# Bias-T with Attenuator & PTT Control

## Installation and Operating Instructions

*Model: BTS-0001*
*HPN: 0901-0001*



Installation and Operating Instructions: HPN 0501-0001
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# *Safety Information*

## EN

This product must be installed and operated according to the user instructions.
Do not operate the product outside of the allowed specifications.
Do not operate the product with any visible damage to the enclosure.

## FR

Ce produit doit être installé et utilisé conformément aux instructions d'utilisation.
N'utilisez pas le produit en dehors des spécifications autorisées.
N'utilisez pas le produit si le boîtier est visiblement endommagé.

## NL

Dit product moet worden geïnstalleerd en bediend volgens de gebruikersinstructies.
Gebruik het product niet buiten de toegestane specificaties.
Gebruik het product niet als er zichtbare schade aan de behuizing is.

## DE

Dieses Produkt muss gemäß den Benutzeranweisungen installiert und betrieben werden.
Betreiben Sie das Produkt nicht außerhalb der zulässigen Spezifikationen.
Betreiben Sie das Produkt nicht, wenn das Gehäuse sichtbare Schäden aufweist.

## IT

Questo prodotto deve essere installato e utilizzato secondo le istruzioni per l'utente.
Non utilizzare il prodotto al di fuori delle specifiche consentite.
Non utilizzare il prodotto con danni visibili alla custodia.

## ES

Este producto debe instalarse y operarse de acuerdo con las instrucciones del usuario.
No opere el producto fuera de las especificaciones permitidas.
No opere el producto si hay algún daño visible en la carcasa.

## PT

Este produto deve ser instalado e operado de acordo com as instruções do usuário.
Não opere o produto fora das especificações permitidas.
Não opere o produto com qualquer dano visível no gabinete.

## PO

Ten produkt należy zainstalować i obsługiwać zgodnie z instrukcją użytkownika.
Nie używaj produktu poza dozwolonymi specyfikacjami.
Nie należy używać produktu z widocznymi uszkodzeniami obudowy.

# Unpacking

## Package Contents

1 x BTS-0001 Bias-T with Attenuator & PTT Control
1 x 3m long BNC to BNC cable HPN 0024-0002
1 x 3m long DC power cable HPN 0024-0004
1 x 3m long RCA to RCA (PTT) cable HPN 0024-0003
1 x Quick Start Guide

Images are representative only:

## BTS-0001

Bias-T with PTT & Attenuator HPN 0901-0001


## BNC to BNC cable

3m Long HPN 0024-0002

## PTT Cable

3m Long HPN 0024-0003

## Power Cable

3m Long HPN 0024-0004

# Product Overview


## Product Description

The HamTEK Bias-T with attenuator and PTT control is designed for use with active antenna systems or any system where a switched bias-T power source is required to protect sensitive receivers from high RF field strengths produced by TX antennas. When an active RX antenna is used in proximity to a high-power TX antenna, the field strength is often high enough to overload the pre-amplifier and damage the circuitry. The BTS-0001 allows the active antenna power to be switched off while transmitting, thereby protecting the sensitive pre-amplifier. A variable attenuator is included to reduce the amplified RX signal and calibrate the levels for a correct S-meter reading.

### Key Features

- Wide variable attenuation range of 4dB to better than 50dB
- Wide frequency range of 50KHz to 75MHz
- High maximum bias-T current (0.5A) for the most demanding applications
- Solid state switching for high speed and reliability
- Filtered power supply input to prevent PSU noise from entering the system

- All inputs are reverse polarity protected with automatic resetting fuses and are fully protected against static discharge and surges
- Double pole power switch to fully isolate PSU from RF connectors when switched off
- Fully protected against bias-T current overload with fold back protection
- Undervoltage protection to prevent low bias-T voltages

## Front Panel

### Power Switch

A push-button style power switch is used to switch the power to the BTS-0001 and anything powered by the bias-T. It is a double pole switch that isolates the positive and negative supply from the antenna system.

### Power Indicator

The power indicator is illuminated whenever power is supplied to the unit with the power switch in the on position.

### Bias Power Indicator

The bias power indicator is illuminated whenever a bias-T voltage is present. If a fault exists that causes too much current to be drawn through the bias-T system, then this indicator will dim, and an audible tone may be heard.

### Variable Attenuator

The variable attenuator is on minimum attenuation when turned fully anticlockwise. Turn clockwise to reduce the received signal level going to the receiver. It is normal for the adjustment to be quite sensitive.

