

Synthesized Base Station Transmitter



COMTEK®

TABLE OF CONTENTS

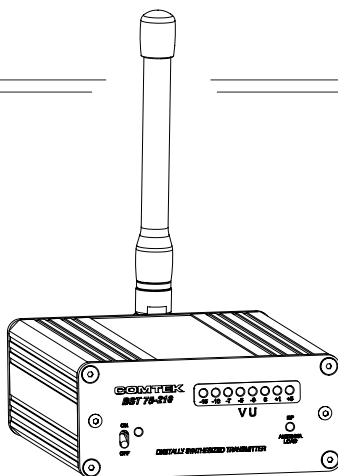
Introduction	1
Equipment Placement	2
Power Requirements	2
Remote Antenna	3
Screw-in Whip Antenna	3
Audio Input Connections	4
Audio Adjustments	4
Audio Processing Circuit	5
Front and Rear Panel Facilities	6-7
Frequency Information	8-9
Accessories	10-11
Specifications	12
Warranty and Service	13

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

INTRODUCTION

BST 75-216

Synthesized Base Station Transmitter



This transmitter may be used for personal listening applications such as cueing and IFB, wireless automatic tour information systems, language interpretation, and for assistive listening for people with hearing loss.

The BST 75-216 mini base station transmitter meets the highest professional standards while offering outstanding value and the most advanced technology available. This versatile and innovative transmitter is simple to use, yet it has sophisticated features such as “Flash Memory” 57-channel programmability with a synthesized manual 10-channel selectable user-switch. Plus a unique multi-function RF indicator detects antenna problems, bad or incorrect antenna, and open coaxial cable for quick and easy trouble shooting.

The audio processing circuit produces full fidelity frequency response from 100 Hz to 10 kHz with very low residual FM noise and distortion. To accommodate a greater variety of receivers, the BST 75-216 can operate with non-companded receivers or with companded receivers for higher fidelity sound reproduction with a signal-to-noise ratio of up to 90 dB.

All this is designed into a stylish, compact, all-metal enclosure suitable for permanent rack-mount installations or for stand-alone portable applications.

OPERATING INSTRUCTIONS

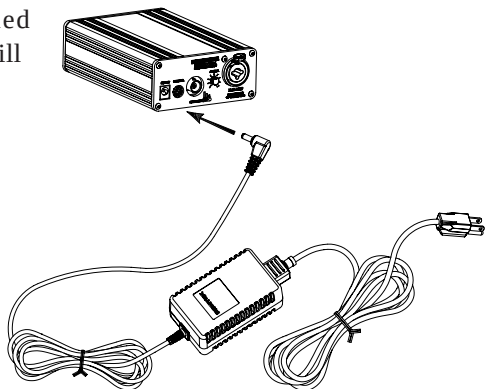
Equipment Placement

If the BST 75-216 base station is to be rack mounted, a remote antenna must be used. The base station should be mounted away from equipment that uses large power transformers to reduce 60 Hz hum possibilities.

Special Note: When using the base station in close proximity to other audio equipment, ensure that the audio equipment is not susceptible to RF interference. This can be accomplished by temporarily installing the base station as per above, and then while the base station is operating, checking all audio outputs for uncharacteristic noise. If a problem is found, move the base station or the remote antenna as far as possible from the affected equipment. Should you continue to have problems, contact COMTEK's Technical Support Services for assistance.

Power Requirements

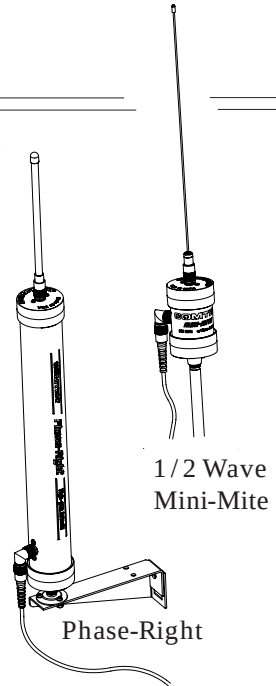
The BST 75-216 base station is designed to be powered by 12 volts DC. The standard barrel type power jack (5.5mm X 2.1mm) is nonpolar and will accept either plus or minus 12 volt DC on the center pin. The switching power supply adaptor which is included is a universal input type that will accept 100-240 volt, 47-63 Hz (AP-12V1B). The on / off switch on the front panel of the base station transmitter should be turned to the "off" position when the power plug is initially plugged into the transmitter.



