

## SECTION 3: HOST UNIT INSTALLATION

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### 1 BEFORE STARTING INSTALLATION

This section provides the installation procedures for the HU, the WDM mounting shelf (accessory item), and the WDM (accessory item). Installation of the RU cabinet and RU electronic modules may proceed separately from installation of the HU. The installation procedures for the single band remote cabinet are provided in the Digivance Long-Range Coverage Solution Single Band Remote Cabinet Mounting Instructions (ADCP-75-117) which are shipped with the cabinet. The installation procedures for the STM and LPA electronic modules and Dual Duplexer/Splitter are provided in the Digivance Long-Range Coverage Solution Remote Unit Installation Instructions which are shipped with the STM. When all units of the Digivance LRCS have been installed, refer to Section 4 of this manual for the system turn-up and test procedures.

Before beginning the installation, review the system design plan with the system engineer. Make sure each equipment installation site is identified and located and all cable runs are mapped out.

#### 1.1 Tools and Materials

The following tools are required to complete the procedures in this section:

- Box cutter
- Pencil or scribe
- Medium size flat-bladed screwdriver
- Phillips screwdriver (#2)

- TORX screwdriver (T20 bit)
- Pliers
- Wire cutters
- Wire stripper
- Tool kit for attaching N-type male connectors to coaxial cable
- Multimeter
- Optical power meter
- Laser light source

The following materials are required to complete the procedures in this section:

- #18 AWG (1.0 mm) insulated stranded copper wire (for chassis grounding wire)
- #18 AWG (1.0 mm) red and black insulated copper wire (for DC power wires)
- Category 3 or 5 cable (for external alarm system wires)
- #6 ring terminal (1) for #18 wire (for chassis ground wire connection)
- #6 fork terminals (2) for #18 wire (for DC power wiring connection)
- Single-mode patch cord(s) with SC connectors (1, 2 or 3 depending on the application)
- High performance, flexible, low-loss 50-ohm coaxial cable
- N-type male connectors
- Wire ties

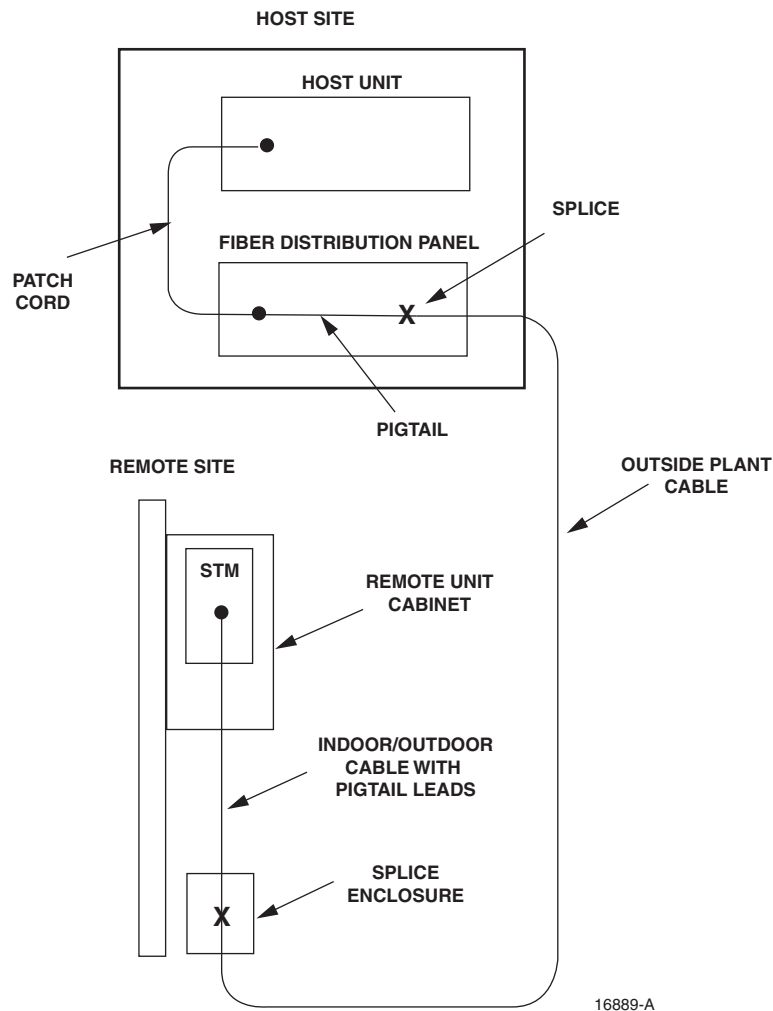
## 1.2 Unpacking and Inspection

This section provides instructions for opening the shipping boxes, verifying that all parts have been received, and verifying that no shipping damage has occurred. Use the following procedure to unpack and inspect the HU and any accessories:

