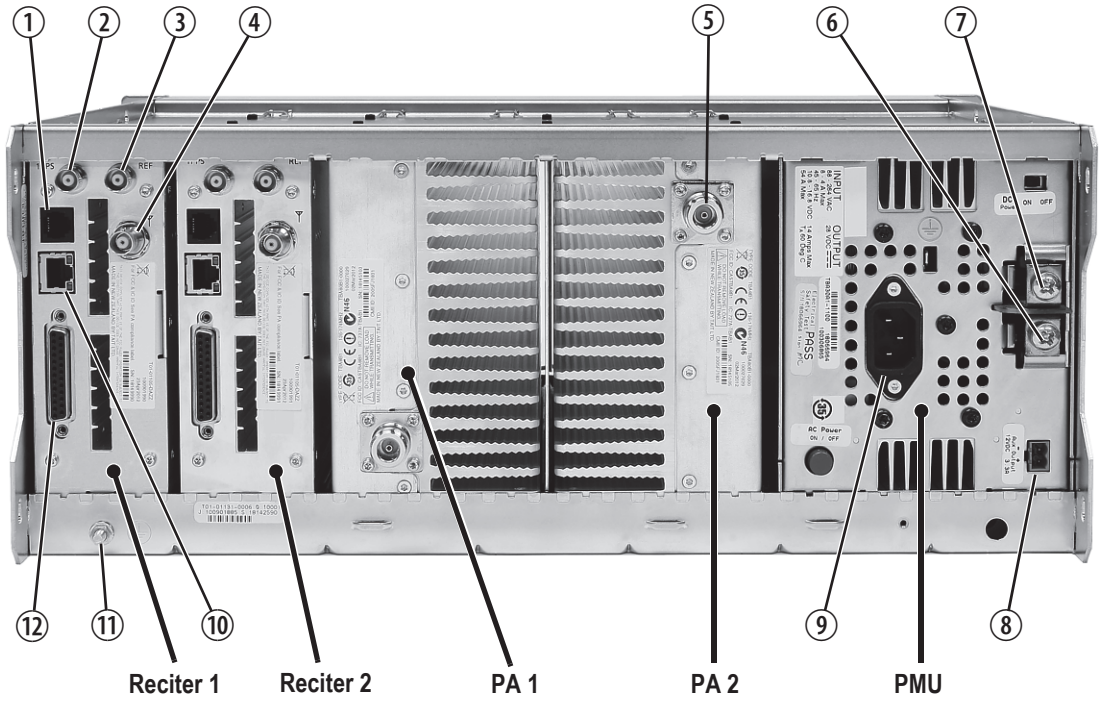
4.6 Connecting Up the Base Station

This section provides information relevant to the task of connecting up the various inputs and outputs of the base station.

4.6.1 Connection Overview

The connections at the rear of a dual 50 W base station are identified in Figure 4.9. External connections are all located at the rear of the subrack.

Figure 4.9 50 W base station inputs and outputs



1. serial RS-232 connector[a]
2. 1 PPS input
3. external reference frequency input
4. RF input
5. RF output
6. –VDC input
7. +VDC input
8. auxiliary DC output
9. AC mains input
10. Ethernet interface connector
11. subrack ground connector
12. system interface connector

a. Factory use only.

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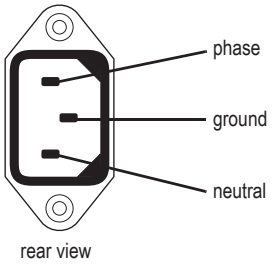
4.6.2 Connecting AC Power

The PMU is designed to accept a mains input of 88 to 264 VAC at 45 to 65 Hz. A standard 3-wire grounded socket outlet must be used to supply the AC power. The socket outlet must be installed near the equipment and must be easily accessible. This outlet should be connected to an AC power supply capable of providing at least 600 W. The requirements of two typical AC supplies are given in the following table.

Nominal Supply	Current Requirement[a]	Circuit Breaker/Fuse Rating[a]
115 VAC	8 A	10 A
230 VAC	4 A	6 A

a. The actual current consumption of the base station will be lower than these requirements (refer to the Specifications Manual for more information).

Your base station should come supplied with a power supply cord to connect the male IEC connector on the PMU to the local AC supply. The pins of the IEC connector on the PMU are identified at right.



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4.6.3 Connecting DC Power

The PMU is designed to accept a nominal 12 VDC, 24 VDC or 48 VDC input (depending on the model) with negative or positive ground. There is a minimum DC startup threshold to prevent damaging a battery which has little capacity left.

You must connect the DC supply from the battery to the PMU via a fuse or DC-rated circuit breaker with the appropriate rating, as shown in the table below. The circuit breaker must have a contact separation of 3 mm, an interrupt capacity of 1000 A or more, and an inrush current capability of at least 500 A for a minimum of 3.5 ms.

Notice The inrush current is not affected by the state of the DC module on/off switch on the PMU. This switch does not disconnect power from the DC converter itself. It disables the converter by switching off its control circuitry. Even when the DC converter is off, the DC input is still connected to its power circuitry.

The DC input leads should be of a suitable gauge to ensure less than 0.2 V drop at maximum load over the required length of lead.

Nominal Supply Voltage	Input Voltage Range	Circuit Breaker/ Fuse Rating[a]	Recommended Wire Gauge[b]
12 VDC	10 VDC to 16.8 VDC	60 A	2 AWG / 35 mm^2
24 VDC	20 VDC to 33.6 VDC	30 A	5 AWG / 16 mm^2
48 VDC	40 VDC to 60 VDC	15 A	8 AWG / 8 mm^2

a. The actual current consumption of the base station will be lower than these requirements (refer to the Specifications Manual for more information).

b. For a length of 5 ft to 6.5 ft (1.5 m to 2 m) (typical).

Terminate and insulate the DC input leads to protect them from accidentally shorting to the subrack if the PMU is removed before the leads are disconnected. Protective covers for the DC terminals are supplied with each PMU. We recommend a screw torque of 18–20 lbf · in (2–2.25 N · m).

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4.6.4 Connecting the Auxiliary DC Power Output

The PMU can provide an auxiliary DC output from the auxiliary power supply board. This board is available with an output of 13.65 VDC, 27.3 VDC, or 54.6 VDC (depending on the model), and is current limited to 3 A, 1.5 A or 750 mA respectively. This power supply is permanently on as soon as the base station has finished powering up, and is available on the auxiliary output connector on the rear panel.

You can connect multiple auxiliary power supply boards in parallel for redundancy purposes, or to provide an output greater than 40 W. Although no active current sharing is used, auxiliary boards connected in parallel will current-share before reaching their power limit. The failure (or switching off) of one auxiliary board will not load any other paralleled auxiliary boards in the circuit.

The auxiliary power supply turns off briefly when the PMU restarts after a firmware upgrade. This interruption may also cause any ancillary equipment powered from the auxiliary supply to restart. If this is a problem for your system, we recommend connecting auxiliary power supply boards in parallel to ensure an uninterrupted power supply for the ancillary equipment.

Auxiliary DC Power Output Cabling

Network elements are supplied with a connector, as shown in Figure 4.10. You can use this to connect the PMU's auxiliary DC power output to another device (refer to "PMU Auxiliary DC Output" on page 112 for the pin allocations).

Contact your regional Tait office for details on the full range of wiring kits available.

Figure 4.10 Auxiliary DC power connector

Phoenix MVSTBR2.5HC/2-ST/5.08 female

4.6.5 Connecting RF

Notice Do not remove the load from the PA while it is transmitting as this may damage the PA output stage. Before disconnecting any RF cables, put the base station into Offline mode to prevent any transmissions.

The RF input to the base station is via the marked BNC connector on the rear panel of the reciter. The RF output is via the N-type connector on the rear panel of the PA (refer to Figure 4.9 on page 70).

Cables and antennas should be of high quality construction. Solid shield heliax type cables are best, but if braided shield cables must be used for short distances, their braids must be silver-plated.

Recommendations for Installing the PA

We recommend the following installation procedures, which should protect the PA from damage under all but the most extreme operating conditions.

1. Do not connect the PA directly to the antenna. Fit an isolator or duplexer between the PA and the load. Fit the isolator as close as possible to the RF output connector on the PA. Do not connect any switching equipment between the isolator and the PA, unless the switch **cannot** operate while there is RF present (i.e. the base station is transmitting).
2. Fit a surge suppressor to the antenna cabling where it enters the building.
3. Inspect all cables and equipment connected to the base station for defects.

Ice on the antenna, or a broken antenna, is unlikely to cause damage to the PA.

Explanation

The circuit design of the PA protects the circuitry from high VSWR. This makes it difficult to damage the RF power device by keying the PA into a mismatched load, or if the load deteriorates over even a short period of time (milliseconds).

However, it is possible to damage the device if **all** the following conditions happen **at the same time**:

- there is a step change in the PA load (for example, the load is removed)
- the PA is transmitting
- the feed line loss between the PA and the mismatch is <1 dB.

The effect of such conditions is variable: some devices will not be destroyed, and some may fail after repeated load interruptions.

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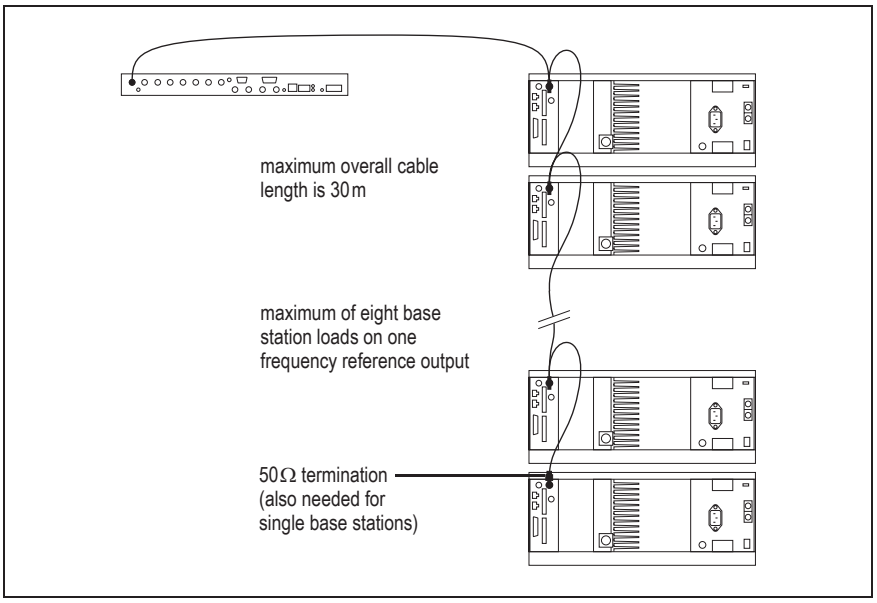
4.6.6 Connecting an External Frequency Reference

An external reference frequency is not normally required for B band. However, an external reference can be used when you need to maximize the range of the base station. For K4 band, the internal frequency reference accuracy is inadequate, and an external reference must be used. The external reference frequency can be 10 MHz or 12.8 MHz, with an input level of 300 mV_{pp} to 5 V_{pp}. The stability of this reference should be better than 100 parts per billion. The reciter automatically detects the frequency of the external reference and configures itself accordingly.

If an external reference is required, enable the external reference “Absent” alarm (Configure > Alarms > Control).

