

**TB8100** base station

# Specifications Manual



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# Preface

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## Scope of Manual

Welcome to the TB8100 base station system Specifications Manual. This manual provides general, performance and physical specifications for the TB8100 5W, 50W and 100W base station systems.

## Enquiries and Comments

If you have any enquiries regarding this manual, or any comments, suggestions and notifications of errors, please contact Technical Support (refer to [“Tait Contact Information”](#) on page 2).

## Updates of Manual and Equipment

In the interests of improving the performance, reliability or servicing of the equipment, Tait Electronics Ltd reserves the right to update the equipment or this manual or both without prior notice.

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## Disclaimer

There are no warranties extended or granted by this manual. Tait Electronics Ltd accepts no responsibility for damage arising from use of the information contained in the manual or of the equipment and software it describes. It is the responsibility of the user to ensure that use of such information, equipment and software complies with the laws, rules and regulations of the applicable jurisdictions.

## Associated Documentation

TB8100 Installation and Operation Manual.

TB8100 Installation Guide (a subset of the Installation and Operation Manual).

TB8100 Service Manual.

TB8100 Service Kit and Alarm Center User's Manuals and online Help.

TB8100 Calibration Kit User's Manual and online Help.

Technical notes are published from time to time to describe applications for Tait products, to provide technical details not included in manuals, and to offer solutions for any problems that arise.

All available TB8100 product documentation is provided on the CD supplied with the base station<sup>1</sup>. Updates may also be published on the Tait support website.

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1. Technical notes are only available in PDF format from the Tait support website. Consult your nearest Tait Dealer or Customer Service Organisation for more information.

# 1 System Specifications

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This chapter provides specifications pertaining to the TB8100 base station system. You will find the specifications for individual modules in separate chapters in this manual.

The performance figures given in the power and current consumption specifications are typical figures based on using the equipment listed in the table below. The test frequency used was 475MHz.

| Module        | Description  |
|---------------|--|
| reciter       | mid-band UHF (H2 band) reciter with isolated system interface PCB                              |
| PA            | 5W, 50W or 100W PA, as stated in the appropriate specifications                                |
| PMU           | AC and DC PMU fitted with a 10W standby power supply card and a 40W auxiliary power supply PCB |
| control panel | standard control panel, unless stated otherwise  |

AC measurements were made using a Voltech PM100 power analyser. High power DC measurements were made using an HP 6032A DC power supply. All measurements for power save modes were made using a Tektronix TM502A current probe.



**Note** For AC power measurements the voltage, current drawn, volt.amp product, and true power are given. True power is equal to the volt.amp product multiplied by the power factor.

## Transmit Power and Current Consumption - 240VAC Input

|                                | <b>A</b> | <b>VA</b> | <b>W</b> |
|--------------------------------|----------|-----------|----------|
| 5W BSS                         |          |           |          |
| Minimum RF Output Power (1W)   | 480mA    | 115VA     | 30W      |
| 50% RF Output Power (2.5W)     | 490mA    | 118VA     | 37W      |
| Maximum RF Output Power (5W)   | 490mA    | 118VA     | 41W      |
| 50W BSS                        |          |           |          |
| Minimum RF Output Power (5W)   | 550mA    | 133VA     | 66W      |
| 50% RF Output Power (25W)      | 650mA    | 155VA     | 102W     |
| Maximum RF Output Power (50W)  | 740mA    | 177VA     | 132W     |
| 100W BSS                       |          |           |          |
| Minimum RF Output Power (10W)  | 640mA    | 154VA     | 100W     |
| 50% RF Output Power (50W)      | 870mA    | 209VA     | 171W     |
| Maximum RF Output Power (100W) | 1.1A     | 262VA     | 230W     |

## Transmit Power and Current Consumption - 110VAC Input

|                                | <b>A</b> | <b>VA</b> | <b>W</b> |
|--------------------------------|----------|-----------|----------|
| 5W BSS                         |          |           |          |
| Minimum RF Output Power (1W)   | 350mA    | 39VA      | 30W      |
| 50% RF Output Power (2.5W)     | 400mA    | 44VA      | 36W      |
| Maximum RF Output Power (5W)   | 430mA    | 47VA      | 39W      |
| 50W BSS                        |          |           |          |
| Minimum RF Output Power (5W)   | 650mA    | 72VA      | 67W      |
| 50% RF Output Power (25W)      | 990mA    | 109VA     | 105W     |
| Maximum RF Output Power (50W)  | 1.3A     | 138VA     | 136W     |
| 100W BSS                       |          |           |          |
| Minimum RF Output Power (10W)  | 960mA    | 106VA     | 103W     |
| 50% RF Output Power (50W)      | 1.6A     | 178VA     | 176W     |
| Maximum RF Output Power (100W) | 2.2A     | 239VA     | 237W     |



## Transmit Power and Current Consumption - AC Input Voltage Extremes

|                          | A     | VA    | W    |
|--------------------------|-------|-------|------|
| 5W BSS*                  |       |       |      |
| 85VAC                    | 530mA | 45VA  | 42W  |
| 264VAC                   | 540mA | 142VA | 40W  |
| *at 5W RF output power   |       |       |      |
| 50W BSS*                 |       |       |      |
| 85VAC                    | 1.6A  | 139VA | 138W |
| 264VAC                   | 730mA | 194VA | 131W |
| *at 50W RF output power  |       |       |      |
| 100W BSS*                |       |       |      |
| 85VAC                    | 2.9A  | 243VA | 242W |
| 264VAC                   | 1.0A  | 274VA | 229W |
| *at 100W RF output power |       |       |      |

## Transmit Power and Current Consumption - 12.5VDC Input

|                                | A     | W    |
|--------------------------------|-------|------|
| 5W BSS                         |       |      |
| Minimum RF Output Power (1W)   | 1.8A  | 23W  |
| 50% RF Output Power (2.5W)     | 2.2A  | 28W  |
| Maximum RF Output Power (5W)   | 2.6A  | 32W  |
| 50W BSS                        |       |      |
| Minimum RF Output Power (5W)   | 4.6A  | 58W  |
| 50% RF Output Power (25W)      | 7.6A  | 95W  |
| Maximum RF Output Power (50W)  | 10A   | 125W |
| 100W BSS                       |       |      |
| Minimum RF Output Power (10W)  | 8.0A  | 100W |
| 50% RF Output Power (50W)      | 14.0A | 175W |
| Maximum RF Output Power (100W) | 19.2A | 240W |

## Transmit Power and Current Consumption - DC Input Voltage Extremes

|                          | A     | W    |
|--------------------------|-------|------|
| 5W BSS*                  |       |      |
| 10.5VDC                  | 2.9A  | 30W  |
| 15.5VDC                  | 2.1A  | 33W  |
| *at 5W RF output power   |       |      |
| 50W BSS*                 |       |      |
| 10.5VDC                  | 11.7A | 123W |
| 15.5VDC                  | 8.3A  | 128W |
| *at 50W RF output power  |       |      |
| 100W BSS*                |       |      |
| 10.5VDC                  | 21.7A | 228W |
| 15.5VDC                  | 15.0A | 232W |
| *at 100W RF output power |       |      |

## Receive Power and Current Consumption

The specifications in this section refer to a BSS operating in receive mode with an input voltage of 12.5VDC.

|  | A     | W     |
|--|-------|-------|
| Normal Mode, No Power Save*                                  |       |       |
| Full Speaker Audio   | 1.1A  | 13.9W |
| Gate Open, Speaker Off                                       | 1.0A  | 12.5W |
| *with standard control panel                                 |       |       |
| Normal Mode, 20ms Receiver Cycling, 20ms Transmit Key Time   |       |       |
| Gate Closed, Standard Control Panel                          | 745mA | 9.3W  |
| Power Save Control Panel                                     | 720mA | 9.0W  |
| Sleep Mode, 200ms Receiver Cycling*                          |       |       |
|  | 400mA | 5.0W  |
| *with power save control panel and standby power supply card |       |       |

## Receive Power and Current Consumption (Continued)

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|                        | A     | W     |
|------------------------|-------|-------|
| Deep Sleep Mode*       |       |       |
| 200ms Receiver Cycling | 160mA | 2.0W  |
| 500ms Receiver Cycling | 122mA | 1.52W |
| 1s Receiver Cycling    | 109mA | 1.36W |
| 5s Receiver Cycling    | 98mA  | 1.23W |

\*with power save control panel and standby power supply card

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## Dimensions and Weight

### Dimensions

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|                       |                |
|-----------------------|----------------|
| Height                | 176.8mm (7in)  |
| Width                 | 482.6mm (19in) |
| Length                |                |
| Subrack Only          | 385mm (15.2in) |
| Including Front Panel | 410mm (16.1in) |

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### Weight\*

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|                                  |                 |
|----------------------------------|-----------------|
| Single 5/50W Base Station System | 20.6kg (45.4lb) |
| Dual 5/50W Base Station System   | 27.6kg (60.8lb) |
| Single 100W Base Station System  | 21.5kg (47.4lb) |

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\*with AC and DC PMU

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## Isolation

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|                                    |  |
|------------------------------------|--|
| Coaxial Changeover Relay Isolation | 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 |
|------------------------------------|--|

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## 2 Reciter Specifications

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This chapter provides specifications pertaining to the receiver and exciter circuitry within the reciter module. However, the transmitter RF specifications which pertain to the combination of exciter and power amplifier are given in “[Transmitter RF Section](#)” on page 29.

The performance figures given in these specifications are applicable only to equipment operating as an integral part of a TB8100 base station. These performance figures are minimum figures, unless otherwise indicated (e.g. “typical”), for equipment tuned with the maximum switching range and operating at standard room temperature (+22°C to +28°C [+71.6°F to +82.4°F]) and standard test voltage (28VDC).

Where applicable, the test methods used to obtain these figures are those described in the ANSI/TIA-603-B-2002 and ETSI-EN specifications. You can obtain further details of test methods and the conditions which apply for compliance testing in all countries from Tait Electronics Ltd.

