TB8100 base station

Installation Guide

Contents

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 CD supplied with the base station. Updates may also be published on the Tait support website. The service manual is only available in PDF format from 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 Service Kit 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

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

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. 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. 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.

Explosive Environments

⚠️ *Warning!!* **Do not operate TB8100 BSS equipment near electrical blasting caps or in an explosive atmos–phere. Operating the equipment in these envi–ronments is a definite safety hazard.**

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.

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) the external surfaces of the PMU and PA can reach temperatures of up to $+80°$C ($+176°$F).

1.2 Equipment Safety

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 ESD S4.1-1997 (revised) or BS EN 100015-4 1994.

Figure 1.1   Typical Antistatic Bench Set-up

conductive wrist strap

dissipative rubber bench mat

to building ground or mains ground via 1 M ohm series resistor
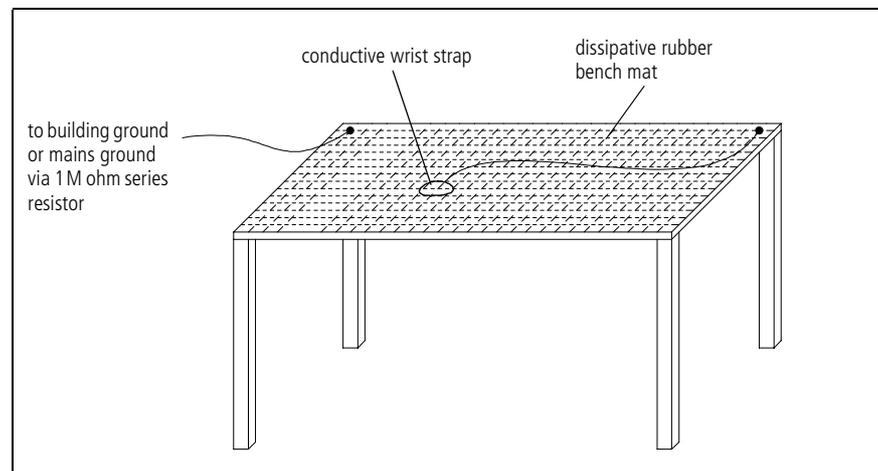
Aerial Load

The TB8100 BSS equipment has been designed to operate safely under a wide range of aerial loading conditions. However, we strongly recommend that the transmitter should always be operated with a suitable load to prevent damage to the transmitter output power stage.

Equipment Grounding

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

Installation and Servicing Personnel

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

1.3 Regulatory Information

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.

FCC Compliance

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

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.

1.4 Environmental Conditions

Operating Temperature Range

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

Humidity

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

Dust and Dirt

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

1.5 Grounding and Lightning Protection

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 setting).

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).

Lightning Ground

It is extremely important for the security of the site and its equipment that you take adequate precautions against lightning strike. While it is outside the scope of this manual to provide comprehensive information on this subject, the following guidelines apply:

- install a suitable lightning rod at the top of the tower and connect it to a secure ground point with appropriate conductors and connectors
- position site buildings and equipment within the cone of protection provided by the grounded tower
- protect all cables entering the site to prevent lightning energy from entering site buildings.

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 to secure the subrack to the rack or cabinet, and also for the DC input terminals on the PMU
- Pozidriv PZ2 screwdriver for the M4 screws used to secure the module retaining clamps
- 0.25 in or 6 mm flat blade screwdriver for the fasteners used to secure the front panel to the subrack

■ 8 mm 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).

Ambient Air Temperature Sensor

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

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

①
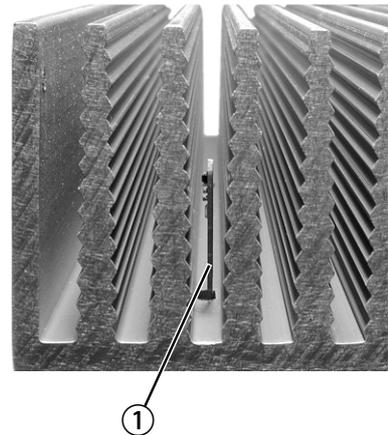
Important   If the sensor PCB is to provide accurate ambient temperature readings, it must have forced airflow and must not come into contact with the metal of the heatsink fins. **Do not stack PAs with the fins together.** It is possible for the fins on one heatsink to slide between the fins on the other heatsink. This can damage the sensor PCB, and possibly result in the heatsink fins becoming locked together.