## *Typical minimum attenuation*

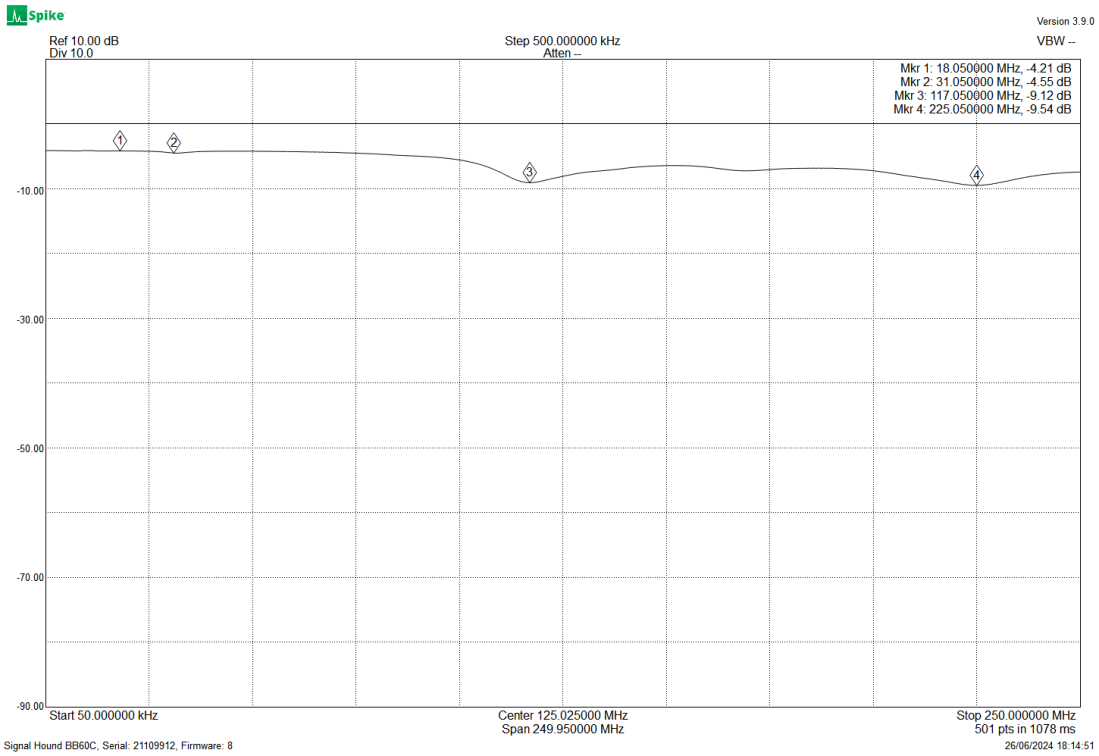



*Figure 1 - Minimum attenuation from 50KHz to 250MHz*

## *Typical Maximum Attenuation*

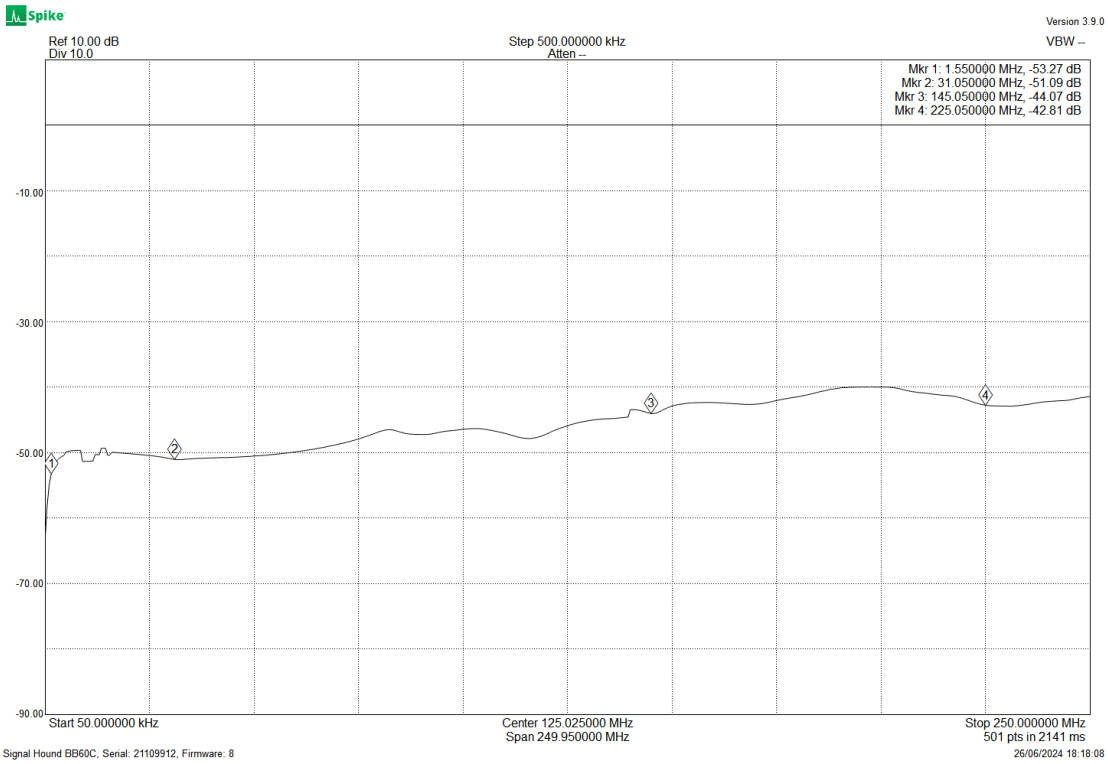



*Figure 2 - Maximum attenuation from 50KHz to 250MHz*

## Rear Panel

### PSU input

This is the power supply for the BTS-0001 and the active system to be powered by the bias-T supply. It should be between 12V and 16V DC. Internal protection circuitry limits the maximum current to 1A. The socket accepts from 2.1 to 2.5mm plugs of at least 14mm length (i.e. 2.5/5.5/14mm plugs).

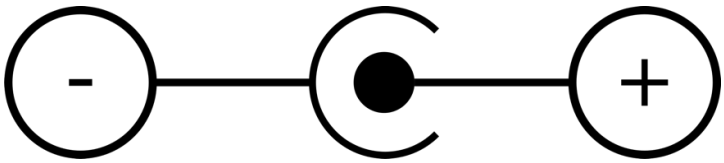



*Figure 3 - DC Plug Polarity*

