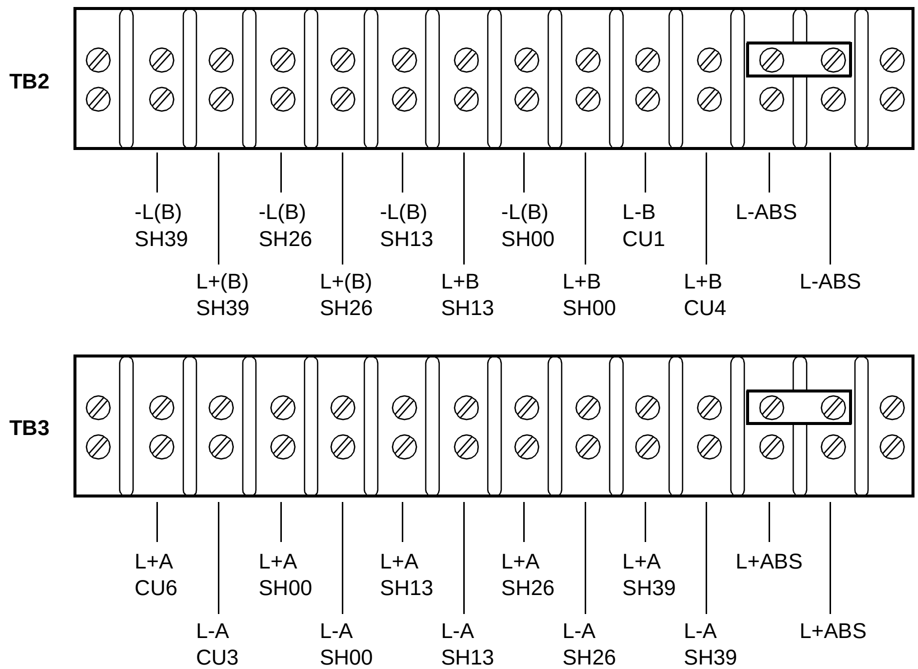
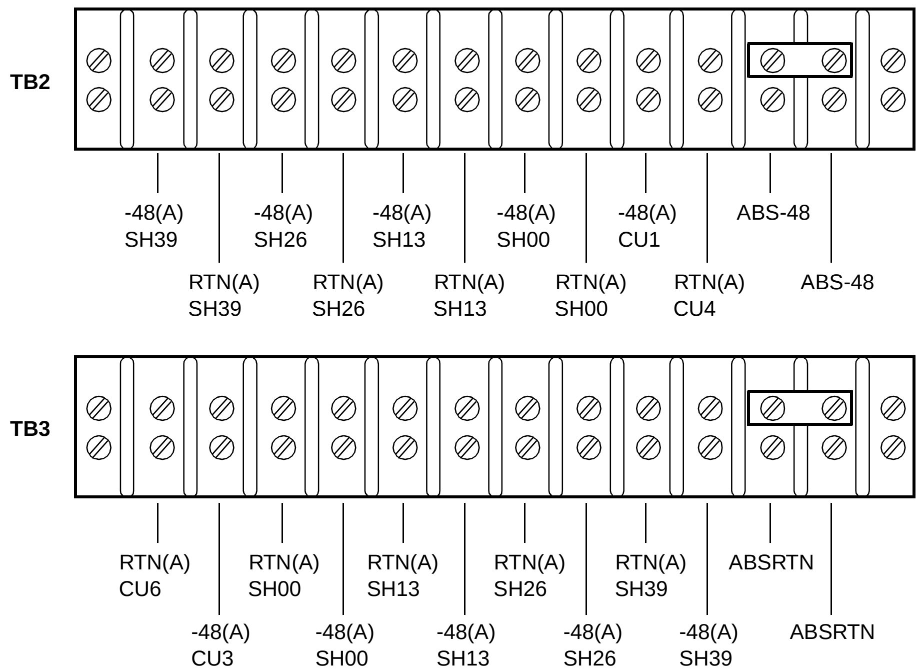


Figure 327 – Horizontal Power Terminations (NT9X05AC and NT9X01JB)

Horizontal Power Terminations for NT9X05AC



Horizontal Power Terminations for NT9X01JB

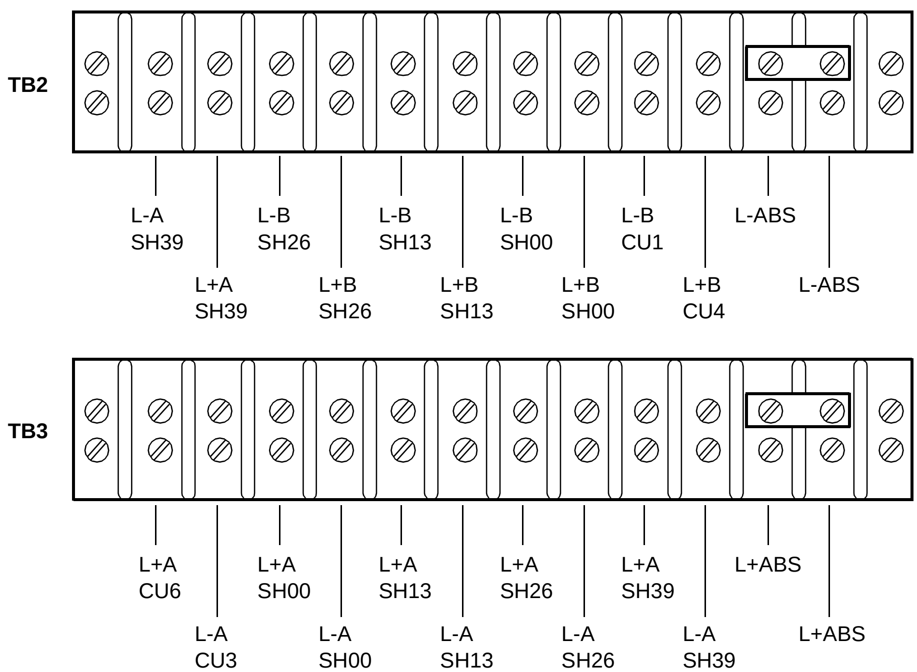
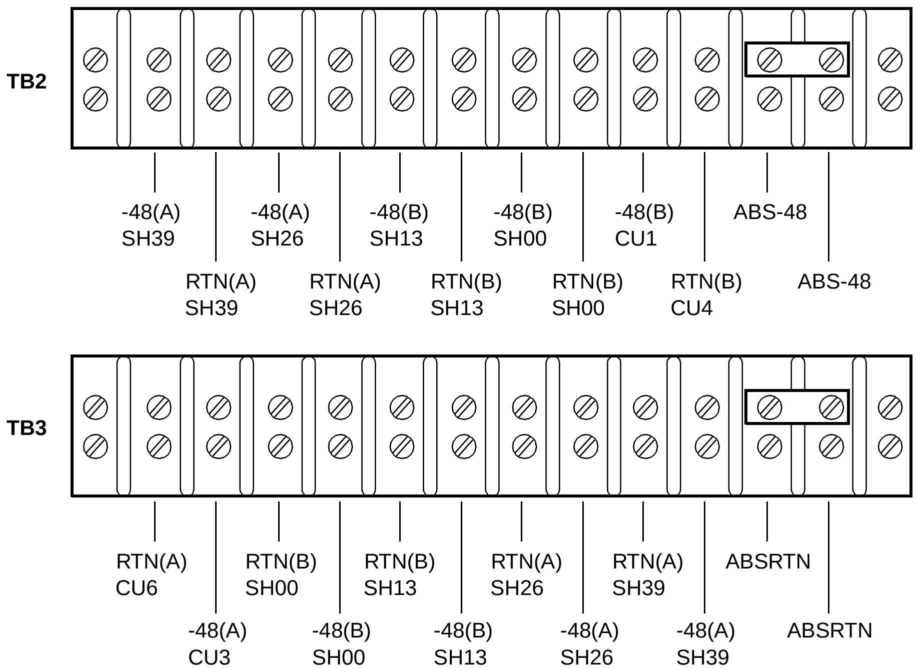
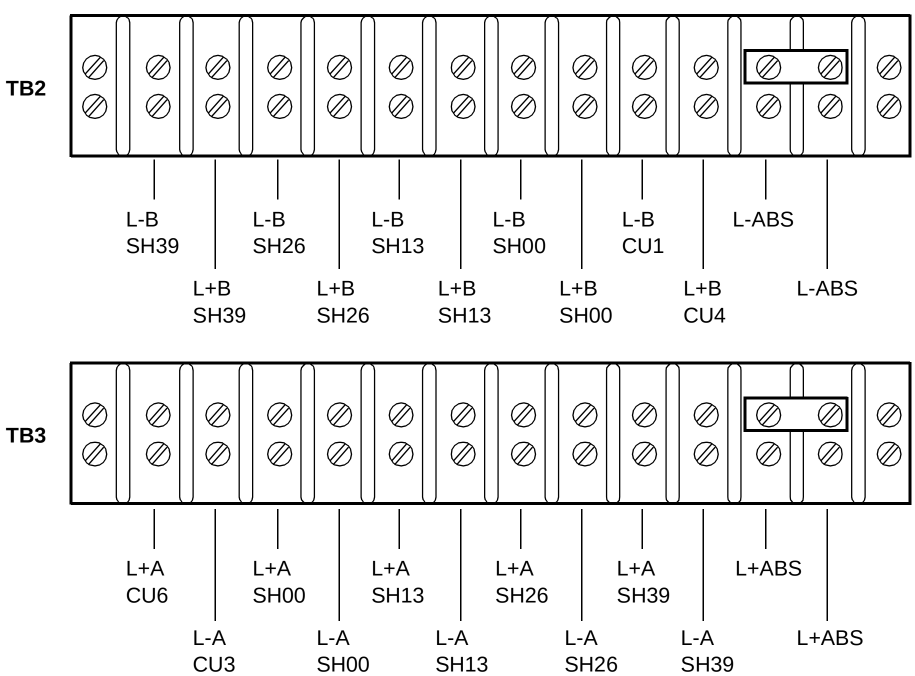


Figure 328 – Horizontal Power Terminations (NT9X05AD and NT9X70BB)

Horizontal Power Terminations for NT9X05AD



Horizontal Power Terminations for NT9X70BB



29.4 C42 Cabinet ABS and Alarm Cabling

1 The ABS terminations are located on TB2 and TB3 in the bottom of the cabinet for horizontal cabling. ABS cables consist of ABS -48 and ABS RTN cables.

2 These cables are to be connected to the preceding and succeeding cabinets. The preceding cabinet will always be the cabinet closest to the CPDC. Figure 326, Figure 327, and Figure 328 reflect the ABS termination points.

3 Do *not* double the ABS terminations on one termination point. Place the succeeding cable on the pin 11 and the preceding cable on pin 12.

4 Vertical cabling of the ABS is to be made at capacitors C23 and C24. The cables must be doubled at each capacitor. Do *not* place a washer between the two lugs. Place the lugs back to back on each capacitor stud.

5 The ABS cables loop back to the CPDC in the Model B system (utilizes a non-filtered CPDC).

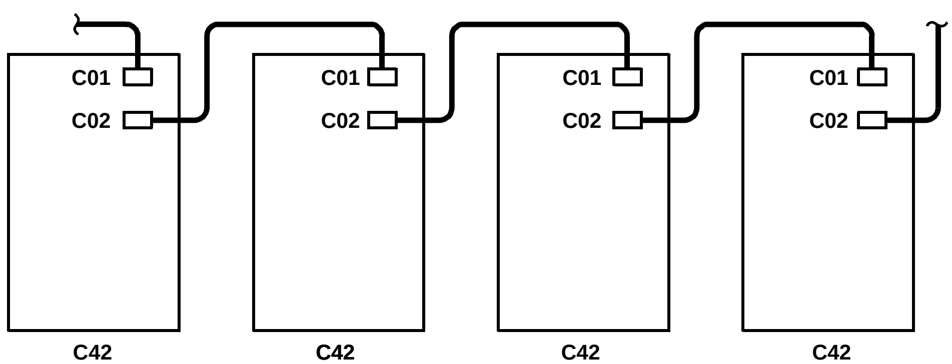
6 ABS cables and their multiples in equipment lineups must be identified at both ends. Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

7 The Aisle Alarms are connected to the C42 cabinets by way of connectorized cables. The C01 and C02 connector are located at the top of the right-hand bulkhead.

8 AISALM1 and AISALM2 are to be connected to the C01 located at the top in the right-hand bulkhead. AISAL1 and AISAL2 are to be connected to the C02 located at the top in right-hand bulkhead.

9 Connect AISALM1 and AISALM2 as reflected in Figure 329.

Figure 329 – Typical Alarm Cabling for C42



Typical C42 Lineup

10 Refer to your job specifications for the cable PEC codes for the Alarm cables.

11 Route the ABS and Alarm cables in the power shield of the cable trough.

12 ABS and Alarm cables will be different when a C42 cabinet is installed within a C28 Model B cabinetized lineup (utilizes a non-filtered CPDC). Refer to Section 31.0 for connections within a Model B C28 lineup.

13 Refer to CARX04 Cabling Information for Power/Grounding/Alarms document for the various cable PEC codes.

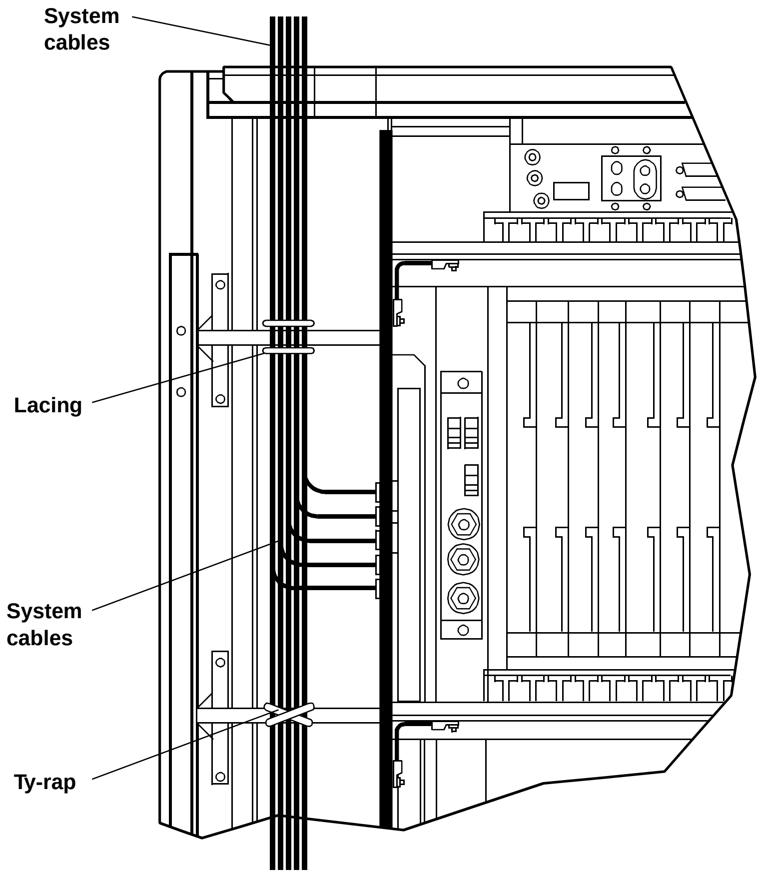
30.0 System Cabling for C42 Cabinets

30.1 C42 System Cabling

1 System cables include all switchboard cables terminating to the cabinet bulkhead and fiber cables terminating at the backplane.

2 Figure 330 reflects routing of system cables into the C42 cabinet.

Figure 330 – System Cabling to a C42 Cabinet



View of left side of bulkhead from the rear

Note: Form system cables on the side of the bulkhead away from the personality plates. Fiber and switchboard cables are to be formed into separate bundles.

3 Figure 330 only reflects the left rear of the bulkhead of a typical C42 cabinet.

4 System cables are to be formed on the side of the bulkhead away from the personality plates. Therefore, system cables will be on the far left for the left, rear bulkhead and on the far right for the right, rear bulkhead.

Use lacing cord to secure cables to the top cable arm in the C42 equipment frames. Securing cables together with ty-raps between cable brackets is not required. All cables are to be secured on top (towards the rear) of the cable brackets. Do *not* route any cables behind the cable brackets.

5 Connect the system cables to the personality plates as indicated by the cable tags. Personality plates will differ from C42 cabinet to C42 cabinet. All of the personality plates are stenciled with the connector number. The numbers are in alphabetical order and correspond to the cable tags.

6 Connect the system cable based on the shelf position of the cabinet and the connector number.

7 Cable connections between the personality plates and the backplane are made by the factory. Fiber cables are connected directly to the paddleboards and, therefore, must be connected by a field technician.

8 Fiber and switchboard cables are to be formed into separate bundles.

9 The individual fiber cable leads are not to be secured. Butts of the cable are to remain staged six inches from the cable trough.

10 Terminate the copper cables to the NT9X65xx bulkhead assemblies. Reference the cable tags for the correct termination point.

30.2 Fiber Optic Cables

1 Care must be taken when running fiber cables. The two basic types of fiber cables used in the ENET system will be Quad and Duplex. Quad cable consists of four fiber cables inside of a protective sheath. Duplex cable consists of two fiber cables inside of a protective sheath. Several "Rules" of care must be taken when running/routing fiber cables.

- Always exercise care when running and handling fiber cables. *Never* handle the fiber cables by the ends.
- When running cables near "live" equipment, Ensure that both ends of the cables are protected within protective sheaths.
- Avoid sharp bends. The minimum bend radii for the different cables during installation (under tensile load) and for long durations (once formed) are as follows:

Cable	Installation	Long Term
Single Strand	5.0 cm	3.0 cm
Duplex	14.0 cm	7.0 cm
Quad	16.0 cm	8.5 cm

Note: Refer to Event 7, 03-9057 for additional information on fiber cables. Clean fiber cables as stated in Event 7.

2 Care must be taken when forming the fiber cables. Do *not* pull on the connector end while forming.

- Pull fiber cable from the breakout point. Do *not* pull each individual fiber cable.
- Protect fiber cable from sharp edges. Use Guard Extrusion (P0663893) or suitable material to cover sharp edges.

3 Disconnected fiber connectors and receptacles should be covered with a protective cap when not in use.

4 Only remove the protective caps when the cable is being terminated. **To prevent circuit pack damage, the following general guidelines should be adhered to:**

- Remove the fiber receptacle dust cap from the paddleboard, with gentle finger pressure. Do *not* use pliers or any other tool which applies direct pressure to the barrel. Excessive force on the dust cap will break the plastic receptacle barrel.
- *Lightly* insert the fiber cable ferrule into the barrel of the paddleboard until the connector pin is pressing against the barrel.
- While applying *light* pressure, rotate the connector until the pin and the slot are aligned and insertion of the cable is complete.
- When the cable is *completely* inserted, twist the connector clockwise until mating is complete.

5 If removal of the fiber cable is required, push the connector in and twist it gently counter-clockwise until the pin and slot are aligned. Gently pull the connector away from the paddleboard.

6 Do *not* secure the individual fiber leads together at the bulkhead assemblies.

7 The following process is to be followed for forming the fiber cables through the personality plates unless specific instructions are provided in individual C42 cabinet subsections.

8 The top part of the bulkhead assembly has 13 port openings for fiber cables to pass through.

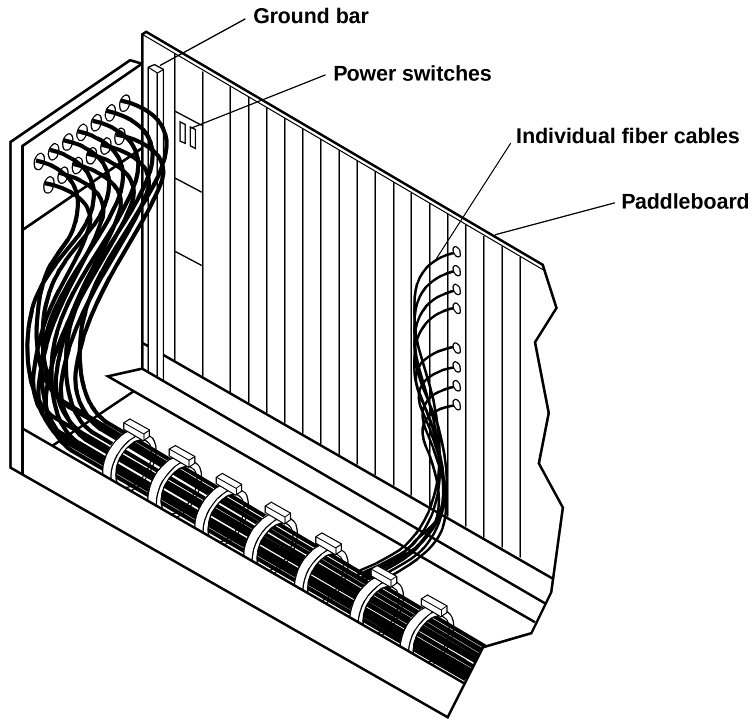
9 Each opening can accommodate up to 8 individual fiber cables. When forming the fiber cables through the openings, do not split quad or duplex fiber cables between openings.

10 Begin forming the fiber cables through the bulkhead assembly from the top down, starting with the opening closest to the backplane. If all of the fiber holes are not used, the holes closest to the rear of the cabinet are to be left empty.

11 After the fiber cables have passed through the cabinet bulkheads, form the cables towards the rear of the cabinet, and into the cable tray located at the bottom of the shelf. terminate the fiber cables to their terminations per cable tags.

12 Figure 331 reflects the top part of a bulkhead assembly. Individual cabinets will have different personality plates but the top part of the bulkhead will be the same and the routing process through the personality plate is the same.

Figure 331 – Forming Fiber Cables To Paddleboard



13 Slack in the fiber cables is not to be stored in the channel under the cable guides. Fiber cable slack is to be stored in the CCTS cabinet when required. Do not loop the fiber strands back and forth and form them under the cable guides. Looping the strands back and forth and storing them under the cable guides may cause damage to the fiber strands.

14 When forming fiber cables to the paddleboards, do *not* pull the cables tight. Do *not* use ty-raps on the individual fiber cables. Form the fiber cables in a manner to allow the power switches to be operated. Refer to Figure 332 for the minimum bend radii of fiber cables.

Figure 332 – Minimum Bending Radii (Fiber Optic Cable)

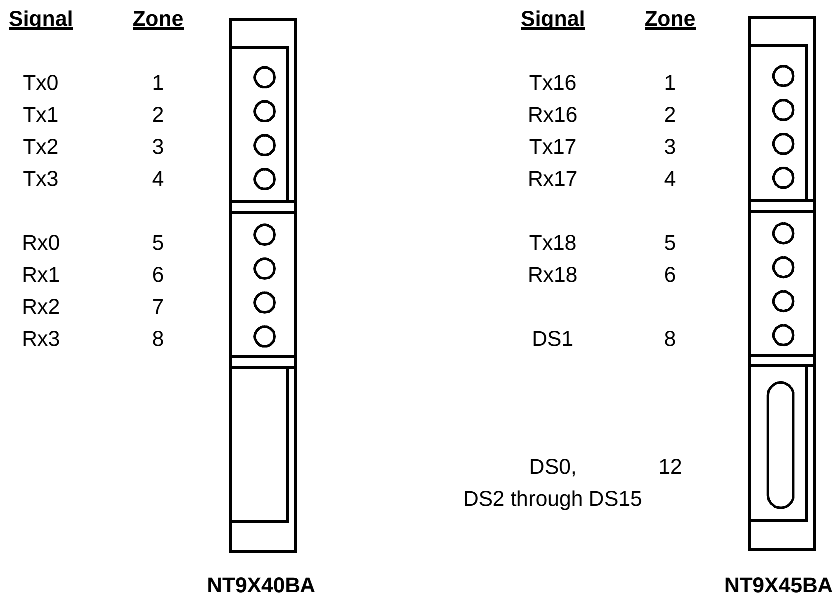
Cable Type	# of Fibers	Min. Bend Radius (No Load)	Min. Bend Radius (Load)
Simplex	1	3 cm	5 cm
		1 3/16 in.	2 in
Duplex	2	7 cm	14 cm
		2 3/4 in	5 1/2 in.
Quad	4	8.5 cm	16 cm
		3 5/16 in.	6 5/16 in

Load refers to conditions when fiber cable is being run or formed.
No Load refers to when the cable is in a still condition.

15 Figure 333 reflects connecting fiber cables at NT9X40BA paddleboard.

16 Reference cable tags for termination point of each fiber cable.

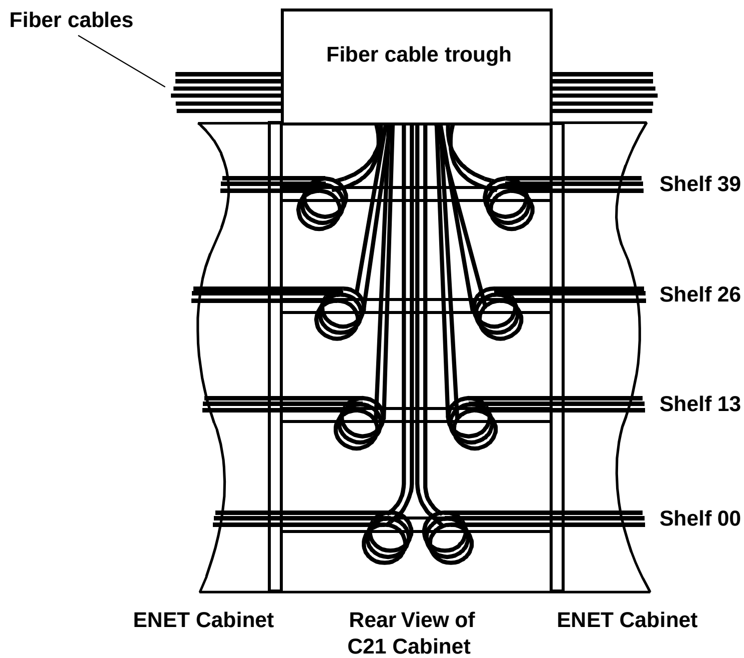
Figure 333 – Forming Fiber Cables at NT9X40BA



30.3 ENET and CCTS Cabinet Cabling

1. CCTS Cabling Cabinet will be installed on both sides of an ENET cabinet. The CCTS cabinet is used to support and provide adequate room for system and fiber cables terminating in the ENET cabinets.
2. Remove the C42 outer panel (P0729753) when a ENET cabinet is next to a CCTS cabinet in order to allow cables to be run directly from the CCTS to the ENET bulkhead or backplane connections.
3. The outer panel is secured in place using four screws and washers. Discard the outer panel and mounting hardware in a safe manner.
4. Install a L-shaped vertical gasket contact strip P0732220 on the front of the C42 cabinets which are adjacent to the CCTS cabinets. Refer to Event 04 (Method 03-9054), "Level, Align, and Secure Equipment," for junctioning information.
5. Each ENET shelf is connected to each MS by way of a Duplex DS512 Fiber Link. These links are connected at the ENET shelf on the message/clock paddleboard (9X40BA/9X45BA, slot 8). The links are connected at the MS end at the appropriate 9X20BB paddleboard. Note that the MS does not have to be busied or powered down to connect the fiber links.
6. Route only Fiber cables in the CCTS cabinet. Copper cables are to enter the cabinet by way of the bulkheads of the ENET cabinet. Copper cables are not to enter the C21 cabinet.
7. The CCTS Cabling Cabinet NT0X35CC may be installed with or without a cable trough. Cable Trough NTRX55BG (Gray) or NTRX55BH (Brown) are available for the NTRX31CC cabinets.
8. The CCTS cable trough has an opening in the fiber shield for the forming of the fiber cables into the C21 cabinet. The forming brackets maintain the bend radius of the fiber cables.
9. Typically when the CCTS cable trough is not used, fiber duct will be installed. Refer to Event 05 (Method 03-9055), "Cable Troughs," for fiber cable duct assembly.
10. Fiber and copper cables are to be formed separately.
11. Fiber cables are connected directly to the paddleboards.
12. The fiber cable butt is to be secured in the ENET bulkhead as close to the oblong holes as possible.
13. All fiber cables should be coiled neatly and secured to the CCTS cable brackets, utilizing fiber sheet fiber and lacing cord. Any fiber cable slack is to be secured in the CCTS cabling cabinet. Cable slack is *not* mandatory for installation.
14. Copper cables are to be secured in place using ty-raps.
15. Cables for each ENET shelf are be formed into a single bundle in the CCTS cabinet.
16. Viewed from the rear of the lineup, the CCTS cabinet on the left will contain cables for the ENET cabinet to the right. The CCTS cabinet in the middle of the two ENET cabinets will contain cables for both cabinets. The CCTS cabinet to the right will contain cables for the ENET cabinet to the left.
17. Figure 334 reflects cabling in the CCTS cabinet located between the two ENET cabinets. This figure does not reflect any copper cables. The copper cables are not shown for clarity. The Fiber Cable trough is shown for reference only.

Figure 334 – CCTS Cabinet with Fiber Cables



18 Copper cables will enter directly into the ENET cabinet bulkhead. Use the CCTS cabling cabinet only for the fiber cables.

19 If fiber cable duct is installed, ensure that the flexible convoluted tubing extends below the top of the cable trough.

20 For bottom entry cabling, the cables for each shelf are to be reversed from top entry. The bundle of cables for shelf 00 will be closest to the ENET cabinet. The bundle of cables for shelf 39 will be the farthest away from the ENET cabinet. All other cabling activity will follow the top entry method.

21 Refer to Figure 335 for routing cables through bulkhead to card slots.

Figure 335 – Cable Routing Through Bulkhead To Card Slot

Through: Port Hole	To: Card Slot	Through: Port Hole	To: Card Slot
Right Rear Bulkhead		**Left Rear Bulkhead**	
1	7R	1	20R
2	8R	2	21R
3	9R	3	22R
4	10R	4	23R
5	11R	5	24R
6	12R	6	25R
7	13R	7	26R
8	14R	8	27R
9	15R	9	28R
10	16R	10	29R
11	17R	11	30R
12	18R	12	31R
13	19R	13	32R

30.4 ENET Cabling Without a CCTS Cabinet

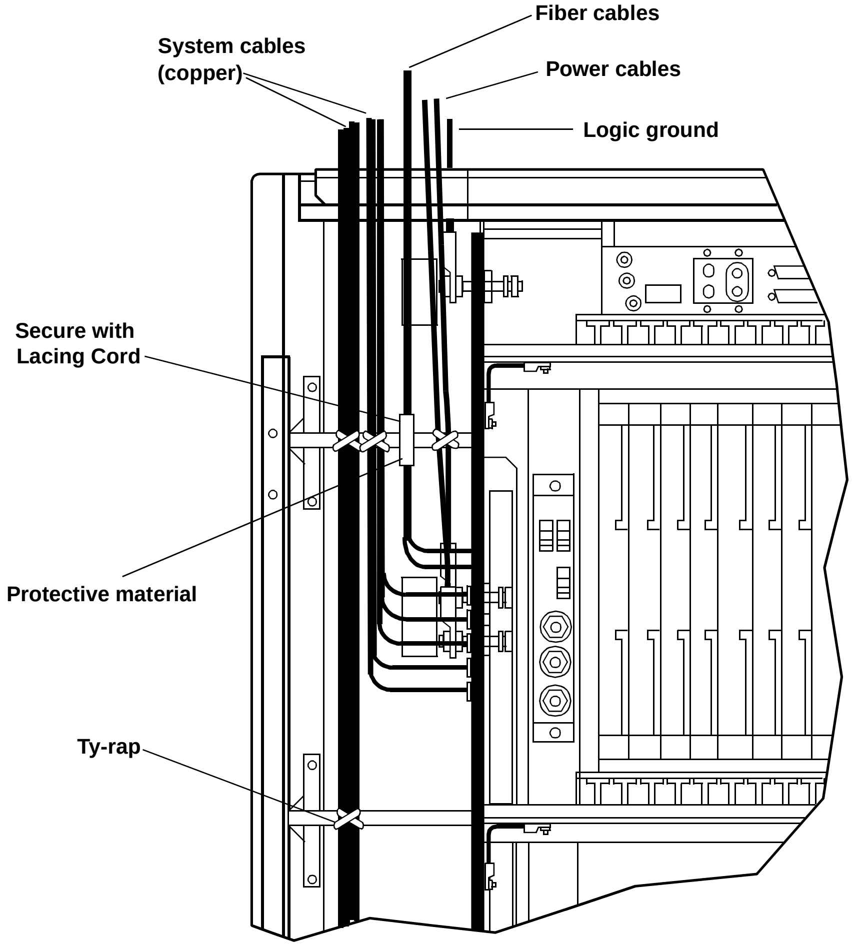
1. Fiber and switchboard cables are to be secured in the cabinet bulkhead in separate bundles.

2. Form the cables (fiber and copper) inside the cabinet in bundles for each shelf. The slack must be placed in the cable troughs throughout the office. The fiber butt locations will be staggered in the ENET cable trough for top-fed offices. The butt locations are not to be closer than 6 inches of either end of the cable trough.

   Place Guard Extrusion (P0663893) on the edge of the cable trough where the cables bend into the top of the cabinet. Care must be taken to ensure that the minimum bend radius is maintained. All fiber leads in the bulkhead of the cabinet must be protected when secured. Protective material (Protective Tubing P0401296, sheet fiber, etc.) must be wrapped around the area where the cable is secured.

3. DS30 cables are to be formed to the bottom of the shelf. Make a small loop in the cable and form up to the connector on the bulkhead. Refer to Figure 336 for cabling layout in the ENET cabinet bulkhead for top feed cabinets.

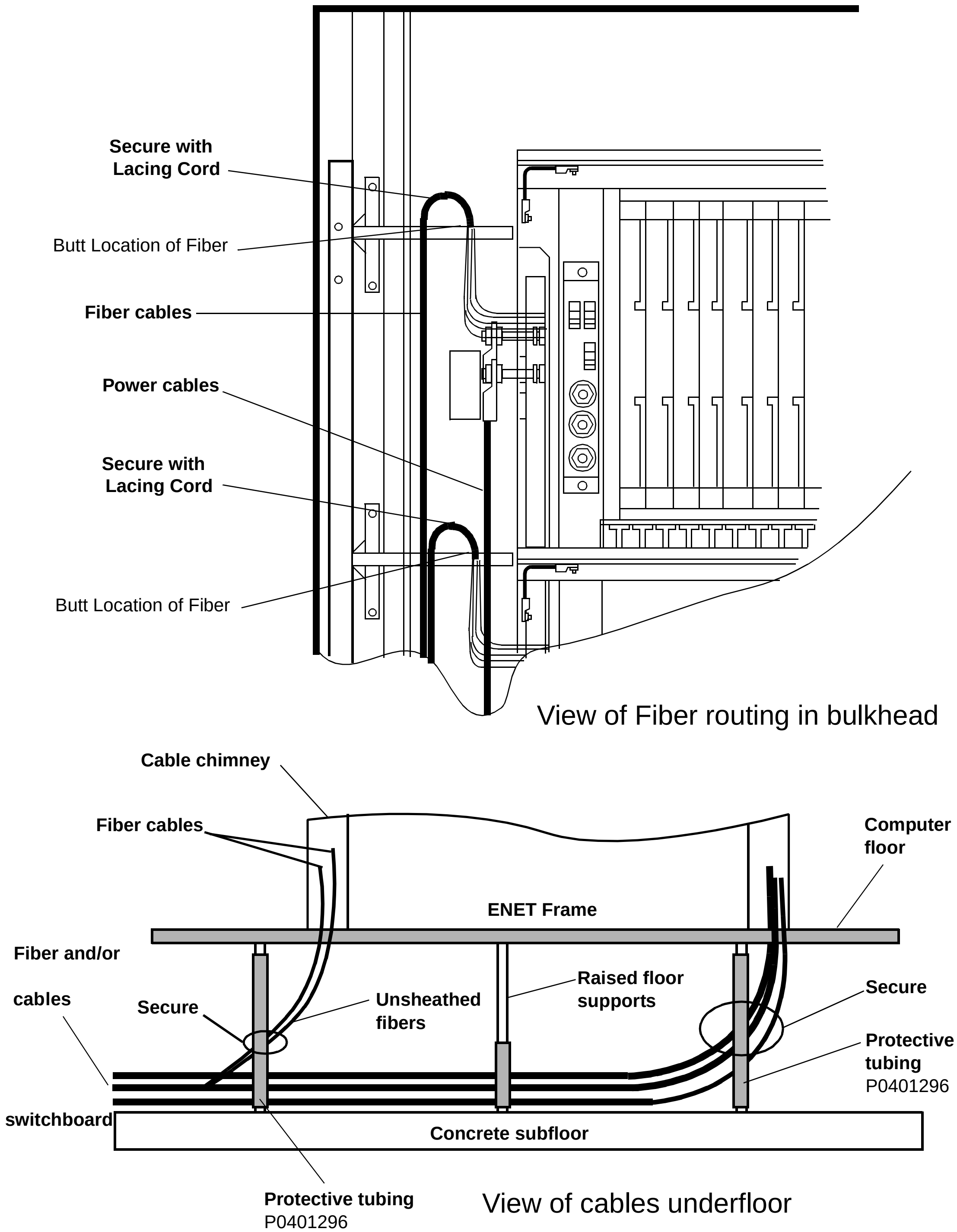
Figure 336 – Cable Layout Without CCTS



4 Figure 336 is intended only to reflect the different bundles of cables in the C42 bulkhead. Actual cables and quantity of cables will vary site to site. The cables are to be secured to the cable brackets in the bulkhead. The system cables and power cables are to be secured using ty-raps. The fiber cables are to be secured utilizing protective material and lacing cord.

5 **This paragraph for bottom feed cabinets only.** Form the cables in reverse order for bottom feed cabinets. The butt locations of the fiber cables will be in the cabinet bulkhead. The butt of the fiber cables is to be laced on the top traverse arm of the associated shelf where the cables are to terminate. The butt location is approximately as shown in Figure 337. Only the left-hand rear bulkhead is shown in Figure 337. Cables in the right rear bulkhead are to be formed like the left bulkhead. Ensure that the fiber cable is protected at the securing location. The unsheathed fiber cables will loop down to the oblong holes in the bulkhead and then through the holes to their respective termination points.

Figure 337 – Bottom Entry Cabling Without CCTS Cabinet



6 Protective tubing (P0401296) is to be installed and secured to the raised floor supports at all locations where unsheathed fiber cables pass or may come in contact with the raised floor supports.

Loosely secure the fiber and switchboard cables to the raised floor support(s) using lacing cord, near the entry points of the ENET cabinet. Refer to Figure 337 for an example.

7 Fiber cables and switchboard (DS30) cables are to be run together for under-floor cabling sites. Loosely secure the cables together every three feet along the route while the cables are under the floor. The cables are to be secured at the cable tie locations within the ENET cabinet using sheet fiber and lacing cord. This is to ensure that the cables remain together and aid in locating cables at a later time.

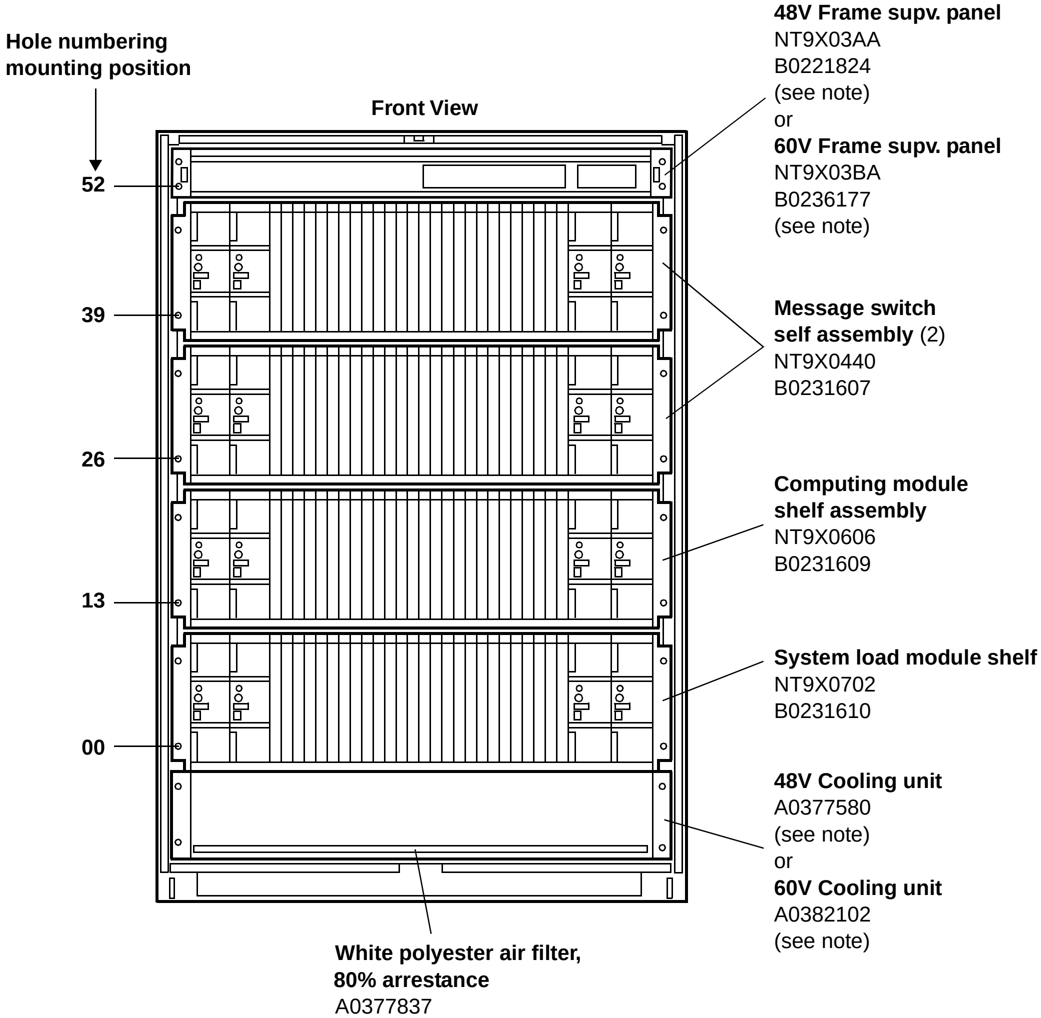
8 The fiber cables without protective sheathing between the cable trough and the top of the ENET cabinet are to be secured using sheet fiber and lacing cord, into bundles for each shelf configured. Protective material (Protective Tubing (P0401296) or Guard Extrusion (P0663893)) must be wrapped around the area where the cable is to be secured.

9 Refer to Subsection 30.3 for cabling at the ENET cabinet bulkhead assemblies and to the paddleboards.

30.5 NT9X01JB Dual Plane Combined Core Cabinet

1 Figure 338 reflects the front view of the NT9X01JB C42 cabinet.

Figure 338 – Front View of NT9X01JB C42 Cabinet



Note: Cooling Unit and Frame Supervisory Panel are provisionable and only one each will be required per cabinet.

2 Most of the cables connecting to the backplane are to be connected by the factory. Contact your Technical Assistance Center (TAC) if these cables are not connected. The only cables not factory connected directly to the backplane are external fiber cables. All external fiber cables are to be connected by the field technician on site. Refer to Subsections 30.1 C42 System Cabling and 30.2 Fiber Optic Cables to run the fibers in the DPCC cabinet.

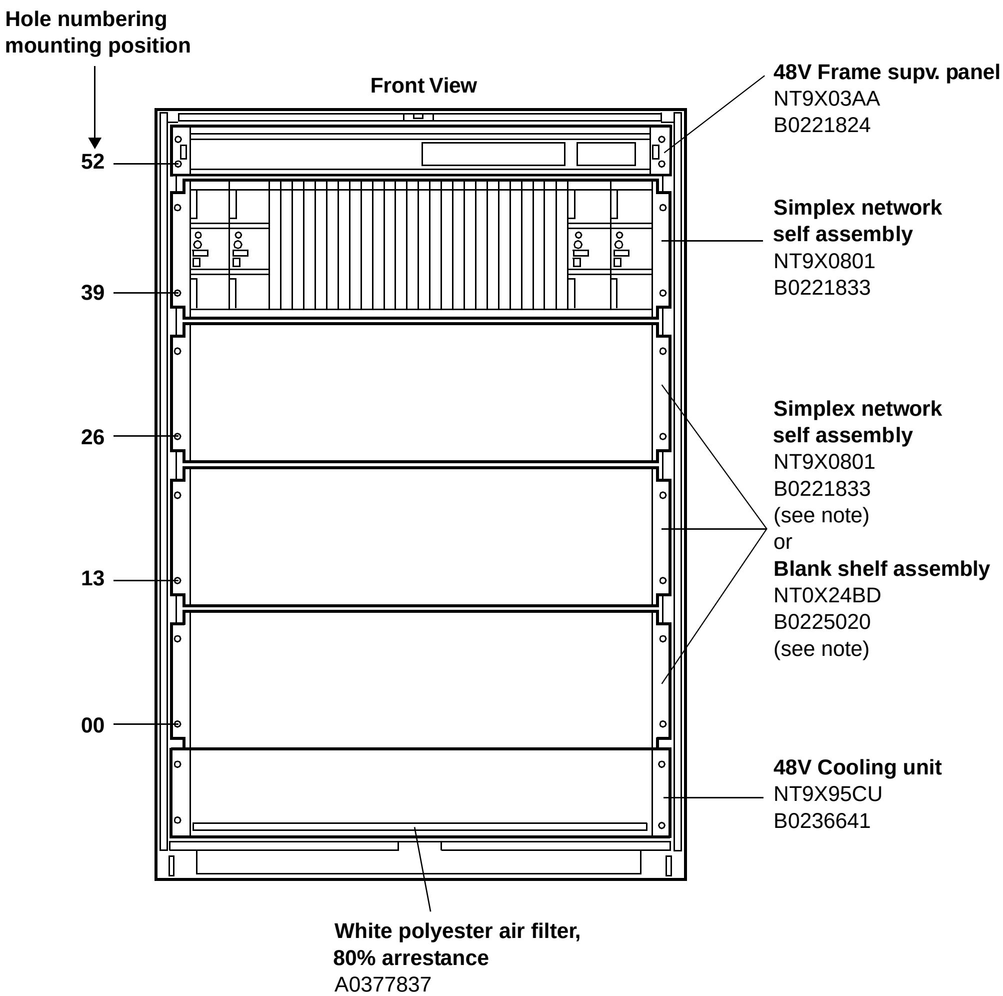
3 All internal cables connected by the factory between the bulkhead and the backplane are reflected on assembly drawing AD9X01JB.

4 Pack fill kits are provisionable and therefore not reflected in this document. Refer to your job specifications for the pack fill required on your cabinet.

30.6 NT9X05AC Enhanced Network Cabinet

1 Figure 339 reflects the front view of the NT9X05AC C42 cabinet.

Figure 339 – Front View of NT9X05AC C42 Cabinet



Note: NT9X0801 or NT0X24BD may be provisioned at positions 00, 13, and 26. Therefore, quantity will vary from 1 to 4 for NT9X0901, and 0 to 3 for NT0X24BD.

2 Most of the cables connecting to the backplane are to be connected by the factory. Contact your Technical Assistance Center (TAC) if these cables are not connected. The only cables not factory connected directly to the backplane are external fiber cables. All external fiber cables are to be connected by the field technician on site.

3 All internal cables connected by the factory between the bulkhead and the backplane are reflected on assembly drawing AD9X05AC.

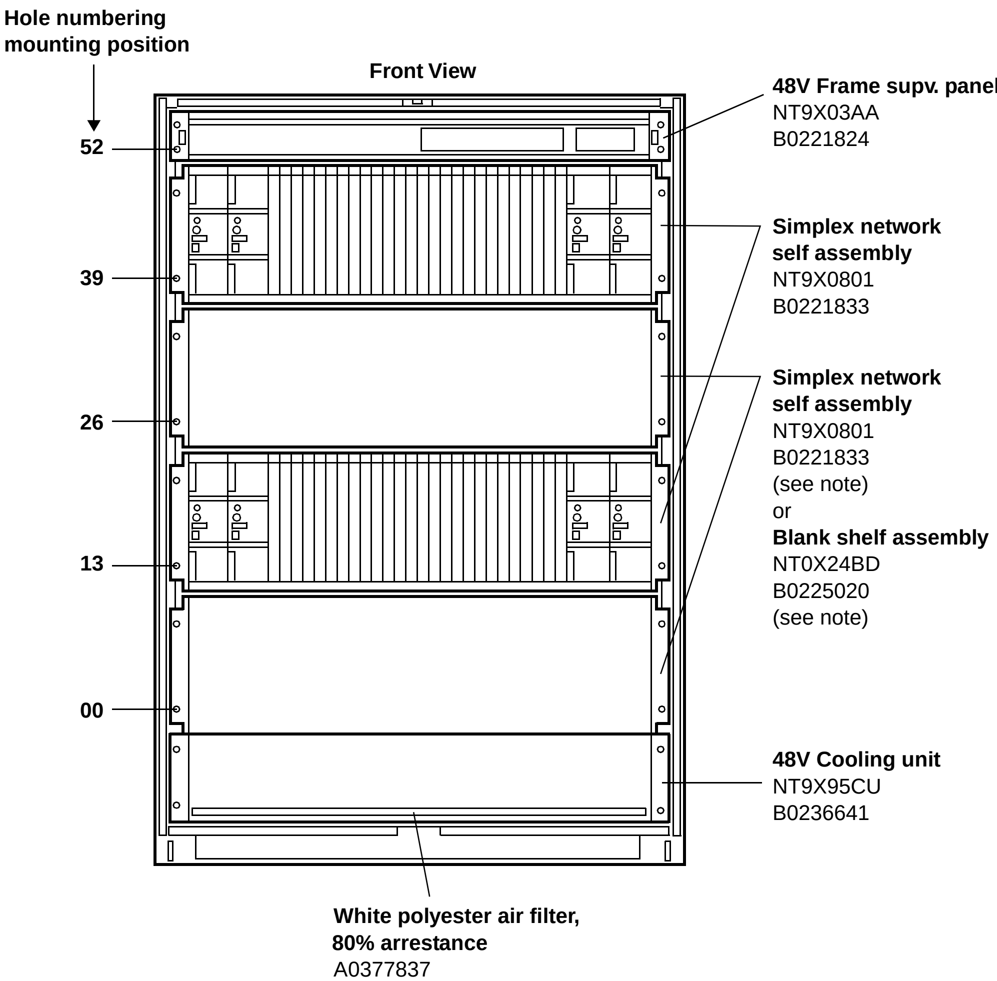
4 Pack fill kits are provisionable and therefore not reflected in this document. Refer to your job specifications for the pack fill required on your cabinet.

