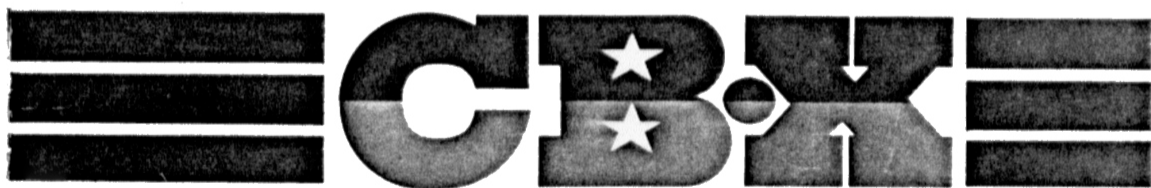

Operating Instructions

HARRIER



Your Harrier CB-X Citizens' Band radio features an advanced phase-locked loop (PLL) frequency control system to generate the multiple frequencies necessary to operate on all 40 channels authorised for use throughout the United Kingdom. The PLL circuit uses only one crystal which assures ultra precise frequency control (as compared to conventional multi-crystal-radios) and results in greater reliability.

Your radio features the following:

- Digital PLL frequency synthesiser.
- Adjustable receiver sensitivity with RF Gain control.

- – Adjustable microphone amplifier sensitivity to suit your voice characteristic with Mic Gain control.
- – Easy-to-read digital channel display.
- – Channel 9 switch for instant channel 9 selection.
- – Public address facility.
- – Adjustable receiving tonal quality with a Tone switch.
- – Communication type microphone with a screw-on connector supplied.
- – Reversible electrical ground polarity.
- – Delta-Tune switch for clearer reception of off-frequency transmissions.

Important

If the transmitter is turned on when it is not connected to a suitable antenna or load it will be severely damaged.

Always check that the antenna is properly connected.

For your own protection, we urge you to record the serial number of this unit in the space provided below. You will find the serial number located on the back panel of the unit.

Serial number

Before You Call For Help.....

Our repair centres receive many returned products which actually are **working properly!** Before you assume your unit needs repair, refer to the Service and Maintenance section of this

manual to see if the problem is due to what you can easily eliminate.

Enjoy your Harrier CB-X!

Nominal Specification

General.

Channels: 40 digital PLL synthesised

Frequency range: See last page

Operating temperature range: -5 degree C to +45 degree C

Power source: 10.8 to 15.6 V DC reversible ground (13.2 V nominal)

Current drain: (1) Transmit. 1.5 A nominal, (2) Receive. 1.2 A nominal.

Dimensions:

Width. 180 mm

Height. 63 mm

Depth. 211 mm

Transmitter.

Emission: 6F3 (FM)

RF power output: 4 W

Frequency tolerance: $> \pm 1.5$ kHz

RF power attenuator: > 10 dB

Frequency response: 500 to 2,500 Hz ± 12 dB

Frequency deviation: $> \pm 1.5$ kHz
@ 1,250 Hz audio

Adjacent channel power: < 10 microwatt

Spurious emission: (1) < 50 nW within the following frequency bands –

80 MHz – 85 MHz

87.5 MHz – 118 MHz

135 MHz – 136 MHz

174 MHz – 230 MHz

470 MHz – 862 MHz

(2) < 0.25 microwatt at any other frequency.

Receiver.

Conversion system: Dual conversion superheterodyne

IF: 10.7 MHz 1st and 455 kHz 2nd

Channel display: Digital 7 segment LED's

Audio output power: > 1.5 W into 8 Ohm

Sensitivity: < 1 microvolt @ 20 dB NQ

Adjacent channel rejection: > 50 dB

Spurious emission: < 20 nW

Squelch sensitivity: 1 to 10 microvolt

Because we continually strive to improve our products we may change specifications without prior notice.

Front Controls and Rear Connectors

S/RF Meter

Indicates relative strength of incoming signal or RF output power.