Cabinet and Rack Ventilation

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.

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

■ an area of at least $150\,cm^2$ ($23\,in^2$) of unrestricted ventilation slots or holes in front of the air intakes for the fans for each subrack; for example, thirty $6\,x\,85\,mm$ ($0.25\,x\,3.3\,in$) slots will allow the recommended airflow

■ a vent in the top of the cabinet with an area of approximately $150\,cm^2$ ($23\,in^2$) 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 $+60°C$ ($+140°F$).

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 $120\,mm$ ($4.75\,in$) fans, each capable of extracting $160\,m^3$ per hour ($94.2\,CFM$), 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 $150\,cm^2$ ($23\,in^2$) 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.

Figure 1.2   Typical Cabinet Ventilation Requirements

①	ventilation slots	③	airflow entry
②	blanking panels	④	airflow exit
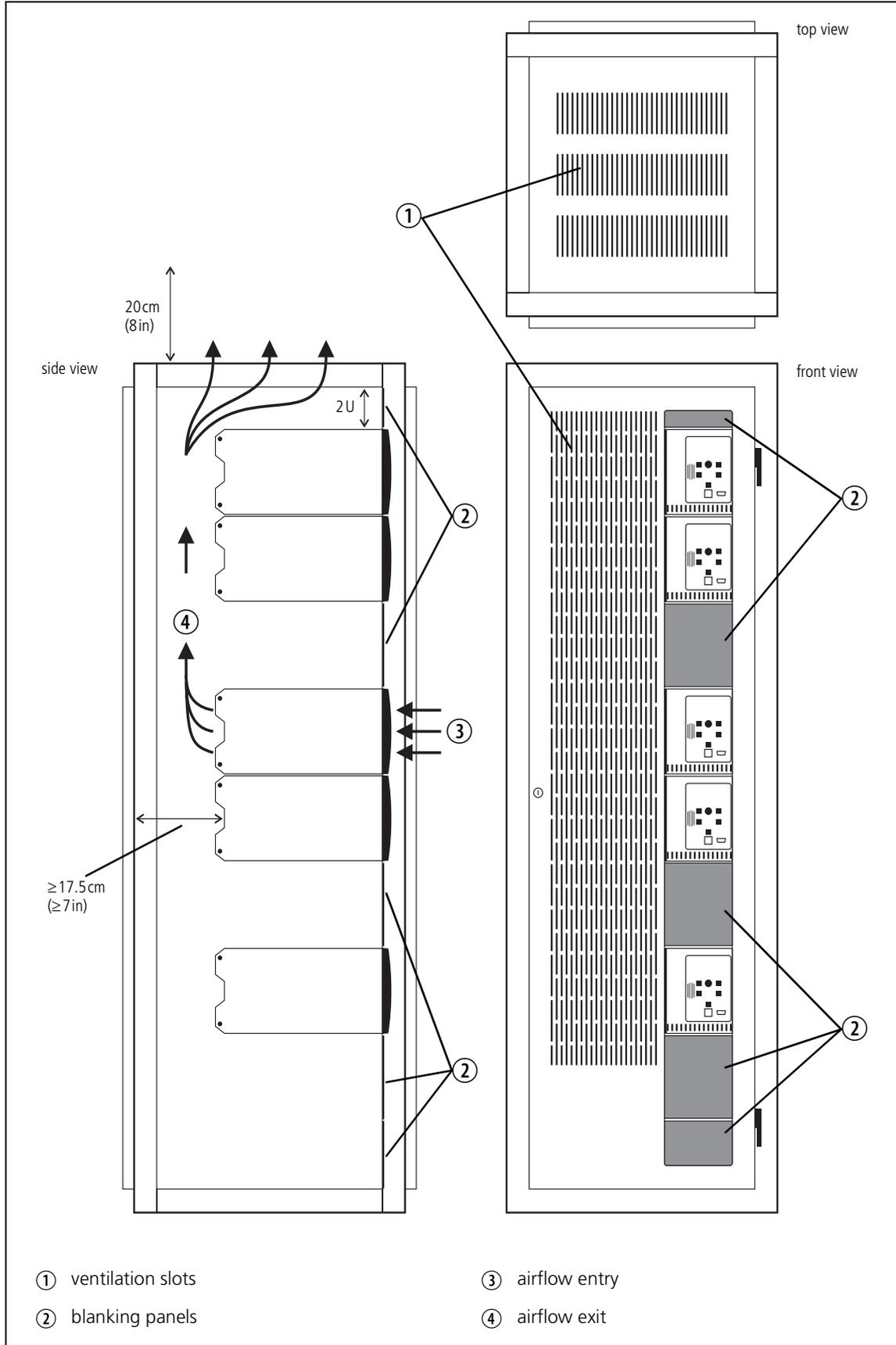
1.8 Installing the Base Station System