Use a 50 Ω coaxial cable (RG58 or RG223) to connect the external reference to the base station’s external reference frequency input. You can daisy-chain up to eight base stations using F-junctions. The maximum overall cable length is 30 m. Terminate the last connection (including single base stations) with a 50 Ω load.

Figure 4.11 Daisy-chaining an external frequency reference input



4.6.7 Ethernet Connection

The RJ-45 socket on the reciter's rear panel provides the 1-BASE-T or 100BASE-T Ethernet connection to the other devices in the network. Use a Cat-5 cable to connect this socket to the Tait Network via a router or switch.

The Web UI allows you to set the Ethernet port speed auto-negotiation to 10/100 Mbit/s or to negotiate a maximum 10 Mbit/s. Tait recommends that you keep the port speed at the factory default setting of 10 Mbit/s. The reciter hardware and software are scaled to meet the performance requirements of processing multiple voice streams along with supervisory control and management communications. 10 Mbit/s is ample for those requirements. The 10/100 Mbit/s setting is provided for compatibility reasons, but it is possible under high traffic conditions at 100 Mbit/s for traffic arriving at the reciter at the full rate within a small timing window to overflow internal buffers and therefore suffer packet loss. If you set the port speed to 100 Mbit/s and observe QoS lost packet alarms, then review your Ethernet port speed settings.

With the port speed at 10 Mbit/s it is particularly important to set the voice QoS on the reciter port of your site router or switch to a strict priority queue policy - which is the same policy that you should also be setting for your site link ports. The default QoS settings restrict the voice bandwidth to 1/25th of the port speed which is smaller than the required bandwidth for typical systems at 10 Mbit/s.

If necessary, refer to "Ethernet Connector" on page 112 for a list of Ethernet connection pin allocations.

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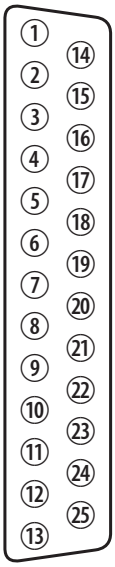
4.6.8 Connecting General Purpose Inputs and Outputs

The base station has a number of general purpose inputs and outputs. These are connected via the 25-way D-range on the rear panel.

The pin allocations for the D-range connector are given in the following table. Not all pins are used in this release of the base station.



external view

Pin	Signal Name	Signal Type	Notes
1	not used		reserved for future use
2			
3			
4			
5			
6			
7			
8			
9			
10			
11	digital in 1	input	5V TTL logic active low
12	digital in 2		
13	+5.2VDC output	power output	maximum current 200mA
14	digital in 3	input	5V TTL logic active low
15	digital in 4		
16	digital in 5		
17	digital in 6		
18	digital in 7		
19	digital in 8		
20	digital in 9		
21	digital in 10		
22	digital in 11		
23	digital in 12		
24	not used		reserved for future use
25	ground	ground	

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5 Working with Base Stations from Your PC

The normal web browser on your PC provides a window into the TB9300 base station. Use it to connect to the base station so that you can monitor, configure, diagnose, and calibrate it (if required).

This section describes the following:

- Connecting to the base station, including initially setting things up.
- Working with base station web pages.
- Carrying out basic tasks.

This section provides an overview of some aspects of the web interface. Refer to the Help for detailed instructions.

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5.1 PC Recommendations

We recommend the following PC hardware and software for connecting to a TB9300 base station:

- SVGA Monitor (1024 x 768 minimum).
- Network connection.
- The base station works with recent versions of most modern browsers. Refer to the Release Notes for more information on currently supported browsers.

5.2 Connecting Your PC to the Base Station

You connect to a base station using your web browser. Using multiple browser windows or tabs, you can view more than one base station and more than one page of any base station at once. Base stations have a web-based interface that provides the pages you view. Up to ten users may be logged in to a base station at once.

The base station has three different user access levels: Administrator, Maintainer, and Monitor. Passwords can be defined for each level. This is done using the base station's web interface (Tools > Tools > User Administration). Refer to the Help for more information on setting user access levels.

Connections to the base station can be authenticated by a remote (i.e. centralized) service. Refer to the Help and "Setting Up Authentication" on page 86 for more information.

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5.2.1 Logging In

1. Enter the base station's URL into your browser using a secure connection (https://). To find out the base station's IP address, on the front panel select Modules > Reciter 1 (or 2) > View Reciter 1 (or 2) Address. To set the IP address, refer to "Setting the IP Address" on page 81.

Notice If access to this menu has been disabled, you cannot use the front panel to find out the IP address. Make sure that you store the IP address securely and do not lose it.

2. A security warning appears when you connect for the first time. Proceed anyway (refer to "Security Certificates" on page 82).

3. The login screen appears.

4. Enter your user name and password. When connecting for the first time, enter the user name "admin" and password "tbc_admin".

5. Click **Login**.

Notice After logging in we recommend that you change the password and username for your own security (refer to "Working with the Web Interface" on page 87). Make sure that you store your passwords and usernames securely and do not lose them. They may be needed by Tait support personnel if assistance is required. Tait cannot retrieve forgotten passwords.

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5.2.2 Setting the IP Address

Before the base station is installed on site, you need to provide it with its proper IP address. Make sure that you do not lose this address. A quick way to set the base station's IP address is to use the front panel, as described below.

Notice If access to this menu on the front panel has been disabled, log in to the base station and set the IP address using the web interface (Identity > Identity > Network Identity).

1. Use the front panel display to enter the IP address, subnet mask and gateway specified for this base station by the IP addressing plan for the network. From the base station menu select Modules > Reciter 1 (or 2) > Edit Reciter 1 (or 2) Address. If the home screen is showing, press an arrow key, a scroll key or OK to clear it.

Notice In this screen each octet in the address lines has provision for three characters. If an octet in the address has less than three characters, enter one or two leading zeroes so that each position is filled, even though the zeroes are not part of the address. For example, enter 172.25.163.47 as 172.025.163.047. Leading zeroes are removed when the address is programmed into the base station.

2. Set each address as described below. Use the left and right arrow keys to move the cursor across each line in the Addresses screen. Use the scroll keys to scroll through the available numbers for each position in a line.
   a. Set the IP address and press OK. This moves the cursor to the next line. To move the cursor back to the previous line, press the return key.
   b. Set the Mask address and press OK.
   c. Set the Gateway address and press OK.
   d. The display shows "Setting Reciter 1 (or 2) address Please wait..." while the base station confirms that the addresses are correct. When this process has finished, the display will show "SUCCEEDED" or "FAILED" as appropriate. Press OK to return to the previous menu.

3. If the process failed, try entering the address again. If it still fails, try the following:
   - enter the address through the web interface
   - check that the IP address you are trying to enter is not already in use by another device on the same subnet.

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5.2.3 Security Certificates

You can upload your own security certificates to the base station (Tools > Settings > Web certificate). If you have installed and configured the appropriate Certification Authority software, you can issue security certificates for all base stations. After uploading the certificates to the base stations, you can configure all maintainers' web browsers to accept security certificates from your own Certification Authority.

Before you have uploaded a security certificate to the base station, it will raise a security warning when your browser connects to it for the first time. The base station creates a self-signed certificate when the reciter's firmware is installed. Your browser raises a security warning because the security certificate was not issued by a trusted Certification Authority. The browser has a way of letting you override or bypass the security warning.

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5.2.4 Connecting a Networked PC to a Base Station

You may want to temporarily disconnect a networked PC from its LAN in order to be able to establish a direct connection with the base station. A physical connection is needed as well as an alternate (Windows 7, Windows Vista, Windows XP) or temporary (Windows 2000) IP address and subnet mask.

Windows 7 or Windows Vista

1. Remove the local area Ethernet connection and connect an Ethernet patch cable between the PC and the base station. You can use either a straight through or crossover Ethernet patch cable with the current base station firmware.
2. Navigate to Control Panel > Network and Internet > Network and Sharing Center.
3. Click View status.
4. In the Local Area Connection Status dialog box, click Properties.
5. In the Local Area Connection Properties dialog box, click Internet Protocol Version 4 (TCP/IPv4), and then click Properties.
6. Click Alternate Configuration.
7. Select the User configured option, and then enter a number that is on the same subnet as the base station. For example, if the TB9300 has IP 192.168.1.2, enter 192.168.1.1 for the PC.
8. Enter a suitable subnet mask, for example 255.255.255.0.

   The web browser should now be able to connect to any physically connected base station that is on the same subnet.
9. Once the web browser session is finished, re-connect the local area network cable to the PC. The PC then uses its normal TCP/IP properties.

ⓘ For those using Windows XP, please be aware that Microsoft no longer produces updates for this, therefore you may be open to security risks.

Windows XP Professional

1. Remove the local area Ethernet connection and connect an Ethernet patch cable between the PC and the base station. You can use either a straight through or crossover Ethernet patch cable with the current base station firmware.
2. Click Start > Settings > Control Panel.
3. Double-click Network Connections.
4. Double-click the Local Area Network icon.
5. Click Properties.

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6. Click Internet Protocol (TCP/IP), and then click Properties.

7. Click Alternate Configuration.

8. Select the User configured option, and then enter a number that is on the same subnet as the base station. For example, if the TB9300 has IP 192.168.1.2, enter 192.168.1.1 for the PC.

9. Enter a suitable subnet mask, for example 255.255.255.0.

   The web browser should now be able to connect to any physically connected base station that is on the same subnet.

10. Once the web browser session is finished, re-connect the local area network cable to the PC. The PC then uses its normal TCP/IP properties.

Windows 2000

1. Remove the local area Ethernet connection and connect an Ethernet patch cable between the PC and the base station. You can use either a straight through or crossover Ethernet patch cable with the current base station firmware.

2. Select Start > Settings > Network and Dialup Connections.

3. Double-click the Local Area Connection icon.

4. Click Properties.

5. Click Internet Protocol (TCP/IP), and then click Properties.

6. Note the current settings so that you can restore them later.

7. Select Use the following IP address, and then enter a number that is on the same subnet as the base station. For example, if the base station has IP 192.168.1.2, enter 192.168.1.1 for the PC.

8. Enter a suitable subnet mask, for example 255.255.255.0.

   The web browser should now be able to connect to the base station.

9. When you have finished the web browser session, re-connect the local area network cable to the PC and then restore the original PC configuration. When you close the Network connection dialog box, the restored configuration is applied.

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5.2.5 Troubleshooting Connection Problems

If the attempt to connect to a base station failed, consider these possible causes.

1. Your PC is part of your organization's LAN and does not belong to the same subnet as the base station. Give the PC a suitable IP address and subnet mask as described in "Connecting a Networked PC to a Base Station" on page 83.

2. You are attempting to connect to the wrong IP address. Check that the IP address is correct.

   Notice You can quickly check the base station's IP address via the front panel, as long as access to this menu has not been disabled.

3. The link to the base station is down. Use ping to check.

4. You may have to bypass the proxy in your organization's LAN to access the Tait Network. Ask your system administrator to give you access.

5. JavaScript may be disabled in your browser. If JavaScript is disabled, your browser will be unable to connect to the base station. Note that modern browsers normally have JavaScript enabled by default.

5.2.6 Finding a Lost or Forgotten IP Address

Use the following procedure if an IP address has been lost or forgotten.

