Teleque

Single T101 Announcement Receiver

T101 Dual Announcement Receiver

Single P101 Announcement Receiver & Polling Box

ADU2-4/PS Antenna Distribution Unit

Product Manual V1.1

This product was designed and manufactured in the United Kingdom

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Contents

Receiver

Receiver

The T101 series is available in 19” 1U format, single or dual or a smaller standalone enclosure for remote applications. The circuitry within the T101 dual Rx is two single receiver cards mounted side be side, so the functionality and connectivity is the same as the T101, as shown on page 7.
The Teleque Announcement Receiver is a high quality, fully synthesised UHF receiver designed specifically for railway station platform announcements.
It is a true diversity system featuring RF high level balanced circuitry for maximum IP3 performance. The audio circuitry boasts a high quality audio dynamics processor which considerably enhances the audio fidelity.

This specialist product offers specific features used to eliminate interference potential.

- It is a highly linear true diversity receiver giving high immunity from RF intermodulation and high signal levels.
- Proprietary ultrasonic (non-standard frequency) pilot tone system which eliminates interference from external sources. The T101 will not “open” unless it receives this unique identifying signal.
- V3.3 and above code also encodes the transmitted signal with one of 5 sub-audio tones greatly increasing the possible channel numbers as well as increasing the security of the signal.
- RSSI and Noise sensing circuitry in addition to the Ultrasonic tone system to sense the “RF signal strength” and “Noise content” of the signal – thus adding another layer of interference rejection.
- Due to careful frequency planning the system is capable of the simultaneous operation of at least 6 channels within the deregulated and licence exempt band of 863-865MHz.

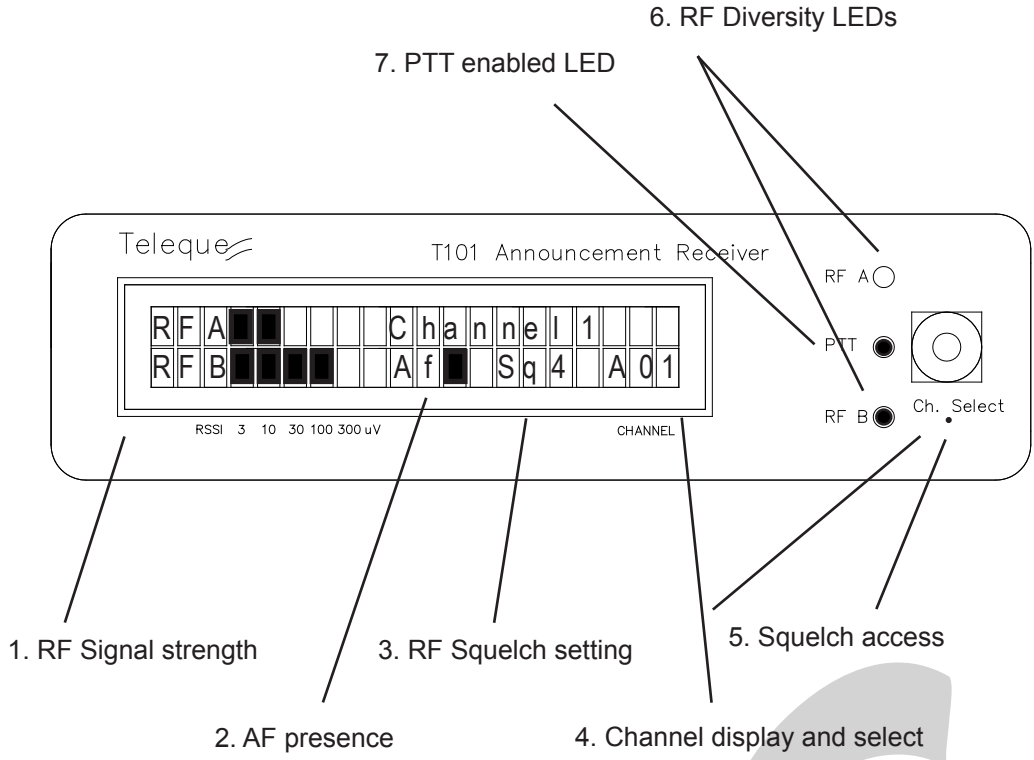
It is designed to be used with the Teleque T101 PTT Announcer and operates on 1 of 16 user selectable frequencies. The receiver has an easy to read LCD that displays the RF signal level, the current selected operating channel, the squelch level and AF present indication.

The connections on the unit allow easy connection of RF and AF signals via a terminal block type connector as well as through standard connectors for AF output (XLR), wired remote microphone input (DIN) and power input (2.1 mm DC JACK). RF connection is through 2 x TNC connectors. The terminal block also has connection for 2 sets of dry contacts, 1 for signal detect (PTT) the other, marked latch, is currently not used. In addition a +5V microprocessor output is available for applications that require continuous monitoring.

Functionality

Front Panel Functionality

The Announcement Receiver is controlled and monitored through the front panel which features a 20 x 2 LCD, 3 x LEDs and a finger adjustable rotary switch. The front panel shown is the T101, the Dual receiver has two panels like this as shown on page 7.



1. RF Signal Strength

The Announcement Receiver is a true diversity receiver, this means it has 2 x RF receiver circuits. The signal from both is continually monitored and the strongest received signal is then chosen and fed through to the PA system. The RF strength meter shown here is displaying Antenna B with the larger signal than Antenna A. Note: The signal strength is still shown even if a signal is present that does not have the Teleque pilot tone.

