

# 5 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.

## 5.1 Personal Safety

### 5.1.1 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.

### 5.1.2 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.

### 5.1.3 Proximity to RF Transmissions

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

### 5.1.4 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).

## 5.2 Equipment Safety

### 5.2.1 ESD Precautions



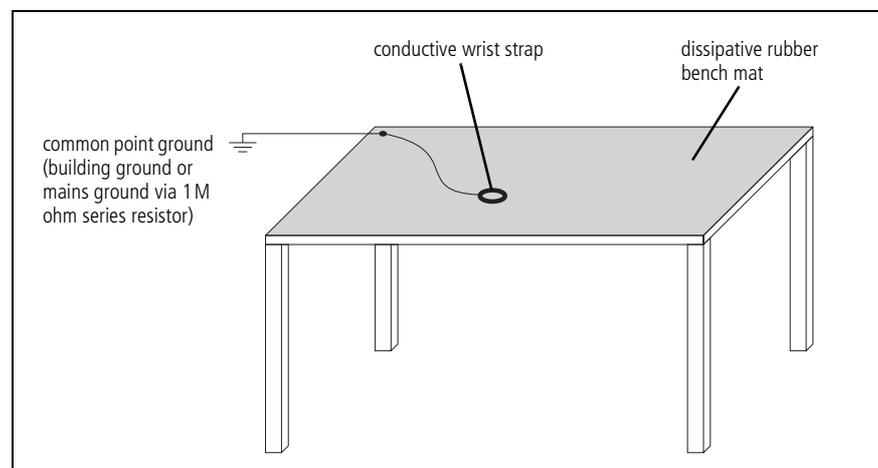
#### **Important**

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 5.1](#) 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 5.1** Typical antistatic bench set-up



## 5.2.2 Antenna Load

The TB8100 BSS equipment has been designed to operate safely under a wide range of antenna 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.

## 5.2.3 Equipment Grounding

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

## 5.2.4 Installation and Servicing Personnel

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

# 5.3 Regulatory Information

## 5.3.1 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.

## 5.3.2 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.

## 5.3.3 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.

### 5.3.4 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 139](#). 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.

## 5.4 Environmental Conditions

### 5.4.1 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.

### 5.4.2 Humidity

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

### 5.4.3 Dust and Dirt

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

## 5.5 Grounding and Lightning Protection

### 5.5.1 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 “[Final Reassembly](#)” on page 97 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](#)” on page 99 for more details).

### 5.5.2 Lightning Ground

It is extremely important for the security of the site and its equipment that you take adequate precautions against lightning strike. 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.

## 5.6 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.

## 5.7 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.

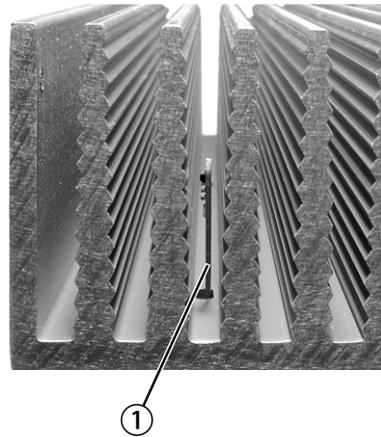


**Important** The cooling fans are mounted on the front panel and will only operate when the panel is fitted correctly to the front of the subrack. To ensure adequate airflow through the BSS, do not operate it for more than a few minutes with the front panel removed (e.g. for servicing purposes).