1. Mount the reciter in a TB9300 subrack and fit the front panel. Power up the subrack.

2. On the front panel display select Modules > Reciter 1 (or 2) > View Reciter 1 (or 2) Address.

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5.2.7 Setting Up Authentication

Connections to the base station can be authenticated by a remote (i.e. centralized) service (Tools > Settings > Authentication). Two remote authentication protocols are supported: LDAP and RADIUS.

Notice Only people experienced with the AAA architecture and authentication protocols should make changes on this page.

Moving logins to a centralized server can provide enhanced security for a number of reasons, such as:

- less work is required to manage password-controlled access to all base stations in a network; you no longer need to change the password in each base station individually
- previously used passwords may be excluded from re-use
- access can be denied after a set number of incorrect passwords is entered
- passwords can be set to expire on a certain date
- remote access to base stations can be globally enabled and disabled as required for technical staff during the commissioning process.

Once the centralized server logins are set up, we recommend that only one local administrator login is left on the base station for emergency use (e.g. when the connection to the server is lost). The password for this emergency login should be kept secret.

Notice Unless they are deleted, any local logins left on the base station will still work and have priority over remote logins.

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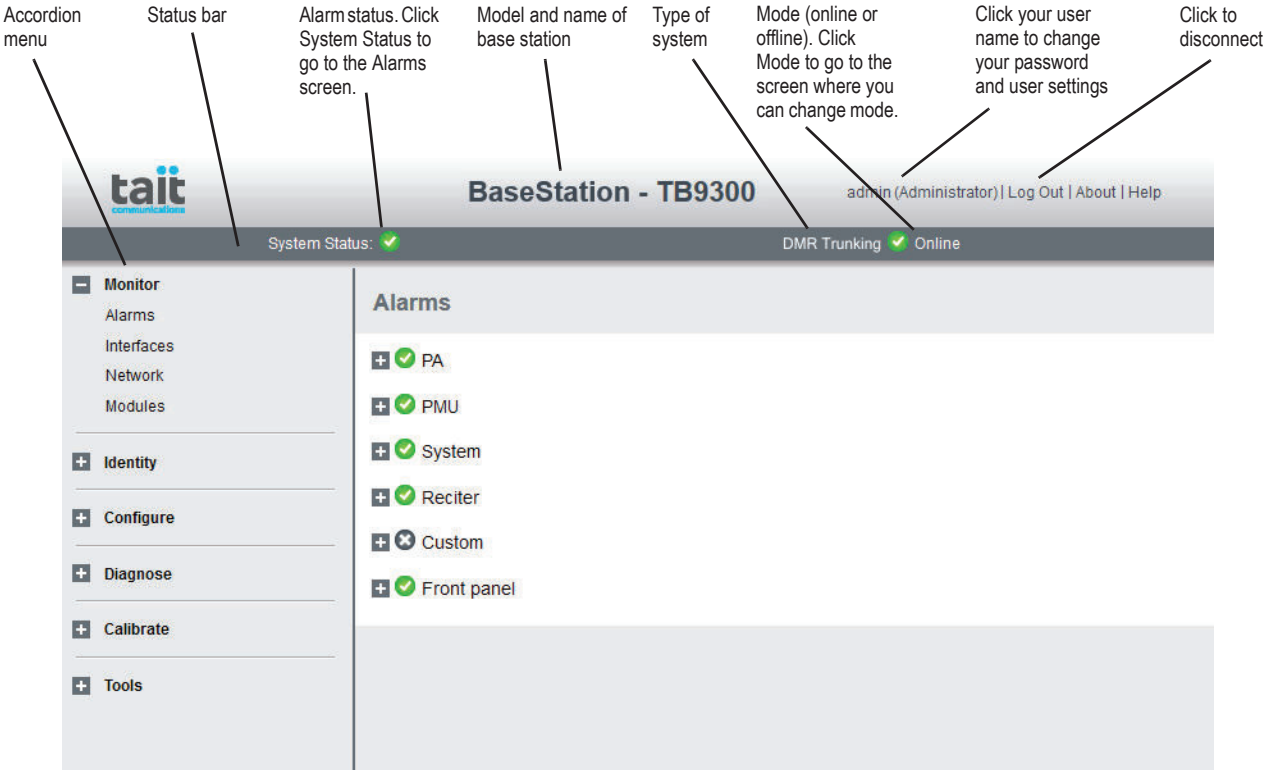
5.3 Working with the Web Interface

This section provides an overview of the web interface. Refer to the Help for detailed instructions.

When you connect to a base station, the browser displays a page like the following.



The accordion menu on the left gives you access to the various pages. Click a top level item (such as Configure) to open up its menu. Click on a menu item to display its page, then click on the appropriate tab on that page to display the required information. Click the + icon (⊞) on a menu item to expand the menu tree and the – icon (⊟) to collapse it again.

Press F11 for a full-screen display of the browser which does not show toolbars and other information. Press F11 again to return to the standard view.

ⓘ Using a browser window size smaller than 1024 x 768 may cause some pages to display incorrectly.

5.3.1 Monitoring Operation

Using the monitoring pages, you can see how the base station is currently operating.

For example, you can see the status of its RF interface (Monitor > Interfaces > DMR RF).

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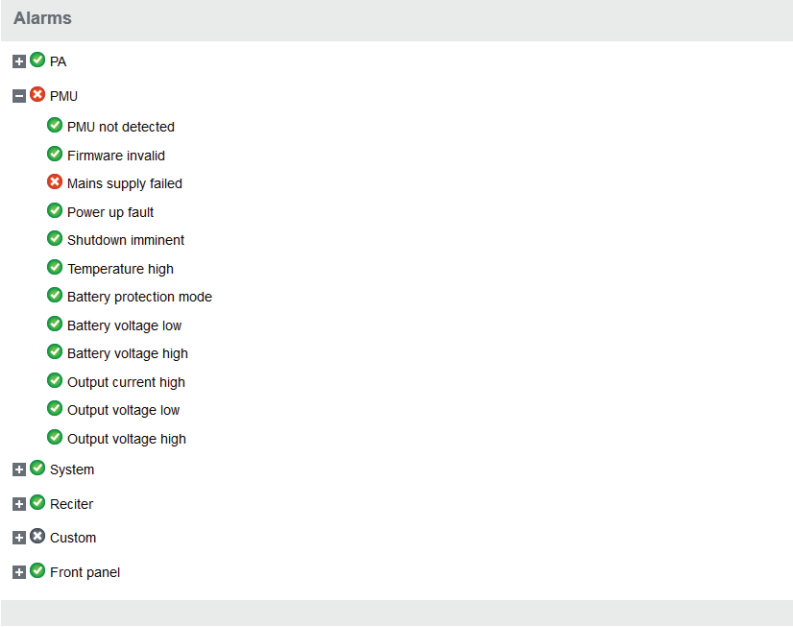
5.3.2 Troubleshooting Alarms

If the Alarm status on the status bar displays red, one or more alarms have been triggered, and the Alarms menu automatically expands to display the alarm(s). Click Help and navigate to the description of that alarm.

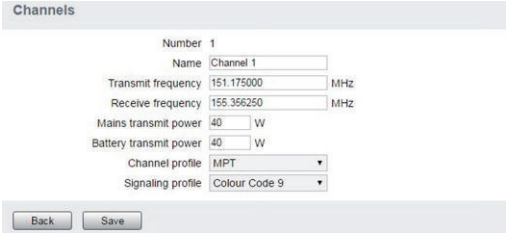


5.3.3 Viewing Configuration Settings

The base station has many configuration settings that personalize it for its particular role in the network. Some settings, such as those for alarm thresholds (Configure > Alarms > Thresholds), always apply.

Others are channel-based so that they can be dynamically changed. To view these, you first need to know the channel on which the base station is operating. To see the channel number and profiles the base station is using, select Monitor > Interfaces > RF >.

Select a channel and click **Edit** to view details of the channel. Clicking directly on any text in a line will also open the edit screen.



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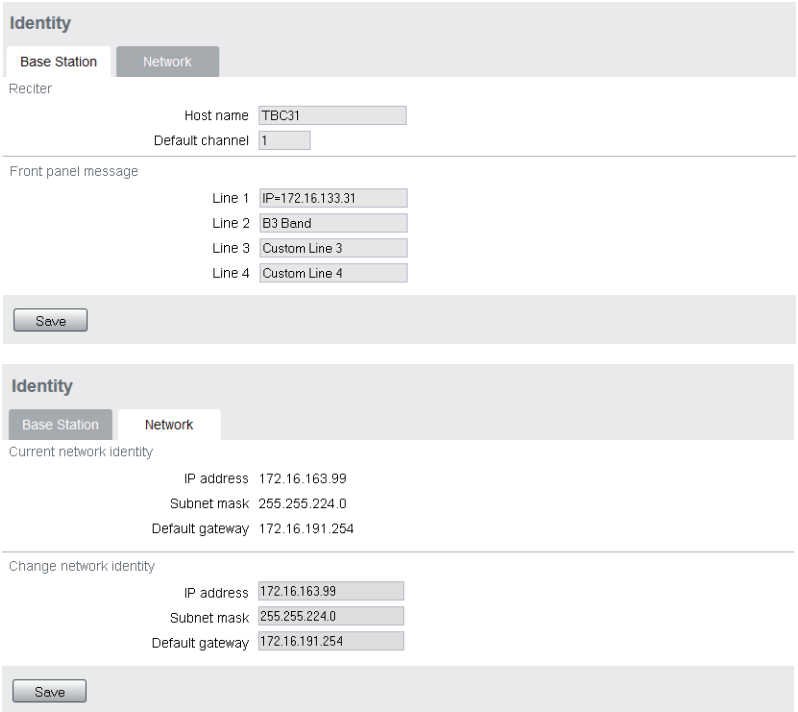
5.3.4 Viewing the Base Station and Network Identity

Each base station in a network has a unique base station and network identity.

Select Identity > Identity and then Base Station or Network to view details such as name, default channel and network addresses. Note that the Host name field has a maximum of 63 characters, and may use the characters a–z, 0–9, dot and hyphen. You cannot use spaces.



You can also enter here the four lines of information you want to appear on the home screen on the front panel display. Each line has a maximum of 20 characters.

5.4 Basic Tasks

5.4.1 User Settings

Click on your user name in the top right corner of the page to choose whether the temperature is displayed in Fahrenheit or Celsius, and to change your password. Note that this information is stored in the reciter, not in your browser.

5.4.2 Taking the Base Station Offline

You may need to take the base station offline in order to carry out diagnostic tests or to take it out of service if a fault develops.

1. Click Mode on the status bar (or Select Tools > Tools > Base Station).
2. Under Control, select Offline. Click Offline to confirm the change. In the Status area, the Mode display changes first to “Changing”, and then to “Offline” (⚠).

5.4.3 Working with Configuration Files

At any time, you can save the current configuration settings as a file (Tools > Files > Configuration > Backup configuration). This is stored in the base station, but we recommend that you download it and store it on your computer as an off-site backup. The base station identity and network identity are not saved as part of the configuration file.

You may want to develop a master configuration and upload it to all base stations in the network. The master configuration can contain all the different channel configurations and can be common to all base stations. The base station identity selects the default channel.

ⓘ Base stations are delivered with a default configuration which provides a safe set of values. We recommend that you download it and store it on your computer as a backup before changing and saving any configuration settings.

You can also generate a report containing all the base station’s configuration settings (Tools > Files > Configuration > Configuration report), which can be saved as a text file. We recommend that you do this when the base station is commissioned. This report can be useful later if there is a problem with the base station. Comparing the original report with the later one may highlight changes in configuration that are causing a problem.