1. Open the shipping cartons and carefully unpack each component from the protective packing material.
2. Check each component for broken or missing parts. If there are damages, contact ADC (see section 6 at the end of this manual) for an RMA (Return Material Authorization) and to reorder if replacement is required.

## 2 OSP FIBER CABLE INSTALLATION GUIDELINES

The outside plant (OSP) fiber optic cables should be routed between the HU and RU and terminated before the equipment is installed. A diagram of a typical OSP cable routing is shown in [Figure 3-1](#). At the HU, the OSP cable should be terminated at a fiber distribution panel and spliced to pigtails. Jumper patch cords may then be used to link the HU optical ports to the OSP cable terminations. Whenever possible, a guideway such as the FiberGuide system should be provided to protect the fiber optic patch cords from damage and to prevent excessive bending. The procedures for connecting the OSP cable optical fibers to the HU is provided in [Section 7](#).



**Figure 3-1. Typical OSP Cable Routing**

At the RU, the OSP fiber optic cable should be spliced to a connectorized outdoor-rated cable (consisting of individual jacketed pigtails) which is routed into the RU cabinet. The individual pigtails can then be connected directly to the STM optical ports. A connector is provided on the bottom of the RU cabinet to seal the cable entry point and provide strain relief. The procedure for routing the fiber cable into the RU cabinet and for connecting the pigtail leads to the STM is provided in the Digivance LRCS Single Band SMR Remote Unit Installation Instructions (ADCP-75-135).

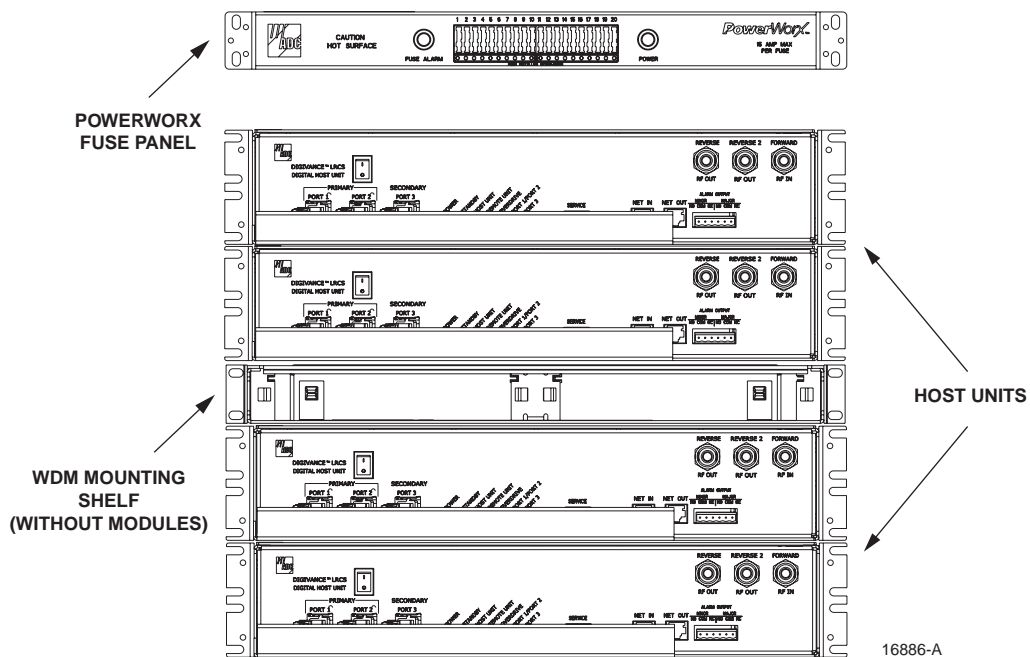
When all splices and terminations are completed, test each fiber for optical loss as described in Section 5 of this document. The optical loss budget for 9/125, single-mode, dark fiber is **17 dB** (typical). The power level of the received optical signal should not exceed **-7 dBm** to avoid overdriving the optical receiver. If necessary, use an in-line optical attenuator to adjust the signal level.

