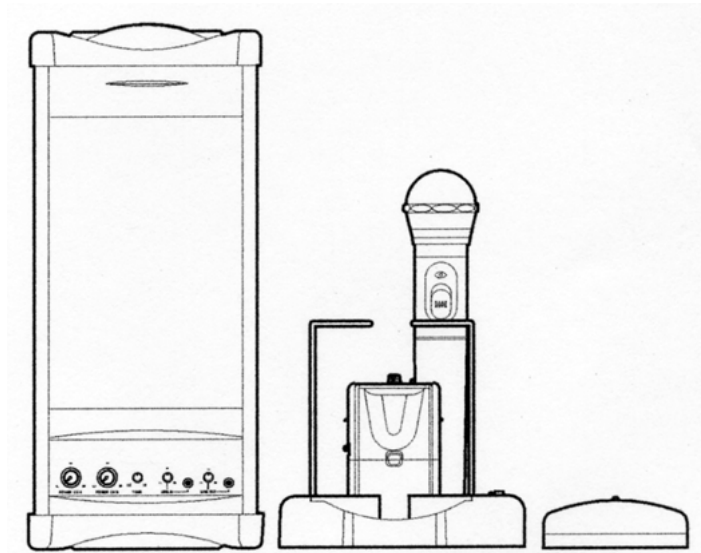


# QUANTUM II

## Infrared Sound Field System User Guide



TeachLogic 

## **FORWARD**

Congratulations on the purchase of your new **QUANTUM II** sound field system produced by TeachLogic. Be assured that the Quantum has met all manufacturers' specifications and it will fulfill all your expectations. TeachLogic incorporates state of the art technology, employs the most advanced manufacturing methodology and uses only premium quality components to assure you many years of reliable performance. Thank you for your confidence in selecting TeachLogic products and we intend to support our products to your complete satisfaction.

We hope you will take some time to review this manual to familiarize yourself with the product features and help you understand its performance. We are confident that the manual will help you gain the maximum use and benefit of the Quantum II sound field system.

The manual provides a basic explanation on Infrared transmission and its benefits. Then there are some guidelines to help with unit location and installation instruction.

The manual continues with product description, followed by operational and use instructions. The manual concludes with maintenance procedures and trouble shooting analysis.

If you should encounter any difficulty or need further assistance, contact TeachLogic customer service department.

Tel: 800-588-0018

Email: [customerservice@teachlogic.com](mailto:customerservice@teachlogic.com)

Brian Van Waay  
President

## **A Brief Explanation of Infrared**

Infrared is a light ray that is below the visible light spectrum (you can't see it), just like the sound spectrum extends beyond your hearing ability. The same as; infrared transmission is used in the remote control of your TV set. A beam of infrared light is emitted by a Light Emitting Diode (LED) from the remote control and it is detected by a receiving diode in your TV set. When you push a certain command on your control, the internal electronics causes the infrared light to flicker in a programmed sequential pattern (called modulating the light beam). That pattern is detected by the receiving diode and is electronically decoded to send a command to the TV set to perform the command you have programmed into your TV set.

So how does this apply to the infrared communication system which you are about to start using? Well, the body-pack transmitter or handheld microphone has several Light Emitting Diodes (LED) that emit infrared light beams to a sensor located on the top of your Quantum II (that dark shining trim atop the Quantum II). Now, when you talk into the microphone, the internal electronics in the handheld or body-pack transmitter causes the light beam to flicker at the same sequence as your breath varies from your voice when you speak into the microphone. That sequential signal is detected by the sensor and a coded electronic signal is sent to the receiver in the Quantum II. The receiver decodes the electronic signal and converts it into electronic signal. The signal is routed to the amplifier. The amplifier strengthens (amplifies) the electronic signal and makes it strong enough to cause the speaker to move back and forth at the same variation as your breath varied into the microphone. Now the replicate of your voice is reproduced by the speaker, creating an audible sound level so all can hear with ease.

Due to the number and strength of the diodes in the transmitter and sensitivity of the Quantum II sensor, the IR signal will bounce off of walls, ceiling and floor and be received by the sensor without interruption. However, infrared will not penetrate solid surfaces, therefore; transmission will not go outside of the room.

