# TransCell 1900TM System
# Operation and Maintenance Manual

## Document No. 1000497

**Revision A**

**08 March 2001**

# TransCell 1900TM
# Operation and Maintenance Manual


REVIEW AND CONCURRENCE

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- High leakage current: The Hub and Remote environmental enclosures must be connected to Protective Earth ground before any connection is made to AC prime power.
- High voltages (115 Vac and 220 Vac) are present within the Hub and Remote environmental enclosures, respectively. Use extreme caution when working inside the enclosures.
- High voltages may exist close to the Hub or Remote environmental enclosure location; use standard industry safety practices when working on an installed enclosure.

**ESD CAUTION**

The Hub Transceiver Assembly, Remote Transceiver Assembly, and 11-Mbps TDMA Chassis Assembly contain circuit card assemblies (CCAs) that are sensitive to Electrostatic Discharge (ESD) damage. Whenever handling these assemblies, use ESD precautionary procedures to minimize the risk of permanent ESD damage to the CCAs. Low relative humidity levels increase the potential for damage to ESD-sensitive devices.

## FCC License Data

The Hub and Remote assemblies are in the process of being licensed by the Federal Communications Commission for operation in the frequency band as noted on the product label affixed to the enclosure.

Any changes or modifications to this equipment (including software) must be expressly approved by Transcept. Failure to do so may void the user's authority to operate this equipment. This equipment complies with FCC rules when the antennas and cables having characteristics and part numbers as specified below are used with the system. The user is responsible for ensuring that only the specified antennas and cables are used and properly installed.

- PCS Antenna: Maximum gain 21 dBi

This system is designed to be used exclusively for fixed, point-to-point operations, as defined in 47CFR15.247. The user is responsible for ensuring that the system is installed and operated in the manner described herein. Operation of this equipment in a manner other than fixed, point-to-point may constitute a violation of the FCC rules.

# SECTION 1
# INTRODUCTION

## 1.1 ABOUT THIS MANUAL

### *1.1.1 Scope*

This manual contains instructions for operating and maintaining the TransCell 1900TM System, which consists of a Hub and a Remote subsystem. The major components and assemblies of the Hub/Remote Pair (HRP) are:

⇒ TDMA Hub Subsystem (Master)

Hub Transceiver Module (HTM)

Data Link Module (DLM)

Signal Processing Module(SPM)

Low Voltage Power Supply (LVPS) (2 each)

Microwave Data Link Antenna

Hub Interface Tray

TDMA Remote Subsystem

Remote Transceiver Module (RTM)

Data Link Module (DLM)

Signal Processing Module(SPM)

Low Voltage Power Supply(LVPS) (2 each)

Power Amp Power Supply (PAPS)

Tower Top Alarm (TTA) Module

Microwave Data Link Antenna

Transmitter Unit Assembly

Remote Interface Tray Assembly

TransCell 1900TM Operating software

- Linux Operating System
- Executive Control and Monitoring

The manual covers use of TransCell 1900TM operating software for normal system operation and fault detection. It also covers the troubleshooting and repair of the enclosure-mounted assemblies.

### *1.1.2 Manual Organization*

This manual is organized into the following sections:

*Section 1* - Provides general system information.

*Section 2* - Defines the function of hardware front panel controls and indicators.

*Section 3*- Provides normal operating procedures.

*Section 4* - Provides maintenance and troubleshooting procedures.

## 1.2 TERMINOLOGY, ACRONYMS, AND ABBREVIATIONS

### *1.2.1 Notation Conventions*

This manual assumes that the user has a basic knowledge of the Windows NT® operating system. Several typographic conventions and standard Windows NT® terms are used in this manual when discussing the TransCell 1900TM user interface software.

### *1.2.2 Acronyms and abbreviations*

| | |
|---|---|
| **A/D** | Analog-to-Digital |
| **ADC** | Analog-to-Digital Converter |
| **AGC** | Automatic Gain Control |
| **ASCII** | American Standard Code for Information Interchange |
| **BER** | Bit Error Rate |
| **BPSK** | Binary Phase Shift Keying |
| **BTS** | Base Transceiver Station |
| **BTU** | British Thermal Unit |
| **CCA** | Circuit Card Assembly |
| **CH** | Channel |
| **CIC** | Carrier Identification Code |
| **CCK** | Complimentary Code Keyed |
| **CPU** | Central Processing Unit |
| **D/A** | Digital-to-Analog |
| **dB** | Decibel |
| **DBPSK** | Differential Binary Phase Shift Keying |
| **DCCH** | Digital Control Channel |
| **DDC** | Digital Down Converter |
| **DIV** | Diversity |
| **DLM** | Data Link Module |
| **DPSK** | Digital Phase Shift Keying |
| **DQPSK** | Differential Quadrature Phase Shift Keying |
| **DS0** | Digital Signal, Level Zero – one channel of a 24 channel T1 line |
| **DSP** | Digital Signal Processor |
| **DSSS** | Direct Sequence Spread Spectrum |
| **DSU/CSU** | Digital Service Unit/Channel Service Unit. Digital equivalent of an analog modem. |
| **DUC** | Digital Up Converter |
| **Duplexer** | A device used to split a higher speed source data stream into two separate streams for transmission over two data channels. |
| **EEPROM** | Electronically Erasable Programmable Read Only Memory |
| **ESD** | ElectroStatic Discharge |
| **EVM** | Error Vector Magnitude |
| **FCC** | Federal Communications Commission |
| **FPGA** | Field Programmable Gate Array |
| **Fresnel Zone** | The line of sight path between two microwave antennas. |
| **FTP** | File Transfer Protocol |
| **GFI** | Ground Fault Indicator |
| **GUI** | Graphical User Interface |
| **HTM** | Hub Transceiver Module |
| **HRP** | HUB Remote Pair |
| **H-RX** | Horizontal Receive |
| **H-TX** | Horizontal Transmit or Transmitter |
| **HUI** | HRP User Interface |
| **Hz** | Hertz |
| **I/F** | Interface |
| **IF** | Intermediate Frequency |
| **ISM Band** | Industrial Scientific Medical; a term the FCC uses to name several frequency bands in the spectrum. ISM band = 902-928 MHz, 2.4 GHz, 5.8GHz |
| **ITU** | International Telecommunications Union |
| **ITU-T** | International Telecommunications Union – Telecommunication sector |
| **LA** | Lightning Arrester |
| **LED** | Light Emitting Diode |
| **LNA** | Low Noise Amplifier |
| **LUT** | Look Up Table |
| **LVDS** | Low Voltage Differential Signaling |
| **LVPS** | Low Voltage Power Supply |
| **MAC** | Media Access Control |
| **MBPS** | Mega Bits Per Second |

| | |
|---|---|
| **MSC** | Master Switch Center |
| **MUX** | Multiplex or Multiplexer |
| **NCO** | Network Control Office |
| **NEMA** | National Electrical Manufacturers Association |
| **Nm** | Newton meter - unit of torque |
| **NOC** | Network Operations Center |
| **OA&M** | Operation, Administration, and Maintenance |
| **OSI** | Open Systems Interconnection, an internationally accepted framework of standards for communication between different systems. |
| **OSS** | Operation Support System |
| **PA** | Power Amplifier |
| **PAPS** | Power Amplifier Power Supply |
| **PCS** | Personal Communications Service |
| **PLL** | Phase Lock Loop |
| **PRI** | Primary |
| **PRISM™** | An Intersil (Harris) trademark denoting a chip set used to implement wireless communications using direct spread spectrum technology. |
| **QPSK** | Quaternary Phase Shift Keying or Quadrature Phase Shift Keying |
| **RSSI** | Receiver Signal Strength Indication |
| **RTM** | Remote Transceiver Module |
| **RXD** | Diversity Receive |
| **RXP** | Primary Receive |
| **SEM** | System Element Manager |
| **SPM** | Signal Processing Module |
| **SCCS** | Self Contained Cell Site |
| **T-1 or T1** | A digital transmission link with a capacity of 1.544 Mbps.(24 digital 64 kbps voice channels) |
| **TCP/IP** | Transmission Control Protocol/Internet Program |
| **TDMA** | Time Division Multiple Access |
| **TEMS** | Test Equipment Mobile Station |
| **TIA/EIA** | Telecommunications Industries Association/Electronics Industries Association (Now called TIA). |
| **TMA** | Tower Mounted Amp |
| **TTA** | Tower Top Alarm |
| **TX** | Transmit or Transmitter |
| **UL** | Underwriters Laboratories |
| **V.35** | ITU-T standard for trunk interface between a network access device and a packet network that defines signaling for data rates greater than 19.2 kbps. |
| **V-RX** | Vertical Receive |
| **V-TX** | Vertical Transmit or Transmitter |
| **WAN** | Wide Area Network |

## 1.3 REFERENCE DOCUMENTATION

- TransCell 1900TM Installation and Integration Manual, Transcept Document No. 1000462
- TransCell 1900TM Product Specifications, Transcept Document No. 1000143
- TDMA Cellular PCS, TIA/EIA-136
- Installation and User Manual for SEM and HUI Subsystems, Transcept Document No. 1000483

## 1.4 SYSTEM OVERVIEW

The TransCell 1900TM System provides an economical means for building out both coverage and capacity for TIA/EIA-136 TDMA wireless communications. The TransCell 1900TM System uses distributed RF elements to receive and transmit TDMA-based signals at remote sites, and microwave data links for two-way transport. These signals between the remote sites and the Base Transceiver Station (BTS) interface at the designated hub site.

The system software oversees all elements of the TransCell 1900TM System and provides operational data to a Network Operations Center (NOC). The software also provides the means to remotely set all system operational parameters and to locally install software upgrades. All user communications are conducted through an Ethernet® TCP/IP ASCII interface.

### *1.4.1 System Configuration*

A typical TransCell 1900TM System configuration is shown in Figure 1-1. The basic system configuration is a Hub/Remote Pair (HRP). Each HRP consists of a Hub Subsystem (either a Master or Slave) and a Remote Subsystem connected with a microwave data link. Each Hub Subsystem (Hub 1 through Hub n) is directly connected to a BTS.

Monitoring and control access to the TransCell 1900TM System is provided both locally and remotely. Local access for monitoring and control of each HRP is provided at both the Hub and the Remote subsystems in the form of an Ethernet port. Any computer meeting the minimum configuration requirements (see paragraph 1.4.5.1) with the HRP User Interface (HUI) software installed and the appropriate list of Internet Protocol (IP) addresses can be connected for password-controlled access.

At the NOC, the System Element Manager (SEM) software, installed on an appropriately configured computer, continuously captures alarm data from the Wide Area Network (WAN) for each HRP. The alarm data is displayed for review and acknowledgment via the SEM user interface, and it is made available to the NOC's Operation Support Services (OSS). A computer with the HUI software installed also may be activated at the NOCC for monitoring and control access to operating parameters of each HRP.

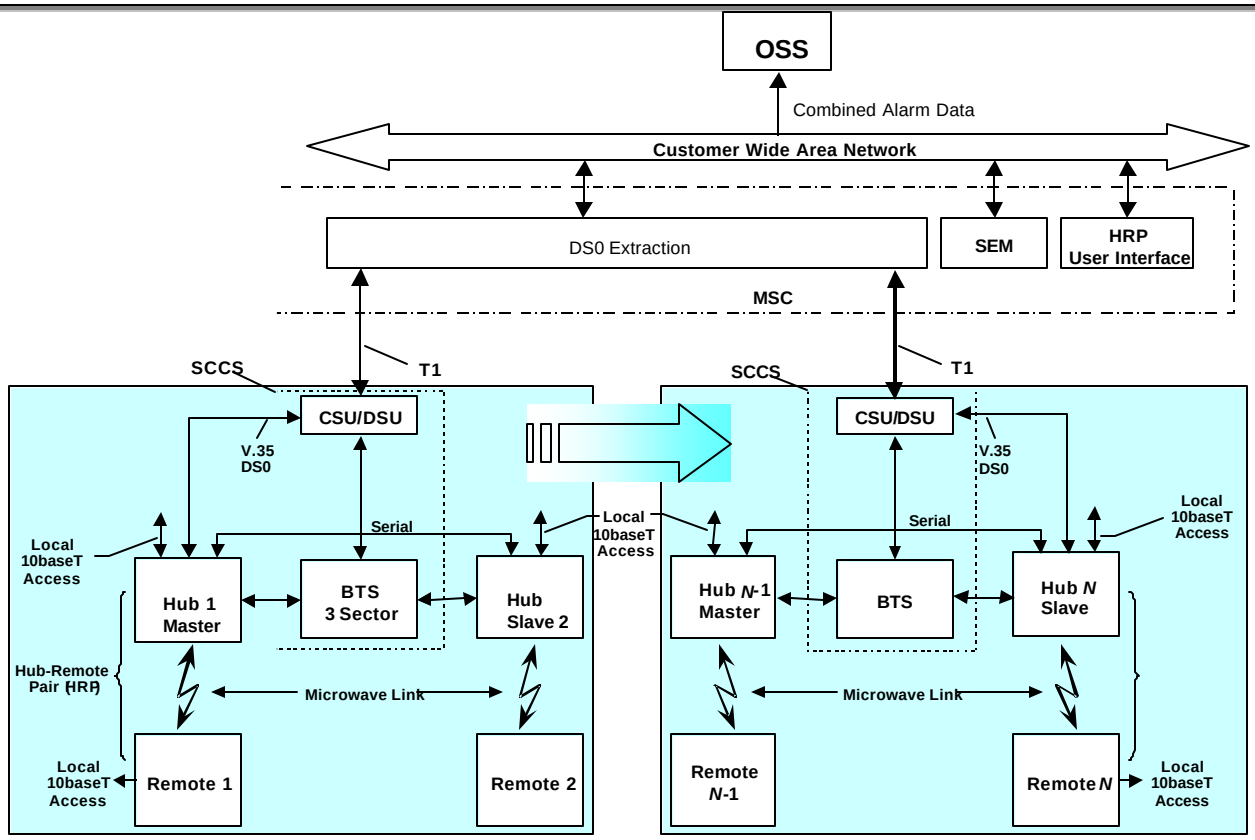


**Figure 1-1. Typical TransCell 1900TM System Configuration**

### *1.4.2 Physical Description*

The Hub/Remote Subsystem enclosures are intended for outdoor use, primarily to provide a degree of protection against corrosion, wind-blown dust and rain. The Hub and Remote enclosures are made of steel with access via a single door on the front of the cabinets. Each has two lifting eyes at the top for cable attachment when moving and positioning the enclosures. The two enclosure configurations are based on similar hardware.

The Hub enclosure dimensions are:

- Height: 78 in. (198 cm) includes 6 in. base
- Depth: 24 in. (61.0 cm)
- Width: 24 in. (61.0 cm),
- Weight: Single Hub 325 lb. (147.6 kg); Dual 450 lb. (202.0 kg)

The Remote enclosure dimensions are:

- Height: 81 in. (205.5 cm) includes 6 in. base
- Depth: 24 in. (61.0 cm)
- Width: 36 in. (92.0 cm),
- Weight: 510 lb. (232.0 kg)

Table 1-1 lists the major assemblies and components installed for the Dual Hub (P/N 1000225) and Single Hub (P/N 1000101) Subsystems. Table 1-2 lists the major assemblies and components installed for the Remote Subsystem (P/N 8344086G1). For a detailed assembly list for each enclosure, refer to Section 2.

**Table 1-1. Major Assemblies for Hub Subsystem Configurations**

| Assembly Item | Part Number | Dual Hub 10000225 | Single Hub 1000101 |
|---|---|---|---|
| Data Link Module (DLM) | 1000428G1 | 2 | 1 |
| Signal Processing Module (SPM) | 1000115G1 | 2 | 1 |
| Hub Transceiver Module (HTM) | 1000361G1 | 2 | 1 |
| Low Voltage Power Supply | 1000107P1 | 4 | 2 |
| | | | |
| Hub Interface Tray | 1000425 | 2 | 1 |
| Microwave Antenna [1](2, 3 or 4 foot dish) | 1920006P004 (2 foot)<br>1920006P005 (3 foot)<br>1920006P001(4 foot) | 2 | 1 |
| Cable Assemblies | Various | X | X |

**Table 1-2. Major Assemblies for Remote Subsystem (P/N 1000102)**

| Assembly Item | Part Number | Qty. |
|---|---|---|
| Data Link Module (DLM) | 1000428G1 | 1 |
| Signal Processing Module (SPM) | 1000115G1 | 1 |
| Remote Transceiver Module (RTM) | 1000362G1 | 1 |
| Low Voltage Power Supply | 1000107P1 | 2 |
| Power Amp Power Supply | 1000106P1 | 4 |
| Remote Interface Tray Assembly | 1000210 | 1 |
| Tower Top Alarm Module | 1000217G1 | 1 |
| Transmitter Unit Assembly | 1000104 | 2 |
| Power Amplifier | 1000103P1 | 6 |
| Microwave Antenna [1](2, 3 or 4 foot dish) | 1920006P004 (2 foot)<br>1920006P005 (3 foot)<br>1920006P001(4 foot) | 1 |
| Cable Assemblies | Various | |

[1] Size of antenna is dependant the on configuration of cell site. Refer to Transcept Product Spec (Spec. No.1000143) for details.

**Figure 1-2. Hub Subsystem (Single)**

### *1.4.3 Hub Subsystem Assemblies*

The following paragraphs describe the major Hub Subsystem assemblies listed in Table 1-1. A typical Single Hub Subsystem is shown in Figure 1-2 with the major assemblies installed.

#### 1.4.3.1 Data Link Module (DLM)

The Data Link Module is a 5.8 GHz Spread Spectrum Transmitter/Receiver that provides the microwave link to/from the remote unit. The DLM converts the digital data to/from the SPM to/from 5.8GHz microwave data. The interface to and from the SPM is an 11 Mbps RS485 serial interface. The data rate over the microwave link is 11 Mbps in both the transmit and receive directions. The general performance specifications are shown in Table 1-3. Figure 1-3 shows the front panel of the DLM.

**Table 1- 3. DLM General Performance Specifications**

| Parameter | Units | Spec | Comments |
|---|---|---|---|
| Frequency | MHz | 5725 to 5850 | Unlicensed, Industrial, Scientific, and Medical band, FCC Section 15.247 |
| Channels | | 4 | One transmit and one receive |
| Receiver sensitivity | dBm | -83 | Minimum, for <1e-5 BER |
| Transmitter output | dBm | 30 | |
| Transmitter Rate | Mbps | 11 | |
| Receiver Rate | Mbps | 11 | |

**Figure 1-3. Data Link Module (DLM)**

### 1.4.3.2 Hub Transceiver Module (HTM)

The HTM provides the interface to the BTS for both forward and reverse paths to the TransCell 1900TM System. The HTM converts the forward PCS signals received from the BTS to a digital IF signal for Digital Down Conversion on the SPM. In the reverse path the HTM converts a digital IF signal from the Digital Up Converters on the SPM to a reverse PCS signal and transmits to the BTS. The general performance specifications are shown in table 1-4. Figure 1-4 shows the front panel of the HTM.

**Table 1-4 HTM General Performance Specifications**

| Parameter | Units | Spec | Comments |
|---|---|---|---|
| Output Carrier frequency (reverse path) | MHz | 1850 – 1910 | In accordance with TIA/EIA-136-110-A, Table 3 |
| Input IF (reverse path) | MHz | 12 – 19.5 | Split band configuration |
| Output Power (reverse path) | dBm | -110 to –20 | |
| Input Carrier Frequency (forward path) | MHz | 1930 – 1990 | In accordance with TIA/EIA-136-110-A, Table 3 |
| Input Power (forward path) | dBm | -18 ± 10 dB | Per Carrier. |
| Output IF (forward path) | MHz | 3.5 – 18.5 | |

**Figure 1-4. Hub Transceiver Module (HTM)**

### 1.4.3.3 Signal Processing Module (SPM)

The SPM consists of a processor, digital IF interfaces, data communication interfaces, Digital Down Converters (DDC) and Digital Up Converters(DUC). The processor uses a Motorola Power PC that runs Linux OS.

The digital IF interface transmits/receives digital IF data to/from the RTM or the HTM and provides the channelization of the wideband data. The interface to the DLM consists of digital baseband receive and transmit data at an 11 Mbps rate. Figure 1-5 shows the SPM Front Panel.

The communications interfaces consist of the following:

- Cell 2 and 3 RS232 Serial interface for dual and triple Hub configuration
- RS-485 serial interface to the Power Amplifier
- Power Amp and Low Voltage Power Supply Interfaces ($I^2C$)
- A v.35 interface that provides the interface to a DSU/CSU connection on a host network. This interface provides for status and health monitoring of the TransCell 1900TM system.
- Maintenance RS-232 and Ethernet ports

**Figure 1-5. SPM Front Panel**

### 1.4.3.4 Hub Interface Tray Assy

This assembly, Figure 1-6, contains high power duplexers that provide the duplexed Rx and Tx signals to and from the HTM. This assembly is only required in configurations that support duplexed transmit and receive RF interfaces such as the Nortel and Lucent basestations. Basestations that have separate receive and transmit interfaces do not require this interface tray, such as the Ericsson basestation.

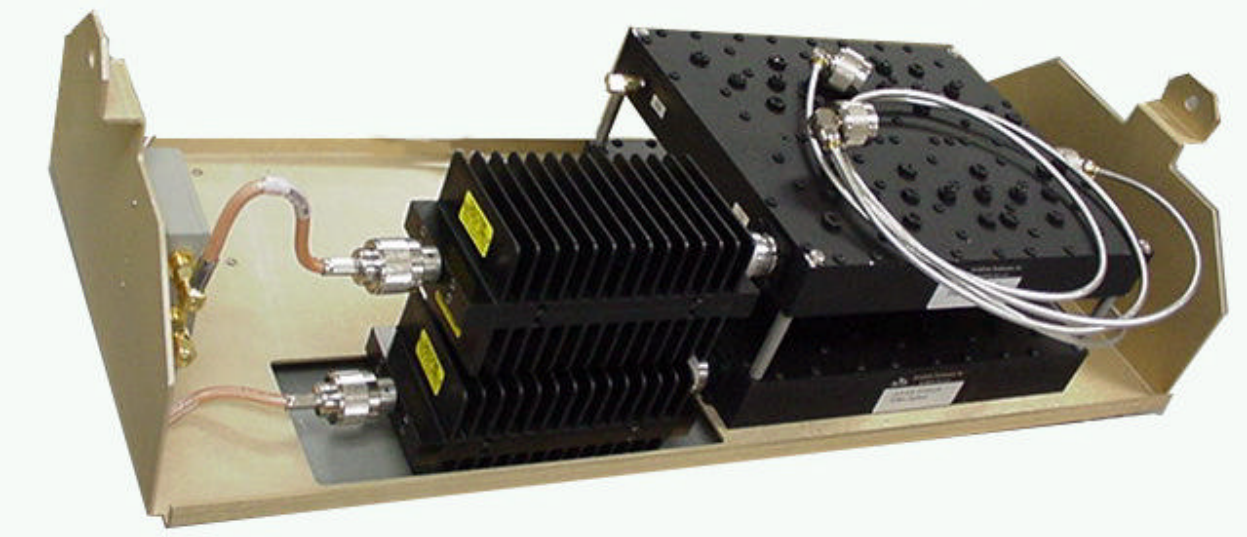

**Figure 1-6 Hub Interface Tray**

### 1.4.3.5 Low Voltage Power Supply (LVPS)

The LVPS operates using 115 VAc, 60 Hz as its input and provides +12, and +8 VDc to the front panel mounted bus bar for distribution to the other modules in the Hub. Two power supplies are installed for redundancy. If the main power supply fails the back up power supply will supply the necessary voltage and current to maintain operation of the system without loss of service. The power supply provides fault status to the SPM via an I2C serial interface. The LVPS front panel is shown in Figure 1-7.


**Figure 1-7. Low Voltage Power Supply**

### 1.4.3.6 Microwave Antenna

The microwave antenna (data link antenna), shown in Figure 1-8 is used for communication between a Hub and a Remote site is available in a two, three or a four foot version. The mechanical specifications of the microwave antenna are:

- Diameter: 4 feet (1.2 meters)
- Weight: 60 pounds (27.2 kilograms) without radome
  70 pounds (31.8 kilograms) with radome

- Elevation Range: ± 25° (Course)
  ±15° (Fine)
- Azimuth Range: ± 180° (Course)
  ±15° (Fine)
- Polarization: Horizontal and vertical

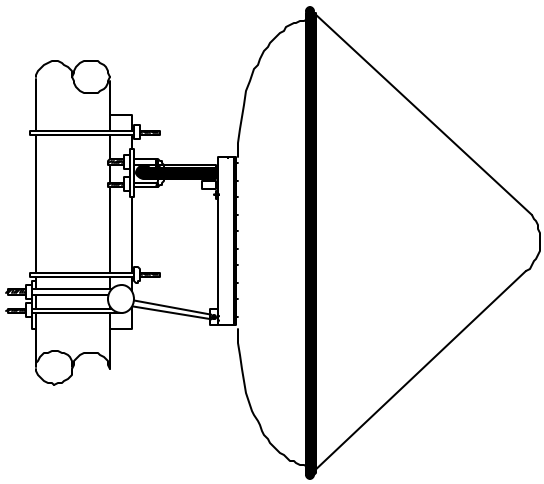

**Figure 1-8. Microwave Antenna**

#### 1.4.3.7 Cable Assemblies

Cable assemblies provided with the Hub Subsystem interconnect the installed assemblies within the enclosure. The external V.35 cable assembly, for interconnection between the Hub and the BTS and all other external-interfacing cables at the site are not provided as part of the TransCell 1900TM system.

### *1.4.4 Remote Subsystem Assemblies*

The following paragraphs describe the major assemblies listed in Table 1-2 that are installed in the Remote Subsystem. A typical Remote Subsystem is shown in Figure 1- with the major assemblies installed. Refer to Section 2 for more information concerning installed assemblies in the Remote Subsystem.


**Figure 1-9. Remote Subsystem**

#### 1.4.4.1 Remote Transceiver Module (RTM)

The RTM provides the RF up conversion from digitized IF to the PCS frequencies and down conversion from PCS frequencies to IF frequencies. In the forward path there are 6 individual carriers that are transmit to the high power amplifiers. The reverse path consists of a primary and diversity carrier that are transmitted to the SPM. The general performance specifications are shown in Table 1-5. Figure 1-10 shows the front panel of the RTM.

**Table 1-5 RTM General Perfromance Specifications**

| Parameter | Units | Requirement | Comments |
|---|---|---|---|
| Output Carrier frequency (forward path) | MHz | 1930-1990 | In accordance with TIA/EIA-136-110-A, Table 3 |
| Input IF (forward path) | MHz | 12 – 15.75 | |
| Output Power (forward path) | dBm | 5 | Max |
| Input Carrier Frequency (reverse path) | MHz | 1850 – 1910 | In accordance with TIA/EIA-136-110-A, Table 3 |
| Input Power (reverse path) | dBm | -88 to -90 | |
| Output IF (reverse path) | MHz | 3.5 – 18.5 | |


**Figure 1-10. Remote Transceiver Module (RTM)**

### 1.4.4.2 Data Link Module

The DLM in the Remote is identical to the DLM in the Hub refer to paragraph 1.4.3.1 for a description of the module

### 1.4.4.3 Remote Power Supplies

The Remote unit contains two sets of power supplies. The LVPS is identical to the unit used in the Hub. Refer to paragraph 1.4.3.5 for a description of the module. The Power Amp Power Supply (PAPS) operates using 220 Vac, 60 Hz and provides +24 Vdc to the transmitter tray and TTA module. The power supply contains four replaceable modules. The power supply is shown in Figure 1-11.

