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**TB8100** base station

# Installation Guide



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## Associated Documentation

TB8100 Installation and Operation Manual.  
TB8100 Service Manual (service centres only).  
TB8100 Specifications Manual.  
TB8100 Service Kit and Alarm Center User's Manuals and online Help.  
TB8100 Calibration Kit User's Manual and online Help.

All available TB8100 product documentation is provided on the Product CD supplied with the base station. Updates may also be published on the Tait support website. Consult your nearest Tait Dealer or Customer Service Organisation for more information

## Tuning and Configuration

If your TB8100 BSS has not been tuned to your requirements at the factory, you will need to tune the reciter modules before operating them in your radio system. To do this you will need to use the Calibration Kit software included on the Product CD, plus the TB8100 calibration test unit. The TB8100 BSS has been programmed with a default software configuration and default passwords at the factory. You will need to use the Service Kit software to configure your BSS to suit the requirements of your radio system. Refer to the Calibration Kit and Service Kit documentation for full details on these procedures.

# 1 Installation

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This chapter describes how to install the TB8100 BSS in a standard 19 inch rack or cabinet. It also provides some general information on safety precautions and site requirements. We recommend that you read the entire chapter before beginning the installation.

## 1.1 Personal Safety

### 1.1.1 Lethal Voltages



**Warning!!** The PMU contains voltages that may be lethal. Refer to the ratings label on the rear of the module.

The TB8100 BSS must be installed so that the rear of the PMU is located in a service access area. The PMU must be connected to the mains supply source by trained personnel in accordance with local and national regulations.

**Disconnect the mains IEC connector and wait for five minutes for the internal voltages to self-discharge before dismantling. The AC power on/off switch does not isolate the PMU from the mains. It breaks only the phase circuit, not the neutral.**

The PMU should be serviced only by qualified technicians. There are no user-replaceable parts inside. If the PMU is damaged and does not function properly, stop the module safely and contact your nearest Tait Dealer or Customer Service Organisation immediately.

All servicing should be carried out only when the PMU is powered through a mains isolating transformer of sufficient rating. We **strongly recommend** that the mains power to the whole of the repair and test area is supplied via an earth leakage circuit breaker.

### 1.1.2 Explosive Environments



**Warning!!** Do not operate TB8100 BSS equipment near electrical blasting caps or in an explosive atmosphere. Operating the equipment in these environments is a definite safety hazard.

### 1.1.3 Proximity to RF Transmissions

Do not operate the transmitter when someone is standing within 90 cm (3 ft) of the antenna. Do not operate the transmitter unless you have checked that all RF connectors are secure.

### 1.1.4 High Temperatures

Take care when handling a PMU or PA which has been operating recently. Under extreme operating conditions (+60°C [+140°F] ambient air temperature) or high duty cycles the external surfaces of the PMU and PA can reach temperatures of up to +80°C (+176°F).

## 1.2 Equipment Safety

### 1.2.1 ESD Precautions



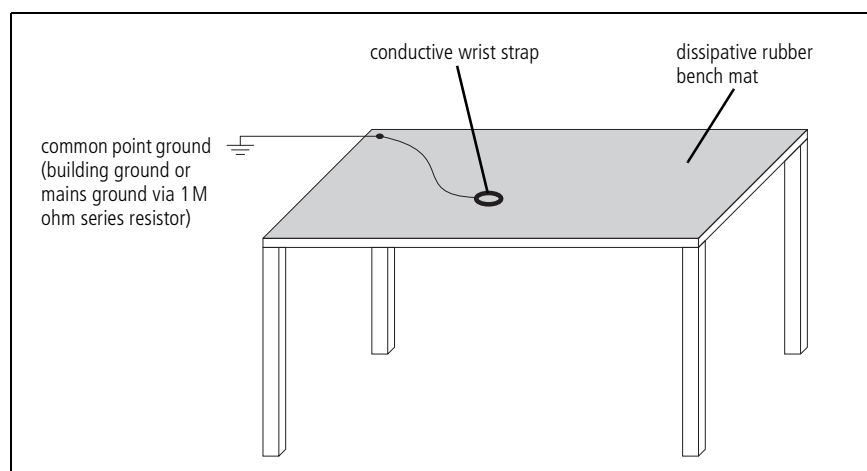
#### **Important**

This equipment contains devices which are susceptible to damage from static charges. You must handle these devices carefully and according to the procedures described in the manufacturers' data books.

We recommend you purchase an antistatic bench kit from a reputable manufacturer and install and test it according to the manufacturer's instructions. [Figure 1.1](#) shows a typical antistatic bench set-up.

You can obtain further information on antistatic precautions and the dangers of electrostatic discharge (ESD) from standards such as ANSI/ESD S20.20-1999 or BS EN 100015-4 1994.

**Figure 1.1** Typical antistatic bench set-up



## 1.2.2 Antenna Load



### **Important**

The PA may be damaged if the load is removed or switched while the PA is transmitting.

To protect the PA output stage from load transients (i.e. switching or removing the load), we recommend that you fit an isolator 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 or combining equipment between the isolator and the PA.

## 1.2.3 Equipment Grounding

To ensure safe operation the TB8100 BSS equipment must be correctly grounded as described in these installation instructions.

## 1.2.4 Installation and Servicing Personnel

The TB8100 BSS should be installed and serviced only by qualified personnel.

# 1.3 Regulatory Information

## 1.3.1 Distress Frequencies

The 406 to 406.1 MHz frequency range is reserved worldwide for use by Distress Beacons. Do **not** program transmitters to operate in this frequency range.

## 1.3.2 FCC Compliance<sup>1</sup>

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

## 1.3.3 Unauthorised Modifications

Any modifications you make to this equipment which are not authorised by Tait Electronics Ltd may invalidate your compliance authority's approval to operate the equipment.

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1. Refer to the TB8100 Specifications Manual for more information on the compliance standards to which the TB8100 BSS equipment has been tested and approved.

### 1.3.4 Health, Safety and Electromagnetic Compatibility in Europe

In the European Community, radio and telecommunications equipment is regulated by Directive 1999/5/EC, also known as the Radio and Telecommunications Terminal Equipment (R&TTE) directive. The requirements of this directive include protection of health and safety of users, as well as electromagnetic compatibility.

#### Intended Purpose of Product

This product is an FM radio transceiver. Its intended purpose is for radio communication in Private Mobile Radio (PMR) services or Public Access Mobile Radio (PAMR) services.



#### **Important**

This product can be programmed for frequencies or emissions that may make its use illegal. A license must be obtained before this product is used. All license requirements must be observed. Limitations may apply to transmitter power, operating frequency, channel spacing, and emission.

#### Declaration of Conformity

Brief Declarations of Conformity appear [on page 27](#). You can download the formal Declaration of Conformity from <http://eudocs.taitworld.com/>. You can also obtain a signed and dated paper copy of the Declaration of Conformity from Tait Europe Ltd.

## 1.4 Environmental Conditions

### 1.4.1 Operating Temperature Range

The operating temperature range of the TB8100 BSS is  $-30^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$ ) ambient temperature. Ambient temperature is defined as the temperature of the air at the intake to the cooling fans.

### 1.4.2 Humidity

The humidity should not exceed 95% relative humidity through the specified operating temperature range.

### 1.4.3 Dust and Dirt

For uncontrolled environments, the level of airborne particulates must not exceed  $100\mu\text{g}/\text{m}^3$ .

## 1.5 Grounding and Lightning Protection

### 1.5.1 Electrical Ground

The TB8100 BSS modules are grounded by physical contact between the module case and the subrack. To ensure a good ground connection you must tighten each module retaining clamp securely (refer to “Replacing Modules” in the Installation and Operation Manual for the correct torque).

A threaded grounding connector is provided on the rear of the subrack for connection to the site ground point (refer to “Connection” in the Installation and Operation Manual for more details).

