

Synthesized Base Station Transmitter



The BST-25 is a low power auxiliary base station transmitter designed to operate under Part 74 of the FCC Regulations in the unused TV channel 5 and TV channel 6 spectrum (76.2 to 87.8 MHz). This transmitter, along with a personal receiver, is used in a TV production studio for IFB and talent cueing. Also, it may be used on remote location from an ENG truck for the same application.

In motion picture production the BST-25 is used as a low power auxiliary base station transmitter located on site with the sound recording equipment. Directors, boom-operators, and others may receive, with a personal receiver and headphone, the high fidelity transmission from the BST-25 to monitor sound track audio being recorded. This transmission or "Confidence Channel" may also be used as an IFB for talent or crew members.

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First Quality in Wireless Sound

OPERATING INSTRUCTIONS

Equipment Placement

The base station should be placed on top of an equipment rack, control console table, or special shelf where the pull-out whip antenna will be free of any metallic objects when fully extended.

If the base station is to be rack mounted, it should be mounted away from equipment that uses large power transformers to reduce 60 Hz hum possibilities.

Special Note:

When using the BST-25 in close proximity to other audio equipment, insure that the audio equipment is not susceptible to RF interference, i.e. hum, oscillations, etc. This can be accomplished by temporarily installing the BST-25 as per above and then, while the BST-25 is operating, checking all audio outputs for uncharacteristic noise. If a problem is found, move the BST-25 or the remote antenna as far as possible from the affected equipment. Should you continue to have problems, contact Comtek's application engineering department for assistance.

Power Requirements

The base station is designed to be powered by 12 volts DC. A power adaptor is furnished for use with standard 110V AC. The on/off switch on the front panel of the base station turns on the transmitter.

Audio Input Connections

The base station transmitter has facilities for audio input from a mic or line level source. The mic/line level audio input is a true balanced input and requires a standard XLR-3 male connector. Unbalanced input is accomplished by shorting pin 2 to pin-1 (audio

ground), leaving pin-3 as the audio source. Please note that it is recommended that all audio input cables be kept as short as possible.

Set-up

a. Select an appropriate location for the BST-25, i.e. a sound cabinet or closet, where there is easy access to the audio equipment and where the antenna can be extended to the correct length.

b. Set the "MIC/LINE" switch, located on the back of the BST-25 transmitter, to the appropriate position: "MIC" position for low impedance microphones or "LINE" position for line level feed from a mixer.

c. Connect the audio source or microphone to the BST-25 using the appropriate input. Be sure to set the audio input level adjust on the BST-25 to its full counter-clockwise position.

d. Plug the adaptor into a standard AC outlet, and plug the power connector into the DC input jack of the transmitter. Turn the display switch on the front of the transmitter "ON" to allow monitoring of the transmitter frequency. Turn the main power switch on the front of the BST-25 to the "ON" position. The front display should now be illuminated.

e. Mount the telescoping whip antenna in the hole on top of the BST-25, rotating it clockwise until it is firmly seated. Extend the antenna completely. During normal operation the antenna indicator should not flash. Turn on the transmitter and verify that the antenna indicator is not flashing. If the antenna indicator is flashing, shorten the telescoping whip antenna by 2 inches and again check the indicator. Continue this procedure until the indicator remains off. If you experience trouble, please contact Comtek's application engineering department.

OPERATING INSTRUCTIONS (continued)

ment for assistance. If you are using an external type antenna, *do not* install the telescoping antenna. Instead, connect the coaxial feed line for the external antenna to the external antenna port on the back of the BST-25.

Note: For optimum performance when using the telescoping whip antenna, the transmitter should be placed on a large metallic surface. Adjustment of antenna length for a "No Flash" condition on antenna indicator will insure maximum radiation.

Adjustments

In order to insure the highest possible transmission fidelity, the transmitter must be modulating at least 50% with normal speech (-3 dB on the VU meter). This adjustment is made in the following manner:

- a. Insure that the audio source has been optimized for best signal-to-noise ratio.
- b. The "MIC/LINE" switch located at the back of the transmitter should be switched to the appropriate setting: "MIC" for mic level or weak line level input; "LINE" level for line level input.
- c. The "LEVEL" control on the back of the base station adapter should be set fully counterclockwise and 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 meter mid-scale. Only very loud speech or music should deflect the VU meter full-scale.

