

# Operation and Installation Manual Barrett SB250RC HF Transceiver

Firmware Version 5, 2010  
User manual update 2

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## **INSTALLATION**

### **LOCATION**

1. Select a suitable location to mount your transceiver. Do not mount the transceiver in a position where it will receive direct sunlight as this may result in internal temperatures exceeding 70 deg C.

2. Connect the transceiver to a suitable power supply ( 12 volts, 20 amps). Inadequate current supply will result in abnormal transmitter performance.

CAUTION: Incorrect supply voltage may damage the SB250 transceiver.

### **MARINE INSTALLATION**

When installing the SB250RC (Remote Control) model, do not run the coaxial cable next to the control cable. Failure to observe this requirement may result in RF instability on transmit. Mount the AUTO ANTENNA TUNER as close to the antenna feed point as possible. The main radio unit can be mounted anywhere between the control unit and the tuner.

NOTE: five metres of control cable is provided as standard.

### **GROUNDING**

On the rear of the transceiver a ground termination lug is provided. Connect the transceiver to the ground system of the vessel via a short substantial copper bonding strap. If in doubt, consult your dealer for the correct installation of a ground system. Inadequate grounding may cause transmitter RF instability.

### **ANTENNA**

Marine: Most Automatic antenna tuners are designed to work into antennae of 7 metres length, or more. Shorter loaded antennae may be used as long as they provide a load within the tuner's transformation ratio. Avoid lengths over 12 metres. Keep antenna feed wires as short as possible and avoid running antenna wires inside the hull. Radiation inside the hull may affect other electronic equipment when transmitting.

### **MOBILE INSTALLATION**

When installing the SB250RC do not run the coaxial cable next to the control cable. Failure to observe this may result in RF instability on transmit.

If using a Multitap antenna system, ensure that 'J2' link is removed (See 'Tuning' - page 7).

## **POWER SUPPLY**

It is essential that the transceiver has a power supply that can deliver 12 volts @ 20 amps to the power input socket of the transceiver. If the supplied power lead is not able to reach the power supply point you must ensure that any extra wiring is of sufficient current capacity to ensure minimum voltage drop under maximum load conditions. Failure to provide correct power may result in unstable transmitter performance. In the case of battery powered installations it is advisable to connect the power lead directly across the battery supply as this will minimise voltage drop. The supply voltage must not fall below 11 volts at the transceiver input power plug when under full load (i.e. tune at HI power).

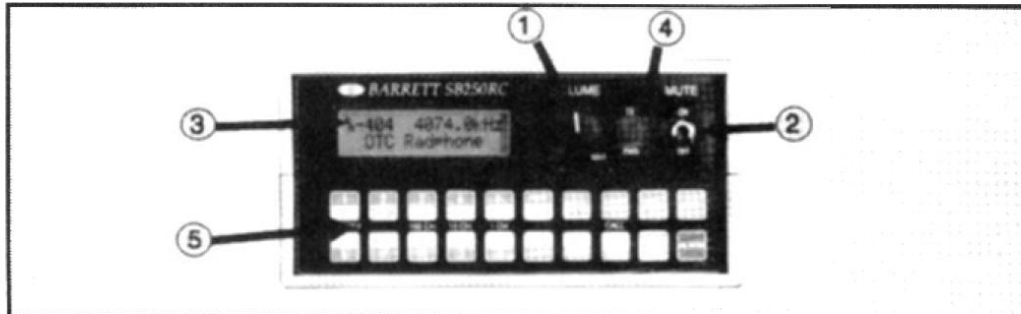
## **FUSES**

In mobile installations, a heavy duty 20A fuse must be fitted close to the power source, i.e. at the battery, not the radio.

DO NOT use standard automotive glass or spade type fuses on the main power feed to the radio. It must be a physically large fuse and fuse holder.

There is also a 3 Amp, M205 style fuse on the power amplifier circuit board inside the main transceiver box. This supplies power to the control head and external tuners etc.

## OPERATION



- 1.....Volume/Power On/Off Control
- 2.....Mute Control
- 3.....32 Character by 2 line Supertwist LCD
- 4.....Power/Modulation Indicator Lamp
- 5.....20 Key Membrane Touch Panel

### 1. VOLUME/POWER ON/OFF

The SB250 is turned on by rotating this control clockwise. Set volume to suit.

### 2. MUTE

The Mute Switch enables the Muting function of the transceiver. The Mute system is audio derived and opens when the audio frequencies below 1000Hz predominate.