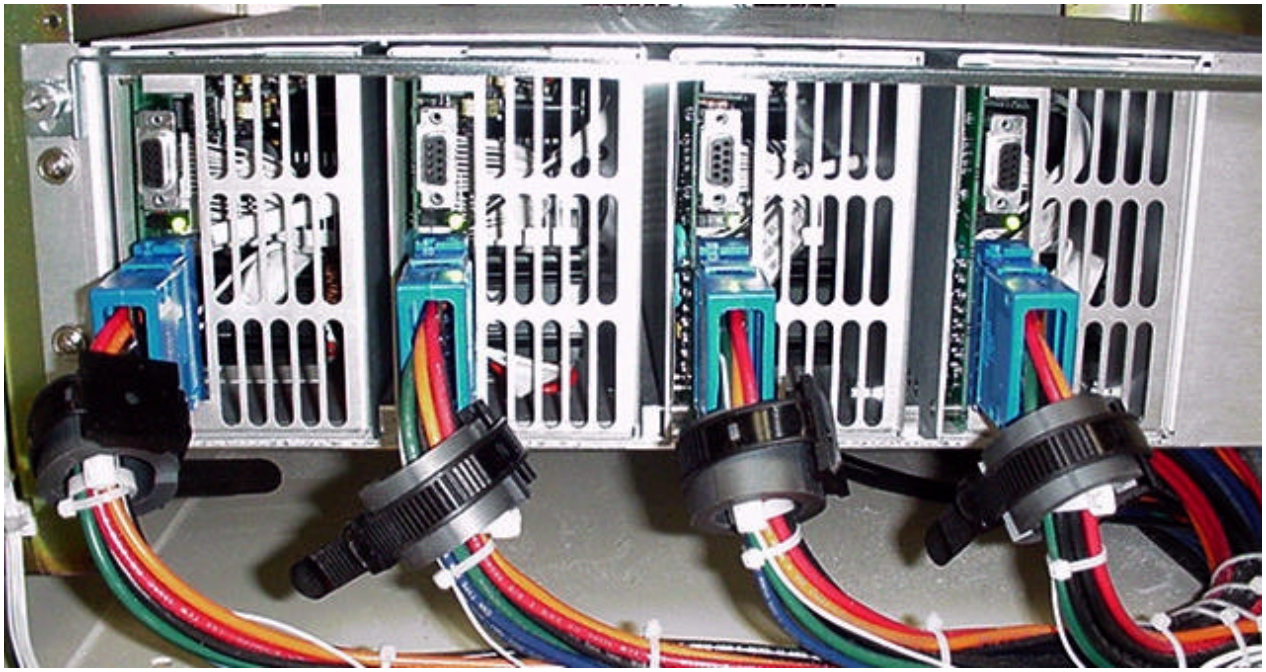

**Figure 1-11. Power Amp Power Supply**

#### 1.4.4.4 Remote Interface Tray Assembly

The Remote Interface Tray houses various RF components used in the TransCell 1900TM System. The major components of the Remote Transmitter are:

- Integrated LNA-Combiner (2)
- PCS Duplexers (4 for 2 sector, 6 for 3 sector configuration)

The Remote Interface tray provides the necessary two or three sector combining and duplexing of the forward and reverse PCS carriers.

### 1.4.4.5 Transmitter Tray Assembly

A transmitter tray, Figure 1-12, contains up to four high power amplifiers, high power combiner and an associated fuse box. The power amplifiers amplify the forward signals from the RTMs for transmission by the PCS antennas. The power amplifiers each contain an RS485 serial interface for communications to and from the SPM.

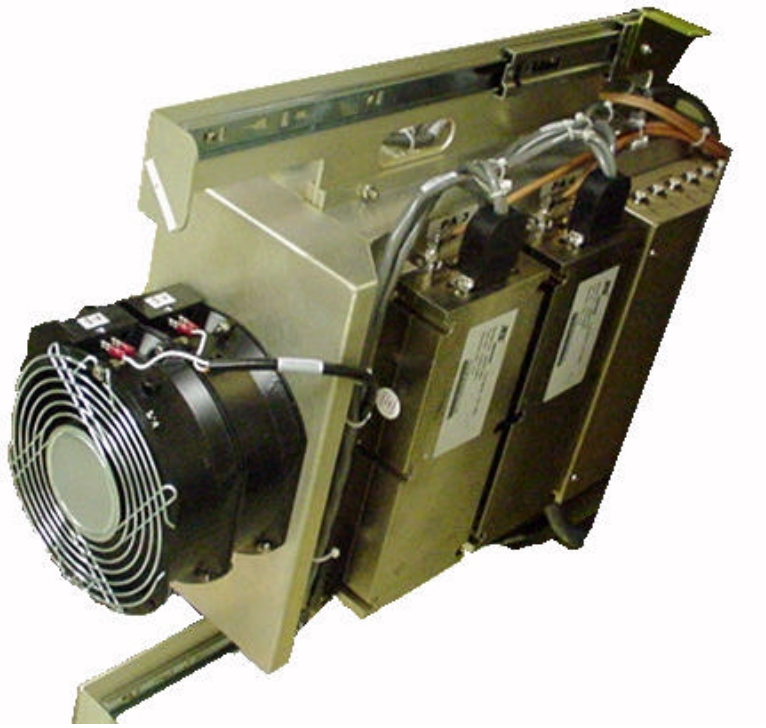

**Figure 1-12. Remote Transmitter Tray**

### 1.4.4.6 Tower Top Alarm Module (TTA)

The TTA module provides an interface to the Tower Mounted Amplifiers (TMA). The TTA module supplies +15Vdc to the TMA and provides for fault monitoring of pulsed or steady state alarms generated from the TMAs. Additionally it provides a fault status indicator for each of the high power amplifiers. Figure 1-13 shows the front panel of the TTA.


**Figure 1-13. TTA Front Panel**

#### 1.4.4.7 Microwave Antenna

The Remote Microwave Antenna is identical to the Hub Microwave Antenna. Refer to paragraph 1.4.3.6 for the description.

#### 1.4.4.8 Cable Assemblies

Cable assemblies provided with the Remote Subsystem interconnect the installed assemblies within the enclosure. Cable assemblies for external Remote Subsystem connections at the site are provided by the customer.

### *1.4.5 Communication Interfaces*

#### 1.4.5.1 Hardware/Software Platform Requirements for HRP User Interface

Any personal computer configured per Table 1-6 may serve as the platform for the HRP User Interface (HUI) software application.

**Table 1-6. Platform Requirements for HRP User Interface Software**

| Computer |
|---|
| 450 MHz (minimum) Pentium P3 laptop computer running Windows NT |
| RS-232 Serial ports, 9-pin |
| 10BaseT Ethernet® |
| 56-kbps Modem |
| pcANYWHERE™ Version 8.0 or later |
| Console cable |

#### 1.4.5.2 Network Interface

Figure 1-14 shows how the System Element Manager (SEM) and HRP User Interface (HUI) communicate over the customer's network with a Hub. The Hubs are connected to a customer provided DSU/CSU via a V.35 serial connection. The DSU/CSU communicates over a DS0 slot in a T1 line to another DSU/CSU at the customer's switch. The DSU/CSU at the Switch is connected to a router over another V.35 serial connection. A TCP/IP connection is established between the Transcept V.35 Master SPM in the HRP and the Customer's router at the Switch. Once this link has been established, the SEM can connect to the Hub to monitor its health. Likewise a HUI located on the customer's network can connect to the HRP to view or change system settings. The Router must be programmed to pass traffic for the IPs out of its V.35 serial port that is connected to the DSU/CSU.

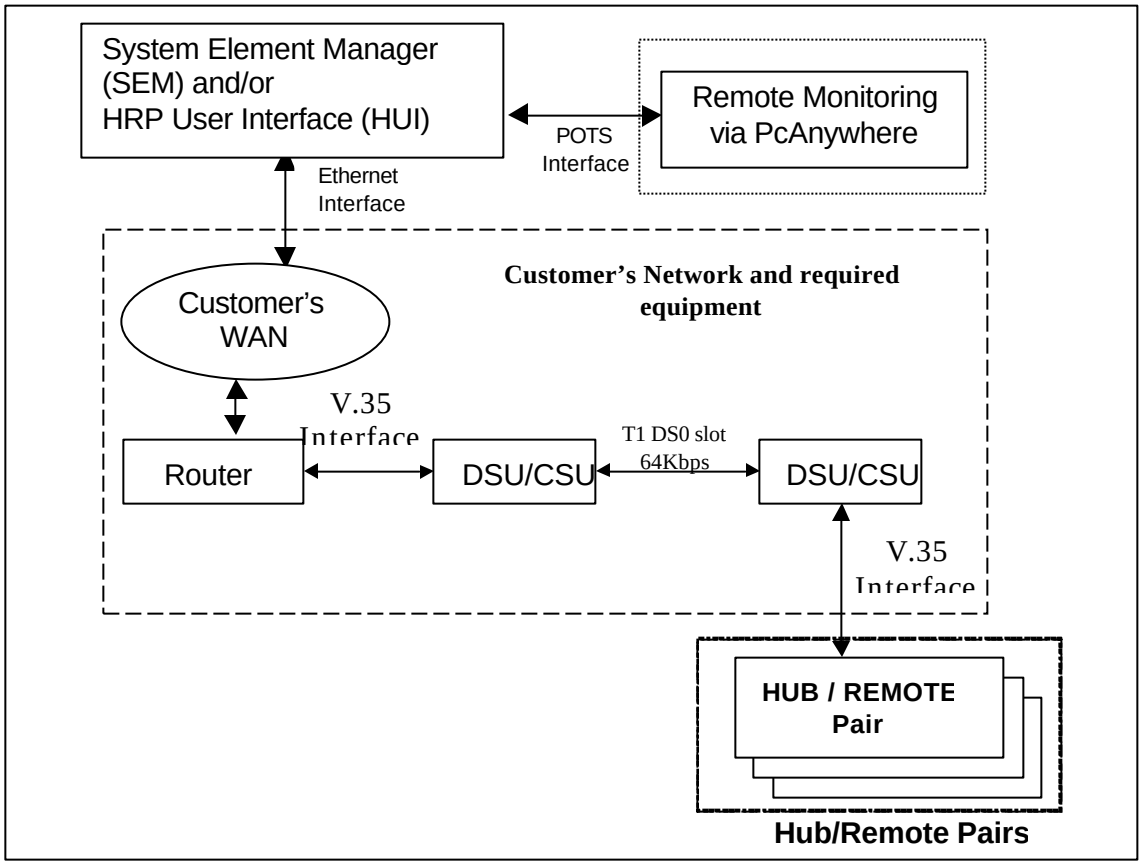


**Figure 1-14. Networking Requirements**

### 1.4.5.3 System Element Manager (SEM) Interface

The SEM software application can be configured to automatically connect to all Hub-Remote Pairs (HRPs) in the network for monitoring of alarm data. The SEM workstation communicates with each HRP by connecting to an Ethernet network via a network interface card.

The SEM Combined Alarm Port can be used to transmit alarms collected at the SEM to the OSS at the Network Operations Center (NOC). See the Installation and User Manual for SEM and HUI Subsystems, Transcept Document Number 1000483 for more detail.

### 1.4.5.4 HRP User Interface (HUI)

The HUI software provides access to the CLI on a HRP. The HUI software operates on the users PC and communicates with the HRP over an Ethernet connection. A computer with HUI software installed functions as a monitoring and control point for the TransCell 1900TM System. Remotely located computers may also use this interface to communicate with the HRPs. See the Installation and User Manual for SEM and HUI Subsystems, Transcept Document number 1000483 for more detail.

#### 1.4.5.5 HRP Command Language

Command language in the form of ASCII text strings is used to send commands to and receive messages from the HRP. For example, a command to set the forward attenuation of Remote RTM carrier number 1 to 4 would be written in HRP Command Language as:

```
$ SET RTM FWATTEN 1 4
```

For a complete list of commands see the Installation and User Manual for SEM and HUI Subsystems, Transcept Document number 1000483.

## 1.5 SEM STARTUP

### *1.5.1 User Access*

The TransCell 1900TM System provides an operator log-in and log-out capability through the HRP User Interface software. To log-in, the operator must enter a password, which defines the authorized user privilege level: The User level typically allows only viewing of operational parameters and status, while the Super-User level allows changing of operational parameters. A valid password is comprised of up to eight alphanumeric characters (no special characters). The HUI validates the password and allows the operator to gain access to the menus to perform required functions.

The Super-User has the privileges necessary to monitor, control, and modify the system parameters. See the Installation and User Manual for SEM and HUI Subsystems, Transcept Document number 1000483 for more detail.

### *1.5.2 SEM and HUI Workstation Initialization*

When power is applied to the SEM workstation, it executes its power-up diagnostics, and then it starts all the necessary processes, initializes all communication interfaces, and waits for input from the operator. The HUI requires the user to start the process. Once started the HUI will start the necessary processes, initializes all communication interfaces, and wait for input from the operator. See the Installation and User Manual for SEM and HUI Subsystems, Transcept Document number 1000483 for more detail.

### *1.5.3 SEM Workstation Shutdown*

Normally the SEM operates 24 hours a day, seven days a week. A system shutdown is only necessary when a SEM workstation is to be replaced or new software is to be downloaded. A shutdown of the system closes all logging functions, terminates communications links, and closes all the SEM processes. Refer to Section 4 for a more detailed description.

### *1.5.4 HUI Workstation Shutdown*

To shut down a HUI workstation, the user logs out and then exits from the HUI software in a manner similar to most other Windows NT® based programs, and powers down the computer. See the Installation and User Manual for SEM and HUI Subsystems, Transcept Document number 1000483 for more detail.

# SECTION 2
# CONTROLS AND INDICATORS

## 2.1 HUB ENCLOSURE CONFIGURATIONS

### *2.1.1 Front and Rear Panels*

The front and rear views of the Hub are shown below in Figure 2-1. A Single Hub configuration only is shown. A dual Hub configuration is very similar. In a dual Hub configuration an additional chassis would be installed with the exact compliment of CCAs that are in the single Hub chassis. Table 2-1 lists all of the major assemblies of a Hub.

**Figure 2-1. Hub Subsystem (Single) Assembly Locations**

**Table 2-1. Hub Subsystem Assemblies**

| Item | Controls/Indicators | Purpose |
|---|---|---|
| Hub Transceiver Module(HTM) | See section 2.1.3 | Converts PCS frequencies from BTS to IF in the forward path and IF to PCS frequencies to the BTS in the reverse path. |
| Data Link Module (DLM) | See Section 2.1.4. | Provides the conversion to/from digital baseband to/from 5.8 GHz data |
| Signal Processing Module (SPM) | See Section 2.1.5. | Provides system control, fault monitoring and data conversion from/to IF to/from baseband |
| Low Voltage Power Supply | See section 2.1.6. | Generates +12 Vdc, and +8 Vdc for the Hub Modules |
| Hub Interface Tray | See section 2.1.7. | Contains high power duplexers that interface to a duplexed BTS. Not required for Non-Duplexed Basestations |

### *2.1.2 Hub Subsystem Enclosure External Connectors*

Figure 2-2 shows the back side of the Hub enclosure and Table 2-2 describes the purpose of each connector. The Hub enclosure contains the connectors for a single or dual configuration. In a single Hub configuration the second set of connectors (labeled Sector 2) would not be connected. Note that the connectors contain built-in lightning protectors with replaceable gas capsules.

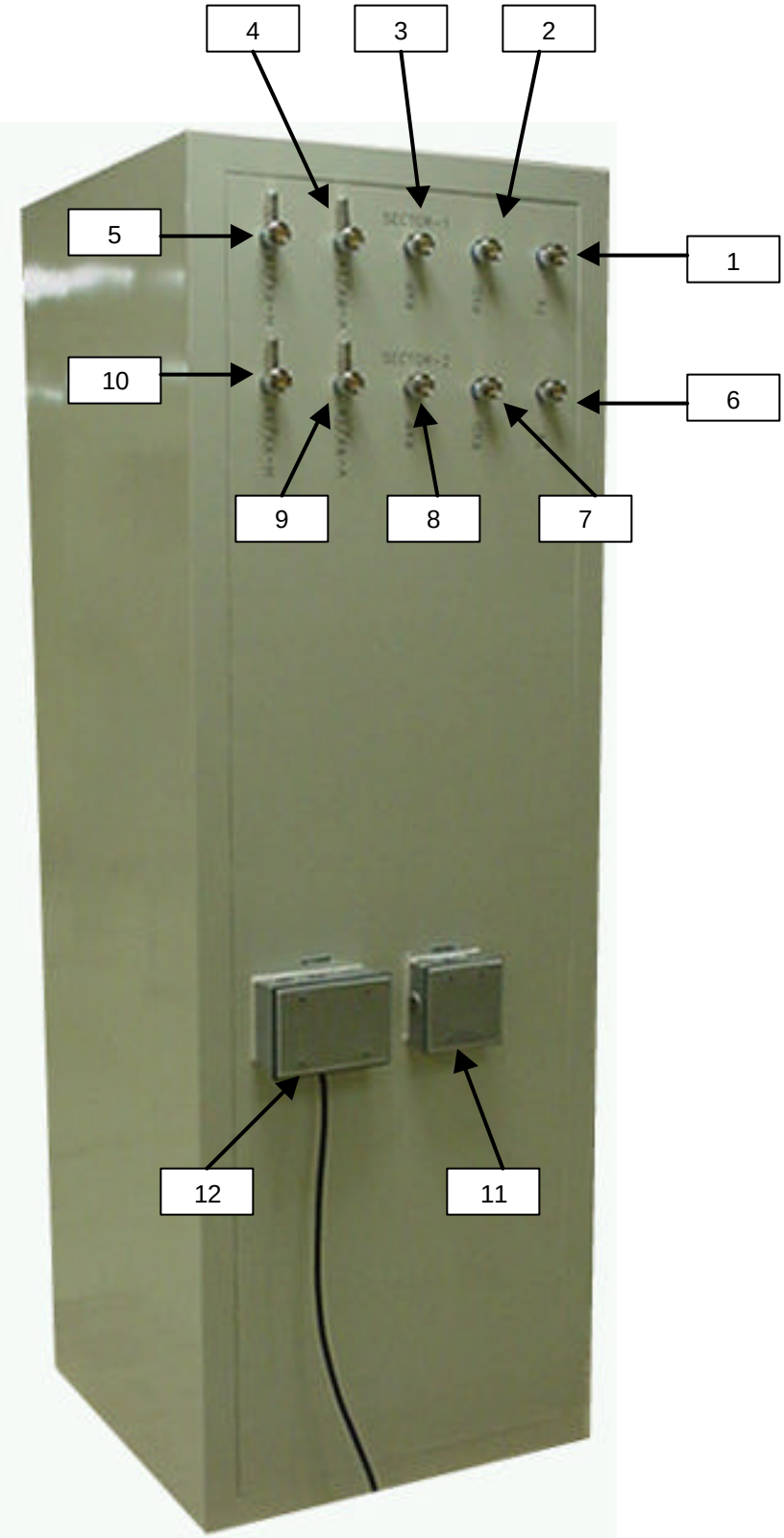


**Figure 2-2. Hub Subsystem Enclosure Connector Side**

**Table 2-2. HUB Subsystem Enclosure External Connectors**

| Index | Connector/Indicator | Purpose |
|---|---|---|
| | | |
| 1 | BTS INTERFACE, TX Sector 1 | Lightning arrester with female DIN connector for interfacing with forward (TX) input from sector 1 of the BTS. Not used in duplexed BTS configurations |
| 2 | BTS INTERFACE, RXD Sector 1 | Lightning arrester with female DIN connector for interfacing with reverse (diversity receive) input to sector 1 of the BTS. |
| 3 | BTS INTERFACE, RXP Sector 1 | Lightning arrester with female Din connector for interfacing with reverse (primary receive) input to sector 1 of the BTS. In duplexed configurations this is also a transmit input from the BTS. |
| 4 | DATA LINK, V-RX/TX Sector 1 | Lightning arrester with female Din connector for vertically polarized microwave (Data Link) antenna. **Note**: The system is typically configured to Vertical polarization. |
| 5 | DATA LINK, H-RX/TX Sector 1 | Lightning arrester with female Din connector for horizontally polarized microwave (Data Link) antenna. **Note**: Horizontal is only used if it is determined that there is a non-optimum performing data link when vertically polarized. |
| 6 | BTS INTERFACE, TX Sector 2 | Lightning arrester with female DIN connector for interfacing with forward (TX) input from sector 2 of the BTS. Not used in duplexed BTS configurations |
| 7 | BTS INTERFACE, RXD Sector 2 | Lightning arrester with female DIN connector for interfacing with reverse (diversity receive) input to sector 2 of the BTS. |
| 8 | BTS INTERFACE, RXP Sector 2 | Lightning arrester with female Din connector for interfacing with reverse (primary receive) input to sector 2 of the BTS. In duplexed configurations this is also a transmit input from the BTS. |
| 9 | DATA LINK, V-RX/TX Sector 2 | Lightning arrester with female Din connector for vertically polarized microwave (Data Link) antenna. **Note**: Vertical polarization is typically used instead of horizontal |
| 10 | DATA LINK, H-RX/TX Sector 2 | Lightning arrester with female Din connector for horizontally polarized microwave (Data Link) antenna. **Note**: Horizontal is only used if it is determined that there is a non-optimum performing data link when vertically polarized. |
| 11 | Comms Interface | v.35 interface to CSU/DSU of system network |
| 12 | AC input | 120 VAC, 60 Hz input power |

### *2.1.3 Hub Transceiver Module (HTM)*

The HTM provides the PCS RF interface to and from the BTS. All HTM connector interfaces and status indicators are provided on the front panel.

### 2.1.3.1 HTM Front panel

HTM interfaces and status LED are located on the front panel. The status LED provides a visual go/nogo status of the module. A green light would indicate module powered on and operating. A red light would indicate module powered on and failed.

Figure 2-3 shows the HTM front panel and Table 2-3 provides a description of the front panel connectors.

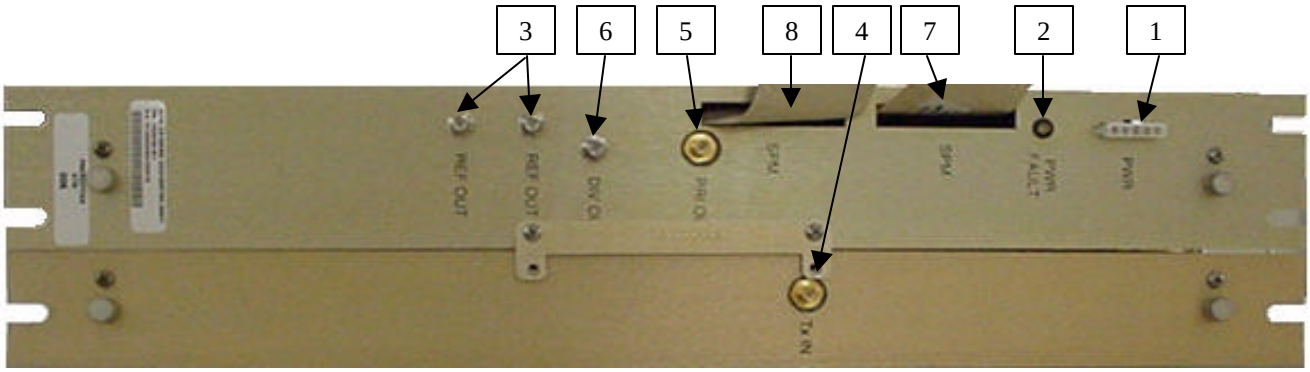


**Figure 2-3. HTM Front Panel**

**Table 2-3. HTM Front Panel Connectors and Indicators**

| Index | Conn. | Purpose |
|---|---|---|
| 1 | PWR | Connects to cable assembly 1000422G1 to supply +12 Vdc and +8 Vdc. |
| 2 | PWR FAULT | Green – Module is operating correctly<br>Red – Module failure |
| 3 | REF OUT | Two identical outputs for the 5 MHz system reference. One is used as a test port only.<br>Connects to DLM via cable assembly 1955000P17 |
| 4 | TX IN | Connects 20 dB attenuattor and 30 dB high power attenuattor via cable assembly 1955002P1 |
| 5 | PRI OUT | Connects to RxP_OUT via cable assembly 1955000P40 |
| 6 | DIV OUT | Connects to RxD_OUT via cable assembly 1955000P40 |
| 7 | SPM | Connects to SPM HTM/RTM connector |
| 8 | SPM | Connects to SPM HTM/RTM connector |

### *2.1.4 Data Link Module (DLM)*

The DLM provides the bi-directional digital radio link from the Hub to Remote, Remote to Hub. There are 3 DLM connector interfaces on the front panel, and 1 DLM connector interface on the rear duplexer antenna (ANT) port.

#### 2.1.4.1 DLM Front Panel

The DLM front panel has the following interfaces: the 5 MHz reference interface, the power interface, and the SPM digital interface. The front panel also has the status LED that provides a visual go/no-go status of the module. A green light would indicate module powered on and operating. A red light would indicate module power on and failed. Figure 2-4 shows the DLM front panel and Table 2-4 provides a description of the front panel connectors.


**Figure 2-4. DLM Front Panel**

**Table 2-4. DLM Front Panel Connectors**

| Index | Item | Purpose |
|---|---|---|
| 1 | DLM Power Cable Connector | Connects to cable assembly 1000269G1<br>Supplies 8 Volts, 12 Volts and Ground. |
| 2 | Power/Fault LED Indicator | Green indicates power and no fault.<br>Red indicates power and a fault. |
| 3 | SPM to DLM Ribbon Cable Connector | Connects to cable assembly 1000262G1<br>Supplies the digital signals from the SPM |
| 4 | 5 MHz Ref | Connects to cable 1955000P17. Provides the DLM with a 5 MHz reference from the HTM/RTM |

#### 2.1.4.2 DLM Rear View

The DLM rear panel has the following interfaces: The duplexer SMA antenna (ANT) interface. This Connects to SMA cable 1955002P2. This interface provides RF to and from the Antenna Bulkhead Connector.

**NOTE**

The two cables from DLM J5 and DLM J6 must be configured for a Remote or a Hub. See Figure 4-6 for a wiring diagram.

**Figure 2-5. DLM Rear View**

### *2.1.5 Signal Processing Module (SPM)*

#### 2.1.5.1 SPM Front Panel

The SPM contains the interfaces to the DLM, HTM or RTM, and v.35, RS232, RS485 and I2C communications interfaces. A front panel LED provides a visual Go/NoGo status of the SPM. Table 2-5 describes each of the connectors shown in Figure 2-6 below.