### 3 WDM MOUNTING PROCEDURE (OPTIONAL ACCESSORY)

A bi-directional wavelength division multiplexer (WDM) is available as an accessory item for non-diversity versions of the Digivance LRCS. If the application does not require the use of a WDM, skip this section and proceed to [Section 4](#).

The version of the WDM that is used with the HU consists of one or two WDM modules and a WDM mounting shelf. Each WDM module can support two HU's and each WDM mounting shelf can hold two WDM modules. A fully loaded WDM mounting shelf can therefore support four HU's.

When multiple HU's require connection to a WDM, the WDM mounting shelf and the HU's should be mounted in the equipment rack as shown in [Figure 3-2](#). This configuration allows the pigtail leads from the two WDM modules to be connected directly to the optical ports on any one of the four HU's.

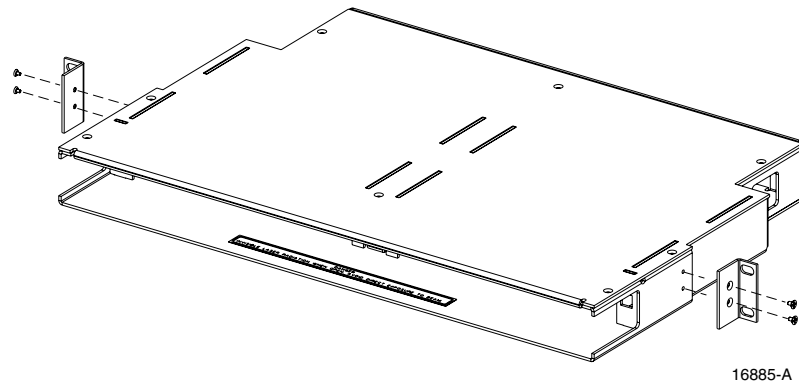


**Figure 3-2. Typical WDM and HU Configuration**

The WDM mounting shelf may be mounted in either a 19-inch or 23-inch EIA or WECCO equipment rack. Four #12-24 screws are provided for securing the mounting shelf to the rack. Use the following procedure to install the WDM mounting shelf in the equipment rack and to mount the WDM modules in the WDM mounting shelf:

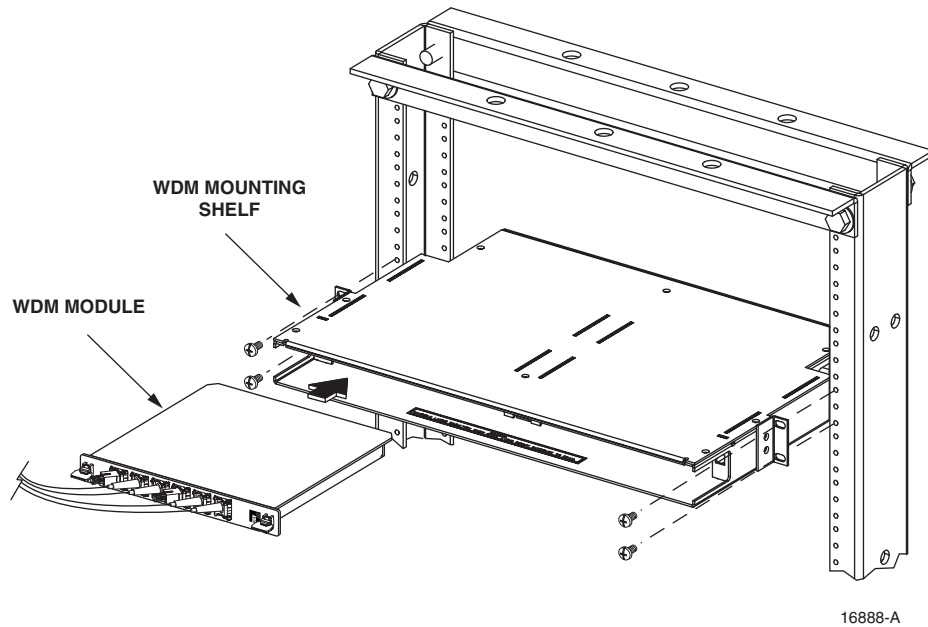
1. The WDM mounting shelf is shipped with the mounting brackets installed for 19-inch EIA rack installations. If installing the mounting shelf in a 19-inch EIA rack, proceed to step 5. If installing the mounting shelf in a 19-inch WECCO rack, a 23-inch EIA rack, or a 23-inch WECCO rack, proceed to step 2.

