the t.bone
audio experience

freeU Twin HT,
freeU Twin PT

User manual

UHF Wireless System

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Table of contents

1 General information

This document contains important instructions for the safe operation of the product. Read and follow the safety instructions and all other instructions. Keep the document for future reference. Make sure that it is available to all those using the product. If you sell the product to another user, be sure that they also receive this document.

Our products and documentation are subject to a process of continuous development. They are therefore subject to change. Please refer to the latest version of the documentation, which is ready for download under *www.thomann.de*.

1.1 Symbols and signal words

In this section you will find an overview of the meaning of symbols and signal words that are used in this document.

Signal word	Meaning
DANGER!	This combination of symbol and signal word indicates an immediate dangerous situation that will result in death or serious injury if it is not avoided.
NOTICE!	This combination of symbol and signal word indicates a possible dangerous situation that can result in material and environmental damage if it is not avoided.

Warning signs	Type of danger
	Warning – danger zone.

2 Safety instructions

Intended use

This device is intended to be used for the wireless transmission of audio signals from microphones or instruments to amplifiers or active speakers. Use the device only as described in this user manual. Any other use or use under other operating conditions is considered to be improper and may result in personal injury or property damage. No liability will be assumed for damages resulting from improper use.

This device may be used only by persons with sufficient physical, sensorial, and intellectual abilities and having corresponding knowledge and experience. Other persons may use this device only if they are supervised or instructed by a person who is responsible for their safety.

Safety

DANGER!

Risk of injury and choking hazard for children!

Children can suffocate on packaging material and small parts. Children can injure themselves when handling the device. Never allow children to play with the packaging material and the device. Always store packaging material out of the reach of babies and small children. Always dispose of packaging material properly when it is not in use. Never allow children to use the device without supervision. Keep small parts away from children and make sure that the device does not shed any small parts (such knobs) that children could play with.

NOTICE!

Damage to the device if operated in unsuitable ambient conditions!

The device can be damaged if it is operated in unsuitable ambient conditions. Only operate the device indoors within the ambient conditions specified in the "Technical specifications" chapter of this user manual. Avoid operating it in environments with direct sunlight, heavy dirt and strong vibrations. Avoid operating it in environments with strong temperature fluctuations. If temperature fluctuations cannot be avoided (for example after transport in low outside temperatures), do not switch on the device immediately. Never subject the device to liquids or moisture. Never move the device to another location while it is in operation. In environments with increased dirt levels (for example due to dust, smoke, nicotine or mist): Have the device cleaned by qualified specialists at regular intervals to prevent damage due to overheating and other malfunctions.

NOTICE!

Radio interference due to electromagnetic fields!

The unit emits electromagnetic radio signals. Overlapping radio waves may cause interference with the device and other devices. Do not use the device in locations where the use of wireless devices is prohibited.

NOTICE!

Risk of fire due to incorrect polarity!

Incorrectly inserted batteries may cause fires and destroy the device and the batteries. Observe the markings on the batteries and on the device. Ensure that proper polarity is observed when inserting batteries.

NOTICE!

Possible damage due to leaking batteries!

Batteries can leak and cause permanent damage to the device. Take the batteries out of the device if it is not going to be used for an extended period of time.

NOTICE!

Possible staining due to plasticiser in rubber feet!

The plasticiser contained in the rubber feet of this product may react with the coating of the floor and cause permanent dark stains after some time. If necessary, use a suitable mat or felt slide to prevent direct contact between the device's rubber feet and the floor.

3 Features

The UHF wireless system is particularly suitable for professional audio transmission, for example at events, on rock stages and in concert halls, theatres, musicals or night clubs.

UHF Wireless System freeU Twin HT

Item no.	Name	Frequency band
432864	the t.bone freeU Twin HT 823	823 MHz…832 MHz
432866	the t.bone freeU Twin HT 863	863 MHz…865 MHz

The UHF wireless system freeU Twin HT consists of the following components:

- 9.5-inch diversity receiver
  - Two antennas for optimum reception quality
  - Infrared interface for sending the frequency selection from the receiver to the transmitter
  - Outputs: 2 × XLR, 6.35-mm jack socket
  - Robust metal housing, designed for mounting in a 19-inch rack (1 RU)
  - Power supply: 12 V ⎓
- Transmitter
  - Two battery-powered handheld microphones with supercardioid characteristics
- Accessories included
  - Two antennas
  - Power adapter
  - Installation kit for the rack mounting
  - Microphone holder

The system operates with pre-programmed frequency groups. The following table shows the number of available pre-programmed groups and the number of pre-programmed frequencies in each group.

