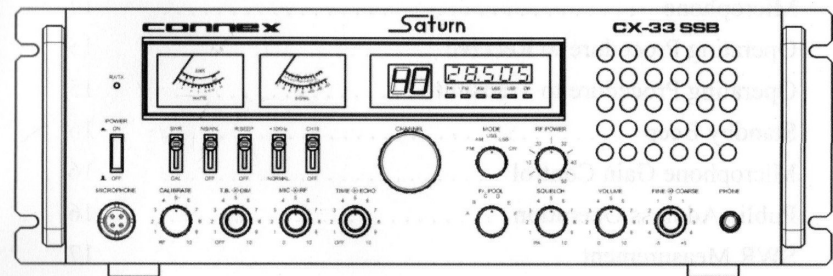


CONNEX

CX-33 SSB

**Deluxe AM/FM/SSB/CW
Amateur Base Station Transceiver
AM/FM 10W · SSB 25W
with Frequency Counter**



USER MANUAL

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SPECIFICATIONS

GENERAL

Model	CX-33 SSB
Frequency Range	28.015 ~ 28.465 MHz
Emission	USB, LSB, CW, AM, FM
Frequency Control	Phase-Lock-Loop Synthesizer
Frequency Stability	0.001%
Operating Temperature Range	-20°C to +50°C
Microphone	Plug-In (4-Pin), Dynamic PTT
AC Input Voltage	110V 60Hz (220V 50Hz Optional)
AC Power Consumption	90W
Antenna Connectors	Standard SO-239 Type
Meter	Meter #1 : Indicates relative RF Power Output /Antenna SWR Meter #2 : Indicates Received Signal Strength /AM Modulation

TRANSMITTER

RF Power Output	10 W : CW/AM/FM 25 W : USB/LSB
SSB Generation	Dual-Balanced Modulation
AM Modulation	Class B Amplitude Modulation
FM Deviation	±4 KHz @ 1KHz 30mV Audio (± 5 KHz max)
Clarifier Range	±5 KHz
Harmonic and Spurious Emission	Better than 60 dB
AM/FM Frequency Response	400 to 5000 Hz
SSB Frequency Response	400 to 3000 Hz
Output Impedance	50 Ohms Unbalanced

SPECIFICATIONS

RECEIVER

Sensitivity	AM/CW : 0.5uV for 10dB S+N/N FM : 0.25uV for 12dB S+N/N USB/LSB : 0.15uV for 10dB S+N/N
AM/FM Selectivity	50dB
SSB Selectivity	70dB
Image Rejection	More than 50dB
IF Rejection	More than 80dB at 455KHz
AGC	SSB/CW/AM 80dB for 50mV for 10dB Change in Audio Output
Squelch	Adjustable- Threshold less than 0.7uV
Audio Frequency Response	400 to 2500 Hz
Distortion	Less than 10% at 2 Watts Output into 8 Ohms
Cross Modulation	>50 dB
Intermediate Frequency	10.695 MHz (AM-1st, SSB), 455KHz(AM-2nd)
Clarifier Range	±5 KHz/ ±1 KHz
Noise Blanker	IF Single Gate Type
Audio Output Power	More than 3 Watts into 8 Ohms
Built-in Speaker	8 Ohms
External Speaker (Optional)	Disables Internal Speaker when connected

(SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE)

INTRODUCTION

Thank you for your confidence in selecting the CX-33 SSB Amateur Base Station two-way radio equipment. We know you'll find your transceiver as exciting as it is practical. Many years of valuable experience designing electronic products are behind our two-way communications systems. Only the highest quality components are incorporated into BASE STATION radios to assure reliability and maximum performance.

Installing and operating the BASE STATION radio is not complicated, but the flexibility provided by its numerous operating features may not be fully appreciated until a little time is spent becoming familiar with its controls and connections. It will be to your advantage to save all the packing materials cartons, fillers, cushioning, etc., they will prove valuable preventing damage should you ever have occasion to transport or ship your BASE STATION radio to the Dealer.

INSTALLATION

Location/Connection

The transceiver should be placed in a convenient operating location close to an AC power outlet and the antenna leading cable(s).