5 All NT9X05AC cabinets are installed with NT0X35CC ICS cabinets. Remove the rear upright panels on the side or sides of the NT9X05AD that are adjacent to the NT0X35CC ICS cabinet.

30.7 NT9X05AD Enhanced Network Duplex Cabinet

1 Figure 340 reflects the front view of the NT9X05AD C42 cabinet.

Figure 340 – Front View of NT9X05AD C42 Cabinet



Note: NT9X0801 or NT0X24BD may be provisioned at positions 00 and 26. Therefore, quantity will vary from 2 to 4 for NT9X0901, and 0 to 2 for NT0X24BD.

2 Most of the cables connecting to the backplane are to be connected by the factory. Contact your Technical Assistance Center (TAC) if these cables are not connected. The only cables not factory connected directly to the backplane are external fiber cables. All external fiber cables are to be connected by the field technician on site.

3 All internal cables connected by the factory between the bulkhead and the backplane are reflected on assembly drawing AD9X05AD.

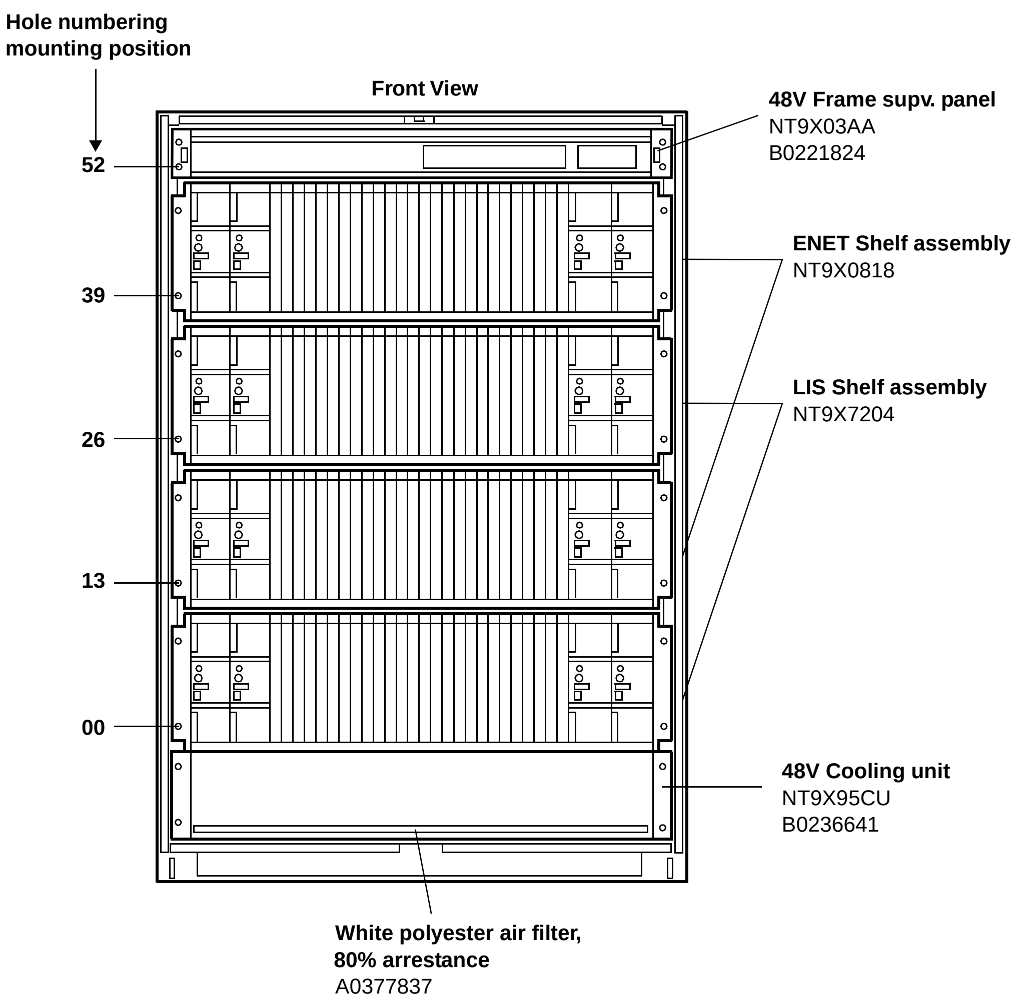
4 Pack fill kits are provisionable and therefore not reflected in this document. Refer to your job specifications for the pack fill required on your cabinet.

5 All NT9X05AD cabinets are installed with NT0X35CC ICS cabinets. Remove the rear upright panels on the side or sides of the NT9X05AD that are adjacent to the NT0X35CC ICS cabinet.

30.8 NTYA05AA Meridian Cabinet Network Interface

1 Figure 341 reflects the front view of the NTYA05AA C42 cabinet.

Figure 341 – Front View of NTYA05AA C42 Cabinet



2 Most of the cables connecting to the backplane are to be connected by the factory. Contact your Technical Assistance Center (TAC) if these cables are not connected. The only cables not factory connected directly to the backplane are external fiber cables. All external fiber cables are to be connected by the field technician on site.

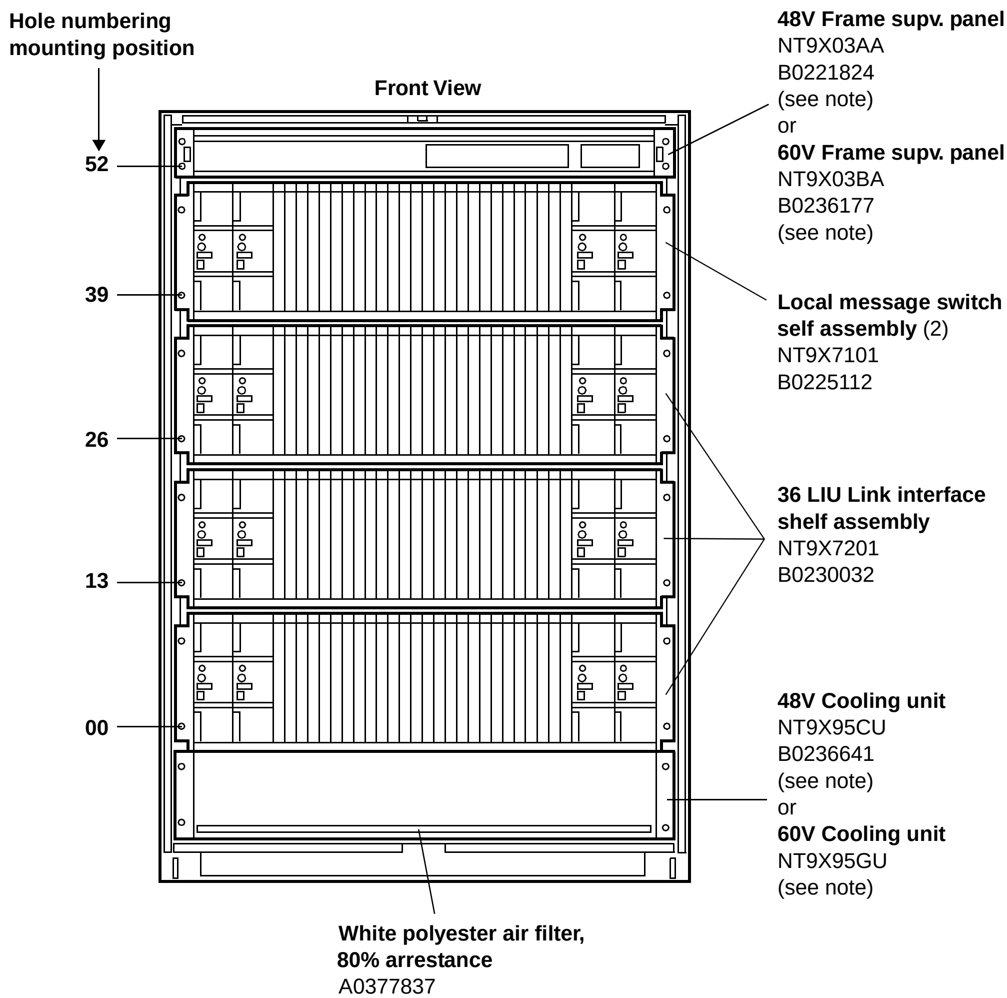
3 All internal cables connected by the factory between the bulkhead and the backplane are reflected on assembly drawing ADYA05AA.

4 Pack fill kits are provisionable and therefore not reflected in this document. Refer to your job specifications for the pack fill required on your cabinet.

30.9 NT9X70BB Link Interface Module Cabinet

1 Figure 342 reflects the front view of the NT9X70BB C42 cabinet.

Figure 342 – Front View of NT9X70BB C42 Cabinet



Note: Cooling Unit and Frame Supervisory Panel are provisionable and only one each will be required per cabinet. Only one of Cooling Unit or Frame Supervisory Panel is provided per customer requirements.

2 All of the cables connecting between the backplane and the bulkhead are connected in the factory. Only external cables are to be connected by the field technician. Contact your Technical Assistance Center (TAC) if these cables are not connected.

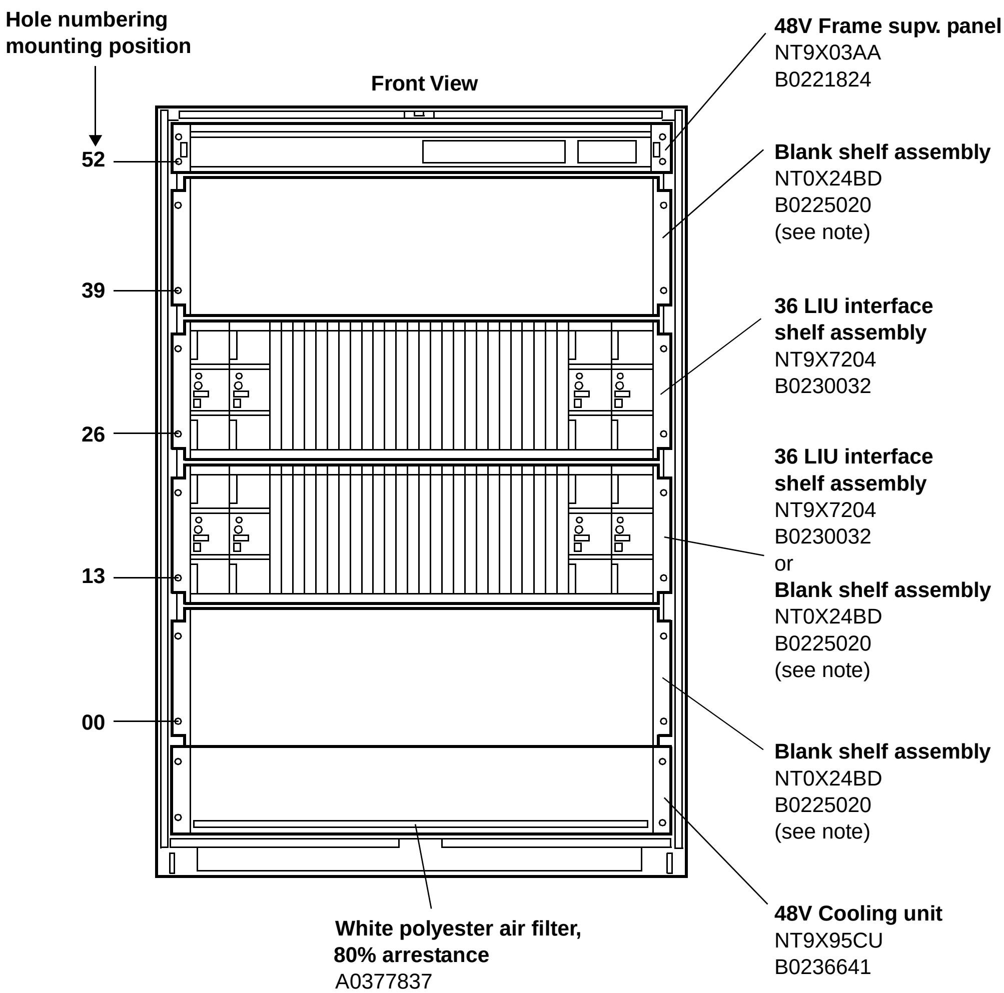
3 All internal cables connected by the factory between the bulkhead and the backplane are reflected on assembly drawing AD9X70BB.

4 Pack fill kits are provisionable and therefore not reflected in this document. Refer to your job specifications for the pack fill required on your cabinet.

30.10 NTEX01AB Enhanced Multipurpose Cabinet

1 Figure 343 reflects the front view of the NTEX01AB C42 cabinet.

Figure 343 – Front View of NTEX01AB C42 Cabinet



Note: NT0X24BD is provisionable in shelves 00, 13, and 39. Quantity will vary from 1 to 3.

2 The Link Interface Shelf Assembly is provided as per customer requirements. The Blank Shelf Assembly will be installed for each unequipped position.

3 Most of the cables connecting to the backplane are to be connected by the factory. Contact your Technical Assistance Center (TAC) if these cables are not connected. The only cables not factory connected directly to the backplane are external fiber cables. All external fiber cables are to be connected by the field technician on site.

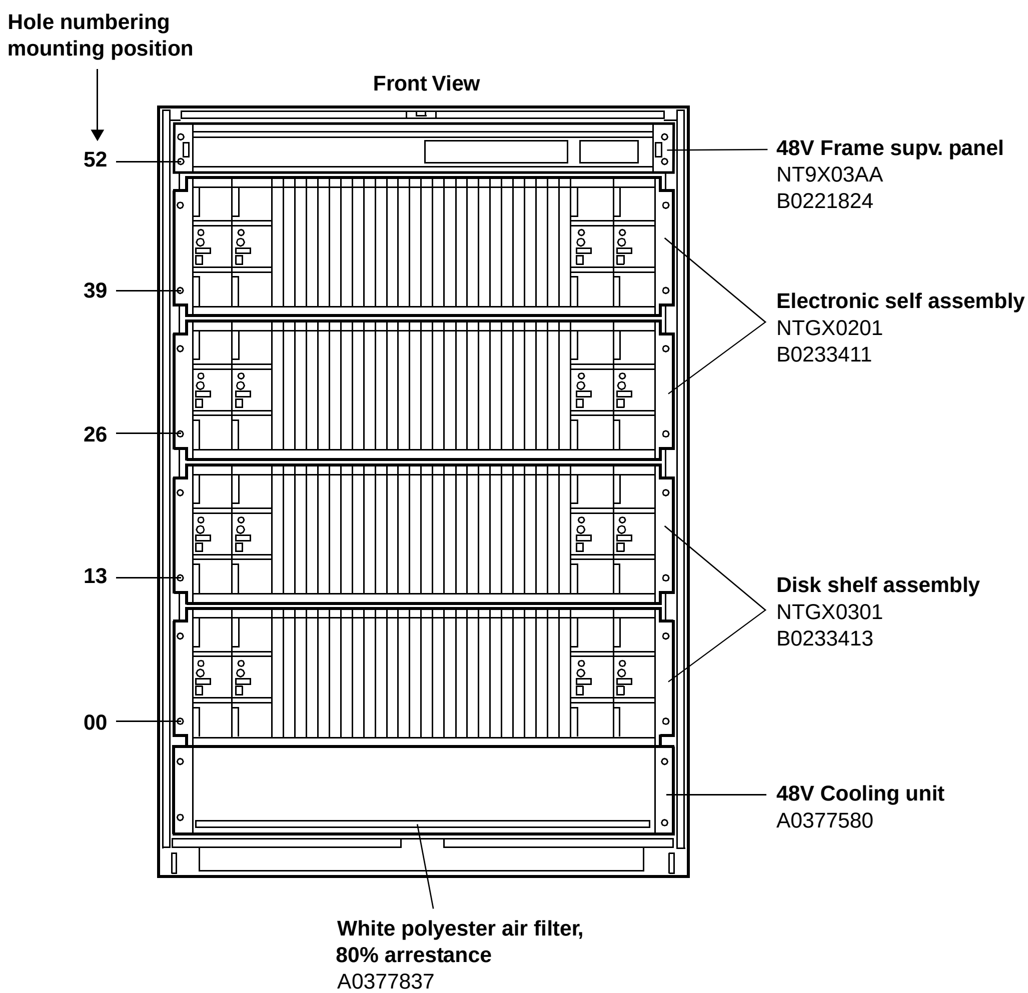
4 All internal cables connected by the factory between the bulkhead and the backplane are reflected on assembly drawing ADEX01AB.

5 Pack fill kits are provisionable and therefore not reflected in this document. Refer to your job specifications for the pack fill required on your cabinet.

30.11 NTGX01AA Service Peripheral Module Cabinet

1 Figure 344 reflects the front view of the NTGX01AA C42 cabinet.

Figure 344 – Front View of NTGX01AA C42 Cabinet



2 Cables connecting to the backplane are to be connected by the factory. Contact your Technical Assistance Center (TAC) if these cables are not connected.

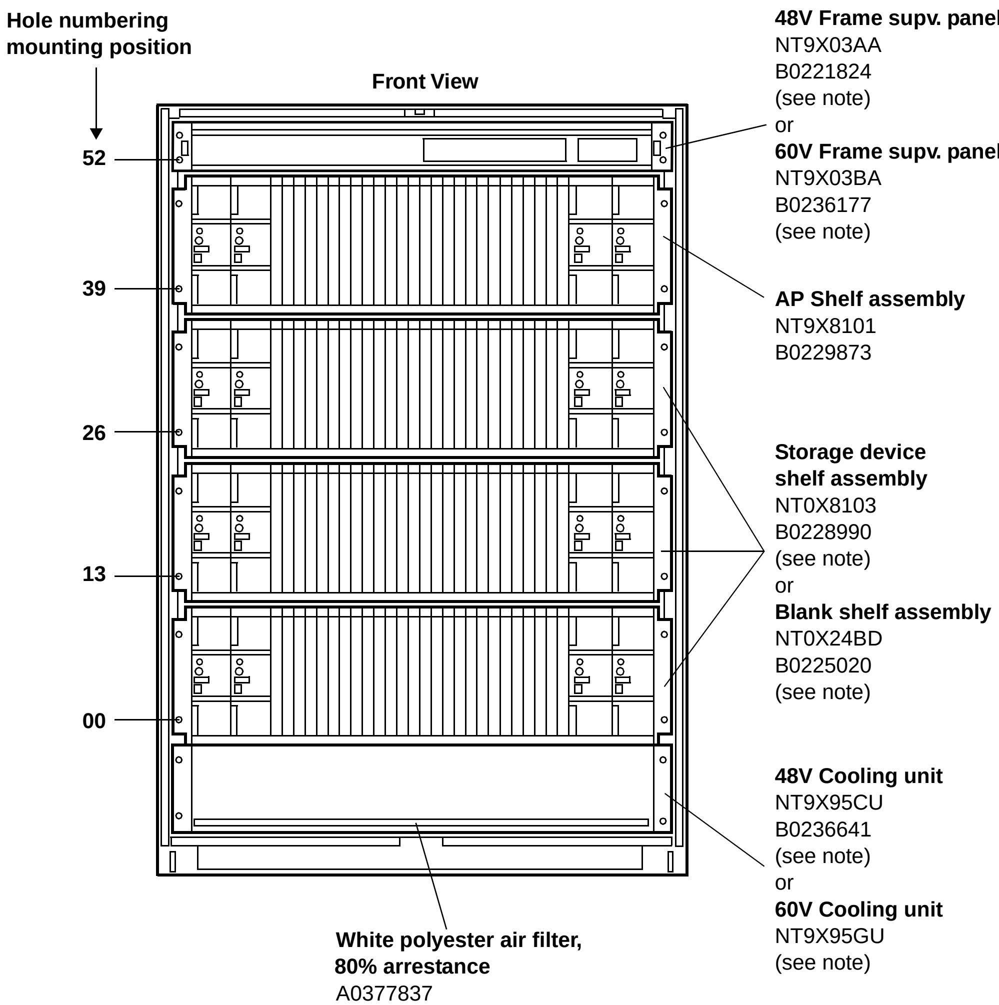
3 All internal cables connected by the factory between the bulkhead and the backplane are reflected on assembly drawing ADGX01AA.

4 Pack fill kits are provisionable and therefore not reflected in this document. Refer to your job specifications for the pack fill required on your cabinet.

30.12 NT9X80CA S/DMS APC Cabinet

1 Figure 345 reflects the front view of the NT9X80CA C42 cabinet.

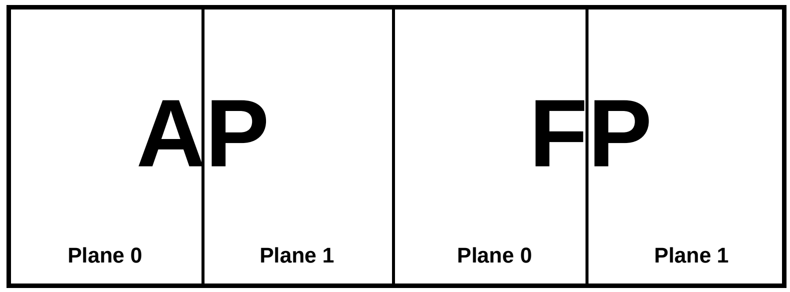
Figure 345 – Front View of NT9X80CA C42 Cabinet



Note: NT0X8103 or NT0X24BD may be provisioned at positions 00, 13, and 26. Quantity will vary with provisioning. Only one of items Cooling Unit or Frame Supervisory Panel is provided per customer requirements.

2 The Application Processor/File Processor (AP/FP) shelf (NT9X81) houses two APs or FPs. Each AP/FP (occupying a half shelf) contains a duplicate processor (occupying a quarter shelf), one per plane. Refer to Figure 346.

Figure 346 – NT9X81AA AP/FP Shelf Example



3 Cables connecting to the paddleboards are to be connected by the factory. Contact your Technical Assistance Center (TAC) if these cables are not connected.

All internal cables connected by the factory between the bulkhead and the paddleboards are reflected on assembly drawing AD9X80CA.

4 External fiber cabling must be connected directly to the circuit packs by the field technician.

The AP/FP is connected to the DMS-Bus by four fiber cables. This means that each processor in an AP/FP has two links, one to MS0 and another to MS1. Each link consists of two fiber cables, one for transmit and one for receive. Figure 347 shows the configuration for the AP/FP to MS fiber links. Figure 347 shows an example of an AP or FP connected to the MS.

Figure 347 – AP/FP to MS Fiber Links

AP or FP	MS
Card_slotPlanePort	MS# MS_CARD# MS_LINK
AP/FPn 12 0 0	0 x y
AP/FPn 12 0 1	1 x+1 y
AP/FPn 15 1 0	1 x y
AP/FPn 15 1 1	0 x+1 y

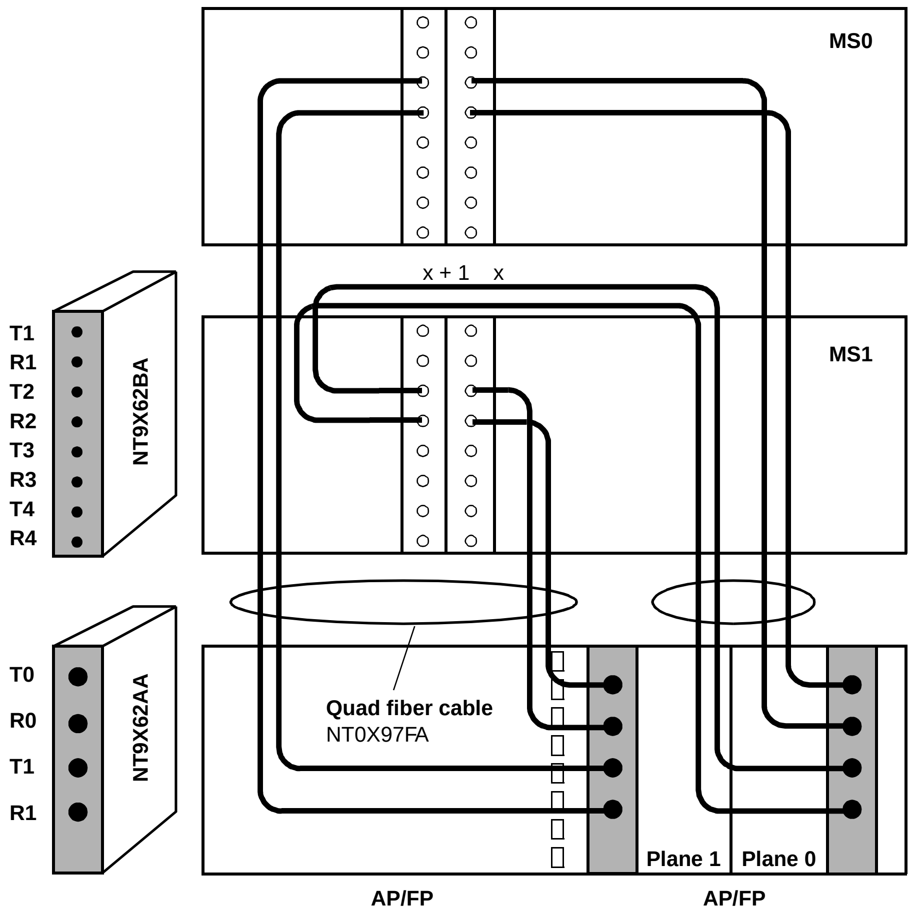
where: n = AP/FP designation number
y = n MOD z
z = number of available ports per MS port card
= 2 for 256 channels per link
= 4 for 128 channels per link

Figure 348 and Figure 349 show examples of twelve FPs connected to the MS using 128 channels per link.

Figure 349 shows an example of AP/FP connected to MS Fiber Links.

Figure 348 – AP/FP to MS Fiber Links Example						
Link	**MS Slot #**					
	6	7	8	9	10	11
0	FP0	FP0	FP4	FP4	FP8	FP8
1	FP1	FP1	FP5	FP5	FP9	FP9
2	FP2	FP2	FP6	FP6	FP10	FP10
3	FP3	FP3	FP7	FP7	FP11	FP11

Figure 349 – AP/FP to MS Fiber Links (Rear view)



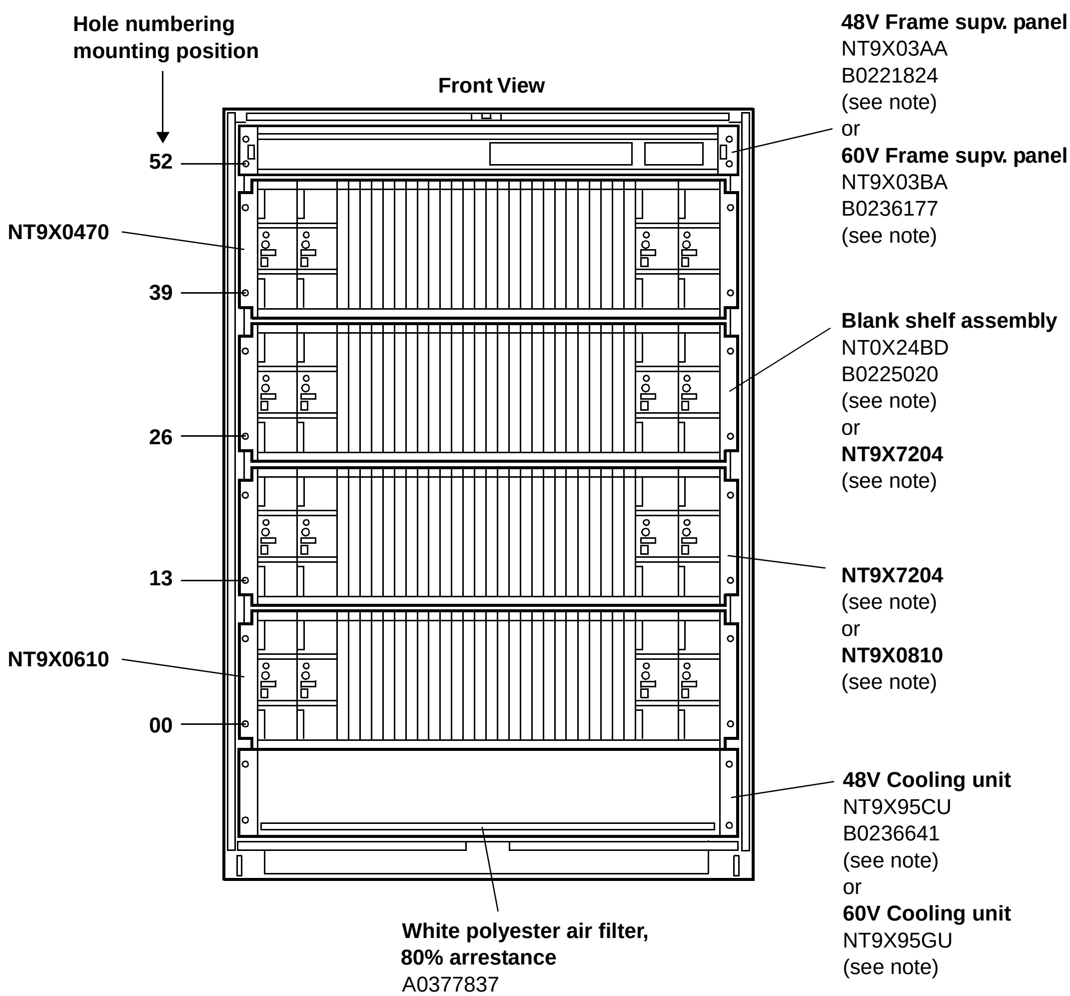
Note: Fiber cables are always connected from "Transmit" to "Receive." Refer to cable tags for termination point of each fiber cable.

5 Pack fill kits are provisionable and therefore not reflected in this event. Refer to your job specifications for the pack fill required on your cabinet. Additional information can be found in ECM-512.

30.13 NT9X01MB Single Core Cabinet

1 Figure 350 reflects the front view of the NT9X01MB C42 cabinet.

Figure 350 – Front View of NT9X01MB C42 Cabinet



Note: NT0X24BD, NT9X7204, and NT9X0810 are provisionable in positions shown and the quantity will vary with provisioning. One of items Cooling Unit or Frame Supervisory Panel is provided per customer requirements.

2 Cables connecting to the backplane are to be connected by the factory. Contact your Technical Assistance Center (TAC) if these cables are not connected.

3 External fiber cabling must be connected directly to the circuit packs by the field technician.

4 All internal cables connected by the factory between the bulkhead and the backplane are reflected on assembly drawing AD9X01MB.

5 Pack fill kits are provisionable and therefore not reflected in this document. Refer to your job specifications for the pack fill required on your cabinet. Additional information can be found in ECM-632.

30.14 Quad Fiber Cable Tag Information

1 Each quad fiber cable has a set of unique cable tags. A cable tag will be placed near the butted end of the quad fiber cable at the ENET end and at the peripheral end.

2 Refer to event 07 (method 03-9057) for details of P0866901 cable tags for fiber cables.

3 Specific cable tags will be placed on the individual fiber leads. The information on each tag will define the termination points for the fiber lead. This information includes the frame, shelf, and port information. OT, OR, 1T, and 1R are the functional names of the ports.

Example:OT = Port 0 Transmit

OR = Port 0 Receive

Refer to Figure 351 for a typical set of cable tags.

Figure 351 – Fiber-End Cable Tags

Fiber End Cable Tag			**Field Descriptions**			
ENC0	00	39	To:	ENET<plane>	<cabinet>	<shelf>
10R	04	17T		<slot>	<zone>	<link/signal>
LTE	000	18	From:	<PM_type>	<frame>	<shelf>
22R	RX			<slot>	<signal>	

Different tag appears on each connector and at each end of each fiber.

<zone> is the receptacle number stamped on the NT9X40/45 faceplate.

<link> is the logical link number displayed at the MAP.

<signal> is either transmit or receive.

31.0 Model B C28 Cabinet Power Cabling

31.1 Guidelines for Model B - Power Cabling

Note: The power and battery return identifiers are referred to as L- and L+. This identifier can be substituted as follows:

L-	is	-48V or -60V
L-A	is	-48VA or -60V
L-B	is	-48VB or -60V
L+	is	RTN
L+A	is	BATRTNA
L+B	is	BATRTNB

1. The Model B C28 cabinets have been designed to allow a single CPDC to provide power to multiple lineups. This is different from the Model A C28 cabinets. The Model B C28 cabinets can still be powered by way of horizontal cabling. Routing and forming cables, when horizontal powering is required, will remain the same as Model A C28 cabinets. Forming of the power cables in the CPDC will be the same for Vertical or Horizontal cabling.

2. The Model B CPDC has been designed to allow multiple lineup powering. Each of the remaining Model B C28 cabinets requiring power have been designed with a power filter kit mounted in the top of the cabinet. The L-A, L-B, ABS, and Alarm connections will be made in this area.

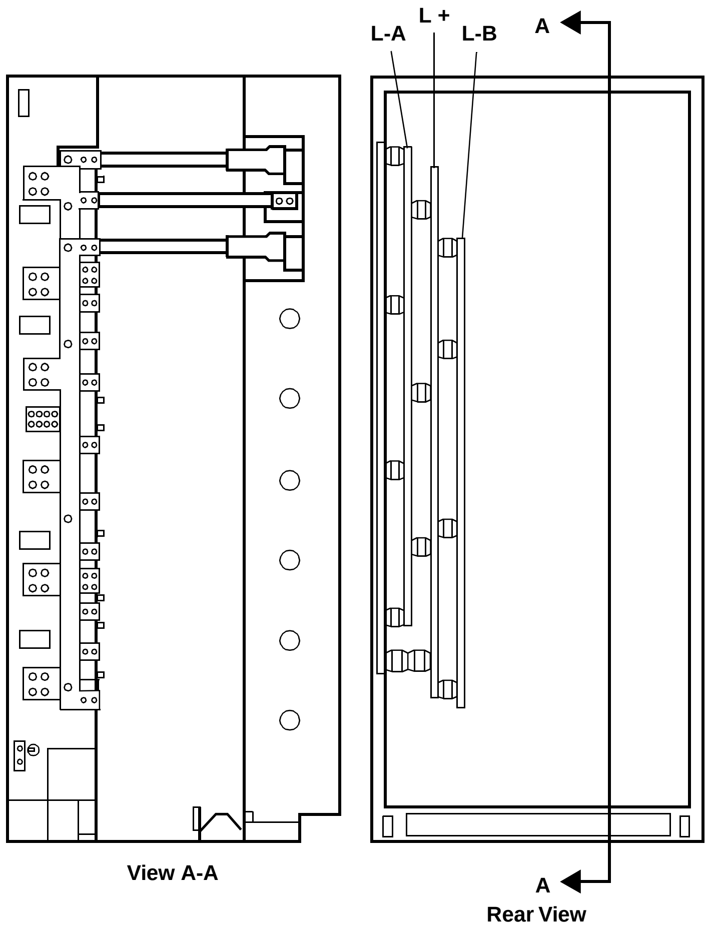
31.2 Model B - CPDC

1. The Model B CPDC is referred to as a centralized CPDC or Model B CPDC. Throughout this section, the cabinet will be referenced as a Model B CPDC.

2. There is no bulkhead in the Model B CPDC cabinet. The main power feeds and return cables will enter the cabinet through the top or bottom. Terminations will be made to a series of bus bars located on the left rear of the cabinet. There are multiple terminations on each bus bar to allow top or bottom feed cabling. Use the top termination points for top feed cables and the bottom termination points for bottom feed cabling.

3. Refer to Figure 352 for location of main bus bars. Each bus bar is designated in the cabinet. Figure 352 does not reflect all of the parts in the CPDC cabinet. Showing all of the parts is not practical. Refer to the Assembly Drawing (ADRX31CA) for additional details.

Figure 352 – Bus Bar Arrangement in CPDC



4 The Model B CPDC can be provisioned with one to four Circuit Breaker Shelf Assemblies. The breaker panel within the assembly can be one of two types, NTRX02CA or NTRX02CD, which contains different breaker combinations.

5 Each of the breaker panels comes with 40 breakers. Half of the breakers (twenty) are connected to the *A* feed and half to the *B* feed. The breaker panel at position 49 (Top) is assigned as follows:

Breaker	**Designation**
CB FA	Reserved for Filter Capacitors A
CB FB	Reserved for Filter Capacitors B
CB01A	Reserved for EAS Alarm A (Optional)
CB01B	Reserved for EAS Alarm B (Optional)
CB02A	Reserved for ABS Power Option (Optional)
CB02B	Reserved for LaMarche Inverter (Optional)

6 CB03 A&B through CB19 A&B are available to assign power products. There are a total of 17A and 17B breakers available on the breaker panel at shelf 49.

7 Breaker panels at positions 35, 22, and 8 are assigned as follows:

Breaker	**Designation**
CB FA	Reserved for Filter Capacitors A
CB FB	Reserved for Filter Capacitors B

8 CB01 A&B through CB19 A&B are available to assign power products. There are nineteen A&B breakers available on these shelves.

9 Each of the Circuit Breaker Shelf Assemblies includes a ground plate and capacitors.

10 An option of the Model B CPDC is the "Single Feed Option." This option is defined as having a single A&B power feed from the power room to the CPDC and then distributing the power to each cabinet. The maximum capacity for the CPDC is 400A per feed. The *A* and *B* feed to the CPDC unit must be protected with 170V dc, 600AMP maximum fuses (Bussman Type TPL or TPN or equivalent) or equivalent circuit breakers at the supply source.

11 With the "Single Feed Option," one pair of circuit breakers are required for the capacitors and a single circuit breaker is required on the first panel to provide alarm sensing for the EAS option. Therefore, only eighteen A&B circuit breakers are available to assign power products.

12 Alarm connections (C01, C02, and C03) are provided on the back of the MSP by way of 20-pin connectors.

31.3 Model B - CPDC Main Feeds

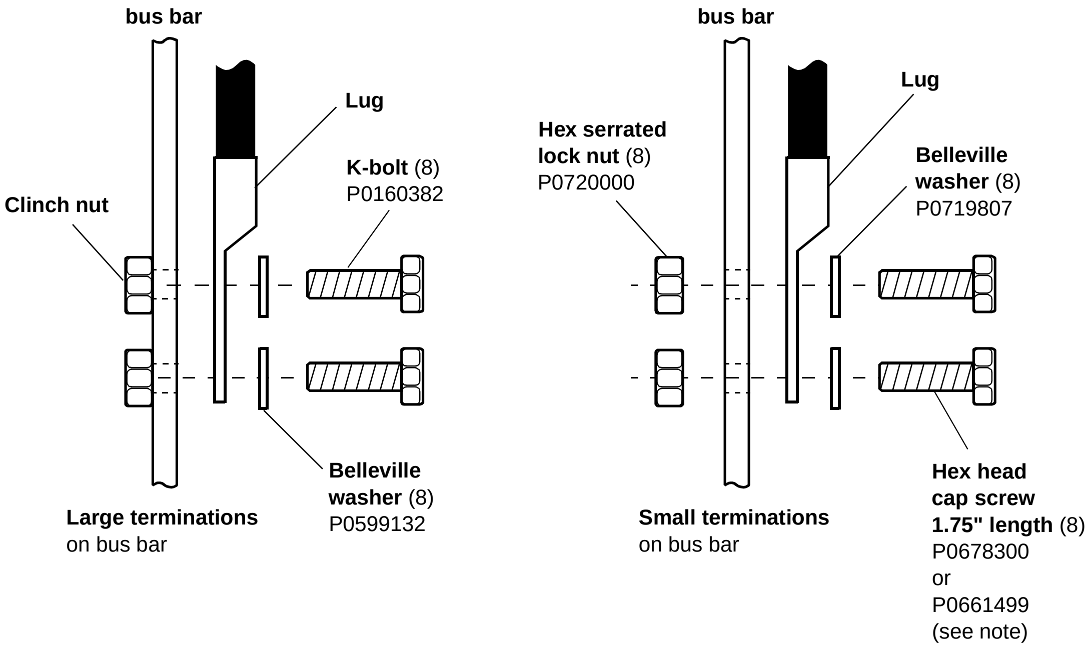
1 Secure the main feeds at the top or bottom of the cabinet. Viewed from the rear, secure these cables as far to the left as practical. Requirements vary from customer to customer and, therefore, secure the cables in the manner required per your customer. Ty-rapping is the standard method of securing cables. Lacing cord may be required to secure the cables to the first entry point of the cabinet. Verify with the customer prior to securing the cables as to the preferred method.

2 It is recommended to form and secure the L-A cable(s) first, then the L+ cable(s), then the L-B cable(s) last.

3 The hardware for securing the cables is provided with the cabinet. Refer to Figure 353 for the different hardware stackup. The *large* terminations are terminated to the clinch nut. The *small* hardware is terminated using a bolt and nut arrangement.

4 After making the terminations, cover each of the lugs with an appropriate cover. Covers are provided with each CPDC. The covers (P0739906) must be modified on site to fit around the cables. Only remove the cutouts on the end of the cover that the cables exists. Secure the covers in place using lacing cord. Covers are not required on the return cables.

Figure 353 – CPDC Model B Hardware Stackup



Note: When double lugging is required, use P0661499 Cap Screw in place of P0678300 Cap Screw and P0170283 K-Bolt in place of P0160382 K-Bolt.

31.4 Model B - CPDC Secondary Feeds

1 The secondary power and ground cables are to be formed into the CPDC on the right side viewed from the rear.

2 Shelf Cable Brackets are installed along the right rear of the cabinet; through these, form the secondary power and ground cables.

3 It is recommended to form one breaker panel at a time; form from the top down and front to rear. The cables terminating at the top Circuit Breaker Shelf Assembly should be closest to the front of the cabinet.

4 The cables for the top shelf are to be bundled together along the right side of the cabinet. Divide the cables into bundles and place into the cable brackets. Remember to leave the section closest to the rear open to allow for expansion, if the cabinet is not fully provisioned.

5 After the cables have passed through the top shelf cable bracket, bundle the cables going to the breakers and return plates separately. Therefore, each Circuit Breaker Shelf Assembly will have four separate bundles.

6 Route the cables as shown in Figure 354 and Figure 355 (note these figures are for Vertical power cabling). Cable tie brackets are provided along the right side of the cabinet. Secure the cables to these brackets. Ty-raps are acceptable unless specific customer requirements will not permit them. The intent of Figure 354 and Figure 355 is not to reflect the ty-rap locations within the cabinet. Ty-raps are to be spaced evenly apart.

7 The power and ground cables terminating to the breakers and battery return plates are to be approximately six to seven inches in length. This length is from the breakout of the main form to the termination point. Battery return cables and power cables are to terminate on corresponding positions.

Example: Breaker 00 to Return Plate position 00, Breaker 05 to Return Plate position 05, etc.

8 Figure 354 reflects two *main* bundles along the upright of the cabinet. Shelves 08 and 22 are to be formed together and shelves 35 and 49 are to be formed together to their respective breakout points. Refer to Figure 354 and Figure 355 for an example of the power cable bundles in the CPDC.

Figure 354 – Rear View of Model B CPDC

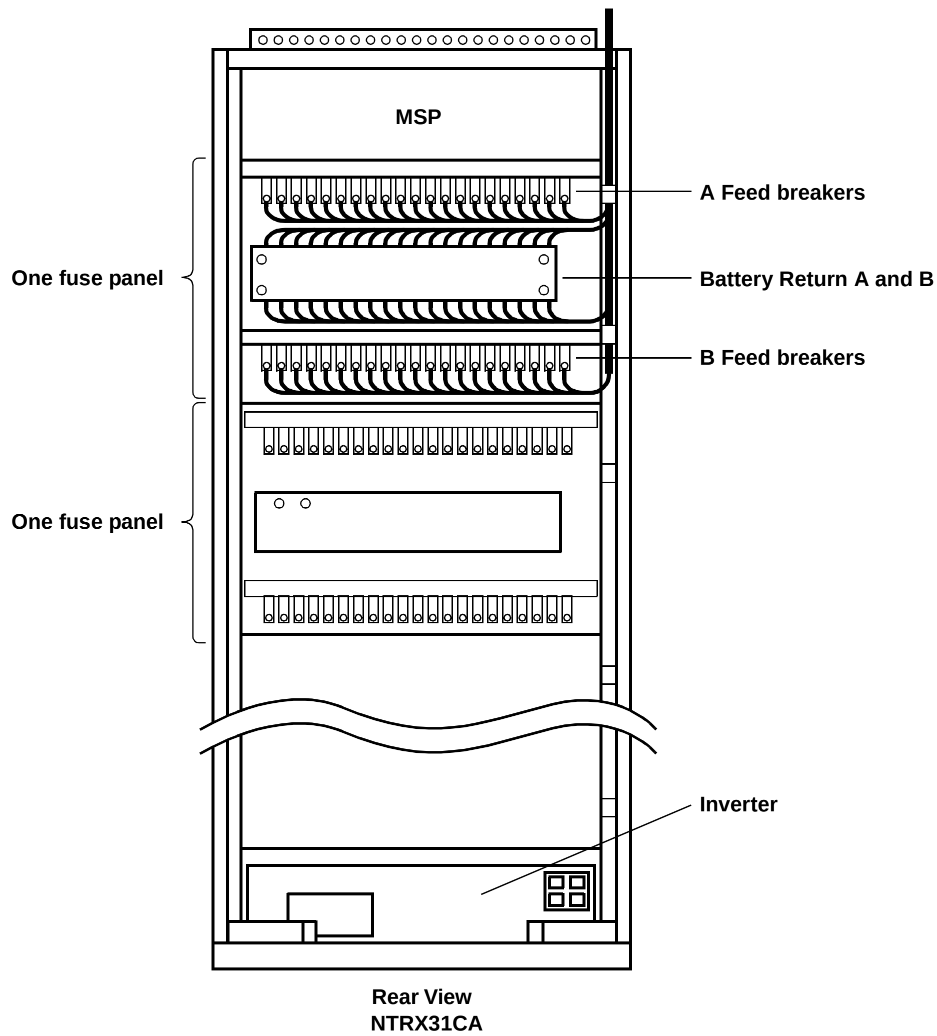
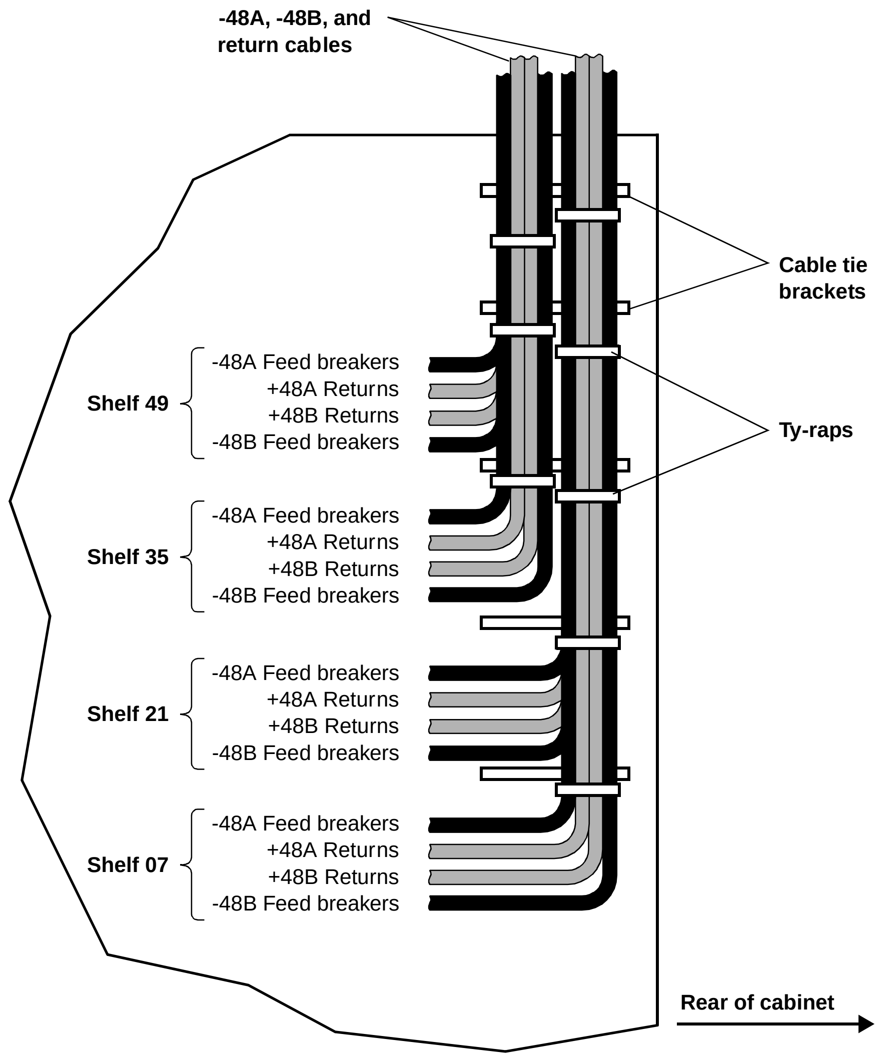


Figure 355 – Forming of 48V and Return Cables for Model B CPDC



Right Side View

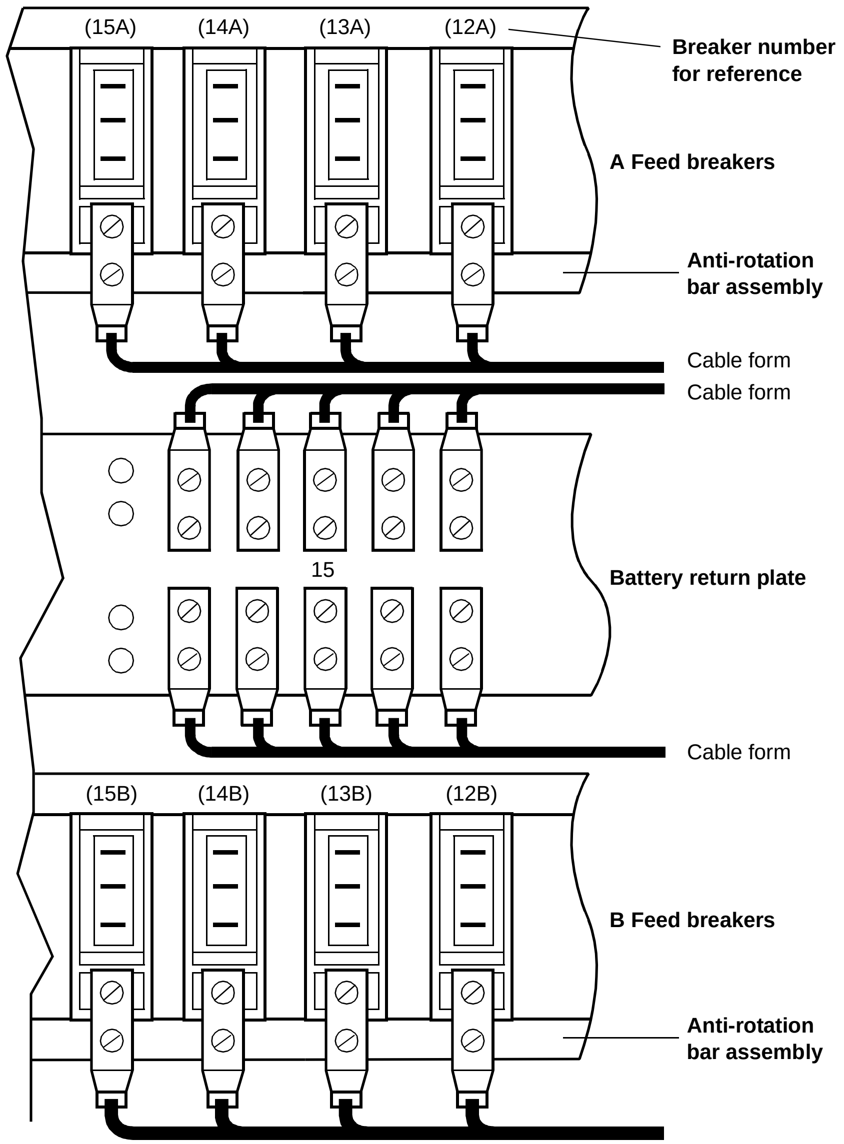
9 The lugs for the cables terminating on the Circuit Breaker Shelf Assembly are to be oriented as shown in Figure 356. The power safety boots are not shown in Figure 356 for clarity.