### Bandwidth

The terms “wide bandwidth”, “mid bandwidth” and “narrow bandwidth” used in this and following sections are defined in the following table.

|                                    | Channel Spacing | Modulation<br>100% Deviation | Receiver<br>IF Bandwidth |
|------------------------------------|-----------------|------------------------------|--------------------------|
| Narrow Bandwidth<br>(NB)           | 12.5kHz         | ±2.5kHz                      | 7.5kHz                   |
| Mid Bandwidth <sup>a</sup><br>(MB) | 20kHz           | ±4kHz                        | 12kHz                    |
| Wide Bandwidth<br>(WB)             | 25kHz           | ±5.0kHz                      | 15.0kHz                  |

a. Mid bandwidth is available only in H band reciters (400MHz to 520MHz).

Sensitivity and distortion figures are stated for standard operating conditions which includes audio de-emphasis. Note that the sensitivity, distortion and signal-to-noise figures will be degraded when flat audio is selected.

## Identifying the Reciter

You can identify the model and hardware configuration of a reciter by referring to the product code printed on a label on the rear panel. The meaning of each character in the product code is explained in the table below.



**Note** This explanation of reciter product codes is not intended to suggest that any combination of features is necessarily available in any one reciter. Consult your nearest Tait Dealer or Customer Service Organisation for more information regarding the availability of specific models and options.

| Product Code          | Description   |
|-----------------------|---|
| TBA <u>X</u> XXX-XXXX | 4 = reciter   |
| TBA4 <u>X</u> XX-XXXX | 0 = default   |
| TBA4X <u>XX</u> -XXXX | <b>Frequency Band and Sub-band</b><br>B2 = 136MHz to 156MHz<br>B3 = 148MHz to 174MHz<br>H1 = 400MHz to 440MHz<br>H2 = 440MHz to 480MHz<br>H3 = 470MHz to 520MHz |
| TBA4XXX- <u>XXX</u>   | <b>System Interface PCB</b><br>000 = no system interface PCB fitted<br>0A0 = standard<br>0B0 = isolated<br>0C0 = isolated E & M<br>0T1 = TaitNet                |
| TBA4XXX-XXX <u>X</u>  | 0 = default   |

## General

---

|                                    |   |
|------------------------------------|---|
| Number of Channels                 | 255   |
| Supply Voltage                     |   |
| Operating Voltage                  | 12VDC to 29.5VDC  |
| Standard Test Voltage              | 28VDC   |
| Polarity                           | negative earth  |
| Polarity Protection                | Zener diode and thermal resistor  |
| Supply Current                     |   |
| Receiver and Exciter Operating     | <330mA at 28VDC   |
| Operating Temperature Range        |   |
|                                    | -30°C to +60°C (-22°F to +140°F) ambient temperature*   |
|                                    | *ambient temperature is defined as the temperature of the air immediately in front of the control panel |
| Cooling                            | convection  |
| Connectors                         |   |
| RF Input                           | BNC female  |
| RF Output                          | SMA female  |
| Control and Alarm                  | 16-way IDC male   |
| External Reference Frequency Input | BNC female  |
| 28VDC Input                        | 4-way Micro-Fit 3.0 (Molex) male  |
| Auxiliary DC Input                 | 4-way Micro-Fit 3.0 (Molex) male  |
| System                             | depends on system interface PCB fitted*   |
|                                    | *refer to Installation and Operation Manual   |
| Dimensions                         |   |
| Height                             | 143.6mm (5.7in)   |
| Width                              | 54.6mm (2.1in)  |
| Length                             | 333.3mm (13.1in)  |
| Weight                             | 2.1 kg (4.6lb)  |

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## Receiver RF Section

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### Frequency Bands

|        |                  |
|--------|------------------|
| B Band | 136MHz to 174MHz |
| H Band | 400MHz to 520MHz |

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### Frequency Sub-bands

|    |                  |
|----|------------------|
| B2 | 136MHz to 156MHz |
| B3 | 148MHz to 174MHz |
| H1 | 400MHz to 440MHz |
| H2 | 440MHz to 480MHz |
| H3 | 470MHz to 520MHz |

---

|      |   |
|------|---|
| Type | triple conversion superheterodyne; first conversion is analogue, second is hybrid, and third is digital |
|------|---|

---

### Frequency Increments

|        |                     |
|--------|---------------------|
| B Band | 3.125kHz and 2.5kHz |
| H Band | 5kHz and 6.25kHz    |

---

|                 |   |
|-----------------|---|
| Switching Range | >2% of the centre frequency*<br>*e.g. $\pm 1.36$ MHz from the centre frequency at 136MHz, $\pm 4$ MHz from the centre frequency at 400MHz, or $\pm 5.2$ MHz from the centre frequency at 520MHz |
|-----------------|---|

---

|                      |                                 |
|----------------------|---------------------------------|
| Input Load Impedance | 50 $\Omega$ nominal (VSWR <2:1) |
|----------------------|---------------------------------|

---

|                     |  |
|---------------------|--|
| RF Input Protection | no degradation after 5 minutes exposure to on-channel signals at +20dBm (2.2V) |
|---------------------|--|

---

|                     |  |
|---------------------|--|
| Frequency Stability | $\pm 1$ ppm $-30^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ ( $-22^{\circ}\text{F}$ to $+140^{\circ}\text{F}$ ) |
|---------------------|--|

---

|      |  |
|------|--|
| RSSI | $-120$ dBm to $-60$ dBm (0.22 $\mu\text{V}$ to 223.6 $\mu\text{V}$ ), 0.5V to 6V, programmable slope |
|------|--|

---

### IF Stages - B Band

|                        |                  |
|------------------------|------------------|
| Frequencies            |                  |
| Analogue               | 16.9MHz          |
| Digital                | 16.9MHz and 0Hz  |
| Analogue IF Bandwidths |                  |
| Narrow Bandwidth       | 9kHz, $-3$ dB    |
| Wide Bandwidth         | 20kHz, $-3$ dB   |
| Digital IF Bandwidths  |                  |
| Narrow Bandwidth       | 8.8kHz, $-3$ dB  |
| Wide Bandwidth         | 14.0kHz, $-3$ dB |

---



## Receiver RF Section (Continued)

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### IF Stages - H Band

|                       |                  |
|-----------------------|------------------|
| Frequencies           |                  |
| Analogue              | 70.1 MHz         |
| Digital               | 9.9 MHz and 0 Hz |
| Analogue IF Bandwidth | 20 kHz, -4 dB    |
| Digital IF Bandwidths |                  |
| Narrow Bandwidth      | 8.8 kHz, -3 dB   |
| Mid Bandwidth         | 12.0 kHz, -3 dB  |
| Wide Bandwidth        | 14.0 kHz, -3 dB  |

---

### Sensitivity\*

|                           |                                      |
|---------------------------|--------------------------------------|
| De-emphasised Response    |                                      |
| Centre of Switching Range | <-119 dBm (0.25 $\mu$ V) at 25°C**   |
| Edge of Switching Range   | <-117 dBm (0.32 $\mu$ V) at 25°C**   |
| Flat Response             |                                      |
| Centre of Switching Range | <-117.5 dBm (0.30 $\mu$ V) at 25°C** |
| Edge of Switching Range   | <-115.5 dBm (0.38 $\mu$ V) at 25°C** |

\*12 dB SINAD

\*\*up to 2 dB degradation at extremes of temperature

---

### Maximum Usable Sensitivity\*

|                           |  |
|---------------------------|--|
| De-emphasised Response    |  |
| Centre of Switching Range | <-116 dBm (0.35 $\mu$ V) at 25°C (NB)**<br><-118 dBm (0.28 $\mu$ V) at 25°C (WB)** |
| Edge of Switching Range   | <-114 dBm (0.45 $\mu$ V) at 25°C (NB)**<br><-116 dBm (0.35 $\mu$ V) at 25°C (WB)** |
| Flat Response             |  |
| Centre of Switching Range | <-112 dBm (0.56 $\mu$ V) at 25°C (NB)**<br><-116 dBm (0.35 $\mu$ V) at 25°C (WB)** |
| Edge of Switching Range   | <-110 dBm (0.71 $\mu$ V) at 25°C (NB)**<br><-114 dBm (0.45 $\mu$ V) at 25°C (WB)** |

\*sensitivity for 20 dB SINAD, psophometrically weighted, RF source modulated at 60% deviation with 1 kHz

\*\*up to 2 dB degradation at extremes of temperature

---

### Ultimate Signal-to-Noise Ratio\*

|                            |   |
|----------------------------|---|
| Narrow Bandwidth           | 45 dB (ANSI/TIA)**<br>50 dB (CEPT - psophometric)** |
| Mid Bandwidth <sup>+</sup> | 50 dB (ANSI/TIA)**                                  |
| Wide Bandwidth             | 55 dB (ANSI/TIA)**                                  |

\*at -47 dBm

\*\*up to 5 dB degradation at extremes of switching range and temperature

---

## Receiver RF Section (Continued)

### Selectivity

|                  |  |
|------------------|--|
| B Band           |  |
| Narrow Bandwidth | 50 dB (ANSI/TIA-603-B)*<br>89 dB (ETSI)*                               |
| Wide Bandwidth   | 87 dB (ANSI/TIA-603-B)*  |
| H Band           |  |
| Narrow Bandwidth | 46 dB (ANSI/TIA-603-B)*<br>85 dB (ETSI)*                               |
| Mid Bandwidth    | 85 dB (ETSI)*  |
| Wide Bandwidth   | 82 dB (ANSI/TIA-603-B)*  |
|                  | *up to 5 dB degradation at extremes of switching range and temperature |

|                               |                                      |
|-------------------------------|--------------------------------------|
| Spurious Response Attenuation | ≥100 dB (ANSI/TIA)*<br>≥90 dB (ETSI) |
|                               | *AGC switched off in H band reciter  |