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

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
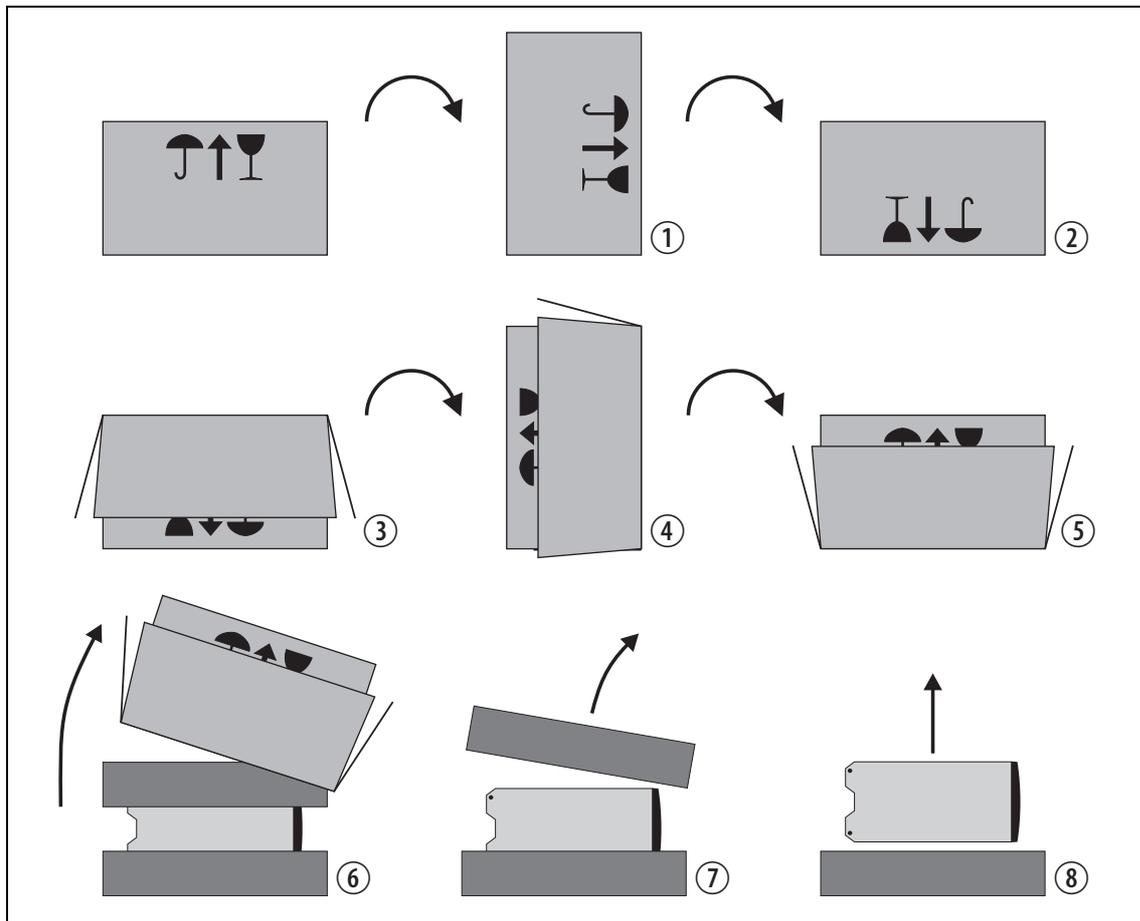
1.   Rotate the carton carefully onto its side ① and then onto its top ②.

2.   Cut the tape securing the flaps at the bottom of the carton and fold them flat against the sides ③.

3. Rotate the carton carefully onto its side ④, and then onto its bottom ⑤, ensuring that none of the flaps is trapped underneath.