### 1.5.2 Lightning Ground

It is extremely important for the security of the site and its equipment that you take adequate precautions against lightning strike. Because it is outside the scope of this manual to provide comprehensive information on this subject, we recommend that you conform to your country’s standards organisation or regulatory body.

## 1.6 Recommended Tools

It is beyond the scope of this manual to list every tool that an installation technician should carry. However, the following tools are specifically required for installing the TB8100 BSS:

- Pozidriv PZ3 screwdriver for the M6 screws used in the DC input terminals on the PMU; M6 screws are also used to secure the subrack to the cabinet in Tait factory-assembled systems
- Pozidriv PZ2 screwdriver for the M4 screws used to secure the module retaining clamps
- 0.25in or 6mm flat blade screwdriver for the fasteners used to secure the front panel to the subrack
- 8mm AF spanner for the SMA connectors.

You can also obtain the TBA0ST2 tool kit from your nearest Tait Dealer or Customer Service Organisation. It contains the basic tools needed to install, tune and service the TB8100 BSS.

## 1.7 Ventilation

Always ensure there is adequate ventilation around the TB8100 BSS. **Do not** operate it in a sealed cabinet. You **must** keep the ambient temperature within the specified range, and we **strongly** recommended that you ensure that the cooling airflow is not restricted.



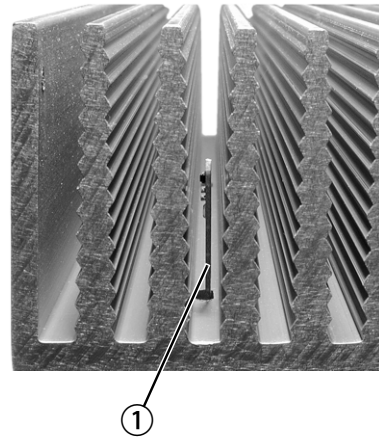
### **Important**

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 BSS, do not operate it for more than a few minutes with the front panel removed (e.g. for servicing purposes).

### 1.7.1 Ambient Air Temperature Sensor

The ambient air temperature reading for the TB8100 BSS is provided by the ambient air temperature sensor board ① fitted to the PA control board.

The sensor board is inserted through slots in the control board and heatsink to be positioned between the heatsink fins.



### **Important**

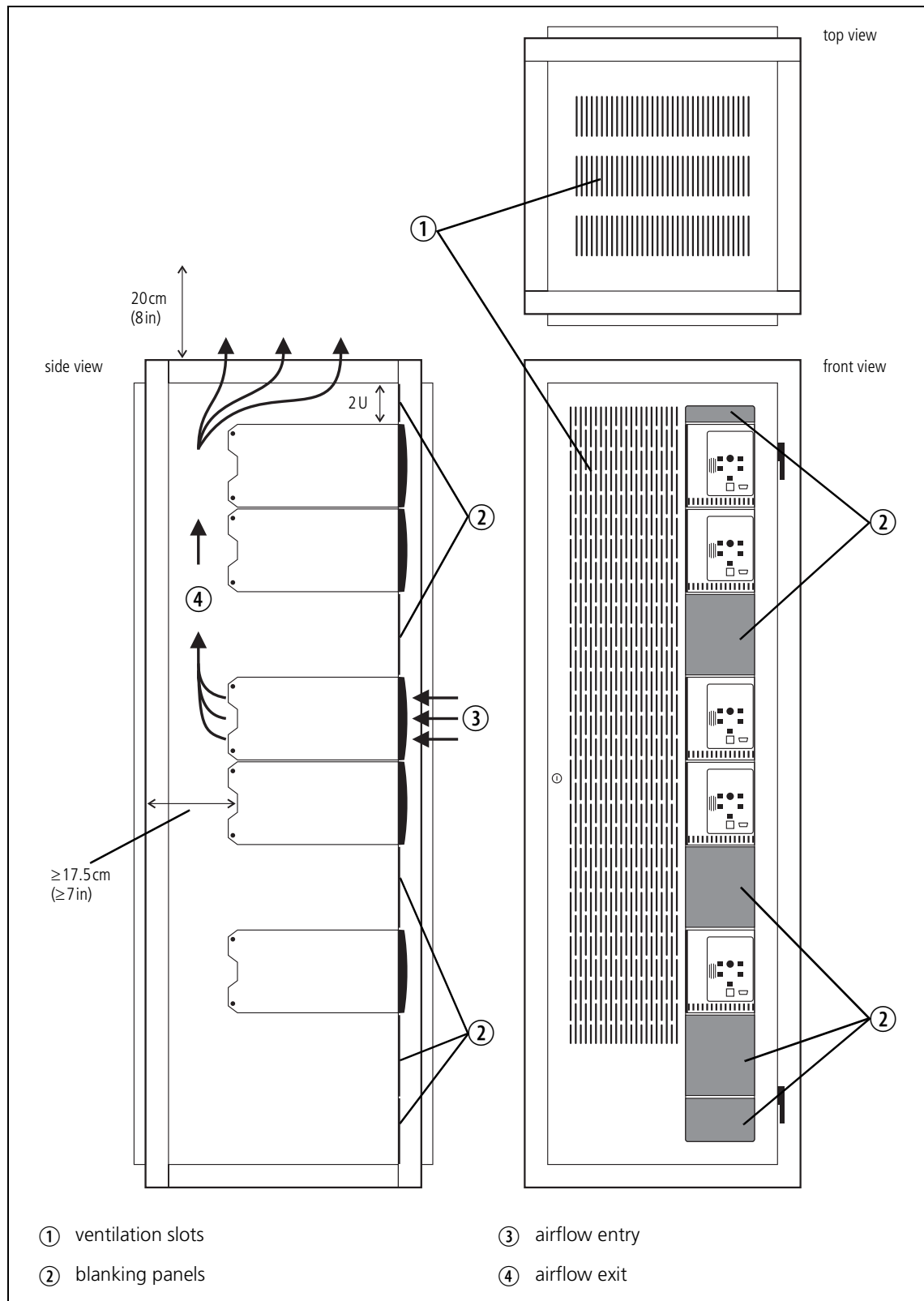
If the sensor board is to provide accurate ambient temperature readings, it must have forced airflow and must not come into contact with the metal of the heatsink fins. **Do not stack PAs with the fins together.** It is possible for the fins on one heatsink to slide between the fins on the other heatsink. This can damage the sensor board, and possibly result in the heatsink fins becoming locked together.

### 1.7.2 Cabinet and Rack Ventilation

Refer to [Figure 1.2 on page 9](#).

The cooling airflow for the TB8100 BSS enters through the front panel and exits at the rear of the subrack. For optimum thermal performance, the heated air that has passed through a BSS must not be allowed to re-enter the air intakes on the front panel. Any space at the front of the cabinet not occupied by equipment should be covered by a blanking panel.

**Figure 1.2 Typical cabinet ventilation requirements**



To allow enough cooling airflow through a cabinet-mounted BSS, we recommend the following:

- an area of at least  $150\text{ cm}^2$  ( $23\text{ in}^2$ ) of unrestricted ventilation slots or holes in front of the air intakes for the fans for each subrack; for example, thirty  $6\times 85\text{ mm}$  ( $0.25\times 3.3\text{ in}$ ) slots will allow the recommended airflow
- a vent in the top of the cabinet with an area of approximately  $150\text{ cm}^2$  ( $23\text{ in}^2$ ) per subrack, or a similar area of ventilation per subrack at the rear of the cabinet behind each subrack
- a 2U gap at the top of the cabinet.



**Note** The ventilation opening must be unrestricted. If the slots or holes are covered with a filter, mesh or grille, the open area must be increased to allow the same airflow as an unrestricted opening.

The maximum ambient temperature entering the cabinet must not exceed  $+60^\circ\text{C}$  ( $+140^\circ\text{F}$ ).

If the TB8100 BSS is installed in a rack or cabinet with other equipment with different ventilation requirements, we recommend that the TB8100 be positioned below this equipment.

