Telex
Operating Instructions

RadioCom™

BTR-80N, TR-80N, TR-82N

Professional
Wireless
Intercom System

CE1588①

TELEX®

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General Description

Telex RadioCom™ BTR-80N UHF Synthesized Wireless Intercom system offers reliable, high-performance, high-fidelity full-duplex communications delivered with minimum spectrum usage.

The BTR-80N system includes the BTR-80N frequency agile base station, working with up to four TR-80N or TR-82N frequency agile beltpacks operating in full-duplex communications. An almost unlimited number of beltpacks may be used with a base station if the beltpacks are in Push-to-Tx mode (half-duplex).

The BTR-80N system incorporates two audio channel operation, permitting the beltpack operator to choose between two separate audio channels of communication, with the base station tracking the beltpack selection. This allows the user the flexibility to create a party-line and a private line within the same beltpack.

The BTR-80N system is perfectly suited for stand-alone operation and can also interface with Audiocom® (Telex), RTS® TW, Clear-Com®, as well as RTS®, Matrix systems and other 4-wire intercom systems. In addition to the external intercom systems interfaces listed above, the system provides connections for auxiliary balanced audio input and output, as well as wireless talk-around (WTA) and stage announce (SA) features.

The RadioCom™ BTR-80N system has been designed for reliable, efficient operation. Operating in the 482 to 722 MHz range the units operate reliably at line-of-sight distances of 1,000 feet. With available antenna systems from Telex, the effective operating range can be extended. The high-efficiency beltpacks provide between 8 and 11 hours of uninterrupted operation using NiMH rechargeable battery packs.

System Features

- Frequency-agile base station and beltpacks. No external computer/device required to select frequencies.

- Backlit base-station LCD allows the user to easily monitor the beltpack's status as well as change base station frequencies.

- Squelch adjust on BTR-80N and TR-80N, TR-82N beltpacks.

- Beltpack's battery level displayed on the base station and in beltpack's menus.

- ClearScan™ function on base station and beltpack to automatically find the best channels on which to operate.

- Full-duplex (simultaneous talk and listen) or Push-to-TX (half-duplex) operation.

- Compatible with Audiocom® (Telex), RTS® TW, Matrix, Clear-Com® , and other wired intercom types.

- Two independent channels of intercom audio with the ability to operate partyline and RTS Matrix on the same intercom channel at the same time.

- WTA (Wireless Talk Around) beltpack control. This feature allows beltpacks to talk to each other, but their audio is lifted from any wired system connected to the base station.

- SA (Stage Announce) beltpack control. Allows the user to direct their audio to a jack on the back of the base for P.A. systems or other external audio systems.

- Relay contact closure on the base when the SA button is pressed.

- TR-82N features two audio channel binaural operation in either stereo or mono mode.

- TR-82N has 1/8 inch (3.5mm) jack for auxiliary input from another audio source, such as an IFB, iPod®, or other similar device.

- Beltpack units contained in a weather and shock resistant die cast magnesium case.

- Convenient IEC power connector on the base station so the unit can plug directly to outlets. No in-line or wall plug power supply.

- Base station has option for DC on the receive coaxial cable line for powering in-line low noise amps.

- Dark mode settable on TR-80N and TR-82N beltpacks. This shuts down all LEDS.

BTR-80N Base Station

Controls and Connections - Front Panel
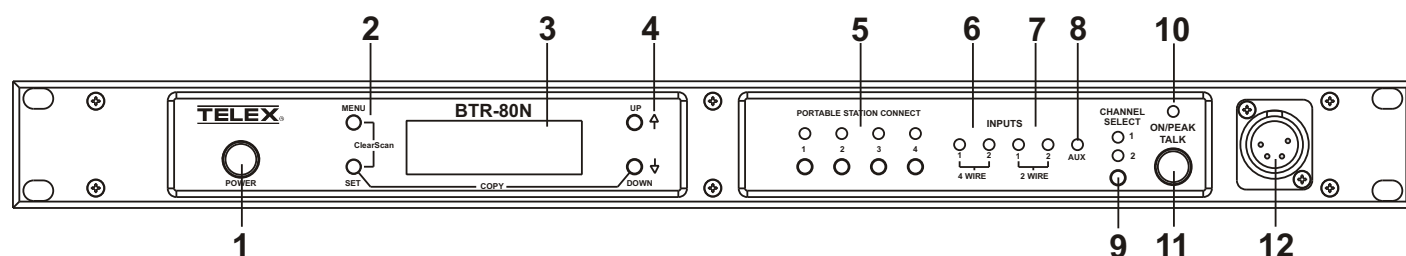
Figure 2-1
BTR-80N - Front Panel

1. **Power switch** – Do not power-up a base station within 3 seconds of the unit being turned off. Voltages within the unit need to drop below a threshold before being re-powered. If powerd-up in less than 3 seconds, the unit may boot as the wrong frequency band.
   Even with the unit powered down via the power switch there are some circuits within the base that are energized. To completely remove power to the unit, the power cord must be disconnected.

2. **[Menu] and [Set] buttons** – Used to select menus and set options on the LCD.

3. **Backlit Graphics LCD (Liquid Crystal Display).**

4. **[Up] and [Down] buttons** – Used to select base station options on the LCD.

5. **Portable Station Connect** – Buttons used to enable or disable the respective receiver's audio. GREEN LED = Audio enabled, LED OFF = Audio disabled.

6. **4-wire Selection/Peak Input Indicators -** Displays when 4-wire intercoms are active with a green indication. A red indication means the intercom input level is too high.

7. **2-Wire Selection/Peak Input Indicators -** Displays which 2-wire intercoms are active with a green indication. A red indication means the intercom input level is too high.

8. **Auxiliary Selection/Peak Input indicator -** Displays if auxiliary input is 'ON" with a green indication. A red indication means the intercom input level is too high

9. **Headset Intercom Select** – Controls the intercom to which the local headset is connected. Each press of the button changes the connection; channel 1, channel 2, both.

10. **Talk/Peak Light** – LED is green when talk button #11 is active. A normal mic gain setting will cause the LED to flash red on the loudest speech levels. If the gain is too high, the LED will be red at normal speech volumes.

11. **Talk Button** – Press to enable the audio path from the local headset. LED #10 will turn green when enabled. A quick press and release latches button on. If the talk function is latched on, pressing the talk button again will turn it off.

12. **Local Headset Connector** – Male XLR connector for Telex units, Female XLR connector for RTS units. A dynamic or electret headset microphone is automatically detected. Microphone gain and volume are settable in the software menus.
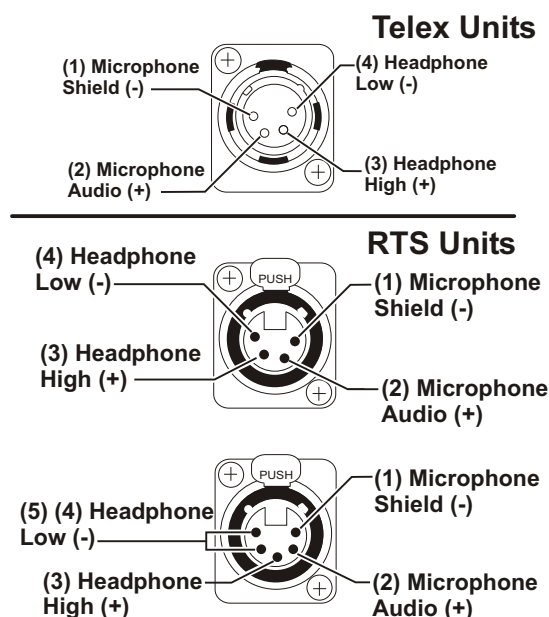
Figure 2-2
Local Headset Wiring

Controls and Connections - Rear Panel
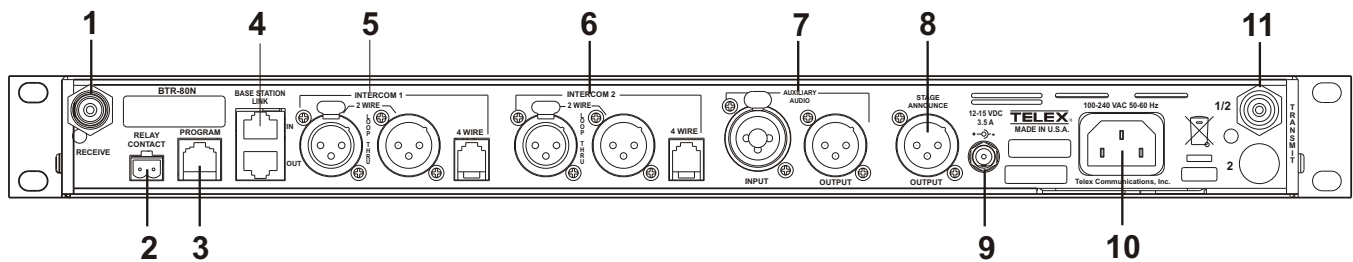
Figure 2-3
BTR-80N - Rear Panel

1. **Receive Antenna** - Female "TNC" Connector. Color band on antenna must match color dot on base station.

2. **Relay Contact** – A dry contact closure which is activated when a beltpack user presses the stage announce (SA) button. Normally Open (NO). The rating is one amp at 24V maximum.

3. **Program Connector** - Used to update software in unit.

4. **Base Station Link Jacks** – When multiple base stations are connected through this jack, it allows wireless talk around (WTA) audio from the beltpacks to be routed from system to system. Also will allow CAN bus data to be passed between base stations.

5. **Intercom 1** – Interface to wired intercom channel 1.
   2-Wire – Male and female 3-pin XLR connectors wired in parallel. The connectors are switched to the appropriate intercom configuration via software.

   4-Wire – An RJ-11 type jack compatible with "Matrix" type intercom systems.

6. **Intercom 2** – Interface to wired intercom channel 2.
   2-Wire – Male and female 3-pin XLR connectors wired in parallel. The connectors are switched to the appropriate intercom configuration via software.

   4-Wire – An RJ-11 type jack compatible with "Matrix" type intercom systems.

7. **Auxiliary Input/Output** – One 3-pin female XLR/ 1/4 inch combination input connector and one 3-pin male XLR output connector.

8. **Stage Announce Output** – Passes the audio from any of the base station's beltpacks that have selected stage announce (SA).

9. **DC Input Jack –** Accepts 12-15 VDC (5.5mm by 2.5mm screw on plug), 3.5 Amps to power base station from a DC source. Base may be connected to DC and AC source at the same time. If AC source fails the base will automatically switch to DC power. Inside the base there is a user replaceable fuse in-line with the DC input jack. This fuse is a 5A, 250V, 5x20mm, fast acting ceramic cartridge fuse.

10. **Power** – IEC receptacle. Accepts 100 – 240 VAC, 1A maximum, 50 – 60 Hz.

11. **Transmit Antenna** - Female "TNC" Connector. Color band on antenna must match color dot on base station.

BTR-80N
Specifications

Overall

RF Frequency Range . . . . 482 - 608 MHz, 614 - 722 MHz, in 18 MHz TX and RX bands
    (Some frequencies only available in certain countries)

Power Requirements . . . . 100-240 VAC, 50-60 Hz, IEC receptacle

DC Only . . . . 12 - 15 VDC, 3.5 Amps

Temperature Range . . . . -4° F to 130° F (-20° C to 55° C)

Dimensions . . . . 19.00" W x 1.72" H x 14.00" D (48.3 cm x 4.4 cm x 35.6 cm)

Weight . . . . 7 lbs 2 oz (3.24 kg)

TX Antenna . . . . ½ Wave (supplied), TNC Male Connector

RX Antenna . . . . ½ Wave (supplied), TNC Male Connector

FCC ID: . . . . B5DM528 (TX 482-608 MHz)

Frequency Response 200Hz-4kHz

Four Wire Input . . . . Level Adjustable (2 Vrms typical)

Four Wire Output . . . . Level Adjustable (2 Vrms typical)

Telex Intercom . . . . Input/Output Level Adjustable (1 Vrms typical), Line impedance 300

RTS Intercom. . . . . Input/Output Level Adjustable (0.775 Vrms typical), Line Impedance 200

Clear-Com® Intercom . . . . Input/Output Level Adjustable (1 Vrms typical), Line Impedance 200

Auxiliary Input . . . . Adjustable (2 Vrms typical)

Auxiliary Output . . . . Adjustable (2 Vrms typical into 600)

Stage Announce Output . . . . Internally Adjustable (2 Vrms typical at rated deviation into 600)

Stage Announce Relay . . . . Dry contact, rated at 1 Amp, 24V Max

Microphone input sensitivity 9mV

Local Headset Output . . . . 40mW output into 600   (1% Distortion)

Transmitter

Type. . . . . Two Synthesized Transmitters, 720 channels each

Transmit Power (each transmitter) . . . . Selectable: off, 10 mW, 50 mW, 100 mW, 249 mW

Modulation Type. . . . . FM

Deviation. . . . . 4 kHz

RF Frequency Stability . . . . 2.5 PPM

Modulation Limiter . . . . Peak-Responding Compressor

Radiated Harmonics & Spurious . . . . Exceeds FCC specifications

Receiver

Type . . . . Triple Conversion Superheterodyne, four Independent Synthesized IFs, FM, 720 channels each

RF Sensitivity . . . . <0.6 µV for 12 dB SINAD

Squelch Threshold . . . . adjustable - 12 / 20 / 24 dB SINAD

IF Selectivity . . . . 6 dB at 30 kHz Bandwidth

Image Rejection . . . . 70 dB or better

Squelch Quieting. . . . . 90 dB

RF Frequency Stability . . . . 2.5 PPM
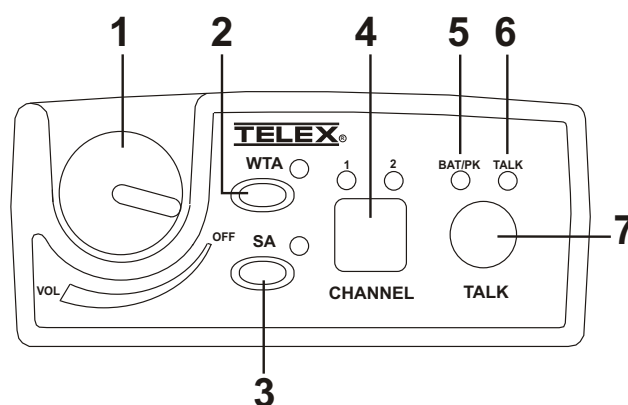
Controls and Connections - Top Panel

Figure 3-1
TR-80N Top Panel

1. **On/Off & Volume Control –** Turns the beltpack power on and controls headset volume.

2. **Wireless Talk Around (WTA)** – When pressed, the user's audio is disconnected from the wired intercom, auxiliary input/output and the base station's local headset. Other beltpack users, on that audio channel, can hear the user as normal. The button activates the nearby red LED as well as the talk button.

3. **Stage Announce (SA)** –When pressed, the user's audio is routed to the stage announce connector on the back of the base station. The user also loses their sidetone as an indication that stage announce is activated. The other wireless beltpacks and wired users do not hear the user's audio. The button is non-latching and activates the nearby red LED as well as the talk button.

4. **Audio Channel Select Button** – Allows user to select either audio channel 1or 2.

5. **Bat/Peak Light (BAT/PK)** – Light will flash once when unit is turned on if the battery is good. If the light stays on, battery is low. If the light does not flash, battery is dead. A normal microphone gain setting will cause the LED to flash for some of the words at normal speech levels. If the gain is too high, the LED will be red during all words at normal speech levels.

6. **Talk Light** – LED is on when the talk button, SA or WTA is active.

7. **Talk button** – Press to enable the audio path from the local headset microphone. The "TALK" LED, #6, will turn red when enabled. A quick press and release latches the talk function, unless latching has been disabled. Holding the button for over ½ a second will cause the audio path to be enabled only for as long as the button is held. If the talk function is latched on, pressing the talk button again will turn it off.
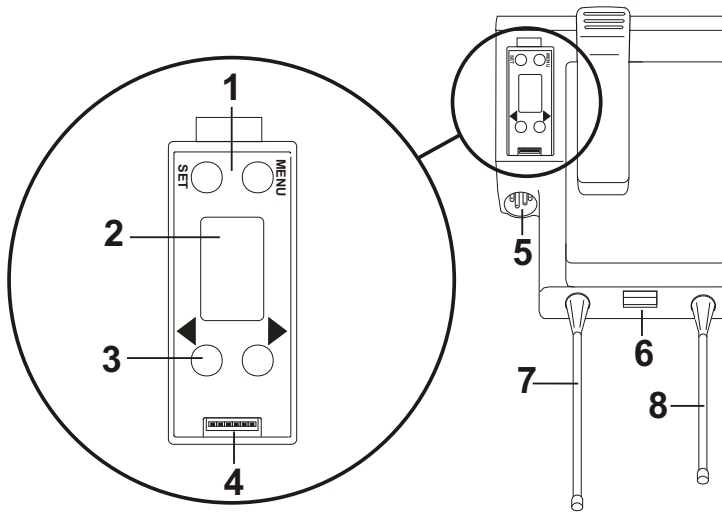
Figure 3-2
TR-80N Rear Panel/Connector/Antennas

5. **Headset Connector** – Male XLR connector for Telex units, Female XLR connector for RTS units. A dynamic or electret headset microphone is automatically detected by the beltpack and a bias voltage supplied if needed.

Telex Units

(1) Microphone Shield (-)
(4) Headphone Low (-)
(2) Microphone Audio (+)
(3) Headphone High (+)

RTS Units

(1) Microphone Shield (-)
(2) Microphone Audio (+)
(4) Headphone Low (-)
(3) Headphone High (+)

(1) Microphone Shield (-)
(2) Microphone Audio (+)
(3) Headphone High (+)
(5) (4) Headphone Low (-)
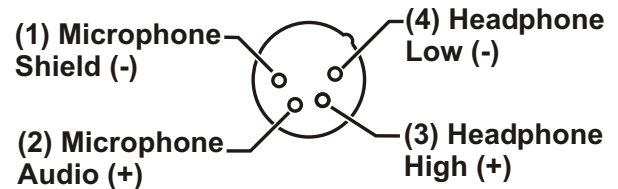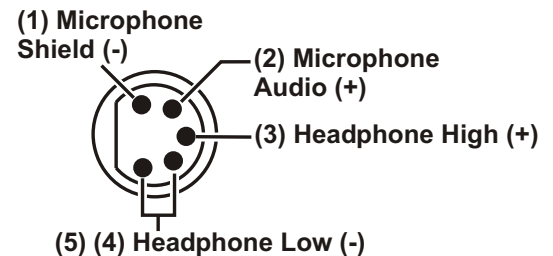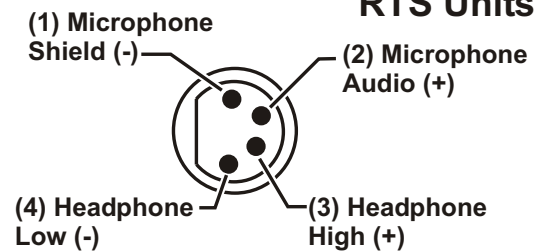
Figure 3-3
Headset Jack Wiring

1. **[MENU] and [SET] buttons** – Used to select menus and set options on the LCD.

2. **LCD (Liquid Crystal Display)**

3. **[UP] and [DOWN] buttons** – Used to select beltpack options on the LCD.

4. **Programming Connector –** Used to update software in unit.

6. **Battery Latch** – Press down to release the battery pack. While holding the latch down, slide the battery pack about 1/8 inch back toward the latch, until it stops, then lift it out.

7. **Receive Antenna** – Screw type ¼-wave replaceable antenna. The color dot on the screw end of the antenna must match color dot on antenna receptacle.

8. **Transmit Antenna** – Screw type ¼-wave replaceable antenna. Color dot on the screw end of the antenna must match color dot on antenna receptacle.

NOTE: Microphone gain and transmit mode is set via software menus.

TR-80N
Specifications

RF Frequency Range . . . . 482 - 608 MHz, 614 - 722 MHz, in 18 MHz TX and RX bands
    (Some frequencies only available in certain countries)

Power Requirements. . . . . 6 "AA" Cells Alkaline (NiMH optional)

Current Draw . . . . 200 mA (Push-to-Talk, Talk On)

Temperature Range . . . . -4° F to 130° F (-20° C to 55° C)

Dimensions . . . . 3.75"W x 5.05"H x 1.65" D (9.5 cm x 12.8 cm x 4.2 cm)

Weight . . . . 16 oz (454g) with alkaline batteries

TX Antenna. . . . . 1/4 Wave (supplied), Screw type, Replaceable

RX Antenna . . . . 1/4 Wave (supplied), Screw type, Replaceable

FCC ID:. . . . . B5DM530 (TX 608-698 MHz)

Frequency Response 200Hz-4kHz

Microphone input sensitivity . . . . 7 mV

Local Headset Output . . . . 40 mW output into 600   (1% distortion)

Transmitter

Type . . . . Synthesized, 720 channels

Transmit Power . . . . Selectable: Auto, 5, 50, 100 mW

Modulation Type. . . . . FM

Deviation. . . . . 4 kHz

RF Frequency Stability. . . . . 2.5 PPM

Modulation Limiter . . . . Peak-Responding Compressor

Radiated Harmonics & Spurious . . . . Exceeds FCC specifications

Receiver

Type . . . . Triple Conversion Superheterodyne, Synthesized, FM, 720 channels

RF Sensitivity . . . . <0.6 µV for 12 dB SINAD

Squelch Threshold . . . . adjustable - 12 / 20 / 24 dB SINAD (About 1.0   V)

IF Selectivity . . . . 6 dB at 30 kHz Bandwidth

Image Rejection . . . . 70 dB or better

Squelch Quieting. . . . . 90 dB

RF Frequency Stability. . . . . 2.5 PPM
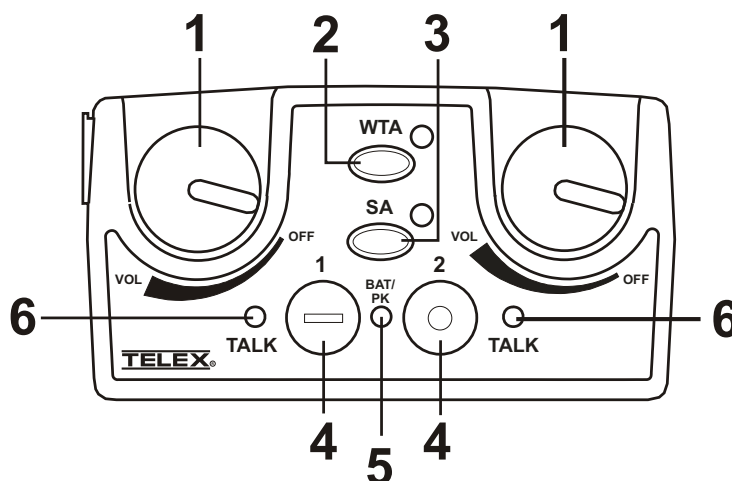
Controls and Connections - Top Panel

Figure 4-1
TR-82N Top Panel

1. **On/Off and Volume Control** - Turns beltpack power on and controls headset volume for intercom channels "1" and "2". Either knob, "1" or "2", turns the beltpack on. Both knobs must be off to turn the beltpack off. If only one knob is on, then that intercom channel, "1" or "2" is on for both transmit and receive audio.

2. **Wireless Talk Around (WTA)** - When pressed, the user's audio is disconnected from the wired intercom, auxiliary input/output and the base station's local headset. Other beltpack users, on that audio channel, can hear the user as normal. The default setting is software selectable, as to which intercom channels, "1", "2", "1 + 2", or currently selected channel, is activated along with the "WTA" button. The "WTA" button activates the nearby red LED as well as the software selected intercom channels "TALK" LED if not already active.

3. **Stage Announce (SA)** - When pressed, the user's audio is routed to the stage announce connector on the back of the base station. The user also loses their sidetone as an indication that stage announce is activated. The other wireless beltpacks and wired users do not hear the user's audio. The button is non-latching and activates the nearby red LED.

4. **Talk Button** - Press to enable the audio path to either intercom channels "1", "2" or "1 + 2", from the local headset microphone. The associated "TALK" LED, #6, will turn red when enabled. A quick press and release latches the talk function, unless latching has been disabled. Holding the button for over ½ second will cause the audio path to be enabled only for as long as the button is held. If the talk function is latched on, pressing the talk button again will turn it off.

5. **Low Battery/Peak (BAT/PK) Light** - Light will flash once when unit is turned on if the battery is good. If the light stays on, battery is low. If the light does not flash, battery is dead. A normal microphone gain setting will cause the LED to flash for some words at normal speech levels. If the gain is too high, the LED will be red during all words at normal speech levels.

6. **Talk Light** - Will turn red when enabled by associated "TALK" or "WTA" button.
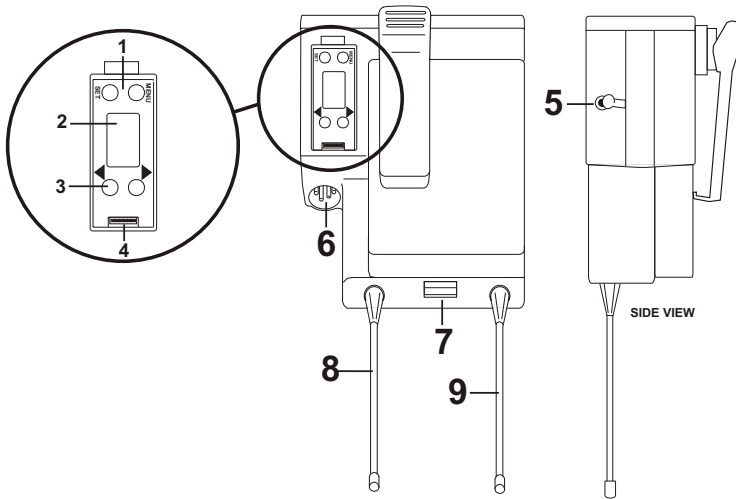
Figure 4-2
TR-82N Rear Panel/Connector/Antennas

Telex Units

Figure 4-3
Headset Jack Wiring

RTS Units

1. **[MENU] and [SET] buttons** – Used to select menus and set options on the LCD.

2. **LCD (Liquid Crystal Display)**

3. **[UP] and [DOWN] buttons** – Used to select beltpack options on the LCD.