OPERATING INSTRUCTIONS

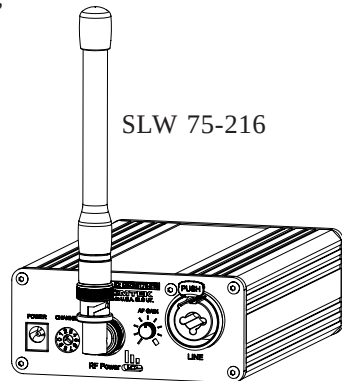
Remote Antenna

When the BST 75-216 base station transmitter is to be rack mounted for permanent installation, a remote antenna must be used. For high performance application when greater coverage is required, the Phase-Right or Mini-Mite 1/2 wave omni antenna should be used. These antennas must be placed vertically polarized up to 15 feet away from the transmitter with the coaxial cable supplied. The highest possible antenna placement away from any metallic object is best. For high gain directional yagi type antennas and specialty antennas, contact COMTEK's Technical Support Services.



Short Loaded Whip BNC Antenna

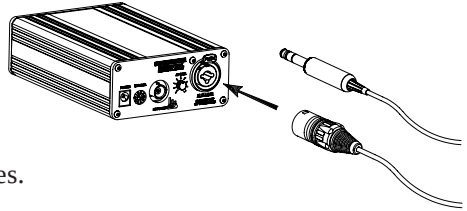
If the BST 75-216 base station transmitter is to be used outside of the traditional rack-mounted environment for stand-alone mobile type applications, the short loaded whip antenna (SLW 75-216) should be used. The transmitter should be placed on a table or platform as high as possible so the antenna is at least 24" away from any metallic object. The radiated output power of the transmitter with this short loaded whip antenna will not be as great as the remote antennas. The BST 75-216 transmitter should be used only in the high power setting when the short loaded whip antenna is used.



OPERATING INSTRUCTIONS

Audio Input Connections

The BST 75-216 base station transmitter uses an XLR-3F connector with a “Combo” phone jack. The XLR portion of the connector will accept a true balanced or unbalanced line level signal up to +20 dBm. The 1/4” phone jack portion of the connector may be used for AUX output level audio or may directly phantom-power most two-conductor electret microphones.



Audio Adjustments

In order to ensure the highest possible transmission fidelity, the transmitter must be modulating at least 50% with normal speech (0 dB on the VU meter). This adjustment is made in the following manner:

- a. Ensure that the audio source has been optimized for best signal-to-noise ratio.
- b. The XLR-3 connector located on the back of the transmitter is used for line level balanced or unbalanced audio source (up to +20 dBm).
- c. Set the AF Gain Control on the back of the base station to fully counterclockwise. Then, while normal program information is present, slowly rotate the “LEVEL” control clockwise until the VU meter on the front panel begins to deflect. Adjustment should be made so that normal speech or music deflects the 0 dB yellow LED. Only peak level of speech or music should deflect the VU meter full-scale into the last red LED.