10 Remove the nuts from the breakers and ground panel studs. Each secondary power cable requires a two-hole lug. Lugs and safety boots are supplied as part of the 1071 specification. Reference the 1071 for the correct lug and safety boot for CPDC cabinets.

Prior to crimping the lug on the cable, ensure that the boot is placed on the cable. After the cable is secured in place, position the boot over the termination point.

Power safety boots are not placed on the ground terminations.

Figure 356 – Model B Lug Orientation on Circuit Breaker Shelf



Partial View of Circuit Breaker Shelf Assembly

11 The power safety boots and lug part numbers are as follows:

Power safety boot	Short Barrel	Long Barrel
10-14 AWG 90-degree lug	A0379092	A0386311
6 AWG 90-lug	A0381005	A0614959
8 AWG 90-lug	A0352431	A0614961
P0730338		

Note: Power Safety Boot (P0730338) is to be used for each of the above cable sizes. Safety boot only covers the breaker cable connection. Connections at the Battery Return plate do *not* use a Power Safety Boot.

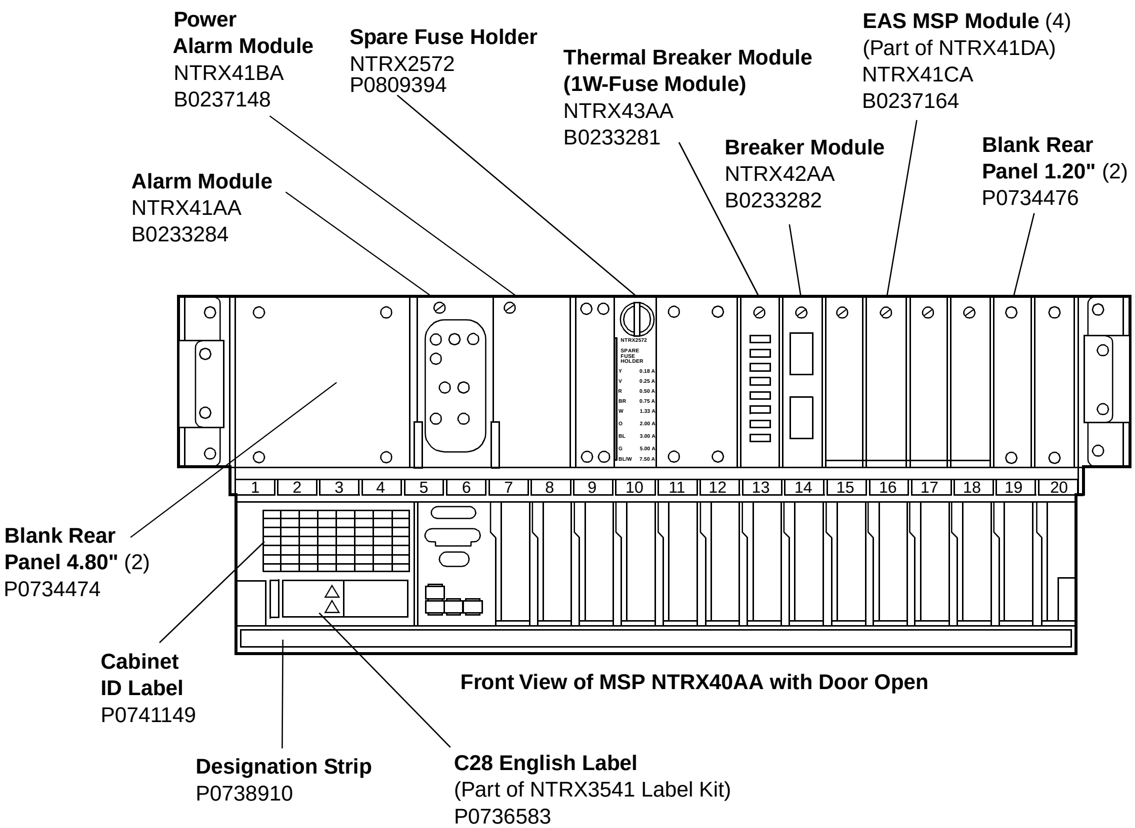
12 The size of the power cables can vary depending on the length of cable run. Therefore, the actual part number for the lugs and power safety boots may be different. The typical wire size will be #10 AWG. Refer to the job specifications if the wire size is different than #10 AWG for the different part numbers.

13 The capacitors in the CPDC cabinet are removed from the front of the cabinet. To remove a capacitor, remove the four screws holding the cover plate and slide the capacitors out of the MSP.

14 The capacitors are located on the left side of the breaker panel viewed from the front.

15 Refer to Figure 357 for Model B CPDC MSP.

Figure 357 – NTRX40AA Model B MSP for NTRX31CA - CPDC



16 Terminations to the Circuit Breaker Shelf Assembly for Vertical and Horizontal cabling will be the same.

17 Cables entering the bottom of the cabinet are to be routed up the right rear of the cabinet. Form the cables terminating at the top shelf first. Form the cables from the top down and front to rear. This will allow cables to be added for extensions or upgrades.

18 Battery, battery return and ABS cables are to be identified at CPDC termination points and at origination points in equipment lineups.

Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

31.5 Model B - Cabinet Power and Return Cables

Note: The power and battery return identifiers are referred to as L- and L+. This identifier can be substituted as follows:

L-	is	-48V
L-A	is	-48VA
L-B	is	-48VB
L+	is	RTN
L+A	is	BATRTNA
L+B	is	BATRTNB

1 The Model B C28 cabinets can be powered horizontally or vertically. Horizontal power is when the cabling is routed through the base of the cabinets. This is the method employed when Model B cabinets are installed in an existing Model A lineup. Form cables through the base in the same manner as done for Model A.

2 This subsection will cover the vertical cabling and connections for the Model B C28 cabinets.

3 The Model B C28 cabinets are vertically powered through a Power Filter Kit located at the top rear of the cabinet. There are several different Power Filter Kits for the Model B C28 cabinets.

4 Each kit includes the A and B feed terminal blocks, ABS, and Alarm connections for the cabinet. Connections to the terminal blocks will be made using two hole lugs. Alarm connections are made using connectorized cables. Alarm and ABS connections will be discussed in Subsection 31.6.

5 The field terminations are to be made to the top of the power filter kits. The connections from the bottom of the filter kits to the MSP are made in the factory.

6 All of the power cables are to be routed through the power shields of the cable troughs. Each cable trough is designed with an opening in the power shield. Route the power cables through the opening and form directly to the terminations.

7 If pre-lugged power cables have been spec'd, there will be one (1) run of cable for each -48 Vdc feed and one (1) run of cable for each Battery Return. Refer to Figure 358

Figure 358 – Model B C28 Pre-lugged Cables

CPC	PEC	Description
B0262205	NTY750CG	Model B C28 Power Cable 10 Ga. (-48V & BR)
B0262206	NTY750CH	Model B C28 Power Cable 8 Ga. (-48V & BR)
B0262207	NTY750CJ	Model B C28 Power Cable 6 Ga. (-48V & BR)

8 The lugged end of pre-lugged cables must be terminated first but can be terminated at either the Originating or Terminating cabinet as indicated on the cable tag. After terminating the pre-lugged end, form the cable back to the un-lugged end. Once formed, this end may be cut to length, lugged and terminated as per the cable tag.

9 Power and battery return cables are to be identified at the CPDC end (breakers or battery return plate) and at the C28 cabinet end (power filter).

Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

Pre-lugged cables will have the cable tags already applied to either end of the cable.

10 Care must be taken when making terminations to the power filters. The threads in the nut must be fully engaged onto the threads of the stud before any significant torque is applied to tighten the nuts. Each nut should be hand started to avoid stripping of the studs.

11 Each of the power connections is to be torqued to 20 in-lbs.

12 Do *not* over tighten the nuts. If a stud is stripped, the entire terminal block must be replaced.

13 The power safety boots and lug part numbers for terminations at the cabinet level are as follows:

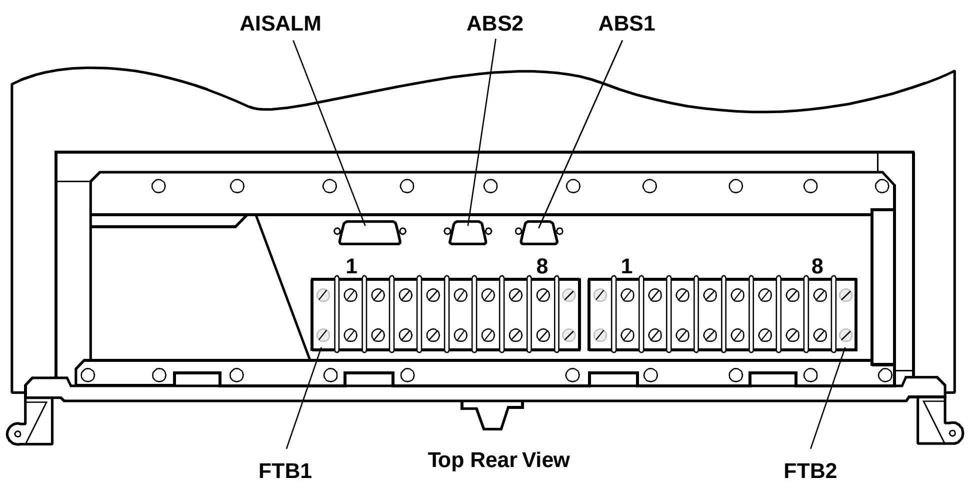
Power safety boot	P0745345
10 AWG 90-degree lug	A0386311
8 AWG 90-lug	A0614961
6 AWG 90-lug	A0614959

Note: A safety boot is not required on the logic ground termination. The Power Filter Safety Boot (P0745345), can be added after the cables have been terminated. The Power Filter Safety Boot is shipped loose.

14 The factory side of the power filter kits are to have Power Safety Filter Boots installed. The Power Filter Safety Boot (P0741700) is to be factory installed.

15 Figure 359 is a view of the NTRX25AB power filter kit used in the CLMI cabinet.

Figure 359 – NTRX25AB Power Filter Kit Assembly

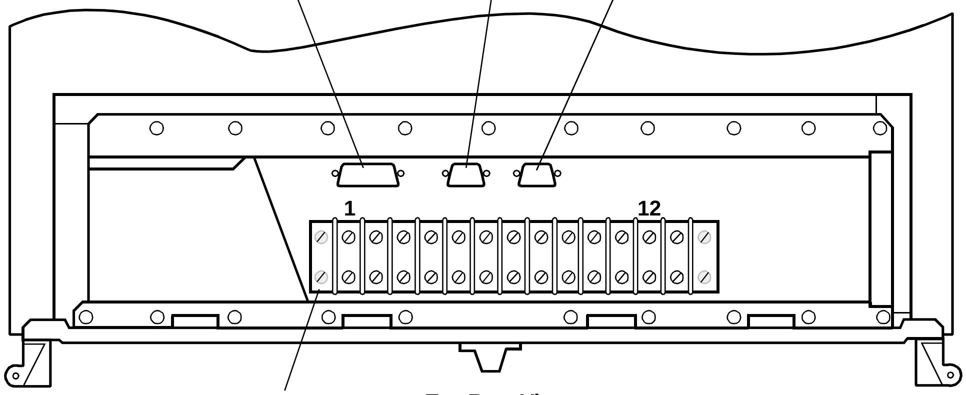


16 Figure 360 reflects the power terminations for the CLMI cabinet.

Figure 360 – Power Connections for CLMI Cabinet		
NTRX25AB Power Filter Kit 16 Position		
Designation	***FTB Connection**	**External Connection**
L- (A) 1	FTB1-1	To CPDC
L- (A) 2	FTB1-2	To CPDC
L- (A) 3	FTB1-3	To CPDC
L- (A) 4	FTB1-4	To CPDC
L- (B) 1	FTB1-5	To CPDC
L- (B) 2	FTB1-6	To CPDC
L- (B) 3	FTB1-7	To CPDC
L- (B) 4	FTB1-8	To CPDC
L+ (A) 1	FTB2-1	To CPDC
L+ (A) 2	FTB2-2	To CPDC
L+ (A) 3	FTB2-3	To CPDC
L+ (A) 4	FTB2-4	To CPDC
L+ (B) 1	FTB2-5	To CPDC
L+ (B) 2	FTB2-6	To CPDC
L+ (B) 3	FTB2-7	To CPDC
L+ (B) 4	FTB2-8	To CPDC
Note: *FTB denotes Filter Terminal Block.		

17 Figure 361 is a view of the NTRX25AC power filter kit used in the CCPE, CIPE, CTME, CMIS, CISM, and CMTA cabinets:

Figure 361 – NTRX25AC Power Filter Kit Assembly



18 Figure 362 reflects the power terminations for the CCPE, CIPE, CTME, CMIS, CISM, and CMTA cabinets.

Figure 362 – Power Connections for CCPE, CIPE, CTME, CMIS, CISM, and CMTA

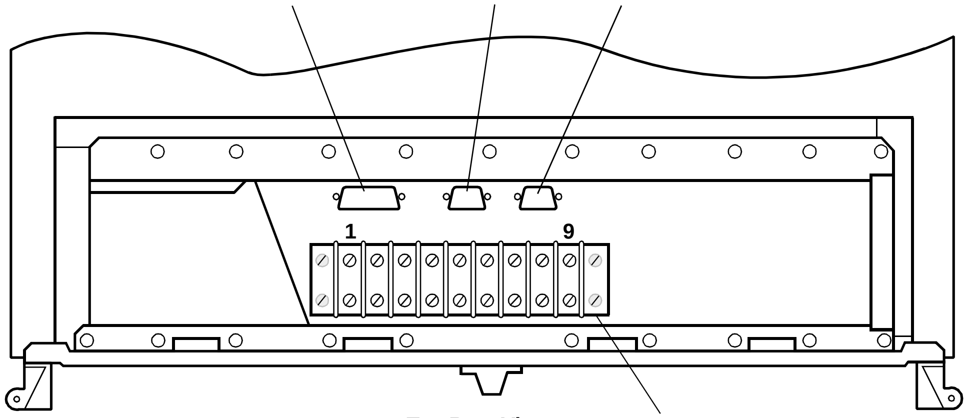
NTRX25AC Power Filter Kit 13 Position

Designation	*FTB Connection	External Connection
L- (A) 1	FTB1-1	To CPDC
L- (A) 2	FTB1-2	To CPDC
L- (A) 3	FTB1-3	To CPDC
L- (B) 1	FTB1-4	To CPDC
L- (B) 2	FTB1-5	To CPDC
L- (B) 3	FTB1-6	To CPDC
L+ (A) 1	FTB1-7	To CPDC
L+ (A) 2	FTB1-8	To CPDC
L+ (A) 3	FTB1-9	To CPDC
L+ (B) 1	FTB1-10	To CPDC
L+ (B) 2	FTB1-11	To CPDC
L+ (B) 3	FTB1-12	To CPDC
Logic Return	FTB1-13	Ref. Job Specs.

Note: *FTB denotes Filter Terminal Block.

19 Figure 363 is a view of the NTRX25AD power filter kit used in the CIOE, CMS7 and GPP cabinets:

Figure 363 – NTRX25AD Power Filter Kit Assembly



20 Figure 364 reflects the power terminations for the CIOE, CMS7 and GPP cabinets.

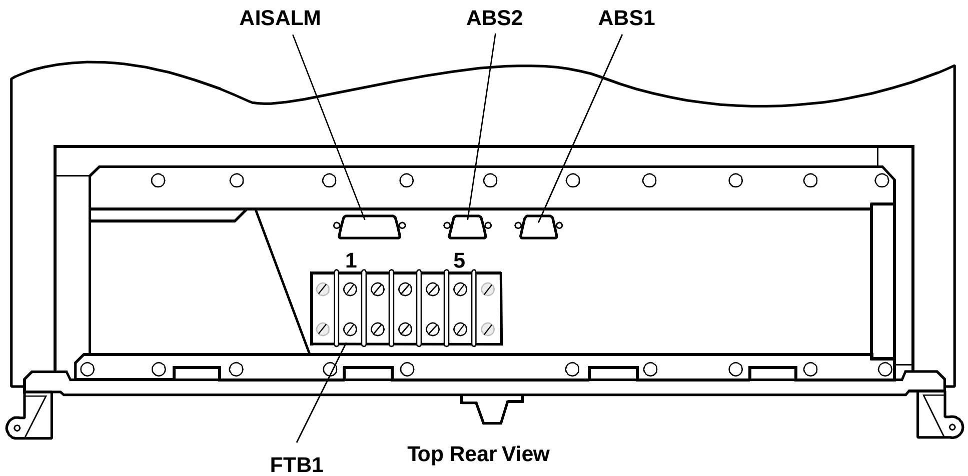
Figure 364 – Power Connections for CIOE, CMS7 and GPP

NTRX25AD Power Filter Kit 9 Position		
Designation	***FTB Connection**	**External Connection**
L- (A) 1	FTB1-1	To CPDC
L- (A) 2	FTB1-2	To CPDC
L- (B) 1	FTB1-3	To CPDC
L- (B) 2	FTB1-4	To CPDC
L+ (A) 1	FTB1-5	To CPDC
L+(A) 2	FTB1-6	To CPDC
L+ (B) 1	FTB1-7	To CPDC
L+ (B) 2	FTB1-8	To CPDC
Logic Return	FTB1-9	Ref. Job Specs.

Note: *FTB denotes Filter Terminal Block.

21 Figure 365 is a view of the NTRX25AF power filter kit used in the CDSN and CIDC cabinets:

Figure 365 – NTRX25AF Power Filter Kit Assembly



22 Figure 366 reflects the power terminations for the CDSN and CIDC cabinets.

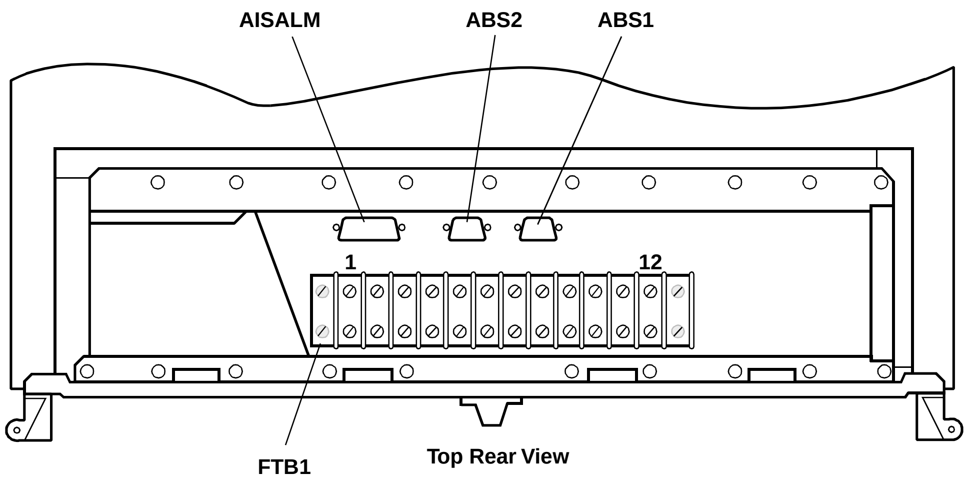
Figure 366 – Power Connections for CDSN and CIDC

NTRX25AF Power Filter Kit 5 Position		
Designation	***FTB Connection**	**External Connection**
L- (A) 1	FTB1-1	To CPDC
L- (B) 1	FTB1-2	To CPDC
L+ (A) 1	FTB1-3	To CPDC
L+ (B) 1	FTB1-4	To CPDC
Logic Return	FTB1-5	Ref. Job Specs.

Note: *FTB denotes Filter Terminal Block.

23 Figure 367 is a view of the NTRX25AJ power filter kit used in the CLCE cabinet.

Figure 367 – NTRX25AJ Power Filter Kit Assembly



24 The CLCE Model B cabinet will have either the 12 position Power Filter Kit or the 8 position Power Kit. The number of system level power cables required for the CLCE cabinet have been reduced and this results in the 8 position Power Filter Kit. Figure 366 reflects the power terminations for the Model B CLCE cabinet.

Figure 368 – Power Connections for CLCE

NTRX25AJ Power Filter Kit 12 Position

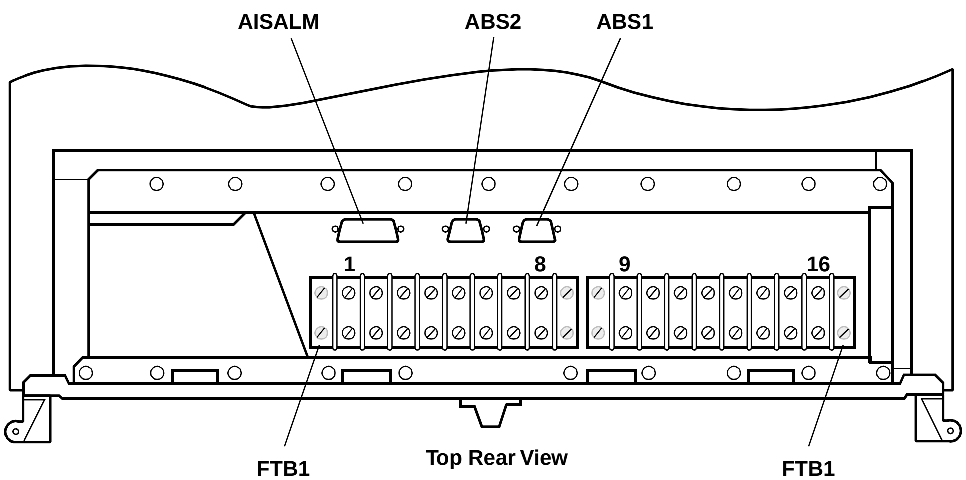
Designation	*FTB Connection	External Connection
L- (A) 1	FTB1-1	To CPDC
L- (A) 2	FTB1-2	To CPDC
L- (A) 3	FTB1-3	To CPDC
L- (B) 1	FTB1-4	To CPDC
L- (B) 2	FTB1-5	To CPDC
L- (B) 3	FTB1-6	To CPDC
L+ (A) 1	FTB1-7	To CPDC
L+ (A) 2	FTB1-8	To CPDC
L+ (A) 3	FTB1-9	To CPDC
L+ (B) 1	FTB1-10	To CPDC
L+ (B) 2	FTB1-11	To CPDC

Figure 368 – Power Connections for CLCE (Cont'd)		
NTRX25AJ Power Filter Kit 12 Position		
Designation	***FTB Connection**	**External Connection**
L+ (B) 3	FTB1-12	To CPDC
NTRX25AL Power Filter Kit 8 Position		
L- (A) 1	FTB1-1	To CPDC
L- (A) 2	FTB1-2	To CPDC
L- (B) 1	FTB1-3	To CPDC
L- (B) 2	FTB1-4	To CPDC
L+ (A) 1	FTB1-5	To CPDC
L+ (A) 2	FTB1-6	To CPDC
L+ (B) 1	FTB1-7	To CPDC
L+ (B) 2	FTB1-8	To CPDC
Note: *FTB denotes Filter Terminal Block.		

25 Figure 369 is a view of the NTRX25AB power filter kit used in the SNOPC cabinet.

26 The NTRX50AB cabinet is to be installed as a stand-alone cabinet. External power cabling from the PDC or CPDC to power filters on the cabinet is required.

Figure 369 – NTRX25AB Power Filter Kit Assembly



27 Figure 370 reflects the power terminations for the SNOPC cabinet.

Figure 370 – Power Connections for SNOPC

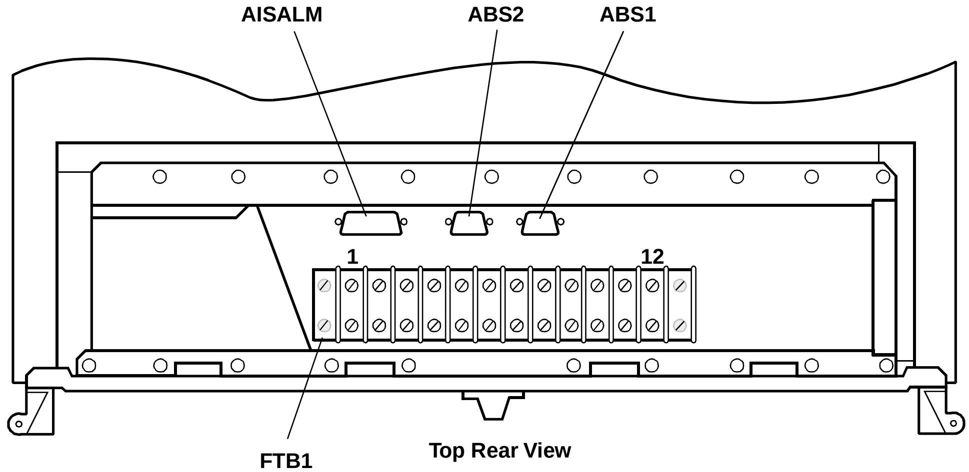
NTRX25AB Power Filter Kit 16 Position		
Designation	***FTB Connection**	**External Connection**
L- (A) 1	FTB1-1	To CPDC
L- (A) 2	FTB1-2	To CPDC
L- (A) 3	FTB1-3	To CPDC
L- (B) 1	FTB1-5	To CPDC
L- (B) 2	FTB1-6	To CPDC
L- (B) 3	FTB1-7	To CPDC
L+ (A) 1	FTB1-9	To CPDC
L+ (A) 2	FTB1-10	To CPDC
L+ (A) 3	FTB1-11	To CPDC
L+ (B) 1	FTB1-13	To CPDC
L+ (B) 2	FTB1-14	To CPDC
L+ (B) 3	FTB1-15	To CPDC

Note: *FTB denotes Filter Terminal Block.

31.6 Model B - Alarm and ABS Cabling

1 The AISLAM and ABS terminations are made at the top rear of the cabinets. Refer to Figure 371 for the location of the AISLAM and ABS terminations.

Figure 371 – AISALM and ABS Termination Location

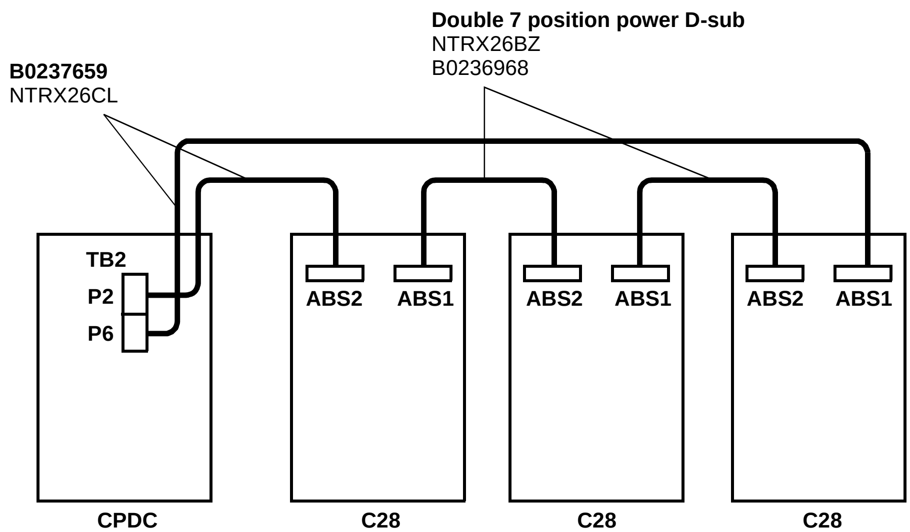


2 Refer to job specifications for the ABS runs. Model B C28 to Model B 28 cabinet ABS cabling will be connectorized on both ends. The ABS cable going from the CPDC to other cabinets will have a ring terminal on the CPDC end of the cable. All ABS cables terminating in the CPDC will terminate at Terminal Block TB2.

3 Some examples of Model B ABS cables are: NTRX26BZ, NTRX26BY, NTRX26CB, and NTRX26CL. An example of the ABS cabling between cabinets is reflected in Figure 372.

4 Figure 372 reflects only Model B C28 cabinets.

Figure 372 – ABS Cabling



Note: Quantities reflected above are only for this figure. Actual quantities will vary from site to site.

5 Refer to Figure 373 for additional connections at the CPDC for ABS cabling. Note that the ABS makes a loop back to the CPDC.

Figure 373 – Model B CPDC ABS Interconnections

CPDC ABS Interconnect

CPDC	TB	1st. Frame in lineup	Last frame in lineup
MSP Module NTRX41EA	TB2	P2	P6
	TB2	P3	P7
	TB2	P4	P8
	TB2	P5	P9

6 Route the ABS cables in the power shield of the cable trough. The ABS cables can be secured with the power cables as the cables exit the trough.

7 ABS cables are to be routed in the cable trough in the power cable shield.

8 ABS cables are to be identified at both ends. Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at the CPDC end of the cable.identification. The connectorized ends of both CPDC to cabinet and intercabinet cables should already be permanently identified by the cable manufacturer. If this has not been done, use the appropriate upper permanent peel-off label from the P0866901 to identify the connectorized end. Refer to event 07 (method 03-9057) for details.

9 The AISLAM cables can be secured with the power cables as the cables exit the trough. Route the AISLAM cables in the power shield.

10 Some of the different types of AISLAM cables are reflected in Figure 374. Additional cables may be designed as new configurations are deployed. Refer to job specifications for the cables PEC codes used on your site.

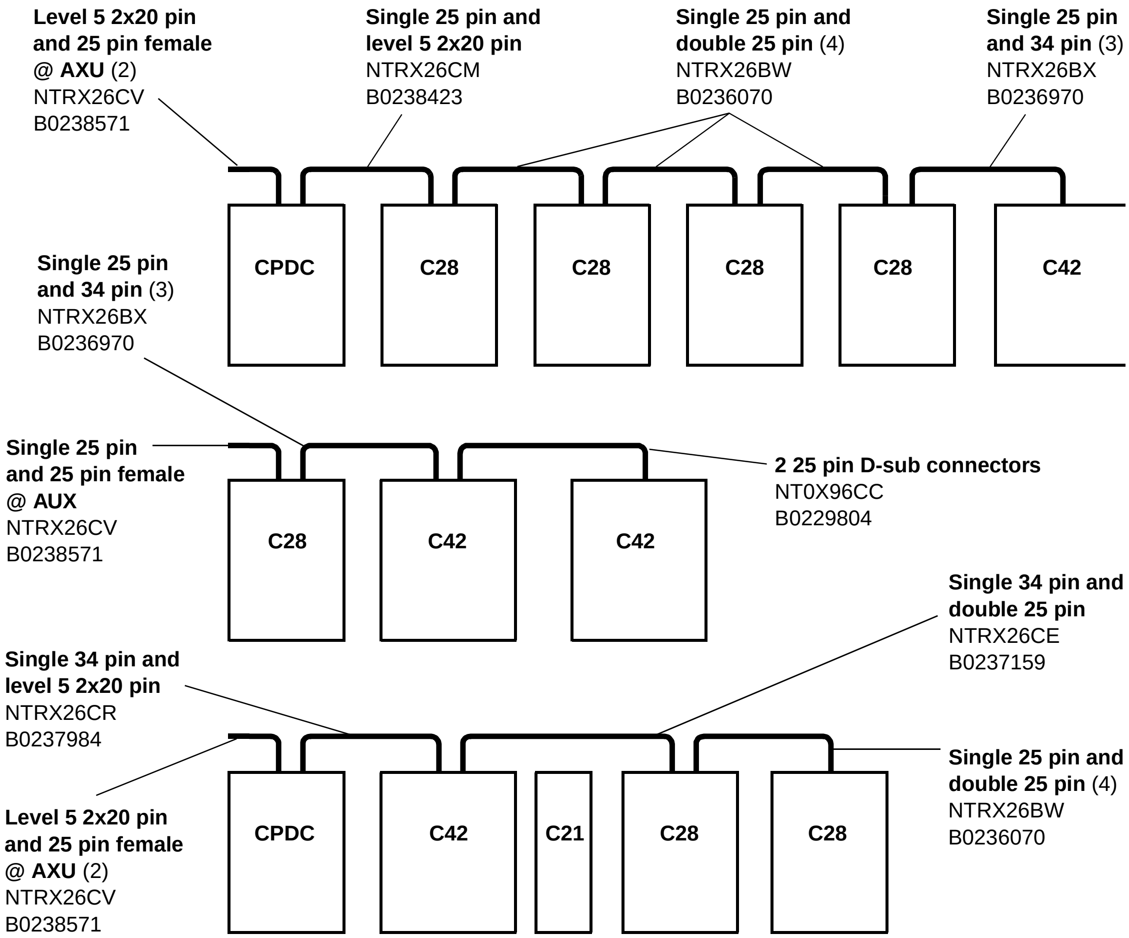
Figure 374 – AISLAM Cables for Model B Cabinets

Item	PEC	CPC	Description
1	NT0X96CC	B0229804	Conn PTL 10P 26CA e/w 2 25 pin D-Sub Connectors
2	NTRX26BW	B0236070	Molded Cable Assembly - Single 25 Pin and Double 25 Pin
3	NTRX26BX	B0236970	Molded Cable Assembly - Single 25 Pin and 34 Pin
4	NTRX26CD	B0237160	Molded Cable Assembly - Single 25 Pin and 25 Pin Female @ AUX
5	NTRX26CE	B0237159	Molded Cable Assembly - Single 34 Pin and Double 25 Pin
6	NTRX26CM	B0238423	Molded Cable Assembly - Single 25 Pin and Level 5 2x20 Pin
7	NTRX26CR	B0237984	Molded Cable Assembly - Single 34 Pin and Level 5 2x20 Pin
8	NTRX26CV	B0238571	Molded Cable Assembly - Level 5 2x20 Pin and 25 Pin Female @ AXU

11 The AISLAM cables will be multiplied between cabinets. Typically, there will be cables entering and existing the cabinet. These cables are referenced as *To Succeeding* and *To Preceding* cabinets.

12 Example of a typical lineup is reflected in Figure 375. Note that these are only examples and your site may be different.

Figure 375 – Typical Lineup with AISLAM Cables



13 Some of the cables have double 25-pin connectors. When a double connector is used, place the double connector on the cabinet first. The single end of the next cable is to be secured to the top of the double connector. Both cables are secured in place using screws.

14 When a cable with a double connector is installed on the last cabinet in the lineup, install Connector Cover (A0377672) on the top of the connector. When adding cabinets to an existing lineup, remove the connector cover and connect the adjacent cabinet cable to the double connector. Place the connector cover on the new cabinet cable. This will eliminate the need to remove alarm cables when doing an extension.

15 The AISLAM cables are found in the 1200 specification.

31.7 Alarm and ABS Cabling for Model B to Existing Model A

The following only applies to Model B cabinets being installed within an existing Model A cabinet lineup. Both cabinets must use the Horizontal Powering option. The following changes only apply to the Model B cabinet installed adjacent to the Model A cabinet. Changes are not required if additional Model B cabinets are installed within the lineup. If four Model B cabinets are being installed at the end of an existing Model A lineup, the only Model B cabinet requiring this change is the Model B cabinet installed adjacent to the "end" Model A cabinet.

1 Aisle Alarm and ABS cabling will be routed internally for Model B cabinet extensions within an existing Model A lineup.

2 Model B cabinets being installed within an existing Model A lineup will have Horizontal cabling option. All of the secondary power, Aisle Alarm, and ABS cables will be routed from the MSP to the bottom of the cabinet and coiled.

3 The Model B cabinet being installed adjacent to an existing Model A cabinet will require some minor modifications. Uncoil the cables located in the bottom of this Model B cabinet, and locate the Alarm and ABS cables. These cables must be removed and replaced with different cables. The cables must be replaced because the connectors on the ends of the cables are not compatible with the Model A FSP.

4 The replacement cables are:

NTRX1688 cable for Aisle Alarm
NTRX1684 cable for ABS.

5 Remove the Aisle Alarm Cable from the Model B cabinet and replace it with the NTRX1688 cable.

6 Remove the ABS cable from the Model B cabinet and replace it with the NTRX1684 cable.

7 The replacement cables are to be formed and secured into the cable form the "old" cables were removed from.

8 Refer to CARX04, Tables 3U and 3V, for additional information on the Alarm and ABS cables between an existing Model A cabinet and a Model B cabinet.

9 Ensure that ABS cables are identified at both ends.Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification of non connectorized cable ends. Cables supplied by the cable manufacturer already connectorized will have permanent labels applied by the manufacturer at the connectorized end. Refer to event 07 (method 03-9057) for details.

31.8 Model B - Miscellaneous Equipment Cabinet

1 The Model B Miscellaneous Equipment Cabinet (CMIS) can be configured as an EMC compliant (Closed) cabinet which houses Nortel supported equipment or as a Non-EMC (Open) cabinet which primarily houses Customer preferred equipment.

2 A Closed CMIS cabinet will house equipment which by itself is not EMC compliant. This cabinet will require bulkhead connector plates and cable filtering or shielding.

3 An Open CMIS cabinet will house customer preferred (Non-Nortel Supported) equipment. This cabinet will not require enclosure of input/output signals at the cabinet level.

4 Equipment that can be mounted in a Closed CMIS is as follows:

NTRX59AZ	LaMarche Inverter Kit
NTRX59AC	DTH/ROTL Kit
NTRX59AD	Audible/Visual Alarm Extension Kit
NTRX59AE	Pylon RG-2 Ringing Generator Kit
NTRX59AY	Inactive System Timing Circuit Kit
NTRX59AH	Audible Alarm Cutoff Unit Kit
NTRX59AJ	Multiple Loop Test Applique Shelf Kit
NTRX59AU	Remote Maintenance Module
NTRX59AX	1014U Universal Shelf Kit
NTRX34LA	480 Pin Terminal Block Assembly CMIS Universal Connector Plate (24 x 25 pin)
NTRX56FA	Right Hand Bulkhead Kit

5 Equipment that can be mounted in an Open CMIS is as follows:

NTRX59AK	Case/Datatel RM4200 -48V dc Modem Shelf Kit
NTRX59AL	Dantel Digital Alarm Scanner (DMS-100 to SCC Interface) Kit
NTRX59AP	Alarm Ext. Kit
NTRX59AS	GDC Modem Shelf
NTRX59AN	Cook DA Shelf Hardware
NTRX59AV	UDS RM16M-23DC Modem
NTRX59AW	ESTU/ITM Kit

6 The following equipment must be isolated from the cabinet:

NTRX59AB	CMIS LaMarche Inverter Kit
NTRX59AF	CMIS Inactive System Timing Circuit Kit
NTRX59AG	CMIS Common Equipment Shelf 115V ac Kit
NTRX59AK	CMIS Case/Datatel RM4200 -48V dc Modem Shelf Kit

7 The items listed in paragraph 6 must have their chassis ground connected to the Logic Return bus bar of the cabinet.

8 When the "Open" CMIS is used, route the cables through the bulkhead in a manner that will prevent cable damage against the bulkhead openings.

9 Individual methods will be developed detailing the installation of the CMIS optional equipment. Method references will be added to this subsection as they are completed.

31.9 Raised Floor Cabling

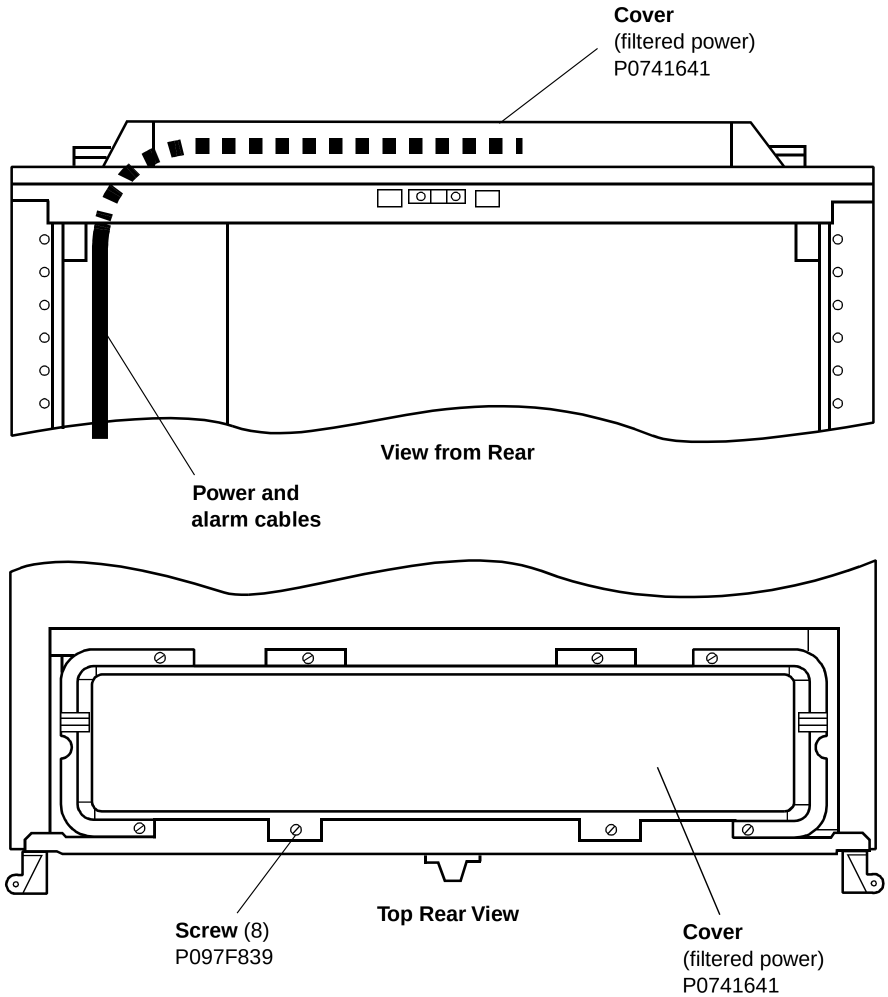
1 Power cables in a raised floor installation may enter the cabinet bulkhead through the bottom side of the cabinet.

2 Bottom fed power cables are to be routed up the left-hand side of the bulkhead viewed from the rear. The power cables are then to be routed to the right and formed to the power filter strips on the top of the cabinet.

3 Cable troughs are not typically installed when cabinets are mounted on a raised floor. A cover (P0741641) is to be installed on the top of the cabinets once the cabling is completed. Do *not* install the cover until all power, grounding, and alarm cabling is completed.

4 Refer to Figure 376 for installation of cover (P0741641).

Figure 376 – Top Filter Power Cover Installation



Note: Use existing screws in the top of the cabinet to secure the cover in place.

5 The power cables are to be secured in a separate bundle.

6 Route the Alarm cables on the left side of the bulkhead and secure next to the power cables. The alarm cables are to be secured in a separate bundle.

32.0 Model B C28 System Cabling

32.1 Guidelines for System Cabling Model B Cabinets

1 The following guidelines are for routing cables within the C28 cabinet lineup. The examples given are for top feed cabinets. Reverse the forming in the bulkhead for bottom feed jobs. Bottom feed cabinets normally do *not* have cable troughs and the cables are routed under a raised floor. All references made to right and left are made when viewed from the rear of the C28 cabinet. Any exceptions to this will be identified.

2 All signal cables will be connected from bulkhead to bulkhead for each cabinet in the lineup. Cables are to be routed through the cable troughs as indicated by the cable tags. All connections are to be made at the bulkhead of the cabinets. Exceptions to this will be noted in the job specifications. Some of the cables connecting to equipment mounted in the Model B CMIS cabinet will pass through the bulkhead and connect directly on the equipment.

3 Each C28 cabinet with the exception of the CPDC and CMIS will have four shelves. Group the cables going to the top two shelves together and form into a single bundle. The cables going to the top two shelves are to be secured as far to the right of the bulkhead as practical. Form the cables going to the bottom two shelves as far to the left as practical. A typical layout of the cables in the bulkhead is shown in Figure 377.

4 Use lacing cord to secure cables to the top cable arm in the C28 equipment frames. Verify with your customer if lacing cord or ty-raps are acceptable for this location.

5 Do *not* pull the cables too tight. Leave a small amount of slack in the signal cables between the termination point on the bulkhead and the last ty-rap support used. The slack is to be consistent throughout the office.

6 Secure the connectorized cables to the bulkhead by way of the screws in the connector hood. Use caution when tightening the securing screws in the connector hood. Tighten each side of the connector until the connector is secured.

7 Typically it is better to run all cables going to a cabinet at the same time. It is recommended to run the cables closest to the CPDC first.

8 Cable tags will define the origination and termination points for the cables connecting within the bulkhead of each C28 cabinet. A typical cable tag is shown in Figure 378.

9 Note that the shelf position and bulkhead are shown as "65LE." 65LE means the personality plate at position 65 on the left bulkhead. The right bulkhead is referenced as "RI."

10 In Figure 378, the connection point on the personality plate is C00 for CTME and C12 for CIOE.

Figure 377 – Typical Layout of Cables in Bulkhead

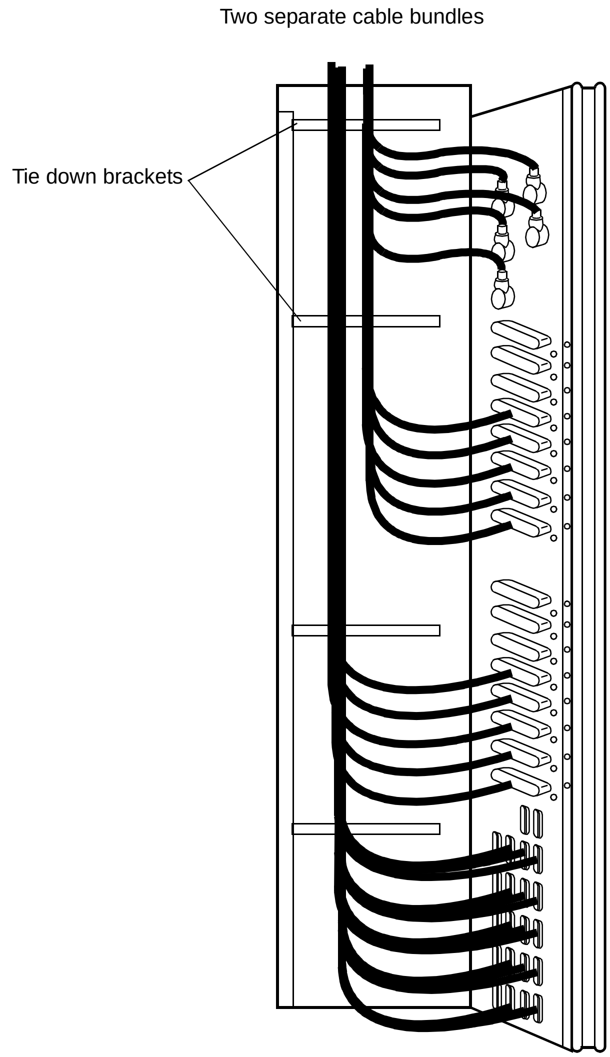


Figure 378 – C28 Cabinet Cable Tag

H20968-00 1400-00 CA0X04 ACIO00 1AB 12 40
ADDNT0X26AK NPS25078-L1 B0208264LENGTH
FT: 26.2 METERS: 8.0 NOTE*****ORIGNATION
***** *****TERMINATION ***** CTME 000 65LE
CIOE 001 32LE------------- -------------C00
C12ODS: -- ODL: 0.57M TDS: -- TDL: 1.84M
SHLD: 3ROUTE: B09,B10,A10,A08

32.2 Fiber Optic Cable Guidelines

1 Care must be taken when running fiber cables. The two basic types of fiber cables used will be Quad and Duplex. Quad cable consists of four fiber cables inside of a protective sheath. Duplex cable consists of two fiber cables inside of a protective sheath. Several "Rules" of care must be taken when running/routing fiber cables.

- Always exercise care when running and handling fiber cables. Never handle the fiber cables by the ends.
- Avoid sharp bends. The minimum bend radii for the different cables during installation (under tensile load) and for long durations (once formed) are as follows:

Cable	Installation	Long Term
Single Strand	5.0 cm	3.0 cm
Duplex	14.0 cm	7.0 cm
Quad	16.0 cm	8.5 cm

Note: Refer to Event 07, 03-9057 for additional information on fiber cables.

2 Care must be taken when forming the fiber cables. Do *not* pull on the connector end while forming:

- Pull fiber cable from the breakout point. Do *not* pull each individual fiber cable.
- Protect fiber cable from sharp edges. Use Guard Extrusion (P0663893) or suitable material to cover sharp edges.

3 Disconnected fiber connectors and receptacles should be covered with a protective cap when not in use. Refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements," for cleaning fiber cables.

4 Only remove the protective caps when the cable is being terminated.
To prevent circuit pack damage, the following general guidelines should be adhered to:

- Remove the fiber receptacle dust cap from the paddleboard, with gentle finger pressure. Do *not* use pliers or any other tool which applies direct pressure to the barrel. Excessive force on the dust cap will break the plastic receptacle barrel.
- *Lightly* insert the fiber cable ferrule into the barrel of the paddleboard until the connector pin is pressing against the barrel.
- While applying *light* pressure, rotate the connector until the pin and the slot are aligned and insertion of the cable is complete.
- When the cable is *completely* inserted, twist the connector clockwise until mating is complete.