2. AF Presence

An indicator that an AF signal is being detected from the PTT transmitter

3. RF Squelch setting

The squelch setting is displayed as a value between 1 and 5. The factory default is setting 3, this should prove suitable for most single installations. Multiple systems may require a higher squelch setting according to local site variables. It should be noted that increasing the squelch setting decreases the overall range. For information on configuration of the squelch setting please see page 9

4. Channel Select

The channel select switch finger adjustable rotary switch. As you rotate the switch the LCD displays channels 1 to 16. Each of the positions relates to a different operating frequency. The displayed channel corresponds to the small number that is displayed in the bottom right hand corner of the Tx LCD

Receiver V3.3 code
Version V3.3 and above has a unique sub-audio tone feature, each operating frequency can be encoded with one of 5 codes. When using the hex switch to select the operating channel a star is displayed for 5 seconds in the top right hand corner of the display. While it is displayed the operator can select the sub-audio tone by pressing the mute change momentary switch (which is done by using a paperclip through a small hole found directly below the channel change hex switch). The display will then, for example, show Ch 07-C meaning it is programmed to operate on channel 7, sub-audio tone C. This channel will relate to the channel number shown in small digits in the bottom right hand corner of the transmitter display. The five sub-audio tones are B-F, while A is the channel with no sub-tone allowing backward compatibility with previous versions of th Teleque product.

5. Squelch Access

A momentary switch behind this 1 mm hole alters the squelch setting. See page 9

6. RF Diversity LEDs

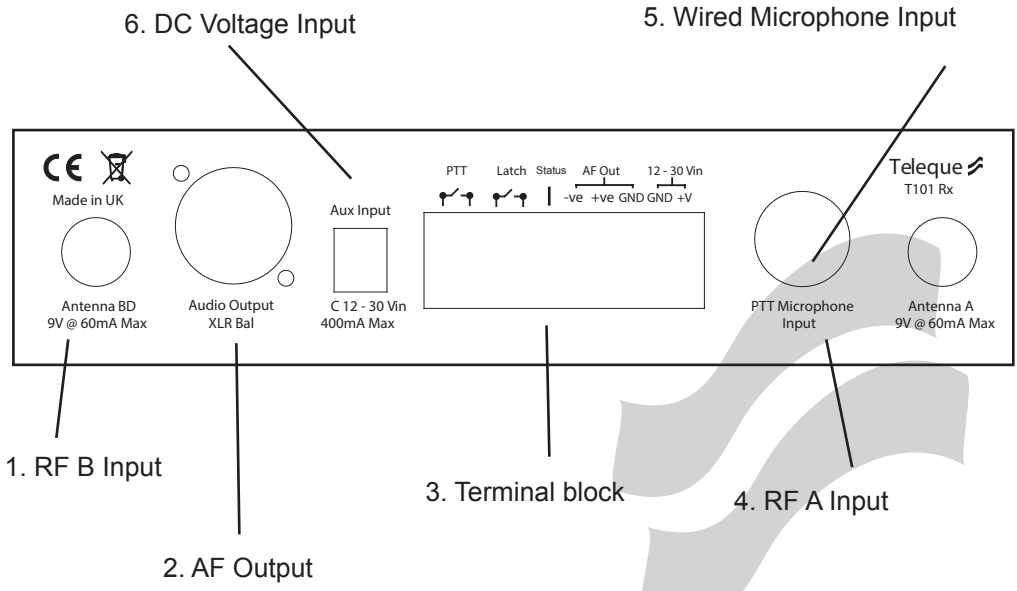
The RF strength meter shown here is displaying Antenna B with the larger signal, hence that is the channel chosen and displayed by the RF B diversity LED (6).

7. PTT LED

This LED becomes illuminated only when a valid signal is received from the PTT Annoucement Transmitter

Rear Panel Functionality

The selection of connections found on rear of the receiver are detailed as follows (duplicated for the T101 Dual Receiver):-

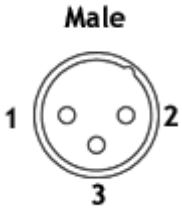


1. RF B Input

Rf B input is a 50Ω TNC RF connector which also supplies a 80mA current limited 9V phantom power supply for a Teleque HA101 antenna head amplifier

2. AF Output

The AF output is through a standard male XLR connector. These are in parallel with the terminal block connector.



PIN 1	–	Ground
PIN 2	–	Hot (Positive)
PIN 3	–	Cold (Negative)

Note :
Factory setting audio output = 0 dBm
Option for audio output = -20 dBm
See page 9 setting for details

3. Terminal Block

The terminal block connections on the T101 receiver are as follows:-

Pin 1	-	12-28 Volt Input
Pin 2	-	GND
Pin 3	-	Audio GND
Pin 4	-	Audio +ve Output
Pin 5	-	Audio -ve Output
Pin 6	-	“Status” Monitor +5 V (current limited)
Pin 7	-	“Dry Contact” for “Latch mode” (Normally open)
Pin 8	-	“Dry Contact” for “Latch mode” (Normally open)
Pin 9	-	“Dry Contact” for PTT mode (Normally open)
Pin 10	-	“Dry Contact” for PTT mode (Normally open)

(Dry contacts rated at 1 Amp 50 V Max)

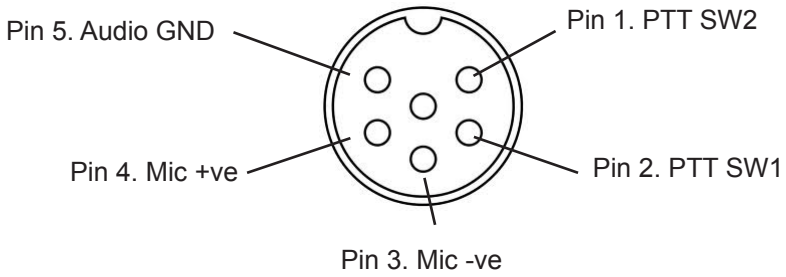
Wire terminations via 10 Way, 5mm pitch, screw terminal Phoenix connector. Manufacturers part no 1715802. Wire size 26-14 AWG.

4. RF A Input

Rf A input is a 50Ω TNC RF connector which also supplies a 80mA current limited 9V phantom power supply for a Teleque HA101 antenna head amplifier

5. Wired Microphone Input

5 pin DIN connector for a wired fist microphone. The system is configured to give preference to the wired microphone over the remote PTT microphone. These connections are suitable for a wide variety of fist microphones with separate PTT (N/O). Solder side view of mating DIN plug.



