

BUSH RANGER

DELUXE 18 CHANNEL
SSB/AM CB TRANSCEIVER

OWNER'S GUIDE



General Description

The Bush Ranger is a combination transmitter and receiver designed for use in the Australian 27 MHz Citizens radio service. It is designed to meet the Postal and Telecommunications Department requirements, RB249, applicable to equipment in this service, and is not to be used for any other purpose. P and T Form RB14 defines operation in this service and the licensee is required to read and understand these regulations prior to operating a CB transceiver.

A station license must be applied for by submitting a properly completed Station License Application, Form RB13, as directed.

This unit will provide efficient and reliable radio communication in its intended application if installed and operated in accordance with instructions contained herein.

Features

This transceiver is an advanced solid-state 2-way CB radio designed primarily for mobile operation. It employs the very latest technology to provide 18 transmit and receive channels in the 27 MHz band by means of digital frequency synthesis with Phase Lock Loop [PLL] circuitry. The transceiver can be operated over 18 channels in the conventional AM mode or in suppressed carrier single sideband mode using either the 18 upper or 18 lower sideband channels, as desired. This not only triples the effective number of operating channels from 18 to 54, but also increases the effective range of transmission because all legal power is concentrated in one sideband to provide 100% talk power. On receive, the single sideband mode offers greatly improved sensitivity and selectivity; this also contributes to an effective increase in operating range.

This transceiver also includes many features which will provide greater operating convenience and assure optimum communications under a wide range of conditions.

- 3-Position Mode Switch – selects AM, LSB and USB.
- Illuminated Meter – indicates S units and RF Power Output.
- Clarifier for fine-tuning on receive.
- Variable Squelch Control.
- Switchable RF Noise Blanker and Automatic Noise Limiter for effective reduction of noise interference.

- RF Gain Control.
- Illuminated Channel Indicator.
- Built-in Ceramic Filter provides razor-sharp selectivity — helps prevent adjacent channel interference.
- Provision for PA operation with volume control.
- External Speaker Jack.
- Push-to-talk dynamic mic with coiled cord and 5-pin DIN type plug.
- Floating type chassis for negative or positive ground operation without switching.

