



**PowerMAX System  
with 8 SSPA Modules**

The **Teledyne Paradise Datacom** PowerMAX system is a purely parallel redundant, modular HPA system. It can be populated with four, eight, or sixteen modules. A modular system is used either as an extremely high output power amplifier or as a self-redundant amplifier system. Parallel architecture systems make excellent redundant systems. The PowerMAX SSPA system should be configured such that a failure of a single SSPA module can be tolerated by the system power budget.

The sophisticated PowerMAX firmware design permits the system to operate as if it were a single chassis amplifier. There is no need to communicate directly with each individual amplifier chassis, whether operating the system by remote link or locally via the front panel.

The PowerMAX system cabinet was shipped from the factory with the 3RU Chassis (with SSPA Module/Heatsink Assemblies removed), Power Supply Chassis (with Power Supply Modules removed), and the waveguide assemblies and supports in place. The user simply needs to complete the installation of the SSPA Module/Heatsink Assemblies and the Power Supply Modules. The system settings were configured at the factory, and no adjustment should be necessary.

### Install SSPA Module/Heatsink Assemblies

**Warning!** Make sure to install the equipment into the rack cabinet from the bottom up. Doing so will help prevent the rack cabinet from tipping over during installation.

**Note:** Match the serial number of the Module/Heatsink assembly with the serial number label shown on the front of the chassis. The outputs of the SSPA modules were phase matched in these positions.

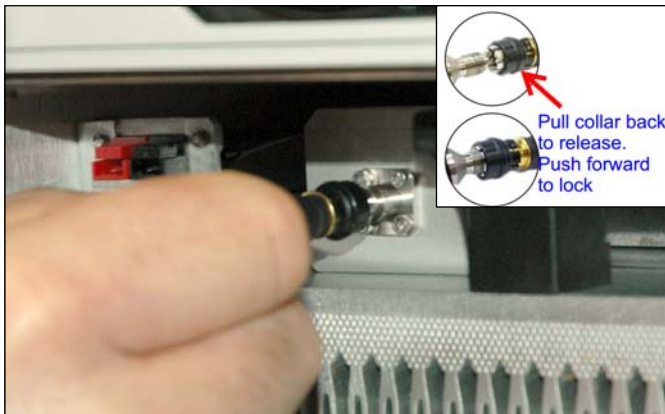
**Warning!** The weight of the module/heatsink assembly is approximately 46 lbs. (21 kg). Removing and installing each module/heatsink assembly requires two people.

1. Remove the front panel of the SSPA Chassis by loosening the captive thumbscrews above and below the large handles on the front panel. Set aside the front panel.
2. Extend the rack slides from inside the chassis enclosure.
3. Gently pull the cables inside the enclosure to the front of the chassis so that the cables out of the way for the module installation.
4. Lift a SSPA Module/Heatsink assembly and insert into the extended rack slides until it clicks into place. See **Figure 1**.



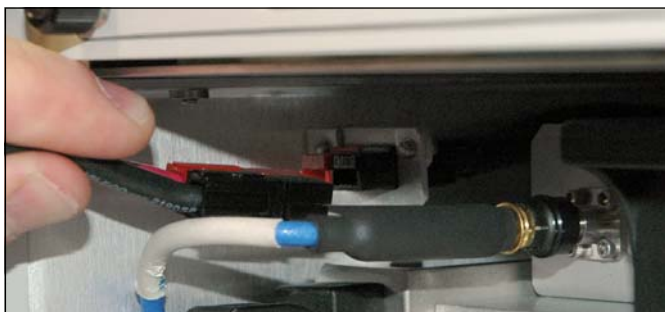
**Figure 1**

5. Carefully slide the assembly back into the enclosure, taking care not to damage or crimp the unattached cables.
6. Ensure the module/heatsink assembly is properly seated by locking the compression latches and gently tugging on the handles. The assembly should not slide forward.