### **Some words of caution and limitations of infrared:**

Be sure that the path of transmission between the emitter and sensor is not obstructed.

*The body-pack transmitter will not function if placed in pocket*

Infrared will not work outdoors in sunlight

Dark soft surfaces do not reflect infrared very well and can cause some limitation to distance of transmission (drop outs).

Rooms larger than 2500 Sq. Ft. or have high ceiling can begin to exceed the ultimate performance of the Quantum II.

If you should experience drop outs in certain areas, you could install an additional sensor (**IWS-50**) to extend the system performance.

## ASSEMBLY and INSTALLATION

### Installing the Quantum II

- A. The Quantum II can be operated as a free stance system on a speaker stand. **To use in this mode of operation:**
- Locate the system off to one side in the front of the room. Point the front of the unit toward the center of the listening area. Find an AC outlet and plug the system in.
  - Side wall location is also acceptable. Locate unit on either side about  $\frac{1}{4}$  from front of room. Point the front diagonally across the listening area. Locate an AC outlet and plug it in.

**Optional:** Folding Tripod Stand SS-300

- B. Mounting the Quantum II on the wall, please review the following guidelines.
1. Selecting the most appropriate location for the Quantum can be the most challenging. Every room is a little different, but in general the most functional location is installing it on the front wall off to one side or the other approximately  $\frac{1}{3}$  from either side wall.

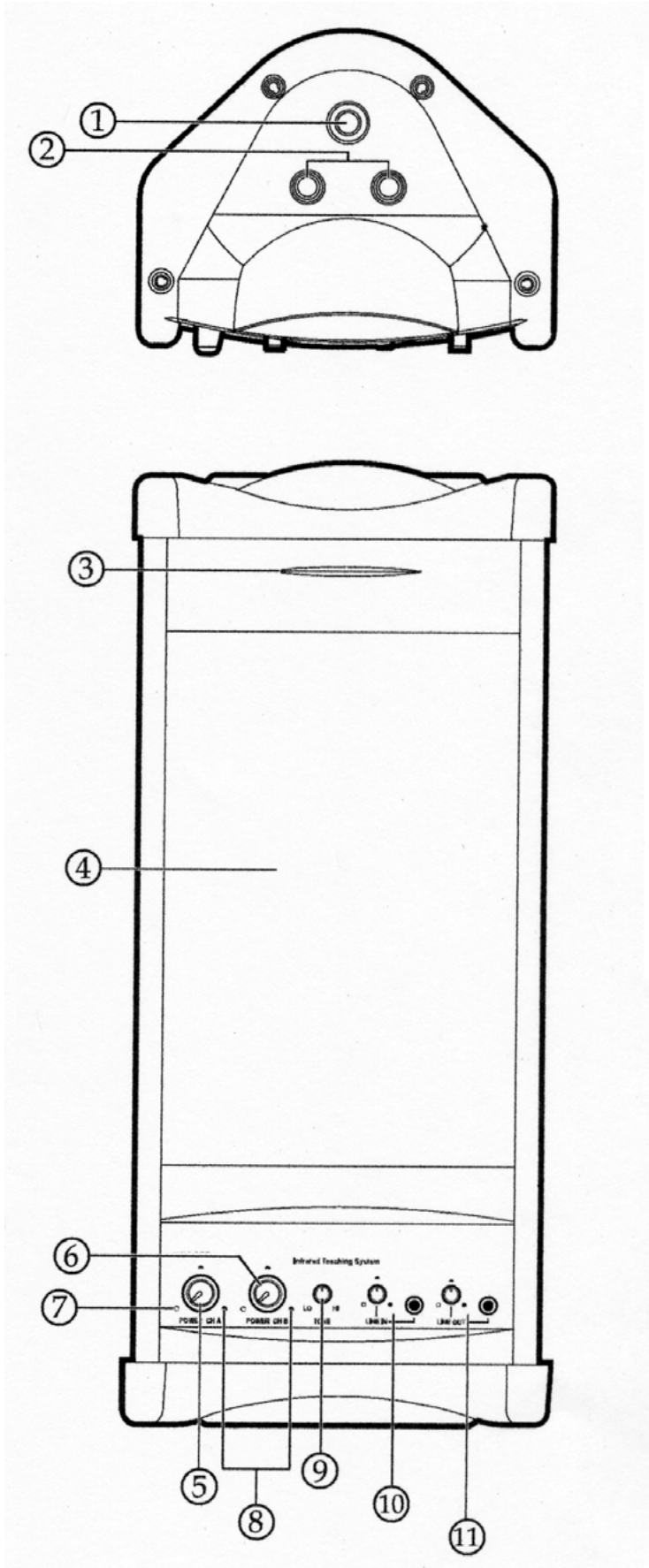
An alternate choice would be on either side wall, located approximately  $\frac{1}{4}$  -  $\frac{1}{3}$  the distance from the front of the room.