### 3. LCD DISPLAY MODULE

The display module provides information on the current status of the transceiver including:- Transmit/Receive frequencies, channel number, power mode, scan mode, alarm mode and Selcall information.

### 4. POWER/MODULATION INDICATOR

When the transceiver is in receive mode, the lamp is fully lit indicating that the transceiver is on. In transmit mode the lamp intensity varies according to modulation.

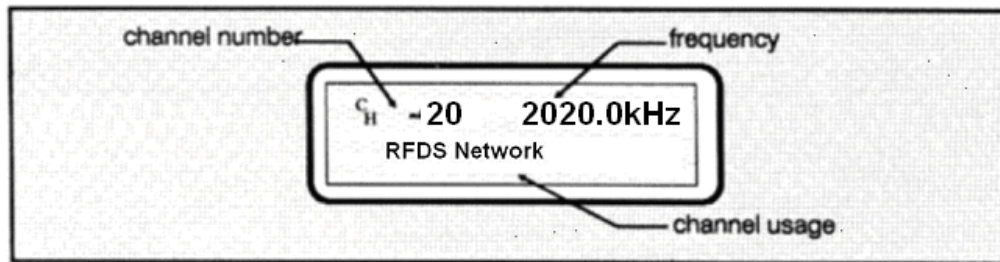
### 5. MEMBRANE KEYPAD

The membrane keypad provides the interface between the user and the SB250.

**LCD DISPLAY**

The SB250 is equipped with a 2 line by 16 character LCD display. The display shows channel number, frequency and channel usage.

**DISPLAY EXAMPLE:**



When the SB250 is in transmit mode the display will show the transmit frequency.



Pressing this key will allow you to listen on the transmit frequency. This function is useful when operating with split frequency channels.

**CLARIFIER**

The SB250 has an in-built digital clarifier to allow for fine tuning of received signals.



Pressing either of these buttons will shift the receiver in steps of 10Hz up or down.


Maximum clarifier deviation is +/- 190Hz (Marine mode)

+/- 50Hz (Land Mobile mode)

**CHANNEL SELECTION**



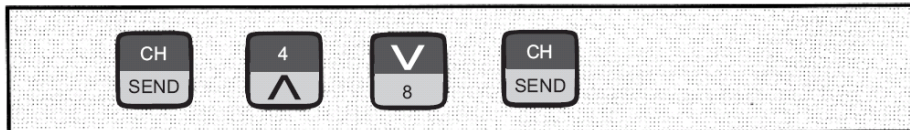
This is the channel select key.

To change channel press the  key and enter the required channel number (0-255).

Once entered press the  key to complete the command.

**CHANNEL CHANGE EXAMPLES:**

To select channel 48:



**SCROLLING THROUGH CHANNELS**



These keys scroll up 100, 10 or 1 channel respectively.



These keys scroll down 100, 10 or 1 channel respectively.

**NOTE:** If the next channel scrolled to is empty the SB250 will jump to the next non-empty channel.

## **TRANSMITTER POWER**



The SB250 is capable of altering its transmit output power from Hi to Low as required. Pressing this key will toggle the output power level between Hi and Low. In Low power mode, output power is approximately 10 Watts.

When the SB250 is in Low power mode the LCD display will flash 'Lo Pwr'

## **ALARM FUNCTION**



The SB250 is equipped with a digitally synthesised alarm encoder which can be used to generate distress tones.

Two alarm systems are supported:



International Marine Radiotelephone two-tone alarm - Alternating 2200Hz/1300Hz, 500ms cycle, 50% duty.  
Royal Flying Doctor Service two-tone alarm - 880Hz + 1320 Hz continuous.

The alarm signal generated by the SB250 is dictated by the channels usage.



Double pressing of the **ALARM** key will activate the relevant alarm system on either RFDS or Marine Distress Frequencies.

Note that the 'Double Press' action must be made in quick succession.



To test the alarm encoder press the **ALARM TEST** key.