2. Remove both mounting brackets from the mounting shelf (requires Phillips screwdriver) and save screws for reuse.
3. Locate the extra mounting brackets that are provided with the mounting shelf and select the brackets that correspond to the rack type. Each mounting shelf includes extra brackets for installing the mounting shelf in the rack types specified in step 1.
4. Install the replacement mounting brackets as shown in [Figure 3-3](#). Use the screws removed in step 2 to attach the new brackets to the mounting shelf.



**Figure 3-3. Installing the Replacement Mounting Brackets**

5. Position the WDM mounting shelf in the designated mounting space in the rack (per system design plan) and then secure the mounting brackets to the rack using the four #12-24 machine screws provided as shown in [Figure 3-4](#).
6. Install each WDM module in the mounting shelf (see [Figure 3-4](#)). A rail on the side of the module fits into a guide within the mounting.
7. Secure each WDM module to the mounting shelf by twisting the handle on each quarter-turn fastener 90°.
8. Carefully store the pigtail leads from each WDM module. The routing and connection procedures for the pigtails are provided in [Section 7](#).



**Figure 3-4. WDM Mounting Shelf and WDM Module Installation**

## 4 HU MOUNTING PROCEDURE

The HU may be mounted in either a 19-inch or 23-inch EIA or WECO equipment rack. Both US standard and metric machine screws are included for rack mounting the HU. When loading the HU in a rack, make sure the mechanical loading of the rack is even to avoid a hazardous condition such as a severely unbalanced rack. The rack should safety support the combined weight of all the equipment it holds. In addition, maximum recommended ambient temperature for the HU is 50° C (122° F). Allow sufficient air circulation or space between units when the HU is installed in a multi-rack assembly because the operating ambient temperature of the rack environment might be greater than room ambient.



**Warning:** *Wet conditions increase the potential for receiving an electrical shock when installing or using electrically powered equipment. To prevent electrical shock, never install or use electrical equipment in a wet location or during a lightning storm.*

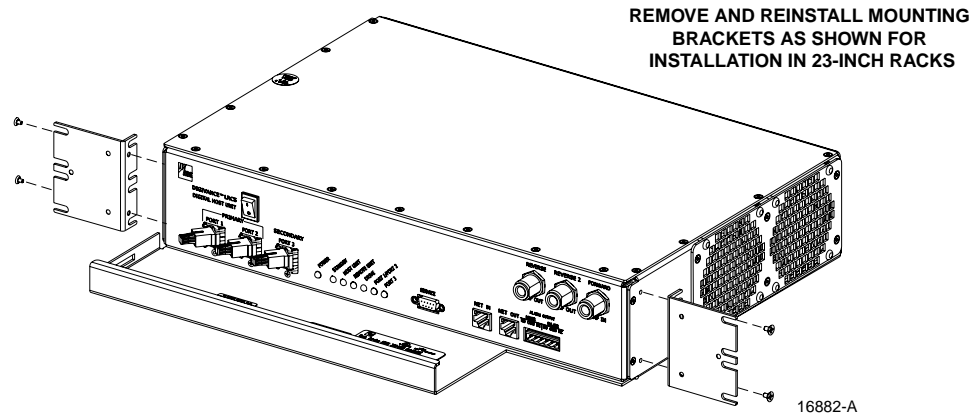


**Note:** To insure that all optical connectors remain dust-free during installation, leave all dust caps and dust protectors in place until directed to remove them for connection.

Use the following procedure to install the HU in the equipment rack:

1. The HU is shipped with the mounting brackets installed for 19-inch rack installations. If mounting the HU in a 19-inch rack, proceed to step 4. If mounting the HU in a 23-inch rack, proceed to step 2.
2. Remove both mounting brackets from the HU (requires TORX screwdriver with T20 bit) and save screws for reuse.