### ANT Connector

The ANT connector is a 50 Ohm BNC socket for connection to the active antenna coaxial feeder or other system that requires a bias-T power supply. When the bias-T supply is active, the PSU input voltage level is present between the BNC contacts (centre pin positive). The received RF signal comes in on this connector and is passed to the variable attenuator.

## RADIO Connector

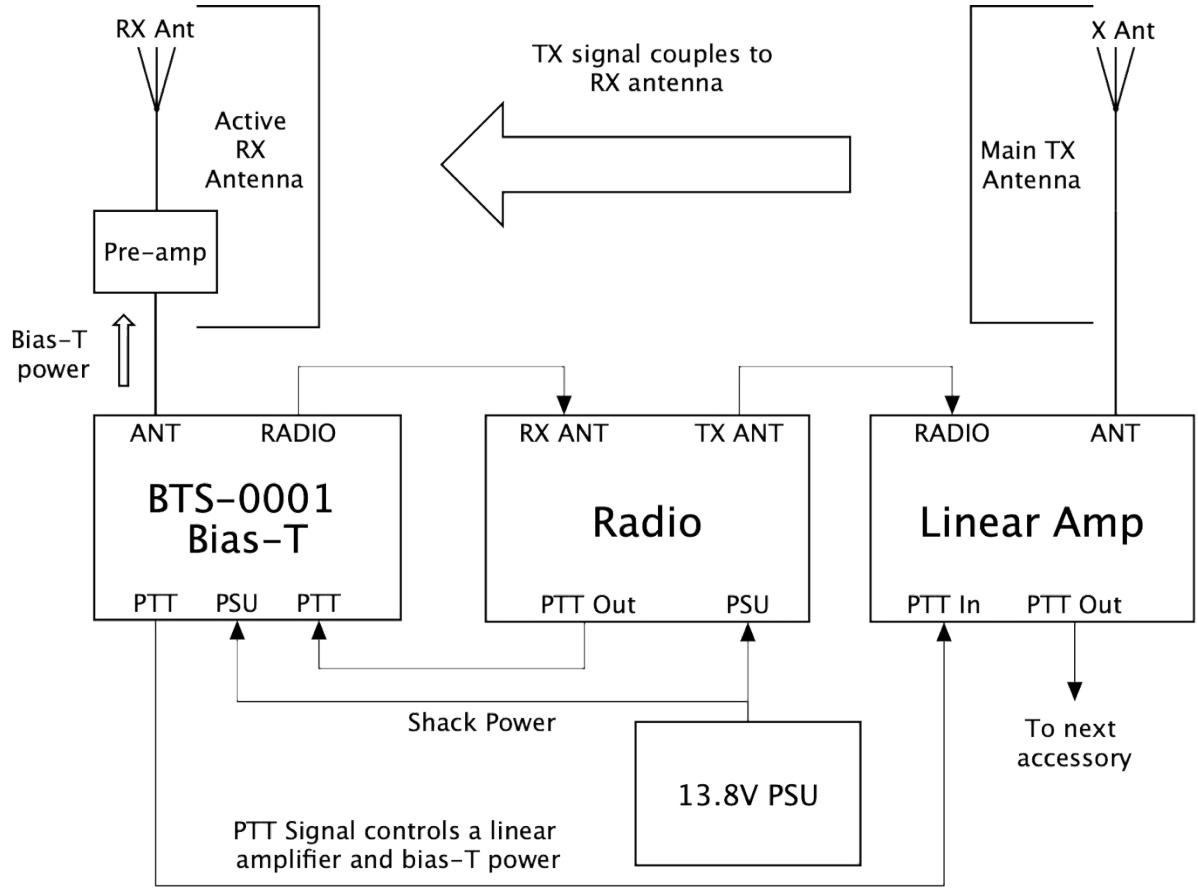
The RADIO connector is a 50 Ohm BNC socket for the connection to the radio receiver feeder coax. The RF signal received on the ANT connector goes through the variable attenuator and comes from this socket. DC voltage is NOT present on this connector.