5 If removal of the fiber cable is required, push the connector in and twist it gently counter-clockwise until the pin and slot are aligned. Gently pull the connector away from the paddleboard.

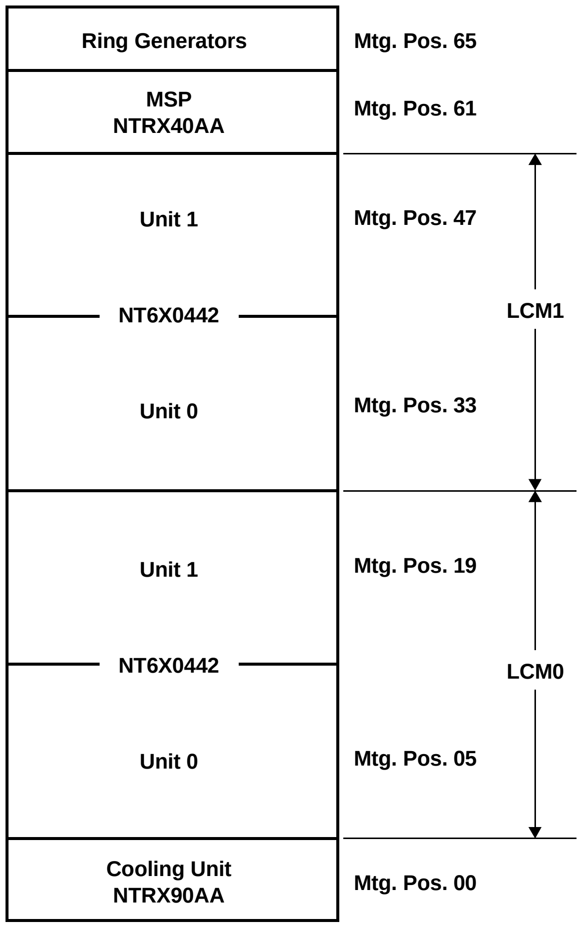
6 Do *not* secure the individual fiber leads together at the bulkhead assemblies.

7 The fiber cables are to be formed through the bulkhead assemblies to their respective paddleboard.

32.3 Model B CLCE NTRX30CA

1 The physical layout of the Model B CLCE cabinet is shown in Figure 379.

Figure 379 – Physical Layout of Model B CLCE

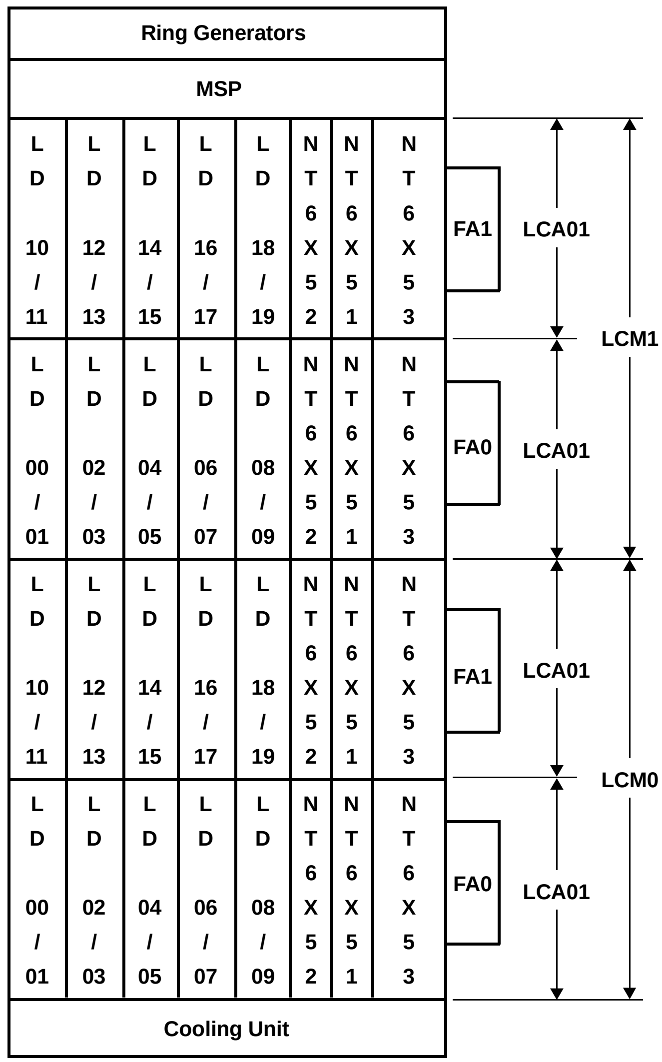


2 Figure 380 reflects the line drawer layout within the LCMs. This figure is only for reference. Actual location of FA units will be different from this figure.

3 Two ringing generators are required per CLCE. There are three different generators as follows:

North America	NT6X30HA
China/Australia	NT6X30EA
United Kingdom	NT6X30GA

Figure 380 – Layout of Line Drawers in Model B CLCE



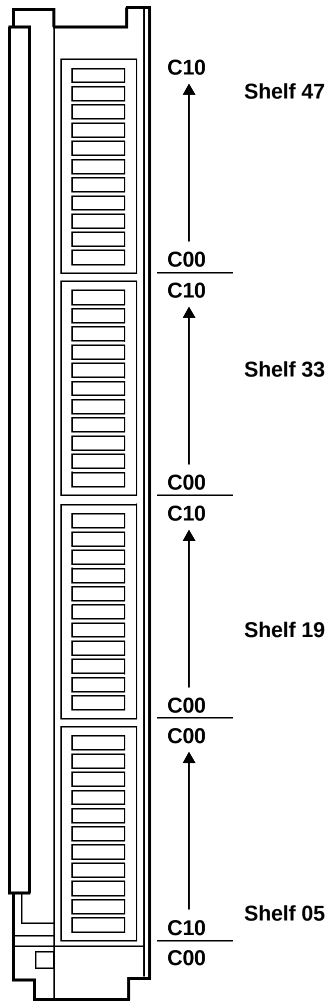
4 Cutover straps are provided for each line drawer. The PEC code for the cutover strap is A0285591. Some of the line drawers may need to be pulled out to gain access to the cutover straps.

5 Connections between the bulkhead and backplane are to be completed in the factory. Field technicians are to make connections only to the bulkhead.

6 Figure 381 reflects the cable connection locations on the personality plates.

7 All connections to the CLCE will be made at the bulkhead by way of connectorized cables. The connectorized cables will be either 32-pair or 64-pair cables.

Figure 381 – Model B CLCE Cable Connection Locations



Bulkhead removed showing personality plate

8 Refer to the cable tags for the connection points for each cable.

9 Cabinets may be delivered to site with line drawers already installed. Field personnel are instructed to check the harnesses are properly formed and ty-rapped.

10 Verify the proper dressing by pulling each line drawer out at the front of the cabinet. The following items should be checked:

- The last line card in the drawer should be accessible when the line drawer is fully extended at the front of the cabinet.
- The ty-raps which secure the cables on both the line drawer and associated spring must not be loose.
- The ty-raps should not interfere with the movement of the drawer or the cabling.
- Ensure that the cables are in a tight bundle and that the bottom of the bundle is no less than approximately 1/4 inch above the flange/kickplate at the rear of the line drawer.
- Ensure that the A and B line connectors are assembled using a double hood.

11 If cabinets are delivered to site without line drawers installed or if deficiencies are found with the dressing, the following steps must be followed.

12 Connect the Upper (Odd A and B) line connectors.

13 Connect the C/D connector (associated cable is the control cable).

14 Connect the Lower (Even A and B) line connectors. The line cable associated with the lower connectors should be positioned in front of the control (C/D) cable.

Note: If applicable, any shielded cable should be positioned such that it faces to the rear/outside of the cabinet.

15 Ensure that ty-raps are positioned around the cables as shown in Figure 382. Add ty-raps if any are missing.

16 Form the cables in a tight bundle at the rear of the drawer. Make a 180-degree turn at the bottom of the drawer. Ensure that the bottom of the cable bundle is approximately 1/4 inch above the flange at the bottom rear of the line drawer.

17 Place a ty-rap around the cable bundle and secure it to the molded ty-rap base on the line drawer. Refer to Figure 382.

18 Place a ty-rap around the bundle and the control spring. The location of this ty-rap is approximately 1.25 inches above the bottom tab of the control spring. This will locate the ty-rap between the 2 tabs on the control spring.

19 Add ty-rap around the bundle at the mid point in the 180-degree turn at the bottom of the form.

20 Use side cutters to trim the excess ty-rap flush where the ty-rap locks. Ensure there are no sharp edges on the ty-rap. Dispose of ty-rap waste in a safe manner.

21 Turn the heads of the ty-raps inward so that they are hidden from view.

22 Verify the proper dressing by pulling each line drawer out at the front of the cabinet. The following items should be checked:

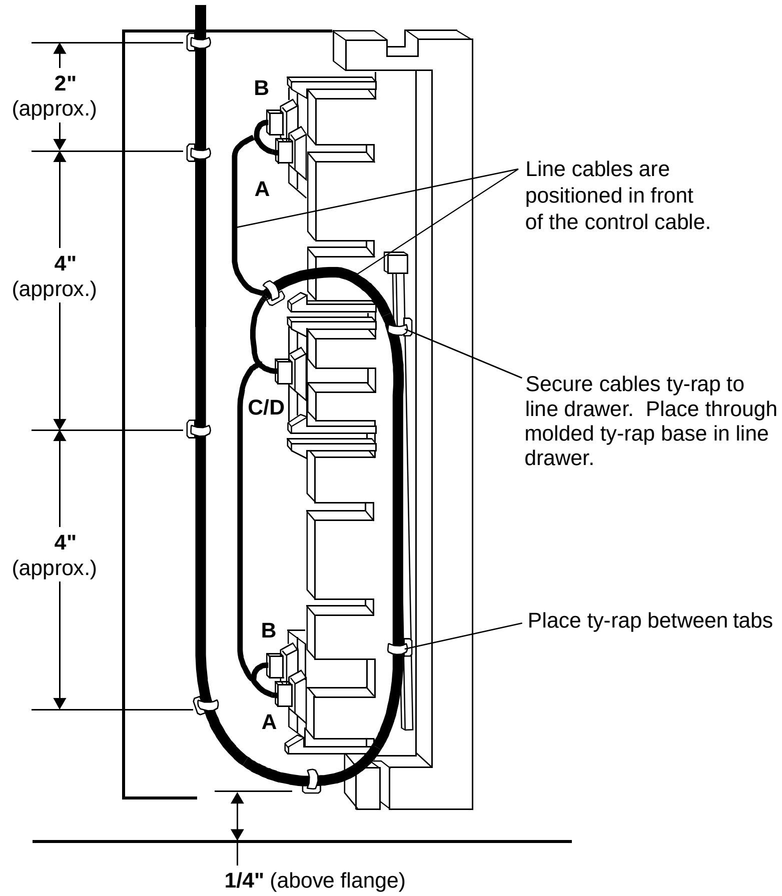
- The last line card in the drawer should be accessible when the line drawer is fully extended at the front of the cabinet.
- The ty-raps which secure the cables on both the line drawer and associated spring must not be loose.
- The ty-raps should not interfere with the movement of the drawer or the cabling.
- Ensure that the cables are in a tight bundle and that the bottom of the bundle is no less than approximately 1/4 inch above the flange/kickplate at the rear of the line drawer.
- Ensure that the A and B line connectors are assembled using a double hood.

23 The A and B line connectors (odd and even) should have been assembled using a double hood (2 x 32 hood). If the double hood is not present, a ty-rap must be placed around the A and B connectors as shown in Figure 383. A small ty-rap should be in place around the hood of each connector.

Ensure that the ty-rap head is correctly positioned; adjust as required. Place another ty-rap around the two connectors to hold them in place. Refer to Figure 383 for the position of these ty-raps. If this ty-rap is not used, the connectors may not remain securely in place.

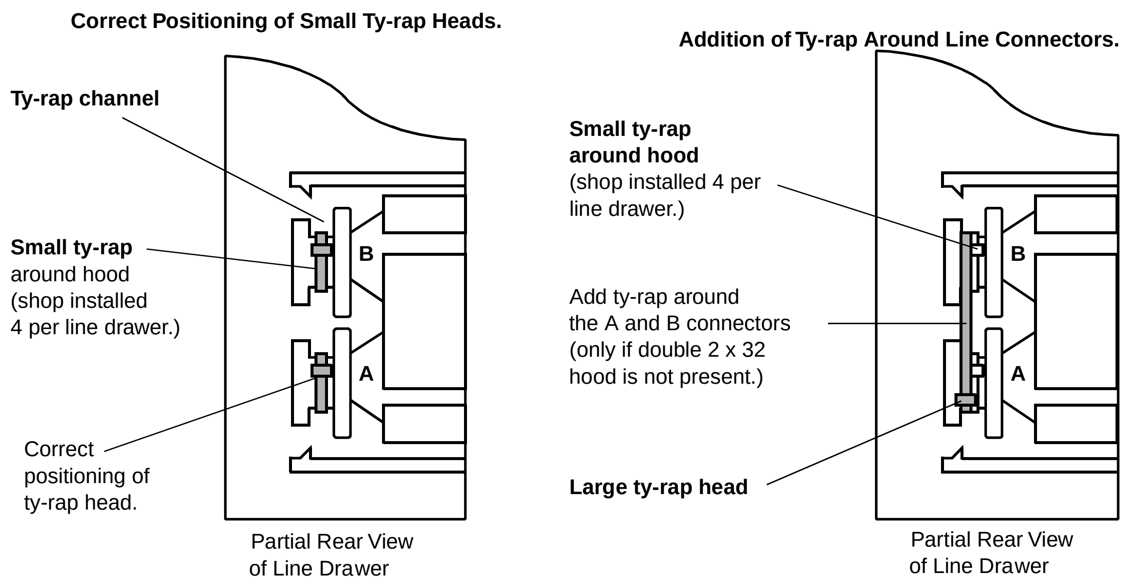
24 Prior to K-date (maximum of two days), check all A and B connectors at the rear of the line drawers to ensure they are properly seated.

Figure 382 – Rear View of Line Drawer for CLCE



Rear of Line Drawer for CLCE

Figure 383 – Partial View Line Connector Assembly at Rear of Line Drawer

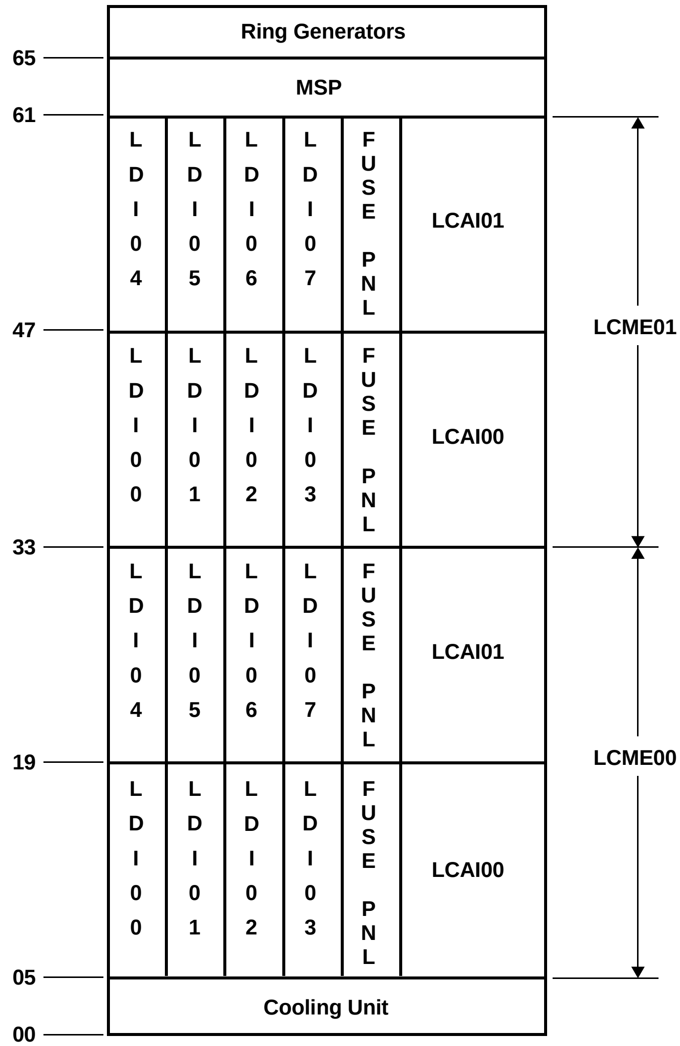


Note: If the double 2 x 32 hood is present, the large ty-rap is not required.

32.4 Model B CLMI NTRX30DA

1 The physical layout of the Model B CLMI cabinet is shown in Figure 384.

Figure 384 – Model B CMLI Physical Layout



Front View

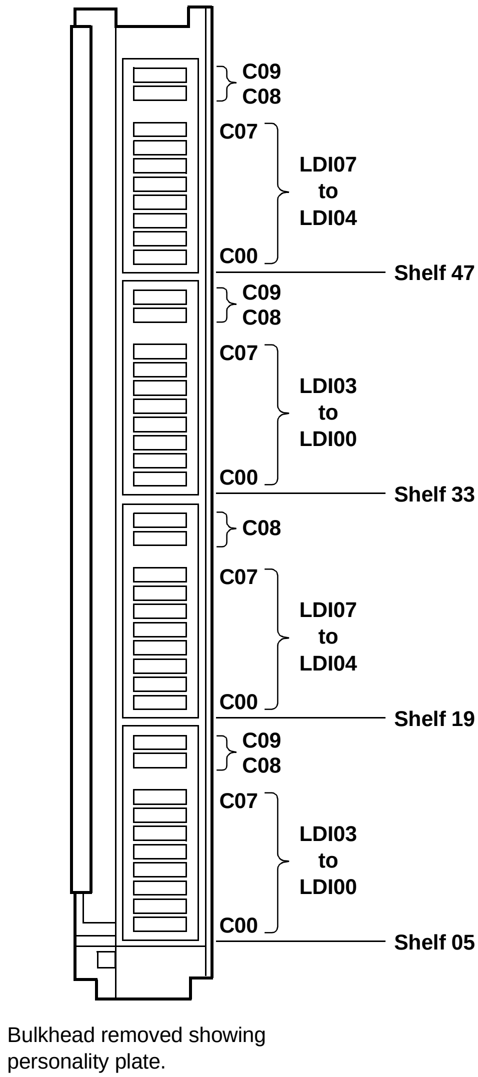
2 The MSP used on the CLMI cabinet is NTRX40AA. This MSP is part of NTRX30PE (B0238002) Modular Supervisory Kit - CLMI Model B. The necessary cables, labels, and mounting hardware are included in the kit.

3 Two ringing generators are required per CLMI. There are three different generators as follows:

North America	NT6X30HA
China/Australia	NT6X30EA
United Kingdom	NT6X30GA

4 Figure 385 reflects the cable connections on the personality plates in the CLMI cabinet.

Figure 385 – Model B CLMI Cable Connection Locations



32.5 Model B CTME NTRX32CA

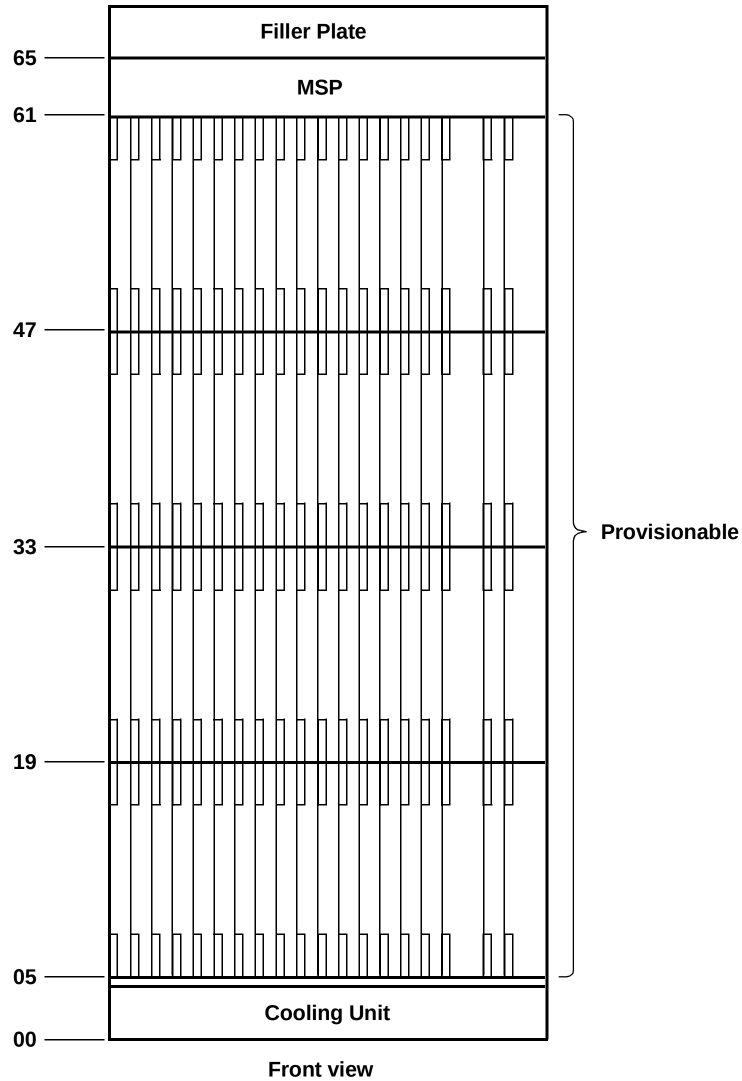
1. The physical layout of the Model B CTME cabinet is shown in Figure 386.

2. The CTME cabinet can be configured in different ways, depending upon the equipment requirements. Refer to the job specifications for the various equipment for your CTME.

3. The MSP used on the CTME cabinet is NTRX40AA. This MSP is part of NTRX32EL, NTRX32EM, or NTRX32EN Modular Supervisory Kit - CTME Model B. The necessary cables, labels, and mounting hardware are included in each kit. The kit required will be consistent with the equipment installed in the cabinet.

4. The personality plates for the CTME vary with the equipment requirements. Each personality plate is stenciled with the connector numbers. Refer to the cable tags for the shelf and connector number for cable connections.

Figure 386 – Model B CTME Physical Layout



32.6 Model B CIOE NTRX33DA

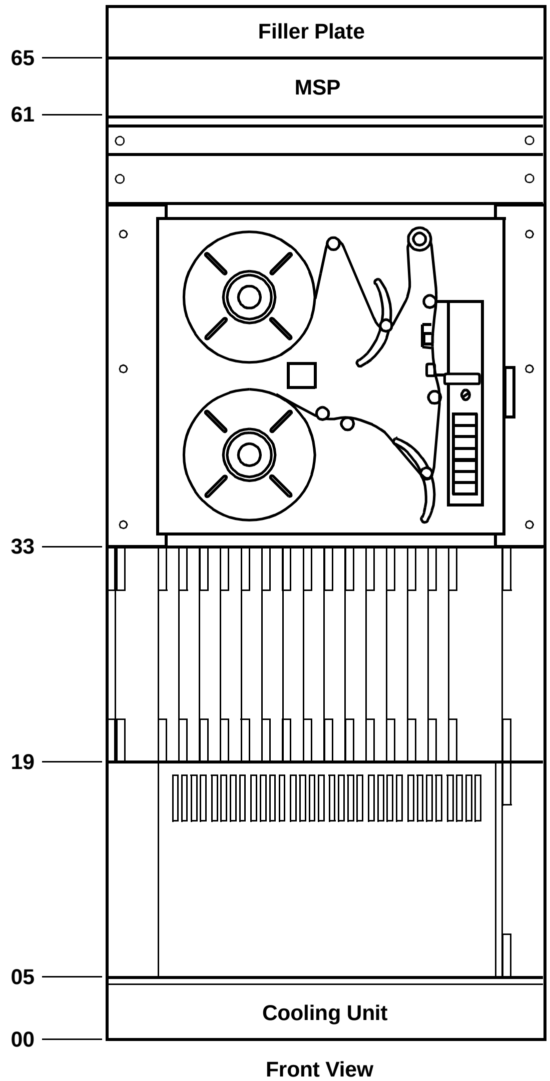
1 The physical layout of the CIOE cabinet will vary from site to site. There are several options that are job specific that make the configuration different. An example of a CIOE cabinet is shown in Figure 387.

2 The shelf provisioning information will be provided by the job engineer. The basic cabinet will include the MSP, IOC, and a cooling unit. Options that are job specific are MTD, DDU, DPP, and Stratum.

3 The equipment mounted in the CIOE cabinet have specific shelf mounting positions as shown in Figure 388.

4 Personality plates in the bulkhead vary depending upon the specified equipment. Refer to your cable tags for the shelf and connector position for making terminations.

Figure 387 – Model B CIOE Physical Layout



5 DDU, DPP, and MTD must be mounted in the same cabinet or the adjacent cabinet.

6 Normally, the CIOE will be provisioned with the various equipment in the factory. If the equipment is shipped directly to site, exercise care when removing the equipment from the shipping cartons. Refer to Figure 389.

7 Several documents are to be ordered by the Spec. Engineer and shipped with the equipment. These documents are:

ADRX33DA	Assembly Drawing for CIOE Cabinet
LWRX33DA	Loose Wiring Drawing for CIOE Cabinet
SRRX3371	Shop Aid Drawing for CIOE Cabinet
SRRX3372	Shop Aid Drawing for CIOE Cabinet

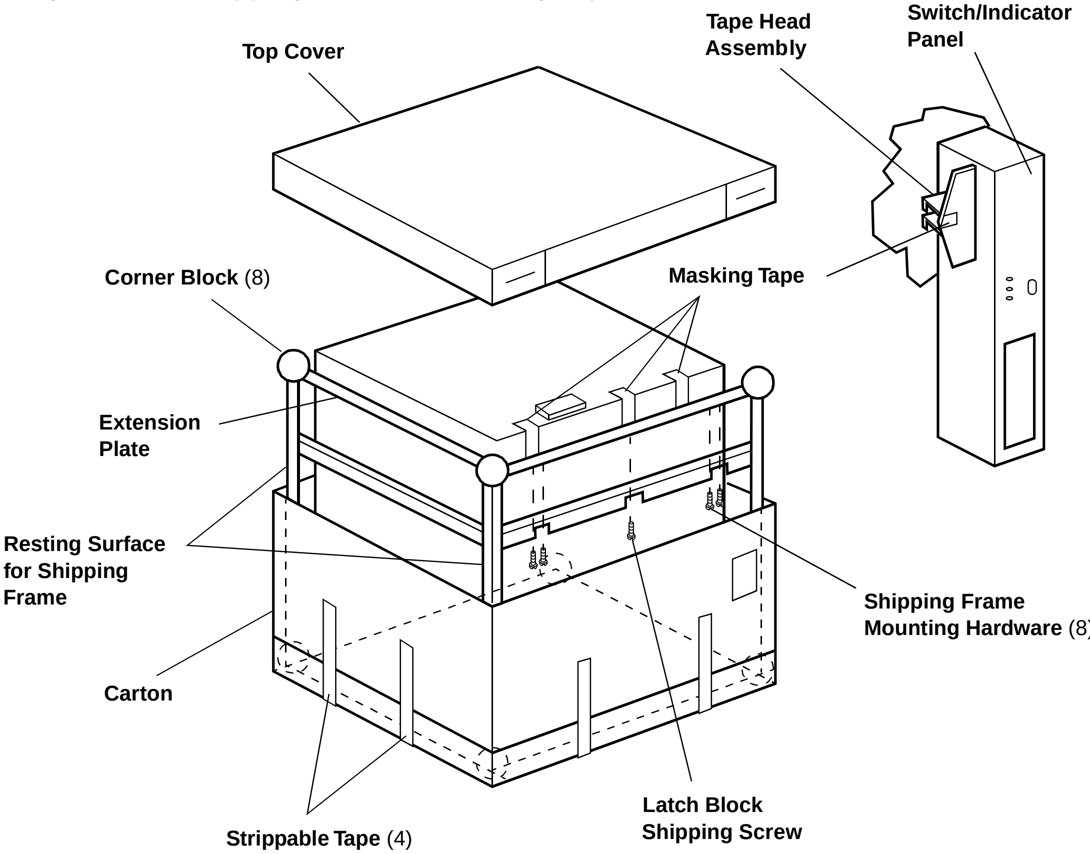
8 Notify your Job Engineer if these documents are not supplied when the equipment is to be field installed.

9 When the MTD is factory installed, remove the shipping brackets mounted below the MTD prior to positioning the cabinet in a lineup.

Figure 388 – Equipment Mounting Positions in CIOE

Description	CPC Code	Mounting Position
Modular Supervisory Panel (MSP)	NTRX40AA	61
Distributed Processing Peripheral (DPP)	NT8X48AD	33
Stratum II Remote -48V	NT3X95AB	05
Stratum 2.5 Remote	NT3X95BB	05
Stratum II Remote -60V	NT3X95AC	05
Magnetic Tape Drive (Cook) -48V	NT0X44AB	33
Magnetic Tape Drive (Cook) E/W 50HZ -48V	NT0X44BB	33
Input/Output Controller (IOC) -48V / -60V	NT1X61AD	19
Dual Disk Drive Shelf (DDU) -48V / -60V	NT4X00FA	05
Cooling Unit Assembly (10") -48V / -60V	NTRX91AA	00

Figure 389 – Shipping Carton - Cook Mag Tape Drive



10 The following paragraphs are to be followed if the MTD unit is shipped separately:

a. The tape drive unit is shipped in a special shipping/checkout frame within the shipping carton. Refer to Figure 389.

b. To unpack the tape drive, first cut the strapping and remove the top cover.

c. Using the shipping frame, lift the tape drive unit out of the carton and place it on a suitable surface in the upright position.

Caution: The unit weighs approximately 140 lb. (63.56 kg.). Two people are required to lift the unit from the shipping container.

d. Do *not* allow the weight of the tape drive unit to bear on the servo-regulator card. Support the tape drive unit under the front panel and under the card rack or heat sink structure.

e. Place the tape drive unit and the shipping frame on a suitable surface in an upright position.

f. Remove the tape holding the front dust cover closed. Open the dust cover and remove the tape holding the head flux gate closed.

g. Remove the latch block shipping screw securing the latch block to the shipping frame. Refer to Figure 389.

h. Open the front door of the MTD by using a screwdriver (NR1324 or T1324). Insert the screwdriver in the securing hole, and turn the screw counter-clockwise until fully withdrawn. Do *not* leave the front panel open, only unlatched.

11 After unpacking and inspecting the MTD for damage, install it in the CIOE per the following:

a. Using an Allen wrench, remove the safety block from the edge of the front panel, just below the upper hinge pin.

b. Using a Phillips screwdriver (T9950 or NR3110), remove the two screws holding the door stay to the front panel.

c. With the dust cover closed, swing tape drive unit out. Lift the tape drive unit up and off the hinges and place aside.

Caution: Retain the bronze hinge washer under top hinge.

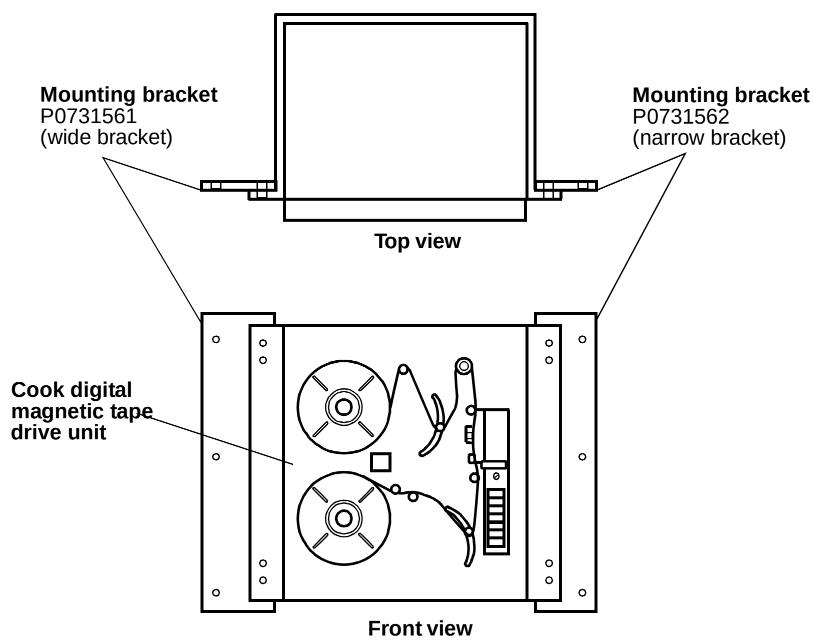
d. Using a socket wrench, remove the eight nuts holding the rear cover (housing) and hinge blocks to the shipping frame.

e. Remove rear cover (housing) from shipping frame and remove the eight screws from the rear cover.

f. Install mounting brackets to rear cover, using the previously mentioned screws and nuts.

g. Install the bracket (P0731561) (the wider one) on the left hand side of the rear cover looking from the front and install the other bracket (P0731562) (the narrower one) on the right hand side. Refer to Figure 390.

Figure 390 – Mounting Details - Cook Mag Tape Drive



h. Install the rear cover with mounting brackets on the designated frame using mounting screws supplied.

i. Lay the bronze washer on the top hinge block, then remount the tape drive unit on the hinge.

j. Re-install the hinge safety block and the front panel door stay.

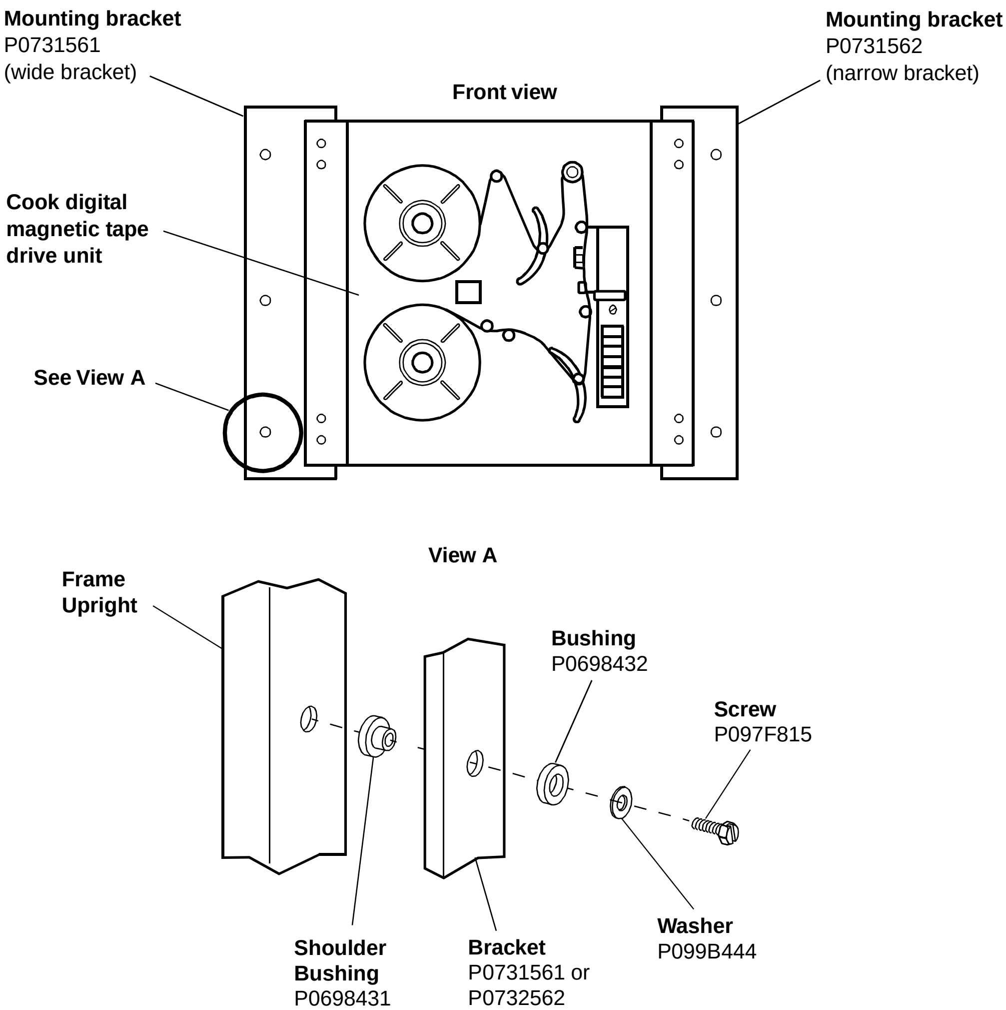
k. Use three people, two in the front of the frame to lift unit and one in the rear to hold it in place. After lifting and placing the unit at the proper location, one person in front and one in rear should hold it while the third person installs the mounting screws to the frame upright. Refer to D410 drawing for the mounting location.

12 The Cook Magnetic Tape drive must be isolated from the framework. The isolation and mounting hardware is supplied in NT0X44AD (B0213601) kit consisting of the following material:

6	P0698431	Shoulder bushing
6	P0698432	Bushing
6	P097F815	Screw
6	P099B444	Washer
1	B0214797	NT0X2837 Cable
1	B0215012	NT0X4404 Cable
1	P0731561	Bracket (left)
1	P0731562	Bracket (right)

Refer to Figure 391 for isolation material stackup.

Figure 391 – Isolating Material for Cook Mag Tape Drive



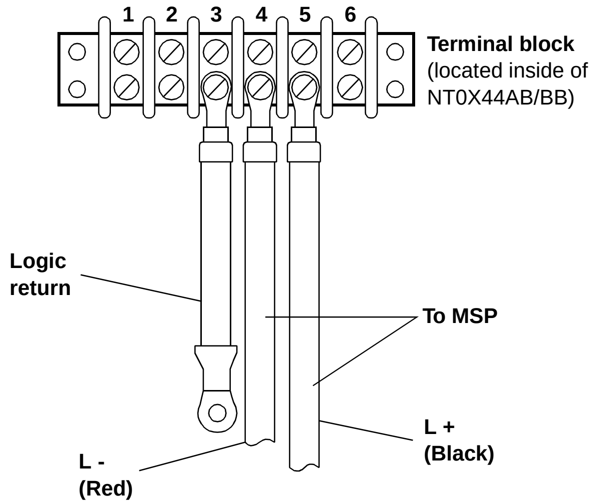
13 Power connections to the power supply of the MTD are made by way of a terminal strip on the bottom edge of the power supply, PS1TB1. The power cables will be located on the left rear upright of the cabinet. Remove the wires from the upright and make the connections to PS1TB1 as shown Figure 392.

14 These power leads should run from MSP down the left upright of the cabinet (facing rear) to the mag tape drive unit and enter through the cable cutout at the top left side. Go to the front of CIOE and open the mag tape drive front cover.

15 Use a screwdriver to release the latch and open the unit all the way to your left. Add adhesive mounting base for ty-raps at three places to support power leads inside the back cover.

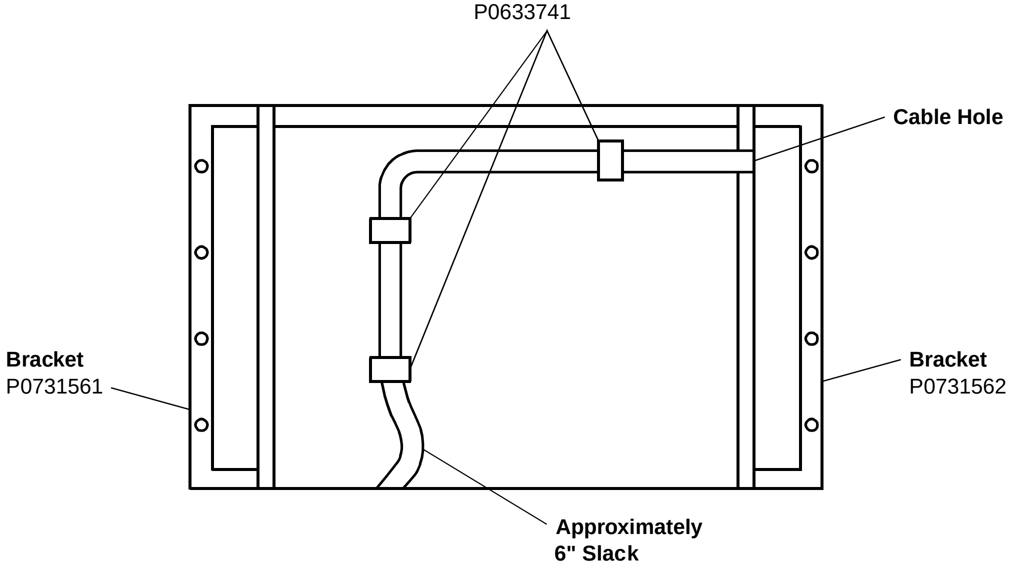
16 Leave approximately six inches of slack between last support and terminating point so the unit can be opened without putting pressure on the cable.

Figure 392 – MTD Power Connections



17 Dress the cable so it will not rub against the bottom grating when opening and closing the unit as shown in Figure 393.

Figure 393 – Inside Power Wiring - Cook Mag Tape Drive



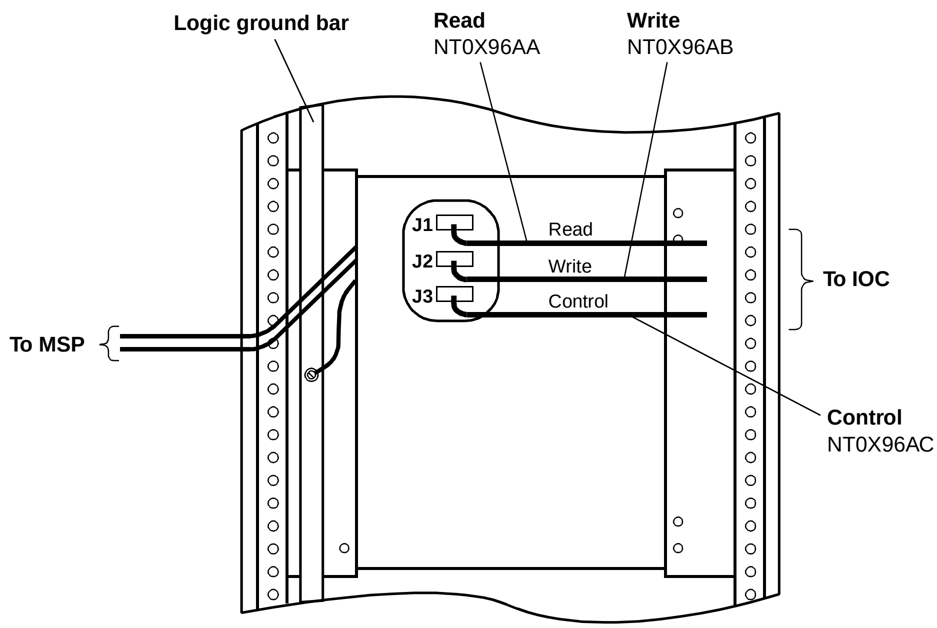
Front View - Looking at back cover, unit open

18 Connection to the tape drive unit control status and data function is made with three switchboard cables with appropriate connectors supplied with the unit.

19 The maximum length of each switchboard cable is fifteen feet between the MAG tape unit and its associated controller.

20 These switchboard cables are identified as NT0X96AA Read, NT0X96AB Write, and NT0X96AC Control. They should run horizontally along the right rear upright and down or up to I/0 shelf. Use two adhesive mounting bases on the outside of the case for ty-raps to hold the cable. The slack is to be stored in the vertical or the bottom of the cabinet. Refer to Figure 394 for Read, Write, and Control cable locations on MTD.

Figure 394 – MTD Connections



Rear View of NT0X44AB/BB

21 All cables connecting from the IOC to MTD will be direct and not through the bulkhead.

22 The following directions are to be followed if the DPP unit is shipped directly to the site:

- Before unpacking the DPP (NT8X48AD), remove the "Unpacking Instruction Sheet" and "DPP System Packing List" from the top shipping carton. As the DPP is unpacked from the shipping cartons, check each received item so that any material shortages can be identified as early as possible. Any critical shortages identified should be reported, as discovered, to Nortel.
- The DPP is drop-shipped to site on a pallet and is enclosed in a heavy cardboard box. The DPP consists of two chassis that are attached together and bolted to a self-standing metal shipping frame.
- A space located beneath the lower shipping pad contains the hardware, cables, and miscellaneous parts required for installation. Manuals and documentation are also located here along with the defect tracking map for each disk (provided and required for the 140 MB disk only).
- When unpacking, ensure that all individual items are removed from boxes, especially under lower shipping pad.
- A third box may be provided, depending on the spare parts ordered with the DPP.

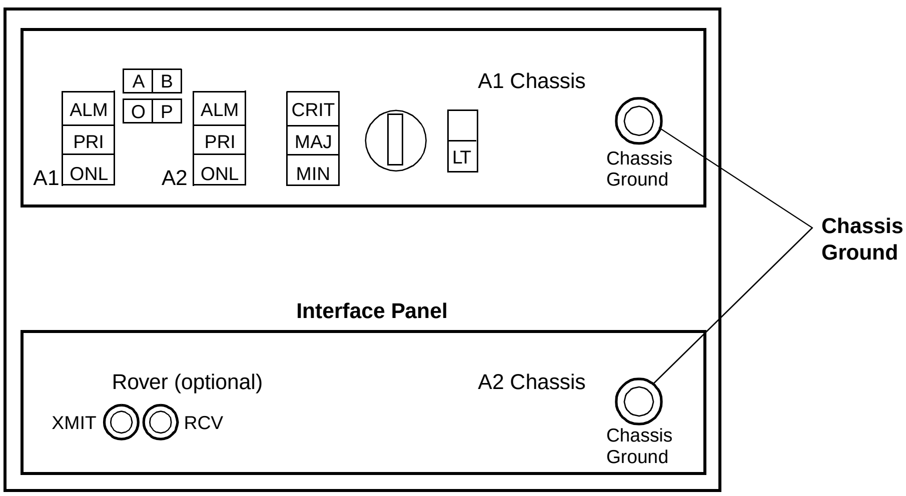
- In the event that a return of any units is required, it is suggested that the shipping boxes be saved until the DPP is installed and is operating properly.

General Precautions: Use extra care when working with DPP cables to avoid contact with live equipment. Refer to ISM/IM0 for guidelines.

ESD Precautions: Observe all anti-static handling precautions when installing and performing maintenance on the DPP. Utilize anti-static wrist grounding straps, (T9908 (U.S.) or ITA9813 (Can.)), and anti-static heel strap for Canadian installations (ITA9857).

- A socket is provided for strap attachment on the DPP chassis as shown in Figure 395.

Figure 395 – DPP Chassis Ground Jack Locations



- Cover all equipment in the IOE frame below the mounting position of the DPP with canvas. By providing this protection, the equipment will not be damaged electrically if anything is dropped.

- Position the DPP so that its front covers face the ceiling. The DPP is attached to the shipping frame with four brackets and eight screws. Remove and discard.

- Remove the DPP front covers by first removing any packing tape and then loosening the four thumb screws.

- Attach the DPP mounting brackets, one to each side of the unit, using the screws provided. The brackets should be mounted so the offset of the brackets brings the DPP front panel flush with the remainder of the IOE bay.

Caution: The DPP unit weighs approximately 80 lbs. and requires at least two people to mount and bolt into position.

- With the brackets securely fastened, carefully lift the DPP and bolt it into its appropriate mounting position as stated in Job Specification.
- Please note that Isolation Hardware is not required and should not be used to mount the DPP or Data Stream Interface (DSI) box.
- Locate the DSI Box (NT6M98AA) and mount it above the DPP using the DSI box brackets, ensuring that the designations on the rear of the box are right side up.
- Carefully inspect all card, rack-mounted PCBs to verify that the correct packfill has been shipped as shown in Figure 396.

Figure 396 – DPP Circuit Pack Locations

BOTTOM CHASSIS (PROCESSOR B)

B1	CPU LOGIC PCB
B2	EPROM PCM
B3	MEMORY EXPANSION PCB
B4	
B5	ERROR CONTROL II JUMPER PCB
B6	QUAD SIO PCB
B7	56K INTERFACE PCB (OPT.)
B8	
B9	
A10	
B11	DISK INTERFACE PCB
B12	DATA STREAM INTERFACE PCB
B13	DATA STREAM INTERFACE PCB
B14	BUS TERMINATOR PCB

TOP CHASSIS (PROCESSOR A)

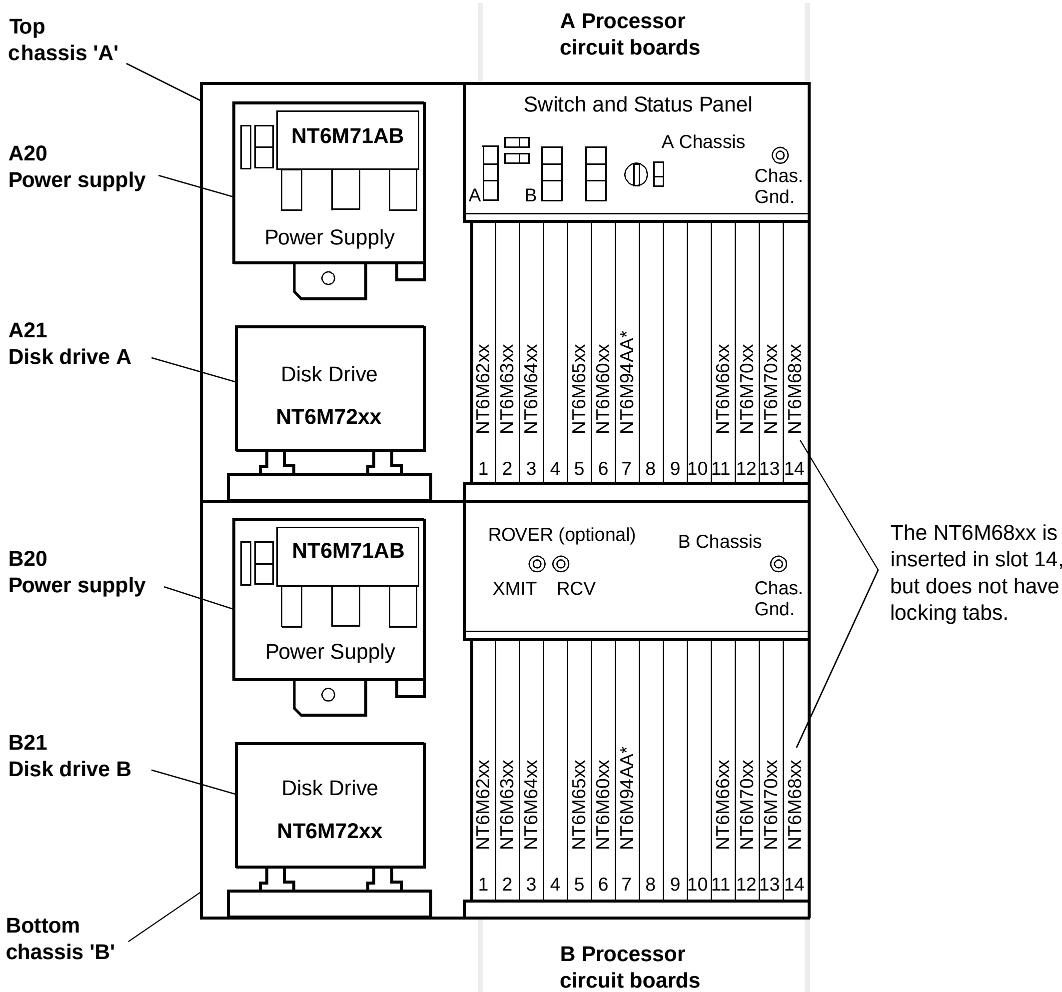
A1	CPU LOGIC PCB
A2	EPROM PCM
A3	MEMORY EXPANSION PCB
A4	
A5	ERROR CONTROL II PCB
A6	QUAD SIO PCB
A7	56K INTERFACE PCB (OPT.)
A8	
A9	
A10	
A11	DISK INTERFACE PCB
A12	DATA STREAM INTERFACE PCB
A13	DATA STREAM INTERFACE PCB
A14	BUS TERMINATOR PCB

- Each DPP chassis is equipped with a power supply in the upper, left corner (viewing chassis from front). The power supply is fully connectorized with three multi-pin connector plugs (P8, P9, and P10), which mate with the corresponding J8, J9, and J10 connector sockets.