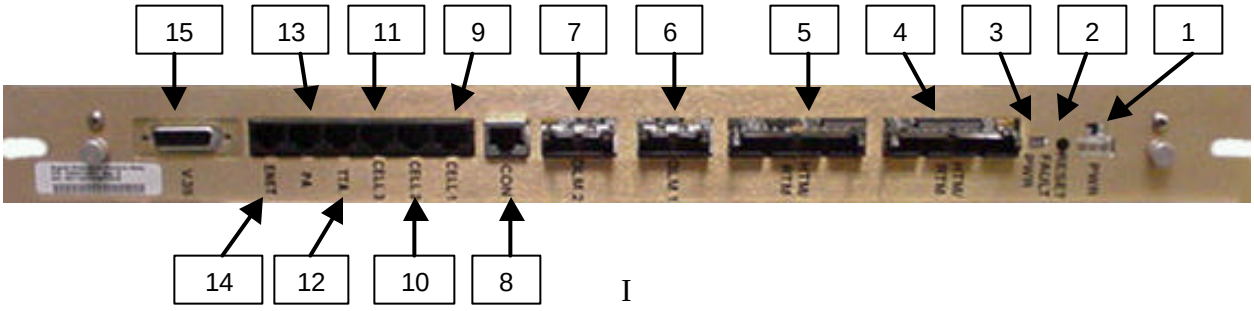


**Figure 2-6. SPM Front panel**

**Table 2-5. SPM Front Panel Connectors and Indicator**

| Index | Item | Purpose |
|---|---|---|
| 1 | Input DC power | Connects to cable assembly 1000270G1 to supply +8 Vdc. |
| 2 | Reset Button | Push button switch used to reset and reboot SPM CCA. |
| 3 | Power/Fault LED Indicator<br>**Note**: At power-up or after a reset, the LED will turn red for a short period of time(less than 3 minutes) then turn green if the module passes internal testing. | Green – Module is operating correctly<br>Red – Module failure |
| 4 | High speed digital data interface to HTM or RTM | Connects to HTM or RTM cable |
| 5 | High speed digital data interface to HTM or RTM | Connects to HTM or RTM cable |
| 6 | Serial interface to primary DLM | Connects to DLM module via cable assembly1000262G1 |
| 7 | Serial interface to optional DLM | Not used |
| 8 | Console port interface | Maintenance port used to locally connect to console port of SPM processor. Cable is not supplied. |
| 9 | Serial comms port for dual master hub configurations only | RS232 Serial port connects to Cell 2 port of dual slave SPM via cable W24 |
| 10 | Serial comms port for dual slave hub configurations only | RS232 Serial port connects to Cell 1 port of dual master SPM via cable W24 |
| 11 | Serial comms port | Not Used |
| 12 | I2C serial interface to TTA (Remote Only) | Serial control and status interface to TTA via cable W5 |
| 13 | RS485 serial Interface to PAs (Remote Only) | Serial control and status interface to up to 6 PAs via cable w74, assembly 10002275G1 |
| 14 | Ethernet Port | Maintenance port used to locally connect to Ethernet port of SPM processor. Cable is not supplied. |
| 15 | V.35 serial interface | Serial interface used to connect to DSU/CSU of users network. Connects to junction box external to rack via cable w9, assembly 1000389G1. |

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### *2.1.6 Low Voltage Power Supply (LVPS)*

The LVPS operates using 115 Vac, 60 Hz and provides +12, and +8 Vdc via an 8-pin connector to the card cage busbar for internal distribution. Two power supplies are installed, one is a primary supply and the other is a redundant supply that only supplies power if the primary LVPS fails. Figure 2-7 shows the LVPS connectors and indicators, and Table 2-6 describes the purpose of each connector and indicator.

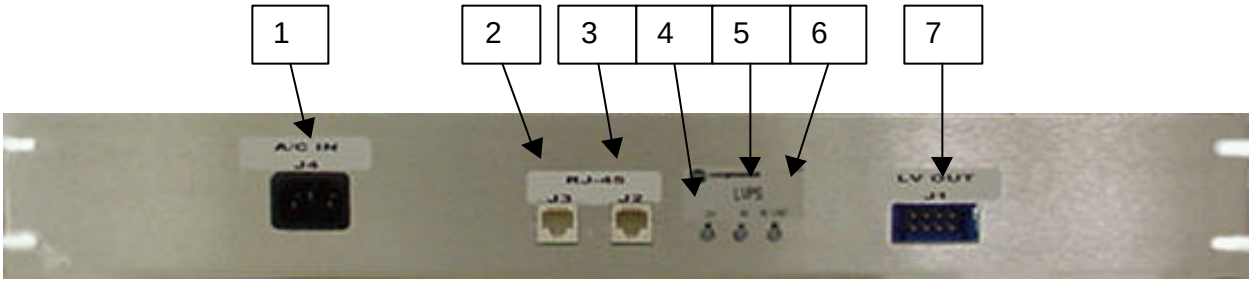



**Figure 2-7. Low Voltage Power Supply**

**Table 2-6. Hub Power Supply Connectors and Indicators**

| Index | Item | Purpose |
|---|---|---|
| 1 | A/C Input | 120 Vac 60 Hz input. Connects to Isobar surge suppressor via cable assembly 1969005P1 |
| 2 | I2C Comms | Serial status and control to/from primary and redundant LVPS via cable assembly1955115P1 |
| 3 | I2C Comms | Serial status and control to/from primary LVPS and SPM via cable assembly1958701P1 |
| 4 | 12 V Status indicator | Green = +12Vdc OK<br>Red = +12Vdc fault |
| | 8 V Status indicator | Green = +8Vdc OK<br>Red = +8Vdc fault |
| 6 | AC Alarm | 115 Vac Input failed |
| 7 | DC Output | +12 Vdc and +8Vdc power and ground output to Card Cage Busbar |

### *2.1.7 Hub Interface Tray Assembly*

The Hub Interface Tray Assembly, 1000425G1, is used only on 1000101G2 Hub configuration (duplexed configuration). The purpose of the Hub Interface Tray Assembly is to filter the transmit signals from the receive signals using the duplexers, attenuate the receive signals, and combine the primary receive signal with the diversity receive signal.

#### 2.1.7.1 Hub Interface Tray Assembly View

Figure 2-8 shows the Hub Interface Tray Assembly and Table 2-7 provides a description of the assembly connectors.

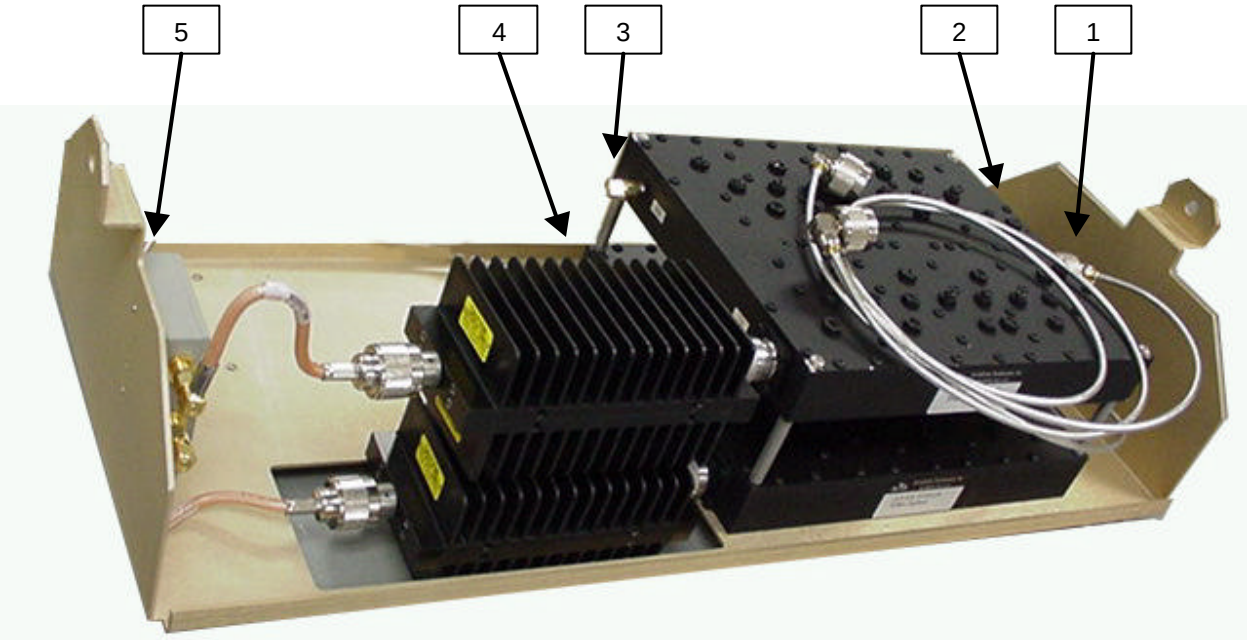



**Figure 2-8 HUB Interface Tray Assembly**

**Table 2-7. Hub Interface Tray Assembly Connectors**

| Index | Item | Purpose |
|---|---|---|
| 1 | Primary Antenna Port | Connects to a N cable, 1955000P47, going to the Rx Primary bulk head connector. |
| 2 | Diversity Antenna Port | Connects to a N cable, 1955000P47, going to the Rx Diversity bulk head connector. |
| 3 | Primary Transmit Connector | Connects to a SMA cable, 1955000P49, going the HTM PRI Out Connector. |
| 4 | Diversity Transmit Connector | Connects to a SMA cable, 1955000P49, going to the HTM DIV Out Connector. |
| 5 | Combined Receive Connector | Connects to a SMA cable, 1955000P49, going to the HTM Tx In connector. |

## 2.2 REMOTE SUBSYSTEM CONFIGURATION

### *2.2.1 Front and Rear Panels*

The front and rear views of the Remote are shown below in Figure 2-9. Table 2-8 lists all of the major assemblies of a Remote.

**Figure 2-9. Remote Subsystem Assembly Locations**

**Table 2-8. Remote Subsystem Control and Indicator Locations**

| Item | Controls/Indicators | Purpose |
|---|---|---|
| Remote Transceiver Module (RTM) | See section 2.2.3 | Converts PCS frequencies from BTS to digital IF. |
| Data Link Module (DLM) | See Section 2.1.4 | Provides the conversion to/from digital baseband to/from 5.8 GHz data |
| Signal Processing Module (SPM) | See Section 2.1.5 | Provides system control, fault monitoring and data conversion from/to IF to/from baseband |
| Low Voltage Power Supply | See section 2.1.6 | Generates +12 Vdc, and +8 Vdc for the Remote Modules |
| Tower Top Alarm Module | See section 2.2.4 | Provides +15 Vdc and a communications interface to the Tower Mounted Amplifiers |
| Remote Interface Tray | See section 2.2.5 | Provides the necessary two or three sector combining and duplexing of the forward and reverse PC carriers |
| Remote Transmitter Unit Assembly | See section 2.2.6 | Contains the high power amplifiers that provide the final amplification and conditioning of forward PCS signals (1930 – 1990 MHz) before they are applied to antenna. |
| Power Amplifier Power Supply | See section 2.2.7 | Generates +24 Vdc for the Power Amps and TTA module |

### *2.2.2 Remote Subsystem Enclosure External Connectors*

Figure 2-10 shows the connector side of the Remote Subsystem enclosure and Table 2-9 describes the purpose of each connector. Note that the connectors contain built-in lightning protectors with replaceable gas capsules.

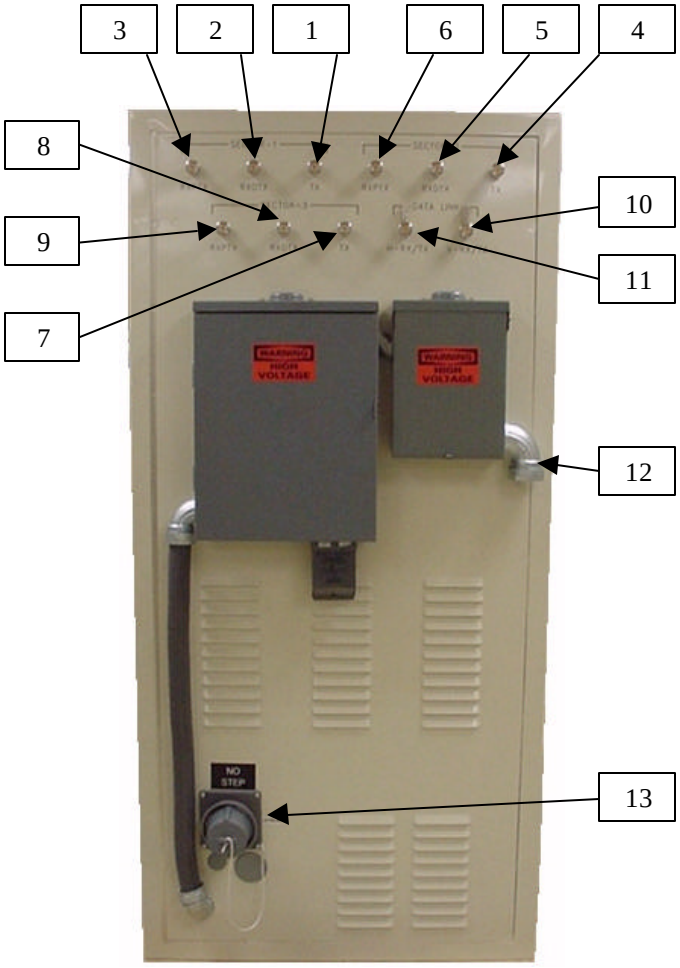



**Figure 2-10. Remote Subsystem Enclosure Connector Side**

**Table 2-9. Remote Subsystem Enclosure External Connectors**

| Index | Item | Purpose |
|---|---|---|
| 1 | BTS INTERFACE, TX Sector 1 | Not Used |
| 2 | BTS INTERFACE, RXDTX Sector 1 | Lightning arrester with female DIN connector for interfacing with duplexed forward output and reverse (diversity receive) input to sector 1 of the BTS. |
| 3 | BTS INTERFACE, RXPTX Sector 1 | Lightning arrester with female Din connector for interfacing with duplexed forward output and reverse (primary receive) input to sector 1 of the BTS. |

| Index | Item | Purpose |
|---|---|---|
| 4 | BTS INTERFACE, TX Sector 2 | Not Used |
| 5 | BTS INTERFACE, RXDTX Sector 2 | Lightning arrester with female DIN connector for interfacing with duplexed forward output and reverse (diversity receive) input to sector 1 of the BTS. |
| 6 | BTS INTERFACE, RXPTX Sector 2 | Lightning arrester with female Din connector for interfacing with duplexed forward output and reverse (primary receive) input to sector 1 of the BTS. |
| 7 | BTS INTERFACE, TX Sector 3 | Not Used |
| 8 | BTS INTERFACE, RXDTX Sector 3 | Lightning arrester with female DIN connector for interfacing with duplexed forward output and reverse (diversity receive) input to sector 1 of the BTS. |
| 9 | BTS INTERFACE, RXPTX Sector 3 | Lightning arrester with female Din connector for interfacing with duplexed forward output and reverse (primary receive) input to sector 1 of the BTS. |
| 10 | DATA LINK, V-RX/TX | Lightning arrester with female Din connector for vertically polarized microwave (Data Link) antenna. **Note**: The system is typically configured to Vertical polarization. |
| 11 | DATA LINK, H-RX/TX | Lightning arrester with female Din connector for horizontally polarized microwave (Data Link) antenna. **Note**: Horizontal is only used if it is determined that there is a non-optimum performing data link when vertically polarized. |
| 12 | Conduit Access | 1.5” Liqui-tite prime power conduit access point. |
| 13 | AUX PWR | Four-wire Auxiliary Power port rated for use with 100A, 220 V emergency power generator. |

### *2.2.3 Remote Transceiver Module (RTM)*

The RTM provides the PCS RF interface to and from the mobile phone. All RTM connector interfaces and status indicators are provided on the front panel.

#### 2.2.3.1 RTM Front Panel

RTM interface connectors and status LED are located on the front panel. The status LED provides a visual go/no-go status of the module. A green light would indicate module powered on and operating. A red light would indicate module powered on and failed. Figure 2-11 shows thee HTM front panel and Table 2-10 provides a description of the front panel connectors.

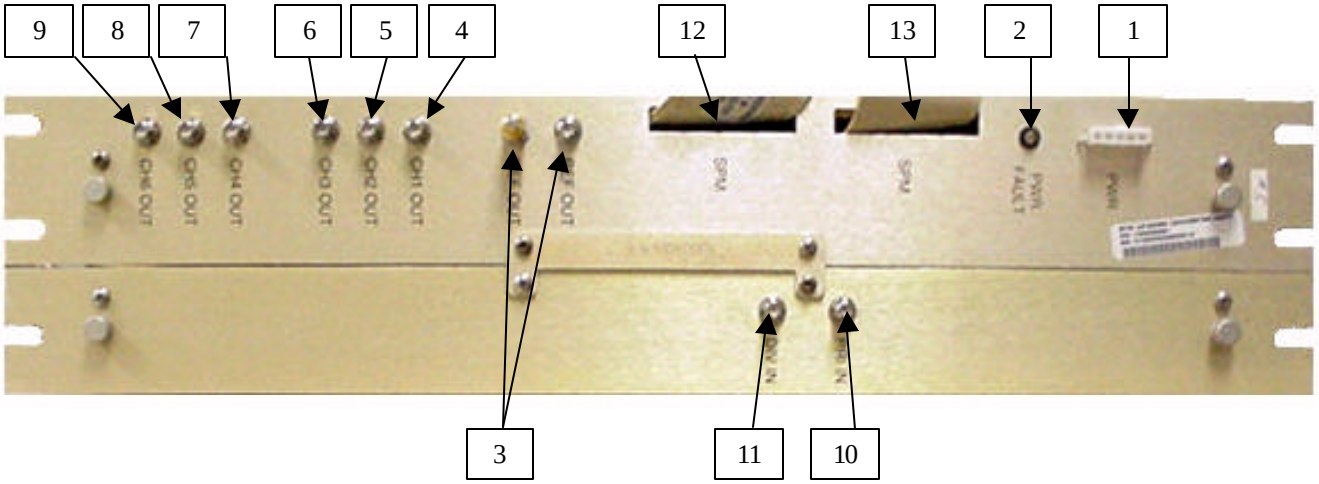



**Figure 2-11. RTM Front Panel**

**Table 2-10. RTM Front Panel Connectors and Indicators**

| Index | Conn. | Purpose |
|---|---|---|
| 1 | PWR | Connects to cable assembly 1000422G1 to supply +12 Vdc and +8 Vdc. |
| 2 | PWR FAULT | Green – Module is operating correctly<br>Red – Module failure |
| 3 | REF OUT | Two identical outputs for the 5 MHz system reference. One is used as a test port only.<br>Connects to DLM via cable assembly 1955000P17 |
| 4 | CH1-OUT | Connects to RF input of PA2 in Transmitter Tray 1 via cable W47, assembly RFL-330001SS |
| 5 | CH2-OUT | Connects to RF input of PA1 in Transmitter Tray 1 via cable W48, assembly RFL-330001SS |
| 6 | CH3-OUT | Connects to RF input of PA2 in Transmitter Tray 2 via cable W51, assembly RFL-330001SS |
| 7 | CH4-OUT | Connects to RF input of PA1 in Transmitter Tray 2 via cable W52, assembly RFL-330001SS |
| 8 | CH5-OUT | Connects to RF input of PA3 in Transmitter Tray 2 via cable W50, assembly RFL-330001SS |
| 9 | CH6-OUT | Connects to RF input of PA4 in Transmitter Tray 2 via cable W49, assembly RFL-330001SS |

| Index | Conn. | Purpose |
|---|---|---|
| 10 | PRI In | Connects to RxP_OUT of Remote interface Tray via cable W54, assembly 32098-2-2905-42A |
| 11 | DIV in | Connects to RxD_OUT of Remote interface Tray via cable W53, assembly 32098-2-2905-42A |
| 12 | SPM | Connects to SPM HTM/RTM connector |
| 13 | SPM | Connects to SPM HTM/RTM connector |

### *2.2.4 TTA Module (TTA)*

The Tower Top Alarm module (TTA) monitors the tower top amplifier status alarms, supplies the Tower Mounted Amplifiers (TMA) with 15 volt power, and displays the PA status alarms issued by the SPM over I2C. All alarms are reported back to the SPM through I2C, and can be reset by the SPM through I2C.

#### 2.2.4.1 TTA Front Panel

Figure 2-12 shows thee TTA front panel and Table 2-11 provides a description of the front panel connectors and indicators.

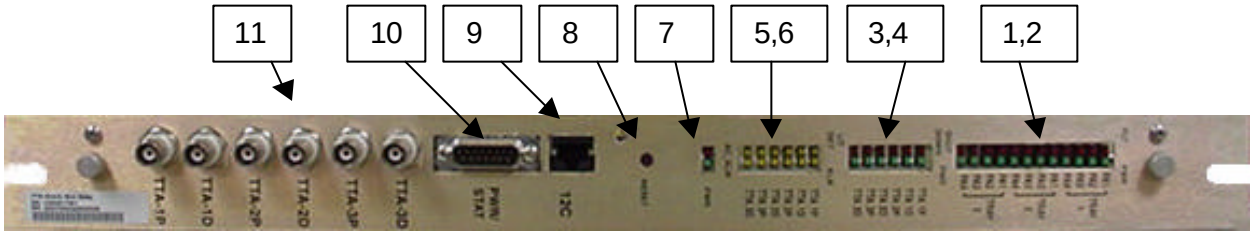



**Figure 2-12. TTA Front Panel**

**Table 2-11. TTA Assembly Front Panel Connectors**

| Index | Item | Purpose |
|---|---|---|
| 1 | PA Fault Status LED's | Illuminated RED indicates a PA fault |
| 2 | PA Power Status LED's | Illuminated GREEN indicates that PA output RF power is enabled |
| 3 | Tower Mounted Amplifier Shutdown Alarm LED's | Illuminated RED indicates that the Tower Mounted Amplifier 15 volts have been disabled. |
| 4 | Tower Mounted Amplifier Power Alarm LED's | Illuminated GREEN indicates that the current to the Tower Mounted Amplifier is within range. |
| 5 | Tower Mounted Amplifier Lightning Detect Alarm LED's | Illuminated GREEN indicates an over current condition existed in Tower Mounted Amplifier |

| Index | Item | Purpose |
|---|---|---|
| 6 | Tower Mounted Amplifier Fault Alarm LED's | Illuminated GREEN indicates a Tower Mounted Amplifier Fault. |
| 7 | Power Supply Fault Alarm | Illuminated RED and GREEN indicates the main power supplies are functional |
| 8 | Manual Reset | Manually resets the TTA fault conditions |
| 9 | I2C Connector | Connects to cable 1955155P1 for I2C communications |
| 10 | TTA Input Power Connector | Connects to cable 1000371G1 supplying 24 volts power to the TTA. |
| 11 | Tower Mounted Amplifier Power Connector | Connects to BNC cable 1955003P1 supplying 15 Volts to the Tower Mounted Amplifiers. |

### *2.2.5 Remote Interface Tray Assembly*

The Remote Interface Tray Assembly takes the Tower Mounted Amplifier power (15 Volts) per channel on all channels (2/3 Primary/Diversity pairs) and combines it with the Transmit Signal In to produce the Transmit Signal Out. This assembly also combines and amplifies (LNA) the 3 primary receive channels into Receiver Primary, and the 3 diversity receive channels into the Receiver Diversity. Both Receiver Primary signal and Receiver Diversity signal are filtered then sent to the RTM. There are 4 configurations of the Remote Interface Tray Assembly. Configuration 1, 1000210G1, is a 2-sector, (2 primary/diversity pairs) low-band system. Configuration 2, 1000210G2, is a 3-sector, (3 primary/diversity pairs) low-band system. Configuration 3, 1000210G3, is a 2-sector, high-band system. Configuration 4, 1000210G4, is a 3-sector, high-band system.

#### 2.2.5.1 Remote Interface Tray Assembly Front View

Figure 2-13 shows thee Remote Interface Tray Assembly front panel and Table 2-12 provides a description of the front panel connectors. Figure 2-14 and Table 2-13 provide a description of the Remote Interface Tray Assembly Rear view.

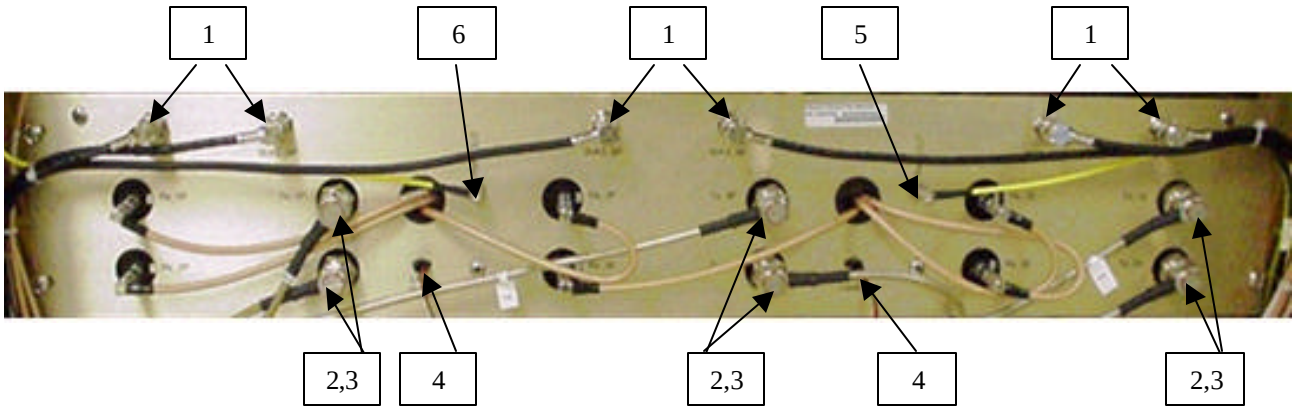



**Figure 2-13. Remote Interface Tray (G2) Assembly Front Panel**

**Table 2-12. Remote Interface Tray Assembly Front Panel Connectors**

| Index | Item | Purpose |
|---|---|---|
| 1 | Tower Mounted Amplifier 15 Volt Power to the bias T's | Connects to 6 BNC cables 1955003P1 for 2/3 primary and 2/3 diversity channels |
| 2 | Transmit Signal In Primary sectors 1,2 and 3 | Connects to 6 N cables 1955001P1 for 2/3 transmit primary, and 2/3 transmit diversity channels |
| 3 | Transmit Signal In diversity sectors 1,2 and 3 | Connects to 6 N cables 1955001P1 for 2/3 transmit primary, and 2/3 transmit diversity channels |
| 4 | LNA Power Primary and Diversity sectors 1,2 and 3 | Connects to cables 1000273G1 supplying power to the 2 receive LNA's for up to 3 sectors. |
| 5 | Receiver Diversity Signal Out | Connects to SMA cable 1955000P2. Provides the Receiver Diversity Out Signal to the RTM. |
| 6 | Receiver Primary Signal Out | Connects to SMA cable 1955000P3. Provides the Receiver Primary Out Signal to the RTM. |

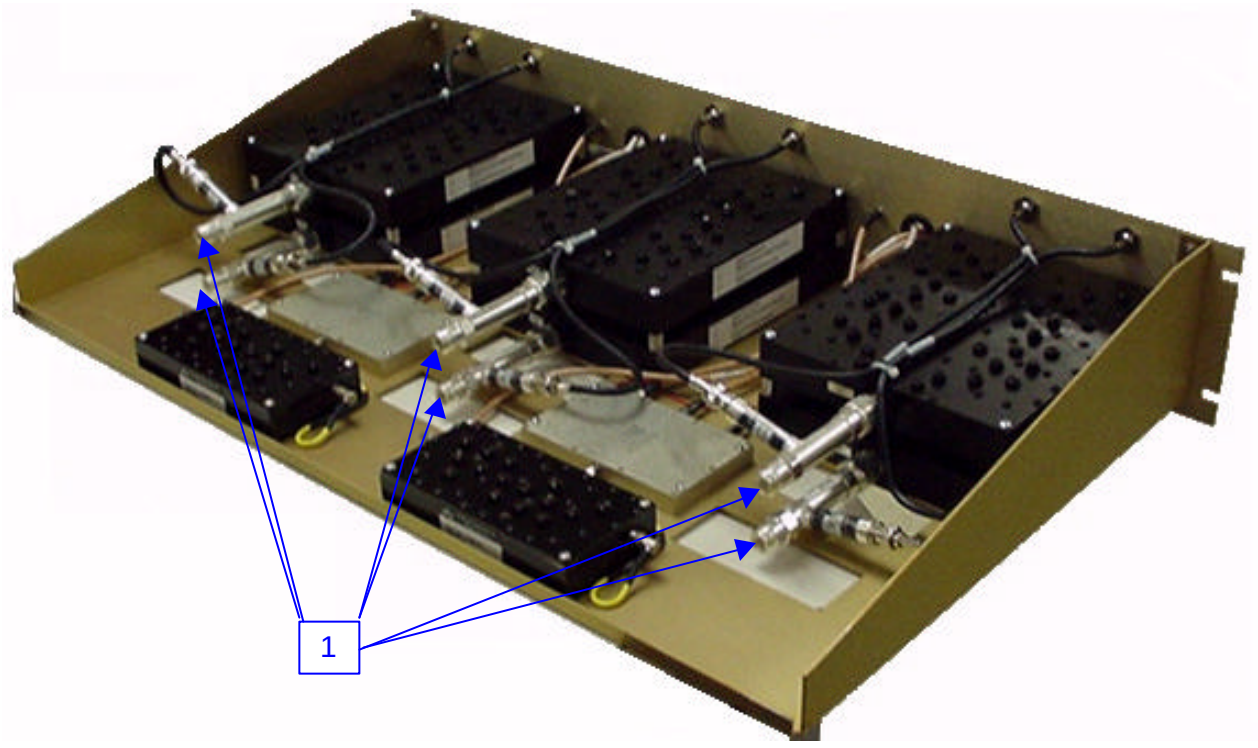



**Figure 2-14. Remote Interface Tray Assembly Rear View**

**Table 2-13. Remote Interface Tray Assembly Rear Panel Connectors**

| Index | Item | Purpose |
|---|---|---|
| 1 | Antenna Port | Connects to 4/6 N cables, 1955001P5, for 2/3 primary, 2/3 diversity channels, and the primary/diversity receiver signals |

### *2.2.6 Transmitter Unit Assembly*

The Transmitter Unit Assembly houses; the PCS Band Power Amplifiers, the Power Combiner Module, the Circuit Breaker Enclosure Assembly, the 2 Brushless DC Fans, and on a 2 sector Remote, a High Power RF Terminator. The input RF signal is sourced from the RTM. The destination of the amplified/combined output RF signal is the Remote Interface Tray Assembly. There are 4 configurations of the Transmitter Unit Assembly. Configuration 1, 1000104G1, is a 2-sector 2-carrier assembly. Configuration 2, 1000104G2, is a 3-sector 2-carrier assembly. Configuration 3, 1000104G3, is a 2-sector 4-carrier assembly. Configuration 4, 1000104G4, is a 3-sector 4-carrier assembly.