Bush Ranger Front View

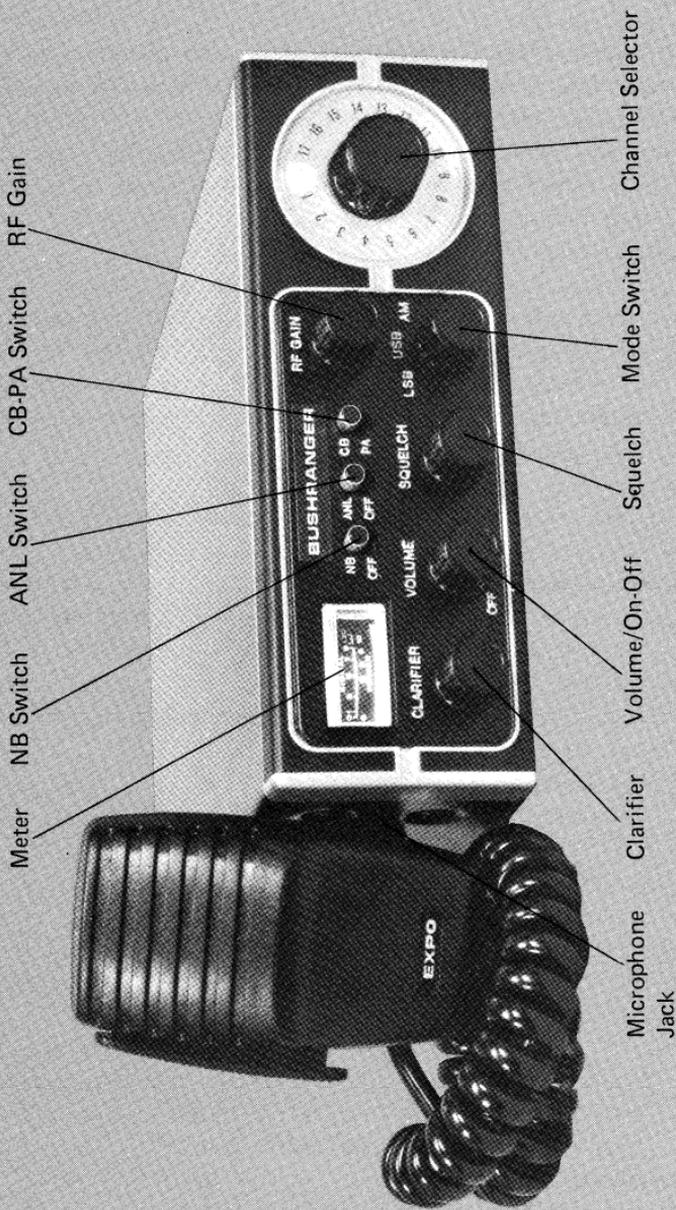


Figure 1.

Operating Controls and Features

- [1] **Clarifier:**

Permits slight adjustment of receiver tuning. Used for clarity on SSB reception and fine tuning of stations on AM reception.
- [2] **Volume/On-Off:**

Varies the sound output from the speaker. Also incorporates an on-off power switch at the extreme counter-clockwise position.
- [3] **Squelch Control:**

This control is used to eliminate any annoying background noise when no signals are present. The degree of sensitivity to incoming signals is adjustable. When the Squelch control is rotated to the fully clockwise position, it provides maximum squelch, in the fully counter-clockwise position it provides minimum squelch.
- [4] **Mode Switch:**

Selects mode of operation — lower sideband, upper sideband or standard AM.
- [5] **Channel Selector:**

Rotary switch selects one of 18 channels for transmit and receive operation.
- [6] **ANL Switch:**

Activates automatic noise limiter for reduction of atmospheric noises.
- [7] **RF Gain Control:**

Used as gain control when receiving SSB signals, normally set to maximum when receiving AM.
- [8] **CB-PA Switch:**

Used to switch unit to CB or PA mode.
- [9] **NB Switch:**

NB position selects special RF noise silencing circuit to combat ignition noise.
- [10] **Meter:**

Illuminated meter indicates relative incoming signal strength when receiving and relative RF power output when transmitting.
- [11] **Microphone Socket:**

5-pin DIN socket for attachment of push-to-talk microphone [supplied].

Mobile Installation

Transceiver Mounting

Before installing the transceiver in a car, truck, boat, etc., be sure to choose a location which is convenient to the operating controls, and will not interfere with the normal functions of the driver. The transceiver may be mounted to the underside of the instrument panel or dashboard of a car, truck, etc., by means of the special bracket that is supplied with the transceiver [See Figure 2].

Attach the bracket to the underside of the instrument panel or dashboard of the vehicle using the self-tapping screws supplied. Then attach the transceiver to the bracket by means of the two knurled securing screws at the sides. Tilt the unit upward or downward to the desired angle before tightening the securing screws.