4. **Programming Connector** - Used to update software in unit.

5. **Auxiliary Input Audio Jack** -1/8" (3.5mm) mono input jack. Local only to beltpack.

6. **Headset Connector** – Male XLR connector for Telex units, Female XLR connector for RTS units. A dynamic or electret headset microphone is automatically detected by the beltpack and a bias voltage supplied if needed. Four pin Telex/RTS units are monaural. Five pin Telex/RTS units have a software set-up to select if XLR pin 3 or 5 is the channel 2 output and if pin 3 is ground.
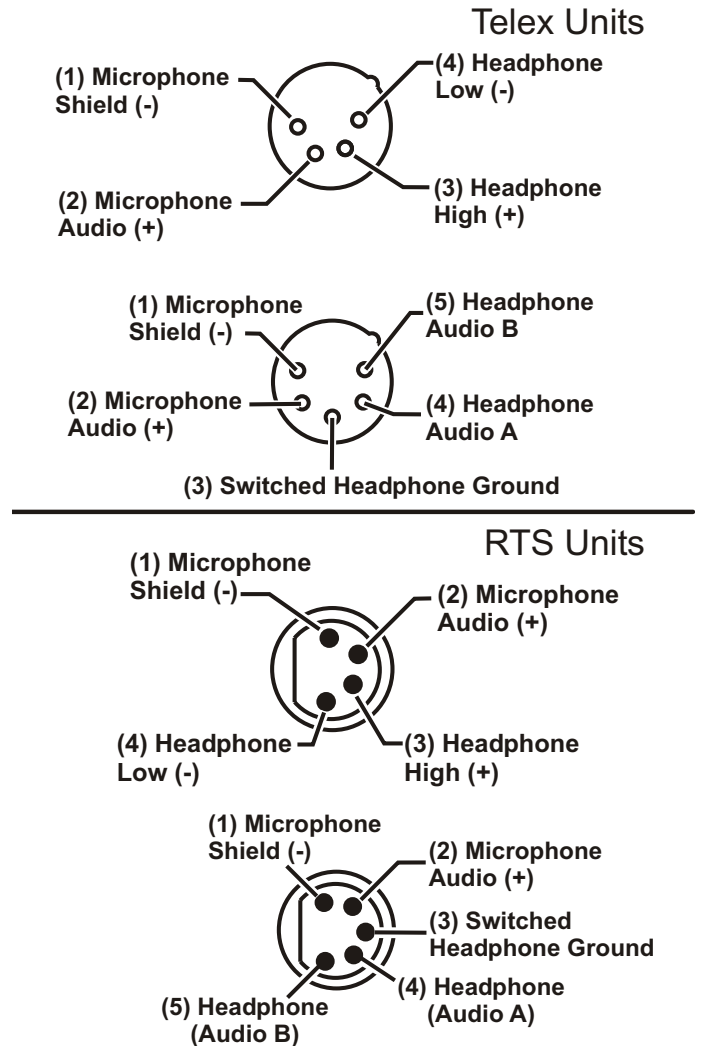
7. **Battery Latch** – Press down to release the battery pack. While the latch is held down, slide the battery pack about 1/8 inch back, toward the latch, until it stops, then lift it out.

8. **Receive Antenna** – Screw type ¼-wave replaceable antenna. The color dot on the screw end of the antenna must match color dot on antenna receptacle.

9. **Transmit Antenna** – Screw type ¼-wave replaceable antenna. The color dot on the screw end of the antenna must match color dot on antenna receptacle.

NOTE: Microphone gain and transmit mode is set via software menus.

TR-82N
Specifications

RF Frequency Range . . . . 482 - 608 MHz, 614 - 722 MHz, in 18 MHz TX and RX bands
   (Some frequencies only available in certain countries)

Power Requirements. . . . . 6 "AA" Cells Alkaline (NiMH optional)

Current Draw . . . . 280 mA (Push-to-Talk, A and B Talk On)

Temperature Range . . . . -4° F to 130° F (-20° C to 55° C)

Dimensions . . . . 3.75" W x 5.35" H x 2.02" D (9.5 cm x 13.5 cm x 5.1 cm)

Weight . . . . 21 oz (595g) with alkaline batteries

TX Antenna. . . . . 1/4 Wave (supplied), Screw type, Replaceable

RX Antenna . . . . 1/4 Wave (supplied), Screw type, Replaceable

FCC ID:. . . . . B5DM531 (TX 608-698 MHz)

Frequency Response 200Hz-4kHz

Microphone input sensitivity . . . . 7 mV

Local Headset Output. . . . . 40 mW output into 600   distortion)

Transmitter

Type . . . . Synthesized, 720 channels

Transmit Power . . . . Selectable: Auto, 5, 50, 100 mW

Modulation Type. . . . . FM

Deviation . . . . 4 kHz

RF Frequency Stability. . . . . 2.5 PPM

Modulation Limiter . . . . Peak-Responding Compressor

Radiated Harmonics & Spurious . . . . Exceeds FCC specifications

Receiver

Type. . . . . Two, Triple Conversion Superheterodyne Receivers, Synthesized, FM, 720 channels

RF Sensitivity . . . . <0.6 μV for 12 dB SINAD

Squelch Threshold . . . . adjustable - 12 /20 /24 dB SINAD

IF Selectivity . . . . 6 dB at 30 kHz Bandwidth

Image Rejection . . . . 70 dB or better

Squelch Quieting. . . . . 90 dB

RF Frequency Stability. . . . . 2.5 PPM

Initial Equipment Set-Up

Unpacking

Unpack your RadioCom™ System. Below are the items that should come with your base station and each belt pack.

Contact the shipper or your dealer immediately if anything is damaged or missing.

BTR-80N

Quantity	Description
1	BTR-80N Base Station
1	Operating Instructions
1	Power Cord
2	Antennas (one Transmit and one Receive)
1	Warranty Card
1	2 terminal plug (for SA Relay)
4	Rubber feet

**TR-80N,
TR-82N**

Quantity	Description
1	TR-80N or TR-82N with Antennas
1	Battery pack
1	Quick Start Card
1	Warranty Card
1	Belt Clip
1	LCD Cover

Antenna Connection

The base station is supplied with two (2) antennas. One 1/2-wave antenna for Transmit and one 1/2-wave for Receive. The antennas have TNC male connectors.

The frequency range of the antennas should match the receiver and transmitter of the base station. Match the color code on the antenna with the color code on the base station.

Attach the transmit 1/2-wave antenna to the antenna input receptacle labeled "Transmit" on the right side of the rear panel. The antenna should be vertically aligned.
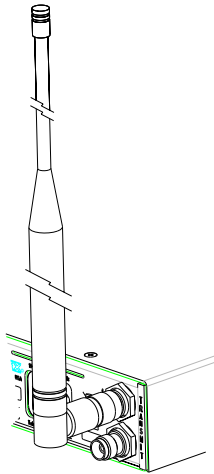
Figure 5-1
Attaching Transmit 1/2-Wave Antenna

Attach the receive 1/2-wave antenna to the antenna input receptacle labeled "Receive" on the left side of the rear panel. The antenna should be vertically aligned.
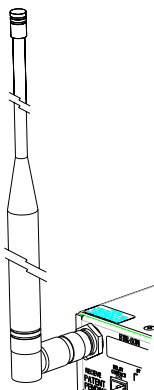
Figure 5-2
Attaching Receive 1/2-Wave Antenna

Antenna Polarization

The Telex Wireless Intercom System is "Vertically Polarized". This means both the transmitting and receiving antennas should operate in the vertical position.
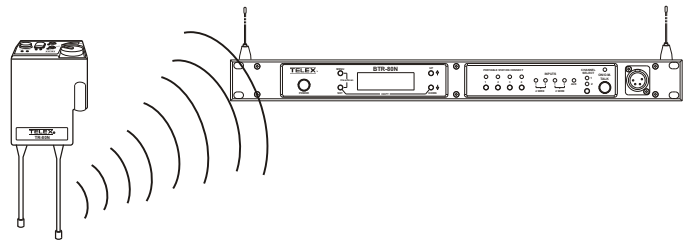
ANTENNAS SHOULD BE VERTICAL

Figure 5-3
Vertically Polarized Antennas

Distance between Antennas

The distance between the base station's receive and transmit antennas is not adjustable when the antennas are connected directly on the back of the unit.

The antennas can be remotely mounted for a better signal path. A Telex coax assembly with remote antennas may be required. See "Accessory" section for ordering information.

NOTE: If your base station is to be located in a shielded rack mount enclosure or other poor RF location, you must remotely mount the 1/2-wave antennas with coax assemblies. See "Accessories and Replacement Parts" section for remote mounting hardware.

Antenna Placement

Proper antenna placement probably has the most effect on your TELEX Wireless Intercom System's overall performance. The following suggestions will result in optimum performance.

Proper placement of the beltpack can be critical. The antennas should be in the open. Bending the antennas up and placing the beltpack in a pocket, etc., will reduce system distance.

It is suggested that the unit be worn on the belt with both antennas vertical for best operating range and performance.
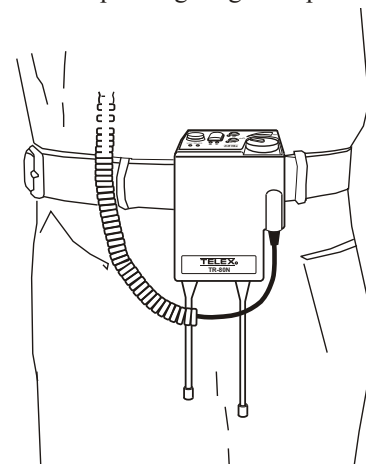

Figure 5-4
Proper Dressing of the Antennas

Keep the distance between the base station and the beltpacks as short as possible. The greater the distance, the weaker the signal. Make sure the "signal paths" between the base station and beltpacks are unobstructed. You should be able to visibly locate the base station antennas at all times for best performance.
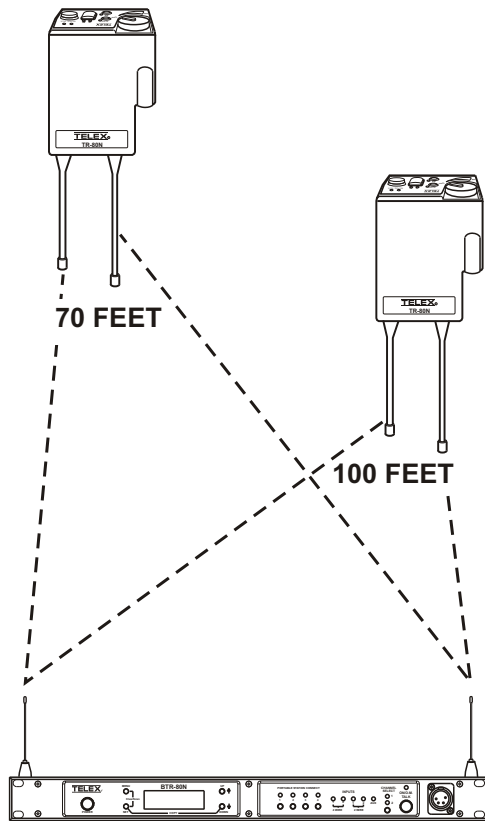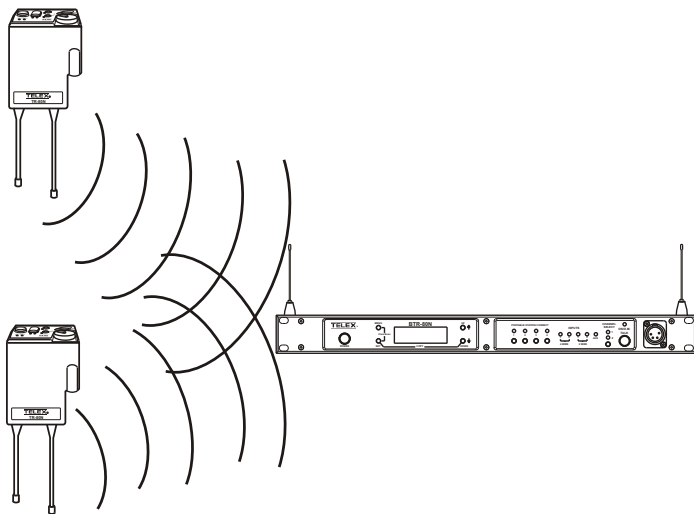
Attempting to operate the wireless intercom system through or around walls, ceilings, metal objects, etc. will reduce system range and performance.
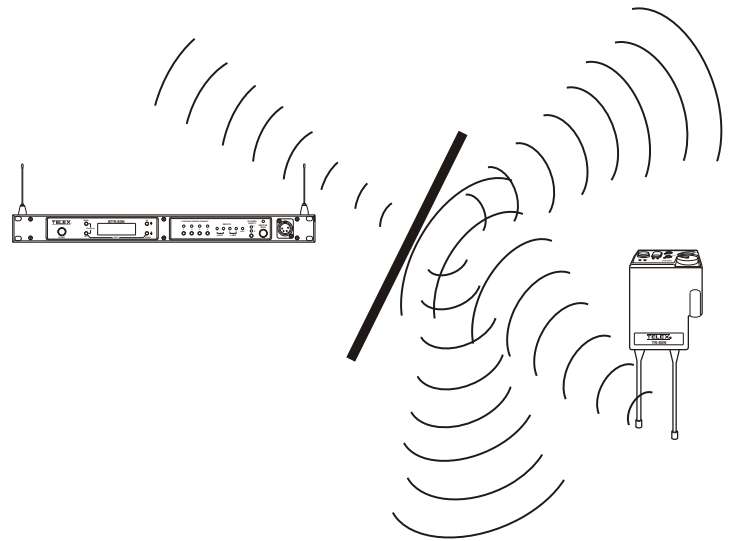

70 FEET

100 FEET

Figure 5-5
Distance Between base station and beltpack

Figure 5-7
Operating System Near Obstructions

DO NOT - mount the base station 1/2-wave antennas on, or next to metal, such as beams, walls with metal studs, equipment racks, etc. This also applies to the antennas when assembled directly to the Base Station. This will "detune" the antennas which can result in noise or loss of RF signal at the Base Station, see Figure 5-8.

Figure 5-6
Keeping Site Clear to Antenna

2. Placing the BTR on top of a shelf or equipment rack unobstructed without remoting the antennas is OK.

1. Placing BTRs in a shelf or equipment rack and using remote antennas is OK.

3. Placing BTRs in a shelf or equipment rack with the antennas mounted on the back of the BTR or the side of the rack is **BAD.**
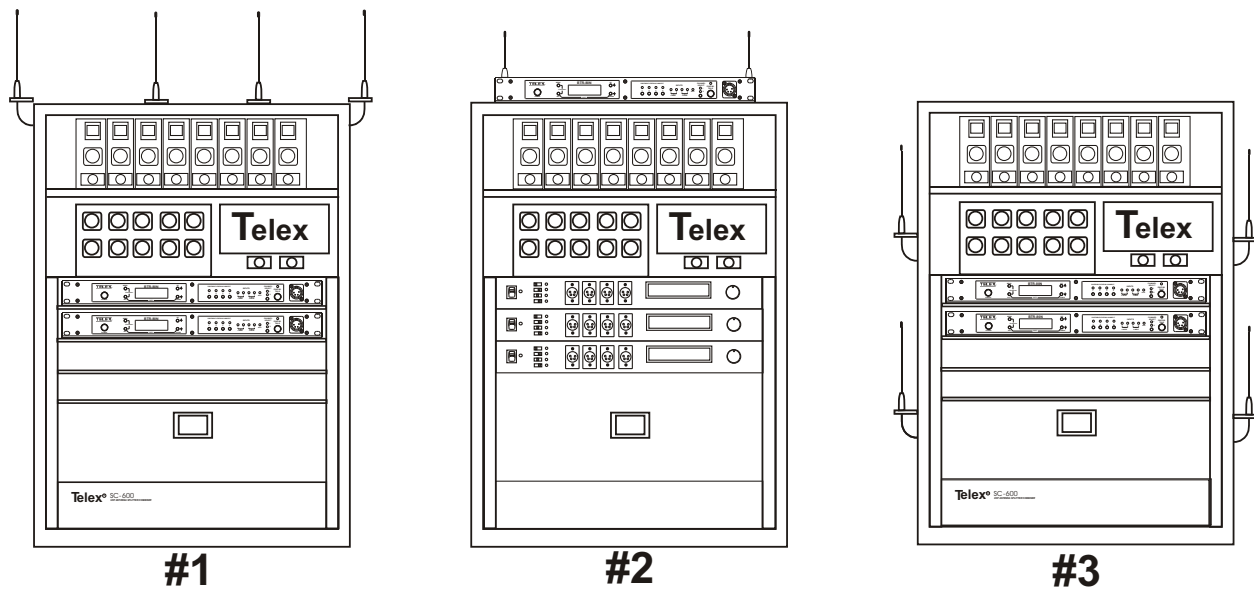
Telex

Telex

Telex

#1

#2

#3

Figure 5-8
Antenna Placement

Improving Reception and Increasing Range

Keeping the distance from the base station and beltpack as short, and unobstructed as possible will produce the most reliable performance.

The base station is supplied with two antennas. This should provide satisfactory system performance in most applications. System range can be enhanced by remotely mounting the 1/2-wave antennas. The ½ wave antennas are ground plane independent, so a ground plane is not required for good performance.

BTR-80N Operation

This Section will discuss the operation and features of the BTR-80N base station. The section will open with the base operation and quick system setup of a BTR-80N system. It will then discuss basic interfacing and setup of a base station. Finally it will end with the connection of multiple base stations and discussion of the links between them.

Basic Operational Description

The BTR-80N narrow band wireless intercom system offers the most comprehensive, user friendly and versatile set of features available in wireless intercom systems anywhere in the world.

The base station can accommodate up to 4 full duplex TR-80N or TR-82N beltpacks. A base may be used with an unlimited number of beltpacks in push-to-TX (half duplex) operation. In push-to-TX mode the unit provides a "First-On-Latch-Out" feature. This feature allows only one beltpack transmitter active at a time when multiple users are on a single base receive channel.

The base station, via the beltpacks or it's local headset, allows communication with other wireless or wired users. The 2-wire and 4-wire intercoms may even be used at the same time. The wired audio interfaces to the base are:

- 2-Wire (Telex, RTS, Clear-Com) - 2 intercom channels

- 4-Wire - 2 audio channels

- Auxiliary (both input and output)

- SA (Stage Announce) (output)

- WTA (Wireless Talk Around). 2 channels of a private 2-wire intercom just among TR-80N and TR-82N beltpacks.

- Local base station headset

The base also has a relay closure available that is activated when the SA is pressed at any beltpack. There are 4 easily accessible portable connect buttons on the front panel. The buttons may be used to turn off the audio from any of the four base receivers while at the same time killing the talk/transmitter at the associated beltpack.

The base station comes with 36 engineering selected, intermodulation-avoiding groups of channels, plus the ability

for the user to enter frequencies of their own via 12 user defined groups.

System Quick Start

The following is a list to quickly get a base station and beltpacks operating.

1. Unpack the base and connect the power cord and antennas.

2. Connect base to audio interfaces. For example; 2-wire, 4-wire, SA, Auxiliary local headset.

3. Press and hold [MENU] as powering-up the base station. Release button when base station displays "...FACTORY SETUP...".

4. Press [MENU] as powering-up the beltpacks(s)

5. Use the [UP] and [DOWN] arrow button to change the channel to an unoccupied receive channel on the base station. Then press [SET] twice to set channel and group.

6. The base should now display the audio channel of the beltpack and a battery symbol will appear shortly.

7. Plug a headset into each beltpack. Adjust the software menu for microphone gain so the overmodulation light flashes only on some of the words at normal speech levels.
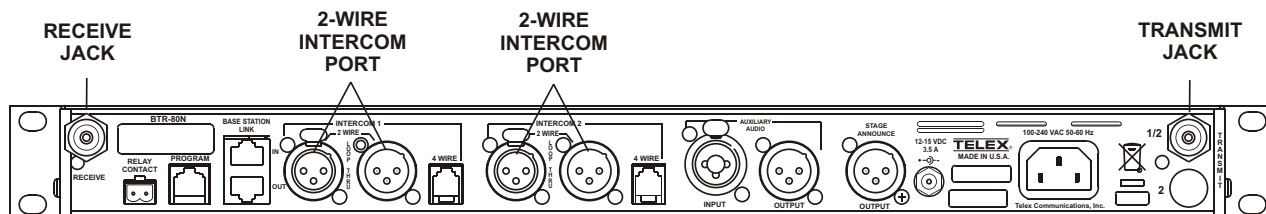
Figure 6-1
BTR-80N Rear View

Transmit and Receive Antennas

The TNC transmit jack and receiver jack are both labeled on the rear of the unit. The base station will come with two ½ wave antennas. Always match the color dot on the rear panel of the base station with the colored band on the antenna.

2-Wire Intercom Ports

The base station has the ability to interface to two, 2-wire external audio intercom systems. These XLR jacks are designated intercom 1 and 2 on the rear panel.

They accept Telex, RTS and Clear-Com types of intercom systems. The pinouts of these standard types of intercom are shown in Figure 6-2.
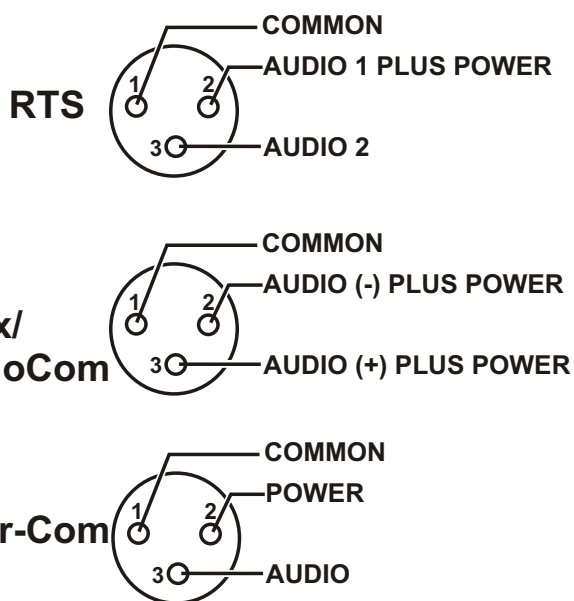

Figure 6-2
Pin Outs of RTS, Telex and Clear-Com Intercoms

The base station does not require "wet" intercom lines for operation. Wet intercom lines are those with D.C. voltages on them for powering 2-wire devices. The base will loop thru wet intercom lines with currents up to 2 Amps.

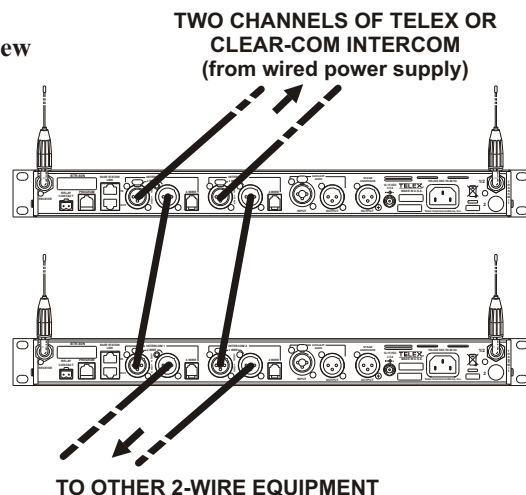**Warning! Do not loop thru more than 2 Amps of current. Damage to the base station may result.**

Figure 6-3
Loop-thru of Two Base Stations connected with Telex/Audiocom or Clear-Com Intercoms

Since RTS-TW carries both channels of audio on one cable, the four intercom **XLR connectors are connected in parallel** when RTS is selected. Thus any one of the four intercom XLRs may be used for RTS input. As shown in Figure 6-4, looping thru of the audio may also be accomplished via any of the rear panel XLRs when in RTS mode. For a description of how to set up the 2-wire ports refer to "Intercom Settings" in this section.
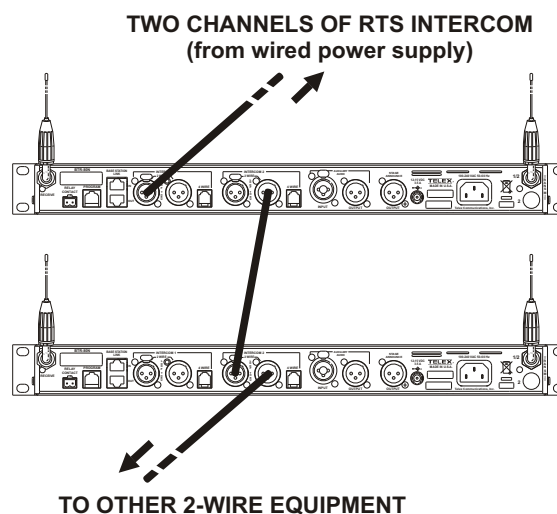

Figure 6-4
Loop-thru of Two Base Stations Connected with RTS Intercoms

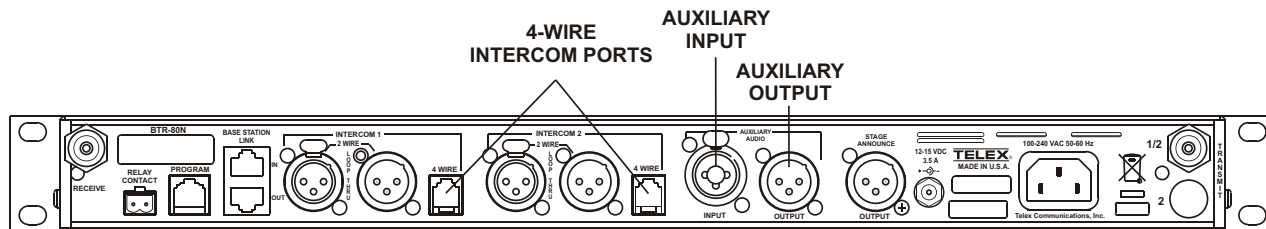The 2-wire intercom may be used at the same time as the 4-wire intercom.