**NOTE:** Some channels have the alarm function disabled as required by the service providers.

## **2182**



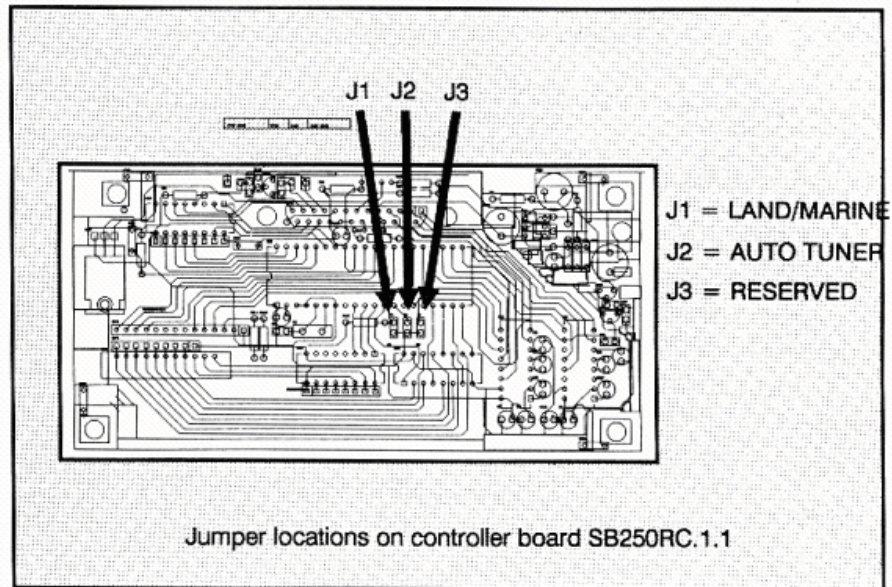
Pressing this key places the transceiver into AM transmit mode on the International Marine Distress frequency 2182.0kHz

This function is enabled only when the SB250 is configured for MARINE RADIO LICENCE. See 'CHANNEL ALLOCATION'. (J1 - IN).

## □ TUNING

TUNE

The SB250 provides support for both Multitap Antennas, and Modern Autotuner systems such as the SGC, SG230.



TUNE

J2 out - pressing the **TUNE** key will transmit carrier.

### Note:

We recommend that J2 is always removed when using either a Multitap Antenna or SGC Autotuner system.

The 'Tune' button is not normally used with a Mobile Multitap, and removing this link will also speed up the tuning sequence of a modern Autotuner.

## **AUTOMATIC TUNE DISABLE**

Operational only when 'J2 Link connected' - Not normally used.



This key toggles the SB250 between fully automatic and semi-automatic tune modes.

In fully automatic mode the SB250 will retune on any channel change including that caused by an incoming selcall during SCAN mode. When in fully automatic mode the LCD flashes 'AUTO'.

In semi-automatic mode the SB250 will only tune after the  key is pressed. Pressing

the  key in both modes will cause the SB250 to retune.

## **CHANNEL ALLOCATION**

The SB250 can be programmed with up to 256 Channels. Some of these channels are pre-programmed for use with Land Mobile (ie. 4WD) or Marine systems depending upon the required application. The channel allocation is defined by the mode in which the SB250 is configured. There are two sets of pre-programmed frequencies within the SB250. The two sets correspond to the two most common transceiver licences in use within Australia.

The First is a Land Mobile service such as RFDS, HF Club or VKS737 networks. Some of these networks also offer direct dial telephone interconnect services.

The second is the Marine Radio licence which allows the operator to use International Distress frequencies as well as general purpose marine channels.

Jumper J1 is used to select the frequency set:

J1 OUT - Land Mobile
J1 IN - MARINE RADIO

Empty channels available for user frequencies are indicated by the usage message  
 Some of the 'PRESET' channels are write protected to prevent their accidental erasure. These write protected channels are provided for important user frequencies which should not be erased.

The location of the Write Protected channels depends on the frequency set used.

Land Mobile Radio	CHANNELS 0-63 ARE WRITE PROTECTED.
Marine Radio	CHANNELS 0-57 ARE WRITE PROTECTED.

**Land Mode:**

Channels 100-119 are normally set aside for User Programmable receive frequencies.

**Marine Mode:**

Channels 120-139 are normally set aside for User Programmable receive frequencies.

**Write Protected 'PRESET' channels and transmit frequencies on Non-write protected channels can only be reprogrammed by authorised technical personnel.**