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5.4.4 Setting Up Custom Alarms

Each of the base station's 12 digital inputs can be used to raise a custom alarm when the input goes high or low. The Custom Alarms form (Configure > Alarms > Custom Alarms) allows you to assign a name to each custom alarm, and to configure whether the alarm is triggered when the digital input goes high or low. Custom alarms are reported via the web interface and SNMP traps.

Custom alarms are used to provide an alarm when an external event activates a digital input. You can rename any of the available alarms to provide a more meaningful name, such as "Door open".

Take care when setting the severity of alarms, including custom alarms (Configure > Alarms > Severity). Setting an alarm's severity to Major will cause the node to take the base station out of service when the alarm is raised. Refer to the Help for more information.

5.4.5 Disabling the Front Panel Keypad

You can disable the front panel keypad to prevent access to the base station via the front panel menus. Select Configure > Base Station > Miscellaneous and in the Front Panel area clear the Keypad enabled check box.

Notice If you disable the front panel keypad, you cannot use it to find out the base station's IP address. Make sure that you store the IP address securely and do not lose it.

5.4.6 Preparing to Download Firmware

New versions of base station firmware are remotely downloaded to base stations from a package server (a web server application). You can set up a single computer to be the central package server for all the base stations on your network, using a web server of your choice. Tait also provides the Mongoose[1] web server as part of the base station firmware package for use with a temporary package server, such as a laptop.

The base station firmware package can be downloaded as a zip file from the Tait support website.

This procedure describes using the Mongoose web server.

Installing the Firmware Package

The installation procedure copies files into a folder and adds items to the Windows Start menu (Start > Programs > Tait Applications > TB9300). From the Start menu you can then access the Help, licenses, manuals and release notes for each firmware package, and also start Mongoose.

1. Mongoose runs on Windows only.

You do not have to install Mongoose to make it work, because it is a self-contained executable file. Once started, it will run in the background until stopped, or the computer is shut down. Mongoose must also run from the same folder as the firmware files.

If you are downloading a base station package zip file:

1. Save the zip file to a suitable location on the hard drive of the package server computer.
2. Extract the zip file, then navigate to the root folder and double-click *TB9300.msi* to run the Windows installer.

Notice Tait recommends that the maximum length of the path to the location of the extracted files is 100 characters. Using a longer path may cause the files to be extracted incorrectly.

Setting Up a Central Package Server

It is beyond the scope of this manual to describe the exact procedure for setting up a central package server for any particular network. Tait expects that each customer will configure their own package server according to the requirements for their network.

However, you do need to configure each base station with the IP address and port of the package server computer.

1. Log in to the base station and select Configure > Base Station > Miscellaneous.
2. Under Package server, enter the IP address and port number of the package server.
3. Download the firmware as described in the Help.

Notice The base station has enough space for two firmware packages. If the base station already has two packages, delete the unwanted package before downloading another.

Setting up a Temporary Package Server

If you want to use a laptop as a temporary package server, you can temporarily override the package server IP address and port in each base station.

1. Run Mongoose on the temporary package server (Start > Programs > Tait Applications > TB9300 > Mongoose).
2. Windows Firewall may raise a Security Alert about allowing Mongoose to access your network or the internet.
   a. In Windows 7 allow access to private networks.
   b. In Windows XP click Unblock.
3. Log in to the base station and select Tools > Firmware > Download.

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4. Under Package server, enter the IP address of the laptop. The default port number is 8080.

5. Download the firmware as described in the Help.

6. If you have trouble with any of the above procedures, please consider the following points:
   - The firmware download process uses the HTTP protocol. If you are using a laptop from outside the radio communications network, make sure that HTTP traffic can get through the firewall.
   - If Mongoose fails to start, it may already be running, or another application may be using port 8080.
   - If the error message “Could not find index file” appears when listing packages, Windows security may be silently blocking access for Mongoose. Turn off the laptop’s WiFi and temporarily disable its firewall, then try again.
   - The base station has enough space for two firmware packages. If the base station already has two packages, delete the unwanted package before downloading another.

5.4.7 Checking for Interference on a Receive Channel

You can use the Signal Level page (Diagnose > RF Interface > Signal Level) to look for sources of interference across a range of receive frequencies.

The chart on this page has two lines. One shows the current RSSI measurement for the selected frequency. The second shows a historical trace of peak RSSI readings on that frequency.

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6 Maintenance

The base station is designed to be very reliable and should require little maintenance. However, performing regular checks will prolong the life of the equipment and prevent problems from happening.

It is beyond the scope of this manual to list every check that you should perform on your base station. The type and frequency of maintenance checks will depend on the location and type of your system. The checks and procedures listed below can be used as a starting point for your maintenance schedule.

Performance Checks

We suggest you monitor the following operational parameters using the web interface:

- VSWR
- DC input voltage, especially on transmit
- any temperature alarms.

These basic checks will provide an overview of how well your base station is operating.

Reciter

We recommend that you calibrate the reciter after three months of operation, and then annually for H-band reciters, or every three years for B-band reciters. The calibration procedure is described in the Help (Calibrate > Reciter > Internal reference), and requires a calibrated frequency generator.

PA

There are no special maintenance requirements for the PA.

PMU

There are no special maintenance requirements for the PMU. However, we suggest that you periodically check that the screws on the DC input terminals are tightened to the recommended torque of 18–20 lbf · in (2–2.25 N · m). They may work loose with thermal cycling. Also, if you are using battery back-up, you should check the batteries regularly in accordance with the manufacturer's recommendations.

Ventilation

The base station has been designed to have a front-to-back cooling airflow. We strongly recommend that you periodically check and maintain the ventilation requirements described in "Equipment Ventilation" on page 49 to ensure a long life and trouble-free operation for your base station. Also check for a build-up of dust in and around the module heatsink fins, front panel air intakes, and fan ducts.

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Cooling Fans

The cooling fans have a long service life and have no special maintenance requirements. You can use the web interface to configure the base station to generate an alarm if any of the front panel cooling fans fails. Refer to the Help for more details.

7 Troubleshooting

Check that all front and rear connectors and cables are in place, and that power switches are on. If problems persist, contact your regional Tait office.

Symptom	Possible Cause	Action
Alarm LED red and steady (not flashing)	The base station is in Offline mode	Use the web interface to put the base station in Online mode
Alarm LED flashing	One or more faults are present	Use the web interface to identify the faulty module
Alarm LED flashing, display shows “Please wait...”, fans are running slowly	Front panel has lost communication with reciter 1	Check cable connections. Check front panel D-range connector. Use the web interface to check reciter 1.
Power LED on front panel is on, but keypad does not work	Keypad is disabled	Check that the keypad is enabled in the web interface (Configure > Base Station > Miscellaneous)
Power LED flashing, fans are running, but display is blank	The base station is downloading firmware	Use the web interface to monitor the progress of the firmware download
No power or LEDs on front panel	System control bus not connected to front panel	Check cable connections
	Pins bent on 15-pin D-range plug on front panel	Replace or repair D-range plug
Desired feature is not operating	Feature license missing	Check that you have the necessary feature licenses (refer to “Licenses” on page 20 and the Help)
	Feature license present but feature is not enabled	Use the web interface to enable the feature
Tx stuck on	Tx and Rx frequencies are the same	Reconfigure Tx and Rx with different frequencies
The base station appears to make random transmissions	CWID feature enabled	No action: CWID transmissions are made according to configuration settings
PA has low power	Channel is configured to low power	Use the web interface to check the power settings
	PA may have suffered partial damage	Replace module and send faulty module for servicing

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8 Replacing Modules

Caution The PA and PMU weigh between 10.1 lb (4.6 kg) and 15.4 lb (7 kg) each. Take care when handling these modules to avoid personal injury.

Notice The cooling fans are mounted on the front panel and will only operate when the panel is fitted correctly to the front of the subrack. To ensure adequate airflow through the base station, do not operate it for more than a few minutes with the front panel removed (e.g. for servicing purposes). Both the PMU and PA modules have built-in protection mechanisms to prevent damage from overheating.

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8.1 Saving the Base Station's Configuration

Before replacing a module in the base station, you should decide whether you need to save its configuration data. If you are unsure whether you have a record of the configuration, backup and save the configuration file before removing any modules. Once you have replaced the module, you will be able to restore the original configuration to the base station.

If one or more of the modules is faulty, you may be unable to save the configuration. In this case, you will have to restore the configuration from a back-up file. Refer to the Help for more information.

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8.2 Preliminary Disassembly

Hot-pluggable Modules

The reciter, PA and front panel are hot-pluggable and can be removed without powering down the whole base station. These modules can also be removed without disrupting the system control bus communications with the other modules in the subrack.

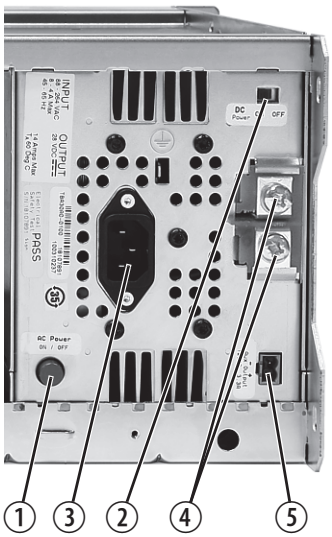
> **Notice** Before removing a PA, disconnect the DC input and RF input first, followed by the RF output. After refitting the PA, reconnect the RF output first, followed by the RF input, and then the DC input.

Disconnecting the Power

If you want to disconnect the power before working on the base station, follow these steps.

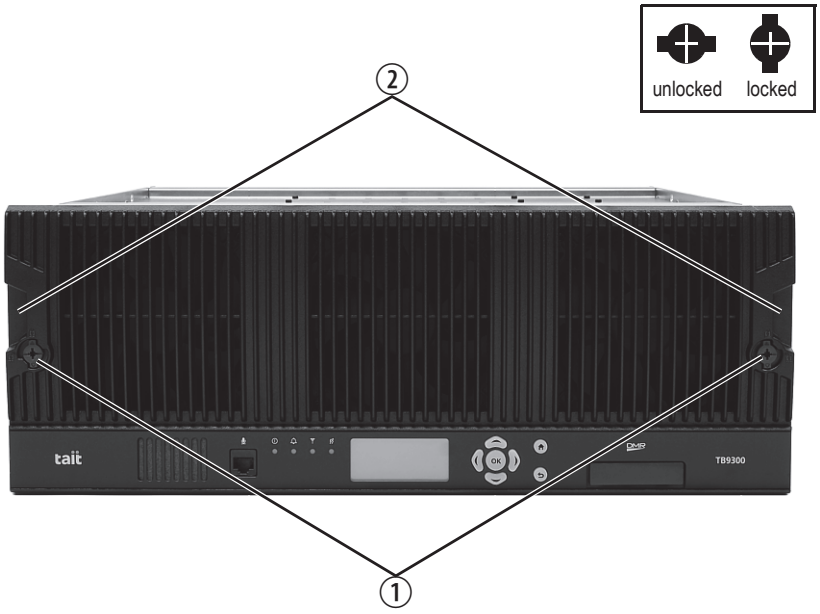
> **Caution** Before disconnecting the battery supply leads from the PMU, open the circuit breaker or disconnect the supply leads from the battery.