Figure 6-5
BTR-80N Rear View

4-Wire Intercom Ports

The BTR-80N can connect to two 4-wire audio intercom systems. These 6-pin modular jacks (RJ-11) are designated "4 wire" under intercom 1 and 2 titles on the rear panel. (See Figure 6-5). The jacks' pinout is shown in Figure 6-6.
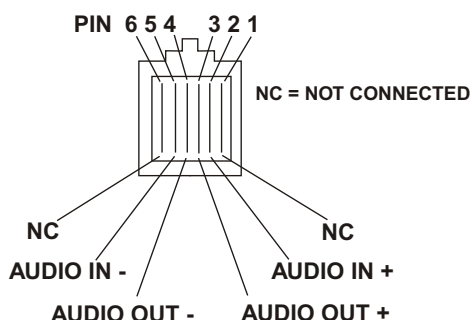

Figure 6-6
Pinout of the 4-Wire Jack

The 4-wire intercom may be used at the same time as the 2-wire intercom.

Auxiliary Input/Output

The auxiliary input jack is a combination jack. It will accept either a 3-pin XLR or 1/4" (6.3mm) plug, the expected input is a balanced line level input. The XLR plug and 1/4 plug are wired in parallel as shown in Figure 6-7.
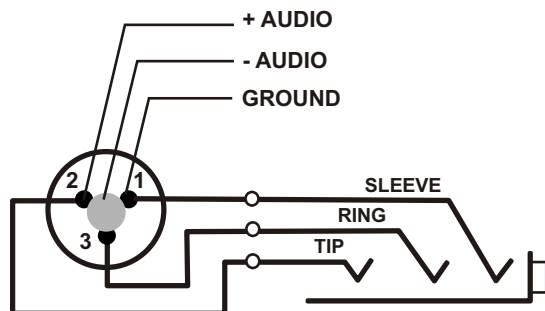

Figure 6-7
Auxiliary Input XLR and 6.3 mm Jack Pinouts

Auxiliary output is a 3-pin XLR jack. It produces a line level balanced output. Please refer to Figure 6-8 for the pin out.
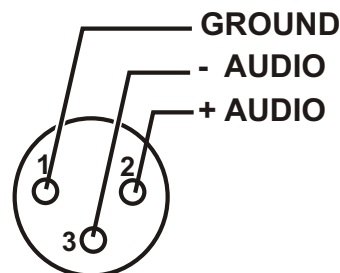
Figure 6-9

Figure 6-8
Pinout of the Auxiliary Output Jack

The auxiliary input/output can be set to local, global or off. (See the Aux Settings menu in the base). The output level is settable in software.

- **Local Aux Input** = The input audio is only heard at the base station's local headset and beltpacks.

- **Local Aux Output** = The output audio is only from the local headset and beltpacks.

- **Global Aux Input** = The input audio is heard at the base station's local headset, beltpacks and placed on the 2-wire/ 4-wire intercom.

- **Global Aux Output** = The output audio is from the base station's local headset, beltpacks and 2-wire/4-wire intercom.

- **Off** = The auxiliary input and output is off.
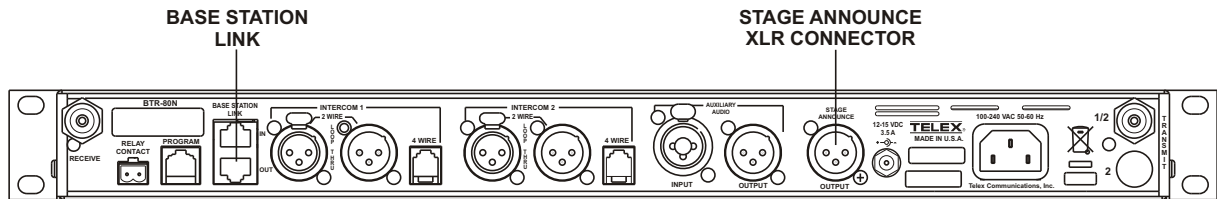
BTR-80N Rear View

Stage Announce (SA) / Relay

The stage announce 3-pin XLR connector (see Figure 6-9) is where audio exits the base from the beltpack that has pressed the [SA] button. The pinout of the plug connector is shown in Figure 6-10.
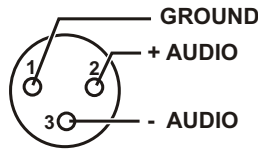
Figure 6-10
Stage Announce Pinouts

The stage announce output is balanced audio at line level. The output level is settable in software.

A relay contact closure is also activated when an beltpack user presses the [SA] button. The contacts are normally open (N.O.). The relay schematic may be seen in Figure 6-11. The rating of the relay is 1 Amp at 24 Volts AC or DC maximum.
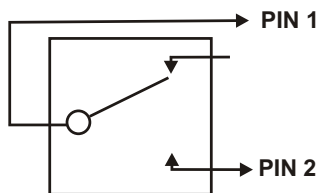
Figure 6-11
Relay Output Schematic (Normally Open)
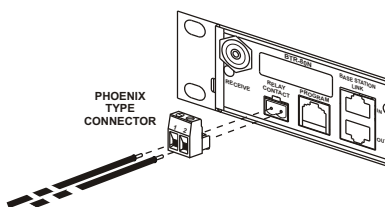
Figure 6-12
Screw Terminal Adapter

A **Phoenix** type connector (supplied) plugs into the relay contact port on the rear of the base station. This connector provides a screw-type closure for an easy connection to wires. Please see Figure 6-12.

Base Station Link

This pair of RJ-45 jacks allow the passage of wireless talk around audio (WTA), WTA termination control voltage and CAN bus data between multiple base stations. Up to 8 base station may be connected with the base station link. If just using WTA between bases, up to 16 base stations may be connected together. The pinout of the IN jack and OUT jack may be seen in Figures 6-13 and 6-14 respectively.
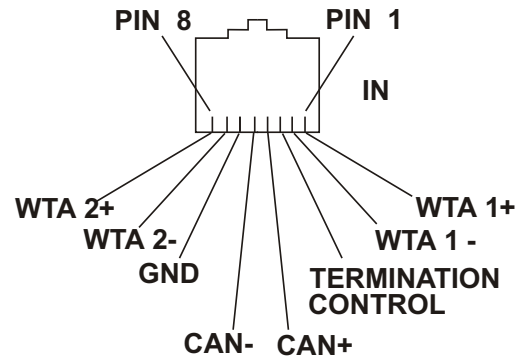
Figure 6-13
Base Station Link IN RJ-45 Jack Pinout
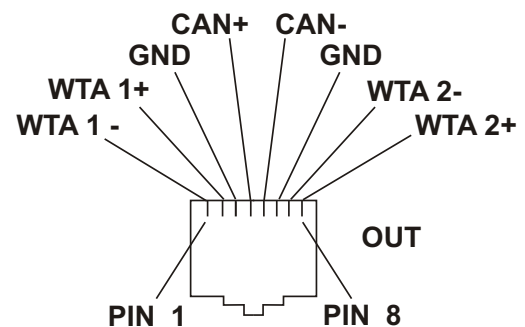
Figure 6-14
Base Station Link OUT RJ-45 Jack Pinout
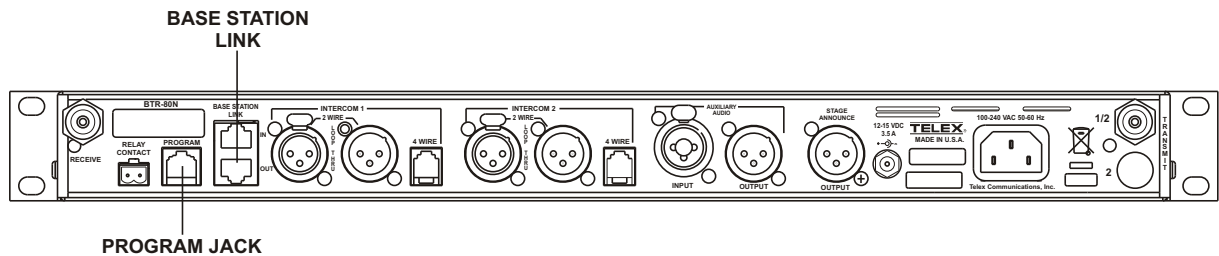
Figure 6-15
BTR-80N Base Station Link Jack and Program Jack

Base Station Link Jack

WTA 1 and WTA 2 audios in the BTR-80N are two independent 2-wire intercom channels. Up to 16 base stations may be connected together to share WTA audio. Do not confuse WTA audio with CAN bus data as only 8 base stations may be connected together to share CAN bus data. Not only does the WTA Link cable pass both channels of WTA audio, it passes a logic level so the 1st base station in the chain is the only one that provides a termination of the WTA intercom channels. Care must be taken to connect cables between base stations from the OUT of base one to the IN of base two and so forth. If the WTA link cable is passed from OUT to OUT or IN to IN the WTA audio may be terminated in multiple places and causing the WTA audio level to be greatly reduced.

The base station link jacks can interface with other base stations via two different types of cables:

● Base Link Cable (BLC)

    o   Straight thru cable that passes CAN data, WTA audio and WTA termination signal.

● CAN Bus Termination Cable (CTC)

    o   Cable that passed WTA audio and WTA termination signal but does NOT pass CAN data. Acts as a termination of the CAN networks on either side of it.

Detailed information on the pinout and operation of these cables may be found under, "Connection of Multiple Base Stations with Link Cables" later in this section.

Program Jack

This jack is only used for updating the internal software of the base station. It is typically used only by the manufacturer and service centers.
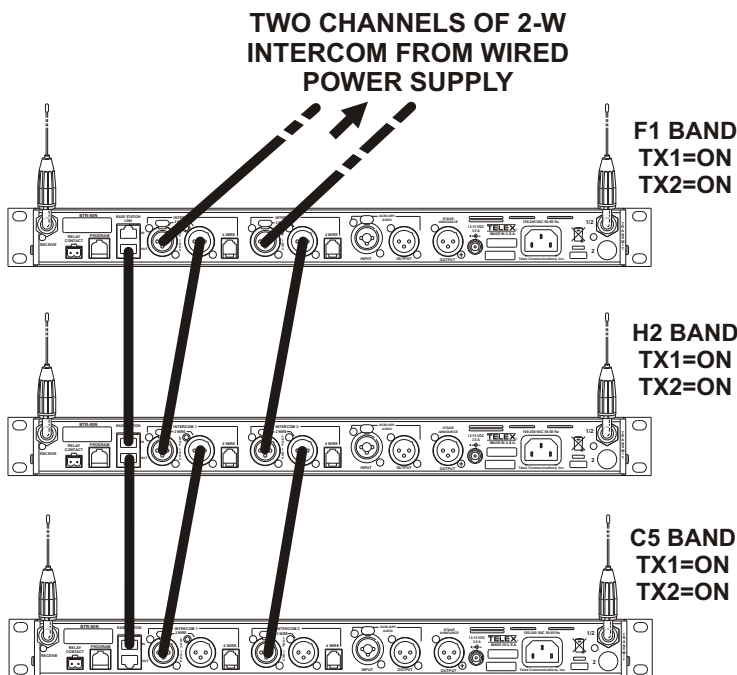
Figure 6-16
Multiple base Stations Connected via 2-Wire Cables
and Sharing WTA Audio Only

Figure 6-17
Front View - BTR-80N

Powering the Base Station

The base station may be powered two different ways:

- Line power at the IEC receptacle. Accepts 100 - 240 VAC, 1A max., 50 or 60 Hz.

- 12 - 15 VDC Power. Accepts a 5.5 mm by 2.5 mm screw on plug. Source must supply at least 3.5 Amps.

Power the base station via a press of the push button located to the far left as facing the base station.

Turn off the base station by pressing and holding the power button down for 1 second.
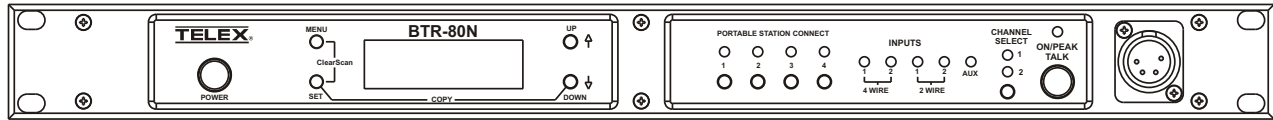
Both line power and DC power may be connected to the base station at the same time. If AC line voltage drops the base will draw power from the DC input automatically. When the AC line power is restored to the base the base will again automatically switch back to AC power. There will be no interruption of base operation during these transitions.

Warning!: Do not power-up a base station within 3 seconds of unit being turned off. Voltages within the unit need time to drop below a threshold. If powered-up within the above time, the unit may boot as the wrong frequency band.

Warning!: Even with the unit powered down via the power switch there are some circuits within the base that are energized. To completely remove power to the unit, the power cord must be disconnected.

Start-up Screen

When the BTR-80N is powered-up the 1st screen displayed is the start-up splash screen. It will be displayed for about 3 seconds. This screen contains both the software version number and band of the base. The following screen has software version sb4010C and indicates it is a F1 band unit.

Start-up Screen

After 3 seconds the status screen will appear.

NOTE: A complete screen flowchart of the base station is available in section 8 of this manual.

Status Screen

The status screen is the main information screen of the base station. It displays a number of system items:

- Frequency group of the base station
- Band of base station
- Mode of base station (Master or Servant)
- Transmitter 1 power setting
- Transmitter 2 power setting
- The beltpack's current activity
- Battery life of the beltpack(s)
- The status of the base's receivers

Status Screen

RSSI Screen

RSSI stands for Received Signal Strength Indicator. This screen displays the detected signal strength on each of the four receivers in the base.

The following are the approximate receive levels indicated by the bars after each receiver.

OFF = Receiver is deselected via the front panel
0 bar < 0.2 uV
1 bar ~ 0.6 uV
2 bars ~ 2 uV
3 bars ~ 6 uV
4 bars ~ 10 uV
5 bars > 20 uV

If no beltpacks are operating, an RSSI level of two bars or above can indicate interference on that frequency. A different receive channel should be selected for that receiver.

RSSI Screen:

1. From the status screen press and hold [MENU] for two seconds.

2. To exit the RSSI screen press [MENU] to arrive back at the status screen.

Group/Channel Selection

The group/channel, group/frequency and frequency edit screens allows the user to set the frequencies of the base station. Each screen has a slightly different way of frequency selection.

```
Group  1A  R1 Ch  01
            2  Ch  02
T1  50mW    3  Ch  03
2   50mW    4  Ch  04
```

Group/Channel Screen

Group/Channel Select

This screen displays the group number and the channel assigned to each of the four receivers. Each channel is a unique base receive frequency. The frequencies of factory-defined groups, groups 1A to 18, can only be selected from a set number of predetermined channels. User-defined groups 18u to 30u may be changed by the user to any frequency within range of the base.

Group/Channel Screen:

1. From the status screen press [MENU].

2. The main selection screen will indicate four options;

    a. GP_CH select
    b. Base Main
    c. Intercom Settings
    d. Aux Settings

3. Use the [UP]/[DOWN] arrow buttons and move the arrow to GP_CH Select. Now hit [SET].

4. This is the Group/Channel Select screen. This Group will be flashing. Use the [UP]/[DOWN] arrow buttons to select a different group, then hit [SET] to accept the change.

5. The receiver 1 channel will begin to flash. Use the [UP]/[DOWN] arrow buttons to select a channel, then hit [SET] to accept the change and move to the next receiver. After the last receive channel is set the unit will change to the group and channels selected. Then the unit will return to the main selection screen.

Group/Frequency Select

This screen displays the group number and frequencies assigned to each of the four receivers. It is just like the Group/Channel screen except the receive channels are displayed as frequencies. Also the transmit frequencies are now displayed.

```
Group  1A  R1 614.125
            2  614.450
T1  482.225 3  617.675
2   485.525 4  618.425
```

Group/Frequencies Screen

Group/Frequencies Screen:

1. From the status screen press [MENU].

2. The main selection screen will indicate four options;

    a. GP_CH select
    b. Base Main
    c. Intercom Settings
    d. Aux Settings

3. Use the [UP]/[DOWN] arrow buttons and move the arrow to GP_CH Select. Now hit [SET].

4. Press [MENU] again in the Group/Channel Screen.

5. This is the Group/Frequency Select screen. This Group will be flashing. Use the [UP]/[DOWN] arrow buttons to select a different group, then hit [SET] to accept the change.

6. The receiver 1 frequency will begin to flash. Use the [UP]/[DOWN] arrow buttons to select a frequency, then hit [SET] to accept the change and move to the next receiver. After the last receive frequency is set the unit will change to the group and frequencies selected. Then the unit will return to the main selection screen.

Frequency Edit (User-Defined Groups Only)

This screen is similar to the Group/Frequency select screen but allows the complete editing of each transmit and receive frequency.

```
Group 25u Ch1 614.100
Freq Edit  2  614.250
T1 482.300 3  615.350
2  485.650 4  618.950
```

Frequency Edit

Frequency Edit Screen:

1. From the status screen press [MENU].

2. The main selection screen will indicate four options;

    a. GP_CH select
    b. Base Main
    c. Intercom Settings
    d. Aux Settings

3. Use the [UP]/[DOWN] arrow buttons and move the arrow to GP_CH Select. Now hit [SET].

4. Press [MENU] two more times

5. This is the Frequency Edit screen. The Group will be flashing. Use the [UP]/[DOWN] arrow buttons to select a different group, then hit [SET] to accept the change.

6. The transmitter 1 frequency will begin to flash. Use the [UP]/[DOWN] arrow buttons to select a frequency, then hit [SET] to accept the change and move to the next transmitter. After transmitter 2 is set the channel 1 receiver frequency will begin to flash.

7. Use the [UP]/[DOWN] arrow buttons to select a frequency, then hit [SET] to accept the change and move to the next channel. After the last receive channel frequency is set the unit will set itself to the frequecies and return to the main selection screen. Press [MENU] at any time and the unit will change to the group and frequencies selected.

Base Main Settings

Settings contained in the base main menu are the following:

- Local headset microphone gain
- Local headset volume
- Transmit power level
- Squelch setting for each receiver
- Stage Announce (SA) audio level setting
- Receive antenna bias T power
- Base Number...Master or Servant
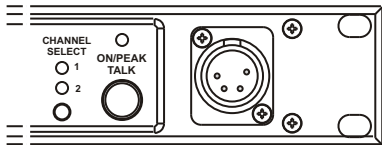
Figure 6-18 Local Headset Area of Front Panel

Talk Button

Press the front panel talk button to enable the audio path from the headset microphone. The talk light will activate when the talk button is active. This light has two functions.

Green indicates activation of the talk button.
Red or flashing red on most speech indicates too strong of input audio (Peak).

Peak Light	Microphone Gain
Light flashes on loudest speech	Okay
Light flashes on all speech	Too high
Light never flashes on norm speech	Too low

Table 6-1 Peak Light and Microphone Gain

Channel Select Button

Press this button to select the intercom channel for the local headset. Each press of the button will cycle through the options; intercom one, intercom two, both and then back to intercom one. The LEDs above the button will indicate what channel is currently connected to the local headset.

Local Headset Volume and Gain

The local headset volume and microphone gain are set in the following software screen.
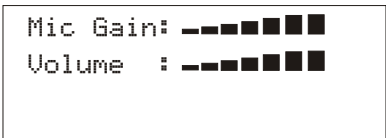
Microphone Gain/Volume

The microphone gain and volume level settings are in the following location:

1. From the status screen press [MENU].
2. Use the [UP]/[DOWN] arrow buttons and move the arrow to Base Main. Now hit [SET].
3. Use the [UP]/[DOWN] arrow buttons and move the arrow to Local Headset. Now hit [SET]/
4. The microphone gain will be flashing. Use the [UP]/[DOWN] arrow button to adjust the gain. Each press of the button is about 3 dB step increase or decrease of gain. Press [SET] when finished.
5. The volume will be flashing. Use the [UP]/ [DOWN] arrow button to adjust the volume. Each press of the button is about a 3 dB step increase or decrease of volume. Press [SET] when finished.
6. The base main selection menu screen will be shown. Press [MENU] twice to go back to the status screen. The base will default back to the status screen in 5 minutes if no action is taken.

Base Transmit Power

The base station has the following possible transmit power settings that apply to both transmitters:

- Off
- 10mW
- 50mW (Default)
- 100mW
- 249mW

The user may also set which transmitter is on or off.
The default is both transmitters on.

TX Power

These transmit power settings are in the following location:

1. From the status screen press [MENU].
2. Use the [UP]/[DOWN] arrow buttons and move the arrow to Base Main. Now hit [SET].
3. Use the [UP]/[DOWN] arrow buttons and move the arrow to Tx- Power. Now press [SET].
4. The transmit power level will be flashing. Use the [UP]/[DOWN] arrow button to adjust the level. Press [SET] when finished.
5. The transmitters on/off will now be flashing. Use the [UP]/[DOWN] arrow button to set the option. Press [SET] when finished.
6. The base main selection menu screen will be shown. Press [MENU] twice to go back to the status screen. The base will default back to the status screen in 5 minutes if no action is taken.

Squelch Settings

Each of the four receivers of the base station has four settable levels for squelch. These levels are approximately equivalent to a SINAD level to open squelch for a receiver. Basically, the higher the squelch level number is the quieter the receiver will be before it squelches, however the RF range will be slightly less than a receiver with a lower number.

- 00 = OPEN (For testing only, Do not use)
- 01 = 12 dB SINAD
- 02 = 20 dB SINAD (Default)
- 03 = 24 dB SINAD

WARNING!
DO NOT USE SQUELCH SETTING 00.
A squelch level of 00 will turn off all squelch gating. This can allow loud white noise into the audio of a base station if no transmitter is on that RF frequency or the portable select button is on. This setting is for test purposes only.

```
Squelch    R1 02
Level      R2 02
           R3 02
           R4 02
```
Squelch Setting

The squelch settings are in the following location:

1. From the status screen press [MENU].

2. Use the [UP]/[DOWN] arrow buttons and move the arrow to Base Main. Now press [SET].

3. Use the [UP]/[DOWN] arrow buttons and move the arrow to Squelch Settings. Now press [SET].

4. The receiver 1 squelch setting will be flashing. Use the [UP]/[DOWN] arrow button to adjust the setting. Press [SET] when finished. Set the other three receivers the same way.

5. After the last receiver is set, the base main selection menu screen will be shown. Press [MENU] twice to go back to the status screen. The base will default back to the status screen in 5 minutes if no action is taken.

Squelch Note: The base employs two different types of squelches. A fast acting noise type squelch and a slower data squelch. For audio to be received by the base both a good signal-to-noise audio signal (with a noise threshold set via the usersquelch settings above) and a valid data stream must be detected.

Stage Announce Level
The software option will allow the user to adjust the audio output level of the rear panel stage announce (SA) jack.

```
SA Level   :▄■■■■
Antenna Pwr:Off
Base No  : 01 Master
```

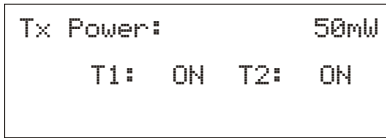The stage announce level is in the following menu path:

1. From the status screen press [MENU].

2. Use the [UP/[DOWN] arrow buttons and move the arrow to Base Main. Now press [SET}.

3. Use the [UP]/[DOWN] arrow buttons and move the arrow to More...Now press [DOWN] again.

4. The stage announce (SA) level will be flashing. Use the [UP]/[DOWN] arrow button to adjust the setting. Each press of the button is about a 6 dB step increase or decrease of volume. Press [SET] when finished.

5. Step through the other setting in the screen by pressing [SET]. After the last option on the screen the display will return to the base main selection menu. Press [MENU] twice to go back to the status screen. The base will default back to the status screen in 5 minutes if no action is taken.

Antenna Power
Antenna power may be set On or Off. If antenna power is on 9VDC is placed on the center pin of the receive antenna. The purpose of this Voltage is to power in-line low noise amplifiers on the receive coaxial cable in order to compensate for excessive RF signal loss due to long cable runs. The default is off.

Specifications of the power on the antenna jack:

Options: On/Off (Off = Default)

Voltage: 9 VDC

Current: 100mA Max.

Protection: Current limited to 100mA.
              Base can withstand a continuous short to ground without damage.

```
SA Level   :▄■■■■
Antenna Pwr:Off
Base No  : 01 Master
```
Antenna Power

The antenna power is in the following area of the software menus:

1. From the status screen press [MENU].

2. Use the [UP]/[DOWN] arrow buttons and move the arrow to Base Main. Now press [SET].

3. Use the [UP]/[DOWN] arrow buttons and move the arrow to more.... Now press [DOWN] again.

4. The stage announce (SA) level will be flashing. Press [SET] to arrive at the Antenna Power option flashing. Use the [UP]/[DOWN] arrow button to adjust the setting. Press [SET] when finished.

5. Step through next setting in the screen by pressing [SET]. The display will return to the base main selection menu. Press [MENU] twice to go back to the status screen. The base will default back to the status screen in 5 minutes if no action is taken.

CAN Bus Number

The CAN bus number for a base station must be set only in multiple base station configurations and only if the operator wishes to have the following features shared among multiple base stations.

- First - On - Latch - Out of receiver channels (Push-to-transmit mode).

- Automatic beltpack TX power control.

- Automatic beltpack user ID assignment.

- Beltpack TX and Talk shutdown via the base front panel.

The valid base number settings are listed in Table 6-2. Please see "Connection of Multiple Base Station with Link Cables" within Section 6 for more information.

Base Number	Function
01	Master
02	Servant
03	Servant
04	Servant
05	Servant
06	Servant
07	Servant
08	Servant
09	Unassigned (Default)

Table 6-2
Valid Base Number Settings

```
SA Level   : ━━■■■■
Antenna Pwr:Off
Base No  : 01 Master
```

Base Number

1. From the status screen press [MENU].

2. Use the [UP]/[DOWN] arrow buttons and move the arrow to Base Main. Now press [SET}.

3. Use the [UP]/[DOWN] arrow buttons and move the arrow to More...Now press [DOWN] again.

4. Press [SET] until you arrive at the Base Number option flashing. Use the [UP]/[DOWN] arrow button to set the number. Press [SET] when finished.

5. The display will return to the base main selection menu. Press [MENU] twice to go back to the status screen. The base will default back to the status screen in 5 minutes if no action is taken.

Intercom Settings

There are multiple parameters to set in the Intercom Setting menu:

- 2-wire intercom type: Telex, RTS, Clear-Com, Off.

- Only intercom 1 active, only intercom 2 active, both active, both off.

- 2-wire intercom input/output levels

- 4-wire intercom on/off.