### Intermodulation Response Attenuation

|                  |  |
|------------------|--|
| Narrow Bandwidth | 80 dB (ETSI)*  |
| Mid Bandwidth**  | 80 dB (ETSI)*  |
| Wide Bandwidth   | 85 dB (ANSI/TIA)*  |
| **H band only    | *up to 5 dB degradation at extremes of switching range and temperature |

### Blocking Rejection

|                       |                                     |
|-----------------------|-------------------------------------|
| 1–10MHz               | 100 dB (ETSI)                       |
| >10MHz                | 110 dB (ETSI)                       |
| ±1, ±2, ±5 and ±10MHz | 100 dB (ANSI/TIA)*                  |
|                       | *AGC switched off in H band reciter |

### Co-channel Rejection

|                  |       |
|------------------|-------|
| Narrow Bandwidth | –8 dB |
| Mid Bandwidth*   | –8 dB |
| Wide Bandwidth   | –5 dB |

\*H band only

|                           |              |
|---------------------------|--------------|
| Amplitude Characteristic* | ≤3 dB (ETSI) |
|---------------------------|--------------|

\*RF Input Level –107 dBm to –13 dBm

### Spurious Emissions

|           |  |
|-----------|--|
| Conducted | <–90 dBm to 2 GHz<br><–70 dBm 2 GHz to 4 GHz           |
| Radiated  | <–57 dBm EIRP to 1 GHz<br><–47 dBm EIRP 1 GHz to 4 GHz |

## Receiver Audio Section - General

|  |   |   |
|--|---|---|
| Outputs Available                                    | speaker output via control panel<br>balanced and unbalanced line outputs via system interface PCB |   |
| Frequency Response                                   | flat or de-emphasised (750µs)   |   |
| De-emphasised Response                               |   |   |
| Bandwidth  | 300Hz to 2.55kHz (NB)<br>300Hz to 3.4kHz (MB)*<br>300Hz to 3.4kHz (WB)                            |   |
| Response   | within +1, -3dB of a -6dB/octave de-emphasis curve (ref. 1kHz)<br>*H band only                    |   |
| Flat Response  | Balanced Audio  | Unbalanced Audio  |
| Bandwidth  | 67Hz to 2.55kHz (NB)<br>67Hz to 3.4kHz (MB)*<br>67Hz to 3.4kHz (WB)                               | 10Hz to 2.55kHz (NB)<br>10Hz to 3.4kHz (MB)*<br>10Hz to 3.4kHz (WB) |
| Response   | within +1, -3dB of output level at 1kHz<br>*H band only   | within +1, -1dB of output level at 1kHz                             |
| Balanced Line Output<br>(via System Interface PCB)   |   |   |
| Output Level Range                                   | -20dBm to +10dBm  |   |
| Output Impedance                                     | 600Ω  |   |
| Distortion*  |   |   |
| De-emphasised  | ≤2%   |   |
| Flat   | ≤4% (NB)  |   |
| *at -70dBm signal level                              | ≤2% (WB)  |   |
| Unbalanced Line Output<br>(via System Interface PCB) |   |   |
| Output Level Range                                   | 0.3Vpp to 3Vpp into 10kΩ  |   |
| Speaker Output<br>(via Control Panel)                |   |   |
| Power  | 0.5W maximum  |   |
| Speaker Impedance                                    | 16Ω nominal   |   |
| Distortion*  | ≤3% at 1kHz, 0.35W, 16Ω   |   |
| *at -70dBm signal level, de-emphasis selected        |   |   |

## Receiver Audio Section - CTCSS

---

### High Pass (Subaudible) Filter

|                 |  |
|-----------------|--|
| Bandwidth       | 300Hz to 2.55kHz (NB)<br>300Hz to 3.4kHz (MB)*<br>300Hz to 3.4kHz (WB) |
| Response        | within +1, -3dB of level at 1kHz                                       |
| Hum and Noise** | 30dB minimum at 250.3Hz<br>35dB typical (67Hz to 240Hz)                |

\*\*1kHz at 60% system deviation, CTCSS at 10% system deviation

\*H band only

---

### Tone Detect

|                       |   |
|-----------------------|---|
| Tone Squelch Opening  | better than 6dB SINAD<br>3dB SINAD at 250.3Hz (typical)<br>4dB SINAD at 100Hz (typical) |
| Tone Detect Bandwidth | $\pm 2$ Hz accept (typical)<br>$\pm 3$ Hz reject (typical)                              |
| Response Time         | 150ms open and close (typical)  |

---

## Receiver Audio Section - Gating Operation

---

|                   |   |
|-------------------|---|
| Systems Available | SINAD gating (noise mute)<br>RSSI gating (carrier mute) |
|-------------------|---|

---

### SINAD Gating

|                |                   |
|----------------|-------------------|
| Opening Level  | 8dB to 20dB SINAD |
| Accuracy       | $\pm 3$ dB        |
| RF Hysteresis* | 1.5dB to 6dB      |
| Opening Time   | $\leq 20$ ms      |
| Closing Time   | $50 \pm 10$ ms    |

\*programmable

---

### RSSI Gating

|               |                   |
|---------------|-------------------|
| Opening Level | -117dBm to -70dBm |
| Accuracy      | $\pm 3$ dB        |
| Hysteresis*   | 2dB to 10dB       |
| Opening Time  | $\leq 5$ ms       |
| Closing Time  | $50 \pm 10$ ms    |

\*programmable

---

## Exciter RF Section

---

### Frequency Bands

|        |                  |
|--------|------------------|
| B Band | 136MHz to 174MHz |
| H Band | 400MHz to 520MHz |

---

### Frequency Sub-bands

|    |                  |
|----|------------------|
| B2 | 136MHz to 156MHz |
| B3 | 148MHz to 174MHz |
| H1 | 400MHz to 440MHz |
| H2 | 440MHz to 480MHz |
| H3 | 470MHz to 520MHz |

---

|                 |    |
|-----------------|----|
| Modulation Type | FM |
|-----------------|----|

---

### Frequency Increments

|        |                     |
|--------|---------------------|
| B Band | 3.125kHz and 2.5kHz |
| H Band | 5kHz and 6.25kHz    |

---

|                          |  |
|--------------------------|--|
| Switching Range - B Band | >8MHz*<br>*i.e. >±4MHz from the centre frequency |
|--------------------------|--|

|                          |   |
|--------------------------|---|
| Switching Range - H Band | >2% of the centre frequency*<br>*i.e. ±4MHz from the centre frequency at 400MHz, and<br>±5.2MHz from the centre frequency at 520MHz |
|--------------------------|---|

---

|                       |                         |
|-----------------------|-------------------------|
| Output Load Impedance | 50Ω nominal (VSWR <2:1) |
|-----------------------|-------------------------|

---

|                     |   |
|---------------------|---|
| Frequency Stability | ±1 ppm -30°C to +60°C (-22°F to +140°F) |
|---------------------|---|

---

|              |             |
|--------------|-------------|
| Power Output | +11dBm ±2dB |
|--------------|-------------|

---

## Exciter Audio Section - Inputs

---

|                  |   |
|------------------|---|
| Inputs Available | microphone input via control panel<br>balanced and unbalanced line inputs via system<br>interface PCB |
|------------------|---|

---

### Microphone Input

|                    |                       |
|--------------------|-----------------------|
| Input Level Range* | 80dB SPL to 115dB SPL |
| Impedance          | 600Ω                  |
| Compressor         |                       |
| Attack Time        | 10ms                  |
| Decay Time         | 800ms                 |
| Dynamic Range      | 35dB                  |
| Distortion         | ≤3%                   |

\*60% modulation at 1kHz

---

## Exciter Audio Section - Inputs (Continued)

### Balanced Line Input

|                    |                  |
|--------------------|------------------|
| Input Level Range* | -20dBm to +10dBm |
| Impedance          | 600Ω balanced    |

\*60% modulation at 1 kHz

### Unbalanced Line Input

|                   |                |
|-------------------|----------------|
| Input Level Range | 0.3Vpp to 3Vpp |
| Impedance         | > 10kΩ         |

## Exciter Audio Section - Modulation Characteristics

|                     |                          |
|---------------------|--------------------------|
| Frequency Response* | flat or pre-emphasised** |
|---------------------|--------------------------|

\*below limiting

\*\*microphone input via control panel, balanced and unbalanced line inputs via system interface PCB

### Line and Microphone Inputs

|                                   |  |
|-----------------------------------|--|
| Pre-emphasised Response Bandwidth | 300Hz to 2.55kHz (NB)<br>300Hz to 3kHz (MB)*<br>300Hz to 3kHz (WB) |
| Below Limiting                    | within +1, -3dB of a 6dB/octave pre-emphasis curve (ref. 1kHz)     |

| Flat Response | Balanced Audio  | Unbalanced Audio  |
|---------------|---|---|
| Bandwidth     | 67Hz to 2.55kHz (NB)<br>67Hz to 3kHz (MB)*<br>67Hz to 3kHz (WB) | 10Hz to 2.55kHz (NB)<br>10Hz to 3kHz (MB)*<br>10Hz to 3kHz (WB) |
| Response      | within +1, -3dB of output level at 1kHz                         | within +1, -1dB of output level at 1kHz                         |
|               | *H band only  |   |

|                         |  |
|-------------------------|--|
| Above Limiting Response | within +1, -2dB of a flat response (ref. 1kHz) |
|-------------------------|--|

|            |     |
|------------|-----|
| Distortion | <2% |
|------------|-----|

### Hum and Noise

|                  |  |
|------------------|--|
| Narrow Bandwidth | -50dB typical (ETSI)*                    |
| Mid Bandwidth**  | -50dB typical (ETSI)*                    |
| Wide Bandwidth   | -55dB typical, 300Hz to 3kHz (ANSI/TIA)* |

\*\*H band only

\*up to 5dB degradation at extremes of switching range and temperature

## Exciter Audio Section - CTCSS

---

|                           |  |
|---------------------------|--|
| Standard Tones            | all 37 ANSI/TIA group A, B and C tones plus 13 commonly used tones |
| Frequency Error*          | 0.08% maximum  |
| *from ANSI/TIA tones      |  |
| Generated Tone Distortion | 1.2% maximum   |
| Generated Tone Flatness   | flat across 67Hz to 250.3Hz to within 1 dB                         |
| Modulation Level          | adjustable   |
| Modulated Distortion      | <5%  |

---

## External Reference Input

---

|  |                  |
|--|------------------|
| Frequencies*   | 10MHz or 12.8MHz |
| *One frequency must be specified by the Service Kit. |                  |
| Lock Range   | ±50Hz            |
| Input Level  | 300mVpp to 5Vpp  |
| Input Impedance                                      | ≥1kΩ             |

---

## Compliance Standards

---

Where applicable, this equipment has been tested and approved to the following standards.