OPERATING INSTRUCTIONS

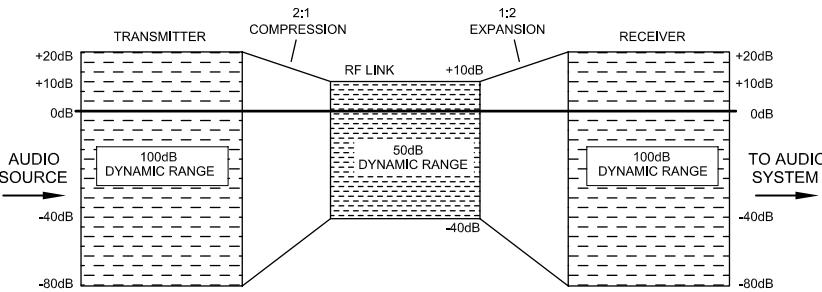
Audio Processing Circuit

The audio processing system incorporates a peak-level compressor to prevent over-modulation and reduce audio distortion at high levels. This compressor has a very fast attack time and a carefully controlled decay time to optimize the dynamic performance of the audio processing system. (The VU meter will indicate this compressor action when the red LEDs are illuminated.) The audio is also equalized to add pre-emphasis as well as a very sharp high frequency roll-off circuit to minimize high frequency noise in the audio signal. The total frequency response and performance of the system is, however, determined by the corresponding de-emphasis and equalization used in the receiver.

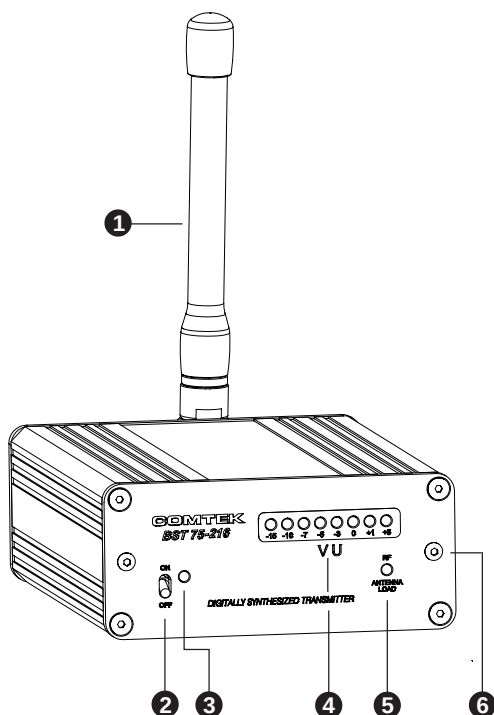
In order to accommodate a greater variety of receivers, the BST 75-216 transmitter incorporates the option to operate with receivers that have companded or non-companded audio processing. However, the BST 75-216 transmitter must operate non-companded with non-companded receivers and companded only with receivers that incorporate companding processing. A mismatch will result in unacceptable audio performance.

Basic Companding Theory

The dynamic range of the audio signal is compressed in the transmitter at a 2:1 ratio. The receiver then expands the audio signal at a complementary 1:2 ratio to restore the dynamic range of the audio signal to the original level and also to provide additional noise reduction when no audio signal is present.

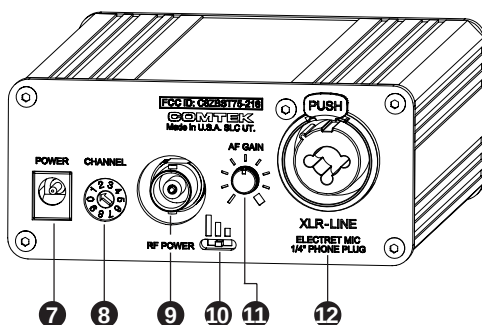


BST 75-216 FRONT PANEL



- ❶ **OPTIONAL ANTENNA:** Used for mobile type applications.
- ❷ **POWER SWITCH:** Turns the transmitter on or off.
- ❸ **POWER LED INDICATOR:** Illuminates when the power is on.
- ❹ **VU METER:** Displays the audio level being used for modulation. (See Audio Adjustment Section.)
- ❺ **ANTENNA INDICATOR:** Detects antenna problems: bad, or incorrect antenna, and open coaxial cable.
- ❻ **RACK-MOUNTING SCREWS:** Used for mounting BST 75-216 to rack-mounting panels.