  Ensure that these connections are mated and inspect the power supply for any shipping damage. Refer to Figure 397 and Figure 398.
- Check the single slotted-head screw on the power supply's lower front flange to ensure that it is firmly tightened.
- Verify that the correct GMT type fuses are installed in the power supplies as follows:

  -48V dc - 10 amp (red/white tab) A0109762
- Each DPP chassis is equipped with a Disk Drive assembly installed immediately beneath the power supply. The Disk Drive assembly consists of one Hard Disk Drive and one Disk Controller PCB, with factory installed ribbon cabling beneath these units

Figure 397 – DPP Cabinet Subassemblies Front View (Covers Removed)



Note: The 56K interface circuit packs are noted with an asterisk.

- Remove the rear panels of the A and B chassis by first loosening the thumb screws.
- Auxiliary Card Locations - PCBs not installed in the card rack are located inside DPP chassis A1 and A2 on a hinged gate mounted to the rear of the backplane assembly. Refer to Figure 399.
- Discard the shipping screw removed from the bottom of the card gate.
- The physical inspection of the DPP is now complete. Close the gate and replace its screws. Re-install the rear panels of both the chassis A1 and A2.

Figure 398 – DPP Power Supply

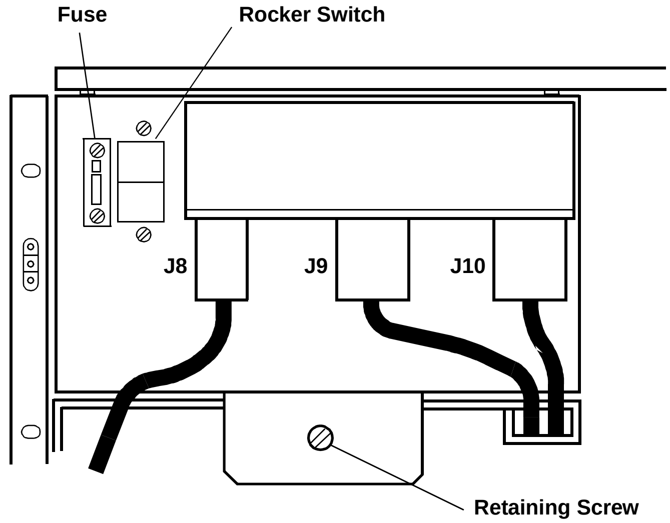
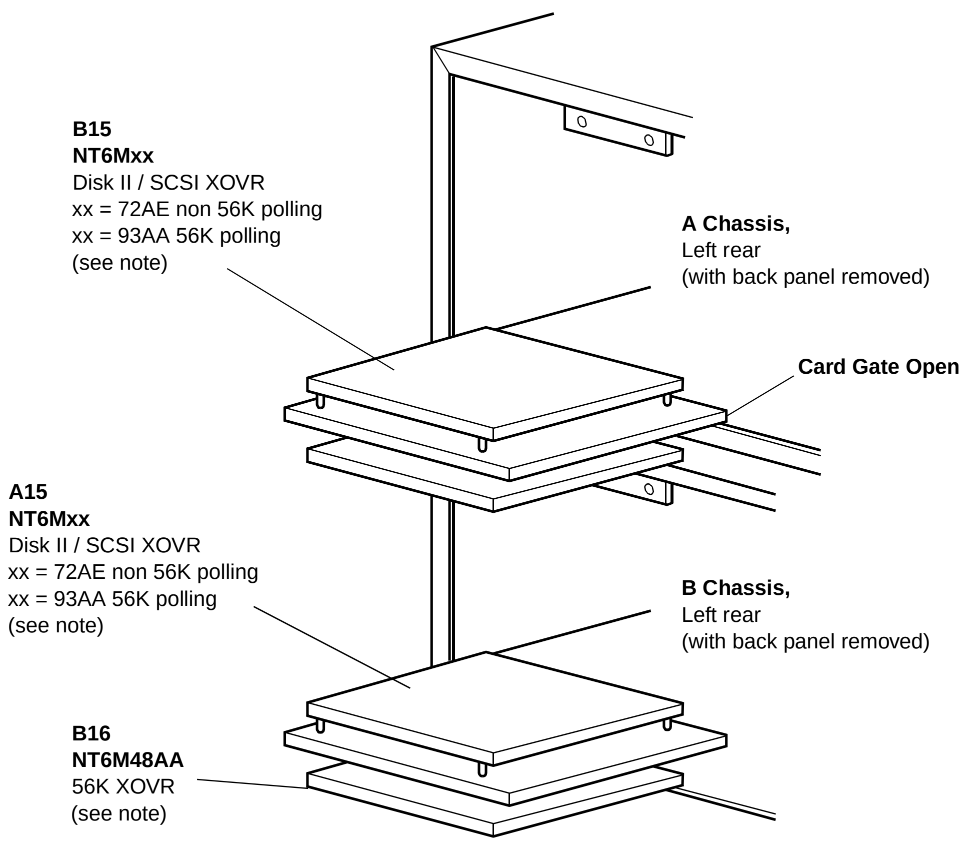


Figure 399 – Auxiliary Circuit Pack Location



Note: Present only if DPP equipped with 56K polling feature.

23 Cabling for the DPP is to be installed per the ADRX33DA, LWRX33DA, SRRX3371, and SRRX3372 documents provided by the Job Engineer when this equipment is shipped directly to the site for field installation.

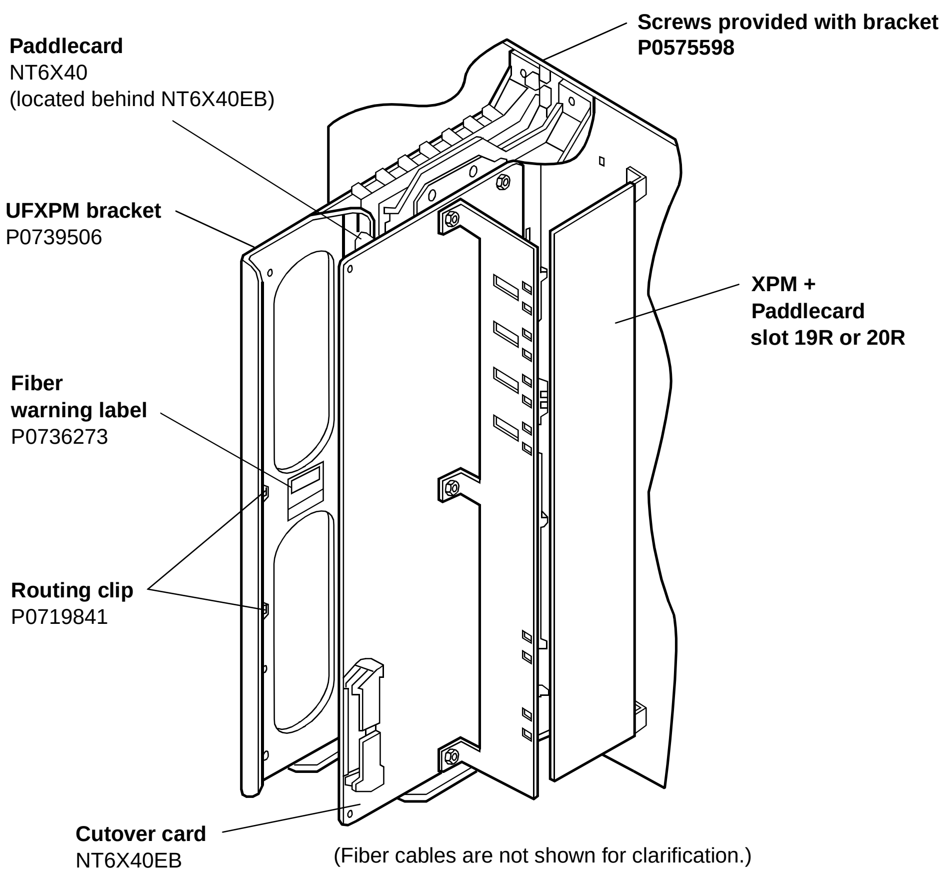
32.7 Universal Fiber Extended Peripheral Module (UFXPM)

1 The new NT6X02UF UFXPM kit is a functionally enhanced, cost-reduced version of the previous NT6X02BU Fiber interface kit. It provides the complete functionality of the NT6X02BU kit; permanent support for the Fiber interfaced paddleboard and Fiber-optic cables, along with temporary support for the DS-30 cutover card.

In addition, the UFXPM kit has the ability to connect DS-30 Copper links for interfacing to the existing Junctor Network (JNET) System. With this Universality, the network interface is always applied to the frames regardless of the job-assigned application; copper or fiber. The new UFXPM mechanicals will replace the current provisionable Fiber XPM interface, NT6X02BU, as an always provided item on the frames/cabinets, thus avoiding costly provisionable Fiber mechanicals upgrades in the field.

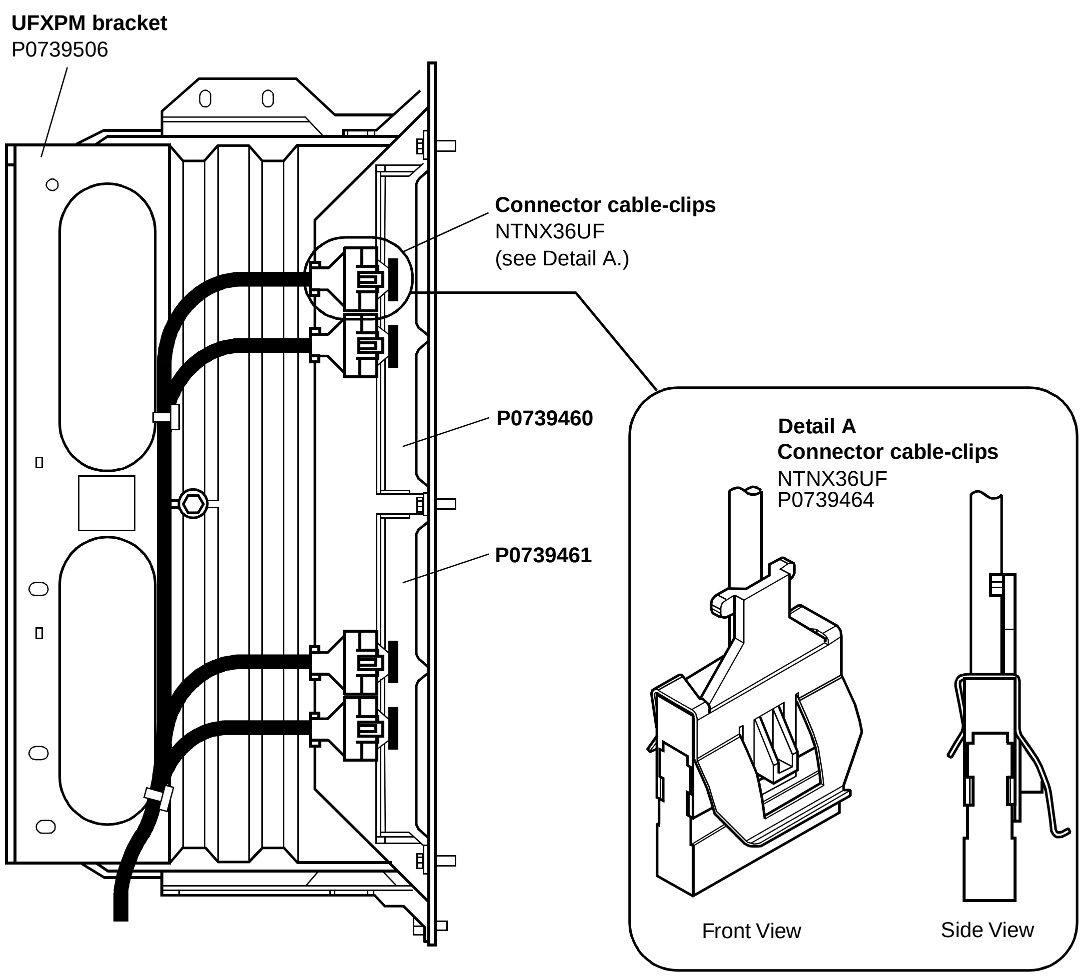
2 The NT6X02UF UFXPM kit contains all of the necessary parts to support the Network interface cables, whether they are DS-512 Fiber optic cables or Copper DS-30 cables. Each kit contains the required mechanicals for one double-shelf XPM module. Refer to Figure 400.

Figure 400 – UFXPM Bracket - DS-512 Fiber Cable Applications



3 The NTNX36UF cable assembly is used to interface with the UFXPM bracket when DS-30 copper links are required. This cable assembly is retained in place, in the top and bottom shrouds, with connector cable-clips. Refer to Figure 401.

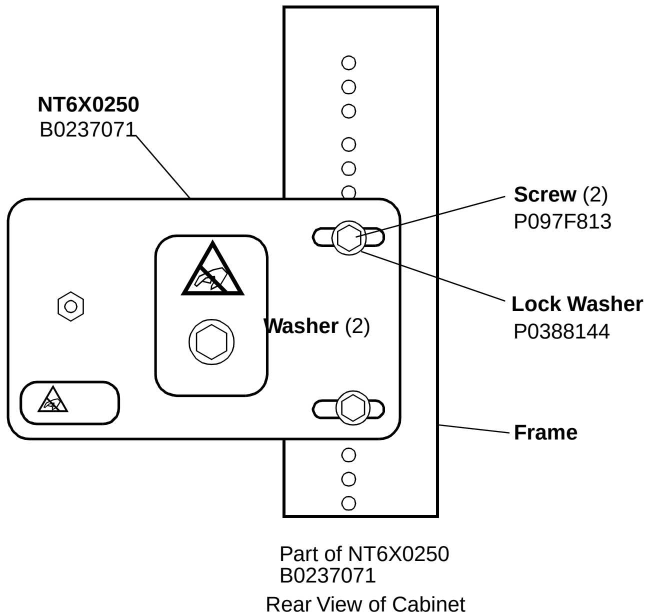
Figure 401 – UFXPM with Copper DS-30 Links (NTNX36UF Connector Cable-Clips)



4 The NT6X02UF UFXPM kit requires the application of the NT6X0251 Fiber cable conversion kit when upgrading to Fiber. The NT6X0251 contains items required only when Fiber cables are used.

5 The new Universal Ground point (NT6X0250) contain both a banana jack and button jack connections. Cabinets without ground points in the rear of the cabinet will have this assembly. Refer to Figure 402.

Figure 402 – NT6X0250 - Universal Ground Point



32.8 Model B CCPE NTRX36BA

1 There are four distinct functional names associated with the CCPE cabinet. The names and description are as follows:

- Cabinetized Line Group Equipment (CLGE), which defines the intended function where the frame is configured specifically to house LGC/LGCI.
- Cabinetized Digital Trunk Equipment (CDTE), which defines the intended function where the frame is configured specifically to house DTC/DTCI.
- Cabinetized Line Trunk Equipment (CLTE), which defines the intended function where the frame is configured specifically to house LTC/LTCI.
- Cabinetized Subscriber Module Equipment (CSME), which defines the intended function where the frame is configured specifically to house SMR, SMS, SMU, or SMS-R. CMSE can also be Subscriber Module SLC96-Remote.

2 Figure 403 reflects a typical CCPE cabinet configuration. The cooling unit is optional and is shown in this figure for reference.

3 The Network Side Port assignments are as follows:

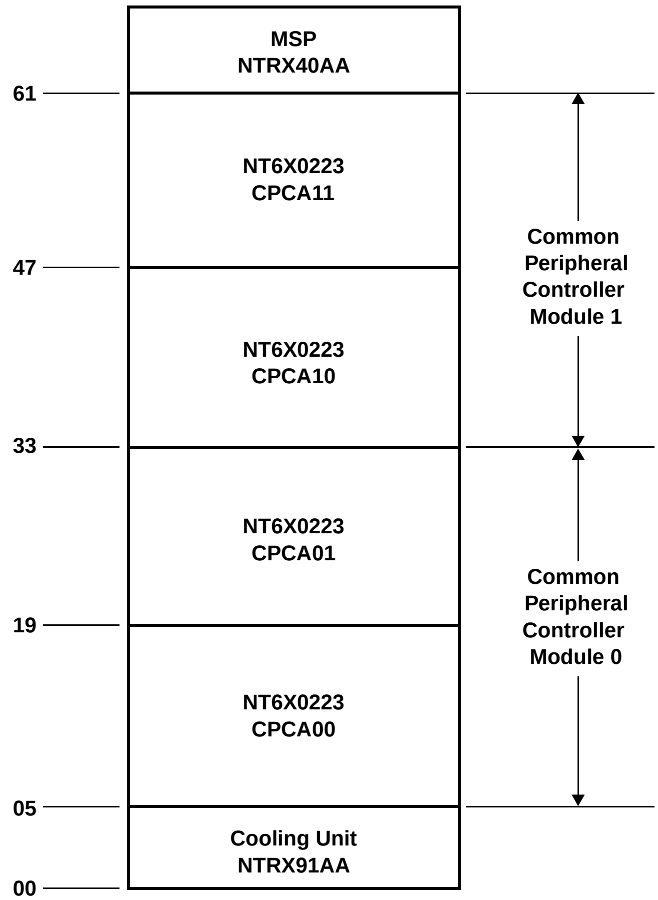
Shelves 05 and 33 for Network Plane 0
Shelves 19 and 47 for Network Plane 1

DS30 Ports 0, 1, 4, 5, 8, 9, 12, 13 Plane 1
DS30 Ports 2, 3, 6, 7, 10, 11, 14, 15 Plane 0

4 The Peripheral Side Port assignments are as follows:

DS30A Ports 0, 1, 4, 5, 8, 9, 12, 13, 16, 17 (Slot 07)
DS30A Ports 2, 3, 6, 7, 10, 11, 14, 15, 18, 19 (Slot 06)

Figure 403 – Model B CCPE Physical Layout



5 The network interface cables may be either copper, fiber, or both. Copper cables will terminate on the bulkhead. Fiber cables will pass through the bulkhead and terminate to the backplane.

6 Fiber and switchboard cables are to be routed separately in the bulkhead.

7 On upgrades, loosely secure the fiber cables together. Fiber cables should be separated from the existing cables utilizing sheet fiber and lacing cord.

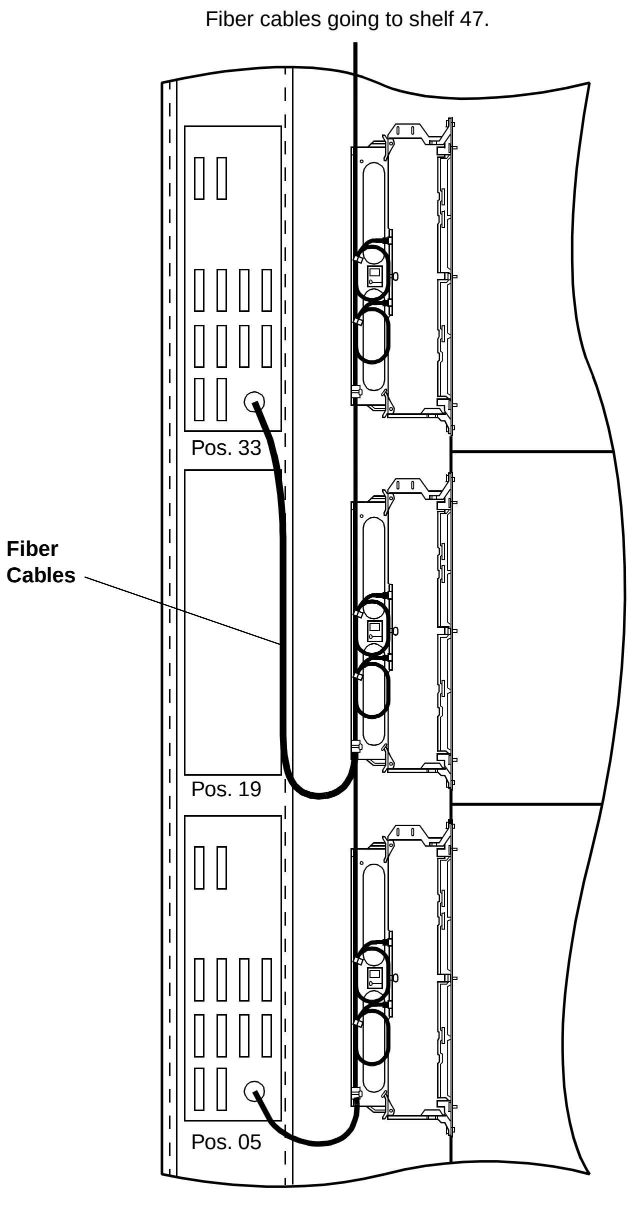
8 Route the fiber cables per the cable tags. The fiber cables are to be formed on the left, rear upright of the bulkhead. Refer to job specifications to determine if the cabling is top or bottom feed. Secure the cables to the cabinet bulkhead utilizing sheet fiber and lacing cord.

9 There is a maximum of two quad fiber cables per Peripheral: one quad cable for Plane 0 and one quad cable for Plane 1.

10 Personality plates at shelf positions 05 and 33 have an opening to allow the fiber cables to route directly to the fiber XPM bracket mounted on the backplane. One Quad fiber cable routing through personality plate at shelf 05 terminates on shelves 05 and 33. One Quad fiber cable routing through personality plate at shelf 33 terminates on shelves 19 and 47. Refer to cable tags for proper termination points.

11 Refer to Figure 404 for an example of the fiber cable forming through the bulkhead. The fiber cables for shelves 05 and 33 enter the bulkhead by way of the fiber hole in personality plate at shelf position 05. Fiber cables for shelves 19 and 47 enter the bulkhead by way of the fiber hole in personality plate in shelf position 33.

Figure 404 – Fiber Cabling Through Bulkhead



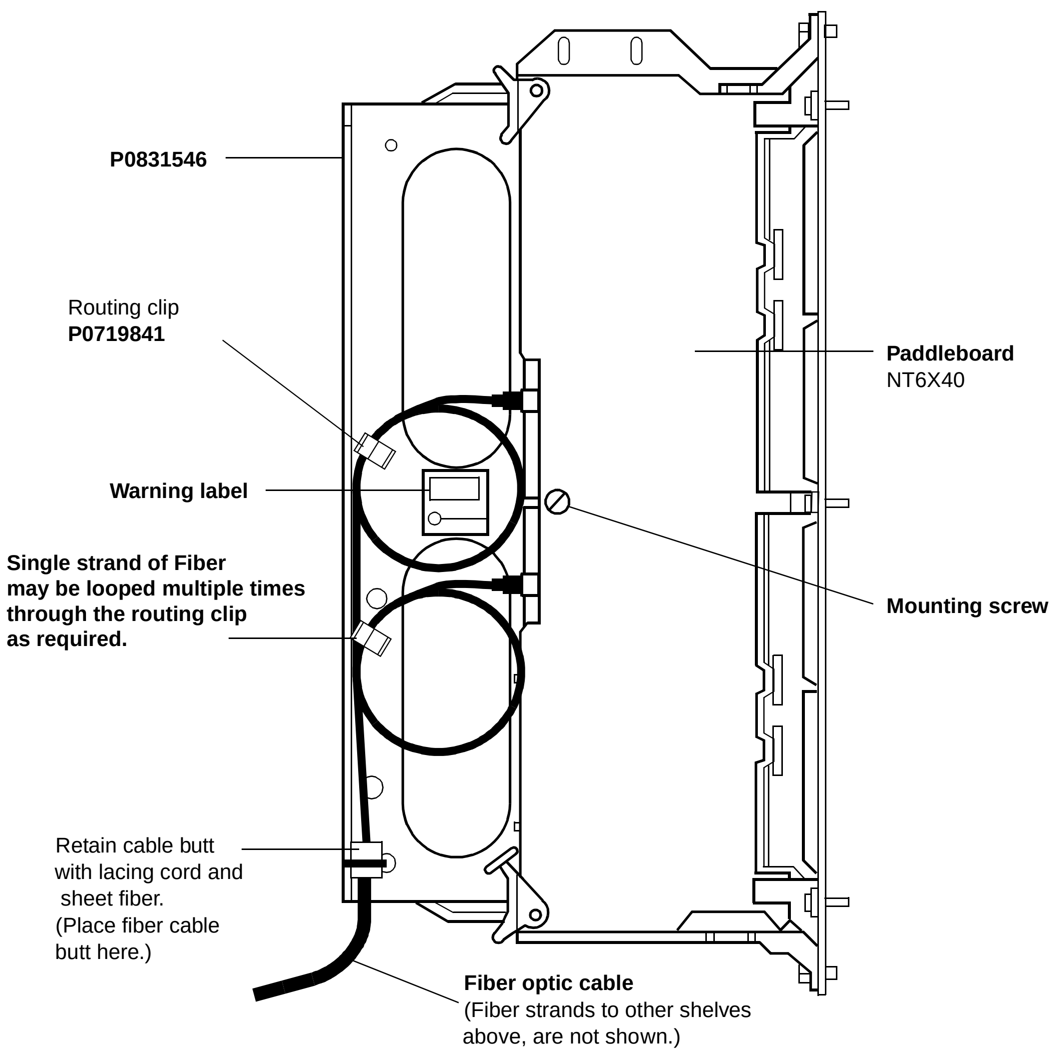
Internal view of bulkhead and backpanel showing FXPM bracket with fiber cables.

12 Form the cables to the side of the UFXPM brackets. *Retain* (loosely secure) the butt of the sheathed fiber cable to the bottom of the plastic UFXPM bracket. Lacing cord is the preferred method when securing the fiber cables at these locations. Use lacing cord and sheet fiber to secure the fiber cables to the FXPM bracket. One cable is to be secured at the UFXPM shelf bracket position 18 and the other cable is to be secured at the UFXPM shelf bracket 32. Refer to Figure 405.

13 Connect the single strands of the fiber cable to the NT6X40DA paddleboard at shelf positions 05, 19, 33, and 47. Form a loop to take up the extra slack of fiber as shown in Figure 405. The loop is only slack and is not mandatory for installation. It may be necessary to adjust the exact position of the butt of the sheathed fiber cable, to ensure sufficient slack so that the minimum bend radius of
1.3/16" (i.e., 3.0" diameter loop) is obtained.

Retain the loop of the single fiber cable strand, to the UFXPM bracket, by utilizing cable clip (P0719841). Single strand fiber cable is to be looped under Refer to Figure 405.

Figure 405 – Securing Fiber Cable to UFXPM Bracket



14 Form any excess cable out of the top of the cabinet and secure it to the left side of the bulkhead utilizing sheet fiber and lacing cord. Use a "Kansas City Stitch" to secure the cable to the bulkhead.

15 Each individual fiber cable will be identified with a cable tag. A different tag appears on each connector and at each end of each fiber cable. Figure 406 reflects a typical fiber cable tag. The information shown in brackets is identified as follows:

• <zone> is the receptacle number stamped on the NT9X40/45 faceplate.

• <link> is the logical link number displayed at the MAP.

• <signal> is either transmit or receive.

Figure 406 – Fiber Cable Tags						
Fiber-End Cable Tag				**Field Descriptions**		
ENC0	00	39	To:	ENET<plane>	<cabinet>	<shelf>
10R	04	17T		<slot>	<zone>	<link/signal>
LTE	000	18	From:	<PM_type>	<frame>	<shelf>
22R	RX			<slot>	<signal>	

16 Fiber cables exiting the cabinets are to be routed into the fiber shield of the cabinet cable trough or fiber cable duct. Refer to your job specifications and job drawings to determine if fiber cable duct is to be used. Refer to Event 05 (Method 03-9055), "Cable Troughs," Subsection 5.1, "Fiber Cable Trough Installation," for installation procedures.

32.9 Model B CIPE NTRX46CA

1 The Model B CIPE cabinet is to be cabled the same as the Model B CCPE cabinets.

2 The Network Side Port assignments are as follows:

Shelves 05 and 33 for Network Plane 0
Shelves 19 and 47 for Network Plane 1

DS30 Ports 0, 1, 8, 10, 4, 12, 6, 14   Plane 1
DS30 Ports 2, 9, 3, 11, 5, 13, 7, 15   Plane 0

3 The Peripheral Side Port assignments are as follows:

DS30A Ports 0, 1, 4, 5, 8, 9, 12, 13, 16, 17   Shelves 05 and 33
DS30A Ports 2, 3, 6, 7, 10, 11, 14, 15, 18, 19   Shelves 19 and 47

4 The personality plates on the CIPE cabinet are unique and allow for the termination of the following cables:

8   37 pin connectors for DS-30A
2   37 pin connectors for DS-30
2   25 pin connectors foe PCM-30 with twisted pairs
16   coaxial connectors for PCM-30 with coax cables

5 There is also a hole for passing the duplex fiber optic cable for DS-512. The personality plates with the fiber holes are located on shelf positions 19 and 47. The fiber cables for shelves 05 and 33 enter the bulkhead by way of the fiber hole in personality plate at shelf position 19. Fiber cables for shelves 19 and 47 enter the bulkhead by way of the fiber hole in personality plate in shelf 47. This is the only difference in forming fiber cables between the CCPE and the CIPE cabinets.

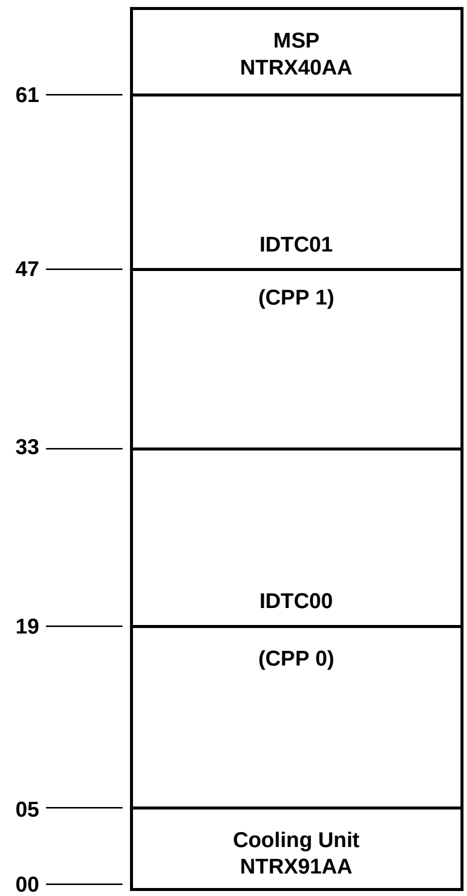
6 All of the connectors except for the coax connectors are D Type and are provided with a filter. The DS-30A connectors will not be used on shelves 19 and 47.

7 Form the coax cables to the right side of the bulkhead and the remaining cables to the left. Separate the fiber cables from all cables.

32.10 Model B CIDC NTRX47CA

1 The physical layout of the CIDC cabinet is shown in Figure 407.

Figure 407 – Model B CIDC Physical Layout



2 The Network Side Port assignments are as follows:

Shelves 05 and 33 for Network Plane 0
Shelves 19 and 47 for Network Plane 1

DS-30 Ports 0-15

3 The Peripheral Side Port assignments are as follows:

DS0 Ports 1-4 Even Shelves 19 or 47
DS0 Ports 1-4 Odd Shelves 19 or 47

DS30A Ports 0, 1, 4, 5, 8, 9, 12, 13, 16, 17	Slot 05
DS30A Ports 2, 3, 6, 7, 10, 11, 14, 15, 18, 19	Slot 06

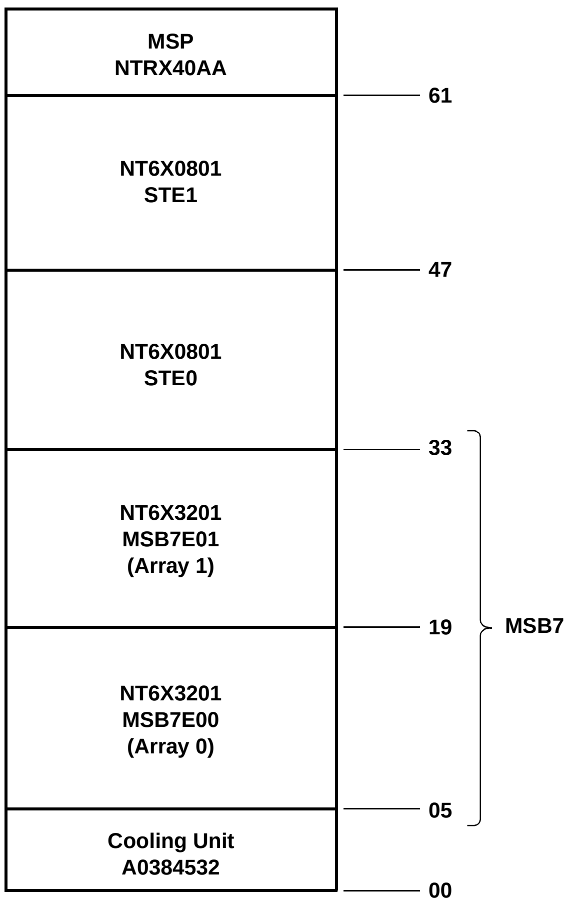
4 Follow the routing and forming instructions in Subsection 32.8, "Model B CCPE NTRX36BA," when running fiber cables.

5 The personality plates with the fiber holes are located on shelf positions 19 and 47. The fiber cables for shelves 05 and 33 enter the bulkhead by way of the fiber hole in personality plate at shelf position 19. Fiber cables for shelves 19 and 47 enter the bulkhead by way of the fiber hole in personality plate in shelf 47. This is the only difference in forming fiber cables between the CCPE and the CIPE cabinets.

32.11 Model B CMS7 NTRX48BA

1 1 The physical layout of the CMS7 cabinet is shown in Figure 408.

Figure 408 – Model B CMS7 Physical Layout



32.12 Model B CMIS NTRX56AA

1 The Model B Miscellaneous Equipment Cabinet (CMIS) can be configured as an EMC compliant (Closed) cabinet which houses Nortel supported equipment or as a Non-EMC (Open) cabinet which primarily houses customer preferred equipment.

2 A Closed CMIS cabinet will house equipment which by itself is not EMC compliant. This cabinet will require bulkhead connector plates and cable filtering or shielding.

3 An Open CMIS cabinet will house customer preferred (Non–Nortel Supported) equipment. This cabinet will not require enclosure of input/output signals at the cabinet level.

4 Equipment that can be mounted in a Closed CMIS is as follows:

NTRX59AZ	LaMarche Inverter Kit
NTRX59AC	DTH/ROTL Kit
NTRX59AD	Audible/Visual Alarm Extension Kit
NTRX59AE	Pylon RG-2 Ringing Generator Kit
NTRX59AY	Inactive System Timing Circuit Kit
NTRX59AH	Audible Alarm Cutoff Unit Kit
NTRX59AJ	Multiple Loop Test Applique Shelf Kit
NTRX59AU	Remote Maintenance Module
NTRX59AX	1014U Universal Shelf Kit
NTRX34LA	480 Pin Terminal Block Assembly CMIS Universal Connector Plate (24 x 25 pin)
NTRX56FA	Right Hand Bulkhead Kit

5 Equipment mounted in the Closed CMIS cabinet will require filtering and therefore personality plates for making cable terminations. Cabling between factory installed equipment and the personality plates will be made by manufacturing.

6 External cables will terminate at the personality plates for equipment mounted in the Closed CMIS cabinet.

7 Equipment installed in an Open CMIS cabinet will not have personality plates. System cables connect directly to the equipment by way of holes in the bulkhead.

8 Filtering will be accomplished at the equipment or shielded cable may be used.

9 Equipment that can be mounted in an Open CMIS is as follows:

NTRX59AK	Case/Datatel RM4200 -48 Vdc Modem Shelf Kit
NTRX59AL	Dantel Digital Alarm Scanner (DMS100 to SCC Interface) Kit
NTRX59AP	Alarm Ext. Kit
NTRX59AS	GDC Modem Shelf
NTRX59AN	Cook DA Shelf Hardware
NTRX59AV	UDS RM16M-23DC Modem
NTRX59AW	ESTU/ITM Kit

10 When the "Open" CMIS is used, route the cables through the bulkhead in a manner that will prevent cable damage against the bulkhead openings.

11 Individual methods will be developed detailing the installation of the CMIS optional equipment. Method references will be added to this subsection as they are completed.

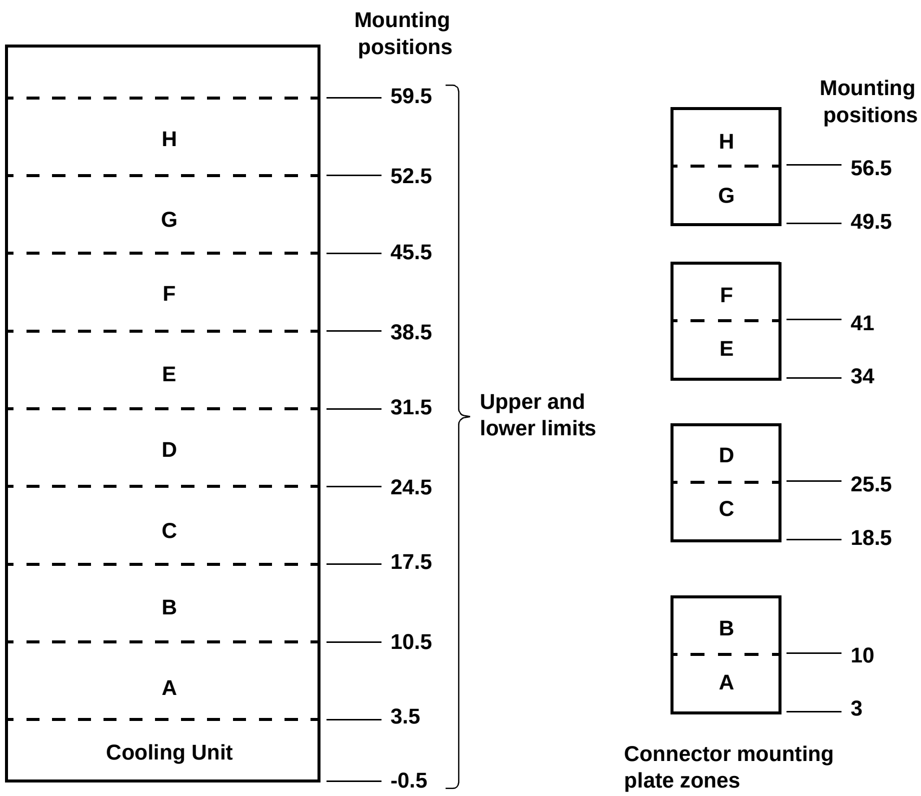
12 The Model B CMIS cabinet has been divided into eight 7-inch zones, A to H. Figure 409 reflects the different zones.

13 Two zones equate to one full connector mounting plate. One zone equates to one half mounting plate. The mounting positions given for the equipment are the lowest location of the mounting screw holding the unit to the cabinet.

14 Refer to job specifications for the location and type of equipment mounted in your CMIS cabinet.

15 Assembly Drawings (AD) and Internal Schematics (IS) are available for each of the different types of equipment approved for the Closed and Open CMIS cabinets. These documents must be ordered through the normal process for field documents. Contact your Technical Assistance Center (TAC), if assistance is required.

Figure 409 – Model B CMIS Mounting Zones



32.13 Model B SNOPC NTRX50AB

1 The SuperNode OPC cabinet contains the following equipment:

- Modular Frame Supervisory Panel (NTRX40AA)
- Mini-media Access Units (MAU) A0xx
- One or two HP827 48V UNIX based processors
- One 16-port modem rack.

2 Connections will depend on the particular SNOPC configuration. Refer to cable tags for the shelf and connector positions for making terminations.

3 Connectors J1-J4, J11, J12, and P1-P4 are located behind the Y-panel assembly located at the rear of shelf 54. To access these connectors, flip down the cover panel by pulling out on the knobs located on each side of the panel, near the top.

4 Figure 410 shows the physical layout of the SNOPC cabinet.

5 Media Access Units (MAUs) are to be connected to the LAN 6 port at the back of each HP unit (refer to Figure 411). MAUs are also to be connected at the bulkhead of the LPP.

Figure 410 – Physical Layout of SNOPC

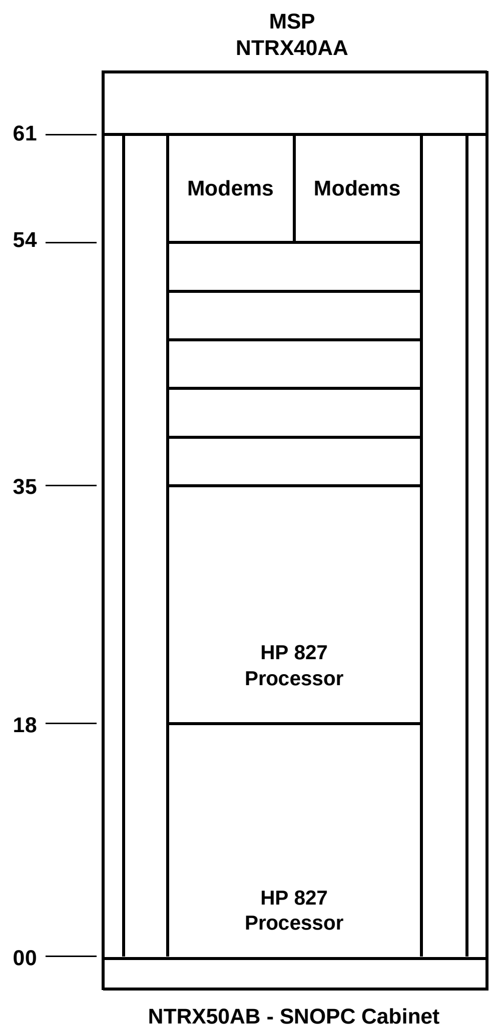
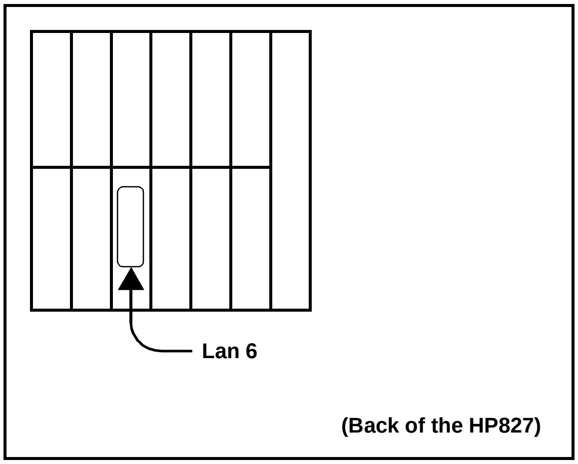


Figure 411 – HP827 MAU Connections



32.14 Model B CISM NTFX40AA

1 The physical layout of Model "B" CISM cabinet is shown in Figure 412. The function of this cabinet is just as same, enhanced, as that of CTME which this cabinet will replace in the future.

2 The cabinet usually comes equipped with four ISM shelves. The only different configuration is when the NT3X89CA AXU alarm cross-connect unit is mounted in position 47. This will occur only on one cabinet per initial office.

3 The cabinet shown in Figure 412 is equipped with three ISM shelves and all circuit packs on these shelves are provisionable, as required and ordered by the customer.

4 The ISM shelf directly below the AXU will be equipped with standard alarm circuit packs. All internal wiring and cabling within the cabinet is connected in the shop. Only the input and output cabling is connected to the cabinet bulkhead.

5 Figure 413 shows the layout of the cabinet bulkhead. It is recommended that connecting cables to the bulkheads is done starting with the lowest inside connector and working towards the outside. A brief explanation of cable connectivity is provided in the following paragraphs.

6 The top two personality plates are dedicated to the alarm circuits. Similarly to the 7 ft. frame version of alarm system cabling there are some connectors on the bulkhead that have the same designations as on the AXU.

7 The top personality plate, refer to Figure 413, contains the connectors for the aisle alarm multiple cables NTRX26AF, to all first cabinets in each lineup. These are all 25-pin connectors and up to 20 lineups may be connected to the alarm system.

8 Next personality plate down serves also as an alarm cabling interface. The following cables connect to this plate:

a. NTRX26BB connector(s) C00 & C01 to CIOE cabinet for portable terminal ports

b. NTRX26BG connector(s) T01-T04 to extra audible panels (up to two)

c. NTRX26BH connector(s) T05 to audible and visual alarm extension control circuit

d. NTRX26BG connector(s) T06 to TTC audible alarm panel

e. NTRX26DA connector C44 to ADP panel C01 connector, the aisle alarm display panel

f. NTRX26AT connector C43 to ACDP panel C01 connector, the alarm control and display panel

g. NTRX26AM connector(s) F00A, F01A, F00B to MDF

h. NTRX26AF connector(s) G00 to other (back-up) alarm ISM shelf

i. NTRX26BH connector(s) F01B to MDF

j. NTRX26AM connector(s) C05-C11 to MDF

k. NTRX26AE connector(s) SL00, SL10 to CSLC*

or

l. NTRX26AZ connector(s) SL00, SL10 to ENET*

or

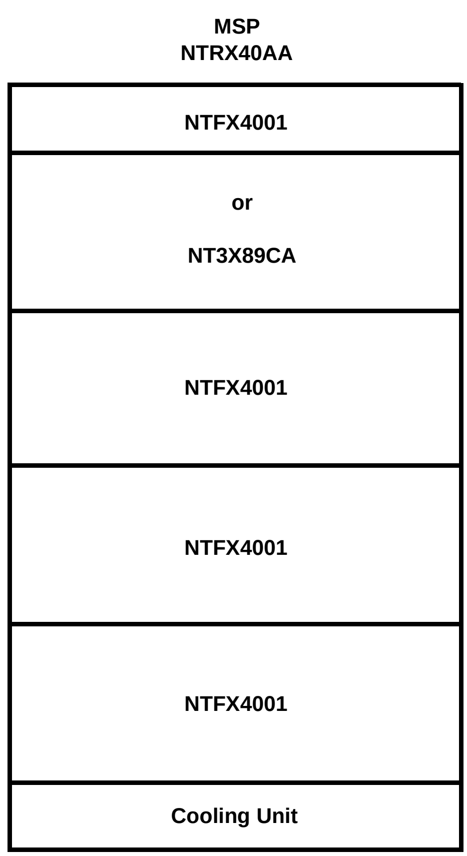
m. NTRX26AH connector(s) SL00, SL10 to CDSN*

or

n. NTRX26BU connector(s) SL00, SL10 to SCC/ENI*

Note: Network ports for all equipped ISM shelves in the cabinet, planes 0 & 1, respectively.