The transceiver is attached with the AC power cord set. Proceed as follows to complete all necessary connections to the transceiver.

1. Your transceiver has standard antenna connectors of type SO-239 both located on rear panel; for easy connection to standard PL-259 coax plugs. If the coax antenna cable must be made longer, use coax cable with impedance of 50ohms and use only enough cable to suit your needs. This will insure a proper impedance match and maximum power transfer from the transmitter to the antenna.
2. **AC Power Operation :** Use 110 volts AC power for the Base Station. (for 220 volts AC operation, consult your dealer).

Noise Interference

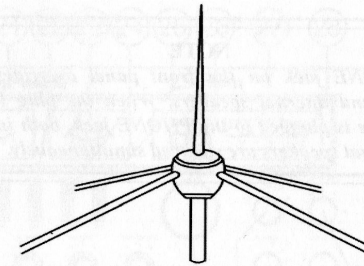
There are several kinds of noise interference you may encounter in Base Station operation. Some of these noise sources are: fluorescent buzz, nearby commercial broadcast, electrical appliance, lawnmower, and electrical storms, etc. Commercial products are available to reduce interference from these sources. Consult your dealer or professional amateur radio supply shops.

Antennas

For best transmission and reception, your transceiver should use an antenna especially designed for a frequency of 28-30 MHz. Antennas are purchased separately and include installation instructions. Numerous type of antennas are available that range from emphasis on ease of installation to emphasis on performance. Often the difference in performance between many of the antennas is modest.

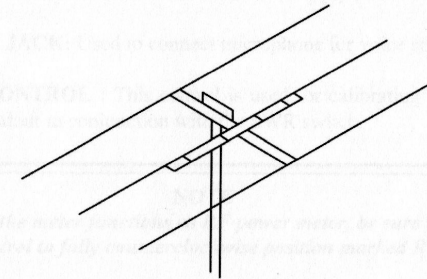
INSTALLATION

1. **Vertical Ground Plane Antenna :** There are omnidirectional antenna that provide optimum performance for contacting other fixed stations using vertical type antenna in addition to all mobile stations. For medium long range communications work.



Ground Plane

2. **Directional Beam Antenna :** Highly efficient and directional antennas generally intended for fixed-to-fixed long range communications.



Directional Beam Antenna

INSTALLATION

Remote Speaker

The external speaker jack (EXT. SP.) on the rear panel is used for remote receiver monitoring. The external speaker should have 8 ohms impedance and be able to handle at least 3 watts. When the external speaker is plugged in, the internal speaker is disconnected.

NOTE

The PHONE jack on the front panel overrides both external and internal speakers. When the plug from a headphone is plugged to the PHONE jack, both internal and external speakers are silenced simultaneously.

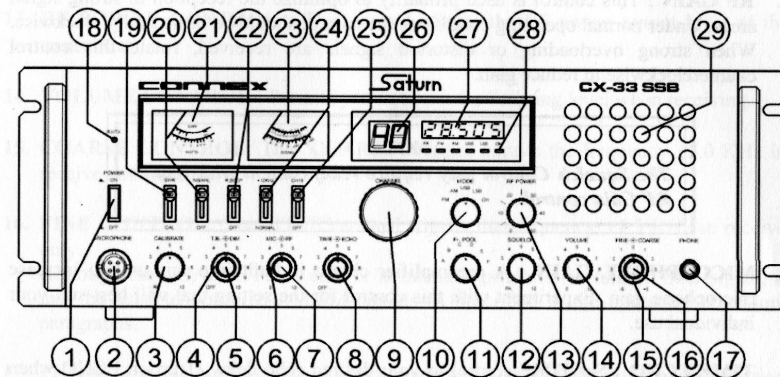
Public Address

An external 8 Ohms, 3 Watts speaker must be connected to the PA jack located on the rear panel when the transceiver is used as a public address system. The speaker should be directed away from the microphone to prevent acoustic feedback. Physical separation or isolation of the microphone and speaker is important when operating the PA at high output levels.