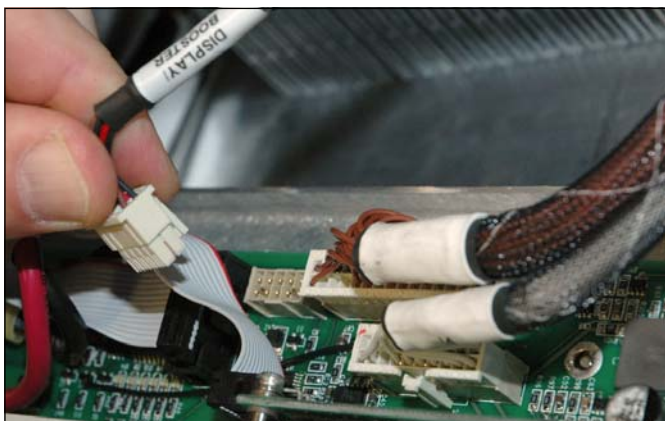
**Figure 2**

7. Connect the RF In connector above the left-side compression latch. See **Figure 2**.
8. Retrieve the front panel removed in Step 1 and connect the power cable from the front panel to the receptacle inside the enclosure. See **Figure 3**.



**Figure 3**

9. Connect the three M&C Cables to the front panel fan boost board. See **Figure 4**.



**Figure 4**

10. Carefully tuck the cables into the enclosure and re-seat the front panel to the front of the chassis. See **Figure 5**.



**Figure 5**

11. Tighten the captive thumbscrews at the front of the chassis to secure the front panel to the chassis.

Repeat the above steps for each SSPA Chassis.

### Install Power Supply Modules

The power supply chassis are shipped installed in the cabinet. Each power supply chassis can house up to four (4) power supply modules. Blanking panels are installed in the bays where power supply modules are not needed. The cabinet will utilize one more power supply module than necessary to power the system.

To install the power supply modules into the chassis, place the module into one of the open bays of a chassis. Slide the module slowly into an empty slot in the chassis until it is properly seated, taking care not to slam or unnecessarily force the unit into the slot. Repeat for each module. See **Figure 6**.



**Figure 6**

Ensure that the output of each Power Supply Chassis is plugged into the bus rail. There should be four (4) cable couplings for each Power Supply Chassis, one for each power supply module.



**Figure 7**

### Cabinet I/O Connectors

The typical PowerMAX system has an I/O panel at the top of the cabinet. See **Figure 7**.

The optional J21 Ethernet connector is a RJ-45 connector used for communication via Ethernet.

The J22 RS485 connector is a DB9 (F) connector at the terminus of the System Serial Cable described in **Section 3.1.6** of the manual.

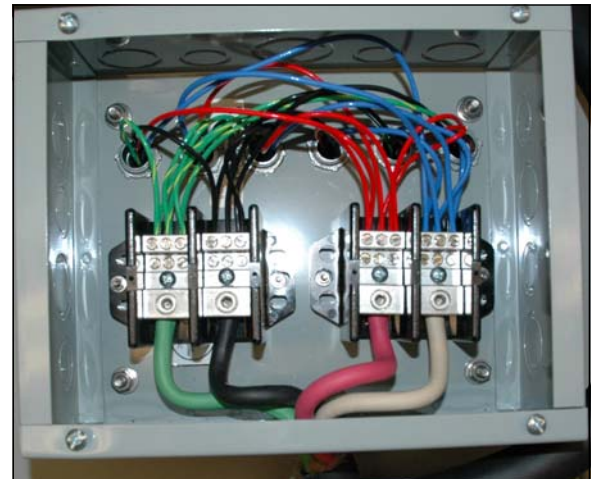
The J23 RF IN connector is a Type N (F) connector used to introduce an RF source to the system. **Maximum input is +15 dBm.**

The J24 n+1 LINK connector is a Type N (M) connector used to monitor the n+1 functions of the system.

The RF OUTPUT port is also housed at the top of the cabinet. The connector type is dependent on the frequency band of the system. C-Band systems use CPRG-137; X-Band systems have CPRG-112; and Ku-Band, WR-75 (grooved). Custom frequencies may use custom waveguide flanges.

**Warning!** Make sure to properly terminate the RF Output port prior to applying power to the system.

Insert a full or half gasket between the output flanges and the connecting waveguide, and secure flanges together with hardware at all available thru-holes.