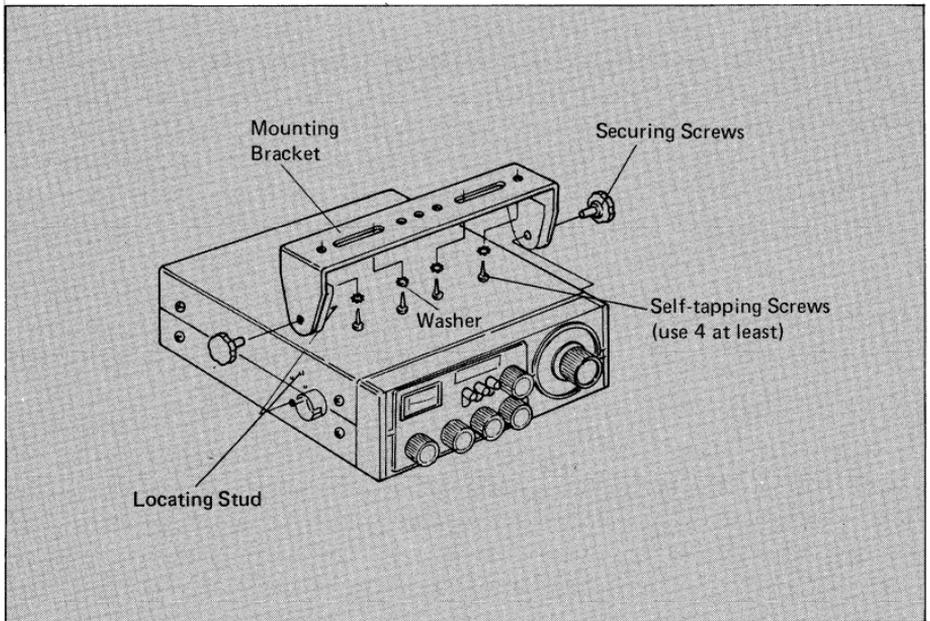


Figure 2. Mobile Installation

DC Power Connections

The transceiver is designed to operate from a battery source of 13.8 volts, DC, in vehicles [or boats] employing either negative or positive ground electrical systems. The fused DC power cable supplied is used to make the necessary power connection to the transceiver. The **red [fused]** lead is connected to the **positive [+]** side of the electrical system in the vehicle, and the **back lead** is connected to the **negative [-]** side of the system. In a negative ground vehicle, connect the **red lead** to the hot point in the electrical system [**battery positive**], and the **black lead** to the metal firewall or any other point that is connected to the vehicle chassis [**battery negative**]. In a positive ground vehicle, connect the black lead to the hot point in the electrical system [**battery negative**], and the red lead to the metal firewall or any other point that is connected to the vehicle chassis [**battery positive**]. A suitable point in the vehicle for connection to the hot battery side can usually be found on the fuse block. Since the transceiver draws a maximum of only 2.5 ampere of current, you can use a terminal which supplies power to the radio or other accessory [use the unfused input side since the DC power cable is equipped with its own fuse]. To simplify connection to this terminal, attach an alligator

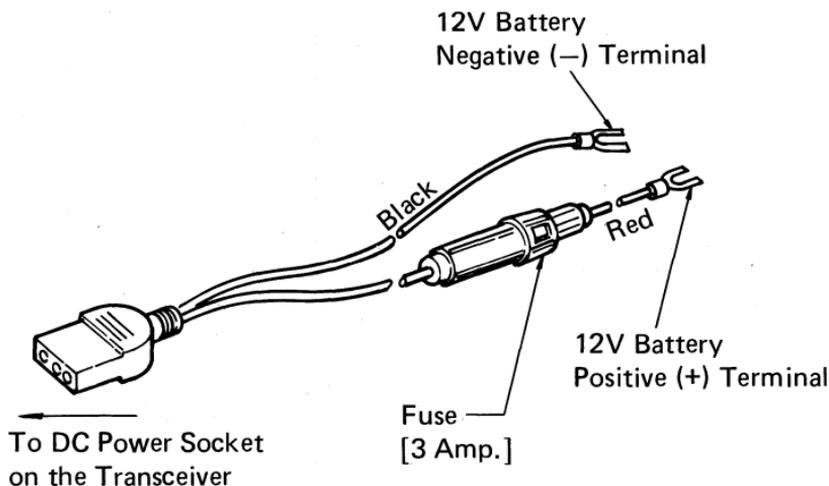


Figure 3.

[spring] clip to the power lead first and then clamp it onto the terminal selected. Be sure to make the power connection to a point which will cut off DC power to the transceiver when the vehicle ignition is turned off.

Note: The transceiver requires 13.8 volts DC to develop full rated RF power output.

When you have completed the connections of the red and black leads of the DC power cables as just indicated, attach the 3-pin female plug at the other end of the power cable to the matching male-power connector at the rear of the transceiver. Note that the plug can be inserted in only one direction due to the unequal spacing between pins.

Antenna Connection

The lead-in cable from the CB antenna should be terminated with a PL-259 type male connector. Attach to the matching antenna input connector at the rear of the transceiver.