- 4-wire intercom input/output levels

2-wire Intercom

The screens below show the progression of setting 2-wire parameters.

```
⟶ 2W Intercom:
   4W Intercom:
```

```
2W Intercom:    TELEX
   Ic1: ON IC2: ON
```

```
2W Ic1 In:  ━━■■■■
2W Ic1 Out: ━━■■■■
 2W Ic2 In:  ━━■■■■
2W Ic2 Out: ━━■■■■
```

2-Wire Intercom

The 2-wire intercom settings are in the following area of the software menus:

1. From the status screen press [MENU].

2. Use the [UP]/[DOWN] arrow buttons and move the arrow to Intercom Settings. Now press [SET].

3. Use the [UP]/[DOWN] arrow buttons and move the arrow to 2-W. Now press [SET].

4. The two 2-wire intercom type will be flashing. Use the [UP]/[DOWN] arrow buttons to set the intercom type. Press [SET] when finished. If off is selected the user will be placed back at the 2-W/4-W selection menu.

5. The intercom channel will be flashing. Use the [UP]/[DOWN] arrow buttons to set the intercom 1 only, intercom 2 only or both. Press [SET] when finished.

6. The intercom input level will be flashing. Use the [UP]/[DOWN] arrow buttons to set the input level. Press [SET] when finished. Proceed through the intercom setting in a similar manner.

7. After the last level on the screen the display will return to the 2-W/4-W selection menu. Press [MENU] twice to go back to the status screen. The base will default back to the status screen in 5 minutes if no action is taken.

4-Wire Intercom

The screens below show the progression of setting 4-wire parameters.

```
        2W Intercom
───→ 4W Intercom
```

```
4W IC1:         On
 4W IC1 IN:  ▬▬▬▬■■■
4W IC1 OUT:  ▬▬▬■■■■
```

```
4W Ic2:         On
 4W IC2 IN:  ▬▬▬■■■■
4W IC2 OUT:  ▬▬▬■■■■
```

The 4-wire intercom settings are in the following area of the software menus:

1. From the status screen press [MENU].

2. Use the [UP]/[DOWN] arrow buttons and move the arrow to Intercom Settings. Now press [SET].

3. Use the [UP]/[DOWN] arrow buttons and move the arrow to 4W. Now press [SET].

4. The intercom one 4-wire on/off selection will be flashing. Use the [UP]/[DOWN] arrow buttons to set it on or off. Press [SET] when finished. If off is selected the user will skip to the intercom two screen..

5. The intercom input level will be flashing. Use the [UP]/[DOWN] arrow buttons to set the input level. Press [SET] when finished. Proceed through the intercom output settings in a similar manner.

6. Now the intercom two 4-wire on/off selection will be flashing. Use the [UP]/[DOWN] arrow buttons to set it on or off. Press [SET] when finished. If off is selected the user will skip to the 2W/4W selection screen

7. The intercom input level will be flashing. Use the [UP]/[DOWN] arrow buttons to set the input level. Press [SET] when finished. Proceed through the intercom output settings in a similar manner.

8. After the last level on the screen the display will return to the 2W/4W selection menu. Press [MENU] twice to go back to the status screen. The base will default back to the status screen in 5 minutes if no action is taken.
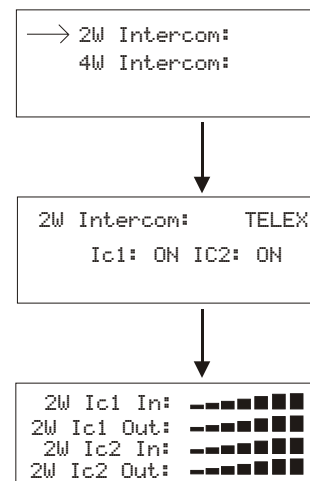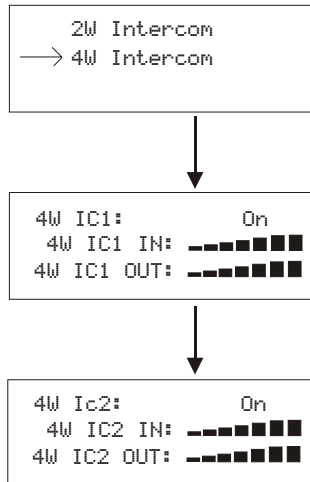
Auxiliary Settings

The parameters to set in the auxiliary setting menu are the following:

● Intercom 1 Auxiliary mode: Local, Global or Off.
● Intercom 2 Auxiliary mode: Local, Global or Off.
● Auxiliary input/output levels.

The auxiliary setting for Local, Global and Off are defined as the follows:

● Local = Any audio placed into the auxiliary input port is routed only to the base's local headset and beltpack(s). Any audio heard out of the auxiliary output port is only from the base's local headset and beltpacks(s).

● Global = Any audio placed into the auxiliary input port is routed not only to the base's local headset and beltpack, but also to any wired 2-wire or 4-wire system connected to the base station. Any audio heard from the auxiliary output is not only from the base's local headset and beltpack, but also from any wired 2-wire or 4-wire system connected to the base station.

● Off = The auxiliary input and output for the intercom channel is disabled.

```
IC1 Aux Mode: Global
IC2 Aux Mode: Local
Aux In:  ▬▬▬■■■■
Aux Out: ▬▬▬■■■■
```
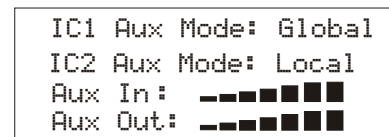
The auxiliary settings are in the following area of the software menus:

1. From the status screen press [MENU].

2. Use the [UP]/[DOWN] arrow buttons and move the arrow to Aux Settings. Now press [SET].

3. The intercom one auxiliary local, global or off selection will be flashing. Use the [UP]/[DOWN] arrow buttons to select the option. Press [SET] when finished. Proceed through intercom two in a similar manner.

4. The auxiliary input level will be flashing. This level applied to both intercom channels. Use the [UP]/[DOWN] arrow buttons to set the input level. Press [SET] when finished.

5. The auxiliary output level will now be flashing. This level applies to both intercom channels. Use the [UP]/[DOWN] arrow buttons to set the output level. Press [SET] when finished.

6. After the last level on the screen the display will return to the main selection menu. Press [MENU] twice to go back to the status screen. The base will default back to the status screen in 5 minutes if no action taken.

ClearScan™

When ClearScan™ is activated the base will shut down its transmitters and begin scanning receive frequencies. The frequencies it scans are those in its factory-defined groups and any user-defined groups that have at least one frequency defined. The result is a screen like that shown in Figure 6-19. The first group shown will be the one with the most clear receive channels. Using the arrow buttons, the next group down is the one with next most clear frequencies and so forth.

Key Sequence: Press and hold [MENU] + [SET] for three seconds to start ClearScan™.

The process may take up to 12 seconds to complete. It depends on how many user-defined groups are set-up. The more groups the longer the scan will take.

```
              ClearScan™
        ┌──────────────────────┐
        │████████████          │
        └──────────────────────┘
                  │
                  ▼
   ┌──────────────────────────┐
   │ Group 01A    01  05  09   │
   │ OK?=[SET]    02      10   │
   │ ↑ Prev          07  11   │
   │ ↓ Next      04  08  12   │
   └──────────────────────────┘
```
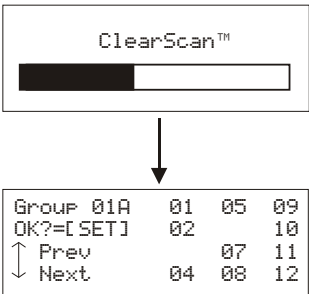
ClearScan™ Results Screen

The base will not be set to the displayed ClearScan™ result if the user presses the [MENU] button to bail out.

Lockout

This function locks out a user from changing any options at the base station except local headset microphone gain and volume.

Key Sequence: Press and hold the [UP] + [DOWN] buttons for 2 seconds to lock or unlock the base station.

A padlock will appear on the status screen if the base is locked.

```
   ┌────────────────────────────┐
   │ Group 25u  R1 Ch1   ████   │
   │ F1   🔒 M   R2 Ch12  ▭      │
   │ T1 50mW    R3 SA    ██     │
   │ T2 50mW    R4 OFF          │
   └────────────────────────────┘
```

Status Screen with Lockout Active

Copy

Press and hold the [SET] + [DOWN] buttons for 2 seconds only in the group/channel select screen and the following screen will appear:

```
   ┌────────────────────────────┐
   │ Group  1A  R1 Ch  01       │
   │ Copy to:   2  Ch  02       │
   │ T1  50mW   3  Ch  03       │
   │ 2   50mW   4  Ch  04       │
   └────────────────────────────┘
```

This allows the user to select a factory defined group and copy it to a user-programmed group. Now the user could edit that group slightly if desired.

1st Use Defaults

This function sets the base station to Group 01A, channels 1, 2, 3, 4 and RETAINS any user-defined groups in memory. It will set the unit to factory defined parameters.

Key Sequence: Press and hold [MENU] while turning on the base station. Release button after "...Factory Setup..." is displayed

Factory Defaults

This function sets the base station to Group 01A, channels 1, 2, 3, 4, and ERASES any user defined groups in memory. It will set the unit to factory defined parameters.

Key Sequence: Press and hold [MENU] + [SET} + [UP] + [DOWN] for 2 seconds.

The following screen will be flashed before the unit reboots.

```
   ┌────────────────────────────┐
   │                            │
   │     ...Factory Setup...    │
   │                            │
   └────────────────────────────┘
```
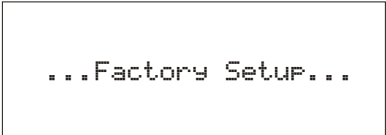
Factory Defaults

Connection of Multiple Base Stations with the Link Cables

This section discusses various configurations of multiple base stations using link cables. Multiple base stations may be connected via standard 2-wire and 4-wire intercoms without additional link cables between them. They will still transmit and receive intercom 1 and 2 audio normally from the beltpacks.
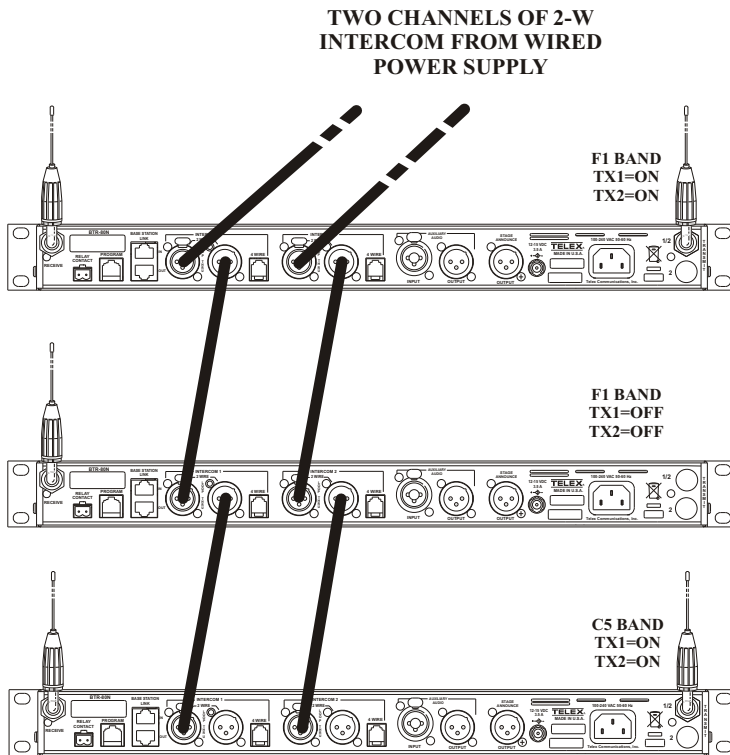
Figure 6-19
Multiple base stations with only 2-wire intercom channels 1 and 2 connected between them.

However by connecting multiple bases together via link cables, in addition to any 2-wire or 4-wire audio connections in use, the feature set of a single base becomes available to the whole system. This feature set also includes base stations that have their transmitters off in order to conserve RF spectrum.

These features are:

- Wireless talk around (WTA) channels 1 and 2 shared between base stations.

- First-On-Latch-Out of beltpacks extended to base stations with their TXs off (when beltpack(s) are in push-to-transmit mode).

- Automatic beltpack TX power control extended to base stations with their TXs off.

- Automatic beltpack user ID assignment extending to base stations with their TXs off.

- Beltpack TX and Talk shutdown via the base front panel extended to base stations with their TXs off (when beltpack(s) are in push-to-transmit mode).

- Beltpack TX and Talk shutdown via the base front panel extended to base stations with their TXs off (when beltpack(s) are in push-to-transmit mode).

- Beltpack Talk shutdown via the base front panel extended to base stations with their TXs off (when beltpack(s) are in push-to-talk mode).

Before the configurations are presented, a discussing on RF data links plus master and servant base stations will be helpful in understanding the multiple base arrangements.

Over-the-Air Data Links

There are two RF data communication links within a BTR-80N system.

- Beltpack-to-base conveys:
    - o Current button(s) selected
    - o Battery level
    - o Beltpack ID set confirmation

- Base-to-beltpack conveys:
    - o Beltpack user ID
    - o Beltpack TX power level
    - o Beltpack TX and/or Talk shutdown
    - o First-On-Latch-Out
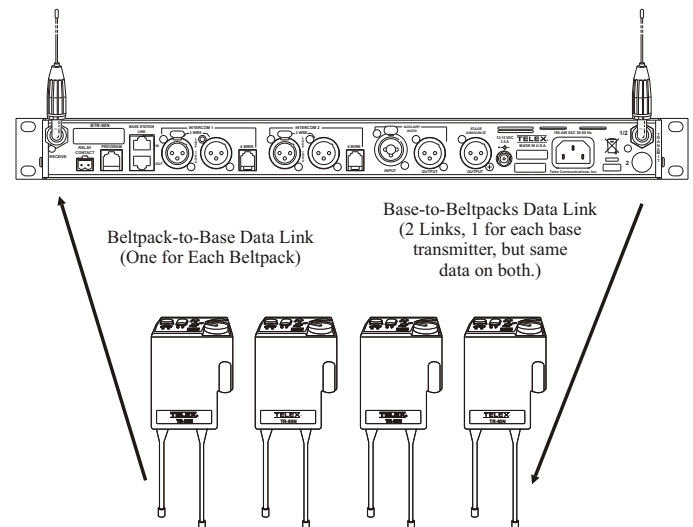
Figure 6-20
Base-to-Beltpack and Beltpack-to-Base RF Data Links.

These two data paths are intact when there is only one base communicating to beltpacks. They are also intact when many base stations on different TX and RX frequencies are communicating to their beltpacks. However in a system with one or more base stations with their transmitters off, the base-to-beltpack data link is lost for these beltpacks.
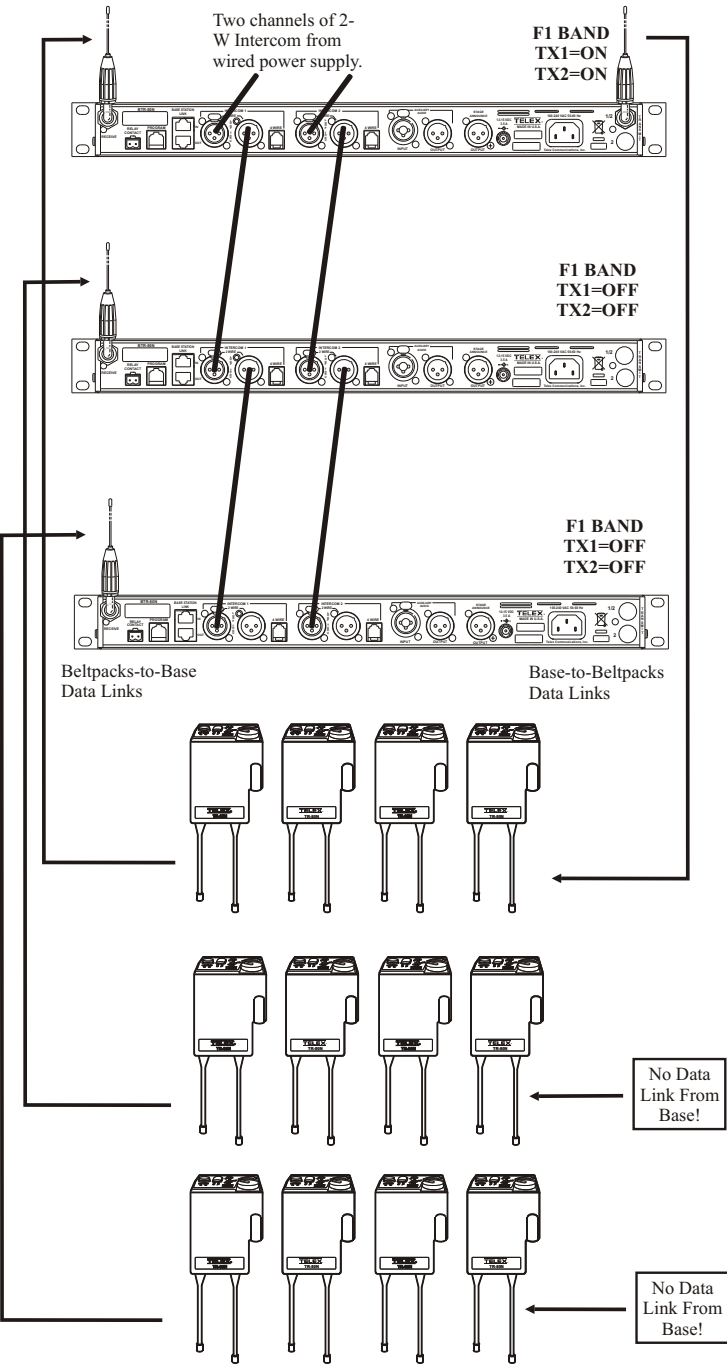
Figure 6-21
Three base stations connected via 2-wire intercom only. Two bases have their transmitter off; one has its transmitters on.

A wired data link is needed to communicate the base-to-beltpack information from the base stations' with their transmitters off to the base with its transmitters on.

Master and Servant Base Stations

A **master base station** is one that the user has set its base number to 01 (Master) and has its transmitters on. A master base conveys base-to-beltpack data to its beltpacks and, via a base station link cable, relays the base-to-beltpack data from base stations that have their base transmitters off. A master may support up to 7 additional base stations with their transmitters off. **There can be only one master base station in a network of base stations.** A master base will automatically set a 09 (default) base to a unique 02 to 08 servant number. If a base is already a servant the master will leave it at that same number.

Base Number	Function
01	Master
02	Servant
03	Servant
04	Servant
05	Servant
06	Servant
07	Servant
08	Servant
09	Unassigned (Default)

Table 6-3 Valid Base Number Settings

Figure 6-22
Status screen of a master designated base station. Note the "M" below the group number.

Anytime a base station is changed to be a master base it must be POWER CYCLED for the change to take affect.

A **servant base station** is one that has its transmitters off and is connected to a master base. Since servant's base stations have their transmitters off, base-to-beltpack information can only get to beltpacks via link cables to a master base station. There can be up to seven servants that will work with one master base.

```
Group  1A  R1 Ch1   ████
F1     02  R2 Ch12  ▢
T1 Off     R3 Ch1   ████
T2 Off     R4 Ch2   ████
```

Figure 6-23
Status screen of a servant base station. Note the servant number below the group number.

A servant or master base is set via the **Base Main** menu screen in the base station.

Status Screen

```
Group  1A  R1 Ch1   ████
F1     M   R2 Ch12  ▢
T1 50mW    R3 SA    ████
T2 50mW    R4 OFF
```

[MENU] ↓

```
  GP_CH Select
→ Base Main
  Intercom Settings
  Aux Settings
```

[SET] ↓

```
  Local Headset
  Tx Power
  Squelch Settings
→ More...
```

[DOWN] ↓

```
SA Level  : ─■■■■■
Antenna Pwr  Off
Base No : 01 Master
```
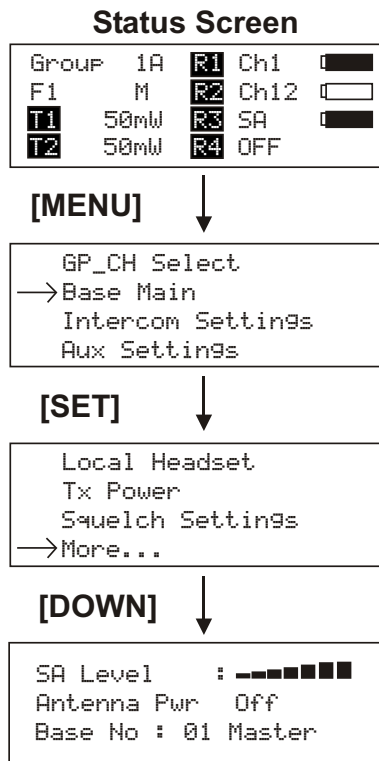
Figure 6-24
How to get to the master / servant selection screen.

From the factory, base stations are set to base number 09. This is an **unassigned base.** This base can be left as 09 if not in a linked system and will work normally with all features available to it. If connected to a master base station the master will automatically assign a valid, unique, servant ID to an unassigned base the first time the networked system is powered-up.

The master base must always power-up after the servant bases in order to detect that there are servant units to control. If all the units are on a common power strip, this is controlled by a built in delay on master base station. The master base station will always boot slower than servant units.

CAN bus

A Controller Area Network (CAN) bus is the data protocol used over the BTR-80N's base station link cable. This balance protocol is a robust standard used the world over in high noise, extreme environments. It requires the use of 120 Ohm terminators at the beginning and end of a CAN bus network.

Pin	Function
1	WTA 1+
2	WTA 1-
3	TERM CONT.
4	CAN+
5	CAN-
6	GND
7	WTA 2-
8	WTA 2+

RJ-45 Plug
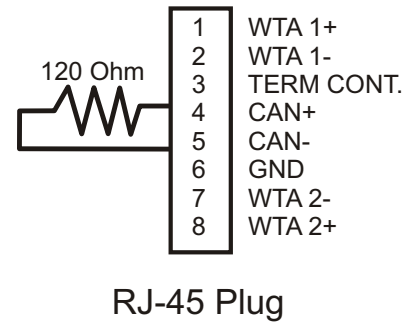
Figure 6-25
CAN Bus 120 Ohm termination (CAN-T) and base pin functions. Part Number: PRD000223002 (Not Supplied)
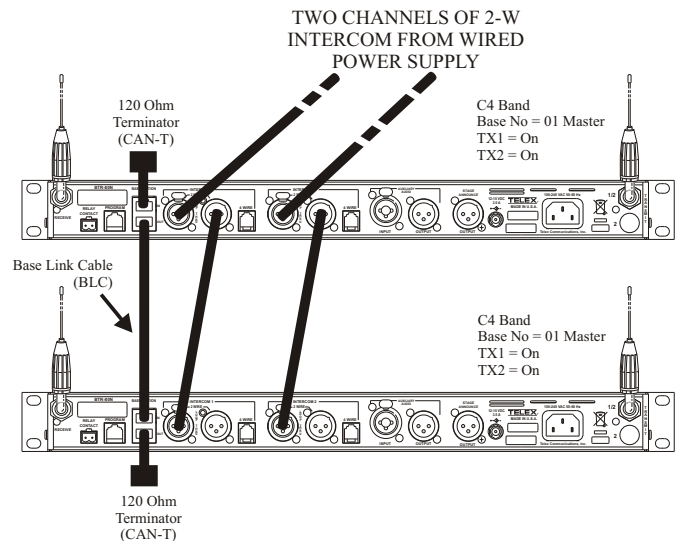
Figure 6-26
A base link cable connected system with terminators on both end.

Base Station Link Configurations

Multiple base stations networks may be connected in different ways. Using the rear panel Base Station Link jacks, a user has three different connection options.

These options are:

- **Wireless Talk Around (WTA) Audio Only**
  - o Bases connected via 2-wire and/or 4-wire audio links
  - o All bases share WTA audio
  - o They do **NOT** share CAN bus data.

- **WTA and a SINGLE CAN Bus Network**
  - o Bases connected via 2-wire and/or 4-wire audio links
  - o All bases share WTA audio
  - o All bases are **ON A SINGLE CAN BUS NET-WORK**.

- **WTA and Several CAN Bus Networks**
  - o Bases connected via 2-wire and/or 4-wire audio links
  - o All bases share WTA audio
  - o There are **MORE THAN ONE CAN BUS NETWORK**.

Base Station Link Jacks
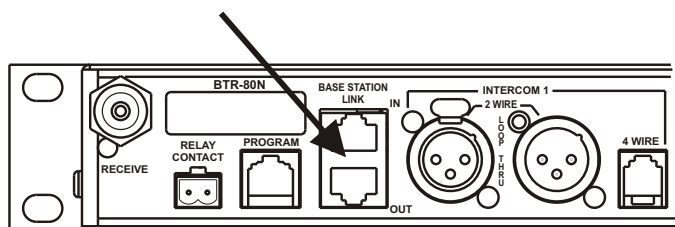
Figure 6-27
Base station link input and output jacks on the rear of the BTR-80N

Wireless Talk Around (WTA) Audio Only

These base stations are connected to share WTA channel 1 and WTA channel 2 audio but do not share the CAN bus data.

Link Overview

WTA 1 and WTA 2 audios in the BTR-80N are two independent 2-wire intercom channels. The WTA intercom channels are very similar to AudioCom types of intercom except they are dry and are meant to only pass audio between BTR-80N base stations. Up to 16 base stations may be connected together with base link cables (BLC) depending on cable length and conductor size. The BLC passes both channels of WTA audio. It also passes a logic level so the 1st base station in the chain is the only one that provides a termination of the WTA intercom channels. This pin is labeled "TERM CONT" on the

RJ-45 plug pin outs in this section. Care must be taken to connect cables between base stations from the OUT of base one to the IN of base two and so forth unit to unit. If the WTA link cable is passed from OUT to OUT or IN to IN the WTA audio will be terminated in multiple places and cause the WTA audio levels to be greatly reduced/distorted.
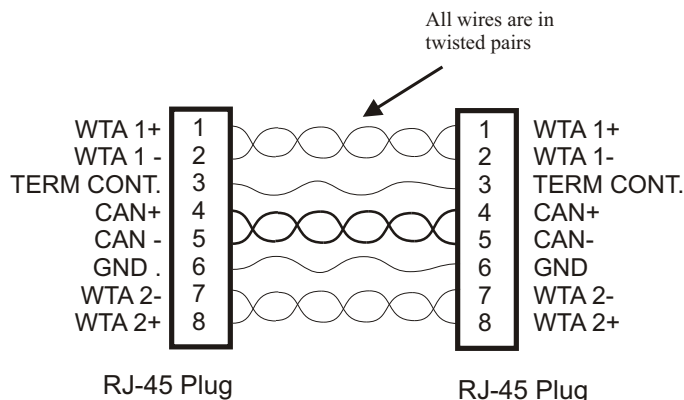
Figure 6-28
Base Link Cable (BLC) and pin functions. Part Number: PRD000223000 (Not Supplied).