OPERATION

A) Controls and Indicators

i) Front Panel



1. **POWER ON/OFF CONTROL** : Push button in to apply power to the unit.
2. **MICROPHONE JACK**: Used to connect microphone for voice source.
3. **CALIBRATE CONTROL** : This control is used for calibrating the SWR meter for accurate SWR readout in conjunction with the SWR switch.

NOTE

So that the meter functions as RF power meter, be sure to set this control to fully counterclockwise position marked RF.

4. **DIM CONTROL** : This knob controls the level of brightness for the meter lamp, the frequency display and the channel display.

OPERATION

5. **TALKBACK/OFF CONTROL** : Adjust this knob for desired volume of Talkback. This is used to monitor your own voice. For example, you could use this feature to compare different microphones.
6. **RF GAIN** : This control is used primarily to optimize the reception in strong signal areas. Under normal operating conditions the control should be turned fully clockwise. When strong overloading or distorted signals are received, rotate this control counterclockwise to reduce gain.

NOTE

The Squelch Control may require readjustment with reduce RF Gain control.

7. **MICORPHONE GAIN** : A preamplifier circuit is built into this unit to increase microphone gain. Experiment with this control for the setting that will best suit your individual use.
8. **TIME/ECHO** : Set TIME control to your desired echo delay. Turn on ECHO when you desire to add an echo effect to your transmitting voice. This control has no effect on receiving.
9. **CHANNEL SELECTOR** : Has 40 detents in a turn and selects one of the channels desired. The selected channel is digitally displayed in the window above the selector.
10. **MODE SELECTOR** : Selects the mode of operation in either CW, standard AM, FM, or USB and LSB. Transmissions in any mode can only be understood by stations operating in the same mode.
11. **Fr. POOL** : The *Frequency Pool* allow the user to select the frequency range of the channel selector.
12. **SQUELCH CONTROL / PA SWITCH** : The squelch control is used to cut off or eliminate receiver background noise in the absence of incoming signal. For maximum receiver sensitivity it is desired that the control be adjusted only to the point where the receiver background noise or ambient background noise is eliminated. Turn fully counterclockwise then slowly clockwise until the receiver noise disappears. Any signal to be received must now be slightly stronger than the average received noise. Further clockwise rotation will increase the threshold level which a signal must

OPERATION

overcome in order to be heard. Only strong signals will be heard at a maximum clockwise setting. The switch activates the public address system when placed in PA position. The PA function should not be used unless an external speaker is connected to the PA SP jack on the rear panel. (See Public Address, on page 7).

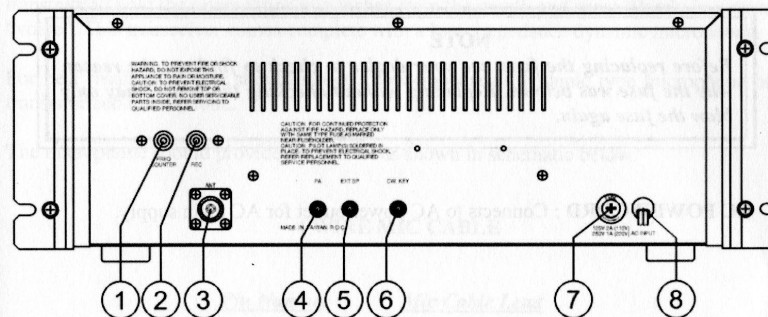
13. **RF POWER CONTROL** : This control adjusts the RF power output level of the transmitter.
14. **VOLUME CONTROL** : Permits you to adjust the listening level when receiving.
15. **COARSE CONTROL**: The "COARSE" control adjusts the frequency ± 5.0 KHz in receive and transmit.
16. **FINE CONTROL**: The "FINE" control adjusts the frequency ± 1.5 KHz in receive only.
Although the COARSE/FINE control is intended primarily to tune in SSB signal, it may be used to optimize AM/FM signals as described in the operating procedure paragraphs.
17. **PHONE JACK**: Accepts a plug from a headset of 4 to 32 Ohm impedance. Insertion of the plug will silence the built in speaker (and external speaker connected to External Speaker jack).
18. **TX/RX LED**: The Red LED indicates the unit is in the transmit mode. The Blue LED indicates the unit is in the receive mode.
19. **SWR CALIBRATE SWITCH** : This switch changes the SWR meter function in two ways :
CAL (Lever down): Used to calibrate the SWR meter before measuring.
SWR (Lever up): Used to directly read the SWR of antenna connected to the unit.
20. **NB/ANL/OFF SWITCH**: In the NB/ANL (Lever up) position, the RF Noise Blanker and the Automatic Noise Limiter in the audio circuits are activated. The Noise Blanker is very effective in eliminating repetitive impulse noise such as ignition interference.
21. **RF/SWR METER** : Used for two purpose – to indicate transmitter power when transmitting and to indicate antenna SWR (standing wave ratio). Note that the power meter has separate scales for AM, FM, SSB and CW transmission, respectively.