Item no.	Name	Pre-programmed frequency groups	Available channels per group
432864	the t.bone freeU Twin HT 823	10	10
432866	the t.bone freeU Twin HT 863	4	4

UHF Wireless System freeU Twin PT

Item no.	Name	Frequency band
432869	the t.bone freeU Twin PT 823	823 MHz…832 MHz
432870	the t.bone freeU Twin PT 863	863 MHz…865 MHz

The UHF wireless system freeU Twin PT consists of the following components:

- 9.5-inch diversity receiver
  - Two antennas for optimum reception quality
  - Infrared interface for sending the frequency selection from the receiver to the transmitter
  - Outputs: 2 × XLR, 6.35-mm jack socket
  - Robust metal housing, designed for mounting in a 19-inch rack (1 RU)
  - Power supply: 12 V ⎓
- Transmitter
  - Two battery-powered bodypack transmitters
- Accessories included
  - Two antennas
  - Power adapter
  - Installation kit for the rack mounting
  - Two instrument cables

The system operates with pre-programmed frequency groups. The following table shows the number of available pre-programmed groups and the number of pre-programmed frequencies in each group.

Item no.	Name	Pre-programmed frequency groups	Available channels per group
432869	the t.bone freeU Twin PT 823	10	10
432870	the t.bone freeU Twin PT 863	4	4

4 Installation and starting up

4.1 General Information

Unpack and check carefully there is no transportation damage before using the unit. Keep the equipment packaging. To fully protect the product against vibration, dust and moisture during transportation or storage use the original packaging or your own packaging material suitable for transport or storage, respectively.

Create all connections while the device is off. Use the shortest possible high-quality cables for all connections. Take care when running the cables to prevent tripping hazards.

Notes on wireless transmission

- This device utilizes frequencies that are not harmonized within the European Union (EU) and therefore may only be used in certain EU member states. In all European countries, the frequencies used for the transmission of audio signals are strictly regulated. Before you start, make sure the frequencies are allowed in the respective country and check whether the operation must be reported to the appropriate authority.
  For more information, please visit: *http://www.thomann.de*.
- Make sure that transmitter and receiver are both tuned to the same channel.
- Never set multiple transmitters to the same channel.
- Make sure that there are no metal objects between the transmitter and receiver.
- Avoid interference from other radio or in-ear systems.

4.2 Receiver

Rack mounting

The device is designed for mounting in a standard 19-inch rack; it occupies one rack unit (RU). The fixing material required for assembly is included.

Connecting the power supply

NOTICE!

Damage to the external power supply due to high voltages!

The device is powered by an external power supply. The external power supply can be damaged if it is operated with the incorrect voltage or if high voltage peaks occur. In the worst case, excess voltages can also cause a risk of injury and fires.

Make sure that the voltage specification on the external power supply matches the local power grid before plugging in the power supply.

Only operate the external power supply from professionally installed mains sockets that are protected by a residual current circuit breaker (FI).

As a precaution, disconnect the power supply from the power grid when storms are approaching or it the device will not be used for a longer period.

First, connect the power supply to the receiver and then plug the power supply into the power outlet.

Attaching the antennas

Attach the included antennas to the rear panel of the transmitter. The antenna can be rotated and swivelled to improve transmission quality and to adapt to spatial conditions.

If there is not enough space on the device for direct assembly of the antennas, for example because there is not much space in the rack, you can use the optionally available coaxial cable to assemble the antennas separately from the device.

Connecting audio and starting up

Connect the audio outputs of the receiver to your mixer or your amplifier. Depending on the application, you can choose between the cabling variant "2 × XLR" or "1 × jack summarised".