Microphone Bracket

The small size of the transceiver prohibits mounting a microphone bracket directly to the chassis. We recommend, therefore, that the microphone bracket be attached to the dashboard of the vehicle or in any other convenient location. If one desires to do this without drilling holes, a magnetic mounting plate may be used and the microphone bracket attached to it.

Microphone Connection

Insert the 5-pin plug at the end of the coiled cord into the microphone socket at the left side of the transceiver.

CB Antennas

The results obtained with your Bush Ranger Citizens Band Transceiver will be greatly determined by the efficiency of the antenna system used. Due to the complexity of the subject, it is not within the scope of this manual to provide detailed information on antenna systems. We suggest that you purchase one of the numerous books available which covers this subject in greater detail.

Antenna Cable

RG-58/U cable is generally used to connect the CB antenna to the transceiver. The cable should be terminated with a PL-259 connector for connection to the antenna input on the transceiver.

Operating Instructions

Make sure the transceiver is properly installed as indicated previously, and that the antenna and power source are connected. If you have not already done so, plug in the microphone.

Receiving

1. Rotate the Squelch control to the counter-clockwise position initially.
2. Set the CB-PA Switch to the CB position.
3. Set the RF Gain control to maximum [fully clockwise].
4. Set the Clarifier control to the center [12 o'clock position].
5. Set the Mode Switch to either AM for standard AM reception or to LSB or USB, depending on whether signal to be received is on the upper or lower sideband.
6. Select desired channel [1-18] by rotating the Channel Selector Switch to the desired position.
7. Set the NB Switch to the Off position initially.
8. Rotate the Volume/On-Off Switch clockwise to apply power to the transceiver. Since the transceiver is fully transistorized, operation will be instantaneous. Continue rotating the Volume/On-Off Switch clockwise to provide a comfortable listening level.

S/P-RF Meter [AM and SSB Reception]

During reception, this meter provides a relative indication of the signal strength of a received signal in S units. During reception of AM signals the meter will indicate in the conventional manner, in accordance with the RF carrier signal received. However, during reception of SSB signals the meter will respond only during voice modulation, this being due to the fact that SSB transmissions do not contain a continuous RF carrier, as is found on AM.

Squelch Control [AM and SSB Reception]

The Squelch control is used to eliminate any annoying background noise when no signals are present. To adjust the Squelch control properly during reception, turn up Volume until background noise is heard [no signal should be present]. Rotate the Squelch slowly clockwise until the background noise just disappears. At this point, the receiver will be quiet under no-signal conditions, but an incoming signal will overcome the squelch action and be heard. Since this control is variable, it can be used to

provide varying degrees of sensitivity to incoming signals. As the control is advanced [from counterclockwise position], the squelch action is progressively increased and progressively stronger incoming signals are needed to overcome it. To receive extremely weak signals or to disable the squelch circuit, simply turn the control fully counterclockwise.

Clarifier [AM and SSB]

This control provides fine tuning of the receiver by ± 800 Hz. On AM reception, this will permit slight adjustment of your tuning in cases where the received signal is slightly off frequency. For SSB reception, this control is used as a voice clarifier by tuning it over the indicated area for clearest, most intelligible voice.

Noise Blanker

Your transceiver is equipped with a special RF noise blanker [NB] which will be found highly effective in combating auto ignition noise. The RF noise blanker is a unique circuit which, when switched in, literally chops out ignition noise by silencing the receiver for the brief duration of each noise impulse. The period during which the receiver is silenced is of such short duration [10 microseconds or less] that there is virtually no audible effect on the output. You may notice a lower reading on the S meter when you switch the blanker into the circuit. This is caused by the reduction of noise passing through the receiver IF stages, and does not indicate a reduction in the actual signal which is virtually unaffected by the Noise Blanker [you may notice a slight hissing noise, however].

Note: The RF Noise Blanker is not designed for use against interference caused by neons, atmospheric and various types of electrical machinery.