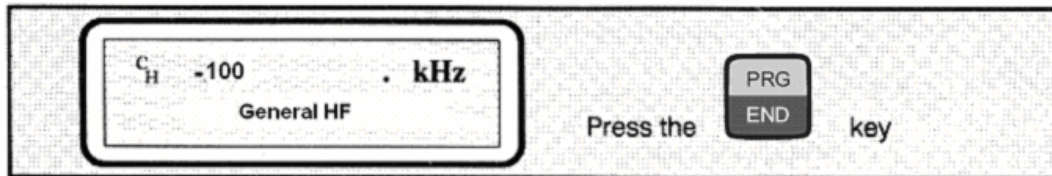
**REPROGRAMMING A CHANNEL**



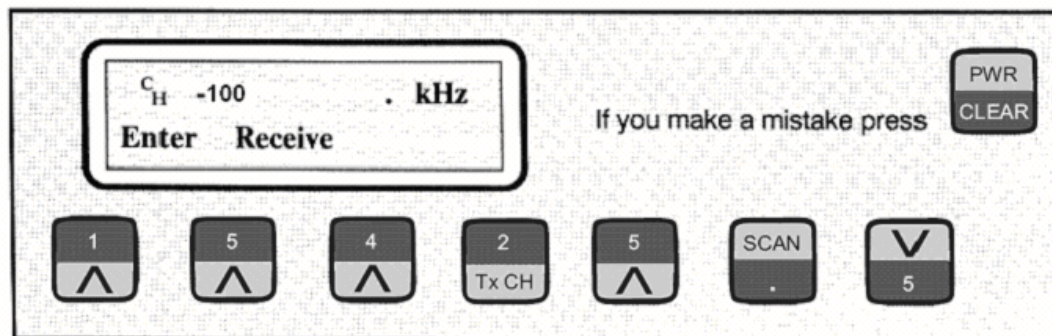
This is the programming key. Pressing this key on a Private, Non Write Protected channel will place the SB250 into program mode.

To program channel 100 to Radio Australia 15425.0kHz

**First select channel 100 (see 'CHANNEL SELECTION')**

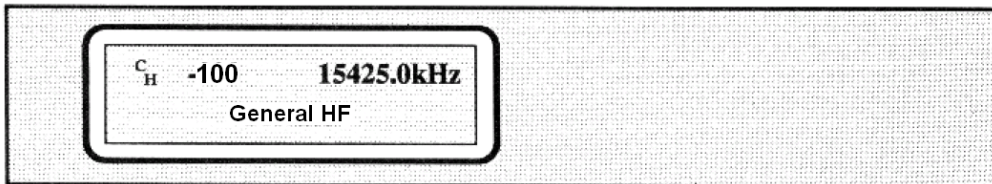


**Enter the frequency.**



Press the  key to store.

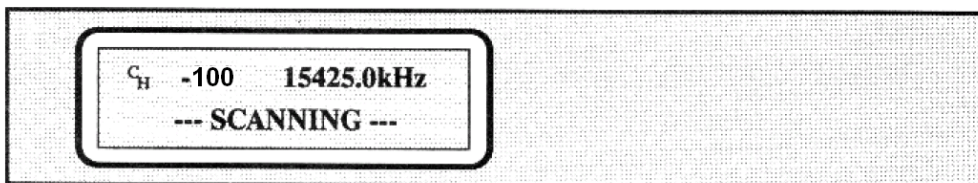
The LCD display should now look like this.



**SCANNING CHANNELS**



This key places the SB250 into **SCAN MODE**. The scanner function only stops on signals from a SELCALL encoder. When in **SCAN MODE** the display is as follows.



Press the microphone PTT switch or any key to exit the **SCAN MODE**.

**PROGRAMMING THE SCANNER**

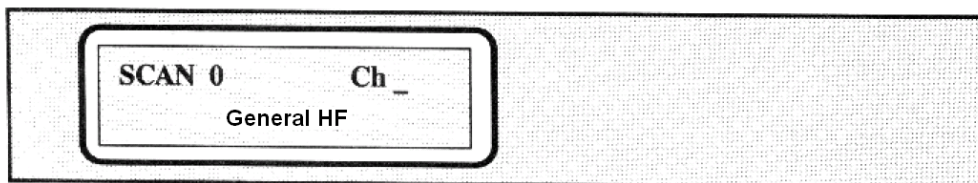
Up to ten channels can be programmed into the scan table however for the best results with SELCALL do not enter more than six channels.

To program the scan table the **SCAN PROGRAM** mode must be entered.



To do this hold the  key down.

After two seconds the SB250 will beep and **SCAN PROGRAM** mode will be activated.



Enter the channel number of the first frequency you wish to scan.



Press the  key.

**Enter the channel number of the second frequency.**



**Press the**  **key.**

Repeat this for all frequencies you wish to scan.

When all channels have been entered press the



key to exit the **SCAN PROGRAM**

The scan table is now programmed.

To confirm this place the SB250 into scan mode and watch that the LCD display steps through the required channels.