If base stations are a longer distance apart, greater than the 12" (30.48 cm) BLC, then 568-A or 568-B Ethernet cables of CAT 5E or above may be use for the base link cables. These Ethernet cables contain 4 twisted pairs exactly like the BLC cable. Ethernet cables may be used to connected base stations that are up to 300 feet apart.
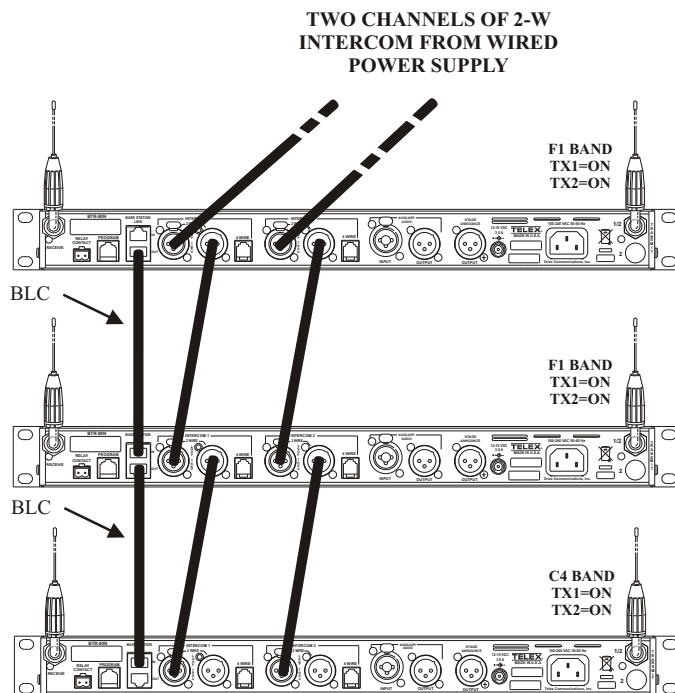
Figure 6-29
Multiple base stations connected via 2-wire audio cable and WTA through via BLCs.

The base station link does not need terminations if only WTA audio is planned to be passed between base stations. There also must not be any base stations set to base number 01 (Master). This is because CAN bus is connected through to the other base stations with a BLC as can be seen in the figure. If there are no masters on the CAN bus system, no activity will be on the CAN bus line, thus no need for terminations.

Setup

1. Connect power to the base stations. Keep power off to the units.

2. Connect the transmit and receive antennas to the base stations. The color dots on the rear of the base should match the color ring of the antennas.

3. Connect the main intercom audio channel(s) to the base stations. This may be 2-wire intercom. This could also be 4-wire intercom via matrix type wired system.

4. Connect the Base Link Cable (BLC) between base stations. Remember to connect from the OUT of the 1st base station to the IN of 2nd base and follow the same connection pattern forward.

5. Power-up all the base stations.

6. The base stations should be set to all unique transmit and receive frequencies.

7. Setup via the BTR-80N software menus the intercoms, local headset, auxiliary, stage announce, etc. as detailed in "BTR-80N Operation" in Section 6.

8. All the base station numbers should be left as 09 (default).

9. Turn on a beltpack and only one beltpack. Try to keep the beltpacks at least 6' (2 meters) away from the base's antennas. Set the beltpack on the appropriate group and channel for its base station.

   As each beltpack is set to its group and channel, an hourglass symbol will appear on the base display in the location normally occupied by the battery symbol. A beltpack will be assigned an ID number by the base in this time. Finally a normal battery symbol will be displayed, indicated the beltpack has been assigned its ID number.

10. Once this 1st beltpack has an ID number, turn it off. Now turn on the next beltpack and set it up as in step 9. Continue this same process until all the beltpacks are set to the proper group / channels and have been assigned their IDs. Now all the beltpacks may be powered-up.

END.

WTA and a SINGLE CAN Bus Network

These base stations that may be connected via 2-wire and/or 4-wire audio links. They are also connected together via the Base Link Cable (BLC). This cable passes WTA audio and CAN bus data information. The CAN bus connected base stations together form a Network.

Link Overview

There are two RF data communication links with a BTR-80N system. They are the beltpack-to-base and the base-to-beltpack links. The beltpack-to-base links convey information such as current button(s) selected, battery level, etc. The base-to-beltpack links convey beltpack user ID, beltpack TX shutdown, beltpack Talk shutdown and other information

These two data paths are intact when there is only one base communicating to beltpacks. They are also intact when many base stations on different TX and RX frequencies are communicating to their beltpacks. However when one or more base stations that have their transmitters off are connected to a base station with its transmitters on, the base-to-beltpack data link is lost for these beltpacks.
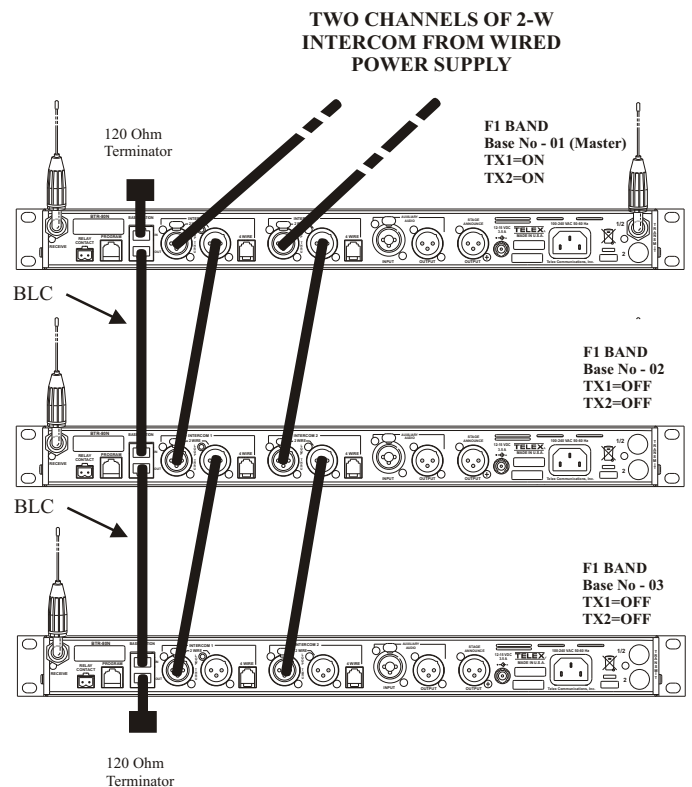
Figure 6-30
Multiple base stations connected via 2-wire audio cable and WTA plus CAN through via BLCs.

Care must be taken to connect cables between base stations from the OUT of base one to the IN of base two and so forth unit to unit. If the WTA link cable is passed from OUT to OUT or IN to IN the WTA audio will be terminated in multiple places and cause the WTA audio levels to be greatly reduced/distorted.

The master base must always power-up after the servant bases in order to detect that there are servant units to control. If all the units are on a common power strip, this is controlled by a built in delay on master base station. The master base station will always boot slower than servant units.

Setup

1. Connect power to the base stations. Keep power off to the units.

2. Connect the transmit and receive antennas to the base stations. The color dots on the rear of the base should match the color ring of the antennas.

3. Connect the main intercom audio channel(s) to the base stations. This may be 2-wire intercom. This could also be 4-wire intercom via matrix type wired system.

4. Connect the Base Link Cable (BLC) between base stations. Remember to connect from the OUT of the 1st base station to the IN of 2nd base and following the same connection pattern forward.

5. Place CAN bus termination plugs (CAN-T) at the beginning and end of the networked base stations.

6. Power-up all base stations and set all to factory defaults via a four button reset; [MENU] + [SET] + [UP] + [DOWN]. Now power down all the bases.

7. Power-up the 1st servant base station. Set the servant base station to all unique receive frequencies. The transmitters will be set to OFF automatically when the master base takes control of them. Leave the base number at the default of 09.

8. Setup via the BTR-80N software menus the intercoms, local headset, auxiliary, stage announce, etc. as detailed in "BTR-80N Operation" in Section 6. Leave the base station powered-up.

9. Power-up the master base station. Set the base to all unique transmit and receive frequencies. Setup via the BTR-80N software menus the intercoms, local headset, auxiliary, stage announce, etc. as detailed in "BTR-80N Operation" in Section 6.

10. Set the base station with its transmitters to be on to master, base number 01.

11. Cycle the power of the master base only, while leaving the single servant base powered-up.

12. The master base, on boot, will take control of the servant base and assign it the base ID of 02 and turn its transmitters off. Now proceed to power-up the next servant base station and go to step 7 above for each servant base. Always leave the previously assigned servant base stations powered-up when going on to the next base.

The **master base must always power-up after the servant bases** in order to detect that there are servant units to control. If all the units are on a common power strip, this is controlled by a built in delay on master base station. The master base station will always boot slower than servant units. Try to keep the beltpacks at least 6' (2 meters) away from the base's antennas.

13. Turn on a beltpack and only one beltpack. Set the beltpack on the appropriate group and channel for its base station.

    As each beltpack is set to its group and channel, an hourglass symbol will appear on the base display in the location normally occupied by the battery symbol. A beltpack will be assigned an ID number by the base in this time. Finally a normal battery symbol will be displayed, indicated the beltpack has been assigned its ID number.

14. Once this 1st beltpack has an ID number, turn it off. Now turn on the next beltpack and set it up as in step 13. Continue this same process until all the beltpacks are set to the proper group / channels and have been assigned their IDs. Now all the beltpacks may be powered-up.

END.

WTA and Several CAN Bus Networks

These base stations may be connected via 2-wire and/or 4-wire audio links. They are also connected together via the Base Link Cable (BLC) and a new cable called the CAN Bus Termination Cable (CTC).
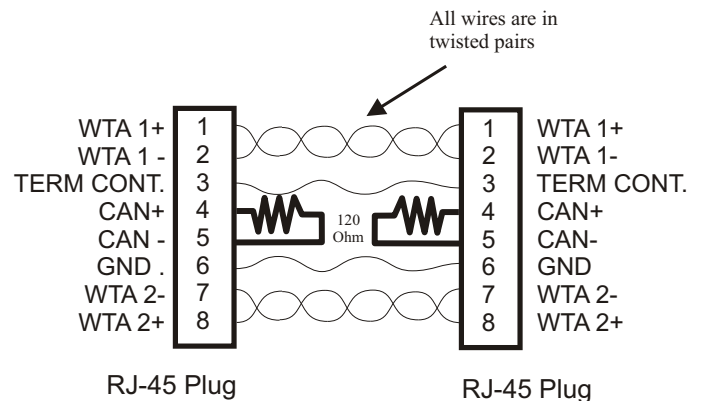
Figure 6-31
CAN Bus Termination Cable (CTC). Part Number: PRD000223001 (Not Supplied)

Link Overview

Multiple masters on the same CAN bus is not allowed. The two different cables solve this issue. The BLC passes WTA audio and CAN bus data information. The CTC only passes WTA audio and also functions to terminate the CAN network on either side of it. This allows many separate CAN networks to share the same two WTA audio channels.

Care must be taken to connect cables between base stations from the OUT of base one to the IN of base two and so forth unit to unit. If the WTA link cable is passed from OUT to OUT or IN to IN the WTA audio will be terminated in multiple places and cause the WTA audio levels to be greatly reduced/distorted.

The master base must always power-up after the servant bases in order to detect that there are servant units to control. If all the units are on a common power strip, this is controlled by a built in delay on master base station. The master base station will always boot slower than servant units.

Setup

Setup is the same as the previous, "WTA and a SINGLE CAN Bus Network" section with the exception of a CTC cable between the two CAN networks.

1. Connect power to the base stations. Keep power off to the units.

2. Connect the transmit and receive antennas to the base stations. The color dots on the rear of the base should match the color ring of the antennas.

3. Connect the main intercom audio channel(s) to the base stations. This may be 2-wire intercom. This could also be 4-wire intercom via matrix type wired system.

4. Connect the Base Link Cable (BLC) between base stations within a CAN network. Remember to connect from the OUT of the 1st base station to the IN of 2nd base and following the same connection pattern forward.

5. Connect the CAN Bus Termination Cable (CTC) **BETWEEN** the CAN networks. Remember to connect from the OUT of the base station to the IN of next base.

6. Place CAN bus termination plugs (CAN-T) at the beginning and end of the multiple connected networks.

7. Power-up all base stations and set all to factory defaults via a four button reset; [MENU] + [SET] + [UP] + [DOWN]. Now power down all the bases.
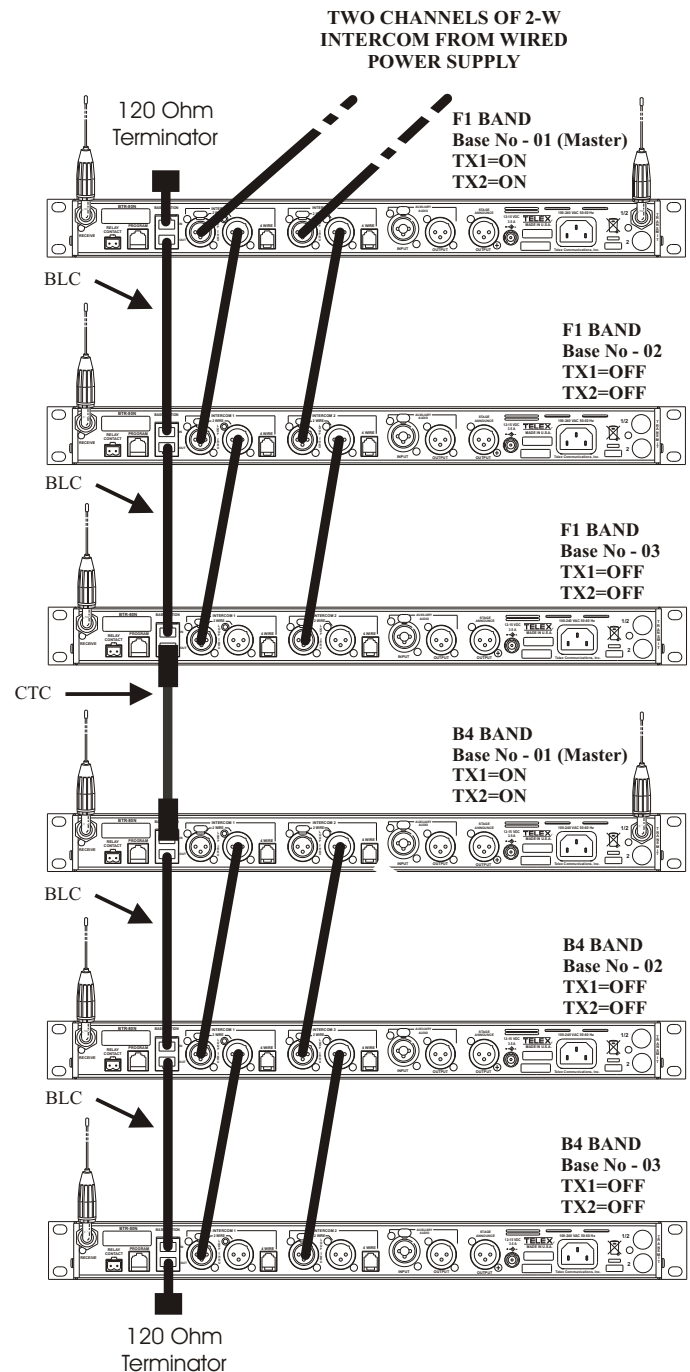
Figure 6-32
Multiple base stations connected via 2-wire audio cable and two CAN Bus networks.

8. For the 1st network of base stations, power-up the 1st servant base station. Set the servant base station to all unique receive frequencies. The transmitters will be set to OFF automatically when the master base takes control of them. Leave the base number at the default of 09.

9. Setup via the BTR-80N software menus the intercoms, local headset, auxiliary, stage announce, etc. as detailed in "BTR-80N Operation" in Section 6. Leave the base station powered-up.

10. Power-up the master base station. Set the base to all unique transmit and receive frequencies. Setup via the BTR-80N software menus the intercoms, local headset, auxiliary, stage announce, etc. as detailed in "BTR-80N Operation" in Section 6.

11. Set the base station with its transmitters to be on to master, base number 01.

12. Cycle the power of the master base only, while leaving the single servant base powered-up.

13. The master base, on boot, will take control of the servant base and assign it the base ID of 02 and turn its transmitters off. Now proceed to power-up the next servant base station and go to step 8 above for each servant base. Always leave the previously assigned servant base stations powered-up when going on to the next base.

   The **master base must always power-up after the servant bases** in order to detect that there are servant units to control. If all the units are on a common power strip, this is controlled by a built in delay on master base station. The master base station will always boot slower than servant units.

14. Go to step 8 above for each additional network.

15. Turn on a beltpack and only one beltpack on the 1st network system. Try to keep the beltpacks at least 6' (2 meters) away from the base's antennas. Set the beltpack on the appropriate group and channel for its base station.

   As each beltpack is set to its group and channel, an hourglass symbol will appear on the base display in the location normally occupied by the battery symbol. A beltpack will be assigned an ID number by the base in this time. Finally a normal battery symbol will be displayed, indicated the beltpack has been assigned its ID number.

16. Once this 1st beltpack has an ID number, turn it off. Now turn on the next beltpack and set it up as in step 15. Continue this same process until all the beltpacks with the different networks are set to the proper group and channels and have been assigned their IDs. Now all the beltpacks may be powered-up.

END.

TR-80N

TR-82N

Figure 7-1
Controls and Connections

1. On/Off & Volume Control
2. BAT/P.K. Light
3. Talk Light
4. Talk Button
5. Channel 1 and 2 Lights
6. Wireless Talk-Around (WTA)
7. Stage Announce (SA)
8. Audio Channel Select
9. [MENU] and [SET] Buttons
10. LCD Display
11. [UP] and [DOWN] Buttons
12. Headset Connector
13. Battery Latch
14. Receive and Transmit Antennas
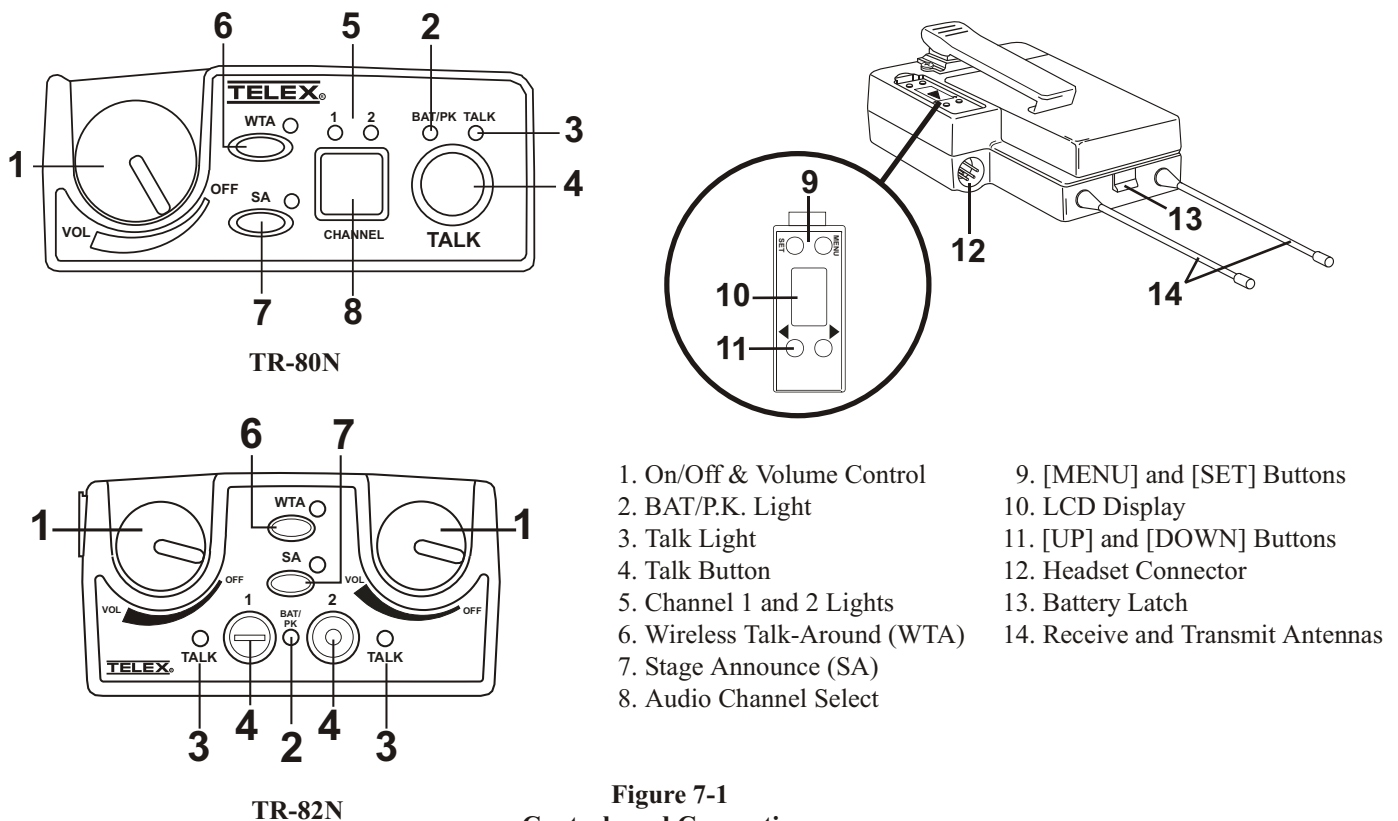
Basic Operational Description

The TR-80N/82N is a full duplex (simultaneous talk and listen) beltpack that works in conjunction with a BTR-80N base station. The beltpack allows a user, via a headset attached to the beltpack, to communicate with other wireless or wired users. Other base stations and / or wired systems connect to the beltpack's base station. The base station is what allows the audio path interconnections for the beltpack audio.

The TALK, WTA (wireless talk around) and SA (stage announce) buttons on a beltpack turn the beltpack's microphone input on or off. They also select the audio paths for the beltpack's audio in the base.

System Quick Start

The following is a list to quickly get a base station and beltpacks operating.

1. Unpack the base and connect the power cord and antennas.

2. Connect base to audio interfaces. For example; 2-wire, 4-wire, SA, Auxiliary local headset.

3. Press and hold [MENU] as powering-up the base station. Release button when base station displays "...FACTORY SETUP...".

4. Press [MENU] as powering-up the beltpacks(s)

5. Use the [UP] and [DOWN] arrow button to change the channel to an unoccupied receive channel on the base station. Then press [SET] twice to set channel and group.

6. The base should now display the audio channel of the beltpack and a battery symbol will appear shortly.

7. Plug a headset into each beltpack. Adjust the software menu for microphone gain so the overmodulation light flashes only on some of the words at normal speech levels.

Battery Installation

Ensure that the On/Off volume control knob is turned off.
Press down and hold down the battery release latch, slide the battery pack about 1/8 inch back, toward the latch, until it stops. Then lift battery pack out. Replace batteries as follows:

2. Pull battery strap to remove low or dead batteries.

1. Open the battery pack by inserting finger nail and lifting.
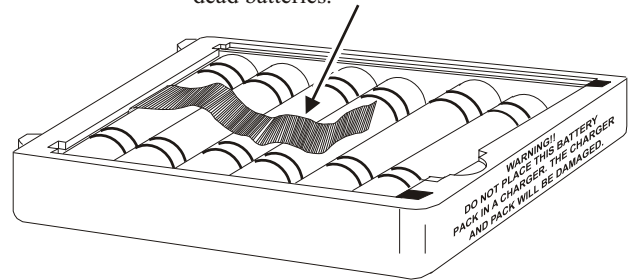
3. Load new batteries following the polarity as shown in battery case

5. Be sure strap goes under batteries.

6. Tuck end of strap under door when placing the battery cover back on the case.
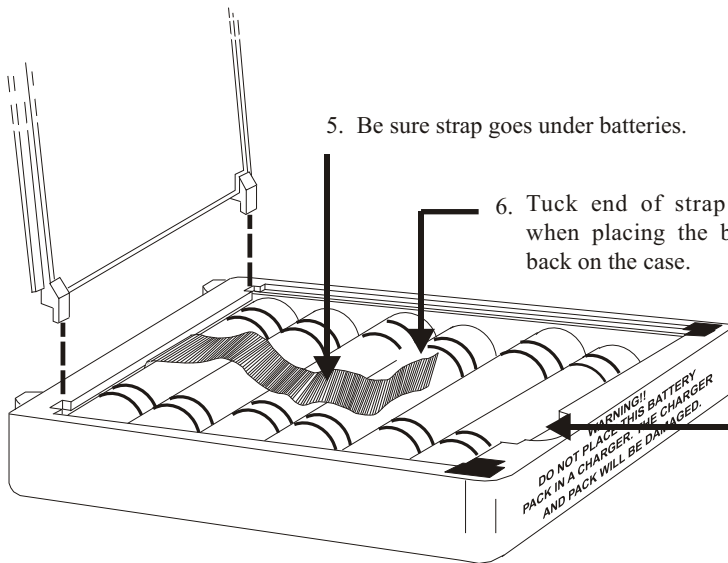
4. Start loading at the end of the case where the strap is attached to the case.

Figure 7-2
Battery Installation

WARNING: Do not place an alkaline TR battery pack in any battery charger. Severe charger and batter pack damage may results.