1. Turn off the AC ① and DC ② switches at the rear of the PMU.
2. Also at the rear of the PMU disconnect the mains ③ and battery ④ supply leads, and the auxiliary DC supply lead ⑤ (if fitted).



Remove the Front Panel

1. Using a Pozidriv PZ2 screwdriver, undo the fastener at each end of the front panel ① with a quarter turn counterclockwise.

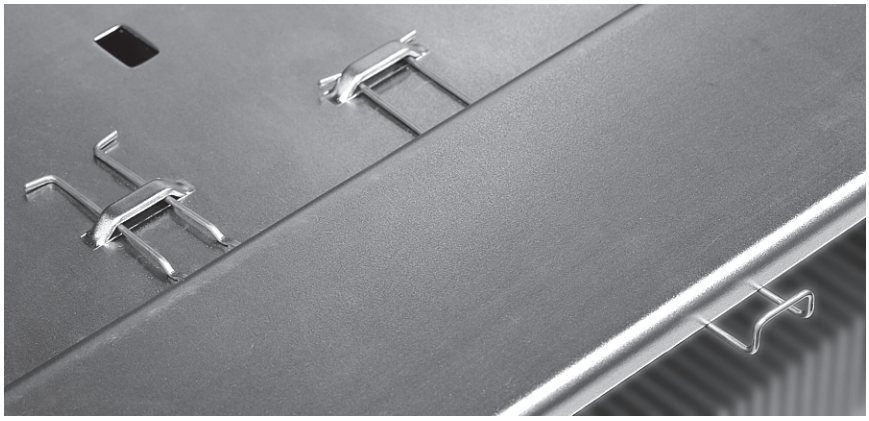


2. Place a finger in the recess ② provided at each end of the front panel and pull the front panel away from the subrack.

Cable Retaining Clips

The cable retaining clips are used to hold cables in position at the top of the subrack so that they do not interfere with the mounting of the front panel, or interrupt the airflow through the base station.

If you need to remove any front panel cables, simply pull the front of the cable retaining clip down and then slide it out from the subrack until it reaches the end of its travel.



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8.3 Replacing a Reciter

Removal

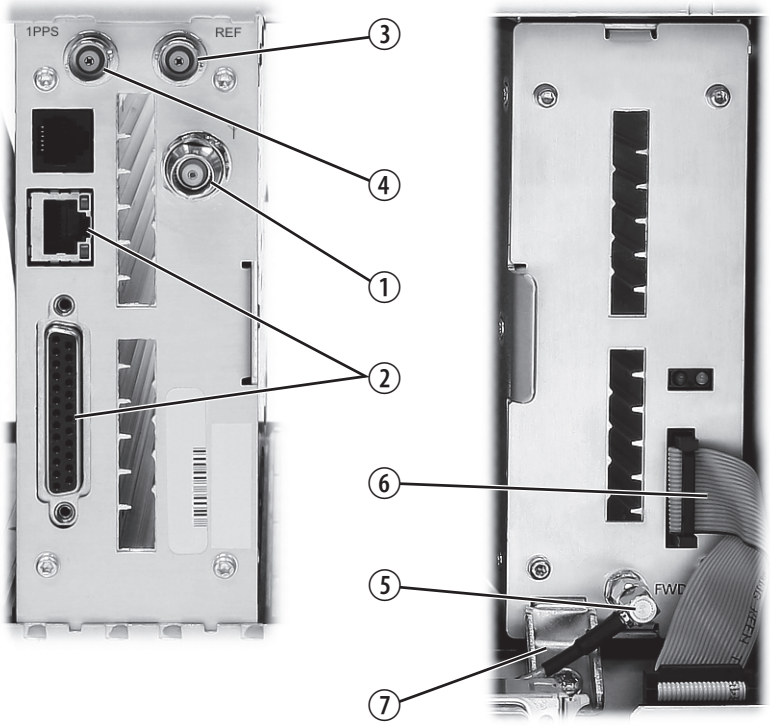
1. If you have not already done so, carry out the instructions in "Preliminary Disassembly" on page 101.

2. At the rear of the reciter, unplug the RF input cable ①, any system cables ②, and the external reference ③ and 1PPS ④ cables (if fitted).

3. At the front of the reciter, unplug the RF output cable ⑤, and move it to one side. Unplug both ends of the system control bus cable ⑥ and remove it.

4. Loosen the screw securing the retaining clamp ⑦ and rotate the clamp through 90° to clear the module.

5. Slide the reciter out of the subrack, taking care not to damage any of the cables.



Refitting

1. Slide the replacement reciter into the subrack and secure it with the retaining clamp.
2. Reconnect all the front and rear panel cables previously disconnected. Ensure the front panel cables are positioned correctly, and retained where required by the cable retaining clips in the top of the subrack (refer to "Appendix B – Inter-Module Connections" on page 113).
3. Tighten the nut on the SMA connector to a torque of 5 lbf·in (0.6 N·m).
4. Carry out the instructions in "Final Reassembly" on page 110.

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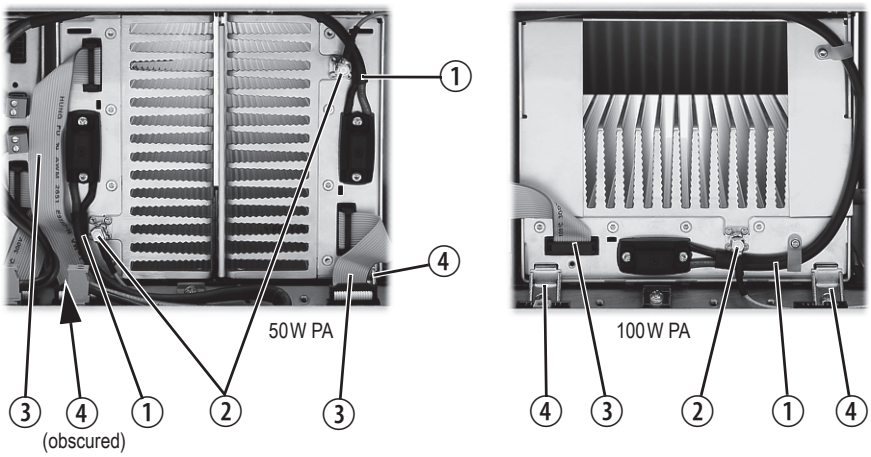
8.4 Replacing a Power Amplifier

Notice Before removing a PA, disconnect the DC input and RF input first, followed by the RF output. After refitting the PA, reconnect the RF output first, followed by the RF input, and then the DC input.

Removal

1. If you have not already done so, carry out the instructions in "Preliminary Disassembly" on page 101.
2. At the front of the PA, unplug the DC input cable ① and the RF input cable ②, and move both cables to one side. Unplug both ends of the system control bus cable ③ and remove it.
3. At the rear of the PA, unplug the RF output cable.
4. Loosen the screw securing the retaining clamp(s) ④ and rotate the clamp(s) through 90° to clear the module.
5. Slide the PA out of the subrack, taking care not to damage any of the cables.



Refitting

1. Slide the replacement PA into the subrack and secure it with the retaining clamp(s).
2. At the rear of the PA, connect the RF output cable.
3. At the front of the PA, connect the RF input cable, followed by the DC input cable.
4. Reconnect all the other front and rear panel cables previously disconnected. Ensure the front panel cables are positioned correctly, and retained where required by the cable retaining clips in the top of the subrack (refer to "Appendix B – Inter-Module Connections" on page 113).
5. Tighten the nut on the SMA connector to a torque of 5 lbf·in (0.6 N·m).

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6. Carry out the instructions in “Final Reassembly” on page 110.

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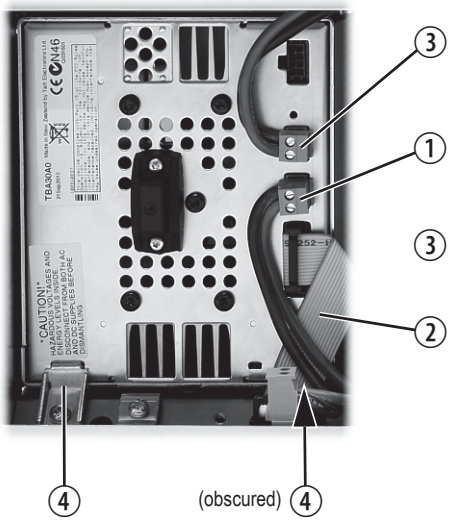
8.5 Replacing a Power Management Unit

Notice You must disconnect the AC and DC power cables before removing the PMU from the subrack.

Removal

1. If you have not already done so, carry out the instructions in "Preliminary Disassembly" on page 101.
2. At the front of the PMU, unplug and remove the output power cable ① to the subrack interconnect board. Also unplug and remove the system control bus cable ②.
3. Unplug the output power cable to the PA ③ and move it to one side.
4. Loosen the screws securing the retaining clamps ④ and rotate the clamps through 90° to clear the module.
5. Slide the PMU out of the subrack, taking care not to damage any of the cables.



Refitting

1. Slide the replacement PMU into the subrack and secure it with the retaining clamps.
2. Reconnect all the front and rear panel cables previously disconnected. Connect the DC power cables on the rear panel as shown in Figure 4.8 on page 69. Tighten the screws to a torque of 18–20 lbf·in (2–2.25 N·m). Ensure the front panel cables are positioned correctly, and retained where required by the cable retaining clips in the top of the subrack (refer to "Appendix B – Inter-Module Connections" on page 113).
3. Carry out the instructions in "Final Reassembly" on page 110.

8.6 Replacing the Module Guide Rails

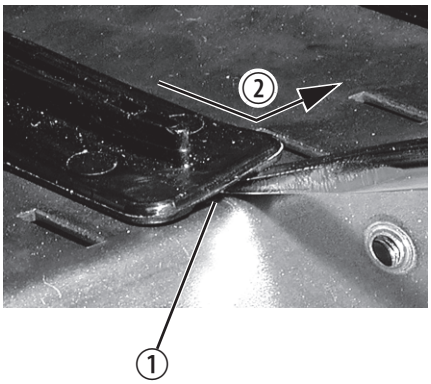
The module guide rails are held in place by four hooks that fit through the slots in the top and bottom of the subrack. There is also a locking tab which prevents the guide rails from working loose.

Notice Subracks produced from late 2008 onwards have wider slots than earlier subracks. Guide rails designed for these wider slots will not fit older subracks with narrow slots.

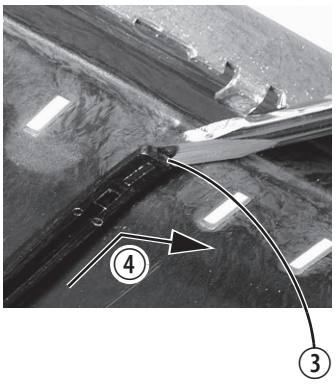
Removal

1. Bottom Guide Rails
   a. Insert a small flat-blade screwdriver under the front end of the guide rail and lift it slightly ①. This will ensure the small locking tab is clear of the slot in the subrack.
   b. While holding the front end of the guide rail up, pull the guide rail towards the front of the subrack ② and lift it clear of the slots.
2. Top Rails
   a. Insert a small flat-blade screwdriver under the rear end of the guide rail and lift it slightly ③. This will ensure the small locking tab is clear of the slot in the subrack.
   b. While holding the rear end of the guide rail up, pull the guide rail towards the rear of the subrack ④ and lift it clear of the slots.

bottom guide rail



top guide rail



Refitting

1. Bottom Guide Rails
   a. With the locating hooks pointing towards the rear of the subrack, insert the hooks into the slots in the subrack.
   b. Push the guide rail towards the rear of the subrack until you hear the locking tab “click” into place.
2. Top Guide Rails
   a. With the locating hooks pointing towards the front of the subrack, insert the hooks into the slots in the subrack.
   b. Push the guide rail towards the front of the subrack until you hear the locking tab “click” into place.