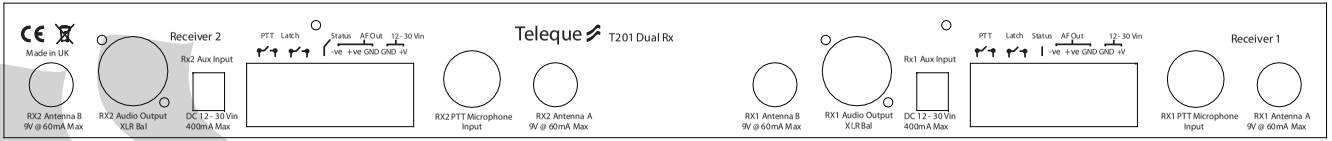
Wired PTT microphone via 5pin 240degree locking Din. Preh part no 71430-250/0802

6. Aux DC Voltage Input

This is a 2.1mm power jack connector configured to be centre hot. This is connected in parallel with the terminal block connector.
(Reverse polarity protected)

T101 Dual Receiver

As shown below the Teleque T101 is simply two T101 circuit boards mounted within a single chassis, therefore the connectivity, operation, and functionality of the T102 and T201 is the same. Dimensional drawing on page 22.



T101 Wall mounted receiver enclosure details

There are two options for wall mounted receivers, both of which can be powered remotely by Cat 5e FTP cable.

1. T101/70/RXWM

The T101 is mounted in an IP65 rated box, this box can then be mounted near the antenna in an ideal position on the platform. The audio and PTT signal is then fed back to the equipment room by Cat 5e FTP cable. See drawing page 23

2. T101/70/Rx/SAP

The Teleque T101 can be mounted in a larger IP65 rated box with integral wired microphone to form a self contained station announcement point. This is useful in applications where the equipment room is located at a great distance from the platform, thus requiring very long RF cable runs. See drawing page 23

T101 Commissioning options

Transmitter configuration

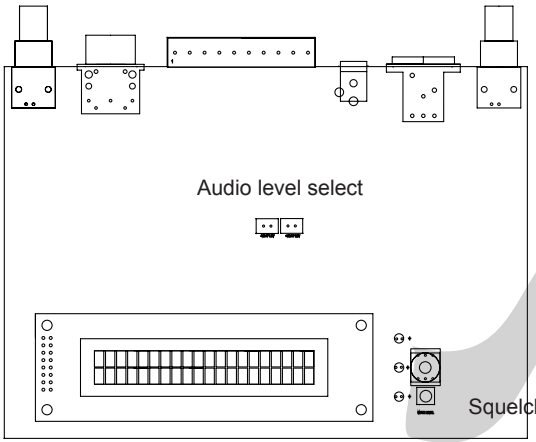
The transmitter can be customised at the time of order to have any message on it's screen, there is a small number in the bottom right hand corner of the transmitter LCD that corresponds to the receiver operating frequency, these two should match.

Squelch Level

The squelch level can be easily modified by pressing a momentary switch which is accessed through a 1mm diameter hole 10mm below the platform change rotary switch. (A paperclip is an ideal tool to use for this.) The squelch has 5 settings, the default of which is setting 3, this should prove suitable for most single installations. Multiple systems may require a higher squelch setting according to local site variables. It should be noted that increasing the squelch setting decreases the overall range. The squelch setting is modified by pressing the momentary switch marked below as "squelch switch".The LCD will then scroll through the 5 possible settings briefly also showing the actual receiver frequency before reverting back to the platform number.

Audio level

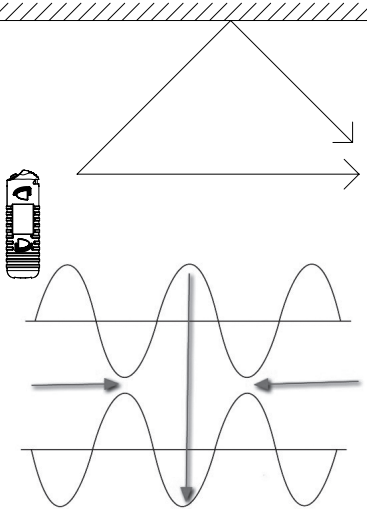
The audio level can be switched betwen line (0dB) and mic level (-20dB) by removing the jumpers as shown below. This is done by simply removing the lid of the receiver.

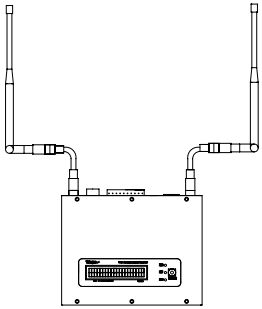


Antenna Coverage and Placement

The T101 Transmitter radiates in all directions. This RF signal can reflect off nearby walls, ceilings, etc. (especially metal surfaces) and a strong reflection can arrive at the receiver antenna along with the direct signal. If the direct and reflected signals are out of phase with each other a cancellation may occur. The result would be a loss in signal at that antenna, known as “drop-out”.

The T101 Receiver offers a sophisticated diversity design which overcomes signal drop-out problems, but in order for the receiver to work as designed the antenna positioning is very important.





Out of phase signals can cancel each other out

For optimum signal coverage when using either the Omni or Directional antenna they should be:

a. Positioned between 3 and 10 m apart, and optimally equidistant from the centre of the required operating area.

b. The antenna assembly should be placed in a vertical plane and be mounted at least 250 mm from any metallic structure.

c. Both Antennas should be positioned to provide direct line of sight to the transmitter, clear of any major metallic obstructions.

Teleque Announcer RF Cabling Requirements

Below are several types of cable that can be used with Teleque equipment

Cable length	Cable types					Antenna types		
	Belden RG58LSU 50 Ohm	Belden RG213 50 Ohm	Belden H1000PE 50 Ohm	Belden H124C02 75 Ohm	Belden CTF100 75 Ohm	TDP101/70/BA Omni Antenna (note 1)	TDP101/70/BA omni antenna with HA101 Head amp	TDP101/70/DAIP65 Directional antenna
	5dB/10m	2.2dB/10m	1.4dB/10m	2.8dB/10m	2.2dB/10m			
Less than 5 m	☑	☑	☑	☑	☑	☑		
Less than 15m	☑	☑	☑	☑	☑		☑	☑
15 - 30 m		☑	☑	☑	☑		☑	☑
30 -40m		☑	☑		☑		☑	☑
40 -75m max		☑	☑				☑	☑

RG58 provides a low cost, easy to terminate solution for short cable runs.

