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<th>Description</th>
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</thead>
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<td>9500 MSS Shelf Connector Locator</td>
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<td>3</td>
<td>9500 MPT–HL Shelf Connector Locator</td>
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<td>14</td>
<td>ODU Connections</td>
</tr>
</tbody>
</table>
Shelf Connections

201. The Core Module locations are as shown in the diagram. The DS1, DS3, Ethernet Access, and MOU 300 Radio modules can be placed in any of the bottom 8 shelf slots. The module placement in this diagram is to show module connector locations only.

202. Select the various cables from the Equipping Option Drawing.

Main Side 9500 MSS-8 Shelf Protect Side

- 10/100/1000baseT Connections: RJ-45
  - Cable Sheet 4
- GigE port: SFP Cable Sheet 4
- DS1 Connections: 68 pin SCSI Cable Sheet 7
- DS3 Connections: Mini-BNC/BNC Cable Sheet 10
- 10/100/1000baseT Connections: RJ-45
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- SFP Port Connections: SFP Modules/Cable Sheet 5
- Sync Clock Connections: BMA Cable Assy Sheet 4
- Craft Terminal Ports: RJ-45/USB Connector Sheet 4
- Power Connections: Main (A Side) Power Sheet 12
- Power Connections: Protect (B Side) Power Sheet 12
- IF ODU Connections: Type N LMR 400 Cable Sheet 6

Interconnect Drawing
Shelf Connections

3.01. MPT-HL shelf will be available for R2.0 release.
Core Module — Transport Interfaces

401. 10/100/1000 Base-T Ethernet Ports (4)

10E and 100E Ethernet are both half duplex and utilize 2 pairs, (1 transmit pair and 1 receive pair), shown in Table A.

1000E or GigE is full duplex and all 4 pair, (4 bi-directional pairs), shown in Table B.

The color code as shown, (Green, Orange, Blue, and Brown) is standard per EIA/TIA 568A. This also satisfies (EIA T 1181). The color code is similar to standard switchbond cable, which may be used in hubs or elsewhere in the Ethernet cabling system.

402. GigE Optical SFP (User Interface Port)

SFP Modules plug into SFP cages provided on the front of the Core Modules. The SFP module requires dual LC connectors that provide input and output signals via a twin zip fiber cable assembly. The twin zip fiber is labeled "A" for Receive", and "B for Transmit" for the input/output to the SFP. See Figure 2.

The RJ-45 mechanical interface distance has been defined as 100 meters maximum section length between hubs. The SFP modules will allow for section length 550 meter (Multi-mode), up to 80 Kileometers (Single-mode) using current SFP modules. See the Transceiver sensitivity table below.

403. Network Management (NMS Craft Port) Standard CAT 5E cable is also used for this port. The NMS part has 2 functions: Management and Debug. See tables C for pin function.

404. For Sync Input and Output Clock coaxial connections, use cable assembly: 3DM0G8504AA. This cable provides 8/257.5 IEC Class 1.5/2.5 connector that plugs to/from the Core module, and a customer side Panel mount BNC connection. The cable length is 39.37 inches.

---

9500 MPR RADIO
Core Module Connections

9500 Core Module

10/100/1000 BASE-T Ports

LED's

MODULE RU-4S CONNECTOR  GIGE SFP Port  Clock In/Out  Reset

10BASET/100BASET

100BASET

NMS (Management)

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Signal</th>
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<tbody>
<tr>
<td>1</td>
<td>TR01+</td>
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<tr>
<td>2</td>
<td>TR01-</td>
</tr>
<tr>
<td>3</td>
<td>TR02+</td>
</tr>
<tr>
<td>4</td>
<td>TR02-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tx+</td>
</tr>
<tr>
<td>2</td>
<td>Tx-</td>
</tr>
<tr>
<td>3</td>
<td>Rx+</td>
</tr>
<tr>
<td>4</td>
<td>Rx-</td>
</tr>
</tbody>
</table>

SFP Module

Duke LC Connectors

---

Interconnect Drawing
501. Ethernet Access

The Ethernet Access Module will be released for $2.00.