*NOTE: Be conscious of an AC outlet requirement for power.*

2. Once you've decided where to mount the Quantum II, hold the 'U' bracket straight up and down against the wall with bottom of the bracket approximately 5 -6 feet above the floor. Using a level to assure true vertical orientation, mark the two mounting holes.  
If installing onto a drywall, drill two  $\frac{1}{4}$ " holes and insert a molley bolt provided. With a #2 Phillips head screwdriver, mount the wall bracket.  
If installing into a wood or like material, use two sheet metal screws with washers to mount the bracket to the wall.  
For concrete wall, you'll need to acquire and install a plastic insert for a # 8 sheet metal screw and install accordingly.
3. With the bracket mounted, route the plastic wire tie through the two tab holes. Hold the power supply onto the two raised tabs with the AC plug end toward the floor. With the power supply resting on the pegs, tighten the wire tie thus securing the power supply to the bracket.
4. Insert the DC plug into the power input jack and place the Quantum II into the bracket, secure each end with the  $\frac{1}{2}$ " bolt and washer provided.
5. Orient the Quantum with center pointing diagonally across the listening area.
6. Plug the power cord into an AC outlet

## **THE QUANTUM II CONTROLS**

- Channel A turns power “on/off” (red LED indicator) and adjusts the volume of the IR microphone assigned to it. Normally the body-pack transmitter is assigned to channel A. When the transmitter is turned “on” a green LED will light, indicating that an IR signal is being received from the transmitter.
- Channel B also turns power “on/off” and adjusts the volume of the microphone assigned to it. Normally the handheld microphone is assigned to channel B. When the transmitter is turned “on” an amber LED will light indicating an IR signal is being received from the transmitter.
- Tone control adjusts the tonal quality of the sound. You will feel a center indent, turn CCW will boost the bass and turning CW will extenuate the high frequencies.
- Line input jack (3.5mm) facilitates connecting the output of a DVD, Video Projector, ipod, computer and amplifying its signal through the Quantum. The volume can be controlled with the adjacent knob.
- Line output jack (3.5 mm) provides a composite line level output; it can be used to connect to a personal FM assistive listening system or as an output to a recording device. The small knob adjusts the output level to match input of the device connected.
- External speaker output connector is located adjacent to the power plug. An unpowered external speaker can be connected to the Quantum for additional coverage. A companion unpowered Quantum would be the speaker of choice.



### Quantum Controls

- 1. Threaded insert for wall mount bracket.
- 2. External sensor inputs.
- 3. Internal sensors.
- 4. Internal speaker.
- 5. Power switch & Channel A Control.
- 6. Power switch & Channel B Control.
- 7. Power indicator LED.
- 8. Infrared wireless transmission LED.
- 9. Tone control.
- 10. Line input volume control.
- 11. Line output gain control.



### **Sapphire (IRT-55)**

The Sapphire's vocal clarity is unsurpassed. Its high level output is achieved by the unidirectional (Cardioid) microphone and a unique free air suspension system. With a built-in breath filter, the Sapphire can function as a pass around hand mic. The strategic alignment of the emitting diodes assures reliable connectivity throughout the room without static or drop out. With a tap on the power button, the microphone is muted for private conversation—tap again to restore to normal operation. The auxiliary input allows wireless playback of your iPod™ through the Sapphire. A three-position slide switch provides selection of low, med, or high microphone sensitivity.