## **SELECTIVE CALL OPTION**

Selcall is a digital system of signalling between HF transceivers. In the Selcall system each transceiver is assigned an individual ID and can be called using this ID. Up to 10000 ID's can be assigned in a Selective calling system.

While waiting for an incoming selcall an SB250 can be placed into 'Selcall Mute'. When in 'Selcall Mute' the audio from the SB250 is muted.



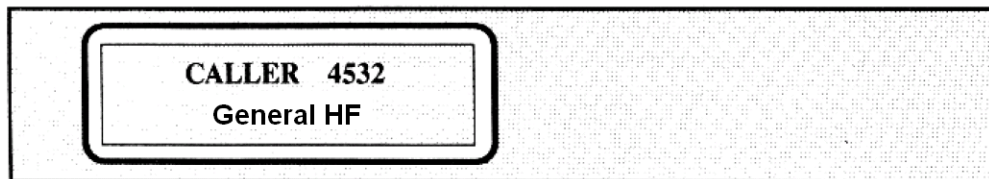
The  key toggles the SB250 between 'Selcall Mute' and normal receive modes.

When a call is received by the SB250 a reverberative tone is transmitted back to the caller and the SB250 switches back to normal mode.

## **RECEIVING A CALL**

The Selcall option, when installed, is always listening for incoming calls. If it is necessary to monitor more than one channel the **SCAN MODE** should be used. Refer to 'PROGRAMMING THE SCANNER' for the set-up of the scan table.

To indicate that a selcall has been received an audible alarm is sounded and the LCD display shows the call as follows.



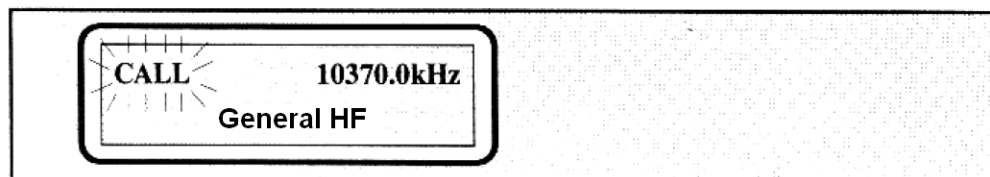
### **TO ANSWER THE CALL:**




Press  or press the microphone PTT to clear the call and talk to the calling party.


If the call is left unanswered the audible alarm will time-out after thirty seconds.

After time-out the SB250 will return to normal mode however the LCD display will flash 'CALL' and a periodic beep will sound.



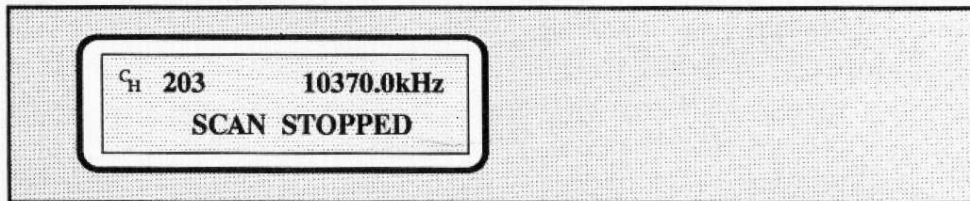
Pressing  will clear the call

Pressing  will display the caller's Selcall ID.

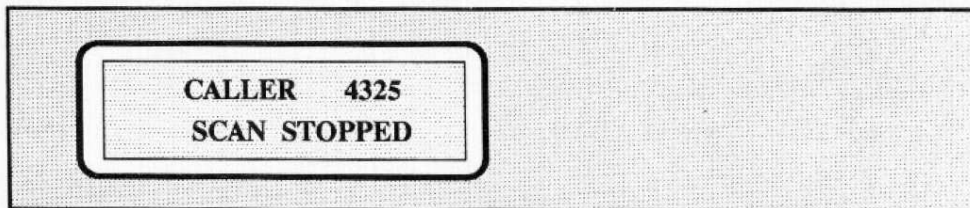
Pressing  will call back the calling party (if required)


#### **RECEIVING A CALL DURING SCAN MODE**

If the SB250 detects a Selcall while in **SCAN MODE** it will stop on that channel.



If the Selcall is valid an audible alarm will sound and the LCD display will indicate that a call was received




If you wish to answer the call press  or the microphone PTT switch and answer the caller.


If the call is unanswered the alarm will time-out.

After time-out the SB250 will go back to scan mode and a periodic beep will sound.

Pressing  will cancel the selcall.

Pressing microphone PTT or a key will exit **SCAN MODE** leaving the SB250 on the channel the Selcall was received on.