4. Slide the carton upwards over the foam cushions and lift it away ⑥.

5. Remove the cushion from the top of the BSS ⑦ and then lift the BSS out of the other cushion 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.

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 main mounting holes - front   ② auxiliary mounting holes - rear
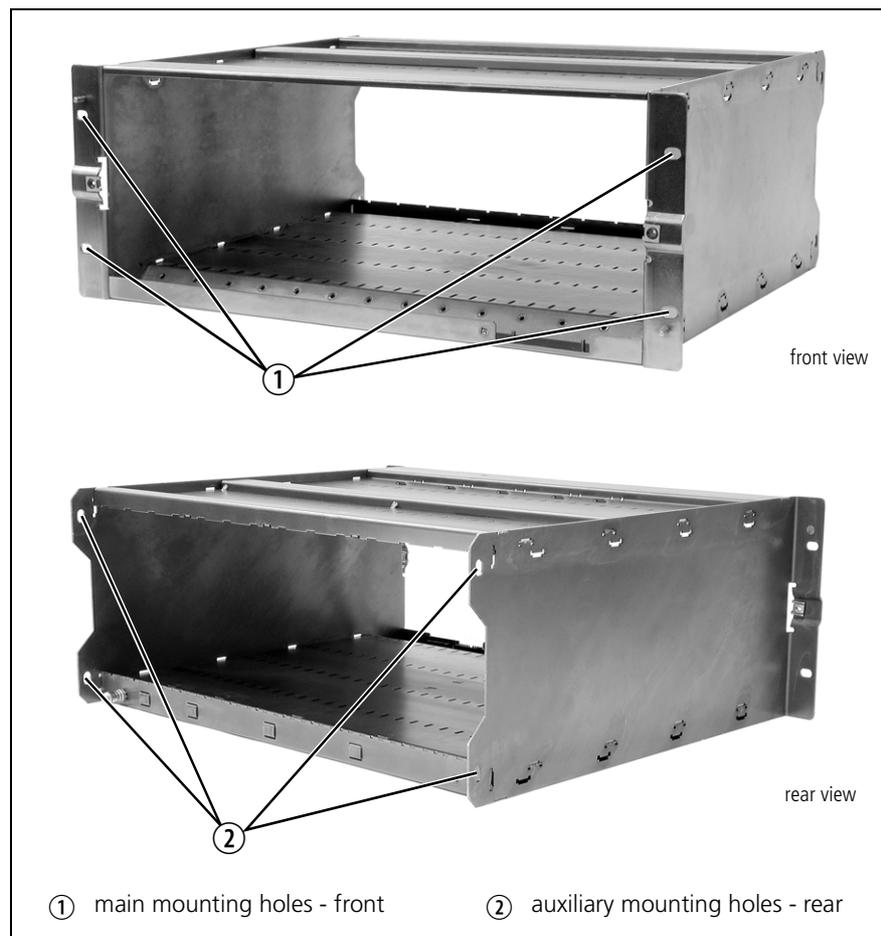
1. Remove the front panel by undoing the fasteners with a quarter turn anti-clockwise, as described in "Preliminary Disassembly" in the Installation and Operation Manual.

2. Fit the subrack into the cabinet or rack and secure it firmly with an M6 screw, flat and spring washer in each of the four main mounting holes ①, as shown in .

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

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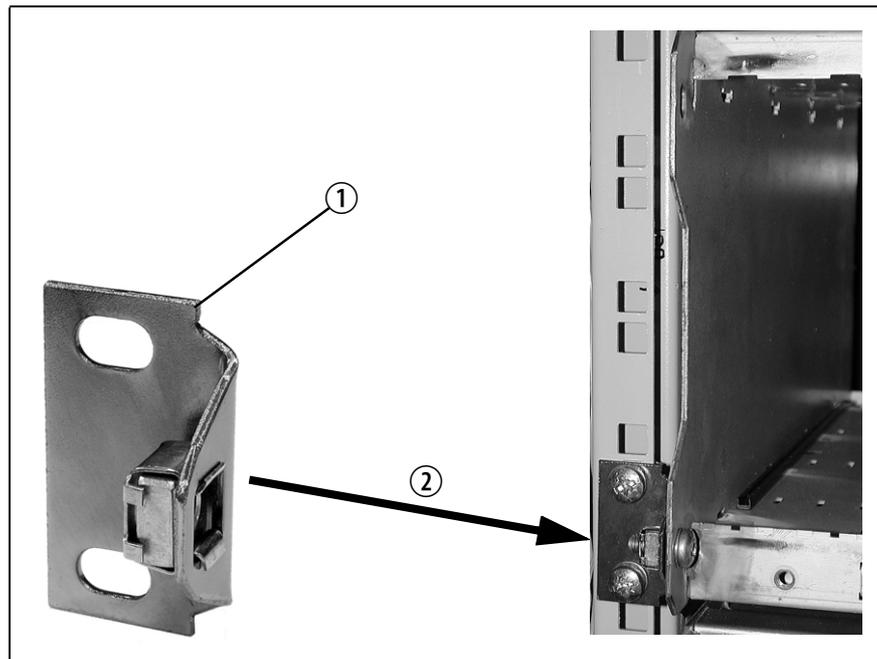
Important You **must** fit the auxiliary support brackets if you intend to transport a cabinet fitted with a fully built-up TB8100 BSS.