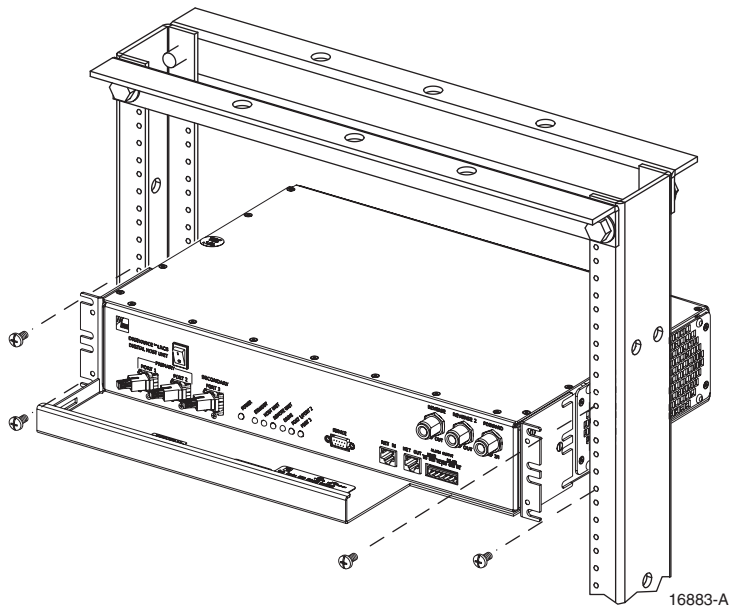
3. Reinstall both mounting brackets so the long side of the bracket is flush with the HU front panel as shown in [Figure 3-5](#). Use the screws removed in step 2 to re-attach the brackets to the HU chassis.



**Figure 3-5. Installing the Mounting Brackets for 23-Inch Rack Installations**

4. Position the HU in the designated mounting space in the rack (per system design plan) and then secure the mounting brackets to the rack using the four machine screws provided (use #12-24 or M6 x 10 screws, whichever is appropriate) as shown in [Figure 3-6](#).

► **Note:** Provide a minimum of 3 inches (76 mm) of clearance space on both the left and right sides of the HU for air intake and exhaust.

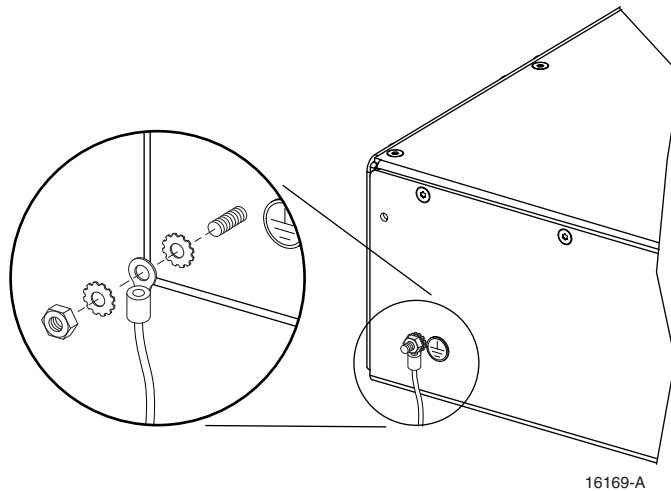


**Figure 3-6. HU Rack Mount Installation**

## 5 CHASSIS GROUND CONNECTION

A stud is provided on the rear side of the chassis for connecting a grounding wire to the chassis. Use the following procedure to connect the grounding wire to the chassis and to route the grounding wire to an approved earth ground source.

1. Obtain a length of #18 AWG (1.00 mm) insulated stranded copper wire for use as a chassis grounding wire.
2. Terminate one end of the wire with a ring terminal.
3. Locate the chassis ground stud at the rear of the HU as shown in [Figure 3-7](#).



**Figure 3-7. Chassis Ground Stud**

4. Attach the ring end of the wire to the chassis ground stud (see [Figure 3-7](#)).
5. Route the free end of the chassis grounding wire to an approved (per local code or practice) earth ground source.
6. Cut the chassis grounding wire to length and connect it to the approved ground source as required by local code or practice.

► **Note:** Be sure to maintain reliable grounding. Pay particular attention to ground source connections.