Figure 412 – Physical Layout of CISM



9 The remaining two personality plates will have the following cables connected:

a. NTRX26AE connector(s) SL00, SL10 to CSLC*
or

b. NTRX26DM connector(s) SL00, SL10 to ENET*
or

c. NTRX26DM connector(s) SL00, SL10 to SCC/ENI*

Note: Network ports for all equipped digital circuits on ISM shelves (DRAM/EDRAM/CTM), plane 0.

d. NTRX26AE connector(s) SL01, SL11 to CSLC*
or

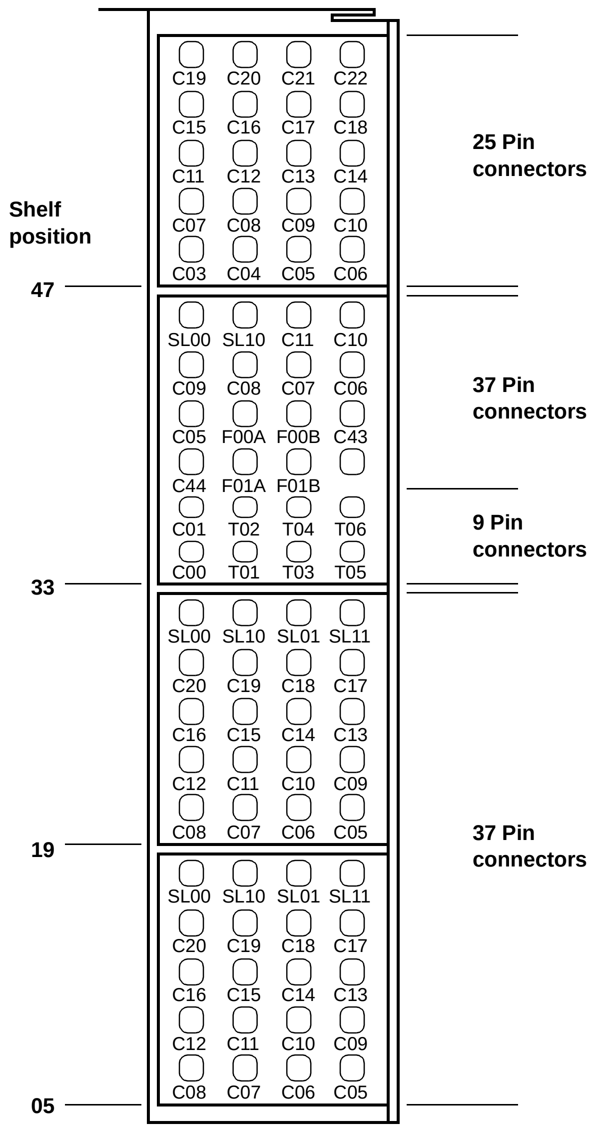
e. NTRX26DM connector(s) SL01, SL11 to ENET*
or

f. NTRX26DM connector(s) SL01, SL11 to SCC/ENI*

Note: Network ports for all equipped digital circuits on ISM shelves (DRAM/EDRAM/CTM), plane 1.

g. NTRX26AM connectors C05-C20 to MDF (for equipped analog circuits on ISM shelves)

Figure 413 – Bulkhead Layout of CISM Cabinet



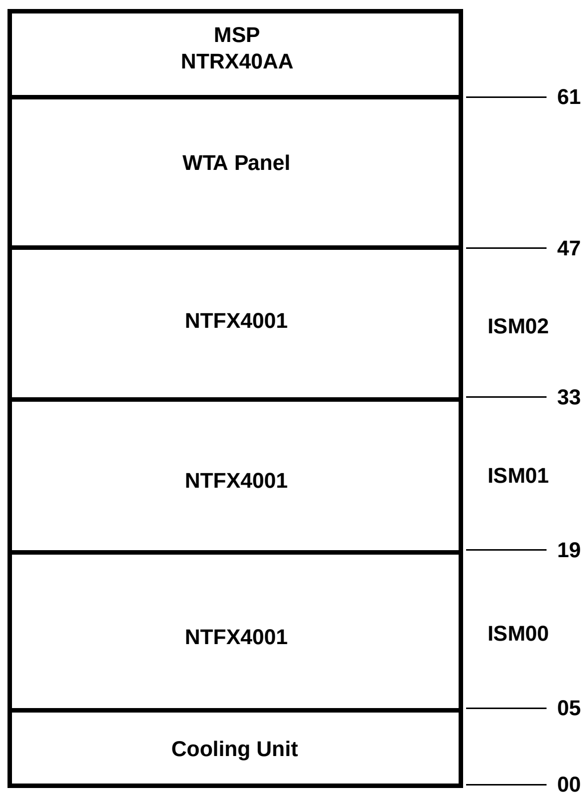
10 The cabinets that are not equipped with the AXU panel will be suited with all four personality plates as the bottom two on this example.

32.15 Model B CMTA NTFX40EA

1 The CMTA cabinet NTFX40EA is a special application CISM. The bottom of the cabinet is equipped with three ISM shelves populated with MTA circuit packs. The top shelf position is occupied with the Wideband Test Access (WTA) panel. Figure 414 illustrates simplified layout of the cabinet.

2 All the equipment in the cabinet is interconnected and only the input and output cabling is taken to the bulkhead. This external cabling is explained in brief in the following paragraphs. Layout of the bulkhead is shown in Figure 415.

Figure 414 – Physical Layout of CMTA



3 The bulkhead is equipped with only two personality plates. Starting with the top personality plate, the cables will be connected as follows:

a. NTRX26DT connector(s) P43-P81 (verticals) to MTA connectors C10 on CLCE and C09 on CLMI cabinets, one cable per cabinet

b. NTRX26DQ connector(s) P34-P104, ESTU0, ESTU1 are MTA horizontals usually cabled to the MDF for cross-connecting to external test circuits

c. NTRX26AY connector(s) P83A/83B to preceding CMTA cabinet connectors P84A/84B (vertical expansion)

d. NTRX26AY connector(s) P84A/84B from succeeding CMTA cabinet connectors P83A/83B (vertical expansion)

e. NTRX26AY connector(s) P89A/89B to preceding CMTA cabinet connectors P90A/90B (horizontal expansion)

f. NTRX26AY connector(s) P91A/91B from succeeding CMTA connectors P92A/92B (horizontal expansion)

g. NTRX26AP connector(s) A103-A305 to MDF to cross-connect to Remote Test Facilities

h. NTRX26AP connector(s) P43-P81 (verticals) to MDF to cross-connect to physical pair TAC leads for testing Remote Sites

i. NTRX26AE connector(s) SL00, SL10 to CSLC*

or

j. NTRX26AZ connector(s) SL00, SL10 to ENET*

or

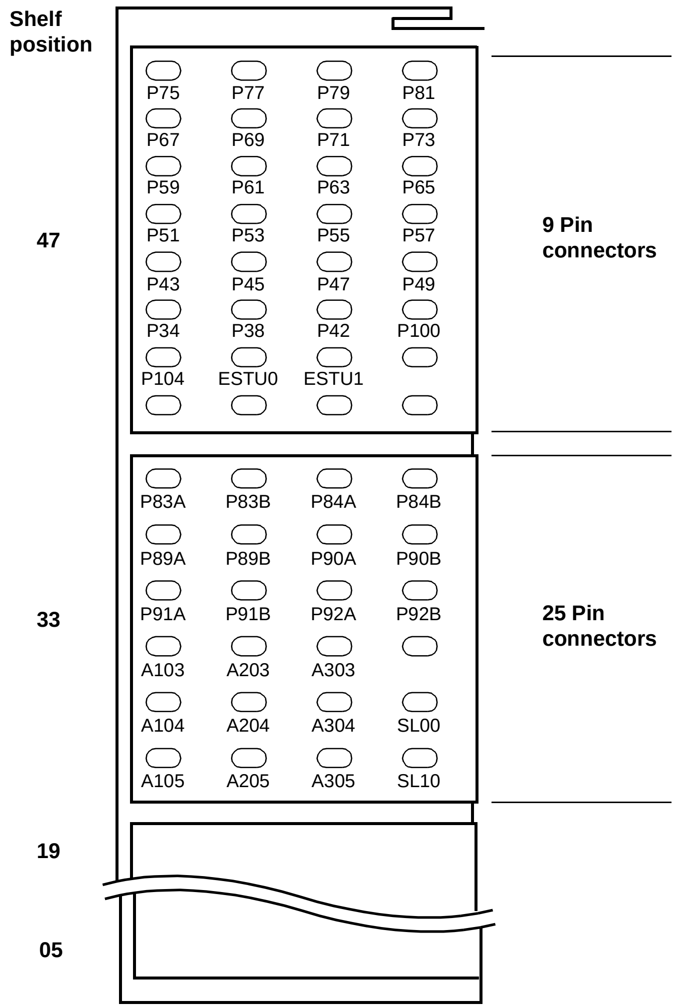
k. NTRX26AH connector(s) SL00, SL10 to CDSN*

or

l. NTRX26DC connector(s) SL00, SL10 to SCC/ENI*

Note: Network ports for all equipped ISM shelves in the cabinet, planes 0 & 1, respectively.

Figure 415 – Bulkhead Layout of CMTA Cabinet



33.0 CRSC, CEXT, and CRME Power and Ground Cabling

33.1 Overview of Sonet RSC

1 The RSC-S can be deployed in any one of the following configurations. This section covers power and alarm cabling procedures for each of the four configurations.

- **Multicabinet** - The RSC-S typically consists of the following type of cabinets: CRSC, CEXT, CLCE/CLMI, and CPDC.
- **Single cabinet or stand-alone** - The RSC-S consists of only the CRSC cabinet (cabinet is not mixed with any other frames or cabinets).
- **Mixed cabinets with 7 ft. frame** - The RSC-S consists of one or more cabinets interfacing with 7 ft. PDC/RME and/or 7 ft. LCE frames. The cabinets are vertically powered in this situation.
- **Mixed Model A with Model B** - The Model B RSC-S can be added to a Model A lineup of office.

2 The cabling length between any CEXT and its associated CRSC is 50 ft. (15 meters). CEXT and CRSC must be powered from the same CPDC. Cabling length between any CLCE and its associated CRSC must not exceed 50 ft. (15 meters). All associated CLCE cabinets must be powered from the same CPDC.

33.2 Model B - External Power Filter Connections: Power - Multicabinet/7 ft. Frame Configuration

Note: This subsection needs to be read prior to adding any cables to the external power filter located on top of the cabinet under the cable trough. This applies to every Model B cabinet with the exception of the CPDC.

Note: The power and battery return identifiers are referred to as L- and L+. This identifier can be substituted as follows:

L-	is	-48V
L-A	is	-48VA
L-B	is	-48VB
L+	is	RTN
L+A	is	BATRTNA
L+B	is	BATRTNB

1 Run the power cables as specified in the 4851 spec or 1400 spec.

2 The field terminations are to made to the top of the power filter kits. The connections from the bottom of the filter to the MSP are made in the factory. Refer to Figure 416.

3 All of the power cables are to be routed through the power shields of the cable troughs. Each cable trough is designed with an opening in the power shield. Route the power cables through the opening and form directly down to the terminations. Refer to Figure 417.

4 If pre-lugged power cables have been spec'd, there will be one (1) run of cable for each -48 Vdc feed and one (1) run of cable for each Battery Return.

5 The lugged end of pre-lugged cables must be terminated first but can be terminated at either the Originating or Terminating cabinet as indicated on the cable tag. After terminating the pre-lugged end, form the cable back to the un-lugged end. Once formed, this end may be cut to length, lugged and terminated as per the cable tag.

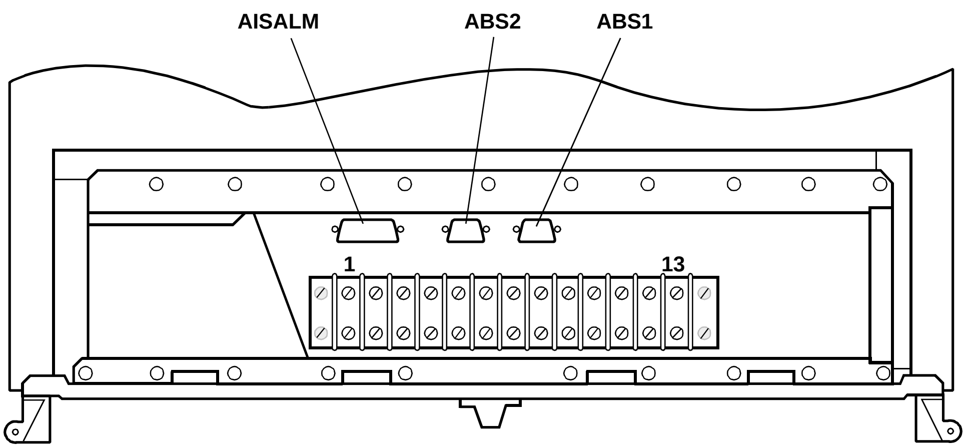
6 Power and battery return cables are to be identified at the CPDC end (breakers or battery return plate) and at the C28 cabinet end (power filter).

Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. Refer to event 07 (method 03-9057) for details.

Pre-lugged cables will have the cable tags already applied to either end of the cable.

7 Figure 416 is a view of the NTRX25AC power filter kit used in the CRSC and CEXT cabinets.

Figure 416 – NTRX25AC Power Filter Kit Assembly



Top Rear View

8 Figure 417 reflects the power terminations for the CRSC and CEXT cabinets.

Figure 417 – Power Connections for CRSC and CEXT

NTRX25AC Power Filter Kit 13 Position

Designation	*FTB Connection	External Connection
L- (A) 1	FTB1-1	To CPDC
L- (A) 2	FTB1-2	To CPDC
L- (A) 3	FTB1-3	To CPDC
L- (B) 1	FTB1-4	To CPDC
L- (B) 2	FTB1-5	To CPDC
L- (B) 3	FTB1-6	To CPDC
L+ (A) 1	FTB1-7	To CPDC
L+ (A) 2	FTB1-8	To CPDC
L+ (A) 3	FTB1-9	To CPDC

Figure 417 – Power Connections for CRSC and CEXT		
NTRX25AC Power Filter Kit 13 Position		
Designation	***FTB Connection**	**External Connection**
L+ (B) 1	FTB1-10	To CPDC
L+ (B) 2	FTB1-11	To CPDC
L+ (B) 3	FTB1-12	To CPDC
Logic	FTB1-13	To CPDC
Note: *FTB denotes Filter Terminal Block.		

9 When installing bulk power cables, connect the cables with the appropriate one-hole, insulated lug found in the hardware kit as follows.

Cable Ordered	**PEC code of Lug**
10 ga:	A0386311
8 ga:	A0614961
6 ga:	A0614959

If pre-lugged power cables have been spec'd, there will be one (1) run of cable for each -48 Vdc feed and one (1) run of cable for each Battery Return. One end of the each cable will be pre-lugged and two (2) lugs will be shipped loose with each cable for termination of the un-lugged end.

The power filter boot (P0741700) is shipped loose with each cabinet and is to be used for each of the previously listed cables. This boot is to be added to the cable prior to any crimping.

10 Care must be taken when making terminations to the power terminations on the Power Filter Kit Assembly. The threads in the nut must be fully engaged onto the threads of the stud before any significant torque is applied to tighten the nuts. Each nut should be hand started to avoid stripping. Refer to Figure 418.

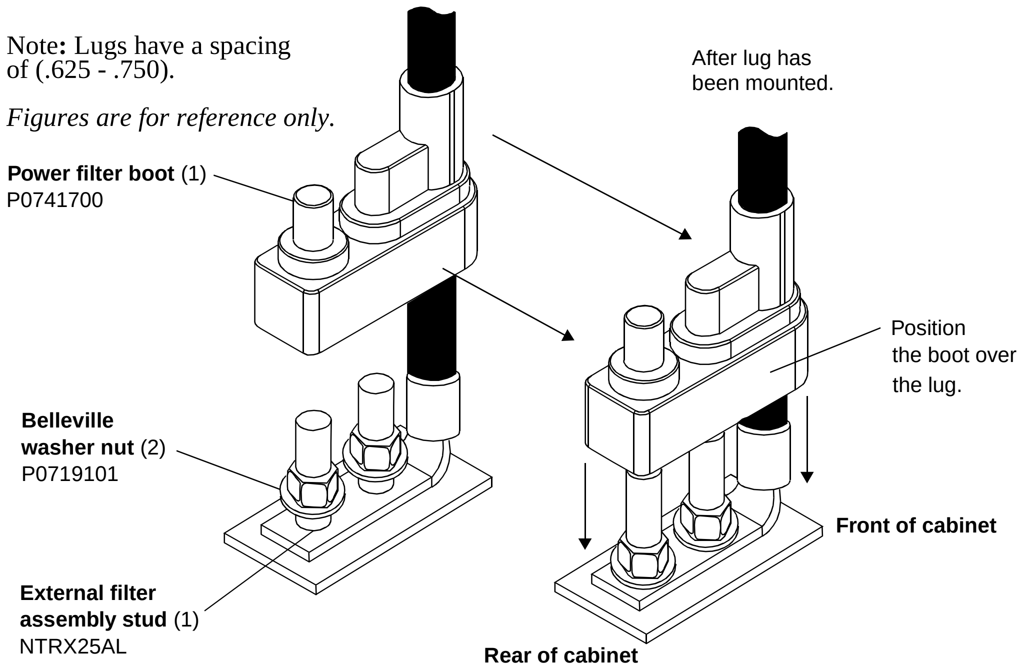
11 Each of the power connections are to be torqued to 20 in-lbs.

12 Do *not* over tighten the nuts. If a stud is stripped, the entire terminal block must be replaced.

13 Once the lug as been secured into place, the power safety boot will slide over the connection. Refer to Figure 418. Lugs in Figure 418 are slotted and have a spacing

of 0.625 - 0.750.

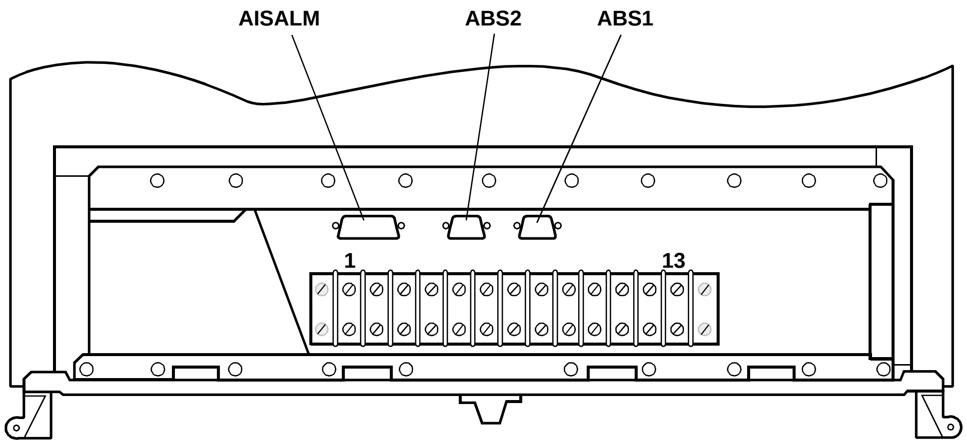
Figure 418 – Model B Power Filter Connection



33.3 Model B - External Power Filter Connections: AISALM and ABS - Multicabinet/7 ft. Frame Configuration

1 The AISLAM and ABS terminations are made at the top rear of the cabinets. Refer to Figure 419 for the location of the AISLAM and ABS terminations.

Figure 419 – NTRX40AA Power Filter Kit Assembly



Top Rear View

2 Route the ABS cables in the power shield of the cable trough. The ABS cables can be secured with the power cables as they form directly through the opening down to the terminations.

3 Each cabinet will have an ABS cable *IN* (ABS1) and an ABS cable *OUT* (ABS2). The ABS cannot end but must make a complete loop back to the first originating cabinet. Refer to Figure 420 for an example.

4 Ensure that ABS cables are identified at both ends.Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification of non connectorized cable ends. Cables supplied by the cable manufacturer already connectorized will have permanent labels applied at the connectorized end. Refer to event 07 (method 03-9057) for details.

5 AISLAM cables are connectorized on both ends. These cables are to be routed in the power shield of the cable trough. Form the cables out of the power shield and directly down to the terminations. Refer to Figure 421.

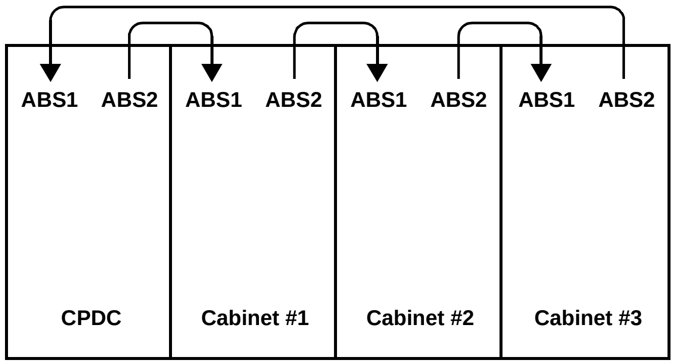
6 The AISLAM cables will be multipled between cabinets. Typically there will be cables entering and existing the cabinet. These cables are referenced as "*To Succeeding*" and "*To Preceding*" cabinets.

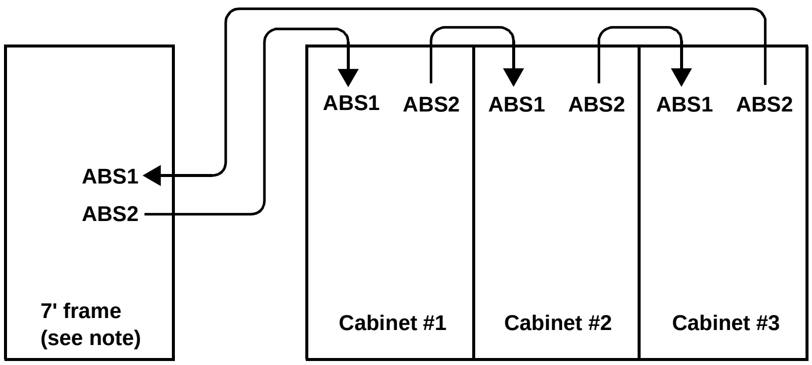
7 Some of the cables have double 25-pin connectors. When a double connector is used, place the double connector on the cabinet first. The single end of the next cable is to be secured to the top of the double connector. Both cables are secured in place using screws.

8 When a cable with a double connector is installed on the last cabinet in the lineup, install Connector Cover (A0377672) on the top of the connector. When adding cabinets to an existing lineup, remove the connector cover and connect the adjacent cabinet cable to the double connector. Place the connector cover on the new cabinet cable. This will eliminate the need to remove alarm cables when doing an extension.

9 The AISLAM cables are found in the 1200 specification.

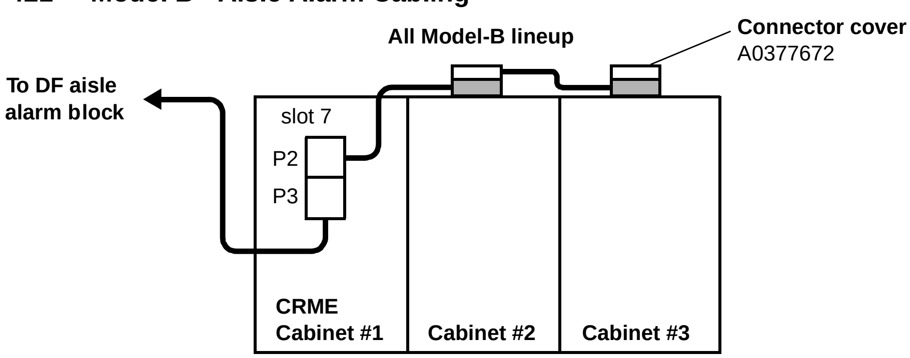
Figure 420 – Model B - ABS Cabling

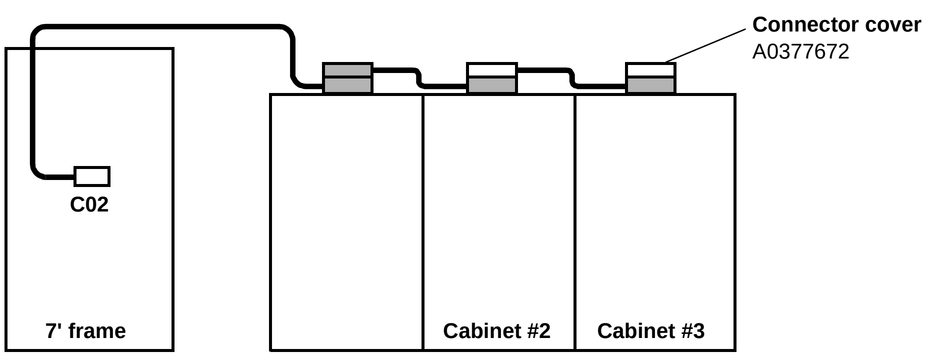




Note: Refer to the job specifications for the correct FSP punchings.

Figure 421 – Model B - Aisle Alarm Cabling





Note: In all Model B lineups using a CPDC, the slot number will change from 7 to 5.

33.4 Model B - Frame Grounding - Multicabinet/Added with 7 ft. Frame Configuration

1 C28 cabinets shall be isolated from any contact with incidental grounds, and bonded to the DMS Single Point Ground (DMS SPG).

2 When external power filters are used in a multicabinet lineup or in conjunction with 7 ft. frames, the power cabling is classified as vertical power. The frame ground location for vertical cabling is on the top right of the cabinet viewed from the front. The frame ground location is denoted by a ground symbol. A #6 AWG pigtail will be terminated at this location by the factory when vertical power is used. Refer to Figure 422 and Figure 423.

3 A #1/0 AWG frame ground collector cable is to be routed through the cable trough of each cabinet in the lineup from the FBE. A shield has been designed into the Model B cable troughs.

4 The #6 AWG cable is to be C-Tapped to the #1/0 AWG cable. Place the C-Tap between the two ground shields of the cable trough as shown in Figure 424.

Note: Refer to Event 06 (Method 03-9056), “Grounding," for method of connecting framework ground in frames.

Figure 422 – Model B - Multicabinet Frame Grounding

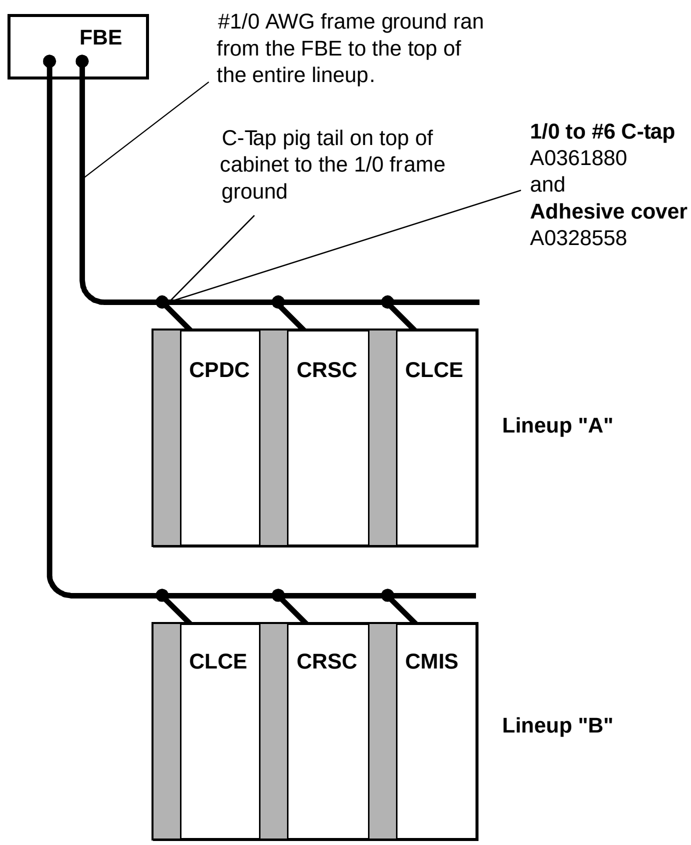


Figure 423 – Model B with 7 ft. Frames - Frame Grounding

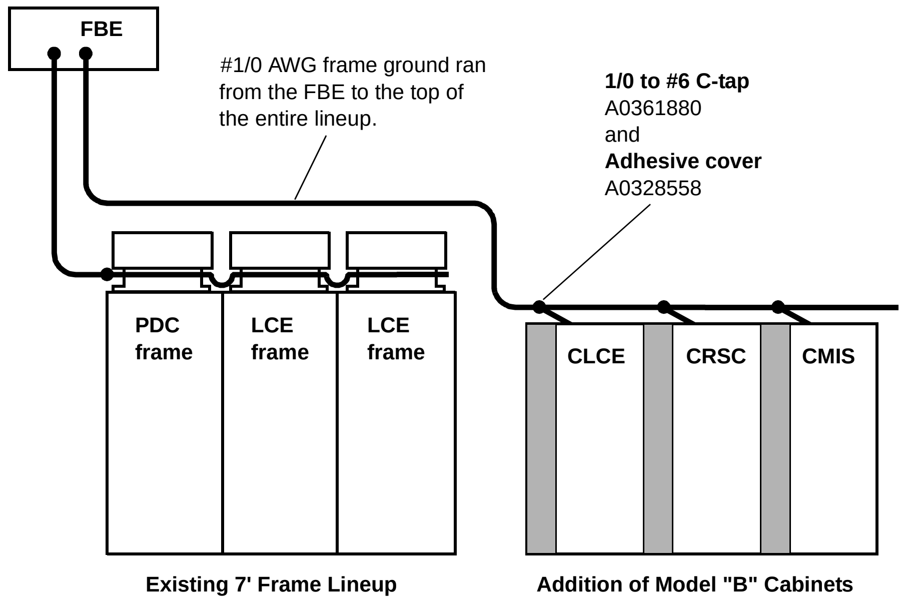
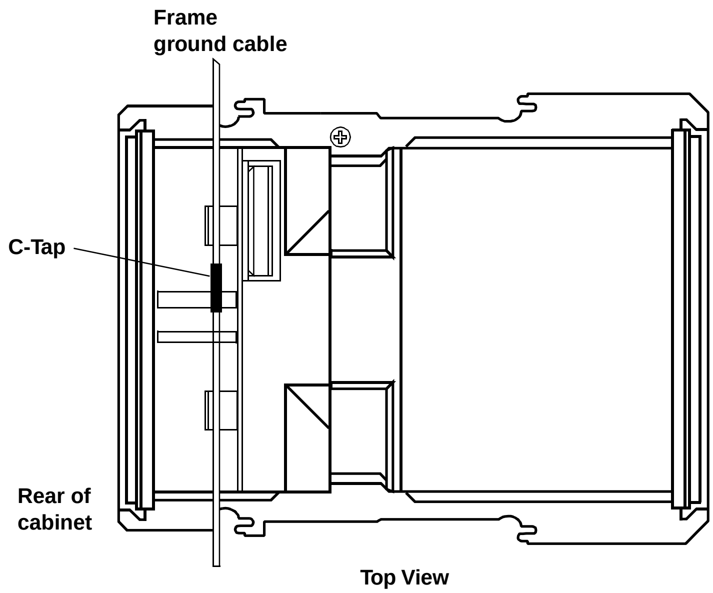


Figure 424 – Model B Ground Location in Cable Trough



5 The end of the #6 AWG cable is to point towards the end of the #1/0 AWG collector connecting to the Framework Bonding Equalizer (FBE).

6 The area where the C-Tap is to be installed is to have a thin coat of N0-OX-ID "A" grease applied.

7 After making the C-Tap, ensure that the connection is covered with the adhesive cover.

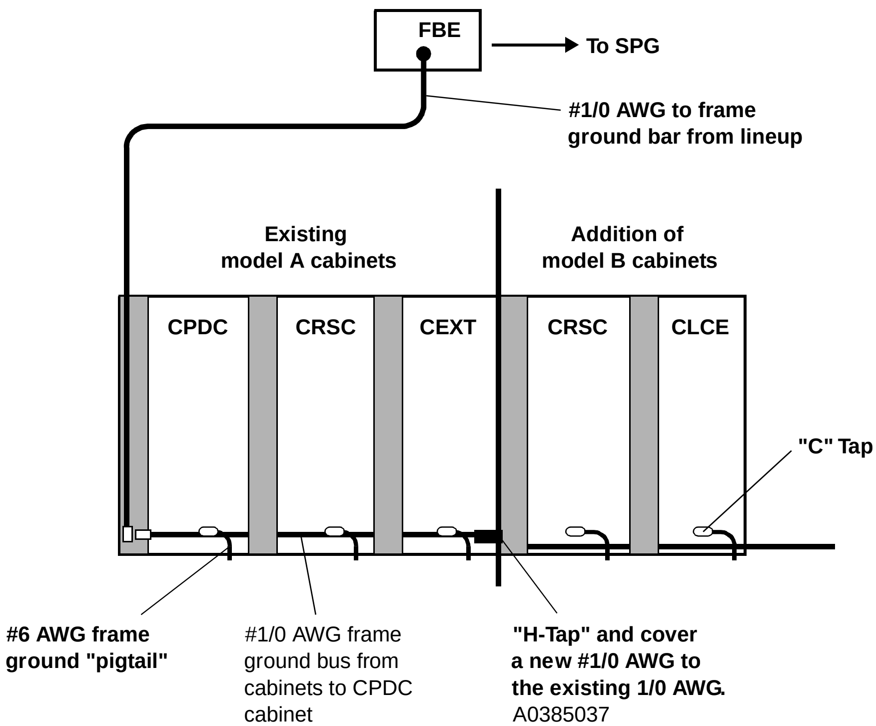
Note: Certain customers may request hard covers for the C-Taps; this additional hardware will be provided in the 4071/411 spec. If the hardcovers are used, the field technician must secure with twine per Event 07 (Method 03-9057), "General Cabling and Torque Requirements.".

33.5 Model B - Frame Grounding - Model B Cabinets to Model A Lineup

1 When adding Model B cabinets to an existing Model A lineup, a new #1/0 AWG needs to be H-Tapped to the existing #1/0 AWG at the base of the cabinets. Refer to Figure 425.

2 The frame ground pigtail cable located on the top right of the cabinet viewed from the front, denoted by the ground symbol, needs to be removed. The removed pigtail needs to be relocated to the base of the cabinet to the position denoted by the same ground symbol used at the position it was removed. Once the cable has been relocated, C-Tap the #1/0 AWG cable run along the base of the cabinet.

Figure 425 – Model B Frame Grounding with Model A Cabinets



Note: The frame ground pigtail in the C-Tap connection is toward the CPDC.

33.6 Model B - Logic Grounding - Multicabinet Configuration/7 ft. Frame Configuration

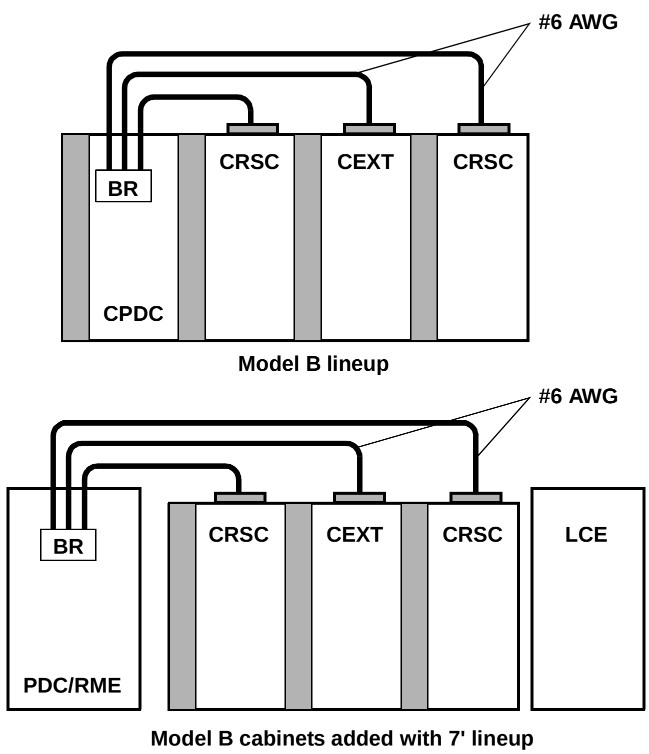
Note: All CRSC and CEXT cabinets, with a logic return connection from the external filter assembly located on the top of the Model B cabinet, are to be referenced to the CPDC, PDC, or RME battery return plate.

1. Run a #6 AWG cable from the external power filter kit assembly located on top of the model B cabinet to the power source as indicated on the cable tag. This cable will be run in the power shield in the cable trough. Refer to the 4851 spec or 1400 spec for the correct cable tags (U.S. only). Refer to Figure 426. (Refer to Subsection 33.2 for securing the lug to the power filter kit assembly).
2. The power source end of the #6 AWG needs one of the following lugs:

   CPDC: A0386307

   PDC/RME (7 ft. frame): A0288178

Figure 426 – Model B Logic Grounding with Model A Cabinets



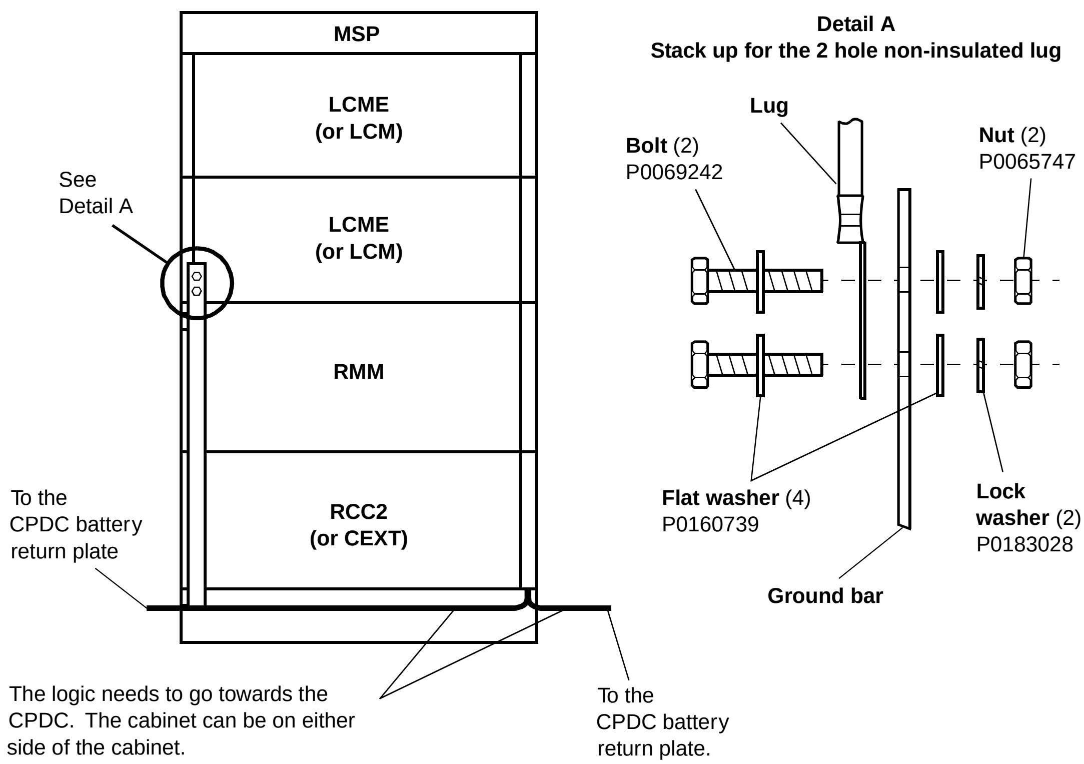
Note: Battery return can be found on a CPDC, PDC, or RME.

33.7 Model B - Logic Grounding - Model B Cabinets to a Model A Lineup

Note: The logic return cable, required in Model B cabinets when added to an existing Model A lineup, is to be referenced to the CPDC battery return plate internally.

1. The logic return cable is to be routed from the top Logic return bar located within the cabinet, along the base of the cabinet to the CPDC battery return plate.
2. A two hole non-insulated lug is required on the #6 AWG cable from the top of the logic bar located behind the bulkhead within the cabinet. Refer to Figure 427 for the cable form and hardware stackup.
3. The two hole non-insulated lug is required at the CPDC. The stackup of the hardware, lug, and boot is to remain the same as what was originally shipped with the CPDC. All of the hardware should be attached to each of the vacant circuit breaker positions within the CPDC.

Figure 427 – Model B Logic Grounding with Model A Cabinets



33.8 Model B - CRME Power Cabling

Note: The power and battery return identifiers are referred to as L- and L+. This identifier can be substituted as follows:

L-	is	-48V
L-A	is	-48VA
L-B	is	-48VB
L+	is	BATRTN
L+A	is	BATRTNA
L+B	is	BATRTNB

Each breaker panel assembly has 20 - (A) feeds and 20 - (B) feeds.

- CB00A and CB00B on each shelf are reserved for the filter capacitors (CB FA and CB FB).
- CB01A and CB01B on each shelf are reserved for EAS.
- CB02A on top panel is reserved for ABS.
- CB02B on all panels are reserved for inverters.

1 The Model B CRME is designed to allow powering of multiple lineups. The CRME is a smaller version of the CPDC; it will allow only two circuit breaker panels in the top portion of the cabinet and miscellaneous equipment in the lower portion of the cabinet.

2 There is no bulkhead in the CRME cabinet. The cables are to main power feeds and returns enter the cabinet directly from the top or the bottom of the cabinet.

3 Secure the main power feeds down the left rear of the cabinet. The cable tie brackets are provided with protective covering; additional protection on the brackets is not required. Lacing cord is required to secure the cables to the first entry point of the cabinet and every bracket following where the main power feeders are secured.

4 Main power feeds are terminated directly to the fuse panels. Typically #4/0 Flex or 350 MCM cable is used for main power feeds.

5 Only ground feeders are terminated to the bus bar provided in the rear of the cabinet.

6 Refer to Figure 428 for the forming of the main power feeders and Figure 429 for the hardware stackup.

Figure 428 – Model B Power Feeder Forming

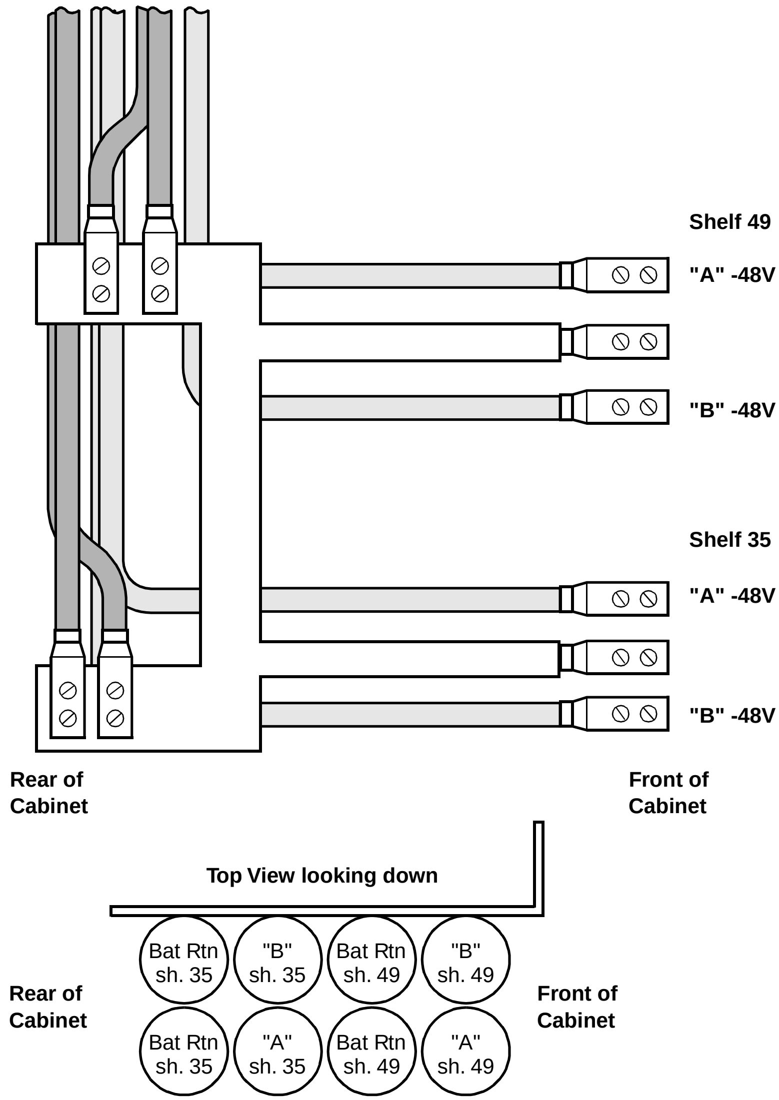
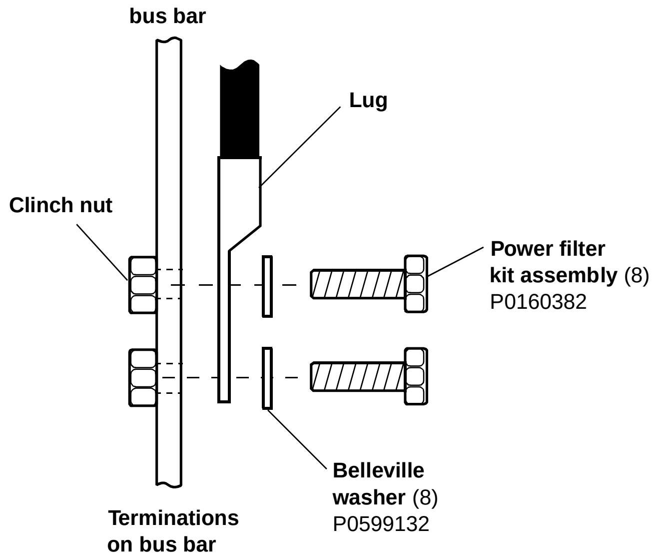


Figure 429 – CRME Model B Hardware Stackup

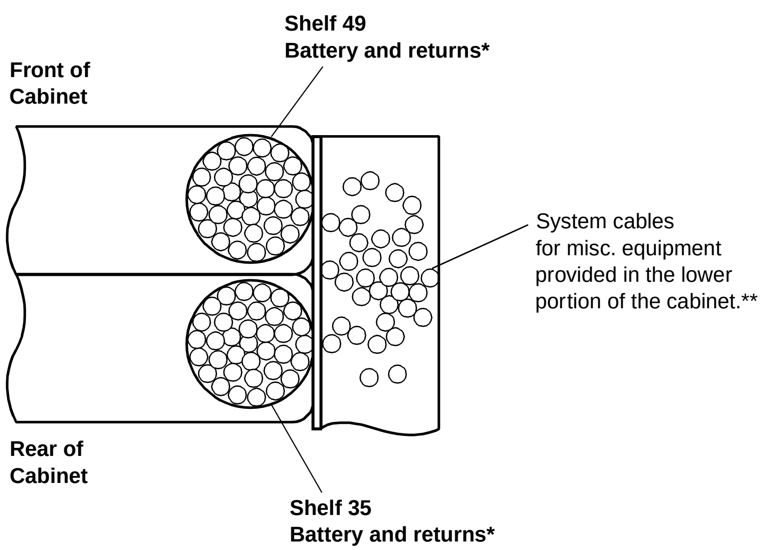


7 The covers removed on the bus bars prior to adding the cables need to be added back into place. The ground bar assembly does not require covers on any of the cables.

8 The secondary power and ground cables are to be formed into the CRME on the right side

9 Shelf cable brackets are installed along the right rear of the cabinet; the secondary cables are to be run through these as shown in Figure 430.

Figure 430 – Model B - CRME Cable Bracket Assignment



Note: * Each power bundle is ty-rapped to the bracket.
** System cables are not ty-rapped.

10 It is recommended to form one breaker panel at a time. Form from the top down and from the front bracket to the rear. The cables terminating at the top circuit breaker shelf assembly should be closest to the front of the cabinet.

11 The secondary power cables and system cables that are formed down the right rear (as shown in Figure 431) are to be secured to these brackets with ty-raps.

12 After the cables have passed through the top shelf bracket, bundle the cables going to the breakers and returns plate separately. Route the cables as shown in Figure 431. There will be four individual forms as break out of the main form for each breaker panel. As these cables are broken off, they are to be secured to the transverse arms located inside the cabinet.

13 The power and ground cables terminating to the breakers and battery return plates are to be approximately 6 to 7 inches in length. This length is from the breakout of the main form to the termination point. Battery return cables and power cables are to terminate on corresponding positions.

Example: Breaker 00 to Return Plate position 00, Breaker 05 to Return Plate position 05, etc.

14 Battery, battery return and ABS cables are to be identified at CRME termination points and at origination points in equipment lineups.

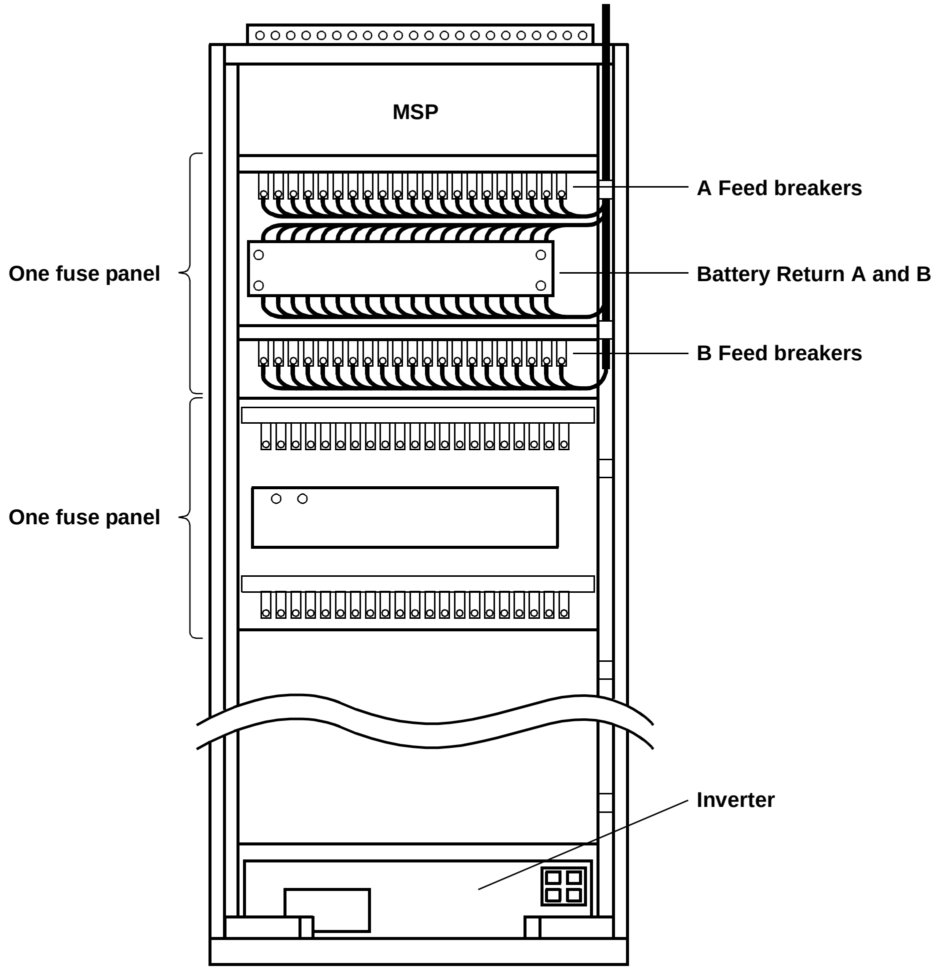
Use the peel-off label from the P0866901 cable tag and a P0884202 flag cable tie at both ends of the cable for cable identification. For cables connectorized at one or both ends, permanently applied cable designations are supplied by the cable manufacturer at the connectorized end(s).Refer to event 07 (method 03-9057) for details.

15 The lugs required for the CRME are located in the Installation Hardware Kit ordered in the 110 spec. The two-hole non-insulated, 90-degree lugs are as follows:

Cable Ordered	Pec code of Lug
10 ga:	A0386311
8 ga:	A0614961
6 ga:	A0614959

The power safety boot (P0730338) is shipped loose with the cabinet and is to be used for each of the cables listed previously. After the cable has been secured into place, the boot is placed on the cable. The power safety boot is added to the battery cables only; they are not to be added to the returns.