### **Crescent (IRT-30)**

The Crescent is a lightweight microphone/transmitter designed to be worn under the chin suspended by an adjustable lanyard. The Crescent shape was designed for efficient performance and user comfort. The dual internal microphones render optimum voice pick up and quality reproduction. The Crescent provides an auxiliary input (3.5mm) to accommodate the insertion of an iPod™ or similar device for supplementary program material. A soft touch mute button cuts the microphone “off” for private conversation (the power LED will flash in the mute position). A volume control allows adjustment of the microphone volume. The external battery contacts accommodate the convenient use of a drop-in charger.



**Pendant Transmitter (IRT-89)** with built-in microphone. The pendant transmitter is the smallest transmitter and is usually worn around the neck. Two lanyards are provided: one with a safety breakaway clasp and a longer adjustable over the head style. The transmitting diodes are in the top portion and the rechargeable NiMH batteries are housed below. The power switch is accompanied by a battery level LED (Green=Useable, Red=Needs Charge). The A-B switch selects the transmission channel. The pendant can be placed in either the BRC-101 or BRC-202 charger.



*An optional Plug-in microphone (PM-505) can be plugged into the top of the pendant for enhanced performance. Although the built-in microphone gives satisfactory performance, the plug-in microphone is a unidirectional element resulting in better vocal quality and much more gain (more volume) before feedback.*

**Body-Pack Transmitter (IRB-30)**, usually worn on the waistband, is the component that transmits the IR signal to the sensor. The IRB-30 has 10 emitting diodes on its front panel and is powered by two rechargeable NiMH batteries. Controls include a power "on/off" switch and a mic gain control. Battery level indicator LED: Green = useable charge, Red = low battery.

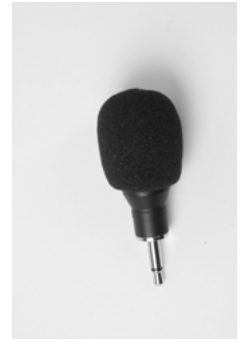


It is required to plug in an external microphone. There are several optional microphones available and they plug into the top of the IRB-30. The IRB-30 is equipped with belt clip for waist attachment.

*Caution: The body-pack cannot be placed in pocket and the red window cannot be obstructed, those are the emitting diodes.*



**Plug-in Microphone (PM-505)** is a small capsule size microphone that plugs directly into the top of the IRB-30 body-pack. A lanyard cord is provided to accommodate wearing the body-pack transmitter around the neck and utilizing it as a pendant microphone. A windscreen is included to prevent breath pops when used in close proximity to the mouth.



**Ultra Lite Microphone (ULM-835)** is a miniature boom style microphone supported by a wire around the left ear. The mic boom extends along side of face and has a unidirectional microphone with windscreen. The small ring on the boom prevents perspiration from entering the mic element. Aside from comfort, the boom style mic renders the best performance in terms of sound quality and is not prone to feedback.



*Caution: The boom can be formed to fit but it is not a flexible boom, do not bend back and forth. IT WILL BREAK !*

**Collar Microphone (CM-838)** is a flexible rod that is formed around the neck. The end with the microphone and windscreen is then contoured up toward the mouth. The cord exits the rod in the center in back, out of the way, and is plugged into the body-pack. The collar mic utilizes a unidirectional mic element to minimize feedback and renders quality voice reproduction.



**Lapel Microphone (LP-835)** is a small capsule microphone with a spring clip for securing on to a clothing edge. The lapel microphone is well suited for out of sight application.

However; as a result of the microphone being farther away from the mouth, more gain is required for adequate volume. An omni-directional microphone element is used to pick up from all directions. These two factors make the lapel microphone most prone to feedback when used near or under a speaker.



**Handheld Microphone Transmitter (IRH-35)** is most applicable for student use or direct presentation. It has an “on/off” switch and a battery level indicator LED; Green=useable charge, Red=low battery. The transmitter has 10 emitting diodes around the bottom of the handle. The metal housing provides low handling noise and insures durable longevity.



### ***You are now ready to test the system***

To test the system, we are going to use a wireless body-pack transmitter with microphone, handheld microphone and an auxiliary audio source (DVD, CD Player, etc.)