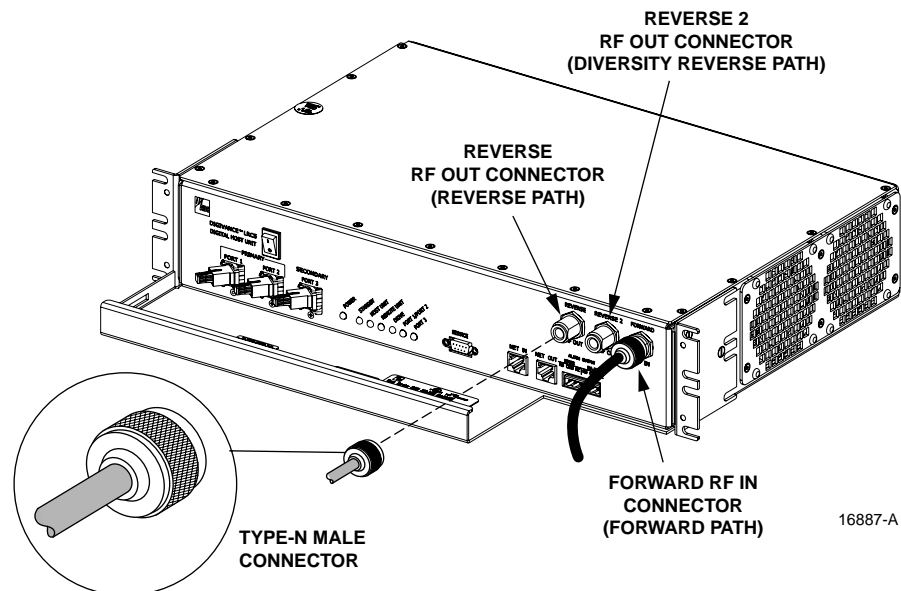
## 6 COAXIAL CABLE CONNECTIONS

The RF interface between the HU and the EBTS is supported through either two (non-diversity) or three (diversity) type N female connectors mounted on the HU front panel. On non-diversity units, one connector provides the coaxial cable connection for the forward path (downlink) signal and the other connector provides the coaxial cable connection for the reverse path (uplink) signal. On diversity units, a third connector provides the coaxial cable connection for the diversity reverse path (uplink) signal.



In SMR installations, it is usually necessary to install an external attenuator in the forward path link between the HU and the EBTS. The procedure for determining the value of the external attenuator is provided in SECTION 4: OPERATION. The HU should be mounted as close as possible to the EBTS to minimize cable losses. Use the following procedure to route the forward and reverse path coaxial cables and connect them to the HU:

1. Obtain the required lengths of high performance, flexible, low loss 50-ohm coaxial communications cable (RG-400 or equivalent) for all coaxial connections.
2. Route the forward and reverse path coaxial cables and the diversity reverse path cable (if the HU supports diversity) between the HU and the EBTS interface (per system design plan) and cut to the required length. Allow sufficient slack for dressing and organizing cables at the HU and for installing an external attenuator in the forward path link.
3. Terminate each cable with a type N male connector following the connector supplier's recommendations.
4. Connect the forward path cable to the **FORWARD RF IN** connector on the HU front panel as shown in [Figure 3-8](#).



**Figure 3-8. Forward and Reverse Path Coaxial Cable Connections**

5. Connect the reverse path cable to the **REVERSE RF OUT** connector on the HU front panel (see [Figure 3-8](#)).
6. If the HU supports diversity, connect the diversity reverse path cable to the **REVERSE 2 RF OUT** connector on the HU front panel (see [Figure 3-8](#)).
7. Dress and secure cables at the HU.
8. Complete all remaining coaxial connections at the EBTS interface as specified in the system design plan.

## 7 OPTICAL CONNECTIONS

The optical interface between the HU and the RU is supported by either two (non-diversity) or three (diversity) optical ports. Each optical port consists of an SC optical adapter which is mounted on the HU front panel. Port 1 provides the optical fiber connection for the forward path (downlink) signal. Port 2 provides the optical fiber connection for the reverse path (uplink) signal. Port 3 provides the optical fiber connection for the diversity reverse path (uplink) signal.