BST 75-216 REAR PANEL

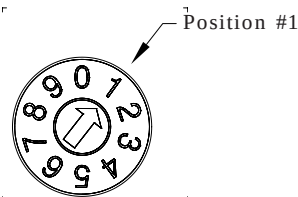


- 7 DC INPUT JACK:** Requires 12V DC at 200 mA source. (Positive or negative center pin.)
- 8 CHANNEL SELECTOR SWITCH:** Selects the frequency on which the transmitter will operate. (See Frequency Information Section.)
- 9 EXTERNAL ANTENNA JACK:** BNC connector provides a standard 50 ohm RF output for use with an external antenna.
- 10 RF POWER SWITCH:** Adjusts the RF power output of the transmitter (High-100 mW, Mid-50 mW, Low-25 mW).
- 11 AUDIO LEVEL CONTROL:** This control is used to set the proper modulation level when referenced with the VU meter.
- 12 MIC / LINE AUDIO INPUT:** XLR-3 accepts balanced line level input. 1/4" phone jack accepts AUX input or 2-conductor electret microphone.

BST 75-216 FREQUENCY INFORMATION

USER-SWITCHABLE SELECTED CHANNELS (STANDARD PROGRAM)

SWITCH POSITION	CHANNEL
#1	41-216.025
#2	42-216.075
#3	44-216.175
#4	46-216.275
#5	49-216.425
#6	51-216.525
#7	55-216.725
#8	57-216.825
#9	59-216.925
#10	60-216.975



Frequency Selection

The BST 75-216 transmitter comes from the factory on 10 standard manually selectable channels. These 10 frequencies have been selected to create two groups of five frequencies that have been coordinated for simultaneous operation.

AVAILABLE 216 MHz “FLASH MEMORY” COMPANDED CHANNELS

CHANNEL	FREQUENCY
41	216.0250 MHz
42	216.0750 MHz
43	216.1250 MHz
44	216.1750 MHz
45	216.2250 MHz
46	216.2750 MHz
47	216.3250 MHz
48	216.3750 MHz
49	216.4250 MHz
51	216.5250 MHz
52	216.5750 MHz
53	216.6250 MHz
54	216.6750 MHz
55	216.7250 MHz
56	216.7750 MHz
57	216.8250 MHz
58	216.8750 MHz
59	216.9250 MHz
60	216.9750 MHz

GROUP FREQUENCY CHARTS

GROUP1		GROUP2	
CHAN	FREQ	CHAN	FREQ
41	216.025	42	216.075 *
44	216.175	46	216.275
51	216.525	49	216.425
55	216.725	57	216.825
60	216.975	60	216.925 *

* Do not use these channels when using Group 1 and Group 2 channels together within the transmitter proximities for multiple channel operation. (See page 9, Transmitter Proximities.)

BST 75-216 FREQUENCY INFORMATION

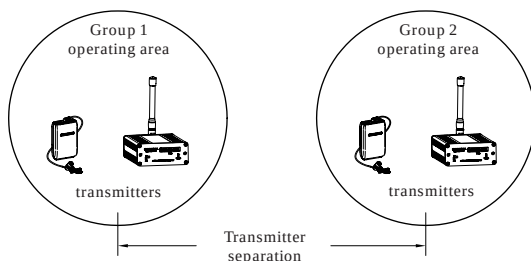
Multiple Channel Operation

When multiple transmitters (more than two) are used in the same proximity, intermodulation interference can occur. This condition is common to all radio receivers to some extent when multiple transmitters are used in the same operating area. The RF signals will “MIX” together generating additional signals. If these product frequencies are too close to a frequency which the receiver can also respond to, you will experience intermodulation interference which may cause undesirable operation.

To avoid this type of interference when multiple transmitters are used in the same proximity, transmitting frequencies must be coordinated by selecting from frequencies in the same group.
(See group frequency chart on page 8.)

Transmitter Proximities For Multiple Channel Operation

Frequency groups being transmitted should be separated by 2X the operating area; and for best performance, the group operating areas should have a 100 ft. minimum separation.



