

# TB7300 Transportable Base Station/ Repeater

## User's Guide

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# Contents

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<b>Preface</b> .....	<b>4</b>
<b>1 General Safety and Compliance Information</b> .....	<b>6</b>
Personal Safety .....	6
Explosive Environments .....	6
High Temperatures .....	6
LED Safety (EN 60825-1) .....	6
Proximity to RF Transmissions .....	7
Equipment Safety .....	8
Installation and Servicing Personnel .....	8
Preventing Damage to the PA .....	8
Environmental Conditions .....	8
Operating Temperature Range .....	8
Humidity .....	8
Dust and Dirt .....	8
Regulatory Information .....	9
Distress Frequencies .....	9
Compliance Standards .....	9
Unauthorized Modifications .....	9
Health, Safety and Electromagnetic Compatibility in Europe .....	9
Device and Network Security .....	10
<b>2 Introduction</b> .....	<b>11</b>
<b>3 Basic Operation</b> .....	<b>12</b>
Battery Select Switch .....	12
Battery Power .....	13
Battery Charging .....	13
Replacing the Battery .....	14
External DC Power .....	14
External AC Mains Connection .....	15
LED Indication Details .....	15
Repeater .....	15
Status .....	15
Charge .....	16
Antenna .....	16
Mains Socket Wiring .....	16

# Preface

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## Scope of Manual

This user's guide provides information on the TB7304 Transportable Base Station/Repeater. For full details on the operation of the repeater itself, refer to MBD-00001-xx TB7300 Installation and Operation Manual.

## Document Conventions

Please follow exactly any instruction that appears in the text as an 'alert'. An alert provides necessary safety information as well as instruction in the proper use of the product. This manual uses the following types of alert:



**Warning** This alert is used when there is a hazardous situation which, if not avoided, could result in death or serious injury.



**Caution** This alert is used when there is a hazardous situation which, if not avoided, could result in minor or moderate injury.

**Notice** This alert is used to highlight information that is required to ensure procedures are performed correctly. Incorrectly performed procedures could result in equipment damage or malfunction.



This icon is used to draw your attention to information that may improve your understanding of the equipment or procedure.

## Associated Documentation

The following documentation is also available for your Tait product, which can be accessed from the Tait Technical Support website (<http://support.taitradio.com>):

- Safety and Compliance Information—supplied with each radio. (The same information is included in this user’s guide.)
- MBD-00001-xx TB7300 Installation and Operation Manual
- MBD-00002-xx TB7300 Base Station/Repeater Specifications Manual

## Publication Record

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01	July 2019	First release

# 1 General Safety and Compliance Information

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This chapter provides general information on safety precautions for operating the transportable base station/repeater.

## 1.1 Personal Safety

### 1.1.1 Explosive Environments



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

### 1.1.2 High Temperatures

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



**Warning** If the unit is operated in a high duty cycle environment with the lid closed, the maximum output power should not exceed 15W.

### 1.1.3 LED Safety (EN60825-1)

This equipment contains Class 1 LED Products.

### 1.1.4 Proximity to RF Transmissions

To comply with the RF Field Limits for Devices Used by the General Public for (Uncontrolled Environment)<sup>a</sup>, a safe separation distance of at least 12 feet (3.6 metres) from the antenna system should be maintained.

This figure is calculated for a typical installation, employing one 50 W base station transmitter. Other configurations, including installations at multi-transmitter sites, must be installed so that they comply with the relevant RF exposure standards.

a. Reference Standards

Health Canada's Safety Code 6: *Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz*

USA Federal Communications Commission OET bulletin 65 (47CFR 1.1310)

IEEE C95.1 2005: *Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*

## 1.2 Equipment Safety

### 1.2.1 Installation and Servicing Personnel

The equipment should be installed and serviced only by qualified personnel.

### 1.2.2 Preventing Damage to the PA

The repeater has been designed to operate safely under a wide range of antenna loading conditions. Transmitting into a low VSWR will maximize the power delivered to the antenna.

**Notice** Do not remove the load from the TB7304 while it is transmitting.

Load transients (switching or removing the load) can damage the PA output stage. See MBD-00001-xx TB7300 Installation and Operation Manual, especially section 5.4, for recommendations.

## 1.3 Environmental Conditions

### 1.3.1 Operating Temperature Range

The operating temperature range of the equipment is  $-22^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$  ( $-30^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ ) ambient temperature with external DC, battery isolated, or  $-22^{\circ}\text{F}$  to  $+122^{\circ}\text{F}$  ( $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ ) ambient temperature with internal battery and AC input.

**Note** Ambient temperature is defined as the temperature of the air at the intake to the cooling fans.

### 1.3.2 Humidity

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

### 1.3.3 Dust and Dirt

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



## 1.4 Regulatory Information

### 1.4.1 Distress Frequencies

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

### 1.4.2 Compliance Standards

This equipment has been tested and approved to various national and international standards. Refer to the latest issue of the Specifications Manual for a complete list of these standards.