4.3 Handheld microphone

Inserting batteries

Unscrew the bottom housing section of the handheld microphone. Insert the batteries. Pay attention to the correct location of the poles. The correct battery arrangement is illustrated in the battery compartment. Close the battery compartment, screw the bottom housing section back on, and switch the transmitter on.

Make sure that you unscrew the complete lower housing part. Do not unscrew the threaded ring above the antenna.

4.4 Bodypack transmitter

Inserting batteries

Squeeze the battery compartment lid, flip it open and insert the batteries. Pay attention to the correct location of the poles. Close the battery compartment and switch the transmitter on.

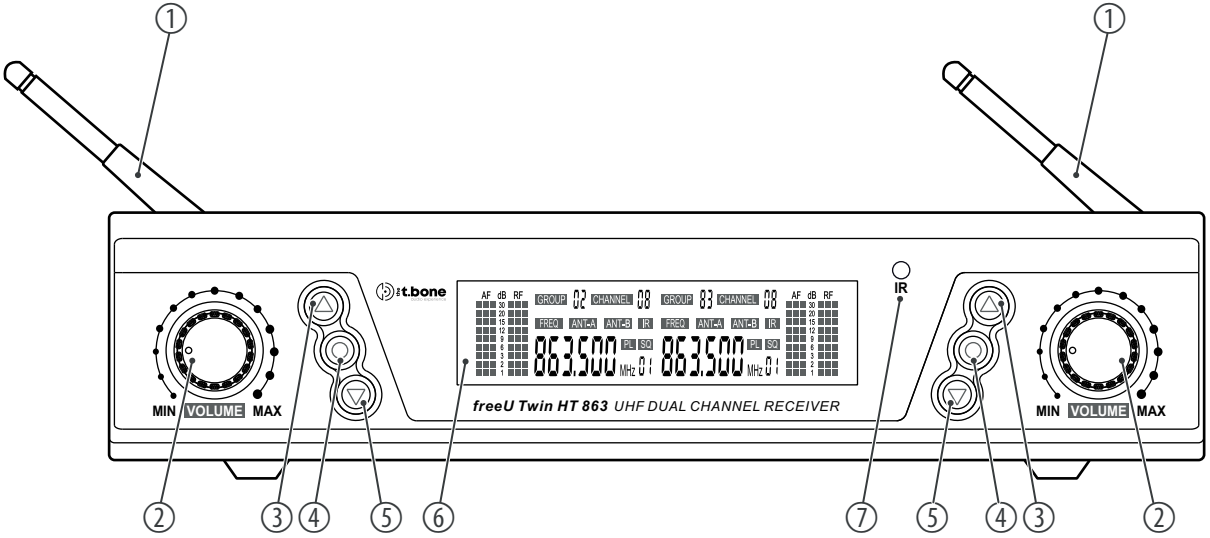
Connecting a microphone or instrument

- Ensure that the transmitter is switched off.
- Connect the microphone cable or instrument cable to the input on the transmitter (mini-XLR panel connector).
- Turn on the transmitter and check the transmission by using the microphone or instrument. If necessary, adjust the amplification of the transmitter and the levels on your mixing console or your amplifier.