The optical connections are dependent on whether or not a WDM (optional accessory) is installed. If the installation **does not** include a WDM, proceed to Section 6.1 for the optical connections procedure. If the installation **does include** a WDM, proceed to Section 6.2 for the optical connections procedure.



**Danger:** *This equipment uses a Class 1 Laser according to FDA/CDRH rules. Laser radiation can seriously damage the retina of the eye. Do not look into the ends of any optical fiber. Do not look directly into the optical transmitter of any unit or exposure to laser radiation may result. An optical power meter should be used to verify active fibers. A protective cap or hood **MUST** be immediately placed over any radiating transmitter or optical fiber connector to avoid the potential of dangerous amounts of radiation exposure. This practice also prevents dirt particles from entering the connector.*

### 7.1 Optical Connections Without WDM

Use the following procedure to connect the optical fibers when a WDM is not installed with the HU:

1. Obtain two (non-diversity) or three (diversity) patch cords that are of sufficient length to reach from the HU to the fiber distribution panel.
2. Designate one of the patch cords as the **forward path** link and the other as the **reverse path** link and attach an identification label or tag next to the connector. For diversity systems, designate and label or tag a third patch cord as the **diversity reverse path** link.
3. Remove the dust caps from the HU optical ports and from the patch cord connectors that will be connected to the HU.
4. Clean each patch cord connector (follow connector supplier's recommendations) and then insert the connector into the appropriate optical port as shown in [Figure 3-9](#) and as specified by the following:

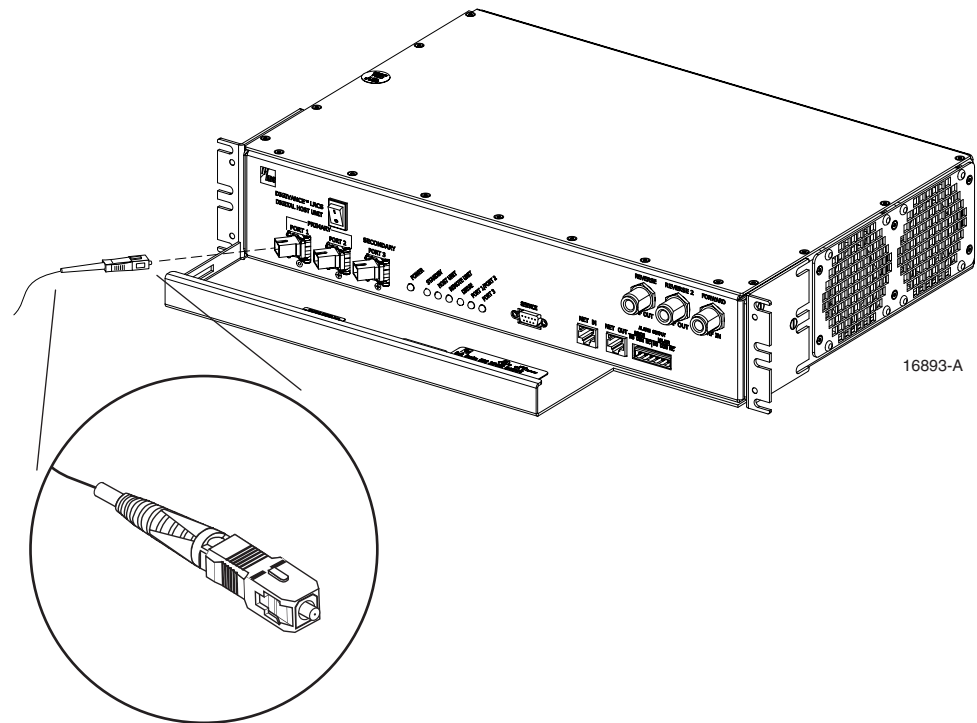
Port 1 - Forward path patch cord

Port 2 - Reverse path patch cord

Port 3 - Diversity reverse path patch cord

5. Route the patch cords from the HU to the fiber distribution panel.

► **Note:** The HU optical adapters are angled to the **left**. Therefore, patch cords should always be routed to the HU from the **left** side of the rack. Routing patch cords to the HU from the right side of the rack may exceed the bend radius limitations for the optical fiber.