RX Indicator

Lights up when receiving.

TX Indicator

Lights up when transmitting.

Microphone

Dynamic type, specifically designed for communications use. Press pushswitch for CB transmitting or paging (PA).

Channel 9 Switch

Set to CH9 position and the unit will jump to channel 9. When returned to Off position, you will be on the previously selected channel.

RF Attenuator Switch

If your antenna is mounted at a height exceeding 7 m, you must set this switch to Lo position to reduce the transmitter power.

Tone Switch

Set this to the position that provides most pleasing sound.

Channel Display

Shows the selected channel in large easy-to-read 7-segment LED display.

Off/Volume Control

Turn clockwise to apply power to the unit and then adjust for the desired loudness.

Microphone Jack

Accepts plug from the dynamic microphone supplied.

Delta-Tune Switch

When receiving unclear signals that may be slightly off-frequency set this switch to + or - to obtain the clearest signals.

Squelch Control

Permits you to cut out annoying background noise in between messages.

Microphone Gain Control

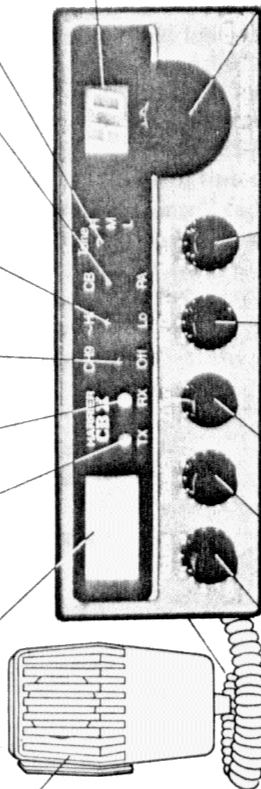
Rotating this control counterclockwise reduces the sensitivity of the microphone amplifier and requires 'close-talking' into the microphone.

RF Gain Control

Adjust to get optimum reception based on the incoming signal strength.

Channel Selector

Selects one of the forty channels as indicated in the channel display.



CB-PA Switch

This switch selects CB or public address operation.

13 The DC Power Socket
Connect the plug from DC power cable set for connection to a source of 12 Volt DC positive or negative ground battery. The **red** wire with the in-line fuse must be connected to the plus (+) side and the **black** wire to the minus (-) side of the battery.

Antenna Connector
Connect your CB antenna to this SO-239 coaxial connector which mates with PL-259 plug.



PA Speaker Jack
To use the public address function of your transceiver, you must connect an external speaker designed for the purpose into this jack. Use 3.5 mm, 2-conductor plug.

External Speaker Jack
If you want to use an external speaker for an extra sound source, connect it into this jack. Use 3.5 mm 2-conductor plug.

Using Your Radio

Do not transmit without a suitable antenna or load connected to the Antenna connector, or the radio will be severely damaged. To ensure proper installation, review the Installation section.

To Receive

- 1 Set the **CB-PA** switch to **CB** position.
- 2 Set the **Channel 9** switch to **Off** for normal 40 channel operation unless you desire to operate on channel 9.
- 3 Rotate the **RF Gain** control fully clockwise to maximum sensitivity.
- 4 Rotate the **Off/Volume** control clockwise to about '2' position. Now the meter and the channel display should light and hissing sound or stations operating on the channel will be heard.
- 5 Select the desired channel by rotating the Channel selector.
- 6 Adjust the **Squelch** control to cut

out annoying background noise when no signals are present (or wait until signals cease on the channel).

To adjust the Squelch control:

Slowly rotate the **Squelch** control clockwise to the point where the background noise just stops. When a signal comes in, it will overcome the squelch action and be heard without interference disturbance on the channel inbetween signals.

Do not set the **Squelch** control too far clockwise, or weak signals will not be able to open the squelch circuit. To receive very weak signals or to disable the squelch circuit, simply set the **Squelch** control fully counterclockwise position.