---

|        |   |
|--------|---|
| RF     | EN 300 086-2:V1.2.1<br>EN 300 113-2 (03/2001)<br>AS4295-1995<br>CFR 47 Parts 15, 22 and 90<br>RSS-119 Iss 6                 |
| EMC    | ETSI EN 301 489 V1.4.1 (2002-08)<br>CFR 47 Part 15 Level B1   |
| Safety | BS EN 60950-1:2002<br>ANSI/UL Std. 60950 3rd edition<br>CAN/CSA-C22.2 No. 60950-00 3rd edition<br>AS/NZS 60950 and ACATS001 |

---

## Compliance Standards (Continued)

---

### Environmental

|                         |                           |
|-------------------------|---------------------------|
| Low Pressure (Altitude) | MIL-STD-810F 500.4 Proc 2 |
| Humidity                | IEC60068-2-30             |
| Vibration               | MIL-STD-810F 514.5 Proc 1 |
| Shock                   | MIL-STD-810F 516.5 Proc 1 |

---



# 3 Power Amplifier and Transmitter Specifications

---

This chapter provides specifications pertaining to the power amplifier as a separate module. It also includes a number of transmitter RF specifications which pertain to the combination of power amplifier and exciter.

The performance figures given in these specifications are applicable only to equipment operating as an integral part of a TB8100 base station. These performance figures are minimum figures, unless otherwise indicated, for equipment operating at standard room temperature (+22°C to +28°C [+71.6°F to +82.4°F]) and standard test voltage (28VDC).

Where applicable, the test methods used to obtain these figures are those described in the ANSI/TIA-603-B-2002 and ETSI-EN specifications. You can obtain further details of test methods and the conditions which apply for compliance testing in all countries from Tait Electronics Ltd.

## Bandwidth

The terms “narrow bandwidth”, “mid bandwidth” and “wide bandwidth” used in this chapter are defined in the following table.

|                            | <b>Channel Spacing</b> | <b>Modulation 100% Deviation</b> | <b>Receiver IF Bandwidth</b> |
|----------------------------|------------------------|----------------------------------|------------------------------|
| Narrow Bandwidth           | 12.5kHz                | ±2.5kHz                          | 7.5kHz                       |
| Mid Bandwidth <sup>a</sup> | 20kHz                  | ±4kHz                            | 12kHz                        |
| Wide Bandwidth             | 25kHz                  | ±5kHz                            | 15kHz                        |

a. Mid bandwidth is available only in H band transmitters (400MHz to 520MHz).

## Identifying the PA

You can identify the model and hardware configuration of a PA by referring to the product code printed on labels on the heatsink and rear of the cover. The meaning of each character in the product code is explained in the table below.



**Note** This explanation of PA product codes is not intended to suggest that any combination of features is necessarily available in any one PA. Consult your nearest Tait Dealer or Customer Service Organisation for more information regarding the availability of specific models and options.

| Product Code          | Description  |
|-----------------------|--|
| TBA <u>X</u> XXX-XXXX | 7 = 5W<br>8 = 50W<br>9 = 100W  |
| TBA <u>X</u> XX-XXXX  | 0 = default  |
| TBA <u>XX</u> -XXXX   | <b>Frequency Band and Sub-band</b><br>B1 = 136MHz to 174MHz<br>H0 = 400MHz to 520MHz |
| TBAXXX- <u>X</u> XXX  | 0 = default  |
| TBAXXX-XX <u>X</u>    | 0 = default  |
| TBAXXX-XX <u>XX</u>   | 0 = default  |
| TBAXXX-XXX <u>X</u>   | 0 = default  |

## General

---

### Supply Voltage

|                       |                        |
|-----------------------|------------------------|
| Operating Voltage     | 26.5VDC to 29.5VDC     |
| Standard Test Voltage | 28VDC                  |
| Polarity              | negative earth only    |
| Polarity Protection   | reverse polarity diode |

---

### Supply Current

|                | Maximum | Typical |
|----------------|---------|---------|
| Standby        | 50mA    | 42mA    |
| Transmit*      |         |         |
| 5W PA @ 5W     | 600mA   | 530mA   |
| 50W PA @ 50W   | 5A      | 4.2A    |
| 100W PA @ 100W | 10A     | 8.3A    |

---

\*into a 50Ω load

---

### Operating Temperature Range

–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 fan

---

### Cooling

forced air over heatsink via fan mounted in subrack

---

### Connectors

|                   |                              |
|-------------------|------------------------------|
| 28VDC Input       | Phoenix Combicon MVSTBR2.5HC |
| RF Input          | SMA female                   |
| RF Output         | N-type female                |
| Control and Alarm | 16-way IDC male              |

---

### Dimensions

|                |                |
|----------------|----------------|
| Height         | 86mm (3.4in)   |
| Length         | 350mm (13.8in) |
| Width          |                |
| 5W and 50W PAs | 144mm (5.7in)  |
| 100W PA        | 177mm (7in)    |

---

### Weight

|               |                |
|---------------|----------------|
| 5 and 50W PAs | 4.9kg (10.8lb) |
| 100W PA       | 5.8kg (12.8lb) |

---

## Power Amplifier RF Section

---

### Frequency Bands

|        |                  |
|--------|------------------|
| B Band | 136MHz to 174MHz |
| H Band | 400MHz to 520MHz |

---

|             |                  |
|-------------|------------------|
| Input Power | +11dBm $\pm$ 2dB |
|-------------|------------------|

---

### Output Power

|                     |                      |
|---------------------|----------------------|
| 5W PA               |                      |
| Rated Power         | 5W                   |
| Range of Adjustment | 1W to 5W in 1W steps |

|                     |                       |
|---------------------|-----------------------|
| 50W PA              |                       |
| Rated Power         | 50W                   |
| Range of Adjustment | 5W to 50W in 1W steps |

|                     |                         |
|---------------------|-------------------------|
| 100W PA             |                         |
| Rated Power         | 100W                    |
| Range of Adjustment | 10W to 100W in 1W steps |

---

|                        |                                     |
|------------------------|-------------------------------------|
| Output Power Accuracy* | $\pm$ 0.5dB into a 50 $\Omega$ load |
|------------------------|-------------------------------------|

\*within normal operating voltages and temperatures

---

|            |  |
|------------|--|
| Duty Cycle | 100% at maximum rated output power* at +60°C (+140°F) ambient temperature<br>*measured directly on PA output |
|------------|--|

---

|                      |   |
|----------------------|---|
| Input Load Impedance | 50 $\Omega$ nominal (VSWR $\leq$ 1.8:1) |
|----------------------|---|

---

|                       |                     |
|-----------------------|---------------------|
| Output Load Impedance | 50 $\Omega$ nominal |
|-----------------------|---------------------|

---

### Mismatch Capability

|            |  |
|------------|--|
| Ruggedness | open and short circuit load at any phase angle for one hour* |
| Stability  | 5:1 load VSWR at all phase angles*<br>*under power foldback  |

---

## Power Amplifier RF Section (Continued)

---

### Protection

|                |  |
|----------------|--|
| Temperature    | power foldback to 10% if RF power devices exceed safe operating conditions   |
| Current        | power foldback and shutdown if RF power devices exceed safe operating currents   |
| Supply Voltage | power foldback to 10% when supply voltage is 24V to 26V and 30V to 32V; shutdown when supply voltage is <24V and >32V        |
| VSWR           | power foldback to 10% at VSWR extremes; continuous analogue power foldback to maintain 100% duty cycle into mismatched loads |

---

## Transmitter RF Section

---

The specifications in this section pertain only to the combination of a 5W, 50W or 100W power amplifier with a TB8100 reciter.