#### 2.2.6.1 Transmitter Unit Assembly Top View

The Transmitter Unit Assembly Top View Connectors are shown in Figure 2-15 below. A description of the connectors is provided in Table 2-14.

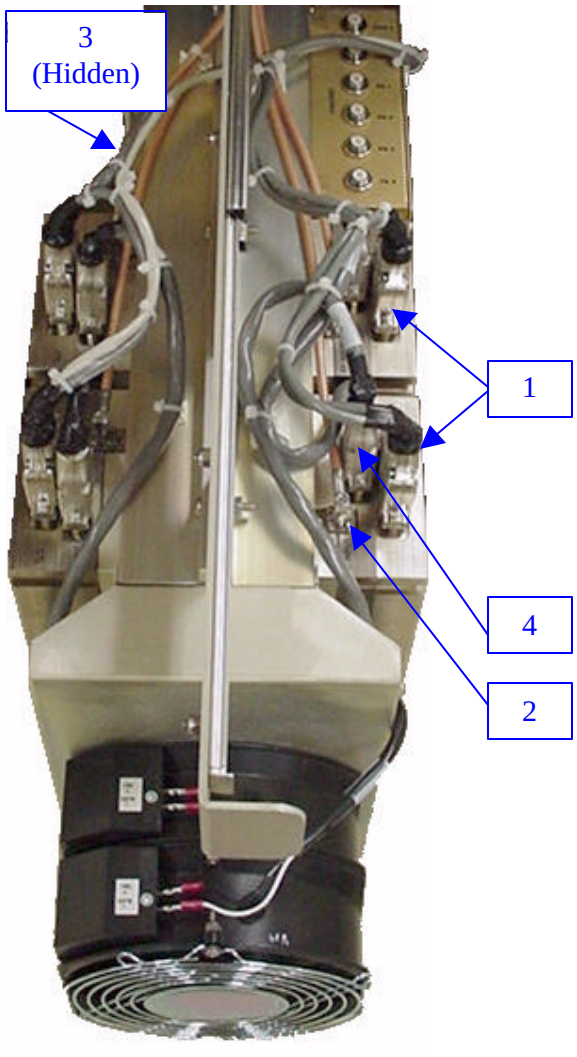



**Figure 2-15. Transmitter Unit Assembly Top View.**

**Table 2-14. Transmitter Unit Assembly Top View Connectors**

| Index | Item | Purpose |
|---|---|---|
| 1 | PA Digital Control | Connects to a DB25 connector on cable 1000346G1. There is 1 connector for each PA on the Transmitter Unit Assembly. |
| 2 | Transmit Signal In | Connects to SMA connector on cables 1955000P6. There is 1 cable for each PA on the Transmitter Unit Assembly. |
| 3 | Transmit Signal Out | Connects to N connector on cables 1955001P1. There are 2/3 cables depending on the number of sectors supported by the Transmitter Unit Assembly. |
| 4 | PA Power Connector | Connects to Transmitter Fuse Box Cables. There is one cable for each PA. |

#### 2.2.6.2 Transmitter Unit Assembly Circuit Breaker Power Cable Connection

The Transmitter Unit Assembly Circuit Breaker Power Cable attaches to the Distribution Panel, 1000233G1. This cable consists of 4 wires, 1 yellow/green wire and 3 black wires. The 3 black wires are marked 1, 2, 3. Black wires 1 and 2 are connected to the Distribution Panel +28 Volts terminal block. The yellow/green wire and black wire 3 are connected to the Distribution Panel 28 Volts return terminal block.

### *2.2.7 Power Amp Power Supply (PAPS)*

The Remote Power Supply operates using 220 Vac, 60 Hz and provides +24Vdc to the Transmitter tray and TTA module. The power supply is made up of four independent modules. A system will operate in a degraded mode on a minimum of 3 modules. These modules are hot swappable allowing for power to remain on while replacing a failed module. Figure 2-16 shows the Remote Power Supply and Table 2-15 describes the purpose of each connector and indicator.

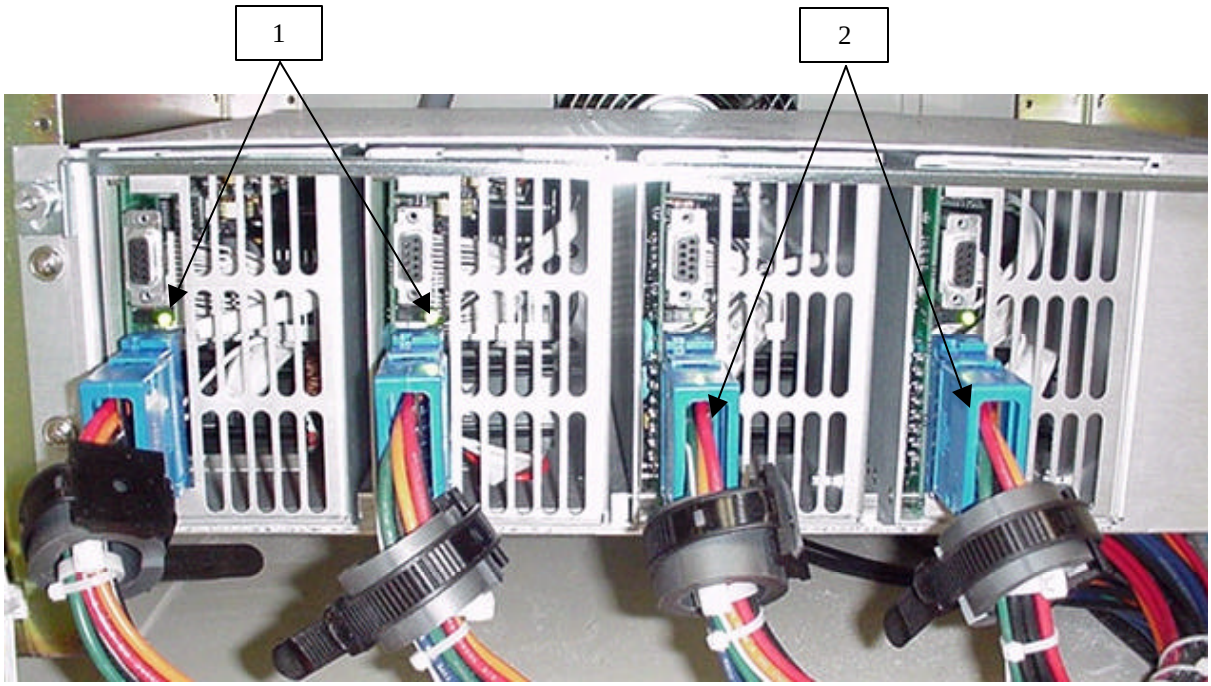



**Figure 2-16. Power Amplifier Power Supply**

**Table 2-15. Power Amp Power Supply Connectors and Indicators**

| Index | Item | Purpose |
|---|---|---|
| 1 | Green LED | Green = Module powered on |
| 2 | 16 pin connector | Provides +28V dc and status indicators. |

## 2.3 TRANSCELL 1900TM OPERATING INSTRUCTIONS

### *2.3.1 Operating Menus*

The SEM/HUI User Manual contains illustrations and descriptions of the System Element Manager and HRP User Interface software for the TransCell 1900TM System. For information concerning system software operation and functionality, refer to paragraph 3.6 of this document.

### *2.3.2 Operating Procedures and System Software Functions.*

Section 3 contains procedures including the equipment energizing instructions and an overview of autonomous system software functionality. For information concerning system setup issues, refer to the TransCell 1900TM Installation Document.

### *2.3.3 Maintenance Instructions*

Section 4 contains the maintenance instructions for the repair of the Hub and Remote enclosures and their constituent assemblies. The maintenance instructions consist of scheduled maintenance procedures, assembly/replacement procedures, alarm message definitions, and troubleshooting.

# SECTION 3
# OPERATING PROCEDURES

## 3.1 HUB EQUIPMENT POWER-ON/POWER-OFF

### *3.1.1 Energizing/De-energizing Hub Subsystem*

These procedures are used to power-on/power-off the Hub Subsystem and individual assemblies. The procedures cover distribution of AC and DC power to subsystem equipment. Each installed unit should be powered on and off using the switch located on the provided power/surge suppressor strip. These procedures are valid for both the single and dual Hub configurations.

#### 3.1.1.1 Power-On Procedure

a. Ensure that power cable for Hub power/surge suppressor strip is connected to 115 Vac power source (AC Outlet).

b. At site's main power panel, set Hub Subsystem circuit breaker to ON.

c. Ensure that each Hub Low Voltage Power Supply output cable is connected to TDMA Card Cage Bus Bar as called out in Table 3-1.

d. Ensure that each Hub Low Voltage Power Supply input power cable is connected to power/surge suppressor strip.

e. Set power switch on power/surge suppressor strip to ON and observe that red power indicator lights, green 8V and 12V indicators light on each LVPS, and chassis fans operate.

**Table 3-1. LVPS Output Wiring Chart**

| LVPS Output Color | TDMA Card Cage Bus Bar Label |
|---|---|
| Red | 8 V |
| Black (paired with RED) | 8 V RTN |
| Purple | 12 V |
| Black (paired with PURPLE) | 12 V RTN |

#### 3.1.1.2 Power-Off Procedure

a. Set power switch on power/surge suppressor strip OFF and observe red power indicator goes out, green 8V and 12V indicators on each LVPS go out, and chassis fans shut down.

b. At Site Main Power Panel, set Hub Subsystem circuit breaker to OFF.

## 3.2 REMOTE EQUIPMENT POWER-ON/POWER-OFF

### *3.2.1 Energizing/De-energizing Remote Subsystem*

These procedures are used to power-on/power-off the Remote Subsystem and individual assemblies. The procedures cover distribution of AC and DC power to subsystem equipment. Each installed unit should be powered on separately using the individual power switches provided.

#### 3.2.1.1 Power-on Procedure

a. Ensure that power cable for power/surge suppressor strip is connected to 115 Vac power source (AC Outlet).

b. At Remote 100 Amp Load Center, set Main circuit breakers (#2 & 4) and AC Outlet Box circuit breaker (#1) to ON.

c. Ensure that each Remote Low Voltage Power Supply output cable is connected to TDMA Card Cage Bus Bar as called out in Table 3-1.

d. Ensure that each Remote Low Voltage Power Supply input power cable is connected to power/surge suppressor strip.

e. Set power switch on power/surge suppressor strip to ON and observe that red power indicator lights, green 8V and 12V indicators on each Low Voltage Power supply light, and Chassis fans operate.

f. At Remote 100 Amp Load Center, set PDU circuit breakers (#3 & 5) to ON and observe that green power indicator on each Power Amplifier Power Supply lights and Power Amplifier Fan Assembly operates.

#### 3.2.1.2 Power-Off Procedure

a. At Remote 100 Amp Load Center, set PDU circuit breakers (#3 & 5) to OFF and observe that green power indicator on each Power Amplifier Power Supply goes out and Power Amplifier Fan Assembly shuts down.

b. Set power/surge suppressor strip power switch to OFF and observe that red power indicator goes out, green 8V and 12V indicators on each Low Voltage Power Supply goes out, and Chassis fans shut down.

c. At Remote 100 Amp Load Center, set AC Outlet Box circuit breaker (#1) and Main circuit breakers (#2 & 4) to OFF.

## 3.3 SEM WORKSTATION POWER-ON/POWER-OFF

These procedures are used to power-on/power-off the System Element Manager workstation.

### *3.3.1 SEM Workstation Power-On Procedure*

a. Ensure that SEM workstation monitor and CPU power cables are connected to an AC power source.

**NOTE**

The use of a surge suppressor with the SEM workstation is recommended.

b. Set monitor power ON/OFF switch to ON. Observe that power indicator lights.

> **NOTE**
>
> If the monitor power cable is connected to the computer, the monitor will not turn on until the computer is powered up.

c. Set SEM computer power ON/OFF switch to ON. Observe that power indicator lights.

d. After SEM workstation executes boot-up routine, Windows NT Desktop is displayed.

### *3.3.2 SEM Workstation Power-off Procedure*

> **CAUTION**
>
> The SEM workstation normally operates 24 hours a day, seven days a week. A system shutdown is only required when a SEM workstation is to be replaced or new software loaded.

a. Shut down SEM workstation operating software per instructions in SEM/HUI User Manual.

b. Shutdown Windows NT® operating system software by selecting the **Start** button on the Windows NT® task bar (bottom left), and then selecting **Shut Down….**

c. At Shut Down Windows dialog, select Shut down the computer? then click Yes.

d. Wait for Windows NT® operating system message prompt saying that it is OK to shut off computer, then set SEM workstation power switch to OFF. Observe that power indicator goes out.

e. Set monitor power switch to OFF. Observe that power indicator goes out.

> **NOTE**
>
> If the monitor power cable is connected to the computer, the monitor will be shut down when the computer is powered off.

## 3.4 SYSTEM SOFTWARE MENUS

For information concerning user interface software operation and functionality, see SEM / HUI User Manual.

## 3.5 TRANSCELL 1900TM SYSTEM SETUP

See TransCell 1900TM Installation Document #1000462 to learn more about the initial system setup and fundamental system software functionality.

## 3.6 TRANSCELL 1900TM SYSTEM OPERATIONS

This section provides descriptions of autonomous system software functions and how to modify them. Also covered are system events such as TDMA channel changes and system status queries.

### *3.6.1 Autonomous Software Functionality*

The TransCell 1900TM system has several health monitoring and conditioning functions geared towards maintaining call quality, maximizing MTBF, and minimizing system down time. This section itemizes some of the main system software functions and their default runtime status. It is recommended that the TransCell 1900TM use the system defaults during normal operation. See Table 3-2 below.

**Table 3-2. Autonomous System Software Settings**

| Function | Default Status |
|---|---|
| Alarm Polling | All Alarm reporting enabled |
| Autolevel | Setpoint: 48 (dBm)*<br>Threshold: 0.5 (dB)<br>Rate: 1 (minute)<br>State: Enabled |
| Autosync | State: Enabled<br>Loop-back test: Enabled |
| Reverse Autogain | Setpoint: 11 (dB)<br>Rate: 60 (minutes)<br>State: Enabled |
| Forward Continuity | State: Enabled |
| Reverse Continuity | State: Enabled |
| Maintenance Window | Start: 3:00 AM (local time)<br>End: 4:00 AM (local time) |

**48 dBm autolevel setpoint is equivalent to 40 dBm at the output antenna port.*

#### 3.6.1.1 Alarm Polling

Each Hub Remote Pair (HRP) collects fault information from its constituent modules and forwards the data through a Master Hub Signal Processing Module (SPM) to a System Element Manager (SEM) for disposition. Specific alarms may be enabled or disabled at a particular HRP using the HRP User Interface (HUI). All alarms are initially enabled. It is recommended that all alarms remain enabled during normal system operation. For more on enabling and disabling particular alarms, see the SEM/HUI User Manual. A complete alarm list and troubleshooting guide can be found in section 4.4.2.5.

### 3.6.1.2 Autolevel Functionality

The Forward Path Automatic Power Leveling ("Autolevel") function regulates power levels throughout all Hub Remote Pair (HRP) forward carriers to maintain a specific output at each Remote Transmitter Antenna Port, thereby stabilizing the system's RF footprint while maintaining signal quality throughout the system. It does so serially, beginning with HRP carrier one and cycling through all six carriers in turn. The frequency of each full visitation cycle can be modified. Also under user control is the Autolevel Setpoint, which is the RF power level to be maintained at the Transmitter, and the Autolevel Threshold, which is the margin under which the Autolevel routine will consider the measured RF power close enough to the desired level. For default settings, see Table 3-2. Autolevel can be enabled and disabled using the HRP User Interface (HUI). It is recommended that this function remain enabled during normal operation. For a complete list of HUI commands and valid parameter ranges, see the SEM/HUI User Manual.

**NOTE**

Autolevel is not intended to prohibit rapid RF power increases, but to compensate for gain variation due to temperature fluctuation or Base Station Radio replacements. Instantaneous overpower conditions are handled autonomously at the Remote Transmitter via Power Amplifier shutdown. Shutdown will occur at an output power of 37.2 watts peak (worst case) measured at the enclosure antenna terminal. However, the Autolevel function does detect when an overpower condition has passed, and will return the Transmitter to its operational state.

### 3.6.1.3 Autosync Functionality

The Microwave Datalink Automatic Synchronization ("Autosync") function uses a staggered cycle operation to autonomously lock Hub and Remote Data Link Forward and Reverse paths. This function uses a fixed frequency approach, so it is imperative that both the Hub and Remote Data Link Modules (DLM) are tuned to the correct channels. Default channels are 1 and 6, and are user controllable. Typical time to completion of a successful Data Link lock from cold start (both Hub and Remote simultaneously powered on) is 2 minutes. If no lock occurs within 11 minutes at the Hub Subsystem, Autosync enters a loop-back mode to determine if there is an equipment problem with the local DLM. After the success or failure of a local loop-back test is noted in the corresponding HUB DLM OUTPUT or REMOTE DLM INPUT ALARM, Autosync restarts the lock process. This cycle is repeated indefinitely until the Data Link is locked between Hub and Remote DLMs. Although Autosync can be enabled and disabled via the HRP User Interface (HUI), it should never be disabled in normal operation. For a complete list of HUI commands and valid DLM parameter ranges, see the SEM/HUI User Manual.

**NOTE**

In simulcast configurations the loop-back test may periodically de-sense the donor base-station. It is recommended that, upon receiving a loop-back alarm in a simulcast system, the operator disable further loop-back testing until the alarm is resolved on site.

| WARNING |
| --- |
| Disabling the Autosync function may lead to extended down time, as any momentary break in Data-Link lock would then require a site visit to the Remote Enclosure to re-enable Autosync and re-lock the Data-Link. Autosync should only be disabled during specific installation procedures called out in the TransCell 1900TM Installation Document #1000462. |

#### 3.6.1.4 Reverse Autogain Functionality

The Reverse Path Automatic Gain ("Reverse Autogain") function uses a noise figure measurement to adjust the reverse HRP carrier gain to maintain specified sensitivity levels. Like Autolevel, Reverse Autogain has a user controlled visit time, gain level setpoint, and toggle state. For default settings, see Table 3-2. For a complete list of HUI commands and valid Reverse Autogain parameter ranges, see the SEM/HUI User Manual.

#### 3.6.1.5 Forward Continuity

The "Forward Continuity" function is used to detect a lost DCCH signal and to determine the exact location of any disconnect within the system's forward path. When a fault is detected, an alarm is generated and sent to the System Element Manager (SEM) for disposition. This function has two main time cycles. Operating outside the Maintenance Window, Forward Continuity validates power levels at each point in the forward path occupied by the DCCH only. This phase is non-intrusive to the system. Operating Inside the Maintenance Window, Forward Continuity uses the DCCH and internal test tones to validate the power levels of each HRP forward carrier. During this phase, call processing is briefly interrupted at the beginning and end of the Maintenance Window. Forward Continuity is enabled by default and can be enabled and disabled via the HRP User Interface (HUI). For a complete list of HUI commands and valid parameter ranges, see the SEM/HUI User Manual.

#### 3.6.1.6 Reverse Continuity

The "Reverse Continuity" function is used to detect and determine the location of any disconnect with the system's reverse path. When a fault is detected, an alarm is generated and sent to the System Element Manager (SEM) for disposition. This function briefly interrupts call processing at the beginning and end of the Maintenance Window to run the required RF testing. Reverse Continuity is enabled by default and can be enabled and disabled via the HRP User Interface (HUI). For a complete list of HUI commands and valid parameter ranges, see the SEM/HUI User Manual.

### *3.6.2 Software System Maintenance*

This section delineates specific system procedures likely to be needed during routine maintenance of the TransCell 1900TM system. For a more complete list of system setup procedures, see the Transcell 1900TM Installation Document #1000462.

#### 3.6.2.1 Defining the Maintenance Window

The Maintenance Window is a period of time in which an HRP may audit the system's channels in a manner that prohibits phone calls. As is discussed in sections 3.6.1.5 and 3.6.1.6, this disruption occurs at each end of the Maintenance Window. If the Maintenance

Window start and end times are set to the same value, the channel auditing functionality will only execute once a night. To disable the TransCell 1900TM channel auditing functionality completely or in part, see section 3.6.1. Widening the Maintenance Window improves system availability, as channel audits are performed over a more statistically significant portion of each day. The Maintenance Window start and end times may be modified via the HRP User Interface (HUI). For a complete list of HUI commands and valid parameter ranges, see the SEM / HUI User Manual.

**NOTE**

If a Maintenance Window parameter is adjusted during the current Maintenance Window, the desired changes will not take effect until the new start time is reached. Furthermore, a change to Maintenance Window parameter while inside the Maintenance Window triggers the termination cycle of the current Maintenance Window.

#### 3.6.2.2 Changing and adding TDMA channels

The procedure for adding TDMA channels can be found in the Transcell 1900TM Installation Document. The procedure for changing channels is as follows.

a. Login to target Hub Remote Pair (HRP) using the HRP User Interface (HUI).

b. Type `GET HTM BAND` and `GET RTM BAND` to see if the HRP is in the desired PCS band.

c. If the HTM and RTM are in the incorrect band, type `SET HTM BAND X` and `SET RTM BAND X`, where X is the desired PCS band of operation.

**WARNING**

This step retunes the HTM and RTM to default frequencies in the desired PCS band, and therefore disrupts current phone traffic on all channels. If only a subset of carriers is to be changed, skip this step.

d. Type `SET HRP TDMACHAN X Y`, where X is the carrier designator through the TransCell 1900TM system (1-6), and Y is the desired TDMA channel assignment. For example, to assign TDMA channel 123 to HRP carrier 6, the command would read `SET TDMACHAN 6 123`.

**WARNING**

The TransCell 1900TM system is a multi-band system meeting TIA/EIA-136 channel specifications. However, it is a single band system at any given time, blocking channel changes that would range outside the set PCS band. The liability for operating in a PCS band not licensed to the operator rests entirely with the operator.

In addition, the ability to tune to what the TIA/EIA-136 specification calls "Border Channels" exists in the TransCell 1900TM system. The use of these channels is allowable provided the operator owns both PCS bands in which these border channels exist. Otherwise, the use of the TDMA border channels violates FCC 47 CFR 24.235. See Table 3-3 for a list of border channels.

e. Repeat previous step for each desired channel change.

**WARNING**

In the event where some HRP carriers are unused, it is imperative that these unused carriers are not mapped to TDMA channels which are active elsewhere in that HRP. Failure to tune inactive carriers away from active TDMA channels may result in degraded system performance.

**Table 3-3. TIA/EIA-136-280 Table 2 Border Channels.**

| Band | Channel Number | Forward Frequency (MHz) | Reverse Frequency (MHz) |
|---|---|---|---|
| A, D | 499, 500, 501 | 1944.99 – 1945.05 | 1864.95 – 1865.01 |
| D, B | 666, 667 | 1950.00, 1950.03 | 1869.96, 1869.99 |
| B, E | 1166, 1167 | 1965.00, 1965.03 | 1884.96, 1884.99 |
| E, F | 1333, 1334 | 1970.01, 1970.04 | 1889.97, 1890.00 |
| F, C | 1499, 1500, 1501 | 1974.99 – 1975.05 | 1894.95 – 1895.01 |

#### 3.6.2.3 Querying System Status

The HRP User Interface (HUI) has a complete command set for querying any TransCell 1900TM system on the operator's network. For a complete list of commands, see the SEM / HUI User Manual. The recommended method to status the entire HRP is by using the script SYSTAT.TXT. The contents of SYSTAT.TXT include a few "GET" commands and several calls to subordinate script files, which the HUI executes in sequence. To use SYSTAT.TXT, login to the target HRP and type `@systat.txt`. There are several bundled scripts which status specific modules and groups of modules in the TransCell 1900TM system. A tutorial on creating and using script files as well as a complete listing of bundled scripts can be found in the SEM/HUI Manual.

#### 3.6.2.4 Toggling Transmitter State

During normal operation, the Remote Transmitter Power Amplifier (PA) should always remain enabled. However, during some maintenance actions (such as removing or adding a BTS radio) the operator may wish to toggle the PA output at the corresponding Hub Remote Pair (HRP) for safety purposes. The following is the procedure for toggling one or more PA states.

a. Login to target HRP

b. If all PA states require enabling, type `@PAON.TXT` at the HRP User Interface (HUI) command line.

c. If all PA states require disabling, type `@PAOFF.TXT` at the HUI command line.

**WARNING**

Due to safety concerns, a manual Remote Transmitter Power Amplifier (PA) shutdown will **not** be reversed by autonomous system software. Be sure to re-enable all desired PA outputs before returning the TransCell 1900TM system to normal operation. Failure to do so will result in degraded call processing statistics.

d. To toggle individual PA states, type `SET PA STATE N B`, where N is the PA number (1-6) and B is a boolean integer (0=off, 1 =on). For example, to disable the PA pertaining to carrier four, the message would read `SET PA STATE 4 0`.

e. Repeat previous step for each desired PA state toggle.

# SECTION 4
# MAINTENANCE AND TROUBLESHOOTING

## 4.1 SCHEDULED MAINTENANCE

### *4.1.1 Hub/Remote Inlet Filter*

The inlet filters on the Hub and Remote Subsystems should be removed and cleaned or replaced periodically to ensure continuous equipment operation. Figure 4-1 shows the Hub and Remote filter locations.