#### **Turn the Quantum “on”, using either large knob**

- Red LED will light to indicate power
- Set the Ch. A and Ch. B controls to 12 O'clock

#### **Using the Body – Pack Transmitter and Microphone**

- Set the body-pack gain control (black knob on top) to minimum, fully CCW
- Turn the body-pack “on” via the slide switch on the side of the body-pack.
- Observe the Green LED on top of body-pack transmitter. (If Red, batteries must be charged or replaced).
- Observe the Green LED adjacent to Ch. A volume control, it indicates that an IR signal is being received from the body-pack.
- If the Ch. B LED turns “on”, remove the battery cover of the body-pack and slide the channel selector switch to Ch. A.
- Speak into the microphone and adjust the volume using the gain control on top of the body-pack
- If additional volume is required, turn Ch. A control clockwise
- While talking, walk around the perimeter of the room to verify 100% reception of the signal.
- Upon completion of the test, put the belt-pack in the charger for recharging

#### **Handheld Microphone Transmitter and its Features**

- Turn “on” the microphone with slide switch and observe the Green LED (If Red, batteries will require a charge or be replaced)
- Observe the amber LED next to Ch. B volume control, it indicates that an IR signal is being received from the microphone.
- If the Ch. A LED turns “on”, unscrew the bottom half of the handheld and slide the channel selector switch to Ch. B.
- Speak into the microphone and adjust the volume using Ch. B control on Quantum.
- While talking, venture around the room, you should experience 100% reception throughout the area.
- Upon completion of test, put the microphone in the charger for recharging

## Check the Auxiliary Line Input

- Connect a DVD player, computer audio output, or iPod using a 3.5 mm patch cable to the line input.

*Caution: Be sure you are connecting to a line level output*

- With the quantum turned “on”, turn “on” or engage your auxiliary source.
- Adjust the volume on the Quantum to about mid scale and then adjust the output (if its not a fixed line output) of the auxiliary source.
- Verify quality of sound and adjust to desired volume.

## Line Output / Control

- The line output delivers a composite audio signal to be fed into another device i.e. a recorder, iPod, or the input of an assisted listening system.
- The adjacent knob adjusts the level of the output signal.

## Drop-in Battery Chargers

The battery chargers were specifically designed to recharge NiMH batteries at an optimum rate to maximize their use. The chargers feature a recycle function, which is used to restore the battery charge capacity and extend their service life.

**BRC-50** charger recharges the Crescent (IRT-30) and Body-Pack transmitter (IRB-30). You merely place the Crescent or body-pack in their respective slot. Connection will be made and charging will commence. Charger will automatically control the rate and maintain the charge.





**BRC-101 and BRC-202** drop-in chargers are for the handheld (IRH-30) and pendant transmitter (IRT-89). The single slot (BRC-101) can charge either or the dual (BRC-202) can charge both simultaneously. In addition, both have a tray to insert two “AA” batteries for recharging.

## Trouble Shooting

- System does not work
  - Verify AC power; the LED lights when turned “on”.
  - System has power but no sound
    - Verify charged batteries in body-pack (Green LED when turned “on”).
    - With body-pack turned “on”, check for signal presence (LED adjacent to the volume control).
    - LED is lit but there is no sound, check microphone plugged into body-pack.
    - Replace microphone.
    - Try with handheld microphone or another body-pack
    - Still inoperative and LED on Quantum is lit, send Quantum in for evaluation.
- When using the microphone, the voice is distorted and / or signal drop out occurs
  - Check the charge on your batteries
    - Recycle the batteries by placing the transmitter in the charger and press the grey button and hold for 3-5 seconds
    - The yellow LED will light and the charger will automatically discharge the batteries and then recharge to full charge. (Time required 4 -6 hours)
    - Recheck the system after cycling the batteries
    - If the problem persists, replace the batteries
- When using the body-pack transmitter and microphone, the voice is intermittent and / or has a static like sound
  - Try moving the cable back and forth at the plug-in connector or where it is connects to the microphone
    - If the noise and intermittent connection is associated with the movement of the cable, the cable connection needs to be repaired.
- When plugging a CD player output into the auxiliary input, I get distorted sound
  - You may have connected to the earphone output of the CD player rather than the line level output and its volume is too high.
  - The earphone output can be used but the volume level of the CD player is very critical and must be held to a very low level.