### 5.7.1 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.



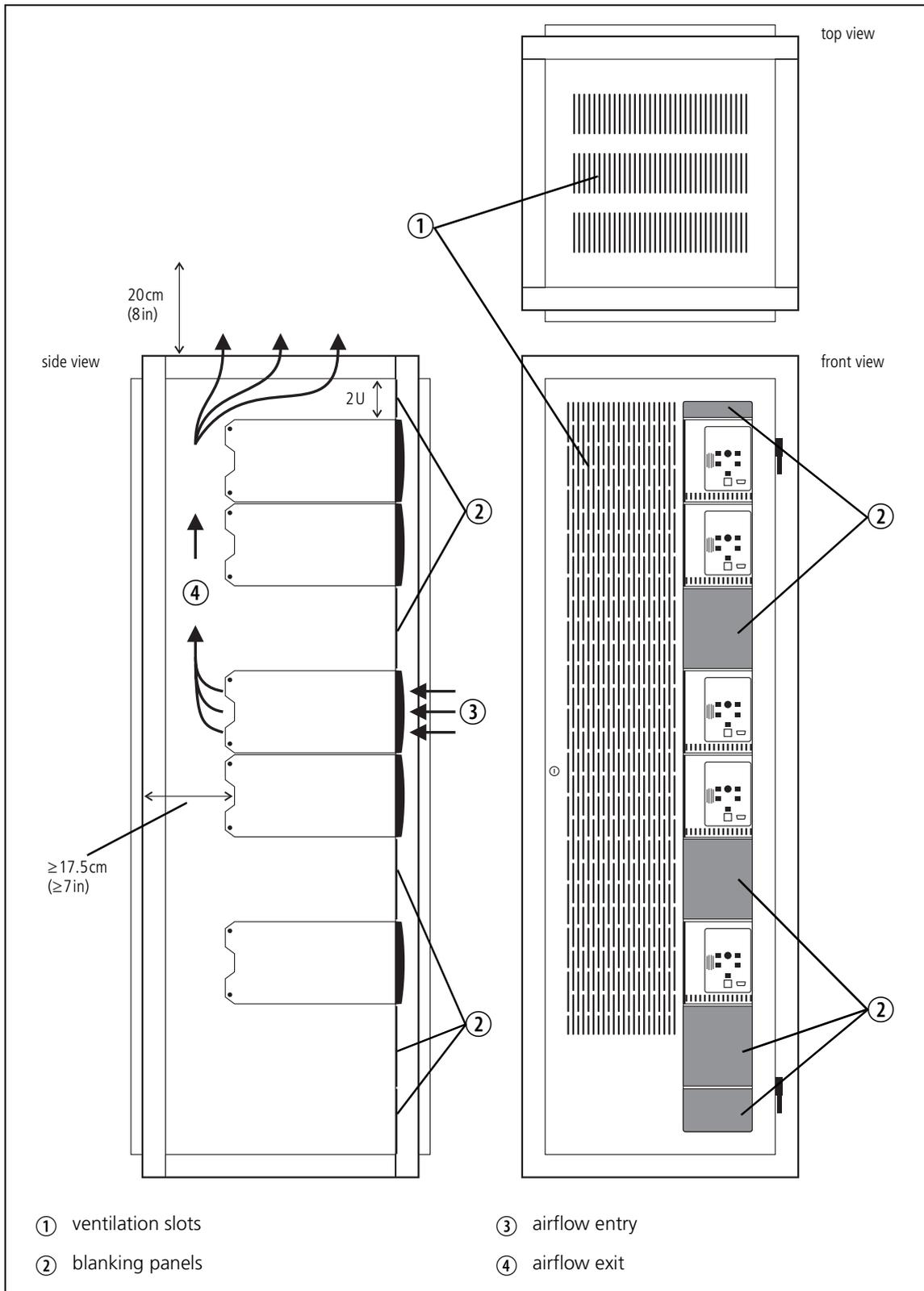
**Important** If the sensor board is to provide accurate ambient temperature readings, it must have forced airflow and must not come into contact with the metal of the heatsink fins. **Do not stack PAs with the fins together.** It is possible for the fins on one heatsink to slide between the fins on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

### 5.7.2 Cabinet and Rack Ventilation

Refer to [Figure 5.2 on page 75](#).

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 5.2 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.