Figure 431 – Model B - CRME Rear View

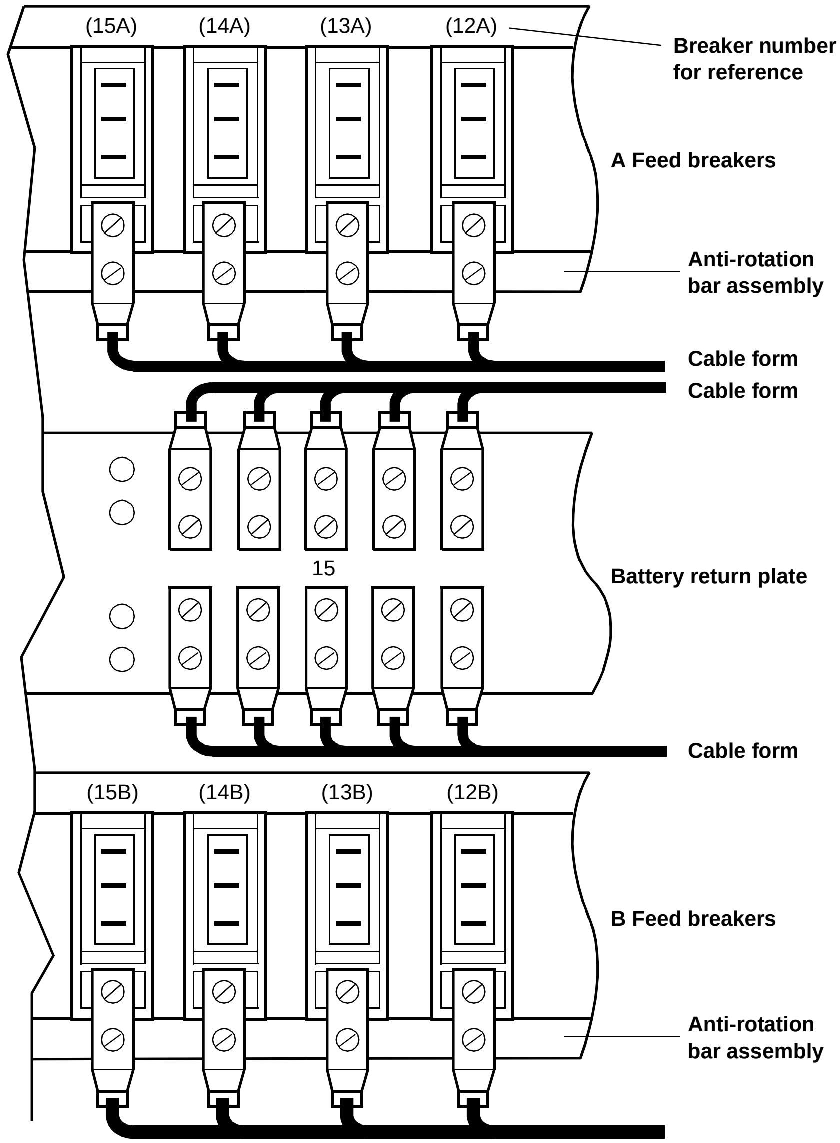


Rear View
NTRX31CA

16 The nuts with Belleville washers (P0719101) attached are used to secure the battery and returns in place. These are shipped loose with the cabinet.

17 The lugs for the cable terminating on the circuit breaker shelf assembly are to be oriented as shown in Figure 432. The power safety boots are not shown in Figure 432 for clarity.

Figure 432 – Model B Lug Orientation on Circuit Breaker Shelf



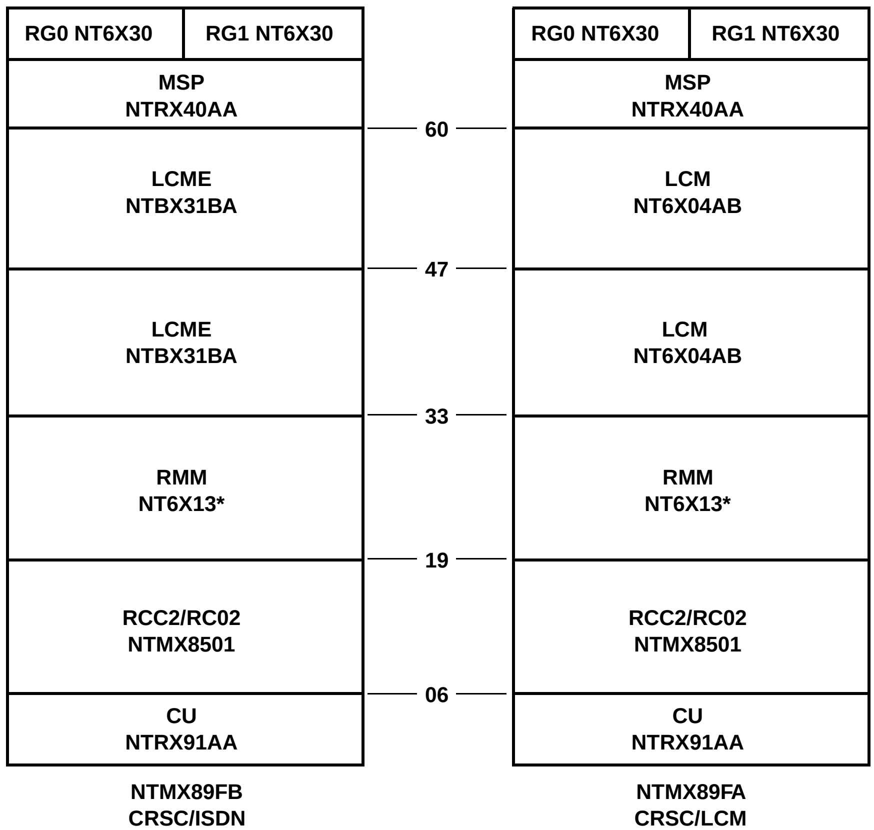
Partial View of Circuit Breaker Shelf Assembly

34.0 CRSC and CEXT System Cabling

34.1 CRSC/ISDN and CRSC/LCM Cabinet Configuration

1 The Model B single cabinet configuration for the Remote Switching Center Sonet (RSC-S) consists of the NTMX89FB cabinet (CRSC/ISDN) or an NTMX89FA cabinet (CRSC/LCM). The CRSC cabinet is equipped with four shelves, a ringing generator shelf, MSP, and cooling units. Refer to Figure 433.

Figure 433 – NTMX89FB (CRSC) and NTMX89FA (CRSC/LCM) Cabinet



Note: * NT6X13AB - Domestic
NT6X13EA - International

NTMX89KA - non-PCM30 (Domestic)
NTMX89KB - PCM30 (International)
} RMM I/O cable kits

2 The four shelves that make up the CRSC include the following: The RCC2 supports 54 P-side ports which can be a mix of DS1s/PCM30s, DS-30As, and DCHs. A maximum of forty-six DS-1/PCM30 ports, thirty-two DS-30A ports or ten DCH ports may be provided in various combinations. The RCO2 is the international version of the RCC2.

3 The RCC2 utilizes a Quad Carrier circuit pack which mounts four DS-1 "packlets." Each packlet provides two DS-1/PCM30 interfaces. Each slot provisioned with a Quad Carrier may have up to eight DS-1/PCM30s. Refer to Figure 434 for the circuit pack layout in the RCC2 shelf.

4 When DCH (NTBX02) circuit packs are provisioned in slots 12, 14, and 16, the cable connecting that slot to the EMI bulkhead must be disconnected at the backplane.

Figure 434 – RCC2 Shelf Provisioning

RCC2 Shelf

01/02	Power Conv.	NTMX72AA
03	Unified Processor	NTMX77AA
04	ISDN Sig. Pre-Processor (Prov.)	NTBX01 or 0X50
05	Class Modem Resource (Pro v.)	NT6X78AA/0X50AA
06	Univ ersal Tone Receiver (Prov.)	NT6X92BB/CA
07	Universal Tone Receiver (Prov.)	NT6X92BB/CA/NT0X50AA
08	Enhanced Messaging	NT6x69AC/LB/NTMX76AA
09	*	
10	Matrix	NTMX75BA
11	Signalling Processor	NTMX73AA
12	**	
13	DS-30A Interface	NTMX74AA
14	**	
15	DS-30A Interface	NTMX74AA
16	**	
17	Signalling Processor	NTMX73AA
18	Matrix	NTMX75BA
19	*	
20	Enhanced Messaging	NT6X69AC/LB/NTMX76AA
21	Universal Tone Receiver	NT6X92BB/CA/NT0X50AA
22	Universal Tone Receiver	NT6X92BB/CA
23	Class Modem Resource	NT6X78AA/0X50AA
24	ISDN Sig. Pre-Processor (Prov.)	NTBX01AB/0X50AA
25	Unified Processor	NTMX77AA
26/27	Power Conv.	NTMX72AA

Unit 0 (slots 01/02–14) Unit 1 (slots 14–26/27)

Note: Metallic Transmission Configuration

* Slot 09, 19 - Quad Carr ier (NTMX87AA) Always Provided.
0-3 Dual DS-1 Packlets (NTMX81AA) Provisionable.
0-3 Dual PCM30 Packlets (NTMX82AA) Provisionable.
0-3 Packlet Filler Face Plate (NTMX83AA) Provisionable.

** Slot 12, 14, 16 - D-Channel Handler (DCH) (NTBX02AA) Provisionable.
Quad Carrier (NTMX87AA) Provisionable.
Filler Face Plate (NT0X50AA) Provisionable.
0-3 Dual DS-1 Packlet (NTMX81AA) Provisionable.
0-3 Dual PCM30 Packlet (NTMX83AA) Provisionable.
0-3 Packlet Filler Face Plate (NTMX83) Provisionable.

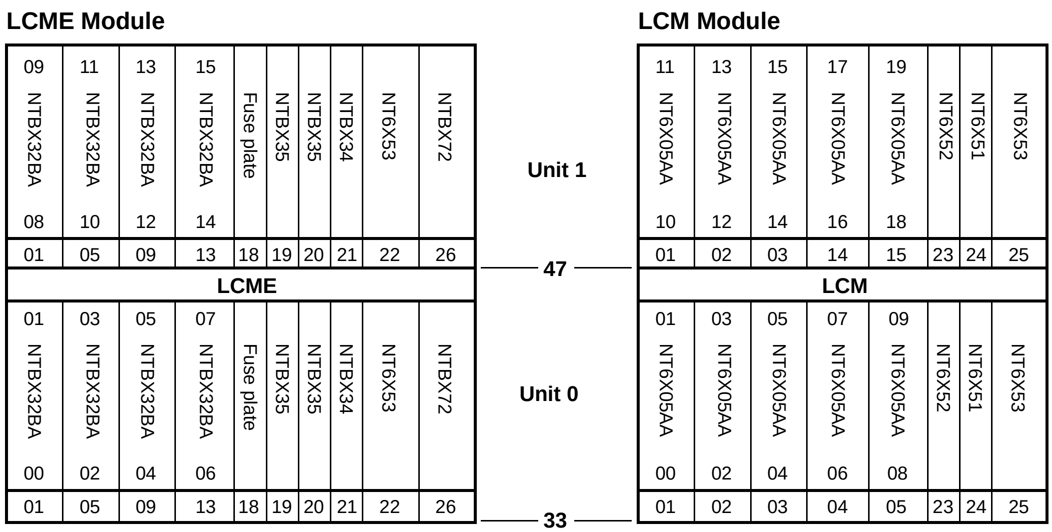
5 Each LCME unit is equipped with four ISDN Enhanced Line Drawers (NTBX32BA) located in slot positions 1, 5, 9, and 13 of each line shelf assembly. Refer to Figure 435. Each line drawer accommodates two line subgroups and supports up to sixty lines. The LCME module will support a total of 480 lines of POTS, MDC, DATAPATH, and ISDN subscriber lines.

6 LCMEs can support NT6X18 type line cards, only, if they are not configured as high voltage lines (coin, ANI, etc.). If coin lines are required, an LCM must be provisioned to support them.

7 Phase 1 limits ISDN modules to the CRSC and CEXT cabinets only. All line card types with the exception of coin lines are provisionable on the ISDN line drawer. The ISDN line card cannot be mounted in a "POTS" LCM.

8 A maximum of ten LCMs are provisionable in five CLCE cabinets or LCE frames for a single RCC2 (double this for a dual RCC2).

Figure 435 – LCME Module and LCM Module



NTBX32BA Line drawer
NTBX35AA Digroup controller card
NTBX34BA Processor Card
NT6X53CA Power convertor
NTBX72AA Battery and ring bus

NT6X05AA Line drawer
or
NT6X05AX Line drawer filler

9 Each LCM unit is equipped with five Line Drawers (NT6X05AA) located in shelf positions 1, 2, 3, 4, and 5 of each line shelf assembly. Refer to Figure 435. Each line drawer accommodates two line subgroups and supports up to sixty-four lines. The LCM module will support a total of 640 lines of POTS subscriber lines. LCMs can support any NT6X18 type line cards.

A maximum of ten LCMs are provisionable in five CLCE cabinets or LCE frames for a single RCC2 (double this for a dual RCC2).

10 One RMM shelf is required in the single CRSC configuration.

11 In the dual CRSC configuration, an RMM shelf is required in one CRSC and provisionable in the other.

12 One RMM is required in the CRSC and provisionable in the CEXT for a single CRSC and a single CEXT configuration.

13 One RMM is required in one CRSC and optional in the other two cabinets for a dual CRSC and CEXT cabinet configuration.

14 Model B card, slots 3 through 16, are all wired to the DF.

15 In Model A card, slots 3 through 10 are fixed circuit pack fill. Card slots 5 and 6 are wired to the MDF. Card slots 7 through 10 are not wired to the MDF. Card slots 11 through 16 are provisionable and are wired to the MDF.

16 Also, in Model A, the horizontals on the fixed NT3X09BA circuit pack in slot 6 are assigned as follows:

17 NT2X90AD (Montalk 0) in slot 7 is assigned to horizontal 0.
NT2X90AD (Montalk 1) in slot 8 is assigned to horizontal 1.
NT2X90AD (Ver 90) in slot 9 is assigned to horizontal 2.
NT2X90AD (Ver 90) in slot 10 is assigned to horizontal 3.

18 Model A - RMM to MDF cables terminate at connectors CO0, CO1, CO2, and CO3 located on personality plate position 19. Model B - RMM to MDF cables terminate at connectors C00, C01, C02, C03, C04, C05, C06, and C07. Refer to cable assembly drawing CARX06 for cable connectivity to MDF.

19 Refer to Figure 436 for RMM Circuit Pack Layout.

Figure 436 – RMM Circuit Pack Layout

RMM Shelf Layout

Group CODEC	NT2X59	01
Controller	NT6X74	02
MTU	NT2X10	03
MTU	NT2X11	04
Misc. Scan	NT0X10	05
Remote MTA	NT3X09	06
Incoming/Outgoing Trunk	NT2X90	07
Incoming/Outgoing Trunk	NT2X90	08
Incoming/Outgoing Trunk	NT2X90	09
Incoming/Outgoing Trunk	NT2X90	10
*		11
*		12
*		13
*		14
*		15
*		16
Power Converter	NT2X09	17 18
Filler Face Plate	NT0X50AA	19
Power Converter	NT2X06	20 21

Note: *Provisionable Circuit Pack

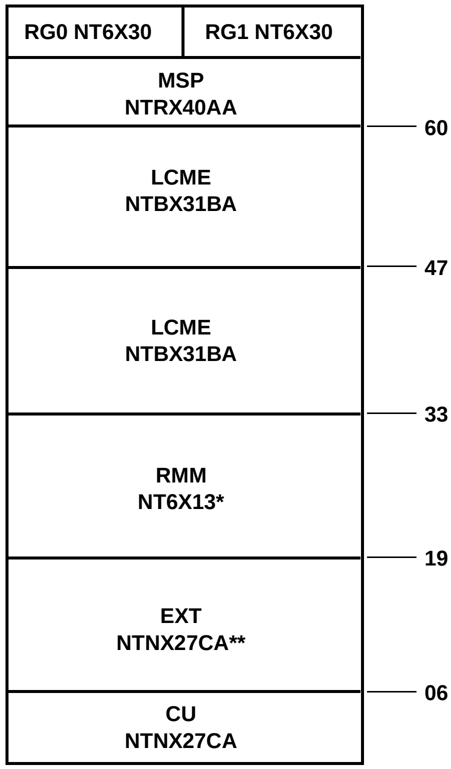
34.2 NTMX88AA (CEXT) Cabinet

1 The RCC2 shelf in the CRSC cabinet and the EXT shelf in the CEXT cabinet are linked by way of DS-60 links. The DS-60 link cable is limited to 20 ft. in length. Refer to Figure 437 for an example of the CEXT cabinet.

2 The EXT shelf is two functional modules on a single card cage. Slots 1 through 13 constitute module 0 and slots 14 through 26 constitute Module 1. Each module is further broken down into two logical units (0 and 1) which provide redundancy.

Each module on the EXT shelf is provisioned independently. The left module (as viewed from the front) is provisioned in support of the first RCC2 shelf and the right module is provisioned to support the second RCC2 shelf.

Figure 437 – CEXT Cabinet



NTMX89FC
(Model B)

Note:

* NT6X13AB - Domestic
NT6X13EA - International

** NTMX89KC - non-PCM30 (Domestic)
NTMX89KD - PCM30 (International)

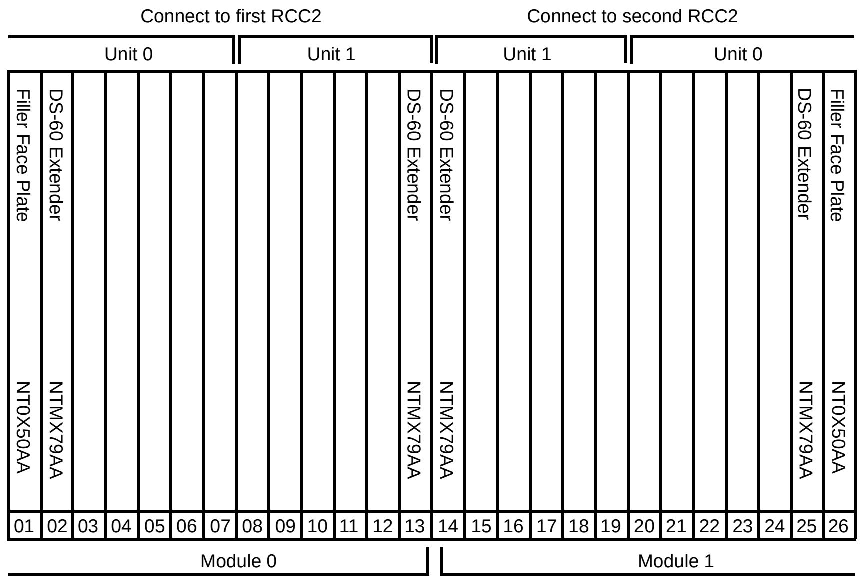
3 Provisioning the EXT shelf enables the assignment of up to forty-six DS-1/PCM30 P side ports at a cost of DS-30A ports or up to ten DCH ports at a cost of DS-1 ports. Refer to ISMX89 and CARX06 for port clarification.

4 Refer to NTP-297-2761-155, "RSC-S Planning & Engineering Guide," for the provisioning configuration tables for the RCC2 and EXT shelves. The tables show all hardware combinations of DCHs, DS-1/PCM30s, and DS-30s, and take into consideration the trade-offs between them.

The combinations shown best utilize the hardware from the stand point of growth without the expense of reconfiguring. When DCH (NTBX02) circuit packs are provided in the provisionable slots, the cable connecting that slot to the EMI bulkhead must be removed.

5 Refer to Figure 438 for an example of the EXT shelf layout.

Figure 438 – EXT Shelf Provisioning



NTMX87		NTMX02	
Qty. per Unit	Slot	Qty. per Unit	Slot
0-3	4, 6, 8, 19, 21, 23	--	--
0-2	4, 6, 21, 23	1-8	* 3, 5, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 22, 24
0-1	4, 23	1-9	** 3, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21, 22, 24
0	--	1-10	*** 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 15, 16, 17, 18, 19, 20, 21, 22, 23, 24

Note:

* Slot 8 and 19 cannot be used for MX87 even if not all DCHs are equipped.

** Slot 6, 8, 19, and 21 cannot be used for MX87 even if not all DCHs are equipped.

*** Slot 4, 6, 8, 19, 21, and 23 cannot be used for MX87 even if not all DCHs are equipped.

34.3 Installing Bulkhead Cables

The Interbay, MDF, and DSX cables are pre-connectorized and will plug into the connectors provided on the CRSC and CEXT cabinet personality plates, located in positions 05, 19, 33, and 47. Refer to Figure 439, Figure 440, Figure 441, and Figure 442 for the model B cabinets.

All references to the right and the left are made when viewed from the rear of the cabinet.

1 When connecting the system level cable cables to the bulkhead, the field technician can torque these connectors with the initial torque of 1 ft-lb. This can prevent over tightening the screws that will break.

Note: This is an initial torque only. There is not any verification torque required.

2 Refer to the cable tags to determine the correct cable trough shield and terminating location.

3 Route the cables from the top of the cabinet and secure with ty-raps to the cable tie brackets. All cables entering the cabinet must be secured at the first cable tie bracket.

4 Group the cables into two separate bundles according to their terminating location on the bulkhead.

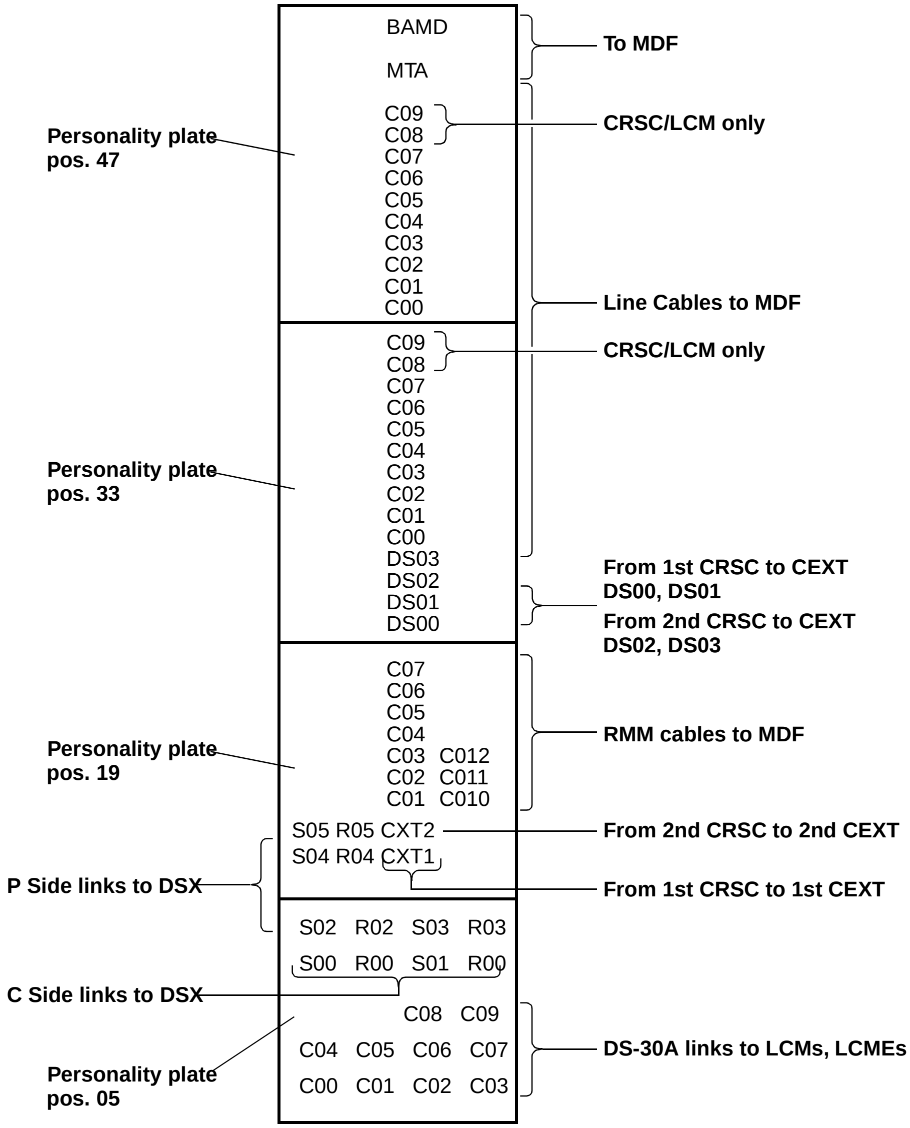
5 Plug the connectorized cables into their connector locations on the personality plates, and secure with the connector hood screws.

6 Form and secure the cables going to personality plate positions 05 and 19 to the left side on the cable tie bracket. Work the excess slack toward the top of the cabinet.

7 Form and secure the cables going to personality plate positions 33 and 47 to the right of the cables previously formed in paragraph 5. Work the excess slack toward the top of the cabinet.

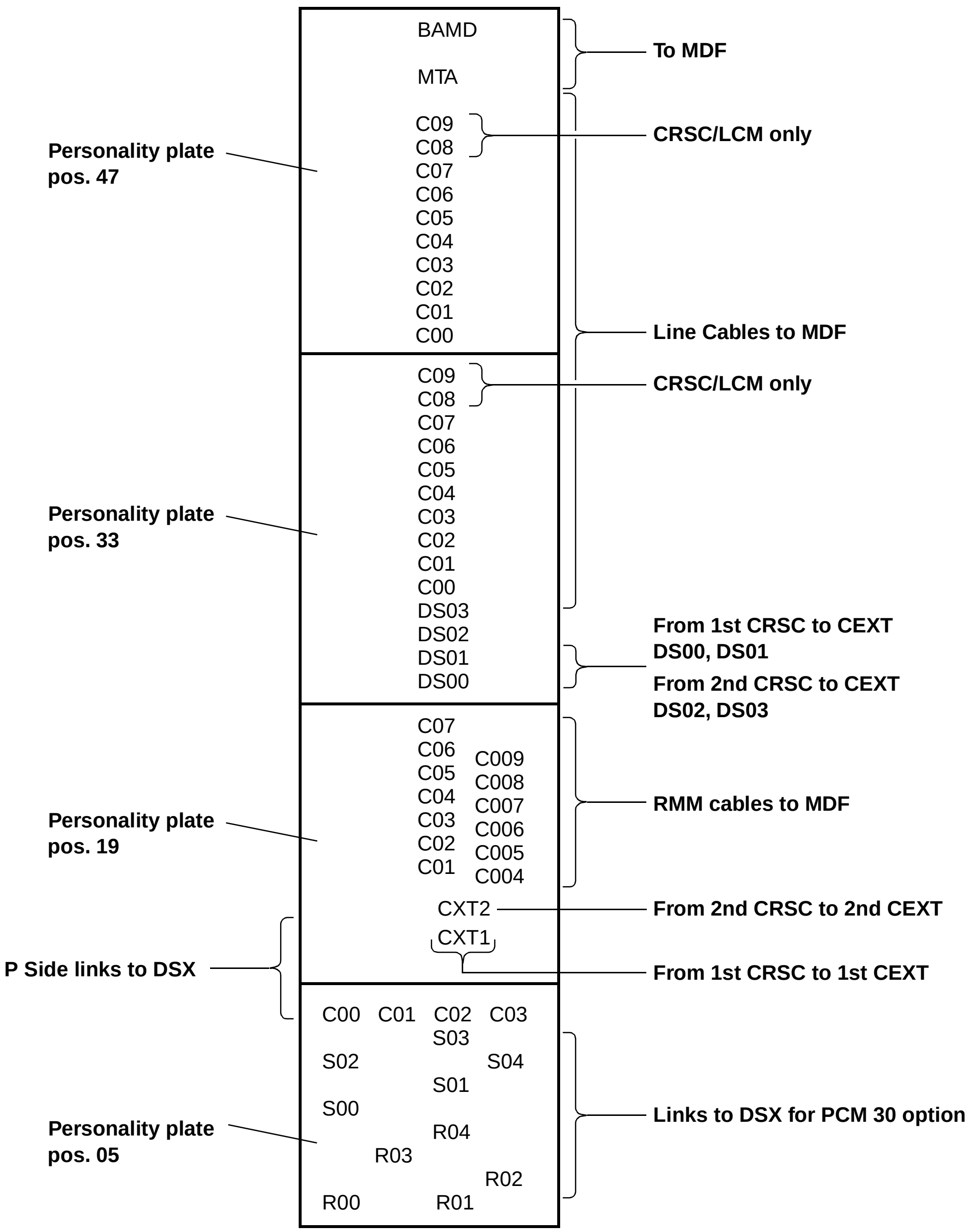
8 Do *not* pull the cables too tight. Leave an amount of service slack in the cables between the termination point at the connector and the last ty-rap support. The service slack is to be consistent throughout the installation.

Figure 439 – Model B (Twisted Pair) - CRSC EMI Bulkhead Connector Layout



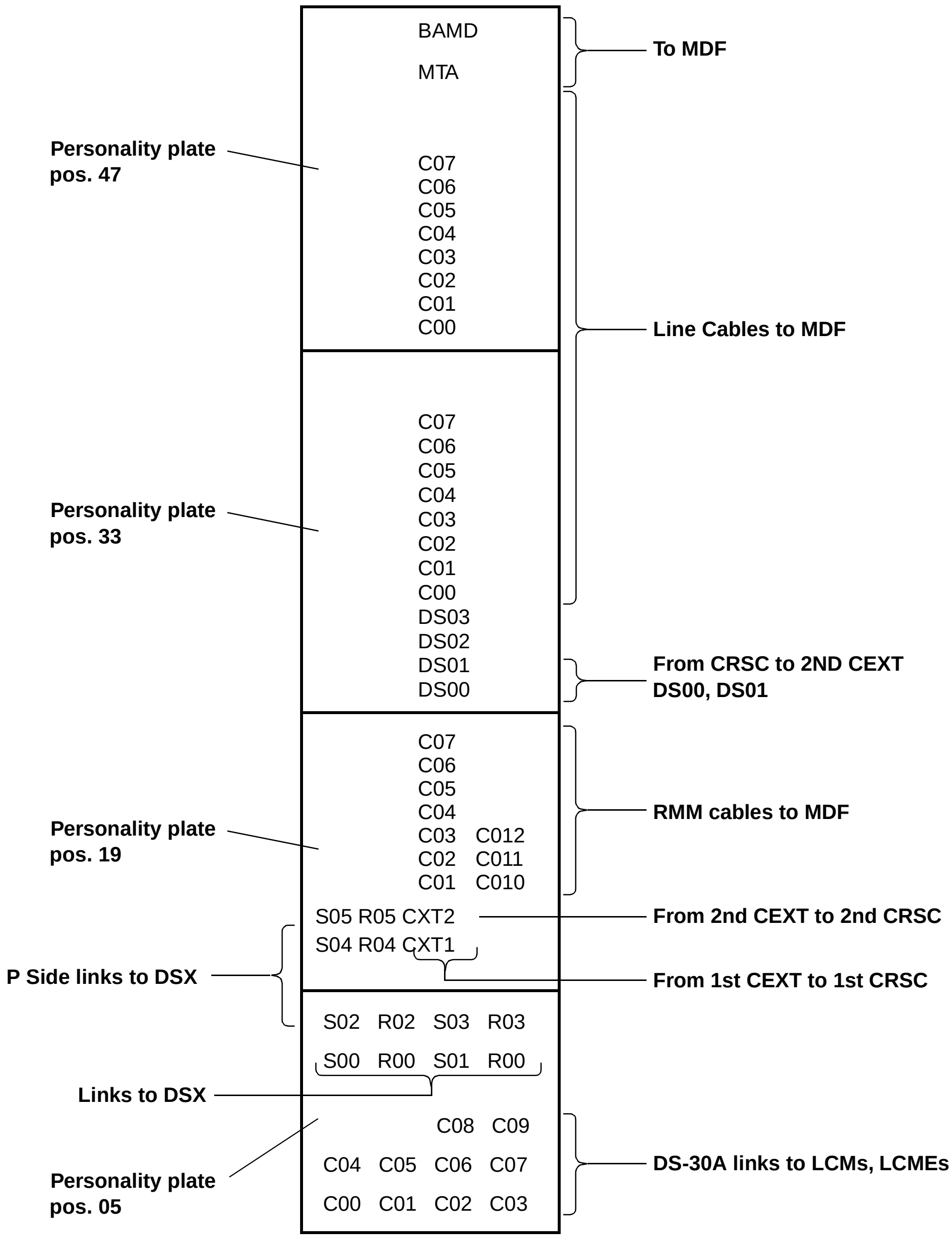
EMI Bulkhead CRSC cabinet

Figure 440 – Model B (PCM30 COAX) - CRSC EMI B/H Connector Layout



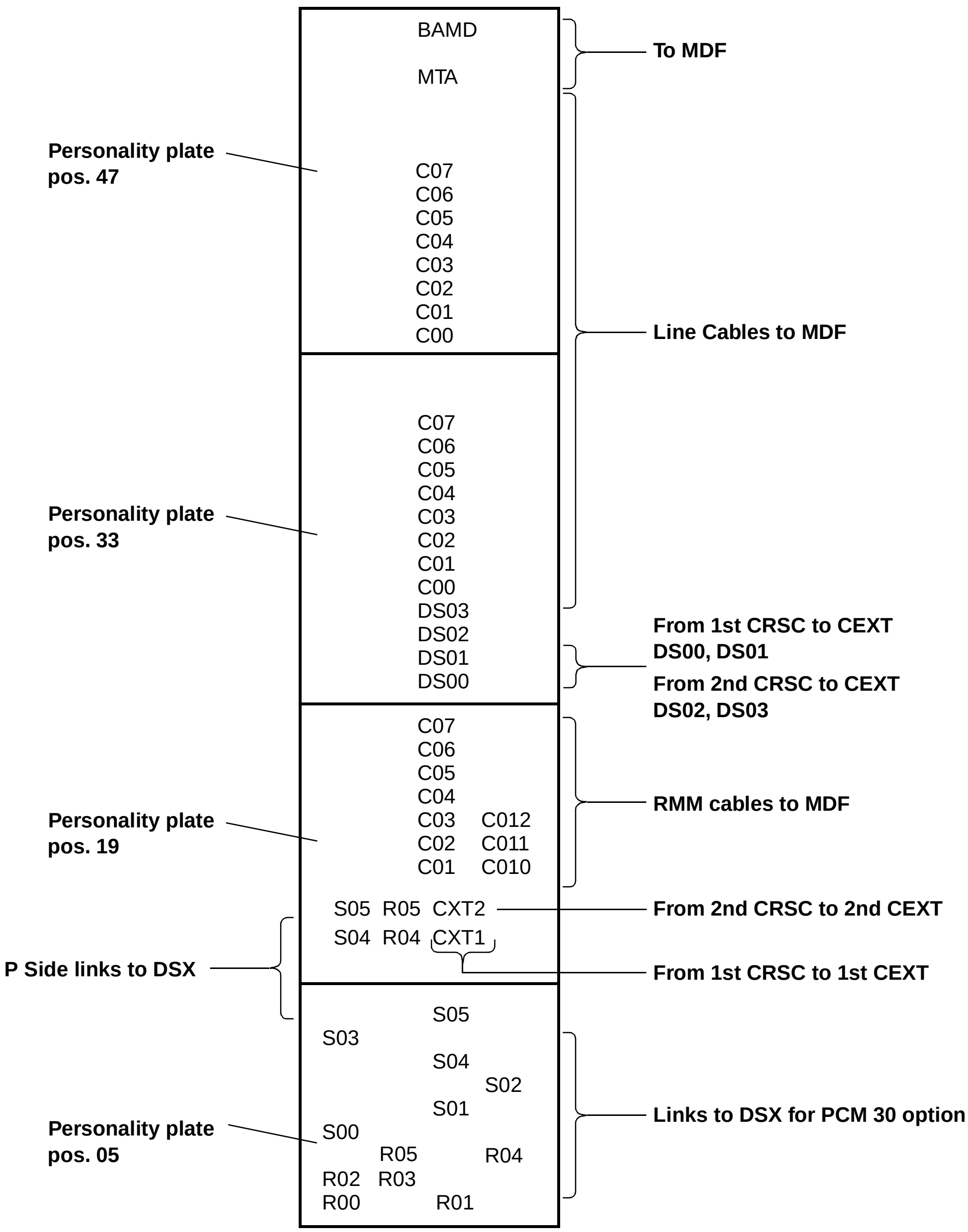
EMI Bulkhead CRSC cabinet

Figure 441 – Model B (Twisted Pair) - CEXT EMI Bulkhead Connector Layout



EMI Bulkhead CRSC cabinet

Figure 442 – Model B (PCM30 COAX) - CEXT EMI Bulkhead Connector Layout



EMI Bulkhead CRSC cabinet

34.4 Installing MTA Cables

Model B Cabinets - All Configurations

The Metallic Test Access (MTA) cables are run to the MDF per the cabling specifications. Cross-connect the MTA(s) to the test circuits and line modules at the MDF. Refer to Method 22-1201, "Metallic Test Access (MTA) Cross-Connections and WTA Installation."

34.5 DS-30A Cabling and Backplane Connections

The DS-30A (NTMX8916 - Model B) cables that are located in position 05 (twisted pair option bulkheads) or positions 05 and 19 (PCM30 COAX option bulkheads) on the shop side of the bulkhead, provide port access to the RCC2 backplane positions 13 and 15. Each DS-30A cable is split out into six 2x4 (Amp Level 5) connectors. The DS-30A connectors are designated A0, B0, C0, D0, E0, F0 through A9-F9. The number after the letter designates what connector position on the bulkhead that the DS-30A connector is coming from. (Refer to paragraph 3 for internal DS-30A cables from a LCME or LCM.) Refer to Cabling Specification 1200 and Drawing D620 for port assignment and terminating information.

Caution: DS-30A Cabling and Back plane Connections require special care when making back plane connections. Refer to Figure 443 for the correct pin numbering.

Note: That the pin count skips from pin 40 (port 35) to pin 54 (port 38) for RCC2 slot 15. The pin count skips from pin 40 (port 37) to pin 54 (port 40) in RCC2 slot 13. Care must be taken to ensure that the correct pins are used or a service outage may occur.

1. Port 22 of the RCC2 is reserved for the "in cabinet" CRSC RMM, port 23 is reserved for the "1st off cabinet" RMM. Port 24 is not reserved and should be cabled per engineering specifications. The "off cabinet" RMM port is cabled to the CRSC cabinet by way of the CEXT/CXT1/CXT2 connector located in personality plate position 19 on the bulkhead.

2. The DS-30A cables connect internal LCM or LCME to the RCC2. The message links are assigned in descending order and are assigned to the same slot position on the RCC2, this is acceptable. ***Do not reassign the message links***. The message links are redundant by having card slots 13 and 15 hardwired together by way of copper tracks on the RCC2 backplane. Refer to the D620 for other port assignments.

   DS-30A cables from the LCME (NTMX8918) or the LCM (NTMX8951) are located within the cabinet. These cables are internal within the cabinet and do *not* come off the bulkhead. They are designated 00A-00J for Unit 0 of the LCME/LCM and 01A-01J for Unit 1 of the LCME/LCM. Refer to the D620 drawing for the port assignments.

3. Plug in and secure the DS-30A (NTMX8926/16) cables to the D-sub connectors (CO0 through CO9) located on the shop side of the personality plate in position 05/19.

4. Form the cables to the "U" channel on the lower part of the RCC2 shelf and secure with ty-raps.

5 Exercise care when mating the connectors with the pins on the backpanel. Mate the 2x4 connector pin #1 to the upper right backplane pin of the port to which it is assigned (as seen from the rear). Repeat for all provisioned ports.

Example: For the LCME XX Unit 0 Port 0 to RCC2 port # 53 connection, align pin #1 on AMP level 5 connector "A" with pin # 82D on backplane position 13.

Refer to Figure 443 for a typical DS-30A link backplane pin connections.

6 Use a four-inch marking ty-rap (P0633713) and a black Venus sharpie pen to identify the provisioned port connectors with the position number on the backplane and the first pin to which the connector is to mate.

Example: Pos 15
Pin 09

7 Spare off the non-assigned port connectors by forming and securing them to the cable form.

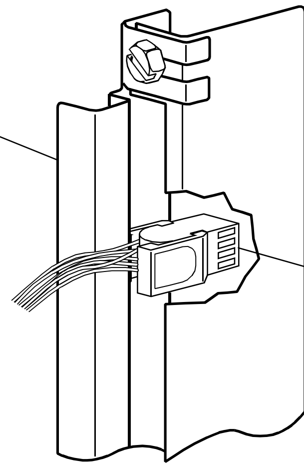
8 Each 2x4 connector is secured with a ty-rap to the individual arms of the DS-30A brackets in slot positions 13 and 15. Ty-raps are to be wrapped around the arm of the bracket and the heat shrink of the DS-30A cables.

Note: Ty-raps are not to be wrapped around the bare wire of the DS-30A cable. Refer to Figure 444 for connection to bracket.

Figure 443 – RCC2 Shelf DS-30A Link Backplane Connections

RCC2 SLOT 15		RCC2 SLOT 13	
ROWS A and B		ROWS C and D	
BACKPLANE PIN #	PORT #	BACKPLANE PIN #	PORT #
9, 10, 11,12	22	9, 10, 11,12	24
13, 14, 15, 16	23	13, 14, 15, 16	25
17, 18, 19, 20	26	17, 18, 19, 20	28
21, 22, 23, 24	27	21, 22, 23, 24	29
25, 26, 27, 28	30	25, 26, 27, 28	32
29, 30, 31, 32	31	29, 30, 31, 32	33
33, 34, 35, 36	34	33, 34, 35, 36	36
37, 38, 39, 40	35	37, 38, 39, 40	37
54, 55, 56, 57	38	54, 55, 56, 57	40
58, 59, 60, 61	39	58, 59, 60, 61	41
62, 63, 64, 65	42	62, 63, 64, 65	44
66, 67, 68, 69	43	66, 67, 68, 69	45
70, 71, 72, 73	46	70, 71, 72, 73	48
74, 75, 76, 77	47	74, 75, 76, 77	49
78, 79, 80, 81	50	78, 79, 80, 81	52
82, 83, 84, 85	51	82, 83, 84, 85	53

Figure 444 – DS-30A Connection to Bracket



34.6 RCC2 and EXT Shelf C-Side Link Backplane Connections

1 The D-Sub connectors (S00, S01, R00, R01) located in position 05 on the bulkhead provides access to sixteen C-side links on the RCC2 shelf backplane. The Amp level 5 connectors are designated A, B, C, and D. Refer to Figure 445 and Figure 446 for the C-side link backplane connections. Refer to Cable Assembly CARX06 for cable connectivity tables.

Figure 445 – RCC2 Shelf C-Side Link Backplane Connections (Send)

BULKHEAD D-SUB CONNECTOR	AMP LEVEL 5 CONNECTOR	CP SLOT	RCC2 UNIT	BACKPLANE PIN #	SEND PORT
S00	A	9	0	10 A,B	0
				12 A,B	1
				14 A,B	4
				16 A,B	5
				18 A,B	8
				20 A,B	9
				22 A,B	12
				24 A,B	13
				21 A,B	16
				25 A,B	17

Figure 445 – RCC2 Shelf C-Side Link Backplane Connections (Send)

BULKHEAD D-SUB CONNECTOR	AMP LEVEL 5 CONNECTOR	CP SLOT	RCC2 UNIT	BACKPLANE PIN #	SEND PORT
S01	B	19	1	10 A,B	2
				12 A,B	3
				14 A,B	6
				16 A,B	7
				18 A,B	10
				20 A,B	11
				22 A,B	14
				24 A,B	15
				21 A,B	18
				25 A,B	19

Figure 446 – RCC2 Shelf C-Side Link Backplane Connections (Receive)

BULKHEAD D-SUB CONNECTOR	AMP LEVEL 5 CONNECTOR	CP SLOT	RCC2 UNIT	BACKPLANE PIN #	REC. PORT
R00	C	9	0	56 A,B	0
				58 A,B	1
				60 A,B	4
				62 A,B	5
				64 A,B	8
				66 A,B	9
				68 A,B	12
				70 A,B	13
				67 A,B	16
				71 A,B	17

Figure 446 – RCC2 Shelf C-Side Link Backplane Connections (Receive)					
BULKHEAD D-SUB CONNECTOR	**AMP LEVEL 5 CONNECTOR**	**CP SLOT**	**RCC2 UNIT**	**BACKPLANE PIN #**	**REC. PORT**
R01	D	19	1	56 A,B	2
				58 A,B	3
				60 A,B	6
				62 A,B	7
				64 A,B	10
				66 A,B	11
				68 A,B	14
				70 A,B	15
				67 A,B	18
				71 A,B	19

34.7 RCC2 and EXT Shelf P-Side Link Backplane Connections

1 The D-Sub connectors (S02, S03, S04, R02, R03, and R04) located in position 05 and 19 on the bulkhead provide access to twenty-two P-side links on the RCC2 shelf backplane positions 12, 14, and 16. The Amp level 5 connectors are designated E, F, G, H, J, and K. Refer to Figure 447 for the P-side link backplane connections. Refer to Cable Assembly CARX06 for cable connectivity tables.

2 The D-Sub connectors (S00 through S05 and R00 through R05) located in position 05 and 19 on the bulkhead provide access to 48 P-side links on the EXT shelf backplane positions 4, 6, 8, 19, 21, and 23. The Amp level 5 connectors are designated A through M. Refer to Figure 448 for the P-side link backplane connections. Refer to Cable Assembly CARX06 for cable connectivity tables.

Figure 447 – RCC2 Shelf P-Side Link Backplane Connections

D-SUB CONN.	AMP LEVEL 5 CONNECTOR	BACKPLANE PIN #	SEND PORT	NTMX81AA PACKLET	D-SUB CONN.	AMP LEVEL 5 CONNECTOR	BACKPLANE PIN #	REC. PORT	NTMX81AA PACKLET	CP SLOT
S02	E	10 A,B	0	0	R02	F	56 A,B	0	0	12
		12 A,B	1				58 A,B	1		
		14 A,B	2	1			60 A,B	2	1	
		16 A,B	3				62 A,B	3		
		18 A,B	4	2			64 A,B	4	2	
		20 A,B	5				66 A,B	5		
		22 A,B	6	3			68 A,B	6	3	
		24 A,B	7				70 A,B	7		
S03	G	10 A,B	8	0	R03	H	56 A,B	8	0	16
		12 A,B	9				58 A,B	9		
		14 A,B	10	1			60 A,B	10	1	
		16 A,B	11				62 A,B	11		
		18 A,B	12	2			64 A,B	12	2	
		20 A,B	13				66 A,B	13		
		22 A,B	14	3			68 A,B	14	3	
		24 A,B	15				70 A,B	15		
S04	J	10 A,B	16	0	R04	K	56 A,B	16	0	14
		12 A,B	17				58 A,B	17		
		14 A,B	18	1			60 A,B	18	1	
		16 A,B	19				62 A,B	19		
		18 A,B	20	2			64 A,B	20	2	
		20 A,B	21				66 A,B	21		

Figure 448 – EXT Shelf P-Side Link Backplane Connections

D-SUB CONN.	AMP LEVEL 5 CONNECTOR	BACKPLANE PIN #	SEND PORT	NTMX81AA PACKLET	D-SUB CONN.	AMP LEVEL 5 CONNECTOR	BACKPLANE PIN #	REC. PORT	NTMX81AA PACKLET	CP SLOT
S00	A	10 A,B	0	0	R00	B	56 A,B	0	0	04
		12 A,B	1				58 A,B	1		
		14 A,B	2	1			60 A,B	2	1	
		16 A,B	3				62 A,B	3		
		18 A,B	4	2			64 A,B	4	2	
		20 A,B	5				66 A,B	5		
		22 A,B	6	3			68 A,B	6	3	
		24 A,B	7				70 A,B	7		
S01	C	10 A,B	8	0	R01	D	56 A,B	8	0	06
		12 A,B	9				58 A,B	9		
		14 A,B	10	1			60 A,B	10	1	
		16 A,B	11				62 A,B	11		
		18 A,B	12	2			64 A,B	12	2	
		20 A,B	13				66 A,B	13		
		22 A,B	14	3			68 A,B	14	3	
		24 A,B	15				70 A,B	15		
S02	E	10 A,B	16	0	R02	F	56 A,B	16	0	08
		12 A,B	17				58 A,B	17		
		14 A,B	18	1			60 A,B	18	1	
		16 A,B	19				62 A,B	19		
		18 A,B	20	2			64 A,B	20	2	
		20 A,B	21				66 A,B	21		
		22 A,B	22	3			68 A,B	22	3	
		24 A,B	23				70 A,B	23		
S03	G	10 A,B	24	0	R03	H	56 A,B	24	0	19
		12 A,B	25				58 A,B	25		
		14 A,B	26	1			60 A,B	26	1	
		16 A,B	27				62 A,B	27		
		18 A,B	28	2			64 A,B	28	2	
		20 A,B	29				66 A,B	29		
		22 A,B	30	3			68 A,B	30	3	
		24 A,B	31				70 A,B	31		
S04	J	10 A,B	32	0	R04	K	56 A,B	32	0	21
		12 A,B	33				58 A,B	33		
		14 A,B	34	1			60 A,B	34	1	
		16 A,B	35				62 A,B	35		
		18 A,B	36	2			64 A,B	36	2	
		20 A,B	37				66 A,B	37		
		22 A,B	38	3			68 A,B	38	3	
		24 A,B	39				70 A,B	39		
S05	L	10 A,B	40	0	R05	M	56 A,B	40	0	23
		12 A,B	41				58 A,B	41		
		14 A,B	42	1			60 A,B	42	1	
		16 A,B	43				62 A,B	43		
		18 A,B	44	2			64 A,B	44	2	
		20 A,B	45				66 A,B	45		
		22 A,B	46	3			68 A,B	46	3	
		24 A,B	47				70 A,B	47		

34.8 RCC2 and EXT Shelf DS-60 Link Backplane Connections

1 The D-Sub connectors (DS00 and DS01) located in position 19 on the bulkhead provide access to the DS-60 links on the RCC2 shelf backplane positions 10 and 18. The Amp level 5 connectors are designated A, B, C, D, E, F, G, and H. Refer to Figure 449 for the DS-60 link backplane connections. Refer to Cable Assembly CARX06 for cable connectivity tables.