- 7 Adjust the **Volume** control and **Tone** switch for a suitable loudness and tonal quality.

Channel 9 Switch

Channel 9 is used only for real emergencies such as road accidents and medical emergencies. Normal requests for a doctor or car breakdowns do not count as emergencies. Channel 9 is the CB equivalent of dialling '999'.

To switch to channel 9 instantly, simply flip the **Channel 9** switch to up (**CH 9**) position. To return to previously monitored channel, flip back to **Off** position.

To Transmit

- 1 Be sure the microphone is firmly connected to the microphone jack at the side of the unit.
- 2 Select the desired channel to transmit.
- 3 Press the microphone's pushswitch and hold it at a distance about 10 cm from your mouth. Speak in a normal voice.

Transmitting on Channel 9

- To transmit on channel 9, flip the **Channel 9** switch to up (**CH 9**) position, or manually select channel 9 on the channel selector with the Channel 9 switch remaining off. Either way, when you press the microphone's pushswitch, you will be transmitting on channel 9.
- 4 To receive, release the microphone's pushswitch.

Using the Public Address

Your transceiver may be operated as a 2-watt public address amplifier. To use the public address amplifier you must first connect an 8-ohm speaker specifically designed for the purpose to the **PA** speaker jack on the unit.

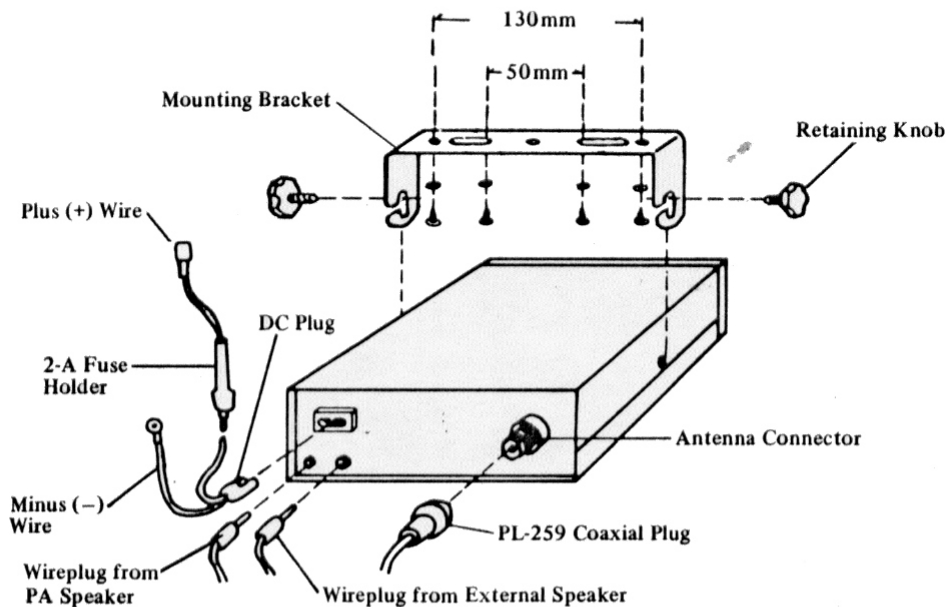
- 1 Connect the **PA** speaker to the **PA** speaker jack on the unit.
- 2 Set the **CB-PA** switch to **PA** position.
- 3 Rotate the **Volume** control clockwise to turn power on.
- 4 Press the microphone's pushswitch and talk into it in a normal voice.
- 5 Adjust the **Mic Gain** control for desired loudness.
- 6 To return to normal CB operation, set the **CB-PA** switch to **CB** position, or to turn off the unit, rotate the **Volume** control fully counterclockwise to **Off** position.

Installation

Safety and convenience are the primary factors in deciding exactly where to locate your radio. The radio is designed for ease in control accessibility. Be sure that the unit is located so that it does not interfere with the driver or impair access to any controls. Connecting cables must be routed and secured in such a manner

as to not interfere with the operation of the brake, accelerator or other controls. Interference from either the unit or connecting cables may contribute to the loss of control of the vehicle.