VIEW A

AUX IN
(TR-82N ONLY)

MENU AND
SET BUTTONS

HEADSET
CONNECTION

UP AND DOWN BUTTONS

ANTENNAS

VIEW A
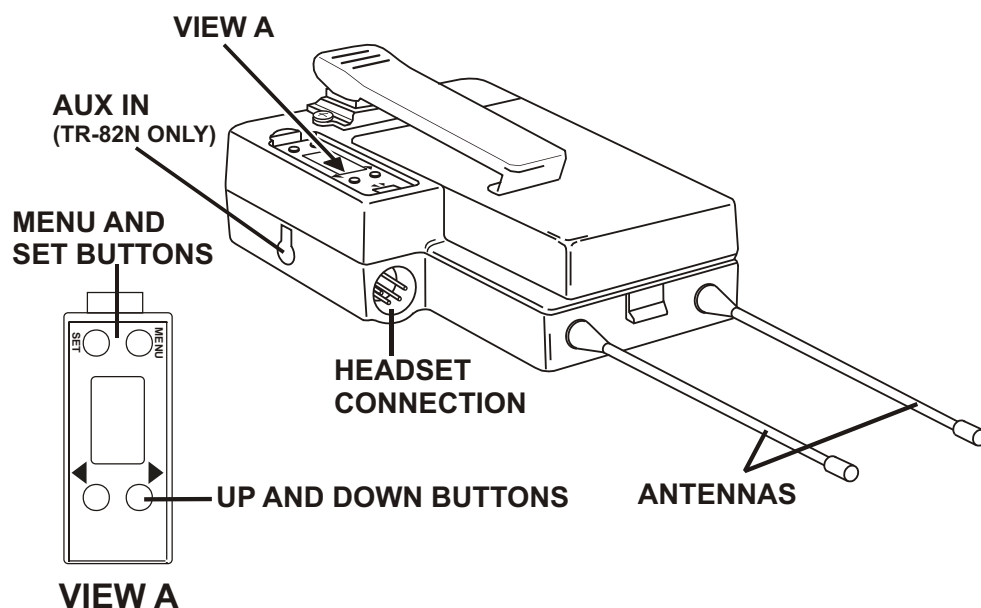
Figure 7-3
TR-80N/82N Controls

Headset Connection

The headset connector is a XLR type connector. Four or five pin Telex or RTS headset connectors may be installed in the unit. See the "TR-80N/82N Controls and Connections" section for information on the pinouts. A dynamic or electret headset microphone is automatically detected by the beltpack and a bias voltage supplied if needed.

Sidetone

Sidetone is the amount of the users voice that is fed back to their headphone. The sidetone level in the beltpack and base station is fixed. It cannot be adjusted.

Antenna Connection

The beltpack comes with two detachable, screw type ¼ wave antennas. Attach the two antennas by screwing the antennas into the receptacles at the bottom of the beltpack. The color dot on the screw end of the antenna must match the color dot on the antenna receptacle.
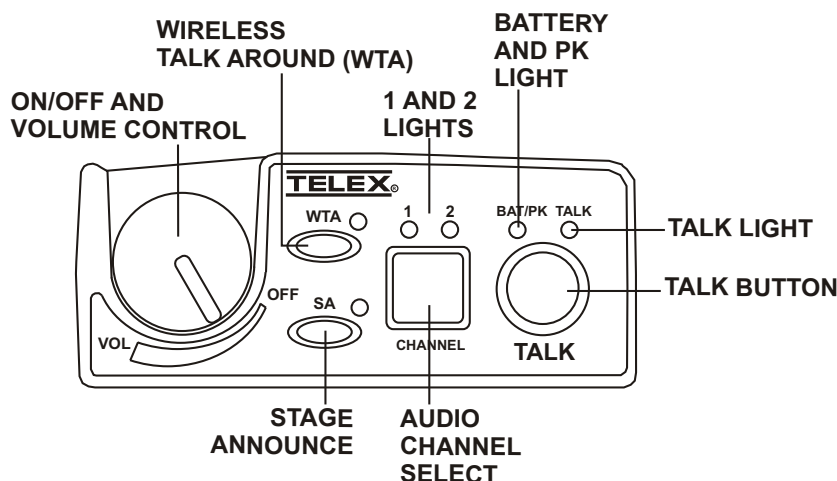
Figure 7-4
TR-80N Top Panel Controls

On/Off and Volume Control

Turn the beltpack power on by rotating the knob CW. Adjust the volume to the headset by rotating the volume control as required for a comfortable listening volume.

Battery	Light flashes on power up	= Battery OK
	Light on continuously	= Battery Low
	Light does not flash or come on	= Battery Dead
Over modulation	Light flashes on some speech	= Gain OK
	Light flashes on all speech	= Gain too high
	Light never flashes on speech	= Gain too Low

Talk Button

Press to enable audio path from the headset microphone. The talk light will activate when the talk button is active.

The talk button has three software selectable modes that can be seen via the LCD display of the beltpack. The mode of the talk button may be selected by pressing and holding [SET] while hitting the talk button. The current mode of the talk button will be displayed the first time the talk button is hit. Hit the talk button again to change the mode of the button. Release the [SET] button to accept the currently displayed setting.

Selectable Modes: TALK	tb off	Talk disabled
	tb Ptt	Push-to-talk
	tb LAt	Push-to-latch

Audio Channel Select Button

Selects the intercom system to which the headset is connected. The LED near the channel button indicates the current selection.

The audio channel select has three options. The options may be selected by pressing and holding [SET] while hitting the channel select button. The current mode of the channel select button will be displayed the first time the button is hit. Hit the button again to change the mode of the button. See table below for the options. Release the [SET] button to accept the currently displayed setting.

Selectable Modes: AUDIO CHANNEL BUTTON	12 on	Channels 1 and 2 available
	1 on	Only channel 1
	2 on	Only channel 2

Stage Announce (SA)

When pressed the audio from the beltpack is routed directly to the stage announce connector on the back of the base station. The base station's SA relay is also closed. The beltpack sidetone is lost as an indication that stage announce is activated. The other beltpacks and wired users do not hear this beltpack's audio when SA is pressed. The button is non-latching and activates the nearby red LED when pressed.

To Enable or Disable Stage Announce, press and hold [SET] while hitting the SA button. The current mode of the [SA] button will be displayed. Press the [SA] button again to turn SA on or off. Release [SET] to accept the displayed setting.

Wireless Talk Around (WTA)

When pressed, the audio from the beltpack is disconnected from the wired intercom, auxiliary input/output and the base station's local headset. Other beltpack users, on that audio channel, can hear the user as normal. The button activates the nearby red LED as well as the appropriate talk LED when pressed.

To Enable or Disable Wireless Talk Around options, press and hold [SET] while hitting the [WTA] button. The current WTA mode will be displayed. Press WTA again to change modes. Available options are: Off, on and Lon (Latch on). Release [SET] to accept the displayed setting.

Groups and Channels

The first LCD screen the beltpack displays is the group / channel screen. This screen shows the currently selected receive group followed by the beltpack transmit channels.

Editing Groups / Channels

1. Push [SET] to edit the transmit channel. The channel number will begin flashing.
2. Select the desired channel with the, [UP]/[DOWN] arrow buttons.
3. Push [SET] to accept the channel. The receive group will now begin flashing.
4. Select the desired group with arrow buttons.
5. Push [SET] to accept the receive group.
6. The new group containing the selected channel is now set.

NOTE: Pressing [MENU] during the group/channel editing will bail out of the editing without any changes.

Factory group's frequencies are not changeable.
User group's (Group 19u to 30u) frequencies are changeable.

Transmit Frequency

This screen displays the frequency in MHz of the beltpack transmitter. The frequency is not changeable in factory-defined groups. The frequency is changeable in user-defined groups.

Editing the TX Frequency (User Groups Only)

1. Set the unit to the desired user defined group and channels; see Groups and Channels Instructions. The menu structure at the right (Figure 7-5) indicates how to get to the transmit frequency screen.
2. Push [SET] to edit the TX frequency. The frequency will begin flashing.
3. Select the desired frequency with the [UP]/[DOWN] arrow buttons. The frequency can be changed in 25 kHz steps.
4. Push [SET] to place the unit on the new transmit frequency.
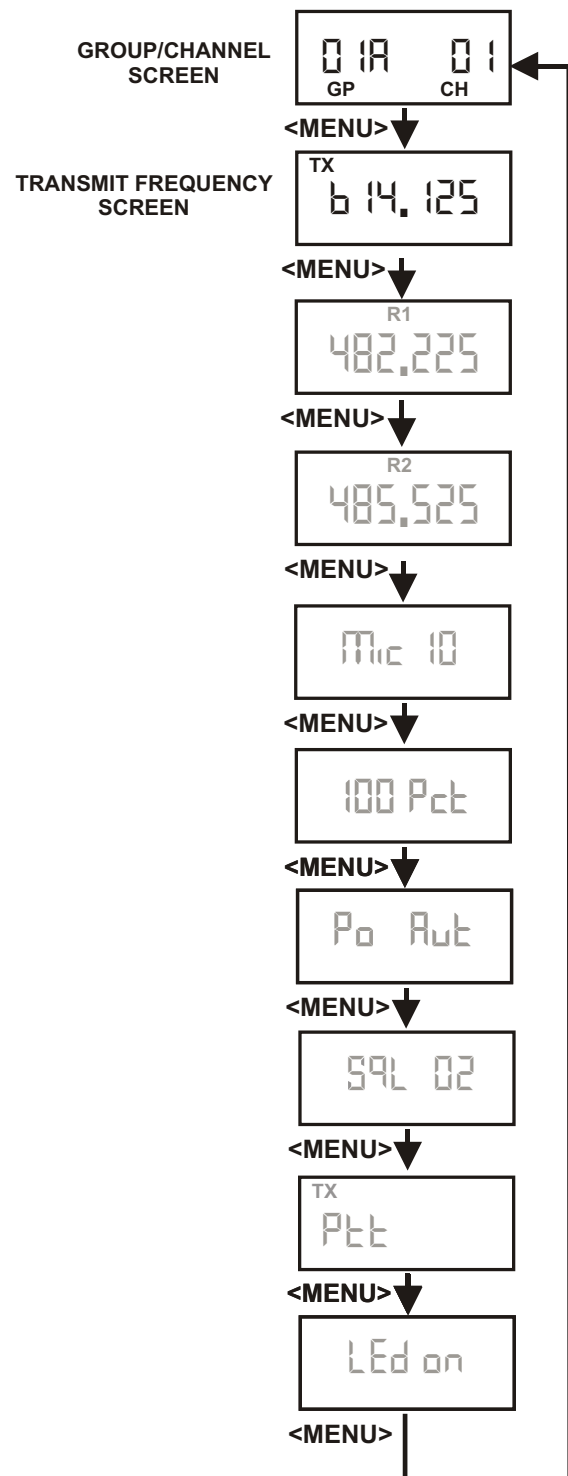
Figure 7-5
Group/Channel and Transmit Frequency Screen

Receive Frequencys

This screen displays the frequency in MHz of the beltpack receiver. The frequency is not changeable in factory defined groups. The frequency is changeable in user-defined groups.

Editing the RX Frequency (User Groups Only)

1. Set the unit to the desired user defined group and channels. See Groups and Channels Instructions. The menu structure at the right (Figure 7-6) indicates how to get to the receive frequency screen.
2. Push [SET] to edit the RX frequency. The frequency will begin flashing.
3. Select the desired frequency with the [UP]/[DOWN] arrow buttons. The frequency can be changed in 25 kHz steps.
4. Push [SET] to place the unit on the new receive frequency.

Microphone Gain

This screen displays the setting of the microphone gain of the beltpack. There are 16 possible settings. The number 0 indicates minimum microphone gain, the number 15 is maximum gain. Each step is about 3 dB.

Adjusting the Microphone Gain

1. Push [SET] at the microphone gain screen. The number will begin flashing.
2. Select the desired gain with the [UP]/[DOWN] arrow buttons.
3. Push [SET] to place the unit at the indicated microphone gain.

Battery Display

The battery display screen indicates the current percentage of battery remaining.

Battery Percentages

100 Pct = Fresh Battery
 75 Pct = 75 % Life Left
 50 Pct = 50 % Life Left
 25 Pct = 25 % Life Left
 10 Pct = 10 % Life Left. Low Battery Light Active.
  0 Pct = Battery Dead. Unit will lose communication
      at any time.

Setting the Low Battery Alert Tone

The beltpack has an audio alert tone that is sent to the headphone if the battery life reaches 10 %. The tone is at 1 kHz and is heard for 0.5 seconds every 30 seconds. The tone is only heard at the beltpack. The alert tone function may be turned on or off at the beltpack:

RECEIVE 1 FREQUENCY SCREEN

RECEIVE 2 FREQUENCY SCREEN

MICROPHONE GAIN SCREEN

BATTERY PERCENTAGE SCREEN
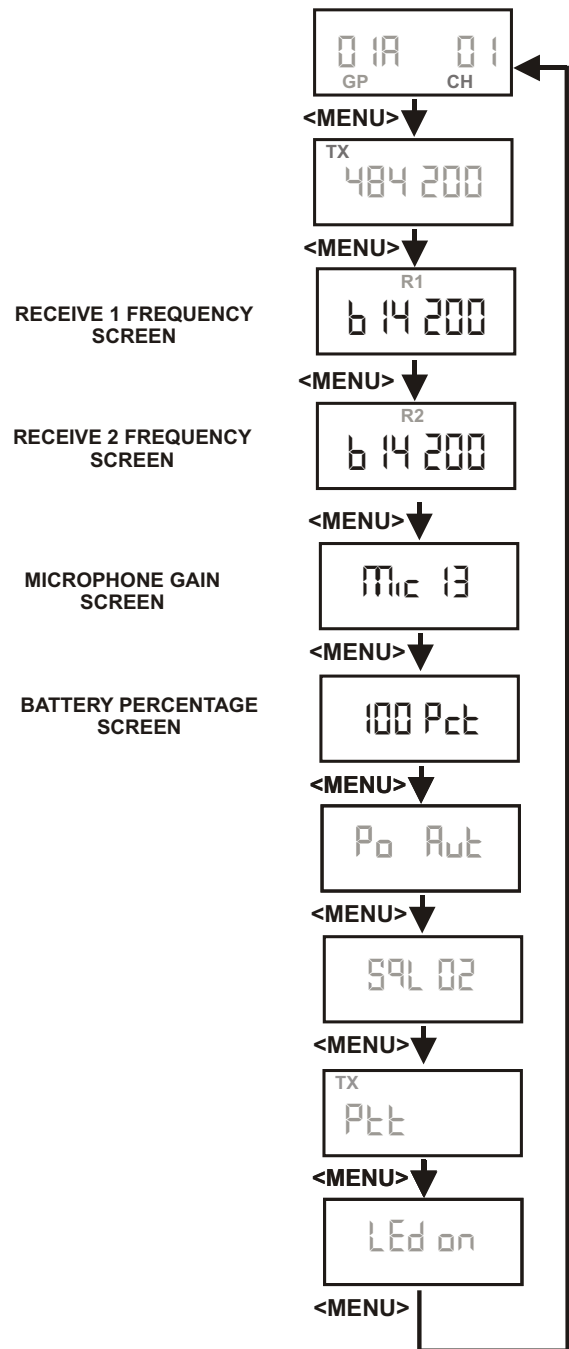
Figure 7-6
Receive Frequencies/Microphone Gain/
Battery Percentage Screens

Low Battery Alert Tone and Battery Type

1. Press [SET] at the battery percentage screen.   The screen below will appear.

```
Lbt oFF
```

2. The low battery tone option will also begin flashing.
3. Use the [UP]/[DOWN] arrow buttons to turn the option on or off.
4. Press [SET] to accept the change.

```
bAt AL
```

5. The screen now displays with AL or ni Flashing. Use [up]/[down] to select AL or ni for Alkaline/NiMH battery gauge calibration.
6. Press [SET] to return to the battery gauge screen.

Transmit Power

The transmit power screen displays the current setting of the beltpack transmitter's output power level. There are four settings.

Transmit Power Settings

Auto (Default)	The beltpack's transmitter adjusts it's output level according to information sent to the beltpack from the base station. It adjust between two levels: 5mW or 50mW.
5	The beltpack is transmitting at 5 mW
50	The transmitter is at 50 mW
100	The transmitter is at 100 mW

When the unit is set to auto, base station information will tell the beltpack the appropriate power setting to use based upon received signal strength level at the base station. By reducing the transmit power when possible, the battery life of the beltpack can be slightly extended and intermodulation products can be reduced.

Changing the Transmit Power Setting

1. Push [SET] at the transmit power screen.
   The power setting will begin flashing.

2. Select the power setting with the [UP]/[DOWN] arrow buttons.

3. Push [SET] to place the unit at the indicated setting.

```
01A      01
  GP       CH
```
<MENU>
```
TX
484 200
```
<MENU>
```
        R1
b 14 200
```
<MENU>
```
        R2
b 14 200
```
<MENU>
```
Mic 10
```
<MENU>
```
100 Pct
```
<MENU>

TRANSMIT POWER SCREEN
```
Po Aut
```
<MENU>

SQUELCH SCREEN
```
SQL 02
```
<MENU>

TRANSMIT MODE SCREEN
```
TX
Ptt
```
<MENU>

LEDs OFF/ON SCREEN
```
LEd on
```
<MENU>

Figure 7-7
Transmit Power,Squelch,
Push-to-Talk/Push-to-Transmit Screen

Squelch Screen

The squelch screen allows the user to adjust the beltpack squelch level.

1. Push [SET] at the squelch screen. The squelch setting will begin flashing.

2. Use the [UP]/[DOWN] buttons to select the desired squelch setting. 1 is minimum squelch, 04 is maximum. A setting of 00 will hold the squelch open for testing. **Warning - do not set the squelch to 00 while wearing headphones with the volume turned up. White noise with no signal can be uncomfortably loud.**

3. Push [SET] to save the new squelch setting.

Squelch Lvl	Approx. SINAD	Notes
00	NA	Open
01	12	
02	20	Default
03	24	
04	NA	RSSI Lvl Squelch

Squelch Note: The beltpack employs two different types of squelches. A fast acting noise type squelch and a slower data squelch. For audio to be received by the beltpack both a good signal-to-noise audio signal (with a noise threshold set via the usersquelch settings above) and a valid data stream must be detected.

Transmit Mode Screen

Transmit mode screen is used to select the following modes:

Transmit Mode	Description
Ptt	Push-to-Talk. The transmitter is always on and the talk button un-mutes the audio when on. The beltpack will respond to the audio mute commands from the base.
	When a user disables the Portable Sation Connect button corresponding to the beltpack the talk button at the beltpack will shut down.
Pt tr	Push-to-Transmit. The transmitter is off and audio muted until the talk button is on. The beltpack will ignore lockout or shutdown commands from the base.
Pt trL	Push-to-Transmit Lockout Enabled. The transmitter is off and audio muted until the talk button is on. The beltpack will respond to lockout commands from the base, such as First-On-Latch Out and Portable Station Connect disable.

Changing the transmit mode setting:

1. Push [SET] at the transmit mode screen. The screen will begin flashing.

2. Use the [UP]/[DOWN] buttons to select the desired mode.

3. Push [SET] to save the mode change.

LEDs Off/On

Tthe LED off/on screen is used to disable all LEDs. This function is useful for users who do not wish to show LEDs in the dark.

1. Push [SET] at the LED on/off screen. The on/off will begin flashing.

2. Use the [UP]/[DOWN] buttons to select the desired mode.

3. Push [SET] to save the mode change.

Software Version/ Band

The software revision and frequency band of the beltpack may be displayed from any of the main beltpack screens.

Viewing the Software Revision and Frequency Band

1. In any of the beltpack main screens press and hold the [DOWN] button for 2 seconds.

2. The first screen indicates the frequency band of the beltpack. The second screen indicates the software revision. The screens below indicate that it is an E5 band beltpack with 80E052 version software.

3. The screen will now revert back to the main screen.

bnd E5

80E 052

ClearScan

ClearScan helps you find clear RF frequencies in your area. The beltpack's receiver scans all the factory defined groups and any user defined groups that have been set. The result is a list of beltpack receive groups that are clear of interference.

Entering ClearScan

1. Press and hold [MENU] + [SET] for 2 seconds to start ClearScan

2. The beltpack display will change to "ClrScn" and the GP icon will flash.

3. After about 12 seconds, the beltpack will display the first clear group. The group number will be flashing.

4. Use the [UP]/[DOWN] buttons to display other clear groups.

5. Select a group by pressing [SET]

6. Press [MENU] to bail out without selecting a group.

Clear groups are displayed first. They are in group order. You can scroll down through groups using the [DOWN] button.
The right half of the screen will give you an indication of interference levels as you scroll through the groups.

User-defined groups that do not have a frequency defined for one of the receive channels will display 'u' to indicate it is "undefined".

The degree of interference found for R1 and R2 will be displayed on the right two most positions on the screen. See chart below:

Interference Level	Right Half of LCD Display
None	Blank
Weak	Single bar
Moderate	Double bar
Strong	Triple bar

Lock Out

This function allows the user to lock the top panel and menu options. The top panel buttons will still work but the talk button options can not be changed. Likewise, values on the LCD screen in the beltpack can be viewed but not changed.

Enabling / Disabling Lock Out

1. Press and hold the [UP] and [DOWN] buttons for two seconds. The word "Loc on" will appear on the screen when lock out is active.

2. Press and hold the [UP] and [DOWN] button for two seconds again to disable lock out. The word "Loc off" will appear.

1st Use Default

This function sets the beltpack to Group 1A, channel 1 and leaves any user-programmed groups in memory. It will set unit to factory-defined menu settings. It will also set the "Talk" buttons to their default modes.

Activating 1st Use Default

1. Press and hold the [MENU] button while powering-up the beltpack.

Factory Reset

This function sets the beltpack to Group 1A, channel 1 and **ERASES** any user defined groups in memory. It will set a unit to factory settings. It will also set the "Talk" buttons to their default modes.

Activating Factory Reset

1. Press and hold the [MENU] + [SET] + [UP] + [DOWN] for three seconds.

RF Monitor Screen

Press and hold the [MENU] button for 2 seconds to display beltpack RF Status. If the channel button is set to "1" then signal strength displayed is for R1 frequency. If the channel button is set to "2" then signal strength displayed is for R2 frequency.

TX Power	Signal Strength
Lo = 5mW	0 = No
hi = 50mW	1 = Very Weak
Hi = 100mW	2 = Weak
	3 = Moderate
	4 = Strong
	5 = Very Strong

Press the [MENU] button again to exit RF Monitor Screen.

Setting Beltpack ID

Several functions require the beltpack to know which base and channel it is associated with.

1. Auto Power Setting: The beltpack reduces its TX power when close to the base. Beltpack transmit power must be set to Auto.

2. Portable Station Deselect: The base can disable the TALK button of a beltpack. This shuts off the mic in PTT mode and turns off the transmitter in PT TR mode.

3. First-On-Latch-Out: This locks a base receive channel so that only one beltpack can transmit on the frequency at a time. A beltpack attempting to talk on top of another beltpack on the same frequency will hear a double beep in their headset.

A beltpack will try to establish its ID automatically when its group/channel is changed. The base must be on for this to work.

To check or set beltpack ID manually:

1. Press and hold [UP] for 2 seconds. The LCD will display 'id' 'Base '--' Receiver'. For example: "Id 1-3" means Base #1, Receiver #3.

2. If the LCD displays "Id ---" or does not match the base and receiver the beltpack is assigned to, Auto Power, Portable Station Deselect and First-On-Latch Out will not work correctly.

3. If the beltpack id is correct, press [MENU] to exit.

4. If the beltpack id is not correct, press [SET] and the id numbers will flash.

5. Use the [UP] or [DOWN] buttons to select a new id.

6. Press [SET] to apply the new id.

Bases with transmitters enabled are always base #1. A second base using the first base transmitters instead of its own, and properly connected to the first base thru CAN bus link cables becomes BASE #2, etc.

Figure 7-8
TR-80N/82N Top Panel Controls

On/Off and Volume Controls

Turn the beltpack power on by rotating either or both of the knobs CW. Adjust the volume to the headset by rotating the volume controls as required for a comfortable listening volume. Left control is for channel 1. Right control is for channel 2.

Bat/Peak Light

See the following table for the light's function.

Battery	Light flashes on power up	= Battery OK
	Light on continuously	= Battery Low
	Light does not flash or come on	= Battery Dead
Over modulation	Light flashes on some speech	= Gain OK
	Light flashes on all speech	= Gain too high
	Light never flashes on speech	= Gain too Low

Talk Buttons

Press to enable audio path from the headset microphone. The talk light will activate when the talk button is active.

Each talk button has three software selectable modes that can be seen via the LCD display of the beltpack. The mode of a talk button may be selected by pressing and holding [SET] while hitting the talk button. The current mode of the talk button will be displayed the first time the talk button is hit. Hit the talk button again to change the mode of the button. Release the [SET] button to accept the currently displayed setting.

Selectable Modes: TALK	1 or 2 off	Talk disabled
	1 or 2 on	Push-to-talk
	1 or 2 Lon	Push-to-latch

Stage Announce (SA)

When pressed the audio from the beltpack is routed directly to the stage announce connector on the back of the base station. The base station's SA relay is also closed. The beltpack sidetone is lost as an indication that stage announce is activated. The other beltpacks and wired users do not hear this beltpacks audio when SA is pressed. The button is non-latching and activates the nearby red LED when pressed.

To Enable or Disable Stage Announce, press and hold [SET] while hitting the SA button. The current mode of the SA button will be displayed. Press the SA button again to turn SA on or off. Release [SET] to accept the displayed setting.

Wireless Talk Around (WTA)

When pressed, the audio from the beltpack is disconnected from the wired intercom, auxiliary input/output and the base station's local headset. Other beltpack users, on that audio channel, can hear the user as normal. The button activates the nearby red LED as well as the appropriate talk LED if configured to do so.

To set Wireless Talk Around options, press and hold [SET] while hitting the WTA button. The current WTA mode will be displayed. Press WTA again to change options:

Options followed by "L" will latch. Release [SET] to accept the displayed setting.

tA Pb	WTA of currently selected talk button
tA 1L	WTA Channel 1only Latching
tA 2L	WTA Channel 2 only Latching
tA 12L	WTA Channel 1 & 2 Latching
tA PbL	WTA of currently selected talk button Latching
tA off	WTA Disabled
tA1	WTA Channel 1
tA2	WTA Channel 2
tA12	WTA Channel 1 & 2

Groups and Channels

The first LCD screen the beltpack displays is the group / channel screen. This screen shows the currently selected receive group followed by the beltpack transmit channel.

