

# *Mini 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

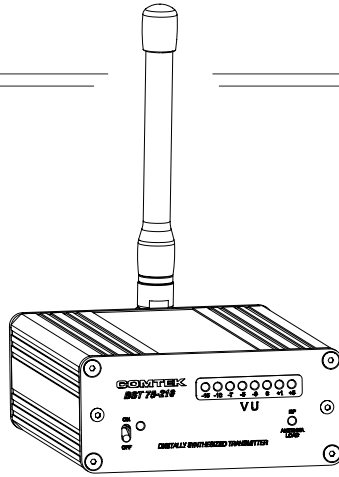
NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment 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

## *Mini Base Station Transmitter*



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 system signal-to-noise ratio of up to 90 dB.

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

# OPERATING INSTRUCTIONS

---

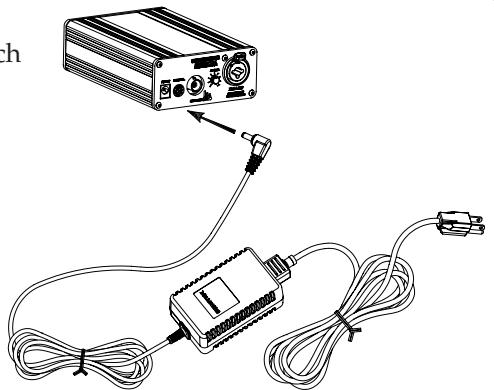
## Equipment Placement

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, 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  $\pm 12$  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-12V1-75). 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.

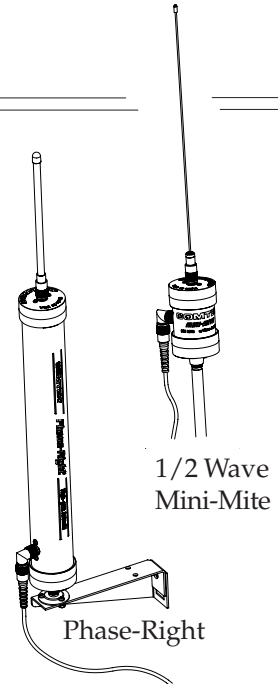


## OPERATING INSTRUCTIONS

---

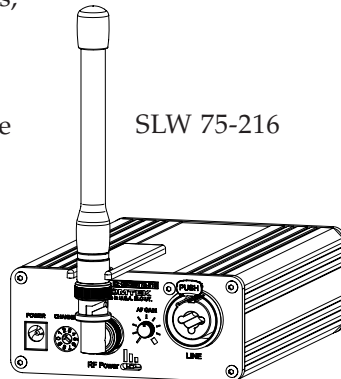
### Remote Antenna

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 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) can be used. The transmitter should be placed on a table or platform as high as possible and 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.



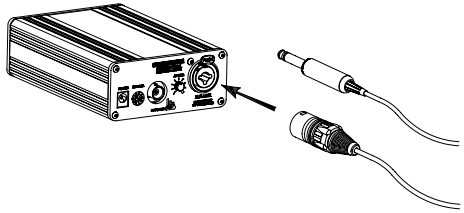
# OPERATING INSTRUCTIONS

---

## 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” mono jack portion of the connector can be used for AUX level audio or line level audio up to +5 dBm. It also can be used to directly phantom-power most two-conductor electret headset microphones.

*Note: For best performance, the 1/4” mono jack should be considered the primary choice for shorter audio line feed.*



## 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

---

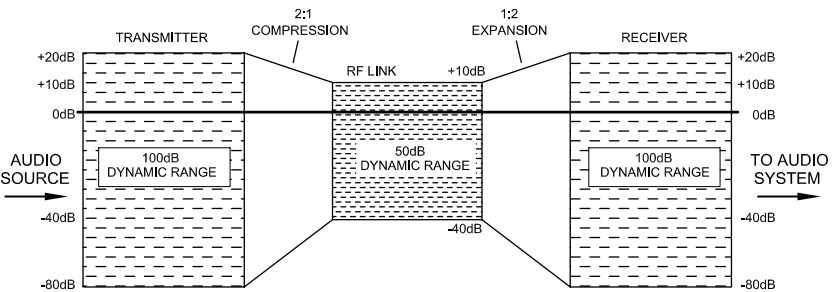
## Audio Processing Circuit

The audio processing system of the BST 75-216 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.