#### 4.1.1.1 Hub /Remote Inlet Filter Cleaning/Replacement Procedure

This procedure contains instructions for cleaning and/or replacing the Hub /Remote inlet air filter. See Figure 4-1 for the Hub /Remote inlet filter locations. Service the inlet filter as follows:

a. Lift inlet filter up and out of enclosure door.

b. Clean inlet filter by flushing with warm water and letting dry thoroughly. If filter is torn or damaged, it is recommended that it be replaced.

c. Reinstall cleaned or new filter.

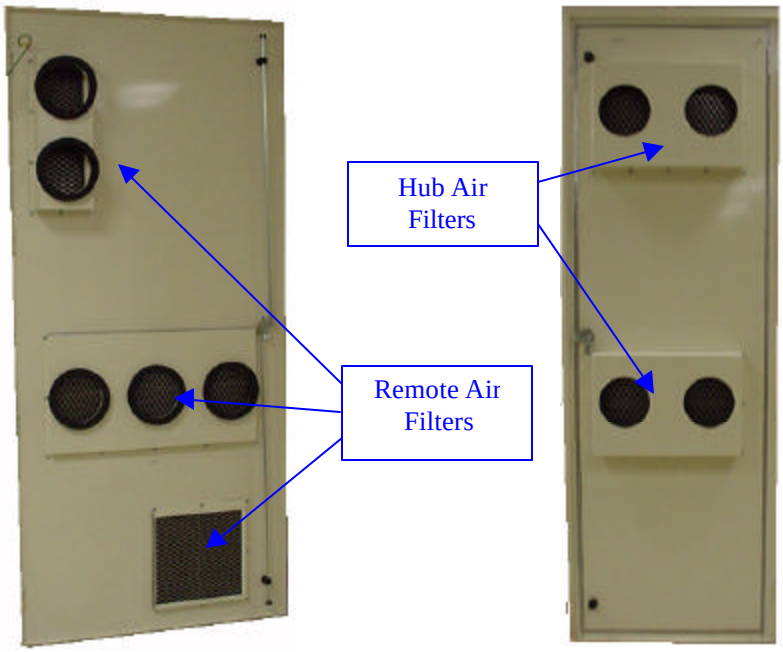



**Figure 4-1. Hub and Remote Inlet Filter Locations**

### *4.1.2 Equipment Connectors*

All equipment interface connections should be checked periodically to ensure that they are tight. Poor connections can cause additional signal loss, external interference or degradation of signal quality.

## 4.2 HUB SUBSYSTEM ASSEMBLY REPLACEMENT INSTRUCTIONS

### *4.2.1 TDMA HUB Card Cage Assembly Replacement Procedures*

The following procedure is provided for removing and replacing defective TDMA Card Cage Modules. Procedures are provided below for field replacement of the TDMA Card Cage Fans, LVPS, HTM, SPM, and DLM. Refer to Figure 4-2.

**WARNING**

The voltages and current levels present in the Subsystem enclosure are potentially lethal. This procedure requires work inside the enclosure. Use extreme caution to avoid coming into contact with the +12V and +8V at TDMA Card Cage Bus Bar. Whenever possible, disconnect the 115 Vac power input to the enclosure.

**ESD CAUTION**

The TDMA Card Cage contains circuit card assemblies (CCAs) that are sensitive to Electrostatic Discharge (ESD) damage. Whenever handling the TDMA Card Cage, use ESD precautionary procedures to minimize the risk of permanent ESD damage to the CCAs. Low relative humidity levels increase the potential for damage to ESD-sensitive devices.

#### 4.2.1.1 Card Cage Fan Replacement Procedure

This procedure is used to replace a defective TDMA Card Cage fan. It can be performed at any time without affecting call statistics. The TDMA Card Cage Fans aid convection through the card cage. In the Remote Enclosure, the uppermost fan exhausts warm air, while the lower fan intakes cool air. See Figure 4-2. In the Hub Enclosure, the TDMA Card Cage has been rotated left 90 degrees, putting the exhaust fan to the left and the intake fan to the right. For ease of installation, each fan has an airflow direction indicator visible on its shroud.

a. Remove white wires connected to 12V at TDMA Card Cage Bus Bar and observe Chassis fans cease to operate.

b. Remove 6 faceplate screws and swing panel out to expose fans.

c. Remove DC power wires from defective fan.

d. Locate and note which way the airflow direction indicator is pointing.

**WARNING**

Failure to install replacement fan in the correct airflow direction may damage modules that reside in the TDMA Card Cage. Such damage is **not** under warranty.

e. Remove 4 nuts which hold fan to panel and detach fan from TDMA Card Cage front panel.

f. Using the 4 nuts removed previously, fasten replacement fan on TDMA Card Cage front panel, ensuring the airflow direction indicator points as noted in step d.

g. Attach DC power wires to replacement fan as follows: BLACK WIRE = "- (BLACK)" TERMINAL; WHITE WIRE = "+ (RED)" TERMINAL.

h. Fasten Chassis fan panel to TDMA Card Cage using the 6 screws previously removed.

i. Reconnect previously disconnected white wires to 12V at TDMA Card Cage Bus Bar and observe that both Chassis Fans operate.

j. Package and return the defective TDMA Card Cage fan to seller for disposition.

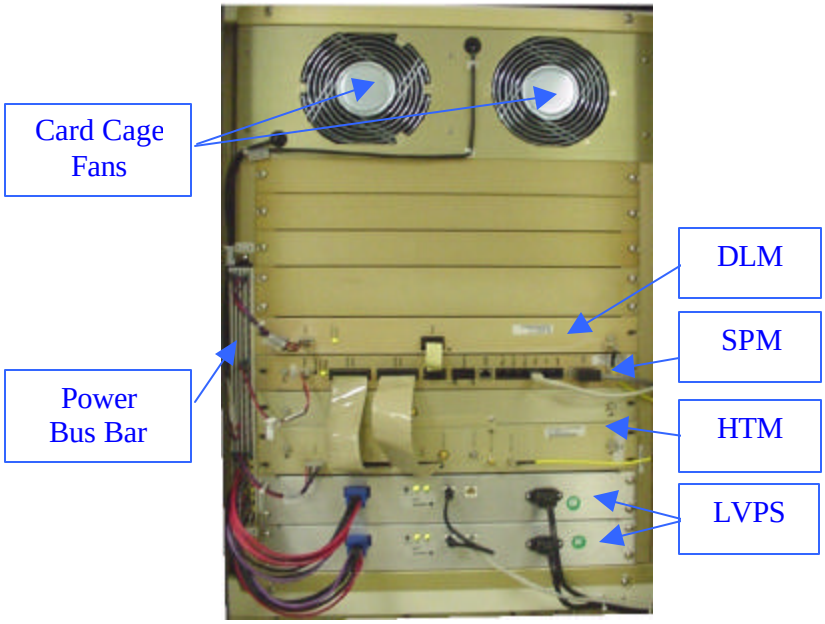



**Figure 4-2. Hub Subsystem TDMA Card Cage**

#### 4.2.1.2 Low Voltage Power Supply (LVPS) Replacement Procedure

This procedure contains instructions for removing a single defective Low Voltage Power Supply and installing a replacement. As the LVPS units are hot swappable and redundant, this procedure can be performed at any time without affecting call statistics. Refer to Figure 4-3.

a. Disconnect Low Voltage Power Supply AC power cable from AC IN (J4) of defective unit.

b. Remove four screws securing LVPS to TDMA Card Cage.

**WARNING**

Potentially dangerous High Voltage exists on the AC power cable to the Low Voltage Power Supply that could cause bodily injury or even death. Use extreme care and required safety precautions while working on the Low Voltage Power Supply and handling the AC power cable.

**NOTE**

The Low Voltage Power Supply is the only hot swappable unit in this system. To ensure continuous coverage, please follow the instructions below.

**NOTE**

Any attempt to repair the internal components of a Low Voltage Power Supply will void the warranty for the assembly. During the warranty period, a suspected defective Low Voltage Power Supply should be returned to the seller for replacement or repair.

c. Gripping the blue LV OUT connector (J1), pull the LVPS roughly one inch of the way out of the TDMA Card Cage.

d. Disconnect LVPS output power wiring harness from LV OUT (J1) of defective unit.

e. Remove LVPS from Card Cage, using care to avoid the output power harness of the remaining functional LVPS.

f. Ensure replacement LVPS is correctly identified as primary or redundant (for primary- red dipswitches 1-4 within the LVPS should be ON; for redundant- red dipswitch 1 should be OFF and 2-4 should be ON).

g. Secure replacement Low Voltage Power Supply to TDMA Card Cage using four screws previously removed.

h. Reconnect LVPS output power wiring harness to LV OUT (J1) of replacement unit.

i. Reconnect LVPS AC power cable to AC IN (J4) of replacement LVPS.

j. Package and return defective Low Voltage Power Supply to seller for disposition.


**Figure 4-3. Low Voltage Power Supply**

#### 4.2.1.3 Hub Transceiver Module (HTM) Replacement Procedure

This procedure contains instructions for removing a defective HTM and installing a replacement unit. Refer to Figure 4-4.

**WARNING**

The voltages and current levels present in the Subsystem enclosure are potentially lethal. This procedure requires work inside the enclosure. Use extreme caution to avoid coming into contact with the +24V at front of the HTM or on the Card Cage Bus Bar. Whenever possible, disconnect the 115 Vac power input to the enclosure.

**ESD CAUTION**

The HTM contains a circuit card assembly (CCA) that is sensitive to Electrostatic Discharge (ESD) damage. Whenever handling the HTM, use ESD precautionary procedures to minimize the risk of permanent ESD damage to the CCA. Low relative humidity levels increase the potential for damage to ESD-sensitive devices.

**NOTE**

Any attempt to repair and/or break the seal to gain access to the internal components of a HTM assembly will void the HTM warranty. During the warranty period, a suspected defective HTM should be returned to the seller for replacement or repair.

a. Power down defective module by disconnecting AC IN (J4) from respective LVPS units at Card Cage.

b. Remove HTM power connection.

c. Tag locations of all other front panel cables as needed, and disconnect all front panel cables from HTM.

d. Remove six screws from front panel that secures HTM to Subsystem enclosure.

e. Remove HTM from TDMA Card Cage.

f. Slide replacement HTM into TDMA Card Cage guides.

g. Secure HTM to Card Cage using six screws previously removed.

h. Connect HTM power cable and all other previously disconnected cables to replacement HTM front panel.

i. Connect AC IN (J4) cables previously removed from LVPS to power up replacement module.

j. Verifiy HTM LED lights green within 1.5 minutes after power-up.

k. Package and return defective HTM to the seller for disposition.

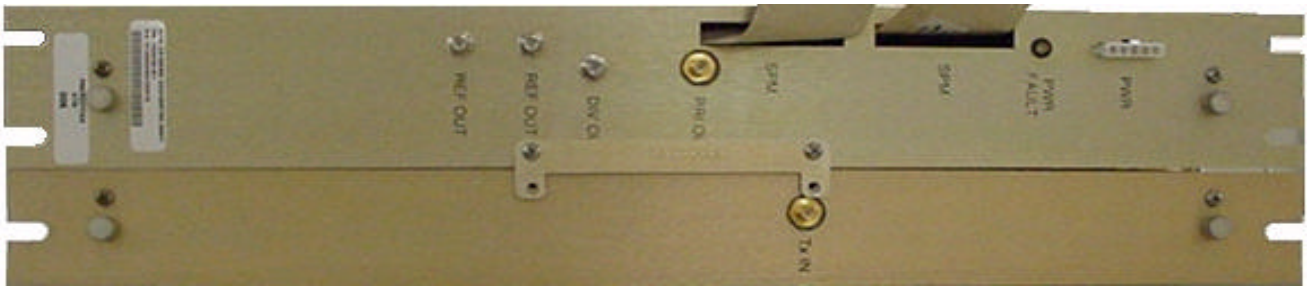



**Figure 4-4. HTM Front Panel**

#### 4.2.1.4 Signal Processing Module (SPM) Replacement Procedure

This procedure contains instructions for removing and replacing a SPM. Refer to Figure 4-5.

**NOTE**

Any attempt to repair the internal components of an SPM will void the warranty for the assembly. During the warranty period, a suspected defective SPM should be returned to the seller for replacement or repair.

a. If possible, record all SPM parameters before shutting down defective unit. Refer to SEM/HUI User Manual for a complete command set and parameter list.

b. If HUI software session is logged into target SPM, perform logout procedure outlined in SEM/HUI User Manual.

c. Power down defective module by disconnecting AC IN (J4) from respective LVPS units at Card Cage.

d. Label front panel cable locations as needed, and disconnect all front panel cables from SPM.

e. Loosen two captive screws securing SPM to TDMA Card Cage and remove SPM.

f. Guide replacement SPM onto TDMA Card Cage track.

g. Install two captive screws to secure replacement SPM to Card Cage assembly.

h. Connect all previously removed front panel cables to replacement SPM assembly.

i. Connect AC IN (J4) cables previously removed from LVPS to power up replacement module.

j. Verify SPM LED lights within 1.5 minutes after power-up.

k. Perform login procedure per instructions found in SEM/HUI User Manual.

l. Change IP Addresses of replacement SPM to that of original SPM using procedure found in TransCell 1900TM Installation Document #1000462.

m. Set all parameters of replacement SPM to settings of original SPM as recorded in step a. Refer to SEM/HUI User Manual for a complete command set and parameter list.

n. If removed SPM is considered defective, package and return to seller for disposition.

**Figure 4-5. SPM Front Panel**

#### 4.2.1.5 Data Link Module (DLM) Replacement Procedure

This procedure contains instructions for removing and replacing a DLM module. Refer to Figure 4-6.

**NOTE**

Any attempt to repair the internal components of a DLM will void the warranty for the assembly. During the warranty period, a suspected defective DLM should be returned to the seller for replacement or repair.

a. If HUI software session is logged into corresponding SPM, perform logout procedure outlined in SEM / HUI User Manual.

b. Power down defective module by disconnecting AC IN (J4) from respective LVPS units at Card Cage.

c. Label front panel cable locations as needed, and disconnect all front panel cables from DLM.

d. Loosen two captive screws securing DLM to TDMA Card Cage.

e. Gently remove DLM the TDMA Card Cage so as to expose the DLM TX/RX cable.

f. Remove DLM output cable from diplexer of defective DLM.

g. Configure replacement DLM for use in HUB by connecting RF-IN to CH 2 and RF OUT to CH 1. Refer to Figure 4-6.

h. Reconnect DLM output cable to diplexer of replacement DLM.

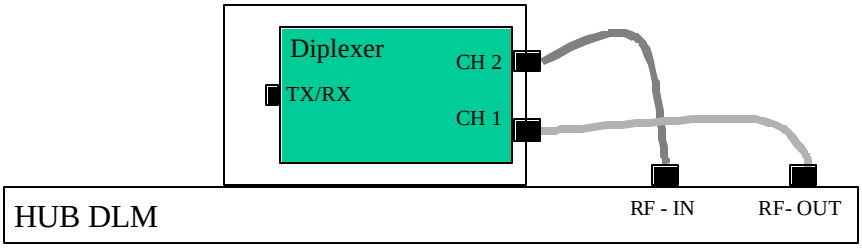
i. Guide replacement DLM onto slides in TDMA Card Cage.

j. Install two previously removed captive screws to secure replacement DLM to TDMA Card Cage.

k. Connect all previously removed front panel cables to replacement DLM assembly.

o. Connect AC IN (J4) cables previously removed from LVPS to power up replacement module.

l. If removed DLM is considered defective, package and return to seller for disposition.



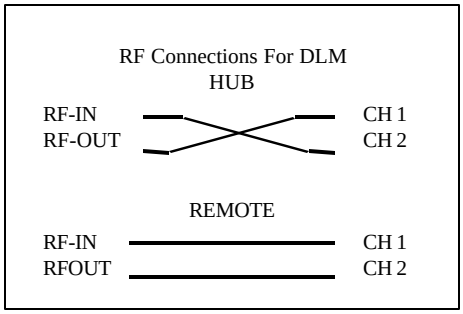




**Figure 4-6. DLM Diplexer Configuration, HUB**

### *4.2.2 Power/Surge Suppressor Strip Replacement Procedure*

This procedure contains instructions for removing a defective power/surge suppressor strip and installing a replacement. Refer to Figure 4-7.

**WARNING**

The voltages and current levels present in the Subsystem enclosure are potentially lethal. This procedure requires work inside the enclosure. Use extreme caution to avoid coming into contact with the 115 Vac. Whenever possible, disconnect the 115 Vac power inputs to the enclosure.

**CAUTION**

Removal of +115 Vac input to Hub Subsystem enclosure will cause all equipment to be inoperative during this procedure.

a. At rear of Subsystem enclosure, set 115 Vac power switch on defective power/surge suppressor strip to OFF.

b. Disconnect 115 Vac power/surge suppressor strip power cable from power source.

c. Disconnect individual 115 Vac power cables from power/surge suppressor strip rear outlets.

d. Cut tie-wrap securing power/surge suppressor strip power cable to Subsystem enclosure.

e. Loosen and remove four screws securing defective power/surge suppressor strip to Subsystem enclosure.

f. Position and secure replacement power/surge suppressor strip to Subsystem enclosure with four screws previously removed.

g. With power/surge suppressor strip secured, connect 115 Vac power cables of individual assemblies to rear noise filtered (white) outlets.

h. Bundle power/surge suppressor strip power cable and secure it to Subsystem enclosure with a tie-wrap.

i. Reconnect replacement 115 Vac power/surge suppressor strip power cable to a power source.

j. Set +115 Vac power switch on replacement power/surge suppressor strip to ON.

k. Return Hub Subsystem to normal operation.

l. Package and return defective power/surge suppressor strip to seller for disposition.

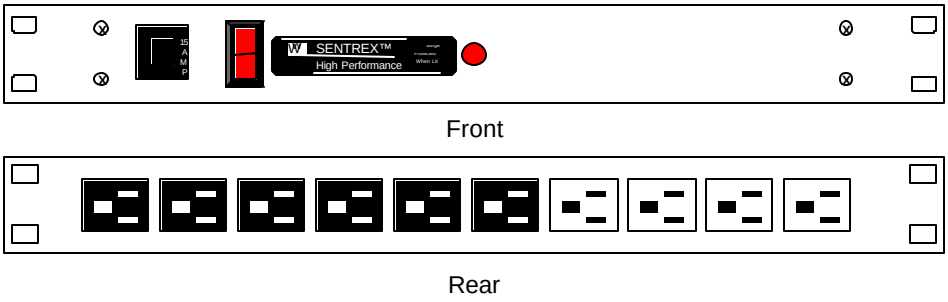



**Figure 4-7. Hub Power/Surge Suppressor Strip**

### *4.2.3 Hub Subsystem Enclosure Lightning Arrester Replacement Procedures*

The following procedure is provided for removing a defective Hub lightning arrester and installing a replacement. Normally, replacing only the arrester gas capsule repairs the PCS port lightning arrester (PN PTR7AFONF60SW). However, the DLM port lightning arrestor (PN QWSNA7A5.8K) does not have a removeable gas capsule. Therefore, additional procedures are provided for replacement of a complete lightning arrester of both the PCS and DLM port types.

#### 4.2.3.1 PCS Port Lightning Arrester Gas Capsule Replacement Procedure

a. Remove AC power to Hub Subsystem enclosure by setting Hub Power / Surge Supressor Strip switch to OFF.

b. Remove defective gas capsule holder from lightning arrester (PN PTR7AFONF60SW).

c. Remove defective gas capsule insert from holder.

d. Insert replacement gas capsule insert into holder. (PN 400-001-12.)

e. Insert replacement gas capsule insert into mounting hole of lightning arrester.

f. Tighten gas capsule holder nut with a minimum torque of 6 N-m (Newton meters) (4.43 ft-lb).

g. Apply AC power to Hub Subsystem enclosure by setting HUB Power / Surge Supressor Strip switch to ON.

#### 4.2.3.2 Lightning Arrester Replacement Procedure

a. Remove AC power to Hub Subsystem enclosure by setting HUB site Prime Power switch to OFF.

b. Disconnect inline equipment cables from defective lightning arrester.

c. Remove mounting nut and lock washer securing defective lightning arrester to Subsystem enclosure.

d. Remove defective lightning arrester from mounting hole on Hub Subsystem enclosure.

e. Insert replacement lightning arrester into mounting hole on Hub Subsystem enclosure and secure with supplied mounting nut and lock washer.

**NOTE**

The lightning arrestors used in the TransCell 1900 TM system are specifically tuned to each port's carrier frequency band. Be sure to use part number PTR7AFONF60SW when replacing PCS TX/RX Port Lightning Arresters, and part number QWSNA7A5.8K when replacing DLM TX/RX Port Lightning Arresters.

f. Tighten mounting nut on replacement lightning arrester with a minimum torque of 20 N-m (Newton meters) (25.8 ft-lb) to ensure appropriate contact resistance between body of lightning arrester and Subsystem enclosure.

g. Reconnect inline equipment cables to replacement lightning arrester.

h. Apply AC power to Hub Subsystem enclosure by setting HUB Power / Surge Supressor Strip switch to ON.

## 4.3 REMOTE SUBSYSTEM ASSEMBLY REPLACEMENT INSTRUCTIONS

### *4.3.1 TDMA Card Cage Assembly Replacement Procedures*

The following procedure is provided for removing and replacing defective TDMA Card Cage Modules. Procedures are provided below for field replacement of the LVPS, HTM, SPM, DLM, and TTAM. Refer to Figure 4-8.

**WARNING**

The voltages and current levels present in the Subsystem enclosure are potentially lethal. This procedure requires work inside the enclosure. Use extreme caution to avoid coming into contact with the +24V at TDMA Card Cage Bus Bar. Whenever possible, disconnect the 115 Vac power input to the enclosure.

**ESD CAUTION**

The TDMA Card Cage contains circuit card assemblies (CCAs) that are sensitive to Electrostatic Discharge (ESD) damage. Whenever handling the TDMA Card Cage, use ESD precautionary procedures to minimize the risk of permanent ESD damage to the CCAs. Low relative humidity levels increase the potential for damage to ESD-sensitive devices.

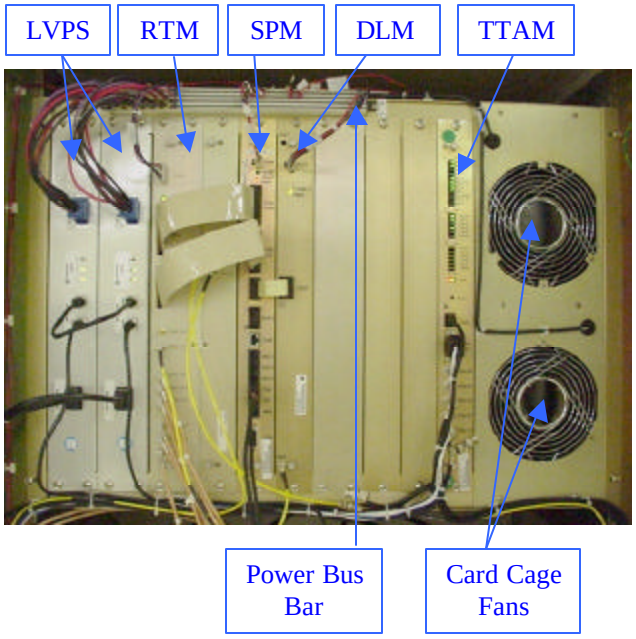



**Figure 4-8. Remote Subsystem TDMA Card Cage**

#### 4.3.1.1 Card Cage Fan Replacement Procedure

The procedure for replacement of a Remote Card Cage Fan is identical to the Hub Card Cage Fan replacement procedure. Refer to paragraph 4.2.1.1.

#### 4.3.1.2 Remote Low Voltage Power Supply Replacement Procedure

The procedure for replacement of the Remote Low Voltage Power Supply is identical to the Hub LVPS replacement procedure. Refer to paragraph 4.2.1.1.

#### 4.3.1.3 Remote Transceiver Module Replacement Procedure

This procedure contains instructions for replacing a defective RTM and installing a replacement unit. Refer to Figure 4-9 for the following procedure.

**WARNING**

The voltages and current levels present in the Subsystem enclosure are potentially lethal. This procedure requires work inside the enclosure. Use extreme caution to avoid coming into contact with the +5 and +15V at rear of the RTM or on the Backplane. Whenever possible, disconnect the 115 Vac power input to the enclosure.

**ESD CAUTION**

The RTM contains a circuit card assembly (CCA) that is sensitive to Electrostatic Discharge (ESD) damage. Whenever handling the RTM, use ESD precautionary procedures to minimize the risk of permanent ESD damage to the CCA. Low relative humidity levels increase the potential for damage to ESD-sensitive devices.

**NOTE**

Any attempt to repair and/or break the seal to gain access to the internal components of an RTM will void the warranty for the assembly. During the warranty period, a suspected defective RTM should be returned to the seller for replacement or repair.

a. Power down TDMA Card Cage using red switch provided at AC power bar/surge suppressor.

b. Label front panel cable locations as needed, and disconnect all front panel cables from defective RTM.

c. Remove six screws from front panel securing RTM to TDMA Card Cage.

d. While wearing a wrist strap connected to ground, remove HTM from TDMA Card Cage.

e. Slide replacement RTM into TDMA Card Cage guides.

f. Secure RTM to TDMA Card Cage using six screws previously removed.

g. Reconnect all cables to front panel of replacement RTM.

h. Power on TDMA Card Cage using red switch provided at AC power bar/surge suppressor.

i. Verify replacement RTM LED lights green within 1.5 minutes of power-up.

j. Package and return defective RTM assembly to seller for disposition.


**Figure 4-9. Remote Transceiver Module (RTM) Front Panel**

#### 4.3.1.4 Signal Processing Module (SPM) Replacement Procedure

The procedure for replacement of the Remote SPM is identical to the Hub SPM replacement procedure. Refer to paragraph 4.2.1.4.

#### 4.3.1.5 Data Link Module (DLM) Replacement Procedure

This procedure contains instructions for removing and replacing a DLM module. Refer to Figure 4-10.

**NOTE**

Any attempt to repair the internal components of a DLM will void the warranty for the assembly. During the warranty period, a suspected defective DLM should be returned to the seller for replacement or repair.

a. Power down defective module by disconnecting AC IN (J4) from respective LVPS units at Card Cage.

b. Label front panel cable locations as needed, and disconnect all front panel cables from DLM.

c. Loosen two captive screws securing DLM to TDMA Card Cage.

d. Gently remove DLM the TDMA Card Cage so as to expose the DLM TX/RX cable.

e. Remove DLM output cable from diplexer of defective DLM.

f. Configure replacement DLM for use in HUB by connecting RF-IN to CH 2 and RF OUT to CH 1. Refer to Figure 4-6.

g. Reconnect DLM output cable to diplexer of replacement DLM.

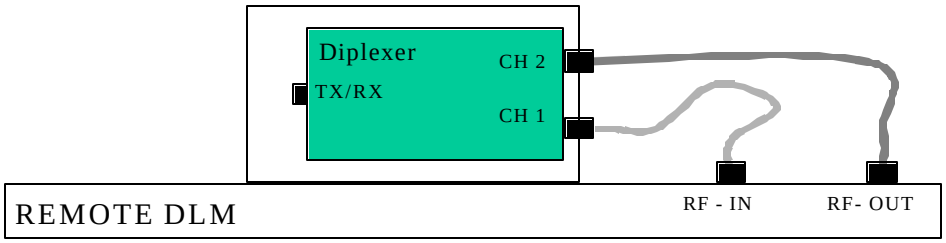
h. Guide replacement DLM onto slides in TDMA Card Cage.

i. Install two previously removed captive screws to secure replacement DLM to TDMA Card Cage.

j. Connect all previously removed front panel cables to replacement DLM assembly.

p. Connect AC IN (J4) cables previously removed from LVPS to power up replacement module.

k. If removed DLM is considered defective, package and return to seller for disposition.