### PTT Connectors

There are two identical RCA socket PTT connectors for connection to the radio PTT output and optional second device (such as a linear amplifier) that requires the radio PTT signal. The PTT sockets act as a Y connector for the PTT signal. The input is active low, so a short circuit between the inner and outer connection of the RCA socket will activate the PTT signal and disable the bias-T voltage.

# Installation

## Typical installation in an Amateur Radio station




Set the Radio TX to PTT delay to allow enough time from the PTT signal to deactivate the active antenna. A value of 10ms to 20ms is normally adequate, but some pre-amp circuits may have internal capacitance that keeps power to the circuitry for longer intervals.

# Troubleshooting

Follow the table in the order shown to determine the required action.

| Fault | Cause | Action |
|---|---|---|
| POWER indicator not illuminating | No power applied to power input | Check the voltage on the DC jack. |
| | | Ensure PSU switched on and working |
| | Internal fault | Return product for service and repair |
| BIAS indicator not illuminating | PTT input active | Disconnect all PTT connections and recheck |
| | Internal fault | Return product for service and repair |
| BIAS indicator is dimming/pulsing | Too much bias-T current is being drawn | Disconnect bias-T device and recheck. Ensure device draws <0.5A |
| Audible sound from BTS-0001 | | Disconnect BNC plug from ANT connector and recheck. Possible short circuit in feeder |
| No Radio reception | Attenuator fully anticlockwise | Turn the attenuator to achieve the desired signal level |
| | Broken feeder | Check feeder for open and short circuits |
| | No bias-T voltage at active amplifier | Check the voltage on the feeder to the amplifier. If none present, check the voltage at the ANT output of the BTS-0001 |
| | Faulty active amplifier | Try the active amplifier |
| | Internal fault | Try inserting the BTS-0001 in line with a non-active antenna feeder to check RF passes. If no RF, return the product for service and repair. |
| Damage to active antenna on TX | PTT line not being activated | Check the BIAS indicator goes out on PTT and fault find PTT switching |
| | TX delay is too short | Increase radio PTT to TX delay setting |

# Service and Maintenance

There are no user serviceable parts inside - no maintenance is required.
Please refer servicing and repair to a Hamtek Ltd authorised service centre.

## WEEE recycling information

Electrical equipment marked with this symbol may not be disposed of in European public disposal systems. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of-life equipment to the manufacturer for disposal at no charge to the user. Note: For return for recycling, please contact the product manufacturer or supplier for instructions on how to return end-of-life equipment for proper disposal.