### 1.4.3 Unauthorized Modifications

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

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

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

In the European Community, radio and telecommunications equipment is regulated by Directive 2014/53/EU. 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 a radio transceiver. It is intended for radio communications in the Private Mobile Radio (PMR) or Public Access Mobile Radio (PAMR) services, to be used in all member states of the European Union (EU) and states within the European Economic Area (EEA). This product can be programmed to transmit on frequencies that are not harmonized throughout the EU/EEA, and will require a license to operate in each member state.

#### Declaration of Conformity

You can download the formal Declaration of Conformity from <https://www.taitradio.com/our-resources/compliance#European>.

## 1.5 Device and Network Security

If this radio network equipment is used for mission-critical applications, it is important to be able to ensure security and continuity of operation. For IP-network-connected equipment, it is also important to ensure that this equipment is not a means of compromising other equipment in the network.

All network elements should be physically secured, where possible. This includes the use of locked cabinets and locked rooms. Seals on connectors can also provide a visual indication of unauthorized tampering.

Tait recommends that all network and audio connectors should be sealed with the stick-on type of seal. The seal should reveal if any of the connectors have been unplugged, or if any unauthorized equipment has been plugged in.

The seals should be difficult to remove without breaking, and should bridge between the cable and equipment side (plug and socket) of the connection.

Seals should cover any unused network or audio sockets. This includes the Ethernet connector on any adaptor front panels, any spare switch ports, and the console port on the router and switch.

The seals should be difficult to reproduce. A sticker initialed or signed by the technician should satisfy this.

Seals must be replaced if they need to be disturbed during maintenance.

## 2 Introduction

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The Transportable Base Station/Repeater is a complete transportable radio solution in a rugged case with three power supply options. It consists of:

- a TB7300 repackaged into a rugged Pelican case with an internal AC supply
- an internal 12V, 15AH SLA battery
- a charge circuit for AC supply to charge the internal battery
- switching circuits for AC and DC supplies
- an external DC supply input

**Notice** The Transportable Base Station/Repeater was designed to be waterproof, but should not be operated in the rain with the lid open.



An N-type antenna connector on the outside of the case enables a sturdy external antenna connection. An Amphenol screw-lock connector for the DC input is also located on the outside of the case.

Four LEDs indicate the status of the repeater. Two further LEDs are present on the inside top panel to indicate the status of the battery while charging. The Shurter three-pin mains socket is located on the left side for AC Mains connection. The Ethernet connection is via a waterproof RJ45 connector on the outside of the case.

## 3 Basic Operation

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### 3.1 Battery Select Switch



**Warning** When shipping and charging the transportable base station, set the battery select switch to **EXTERNAL AC/DC, BATTERY ISOLATE** to comply with safety regulations.

The battery select switch is protected with a raised red surround to avoid accidental switching on when the lid is closed.



Figure 3.1 Battery select switch



**Warning** Risk of missing calls! Switching between Internal Battery and **EXTERNAL AC/DC, BATTERY ISOLATE** will likely cause the transportable base station to restart!

When the switch is set to Internal Battery, the transportable base station runs from the internal battery only.

When the switch is set to **EXTERNAL AC/DC, BATTERY ISOLATE**, the internal battery is disconnected from all circuitry in the transportable base station. In this situation, all the circuits in the transportable base station, including the repeater, can only run from an external DC or AC supply.

When connected to a mains lead (AC supply), the repeater will run and charge the battery if the battery switch is set to **EXTERNAL AC/DC**.

**Notice** Press the recessed button located at the left of the Charge LED to turn charging off and on.



Figure 3.2 Recessed charge button

## 3.2 Battery Power

With a fully-charged battery, an operating regime of 10% transmit at 15W, and 90% standby time will keep the transportable base station running for approx. 8 hours (with a new battery). Note that the internal battery is rated to operate to max +50°C ambient temperature.

## 3.3 Battery Charging



**Warning** Risk of fire! The lid must be open when charging. The VRLA battery may vent when charged at a current greater than 3A. This does not occur during normal charging.

The transportable base station will shut itself down when the internal battery voltage drops too low. When that level of discharge has been reached, it will take up to 12 hours to recharge the battery using an AC mains connection. When charging, press the recessed button located at the left of the Charge LED to turn charging off and on.

**Notice** The internal battery can only be charged when AC Mains is connected and the battery select switch is set to EXTERNAL AC/DC.