---

### Adjacent Channel Power

|                               |         |
|-------------------------------|---------|
| Steady State (Full Deviation) |         |
| Narrow Bandwidth              | <-60dBc |
| Mid* and Wide Bandwidth       | <-70dBc |
| Transient (Unmodulated)       |         |
| Narrow Bandwidth              | <-50dBc |
| Mid* and Wide Bandwidth       | <-60dBc |

\*H band only

---

### Sideband Noise\*

|        |  |
|--------|--|
| ±25kHz | <-137dBc/Hz  |
| ±1MHz  | <-147dBc/Hz  |
| ±10MHz | <-147dBc/Hz at 5W<br><-157dBc/Hz at 50W<br><-160dBc/Hz at 100W |

\*no modulation, measured from centre frequency

---

### Hum and Noise

|                  |                                  |
|------------------|----------------------------------|
| Narrow Bandwidth | -50dB (300Hz to 3kHz [ANSI/TIA]) |
| Mid Bandwidth*   | -54dB (300Hz to 3kHz [ANSI/TIA]) |
| Wide Bandwidth   | -55dB (300Hz to 3kHz [ANSI/TIA]) |

\*H band only

---

|                 |   |
|-----------------|---|
| Intermodulation | -40dBc with interfering signal at -30dBc at PA output |
|-----------------|---|

---

## Transmitter RF Section (Continued)

---

### Radiated Spurious Emissions

|          |  |
|----------|--|
| Transmit | <-36dBm to 1 GHz<br><-30dBm 1 GHz to 4GHz  |
| Standby  | <-57 dBm to 1 GHz<br><-47dBm 1 GHz to 4GHz |

---

### Conducted Spurious Emissions

|          |   |
|----------|---|
| Transmit | <-36dBm to 1 GHz<br><-30dBm 1 GHz to 12.75 GHz  |
| Standby  | <-57 dBm to 1 GHz<br><-47dBm 1 GHz to 12.75 GHz |

---

|                       |  |
|-----------------------|--|
| Transmitter Switching | complies with EN 300 113-1 v1.4.1 and EN 300 113-2 (03/2001) |
|-----------------------|--|

---

### Transmit Key Time\*

|                         |         |
|-------------------------|---------|
| Key Up                  |         |
| 5W PA                   | ≤2.5 ms |
| 50 and 100W PAs         | ≤2 ms   |
| Key Up Debounce Timer   | 20ms    |
| Key Down                |         |
| 5W PA                   | ≤2.5 ms |
| 50 and 100W PAs         | ≤2 ms   |
| Key Down Debounce Timer | 20ms    |

\*with VCO in lock

---

|                                |              |
|--------------------------------|--------------|
| Continuous Repetitive Key Rate | 24Hz maximum |
|--------------------------------|--------------|

---

|           |       |
|-----------|-------|
| Lock Time | ≤20ms |
|-----------|-------|

---

## Control and Monitoring

---

|                            |  |
|----------------------------|--|
| Control Inputs and Outputs | I <sup>2</sup> C data, clock and ground<br>PA key line input<br>fan control output |
|----------------------------|--|

---

### Monitor Outputs\*

|                      |   |
|----------------------|---|
| Permanently Assigned | forward power<br>reverse power                  |
| Selectable**         | ambient temperature<br>RF power control voltage |

\*analogue

\*\*select one

---

## Compliance Standards

---

Where applicable, this equipment has been tested and approved to the following standards.

---

|        |   |
|--------|---|
| Safety | BS EN 60950-1:2002<br>ANSI/UL Std. 60950 3rd edition<br>CAN/CSA-C22.2 No. 60950-00 3rd edition<br>AS/NZS 60950 and ACATS001 |
|--------|---|

---

|     |   |
|-----|---|
| EMC | ETSI EN 301 489 V1.4.1 (2002-08)<br>CFR 47 Part 15 Level B1 |
|-----|---|

---

|    |   |
|----|---|
| RF | EN 300 086-2:V1.2.1<br>EN 300 113-2 (03/2001)<br>AS4295-1995<br>CFR 47 Parts 15, 22 and 90<br>RSS-119 Iss 6 |
|----|---|

---

### Environmental

|                         |                           |
|-------------------------|---------------------------|
| Low Pressure (Altitude) | MIL-STD-810F 500.4 Proc 2 |
| Humidity                | IEC60068-2-30             |
| Vibration               | MIL-STD-810F 514.5 Proc 1 |
| Shock                   | MIL-STD-810F 516.5 Proc 1 |

---





# 4 Power Management Unit Specifications

---

This chapter provides specifications pertaining to the power management unit (PMU) as a separate module.

The performance figures given in these specifications are applicable only to equipment operating as an integral part of a TB8100 base station. These performance figures are minimum figures, unless otherwise indicated, for equipment operating at standard room temperature (+22°C to +28°C [+71.6°F to +82.4°F]) and standard test voltages as follows:

- AC module - 230VAC
- DC module - 12VDC.

Where applicable, the test methods used to obtain these figures are those described in the ETSI-EN specifications. You can obtain further details of test methods and the conditions which apply for compliance testing in all countries from Tait Electronics Ltd.

## Product Identification

TB8100 PMUs are identified by a product code printed on the label fixed to the rear panel. The product codes are explained in the following table.

| Product Code | Model  |
|--------------|--|
| TBA30A0-xxxx | AC PMU - 88VAC to 264VAC input                       |
| TBA3001-xxxx | DC PMU - 12VDC input                                 |
| TBA30A1-xxxx | AC and DC PMU - 88VAC to 264VAC input<br>12VDC input |

## General

---

|                             |   |
|-----------------------------|---|
| Operating Temperature Range | -30°C to +60°C (-22°F to +140°F) ambient temperature*<br>*ambient temperature is defined as the temperature of the air at the intake to the cooling fan |
|-----------------------------|---|

---

|         |   |
|---------|---|
| Cooling | forced air over heatsink via fan mounted in subrack |
|---------|---|

---

### Front Panel LED Indicators

|                  |   |
|------------------|---|
| Green - Steady   | PMU operating correctly                   |
| Green - Flashing | PMU not operating, bootloader in progress |
| Red - Flashing   | one or more alarm conditions present      |

---

|  |  |
|--|--|
| Parameters Monitored by PMU Microprocessor | mains input good signal<br>DC input voltage<br>PA output current and voltage<br>heatsink temperatures of AC and DC modules |
|--|--|

---

### Dimensions

|               |                   |
|---------------|-------------------|
| Height        | 143.5 mm (5.6 in) |
| Width         | 121.4 mm (4.8 in) |
| Length        |                   |
| AC PMU        | 324 mm (12.8 in)  |
| DC PMU        | 337 mm (13.3 in)  |
| AC and DC PMU | 337 mm (13.3 in)  |

---

### Weight

|               |                   |
|---------------|-------------------|
| AC PMU        | 4.60 kg (10.1 lb) |
| DC PMU        | 4.86 kg (10.7 lb) |
| AC and DC PMU | 6.40 kg (14.1 lb) |

---

## Input - AC Module

---

### Input

|                                 |                 |
|---------------------------------|-----------------|
| Voltage                         | 88VAC to 264VAC |
| Frequency                       | 45Hz to 65Hz    |
| Power Factor                    | >0.95           |
| Total Harmonic Distortion (THD) | <8%             |
| Inrush Current                  | <30A            |
| Leakage Current                 | <3.5mA/240VAC   |

---

### Protection

|                                       |                         |
|---------------------------------------|-------------------------|
| Fault Current (Input)                 | 10A fuse                |
| Transient Suppression                 | 275V MOV (line-to-line) |
| Overvoltage Inhibit (Self Recovering) | 275VAC ±10V             |
| Undervoltage Signal                   | 83VAC ±5V               |

---

## Input - AC Module (Continued)

---

### General

|                             |                         |
|-----------------------------|-------------------------|
| Efficiency at Rated Output* | 86%                     |
| Input-to-chassis Isolation  | 1500VAC, 50Hz, 1 minute |
| Input-to-output Isolation   | 3000VAC, 50Hz, 1 minute |
| Output-to-chassis Isolation | 500VAC, 50Hz, 1 minute  |

\*at 220VAC

---

## Input - DC Module

---

### Input - 12V System

|   |                  |
|---|------------------|
| Factory-set Limits                              |                  |
| Minimum Run Voltage                             | 9.5V $\pm$ 0.3V  |
| Minimum Turn-on Voltage                         | 11.7V $\pm$ 0.3V |
| Maximum Run Voltage                             | 18.1V $\pm$ 0.3V |
| Maximum Turn-on Voltage                         | 17.1V $\pm$ 0.3V |
| User-programmable Limits*+                      |                  |
| Low Battery Shutdown Voltage                    | 10.0V to 13.5V   |
| Low Battery Restart Voltage<br>(after shutdown) | 12.0V to 15.0V   |
| User-programmable Alarms*                       |                  |
| Low Battery Voltage                             | 10V to 14V       |
| High Battery Voltage                            | 14V to 17.5V     |

\*using the Service Kit software

+only available if the 10W standby power supply card is fitted

---

### Protection

|                              |   |
|------------------------------|---|
| Fault Current (Input)        | circuit breaker or fuse in external wiring* |
| Wrong Input Voltage          | electronic lock-out                         |
| Wrong Input Voltage Polarity | shunt diode                                 |
|                              | *provided by user                           |

---

### General

|                             |                         |
|-----------------------------|-------------------------|
| Efficiency at Rated Output* | 82%                     |
| Input-to-output Isolation   | 1000VAC, 50Hz, 1 minute |

\*at 13VDC

---

## Output - AC and DC Modules

---

### High Current Output for PA

|                                      |                                       |
|--------------------------------------|---------------------------------------|
| Voltage                              | 28V                                   |
| Current                              | 14A maximum                           |
| Regulation                           | ±0.5%                                 |
| Ripple and Noise*                    | 50mV pp                               |
| Ripple and Noise rms                 | 10mV rms                              |
| Transient Response on 28V Loadstep** | 2% overshoot and recover within 0.6ms |

\*100MHz bandwidth

\*\*10% to 100% loadstep

---

### Low Current Output for Reciter

|                      |                                   |
|----------------------|-----------------------------------|
| Voltage              | 28.6V<br>26.5V in hysteresis mode |
| Current              | 1.2A maximum                      |
| Regulation           | ±3.5%                             |
| Ripple and Noise*    | 50mV pp                           |
| Ripple and Noise rms | 10mV rms                          |

\*100MHz bandwidth

---

### Protection - PA Output

|               |                                     |
|---------------|-------------------------------------|
| Overload      | electronic current limit above 16A  |
| Short Circuit | hiccup mode, self-resetting         |
| Overvoltage   |                                     |
| AC Module     | electronic shutdown latch (33.5V)   |
| DC Module     | electronic hysteric control (33.5V) |

---

### Protection - Reciter Output

|               |                          |
|---------------|--------------------------|
| Short Circuit | 2.5A self-resetting fuse |
|---------------|--------------------------|

---

## Optional 10W Standby Output - DC Module

---

### Low Current Output for Reciter

|                      |              |
|----------------------|--------------|
| Voltage              | 28.9V        |
| Current              | 0.3A maximum |
| Regulation           | ±2.5%        |
| Ripple and Noise*    | 50mV pp      |
| Ripple and Noise rms | 10mV rms     |

\*100MHz bandwidth

---

### Protection

|                        |                          |
|------------------------|--------------------------|
| Overload/Short Circuit | electronic current limit |
|------------------------|--------------------------|

---

## Optional 10W Standby Output - DC Module (Continued)

---

### General

|                                   |  |
|-----------------------------------|--|
| Efficiency at Rated Output        | 86%  |
| Input-to-output Isolation Control | 1000VAC, 50Hz, 1 minute shutdown signal (isolated) |

---

## Optional 40W Auxiliary Power Supply

---

The output from this optional power supply PCB may also be used to trickle-charge a 12V battery.