Editing Groups / Channels

1. Push [SET] to edit the transmit channel. The channel number will begin flashing.
2. Select the desired channel with the, [UP]/[DOWN] arrow buttons.
3. Push [SET] to accept the channel. The receive group will now begin flashing.
4. Select the desired group with arrow buttons.
5. Push [SET] to accept the receive group.
6. The new group containing the selected channel is now set.

NOTE: Pressing [MENU] during the group/channel editing will bail out of the editing without any changes.

Factory group's frequencies are not changeable.
User group's (Group 19u to 30u) frequencies are changeable.

Transmit Frequency

This screen displays the frequency in MHz of the beltpack transmitter. The frequency is not changeable in factory defined groups. The frequency is changeable in user-defined groups.

Editing the TX Frequency (User Groups Only)

1. Set the unit to the desired user defined group and channels; see Groups and Channels Instructions. The menu structure at the right (Figure 7-9) indicates how to get to the transmit frequency screen.
2. Push [SET] to edit the TX frequency. The frequency will begin flashing.
3. Select the desired frequency with the [UP]/[DOWN] arrow buttons. The frequency can be changed in 25 kHz steps.
4. Push [SET] to place the unit on the new transmit frequency.

GROUP/CHANNEL SCREEN

01A 01
GP   CH

<MENU>

TRANSMIT FREQUENCY SCREEN

TX
614.125

<MENU>

R1
482.225

<MENU>

R2
485.525

<MENU>

Mic 10

<MENU>

100 Pct

<MENU>

Po Aut

<MENU>

SqL 02

<MENU>

TX
Ptt

<MENU>

hP 4-P

<MENU>

Au oFF

<MENU>

Lcd on

<MENU>
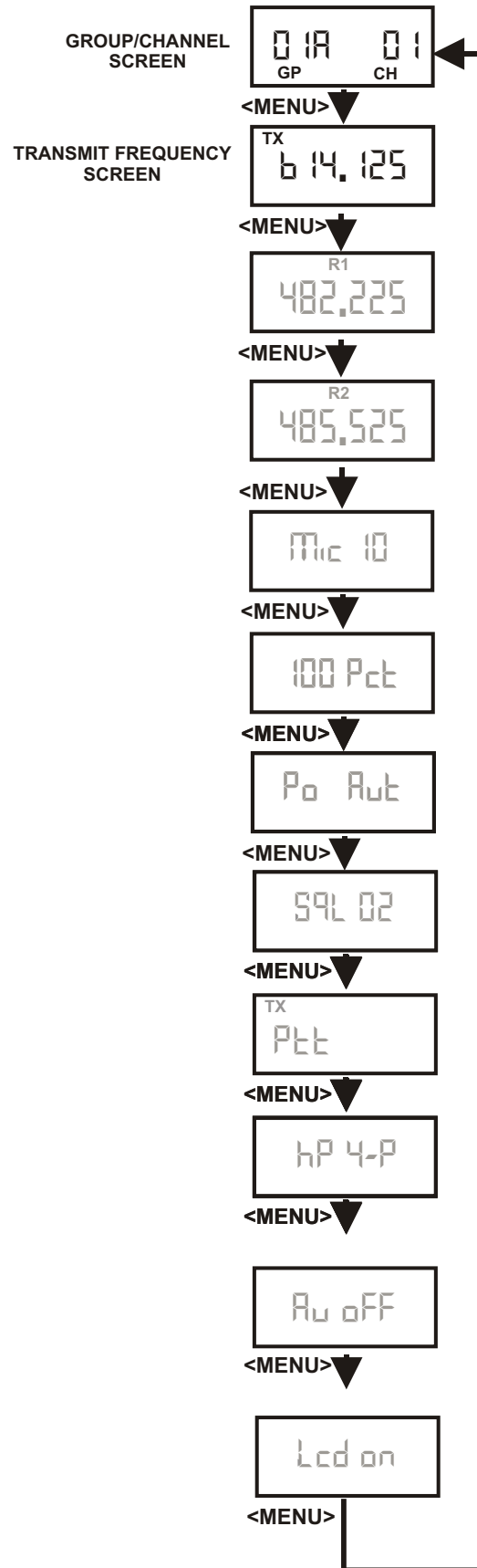
Figure 7-9
Group/Channel and Transmit Frequency Screen

Receive Frequencies

This screen displays the frequency in MHz of the beltpack receiver. The frequency is not changeable in factory defined groups. The frequency is changeable in user-defined groups.

Editing the RX Frequency (User Groups Only)

1. Set the unit to the desired user defined group and channels. See Groups and Channels Instructions. The menu structure at the right (Figure 7-10) indicates how to get to the receive frequency screen.
2. Push [SET] to edit the RX frequency. The frequency will begin flashing.
3. Select the desired frequency with the [UP]/[DOWN] arrow buttons. The frequency can be changed in 25 kHz steps.
4. Push [SET] to place the unit on the new receive frequency.

Microphone Gain

This screen displays the setting of the microphone gain of the beltpack. There are 16 possible settings. The number 0 indicates minimum microphone gain, the number 15 is maximum gain. Each step is about 3 dB.

Adjusting the Microphone Gain

1. Push [SET] at the microphone gain screen. The number will begin flashing.
2. Select the desired gain with the [UP]/[DOWN] arrow buttons.
3. Push [SET] to place the unit at the indicated microphone gain.

Battery Display

The battery display screen indicates the current percentage of battery remaining.

Battery Percentages

100 Pct = Fresh Battery
 75 Pct = 75 % Life Left
 50 Pct = 50 % Life Left
 25 Pct = 25 % Life Left
 10 Pct = 10 % Life Left. Low Battery Light Active.
  0 Pct = Battery Dead. Unit will lose communication
        at any time.

Figure 7-10
Receive Frequencies/Microphoe Gain/
Battery Percentage Screen

Setting the Low Battery Alert Tone

The beltpack has an audio alert tone that is sent to the headphone if the battery life reaches 10 %. The tone is at 1 kHz and is heard for 0.5 seconds every 30 seconds. The tone is only heard at the beltpack. The alert tone function may be turned on or off at the beltpack:

Low Battery Alert Tone On/Off

1. Press [SET] at the battery percentage screen. The screen below will appear.

2. The low battery tone option will also begin flashing.

```
Lbt oFF
```

3. Use the [UP]/[DOWN] arrow buttons to turn the option on or off.
4. Press [SET] to accept the change.

```
bAt AL
```

5. The screen now displays with AL or ni Flashing. Use [UP]/[DOWN] to select Al or ni for Alkaline/NiMH battery gauge calibration.

6. Press [SET] to return to the battery gauge screen.

Transmit Power

The transmit power screen displays the current setting of the beltpack transmitter's output power level. There are four settings.

Transmit Power Settings

Auto (Default)	The beltpack's transmitter adjusts it's output level according to information sent to the beltpack from the base station. It adjust between two levels: 5mW or 50mW.
5	The beltpack is transmitting at 5 mW
50	The transmitter is at 50 mW
100	The transmitter is at 100 mW

When the unit is set to auto, base station information will tell the beltpack the appropriate power setting to use based upon received signal strength level at the base station. By reducing the transmit power when possible, the battery life of the beltpack can be slightly extended and intermodulation products can be reduced.

Changing the Transmit Power Setting

1. Push [SET] at the transmit power screen. The power setting will begin flashing.

2. Select the power setting with the [UP]/[DOWN] arrow buttons.

3. Push [SET] to place the unit at the indicated setting.

Figure 7-11
Transmit Power/Squelch Screen

Squelch Screen

The squelch screen allows the user to adjust the beltpack squelch level.

1. Push [SET] at the squelch screen. The squelch setting will begin flashing.

2. Use the [UP]/[DOWN] buttons to select the desired squelch setting. 1 is minimum squelch, 04 is maximum. A setting of 00 will hold the squelch open for testing. **Warning - do not set the squelch to 00 while wearing headphones with the volume turned up. White noise with no signal can be uncomfortably loud.**

3. Push [SET] to save the new squelch setting.

Squelch Lvl	Approx. SINAD	Notes
00	NA	Open
01	12	
02	20	Default
03	24	
04	NA	RSSI Lvl Squelch

Squelch Note: The beltpack employs two different types of squelches. A fast acting noise type squelch and a slower data squelch. For audio to be received by the beltpack both a good signal-to-noise audio signal (with a noise threshold set via the usersquelch settings above) and a valid data stream must be detected.

Transmit Mode	Description
PƩƩ	Push-to-Talk. The transmitter is always on and the talk button un-mutes the audio when on. The beltpack will respond to the audio mute commands from the base. When a user disables the Portable Sation Connect button corresponding to the beltpack the talk button at the beltpack will shut down.
PƩ Ʃr	Push-to-Transmit. The transmitter is off and audio muted until the talk button is on. The beltpack will ignore lockout or shutdown commands from the base.
PƩ ƩrL	Push-to-Transmit Lockout Enabled. The transmitter is off and audio muted until the talk button is on. The beltpack will respond to lockout commands from the base, such as First-On-Latch-Out and Portable Station Connect disable.

Transmit Mode Screen

The transmit mode screen is used to select the following modes:

Changing the transmit mode setting:

1. Push [SET] at the transmit mode screen. The screen will begin flashing.

2. Use the [UP]/[DOWN] buttons to select the desired mode.

3. Push [SET] to save the mode change.

Headphone Options:

If the TR-82N has a 4 pin headset connector, the headphone should be set to "hP 4-P" (4 pin). When supplied with a 5 pin (stereo) headset connector, the settings "hP Add" should be used for Mono or "hP SEP" for channel 1 in left earpiece and channel 2 in the right earpiece. A 5 pin single-sided headset should be set to "hP 4-P".

Auxiliary Input:

The TR-82N has a 3.5 mm mono auxiliary input jack. Audio from this jack is heard only in the belt pack headset. From the menu, press [SET] and use [UP] or [DOWN] arrows to select the Aux mode setting:

Setting	Auxiliary Input Function
Off	Aux input is disabled
1	Aux is heard with Ch1
2	Aux is heard with Ch2
12	Aux is heard with Ch 1 & 2

Press [SET] to accept setting on screen. If Aux is not Off, the next screen will display "Au NN" where NN is a 2 digit number between 0 and 15. This is the volume level setting for the aux input. Press [SET] and the 2 digits will flash. Use the [UP] and [DOWN] arrows to set Aux volume. Press [SET] again to accept the gain setting.

LEDs Off/On

The LED off/on screen is used to disable all LEDs. This function is useful for users who do not wish to show LEDs in the dark.

1. Push [SET] at the LED on/off screen. The on/off will begin flashing.

2. Use the [UP]/[DOWN] buttons to select the desired mode.

3. Push [SET] to save the mode change.

Software Version/ Band

The software revision and frequency band of the beltpack may be displayed from any of the main beltpack screens.

Viewing the Software Revision and Frequency Band

1. In any of the beltpack main screens press and hold the [DOWN] button for 2 seconds.

2. The first screen indicates the frequency band of the beltpack. The second screen indicates the software revision. The screens below indicate that it is an E5 band beltpack. with 80E052 version software.

3. The screen will now revert back to the main screen.

```
bnd E5
```

```
80E 052
```

ClearScan

ClearScan helps you find clear RF frequencies in your area. The beltpack's receiver scans all the factory defined groups and any user defined groups that have been set. The result is a list of beltpack receive groups that are clear of interference.

Entering ClearScan

1. Press and hold [MENU] + [SET] for 2 seconds to start ClearScan

2. The beltpack display will change to "ClrScn" and the GP icon will flash.

3. After about 12 seconds, the beltpack will display the first clear group. The group number will be flashing.

4. Use the [UP]/[DOWN] buttons to display other clear groups.

5. Select a group by pressing [SET]

6. Press [MENU] to bail out without selecting a group.

Clear groups are displayed first. They are in group order. You can scroll down through groups using the [DOWN] button.

The right half of the screen will give you an indication of interference levels as you scroll through the groups.

User-defined groups that do not have a frequency defined for one of the receive channels will display a 'u' to indicate it is "undefined".

The degree of interference found for R1 and R2 will be displayed on the right two most positions on the screen. See chart below:

Interference Level	Right Half of LCD Display
None	Blank
Weak	Single bar
Moderate	Double bar
Strong	Triple bar

Lock Out

This function allows the user to lock the top panel and menu options. The top panel buttons will still work but the talk button options can not be changed. Likewise, values on the LCD screen in the beltpack can be viewed but not changed.

Enabling / Disabling Lock Out

1. Press and hold the [UP] and [DOWN] buttons for two seconds. The word "Loc on" will appear on the screen when lock out is active.

2. Press and hold the [UP] and [DOWN] button for two seconds again to disable lock out. The word "Loc off" will appear.

1st Use Default

This function sets the beltpack to Group 1A, channel 1 and leaves any user-programmed groups in memory. It will set unit to factory-defined menu settings. It will also set the "Talk" buttons to their default modes.

Activating 1st Use

1. Press and hold the [MENU] button while powering-up the beltpack.

Factory Reset

This function sets the beltpack to Group 1A, channel 1 and **ERASES** any user defined groups in memory. It will set a unit to factory settings. It will also set the "Talk" buttons to their default modes.

Activating Factory Reset

1. Press and hold the [MENU] + [SET] + [UP] + [DOWN] for two seconds.

RF Monitor Screen

Press and hold the [Menu] button for 2 seconds to display beltpack RF Status.
Press the [MENU] button again to exit RF Monitor Screen.

TX Power	Signal Strength
Lo = 5mW	0 = No
hι = 50mW	1 = Very Weak
Hι = 100mW	2 = Weak
	3 = Moderate
	4 = Strong
	5 = Very Strong

Setting Beltpack ID

Several functions require the beltpack to know which base and channel it is associated with.

1. Auto Power Setting: The beltpack reduces its TX power when close to the base. Beltpack transmit power must be set to Auto.

2. Portable Station Deselect: The base can disable the TALK button of a beltpack. This shuts off the mic in PTT mode and turns off the transmitter in PT TR mode.

3. First-On-Latch Out: This locks a base receive channel so that only one beltpack can transmit on the frequency at a time. A beltpack attempting to talk on top of another beltpack on the same frequency will hear a double beep in their headset.

A beltpack will try to establish its ID automatically when its group/channel is changed. The base must be on for this to work.

To check or set beltpack ID manually:

1. Press and hold [UP] for 3 seconds. The LCD will display 'id' Base '-' Receiver . For example: "id 1-3" means Base #1, Receiver #3.

2. If the LCD displays "Id---" or does not match the base and receiver the beltpack is assigned to, Auto Power, Channel Deselect and Transmit Lockout will not work correctly.

3. If the beltpack id is correct, press [MENU] to exit.

4. If the beltpack id is not correct, press [SET] and the id numbers will flash.

5. Use the [UP] or [DOWN] buttons to select a new id.

6. Press [SET] to apply the new id.

Bases with transmitters enabled are always base #1. A second base using the first base transmitters instead of its own, and properly connected to the first base thru CAN bus becomes BASE #2, etc.

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BTR-80N Menu Structure
Page 1 of 1

Start-up Screen

```
Telex Communications
BTR-80N
sb4001A      B30001
```

Display Contrast Adjust

↑ OR ↓

Status Screen

```
Group 25u R1 Ch1  R2 Ch12
B3  A  M   SA
    50mW R3 R4 OFF
T1  50mW
T2
```

<MENU> Hold for 3 seconds to enter.
+
<SET>
hold for 3 seconds

RSSI Screen

```
RSSI    R1
Level   R2
        R3
        R4
```

NOTE: From any screen

<MENU>
+
<SET>
hold for 3 seconds

```
ClearScan™
```

<SET> Does set results

```
Group 01A  01  05  09
OK?=[SET]  02  06  10
    Prev   03  07  11
    Next   04  08  12
```

<MENU> Does NOT set results

```
→ GP_CH Select
  Base Main
  Intercom Settings
  Aux Settings
```

<MENU>

<MENU> + <UP>
For quick frequency display / edit

GP/CH Select
<SET>

Group/Channel Select

```
Group 25u R1 Ch 01
      R2 Ch 02
T1 50mW R3 Ch 03
T2 50mW R4 Ch 04
```

NOTE: Group/Channel Selection to operate just like BTR-800

Group/Channel Select

```
Group 25u R1 668.050
      R2 672.100
T1 554.250 R3 679.500
T2 565.350 R4 685.625
```

(Factory Groups Only)
Status Screen

<MENU>

Frequency Edit
(User-Programmed Groups Only)

```
Group 25u Ch1 668.050
Freq Edit R2 672.100
T1 554.250 R3 679.500
T2 565.350 R4 685.625
```

<MENU> or <SET>
save settings

Status Screen

Base Main
<SET>

```
→Local Headset
 Tx Power
 Squelch Settings
 More....
```

```
SA Level :: Off
Antenna Pwr:: 01 Master
Base No :: 01
```

Local Headset

```
Mic Gain:
Volume :
```

<SET>

```
Squelch   R1 Open
Level     R2 02
          R3
          R4 03
```

<SET>

TX Power

```
Tx Power: 249mW

T1: ON    T2: ON
```

<SET>

Intercom Settings
<SET>

```
→2W Intercom
 4W Intercom
```

```
2W Intercom: TELEX

IC1: ON   IC2: ON
```

<SET>

```
2W IC1 In:
2W IC1 Out:
2W IC2 In:
2W IC2 Out:
```

<SET>

```
4W IC1:        On
4W IC1 IN:
4W IC1 OUT:
```

<SET>

```
4W IC2:  On
4W IC2 IN:
4W IC2 OUT:
```

<SET>

Aux Settings
<SET>

```
IC1 Aux Mode: Global
IC2 Aux Mode: Local
    Aux In:
    Aux Out:
```

<SET>

NOTEs:

1. If editing any screen, pressing <MENU> once, ends editing without saving changes, and displays current screen with nothing flashing. The only exceptions are the Group/CH, Group/Freq, and Freq. Edit screens where a <MENU> press does save frequencies and places unit on those frequencies

2. Pressing <MENU> in any screen where no editing is occurring returns unit to status screen.

3. If an entry is set to "off" that has level setting values following, skip the level settings.

4. Status screen RX options: OFF, No Tx, Ch 1, Ch 2, Ch12, WT 1, WT 2, WT12, SA

5. TX power options: Off, 10, 50, 100, 249mW
6. Antenna power options: On, Off
7. 2W Intercom types: Telex, RTS, Clear-Com, Off
8. 2W Intercom channels: On, Off
9. Aux IC Mode options: Off, Local, Global
10. 4W IC1 and IC2 options: On, Off
11. All screens default to status screen after 5 minutes except RSSI screen. If RSSI screen is selected the unit stays on that screen until user switches it back.

Special Key Sequences:

1. Lockout: Press and hold <UP> + <DOWN> for 2 seconds.
2. Copy: Press and hold <SET> + <DOWN> for 2 seconds.
3. 1st Use Default: Press <MENU> while turning on the base station.
4. Factory Default: Press and hold <MENU> + <SET> + <UP> + <DOWN> for 2 seconds.

NOTE: After holding the button for 2 seconds, the screen will change to the desired screen before the button release.

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TR-80N Beltpack Screen Flowchart

Group / Channel — [SET], [MENU]

TX Frequency — [SET], [MENU], FAc dEF (If Factory Group)

RX1 Frequency — [SET], [MENU], FAc dEF (If Factory Group)

RX2 Frequency — [SET], [MENU], FAc dEF (If Factory Group)

Microphone Gain — AM c 10, [SET]
NOTE:
0 = No Gain
15 = Full Gain

Battery Gauge — qS Pct, [SET], Lbt oFF, bAt-AL
MENU Options:
Lbt = Low Battery Tone
bAt = Battery Type
AL = Alkaline
ni = NiMH

TX Output Power — Po Aut, [SET]
MENU Options:
Aut = Automatic Selection between 5 and 50mW
5 = 5 mW TX Power
50 = 50mW TX Power
100 = 100mW TX Power

Squelch Level — SqL 02, [SET]
MENU Options:
00 = Open
01 = High noise before Sql.
02 = Mid. noise before Sql.
03 = Low noise before Sql.
04 = Quiet before Sql.

Push-to-Talk / TX — Ptt, [SET]
MENU Options:
Ptt = Push-to-Talk
Ptt-tr = Push-to-TX
Ptt trL = Push-to-TX Lockouts Enabled

Lights On/Off — LEd on, [SET], LEd-on, [MENU]

General Notes:
1) Pressing [MENU] will bail out of editing without any changes.
2) Groups 01 to 18 are factory groups. 19u - 30u are user defined groups.
3) = Flashing.

Special Key Functions

Tx Power and Receiver RSSI
Hold [MENU] for 2 seconds
Hi 3
Press [MENU] to exit to normal menus
Function:
Display current TX power of unit:
Hi = 100mW
hi = 50mW
Lo = 50mW
-- = Off
Display receiver strength; 0 - 5:
0 = Clear
5 = Strong Signal

Beltpack Identification
Hold [↑] for 2 seconds
id i-1
[SET]
id -i-1
[SET]
Press [MENU] to exit to normal menus
Function:
View ID assigned to beltpack by base station.
May also be used to change beltpack ID.

Software Band / Software Version
Hold [↓] for 2 seconds
bnd F1
Displayed for 1 second
80001
Displayed for 1 second or when [↓] released
Back to normal menu

ClearScan
Hold [MENU] + [SET] for 1 sec.
CLr Scn
After 10 seconds best group selected
[SET]
[SET]
Group / Channel Screen

Talk Button Options
Hold [SET] and press [TALK]
tb Lbt
[TALK]
tb oFF
[TALK]
Function:
Talk button operation.
on = Talk Latch on
oFF = Momentary

Stage Announce (SA)
Hold [SET] and press [SA]
SA on
[SA]
SA oFF
[SA]

Wireless Talk Around (WTA)
Hold [SET] and press [WTA]
tA on
[WTA]
[WTA]
Options in menu:
on = Momentary
Lon = Latch
oFF = WTA disabled

Lockout
Hold [↑]+[↓] for 2 seconds
Loc on
Hold [↑]+[↓] again for 1 second
Loc oFF
Function:
Menu items can be viewed but not changed when activated.

1st Use Default
Hold [MENU] as powering-up unit
Sets unit to Group 01A, Channel 01, with 01 flashing. User must set channel number.
Sets Unit to defaults
All user defined gourps are Retained

Factory Reset Default
Hold [MENU] + [SET] + [↑] + [↓] for 2 seconds
FAc rES
Sets unit to Group 01A, Channel 01, with 01 flashing. User must set channel number.
Sets Unit to defaults
All user defined gourps are Erased

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TR-82N Beltpack Screen Flowchart

Group / Channel

[SET]

[SET]

TX Frequency

[MENU]

[SET]

If Factory Group — FRc dEF

RX1 Frequency

[MENU]

[SET]

[SET]

If Factory Group — FRc dEF

RX2 Frequency

[MENU]

[SET]

[SET]

If Factory Group — FRc dEF

If Factory Group

Microphone Gain

[MENU]

[SET]

NOTE:
0 = NO GAIN
15 = FULL GAIN

Battery Gauge

[MENU]

[SET]

Lbt oFF

bRt-RL

[SET]

MENU Options:
Lbt = Low Battery Tone
bRt = Battery Type
RL = Alkaline
ni = NiMH

TX Output Power

[MENU]

[SET]

[SET]

MENU Options:
Rut = Automatic Selection between 5 and 50mW
5 = 5 mW TX Power
50 = 50mW TX Power
100 = 100mW TX Power

Squelch Level

[MENU]

[SET]

[SET]

MENU Options:
00 = Open
01 = High noise before Sql.
02 = Mid. noise before Sql.
03 = Low noise before Sql.
04 = Quiet before Sql.

Push-to-Talk / TX

[MENU]

[SET]

[SET]

MENU Options:
Ptt = Push-to-Talk
Pt tr = Push-to-TX
Pt tr-L = Push-to-TX Lockouts Enabled

Headphone Audio

[MENU]

[SET]

hP-Add

hP-SEP

[SET]

MENU Options:
4-P = Output for any 4-Pin headset or single headphone 5/6-Pin headset
Add = Add 1 and 2 audio in a dual headphone 5/6-Pin headset
SEP = Separate 1 and 2 audio in a dual headphone 5/6-Pin headset

Auxiliary Input

[MENU]

[SET]

Ru 1

[SET]

MENU Options:
Ru 1 = Aux. in to Audio 1
Ru 2 = Aux. in to Audio 2
Ru 12 = Aux. in to Audio 1 & 2
Ru oFF = Aux. input off.

Auxiliary In Level
(Only if Aux In Active)

[MENU]

[SET]

Ru -05

[SET]

NOTE:
0 = No Gain
15 = Full Gain

Lights On/Off

[MENU]

LEd on

[SET]

LEd on

[SET]

General Notes:

1) Pressing [MENU] will bail out of editing without any changes.
2) Groups 01 to 18 are factory groups. 19u - 30u are user defined groups.
3) ☼ ☼ ☼ = Flashing.

Special Key Functions

	Tx Power and Rx1 / Rx2 RSSI	Beltpack Identification	Software Band Software Version	ClearScan	Talk Button Options	Stage Announce (SA)	Wireless Talk Around (WTA)	Lockout	1st Use Default	Factory Reset Default
	Hold [MENU] for 2 seconds	Hold [⬆] for 2 seconds	Hold [⬇] for 2 seconds	Hold [MENU] + [SET] for 2 sec.	Hold [SET] and press [TALK]	Hold [SET] and press [SA]	Hold [SET] and press [WTA]	Hold [⬆] + [⬇] for 2 seconds	Hold [MENU] as powering-up unit	Hold [MENU] + [SET] + [⬆] + [⬇] for 1 second

Press [MENU] to exit to normal menus

Function:
Display current TX power of unit:
HI = 100mW
hi = 50mW
Lo = 5mW
-- = Off

Display receiver 1 and 2 signal strength; 0 — 5:

0 = Clear
5 = Strong Signal

[SET]

Function:
View ID assigned to beltpack by base station.

May also be used to change beltpack ID.

Displayed for 1 second

Displayed for 1 second or when [⬇] released

Back to normal menu

After 8 seconds best group selected

[SET]

[SET]

Group / Channel Screen

[TALK] Lon

[TALK] oFF

[TALK] on

Function:
Talk button operation.