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.

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 screws through the main mounting holes on the front of the subrack, as shown in Figure 1.4 on page 11.

Figure 1.6   Optional Slide Mounting Rail - Rear View
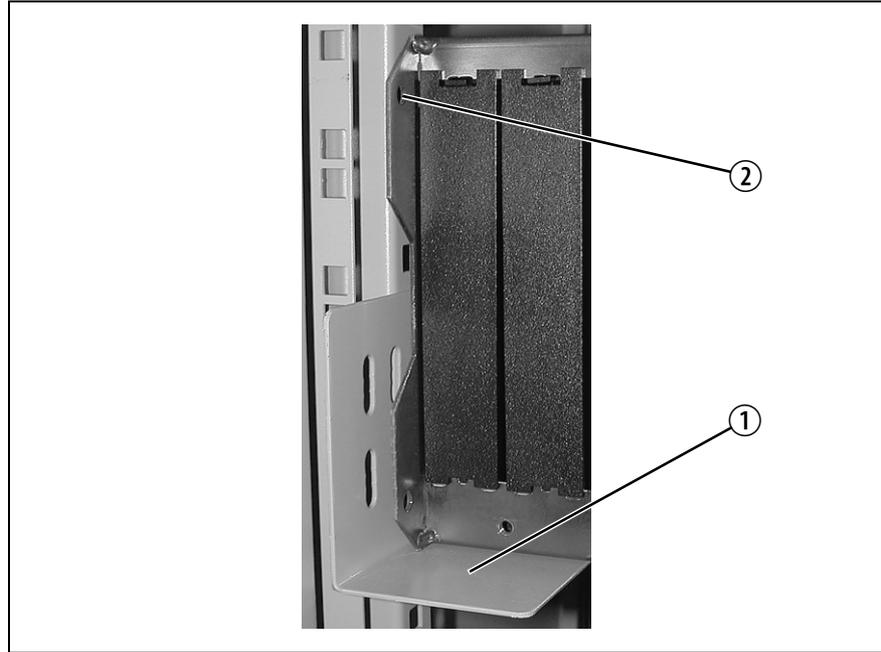
Important   The slide mounting rails are not suitable for transporting a cabinet fitted with a fully built-up TB8100 BSS. In this case, you must also fit the TBA2140 auxiliary support brackets to the upper set of rear mounting holes ②.