9500 Ethernet Access Module
9500 MPR RADIO
MOD 300 Connections

MOD 300

601. The MOD 300 provides an IF output signal and DC voltage to the ODU via QMA connector on the front of the module. A 12 inch jumper cable is provided to act as strain relief between the module connection and the Type N bracket that holds the opposite end of the jumper cable assembly. Note: for future MWC to MSS upgrades, an SMA to QMA adapter will be provided.

602. Each jumper cable bracket holds 3 cable assemblies and takes up 1 RU of rack space, but only for 1 side of the rack. If more than 3 MOD 300 modules are required in the MSS shelf, then a second bracket is required, directly opposite the first bracket in the same RU of space on the other rack channel.

603. LMR 400 cable is used in between the ODU and type N panel mount connector shown in the bracket. The LMR 400 cable is cut to length in the field and the cable is terminated as shown in the diagram. A special tool kit (PPC Tool Kit-1AG8353935001) is required to provide connector termination.

604. LMR grounding kits (not shown in the diagram) are required at the building entrance and ODU. One extra grounding kit is required for every 100 ft of LMR 400 cable. (Grounding Kit 1AG8350410001).
701. The DS1 Tributary (TDm-32 Module), provides 388 pin SCS type
connections for DS1 access on the front of the module. The right
facing connector provides access to 1-18 DS1 signals, and the left
facing connector provides access to 17-32 DS1 signals. Both
connections have mix input/output signals, (transmit/Receive inputs).

702. The stub cable assemblies split input/output signals to individual
cables at the backshell. These cable assemblies may only be used for
direct access to DS1 signals for non-protected DS1 Trib applications.
(Refer to A2-45 Panel or 37 pin D panel for protected DS1 Trib
requirements).

703. The main side cable assembly must be used with DS1 Tribs placed in
the main side of the MPO shell. The protect side cable assemblies
must be used with DS1 Trib's placed in the protect side of the MPO
shell. (This allows for ease of cable maintenance for installation).

704. Cables are available in 25 and 50 ft lengths. These are 24 AWG
switchboard type solid conductor cables, suitable for wire wrapping.
P/N's 3EM21559AA/AC/AD

---

**9500 MPR RADIO**
**DS1 Trib Connections**

---

**9500 DS1 Trib Module**

---

**Interconnect Drawing**
DS1 RJ-45 Panel

801. The RJ-45 DS1 Protection Panel provides a single customer access point for up to 32 100 Ohm DS1 ports and feeds the same 32 DS1 signals to both Main and Protect side DS1 Trias in the MSS shelf. The connector pin assignment conforms to B-position ILHRC.

802. The main function of the RJ-45 Panel is to provide protection access to the DS1 Trias, but it may also be used for RU-45 access to a single non-protected DS1 Trib as well.

803. Each RU-45 connector uses 2 pair, (1 DS1 input and 1 DS1 output) connector conductors as shown in figure 1. Standard Cable rated cable may be used with RU-45 connectors on both ends. If stubbing down to a pin block is required, T1 cables are available with 22 AWG solid conductor with RU-45 conductor assignment in an RU-45 connector as well. JEM13052XX shown below is straight pin to pin.

804. The RU-45 panel requires 2.5 inches of RU space, not the typical 2 RU (3.5 inches).

805. For Protected Trib Access, the panel requires 4 68 Pin SCSI cable assemblies, (3C55/118A) cabled up as shown. The RU-45 panel must be mounted in close proximity to the MSS Shelf, and the RU-45 connectors face rack front for customer access.
DS1 37 Pin D Panel

901. The 37 Pin D, DS1 Protection Panel provides a single customer access point for up to 32 DS1 lines and feeds the some 32 DS1 signals to both Main and Spare side DS1 Tribs in the MSS shelf.