CTF100 provides an alternative low cost solution when cabling lengths do not exceed 40m.

RG213 and H1000 provide the best solution with cable runs in excess of 40m. Teleque equipment although nominally 50 Ohms, will operate with 75 Ohm feeder with little additional degradation. Note 1.

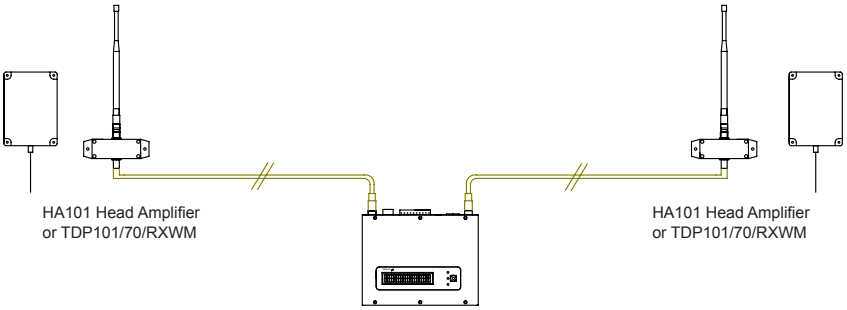
It is possible to use the TDP101/70/BA without HA101 head amplifier with either 5m of RG58 or up to 15m of others (note 1). However this will result in a decrease of coverage compared with operation with the HA101 Head amp.
It should be noted that Teleque Ltd do not warrant or imply the suitability of the above cables with respect to specific technical requirements and regulations which may be in force at specific locations.

Remote receiver T101/70/RXWM cabling and remote powering

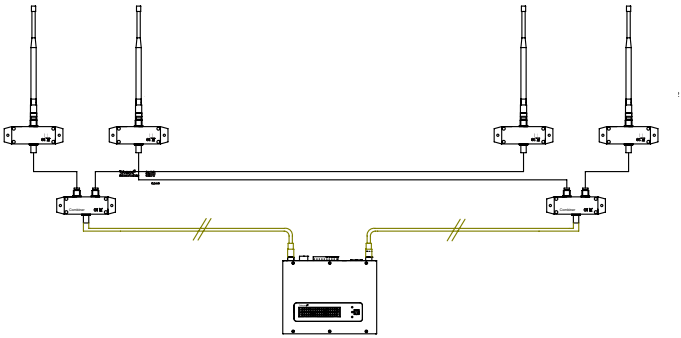
Teleque recommend when remote cabling the T101/70/RXWM the use of screened cable with at least 3 twisted pair for audio, power and signaling as a minimum requirement.

Tests conducted using Belden Cat5e FTP 4 twisted pair LSZH cable with AWG24 conductors suggest a maximum length of 175m when using a standard Teleque supplied 24Vdc PSU. (voltage drop 6V @ 207mA). It is suggested that for lengths in excess of 175m, either parallel existing spare pair or alternatively power the remote receiver locally.

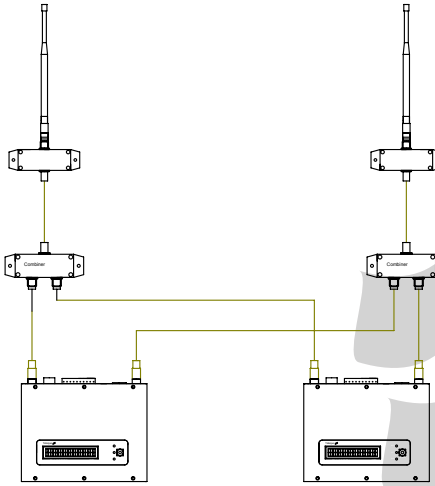
Typical receiver, headamp and antenna combination



Typical combiner connection for single receiver coverage over 2 zones



Typical splitter connection for 2 receivers using common antennas



SPECIFICATION

Operating Frequencies (From Version 2.0 onwards)

Channel	Frequency	LCD Text	Channel Code
1	863.050 MHz	Channel 1	A01
2	863.700 MHz	Channel 2	A02
3	864.175 MHz	Channel 3	A03
4	864.500 MHz	Channel 4	A04
5	864.925 MHz	Channel 5	A05
6	863.350 MHz	Channel 6	A06
7	863.900 MHz	Channel 7	A07
8	864.375 MHz	Channel 8	A08
9	864.700 MHz	Channel 9	A09
10	863.550 MHz	Channel 10	A10
11	864.025 MHz	Channel 11	A11
12	864.650 MHz	Channel 12	A12
13	864.325 MHz	Channel 13	A13
14	864.975 MHz	Channel 14	A14
15	863.925 MHz	Channel 15	A15
16	Test	Channel 16	A16

From Version 3.3 onward

Each frequency has one of 5 sub-audio tones encoded into the signal so LCD text now displays Ch 01- (A-F*) where "A" is no code and "B" to "F" are the tones. These are selected by the technique described on page 3

Receiver operating frequency	: 863-865 MHz (other channels on request).
RF input impedance	: 50 Ω
RF sensitivity	: -114 dBm for 12 dB SINAD at 1 kHz mod 40 kHz dev.
RSSI mute range	: Approx 20 dB selectable in 5 fixed settings.
IF Bandwidth	: 110 kHz
1st IF Frequency	: 110.600 MHz.
2nd IF Frequency	: 10.7 MHz
Audio Frequency response	: 100 Hz – 15 kHz (-3dB)
Audio signal to noise ratio	: Greater than 96 dBA.
Audio output	: 0 dBm (-20 dBm*) @ 22 kHz deviation. * See page 9
Max Audio Output	: +6 dBm.
DC Power source	: 11-28 V DC
Current consumption	: Typically 100 mA (210mA with active antenna or HA101)@24 V DC
Phantom Power (RFA,RFB)	: 9 V
Phantom Power Current Limit	: 80 mA
Pilot Tone Frequency	: 32.718 kHz
System monitor output	: Microprocessor based +5V in "Good Health"