---

|                  |               |
|------------------|---------------|
| DC Input Voltage | 28V $\pm$ 15% |
|------------------|---------------|

---

### DC Output\*

|                      |            |
|----------------------|------------|
| Voltage              | 13.65V     |
| Current              | 3A maximum |
| Regulation           | $\pm$ 2%   |
| Ripple and Noise**   | 50mV pp    |
| Ripple and Noise rms | 10mV rms   |
| Zero Load Ripple     | 100mVpp    |

\*also for trickle-charging 12V battery

\*\*100MHz bandwidth

---

### Protection

|                        |                          |
|------------------------|--------------------------|
| Overload/Short Circuit | electronic current limit |
| Overvoltage*           | 16V Zener diode          |

\*for 12V

---

### General

|                             |                         |
|-----------------------------|-------------------------|
| Efficiency at Rated Output  | 88%                     |
| Input-to-output Isolation   | 1000VAC, 50Hz, 1 minute |
| Output-to-chassis Isolation | 500VAC, 50Hz, 1 minute  |

---

## Connections

---

The following specifications refer to the external wiring and connectors which are connected to the PMU. They do not refer to the wiring and connectors built into the PMU itself.

---

### AC Input

|                |            |
|----------------|------------|
| Connector Type | IEC female |
| Current Rating | 8A         |

---

## Connections (Continued)

---

### DC Input\*

|                    |   |
|--------------------|---|
| Connector Type     | M6 screw into threaded fitting on bus bar                     |
| Flexible Wire Size | 2AWG for a length of 1.5m to 2m (5ft to 6.5ft)<br>(typical)** |
| Current Rating     | 50A   |

\*battery

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

---

### DC Output - 28V High Current

|                    |                                      |
|--------------------|--------------------------------------|
| Connector Type     | Phoenix MVSTBR2.5HC/2-ST/5.08 female |
| Flexible Wire Size | 11AWG                                |
| Current Rating     | 16A                                  |

---

### DC Output - 28V Low Current

|                    |   |
|--------------------|---|
| Connector Type     | 2x4-way Molex 43025-0800/crimp socket 43030-0001 female |
| Flexible Wire Size | 20AWG   |
| Current Rating     | 3A  |

---

### DC Output - 12V Low Current/Battery Charger

|                    |   |
|--------------------|---|
| Connector Type     | 2x4-way Molex 43025-0800/crimp socket 43030-0001 female |
| Flexible Wire Size | 20AWG   |
| Current Rating     | 2 x 3A (2 conductors in parallel)                       |

---

## Compliance Standards

---

Where applicable, this equipment has been tested and approved to the following standards.

---

|        |   |
|--------|---|
| Safety | BS EN 60950-1:2002<br>ANSI/UL Std. 60950 3rd edition<br>CAN/CSA-C22.2 No. 60950-00 3rd edition<br>AS/NZS 60950 and ACATS001 |
|--------|---|

---

|     |   |
|-----|---|
| EMC | ETSI EN 301 489 V1.4.1 (2002-08)<br>CFR 47 Part 15 Level B1 |
|-----|---|

---

### Environmental

|                         |                           |
|-------------------------|---------------------------|
| Low Pressure (Altitude) | MIL-STD-810F 500.4 Proc 2 |
| Humidity                | IEC60068-2-30             |
| Vibration               | MIL-STD-810F 514.5 Proc 1 |
| Shock                   | MIL-STD-810F 516.5 Proc 1 |

---

# 7 Connection

Once the TB8100 BSS hardware is installed, you need to connect the individual modules to each other, and to any ancillary equipment required in your system. This chapter provides information on all the inputs and outputs available on the TB8100 BSS.

## 7.1 Overview of Inputs and Outputs

This section identifies the main input and output connections for the TB8100 BSS. [Figure 7.1](#) below identifies the connections at the front of a dual base station, and [Figure 7.3 on page 85](#) identifies those at the rear. [Figure 7.2 on page 84](#) identifies the connections at the front of a single 100 W base station. [Figure 7.4 on page 85](#) and identifies the connections on the control panel. Refer to the following sections in this chapter for more details on these connections.