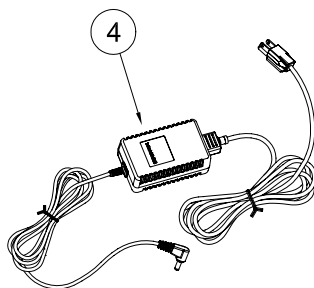
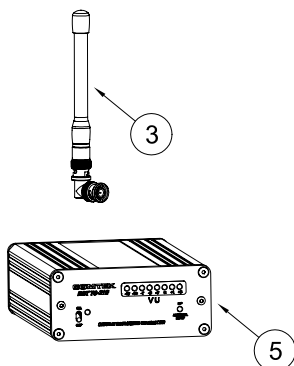
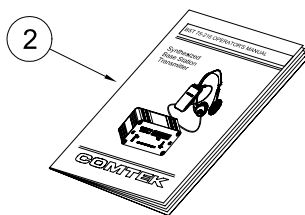
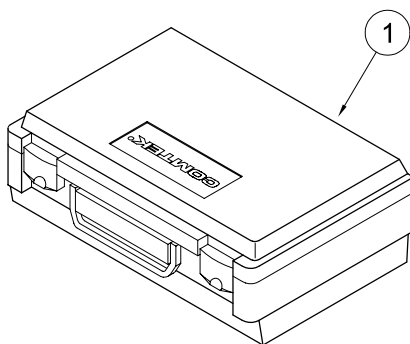
Free Frequency Coordination Software

Frequency coordination and after-sale programming for different compatible frequency groups can be done through COMTEK's Technical Support Services. ***Frequency selection software may be downloaded from COMTEK's website at www.comtek/support.html***

BST 75-216 ACCESSORIES

Included Accessories

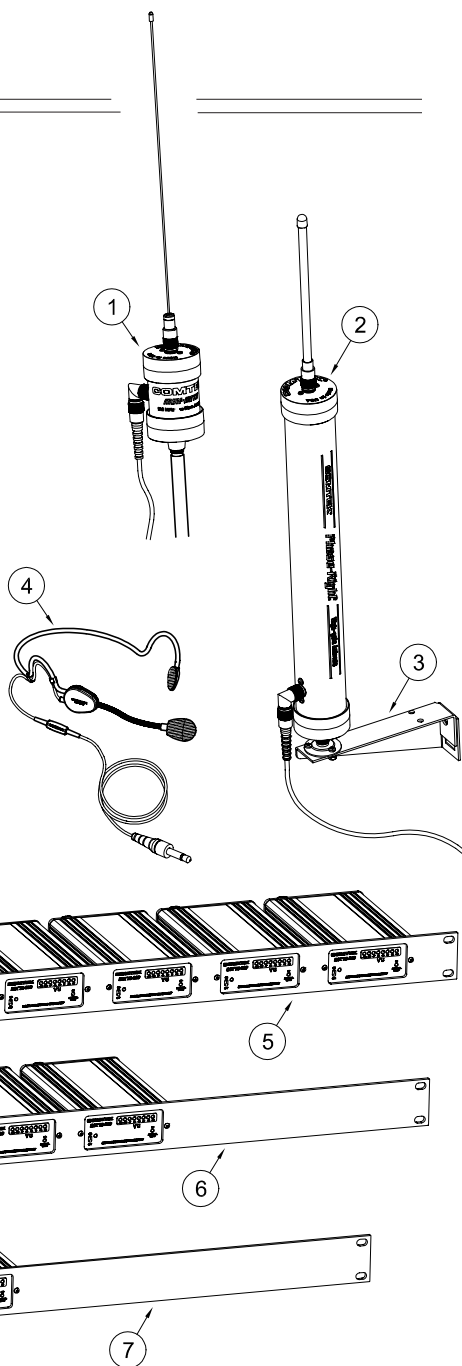
1. C-75 Carrying case
2. BST-75 Operator's manual
3. SLW 75-216 Short loaded whip antenna
4. AP-12VAC Power adaptor (115V AC Input)
5. BST-75 Base station transmitter



BST 75-216 ACCESSORIES

Optional Accessories

1. Mini-Mite 1/2 wave omni antenna
2. Phase-Right coaxial antenna
3. PRA Phase-Right antenna mount
4. HM-100 Behind-the-neck directional boom microphone with 1/4" phone jack plug
5. RMK 75-4 Quad rack-mount face plate
6. RMK 75-2 Double rack-mount face plate
7. RMK 75 Single rack-mount face plate