#### **Auxiliary Extractor Fans**

The TB8100 BSS does not require auxiliary extractor fans mounted in the top of the cabinet. If your cabinet is already fitted with fans, the following procedures apply:

- if there are six or more  $120\text{ mm}$  ( $4.75\text{ in}$ ) fans, each capable of extracting  $160\text{ m}^3$  per hour ( $94.2\text{ CFM}$ ), they must run continuously
- if there are fewer than six fans, you must remove them and ensure the vent in the top of the cabinet has an area of approximately  $150\text{ cm}^2$  ( $23\text{ in}^2$ ) per subrack.

If you have any other configuration, the performance of your system will depend on how closely you comply with the TB8100 BSS airflow requirements described above.

## 1.8 Installing the Base Station System



### Caution

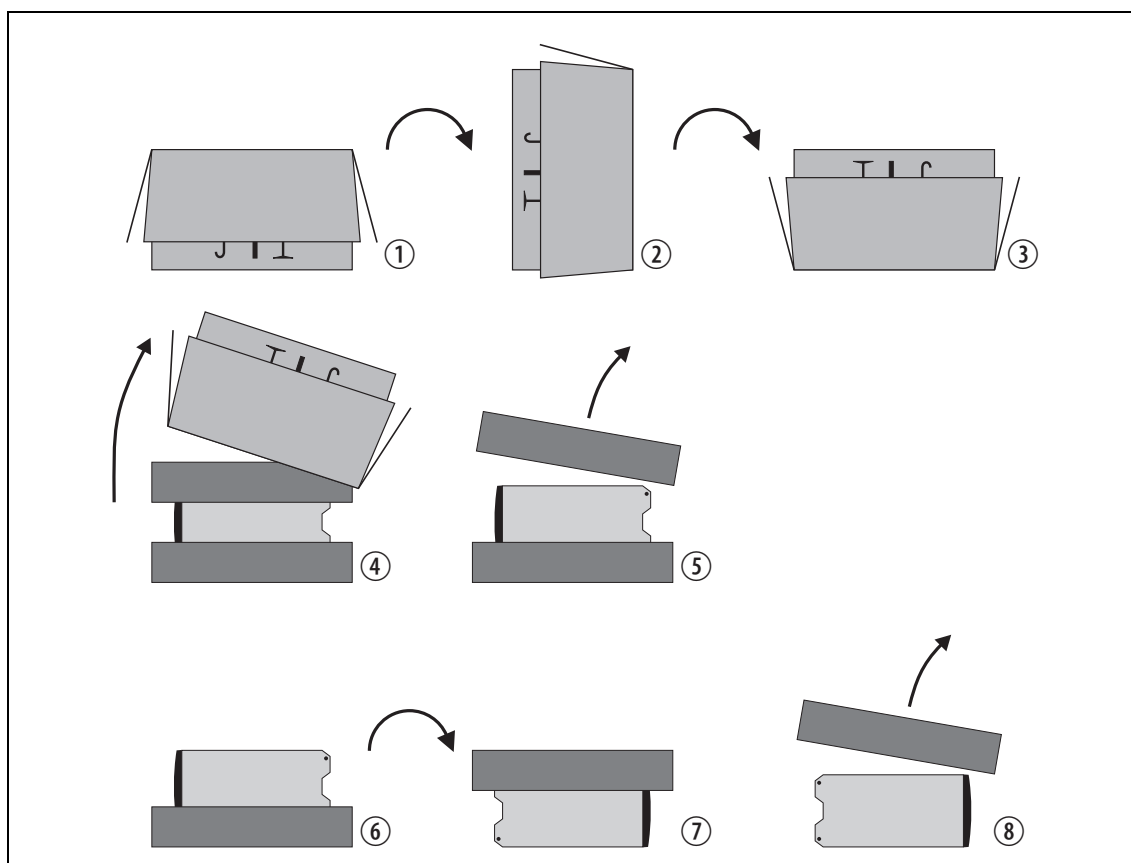
A TB8100 subrack complete with modules can weigh up to 28kg (62lb), or up to 30kg (66lb) complete with packaging. We recommend that, once the equipment is out of the carton, you remove the modules from the subrack before moving the equipment again. Otherwise, have another person help you with the lifting. In all cases follow safe lifting practices.

### 1.8.1 Unpacking the Equipment

#### Unpacking the TB8100 BSS

The TB8100 BSS is packed in a strong corrugated cardboard carton with top and bottom foam cushions. To prevent personal injury and damage to the equipment, we recommend that two people unpack the BSS.

Figure 1.3 Unpacking the TB8100 BSS



1. Cut the tape securing the flaps at the top of the carton and fold them flat against the sides ①.
2. Rotate the carton carefully onto its side ② and then onto its top ③, ensuring that none of the flaps is trapped underneath.

3. Slide the carton upwards over the foam cushions and lift it away ④. Remove the cushion from the bottom of the BSS ⑤.
4. Rotate the BSS and cushion carefully over the rear of the BSS ⑥ so that the BSS is the right way up with the cushion on top ⑦. Remove the cushion from the top of the BSS ⑧.

#### Disposal of Packaging

If you do not need to keep the packaging, we recommend that you recycle it according to your local recycling methods. The foam cushions are CFC- and HCFC-free and may be burnt in a suitable waste-to-energy combustion facility, or compacted in landfill.

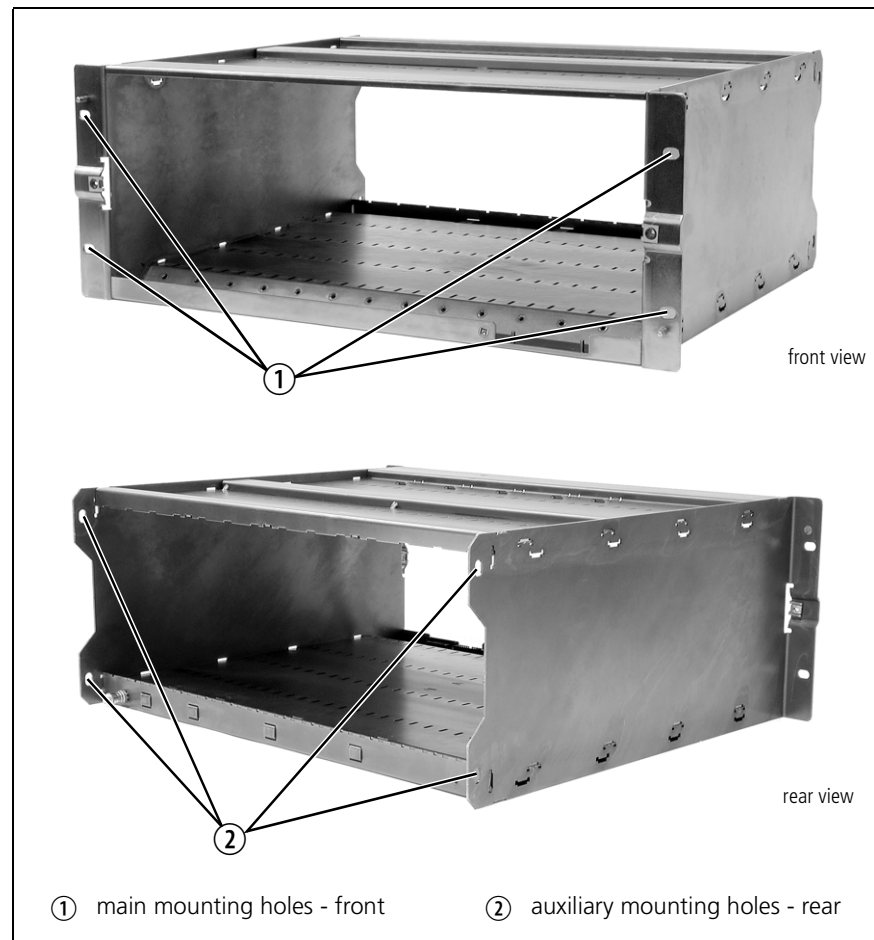
## 1.8.2 Mounting the Subrack



#### Caution

We recommend that you remove the modules from the subrack before lifting it (refer to “Replacing Modules” in the Installation and Operation Manual), or have another person help you with the lifting.