General

Material	: Stainless Steel
Colour	: Brushed Natural

Environmental

Temperature	: −10 °C to +50 °C (storage and operating)
Humidity Range	: 0% to 93% (non-condensing)

Antenna Distribution Unit ADU2-4PS

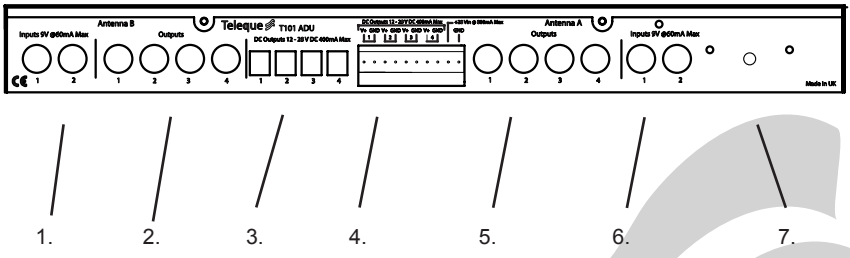
1. Description

The ADU2-4/PS is a 4-way antenna distribution unit with 4 power supply outputs. It features 2 antenna inputs for each RF channel, all 4 are able to supply a current limited phantom supply to remote antenna amplifiers. The ADU2-4/PS is packaged in a 1U high 19” rack mount box and is specifically designed for use with the Teleque T101 product range.

2. Front Panel

The front panel has 5 x LEDs, these are the power LED and an LED to show the health of each of the antenna amplifier phantom supplies.

3. Rear Panel



3.1 Antenna B inputs

Antenna B has 2 inputs, both featuring current limited phantom supplies . Either or both of these inputs can be used without any additional matching resistive terminations

3.2 Antenna B outputs

The Antenna B inputs are internally filtered and boosted to supply 4 Antenna B outputs with approximately 2-3dB gain over the input.

3.3 4 x power supply outputs

4 x 2.1 power jacks supply the necessary power requirements for 4 x T101 receivers.

3.4 Phoenix connector

This screw terminal connector parallels the 4 x power supply outputs, it also features a “standard” 28 Volt input for powering the ADU from a local DC supply.

1. 12/28 Volt output
2. GND
3. 12/28 Volt ouput
4. GND
5. 12/28 Volt output
6. GND
7. 12/28 Volt ouput
8. GND
9. 28 Volt input
10. GND

3.5 Antenna A outputs

The Antenna A inputs are internally filtered and boosted to supply 4 Antenna A outputs with approximately 2-3dB gain over the input.

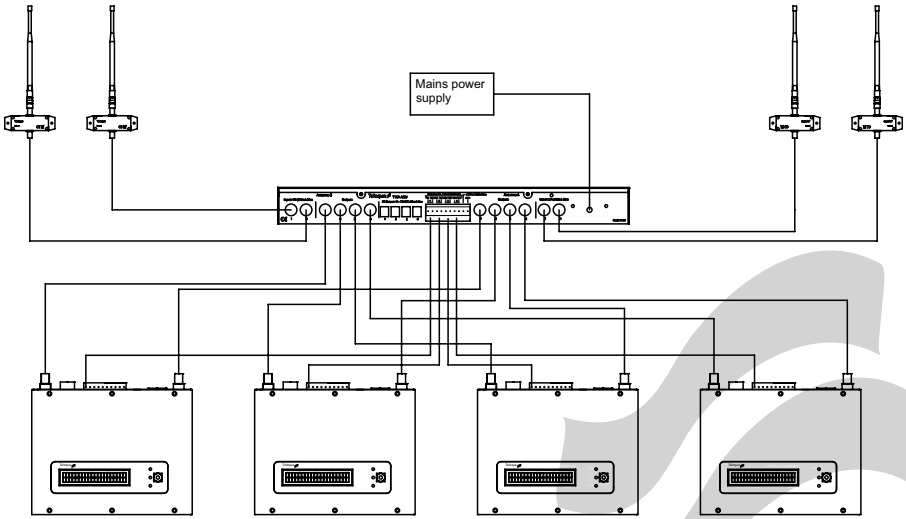
3.6 Antenna A inputs

Antenna A has 2 inputs, both featuring current limited phantom supplies . Either or both of these inputs can be used without any additional matching resistive terminations

3.7 Power Input

The ADU has a standard IEC mains input.

Typical connection of a four way system featuring omni-directional antennas, shown with the optional second pair of antennas



8. Specification

Technical

Power	ADU2-4/PS can be powered from either a mains or a 24 VDC supply, it is not recommended to power from both at the same time.
Mains	: 120/240 VAC 50/60Hz 20VA
DC	: 24 Volt DC input @ 1 Amp
ADU operating frequency	: 863-865 MHz (other channels on request).
Antenna Input	: 2 Inputs for each channel, 50 Ω, TNC
Antenna Outputs	: 4 outputs for each channel, 50 Ω, TNC
Phantom Power (2 x RFA, 2 x RFB)	: 10 V, each with LED status indication
Phantom Power Current Limit	: 100 mA
Power outputs	: 4 x 2.1mm DC jacks (centre hot)
Current	: 250mA max for each output
Power output	: 15 VDC if mains powered : 24 VDC if DC powered

Enclosure

Material	: Stainless Steel
Colour	: Brushed Natural
Front Panel	: Perspex

Environmental

Temperature	: −10 °C to +50 °C (storage and operating)
Humidity Range	: 0% to 93% (non-condensing)

Dimensions and Weight

Dimensions	: Full width 1U 19” rack enclosure
Weight	: 1.5 Kg

Accessories

AC mains Cable
8 x TNC - TNC leads 1 metre

Optional Polling Box PCB module P101/PCB

Polling Box Description

The polling box P101 allows the use of a single “All Zone” frequency to be monitored by multiple receivers over an extensive site.
The P101 continually compares the signal strength, derived from the PTT status, from two receivers and sends the best audio signal to the PA. The P101 is supplied as an option to the single receiver in a 19” rack P101/2/PCB or alternatively can be supplied as a standalone unit P101/2/SA.