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

secure the cables to the cabinet to support their weight
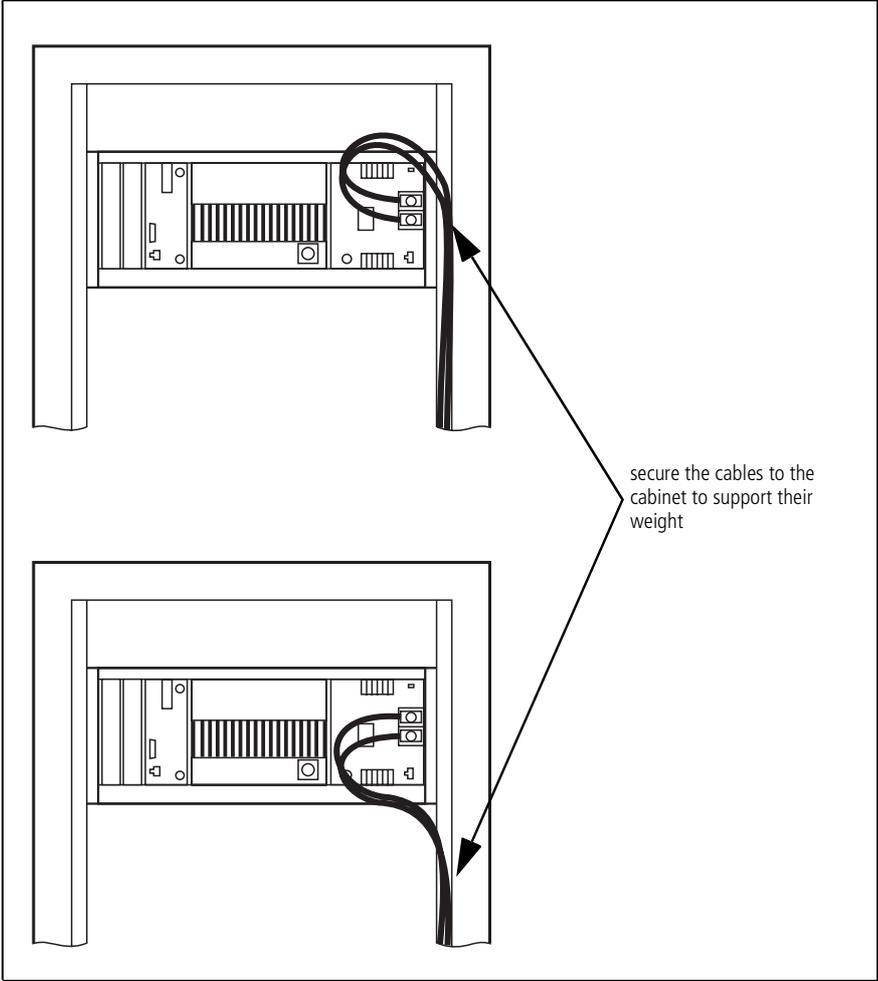
2   Connection

2.1   Power Supply Connections

**Auxiliary DC Input**   The system interface PCB in the reciter has an auxiliary DC input connector. DC from the auxiliary DC output on the PMU (see "Auxiliary DC Output" below) can be supplied to the +AUX_V pin on the system interface connector via this input.

The pin allocations for the auxiliary DC input on the system interface PCB are given in the following table. Note that pins 1 & 3 and pins 2 & 4 on this connector are linked. Refer to "System Connections" on the following pages for the pin allocations for +AUX_V on each system interface PCB.
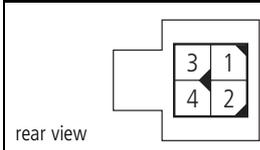
| Pin	Description	Links
1	+V input	
2	ground	
3	+V input	
4	ground	

The DC output from the PMU is 12VDC. Although this power output is isolated, the negative side of the supply is grounded on the system interface PCB to give a +V output.

Auxiliary DC Output   The PMU can provide an auxiliary DC output when it is fitted with the optional 40W auxiliary power supply PCB. This power supply is current limited to 3A and is available on the auxiliary DC output connector on the rear panel. DC from this output can be supplied to the +AUX_V pin on the system interface connector on the reciter via the auxiliary DC input connector on the system interface PCB (see "Auxiliary DC Input" above).

The pin allocations for the auxiliary DC output on the PMU are given in the following table. Note that pins 1 to 4 and pins 5 to 8 on this connector are linked.
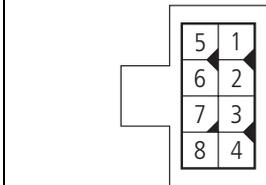
Pin	Description	Links
1	+V output	
2	+V output	
3	+V output	
4	+V output	
5	ground	
6	ground	
7	ground	
8	ground	

2.2　System Connections

Standard　　The standard system interface PCB is fitted to reciters bearing the product code TBA4xxx-0A0x or TBA5xxx-0A0x. If purchased separately, it has the product code TBA10A0. It provides:

■　non-isolated 600Ω balanced audio I/O

■　high impedance unbalanced audio I/O

■　Tx key

■　Rx gate

■　RSSI

■　Tx relay

■　digital I/O.

It is fitted with a 25-way female D-range connector and an auxiliary DC input connector. The pin allocations are listed in the table below.