# Specifications

| General description | |
|---|---|
| Dimensions | 130 W x 45 H x 110 D mm |
| Weight | 180g |
| Enclosure | Carbon fibre impregnated PLA |
| **Electrical characteristics** | |
| Power supply | 12VDC to 16VDC, 1A 16W maximum<br>Connection: 2.1 to 2.5mm DC plugs, 14mm long<br>Life: 5,000 insertions minimum |
| PTT RCA connections | Internal pull up resistance: 10K Ohms<br>Open circuit voltage: 16VDC max. (PSU input voltage)<br>Bias-T turn-on threshold voltage: 3.0V maximum<br>Bias-T turn-off threshold voltage: 1.82V minimum<br>Bias-T switch threshold hysteresis: 0.2V typical |
| ANT BNC connector – RF input and bias-T output | RF Impedance: 50 Ohms<br>Maximum RF input: 0.25W<br>Maximum input voltage: 16VDC<br>Maximum output voltage: Bias-T output |
| RADIO BNC connector – RF output only | RF Impedance: 50 Ohms<br>Maximum RF input: 0.25W<br>Maximum input voltage: 0VDC |
| PTT Response time | 200μs maximum on and off |
| Operating Frequency Range | 50KHz to 75MHz |
| Attenuation Range | <4dB to >50dB |
| VSWR | Better than 2:1 across attenuator and frequency range |
| Bias-T output | Output Voltage: 12VDC to 16VDC (PSU input voltage)<br>Output Current: 0.5A continuous, 1A limited<br>Output Resistance: 6.5 Ohms maximum<br>Undervoltage shutdown: Between 7V and 10.5V |
| **Operating Environment** | |
| Ambient temperature | 5ºC to 45ºC |
| Ambient humidity | 0-99% RH non-condensing |

# Warranty

## Post-sale Warranty Agreement

The product is warranted by the Company (Hamtek Ltd) to be free from material defects in workmanship and/or materials at the time of delivery to the Customer and that for a period of one year (12 months) from such time the Company will repair or replace any Product which does not comply with this warranty PROVIDED ALWAYS THAT the Company's liability under this warranty shall be limited to the repair or replacement of affected Products and is conditional upon the Customer:

1. Notifying the Company promptly of any such material defect and in any event within such period of one year.
2. Returning to the Company the affected Products properly and adequately packed, carriage or post-paid, within fourteen days of such notification.
3. Having ensured that the Products have not been tampered with, repaired, modified or altered in any way; and
4. Ensuring that the Products are protected from harm or otherwise properly cared for and are retained in the possession of the Purchaser.

In the event of a failure as above the Company will:

1. At its discretion, repair or replace the faulty unit free-of-charge for a unit returned to an authorised service centre.
2. Pay all return shipment charges from the Company service centre to the customer.

## Limitation of Warranty

The foregoing warranty shall not apply to defects resulting from consumable or perishable items, unauthorised modification or misuse, or operation outside of the product specification. No other warranty is expressed or implied.

Whilst every care has been taken in compiling the information in this publication, the Company cannot accept legal liability for any inaccuracies contained herein. Hamtek Ltd has an intensive program of design and development and reserve the right to alter product specifications without notice and whenever necessary to ensure optimum performance from its product range. It shall be deemed to exclude all other warranties and conditions whether express or implied and whether arising by common law statute or otherwise.

Hamtek Ltd reserve the right to waive this benefit in any event where it is clear upon inspection that the cause of the failure is due to customer misuse. Hamtek Ltd will be the sole arbiter in these circumstances.

In no event will Hamtek Ltd be liable for direct, indirect, special, incidental or consequential damages arising out of the use of or inability to use the product or documentation, even if advised of the possibility of such damage.

Bias-T with Attenuator & PTT Control
Model: BTS-0001
HPN: 0901-0001

# UK/EU Declaration of Conformity

We, Hamtek Ltd, hereby declare under sole responsibility that the Bias-T with Attenuator model BTS-0001 (Hamtek Part Number 0901-0001) to which this declaration relates is in conformity with the following directives and standards:

## Electromagnetic Compatibility Directive 2014/30/EU (EMC)

BS EN 55032:2015+A11: 2020 Class B Conducted and Radiated Emissions
BS EN 55035:2017+A11:2020 Immunity Requirements

## Low Voltage Directive 2014/35/EU (LVD)

BS EN 62368-1:2014+A11:2017
EN 62311:2008

## Packaging Directive 94/62/EC

The product packaging complies to the essential requirements in Annex II of the directive

## RoHS Directive 2011/65/EU and 2015/863/EU and its amendment

EN 63000:2018 Restriction of Hazardous Substances and Technical Documentation

Signed on behalf of Hamtek Ltd

Tim Keep
Managing Director
June 25th 2024

Registered Office:
Hamtek Ltd
Coombe Cottage
Coombe Lane
Cradley
Malvern, WR13 5JF
UK

https://www.hamtek.co.uk