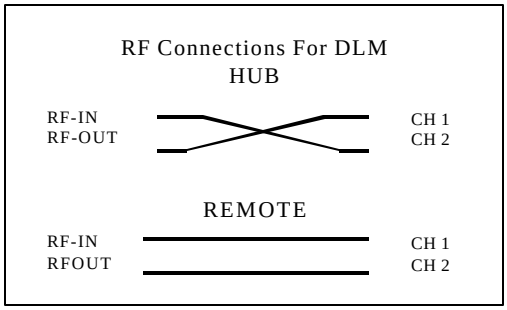




**Figure 4-10. DLM Diplexer Configuration, REMOTE**

#### 4.3.1.6 TTAM Replacement Procedure

This procedure contains the steps necessary to replace a defective Tower Top Alarm Module (TTAM). Refer to Figure 4-11.

**NOTE**

Any attempt to repair the internal components of a TTAM will void the warranty for the assembly. During the warranty period, a suspected defective TTAM should be returned to the seller for replacement or repair.

a. At the Remote 100-Amp Load Center, set the breaker labeled PDU (#3 and 5) to OFF.

b. Verify front panel LEDs extinguish on defective TTAM.

c. Remove all cables from TTAM front panel and label as necessary.

**CAUTION**

Be sure to completely unscrew PWR/STAT connector from TTAM faceplate, using a standard flat-head screwdriver, before pulling cable. Failure to do so will result in damage to the TTAM and void warranty.

d. Remove two screws securing TTAM to TDMA Card Cage.

e. Grasp thumbscrews and pull defective TTAM from TDMA Card Cage.

f. Secure replacement TTAM in vacant slot with two screws previously removed.

g. Replace all previously disconnected TTAM front panel connectors.

h. At the Remote 100-Amp Load Center, set the breaker labeled PDU (#3 and 5) to ON

i. Package and return defective TTAM to seller for disposition.

**Figure 4-11. TTAM Front Panel**

### *4.3.2 Remote Interface Tray Replacement Procedure*

The following procedure is provided for removing a defective Remote Interface Tray and installing a replacement. This module is replaced as a complete assembly. Refer to Figure 4-12.

**WARNING**

Potentially dangerous RF power levels exist at the Remote Interface Tray. Be sure to use caution and shut down RF Power Amplifiers when working on this module, as outlined in the procedure below. Before power-up, ensure all RF cables are firmly seated so as to remove the risk of radiated RF injury.

**NOTE**

Any attempt to repair will void the warranty for the assembly. During the warranty period, a suspected defective Remote Interface Tray should be returned to the seller for replacement or repair.

a. At Remote 100 Amp Load Center, set PDU circuit breakers (#3 & 5) to OFF and observe that green power indicator on each Power Amplifier Power Supply goes out and Power Amplifier Fan Assembly shuts down.

b. Label front panel cable locations as needed, and disconnect all front panel cables from defective Remote Interface Tray. Note that RX_1P / 1D through RX_3P / 3D need not be removed.

c. Label rear RX / TX cable locations as needed, and disconnect all 6 RX / TX N-type RF cables from their respective Bias Tees.

d. Remove four front plate capture screws and pull Remote Interface Tray from subsystem enclosure.

e. Affix replacement Remote Interface Tray to vacant slot using four front plate capture screws removed earlier.

f. Replace all front and rear RF and power cables. To remove the risk of radiated RF injury, ensure all RF cables are firmly seated.

g. At Remote 100 Amp Load Center, set PDU circuit breakers (#3 & 5) to ON and observe that green power indicator on each Power Amplifier Power Supply lights and Power Amplifier Fan Assembly operates.

h. Package and return defective Remote Interface Tray to seller for disposition.

**Figure 4-12. Remote Interface Tray Front Panel.**

### *4.3.3 Power/Surge Strip Replacement Procedure*

The procedure for replacement of the Remote Power/surge suppressor strip is identical to the Hub Power/surge suppressor strip replacement procedure. Refer to paragraph 4.2.2.

### *4.3.4 Remote Subsystem Lightning Arrester Replacement Procedures*

The following procedure is provided for removing a defective Remote lightning arrester and installing a replacement. Normally, replacing only the arrester gas capsule repairs the lightning arrester. However, procedures are also provided for replacement of a complete lightning arrester.

#### 4.3.4.1 Lightning Arrester Gas Capsule Replacement Procedure

a. Remove AC power to Remote Subsystem by setting main power circuit breakers (#2 and 4) to OFF.

b. Remove defective gas capsule holder from lightning arrester.

c. Remove defective gas capsule insert from holder.

d. Insert replacement 470V gas capsule insert (P/N 73Z-0-0-50) into holder.

e. Insert replacement gas capsule holder insert into mounting hole of lightning arrester.

f. Tighten gas capsule holder nut with a minimum torque of 6 N-m (Newton meters) (4.43 ft-lb).

g. Apply AC power to the Remote Subsystem by setting the main power circuit breaker (#2 & 4) to ON.

#### 4.3.4.2 Lightning Arrester Replacement Procedure

a. Remove AC power to Remote Subsystem by setting main power circuit breakers (#2 and 4) to OFF.

b. Disconnect inline equipment cables from defective lightning arrester.

c. Remove mounting nut and lock washer securing lightning arrester to Remote Subsystem enclosure.

d. Remove defective lightning arrester from mounting hole on Remote Subsystem enclosure.

e. Insert replacement lightning arrester into mounting hole on Remote Subsystem enclosure and secure with supplied mounting nut and lock washer.

**NOTE**

Ensure that gas capsule is 470V P/N 73Z-0-0-50.

f. Tighten mounting nut with a minimum torque of 20 N-m (Newton meters) (25.8 ft-lb) to ensure appropriate contact resistance between lightning arrester and Remote Subsystem enclosure.

g. Reconnect inline equipment cables to lightning arrester.

h. Apply AC power to Remote Subsystem by setting main power circuit breakers (#2 and 4) to ON.

### *4.3.5 Remote Transmitter Assembly Replacement Procedures*

The replacement procedures for the Remote Transmitter Assembly consist of instructions for removing a defective Remote Transmitter component/assembly and installing a replacement. Refer to Figure 4-13. The major components/assemblies that may require replacement are:

- Remote Transmitter Breaker Box Assembly
- Remote Transmitter Power Amplifier
- Remote Transmitter Fan Assembly

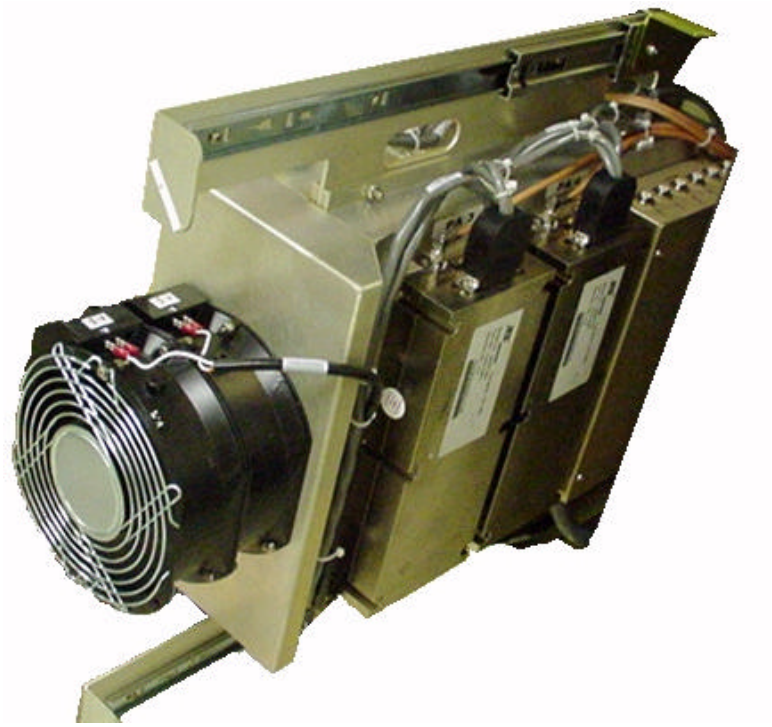


**Figure 4-13. Remote Transmitter Assembly**

**NOTE**

Any attempt to repair and/or break the seal to gain access to the internal components of an Remote Transmitter Assembly will void the warranty for the assembly. During the warranty period, a suspected defective Remote Transmitter Assembly should be returned to the seller for replacement or repair.

### 4.3.5.1 Remote Transmitter Breaker Box Replacement Procedure

This section includes procedures for replacing a Remote Transmitter Upper Panel and individual breakers. Refer to Figure 4-13.

#### 4.3.5.1.1 BREAKER BOX ASSEMBLY REPLACEMENT PROCEDURE

a. At the Remote 100-Amp Load Center, set the breaker labeled PDU (#3 and 5) to OFF.

b. After taking note of cable routing, remove power cables from each Transmitter that is serviced by the defective Transmitter Breaker Box.

c. Remove four screws securing Transmitter Breaker Box to Power Amplifier Rack and remove Transmitter Breaker Box.

d. Position replacement Transmitter Breaker Box and secure using four screws previously removed.

e. Reconnect power cables to each Transmitter that is serviced by the replacement Transmitter Breaker Box.

f. At the Remote 100-Amp Load Center, set the breaker labeled PDU (#3 and 5) to ON.

g. Package and return defective Transmitter Breaker Box to seller for disposition.

#### 4.3.5.1.2 TRANSMITTER BREAKER REPLACEMENT PROCEDURE

a. Follow procedure for removing the Transmitter Breaker Box as outlined in 4.3.5.1.1.

b. To open Transmitter Breaker Box, remove four screws capturing lid.

c. Remove wires from defective breaker, and unfasten ring nut located around breaker reset switch to remove breaker.

d. Since there are two breaker ratings employed by the Transmitter Breaker Box, ensure replacement breaker matches the rating of the breaker being replaced.

e. Orient replacement breaker so that the red number on the breaker switch reads in the same direction as the other existing breakers and insert replacement breaker into vacant hole.

f. Fasten replacement breaker using ring nut previously removed.

g. Fasten Transmitter Breaker Box lid using four screws previously removed.

h. Return Transmitter Breaker Box to original position using the procedure outlined in 4.3.5.1.1.

#### 4.3.5.2 Remote Transmitter Power Amplifier Replacement Procedure

This procedure contains instructions for removing a defective Remote Transmitter Power Amplifier and installing a replacement. Refer to Figure 4-13.

**NOTE**

Any attempt to repair and/or break the seal to gain access to the internal components of an Remote Transmitter Power Amplifier will void the warranty for the assembly. During the warranty period, a suspected defective Remote Transmitter Power Amplifier should be returned to the seller for replacement or repair.

i. At the Remote 100-Amp Load Center, set the breaker labeled PDU (#3 and 5) to OFF.

j. Disconnect RF input, RF output, power, and control cables from defective Power Amplifier.

k. When necessary, black plastic interlocks may be opened to slide target Power Amplifier further out of the enclosure than the Power Amplifier Rack normally allows, thereby gaining easier access.

**WARNING**

The Power Amplifier Rack is not designed to operate at maximum deflection. Removing the safety interlocks should be done with care, and the Power Amplifier Rack should never be deflected more than 4 inches past the interlocked point. Moving the Power Amplifier rack beyond this limit may result in personal injury and/or equipment damage.

**NOTE**

To open interlocks, push interlock levers down. Interlocks automatically close when rack is slid back into the enclosure.

l. While supporting Power Amplifier, remove six screws securing Power Amplifier to the Power Amplifier Rack.

m. Support replacement Power Amplifier while affixing it to the Power Amplifier Rack with the six screws removed previously.

n. Connect RF input, RF output, power, and control cables and slide Power Amplifier Rack back into enclosure.

o. At the Remote 100-Amp Load Center, set the breaker labeled PDU (#3 and 5) to ON.

p. Package and return defective Power Amplifier to seller for disposition.

#### 4.3.5.3 Transmitter Fan Assembly Replacement Procedure

This procedure contains instructions for removing a defective Remote Transmitter Fan Assembly and installing a replacement. The fan assembly is a stack of two fans working in tandem. Refer to Figure 4-13.

a. At the Remote 100-Amp Load Center, set the breaker labeled PDU (#3 and 5) to OFF.

b. Remove DC power wires (black and white) from defective fan assembly.

c. Remove four screws and lock nuts securing fan to Power Amplifier Rack, or to tandem fan.

d. Remove defective fan.

e. Position replacement fan on Power Amplifier Rack, or tandem fan, so the airflow direction indicator points into the enclosure, and secure replacement fan with four previously removed screws and lock washers.

**NOTE**

Transmitter Fan Assembly intakes air from the environment and pushes it through the Power Amplifier Rack for cooling purposes. Ensure that the airflow direction indicator on each fan points into the Power Amplifier Rack before operation. Improper fan installation may result in system degradation as Power Amplifiers heat up and shut down.

f. Reconnect DC power wires (black and white) to replacement fan.

g. At the Remote 100-Amp Load Center, set the breaker labeled PDU (#3 and 5) to ON.

h. Package and return defective Fan assembly to seller for disposition.

### *4.3.6 Remote Power Amplifier Power Supply (PAPS) Replacement Procedure*

This procedure contains instructions for removing a defective Remote Power Amplifier Power Supply and installing a replacement. These modules are redundant and can therefore be hot-swapped without affecting service. Refer to Figure 4-14.

a. Locate defective PAPS module at the bottom of the Remote Subsystem Chassis. The PAPS modules are numbered from the left, 1 through 4.

**WARNING**

Potentially dangerous High Voltage exists in the power cable to the Power Amplifier Power Supply that could cause bodily injury or even death. Use extreme care and required safety precautions while working with the Power Amplifier Power Supply.

**NOTE**

Any attempt to repair and/or break the seal to gain access to the internal components of a Power Amplifier Power Supply will void the warranty for the assembly. During the warranty period, a suspected defective Power Amplifier Power Supply should be returned to the seller for replacement or repair.

b. Disconnect power-I/O cable from front panel of PAPS.

c. Unfasten hand screws securing PAPS Retaining Bar to Remote Chassis and remove PAPS Retaining Bar.

d. Remove defective PAPS.

e. Insert replacement PAPS in vacant slot and re-fasten PAPS Retaining Bar with previously removed hand screws.

f. Reconnect power-I/O cable to front panel of replacement PAPS

g. Package and return defective Transmitter Power Supply to seller for disposition.

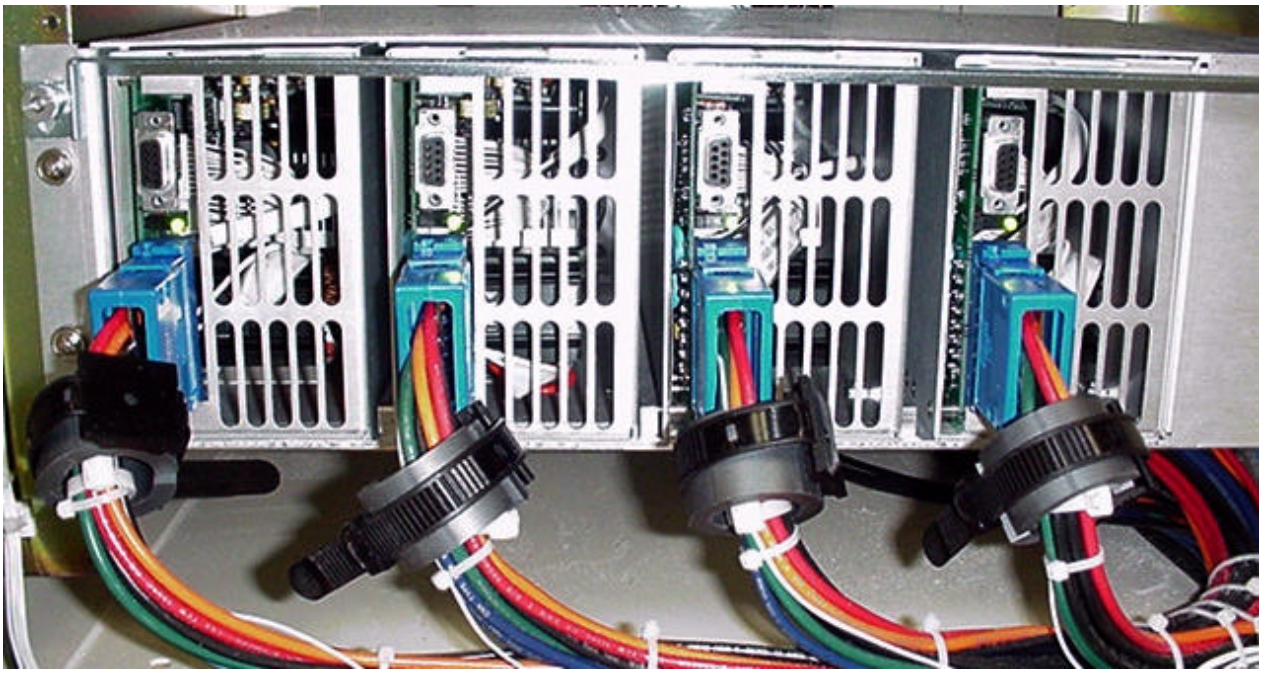


**Figure 4-14. Power Amplifier Power Supply**

## 4.4 TROUBLESHOOTING

Troubleshooting the TDMA-Over-Microwave System hardware consists of using the alarm messages, displayed at the SEM monitor, as an aid to fault isolating to the defective unit. See Table 4-3 for alarm list and corrective actions.

### *4.4.1 Reverse and Forward Link System Power Levels*

The following Subsystem acceptance test power levels are provided for reference purposes, as an aid to verifying TDMA-Over-Microwave System performance following a repair or other maintenance action.

**Table 4-1. Subsystem Acceptance Test Power Levels**

| Hub Subsystem | Parameter Value | Comment |
|---|---|---|
| HTM Forward Input Power | -18 +1, -4 dBm | |
| HTM Primary Power Output Level | -39 ± 3 dBm | -50 dBm input at PCS antenna. |
| HTM Diversity Power Output Level | -39 ± 3 dBm | -50 dBm input at PCS antenna. |
| SPM Forward Output Power Level | 3.0 ± 3 dBm | Measured via HUI software. |
| PRX Output Power Level | -42 ± 3 dBm | -50 dBm input at PCS antenna. |
| DRX Output Power Level | -42 ± 3 dBm | -50 dBm input at PCS antenna. |
| H-Tx Output Power Level | 27 ± 3 dBm @ ISM Band Frequencies | Measured at H-Rx/Tx Lightning Arrester on Hub Enclosure |
| V-Tx Output Power Level | 27 ± 3 dBm @ ISM Band Frequencies | Measured at V-Rx/Tx Lightning Arrester on Hub Enclosure |
| H-Rx Output Power Level | 27 ± 3 dBm @ ISM Band Frequencies | Measured at H-Rx/Tx Lightning Arrester on Hub Enclosure |
| V-Rx Output Power Level | 27 ± 3 dBm @ ISM Band Frequencies | Measured at V-Rx/Tx Lightning Arrester on Hub Enclosure |
| **Remote Subsystem** | **Parameter Value** | **Comment** |
| RTM – PRI Input Power Level | -29 dBm ± 3 dBm | -50 dBm input at PCS antenna. |
| RTM – DIV Input Power Level | -29 dBm ± 3 dBm | -50 dBm input at PCS antenna. |
| SPM – PRI RX Power Level | 6 ± 3 dBm | Measured via HUI software, -50 dBm input at PCS antenna. |
| SPM – DIV RX Power Level | 6 ± 3 dBm | Measured via HUI software, -50 dBm input at PCS antenna. |
| H-Tx Data Link Signal Power Level | 27 ± 3 dBm @ ISM Band Frequencies | Measured at H-Rx/Tx Lightning Arrester on Remote Enclosure |
| V-Tx Data Link Signal Power Level | 27 ± 3 dBm @ ISM Band Frequencies | Measured at V-Rx/Tx Lightning Arrester on Remote Enclosure |
| H-Rx Data Link Signal Power Level | 27 ± 3 dBm @ ISM Band Frequencies | Measured at H-Rx/Tx Lightning Arrester on Remote Enclosure |
| V-Rx Data Link Signal Power Level | 27 ± 3 dBm @ ISM Band Frequencies | Measured at V-Rx/Tx Lightning Arrester on Remote Enclosure |
| Power Amplifier Output Power Level | 48 ± 2 dBm @ PCS Frequencies | Measured via HUI software. |
| Power Amplifier Input Power Level | -1 ± 2 dBm @ PCS Frequencies | Measured via HUI software. |

### *4.4.2 Alarms*

Alarms are system messages that alert the operator about conditions that may be affecting system performance, and they serve as the impetus for taking appropriate corrective action. Alarms are determined by the Hub-Remote Pairs (HRPs) from the detected faults generated by the Hub and Remote hardware.

The SPM in each Hub and Remote Subsystem acts as the HRP fault manager, monitoring the respective equipment for conditions that are out of normal operating limits. Faults are filtered and/or correlated by the SPM to generate alarms. All faults are monitored and logged by the HRPs. The alarms are then reported to the MSC via the SEM workstation.

Current alarms can also be gathered on site using the HRP User Interface software. By logging into the local SPM via the HUI, the user is able to retrieve active alarms by typing `GET LOCALSPM OPENALMS`.

#### 4.4.2.1 Software Fault Detection

The SPMs in the Hub and Remote Subsystems perform fault detection on a scheduled basis. The software in the SPM monitors for new fault occurrences and absence of previous occurrences. New faults are analyzed to determine if a new alarm should be generated. The non-repetition of previously detected faults results in the closing of one or more active alarms. Each TransCell 1900TM modulel has a hexidecimal fault bitmask which can be modified to disable certain faults at a module level. However, this practice is not recommended. See Table 4-2 for a complete bitmask list. If an alarm activity must be disabled, it is recommended that it is disabled usint the alarm number via the HUI. Refer to SEM/HUI User's Guide. The Hub and the Remote alarm statuses are reported to the SEM workstation through messages in SPM command language format.

The Hub and Remote Subsystems are equipped with hardware watchdog timers. If the software does not reset the watchdog timer during a preset time period, the watchdog timer times out and issues a hardware reset to the Hub and Remote SPM processors.

**Table 4-2 Fault Bitmasks by Module**

| Module | BIT | Fault |
|---|---|---|
| LVPS | [0] | 8 Volt Fault for both Prim/Red |
| | [1] | 12 Volt Fault for both Prim/Red |
| | [2] | Lost AC Fault for both Prim/Red |
| | | |
| PAPS | [0] | **Comms loss fault** |
| | | |
| TTAM | [0] | 3 dB Loss |
| | [1] | >=6 dB Loss |
| | [2] | Power Disabled |
| | [3] | DC Power |
| | [4] | Battery backup |
| | | |
| SPM | [0] | Too Hot |
| | [1] | Too Cold |
| | [2] | No Comms |
| | | |
| Power Amp | [0] | Over Temperature Fault |
| | [1] | Input Over Power Fault |
| | [2] | Output Over Power Fault |
| | [3] | Over Voltage Fault |
| | [4] | Under Voltage Fault |
| | [5] | Output VSWR Fault |
| | [6] | Low Gain Fault |
| | [7] | High Gain Fault |
| | [8] | Warmup Period Fault |
| | [9] | Reset Indication Fault |
| | [10] | Spare 2 |
| | [11] | Spare 3 |

| | | | |
|---|---|---|---|
| | [12] | Spare 4 | |
| | [13] | Spare 5 | |
| | [14] | Spare 6 | |
| | [15] | Spare 7 | |
| | [16] | AA Over Temperature Fault | |
| | [17] | AA Input Over Power Fault | |
| | [18] | AA Output Over Power Fault | |
| | [19] | AA Over Voltage Fault | |
| | [20] | AA Under Voltage Fault | |
| | [21] | AA Output Reduction 1 | |
| | [22] | AA Output Reduction 2 | |
| | [23] | AA Output Reduction 3 | |
| | [24] | Version Check Fault | |
| | [25] | Disabled Fault | |
| | [26] | CONT DCCH Input Fault | |
| | [27] | CONT DCCH Output Fault | |
| | | | |
| DLM | [0] | Out of Lock Fault | |
| | [1] | High BER Fault | |
| | [2] | No I2C Comms Fault | |
| | [3] | PLL 24 TX Unlock Fault | |
| | [4] | PLL 24 RX Unlock Fault | |
| | [5] | PLL 58 TX Unlock Fault | |
| | [6] | PLL 58 RX Unlock Fault | |
| | [7] | PLL 44 Unlock Fault | |
| | [8] | Prism Init Fault | |
| | [9] | Baseband TX Init Fault | |
| | [10] | Baseband RX Init Fault | |
| | [11] | Loopback Good Fault | |
| | [12] | Loopback Bad Fault | |
| | [13] | Low Output Power Fault | |
| | [14] | High Output Power Fault | |
| | [15] | Output Power Out Fault | |
| | [16] | Autosync Disabled Fault | |
| | | | |
| HTM | [0] | No I2C Comms Fault | |
| | [1] | 203_0 Fault | 17000 PLLs (Main AND Backup) |
| | [2] | 203_1 Fault | 173 PLL |
| | [3] | 204 Fault | 1700 PLL (Main OR Backup) |
| | [4] | 213_0 Fault | 1700 PLL (Prim AND Div Upper) |
| | [5] | 213_1 Fault | 1700 PLL (Prime AND Div Lower) |
| | [6] | 213_2 Fault | 224 PLL |
| | [7] | 213_3 Fault | 255 PLL |
| | [8] | 214_0 Fault | 1700 PLL (Prime OR Div Upper) |
| | [9] | 214_3 Fault | 1700 PLL (Prime OR Div Lower) |
| | [10] | 215_0 Fault | 44 PLL |
| | [11] | 215_1 Fault | ALL HTM PLLs |
| | [12] | 261_HI Fault | High Temp |
| | [13] | 261_LO Fault | Low Temp |

| | | | |
|---|---|---|---|
| | [14] | Prim Test Tone Fault | |
| | [15] | Div Test Tone Fault | |
| | | | |
| RTM | [0] | No I2C Comms Fault | |
| | [1] | 303_0 Fault | 1700 PLL (All Forward) |
| | [2] | 303_1 Fault | 224 PLL |
| | [3] | 304 Fault | 1700 PLL (Some Forward) |
| | [4] | 313_0 Fault | 1700 PLL (Prime AND Div) |
| | [5] | 313_1 Fault | 173 PLL |
| | [6] | 314 Fault | 1700 PLL (Prim OR Div) |
| | [7] | 315_0 Fault | 44 MHz PLL |
| | [8] | 315_1 Fault | All RTM PLLs |
| | [9] | 361_HI Fault | High Temp |
| | [10] | 361_LO Fault | Low Temp |
| | [11] | No Acceptable Freq Plan Fault | |
| | [12] | Check DCCH Fault | |
| | | | |
| RAGC | | | |

#### 4.4.2.2 Alarm Displays

The user interface at the SEM workstation displays both new and closed alarms. A user is able to view all active (open) alarms via the Active Alarms display. The Logged Alarms display can be used to view a single alarm file or the last 400 logged (closed) alarms in chronological order. The severity of the alarms is categorized using the following color-coding scheme:

- Red: Critical Alarm - Loss of service on multiple HRPs
- Yellow: Major Alarm - Loss of service on a single HRP
- Blue: Minor Alarm - Possible loss of service in the near future and/or degradation in performance
- White: Informational/Other - Abnormal event detected, not currently affecting service
- Green: Unalarmed - No alarms detected

#### 4.4.2.3 Alarm Reporting

Alarms (both new and closed alarms) are reported on an unsolicited basis. Alarm events are reported to the SEM via TCP/IP from the SPM. Alarm events are reported to the MSC via TCP/IP from the SEM Alarm Port. The alarm format is shown below and each format element is described in Table 4-.