**Figure 3-9. Fiber Optic Cable Connections To Host Unit**

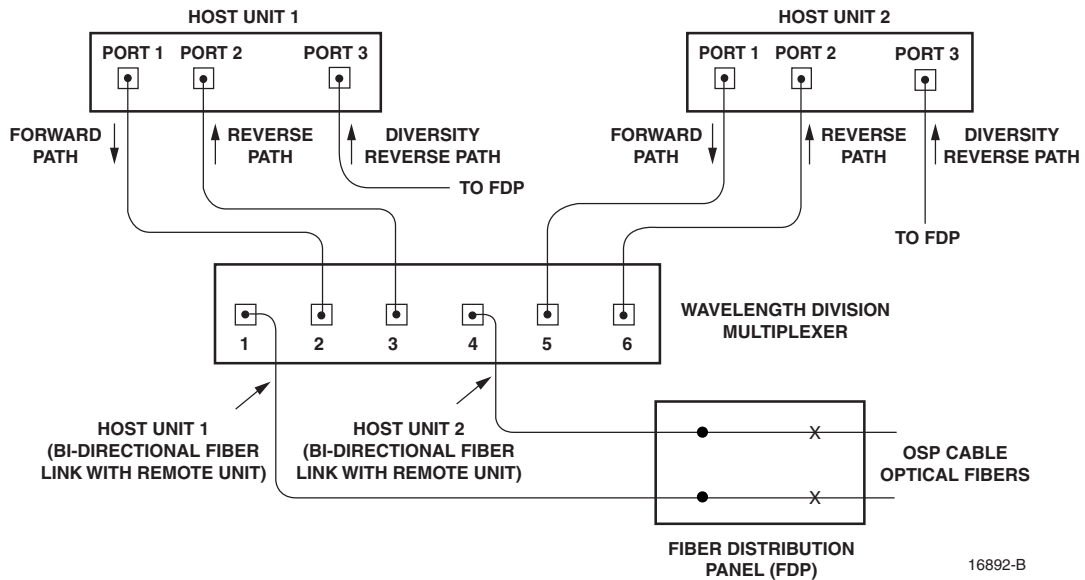
6. Identify the OSP cable optical fiber terminations that correspond to the RU.
7. Designate one of the OSP fibers as the **forward path** link and the other as the **reverse path** link and attach an identification label or tag next to the connector. For diversity systems, designate and label or tag a third fiber as the **diversity reverse path** link.
8. Remove the dust caps from the OSP cable optical fiber adapters and from the patch cord connectors.
9. Clean each patch cord connector (follow connector supplier's recommendations) and then mate the connector with the appropriate OSP cable adapter.
10. Store any excess patch cord slack at the fiber distribution panel.

## 7.2 Optical Connections With WDM

Use the following procedure to connect the optical fibers when a WDM module is installed with the HU:

1. Obtain a patch cord that is of sufficient length to reach from the WDM module to the fiber distribution panel.
2. Remove the dust cap from one of the two optical ports on the WDM module and from the patch cord connector that will be connected to the WDM module.

- ▶ **Note:** Each WDM module can support two separate HU's. The WDM module ports are numbered from 1 through 6 as shown in [Figure 3-10](#). Ports 1 through 3 are used for HU #1 and Ports 4 through 6 are used for HU #2.



**Figure 3-10. Fiber Optic Connections To WDM Module**

3. Clean the patch cord connector (follow connector supplier's recommendations) and then insert the connector into one of the WDM module's optical ports (port 1 or 4).
  4. Route the patch cord from the WDM to the fiber distribution panel.
  5. Identify the OSP cable optical fiber termination that corresponds to the RU.
  6. Remove the dust cap from the OSP cable optical adapter and from the patch cord connector.
  7. Clean the patch cord connector (follow connector supplier's recommendations) and then mate the connector with the appropriate OSP cable adapter.
  8. Store any excess patch cord slack at the fiber distribution panel.
  9. Remove the dust caps from the HU optical ports and from the WDM pigtails that will be connected to the HU.
  10. Clean each pigtail connector (follow connector supplier's recommendations) and then insert the connector into the appropriate optical port on the HU as shown in [Figure 3-9](#) and as diagramed in [Figure 3-10](#).
- ▶ **Note:** The HU optical adapters are angled to the **left**. Therefore, pigtails should always be routed to the HU from the **left** side of the rack. Routing pigtails to the HU from the right side of the rack may exceed the bend radius limitations for the optical fiber.