OPERATION

22. **ROGER BEEP SWITCH** : This switch activates the ROGER BEEP circuit, when placed in R.BEEP (Lever up) position. The radio automatically transmits an audio tone at the end of your transmission. This indicates the end of your transmission so that people who are having trouble hearing you will know that you are done speaking. As a courtesy to others, use the Roger Beep only when necessary.
23. **SIGNAL/MODULATION METER** : This meter indicates the strength of received signals during reception and your percentage of modulation when transmitting in AM. Modulation readings are most accurate when using maximum output power. The modulation meter does not work in FM or SSB mode.
24. **+10KHz SWITCH** : This switch adds 10KHz to the frequency being used.
25. **CH19 SWITCH** : This switch allows you to select CH19 instantly.
26. **CHANNEL DISPLAY** : The channel display indicates the selected channel.
27. **FREQUENCY COUNTER** : The frequency counter indicates the frequency of the selected channel you wish to operate on.
28. **FUNCTION INDICATORS (PA-FM-AM-USB-LSB-CW)** : The indicators permit you to know instantly the mode to which the unit is set. Indicators correspond to the mode selected by the MODE SELECTOR (Item 10).
29. **FRONT SPEAKER** : The voice will output from this speaker.

OPERATION

ii) Rear Panel Connectors



1. **FREQUENCY COUNTER OUTPUT JACK** : This jack provides output for connecting an optional frequency counter so that you can watch channel frequency digitally. The frequency counter readout will be possible on transmit mode only.
2. **RECORDING OUTPUT JACK** : This jack provides output for connection to a tape recorder to permit recording of received signals or transmitter modulation.
3. **ANTENNA**: This jack accepts 50 Ohm coaxial cable with a type PL-259 connector.
4. **PA SPEAKER JACK** : Used for public address operation. The PA speaker should be connected to this jack using 1/8"(3.5mm) diameter plug. Insertion of an external speaker (8 Ohm 4w) into the External Speaker jack will not interrupt the PA operation.
5. **EXTERNAL SPEAKER JACK** : Used to connect an external speaker for extra sound source. Use 1/8" (3.5mm) diameter plug for connection. Insertion of the plug into this jack will silence the internal speaker.
6. **CW KEY** : Used for morse code operation. Connect a CW key to this jack and set the MODE SELECTOR switch in the CW position.

OPERATION

7. **FUSE:** Accommodates a fuse for AC input circuit protection. Use 125V/7A (for 220 VAC operation, use 250V/4A fuse) fuse for replacement.

NOTE

Before replacing the fuse, see your dealer to check to find out the reason why the fuse was blown. Replacing without checking the cause, may only blow the fuse again.

8. **AC POWER CORD :** Connects to AC power outlet for AC main supply.

OPERATION

B) Microphone

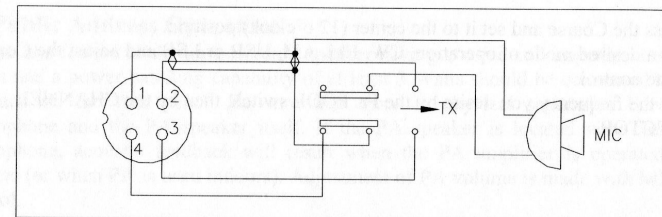
The receiver and transmitter are controlled by the push-to-talk switch on the microphone. Press the switch and the transmitter is activated, release switch to receive. When transmitting hold the microphone two inches from the mouth and speak clearly in a normal "voice". This transceiver comes complete with a low-impedance dynamic microphone.