RF Gain Control

During AM reception, this control is normally left at maximum, the speaker output level being adjusted by means of the VOLUME control. During SSB reception, the VOLUME control should be set to about the mid position [12 o'clock] initially and the output level adjusted by means of the RF Gain control. If necessary, readjust the setting of the Volume control to produce proper gain control action with the RF Gain control.

External Speaker Jack

The recommended plug for the EXT SP jack is a subminiature phone plug [3.5 mm ϕ]. The impedance of earphones or speakers connected to this jack should be 8 to 16 ohms. Insertion of a plug into the jack automatically silences the internal speaker.

Transmitting on AM and SSB

Warning: Never attempt to transmit without an antenna or load.

Transmitting with this unit on any of the 18 CB channels requires unusual procedures except that you must first select one of the three modes of operation possible, AM, upper sideband or lower sideband. If you are attempting to communicate with a station having a similar transceiver to yours, you can make initial contact on AM and then arrange to conduct subsequent communications in one of the sideband modes, either upper or lower sideband. Of course, if the other station is only capable of AM reception, you will also have to transmit in the AM mode. After you have selected the desired mode of operation by means of the AM-USB-LSB selector switch, simply depress the push-to-talk button on the microphone to transmit. Hold the microphone 3 to 4 inches from the mouth and slightly to one side so that the voice does not project directly into the microphone [this provides best results]. Speak at a normal level — there is no need to raise your voice or shout into the microphone. During periods of transmission, the receiver is silenced and reception is therefore impossible. In the same way, your signal cannot be heard by another station when he is transmitting — each must take turns. To receive again, simply release the microphone push-to-talk button.

S/P-RF Meter Indications

On AM, the S/P-RF meter will immediately indicate as soon as you press the push-to-talk button on the microphone, showing that the unit is transmitting an RF carrier. When the push-to-talk button is pressed while in the single sideband mode, the meter will produce no reading until you speak into the microphone and provide modulation. The meter pointer will then fluctuate in accordance with your voice as you transmit the single sideband signal. It should be noted that the meter will indicate approximate power output only when connected to a 50 ohm resistive load. If the antenna and transmission line do not offer such a load the meter cannot be used as a true indication of power output.

Citizens Band Frequencies

Your transceiver is capable of operation on all presently available Australian CB frequencies for which are listed as follows.

New Australian Channel	Frequency	Previous USA Channel
1	27.015 MHz	5
2	27.025 MHz	6
3	27.035 MHz	7
4	27.055 MHz	8
5*	27.065 MHz	9
6**	27.085 MHz	11
7	27.095 MHz	Not alloc.
8	27.105 MHz	12
9	27.115 MHz	13
10	27.125 MHz	14
11	27.135 MHz	15
12	27.155 MHz	16
13	27.165 MHz	17
14	27.175 MHz	18
15	27.185 MHz	19
16	27.195 MHz	Not alloc.
17	27.205 MHz	20
18	27.225 MHz	22

* Channel 5 shall be used for emergency.