5 Connections and controls

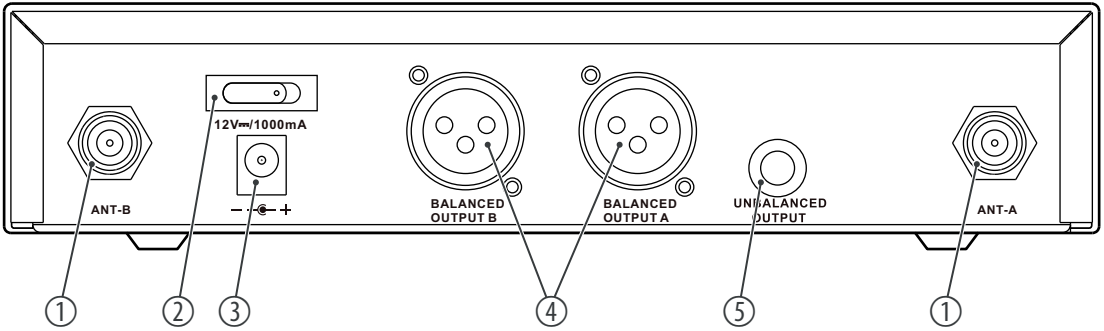
5.1 Receiver

Front panel



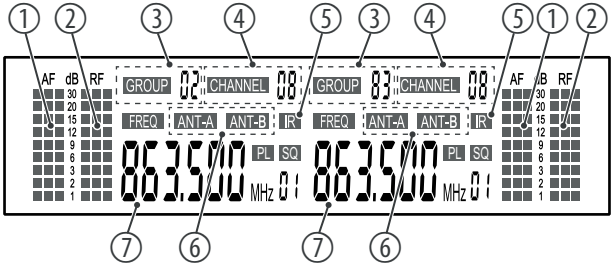
1	UHF antennas
Operating elements for channel A (left) and channel B (right) respectively	
2	*[VOLUME]* | Volume control for adjusting the audio output level.
3	▲ | Increases the displayed value by one.
4	● | Opens the menu.
5	▼ | Decreases the displayed value by one.
6	Display
7	*[IR]* | Infrared interface

Rear panel



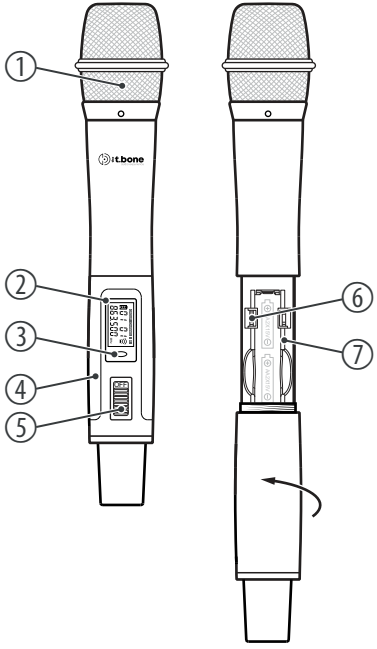
1	*[ANT A] / [ANT B]* | Connections for UHF antennas
2	Main switch, turns the device on and off. All previous settings are retained even when you switch the device off and disconnect it from the mains.
3	*[12 V]* | Socket for connecting the supplied power supply If you are using a different power supply, observe the correct voltage, the polarity of the plug and the power consumption.
4	*[BALANCED OUTPUT A] / [BALANCED OUTPUT B]* | XLR panel plug as balanced audio signal output for direct connection to a mixer, power amplifier or recording device.
5	*[UNBALANCED OUTPUT]* | 6.35-mm jack socket as unbalanced output with the sum signal from channels A and B for direct connection to a mixer, power amp or recording device.

Display



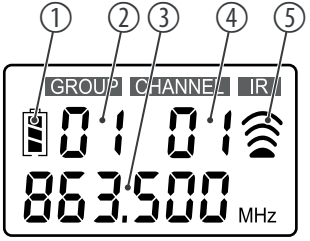
Operating elements, each for channel A (left) and channel B (right)	
1	*[AF]* | Level display for the audio signal
2	*[RF]* | Level display for the received radio signal
3	*[GROUP]* | Displays the selected frequency group.
4	*[CHANNEL]* | Displays the selected channel.
5	*[IR]* | Indicates data transfer via the infrared interface.
6	*[ANT-A]*, *[ANT-B]* | Shows which of the two antennas is currently being used for signal transmission.
7	*[FREQ]* | Indicates the frequency that is assigned to the set combination of frequency group and channel.