Frequency Selection

The BST-25 base station transmitter has the ability to operate on one of 119 preset channels between 76.200 MHz and 87.800 MHz (TV channel 5 and TV channel

6). Channels are designated by both frequency and channel number. Channels which operate in the TV 5 spectrum are prefixed with a 5 (5-50 is 81.100 MHz), channels operating in the TV 6 spectrum are prefixed with a 6 (6-50 is 87.100 MHz). This channel rastering makes it easy to determine which TV band you are operating on. If you are using this transmitter in a area which does not have a TV station operating on channel 5 you can use one of the channels in the TV 5 range. Conversely, if the area does not have a station on TV 6, you can operate on one of the TV 6 channels. *Note:* It is unlawful to operate this transmitter in a band that is already occupied by a TV station. After you have determined the channel on which you are going to operate, use the "TUNING" button to select the channel that you have chosen. *See charts on pages 6 and 7 for preset selectable frequencies.*

Multiple Channel Operation

IMPORTANT

Simultaneous operation with more than two channels requires coordination of the frequencies that are used to avoid interference. This interference would result in poor or unusable performance. When multiple transmitters are broadcasting, the RF signals will "mix" together generating additional signals on other frequencies in the receiver's mixer. This condition, common to all RF receivers, is called intermodulation or intermod.

If a mixed frequency product is generated close to a frequency which you are using, the system on that frequency will experience interference. Interference produces whistle and whine type sounds and/or reductions of range. **To avoid this type of interference, you should select frequencies from one of the standard groups (see frequency group charts on page 8), or you can use COMTEK's frequency selection guide software to determine appropriate frequencies.** (Contact COMTEK to obtain a free copy of the frequency selection software.)

Test Tone

The BST-25 base station transmitter has an internal

OPERATING INSTRUCTIONS (continued)

400 Hz source which is transmitted when the "TONE" switch is enabled. This source is intended to be used to make technical adjustments and for verification of the system. When using this transmitter with "FM Tunable Receivers" use this tone to assist in the proper tuning of the receivers. Tune the receiver until it receives the tone and adjust the tuning until the tone is as pure and distortion free as possible. Other possible uses include; testing receivers, comparing receivers from different manufacturers, range testing the system, or other tests which would require a modulated carrier. Under normal operation the "TONE" switch should be disabled.

Speech EQ

On the back of the transmitter there is a switch labeled "EQ". With this function enabled (switch up), the audio dynamics and frequency response are processed to improve intelligibility of speech. If the primary audio source is going to be speech, you should enable this processing. If the main audio source is going to include music or other program information, you should disable it. You may want to experiment to determine which position sounds most pleasing with the program source you intend to use.

Display On and Off

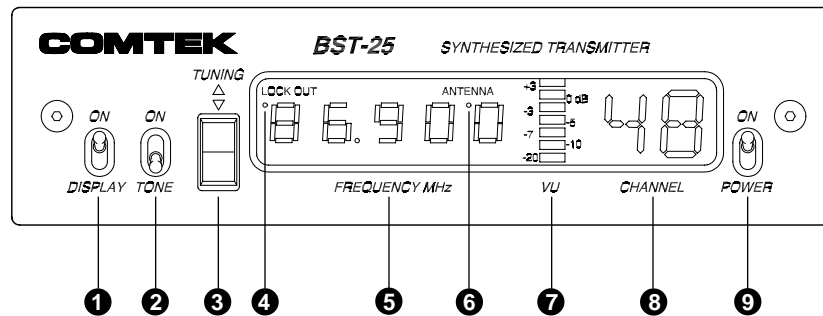
The digital display can be turned on or off using the "DISPLAY" switch. Disabling the display reduces the current consumption of the transmitter for battery operation. In environments where the display could be distracting, disabling the display may also be appropriate. When the display is disabled, the tuning controls are also disabled, insuring the transmitter frequency is not changed inadvertently. With the display disabled one segment is turned on as a power indicator. Additionally the "LOCK OUT" indicator is illuminated indicating the tuning is disabled. The VU meter and the "ANTENNA" indicator are unaffected.