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8.7 Replacing the Subrack Interconnect Board

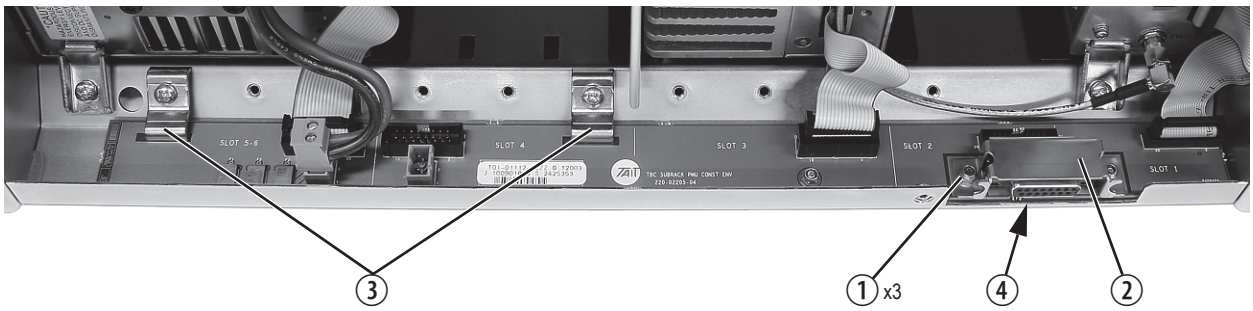
Removal

1. If you have not already done so, carry out the instructions in "Preliminary Disassembly" on page 101.
2. Disconnect any system control bus cables and DC power cables from the subrack board.
3. Remove the three M3 nuts and spring washers ① securing the right end of the board to the subrack.
4. Remove the D-range cover ②.
5. Remove the two retaining clamps ③ securing the left end and centre of the board.
6. Remove the board.

Refitting

1. If previously removed, replace the insulator ④.
2. Refit the board and D-range cover, and secure with the M3 nuts and spring washers. Replace the two retaining clamps.
3. Reconnect the system control bus cables and reciter DC cables as shown in "Appendix B – Inter-Module Connections" on page 113.

Figure 8.1 Replacing the subrack interconnect board



8.8 Final Reassembly

Notice You must refit the correct type of front panel to your base station. There are several small but important differences between the front panel for a 50 W base station and the front panel for a 100 W base station. These differences are in the duct for the PA fan and are described in the following paragraphs.

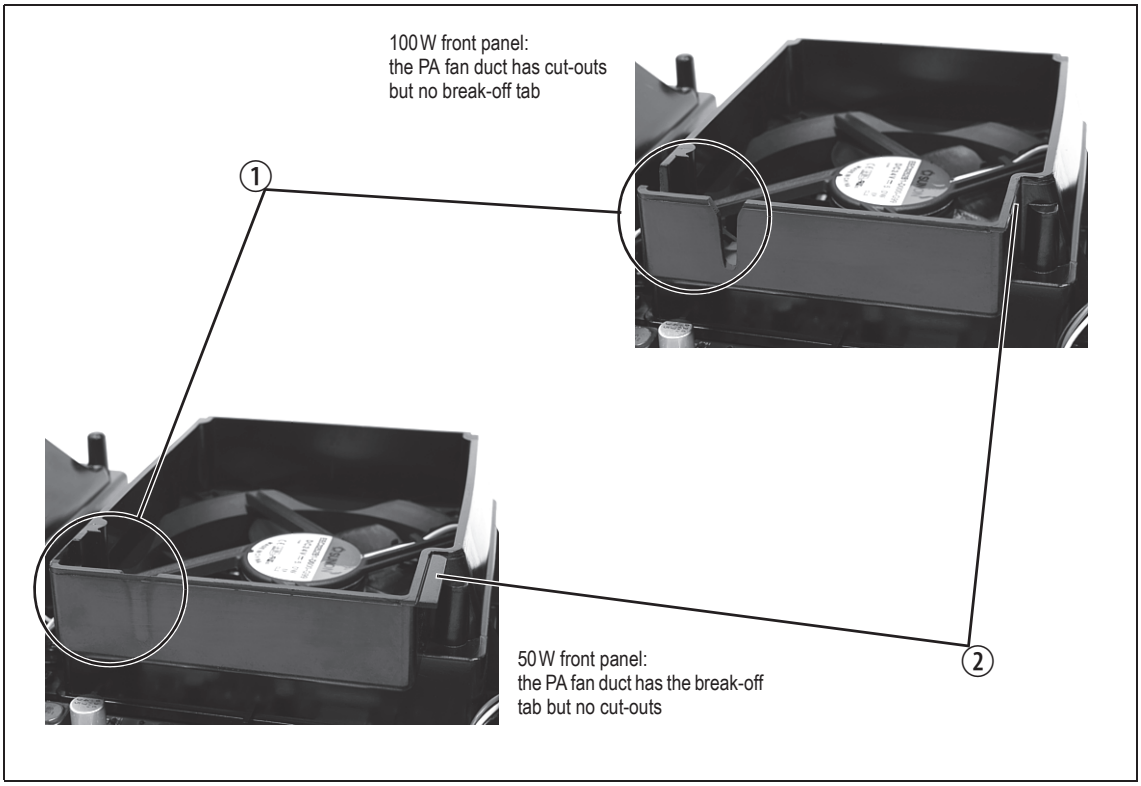
50 W Front Panel

The PA fan duct does not have the cut-outs ① required for the 100 W PA RF and DC cables. The break-off tab ② will also still be present and will jam on the system control bus. Do not try to fit this front panel to a 100 W base station or you will damage these cables and possibly the front panel itself.

100 W Front Panel

Do not fit this front panel to a 50 W base station. The presence of the cut-outs and absence of the break-off tab will allow air to escape and reduce the velocity of air directed through the heatsink.

Figure 8.2 Identifying the correct front panel



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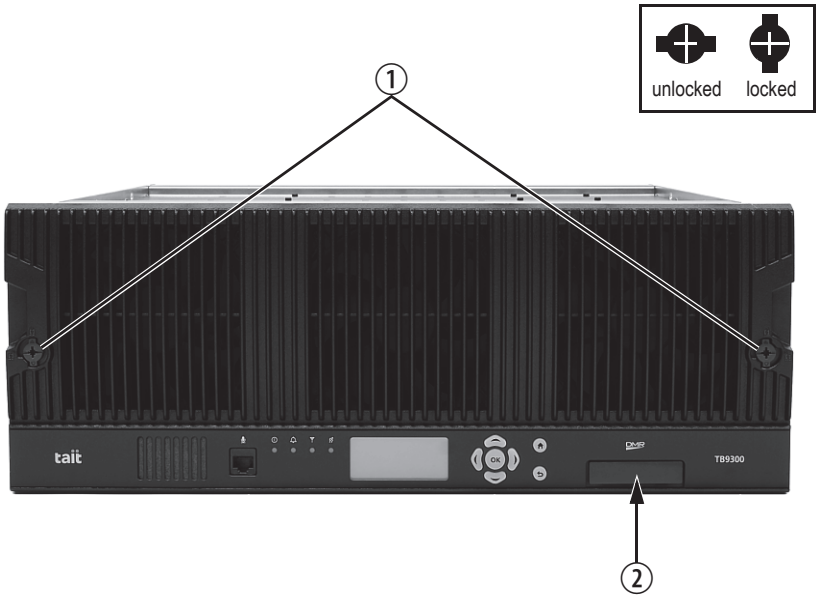
1. Before fitting the front panel, ensure that all cables are secured and positioned correctly so they are clear of the fan ducts (refer to "Appendix B – Inter-Module Connections" on page 113). Otherwise the panel may not fit properly, or you may damage the cables.

2. In 50 W base stations, check that the airflow separator is fitted correctly.

3. Refit the Front Panel
   a. Ensure that the fasteners ① are in the unlocked position.
   b. Fit the front panel onto the locating pegs on the subrack.
   c. Secure each fastener with a quarter turn clockwise.
   d. **Push the self-aligning D-range connector ② fully in.**



4. Before powering up the base station, check that all power, RF and system cables are connected correctly and securely at the rear of the base station.

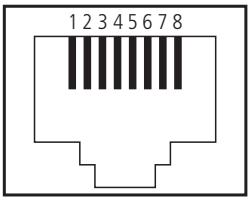
Notice When refitting modules, make sure they are fitted correctly into the subrack and all retaining clamps are securely tightened. The recommended torque for the retaining clamp screws is 17 lbf·in (1.9 N·m). As well as holding the modules in place, the retaining clamps push the modules hard against the rear rail of the subrack to ensure a good ground connection between the modules and the subrack.

Appendix A – Interface Pin Allocations

System Interface Connector

For the pin allocations for the system interface D-range connector, see "Connecting General Purpose Inputs and Outputs" on page 77.

Ethernet Connector

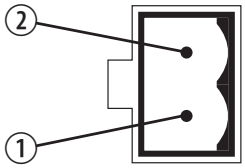


external view

Pin	Description
1	transmit data +
2	transmit data –
3	receive data +
4	not connected
5	not connected
6	receive data –
7	not connected
8	not connected

PMU Auxiliary DC Output

The pin allocations for the auxiliary DC output on the PMU are given in the following table.



2-pin connector - external view

Pin	Description
1	+V output
2	–V output

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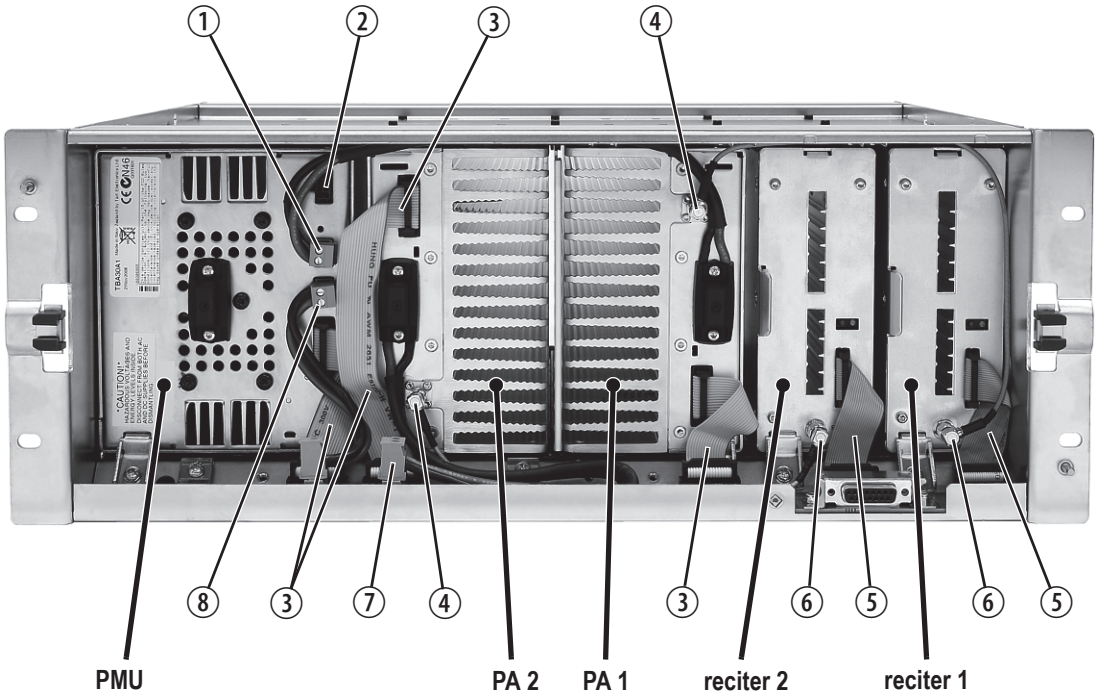
Appendix B – Inter-Module Connections

Dual 50 W Base Station

The connections between modules at the front of a dual 50 W base station are shown below.