Figure 1.4 Subrack mounting points



1. Remove the front panel by undoing the fasteners with a quarter turn anti-clockwise, as described in “Replacing Modules” in the Installation and Operation Manual.
2. Fit the subrack into the cabinet or rack and secure it firmly with an M6 (or 0.25in if you are using imperial fittings) screw, flat and spring washer in each of the four main mounting holes ①, as shown in [Figure 1.4 on page 12](#).

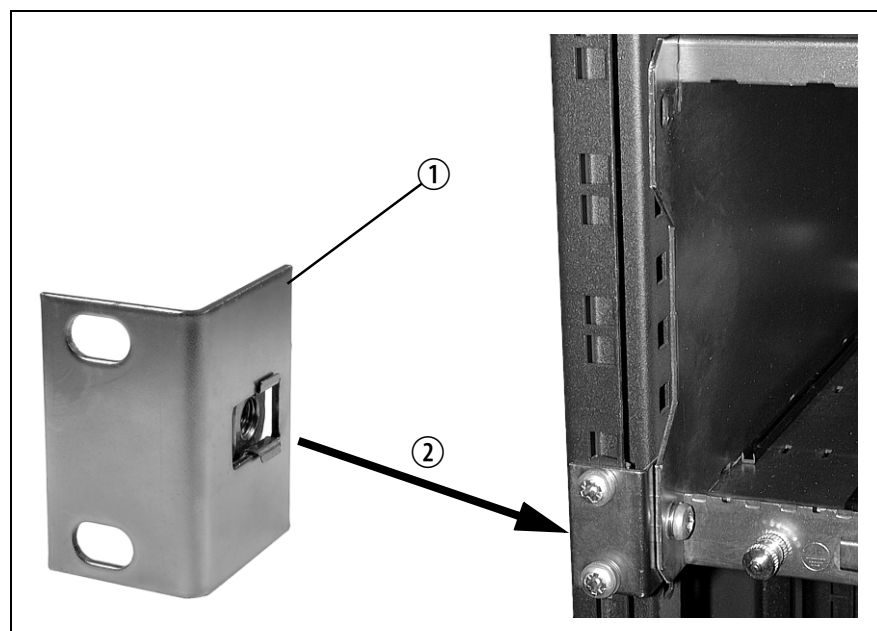


**Note** If you need extra mounting security, there are additional mounting holes ② provided at the rear of the subrack for auxiliary support brackets.

### 1.8.3 Auxiliary Support Bracket

TBA2140 auxiliary support brackets can be fitted to the rear of the TB8100 subrack to provide additional mounting security. [Figure 1.5](#) below shows a standard TBA2140 bracket ① fitted in a typical Tait Electronics cabinet ②. If you are not using a Tait cabinet, you may have to make your own brackets to suit your installation.

**Figure 1.5** Auxiliary support bracket



**Important** You **must** fit the auxiliary support brackets if you intend to transport a cabinet fitted with a fully built-up TB8100 BSS.

We also recommend that you fit the brackets under the following conditions:

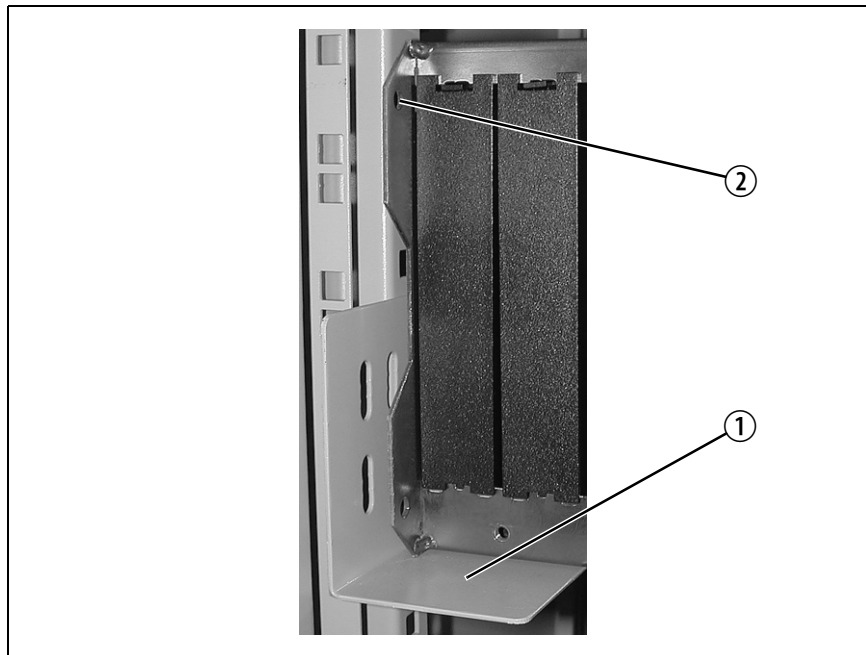
- when the installation is in an area prone to earthquakes
- when third party equipment is installed hard up underneath the TB8100 BSS subrack.

## 1.8.4 Optional Slide Mounting Rails

You can also use TBA2141 slide mounting rails ① when mounting the TB8100 BSS in a cabinet, as shown in [Figure 1.6](#) below. These rails will support the BSS while you slide it into the cabinet.

However, you must still secure the BSS to the cabinet with four M6 (0.25in) screws through the main mounting holes on the front of the subrack, as shown in [Figure 1.4 on page 12](#).

**Figure 1.6** Optional slide mounting rail - rear view



### **Important**

The slide mounting rails are not suitable for transporting a cabinet fitted with a fully built-up TB8100 BSS. In this case, you must also fit the TBA2140 auxiliary support brackets to the upper set of rear mounting holes ②.

## 1.8.5 Cabling

### **General**

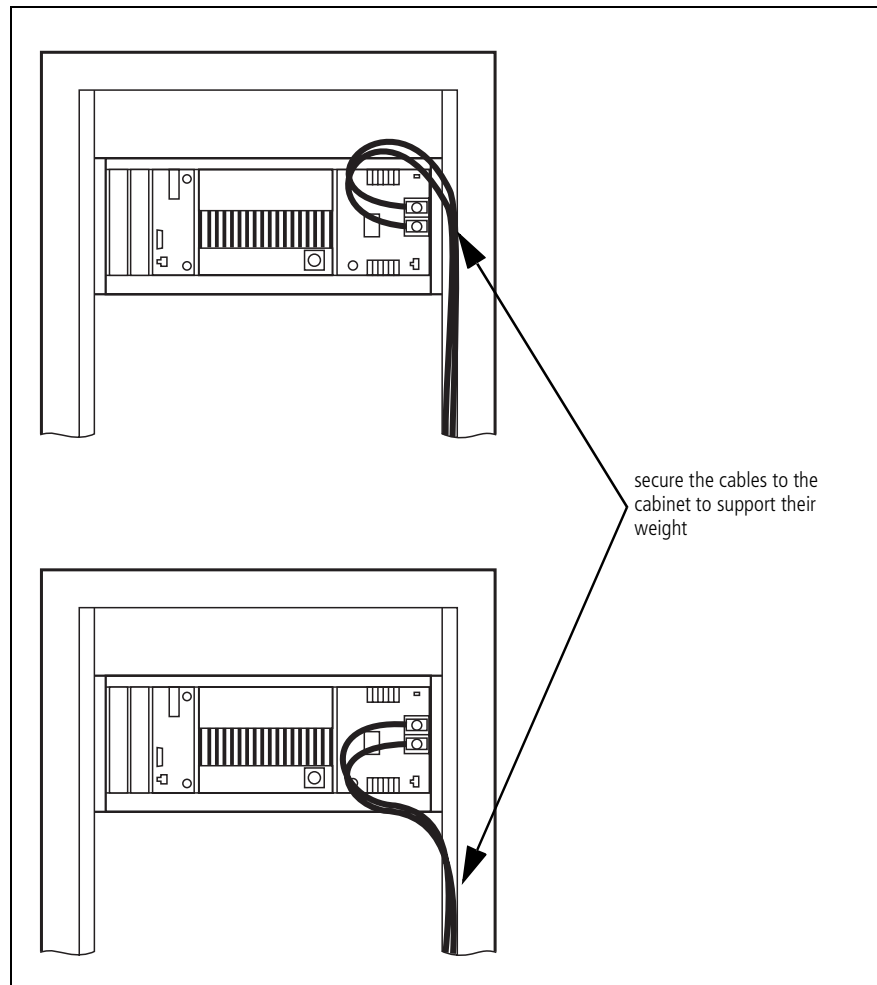
We recommend that you try to route all cables to and from the TB8100 BSS along the side of the cabinet so the cooling airflow is not restricted.