## IRC-320 Quantum II General Specifications

Receiver Input Modulation	Infrared FM
Reception Frequencies	FM Wide-band Ch. A: 2.08 MHz Ch. B: 2.54 MHz
Infrared Wavelength	850 nm
Tone Signal	Ch. A: 32.768 KHz
De-emphasis	50 $\mu$ s
Frequency Response	50 Hz, -15KHz, $\pm$ 3dB
S/N Ratio	$\geq$ 65 dB
THD	$\leq$ 1% @1KHz
Nominal Deviation	$\pm$ 10 KHz
Maximum Deviation	$\pm$ 25 KHz
External Sensor Input	Two, RCA
Connectivity Coverage	60 Ft. Line of Sight
Line Input	3.5mm with Gain Control, Front Panel
Line Output	3.5mm with Gain Control, Front Panel
Equalization	Panel
Output Power	Tone Control, $\pm$ 6dB
External Speaker Output	30 Watts (RMS)
External Speaker Connection	10 Watt / 4 $\Omega$
Power Supply	Two Terminal Phoenix Connector
Dimensions	15VDC / 2.3A / 34.5W
Weight	CE, CSA and UL Listed 6 $\frac{1}{4}$ " W x 14" H x 4 $\frac{3}{4}$ " D 4.2 lbs.

### GENERAL TRANSMITTER SPECIFICATIONS

Transmission Carrier	Infrared
Transmission Frequencies	2.08 MHz & 2.54 MHz
Channel Switchable A or B	Field Switchable
Transmitting Diodes	Ten
Modulation	FM Wide-Band
Pilot Tone Frequency	32.768 KHz
Peak Deviation	$\pm$ 25KHz
Operating Range	2500 Ft <sup>2</sup> . 60 Ft.
Power Switch (Slide)	On/Off
Battery Charge Level (LED)	Green, (Useable Charge) Red, (Needs Charging)
Battery Life	Approx. 7 Hr./Charge
External Battery Contact	Charger Connection

**IRT-55 SAPPHIRE TRANSMITTER**

Transmitting Diodes	6
Operating Range	1,500 Ft <sup>2</sup> . 60 Ft. Line of Sight
Battery Discharge Indicator	
Blue	Full
Purple	Medium
Red	Low
Flashing Red	Very Low Battery
Battery Used	Lithium-ion (3.7V / 620mAh)
Battery Life	Approx. 8-9 Hrs/Charge
External Power Charger	DC +5V, Micro USB Connector
Transmission Angle	180° Conical
User Controls	
Power Switch (push)	On/Off
Mute Switch (push)	On/Off
Mic Switch (3 position)	+6db, Normal, -3db
Aux. Vol./Gain	Increase, Decrease
Channel Select	(A or B) in battery compartment
External Aux. Input	3.5mm Stereo Line Level
Dimensions	3 5/8" H x 1 1/4" W x 3/4" D
Weight	1.4 oz. Including battery

**IRT-89 PENDANT TRANSMITTER**

Adjustable Lanyard	Safety Breakaway Clasp
Transmission Angle	180°
Input	Top/Center
Microphone Input	3.5mm Jack, Lo-z
Waist Band Clip	Tension Wire
Dimensions	5.25" H x 1.5" W x 1" D
Weight	4.8 oz. w/ Batteries
LM-300	Plug-In Microphone
Mic Type	Electret/Condenser
Pick-Up Pattern	Unidirectional
Connector	Male, 3.5 mm
Frequency Response	100 Hz–16 kHz
Windscreen	Pop Filter



**IRB-30 BODY-PACK TRANSMITTER**

Transmission Angle	180°
User Controls	User Controls
Power Output	Mic. Volume Power On/Off IR Power Output: (Hi/Lo) CH. Select (A or B)
External Mic. Input	Lo-z, 3.5mm
Waist Band Clip	Heavy Spring Wire
Dimensions	4 <sup>3</sup> / <sub>4</sub> " H x 2 <sup>3</sup> / <sub>4</sub> " W x <sup>3</sup> / <sub>4</sub> " D
Weight	4.8 oz. w/ Batteries