902. The main function of the 37 Pin D Panel is to provide protection access to the DS1 Tribs, but it may also be used for 37 Pin D access to a single non-protected DS1 Trib as well.

903. Each 37 Pin D connector handles 8 pair, (8 DS1 input and 8 DS1 output) connections as shown in the table below. The standard cable interface is 37 Pin D ASM to Stub cable, suitable for wire wrapping to a pin block. The table shows each 37 Pin D pinout as J1 pairs.

904. The 37 Pin D panel requires 1.75 inches, or 1 RU of space. The 37 Pin D panel does not include mounting, the required bracket for mounting is 30816109AA, see diagram below. This bracket will mount (1) 37 Pin D panel to the rack facing left hand side, and takes up 1 RU of space.

905. For Protected Trib Access, the panel requires 4 68 Pin SCSI cable assemblies, (3C5321BBAA) cabled up as shown. The 37 Pin D panel must be mounted in close proximity to the MSS Shelf, and the 37 Pin D connectors face rack rear for customer access.

37 Pin D Connector Functions
Cable Assembly 3DM231104AA–AD

<table>
<thead>
<tr>
<th>PAIR</th>
<th>FROM</th>
<th>WIRE COLOR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>J1–12</td>
<td>WHITE/BLUE</td>
<td>T1–TOP</td>
</tr>
<tr>
<td>2</td>
<td>J1–30</td>
<td>BLUE/WHITE</td>
<td>T1–RING</td>
</tr>
<tr>
<td>3</td>
<td>J1–13</td>
<td>WHITE/ORANGE</td>
<td>T2–TOP</td>
</tr>
<tr>
<td>4</td>
<td>J1–31</td>
<td>ORANGE/WHITE</td>
<td>T2–RING</td>
</tr>
<tr>
<td>5</td>
<td>J1–14</td>
<td>WHITE/GREEN</td>
<td>T3–TOP</td>
</tr>
<tr>
<td>6</td>
<td>J1–32</td>
<td>GREEN/WHITE</td>
<td>T3–RING</td>
</tr>
<tr>
<td>7</td>
<td>J1–15</td>
<td>WHITE/BROWN</td>
<td>T4–TOP</td>
</tr>
<tr>
<td>8</td>
<td>J1–33</td>
<td>BROWN/WHITE</td>
<td>T4–RING</td>
</tr>
<tr>
<td>9</td>
<td>J1–16</td>
<td>WHITE/SLATE</td>
<td>T5–TOP</td>
</tr>
<tr>
<td>10</td>
<td>J1–34</td>
<td>SLATE/WHITE</td>
<td>T5–RING</td>
</tr>
<tr>
<td>11</td>
<td>J1–17</td>
<td>RED/BLUE</td>
<td>T6–TOP</td>
</tr>
<tr>
<td>12</td>
<td>J1–35</td>
<td>BLUE/RED</td>
<td>T6–RING</td>
</tr>
<tr>
<td>13</td>
<td>J1–18</td>
<td>RED/ORANGE</td>
<td>T7–TOP</td>
</tr>
<tr>
<td>14</td>
<td>J1–36</td>
<td>ORANGE/RED</td>
<td>T7–RING</td>
</tr>
<tr>
<td>15</td>
<td>J1–19</td>
<td>RED/GREEN</td>
<td>T8–TOP</td>
</tr>
<tr>
<td>16</td>
<td>J1–37</td>
<td>GREEN/RED</td>
<td>T8–RING</td>
</tr>
</tbody>
</table>

9500 MPR RADIO
DS1 Trib Connections

9500 DS1 Trib (Protected Pair)
Main Side
MSS–8 Shelf
Spare Side
68 Pin SCSI Connections

37 Pin D Connectors (Customer Interface)

Interconnect Drawing
DS3 Tributary

1001. The DS3 Tributary (DS3/E3-2 Module), provides 4 Mini-BNC type connectors for DS3 access on the front of the module. The left facing connectors provide access to line 1 DS3 input/output, and the right facing connectors provide access to line 2 DS3 input/output.