### **DC Power Cabling**

DC power cables should be well supported so that the terminals on the PMU and on the ends of the cables do not have to support the full weight of the cables.

Figure 1.7 below shows two recommended methods of securing these cables to prevent straining either set of terminals.

**Figure 1.7 DC power cabling**



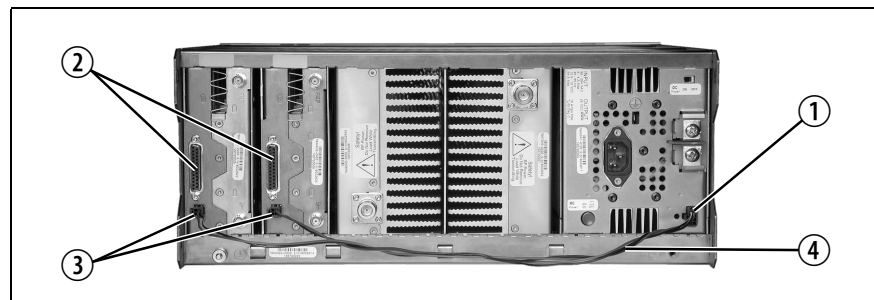
## 2 Connection

### 2.1 Auxiliary Power Supply Connections

#### PMU Auxiliary DC Output

The PMU can provide an auxiliary DC output when it is fitted with the optional auxiliary power supply board. This board is available with an output of 13.65VDC, 27.3VDC, or 54.6VDC (depending on the model), and is current limited to 3A, 1.5A or 750mA respectively. This optional power supply is available on the auxiliary DC output connector ① on the rear panel. DC from this output can be supplied to the +AUX\_V pin on the system interface connector ② on the reciter via the auxiliary DC input connector ③ on the system interface board (see [“Reciter Auxiliary DC Input from PMU” on page 18](#)). The auxiliary DC power cables ④ are described in “Power Supply Connections” in the Installation and Operation Manual.

**Figure 2.1** Auxiliary DC power supply connections



The auxiliary power supply is configured with the Service Kit (Configure > Base Station > Miscellaneous > Power configuration > Auxiliary power control). Its operation can be controlled by Task Manager statements, for example:

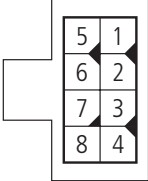
**IF Digital input 01 active THEN Enable auxiliary supply.**

Refer to the Service Kit documentation for more details.

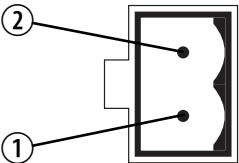
We do not recommend connecting two or more auxiliary power supply boards in parallel to increase the current supply to external equipment. In this situation, the auxiliary board with the highest voltage will try to supply all the current required, until it goes into current limit and the voltage reduces to the level where another board will begin to supply power. Running an auxiliary board continuously in current limit will reduce its life span and reliability. Also, if one auxiliary board fails or is switched off when a base station is powered down for some reason, the remaining auxiliary boards will be unable to supply the required current and will go into current limit, possibly causing the external equipment to shut down.

It is, however, acceptable to connect two or more auxiliary power supply boards in parallel (e.g. for redundancy), as long as the current consumption of the external equipment is less than the rating of one board. This means that, even if only one auxiliary board is functioning, it will still be able to supply the current requirements of the external equipment.

Two different types of auxiliary DC output connector have been fitted to the PMU. The pin allocations for the 8-way connector fitted to PMUs manufactured before August 2004 are given in the following table. Note that pins 1 to 4 and pins 5 to 8 on this connector are linked.

|                                                                                                                          | Pin | Description | Links |
|--------------------------------------------------------------------------------------------------------------------------|-----|-------------|-------|
|  <p>8-way connector - external view</p> | 1   | +V output   | ●     |
|                                                                                                                          | 2   | +V output   |       |
|                                                                                                                          | 3   | +V output   |       |
|                                                                                                                          | 4   | +V output   |       |
|                                                                                                                          | 5   | ground      | ●     |
|                                                                                                                          | 6   | ground      |       |
|                                                                                                                          | 7   | ground      |       |
|                                                                                                                          | 8   | ground      |       |

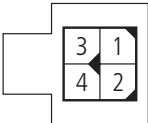
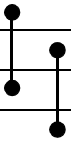
The pin allocations for the 2-way connector fitted to PMUs manufactured from August 2004 onwards are given in the following table.

|                                                                                                                            | Pin | Description |
|----------------------------------------------------------------------------------------------------------------------------|-----|-------------|
|  <p>2-way connector - external view</p> | 1   | +V output   |
|                                                                                                                            | 2   | ground      |

Reciter Auxiliary DC Input from PMU

The system interface board in the reciter has an auxiliary DC input connector. DC from the auxiliary DC output on the PMU can be supplied to the +AUX\_V pin on the system interface connector via this input (see “PMU Auxiliary DC Output” on page 16).

The pin allocations for the auxiliary DC input on the system interface board are given in the following table. Older boards use the 4-way connector, while the TaitNet RS-232 board and all other boards manufactured after March 2005 use the 2-way connector. Note that pins 1 & 3 and pins 2 & 4 on the 4-way connector are linked. Refer to “System Connections” on page 20 for the pin allocations for +AUX\_V on each system interface board.

|                                                                                                                      | Pin | Description | Links                                                                               |
|----------------------------------------------------------------------------------------------------------------------|-----|-------------|-------------------------------------------------------------------------------------|
| <br>4-way connector - external view | 1   | +V input    |  |
|                                                                                                                      | 2   | ground      |                                                                                     |
|                                                                                                                      | 3   | +V input    |                                                                                     |
|                                                                                                                      | 4   | ground      |                                                                                     |
| <br>2-way connector - external view |     |             |                                                                                     |

The DC output from the PMU is 13.65VDC, 27.3VDC, or 54.6VDC (depending on the model). Although this power output is isolated, the negative side of the supply is grounded on the system interface board to give a +V output.

2.2 12V PA Power Saving Control Connection

To enable Power Saving in the 12V PA, you must connect digital out 1 on the reciter’s system interface connector to pin 1 of the Power Saving control connector on the rear panel of the PA. Once this connection is made, the PA will shut down whenever the reciter goes into Deep Sleep mode. For more information on the operation and configuration of Power Saving, refer to “Power Saving” in the Installation and Operation Manual.



**Note** When a base station with a 12V PA is configured for Deep Sleep, digital out 1 is dedicated to Power Saving control and should not be used for any other Task Manager function.

Two ways of making the Power Saving control connection between the 12V PA and reciter are described below. The circled numbers in the following instructions refer to Figure 2.2 on page 19.

Method 1

- 1. Connect one end of the Power Saving control cable ① (Tait part number 219-02971-00) to the Power Saving control connector ② at

the rear of the PA. Connect the other end to the auxiliary DC input connector ③ at the rear of the reciter.