Dual 50 W base station inter-module connections



① 28 VDC output to PA 1

② not used

③ system control bus

④ RF input from reciter

⑤ system control bus and 28 VDC input

⑥ RF output to PA

⑦ 28 VDC input to PA2

⑧ 28 VDC output to subrack interconnect board

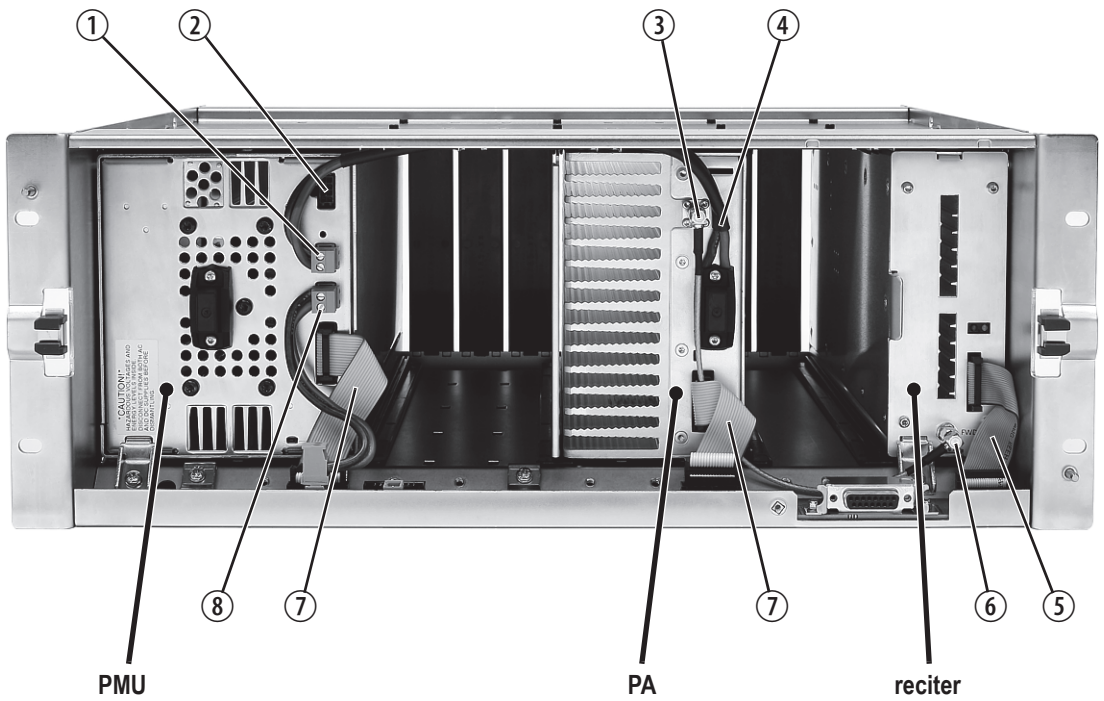
DC Supply

PA 1 is powered by a direct connection from the PMU. The other modules in the subrack are powered from the PMU via the subrack interconnect board. The DC supply to the reciters is via the system control bus ribbon cable.

Single 50 W Base Station

The connections between modules at the front of a single 50 W base station are shown below.

Single 50 W base station inter-module connections



① 28 VDC output for PA

② not used

③ RF input from reciter

④ 28 VDC input cable from PMU

⑤ system control bus and 28 VDC input

⑥ RF output to PA

⑦ system control bus

⑧ 28 VDC output to subrack interconnect board

DC Supply

The PA is powered by a direct connection from the PMU. The reciter is powered from the PMU via the subrack interconnect board and system control bus ribbon cable.

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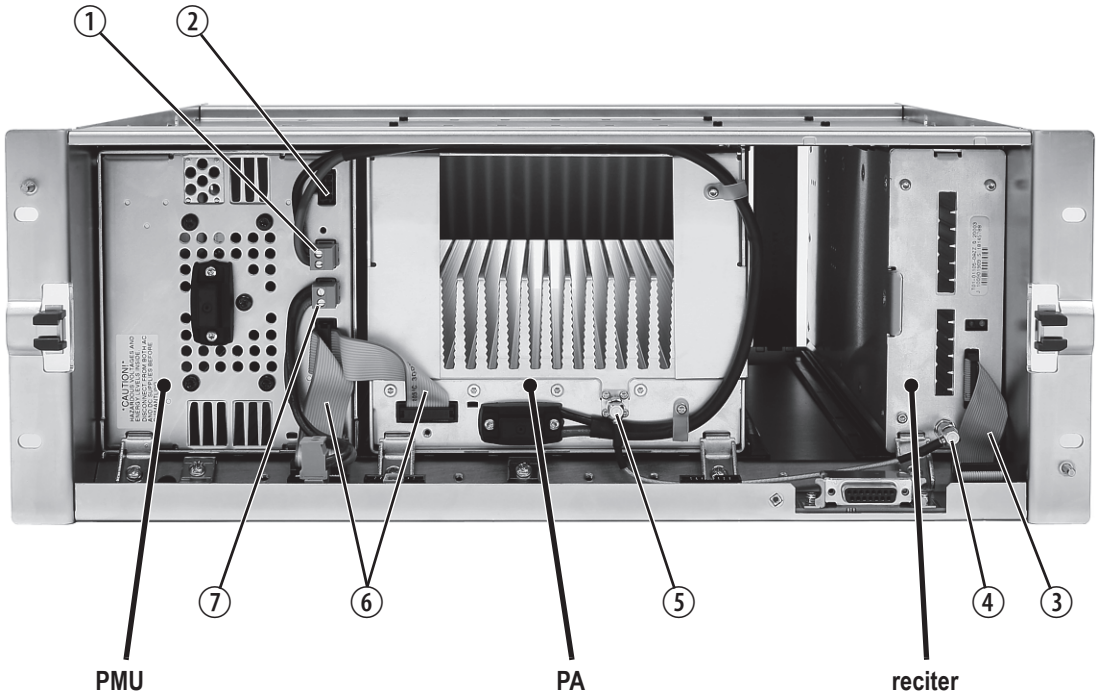
100W Base Station

The connections between modules at the front of a 100W base station are shown below.

100W base station inter-module connections



1. 28VDC output for PA
2. not used
3. system control bus and 28VDC input
4. RF output to PA
5. RF input from reciter
6. system control bus
7. 28VDC output to subrack interconnect board

DC Supply

The PA is powered by a direct connection from the PMU. The reciter is powered from the PMU via the subrack interconnect board and system control bus ribbon cable.

Glossary

This glossary contains an alphabetical list of terms and abbreviations related to the TaitNet network and the TB9300 base station.

AAA protocols
AAA commonly stands for Authentication, Authorization and Accounting. It refers to an IP-based security architecture that allows centralized, controlled access to devices in a network.

ADC
Analog-to-Digital Converter. A device for converting an analog signal to a digital signal that represents the same information.

AMBE+2™
Advanced Multiband Excitation. A voice compression technology patented by Digital Voice Systems, Inc and used in the vocoders of DMR radios.

ANI
Automatic Number Identification. A service that provides the receiver of a call with a numerical identifier or alphanumeric label of the caller.

ARP
Address Resolution Protocol is an IP protocol used to map IP network addresses to the hardware addresses used by a data link protocol.

base station
A radio receiver and transmitter that is located in a specific place (at a site) that enables a two-way radio to communicate with a dispatcher or over a larger range with other two-way radios. Specifically, Tait TB9300 equipment in a subrack.

battery protection mode
A PMU enters battery protection mode when its DC input drops below the user-configured power shutdown voltage. In battery protection mode, the PMU will shut down the base station to protect the battery. The base station will restart when the DC input reaches the user-configured startup voltage.

bearer network
Telecom equipment that is used to carry user data.

BER
Bit Error Rate. A measure of the quality of digital transmission, expressed as a percentage. The BER indicates the proportion of errors to correctly received digits in a received signal.

BSP
Base Station Protocol. A proprietary protocol operating over IP for the exchange of channel control messages between a base station and a trunking node controller.

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call
A complete exchange of information between two or more parties. A call requires a receive signal path and a transmit signal path. In conventional systems, a call is an over, but in trunked systems, a call may be a conversation, made up of a number of overs.

channel
1. A path through which signals can flow.
2. In the RF domain, a frequency pair (or just a single frequency in a simplex system). Also called a physical channel in this manual.
3. One of the two timeslots that DMR provides for each radio frequency (physical channel). Refer to “logical channel”.
4. A set of configuration information that defines the frequency pair and other related settings (a channel configuration). “Channel” has this meaning in the web interface.

channel spacing
The bandwidth that a channel nominally occupies. If a base station has a channel spacing of 12.5 kHz, there must be a separation of at least 12.5 kHz between its operating frequencies and those of any other equipment.

channel table
The base station’s database of channel configurations.

CODEC
A device which combines analog-to-digital conversion (coding) and digital-to-analog conversion (decoding).

colour code
A marker determining which transmitted signals are gated. Inbound messages must carry this code to be listened to. The colour code is configured at the Node Controller. It can prevent interference from other networks and define private talkgroups.

configuration file
Consists of all the configuration settings needed for a base station, stored as a file.

conventional network
Systems that do not have centralized management of channel access. System operation is entirely controlled by system end users.

CTCSS
CTCSS (continuous tone controlled squelch system), also known as PL (private line), is a type of signaling that uses subaudible tones to segregate groups of users.

CWID
Continuous Wave Identification is a method of automatically identifying the base station using a Morse code. Continuous wave means transmission of a signal with a single frequency that is either on or off, as opposed to a modulated carrier.

DAC
Digital-to-Analog Converter. A device for converting a digital signal to an analog signal that represents the same information.

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DDC Digital Down Converter. A device which converts the digitized IF signal of the receiver down to a lower frequency (complex baseband) to suit the DSP.

dispatcher A person who gives official instructions by radio to one or more mobile stations.

DMR Digital Mobile Radio. A set of standards and requirements endorsed by ETSI and intended for professional mobile radio (PMR) users.

dotted quad A method for writing IPv4 addresses. The form is DDD.DDD.DDD.DDD where DDD is an 8-bit decimal number.

downlink The transmission path from fixed equipment to mobile stations.

DSP Digital Signal Processor.

duplex Providing transmission and reception in both directions simultaneously.

duty cycle Used in relation to the PA, it is the proportion of time (expressed as a percentage) during which the PA is transmitting.