NOTE: Disabling the digital display will further reduce background noise during *non-companded* operation of the BST-25.

Lock Out

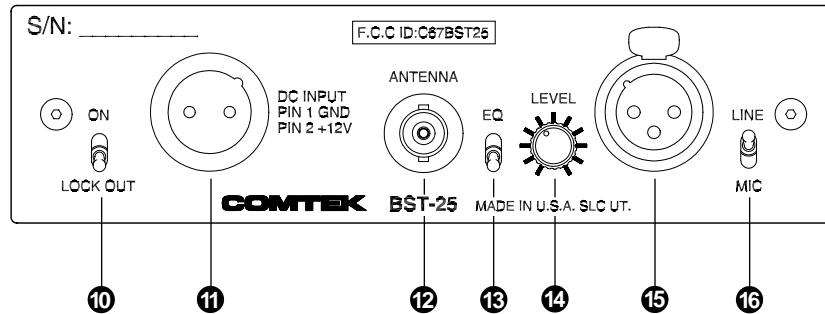
After the transmitting frequency has been determined the transmitter tuning function can be disabled with the "LOCK OUT" switch on the back of the transmitter. This insures that the transmitter operating frequency is not inadvertently changed. The "LOCK OUT" indicator (above the first numeric digit on the display) will illuminate indicating that the tuning has been disabled. When rack mounting the transmitter this switch must be accessed from behind the rack, this provides added protection from intentional tampering.

BST-25 FRONT PANEL



- ❶ **DISPLAY SWITCH:** This switch disables the digital display to conserve current when used with a battery.
- ❷ **TONE SWITCH:** Enables/disables the internal 400 Hz test tone.
- ❸ **TUNING SWITCH:** Selects the frequency on which the transmitter will operate.
- ❹ **LOCK OUT INDICATOR:** Illuminates when the “TUNING” switch is disabled by setting the “LOCK OUT” switch (rear panel) to “ON”.
- ❺ **DIGITAL FREQUENCY DISPLAY:** Displays the frequency on which the transmitter is operating.
- ❻ **ANTENNA INDICATOR:** Flashes when the transmitter senses a deficient antenna condition.
- ❼ **VU METER:** Displays the level of audio being transmitted. Used to adjust the “LEVEL” (rear panel) control.
- ❽ **DIGITAL CHANNEL DISPLAY:** Displays the channel on which the transmitter is operating.
- ❾ **POWER SWITCH:** Turns the transmitter on or off.

BST-25 REAR PANEL



- ⑩ **LOCK OUT SWITCH:** Disables the (front panel) "TUNING" switch, locking the transmitter on one frequency.
- ⑪ **DC INPUT JACK:** Requires 12 VDC at 500 mA (Pin-1 ground, pin-2 +12 volts).
- ⑫ **EXTERNAL ANTENNA JACK:** BNC connector provides a standard 50 ohm RF output for use with an external antenna.
- ⑬ **SPEECH ENHANCEMENT SWITCH:** Enables and disables speech enhance feature. Enable this function (switch up) for speech and disable it (switch down) for music.
- ⑭ **LEVEL CONTROL:** This control should be adjusted to so that normal audio deflects the VU Meter to midscale.
- ⑮ **BALANCED AUDIO INPUT:** Accepts audio from a PA system or dynamic microphone (Pin-1: ground).
- ⑯ **MIC/LINE SWITCH:** Selects the desired audio input sensitivity.

BST-25
TV CHANNEL 5
FREQUENCY CHART

CHANNEL	FREQUENCY
5-1	76.200 MHz
5-2	76.300 MHz
5-3	76.400 MHz
5-4	76.500 MHz
5-5	76.600 MHz
5-6	76.700 MHz
5-7	76.800 MHz
5-8	76.900 MHz
5-9	77.000 MHz
5-10	77.100 MHz
5-11	77.200 MHz
5-12	77.300 MHz
5-13	77.400 MHz
5-14	77.500 MHz
5-15	77.600 MHz
5-16	77.700 MHz
5-17	77.800 MHz
5-18	77.900 MHz
5-19	78.000 MHz
5-20	78.100 MHz
5-21	78.200 MHz
5-22	78.300 MHz
5-23	78.400 MHz
5-24	78.500 MHz
5-25	78.600 MHz
5-26	78.700 MHz
5-27	78.800 MHz
5-28	78.900 MHz
5-29	79.000 MHz
5-30	79.100 MHz