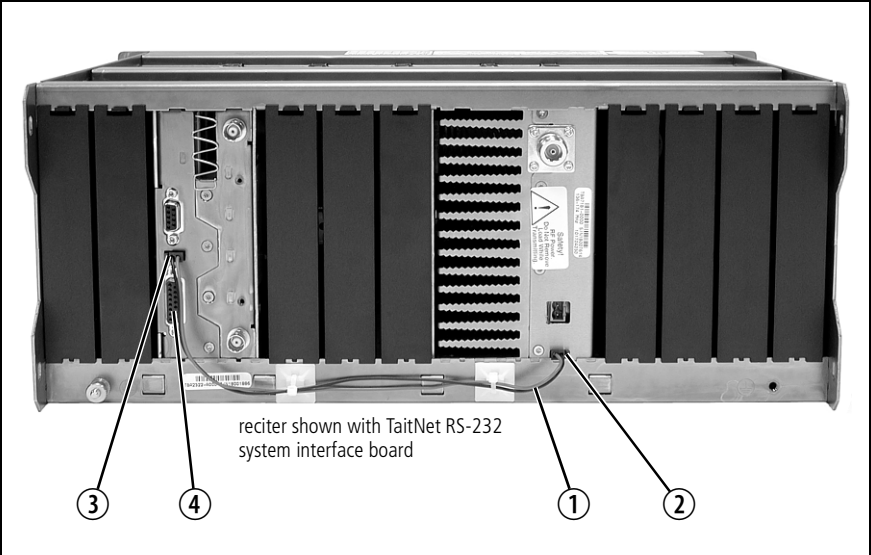
**Note** If you are using an older reciter with a 4-way connector, you will need to use Method 2.

- On the D-range plug that is fitted to the system interface connector ④ on the reciter, link digital out 1 to +AUX\_V.

**Method 2**

- Connect one end of the Power Saving control cable ① to the Power Saving control connector ② at the rear of the PA.
- Cut the socket off the other end of the cable. Connect the wires directly to the D-range plug fitted to the system interface connector ④ as follows:
  - red - digital out 1
  - black - ground.

**Figure 2.2     Fitting the Power Saving control cable to a 12V PA**



The pin allocations for the Power Saving control connector on the PA are given in the following table.

|                                                     | Pin | Signal Name | Signal Type | Notes      |
|-----------------------------------------------------|-----|-------------|-------------|------------|
| <div> <div>21</div> <div>external view</div> </div> | 1   | PA shutdown | input       | active low |
|                                                     | 2   | ground      | ground      |            |
|                                                     |     |             |             |            |

If you wish to make up your own cable, use the following connector for both the PA and reciter connections:

- 2x1-way Molex 43025-0200/crimp socket 43030-0001 female.

## 2.3 System Connections

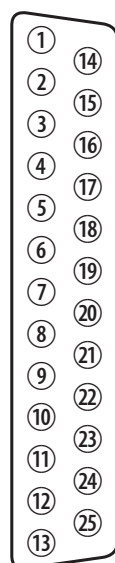
### Standard

The standard system interface board is fitted to reciters bearing the product code TBA4xxx-0A0x. If purchased separately, it has the product code TBA10A0. It provides the following:

|                                                                                                                                                                                                        |                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>■ non-isolated 600Ω balanced audio I/O</li> <li>■ high impedance unbalanced audio I/O</li> <li>■ digital I/O (2 outputs, 6 inputs, 4 bi-directional)</li> </ul> | <ul style="list-style-type: none"> <li>■ Tx key</li> <li>■ Tx relay</li> <li>■ Rx gate</li> <li>■ RSSI</li> </ul> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|

It is fitted with a 25-way female D-range connector and a 4-way auxiliary DC input connector. The pin allocations for the D-range are listed in the table below, and the pin allocations for the DC input connector are provided in [“Reciter Auxiliary DC Input from PMU” on page 18](#).

| Pin | Signal Name                   | Signal Type  | Notes                           |
|-----|-------------------------------|--------------|---------------------------------|
| 1   | Rx line out +                 | audio output | non-isolated<br>AC coupled line |
| 2   | Rx line out –                 |              |                                 |
| 3   | Rx audio out                  | audio output | AC coupled                      |
| 4   | ground                        | ground       |                                 |
| 5   | Tx audio in                   | audio input  | AC coupled                      |
| 6   | Tx line in +                  | audio input  | non-isolated<br>AC coupled line |
| 7   | Tx line in –                  |              |                                 |
| 8   | RSSI                          | DC signal    |                                 |
| 9   | Rx gate                       | output       | open collector                  |
| 10  | Tx key                        | input        | active low                      |
| 11  | digital out 1 <sup>a</sup>    | output       | open collector                  |
| 12  | digital out 2                 |              |                                 |
| 13  | +AUX_V                        | power output | from auxiliary DC input         |
| 14  | digital in 1                  | input        | 5V TTL logic<br>active low      |
| 15  | digital in 2                  |              |                                 |
| 16  | digital in/out 3 <sup>b</sup> |              |                                 |
| 17  | digital in/out 4 <sup>b</sup> |              |                                 |
| 18  | digital in/out 5 <sup>b</sup> |              |                                 |
| 19  | digital in/out 6 <sup>b</sup> |              |                                 |
| 20  | digital in 7                  |              |                                 |
| 21  | digital in 8                  |              |                                 |
| 22  | digital in 9                  |              |                                 |
| 23  | digital in 10                 |              |                                 |
| 24  | Tx relay                      | output       | open collector                  |
| 25  | ground                        | ground       |                                 |



external view

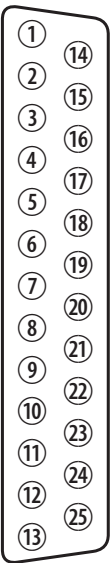
- a. If a base station with a 12V PA is configured for Deep Sleep, digital out 1 is dedicated to Power Saving control and should not be used for any other Task Manager function.
- b. On version 1 and later system interface boards, digital inputs 3, 4, 5, and 6 may also be configured as outputs using a Task Manager statement. For more details refer to [“Digital Interface” on page 117](#) of the Installation and Operation Manual, and to the Service Kit documentation.

## Isolated

This system interface board is fitted to reciters bearing the product code TBA4xxx-0B0x or TBA5xxx-0B0x. If purchased separately, it has the product code TBA10B0. It is the same as the standard model, except that the balanced audio interfaces are galvanically (transformer) isolated. It provides the following:

|                                                       |            |
|-------------------------------------------------------|------------|
| ■ transformer isolated 600Ω balanced audio I/O        | ■ Tx key   |
| ■ high impedance unbalanced audio I/O                 | ■ Tx relay |
| ■ digital I/O (2 outputs, 6 inputs, 4 bi-directional) | ■ Rx gate  |
|                                                       | ■ RSSI     |

It is fitted with a 25-way female D-range connector and a 4-way auxiliary DC input connector. The pin allocations for the D-range are listed in the table below, and the pin allocations for the DC input connector are provided in [“Reciter Auxiliary DC Input from PMU” on page 18](#).