5.2 Handheld microphone



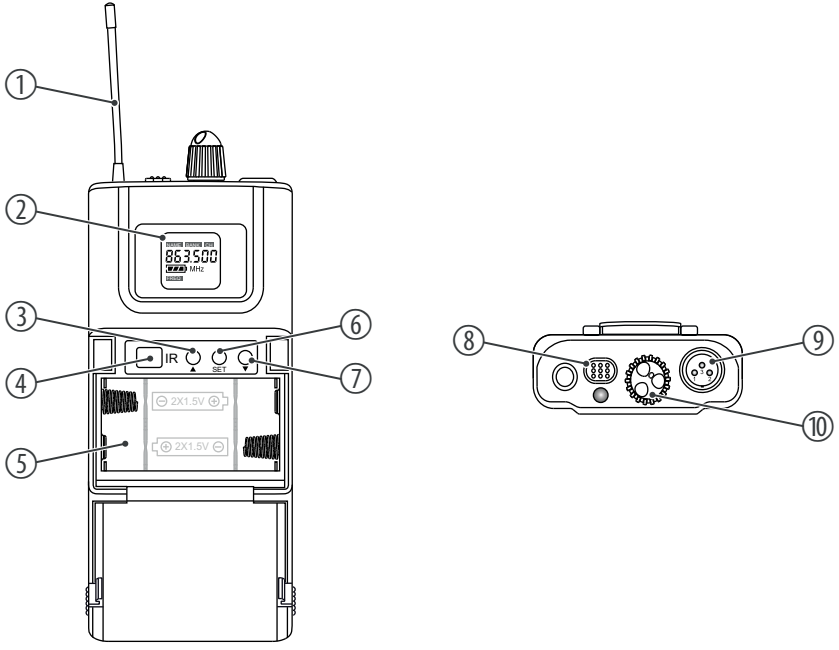
1	Microphone head grill to prevent damage and to reduce wind and breathing noises.
2	Display
3	Infrared sensor
4	Lower housing part. Unscrew to open. Make sure that you unscrew the complete lower housing part. Caution! Do not unscrew the threaded ring (left-hand thread) above the antenna.
5	Main switch. Slide the switch all the way forward to turn on the microphone. Slide it all the way back to turn it off. Set the switch to the centre position to mute the microphone.
6	Indication of the frequency range in which the device operates. The specification here must match the specification printed on the back of the receiver.
7	Battery holder for two round cell batteries (AA, LR06), 1.5 V or comparable rechargeable batteries.

Display



1	Battery level indicator. Replace the batteries when only one blinking bar is displayed. If the battery voltage drops any further the transmitter is switched off automatically.
2	*[GROUP]* | Displays the selected frequency group.
3	Indicates the set frequency that is assigned to the set combination of frequency group and channel.
4	*[CHANNEL]* | Displays the selected channel.
5	*[IR]* | Indicates data transfer via the infrared interface.

5.3 Bodypack transmitter



1	Antenna
2	Display
3	▲ | Increases the displayed value by one.
4	*[IR]* | Infrared sensor
5	Battery holder for two round cell batteries (AA, LR06), 1.5 V or comparable rechargeable batteries.
6	● | Opens the menu.
7	▼ | Decreases the displayed value by one.
8	Main switch. Press the switch for several seconds to switch the device on or off.
9	Mini-XLR panel plug for connecting a microphone or an instrument
10	Volume control
11	Retaining clamp

Display

1	*[NAME] / [BANK] / [CH]* | No function
2	*[FREQ]* | Indicates the set frequency that is assigned to the set combination of frequency group and channel.
3	Battery level indicator. Replace the batteries when only one blinking bar is displayed. If the battery voltage drops any further the transmitter is switched off automatically.

6 Operating

6.1 Receiver

Turning the receiver on and off

- Turn on the device with the main switch.
  - ⇨ The display is activated. The device is operational. Now you can make the desired settings.

Selecting the frequency group and channel

1. Press ●.
   - ⇨ The *[GROUP]* display flashes.
2. Use the arrow buttons to select the frequency group.
3. Press ● to confirm the selection.
   - ⇨ The setting is accepted. The *[CHANNEL]* display flashes.
4. Use the arrow buttons to select a channel within the set frequency group.
5. Press ● to confirm the selection.
   - ⇨ The setting is accepted. The *[PO.x]* display flashes.

6. Use the arrow buttons to select the level for the radio signal in a range from 5 mW (PO.1) to 30 mW (PO.4) (this option is omitted for the t.bone freeU Twin HT 863 and the t.bone freeU Twin PT 863).

Press ● to confirm the selection.

⇨ The settings are complete.