## 5.8 Installing the Base Station System



### Caution

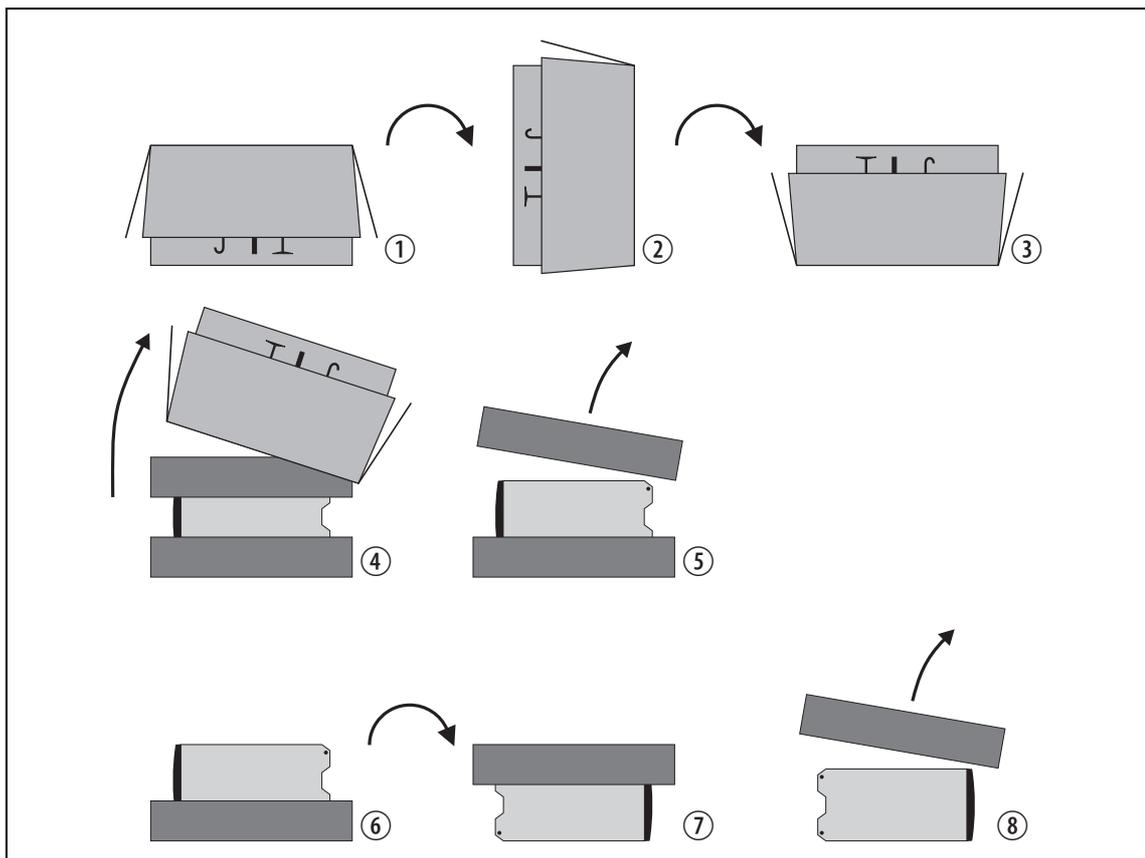
A TB8100 subrack complete with modules can weigh up to 28kg (62lb), or up to 30kg (66lb) complete with packaging. We recommend that, once the equipment is out of the carton, you remove the modules from the subrack before moving the equipment again. Otherwise, have another person help you with the lifting.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

### 5.8.1 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 5.3 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.

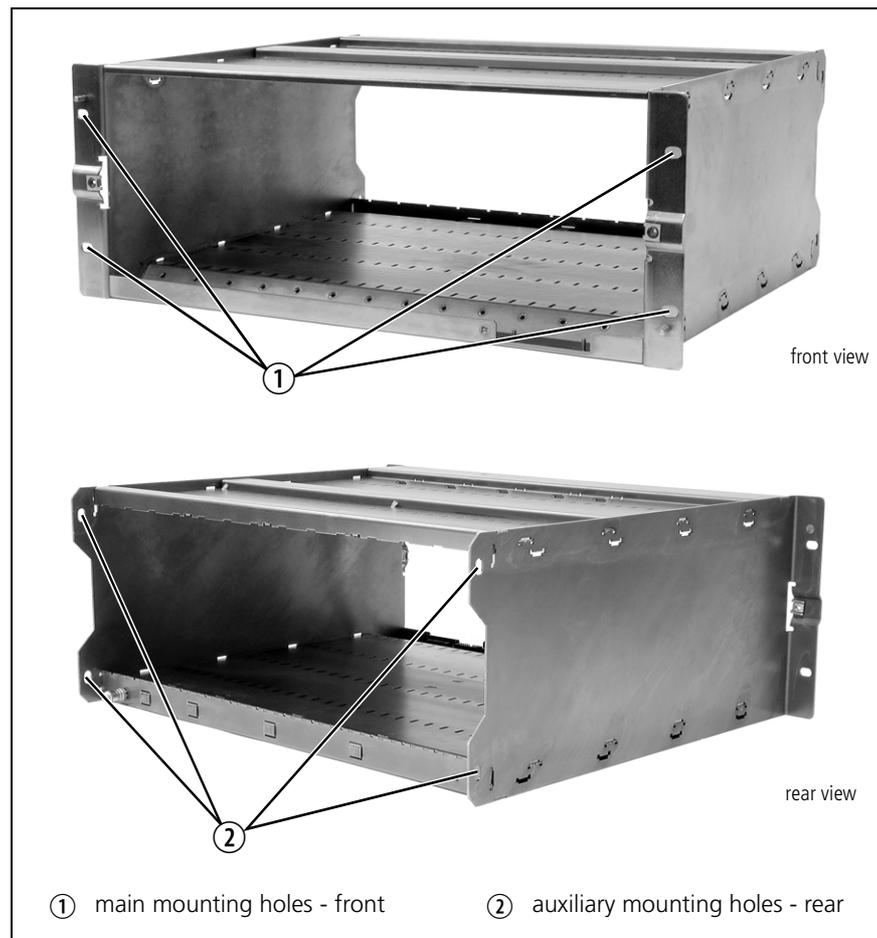
## 5.8.2 Mounting the Subrack



**Caution**

We recommend that you remove the modules from the subrack before lifting it (refer to [“Replacing Modules” on page 83](#)), or have another person help you with the lifting.