The radio is designed for use with either negative or positive ground electrical systems.



Step 1: With negative ground system, connect the red wire (one with in-line fuse holder) to either the (a) fuse block, (b) cigarette lighter, or (c) directly to the positive post on the battery. Usually, the fuse block is the most convenient connecting point. It is also possible to connect to the **Accessory** terminal on the fuse block or ignition switch, so that your CB unit automatically goes off, preventing accidental battery drainage. Then tightly connect the black wire directly to the vehicle's metal frame.

Step 2: With positive ground system, reverse the wires, connecting the red/fuse-holder wire to the frame, the black wire to your DC power source. A light or meter can be a good aid in locating a suitable power source and ground. In either case, a good, direct metal-to-metal ground is essential for optimum performance.

Connect your antenna system to the antenna connector. If you are using an external speaker or a PA speaker, connect it to the appropriate jack on the unit rear panel.

CB Antennas

Note: The licence requires that equipments which have provision for the connection of an external antenna shall not be connected to other than a single element rod or wire antenna not exceeding 1.5 m in overall length.

For best reception and transmission, your radio should use an antenna especially designed for a frequency of 27 MHz. Antennas are purchased separately and supplied with assembly and installation instructions, mounting hardware, and a coaxial antenna cable fitted with a fully assembled standard connector (type PL-259) for quick connection to your radio. CB antennas are available in many sizes and styles. Loaded and helical type quarter-wave antennas are physically shorter but electrically equivalent to full quarter-wave whip antennas, which are illegal in the U.K.

The antenna's mounted location on the vehicle affects the operation of the radio. Transmission and reception characteristics vary for different antenna locations. Four of the most popular antenna mountings are shown on next page.

Roof mount — The antenna mounted on roof represents a transmission/reception range closest to ideal.

Front wing mount — The radiation pattern is slightly greater in the direction of the rear bumper opposite the side on which the antenna is mounted. Provides ease in antenna mounting.

Rear deck mount — The radiation pattern is strongest in the direction of the front bumper opposite the side on which the antenna is mounted.

Bumper mount — The antenna radiates in a pattern directly in front of and to the rear of the vehicle, with maximum radiation directly away from the vehicle in a horizontal plane. Provides easy antenna removal and no hole on the car.

Roof Mount



Front Wing Mount



Rear Deck Mount



Bumper Mount



About SWR

Antenna performance may be peaked by slightly adjusting its length (1/8" to 1/4") using an SWR (standing wave ratio) meter. This meter is purchased separately or the SWR can be checked professionally. Most antennas are factory-tuned, but this adjustment may improve antenna efficiency. An SWR reading below 2:1 is desired, as this indicates that over 75% of the transmit power is broadcast into the air. The rest is 'reflected' back into your radio.

A higher ratio than this usually indicates that there is a break in the antenna connecting wire or that an incorrect antenna has been fitted.

The transmitter **most not be operated** under these conditions.

Important Notice

If the base of your antenna is mounted at a height exceeding 7m above ground level, the Secretary of State requires a reduction in transmitter power of 10 dB. When above is applicable to you, you must set the RF Attenuator switch located on the unit front panel to **Lo** position to accomplish reduction of the transmitter power output.

General rules for best mobile antenna performance

- 1 Mount antenna on vehicle as high as possible.
- 2 The higher percentage of the antenna length mounted above rooftop, the better performance.
- 3 Centre antenna in middle of selected location (i.e., boot, gutter or roof).
- 4 Install an antenna cable line away from noise sources (ignition system, gauges, etc.).
- 5 Be sure to mount antenna with a good metal-to-metal ground.
- 6 Prevent antenna cable damage.