**Figure 7.1 Dual 5 or 50W Base Station Inputs and Outputs - Front View**

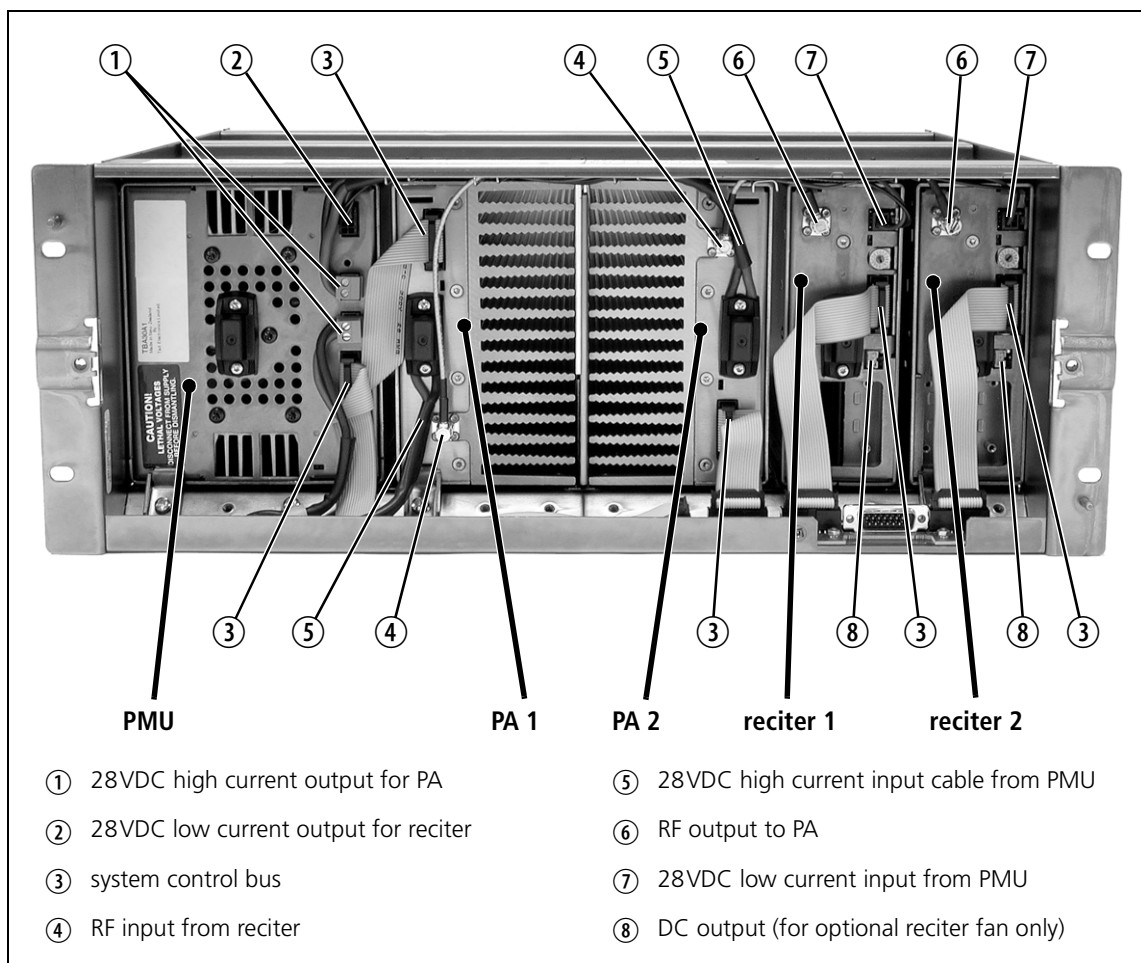
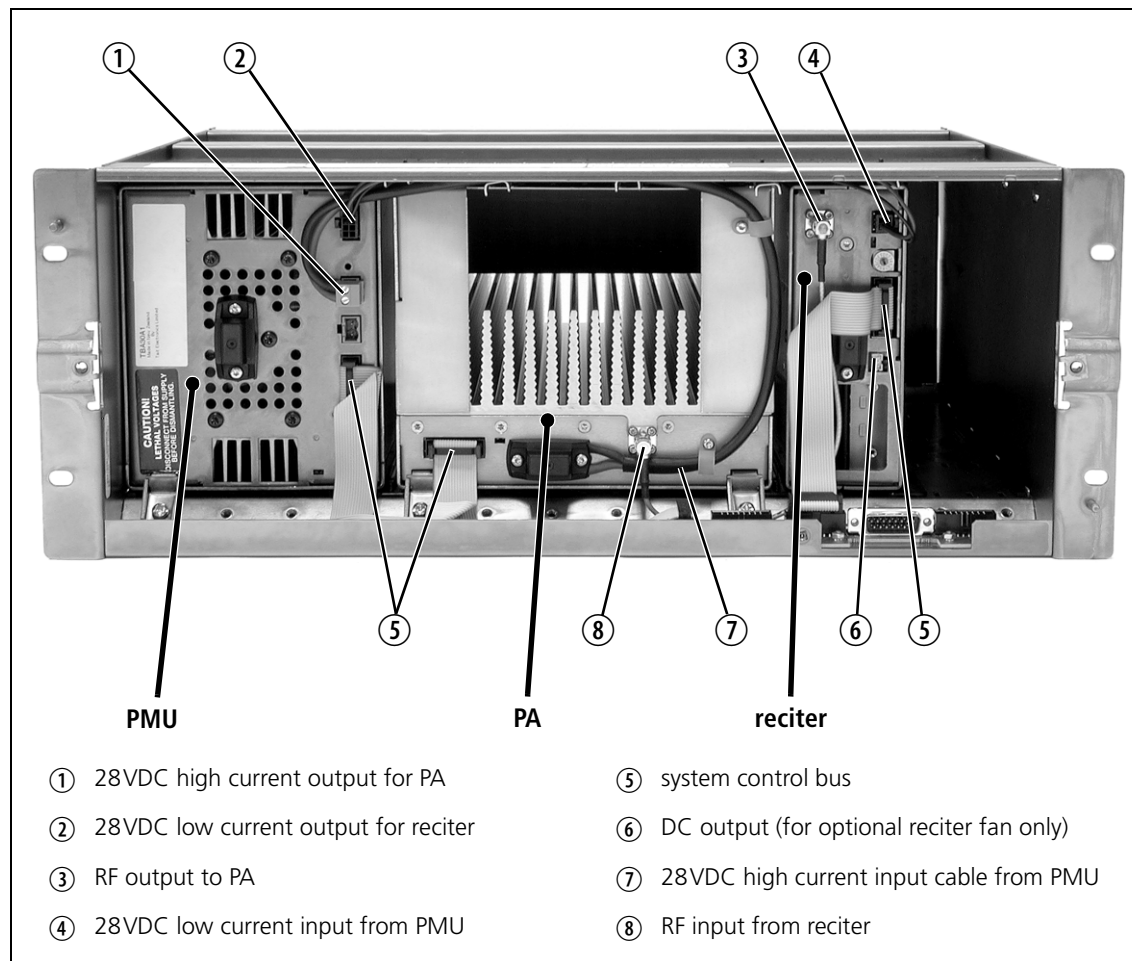
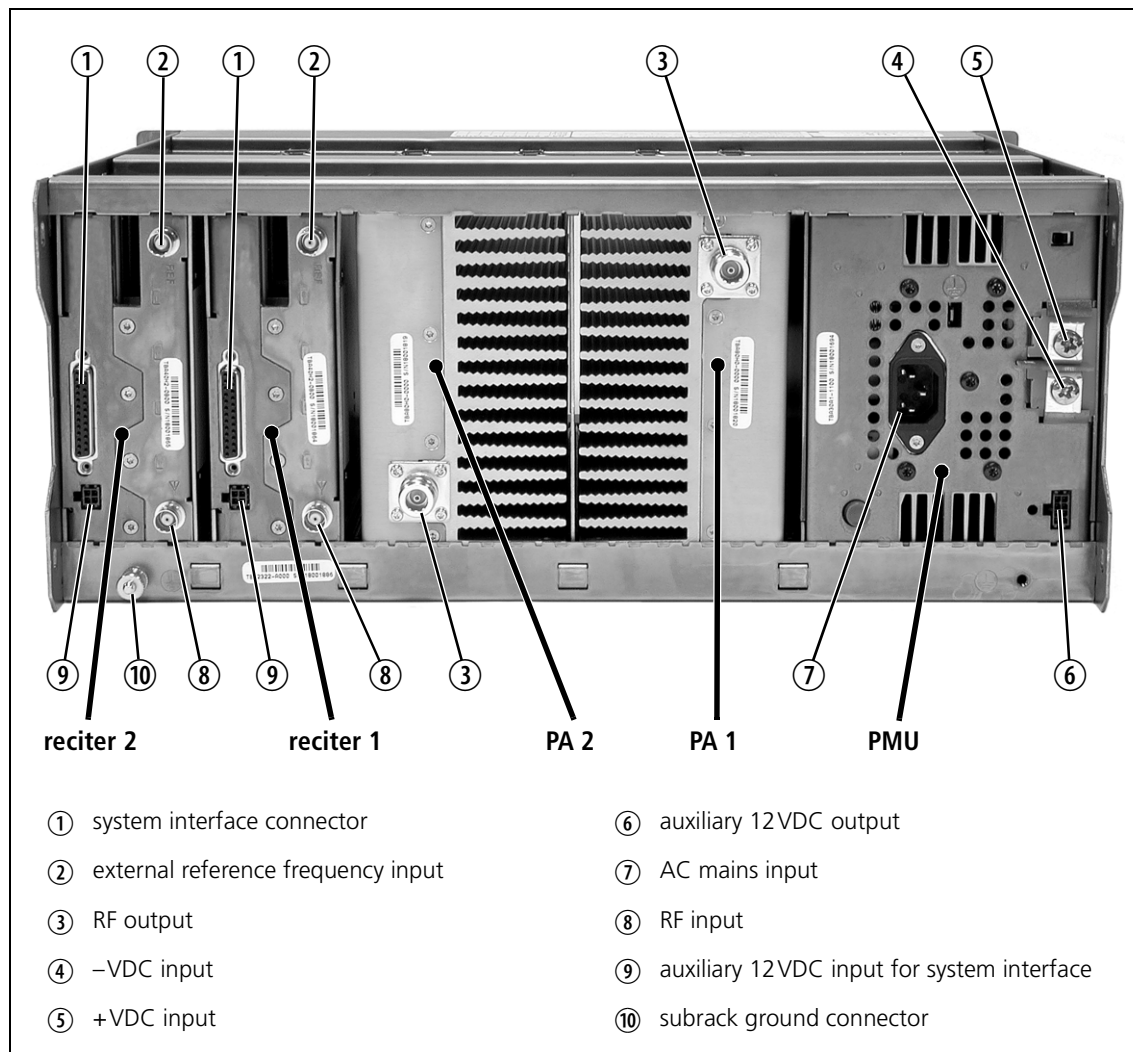


Figure 7.2 Single 100W Base Station Inputs and Outputs - Front View

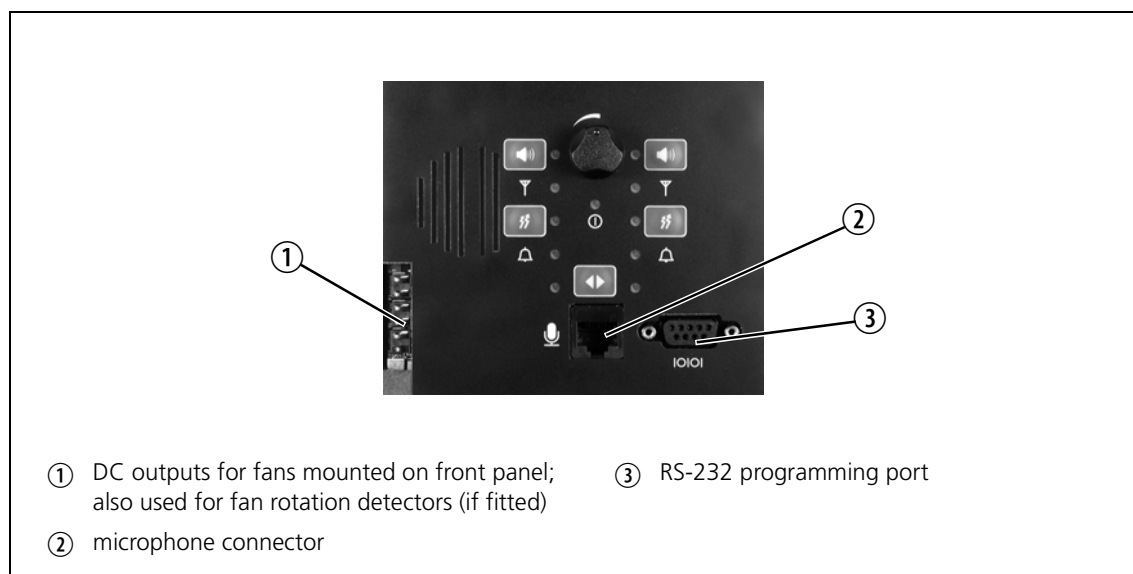




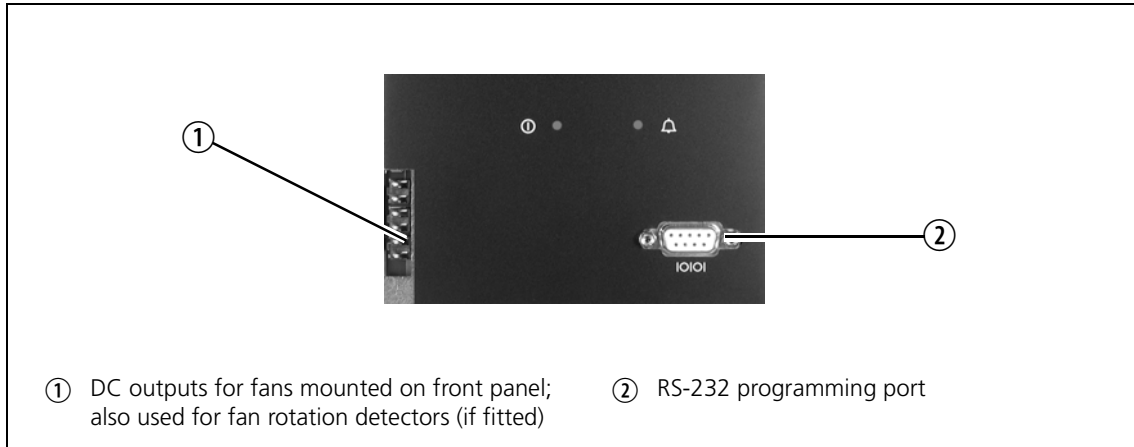
**Figure 7.3 Dual 5 or 50W Base Station Inputs and Outputs - Rear View**



**Figure 7.4 Standard Control Panel Inputs and Outputs**



**Figure 7.5 Power Save Control Panel Outputs**



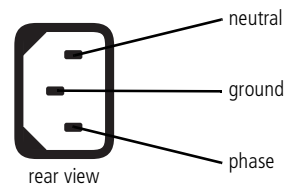
## 7.2 Power Supply Connections

### AC Power

The TB8100 PMU is designed to accept a mains input of 88 to 264 VAC at 45 to 65 Hz. We recommend that a standard 3-wire grounded outlet is used to supply the AC power. The socket-outlet must be installed near the equipment and must be easily accessible. This outlet should be connected to an AC power supply capable of providing a maximum of 600 W. The requirements of two typical AC supplies are given in the following table.

| Nominal Supply | Current Requirement | Circuit Breaker/Fuse Rating |
|----------------|---------------------|-----------------------------|
| 115VAC         | 8A                  | 10A                         |
| 230VAC         | 4A                  | 6A                          |

Your TB8100 BSS should come supplied with a power supply cord to connect the male IEC connector on the PMU to the local AC supply. The pins of the IEC connector on the PMU are identified at right.