**IRH-30 HANDHELD TRANSMITTER**

Comander Circuit	Yes
Pre-emphasis	50μS
IR Emitter Location	Built-in
Transmission Angle	360°
Current Consumption	330ma
Microphone Element	Unidirectional, Dynamic
Battery	Two Rechargeable NiMH, 1.2v / 2300mAH
Battery Life	Approximately 6 Hours
Housing	Aluminum
Dimensions	10" L x 1 <sup>1</sup> / <sub>2</sub> " Dia.
Weight	11.4 oz. (with batteries)

**IRT-30 CRESCENT TRANSMITTER**

Shape	Crescent, Under Chin
Lanyard Attachment	Snap-In, Top (Safety)
Transmission Angle	180°, Conical
Emitting Diodes	Six
Mute Switch	Momentary, On/Off
Aux. Input (3.5mm)	Switchable, Mic. or Line Level
Volume Control	Thumb, Rotary
Two Microphone Elements	Condenser Type, Unidirectional
Battery	Single "AA" NiMH, Rechargeable
Power Consumption	300 mA@1.2Volt
Battery Life	6-7 Hours
Battery LED	Green—Useable Red—Needs Charging
Dimensions	4 <sup>3</sup> / <sub>4</sub> " W x 1" D x 1 <sup>3</sup> / <sub>4</sub> " H
Weight	3.0 oz. w/ Battery

**BRC-50 DROP-IN BATTERY CHARGER**

Charging Slots	Two Handheld, Slots A & C One Crescent, Slot B One Body-Pack, Slot D
Charging Mode	Switching
Charging Current	1700ma ±10%
Discharge Rate	350ma
Red LED Indicator	Batteries being Charged
Green LED Indicator	Batteries Fully Charged
Yellow LED Indicator	Batteries being Discharged
Audible Alert	Intermittent Buzz - Batteries Fully Charged
Recycle Button (Grey)	Press for Full Discharge and Auto Recharge
Auto Switching	Switch from Discharge to Charge Mode
Charging Time	1.5Hr./Slot
Power Supply	12VDC/1.5A (Fuse protected)
Dimensions	6½" L x 3 3/8" W x 1 1/8" H
Weight	12.2 oz.

**SINGLE-INSERT CHARGER (BRC-101)**

Charging Port (Single)	Pendant or Handheld
Flashing Red LED	Batteries being charged
Solid Green LED	Batteries fully charged
Dimensions	5" W x 3¾" D x 1½" H
Weight	7.4 oz.

**DUAL DROP-IN CHARGER (BRC-202)**

Charging Ports (Two)	Pendant or Handheld
Flashing Red LED	Batteries being charged
Solid Green LED	Batteries fully charged
Dimensions	7½" W x 3¾" D x 1½" H
Weight	14.8 oz.

## Five Year Limited Warranty

TeachLogic Infrared products are guaranteed to be free of defects in workmanship or material for a period of five (5) years from date of original purchase, subject to the following conditions:

1. Warranty excludes defects caused by normal use and wear, any abuse, or failure to use the product in accordance per instructions.
2. Warranty is void if damage occurred because of misuse, or attempted repair or modification by unauthorized personnel.
3. Warranty on batteries, cables, and cable connections are limited to one (1) year.
4. Warranty on microphones/microphone elements are limited to one (1) year.
5. Warranty does not extend to finish or appearance past ninety (90) days.
6. All warranty service will be provided by TeachLogic or authorized service center
7. Warranty is made to the original purchaser and may not be transferred another user.
8. Warranty service rendered will be on a repair basis or replacement, which ever TeachLogic deems to be most prudent for customer satisfaction and economic feasibility.

TeachLogic will only accept warranty shipments accompanied by Return Authorization Number previously assigned by TeachLogic personnel. Advance warranty replacements will be made per the discretion of TeachLogic personnel.

TeachLogic will pay return shipping cost on all warranty repairs or replacements.

For Warranty Service: TeachLogic, Inc.

Tel: (800) 588-0018 or (760) 631-7800

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