CHANNEL	FREQUENCY
5-31	79.200 MHz
5-32	79.300 MHz
5-33	79.400 MHz
5-34	79.500 MHz
5-35	79.600 MHz
5-36	79.700 MHz
5-37	79.800 MHz
5-38	79.900 MHz
5-39	80.000 MHz
5-40	80.100 MHz
5-41	80.200 MHz
5-42	80.300 MHz
5-43	80.400 MHz
5-44	80.500 MHz
5-45	80.600 MHz
5-46	80.700 MHz
5-47	80.800 MHz
5-48	80.900 MHz
5-49	81.000 MHz
5-50	81.100 MHz
5-51	81.200 MHz
5-52	81.300 MHz
5-53	81.400 MHz
5-54	81.500 MHz
5-55	81.600 MHz
5-56	81.700 MHz
5-57	81.800 MHz
5-58	81.900 MHz
5-59	82.000 MHz
TV 5 Audio	81.750 MHz

BST-25
TV CHANNEL 6
FREQUENCY CHART

CHANNEL	FREQUENCY
6-0	82.100 MHz
6-1	82.200 MHz
6-2	82.300 MHz
6-3	82.400 MHz
6-4	82.500 MHz
6-5	82.600 MHz
6-6	82.700 MHz
6-7	82.800 MHz
6-8	82.900 MHz
6-9	83.000 MHz
6-10	83.100 MHz
6-11	83.200 MHz
6-12	83.300 MHz
6-13	83.400 MHz
6-14	83.500 MHz
6-15	83.600 MHz
6-16	83.700 MHz
6-17	83.800 MHz
6-18	83.900 MHz
6-19	84.000 MHz
6-20	84.100 MHz
6-21	84.200 MHz
6-22	84.300 MHz
6-23	84.400 MHz
6-24	84.500 MHz
6-25	84.600 MHz
6-26	84.700 MHz
6-27	84.800 MHz
6-28	84.900 MHz
6-29	85.000 MHz

CHANNEL	FREQUENCY
6-30	85.100 MHz
6-31	85.200 MHz
6-32	85.300 MHz
6-33	85.400 MHz
6-34	85.500 MHz
6-35	85.600 MHz
6-36	85.700 MHz
6-37	85.800 MHz
6-38	85.900 MHz
6-39	86.000 MHz
6-40	86.100 MHz
6-41	86.200 MHz
6-42	86.300 MHz
6-43	86.400 MHz
6-44	86.500 MHz
6-45	86.600 MHz
6-46	86.700 MHz
6-47	86.800 MHz
6-48	86.900 MHz
6-49	87.000 MHz
6-50	87.100 MHz
6-51	87.200 MHz
6-52	87.300 MHz
6-53	87.400 MHz
WIDEBAND CHANNELS (for use with FM tunable receivers)	
6-54	87.500 MHz
6-55	87.600 MHz
6-56	87.700 MHz
6-57	87.800 MHz
TV 6 Audio	87.750 MHz

BST-25
TV CHANNEL 5
FREQUENCY GROUPS

GROUP ONE

CHANNEL	FREQUENCY
5-3	74.400 MHz
5-6	76.700 MHz
5-10	77.100 MHz
5-15	77.600 MHz
5-21	78.200 MHz
5-34	79.500 MHz
5-42	80.300 MHz
5-56	81.700 MHz

GROUP TWO

CHANNEL	FREQUENCY
5-5	76.600 MHz
5-7	76.800 MHz
5-13	77.400 MHz
5-33	79.400 MHz
5-38	79.900 MHz
5-47	80.800 MHz
5-54	81.500 MHz
5-57	81.800 MHz