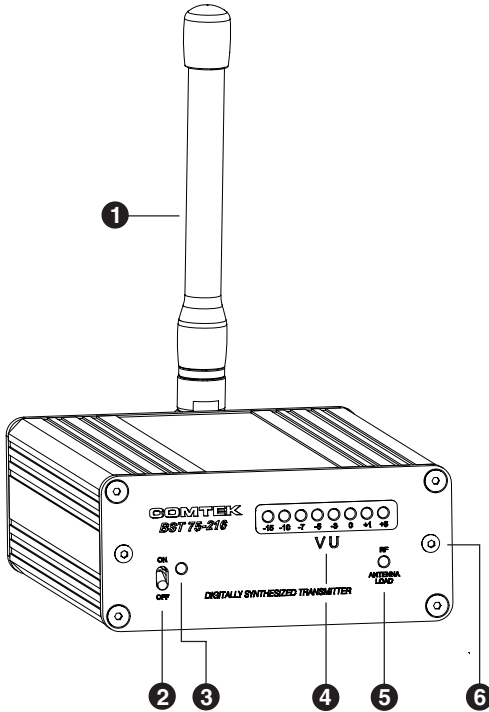
### *Basic Companding Theory*

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

---

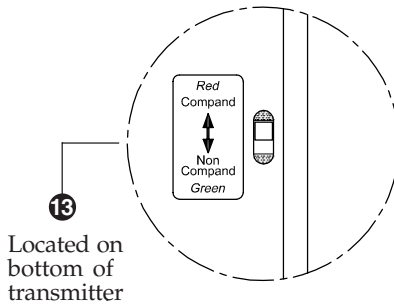


- 1 OPTIONAL ANTENNA:** Used for mobile applications.
- 2 POWER SWITCH:** Turns the transmitter on or off.
- 3 POWER LED INDICATOR:** Illuminates when the power is on.
- 4 VU METER:** Displays the audio level being used for modulation. (See Audio Adjustment Section.)
- 5 ANTENNA INDICATOR:** Flashes when transmitter detects coaxial cable shorts and open conditions, bad antenna load.
- 6 RACK-MOUNTING SCREWS:** Used for mounting BST 75-216 to rack-mounting panels.

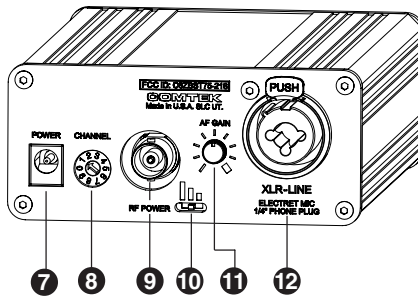


## BST 75-216 REAR PANEL

---



Located on  
bottom of  
transmitter



- 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.
- 13 COMPAND / NON COMPAND SWITCH:** For high fidelity operation, switch must be in compand position when using companded receivers and in non-companded position when using non-companded receivers.

# BST 75-216 FREQUENCY INFORMATION

## SELECTED CHANNELS (STANDARD PROGRAM)

CHANNEL	SWITCH POSITION	FREQUENCY
WIDE BAND COMPANDED CHANNELS		
41	#1	216.0250
42	#2	216.0750
44	#3	216.1750
46	#4	216.2750
49	#5	216.4250
51	#6	216.5250
55	#7	216.7250
57	#8	216.8250
59	#9	216.9250
60	#10	216.9750

## GROUP FREQUENCY CHARTS

CHANNEL	SWITCH POSITION	FREQUENCY
GROUP A		
41	#1	216.0250
44	#3	216.1750
55	#7	216.7250
60	#10	216.9750
GROUP B		
42	#2	216.0375
46	#4	216.2750
51	#6	216.5250
59	#9	216.9250
GROUP C		
44	#3	216.1750
49	#5	216.4250
57	#8	216.8250
60	#10	216.9750

## AVAILABLE 216 MHz "FLASH MEMORY" PROGRAMMABLE CHANNELS

Non-Companded Channels

CHANNEL	FREQUENCY
01	216.0125 MHz
02	216.0375 MHz
03	216.0625 MHz
04	216.0875 MHz
05	216.1125 MHz
06	216.1375 MHz
07	216.1625 MHz
08	216.1875 MHz
09	216.2125 MHz
10	216.2375 MHz
11	216.2625 MHz
12	216.2875 MHz
13	216.3125 MHz
14	216.3375 MHz
15	216.3625 MHz
16	216.3875 MHz
17	216.4125 MHz
18	216.4375 MHz
21	216.5125 MHz
22	216.5375 MHz
23	216.5625 MHz
24	216.5875 MHz
25	216.6125 MHz
26	216.6375 MHz
27	216.6625 MHz
28	216.6875 MHz
29	216.7125 MHz
30	216.7375 MHz
31	216.7625 MHz
32	216.7875 MHz
33	216.8125 MHz
34	216.8375 MHz
35	216.8625 MHz
36	216.8875 MHz
37	216.9125 MHz
38	216.9375 MHz
39	216.9625 MHz
40	216.9875 MHz

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

**Note:** For best audio fidelity and overall performance, the companded channels 41-60 must be used. COMTEK receivers will automatically change to companded operation when set to channels 41-60.

COMTEK non-companded receivers, as well as "all-in-ear" receivers having 5 kHz FM deviation, may be used with COMTEK channels 41-60

if the compand switch located on bottom of transmitter is switched to the non-companded position. Non-companded channels 01-40 can be custom-installed for use with older "all-in-ear" receivers that are crystal-controlled on standard group frequency channels.

## BST 75-216 FREQUENCY INFORMATION

---

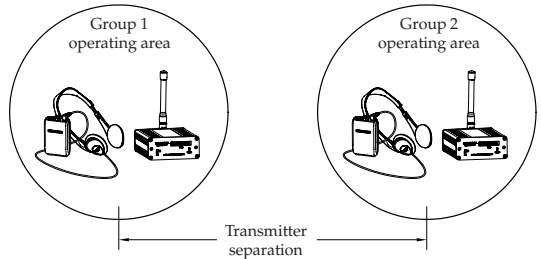
### Multiple Channel Operation

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.