Checking the frequency

Press ● on the receiver repeatedly until the display shows *'SCAN'*.

⇨ The *'SCAN'* display flashes. The device checks the set combination of frequency group and channel on possible interferences.

If the set channel is free, the display shows the frequency with the status message *'PF'*.

If the set channel is not free, the display shows the frequency without the status message *'PF'*. In this case search for a free channel.

Searching for a free channel

1. Press ● on the receiver repeatedly until the display shows *'SCAN'*.
   ⇨ The *'SCAN'* display flashes.
2. Press the arrow buttons while *'SCAN'* is flashing.
   ⇨ The device searches automatically for a free channel. If a free channel has been found, the display shows the frequency with the status message *'PF'*.

Synchronising the receiver with the transmitter

1. Press and hold ● on the receiver until *'IR'* flashes on the display.
2. Hold the infrared sensor of the transmitter near the infrared interface of the receiver.
   ⇨ The settings of the receiver are transmitted to the transmitter.
3. Once the synchronisation is finished, the display returns to the default state and *'IR'* lights permanently.

6.2 Handheld microphone

Turning the microphone on and off

1. Slide the switch all the way forward (ON) to turn on the microphone.
2. Slide the switch all the way back (OFF) to turn it off.
3. Set the switch to the centre position to mute the microphone.

Synchronising the microphone with the receiver

1. Prepare the receiver for synchronisation (*'Synchronising the receiver with the transmitter' on page 30*).
2. Hold the infrared sensor of the microphone near the infrared interface of the receiver.
   ⇨ The settings of the receiver are transmitted to the microphone and are displayed.

6.3 Bodypack transmitter

Turning the bodypack transmitter on and off

1. Briefly press the main switch on the top of the device to turn the bodypack transmitter on.

   ⇨ The display shows the frequency and the charging level of the batteries. The device is operational.

2. Hold down the main switch on the top of the unit to turn the bodypack transmitter off.

   ⇨ The display shows *'OFF'* for a few seconds. Then the display turns black. The device is turned off.

Synchronising the bodypack transmitter with the receiver

1. Prepare the receiver for synchronisation (*'Synchronising the receiver with the transmitter' on page 30*).
2. Press the lid of the battery compartment of the bodypack transmitter on one side and flip the lid open. The infrared sensor *[IR]* of the device is located above the batteries.
3. Hold the infrared sensor of the bodypack transmitter near the infrared interface of the receiver.

   ⇨ The settings of the receiver are transmitted to the bodypack transmitter and are displayed.

Setting the frequency manually

If you don't want to synchronise the transmitter with the receiver using the infrared interface, you can also set the transmission frequency manually.

1. Press the lid of the battery compartment of the bodypack transmitter on one side and flip the lid open. The buttons for operating the device are located above the batteries.

The buttons for operating the device are located in a recess. Use a ballpoint pen or similar pointed object to press the buttons.

2. Press *[SET]* until the numeric value flashes on the display.

3. Use the arrow buttons to select the desired frequency.

Press *[SET]* to confirm the selection.

⇨ The selected transmission frequency is set.

7 Technical specifications

7.1 Receiver

Input connections	Power supply	Socket for connecting the power adapter
Output connections	Audio signal output	1× 6.35-mm jack socket, unbalanced
		2× XLR panel plug, balanced
Output level adjustment	–32 dB … +0 dB	
NF frequency response	50 Hz …16 kHz (±3 dB)	
Antenna gain	2 dBi	
Total harmonic distortion (THD)	< 0.5% (1 kHz)	
Signal-to-noise ratio	> 105 dB (A) (–60 dBm)	
Dynamic range	> 100 dB	
Power supply	External power adapter, 100 - 240 V ~ 50/60 Hz	
Operating voltage	12 V ⎓ / 1,000 mA, centre positive	
Dimensions (W × H × D), without antennas	210 mm × 44 mm × 200 mm	
Weight	930 g	

Ambient conditions	Temperature range	0 °C…40 °C
	Relative humidity	20%…80% (non-condensing)

Carrier frequency, frequency range, number of channels, bandwidth, and modulation type correspond to those of the transmitter.