Lon = Talk Latch on
oFF = Talk off
on = Momentary on

[SA] SR on

[SA] SR oFF

[WTA] tR Pb

[WTA]

Options in menu:
Pb = Push button
1L = Audio 1 Latch
2L = Audio 2 Latch
12L = Audio 1 &2 Latch
PbL = Push button Latch
oFF = WTA disabled
1 = Audio 1 M
2 = Audio 2 M
12 = Audio 1&2 M

Loc on

Hold [⬆] + [⬇] again for 1 second

Loc oFF

Function:
Menu items can be viewed but not changed when activated.

Sets unit to Group 01A, Channel 01, with 01 flashing. User must set channel number.

Set unit to defaults

All user defined groups retained

FRc rES

Sets unit to Group 01A, Channel 01, with 01 flashing. User must set channel number.

Set unit to defaults

All user defined groups erased

Frequency Bands

The BTR-80N system operates over the following frequency ranges:

- North America
  - Base TX: 482 - 608 MHz
  - Base RX: 614 - 698 MHz
- Europe
  - Base TX: 482 - 608 MHz
  - Base RX: 614 - 722 MHz

The bands, US TV channels, and frequencies are shown in Table 11-l. All bands are 18 MHz wide.

Bands F to G are always base transmit bands (beltpack receive bands). Bands 1 - 6 are always base receive bands (beltpack transmit bands). Thus an A2 base station would be comprised of an A band transmitter paired with a 2 band receiver.

Band Pairing for Systems

All band pairs cannot be made into a system. Table 1 shows the available band pairings.

Base TX Bands	Base RX Bands
F	1, 2, 3, 4, 5, 6
H	1, 2, 3, 4 ,5, 6
A	1, 2, 3, 4, 5, 6
B	2, 3, 4, 5, 6
C	3,4, 5, 6
D	4, 5, 6
E	5, 6

Table 11-1
Available band pairings

On Table 11-1 it can be seen that a C base station transmit band can be paired with 3, 4, 5, or 6 receive bands. However, a C2 unit cannot be made. This is because a certain amount of frequency separation between transmit and receive bands is required for good transmit and receive operation. If they are too close the RF performance of the system is reduced.

Band	US TV	Freq. Start	Freq. End	US TV
F	16	482	488	16
F	17	488	494	17
F	18	494	500	18
H	19	500	506	19
H	20	506	512	20
H	21	512	518	21
A	22	518	524	22
A	23	524	530	23
A	24	530	536	24
B	25	536	542	25
B	26	542	548	26
B	27	548	554	27
C	28	554	560	28
C	29	560	566	29
C	30	566	572	30
D	31	572	578	31
D	32	578	584	32
D	33	584	590	33
E	34	590	596	34
E	35	596	602	35
E	36	602	608	36
	37	608	614	37
1	38	614	620	38
1	39	620	626	39
1	40	626	632	40
2	41	632	638	41
2	42	638	644	42
2	43	644	650	43
3	44	650	656	44
3	45	656	662	45
3	46	662	668	46
4	47	668	674	47
4	48	674	680	48
4	49	680	686	49
5	50	686	692	50
5	51	692	698	51
5	52	698	704	52
6	53	704	710	53
6	54	710	716	54
6 EURO ONLY	55	716	722	55

Table 11-2 -Band Names, Frequencies, and US TV Channels

Frequency Plan

There are 48 groups in a BTR-80N system. The 48 groups are divided up into 36 factory-defined groups and 12 user-defined groups. A group referenced to a base station is comprised of two TX channels and up to 12 RX channels.

User-defined groups are blank initially and allow the user to enter their own frequencies.

Factory-defined groups are composed of frequencies that cannot be modified by the user. The 36 groups are composed of the following:

- 9 Triplet groups
    - Groups 1a to 9c
- 9 Single groups
    - Groups 10-18

The factory groups are organized in different ways to provide flexibility to the user on selecting frequencies. A group is composed of intermodulation free frequencies. The triplet groups may be used together for up to three systems that are intermodulation coordinated. For example, three intermodulation coordinated systems may be set up by using the following groups and channels:

- System A = Group 1a, channels: 1, 2, 3, 4
- System B = Group 1b, channels: 5, 6, 7, 8
- System C = Group 1c, channels: 9, 10, 11, 12

A group also contains frequencies within different combinations of the TV channels. The user then can select a group that is clear of broadcast TV channels in the area by selecting a group(s) that doesn't use those channels.

Table 11-3 indicates how the factory defined groups used the three TV channels for TX and three TV channels for receive. These plans are based upon US broadcast TV channels. A darkened TV channel indicates the group has frequencies in that channel. The white TV channel indicates the group has no frequencies in that TV channel. For example, Group 1A uses at least one frequency from each of the three TV channels for RX and only the 1st TV channel for TX. However group 18 uses only the third TV channel for TX and RX.

	Base TX Freq.			Base RX Freq.		
	TV1	**TV2**	**TV3**	**TV4**	**TV5**	**TV6**
1a	█			█	█	█
1b	█			█	█	█
1c	█			█	█	█
2a		█		█	█	█
2b		█		█	█	█
2c		█		█	█	█
3a			█	█	█	█
3b			█	█	█	█
3c			█	█	█	█
4a	█			█	█	
4b	█			█	█	
4c	█			█	█	
5a		█		█	█	
5b		█		█	█	
5c		█		█	█	
6a			█	█	█	
6b			█	█	█	
6c			█	█	█	
7a	█			█		█
7b	█			█		█
7c	█			█		█
8a		█		█		█
8b		█		█		█
8c		█		█		█
9a			█	█		█
9b			█	█		█
9c			█	█		█
10	█			█	█	█
11		█		█	█	█
12			█	█	█	█
13	█			█		
14		█		█		
15			█	█		
16	█				█	
17		█				█
18			█			█

**Table 11-3 - Groups and TV Channel Used.
Dark = TV used, Light = TV not used.**

Reread the sections of this manual to make sure you have completed system set-up properly.

If you are unable to solve the problem, contact the dealer from whom you purchased the system for assistance.

PROBLEM	SOLUTION
DISTORTION - System's audio quality seems distorted at medium to high input levels.	Reduce microphone gain by adjusting microphone gain control in software.
HISS - System seems to produce a "hiss" which is undesirable.	Check the gain setting on all beltpacks and the base. They may be too low or too high. Check to make sure you are still well within range of the base station.
LOW OUTPUT - System produces a low output level.	Check the gain setting on both the beltpacks and the base. They may be too low.
FEEDBACK - Moving around area of use produces "squeal" or "howl" in various locations using ext. speakers.	Reduce the gain settings on both the beltpacks and the base. They may be too high. If in 2-wire mode, the intercom channel your are on may be unloaded.
DROPOUTS - When moving around the area of use there seems to be locations where the signal "swooshes" or completely disappears.	Make sure both antennas on the base and beltpack are connected and follow the location suggestions. Change the location of the base unit and antennas or avoid the bad areas with the remote beltpacks.
INTERFERENCE - System picks up signals other than wireless intercoms.	Make sure that all the Telex beltpack(s) are on. If there are any unused receivers at the base, turn the audio off from those receivers by deselecting the appropriate "Portable Station Connect" button. If problems persist with the beltpack on, you will probably need to change the group. Make sure the base and beltpack match after any Group/Channel change.
NO AUDIO from BASE or BELTPACK headsets.	Check Transmitter setting on base and beltpack. Check talk LED to make sure it is on. Make sure beltpack batteries are OK.

Improper battery selection, use, installation and care are the cause of numerous wireless system failures.

Alkaline Batteries: Alkaline batteries such as Mallory's DURACELL® or Eveready's ENERGIZER® provide the most reliable operation in wireless transceivers.

The use of low cost carbon-zinc batteries is NOT recommended.

Nickel-Metal Hydride Batteries: These batteries can save you money in the long run, as they can be recharged. Typical battery life is greater than the length of time alkaline batteries last.

Cold Temperatures and Batteries

The battery life times listed in this section are at room temperature. Alkaline and Nickel-Metal Hydride batteries service hours falls off significantly at low temperatures due to battery chemistry. Alkaline batteries typically have less than half their room temperature service life if used at freezing 32° F (0° C). Due to the service hours reduction of Alkaline and Nickel Metal Hydride batteries at low temperature the user will need to change batteries more often.

Another solution is using Lithium AA cells if beltpacks are to be used in very cold temperatures. Lithium batteries, like the Energizerâ E^2 Lithium AA cells, are excellent batteries at cold temperatures. At the temperatures of 15° F (-9° C), Lithium AA cells will last about 7 times longer than Alkaline batteries. that equates to 2 hours for Alkaline vs 14 hours for Lithiums. However, the tradeoff is Lithiums cost more and are less friendly to the environment than alkalines.

Battery Life:

TR-80N
Alkaline, 9-10 hours typical
Nickel Metal Hydride, 10-11 Hours typical

TR-82N
Alkaline, 6-7 hours typical
Nickel Metal Hydride, 8-9 Hours typical

WARNING:
Do not place an alkaline TR battery pack in any battery charger. Severe charger and battery pack damage may result.
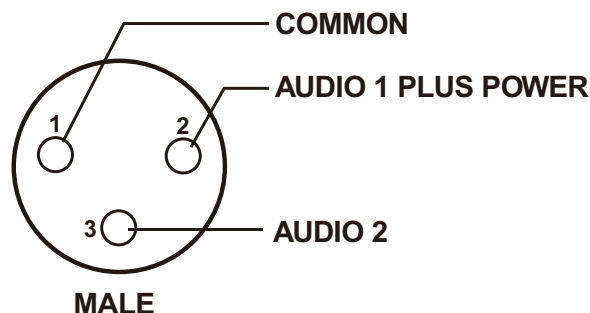
2-Wire Systems Specifications

RTS

Input Impedance:..200W

Output Level:..0.775 Vrms nominal

Bridging Impedance:......................................>10kW

Call Signaling:

    Send: ....20kHz   100 Hz, 240 mVrms

    Receive: ....20kHz ±800 Hz, 100 mVrms

Power Voltage: ....28.0 VDC nominal

COMMON

AUDIO 1 PLUS POWER

1   **2**

3   AUDIO 2

MALE

AudioCom/Telex

Input Impedance:..300W

Output Level:..1.0 Vrms nominal

Bridging Impedance:......................................>10kW

Call Signaling:

    Send: ....20kHz ± 100 Hz, 05 mVrms

    Receive: ....20kHz ±800 Hz, 100 mVrms

Power Voltage: ....24.0 VDC nominal

COMMON

AUDIO (-) PLUS POWER

1   **2**

3   AUDIO (+) PLUS POWER

MALE
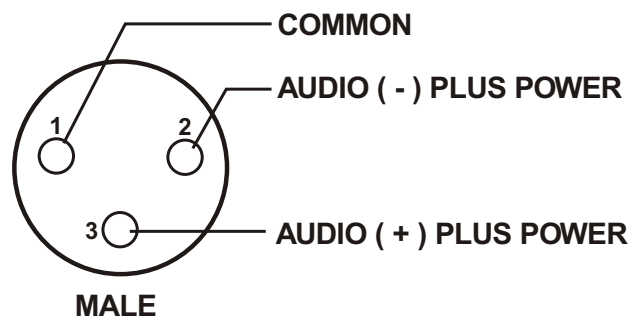
Clear-Com

Input Impedance:..200W

Output Level:..1.0 Vrms nominal

Bridging Impedance:......................................>10kW

Call Signaling:

    Send:...12   3 VDC

    Receive: ....4 VDC Minimum

Power Voltage: ....30.0 VDC nominal

COMMON

POWER

1   **2**

3   AUDIO

MALE
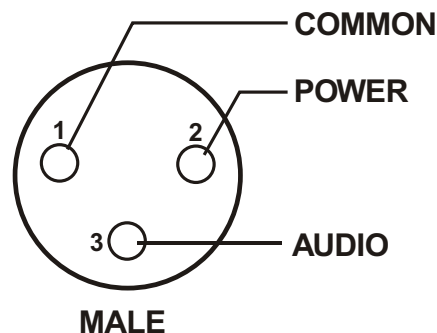
Certification Information

FCC

The Telex BTR-80N, TR-80N, and TR-82N Transmitter/receiver are type accepted under United States Federal Communications Commission Part 74. Licensing of Telex equipment is the user's responsibility and licensibility depends on the user's classification, users application, and frequency selected. Telex strongly urges the user to contact the appropriate telecommunications authority for any desired clarification.

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

CAUTION: Changes or modifications made by the user could void the user's authority to operate the equipment.

The beltpack is intended to be worn on the belt of the user with both antenna's vertical for best operating range and performance. Placing the beltpack in other locations on the body may reduce performance and void the user's authority by the FCC to operate the equipment.

Mandatory Safety Instructions
to Base Station Installers and Users

1. Use only manufacturer or dealer supplied antenna. Antenna minimum safe distance, for a base-station, as set by the FCC is 20cm. Antenna gain: zero dBd referenced to a dipole.

2. The FEDERAL COMMUNICATIONS COMMISSION has adopted a safety standard for human exposure to RF (Radio Frequency) energy, which is below the OSHA (Occupational Safety and Health Act) limits.

3. To comply with current FCC RF Exposure limits, the antenna must be installed at or exceeding the minimum safe distance show here, and in accordance with the requirements of the antenna manufacturer or supplier.

4. Antenna substitution: Do Not substitute any antenna for the one supplied by or recommended by the manufacturer or radio dealer. You may be exposing person or persons to harmful radio frequency radiation. You may contact your radio dealer or the manufacturer for further instructions.

5. WARNING: Maintain a separation distance from the antenna to person(s) of at least 20cm.

   You, as the qualified end-user of this radio device must control the exposure conditions of bystanders to ensure that the minimum separation distance (above) is maintained between the antenna and nearby persons for satisfying RF Exposure compliance.

   The operation of this transmitter must satisfy the requirements of the General Population/Uncontrolled Exposure Environment for work-related use. Transmit only when person(s) are at least the minimum distance from the properly installed, externally mounted antenna.

Industry Canada

The Telex BTR-80N, TR-80N, TR-82N transmitter/receiver are certified to Industry Canada RSS-123 rules

Licensing of Telex equipment is the users responsibility and licensability depends upon the user's classification, user's application and frequency selected. Telex strongly urges the user to contact the appropriate telecommunicatins authority for any desired clarification.

CAUTION: Any changes or modifications made to the above equipment could void the user's authority to operat the equipment.

Europe

This equipment is in compliance with the following directives;

2002/95/EC RoHS Directive
2002/96/EC WEEE Directive

Please dispose of the base station and beltpacks at the end of its operational life by taking it to your closest collection point or recycling center.

This equipment is intended for use in professional audio intercom applications.

Equipment intended for sale in (ISO 3166-1, 2 letter country code): AT, BE, CY, CA, DK, EE, FI, FR, DE, GR, HU, IE, LV, LT, LU, MT, NL, PL, PT, RO, SK, SI, ES, GB.

A license may be required to operate this equipment in certain regions! Consult your national authority for possible requirements.

The EC Declaration of Conformities for the BTR-80N, TR-80N and TR-82N are contained in this section.

CE

TELEX®

EC Declaration of Conformity

The undersigned, representing the following manufacturer

Manufacturer:

Bosch Security Systems, Inc.

Address:

8601 East Cornhusker Highway, Lincoln, NE 68507, USA

Authorized Representative where Technical Construction File is held:

EVI Audio GmbH, Sachsenring 60, D-94315, Straubing, Germany

hereby declares that the following product(s)

BTR-80N Wireless Intercom Base Station

TX Frequency bands: F: 482 – 500MHz, H: 500 – 518MHz, A: 518 – 536MHz, B: 536 – 554MHz
C: 554 – 572MHz, D: 572 – 590MHz, E: 590 – 608MHz

RX Frequency bands: 1: 614 – 632MHz, 2: 632 – 650MHz, 3: 650 – 668MHz, 4: 668 – 686MHz
5: 686 – 704MHz, 6: 704 – 722MHz

is (are) in conformity with the regulations of the following marked EC-directive(s) and bear(s) the CE · mark accordingly

	reference number	Title
☐	2004/108/EC	EMC Directive (EMC)
☐	2006/95/EC	Low-Voltage Directive (LVD)
☐	89/106/EC	Construction Products Directive (CPD)
☒	1999/5/EC	Radio equipment and Telecommunications Terminal Equipment (R&TTE), according to annex IV

The conformity of the product(s) with (above ticked) EC directives has been assessed with the involvement of Notified Body: 1588. No other directives apply. Conformity is provided by the compliance with the following standard(s):

Standard(s) / date

EN 300 454-1 v1.1.2 (2000-08), EN 300 454-2 V1.1.1 (2000-08) (Radio Performance)
EN 301-489-1 v1.8.1 (2008-04), EN 301 489-9 v1.4.1, (2007-11) (EMC)
EN 62311 (2008) (Health), EN 60950-1:2006 (Safety)

Year of affixing the CE mark: 2010

Place, date:

Bosch - Lincoln, Jan. 28, 2010

Vice President, Business Line
Printed name: Ralph Strader

R+D Manager, Business Line
Printed name: Keith Jenkins

Doc No. REG000365002   Version : 1.00

$C\!\in$ **TELEX**®

EC Declaration of Conformity

The undersigned, representing the following manufacturer

Manufacturer:

Bosch Security Systems, Inc.

Address:

8601 East Cornhusker Highway, Lincoln, NE 68507, USA

Authorized Representative where Technical Construction File is held:

EVI Audio GmbH, Sachsenring 60, D-94315, Straubing, Germany

hereby declares that the following product(s)

TR-80N Wireless Intercom Beltpack

TX Frequency bands: 1: 614 – 632MHz, 2: 632 – 650MHz, 3: 650 – 668MHz, 4: 668 – 686MHz

5: 686 – 704MHz, 6: 704 – 722MHz

RX Frequency bands: F: 482 – 500MHz, H: 500 – 518MHz, A: 518 – 536MHz, B: 536 – 554MHz

C: 554 – 572MHz, D: 572 – 590MHz, E: 590 – 608MHz

**is (are) in conformity with the regulations of the following marked EC-directive(s)
and bear(s) the $C\!\in$ · mark accordingly**

	reference number	Title
☐	2004/108/EC	EMC Directive (EMC)
☐	2006/95/EC	Low-Voltage Directive (LVD)
☐	89/106/EC	Construction Products Directive (CPD)
☒	1999/5/EC	Radio equipment and Telecommunications Terminal Equipment (R&TTE), according to annex IV

The conformity of the product(s) with (above ticked) EC directives has been assessed with the involvement of Notified Body: 1588. No other directives apply. Conformity is provided by the compliance with the following standard(s):

Standard(s) / date

EN 300 454-1 v1.1.2 (2000-08), EN 300 454-2 V1.1.1 (2000-08) (Radio Performance)
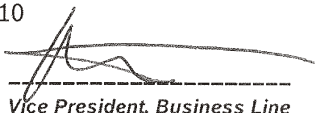EN 301-489-1 v1.8.1 (2008-04), EN 301 489-9 v1.4.1, (2007-11) (EMC)
EN 62311 (2008) (Health), EN 60950-1:2006 (Safety)

Year of affixing the CE mark: 2010
Place, date:
Bosch - Lincoln, Jan. 28, 2010

Vice President, Business Line   **R+D Manager, Business Line**
Printed name: Ralph Strader   Printed name: Keith Jenkins

Doc No. REG000366002   Version : 1.00

Form No. FRM000525006, Version 2.01-TELEX   Page 1

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TELEX®

EC Declaration of Conformity

The undersigned, representing the following manufacturer

Manufacturer:

Bosch Security Systems, Inc.

Address:

8601 East Cornhusker Highway, Lincoln, NE 68507, USA

Authorized Representative where Technical Construction File is held:

EVI Audio GmbH, Sachsenring 60, D-94315, Straubing, Germany

hereby declares that the following product(s)

TR-82N Wireless Intercom Beltpack

TX Frequency bands: 1: 614 – 632MHz, 2: 632 – 650MHz, 3: 650 – 668MHz, 4: 668 – 686MHz
5: 686 – 704MHz, 6: 704 – 722MHz

RX Frequency bands: F: 482 – 500MHz, H: 500 – 518MHz, A: 518 – 536MHz, B: 536 – 554MHz
C: 554 – 572MHz, D: 572 – 590MHz, E: 590 – 608MHz

is (are) in conformity with the regulations of the following marked EC-directive(s) and bear(s) the C E · mark accordingly

	reference number	Title
☐	2004/108/EC	EMC Directive (EMC)
☐	2006/95/EC	Low-Voltage Directive (LVD)
☐	89/106/EC	Construction Products Directive (CPD)
☒	1999/5/EC	Radio equipment and Telecommunications Terminal Equipment (R&TTE), according to annex IV

The conformity of the product(s) with (above ticked) EC directives has been assessed with the involvement of Notified Body: 1588. No other directives apply. Conformity is provided by the compliance with the following standard(s):

Standard(s) / date

EN 300 454-1 v1.1.2 (2000-08), EN 300 454-2 V1.1.1 (2000-08) (Radio Performance)
EN 301-489-1 v1.8.1 (2008-04), EN 301 489-9 v1.4.1, (2007-11) (EMC)
EN 62311 (2008) (Health), EN 60950-1:2006 (Safety)

Year of affixing the CE mark: 2010
Place, date:
Bosch - Lincoln, Jan. 28, 2010

Vice President, Business Line
Printed name: Ralph Strader

R+D Manager, Business Line
Printed name: Keith Jenkins

Doc No. REG000367002   Version : 1.00

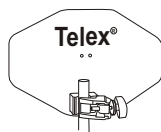*Form No.* FRM000525006, Version 2.01-TELEX   Page 1

Accessories and Replacement Parts

ALP-700
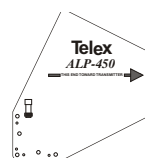450-760MHz Bi-directional
Log Periodic Antenna

P.N. 301824000

ALP-450
450-900 MHz Log Periodic Antenna
Includes mounting hardware and 10 feet
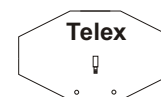(3 meters) coaxial cable with TNC con-
nectors

P.N. 71147000

ALP-600
520-760 MHz Bi Directional Log Peri-
odic Antenna Includes mounting hard-
ware and 10 feet (3 meters) of coaxial ca-
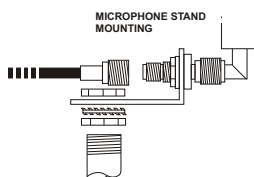ble with TNC Connectors

P.N. 878896

Antenna Cables
Special low loss antenna cables with TNC Connectors

Model No.	Length	Part No.
CXU-10	10 Ft. (3 meter)	690419
CXU-25	25 Ft. (7.6 meter)	71151-025
CXU-50	50 Ft. (15 meter)	71151-050
CXU-75	75 Ft. (23 meter)	71151-075
CXU-100	100 Ft. (30 meter)	71151-100

AB-2

MICROPHONE STAND MOUNTING

Bracket for 1/2 wave Antenna
with 10 ft. of coax-

P.N. 71138000

BTR Power Cords
North America..P.N. 550024013
U.K...P.N. 550024002
European ....P.N. 550014000
Australian..P.N. 550024018

BTR Intercom Dummy Load
Telex type..P.N. 878935
RTS type...P.N. 878990

2TX80N Dual transmit connector kit
for BTR-80N .....................................P.N. PRD000224000

SA Relay plug adapter.....................................P.N. 2862046

DC-LP Locking D.C plug...................................P.N. 650102

BLC, BTR-80N Link Cable...................P.N. PRD000223000

CTC, BTR-80N
CAN BUS Termination Cable...................P.N. PRD000223001

CAN-T, BTR-80N
CAN BUS 120 Ohm Termination ............P.N. PRD000223002

BP-700 TR Battery pack, alkaline
(batteries not included) ................................P.N. 71315-000

BP-800NM Rechargeable 2200mAhr
Nickle-metal hydride battery pack...............P.N. 71315-002

BC-800NM4

Four Slot "Smart" Charger   North America..PRD000070008
with Four BP-800NM   Euro PRD000070009
battery packs

BC-800NM
Single Slot
"Smart" Charger   North America..PRD000070006
with BP-800NM   Euro...........PRD000070007
battery pack

Beltpack:
1/4 - Wave antennas

Part No.	Band Color	Frequency Coverage of Antenna	Beltpack RX Band							Beltpack TX Band					
			F	H	A	B	C	D	E	1	2	3	4	5	6
879220-1	Violet	425.0 - 488.0 MHz													
879220-2	Black	485.0 - 553.9 MHz	X	X	X	X									
879220-3	Yellow	554.0 - 635.9 MHz					X	X	X	X					
879220-4	Green	636.0 - 725.9 MHz									X	X	X	X	X
879220-5	Red	726.0 - 826.0 MHz													
879220-6	Blue	826.0 - 930.0 MHz													

Base Station:
Flexible Ground Independent Dipole Antennas

Model No.	Part No.	Band Color	Frequency Coverage of Antennas	Base TX Band							Base RX Band					
				F	H	A	B	C	D	E	1	2	3	4	5	6
FA-RW	EML000106RW	Red/White	470-550 MHz	X	X	X										
FA-YW	EML000106YW	Yellow/White	525-610 MHz				X	X	X	X						
FA-GW	EML000106GW	Green/White	610-710 MHz								X	X	X	X	X	
FA-BW	EML000106BW	Blue/White	710-880 MHz													X

Base Station:
1/2-Wave Ground Plane Independent Antenna

Model No.	Part No.	Band Color	Frequency Coverage of Antenna	Base TX Band							Base RX Band					
				F	H	A	B	C	D	E	1	2	3	4	5	6
CLA-1	870658-1	Blue	520 -564.9 MHz				X									
CLA-2	870658-2	Yellow	565 - 614.9 MHz					X	X							
CLA-3	870658-3	Red	615 - 659.9 MHz								X	X	X			
CLA-4	870658-4	White	660 - 689.9 MHz											X		
CLA-5	870658-5	Green	690 - 724.9 MHz												X	X
CLA-6	870658-6	Orange	725 - 760 MHz													
CLA-8	870658-8	Purple	796 - 865 MHz													
CLA-10	870658-10	Tan	470 - 506 MHz	X	X											
CLA-11	870658-11	Pink	515 - 548 MHz			X										
CLA-12	870658-12	Brown	542 - 575 MHz				X									

TELEX®