<HRPID><\t><DATE><space><TIME><\t><STATUS><\t><ALARM NUMBER><\t><ALARM NAME><\t><FAULT NUMBER><\t><ALARM DETAILS><\t><SEVERITY><\t><CARRIER ID><\t><CLOSABLE><\t><IP ADDRESS>

**Table 4-3. Alarm Format Description**

| Format Element | Description |
|---|---|
| <HRP_ID> | User configurable text string (1-31 characters) |
| <\t> | Tab character |
| <DATE> | Date in MM/DD/YYYY format (MM = month(1-12), DD = day(1-31), YYYY = 4 digit year) |
| <space> | Space character |
| <TIME> | 24 hour time code, HH:MM:SS, HH = 00-23 hours, MM = 0-59 minutes, SS = 0-59 seconds, GMT |
| <STATUS> | Status of alarm, either NEW or CLOSED |
| <ALARM#> | Unique number assigned to each alarm |
| <ALARM_NAME> | Unique text string for each alarm |
| <Fault #> | Used for sub-element identification, such as primary / diversity #1-3 TTA in the TTAM |
| <DETAILS> | 0-127 character string specifying the reason for the alarm |
| <SEVERITY> | Alarm severity, CRITICAL, MAJOR, MINOR or INFO |
| <CARRIER ID> | Designated which HRP carrier the fault originated from (1-6) |
| <CLOSEABLE> | Indicates whether or not the alarm is manually (user) closeable |
| <IP ADDRESS> | IP address of SPM sending the alarm |
| <cr> | Carriage return |
| <lf> | Line feed |

#### 4.4.2.4 Alarm Logging

The SEM software logs alarm events to disk via a database. All alarms are time stamped. The format of a logged alarm is equivalent to that of the alarm message discussed in section 4.4.2.3. For details on alarm database utilities and functionality, see SEM / HUI User Manual.

#### 4.4.2.5 Alarm Closing

The TransCell 1900TM system employs many autonomous functions in an effort to rectify alarm conditions. When an alarm condition is no longer occurring, the HRP will auto-close the corresponding alarm. The exception to this model is the case where one-shot alarms are generated. One-shot alarms report a condition that is either rectified prior to or as part of the reporting process, or a condition that cannot be determined by a thirty second cycle. If these alarms were allowed to auto-close, they would only be active for one cycle, potentially escaping detection by the SEM operator. Therefore, to facilitate the operator's awareness of potential issues, these one-shot alarms are "user-closeable" alarms. Except in the case of continuity alarms, user-closeable alarms do not auto-close. Alarms with "Continuity" included in their details will close if the next continuity cycle produces no errors. For more information on continuity cycles, see paragraphs 3.6.1.4 and 3.6.1.5. The SEM operator may close any user-closeable alarm after taking the appropriate action, as necessary, to resolve the issue. To close an alarm, select its entry in the SEM active alarm window and click on the "close" button which appears below the active alarm list. The following criteria define a User-Closeable Alarm:

- All alarms/warnings which include the word "Continuity" in their details section.
- All HUB_SPM_PROCESSOR_WARNINGs
- All REM_SPM_PROCESSOR_WARNINGs

#### 4.4.2.6 Alarm List

Table 4-3 provides a list of alarm messages associated with faults detected in the HRP. The description of each alarm includes:

- *Alarm Number* – Alarm identification number
- *Severity* - see paragraph 4.4.2.2
- *Alarm Name* – Module interface specific alarm name
- *Alarm Details* – the cause of the alarm or other details
- *Corrective Action* – Suggested corrective action.

**NOTE**

If corrective action outlined in Table 4-4 does not solve alarm issue, contact Transcept Technical Support. Transcept Technical Support contact sheet included with documents provided at time of installation.

Whenever module power cables or communications cables are replaced or tightened, cycle power at the corresponding TDMA Card Cage.