Further information

Frequency band	UHF
Diversity	Yes
Switchable frequencies	Yes
Detachable antennas	Yes
Pilot tone	Yes

7.2 Handheld microphone

	the t.bone freeU Twin HT 823 (item no. 432864)	**the t.bone freeU Twin HT 863 (item no. 432866)**
Number of systems that can be operated in parallel	2	1
Number of channels	100 (10 pre-programmed frequency groups, each with 10 channels available)	16 (4 pre-programmed frequency groups, each with 4 channels available)
Frequency band	UHF band (600 MHz…952 MHz)	
Frequency range	823 MHz…832 MHz	863 MHz…865 MHz
Max. transmission power	Adjustable in four levels: ■ PO.1: 5 mW ■ PO.2: 10 mW ■ PO.3: 15 mW ■ PO.4: 30 mW	10 mW
Maximum input level	–12 dBV	
Bandwidth	9 MHz	2 MHz
Modulation type	Frequency modulation (FM)	
Input impedance	5.6 kΩ	

		the t.bone freeU Twin HT 823 (item no. 432864)	the t.bone freeU Twin HT 863 (item no. 432866)
Range in clear field of vision		up to 50 m	
NF frequency response		50 Hz…16 kHz (±3 dB)	
Spurious rejection		> 55 dBc	
Peak deviation		± 48 kHz	
Battery	Battery type	2× Round cell batteries (AA, LR06) or comparable rechargeable batteries	
	Voltage	1.5 V	
	Operating time	> 10 h (with alkaline cells)	
Dimensions (L × D)		265 mm × 65 mm	
Weight (without batteries)		370 g	
Ambient conditions	Temperature range	0 °C…40 °C	
	Relative humidity	20%…80% (non-condensing)	

Further information

Capsule type	Dynamic
Polar pattern	Supercardioid

7.3 Bodypack transmitter

	the t.bone freeU Twin PT 823 (item no. 432869)	**the t.bone freeU Twin PT 863 (item no. 432870)**
Number of systems that can be operated in parallel	2	1
Number of channels	100 (10 pre-programmed frequency groups, each with 10 channels available)	16 (4 pre-programmed frequency groups, each with 4 channels available)
Frequency band	UHF band (600 MHz…952 MHz)	
Frequency range	823 MHz…832 MHz	863 MHz…865 MHz
Max. transmission power	Adjustable in four levels: ■ PO.1: 5 mW ■ PO.2: 10 mW ■ PO.3: 15 mW ■ PO.4: 30 mW	10 mW

		the t.bone freeU Twin PT 823 (item no. 432869)	the t.bone freeU Twin PT 863 (item no. 432870)
Maximum input level		–4.15 dBV	
Bandwidth		9 MHz	2 MHz
Modulation type		Frequency modulation (FM)	
Input impedance		6.8 kΩ	
Range in clear field of vision		up to 50 m	
Peak deviation		± 48 kHz	
Battery	Battery type	2× Round cell batteries (AA, LR06) or comparable rechargeable batteries	
	Voltage	1.5 V	
	Operating time	> 10 h (with alkaline cells)	
Dimensions (W × H × D), without antennas		63 mm × 110 mm × 21 mm	
Weight (without batteries)		90 g	
Ambient conditions	Temperature range	0 °C…40 °C	
	Relative humidity	20%…80% (non-condensing)	

Further information

	the t.bone freeU Twin PT 823 (item no. 432869)	**the t.bone freeU Twin PT 863 (item no. 432870)**
Max. number of radio links	2	1

8 Plug and connection assignment

Introduction

This chapter will help you select the right cables and plugs to connect your valuable equipment in such a way that a perfect sound experience is ensured.

Please note these advices, because especially in 'Sound & Light' caution is indicated: Even if a plug fits into the socket, an incorrect connection may result in a destroyed power amp, a short circuit or 'just' in poor transmission quality!

Balanced and unbalanced transmission

Unbalanced transmission is mainly used in semi-professional environment and in hifi use. Instrument cables with two conductors (one core plus shielding) are typical representatives of the unbalanced transmission. One conductor is ground and shielding while the signal is transmitted through the core.