GROUP THREE

CHANNEL	FREQUENCY
5-2	76.300 MHz
5-8	76.900 MHz
5-11	77.200 MHz
5-16	77.700 MHz
5-18	77.900 MHz
5-29	79.000 MHz
5-41	80.200 MHz
5-58	81.900 MHz

BST-25
TV CHANNEL 6
FREQUENCY GROUPS

GROUP ONE

CHANNEL	FREQUENCY
6-4	82.500 MHz
6-7	82.800 MHz
6-9	83.000 MHz
6-13	83.400 MHz
6-20	84.100 MHz
6-30	85.100 MHz
6-38	85.900 MHz
6-50	87.100 MHz

GROUP TWO

CHANNEL	FREQUENCY
6-2	82.300 MHz
6-5	82.600 MHz
6-28	84.900 MHz
6-34	85.500 MHz
6-42	86.300 MHz
6-44	86.500 MHz
6-49	87.000 MHz
6-53	87.400 MHz

GROUP THREE

CHANNEL	FREQUENCY
6-1	82.200 MHz
6-3	82.400 MHz
6-6	82.700 MHz
6-10	83.100 MHz
6-16	83.700 MHz
6-24	84.500 MHz
6-36	85.700 MHz
6-52	87.300 MHz

BST-25 SPECIFICATIONS

Audio Inputs:

- Mic XLR, 600 W Balanced -40 dBV (nominal)
- Line XLR, >10 kW Balanced 0 dBV (nominal)

Connectors:

- XLR-3 Female audio input connector for mic and line input
- XLR-2 Male power input 12 volts
BNC type RF output connector

Operation Indicators:

- LED Bargraph VU Meter displays audio input (modulation)
- Two Digit Alpha Numeric Display shows operating channel
- Five Digit Numeric Display shows operating frequency
- Antenna Indicator displays deficient antenna condition
- Lock Out Indicator shows tuning has been disabled

Antenna:

- Telescopic antenna mounts directly into top of transmitter
- BNC RF output connector for optional external antenna

FCC Compliance:

Type accepted under Part 74

Power Requirements:

12 Volts DC, 300 mA max

Frequency Response:

80 Hz to 15 kHz

Audio Distortion:

Less than 0.5% at 80% modulation

Modulation Limiter:

Soft compressor type with high (25 dB) linear overload protection, attack time less than 1 ms, recovery time 10 ms

Audio Gain Control:

Greater than 40 dB

Test Tone Generator:

400 Hz 0.05% distortion

Frequency Modulation:

- 10 kHz deviation for narrow band channels,
- 75 kHz deviation for wide band channels

RF Output Power:

Set for 50 mW for FCC Part 74

Frequency Stability:

Better than 0.002%. digitally synthesized, crystal controlled

Operating Frequency:

76.2 to 87.8 MHz

Harmonic and Spurious Emissions:

Better than 55 dB below carrier

Dimensions:

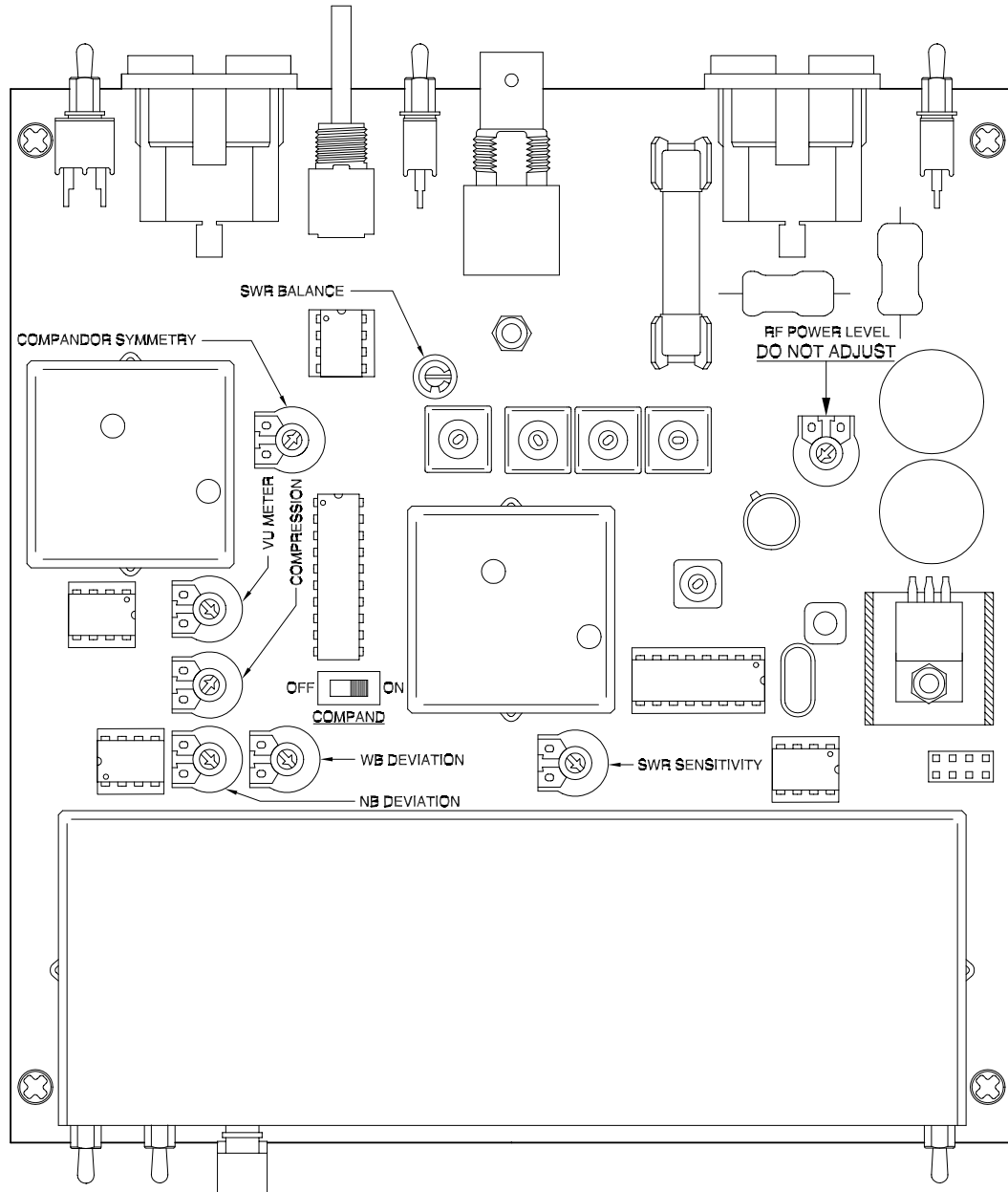
6 1/2" wide x 1 3/4" high x 5 5/8" deep

Weight:

44 oz.

NOTE: Specifications subject to change without notice

BST-25 INTERNAL ADJUSTMENTS



NOTE: The "COMPAND" switch must be left in the preset "ON" position for operation with PR-25 receivers *and* Walkman type receivers. The BST-25 is automatically adjusted for use with Walkman receivers when frequency is set for 87.5 to 87.8 MHz.

WARRANTY

COMTEK transmitters and receivers carry a one-year warranty for parts and labor for repairs needed due to defects in material or workmanship. Items such as batteries, cords, earphones, neckloops and transducer coils are not covered by the warranty. Damage due to misuse, ill treatment and unauthorized modifications and repairs are not covered by this warranty. COMTEK is not liable for consequential 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 FOR A PARTICULAR PURPOSE OF SUCH EQUIPMENT INCLUDING, WITHOUT LIMITATION, ANY WARRANTY THAT THE USE OF SUCH EQUIPMENT FOR ANY PURPOSE WILL COMPLY WITH APPLICABLE LAWS AND REGULATIONS.

When returning units for service, use adequate packaging to prevent shipping damage. If in doubt as to which is defective, return both transmitter and receiver along with a note indicating trouble (cuts out, dead, distorted, etc.). Most units returned for service have dead batteries. PLEASE DOUBLE-CHECK BATTERIES BEFORE SENDING UNITS TO FACTORY FOR SERVICE.

In the event that a frequency change is needed, please contact COMTEK's service department. There may be a charge for this service. Also, units returned for performance verification are not covered by this warranty.

COMTEK[®]

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