1002. For non-protected DS3 Trib, Mini-BNC to BNC cables are provided to cable up input and output signals for each DS3 line set. Typical DS3 interconnect is BNC, and the cables shown are available in 2 meter (6.56 ft) or 5 meter (16.4 ft) lengths. 3LM22867A-AB.

1003. Protected DS3 trib sets utilize external 3dB hybrid splitters as shown. The customer side of the splitter assembly is female BNC, and the trib side is Mini-BNC. The customer side BNC is panel mount to accommodate a feed thru panel.

1004. The Hybrid splitter Trib side cable lengths are offset to accommodate the cable mounting difference as shown in the diagram. See the cable length dimensions below. Hybrid splitter P/N is: 3LM22900AA.

---

9500 MPR RADIO
DS3 Trib Connections

9500 DS3 Trib Module

Mini-BNC
Trib Side

BNC
Customer Side

Hybrid Assy

Female BNC
Panel Mount

P1
20.0 in

P2

P3
30.0 in

Mini-BNC
Ends

9500 DS3 Trib (Protected Pair)

Main Side

MSS-8 Shelf

Spare Side

Interconnect Drawing

Line 1 Out

Line 1 In

BNC Panel Mount
Customer Connectors

BNC Panel Mount
Customer Connectors

Line 2 Out

Line 2 In
DS3 Connector Panel

1101. The DS3 connector panel is not available for R1.0 release.

9500 DS3 Trib (Protected Pair)

Main Side - MSS-8 Shelf - Spare Side

Mini BNC Connectors

BNC Panel Mount
Customer Connectors

Line 1 Out  Line 1 In  Line 2 Out  Line 2 In

Future DS3 Connector Panel shown

Interconnect Drawing
Fuse Panel Power Connections

1201. The MSS shelf requires ~48 VDC. The following shall apply:
1202. Two Power cables may be used with each 9500 MSS shelf, but only 1 power cable is required to provide power to both Main and Protect sides of the 9500 MSS shelf. However, 2 power cables are required to provide fused power backup in case of a blown fuse or bad cable connection. The main side of the MSS shelf should be fused through the "A Side" of the Fuse panel, and the protect side of the MSS shelf should be fused through the "B Side" of the Fuse panel. See the E-pin table for designated hook up.
1203. The power cables are routed out of the rear of the Fuse panel, and are tie-wrapped to standoffs on the rear of the rack rails.
1204. The Fuse panel has floating battery inputs to handle either positive or negative 24/48 VDC operation. The strap for Gnd should not be used unless the following has been determined: If the rectifier source of power at the site has not been bonded to the common bonding network (CBN) of the building, then the Fuse panel must be grounded to the rack rail. (This practice will avoid Gnd loops).
1205. Fuse positions 1–4 are equipped with 20 amp fuses. Fuse positions 5–8 are equipped with 10 amp fuses. The Fuse panel is designed for 60 amps max per A or B side. A fuse puller is attached inside the front cover for fuse extraction.
1206. The power cable outer sheath must be stripped back 6 inches to accommodate conductor placement in the Fuse panel. Attach the lugs as shown, P/N (304–1540–070) to the power cable ends.

Fuse Panel (E-Pin) Definition Table

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Pos</th>
<th>Neg</th>
<th>Gnd</th>
<th>Pos</th>
<th>Neg</th>
<th>Gnd</th>
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<tr>
<td>Wire Color</td>
<td></td>
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<tr>
<td>Shelf 1</td>
<td>E1</td>
<td>E7</td>
<td>E25</td>
<td>E18</td>
<td>E24</td>
<td>E36</td>
</tr>
<tr>
<td>Shelf 2</td>
<td>E2</td>
<td>E8</td>
<td>E26</td>
<td>E17</td>
<td>E25</td>
<td>E35</td>
</tr>
<tr>
<td>Shelf 3</td>
<td>E3</td>
<td>E9</td>
<td>E27</td>
<td>E16</td>
<td>E22</td>
<td>E34</td>
</tr>
<tr>
<td>Shelf 4</td>
<td>E4</td>
<td>E10</td>
<td>E28</td>
<td>E15</td>
<td>E21</td>
<td>E33</td>
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<td>Auxiliary</td>
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<td>E6</td>
<td>E12</td>
<td>E30</td>
<td>E13</td>
<td>E19</td>
<td>E31</td>
</tr>
</tbody>
</table>