Pin	Signal Name	Signal Type	Notes
1	Rx line out +	audio output	non-isolated 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	AC coupled line
7	Tx line in –		
8	RSSI	DC signal	
9	Rx gate	output	open collector
10	Tx key	input	
11	digital out 1	output	open collector
12	digital out 2		
13	+AUX_V	power output	
14	digital in 1	input	5V logic
15	digital in 2		
16	digital in 3		
17	digital in 4		
18	digital in 5		
19	digital in 6		
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	

rear view

Isolated

This system interface PCB 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 isolated.

Isolated E&M

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

■ isolated balanced audio I/O

■ opto-isolated keying

■ opto-isolated gate output.

It is fitted with a 25-way female D-range connector and an auxiliary DC input connector. The pin allocations are listed in the table below.

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	
11	digital out 1	output	open collector
12	digital out 2		
13	+AUX_V	power output	
14	digital in 1	input	5V logic
15	digital in 2		
16	digital in 3		
17	digital in 4		
18	digital in 5		
19	digital in 6		
20	opto +/−	isolated keying input	
21	opto −/+		
22	relay +/−	isolated gate output	
23	relay −/+		
24	Tx relay	output	open collector
25	ground	ground	
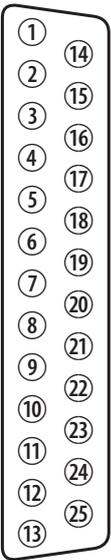
rear view

TaitNet (TBA10T1) This system interface PCB is fitted to reciters bearing the product code TBA4xxx-0T1x or TBA5xxx-0T1x. If purchased separately, it has the product code TBA10T1. It is designed for use with MPT trunking systems. It is fitted with a 15-way female D-range connector and an auxiliary DC input connector. The pin allocations are listed in the table below.
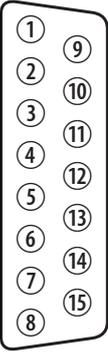
Pin	Signal Name	Signal Type	Notes
1	Rx line out +	audio output	AC coupled line
2	Rx line out –		
3	Rx audio out	audio output	
4	Rx gate	output	open collector
5	Tx key	input	
6	Tx audio in	audio input	
7	Tx line in +	audio input	AC coupled line
8	Tx line in –		
9	+AUX_V	power output	
10	digital out 3	output	open collector
11	no connection		
12	digital out 1	output	open collector
13	digital out 2		
14	digital in 1	input	5V logic
15	ground	ground	

rear view

2.3   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.
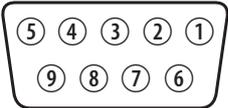
Pin	Description	Links
1	not connected	●
2	receive data	
3	transmit data	
4	not connected	●
5	ground	
6	not connected	●
7	not connected	●
8	not connected	●
9	not connected	

front view

Notes

Tait Contact Information

Corporate Head Office
New Zealand

Tait Electronics Ltd
P.O. Box 1645
Christchurch
New Zealand
E-mail (Marketing): taitnet@taitworld.com
E-mail (Sales): sales@taitworld.com

Technical Support

Technical Support Manager
Tait Electronics Ltd
P.O. Box 1645
Christchurch
New Zealand

E-mail: support@taitworld.com

Internet

http://www.taitworld.com

Oceania

New Zealand
Tait Communications Ltd
E-mail: headoffice@tcl.tait.co.nz

Australia
Tait Electronics (Aust) Pty Ltd
E-mail: australia@taitworld.com

Tait North America

Regional Head Office – Canada
Tait North America Inc
E-mail: canada@taitworld.com

United States of America
Tait North America Inc
E-mail: usa@taitworld.com

Latin America

Tait Latin America
E-mail: latinamerica@taitworld.com

Tait Europe

Regional Head Office – United Kingdom
Tait Mobile Radio Ltd
E-mail: teusales@tait.co.uk

Tait North Asia

Regional Head Office – Hong Kong
Tait Mobile Radio (Hong Kong) Ltd
E-mail: hongkong@taitworld.com

Beijing
Tait Mobile Radio (Hong Kong) Ltd
E-mail: beijing@taitworld.com

Tait South Asia

Regional Head Office – Singapore
Tait Electronics (Far East) Pte Ltd
E-mail: singapore@taitworld.com

Thailand
Tait Mobile Radio Ltd
E-mail: thailand@taitworld.com