EIA Electronic Industries Alliance. Accredited by the American National Standards Institute (ANSI) and responsible for developing telecommunications and electronics standards in the USA.

EMC Electromagnetic Compatibility. The ability of equipment to operate in its electromagnetic environment without creating interference with other devices.

ETSI European Telecommunications Standards Institute. The non-profit organization responsible for producing European telecommunications standards.

fallback mode An operational mode of Tait DMR and MPT trunked networks. It comes into effect when the base station loses communication with the trunking node controller. In fallback, one base station operates a control channel and allocates calls to the other traffic channels at the site. The base station in fallback mode will accept all registrations without requiring authorisation.

FCC Federal Communications Commission. The FCC is an independent United States government agency that regulates interstate and international radio communications.

feature code The alphanumeric code used to identify a feature set.

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feature set A function or mode of operation of the base station which can be enabled or disabled using the web interface. Each feature set requires a license to be purchased from Tait before it can be enabled.

feature license key The unique set of digits belonging to a license which is programmed into the base station to enable a feature set.

fill-in receiver An additional receiver placed within the coverage area of a base station to receive MS transmissions that are too weak to be received by that base station.

FLASH Electrically block-erasable and programmable read-only memory.

FM Frequency Modulation. Often used as an adjective to denote analog radio transmission.

frequency band The range of frequencies that the equipment is capable of operating on.

front panel The cover over the front of the base station containing the indicator LEDs, four-line LCD display, user controls and cooling fans.

gating The process of opening and closing the receiver gate. When a valid signal is received, the receiver gate opens, letting the signal through.

group call A call that is sent to more than one MS simultaneously.

heartbeat message A message whose purpose is to indicate to the receiver that the sender is operational.

hiccup mode Many power supplies switch off in the event of a short-circuit and try to start again after a short time (usually after a few seconds). This “hiccup”-type of switching off and on is repeated until the problem is eliminated.

hostname The unique name by which a network element is known on the network.

hub A unit for connecting hosts together. It sends all incoming Ethernet packets to all the other hosts.

hysteresis The difference between the upper and lower trigger points. For example, the receiver unmutes when the upper trigger point is reached, but will mute again until the level falls to the lower trigger point. An adequate hysteresis prevents the receiver gate from repeatedly muting and unmuting when the level varies around the trigger point.

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I^2C A bi-directional two-wire serial bus which is used to connect integrated circuits (ICs). I^2C is a multi-master bus, which means that multiple chips can be connected to the same bus, and each one can act as a master by initiating a data transfer. Used in the TB9300 for communications between each reciter and its associated PA, and between reciter 1 and the PMU.

inbound Describes the direction of a signal: from an MS over the air interface to the fixed station.

IP Internet Protocol is a protocol for sending data packets between hosts.

isolator A passive two-port device which transmits power in one direction, and absorbs power in the other direction. It is used with a PA to prevent damage to the RF circuitry from high reverse power.

kernel The core executable of an operating system.

LAN Local Area Network. A computer network that interconnects computers in a limited area, such as a single building or group of buildings.

LED Light Emitting Diode. Also the screen representation of a physical LED.

license Some operational functions of the base station are controlled by licenses. Purchasing a license from Tait allows you to enable the feature set which includes the required functionality.

logical channel One of the two timeslots provided in each TB9300 radio frequency. Each timeslot can function as a separate logical channel, independent of the other timeslot. One radio frequency can therefore carry two separate voice or data streams, one in each timeslot.

mobile station The term used in the ETSI DMR standard documents for a two-way radio (generally a mobile or a portable radio) conforming to the DMR specifications.

mute Prevents audio from being passed to the radio's speaker.

MS Mobile Station (see above).

NAT Network Address Translation allows the use of a single IP address for a whole network of computers. A NAT sits between the public Internet and the network it serves, and works by rewriting IP addresses and port numbers in IP headers on the fly so the packets all appear to be coming from (or going to) the single public IP address of the NAT device instead of the actual source or destination.

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network element Any device that is network-connected. A TaitNet digital network consists of a number of network elements. The TB9300 base station is a network element designed and manufactured by Tait.

NTP Network Time Protocol is a protocol and software implementation for synchronizing the clocks of computer systems across a network. An NTP server obtains the correct time from a time source and sets the local time in each connected computer.

octet A set of 8 bits.

Offline mode A mode of operation in which active service is suspended so that special operations can be carried out, such as programming in a new configuration or carrying out certain diagnostic tests.

Online mode The normal operating mode of the base station.

outbound Describes the direction of a signal: from a fixed station over the air interface to an MS.

over A single transmission, which begins when a user presses PTT and ends when the user stops pressing.

PA The Power Amplifier is a base station module that boosts the exciter output to the required transmit level.

PCB Printed Circuit Board.

PMU The Power Management Unit is a module in the base station that provides power to the subrack and monitors power conditions.

privileges A set of access rights to the web interface functions. There are Administrator, Maintainer and Monitor privileges.

PSTN Public Switched Telephone Network: the public telephone network.

PTT Push To Talk. The button on an MS that keys the transmitter.

QoS Quality Of Service. A router feature that gives real-time data such as voice calls priority over other data.

reciter A module of a base station that provides both receiver and exciter functionality as well as the interface to the network.

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repeater talkaround Allows the MS to bypass repeater operation and so communicate directly with other mobile stations. While repeater talkaround is active, all transmissions are made on the receive frequency programmed for the channel.

RISC Reduced Instruction Set Computer. A type of microprocessor that recognizes a relatively limited number of instructions. The reciter's control board has a RISC microprocessor.

router A router is an internetwork packet switch that switches data packets from an input interface to an output interface. The interfaces can be of different types.

RS-232 A protocol for serial communications between a DTE (data terminal equipment) and a DCE (data communications equipment) device.

RS-485 An updated version of the RS-232 protocol for serial communications between multiple devices.

RSSI Received Signal Strength Indicator is a level that indicates the strength of the received signal.

RTP Real Time Protocol is an Internet protocol that supports the real-time transmission of voice and data.

Rx Receiver.

SAW filter Surface Acoustic Wave filter. A band pass filter that can be used to filter both RF and IF frequencies. A SAW filter uses the piezoelectric effect to turn the input signal into vibrations that are turned back into electrical signals in the desired frequency range.

selectivity The ability of a radio receiver to select the wanted signal and reject unwanted signals on adjacent channels (expressed as a ratio).

sensitivity The sensitivity of a radio receiver is the minimum input signal strength required to provide a usable signal.

simplex Able to provide transmission and reception in only one direction at a time.

SINAD Signal plus Noise and Distortion is a measure of signal quality. It is the ratio of (signal + noise + distortion) to (noise + distortion). A SINAD of 12 dB corresponds to a signal-to-noise ratio of 4:1.

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site	1. The base station equipment at a particular location. This includes power supplies, transmitters, receivers, network interfaces and controllers. 2. The location of that equipment.
SNMP	Simple Network Management Protocol. A protocol used (for example) by the trunking site controller to monitor the base station's parameters and alarm status.
standalone node	The base station itself can act as a DMR trunking controller, but with limited functionality. The base station is then said to be a standalone node.
syslog collector	A program that can receive, display, and log syslog messages from many devices.
syslog protocol	A standard protocol used for the transmission of event notification messages across IP networks. TB9300 base stations can send messages such as alarms to an IP address on the Tait Network. The base station's logs store messages in the syslog format.
system control bus	Provides the following physical paths in a TB9300 base station: ■ I^2C and RS-485 communications between the modules in the subrack ■ fan power from the PMU ■ power connections for the reciter and front panel.
TaitNet	Brand name for any PMR network designed and manufactured by Tait Limited.
TaitNet DMR network	A set of Tait base stations and controllers interconnected by an IP network that can carry voice and data traffic.
TB9300 Base Station	A base station consisting of the equipment necessary to receive and transmit on one physical channel in a DMR or analog network. Generally, this means a reciter, a PA, and a PMU. Often abbreviated to TB9300 or base station.
TCP	Transmission Control Protocol. A complex protocol on top of IP for sending reliable streams of data with flow control.
TDMA	Time Division Multiple Access. In the TB9300 each radio frequency provides two timeslots, with each timeslot representing one logical channel.
TELCO	Telephone company.

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TIA	Telecommunications Industry Association
toggle	Describes the switching between two states. If something is on, toggling it turns it off. If it is off, toggling it turns it on.
tone	A sound wave of a particular frequency.
Tx	Transmitter.
UDP	User Datagram Protocol. A simple protocol on top of IP for sending streams of data.
uplink	The transmission path from mobile stations to fixed equipment.
UTC	Coordinated Universal Time (word order from French). An international time standard that has replaced Greenwich Mean Time.
valid signal	A signal that the receiver unmutes to. A signal is valid, for example, when it is strong enough to be decoded and when it has the specified NAC.
VDP	Voice Data Protocol. A proprietary protocol operating over IP for the exchange of voice and data between a base station and a trunking node controller.
voice stream	A digitized voice signal that passes through the main switch.
VoIP	Voice over IP. The name for the technology that puts speech signals in packets and then routes them over an IP backbone network.
VPN	Virtual Private Network. A private communications network used to communicate confidentially over a non-private network.
VSWR	Voltage Standing Wave Ratio is the ratio of the maximum peak voltage anywhere on the transmission line to the minimum value anywhere on the transmission line. A perfectly matched line has a VSWR of 1:1. A high ratio indicates that the antenna subsystem is poorly matched.
watchdog	A circuit that checks that the system is still responding. If the system does not respond (because the firmware has locked up), the circuit generally resets the system.

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Directive 1999/5/EC Declaration of Conformity

da Dansk

Undertegnede Tait Limited erklærer herved, at følgende udstyr TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Se endvidere: www.taitradio.com/eudoc

de Deutsch

Hiermit erklärt Tait Limited die Übereinstimmung des Gerätes TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG.
Siehe auch: www.taitradio.com/eudoc

el Ελληνικά

Η Tait Limited δηλώνει ότι το TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B συμμορφώνεται προς τις ουσιώδεις απαιτήσεις και τις λοιπές σχετικές διατάξεις της Οδηγίας 1999/5/ΕΚ.
Βλέπε επίσης: www.taitradio.com/eudoc

en English

Tait Limited declares that this TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B complies with the essential requirements and other relevant provisions of Directive 1999/5/EC.
See also: www.taitradio.com/eudoc

es Español

Por medio de la presente Tait Limited declara que el TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Vea también: www.taitradio.com/eudoc

fi Suomi

Tait Limited vakuuttaa täten että TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Katso: www.taitradio.com/eudoc

fr Français

Par la présente, Tait Limited déclare que les appareils TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B sont conformes aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
Voir aussi: www.taitradio.com/eudoc

it Italiano

Con la presente Tait Limited dichiara che questo TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Vedi anche: www.taitradio.com/eudoc

nl Nederlands

Hierbij verklaart Tait Limited dat het toestel TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/ EG.
Zie ook: www.taitradio.com/eudoc

pt Português

Tait Limited declara que este TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B está conforme com os requisitos essenciais e outras provisões da Directiva 1999/5/CE.
Veja também: www.taitradio.com/eudoc

sv Svensk

Härmed intygar Tait Limited att denna TBCB1A, TBCB1B, TBCB1X, TBCH1A, TBCH1B, TBCH2A & TBCH2B står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Se även: www.taitradio.com/eudoc

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