Polling Box Rear Panel Pinout

Phoenix connector (Viewed from rear Pin 1 on RHS)

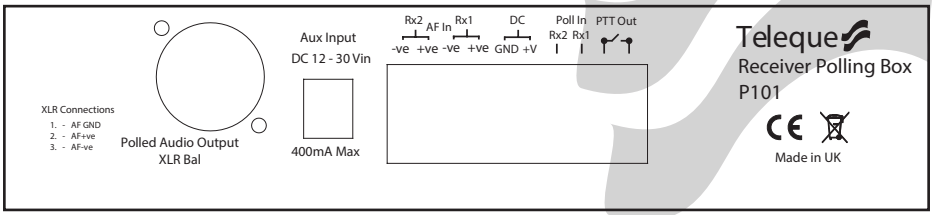
Pin 1 - “Dry Contact” for PTT (Normally open)
Pin 2 - “Dry Contact” for PTT (Normally open)
Pin 3 - Receiver Poll in Rx1
Pin 4 - Receiver Poll in Rx2
Pin 5 - DC supply 12 - 30 Volts 100mA Max
Pin 6 - GND
Pin 7 - Receiver 1 Audio Input +ve
Pin 8 - Receiver 1 Audio Input -ve
Pin 9 - Receiver 2 Audio Input +ve
Pin 10 - Receiver 2 Audio Input -ve
(Dry contacts rated at 1 Amp 50 V Max)

XLR connector

Pin 1 - GND
Pin 2 - AF +ve Output
Pin 3 - AF -ve Output

Polling Box Rear Panel Layout

The P101/2/PCB rear panel comprises a Phoenix connector with the connectvity shown in item 3, a 2.1 mm DC jack connector, and a male XLR connector for the audio output.

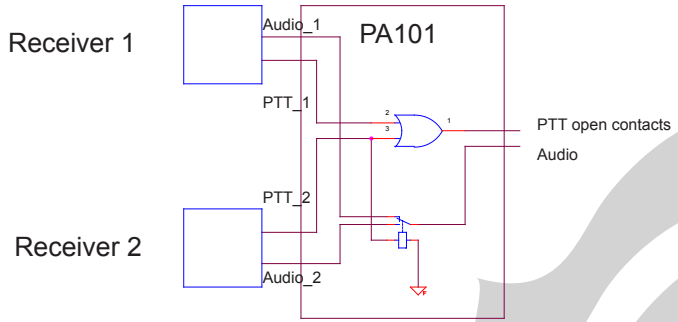


Polling Box Typical Connectivity

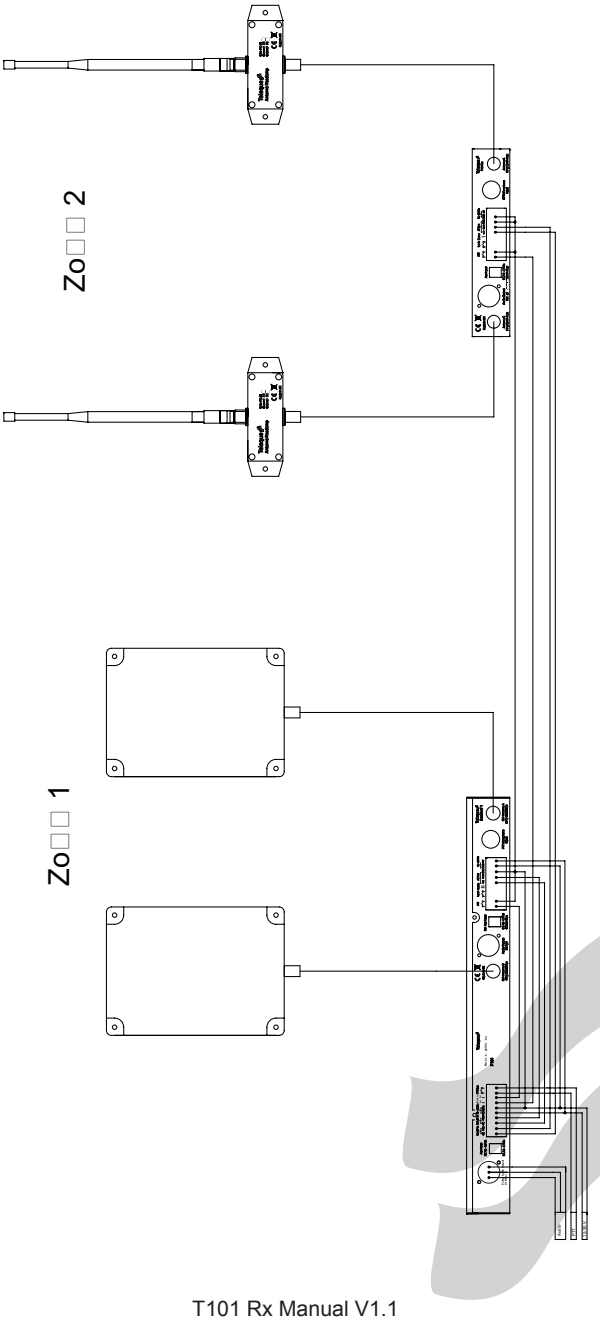
The diagram overleaf shows a typical connection for the P101. It indicates a remote receiver with omni-directional antenna (Rx2) and a local receiver (Rx1) with directional antenna mounted in a full width 19” rack alongside a P101 unit. Connections (pin number)