Pressing  will display the caller's ID.

Pressing  will call back the calling party.

## **MAKING A CALL**

Select the channel on which the call is to be made.

Un-mute the SB250 by pressing  . If channel is clear then continue.

Press  key once.

Enter the desired Selcall number.

Press  to send the call.

The radio should then go quiet for about 10 seconds while the selcall data is sent .

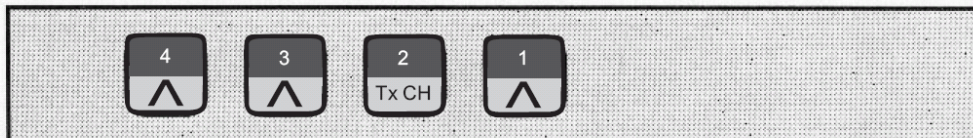
If the call is successful a revertive signal will be heard from the called station. If the revertive is not heard try again later or try another frequency.

### **EXAMPLE: MAKING A CALL TO STATION 4321**

Select channel on which station is to be called (see 'CHANNEL SELECTION')

Press  key.

Enter Station Selcall number



Press to  send the call.

### **BEACON MODE**

Channel selection is a very crucial factor in the use of any HF systems. Parameters such as distance, time of day and even solar activity all affect the choice of frequency between any two points.

Some HF Networks are equipped with a beacon mode to help with the selection of the best frequency between you and the network base station.

Beacon mode is activated by Selcalling the Base interconnect with the Selcall ID XX99. XX is the first digits of the Base interconnect you are connecting with. When the Base receives this Selcall it will transmit a beacon. By requesting Beacons on a number of frequencies and listening for the beacon a decision can be made as to which frequency provided the best path.

### **TELEPHONE INTERCONNECT OPTION**

The SB250 is designed to take full advantage of automated 'Telephone Interconnect' services offered by some networks. With the Telcall option fitted\*, the SB250 can direct dial standard PSTN & Mobile telephone networks.

Note\*: That the Telcall option is only available on transceivers with v4 or v5 Firmware fitted.

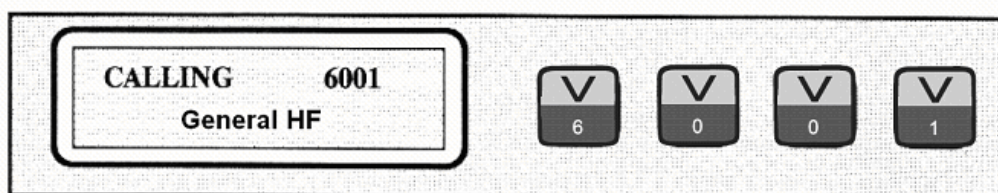
**DIRECT DIALLING**

Select channel on which 'Base' is operating. For best results see 'BEACON MODE' to select best path.

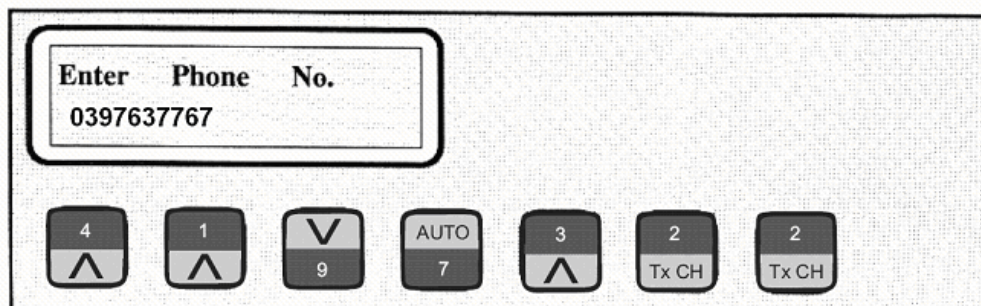
Un-mute SB250 and listen for any traffic on channel. If no traffic, proceed.

Press  once.

Enter Selcall ID of Base. (Example Interconnect ID is 6001)



Press  and enter desired phone number including area code.



Press  to make call

If successful revertive will be heard and call connection will commence.

Wait for telephone connection to be answered. When answered, talk as per a normal telephone call. (Don't forget to press PTT).

When the call is complete or the line is busy you should **HANG-UP** the connection.

TO HANG-UP

Press  once.

Enter Selcall ID of Base.

Press  to complete HANG-UP .

LAST NUMBER REDIAL

Press  twice

The last number called should be on the LCD display.

Press  to complete Redial.