**Figure 5.4 Subrack mounting points**



1. Remove the front panel, as described in “Preliminary Disassembly” on page 84.
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 5.4 on page 78.

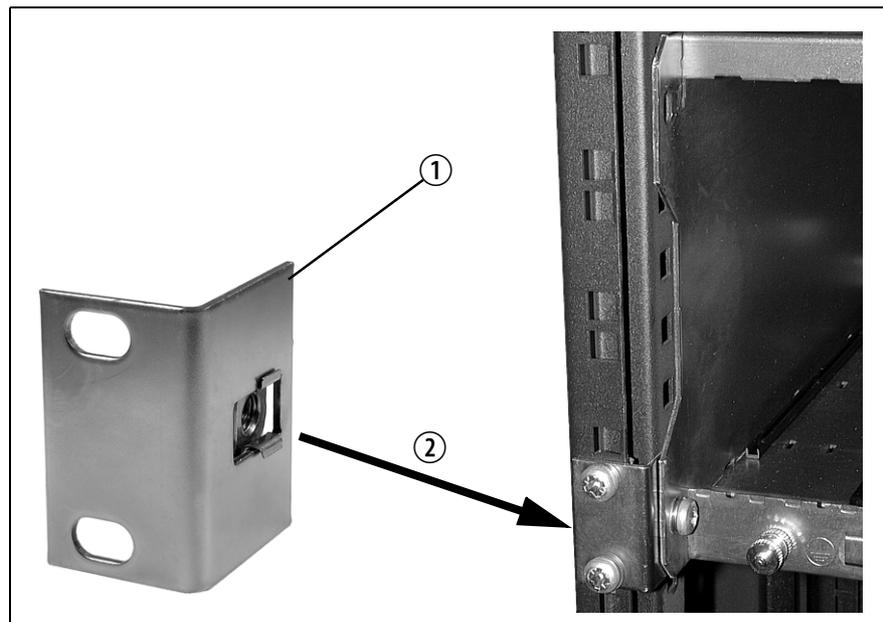


**Note** If you need extra mounting security, there are additional mounting holes ② provided at the rear of the subrack for auxiliary support brackets.

### 5.8.3 Auxiliary Support Bracket

TBA2140 auxiliary support brackets can be fitted to the rear of the TB8100 subrack to provide additional mounting security. Figure 5.5 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 5.5 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:

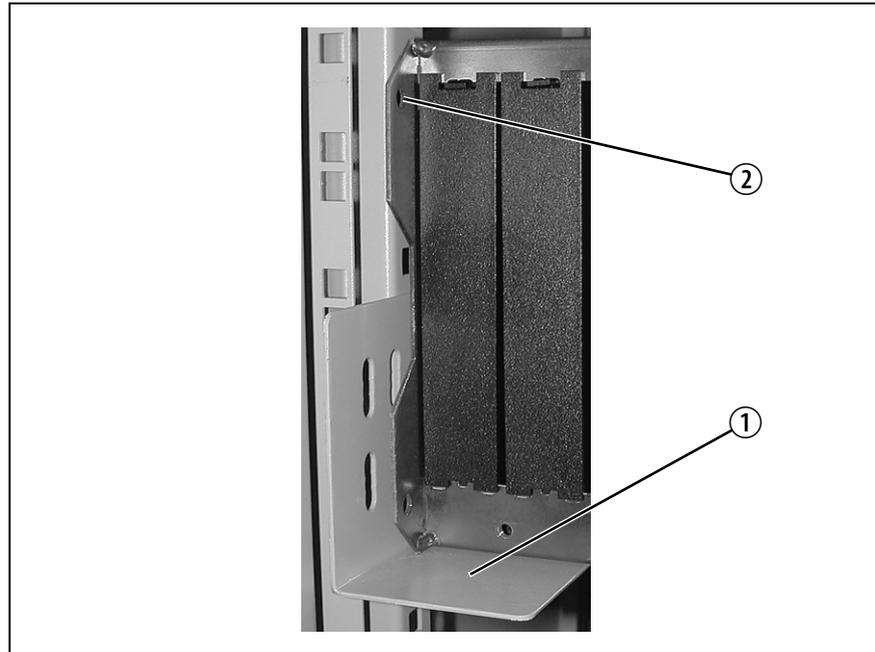
- when the installation is in an area prone to earthquakes
- when third party equipment is installed hard up underneath the TB8100 BSS subrack.

## 5.8.4 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 5.6 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 (0.25 in) screws through the main mounting holes on the front of the subrack, as shown in Figure 5.4 on page 78.

Figure 5.6 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.

## 5.8.5 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 5.7 below shows two recommended methods of securing these cables to prevent straining either set of terminals.

**Figure 5.7 DC power cabling**