1.	Rx1 AF out +ve (4)	connects to	P101 Rx1 AF In +ve (7)
2.	Rx1 AF out -ve (5)	connects to	P101 Rx1 AF In -ve (8)
3.	Rx2 AF out +ve (4)	connects to	P101 Rx2 AF In +ve (9)
4.	Rx2 AF out -ve (5)	connects to	P101 Rx2 AF In -ve (10)
5.	Rx1 and RX2 GND (2)	connects to	P101 GND (5)
6.	Rx1 PTT (10)	connects to	P101 Rx1 Poll in (3)
7.	Rx2 PTT (10)	connects to	P101 Rx2 Poll in (4)
8.	Rx1 and Rx 2 PTT (9)	connects to	P101 GND (5)
9.	P101 (1&2)	connects to	PTT on PA amplifier
10.	P101 XLR (2&3)	connects to	AF in PA amplifier
11.	P101 DC in (6)	connects to	DC power supply
12.	Rx1 and Rx2 DC in (1)	connects to	DC power supply

Polling Box Logical circuit diagram

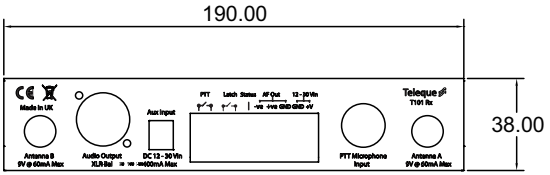


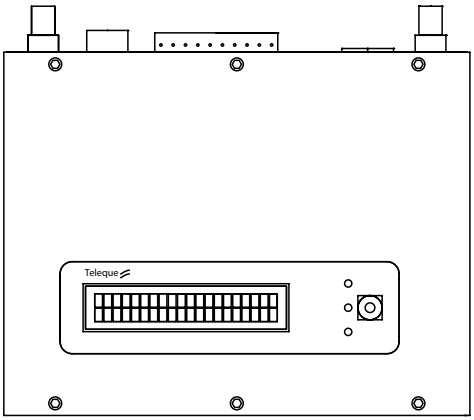
Polling Box Typical Connection Drawing

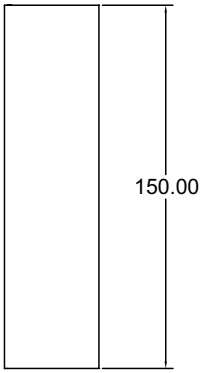


T101 Drawings

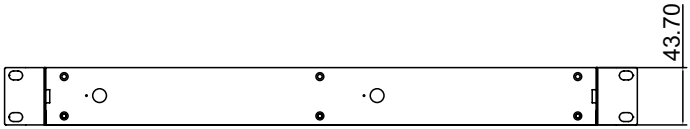
T101 Single Receiver

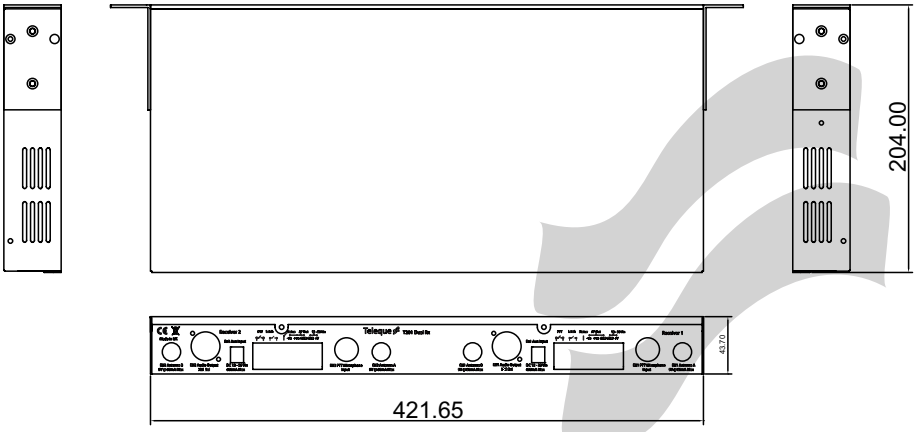




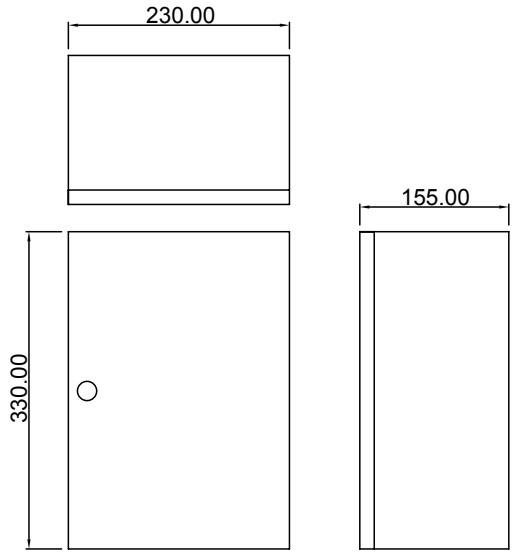


T101 Dual Receiver

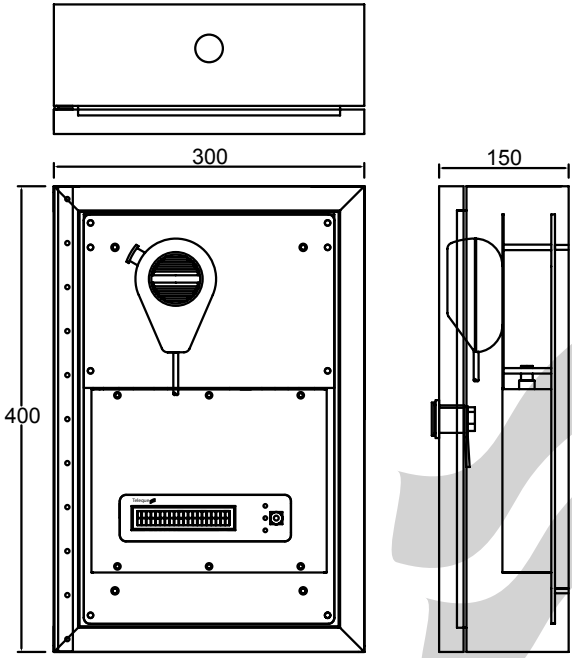




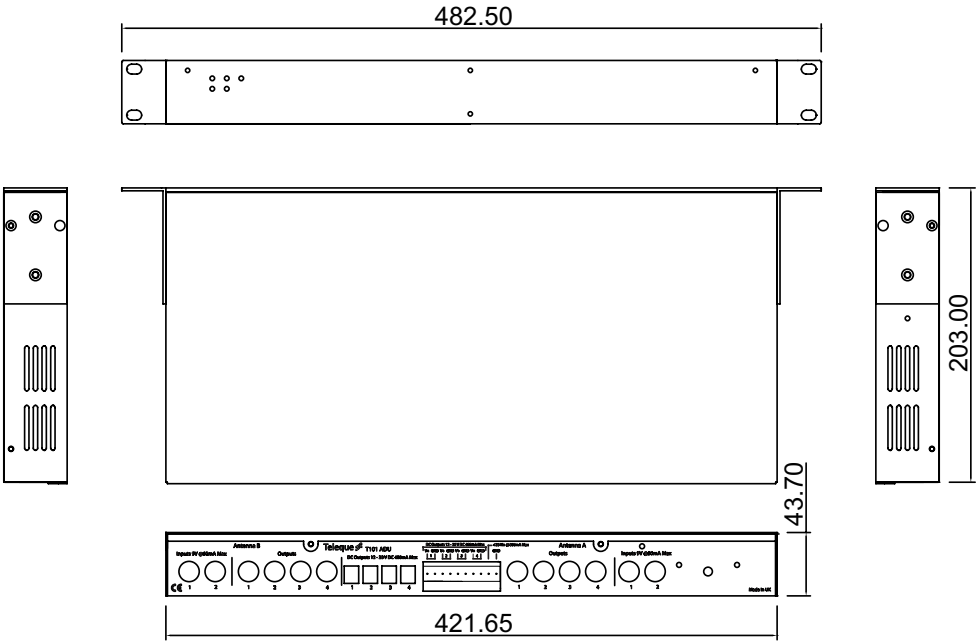
T101 Single Receiver mounted in IP65 Box



T101 Single Receiver mounted in IP65 Box with microphone



ADU2-4/PS Antenna Distribution Unit



Teleque Part Numbers

Receiver unit standalone 12-28V operation	T101/70/RX
Dual receiver unit in custom 19” 1U Rack format	T101/70/Dual RX
Single receiver in 19” rack mount format	T101/70/RX 19
Receiver antenna and bracket Assy (pair)	TDP101/70/BA
Transmitter	T101/70/TX
Standalone 2 Gang charger c/w 100-230VAC adaptor.	TC101-2
Head amplifier with mounting flange	HA101/70
Receiver 230V mains operated power supply	T101/110-230V/PS
Antenna distribution amplifier & Mains PSU for 4 RX and 2pr antenna	ADU2-4/PS
Receiver active directional antenna in IP65 enclosure each.	TDP101/70/DAIP65
2 way passive antenna splitter/combiner with selectable DC coupling	PSA201
Single receiver in wall mount IP65 steel case	T101/70/RXWM
2 way receiver polling and aux switching unit mounts into 19” dual RX case	P101/2/PCB
2 way receiver polling and aux switching unit in standalone case	P101/2/SA
Receiver unit integrated into IP65 Enclosure with integral microphone	T101/70/RX/SAP

EC DECLARATION OF CONFORMITY TO R&TTE DIRECTIVE 1995/5/EC

Manufacturer:	Teleque
Representative for Distribution:	
Product:	Teleque T101 Wireless communicator Handheld Transmitter and Fixed Receiver.
Conformity Assessment:	Annex III - Internal Production Control plus Specific Apparatus Tests.
Notified Bodies used:	None
Certificate:	not applicable
Other applicable directives:	None

Reference standards used for presumption of conformity:

Article 3.1a EN 60065:2002, A1:2006