## 3.4 Replacing the Battery

If you need to replace the battery, see the following instructions:

### Removing the Battery

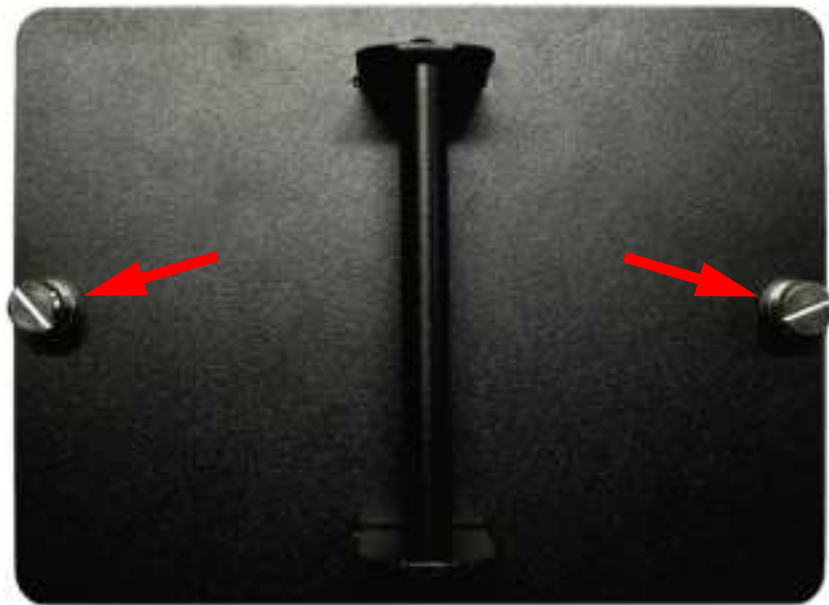
1. Press the “External DC/Battery Isolate” button.
2. Unscrew the two captive panel screws (as indicated by the red arrows below) and carefully lift the battery out by its handle.

### Inserting a New Battery

- ⓘ Ensure you observe the orientation of the battery before installing. The correct orientation is defined by the white protruding connector block.

  1. Carefully lift the new battery and place it in the battery slot.
- ⓘ Before tightening the captive panel screws, ensure the battery connector is fully engaged. To do this, firmly push the battery using the handle and check that it is sitting flush with the outside rim.


  2. Screw and tighten the captive panel screws.
  3. Flick the switch button to the “Internal Battery” position.



## 3.5 External DC Power

A DC input cable with red and black clamps (clips) is supplied with the transportable base station for connection to external DC Supplies between 11 and 15 VDC. Refer to the product label for the input voltage range.

To operate the unit from an external DC source, set the battery select switch to EXTERNAL AC/DC.

 External DC supply will not charge the internal battery.

**Notice** When the transportable base station is not in use, always switch the battery select switch to External DC/Battery Isolate.

## 3.6 External AC Mains Connection

External AC mains must be connected to the unit using an AC power cable (see "[Mains Socket Wiring](#)") made up from the supplied Shurter AC plug with female socket (IEC320 10A IP67). AC mains can be used to charge the internal battery and to operate the unit.

## 3.7 LED Indication Details

### 3.7.1 Repeater

LED	Indication	Details
Repeater Power	green	repeater power is on
All LEDs/Alarm	flashing	power up sequence is in progress
Alarm	on	repeater is in offline mode
Alarm	flashing <sup>a</sup>	an alarm condition needs to be cleared
Receive	orange	receiver is receiving
Transmit	orange	transmitter is keyed

a. after the four power-up sequences

### 3.7.2 Status


This LED is lit when running on AC power, or switched to internal battery.

LED	Indication	Details
Status	green	battery is fully charged or above 20% charged
Status	red, flashing	battery is low
Status	off	battery has been disconnected due to low voltage

### 3.7.3 Charge

This LED is only lit when an AC supply is connected.

**Set the battery select switch to EXTERNAL AC/DC when charging the battery with AC Mains.**

 External DC supply will not charge the internal battery.

LED	Indication	Details
Charge	red	battery is being charged
Charge	off	battery is fully charged

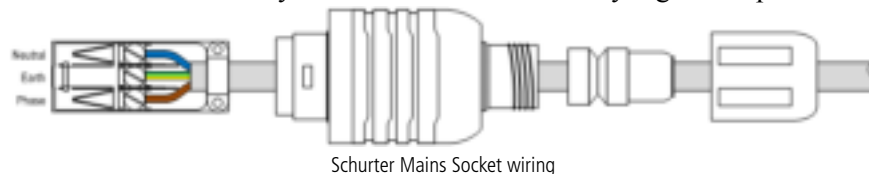
## 3.8 Antenna

The transportable base station is a 15W Repeater that requires a remote mounted antenna with a suitable ground plane. This antenna and internal duplexer must be tuned to the frequency of the Repeater. The transportable base station has an N-type antenna connector.

**Caution** Risk of harm from RF radiation! While the Repeater is operating (transmitting), you must ensure that there is always a distance of 0.9m between people and the antenna. This is the minimum safe distance.

## 3.9 Mains Socket Wiring

The repeater is shipped with a Schurter waterproof AC Mains socket this will need to be wired by an electrician or electrically registered person.



**Warning** Incorrect wiring of AC mains could result in death or serious injury.

**Notice** TB7304 is operation-ready. To change any settings, refer to MBD-00001-xx TB7300 Base Station Installation and Operation Manual.