For best results, the user should select a low-impedance dynamic type microphone or a transistorized microphone.

The microphone should provide the functions shown in schematic below.

4 WIRE MIC CABLE

<u>Pin Number</u>	<u>Mic Cable Lead</u>
1	Audio Shield
2	Audio Lead
3	Transmit Control
4	Receive Control



Transceiver Microphone Schematic Diagram

OPERATION

C) Operating Procedure To Receive

1. Set the ECHO switch to OFF position.
2. Turn the unit on by setting the POWER SWITCH to ON position. Now the meters, Channel Indicator, and Function Indicators will be illuminated.
3. Temporarily, set MODE SELETOR switch in AM position.
4. Set the SQUELCH CONTROL in fully counterclockwise position and adjust the VOLUME control for a comfortable listening level.
5. Listen to the background noise from the speaker. Turn the SQUELCH CONTROL slowly clockwise until the noise just disappears (no signal should be present). Leave the SQUELCH CONTROL at this setting. The SQUELCH CONTROL is now properly adjusted.

The receiver will remain quiet until a signal is actually received. Do not advance the SQUELCH CONTROL too far clockwise or some of the weaker signal will not be heard.

IMPORTANT:

Make sure that the ANTENNA, POWER SOURCE, and MICROPHONE are connected before you operate.

6. Depress the Coarse and set it to the center (12 o'clock) position.
7. Select a desired mode of operation, CW, FM, AM, USB or LSB and adjust the Coarse or Fine control.
8. Select the frequency you desire by the Fr. POOL switch, then by the CHANNEL SELECTOR.

D) Operating Procedure To Transmit

1. Select the desired channel and mode of transmission.
2. If the channel is clear, depress the Push-to-Talk switch on the microphone. Speak in a normal tone of voice.

OPERATION

E) Standby-Beep

A special provision has been built in your radio to give other stations a sign which tells that you are turning to receive. This feature is activated with the Roger Beep switch (Item 22). When activated, a beep tone is automatically transmitted at each time you release the Push-to-Talk switch on the microphone to turn to receive mode.

F) Microphone Gain Control

A preamplifier circuit is built into the radio to increase the microphone gain. Experiment with the control for setting that will best suit your individual use.

NOTE

When the microphone gain control is set to maximum, ambient noise may also be picked up by the microphone. In high noise situation, low microphone gain setting may produce the best results. The microphone gain control is also used to adjust PA loudness.

G) Public Address Operation

To use this feature of the transceiver, a speaker having a voice coil impedance of 8 to 16 Ohms and a power handling capability of at least 3 Watts should be connected to the PA SP jack on the rear panel. Be sure that there is physical separation between the microphone and the PA speaker itself. If the PA speaker is located very close to the microphone, acoustic feedback will result when the PA amplifier is operated at high volume (or when PA is used indoors). Adjustment of PA volume is made with MIC GAIN control.

OPERATION

H) SWR Measurement

Most antennas are factory tuned, but the antenna efficiency may be peaked by slightly adjusting the length of antenna using the SWR meter built into the unit. This adjustment may improve the antenna standing wave ratio (SWR). The SWR permits you to determine how well matched the antenna and cables is to your transceiver.

1. Turn the unit ON.
2. Set the Mode switch to AM position.
3. Set the MIC GAIN CONTROL to minimum.
4. Press the Push-to-Talk switch on the microphone and turn the Calibrate Control clockwise (past click) so that the SWR meter pointer exactly coincides with the set mark on the scale. Release the Push-to-Talk switch.
5. Set the RF POWER CONTROL to maximum.
6. Activate the SWR button. Press the Push-to-Talk switch again. The SWR of your antenna is read directly on the scale.

NOTE

An SWR below 2 or less is desired as this indicates that over 95% of the transmitted power is broadcast into the air.

MEMO

CAUTION

This radio is intended for use by amateur radio operators. A license from the FCC is required for transmission on the radio in the United States. Transmission without a license may be unlawful.

Bells CB

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