**Figure 8**

### Apply Power

If the system was ordered with the optional AC Distribution Box, the installer need only connect a single- or three-phase line (depending on the power requirements of the system) to the terminal blocks at the top of the system cabinet. See **Figure 8**. For systems ordered without the AC Distribution Box, wire each power supply chassis separately.

See the specification sheet to review the power requirements of your system.

### Controlling System Operation

The PowerMAX System is under the control of the Master SSPA unit at all times. Any system-wide settings changes (local or remote) need to be performed on the Master unit. If a setting is adjusted on a Slave unit, the Master unit will erase and override it with the current system setting.

### Mute/Unmute System

The Master unit controls the mute state of the entire system.

To mute the system, press the **Main Menu** key on the Master unit; select **3.Operation** and press the **Enter** key; select **3.Mute** and press the **Enter** key; select **1.Mute On** and press the **Enter** key.

To unmute the system, press the **Main Menu** key on the Master unit; select **3.Operation** and press the **Enter** key; select **3.Mute** and press the **Enter** key; select **2.Mute Off** and press the **Enter** key.



### Adjust System Gain

Nominal system gain with Auto Gain enabled is 65 dB; nominal system gain with Auto Gain disabled is 70 dB.

To adjust the gain of the system, press the **Main Menu** key on the Master unit; select **3.Operation** and press the **Enter** key; select **5.Attenuation** and press the **Enter** key. Enter a value between 0.0 and 20.0 dB. If Auto Gain is enabled, the system will reserve 5 dB of attenuator range for gain compensation and attenuation is limited to a value between 0 and 15.0 dB.

### Automatic Gain Control

Any modular hitless SSPA system such as PowerMAX may exhibit natural gain drift when one or more individual SSPA chassis is removed from the system or malfunctions. The automatic gain control option allows the system to maintain a constant gain level during such events. This feature is user selectable and can be activated from the SSPA front panel or a remote interface.

To toggle the Automatic Gain Control option, press the **Main Menu** key; select **6.Redundancy** and press the **Enter** key; select **6.N+1** and press the **Enter** key; select **3.Gain Control** and press the **Enter** key. Select

either Auto Gain 5dB or Auto Gain Off. Only use alternate selections at the direction of the factory.

When this option is activated, the SSPA will automatically reserve 5 dB of attenuator range for future gain compensation. This will reduce the maximum SSPA gain by 5 dB. The attenuator range will also be reduced to 15 dB.

Five dB of reserved attenuator range will allow the system to fully auto compensate gain when up to two SSPA chassis enter a fault condition in an 8-chassis PowerMAX system and up to one chassis in a 4-chassis PowerMAX system.

### Document Download



Visit <http://www.paradisedata.com/index.php/products/powermax/>

### Safety Considerations

Potential safety hazards exist unless proper precautions are observed when working with this unit. To ensure safe operation, the operator must follow the information, cautions and warnings provided in the Operations Manual, and observe the warning labels placed on the unit itself.

### High Voltage Hazards

High voltage is any voltage in excess of 30V. Voltages above this value can be hazardous and even lethal under certain circumstances. Care should be taken when working with devices that operate at high voltage.

### Electrical Discharge Hazards

An electric spark can not only create ESD reliability problems, it can also cause serious safety hazards. Follow all ESD precautions when working with this unit.

### High Current Hazards

Many high power devices are capable of producing large surges of current. This is true at all voltages, but needs to be emphasized for low voltage devices. Low voltage devices provide security from high voltage hazards, but also require higher current to provide the same power. High current can cause severe injury from burns and explosion.

### Warranty

Refer to the manufacturer's warranty document for specific warranty coverage by product. The warranty does not apply to any goods that, upon examination by the manufacturer, are found to have been (i) mishandled, misused, abused, or damaged by the Buyer or Buyer's customer, (ii) altered from their original state, (iii) repaired without the manufacturer's prior written approval, or (iv) improperly stored, installed, operated, or maintained in a manner inconsistent with the manufacturer's instructions. This warranty does not apply to defects attributed to normal wear and tear.

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Specifications are subject to change without notice.

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