OUI Mounting Plate

MSS Shelf

Main side Power
(A side Fuse panel)

Protect side Power
(B side Fuse panel)

Front View Fuse Panel

Note 1204

Cable Assy: 3DB18271AA

Cable Wiring

<table>
<thead>
<tr>
<th>Mt</th>
<th>Fuse Panel</th>
<th>Wire Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Battery +</td>
<td>Black</td>
</tr>
<tr>
<td>2</td>
<td>Battery -</td>
<td>Blue</td>
</tr>
</tbody>
</table>

Interconnect Drawing

Strip back ~6 in.
Fuse Panel Form C Relay Contacts

1301. The Fuse Panel alarm function provides (8) Input and (8) Form C relay outputs. The LED indicator illuminates when any fuse blows, plus provides a Form C output for external hook-up.

1302. The (8) Form C Outputs provide the following:
   NO = (Normally Open) contact
   NC = (Normally Closed) contact
   C = Common contact

1303. The (8) inputs and outputs are paired up and numbered 1 thru 8.
   The contacts may be used non-sequentially to provide output for any device, but are recommended to be used in order as shown in the diagram.

The front fuse panel LED illuminates only for fuse failure.

The alarm card shown on this sheet is an optional. The Fuse panel includes an alarm card that provides a single fuse alarm with relay output. The is no system alarm output from the 9500 MFR shelf, but the B Form C relay outputs may be used for other customer site functions if the optional alarm card is required.

3EM100494A - Alarm card (Fuse Alarm w/relay output) comes with Fuse Panel
3EM100494AA - Alarm card (Fuse Alarm + B Form C relay outputs) Optional
ODU Connections

Three main external connections on the ODU are:

1401. RF Type N connection
   The lightning arrester used comes with a mounting bracket, RT angle Type N connector, and Grid lug with cable. The lightning arrester is assembled as shown in Figure 1.

1402. RSSI BNC connection
   The RSSI BNC connection is used for antenna alignment. The BNC center pin is positive. See the manual for alignment. The waterproof cover needs to stay in place at all times when not in use.

1403. Ground lug bolt
   The Ground lug is used as a support for the lightning arrester mounting bracket, which in turn provides a ground lug and Grid cable for the ODU.

   ODU Mounting
   These are brief descriptions of ODU mounting options. See the Manual for full description and pictorial diagrams.

1404. The ODU provides 4 mounting bolts as shown in Figure 2 to attach to a direct mount antenna plate, or a remote mount plate assembly.

1405. When using direct mount antenna, the antenna includes a collar with integral polarization rotator. V and H settings are located on the rotator head. Vertical polarization is the default setting.

1406. If the ODU is not mounted directly to the antenna, then a remote mounting plate is required to provide pole mount support for the ODU. V and H polarization is determined by the orientation of the waveguide port/slot.

1407. Another alternative for mounting the ODU is as a rock mount plate, that is used when the ODU is mounted indoor to an equipment rack and the antenna transmits/receives through a building window.

Figure 1

Figure 2

ODU will mount 45 degrees to antenna mounting plate to obtain V/H polarization

Antenna mounting plate bolts (4 places)

Vertical Polarization
Horizontal Polarization

Waveguide Feedhead

IF Type N Connector (from Mod 300)
Grid lug support
Lightning Arrester Bracket (Included)
Lightning Arrester (Polyphase)
Type N RT Angle Connector (Included)
RSSI BNC (Waterproof cover)

RSSI BNC Port for Antenna alignment

Interconnect Drawing