|                                                                                                          | Pin | Signal Name                   | Signal Type  | Notes                      |
|----------------------------------------------------------------------------------------------------------|-----|-------------------------------|--------------|----------------------------|
|  <p>external view</p> | 1   | Rx line out +                 | audio output | transformer isolated line  |
|                                                                                                          | 2   | Rx line out –                 |              |                            |
|                                                                                                          | 3   | Rx audio out                  | audio output | AC coupled                 |
|                                                                                                          | 4   | ground                        | ground       |                            |
|                                                                                                          | 5   | Tx audio in                   | audio input  | AC coupled                 |
|                                                                                                          | 6   | Tx line in +                  | audio input  | transformer isolated line  |
|                                                                                                          | 7   | Tx line in –                  |              |                            |
|                                                                                                          | 8   | RSSI                          | DC signal    |                            |
|                                                                                                          | 9   | Rx gate                       | output       | open collector             |
|                                                                                                          | 10  | Tx key                        | input        | active low                 |
|                                                                                                          | 11  | digital out 1 <sup>a</sup>    | output       | open collector             |
|                                                                                                          | 12  | digital out 2                 |              |                            |
|                                                                                                          | 13  | +AUX_V                        | power output | from auxiliary DC input    |
|                                                                                                          | 14  | digital in 1                  | input        | 5V TTL logic<br>active low |
|                                                                                                          | 15  | digital in 2                  |              |                            |
|                                                                                                          | 16  | digital in/out 3 <sup>b</sup> |              |                            |
|                                                                                                          | 17  | digital in/out 4 <sup>b</sup> |              |                            |
|                                                                                                          | 18  | digital in/out 5 <sup>b</sup> |              |                            |
|                                                                                                          | 19  | digital in/out 6 <sup>b</sup> |              |                            |
|                                                                                                          | 20  | digital in 7                  |              |                            |
|                                                                                                          | 21  | digital in 8                  |              |                            |
|                                                                                                          | 22  | digital in 9                  |              |                            |
|                                                                                                          | 23  | digital in 10                 |              |                            |
|                                                                                                          | 24  | Tx relay                      | output       | open collector             |
|                                                                                                          | 25  | ground                        | ground       |                            |

- If a base station with a 12V PA is configured for Deep Sleep, digital out 1 is dedicated to Power Saving control and should not be used for any other Task Manager function.
- On version 1 and later system interface boards, digital inputs 3, 4, 5, and 6 may also be configured as outputs using a Task Manager statement. For more details refer to [“Digital Interface” on page 117](#) of the Installation and Operation Manual, and to the Service Kit documentation.

## Isolated E&M

This system interface board is fitted to reciters bearing the product code TBA4xxx-0C0x or TBA5xxx-0C0x. If purchased separately, it has the product code TBA10C0. It provides the following:

|                                                       |            |
|-------------------------------------------------------|------------|
| ■ transformer isolated 600Ω balanced audio I/O        | ■ Tx key   |
| ■ opto-isolated keying                                | ■ Tx relay |
| ■ opto-isolated gate output                           | ■ Rx gate  |
| ■ digital I/O (2 outputs, 2 inputs, 4 bi-directional) | ■ RSSI     |

It is fitted with a 25-way female D-range connector and a 4-way auxiliary DC input connector. The pin allocations for the D-range are listed in the table below, and the pin allocations for the DC input connector are provided in [“Reciter Auxiliary DC Input from PMU” on page 18](#).

| Pin | Signal Name                   | Signal Type           | Notes                                   |
|-----|-------------------------------|-----------------------|-----------------------------------------|
| 1   | Rx line out +                 | audio output          | transformer isolated line               |
| 2   | Rx line out –                 |                       |                                         |
| 3   | Rx audio out                  | audio output          |                                         |
| 4   | audio ground                  | ground                |                                         |
| 5   | Tx audio in                   | audio input           |                                         |
| 6   | Tx line in +                  | audio input           | transformer isolated line               |
| 7   | Tx line in –                  |                       |                                         |
| 8   | RSSI                          | DC signal             |                                         |
| 9   | Rx gate                       | output                | open collector                          |
| 10  | Tx key                        | input                 | active low                              |
| 11  | digital out 1 <sup>a</sup>    | output                | open collector                          |
| 12  | digital out 2                 |                       |                                         |
| 13  | +AUX_V                        | power output          | from auxiliary DC input                 |
| 14  | digital in 1                  | input                 | 5V TTL logic<br>active low              |
| 15  | digital in 2                  |                       |                                         |
| 16  | digital in/out 3 <sup>b</sup> |                       |                                         |
| 17  | digital in/out 4 <sup>b</sup> |                       |                                         |
| 18  | digital in/out 5 <sup>b</sup> |                       |                                         |
| 19  | digital in/out 6 <sup>b</sup> |                       |                                         |
| 20  | opto +/-                      | isolated keying input | input voltage range<br>±10VDC to ±60VDC |
| 21  | opto -/+                      |                       |                                         |
| 22  | relay +/-                     | isolated gate output  |                                         |
| 23  | relay -/+                     |                       |                                         |
| 24  | Tx relay                      | output                | open collector                          |
| 25  | ground                        | ground                |                                         |



external view

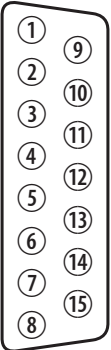
- If a base station with a 12V PA is configured for Deep Sleep, digital out 1 is dedicated to Power Saving control and should not be used for any other Task Manager function.
- On version 1 and later system interface boards, digital inputs 3, 4, 5, and 6 may also be configured as outputs using a Task Manager statement. For more details refer to [“Digital Interface” on page 117](#) of the Installation and Operation Manual, and to the Service Kit documentation.

TaitNet

This system interface board is fitted to reciters bearing the product code TBA4xxx-0T1x. If purchased separately, it has the product code TBA10T1. It is designed for use with MPT trunking systems. It provides the following:

|                                                |           |
|------------------------------------------------|-----------|
| ■ transformer isolated 600Ω balanced audio I/O | ■ Tx key  |
| ■ high impedance unbalanced audio I/O          | ■ Rx gate |
| ■ digital I/O (3 outputs, 1 input)             |           |

It is fitted with a 15-way female D-range connector and a 4-way auxiliary DC input connector. The pin allocations for the D-range are listed in the table below, and the pin allocations for the DC input connector are provided in [“Reciter Auxiliary DC Input from PMU”](#) on page 18.

|                                                                                                     | Pin | Signal Name                | Signal Type  | Notes                     |
|-----------------------------------------------------------------------------------------------------|-----|----------------------------|--------------|---------------------------|
| <br>external view | 1   | Rx line out +              | audio output | transformer isolated line |
|                                                                                                     | 2   | Rx line out –              |              |                           |
|                                                                                                     | 3   | Rx audio out               | audio output |                           |
|                                                                                                     | 4   | Rx gate                    | output       | open collector            |
|                                                                                                     | 5   | Tx key                     | input        |                           |
|                                                                                                     | 6   | Tx audio in                | audio input  |                           |
|                                                                                                     | 7   | Tx line in +               | audio input  | transformer isolated line |
|                                                                                                     | 8   | Tx line in –               |              |                           |
|                                                                                                     | 9   | +AUX_V                     | power output | from auxiliary DC input   |
|                                                                                                     | 10  | digital out 3              | output       | open collector            |
|                                                                                                     | 11  | no connection              |              |                           |
|                                                                                                     | 12  | digital out 1 <sup>a</sup> | output       | open collector            |
|                                                                                                     | 13  | digital out 2              |              |                           |
|                                                                                                     | 14  | digital in 1               | input        | 5V logic                  |
|                                                                                                     | 15  | ground                     | ground       |                           |

- a. If a base station with a 12V PA is configured for Deep Sleep, digital out 1 is dedicated to Power Saving control and should not be used for any other Task Manager function.

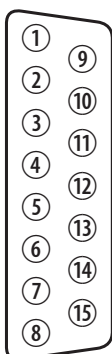
## TaitNet RS-232

This system interface board is fitted to reciters bearing the product code TBA4xxx-0L0x or TBA5xxx-0L0x. If purchased separately, it has the product code TBA10L0. It is designed for use with MPT trunking systems, and also for use with multiple base station systems. It provides the following:

|                                                |           |
|------------------------------------------------|-----------|
| ■ transformer isolated 600Ω balanced audio I/O | ■ Tx key  |
| ■ high impedance unbalanced audio I/O          | ■ Rx gate |
| ■ digital I/O (3 outputs, 1 input)             |           |

It is fitted with a 15-way female D-range connector (TaitNet), a 9-way female D-range connector (RS-232), and a 2-way auxiliary DC input connector. The pin allocations for the D-ranges are listed in the following tables, and the pin allocations for the DC input connector are provided in “Reciter Auxiliary DC Input from PMU” on page 18.