BST 75-216 SPECIFICATIONS

Audio Inputs:

- Line level balanced input
0 dBm for 80% modulation
(+20 dBm max, XLR-3F)
- Unbalanced input with bias
voltage for electret microphone
(-35 dBv at 5 K ohms, 1/4" mono plug)

Connectors:

- XLR-3F Combo with 1/4"
phone jack
- Barrel type 5.5mm X 2.1mm
power jack DC
- BNC type RF output

Operation Indicators:

- LED bargraph VU meter
- LED antenna load and SWR indicator
- LED DC power indicator

Antenna:

- Short loaded BNC whip antenna
- BNC RF output connector for
optional external antenna

FCC Compliance:

Type Certification and Type
Acceptance under FCC Part 95.

Power Requirements:

12 Volts DC, 200 mA max

Frequency Response:

100 Hz to 10 kHz

Audio Distortion:

Less than 1% at 80% modulation

Audio Gain Control:

Limited to 20 dB

Modulation Limiter:

Peak compressor type with
high linear overload protection
(25 dB). Attack time less than
1 ms, recovery time 10 ms

Audio Processing:

Companded and non-companded
to accommodate a variety of
receivers

RF Output Power:

Maximum power output for
FCC Part 95 (100 mW)

Frequency Stability:

Better than 0.002% digitally
synthesized, crystal controlled

Frequency Modulation:

10 kHz deviation companded
5 kHz deviation non-companded

Operating Frequency:

216.0125 to 216.9750 MHz
(57 channels)

Custom factory programmed
to 10 of 19 available high-fidelity
companded channels or may be
programmed to 10 of 38 standard
non-companded NB channels

Harmonic and Spurious Emissions:

Better than 50 dB below carrier

Dimensions:

3 3/4" X 1 5/8" X 5 1/4" deep

Weight:

17 oz.

NOTE: Specifications subject to
change without notice
or obligation

WARRANTY AND SERVICE

Warranty

COMTEK transmitters and receivers are warranted to be free from defects in workmanship and material under normal stand-alone use and conditions for a period of **two years** from date of original purchase. Items such as headphones and earphones, neckloops, and cords are warranted to be free from defects in workmanship and material for a period of 90 days from the date of original purchase. Batteries are not covered by this warranty. Damage due to abnormal use, extreme conditions, misuse, use of the product as a component of another product, ill treatment and unauthorized modification and repairs are not covered by this warranty. COMTEK is not liable for any consequential or punitive damages arising out of any failure of the equipment to perform as intended. COMTEK shall bear no responsibility or obligation with respect to the manner of use of any equipment sold by it. COMTEK SPECIFICALLY DISCLAIMS AND NEGATES ANY WARRANTY OF MERCHANTABILITY OR FITNESS OF THE PRODUCT FOR A PARTICULAR PURPOSE INCLUDING, WITHOUT LIMITATION, ANY WARRANTY THAT THE USE OF SUCH EQUIPMENT FOR ANY PURPOSE WILL COMPLY WITH APPLICABLE LAWS AND REGULATIONS.

Service Policies

Warranty repairs must be done by COMTEK. Only factory technicians are authorized to perform warranty service on the BST 75-216 transmitter. Before returning the BST 75-216 for service, a Return Authorization Number should be obtained from the service department by calling 1-800-496-3463 or 1-801-466-3463. Return the unit to the factory with the original or comparable packing. COMTEK will pay for insurance and ground return shipping costs in the United States for all warranty service.

COMTEK®

357 West 2700 South • Salt Lake City, Utah 84115 • Phone: (800) 496-3463 • Fax: (801) 484-6906 • www.comtek.com
E-mail: sales@comtek.com

COMTEK®

357 West 2700 South • Salt Lake City, Utah 84115 • Phone: (800) 496-3463 • Fax: (801) 484-6906 • www.comtek.com