Figure 449 – RCC2 Shelf DS-60 Link Backplane Connections

BULKHEAD D-SUB CONNECTOR	AMP LEVEL 5 CONNECTOR	CP SLOT	ROWS C and D BACKPLANE PIN #
DS00	A	10C, D	6, 7, 8,9
	B		10, 11, 12, 13
	C		14, 15, 16, 17
	D		18, 19, 20, 21
	E		22, 23, 24, 25
	F		26, 27, 28, 29
	G		30, 31, 32, 33
	H		34, 35, 36, 37
DS01	I	18C, D	6, 7, 8,9
	J		10, 11, 12, 13
	K		14, 15, 16, 17
	L		18, 19, 20, 21
	M		22, 23, 24, 25
	N		26, 27, 28, 29
	O		30, 31, 32, 33
	P		34, 35, 36, 37

2 The D-Sub connectors (DS00 and DS01) located in position 19 and the D-Sub connectors (DS02 and DS03) located in position 33 on the bulkhead provide access to the DS-60 links on the EXT shelf backplane positions 02, 13, 14, and 25. The Amp level 5 connectors are designated A, B, C, D, E, F, G, and H. Refer to Figure 450 for the DS-60 link backplane connections. Refer to Cable Assembly CARX06 for cable connectivity tables.

Figure 450 – EXT Shelf DS-60 Link Backplane Connections

BULKHEAD D-SUB CONNECTOR	AMP LEVEL 5 CONNECTOR	CP SLOT	ROWS C and D BACKPLANE PIN #
DS00	A	02 C,D	51, 52, 53,54
	B		55, 56, 57, 58
	C		59, 60, 61, 62
	D		63, 64, 65, 66
	E		67, 68, 69, 70
	F		71, 72, 73, 74
	G		75, 76, 77, 78
	H		79, 80, 81, 82
DS01	I	13 C,D	51, 52, 53,54
	J		55, 56, 57, 58
	K		59, 60, 61, 62
	L		63, 64, 65, 66
	M		67, 68, 69, 70
	N		71, 72, 73, 74
	O		75, 76, 77, 78
	P		79, 80, 81, 82
DS02	A	25 C,D	51, 52, 53,54
	B		55, 56, 57, 58
	C		59, 60, 61, 62
	D		63, 64, 65, 66
	E		67, 68, 69, 70
	F		71, 72, 73, 74
	G		75, 76, 77, 78
	H		79, 80, 81, 82
DS03	I	14 C,D	51, 52, 53,54
	J		55, 56, 57, 58
	K		59, 60, 61, 62
	L		63, 64, 65, 66
	M		67, 68, 69, 70
	N		71, 72, 73, 74
	O		75, 76, 77, 78
	P		79, 80, 81, 82

34.9 Line Drawer Dressing for CRSC (ISDN) and CEXT

1 Cabinets may be delivered to the site with line drawers already installed. Field personnel are instructed to check that the harnesses are properly formed and ty-rapped.

2 Verify the proper dressing by pulling each line drawer out at the front of the cabinet. The following items should be checked:

- The last line card in the drawer should be accessible when the line drawer is fully extended at the front of the cabinet.
- The ty-raps which secure the cables on both the line drawer and associated spring must not be loose.
- The ty-raps should not interfere with the movement of the drawer or the cabling.
- Ensure that the cables are in a tight bundle and that the bottom of the bundle is flush with the bottom of the spring.
- Ensure that the cabling loops, where the connectors plug in, are not touching the drawer beside it.
- Ensure that the A and B line connectors are assembled using a double hood.

3 If cabinets are delivered to site without line drawers installed or if deficiencies are found with the dressing, the following paragraphs must be followed.

4 Connect the C/D connector (associated cable is the control cable).

5 Connect the E connector.

6 Connect the Upper (odd A and B) line connectors. The line cable associated with the upper connectors should be positioned in front of the control (C/D) cable.

7 Connect the Lower (even A and B) line connectors. The line cable associated with the lower connectors should be positioned in front of the control (C/D) cable.

Note: If applicable, any shielded cable should be positioned such that it faces to the rear/outside of the cabinet.

8 Ensure that ty-raps are positioned around the cables as shown in Figure 451. Add ty-raps, if any are missing.

9 Form the cables in a tight bundle at the rear of the drawer. Make a 180-degree turn at the bottom of the drawer. Ensure that the bottom of the cable bundle is approximately 1/4 inch above the flange at the bottom rear of the line drawer.

10 Place a ty-rap around the cable bundle and secure it to the molded ty-rap base on the line drawer. Refer to Figure 451.

11 Place a ty-rap around the bundle and the control spring. Position the ty-rap 1.25" above the bottom tab on the spring.

12 Add a ty-rap around the bundle at the mid point in the 180-degree turn at the bottom of the form.

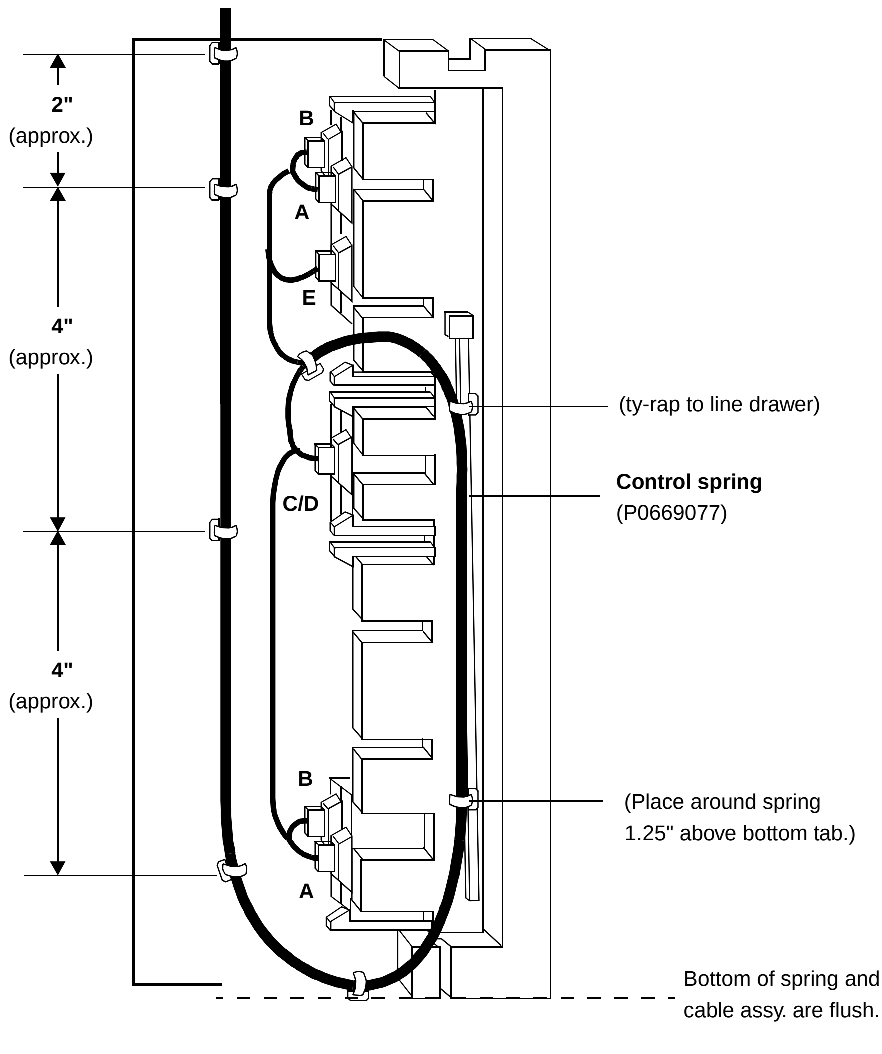
13 Place a ty-rap around the C/D control cable, the E control cable, and the upper (odd) line cable. Refer to Figure 451.

14 Use side cutters to trim the excess ty-rap flush where the ty-rap locks. Ensure there are no sharp edges on the ty-rap. Dispose of ty-rap waste in a safe manner.

15 Turn the heads of the ty-raps inward so they are hidden from view.

16 Verify the proper dressing by pulling each line drawer out at the front of the cabinet. Refer to paragraph 2 for the checklist.

Figure 451 – Rear of Line Drawer - CRSC (ISDN) and CEXT



Rear of Line Drawer for CLMI CRSC

34.10 Line Drawer Dressing for CRSC (LCM)

1 Cabinets may be delivered to site with line drawers already installed. Field personnel are instructed to check the harnesses are properly formed and ty-rapped.

2 Verify the proper dressing by pulling each line drawer out at the front of the cabinet. The following items should be checked:

- The last line card in the drawer should be accessible when the line drawer is fully extended at the front of the cabinet.
- The ty-raps which secure the cables on both the line drawer and associated spring must not be loose.
- The ty-raps should not interfere with the movement of the drawer or the cabling.
- Ensure that the cables are in a tight bundle and that the bottom of the bundle is flush with the bottom of spring.
- Ensure that the cabling loops, where the connectors plug in, are not touching the drawer beside it.
- Ensure that the A and B line connectors are assembled using a double hood.

3 If cabinets are delivered to the site without line drawers installed or if deficiencies are found with the dressing, the following paragraphs must be followed.

4 Connect the Upper (odd A and B) line connectors.

5 Connect the C/D connector (associated cable is the control cable).

6 Connect the Lower (even A and B) line connectors. The line cable associated with the lower connectors should be positioned in front of the control (C/D) cable.

Note: If applicable, any shielded cable should be positioned such that it faces to the rear/outside of the cabinet.

7 Ensure that ty-raps are positioned around the cables as shown in Figure 452. Add ty-raps, if any are missing.

8 Form the cables in a tight bundle at the rear of the drawer. Make a 180-degree turn at the bottom of the drawer. Ensure that the bottom of the cable bundle is flush with the bottom of the spring bracket.

9 Place a ty-rap around the cable bundle and secure it to the molded ty-rap base on the line drawer. Refer to Figure 452.

10 Place a ty-rap around the bundle and the control spring. Position the ty-rap 1.25" above the bottom tab in the spring.

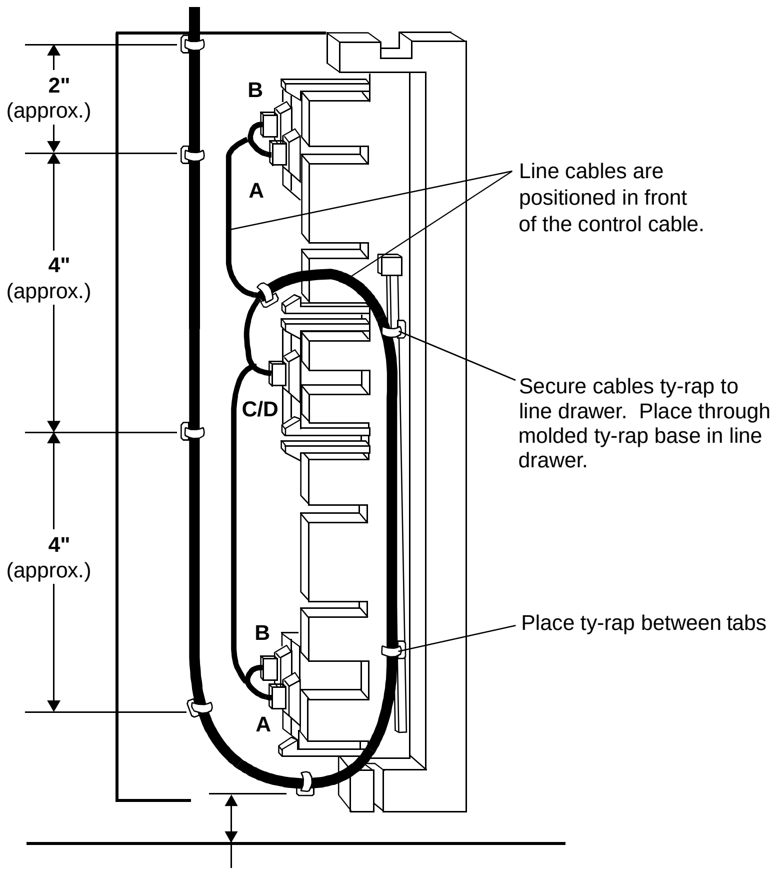
11 Add a ty-rap around the bundle at the mid point in the 180-degree turn at the bottom of the form.

12 Use side cutters to trim the excess ty-rap flush where the ty-rap locks. Ensure there are no sharp edges on the ty-rap. Dispose of ty-rap waste in a safe manner.

13 Turn the heads of the ty-raps inward so they are hidden from view.

14 Verify the proper dressing by pulling each line drawer out at the front of the cabinet. Refer to paragraph 2 for the checklist.

Figure 452 – Rear View of Line Drawer for CRSC (LCM)



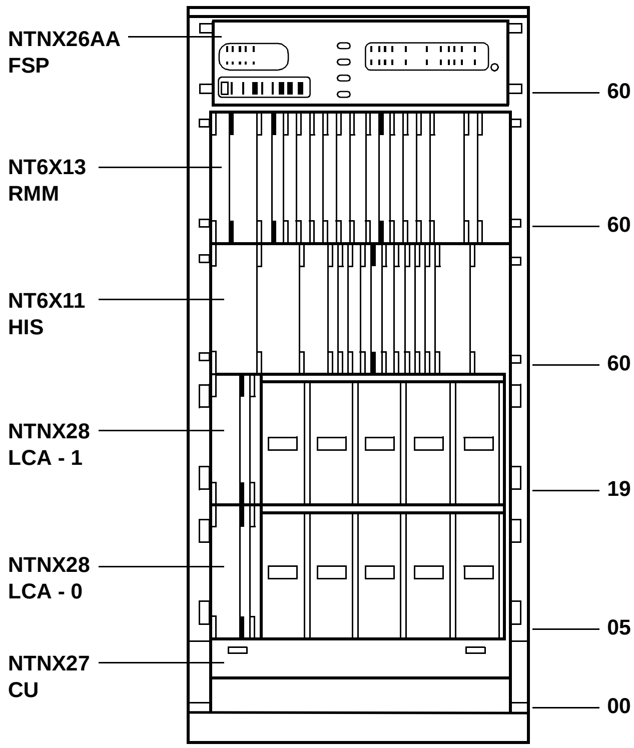
Rear of Line Drawer for CLMI CRSC

35.0 Remote Line Concentrating Cabinet (RLCC) - Power and Switchboard Cabling

35.1 RLCC Configuration

1 Refer to Figure 453 for a front view of NTNX14AA.

Figure 453 – RLCC Configuration



Front View
RLCC
NTNX14AA

35.2 RLCC Frame Grounding

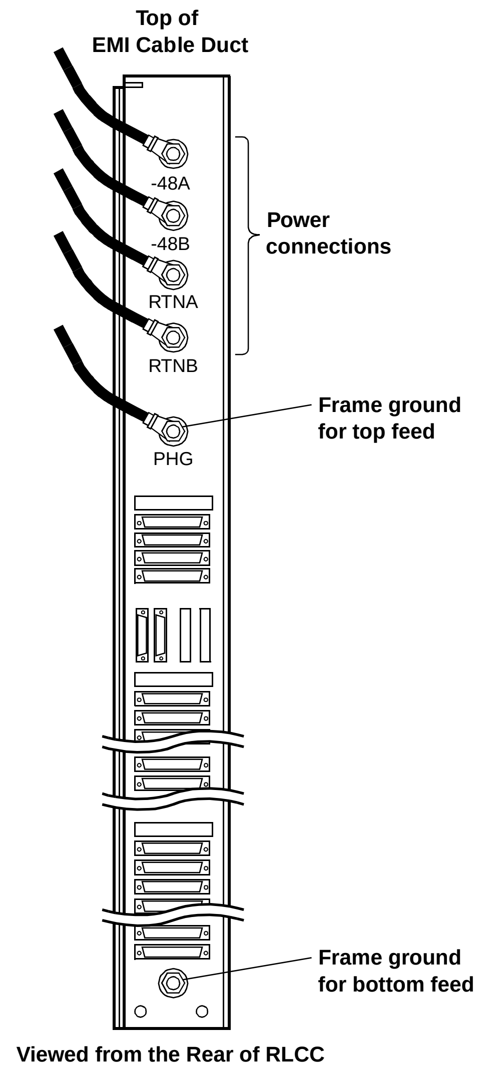
1 The Personal Hazard Ground (PHG) and the logic return will be insulated from contact with each other within the cabinet.

2 The PHG cable size is site dependent and specified in the job specifications.

3 The frame ground is connected from the PHG stud located on the bulkhead of the cabinet to the Frame Ground Equalizer (FGE) bar. Refer to Event 06 (Method 9056), "Grounding," for connections at the FGE bar.

4 Refer to Figure 454 for location of PHG stud.

Figure 454 – Personal Hazard Ground (PHG)



5 The PHG cable is to be routed from the top of the cabinet through the EMI cable duct to the PHG stud located on upper half of the bulkhead for top feed cabling. Route the PHG cable through the EMI cable duct in the bottom of the cabinet and terminate on the PHG stud located at the bottom of the bulkhead for bottom feed sites. The ground cable is to be formed on the right hand side of the bulkhead viewed from the rear of the cabinet. Refer to Figure 455 for routing of frame ground cable.

6 Terminate the ground cable per Figure 456. Use a second wrench to hold the bottom nut while torquing the connection to 30 ft-lbs.

Figure 455 – Routing of Frame Ground Cable, Power Cables, and Switchboard Cables

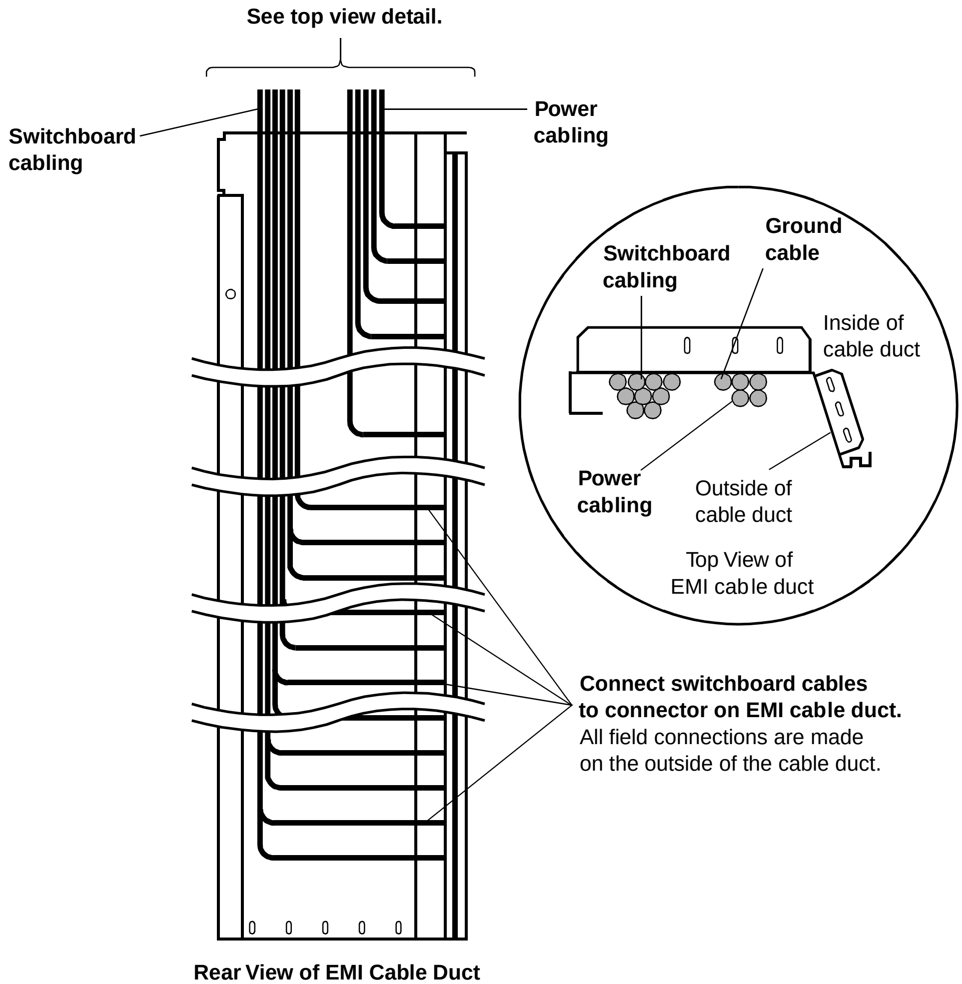
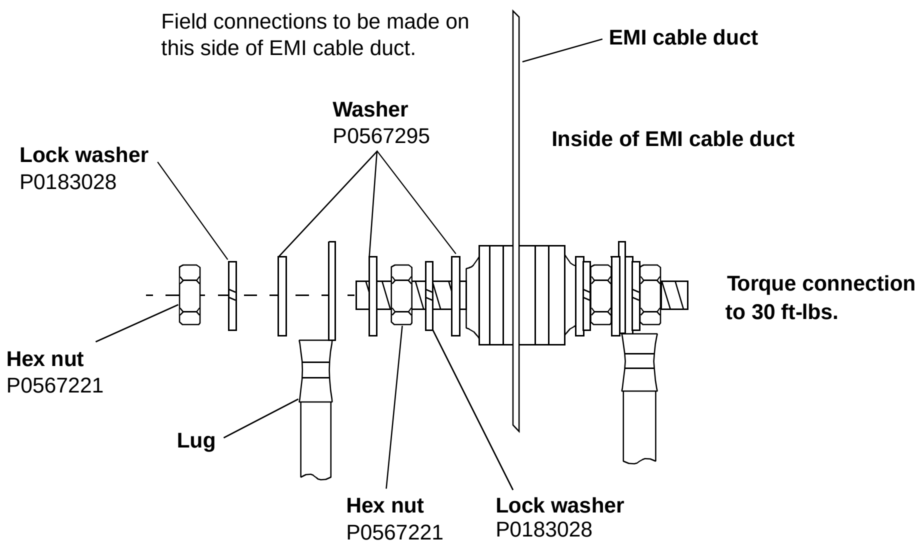


Figure 456 – Frame Ground Cable Termination

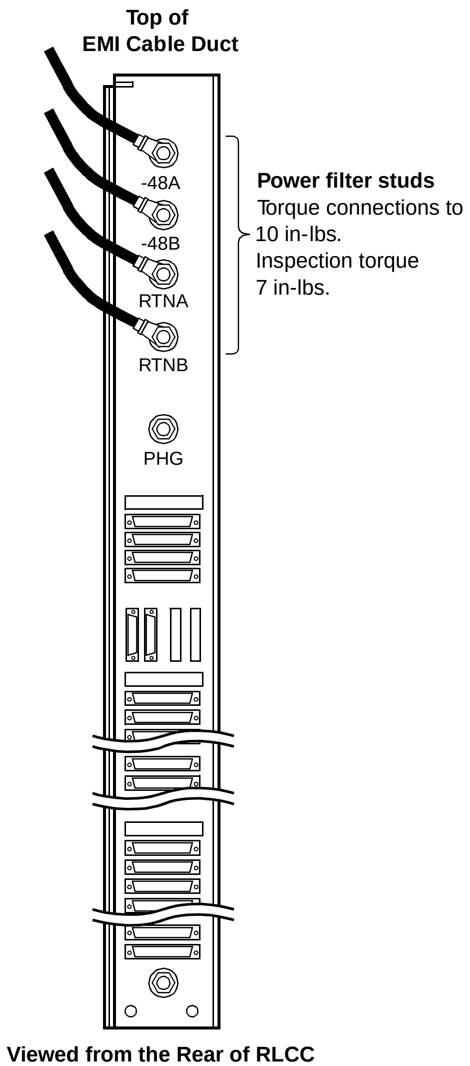


35.3 RLCC Power Cabling

1 Power is fed to the RLCC cabinet from the main power source. The conductor size is dependent upon cabling distances between the RLCC and the main power source. Refer to job specifications for the size of cable to be used.

2 The RLCC cabinet is equipped with power filter studs located in the EMI cable duct for connecting power form the primary source. The power cables are to be torqued to 30 ft-lbs. Figure 457 reflects the location of the power filter studs.

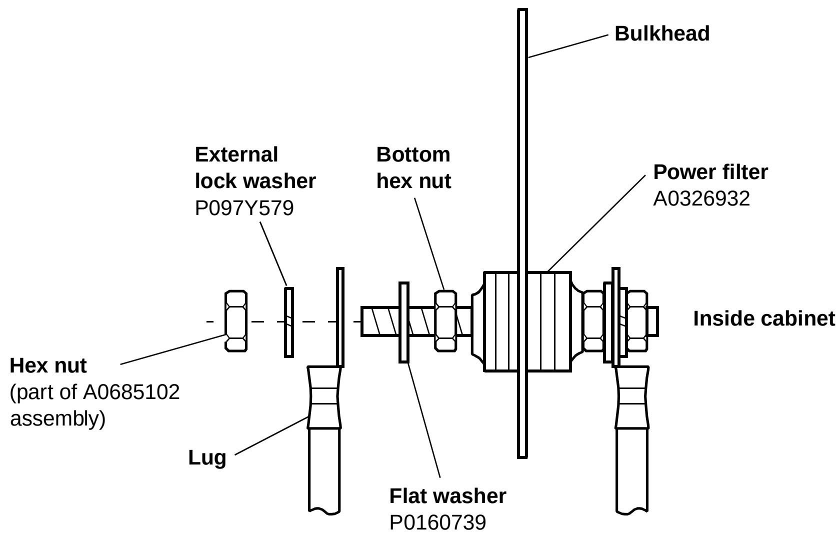
Figure 457 – Location of Power Filter Studs



3 The power cables are to be routed from the top of the cabinet through the EMI cable duct to the power filter studs located on the bulkhead for top feed cabling. Route the power cables through the EMI cable duct in the bottom of the cabinet for bottom feed sites. The power cables are to be formed on the right-hand side of the bulkhead as viewed from the rear of the cabinet. Refer to Figure 455 for location of power cables in the EMI cable duct.

4 Remove the hardware from each filter stud and secure each power cable as shown in Figure 458.

Figure 458 – Power Filter Stud Assembly



Side View of Power Filter

Note: Field Technician connections are made on the inside of the EMI cable duct. Torque hex nut to 10 in-lbs. Hold bottom nut while torquing top nut.

35.4 RLCC Switchboard Cabling

1 Switchboard cabling for the RLCC cabinet is accomplished by connectorized cables at the EMI bulkhead. All field connections are made at the bulkhead.

2 There are a total of thirty-four connectors in the RLCC bulkhead. The cable designations, signal type, and termination point are listed in Figure 459.

Figure 459 – RLCC Switchboard Cables

Cable Duct Conn Design	Cable PEC	Conn Type	Leads Used	Signal Type	Termination Point
C000 - C013	NTNX36AT	50 PIN	48	LD00 -09 TIP/RING	MDF
C014 C027	NTNX36AT	50 PIN	48	LD10 -19 TIP/RING	MDF
C028	NTNX36AB	25 PIN	12	DS1 RECEIVE	DSX
C029	NTNX36AB	25 PIN	12	DS1 TRANSMIT	DSX
C030 - C033	NTNX36AT	50 PIN	48	RMM SC & SD POINTS, AISALM1 & AISALM2, MISC TRUNKS	MDF

3 The NTNX36AT cables are connectorized with a straight 50-pin connector on the end which plugs into the EMI cable duct and a 90 degree 50-pin connector on the end that plugs into the MDF.

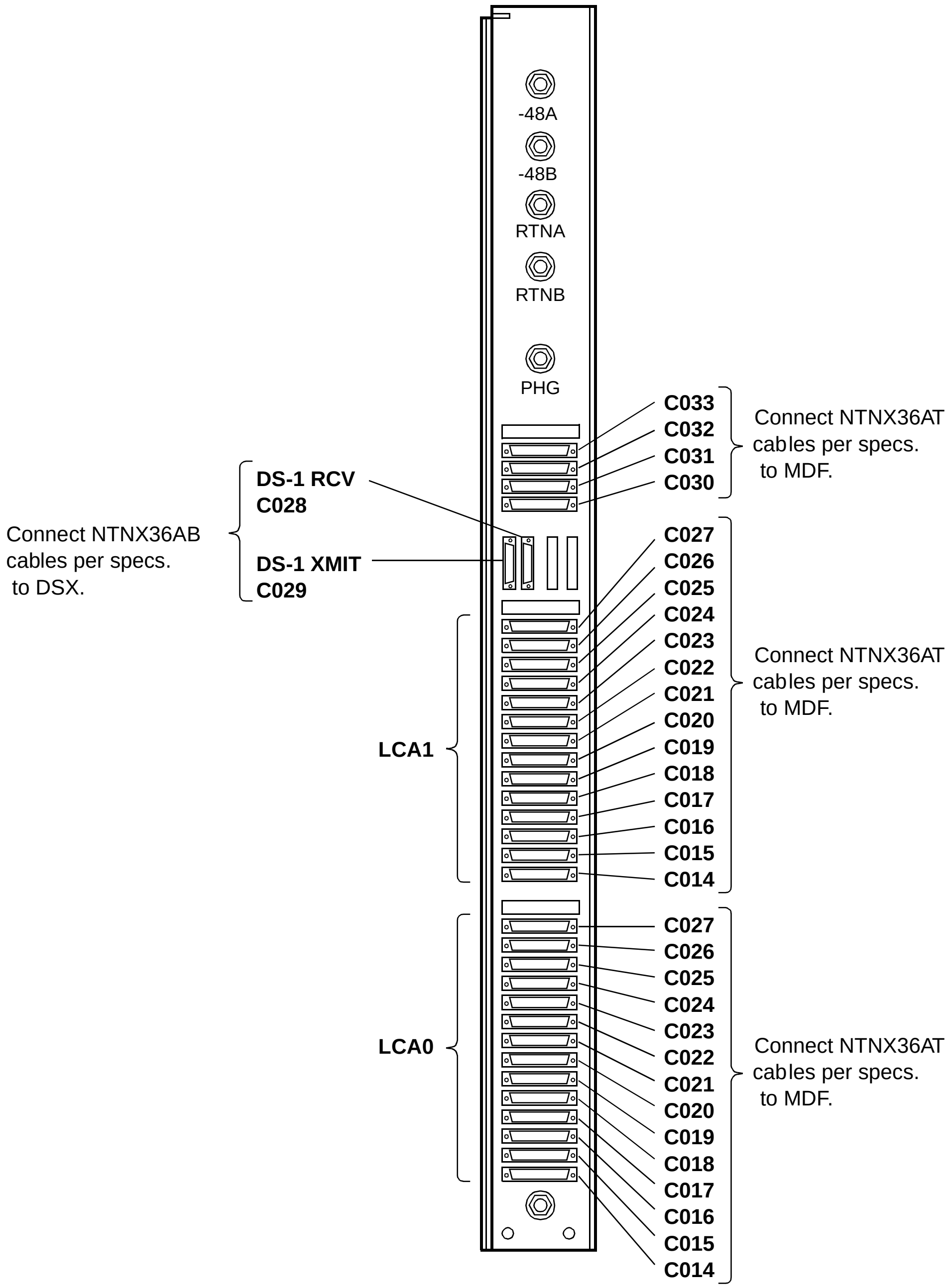
4 Run the NTNX36AT cables from the RLCC EMI cable duct to the MDF and terminate per the job drawings. Refer to CANX11 Tables 1B and 1D for cable connectivity.

Note: If a non-connectorized MDF is provided, cut the 50-pin connector off of the MDF end on the NTNX36AT cables and terminate per job drawings.

5 Run the NTNX36AB cables from the EMI cable duct to the DSX panel and terminate per the job drawings. Refer to CANX11 Table 1C for cable connectivity.

6 Refer to Figure 455 for location of switchboard cables in the EMI cable duct.

Figure 460 – Switchboard Cable Connections



7 The switchboard cables are to be routed from the top of the cabinet through the EMI cable duct to their appropriate connector on the EMI cable duct for top feed cabling. Route the switchboard cables through the EMI cable duct in the bottom of the cabinet for bottom feed sites. The switchboard cables are to be formed on the left-hand side of the EMI cable duct as viewed from the rear of the cabinet.

8 Secure the NTNX36AT and NTNX36AB cables to the left-hand side of the cable duct viewed from the rear using ty-raps. Secure the cable by running the ty-raps around the cable bundle and through the punch outs provided on the back wall of the EMI cable duct. The switchboard cables are to be formed into a common bundle.

9 Refer to Figure 460 for switchboard connection points.

35.5 RLCC Aisle Alarm Cabling

1 The aisle alarm cabling for the RLCC cabinet is wired out to the DF in connector C033 as follows:

AISLEAALM1	C033	Pin 44
AISLEALM2	C033	Pin 19

2 Run cable from C033 to DF as per cable specification.

3 Cross-connect AISLEALM1 and AISLEALM2 to SC points as per job drawings.

4 Form the aisle alarm cable in the switchboard cable form provided on the back wall of the EMI cable duct.

35.6 RLCC Circuit Pack Fill

1 The Remote Maintenance Module (RMM) is configured on a per site basis. Refer to job specifications for the shelf configuration.

2 The Line Concentrating Module (LCM) shelf is mounted in positions 5 and 19. The LCM shelf is configured as shown in Figure 461.

3 The Host Interface Equipment (HIE) shelf is mounted at shelf position 35. The HIE is to be configured as shown in Figure 462.

Figure 461 – LCM Configuration

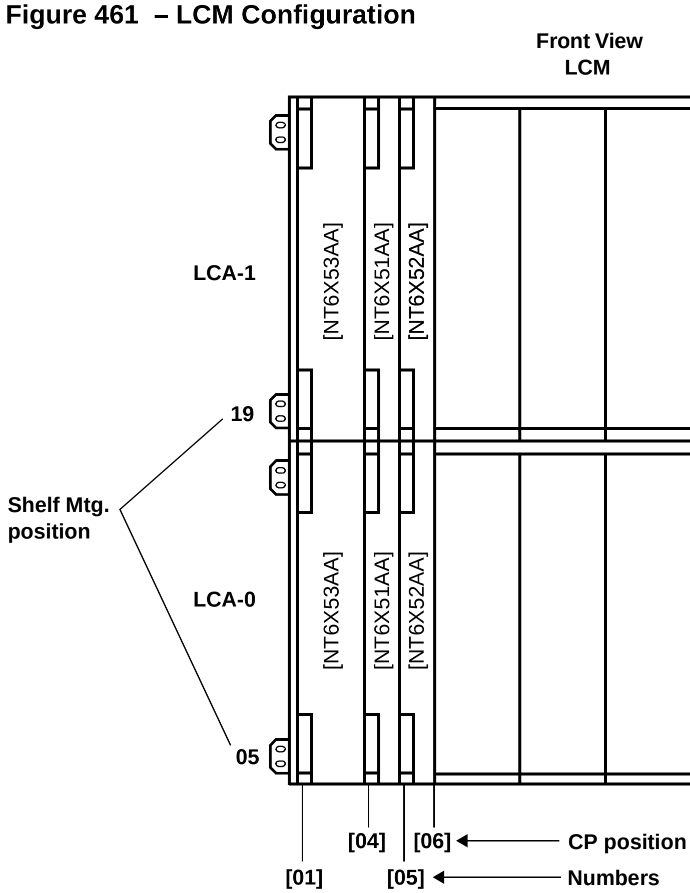
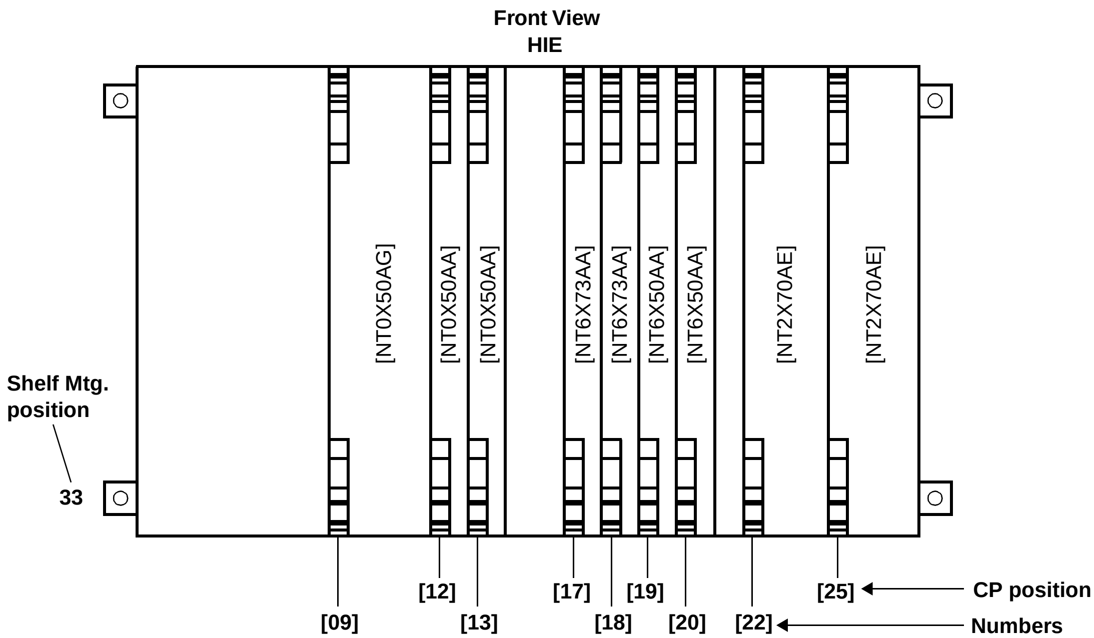


Figure 462 – HIE Shelf Configuration

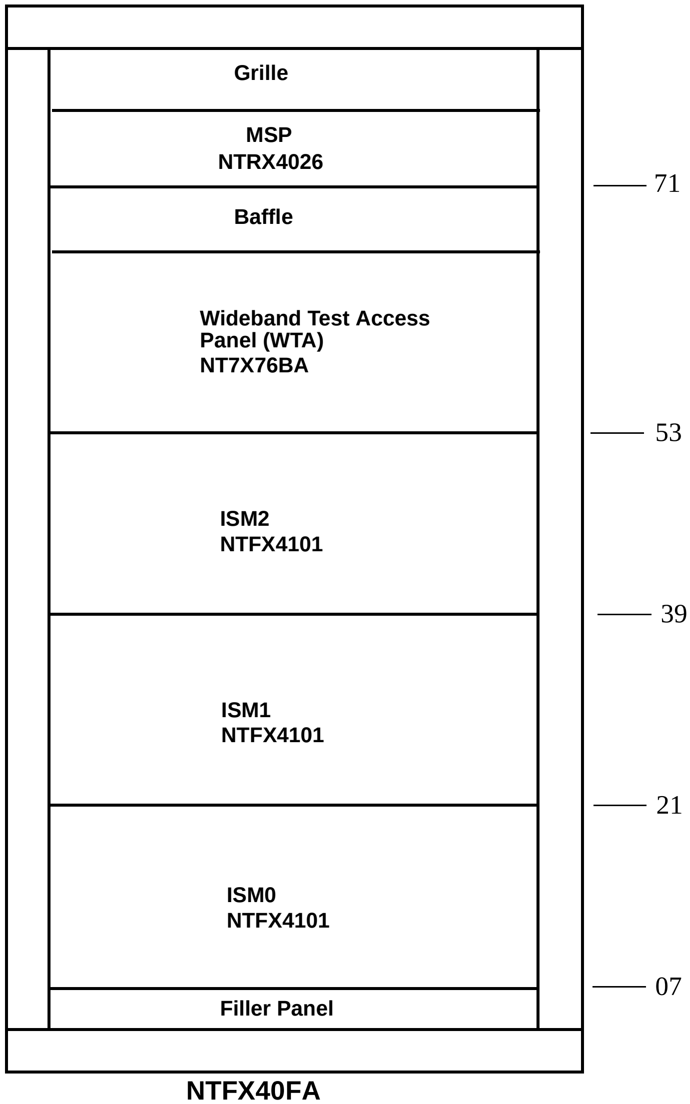


36.0 Metallic Test Access Equipment (MTAE) NTFX40FA

36.1 MTAE Frame Layout

1 Refer to Figure 463 for a layout of the MTAE frame.

Figure 463 – MTAE Frame Layout



36.2 MTAE Power and Ground Cabling

1 Secure the frame ground termination to the Framework Bonding Bar as instructed in subsection on "Frame Bonding Bar Connection" located in Event 6.

2 Run the power as specified in the 4851 spec or 1400 spec.

3 When bundled cables are spec'd, there will be one (1) run of bundled -48 VDC cables and one (1) run of bundled Battery Return cables. The bundled cable end(s) equipped with 90-degree lugs terminate at the MTAE, the unlugged cable end(s) terminate at the

PDC. The PDC end will require lugging prior to terminating.

4 Terminate and form the power cables to the MSP prior to terminating the cables in the PDC. The slack is to be formed in the direction of the PDC.

5 ***Note:*** Do *not* remove insulators from either cable end until just prior to lugging and termination. Refer to Figure 464 and Figure 465 for the bundled cable codes and terminations at the MSP.

Figure 464 – MTAE Bundled Cables

CPC	PEC	Description
B0261182 B0261185	NTY750AN NTY750AR	ISME Power Cable 10 Ga. (-48V) ISME Power Cable 10 Ga. (BR)
B0261183 B0261186	NTY750AP NTY750AS	ISME Power Cable 8 Ga. (-48V) ISME Power Cable 8 Ga. (BR)
B0261184 B0261187	NTY750AQ NTY750AT	ISME Power Cable 6 Ga. (-48V) ISME Power Cable 6 Ga. (BR)

Figure 465 – MTAE Power Connections

-48V	BAT RTN
TB2-1, 2, 3, 4, 5, 6	TB1-1, 2, 3, 4, 5, 6

6 Horizontal form should be ty-rapped approximately every four inches to the first breakout. Event 07 (Method 03-9057), "General Cabling and Torque Requirements," will be the controlling document with regards to ty-rapping.

7 When installing bulk power cables, connect the cables with the appropriate one-hole, insulated lug found in the hardware kit as follows.

Cable Ordered	PEC code of Lug
6 ga.	A0288176 (90-degree)
8 ga.	A0288178 (90-degree)
10 ga.	A0298616 (90-degree)

For both top and bottom feeds, 90-degree lugs are to be used for both the top and bottom of TB1 and TB2.

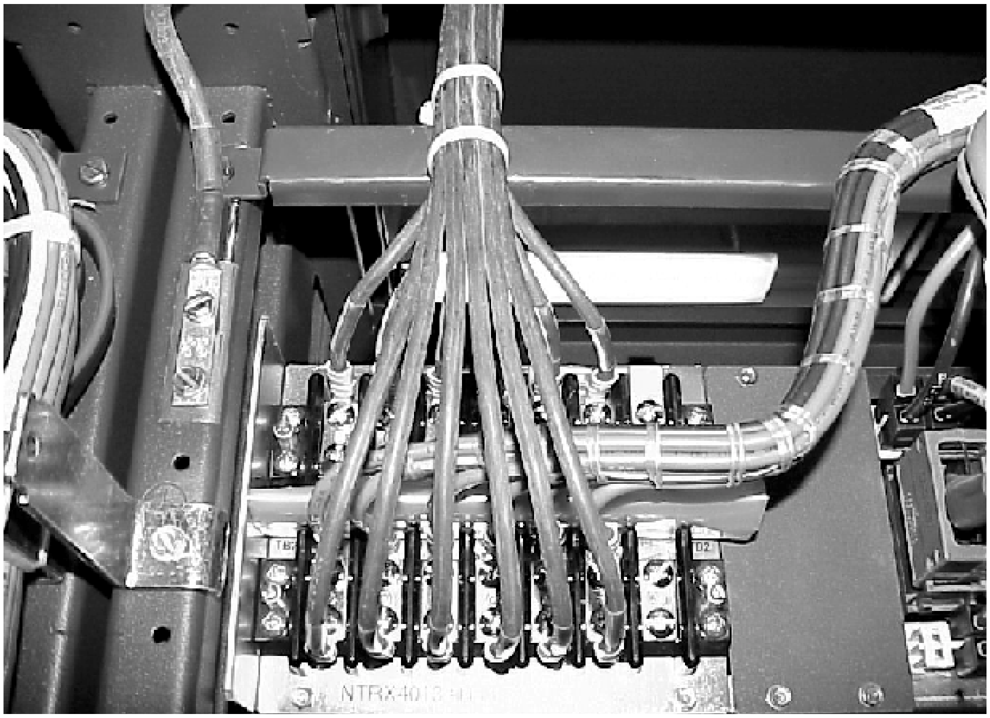
8 Remove safety covers from terminal strips TB01 and TB02. Save this hardware for reassembly.

9 Power cables are to be routed through the power shields of the cable troughs. Route the power cables across the top of the MSP and form them down at drop location S5 of the MSP and back towards the terminal blocks. The power cables may be secured to the cable support bracket on top of the MSP. Refer to Figure 466

10 For torquing power connections on terminal strips, refer to Event 07 (Method 03-9057), "General Cabling and Torque Requirements."

11 After all power and ground connections (bundled or bulk) have been made to the MSP, add the removed covers to terminal strips TB01 and TB02. Refer to Figure 466.

Figure 466 – NTFX40FA MSP Cable Routing



36.3 MTAE Alarm, ABS and End Aisle Lamp Cabling

1 Run and connect the ABS cables as specified in the 4851 spec and the AISALM cables per the 1400 spec.

2 The ABS and AISALM cables are to be formed along the top of the MSP with the existing cables. Secure the cables to the existing form. Do not remove the factory ty-raps. Secure the cables to the form using ty-raps.

3 Each frame will have an ABS cable *IN* (slot 02, connector P1A) and an ABS cable *OUT* (slot 02, connector P1B). The ABS cannot end, but must make a complete loop back to the first originating frame.

4 The ABS cables are to be routed per the cable tags and CA0X04 Note 90. "When cables are run between units in the same equipment position on adjacent frames, the finished cable length is 1.06 M. For units between positions 45 and 72 on adjacent frames the finished length is 1.46 M, otherwise the cable length is to be adjusted accordingly. These cables run directly across the back of the frame without entering the cable trough."

5 Each frame will have an AISALM cable *IN* (slot 05, connector P07) and an AISALM cable *OUT* (slot 05, connector P08). The AISALM must make a complete loop.

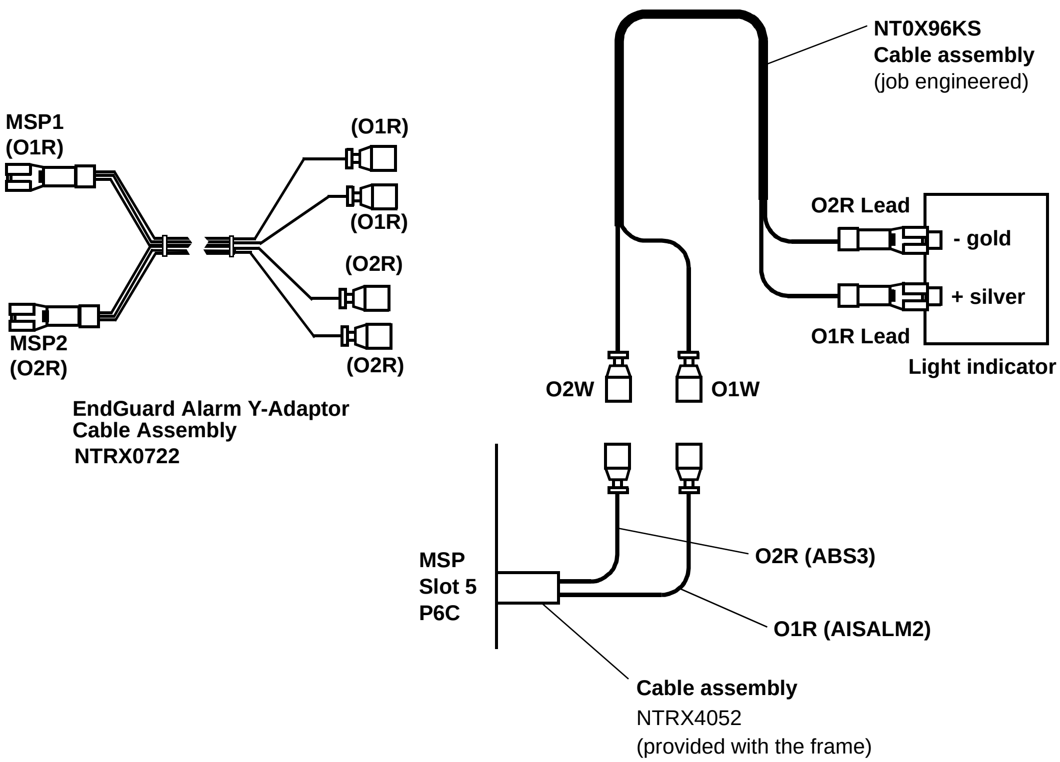
6 On each MSP, there are two loose aisle alarm connectors wrapped with plastic with a small ty-rap. The wires are only used when the frame is the last frame in a line-up. The plastic must be removed on the frame to which the end aisle light will be connected. Connect the cable as shown in Figure 467.

Note: Leave the plastic protection on the frames that will not be receiving end aisle connection.

7 EndGuard Alarm Y-Adaptor Cable Assembly NTRX0722 is to be used when only one frame is being installed. The NTRX0722 cables is installed between the MSP leads and the leads from the End Guard Lamps. There will be 4 leads entering the frame, 2 leads from each End Guard Lamp.

8 Connect the two loose aisle alarm leads from the MSP to the end with two leads on the NTRX0722 cable assembly. Connect the opposite lead of NTRX0722 to the cables from the two End Aisle Lamps. Refer to Figure 467 for a view of the connections and the NTRX0722 cable assembly.

Figure 467 – End Aisle Alarm Connection



36.4 MTAE System Cabling

All references to the right and the left are made when viewed from the rear of the frame.

1 Refer to the cable tags to determine the correct cable trough shield and terminating location.

2 All cables entering the frame must be secured at the first cable tie bracket.

3 Do not remove existing factory installed ty-raps. Cables may be secured to existing cables without removing factory installed ty-raps.

4 Cable brackets are installed on the rear of the MTAE frame. Secure the system cables to the brackets using ty-raps.

5 NT0X96DK cable terminates on P83 from succeeding frame and P84 for preceding frame. Route the NT0X96DK cables as indicated on the cable tags. Form the cables to the bottom of the WTA panel. Form the cables across the cable bracket and up to their termination points.

6 NT0X96DH cables from the LCE frames terminating on WTA panel connectors P43 to P82 are to be routed and secured to the cable bracket located at the top of the WTA panel. Secure the cables using ty-raps to the cable bracket.

7 NT0X96KD cables terminating on WTA panel connectors P34 to P42 and P97 to P107 are to be routed down the left rear. Cables terminating on connectors P34 - 42 are to be formed across the top of the WTA panel and down to the connectors. Cables terminating on connectors P97 - P107 are to be formed across the bottom of the WTA panel and up to the connectors.

8 NT0X96DL cables terminating on WTA panel connectors P89 to P92 are to be routed down the right rear to the bottom of the WTA panel and across to their terminations.

End of Event