Article 3.1b EN 301 489-9 v1.4.1
Article 3.2 EN300 422-2 v1.3.1
Article 3.3 EN50121-4

Declaration

We, Teleque Ltd, declare under our sole responsibility that the essential radio test suites have been carried out and that the above product to which this declaration relates is in conformity with all the applicable essential requirements of EU Directive 1995/5/EC

London 1st July 2011

Mr Richard Ganley. Head of R&D

Railway Specific Approvals

PADS Certified: **PA05/05898**

CE

Standard Limited Warranty

Teleque warrants that the Equipment shall be free from defects in materials or workmanship during the Warranty Period. The Warranty Period is ONE (1) YEAR from the date of purchase by the original end-user customer.

Subject to the exclusions detailed below, if the Equipment fails to conform to this Warranty and the purchaser notifies Teleque in writing within the Warranty Period, Teleque shall, without charge for labour or parts, (in its sole discretion), repair or replace the Equipment on the terms and conditions set out below.

Exclusions

The following are excluded from warranty:

Damage caused by:

- Misuse, including (but not limited to) failure to use the Equipment for its normal purpose in accordance with Teleque's instructions on its proper use and maintenance.
- Improper operation or maintenance of the Equipment.
- Connection to improper power supply; attempted repair by anyone other than a properly Teleque authorized service agent.
- Use of the Equipment in conjunction with third party accessories, products or ancillary peripheral equipment.
- Equipment where the manufacturer's serial number has been altered, deleted, removed, or made illegible.
- Equipment which has been adjusted or adapted without Teleque's prior written consent, including (but not limited to): upgrading the Equipment beyond specifications or features described in the instruction manual, or modifications to the Equipment to conform it to national or local technical or safety standards in countries other than those for which the Equipment was specifically designed and manufactured.
- Normal wear and tear of parts, as defined by Teleque for example in Service Manuals, unless there is evidence of a manufacturing defect.
- Costs associated with de-installation, re-installation or integration into a system.
- Acts of God or any reason beyond Teleque's reasonable control.

THE EXPRESS WARRANTY ABOVE SHALL BE THE FULL EXTENT OF TELEQUE'S LIABILITY. ACCORDINGLY, TELEQUE DISCLAIMS ALL OTHER LIABILITY FOR LOSS OR DAMAGE HOWSOEVER CAUSED (EXCEPT FOR DEATH OR PERSONAL INJURY RESULTING FROM PROVED NEGLIGENCE)

Teleque Ltd.
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