SWR Reading	Output Power Transmitted
1 :1	100%
1.3:1	98.3%
1.5:1	96.0%
1.7:1	93.3%
2 :1	89.0%
3 :1	75.0%
4 :1	64.0%
5 :1	58.0%
6 :1	49.0%
10 :1	33.0%

Noise

Some noise is to be expected and is normal. There will be a higher level of background noise when used as a mobile CB transceiver and the car is running. If this noise becomes objectionable (which is caused by the vehicle's alternator, generator, spark plugs, windshield washer and other electrical systems), a noise suppression kit may need to be installed.

Noise from the alternator or generator will create a whining high-pitched sound and will vary with engine speed. Spark plugs and ignition noise will show up as a popping sound and can also vary with engine speed.

To tell the difference between noise created by the ignition system and noise

created by the generator, start the vehicle and race the engine — now, turn the engine off, and if the noise stops immediately, you have determined the ignition system is at fault. Noise which stops a few seconds after the ignition is turned off, is caused by the alternator or generator.

Noise can be caused by electrical interference from spark plugs and ignition cables. Most late model vehicles have resistance high tension ignition cable and resistive spark plugs supplied as standard equipment. This eliminates the need for spark plugs suppression. If not supplied, kits are available from automotive supply dealers.

Service and Maintenance

Your radio has been built to exacting quality control standards. However, the radio should be treated with reasonable care normally accorded to any electronic equipment.

If you encounter difficulty in operating the radio, please check the following:

Symptom	Possible Cause (and Remedy)
Unit dead, no indicator lights.	(1) Blown fuse (Replace). (2) Power wire disconnected (Review installation instructions).
Unit will not send or receive, indicator lamps on.	(1) Unit's CB-PA switch set to PA (Reset). (2) Antenna disconnected or shorted.
Unit will not receive, no background noise.	(1) Squelch set too high (Readjust).
Unit will receive but not transmit.	(1) Loose microphone connection. (2) Antenna problem (Check). (3) Microphone defective (Substitute another mic).

Symptom	Possible Cause (and Remedy)
Reception garbled with loud whining background noises. Symptom comes and goes, or persists for days.	(1) Atmospheric disturbances. Worsens during peak sunspot activity.

Caution

The 2-A fuse included with this radio is an important safety feature which must not be circumvented. The use of a fuse greater than 2-A may result in overloading and/or fire and consequential damage to the radio or vehicle.

Operating Frequencies

Your radio provides for transmission and reception of frequency modulated emissions on the following frequencies:

Channel 1	27.60125 MHz	Channel 21	27.80125 MHz
Channel 2	27.61125 MHz	Channel 22	27.81125 MHz
Channel 3	27.62125 MHz	Channel 23	27.82125 MHz
Channel 4	27.63125 MHz	Channel 24	27.83125 MHz
Channel 5	27.64125 MHz	Channel 25	27.84125 MHz
Channel 6	27.65125 MHz	Channel 26	27.85125 MHz
Channel 7	27.66125 MHz	Channel 27	27.86125 MHz
Channel 8	27.67125 MHz	Channel 28	27.87125 MHz
Channel 9	27.68125 MHz	Channel 29	27.88125 MHz
Channel 10	27.69125 MHz	Channel 30	27.89125 MHz
Channel 11	27.70125 MHz	Channel 31	27.90125 MHz
Channel 12	27.71125 MHz	Channel 32	27.91125 MHz
Channel 13	27.72125 MHz	Channel 33	27.92125 MHz
Channel 14	27.73125 MHz	Channel 34	27.93125 MHz
Channel 15	27.74125 MHz	Channel 35	27.94125 MHz
Channel 16	27.75125 MHz	Channel 36	27.95125 MHz
Channel 17	27.76125 MHz	Channel 37	27.96125 MHz
Channel 18	27.77125 MHz	Channel 38	27.97125 MHz
Channel 19	27.78125 MHz	Channel 39	27.98125 MHz
Channel 20	27.79125 MHz	Channel 40	27.99125 MHz