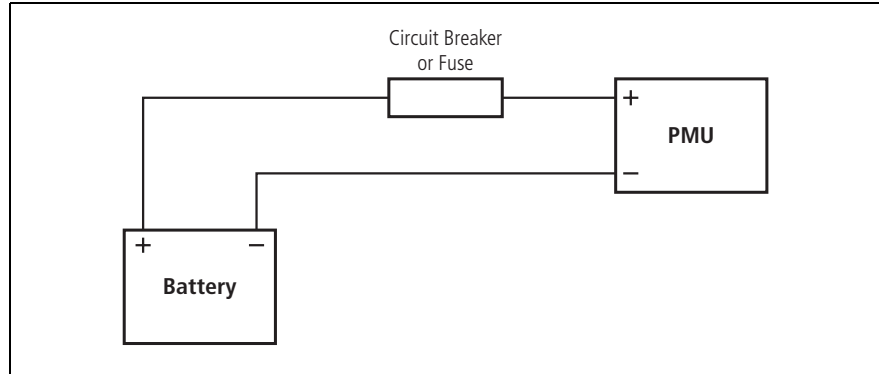
### DC Power

The TB8100 PMU is designed to accept a DC input of 10.3 to 15.5 VDC with negative or positive ground. There is a minimum DC start-up threshold to prevent damaging a battery which has little capacity left.

You must connect the DC supply from the battery to the PMU via a fuse or DC-rated circuit breaker with a rating of 60A. The DC input leads should be of a suitable gauge to ensure less than 0.2V drop at maximum load over the required length of lead.

Terminate and insulate the DC input leads so they are protected from accidentally shorting to the subrack if the PMU is removed before the leads are disconnected.

**Figure 7.6 Recommended DC Power Connection**



**Reciter 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 “[PMU 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 page 89 for the pin allocations for +AUX\_V on each system interface PCB.

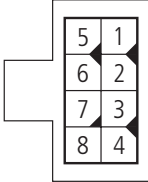
|               | Pin | Description | Links |   |
|---------------|-----|-------------|-------|---|
| <br>rear view | 1   | +V input    | ●     |   |
|               | 2   | ground      |       | ● |
|               | 3   | +V input    | ●     | ● |
|               | 4   | ground      | ●     |   |

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.

**PMU 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 “[Reciter 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 |
|--|-----|-------------|-------|
|  <p>rear view</p> | 1   | +V output   | ●     |
|  | 2   | +V output   | ●     |
|  | 3   | +V output   | ●     |
|  | 4   | +V output   | ●     |
|  | 5   | ground      | ●     |
|  | 6   | ground      | ●     |
|  | 7   | ground      | ●     |
|  | 8   | ground      | ●     |

## 7.3 RF Connections

The RF input to the TB8100 BSS is via the lower BNC connector on the rear panel of the reciter. The RF output is via the N-type connector on the rear panel of the PA (refer to [Figure 7.3 on page 85](#)).

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

## 7.4 System Connections

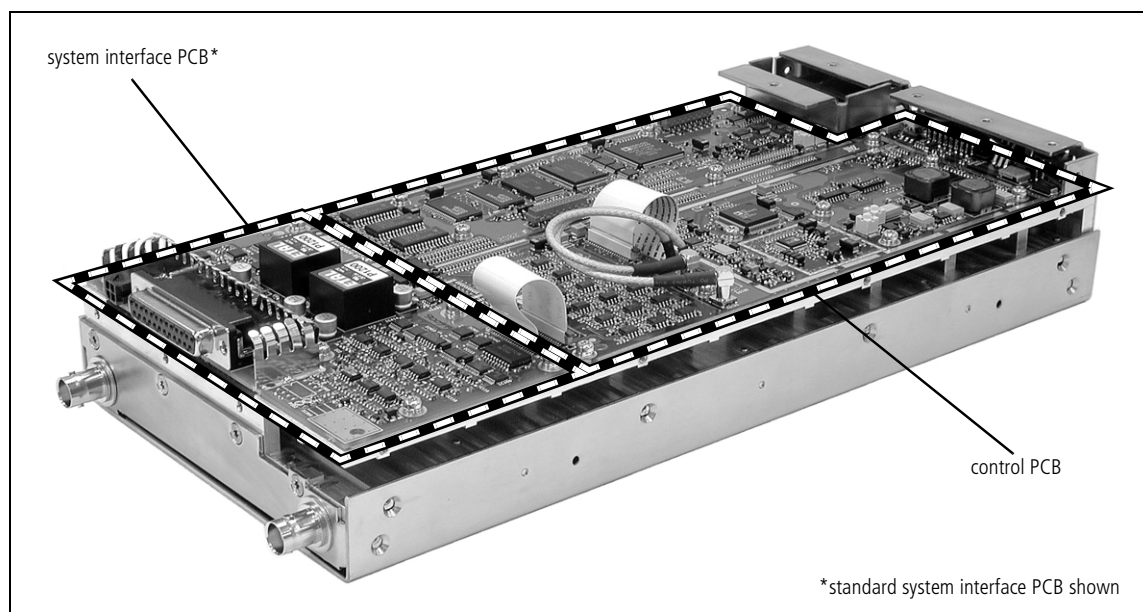
The reciter can be fitted with an optional system interface PCB which provides the links between the reciter's internal circuitry and external equipment. This PCB is securely mounted to the reciter's chassis and is connected to the control PCB with a flexible connector. The system interface PCB is fitted with industry-standard connectors and several standard types are available for different applications.

The circuitry on the system interface PCB provides additional signal processing so that the outputs meet standard system requirements. It also enables the PCB to identify itself to the reciter control circuitry.

The system interface PCB is removable, which makes it possible to change the application of a reciter by removing one type of PCB and fitting another. Only one system interface PCB can be fitted to a reciter at any one time.

This section provides details on the system interface PCBs available at the time of publication. Other types may be developed for future applications.

**Figure 7.7** System Interface PCB



### Standard

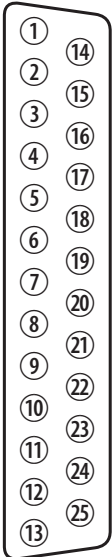
The standard system interface PCB is fitted to reciters bearing the product code TBA4xxx-0A0x or TBA5xxx-0A0x. If purchased separately, it has the product code TBA10A0. It provides:

- non-isolated 600T 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<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  | 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.

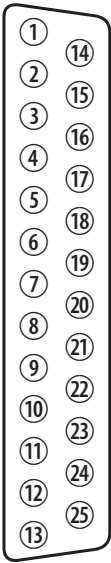
### Isolated E&M

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.

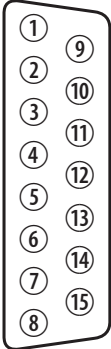
| Pin | Signal Name   | Signal Type           | Notes                     |
|-----|---------------|-----------------------|---------------------------|
| 1   | Rx line out + | audio output          | transformer isolated line |
| 2   | Rx line out – |                       |                           |
| 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

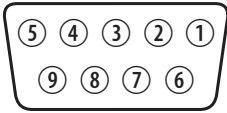
**TaitNet**

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           |
|--|-----|---------------|--------------|-----------------|
|  <p>rear view</p> | 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       |                 |

## 7.5 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.

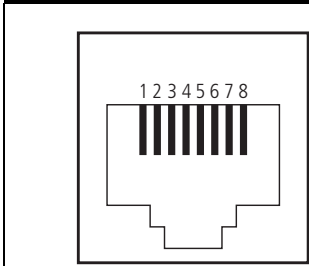
|   | Pin | Description   | Links |
|---|-----|---------------|-------|
|  <p>front view</p> | 1   | not connected | ●     |
|   | 2   | receive data  | ●     |
|   | 3   | transmit data | ●     |
|   | 4   | not connected | ●     |
|   | 5   | ground        |       |
|   | 6   | not connected | ●  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



## 7.6 Microphone Connection

You can connect a microphone to the TB8100 BSS via the standard RJ45 socket on the control panel. If a standard TB8100 microphone has not been supplied with your BSS, you should use an electret microphone. The pin allocations for the microphone socket are given in the following table.

| Pin | Description                   |
|-----|-------------------------------|
| 1   | not connected                 |
| 2   | not connected                 |
| 3   | not connected                 |
| 4   | PTT and hookswitch            |
| 5   | voice band (microphone) input |
| 6   | microphone ground             |
| 7   | not connected                 |
| 8   | not connected                 |



The diagram shows a front view of an RJ45 socket. The socket is rectangular with a notch at the bottom. Inside the socket, there are eight vertical pins. The pins are numbered 1 through 8 from left to right. The text 'front view' is centered below the socket diagram.