## Table 4-4. HRP Alarm Messages and Corrective Action

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 101 | | SEM_COMMS_ALARM | "No heartbeat from all HRPs" | This alarm occurs when the SEM fails to communicate with all active HRPs for a user configurable amount of time.<br><br>Check physical network connection to SEM. If connected, follow actions for alarm 102. |
| 102 | | HUB_COMMS_ALARM | "No heartbeat from HUB" | This alarm occurs when the SEM fails to communicate with some (not all) HRPs for a user configurable amount of time.<br><br>Check network connection by pinging alarming HUB IP from SEM. If successful, telnet into target HUB and type "ps". If "executive" does not appear in right-hand column, type "exec-primer" at prompt. If "executive" is present, type "sync" and "reboot" at prompt. If initial ping not successful, ping router assigned to HUB. If router responds, commercial AC power is likely lost at HUB site. Double check router table at corresponding router before visiting HUB site. If upon visitation, power is available at HUB site, call Transcept Tech Support. |
| 103 | | SEM_PROCESSOR_WARNING | "Unsolicited Reset" | This alarm occurs when the SEM is not shutdown properly because AC power was lost at the SEM site.<br><br>If this Warning reoccurs often, check SEM AC Line Cord. Call Transcept Tech Support with any known events taking place at SEM immediately prior to this warning. |
| | | | "Watchdog Timeout" | This alarm occurs when the SEM software fails to communicate with the watchdog software utility and the utility automatically resets the SEM software. |
| 201 | Major | HUB_HTM_FORWARD_INPUT_ALARM | "Fwd Continuity - Input Test Failed (Main AND Backup)" | This alarm occurs when both the main and backup forward RF paths fail the HTM forward input test.<br><br>Replace HTM. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 202 | Minor | HUB_HTM_FORWARD_INPUT_WARNING | "Fwd Continuity - Input Test Failed (Main)" | This alarm occurs when either the Main or Backup forward RF path fails the HTM forward input test.<br><br>During Maintenance Window, replace HTM. |
| | | | "Fwd Continuity - Input Test Failed (Backup)" | This alarm occurs when either the Main or Backup forward RF path fails the HTM forward input test.<br><br>During Maintenance Window, replace HTM. |
| 203 | Major | HUB_HTM_FORWARD_OUTPUT_ALARM | "PLL 1700 (Main AND Backup) Out of Lock" | This alarm occurs when the 1700 MHz PLL used for each main and backup downconverter loses lock.<br><br>Attempt to retune the PLLs (reset htm); If remains, replace HTM. |
| | | | "PLL 173 Out of Lock" | This alarm occurs when the 173 MHz PLL used for both main and backup downconverters loses lock. Replace HTM<br><br>Attempt to retune the PLL (reset htm); If remains, replace HTM. |
| | | | "Fwd Continuity - Power Below Tolerance (Main AND Backup, All Carriers)" | Verify BTS DCCH output power is 10W and HRP DCCH channel setting is correct. If so, then replace HTM. |
| 204 | Minor | HUB_HTM_FORWARD_OUTPUT_ WARNING | "PLL 1700 (Main OR Backup) Out of Lock" | This alarm occurs when the 1700 MHz PLL used for the main or backup downconverter loses lock. Service is not impacted because the software utiliizes the one operating path<br><br>Attempt to retune the PLL (reset htm); If remains, during Maintenance Window, replace HTM. |
| | | | "Fwd Continuity - Power Below Tolerance (Main, All Carriers)" | Verify BTS DCCH output power is 10W and HRP DCCH channel setting is correct. If so, then during Maintenance Window, replace HTM. |
| | | | "Fwd Continuity - Power Below Tolerance (Backup, All Carriers)" | Verify BTS DCCH output power is 10W and HRP DCCH channel setting is correct. If so, then during Maintenance Window, replace HTM. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 213 | Major | HUB_HTM_REVERSE_OUTPUT_ALARM | "PLL (1700 MHz, Primary & Diversity Upper) Out of Lock" | This alarm occurs when the 1700 MHz PLL used for each Primary Upper band and Diversity Upper band upconverters loses lock. Note: If the channels in use do not fall in the upper half of the band, this alarm is does not indicate service is lost.<br><br>Attempt to retune the PLL (reset htm); If remains, replace HTM. |
| | | | "PLL (1700 MHz, Primary & Diversity Lower) Out of Lock" | This alarm occurs when the 1700 MHz PLL used for each Primary Lower band and Diversity Lower band upconverters loses lock. Note: If the channels in use do not fall in the lower half of the band, this alarm is does not indicate service is lost.<br><br>Attempt to retune the PLL (reset htm); If remains, replace HTM. |
| | | | "PLL (224 MHz) Out of Lock" | This alarm occurs when the 224 MHz PLL used for both Primary Upper band and Diversity Upper band upconverters loses lock. Note: If the channels in use do not fall in the upper half of the band, this alarm is does not indicate service is lost.<br><br>Attempt to retune the PLL (reset htm); If remains, replace HTM. |
| | | | "PLL (255 MHz) Out of Lock" | This alarm occurs when the 255 MHz PLL used for both Primary Lower band and Diversity Lower band upconverters loses lock. Note: If the channels in use do not fall in the lower half of the band, this alarm is does not indicate service is lost.<br><br>Attempt to retune the PLL (reset htm); If remains, replace HTM. |
| | | | "Rev Continuity - Power Below Tolerance (Primary AND Diversity, All Carriers)" | Replace HTM. If Alarm persists, replace SPM. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 214 | Minor | HUB_HTM_REVERSE_OUTPUT_ WARNING | “PLL (1700 MHz, PU or PL or DU or DL) Out of Lock” | This alarm occurs when the 1700 MHz PLL for Primary Upper, Primary Lower, Diversity Upper, or Diversity Lower upconverter loses lock.<br><br>Attempt to retune the PLL (reset htm); If remains, during Maintenance Window, replace HTM. |
| | | | "Rev Continuity - Power Below Tolerance (Primary)” | During Maintenance Window, replace HTM. If alarm persists, replace SPM during Maintenance Window. |
| | | | "Rev Continuity - Power Below Tolerance (Diversity)” | During Maintenance Window, replace HTM. If alarm persists, replace SPM during Maintenance Window. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 215 | Major | HUB_HTM_ALARM | "No Comms" | This alarm occurs when the SPM fails to communicate with the HTM.<br><br>Check HTM power cable and ribbon cables from HTM to SPM. If secure, verify LED is green at HTM front panel. If LED is green, check communications by logging into HRP and typing "GET HTM TEMP" at HUI command line. If no response is generated, or if LED is extinguished, replace HTM. After replacing HTM, if LED still extinguished, replace SPM. |
| | | | "DUC Starvation - 5 MHz OCXOs Need Calibration" | This alarm occurs when a digital upconverter (reverse path) has processed all its data and is waiting to receive data from the digital downconverter on the remote. This could happen if the 5 MHz reference clock at the hub is running faster than 5 MHz reference clock at the remote.<br><br>Replace HTM. |
| | | | "PLL (44MHz) Out of Lock" | This alarm occurs when the 44 MHz PLL loses lock. The 44 MHz clocks is used by the D/A and A/Ds.<br><br>Attempt to retune the PLL (reset htm); If remains, replace HTM. |
| | | | "All HTM PLLs Out of Lock"" | This alarm occurs when all PLLs within the HTM loses lock. This could happen if the 5 MHz reference is lost or needs calibration.<br><br>Attempt to retune the PLL (reset htm); If remains, replace HTM. |
| | | | "All Hub DLM PLLs Out of Lock" | This alarm occurs when all PLLs within the DLM loses lock. This could happen if the 5 MHz reference is lost or needs calibration.<br><br>Attempt to retune the PLL (reset htm); If remains, replace HTM. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 222 | Minor | HUB_SPM_FORWARD_INPUT_WARNING | "Fwd Continuity - Power Below Tolerance (Main)" | Verify BTS DCCH output power is 10W and HRP DCCH channel setting is correct. If so, then during Maintenance Window, replace HTM. If alarm persists, replace SPM during Maintenance Window. |
| | | | "Fwd Continuity - Power Below Tolerance (Backup)" | Verify BTS DCCH output power is 10W and HRP DCCH channel setting is correct. If so, then during Maintenance Window, replace HTM. If alarm persists, replace SPM during Maintenance Window. |
| 223 | Major | HUB_SPM_FORWARD_OUTPUT_ALARM | "Fwd Continuity - Power Below Tolerance (Main AND Backup, All Carriers)" | Verify BTS DCCH output power is 10W and HRP DCCH channel setting is correct. If so, then replace HTM. |
| 224 | Minor | HUB_SPM_FORWARD_OUTPUT_ WARNING | "Fwd Continuity - Power Below Tolerance (Main)" | Verify BTS DCCH output power is 10W and HRP DCCH channel setting is correct. If so, then replace HTM during Maintenance Window |
| | | | "Fwd Continuity - Power Below Tolerance (Backup)" | Verify BTS DCCH output power is 10W and HRP DCCH channel setting is correct. If so, then replace HTM during Maintenance Window |
| 231 | Major | HUB_SPM_REVERSE_INPUT_ALARM | "Rev Continuity - Power Below Tolerance (Primary AND Diversity, All Carriers)" | Check DLM ribbon cable. If secure, replace HUB SPM. |
| 232 | Minor | HUB_SPM_REVERSE_INPUT_WARNING | "Rev Continuity - Power Below Tolerance (Primary)" | During Maintenance Window, check DLM ribbon cable. If secure, replace HUB SPM. |
| | | | "Rev Continuity - Power Below Tolerance (Diversity)" | During Maintenance Window, check DLM ribbon cable. If secure, replace HUB SPM. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 243 | Minor | HUB_DLM_FORWARD_OUTPUT_ALARM | “PLL (5.8 GHz – Tx) Out of Lock” | This alarm occurs when the 5.8 GHz transmit PLL loses lock. This could happen if the 5 MHz reference from the HTM needs calibration or is lost OR there is a problem with the DLM. If only this alarm is displayed, odds are that it is a DLM issue.<br><br>Attempt to reset the DLM (reset dlm device). If remains, replace DLM. |
| | | | "PLL (2.4 GHz – Tx) Out of Lock” | This alarm occurs when the 2.4 GHz transmit PLL loses lock. This could happen if the 1 MHz reference from the SPM (which comes from the 44 MHz from HTM) is lost OR there is a problem with the DLM. If only this alarm is displayed, odds are that it is a DLM issue.<br><br>Attempt to reset the DLM (reset dlm device). If remains, replace DLM. |
| | | | "No Output Power” | This alarm occurs if all twelve (main and backup) carrier forward paths exhibit low output power during a forward continuity test.<br><br>Replace HTM. |
| | | | "Tx Baseband Init Failure” | This alarm occurs when, on startup or a reboot, the DLM baseband is not properly set up<br><br>Attempt to reboot the hub; if remains, replace DLM |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 244 | Minor | HUB_DLM_FORWARD_OUTPUT_ WARNING | “Output Power Below Tolerance” | This alarm will occur if the reported output power of DLM FWPOWER is less than 29.5 dBm.<br><br>If the data-link is out of lock, replace DLM immediately. Using the HUI, reduce DLM FWATTEN to achieve an output level of 31 dBm at the DLM. If the desired level cannot be achieved, or if the FWATTEN is set lower than 9, replace DLM during Maintenance Window. |
| | | | "Output Power Above Tolerance”” | This alarm occurs when the DLM FWPOWER is reported above 33.5 dBm.<br><br>If the data-link is out of lock, replace DLM immediately. Using the HUI, raise DLM FWATTEN to achieve an output level of 31 dBm at the DLM. If the desired level cannot be achieved, replace DLM during the Maintenance Window. |
| 251 | Major | HUB_DLM_REVERSE_INPUT_ALARM | “Data Link Out-Of-Lock” | This alarm occurs when the reverse path data link bit error rate is > 1.0e-3. If autosync is on, the software continues to attempt to lock up the link.<br><br>Check commercial AC power at REMOTE site. If, upon visitation, AC power is available at remote site, log into Remote SPM via the HUI and query data-link status. If dtat-link still unlocked, verify REMOTE DLM channels and attenuator settings are valid via the HUI. If HUI queries are “nacked”, replace REMOTE DLM ribbon and power cables and reboot SPM. If HUI queries are still “nacked”, replace DLM. Check for lock status after 1.5 minutes. If HUI queries are still “nacked”, replace SPM. Check for lock status after 1.5 minutes. If data-link is still unlocked, repeat procedure at the Hub site. If data-link is still unlocked after the Hub has been checked, it is probably either being jammed by another ISM-band operator, or the data-link antennae are out of alignment. Move the DLM channels, implement a 90 degree polarization shift (H-V), or re-align the data-link antennae. |
| | | | "PLL (2.4 GHz – Rx) Out of Lock” | This alarm occurs when the 5.8 GHz receive PLL loses lock. This could happen if the 5 MHz reference from the HTM needs calibration or is lost OR there is a problem with the DLM. If only this alarm is displayed, odds are that it is a |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | DLM issue.<br><br>Attempt to reset the DLM (reset dlm device). If remains, replace DLM. |
| | | | "PLL (5.8 GHz – Rx) Out of Lock" | This alarm occurs when the 2.4 GHz receive PLL loses lock. This could happen if the 1 MHz reference from the SPM (which comes from the 44 MHz from HTM) is lost OR there is a problem with the DLM. If only this alarm is displayed, odds are that it is a DLM issue.<br><br>Attempt to reset the DLM (reset dlm device). If remains, replace DLM. |
| | | | "Rx Baseban Init Failure" | This alarm occurs when, on startup or a reboot, the DLM baseband is not properly set up<br><br>Attempt to reboot the hub; if remains, replace DLM |
| 252 | Minor | HUB_DLM_REVERSE_INPUT_WARNING | "BER Above Tolerance" | This alarm occurs when the reverse path datalink bit error rate is > 1.0 e-5 (which equates to one bad header for every TBD total headers)<br><br>An occasional Warning of this type is no cause for concern. However, consistent warnings of this type indicate a poor DLM antenna alignment or degraded equipment. Check DLM RF cables. If secure, use HUI software to ensure DLM attenuators are set near the levels called out in the installation document. If Warnings still exist, use the opposite polarity (H - V) of the data-link antenna. If Warnings persist, replace DLM. If Warnings continue after DLM replacement, replace HTM. If Warnings persist, align data-link antennas. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 255 | Major | HUB_DLM_ALARM | "No Comms" | This alarm occurs when the SPM fails to communicate with the DLM.<br><br>From the SEM, ping IP of Alarming Hub. If successful, telnet into Hub and type "ps" to verify the "executive" is running. If "executive" does not appear in the right-hand column, copy /var/lib/exec.messages to /var/lib/bug.report, type "exec-primer", and call Transcept support line. |
| | | | "PLL (44 MHz) Out of Lock" | This alarm occurs when the 44 MHz DLM PLL loses lock.<br><br>Replace HUB DLM. |
| | | | "Loopback Failed" | This alarm occurs when, after 10 minutes of data link not locked, the self DLM loopback test indicates that the hub DLM was unable to lock on itself. This usually indicates an issue with the hub DLM.<br><br>Replace hub DLM |
| | | | "Remote Loopback Succeeded, Still Out-Of-Lock" | This alarm occurs when, after 10 minutes of data link not locked, the self DLM loopback test indicates that the remote DLM was able to lock on itself. This usually indicates an issue with the hub DLM. This alarm would really only be seen when checking remote alarms at the remote site via HUI software (get localspm openalms). Note: This alarm is generated by the remote, even though it is a hub alarm<br><br>Replace hub DLM |
| | | | "Prism Init Failure" | This alarm occurs when, on startup or a reboot, the DLM Prism chipset is not properly loaded<br><br>Attempt to reboot the remote; if remains, replace DLM |
| 256 | Minor | HUB_DLM_WARNING | "Autosync Disabled" | This alarm occurs when the autosync functionality is disabled at the hub.<br><br>Enable autosync via the HUI command line: "SET HUBDLM AUTOSYNC 1" |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 261 | Minor | HUB_HTM_TEMPERATURE_WARNING | "Temperature Above High Threshold" | This alarm occurs when the HTM indicates a temperature above 55deg C. The system might not work per specification.<br><br>Check and replace Hub Enclosure Fans as necessary. |
| | | | "Temperature Below Low Threshold" | This alarm occurs when the HTM indicates a temperature below –35deg C. The system might not work per specification. |
| 262 | Minor | HUB_SPM_TEMPERATURE_WARNING | "Temperature Above High Threshold" | This alarm occurs when the SPM indicates a temperature above 55deg C. The system might not work per specification.<br><br>Check and replace Hub Enclosure Fans as necessary. |
| | | | "Temperature Below Low Threshold" | This alarm occurs when the SPM indicates a temperature below –35deg C. The system might not work per specification. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 263 | | HUB_SPM_PROCESSOR_ALARM | "All SPM Forward Channels Failed" | This alarm occurs when, at startup or reboot, the software DDC manager fails to load all of the digital downconverters properly.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "All SPM Reverse Channels Failed" | This alarm occurs when, at startup or reboot, the software DUC manager fails to load all of the digital upconverters properly.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "FPGA Failure" | This alarm occurs when, at startup or reboot, the software fails to properly load the FPGA.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "Compander RAM Failure" | This alarm occurs when, at startup or reboot, the software fails to properly load the RAM compander.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "Unable To Load DDC Filter Files" | This alarm occurs when, at startup or reboot, the software is unable to properly load the digital downconverters. This alarm should be seen in conjunction with all SPM forward channels failed alarm.<br><br>Telnet into alarming SPM and verify /etc/6cmr/ddchub.r0 exist. If the file is absent, use FTP to transfer missing files from SPM software release disk provided at time of installation or upgrade. If the file exists, reinstall it via FTP from the latest SPM software release disk, type "sync" at the SPM prompt, and reboot the SPM. If problem still persists, replace SPM. |
| | | | "Disk Usage:" | This alarm occurs when the SPM disk utilization reaches 95%. This could happen if a logged file grows extraordinarily large or there is a problem with the flash. The odds of the executive software crashing in this condition are high.<br><br>Telnet into alarming SPM. Type "du /" and press RETURN. Identify the large file and either remove or FTP the file off |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | the flash. Otherwise, replace SPM. |
| 264 | | HUB_SPM_PROCESSOR_WARNING | "Unsolicited Reset"<br><br>“ | This alarm occurs when power is lost at the SPM or the watchdog utility crashes and the system is restarted. The most common excuse is simply that Commercial AC power was lost at the HUB site.<br><br>Close alarm at SEM. If Warning occurs frequently, check HUB SPM power cable and commercial power hookup.<br>Telnet into the alarming SPM and use FTP to retrieve /var/log/exec.messages.old. Close alarm at SEM. If this Warning persists, E-mail Transcept Tech Support, with the exec.messages.old log as an attachment, and replace SPM. |
| | | | "Watchdog Timeout” | This alarm occurs when the watchdog utility is unable to communicate with the executive software for a configurable amount of time (e.g., 60 seconds) and the system is restarted.<br><br>Save logged files and forward them on to Transcept for analysis. |
| | | | "Some SPM Forward Channels Failed: ", | This alarm occurs when, at startup or reboot, the software DDC manager fails to load some of the digital downconverters properly.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "Some SPM Reverse Channels Failed: | This alarm occurs when, at startup or reboot, the software DUC manager fails to load some of the digital upconverters properly.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "Disk Usage:" | This alarm occurs when the SPM disk utilization reaches 85%. This could happen if a logged file grows extraordinarily large or there is a problem with the flash.<br><br>Telnet into alarming SPM. Type “du /” and press RETURN. Identify the large file and either remove or FTP the file off the flash. Otherwise, replace SPM. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 265 | | HUB_LVPS_POWER_ALARM | "No Comms: " | This alarm occurs when the SPM fails to communicate with both the primary and redundant LVPS via the I2C.<br><br>Replace I2C cables at alarming HUB. |
| | | | "Failed: " | This alarm occurs when the 8V AND 12V fail for a particular LVPS.<br><br>Check AC line cord into LVPS J-4. If secure, replace LVPS. |
| 266 | | HUB_LVPS_POWER_WARNING | "Primary: " | This alarm occurs when the 8V or 12V fails for the primary LVPS.<br><br>Check AC line cord into LVPS J-4. If secure, replace LVPS. |
| | | | "Redundant: " | This alarm occurs when the 8V or 12V fails for the redundant LVPS.<br><br>Check AC line cord into LVPS J-4. If secure, replace LVPS. |
| | | | "No Comms: " | This alarm occurs when the SPM fails to communicate with either the primary or redundant LVPS.<br><br>Check I2C cables at alarming LVPS. If cables secure, remove LVPS and verify I2C address is correct. If address is correct, replace LVPS. Otherwise, set LVPS I2C address to correct value and re-install LVPS. |
| 303 | | REMOTE_RTM_FORWARD_OUTPUT_ ALARM | "PLL (1700 MHz, All Forward Channels) Out of Lock" | This alarm occurs when the 1700 MHz PLL for each of the six upconverters loses lock<br><br>Attempt to retune the PLLs (reset rtm); If remains, replace RTM. |
| | | | "Fwd Continuity - Power Below Tolerance (All Carriers)" | Verify HUB SPM forward output power is 3 dBm +/- 5 and HRP DCCH channel setting is correct. If so, then replace RTM. |
| | | | "PLL (224 MHz) Out of Lock" | This alarm occurs when the 224 MHz PLL used for all six upconverters loses lock. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | Attempt to retune the PLL (reset rtm); If remains, replace RTM. |
| 304 | | REMOTE_RTM_FORWARD_OUTPUT_ WARNING | "PLL (1700 MHz, Some Forward Channels) Out of Lock" | This alarm occurs when the 1700 MHz PLL for some of the six upconverters loses lock<br><br>Attempt to retune the PLLs (reset rtm); If remains, replace RTM. |
| | | | "Fwd Continuity - Power Below Tolerance" | This alarm occurs when the PA input power level is measured below tolerance on one or more HRP channels.<br><br>During Maintenance Window, replace the RF cable connecting RTM to alarming Power Amplifier. Using the CLI, verify PA FWPOWER input level is –1 +/- 3 dBm. If not, replace RTM. |
| 311 | | REMOTE_RTM_REVERSE_INPUT_ ALARM | "Rev Continuity - Noise Test Failed (Primary AND Diversity)" | *<This alarm is in the process of being defined>* |
| 312 | | REMOTE_RTM_REVERSE_INPUT_ WARNING | "Rev Continuity - Noise Test Failed (Primary)" | *<This alarm is in the process of being defined>* |
| | | | "Rev Continuity - Noise Test Failed (Diversity)" | *<This alarm is in the process of being defined>* |
| 313 | | REMOTE_RTM_REVERSE_OUTPUT_ ALARM | "PLL (1700, Primary AND Diversity) Out of Lock" | This alarm occurs when the 1700 MHz PLL for each of the Primary and Diversity downconverters loses lock<br><br>Attempt to retune the PLLs (reset rtm); If remains, replace RTM. |
| | | | "Rev Continuity - Power Below Tolerance (Primary AND Diversity, All Carriers)" | *<This alarm is in the process of being defined>* |
| | | | "PLL (173 MHz) Out of Lock" | This alarm occurs when the 173 MHz PLL for both the Primary and Diversity paths loses lock<br><br>Attempt to retune the PLLs (reset rtm); If remains, replace RTM. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 314 | | REMOTE_RTM_REVERSE_OUTPUT_ WARNING | "PLL (1700 MHz, Primary or Diversity) Out of Lock" | This alarm occurs when the 1700 MHz PLL for one of the Primary and Diversity downconverters loses lock<br><br>Attempt to retune the PLLs (reset rtm); If remains, replace RTM. |
| | | | "Rev Continuity - Power Below Tolerance (Primary, All Carriers)" | *<This alarm is in the process of being defined>* |
| | | | "Rev Continuity - Power Below Tolerance (Diversity, All Carriers)" | *<This alarm is in the process of being defined>* |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 315 | | REMOTE_RTM_ALARM | "No Comms" | This alarm occurs when the SPM fails to communicate with the RTM.<br><br>Check RTM power cable and ribbon cables from RTM to SPM. If secure, verify LED is green at RTM front panel. If LED is green, check communications by logging into HRP and typing "GET RTM TEMP" at HUI command line. If no response is generated, or if LED is extinguished, replace RTM. After replacing RTM, if LED still extinguished, replace SPM. |
| | | | "DUC Starvation - 5 MHz OCXs Need Calibration" | This alarm occurs when a digital upconverter (forward path) has processed all its data and is waiting to receive data from the digital downconverter on the hub. This could happen if the 5 MHz reference clock at the remote is running faster than 5 MHz reference clock at the hub.<br><br>Replace RTM. |
| | | | "PLL (44 MHz) Out of Lock" | This alarm occurs when the 44 MHz PLL loses lock. The 44 MHz clock is used by the D/A and A/Ds.<br><br>Attempt to retune the PLL (reset rtm); If remains, replace RTM. |
| | | | "All RTM PLLs Out of Lock" | This alarm occurs when all PLLs within the RTM loses lock. This could happen if the 5 MHz reference is lost or needs calibration.<br><br>Attempt to retune the PLL (reset rtm); If remains, replace RTM. |
| | | | "All Remote DLM PLLs Out of Lock" | This alarm occurs when all PLLs within the DLM loses lock. This could happen if the 5 MHz reference is lost or needs calibration.<br><br>Attempt to retune the PLL (reset rtm); If remains, replace RTM. |
| 321 | | REMOTE_SPM_FORWARD_INPUT_ ALARM | "Fwd Continuity - Power Below Tolerance (All Carriers)" | This alarm occurs if all twelve (main and backup) carrier forward paths exhibit low output power during a forward continuity test. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | Re-seat SPM-DLM ribbon cable and reboot SPM. If alarm persists, verify RTM TDMA channels are correct. If channels correct, replace SPM. If alarm still persists, replace DLM. If alarm continues, replace RTM. |
| 322 | | REMOTE_SPM_FORWARD_INPUT_ WARNING | "Fwd Continuity - Power Below Tolerance" | This alarm occurs if either main or backup carrier forward paths exhibit low output power during a forward continuity test.<br><br>Replace SPM at Maintenace Window. |
| 331 | | REMOTE_SPM_REVERSE_INPUT_ ALARM | "Rev Continuity – Power Below Tolerance (Primary and Diversity)" | This alarm occurs when no signal is detected at all SPM front end detectors on both primary and diversity paths(rev continuity)<br><br>Replace SPM. |
| 332 | | REMOTE_SPM_REVERSE_INPUT_ WARNING | "Rev Continuity - Power Below Tolerance (Primary)" | This alarm occurs when no signal is detected at some (not all) SPM front end detectors in primary path.<br><br>Replace SPM during Maintenance Window. |
| | | | "Rev Continuity - Power Below Tolerance (Diversity)" | This alarm occurs when no signal is detected at some (not all) SPM front end detectors in diversity path.<br><br>Replace SPM during Maintenance Window. |
| 333 | | REMOTE_SPM_REVERSE_OUTPUT_ ALARM | "Rev Continuity - Power Below Tolerance (Primary AND Diversity, All Carriers)" | This alarm accurs when no Test Tone detected on all remote SPM rev channels (rev continuity).<br><br>Replace SPM. |
| 334 | | REMOTE_SPM_REVERSE_OUTPUT_ WARNING | "Rev Continuity - Power Below Tolerance (Primary)" | This alarm occurs when no test tone detected on backend of some (but not all) remote SPM reverse primary channels (rev continuity).<br><br>Replace SPM. |
| | | | "Rev Continuity - Power Below Tolerance | This alarm occurs when no test tone detected on |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | (Diversity)" | backend of some (but not all) remote SPM reverse diversity channels (rev continuity) |
| 341 | | REMOTE_DLM_FORWARD_INPUT_ ALARM | "Data Link Out-Of-Lock" | This alarm occurs when the forward path data link bit error rate is > 1.0e-3. If autosync is on, the software continues to attempt to lock up the link. Note: this alarm would mostly be viewed if at the remote site and viewing alarms via the HUI through the ethernet port (get localspm openalms).<br><br>Upon visitation, verify REMOTE DLM channels and attenuator settings are valid via the HUI. If HUI queries are "nacked", replace REMOTE DLM ribbon and power cables and reboot SPM. If HUI queries are still "nacked", replace DLM. Check for lock status after 1.5 minutes. If HUI queries are still "nacked", replace SPM. Check for lock status after 1.5 minutes. If data-link is still unlocked, repeat procedure at the Hub site (if not already done). If data-link is still unlocked after the Hub has been checked, it is probably either being jammed by another ISM-band operator, or the data-link antennae are out of alignment. Move the DLM channels, implement a 90 degree polarization shift (H-V), or re-align the data-link antenna. |
| | | | "PLL (5.8 GHz - Rx) Out of Lock" | This alarm occurs when the 5.8 GHz receive PLL loses lock. This could happen if the 5 MHz reference from the RTM needs calibration or is lost OR there is a problem with the DLM. If only this alarm is displayed, odds are that it is a DLM issue.<br><br>Attempt to reset the DLM (reset dlm device). If remains, replace DLM. |
| | | | "PLL (2.4 GHz - Rx) Out of Lock" | This alarm occurs when the 2.4 GHz receive PLL loses lock. This could happen if the 1 MHz reference from the SPM (which comes from the 44 MHz from RTM) is lost OR there is a problem with the DLM. If only this alarm is displayed, odds are that it is a DLM issue.<br><br>Attempt to reset the DLM (reset dlm device). If remains, replace DLM. |
| | | | "Rx Baseband Init Failure" | This alarm occurs when, on startup or a reboot, the DLM baseband is not properly set up |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | Attempt to reboot the remote; if remains, replace DLM |
| 342 | | REMOTE_DLM_FORWARD_INPUT_ WARNING | "BER Above Tolerance" | This alarm occurs when the forward path data link bit error rate is > 1.0e-5<br><br>An occasional Warning of this type is no cause for concern. However, consistent warnings of this type indicate a poor DLM antenna alignment or degraded equipment. Check DLM RF cables. If secure, use HUI software to ensure DLM attenuators are set near the levels called out in the installation document. If Warnings still exist, re-align data link antennas. If Warnings persist, replace DLM. If Warnings continue after DLM replacement, replace RTM. |
| 353 | | REMOTE_DLM_REVERSE_OUTPUT_ ALARM | "No Power Output" | This alarm occurs if the DLM reports no transmit power.<br><br>Replace DLM. |
| | | | "PLL (5.8 GHz – Tx) Out of Lock" | This alarm occurs when the 5.8 GHz transmit PLL loses lock. This could happen if the 5 MHz reference from the HTM needs calibration or is lost OR there is a problem with the DLM. If only this alarm is displayed, odds are that it is a DLM issue.<br><br>Attempt to reset the DLM (reset dlm device). If remains, replace DLM. |
| | | | "PLL (2.4 GHz – Tx) Out of Lock" | This alarm occurs when the 2.4 GHz transmit PLL loses lock. This could happen if the 1 MHz reference from the SPM (which comes from the 44 MHz from HTM) is lost OR there is a problem with the DLM. If only this alarm is displayed, odds are that it is a DLM issue.<br><br>Attempt to reset the DLM (reset dlm device). If remains, replace DLM. |
| | | | "Tx Baseband Init Failure" | This alarm occurs when, on startup or a reboot, the DLM baseband is not properly set up<br><br>Attempt to reboot the hub; if remains, replace DLM |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 354 | | REMOTE_DLM_REVERSE_OUTPUT_ WARNING | "Output Power Below Tolerance" | This alarm will occur if the reported output power of DLM FWPOWER is less than 29.5 dBm.<br><br>If the data-link is out of lock, replace DLM immediately. Using the HUI, reduce DLM FWATTEN to achieve an output level of 31 dBm at the DLM. If the desired level cannot be achieved, or if the FWATTEN is set lower than 9, replace DLM during Maintenance Window. |
| | | | "Output Power Above Tolerance" | This alarm occurs when the DLM FWPOWER is reported above 33.5 dBm.<br><br>If the data-link is out of lock, replace DLM immediately. Using the HUI, raise DLM FWATTEN to achieve an output level of 31 dBm at the DLM. If the desired level cannot be achieved, replace DLM during the Maintenance Window. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 355 | | REMOTE_DLM_ALARM | "No Comms" | This alarm occurs when the SPM fails to communicate with the DLM.<br><br>From the SEM, ping IP of Alarming Hub. If successful, telnet into Hub and type "ps" to verify the "executive" is running. If "executive" does not appear in the right-hand column, copy /var/lib/exec.messages to /var/lib/bug.report, type "exec-primer", and call Transcept support line. |
| | | | "PLL (44 MHz) Out of Lock" | This alarm occurs when the 44 MHz DLM PLL loses lock.<br><br>Replace HUB DLM. |
| | | | "Loopback Failed" | This alarm occurs when, after 10 minutes of data link not locked, the self DLM loopback test indicates that the remote DLM was unable to lock on itself. This usually indicates an issue with the remote DLM. This alarm would be seen when checking remote alarms at the remote site via HUI software (get localspm openalms).<br><br>Replace DLM |
| | | | "Hub Loopback Succeeded, Still Out-Of-Lock" | This alarm occurs when, after 10 minutes of data link not locked, the self DLM loopback test indicates that the remote DLM was able to lock on itself. This usually indicates an issue with the remote DLM. Note: This alarm is generated by the hub, even though it is a remote alarm |
| | | | "Prism Init Failure" | This alarm occurs when, on startup or a reboot, the DLM Prism chipset is not properly loaded<br><br>Attempt to reboot the remote; if remains, replace DLM |
| 356 | Minor | REMOTE_DLM_WARNING | "Autosync Disabled" | Enable autosync via the HUI command line: "SET REMDLM AUTOSYNC 1" |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 361 | | REMOTE_RTM_TEMPERATURE_ WARNING | “Temperature Above High Threshold” | This alarm occurs when the HTM indicates a temperature above 55deg C. The system might not work per specification.<br><br>Check and replace Hub Enclosure Fans as necessary. |
| | | | "Temperature Below Low Threshold” | This alarm occurs when the HTM indicates an internal temperature below –35deg C. The system might not work per specification. |
| 362 | | REMOTE_SPM_TEMPERATURE_ WARNING | “Temperature Above High Threshold” | This alarm occurs when the SPM indicates a temperature above 55deg C. The system might not work per specification.<br><br>Check and replace Hub Enclosure Fans as necessary. |
| | | | "Temperature Below Low Threshold” | This alarm occurs when the SPM indicates a temperature below –35deg C. The system might not work per specification. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 363 | | REMOTE_SPM_PROCESSOR_ ALARM | "All SPM Forward Channels Failed" | This alarm occurs when, at startup or reboot, the software DUC manager fails to load all of the digital upconverters properly.<br><br>Attempt to reboot the remote; If remains, replace SPM. |
| | | | "All SPM Reverse Channels Failed" | This alarm occurs when, at startup or reboot, the software DDC manager fails to load all of the digital downconverters properly.<br><br>Attempt to reboot the remote; If remains, replace SPM. |
| | | | "FPGA Failure" | This alarm occurs when, at startup or reboot, the software fails to properly load the FPGA.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "Compander RAM Failure" | This alarm occurs when, at startup or reboot, the software fails to properly load the RAM compander.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "Unable To Load DDC Filter Files" | This alarm occurs when, at startup, reboot or attempting to change DDC filters via HUI, the software is unable to properly load the digital downconverters.<br><br>Telnet into alarming SPM and verify /etc/6cmr/ddcrmt31pri.r0, ddcrmt31div.r0, ddcrmt63pri.r0, ddcrmt63div.r0, ddcrmt127pri.r0, and ddcrmt127div.r0 exist. If the files are absent, use FTP to transfer missing files from SPM software release disk provided at time of installation or upgrade. If the files exist, reinstall them via FTP from the latest SPM software release disk, type "sync" at the SPM prompt, and reboot the SPM. If problem still persists, replace SPM. |
| | | | "Disk Usage:" | This alarm occurs when the SPM disk utilization reaches 95%. This could happen if a logged file grows extraordinarily large or there is a problem with the flash. The odds of the executive software crashing in this condition are high.<br><br>Telnet into alarming SPM. Type "du /" and press RETURN. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | Identify the large file and either remove or FTP the file off the flash. Otherwise, replace SPM. |
| 364 | | REMOTE_SPM_PROCESSOR_WARNING | "Unsolicited Reset" | This alarm occurs when power is lost at the SPM or the watchdog utility crashes and the system is restarted. The most common excuse is simply that Commercial AC power was lost at the Remote site.<br><br>Close alarm at SEM. If Warning occurs frequently, check Remote SPM power cable and commercial power hookup.<br>Telnet into the alarming SPM and use FTP to retrieve /var/log/exec.messages.old. Close alarm at SEM. If this Warning persists, E-mail Transcept Tech Support, with the exec.messages.old log as an attachment, and replace SPM. |
| | | | "Watchdog Timeout" | This alarm occurs when the watchdog utility is unable to communicate with the executive software for a configurable amount of time (e.g., 60 seconds) and the system is automatically restarted.<br><br>Save logged files and forward them on to Transcept for analysis. |
| | | | "Some SPM Forward Channels Failed: ", | This alarm occurs when, at startup or reboot, the software DUC manager fails to load some of the digital upconverters properly.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "Some SPM Reverse Channels Failed:" | This alarm occurs when, at startup or reboot, the software DDC manager fails to load some of the digital downconverters properly.<br><br>Attempt to reboot the hub; If remains, replace SPM. |
| | | | "Disk Usage:" | This alarm occurs when the SPM disk utilization reaches 85%. This could happen if a logged file grows extraordinarily large or there is a problem with the flash.<br><br>Telnet into alarming SPM. Type “du /” and press RETURN. Identify the large file and either remove or FTP the file off the flash. Otherwise, replace SPM. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 365 | | REMOTE_LVPS_POWER_ALARM | "No Comms: " | This alarm occurs when the SPM fails to communicate with both the primary and redundant LVPS via the I2C.<br><br>Replace I2C cables at alarming REMOTE. |
| | | | "Failed: " | This alarm occurs when the 8V AND 12V fail for a particular LVPS.<br><br>Check AC line cord into LVPS J-4. If secure, replace LVPS. |
| 366 | | REMOTE_LVPS_POWER_WARNING | "Primary: " | This alarm occurs when the 8V or 12V fails for the primary LVPS.<br><br>Check AC line cord into LVPS J-4. If secure, replace LVPS. |
| | | | "Redundant: " | This alarm occurs when the 8V or 12V fails for the redundant LVPS.<br><br>Check AC line cord into LVPS J-4. If secure, replace LVPS. |
| | | | "No Comms: " | This alarm occurs when the SPM fails to communicate with either the primary or redundant LVPS.<br><br>Check I2C cables at alarming LVPS. If cables secure, remove LVPS and verify I2C address is correct. If address is correct, replace LVPS. Otherwise, set LVPS I2C address to correct value and re-install LVPS. |
| 379 | | REMOTE_PA_FORWARD_INPUT_ ALARM | "Fwd Continuity - Power Below Tolerance (All Carriers)" | This alarm occurs when the PA input power level is measured below tolerance on all HRP carriers.<br><br>Replace the RF cable connecting RTM to alarming Power Amplifier. Using the CLI, verify PA FWPOWER input level is –1 +/- 3 dBm. If not, replace RTM. |
| | | | "RF Over Power: All" | This alarm occurs when all six forward PA input power is > +2.5 dBm. Note: this alarms only occurs when calls are being processed through each PA.<br><br>Check signal strength from BTS (higher than expected?); |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | Check HTM forward attenuator (get htm fwatten)- should be approx. 4, not 0; Check the autolevel setpoint to ensure not erroneously set to +50 dBm (nominal is +48 dBm)- this could cause higher than expected power at the PA input; Observe PA fwpower for sensor irregularities (get pa fwpower X)- sensors could be degraded |
| 380 | | REMOTE_PA_FORWARD_INPUT_ WARNING | "Fwd Continuity - Power Below Tolerance" | This alarm occurs when the PA input power level is measured below tolerance on one or more HRP channels.<br><br>During Maintenance Window, replace the RF cable connecting RTM to alarming Power Amplifier. Using the CLI, verify PA FWPOWER input level is –1 +/- 3 dBm. If not, replace RTM. |
| | | | "RF Over Power: " | This alarm occurs when some of the six forward PA input power is > +2.5 dBm.<br><br>Check the autolevel setpoint to ensure not erroneously set to +50 dBm (nominal is +48 dBm)- this could cause higher than expected power at the PA input; Check hub (get hubspm fwgain X) and remote parameters (get remspm fwatten X) for values outside nominal range (fwgain 15-25dB; fwatten 3-11dB); Observe PA fwpower for sensor irregularities (get pa fwpower X)- sensors could be degraded- if so, power PA down, then power back up; if remains,replace PA |
| 381 | | REMOTE_PA_FORWARD_OUTPUT_ ALARM | "Fwd Continuity - Power Below Tolerance (All Carriers)" | This alarm occurs when the PA output power level of each of the six HRP carriers is 3 dB less than the autolevel setpoint.<br><br>Ensure the HRP autolevel setpoint is set to 48 via the HUI. |
| | | | "RF Over Power: All" | This alarm occurs when all six forward PA input power is > +50.0 dBm. Note: this alarms only occurs when calls are being processed through each PA.<br><br>Check signal strength from BTS (higher than expected?); Check HTM forward attenuator (get htm fwatten)- should be approx. 4, not 0; Check the autolevel setpoint to ensure not erroneously set to +50 dBm (nominal is +48 dBm)- this could cause higher than expected power at the PA output; |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | Observe PA power for sensor irregularities (get pa fwpower X)- sensors could be degraded. |
| 382 | | REMOTE_PA_FORWARD_OUTPUT_ WARNING | "Fwd Continuity - Power Below Tolerance" | This alarm occurs when an active PA carrying phone calls reports an output power less than 3 dB lower than the HRP AUTOLEVEL SETPOINT.<br><br>Using the HUI, ensure autolevel is enabled and setpoint is set to 48. If autolevel is enabled, check PA input power. If PA input power is reported between –2 and +2 dBm, then replace PA. If input power is low, follow procedure for alarm #304. |
| | | | "RF Over Power: " | This alarm occurs when some of the six forward PA input power is > +50 dBm.<br><br>Check the autolevel setpoint to ensure not erroneously set to +50 dBm (nominal is +48 dBm)- this could cause higher than expected power at the PA output; Check hub (get hubspm fwgain X) and remote parameters (get remspm fwatten X) for values outside nominal range (fwgain 15-25dB; fwatten 3-11dB); Observe PA power for sensor irregularities (get pa fwpower X)- sensors could be degraded- if so, power PA down, then power back up; if remains,replace PA |
| 383 | | REMOTE_PA_TEMPERATURE_ WARNING | "Temperature Exceeds Specified Limit:" | This occurs when the PA internal temperature has surpassed 85 deg C. A 'SHUTDOWN" indication along with the warning indicates that the PA has surpassed 100deg C and has been autonously shutdown.<br><br>Check Power Amplifier Fans and intake air filter at Remote Enclosure. |
| 384 | | REMOTE_PAPS_POWER_ALARM | "Multiple Module Failures: " | This alarm occurs when more than one PAPS module indicates failure.<br><br>Check TTAM power connector, PAPS connector, PDU breaker at 100A load center. If all three secure, replace PAPS. |
| | | | "Multiple Comms Failures:" | This alarm occurs when the SPM fails to communicate with more than one PAPS module. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | Check PAPS connector, TTAM power-I/O connector. If both secure, replace PAPS. |
| 385 | | REMOTE_PAPS_POWER_WARNING | "Module Failure: " | This alarm occurs when one PAPS module indicates failure.<br><br>Check PAPS connector. If secure, replace PAPS. |
| | | | "Comms Failure:" | This alarm occurs when the SPM fails to communicate with one PAPS module.<br><br>Check PAPS connector, TTAM power-I/O connector. If secure, replace PAPS. |
| 386 | | REMOTE_TMA_ALARM | "TMA in Bypass Mode: " | This alarm occurs when the TMA sends a pulse current, indicating the TMA has failed (no power gain)<br><br>Attempt to reset TTA (reset TTA); If remains, replace TMA |
| 387 | | REMOTE_TMA_WARNING | "TMA Degraded: " | This alarm occurs when the TTAM draws over 150 mA current from TMA (indication that TMA has lost 6 dB gain). Note: this warning may appear when a TMA is initially power up via the TTAM. Should disappear in < 1 minute.<br><br>Attempt to reset TTA (reset TTA); If remains, replace TMA |
| 388 | | REMOTE_TTA_ALARM | "No Comms" | This alarm occurs when the SPM fails to communicate with the TTAM<br><br>Check I2C connector at TTAM, LVPS, and SPM. Check TTAM power-I/O connector, |
| | | | "Power Disabled to TMA: All: " | This alarm occurs when the TTAM draws < 400 mA of current from all TMAs. As a result, the 15 V is shutdown to the TMA.<br><br>Reset the tta (reset tta); if remains, could be a short in the cabling to the TMA or the TMA is not functioning properly; replace TMA to eliminate it as falsely shutting down |
| | | | "No Current Draw From TMA: All " | This alarm occurs when the TTAM draws < TBD mA of current from all TMAs. This indicates that a TMA is not powered up or there is no TMA present to power up. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| | | | | Check connections from TMA to remote; If remains, replace TTA; If remains, replace TMA |
| 389 | | REMOTE_TTA_WARNING | "Power Disabled To TMA: “ | This alarm occurs when the TTAM draws < 400 mA of current from some TMAs. As a result, the 15 V is shutdown to the TMA.<br><br>Reset the tta (reset tta); if remains, could be a short in the cabling to the TMA or the TMA is not functioning properly; replace TMA to eliminate it as falsely shutting down |
| | | | "No Current Draw From TMA:" | This alarm occurs when the TTAM draws < TBD mA of current from some TMAs. This indicates that a TMA is not powered up.<br><br>Check connections from TMA to remote; If remains, replace TTA; If remains, replace TMA |
| 390 | | REMOTE_PA_ALARM | “No Comms: All” | This alarm occurs when the SPM fails to communicate with all Pas.<br><br>Check I2C connector at TTAM, TTAM power-I/O connector, PDU breaker at 100A load center. |
| | | | "Over Voltage: All” | This alarm occurs when all PAs report an overvoltage condition (> 31 V) and the PA were automatically disabled<br><br>Check remote site power |
| | | | "Under Voltage: All” | This alarm occurs when all PAs report an undervoltage condition (< 19.5 V) and the PAs were automatically disabled<br><br>Check remote site power |
| | | | "Invalid SW Version: All” | This alarm occurs when the PA software version doesn’t match the latest version.<br><br>Download latest Power Amplifier Software Revision as outlined in Installation Document # 1000462. |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 391 | | REMOTE_PA_WARNING | "No Comms:" | This alarm occurs when the SPM fails to communicate with some PAs.<br><br>Check I2C connector at TTAM, TTAM power-I/O connector, PDU breaker at 100A load center. |
| | | | "Over Voltage:" | This alarm occurs when some PAs report an overvoltage condition (> 31 V) and the PA was automatically disabled OR Pas report an overvoltage warning (>- 29 V) but the PA remains operational<br><br>Check remote site power |
| | | | "Under Voltage:" | This alarm occurs when some PAs report an undervoltage condition (< 19.5 V) and the PA was automatically disabled OR Pas report an undervoltage warning (<- 21.5 V) but the PA remains operational<br><br>Check remote site power |
| | | | "Invalid SW Version:" | This alarm occurs when the PA software version doesn't match the latest version.<br><br>Download latest Power Amplifier Software Revision as outlined in Installation Document # 1000462. |
| | | | "Unsolicited Reset:" | This alarm occurs when the PA had lost power and had been autonously turned on (if the PA was on previously). |
| 400 | | HRP_USER_ALARM | "PA Disabled: All" | This alarm occurs when all Pas have been manually turned off<br><br>At the HUI, set each pa back on (set pa state X 1 – where X is numbers 1-6) |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 401 | | HRP_USER_WARNING | “Reverse AGC Disabled” | This alarm occurs when the reverse autogain functionality is disabled<br><br>At the HUI, set ragc remstate 1; set ragc hubstate 1 |
| | | | "Autolevel Disabled” | This alarm occurs when the forward path automatic leveling functionality is disabled.<br><br>At the HUI, set autolevel state 1 |
| | | | "Fwd Continuity Disabled” | This alarm occurs when forward path continuity check is disabled<br><br>At the HUI, set fcont state 1 |
| | | | "Rev Continuity Disabled” | This alarm occurs when reverse path continuity check is disabled<br><br>At the HUI, set rcont state 1 |
| | | | "DCCH Not Selected” | This alarm occurs when the DCCH has not been selected for the HPR. By default, the DCCH is 0 (i.e., not selected). Forward continuity check does not perform if the DCCH is not selected.<br><br>At the HUI, set hrp dcch X – where X is the carrier of the control channel |
| | | | "PA Disabled:” | This alarm occurs when some Pas have been manually turned off<br><br>At the HUI, set each pa back on (set pa state X 1 – where X is numbers 1-6) |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 410 | | HRP_VAL_ALARM | "TDMA Channel Mismatch (All Carriers)" | This alarm occurs when all tdma channels at the hub and remote do NOT match. The channels must match in order for the system to function properly<br><br>At the HUI, set hrp tdmachan X Y – where X is the carrier and Y is the desired channel |
| | | | "Hub DDC Frequency Mismatch (All Carriers)" | This alarm occurs when the Hub DDC IF frequency does not match the anticipated IF frequency. This is an internal check completed by the software.<br><br>Reboot the hub |
| | | | "Hub DUC Frequency Mismatch (All Carriers)" | This alarm occurs when the Hub DUC IF frequency does not match the anticipated IF frequency. This is an internal check completed by the software.<br><br>Reboot the hub |
| | | | "Remote DDC Frequency Mismatch (All Carriers)" | This alarm occurs when the Remote DDC IF frequency does not match the anticipated IF frequency. This is an internal check completed by the software.<br><br>Reboot the remote |
| | | | "Remote DUC Frequency Mismatch (All Carriers)" | This alarm occurs when the Remote DUC IF frequency does not match the anticipated IF frequency. This is an internal check completed by the software.<br><br>Reboot the remote |

| ALM # | SEV | ALARM TITLE | ALARM DETAILS | ⇒ ACTION |
|---|---|---|---|---|
| 411 | | HRP_VAL_WARNING | "TDMA Channel Mismatch" | This alarm occurs when some tdma channels at the hub and remote do NOT match. The channels must match in order for the system to function properly on those channels<br><br>At the HUI, set hrp tdmachan X Y – where X is the carrier and Y is the desired channel |
| | | | "Reverse AGC Insufficient Noise Measurement" | This alarm occurs when, during reverse autogain cycle, the software was unable to gather enough noise data to calculate a valid measurement |
| | | | "Reverse AGC Atten Out-Of-Range" | This alarm occurs when , during reverse autogain cycle, the attenuation has been set at the range limits |
| | | | "Autolevel Value Out-Of-Range" | This alarm occurs when, during an autolevel cycle, the software identifies that the fwgain OR fwattenuation is outside the nominal range (fwgain 15-25; fwatten 3-11) |
| | | | "No RTM Frequency Plan Available" | This alarm occurs when a particular channel set does not have an ideal frequency plan. The default in this condition is frequency plan A, although the system might not perform as specifiied from a sensitivity point of view. |