** Channel 6 shall be used for calling.

PA [Public Address] Operation

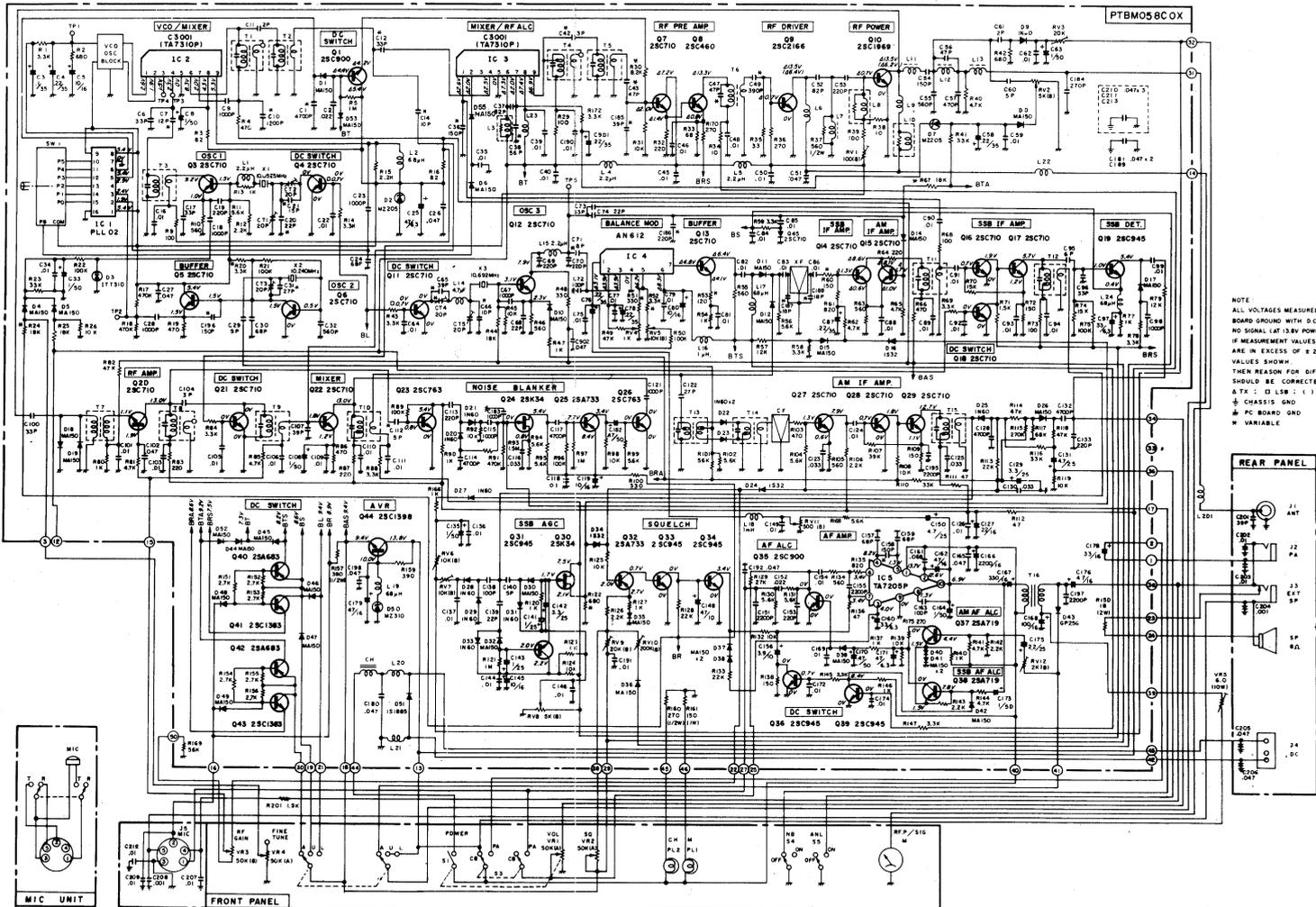
Special provision has been made for Public Address [PA] operation utilizing the microphone and audio stages in the transceiver. For PA operation, you should use an external 8–16 ohm speaker connected to the **PA** jack [located at the rear of the transceiver]. The recommended plug for the **PA** jack is a subminiature phone plug [3.5 mm ϕ]. To set the transceiver to the PA mode, set the CB/PA switch to the PA position to operate the PA circuit, then press the push-to-talk button on the microphone and talk into it – your voice will be heard from the external speaker [which may be mounted on the exterior of a car or building].

Note: During PA operation, the Volume control can be used to adjust the speaker output level.

To reduce acoustic feedback when the PA speaker is mounted on a car or truck, you may have to close the vehicle windows, or reduce the volume as necessary to stop any feedback that may occur.

BUSHRANGER

Schematic Diagram



NOTE:
 ALL VOLTAGES MEASURED FROM PC BOARD GROUND WITH D.C. 15VW AT NO SIGNAL AT 13.8V POWER SUPPLY. IF MEASUREMENT VALUES OBTAINED ARE IN EXCESS OF 20% OF VALUES SHOWN, THEN REASON FOR DIFFERENCE SHOULD BE CONNECTED A TX : D LSR : L TAM TX ± CHASSIS GND * VARIABLE

Figure 4.

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