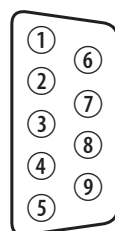
| Pin | Signal Name                | Signal Type  | Notes                     |
|-----|----------------------------|--------------|---------------------------|
| 1   | Rx line out +              | audio output | transformer isolated line |
| 2   | Rx line out –              |              |                           |
| 3   | Rx audio out               | audio output |                           |
| 4   | Rx gate                    | output       | open collector            |
| 5   | Tx key                     | input        |                           |
| 6   | Tx audio in                | audio input  |                           |
| 7   | Tx line in +               | audio input  | transformer isolated line |
| 8   | Tx line in –               |              |                           |
| 9   | +AUX_V                     | power output | from auxiliary DC input   |
| 10  | digital out 3              | output       | open collector            |
| 11  | no connection              |              |                           |
| 12  | digital out 1 <sup>a</sup> | output       | open collector            |
| 13  | digital out 2              |              |                           |
| 14  | digital in 1               | input        | 5V logic                  |
| 15  | ground                     | ground       |                           |



external view

- a. If a base station with a 12V PA is configured for Deep Sleep, digital out 1 is dedicated to Power Saving control and should not be used for any other Task Manager function.

| Pin | Description   | Links |
|-----|---------------|-------|
| 1   | not connected | ●     |
| 2   | receive data  |       |
| 3   | transmit data |       |
| 4   | not connected | ●     |
| 5   | ground        |       |
| 6   | not connected | ●     |
| 7   | not connected |       |
| 8   | not connected |       |
| 9   | not connected |       |



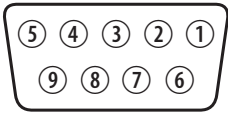
external view

The rear-mounted RS-232 serial port facilitates the connection of multiple base stations to a Service Kit or Alarm Center using an APS (asynchronous

port switch) and modem or radio modem. Refer to TN-906 for more details on using an APS with TB8100 base stations.

## 2.4 Service Kit Connections

The TB8100 Service Kit is connected to the BSS via the RS-232 serial port on the control panel. This port is a 9-way female D-range connector. Use a straight through cable, as supplied with the Service Kit, to connect your programming computer to the BSS. The pin allocations for the serial port are given in the following table. Note that pins 1, 4 & 6 and pins 7 & 8 are linked. This port is also used for remote connection to the Service Kit or Alarm Center software via a modem or radio modem.

|                                                                                                    | Pin | Description   | Links |
|----------------------------------------------------------------------------------------------------|-----|---------------|-------|
| <br>external view | 1   | not connected | ●     |
|                                                                                                    | 2   | receive data  | ●     |
|                                                                                                    | 3   | transmit data | ●     |
|                                                                                                    | 4   | not connected | ●     |
|                                                                                                    | 5   | ground        | ●     |
|                                                                                                    | 6   | not connected | ●     |
|                                                                                                    | 7   | not connected | ●     |
|                                                                                                    | 8   | not connected | ●     |
|                                                                                                    | 9   | not connected |       |



**Note** If high-power HF equipment is located close to the TB8100 BSS, it can sometimes cause interference to RS-232 serial port communications. If this interference does occur, we recommend fitting ferrites on the serial cable close to the control panel. This recommendation only applies to communication equipment permanently connected to the BSS.



**Note** When a reciter fitted with a TaitNet RS-232 system interface board is used in a TB8100 BSS, the RS-232 port on the control panel is disabled. In this situation you must connect to the RS-232 port at the rear of the reciter. Refer to [“TaitNet RS-232” on page 24](#) for more details.

## 2.5 RF Connections



### **Important**

The PA may be damaged if the load is removed or switched while the PA is transmitting.

To protect the PA output stage from load transients (i.e. switching or removing the load), we recommend that you fit an isolator 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 or combining equipment between the isolator and the PA.

We recommend that you use dual-screened coaxial cable such as RG223 for the BNC/TNC connections, and RG214 for the N-type connections.

When the base station is used in simplex mode using a single antenna with a coaxial changeover relay, the isolation of this relay must be  $\geq 40$  dB.

## 2.6 System Control Bus



### **Important**

In base station systems which use a PMU, the PMU must be connected to the system control bus at all times. The I<sup>2</sup>C current source is located in the PMU, and if the PMU is disconnected, the state of much of the bus will be undefined. This may cause corrupted data to be present on the bus when the reciter reads the states of the switches on the control panel. This in turn may result in random actuations of microphone PTT, carrier, or speaker key, causing the BSS to transmit or the speaker to be actuated incorrectly.

# Directive 1999/5/EC Declaration of Conformity

## **da Dansk**

Undertegnede Tait Electronics Limited erklærer herved, at følgende udstyr TBAB1, TBAC0 & TBAH0 overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

Se endvidere: <http://eudocs.taitworld.com/>

## **fr Français**

Par la présente, Tait Electronics Limited déclare que l'appareil TBAB1, TBAC0 & TBAH0 est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.

Voir aussi: <http://eudocs.taitworld.com/>

## **de Deutsch**

Hiermit erklärt Tait Electronics Limited die Übereinstimmung des Gerätes TBAB1, TBAC0 & TBAH0 mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG.

Siehe auch: <http://eudocs.taitworld.com/>

## **it Italiano**

Con la presente Tait Electronics Limited dichiara che questo TBAB1, TBAC0 & TBAH0 è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.

Vedi anche: <http://eudocs.taitworld.com/>

## **el Ελληνικός**

Με την παρούσα Tait Electronics Limited δηλώνει ότι TBAB1, TBAC0 & TBAH0 συμμορφώνεται προς τις ουσιαστικές απαιτήσεις και τις λοιπές σχετικές διατάξεις της οδηγίας 1999/5/ΕΚ.

βλέπε και: <http://eudocs.taitworld.com/>

## **nl Nederlands**

Hierbij verklaart Tait Electronics Limited dat het toestel TBAB1, TBAC0 & TBAH0 in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/ EG.

Zie ook: <http://eudocs.taitworld.com/>

## **en English**

Tait Electronics Limited declares that this TBAB1, TBAC0 & TBAH0 complies with the essential requirements and other relevant provisions of Directive 1999/5/EC.

See also: <http://eudocs.taitworld.com/>

## **pt Português**

Tait Electronics Limited declara que este TBAB1, TBAC0 & TBAH0 está conforme com os requisitos essenciais e outras provisões da Directiva 1999/5/CE.

Veja também: <http://eudocs.taitworld.com/>

## **es Español**

Por medio de la presente Tait Electronics Limited declara que el TBAB1, TBAC0 & TBAH0 cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

Vea también: <http://eudocs.taitworld.com/>

## **sv Svensk**

Härmed intygar Tait Electronics Limited att denna TBAB1, TBAC0 & TBAH0 står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

Se även: <http://eudocs.taitworld.com/>

## **fi Suomi**

Tait Electronics Limited vakuuttaa täten että TBAB1, TBAC0 & TBAH0 tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

Katso: <http://eudocs.taitworld.com/>

# Tait Contact Information

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## Tait Radio Communications Corporate Head Office

Tait Electronics Ltd  
P.O. Box 1645  
Christchurch  
New Zealand

For the address and telephone number of regional offices, refer to the TaitWorld website:

Website: <http://www.taitworld.com>

## Technical Support

For assistance with specific technical issues, contact Technical Support:

E-mail: [support@taitworld.com](mailto:support@taitworld.com)

Website: <http://support.taitworld.com>



### To our European customers:

Tait Electronics Limited is an environmentally responsible company which supports waste minimization and material recovery. The European Union's Waste and Electrical and Electronic Equipment Directive requires that this product be disposed of separately from the general waste stream when its service life is over. Please be environmentally responsible and dispose through the original supplier, your local municipal waste "separate collection" service, or contact Tait Electronics Limited.