### Channel Programming

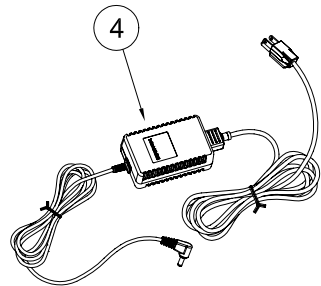
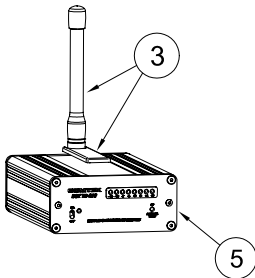
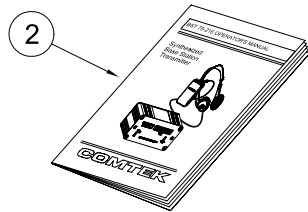
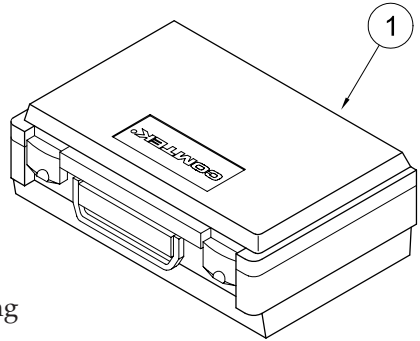
Custom “Flash Memory” programming can be done before or after sale to accommodate special frequency groups. Frequency selection software may be downloaded from COMTEK’s website at [www.comtek/support.html](http://www.comtek/support.html)

# BST 75-216 ACCESSORIES

---

## Included Accessories

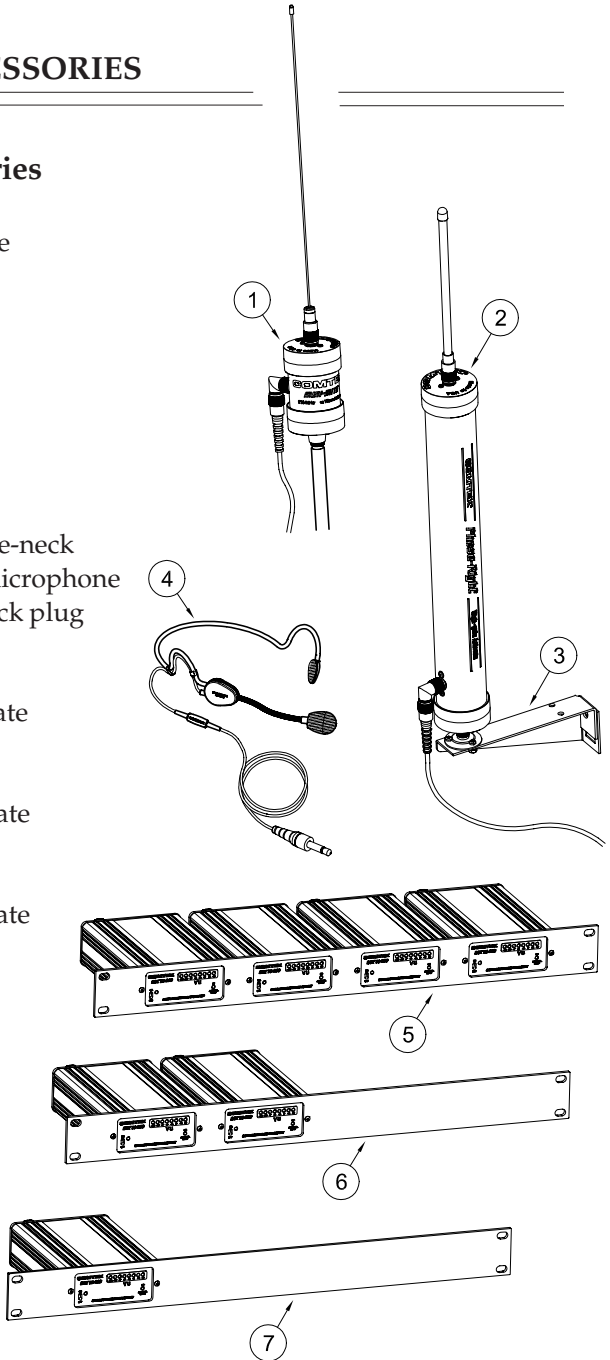
1. C-75 Carrying case
2. BST 75-216 Operator's manual
3. SLW 75-216 Short loaded whip antenna and bracket
4. AP-12V1-75 Universal switching power supply (12V DC output)
5. BST 75-216 Base station transmitter



# 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 (+5 dBm Max) or  
two wire electret microphone with  
bias voltage for electret microphone  
(-35 dBv at 5 K ohms) with 1/4"  
phone jack.

## 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, 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 Policy

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®

---

---

**COMTEK<sup>®</sup>**

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