Unbalanced transmission is susceptible to electromagnetic interference, especially at low levels, such as microphone signals and when using long cables.

In a professional environment, therefore, the balanced transmission is preferred, because this enables an undisturbed transmission of signals over long distances. In addition to the conductors 'Ground' and 'Signal', in a balanced transmission a second core is added. This also transfers the signal, but phase-shifted by 180°.

Since the interference affects both cores equally, by subtracting the phase-shifted signals, the interfering signal is completely neutralized. The result is a pure signal without any noise interference.

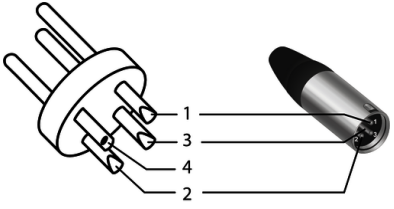
1/4" TS phone plug (mono, unbalanced)

1	Signal
2	Ground, shielding

1/4" TRS phone plug (mono, balanced)

1	Signal (in phase, +)
2	Signal (out of phase, –)
3	Ground

XLR plug (balanced)



1	Ground, shielding
2	Signal (in phase, +)
3	Signal (out of phase, –)
4	Shielding on plug housing (option)

Mini XLR

1	Ground
2	Positive signal (+)
3	Negative signal (–)

9 Troubleshooting

In the following we list a few common problems that may occur during operation. We give you some suggestions for easy troubleshooting:

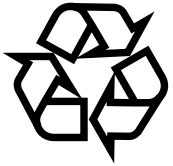
Symptom	Remedy
No sound	1. Check the power supply of the transmitter and receiver.
	2. Make sure that transmitter and receiver are operating in the same frequency range. The frequency range can be found on the devices.
	3. Are the transmitter and receiver set to the same channel?
	4. Test the connection between the receiver and the connected audio device (amplifier, mixer). Is the connected audio device turned on and does the signal level on the output of the receiver match the input requirements of the audio device?
	4. See if the audio transmission works when you move the transmitter closer to the receiver.
	6. Make sure that no metal objects near the transmitter or receiver are obstructing the transmission.
Transmission is interrupted	1. Modify the orientation of the antennas.

Symptom	Remedy
	2. If you are using more than one wireless system at the same time, check the used frequencies and channels.
	3. Interference can also be caused by other radio or in-ear systems.

If the procedures recommended above do not succeed, please contact our Service Center. You can find the contact information at *www.thomann.de*.

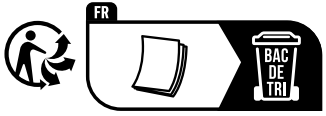
10 Protecting the environment

Disposal of the packing material



Environmentally friendly materials have been chosen for the packaging. These materials can be sent for normal recycling. Ensure that plastic bags, packaging, etc. are disposed of in the proper manner.

Do not dispose of these materials with your normal household waste, but make sure that they are collected for recycling. Please follow the instructions and markings on the packaging.



Observe the disposal note regarding documentation in France.

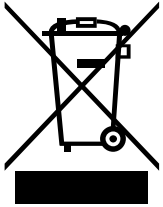
Disposal of batteries

Batteries must not be thrown away or burnt, but must instead be disposed of in line with the local regulations on the disposal of hazardous waste. Use the available collection sites.

Before disposing of your old device, remove the batteries if this is possible without destroying it.

Dispose of the batteries or rechargeable batteries at suitable collection points or through your local waste facility.

Disposal of your old device



This product is subject to the European Waste Electrical and Electronic Equipment Directive (WEEE) as amended.

Do not dispose of your old device with your normal household waste; instead, deliver it for controlled disposal by an approved waste disposal firm or through your local waste facility. When disposing of the device, comply with the rules and regulations that apply in your country. If in doubt, consult your local waste management facility. Proper disposal protects the environment as well as the health of your fellow human beings.

Also note that waste avoidance is a valuable contribution to environmental protection. Repairing a device or passing it on to another user is an ecologically valuable alternative to disposal.

You can return your old device to Thomann GmbH at no charge. Check the current conditions on *www.thomann.de*.

If your old device contains personal data, delete those data before disposing of it.