

# WASHINGTON

## 40-CHANNEL SOLID STATE CB TRANSCEIVER



## OWNER'S MANUAL

**PRESIDENT™**  
**ELECTRONICS, INC.**



## SPECIFICATIONS

### GENERAL

Channels	40AM, 40LSB, 40USB
Frequency Range	26,965 to 27,405MHz
Frequency Control	Phase Locked Loop(PLL) Synthesized Circuitry.
Frequency Tolerance	0.05%
Frequency Stability	0.001%
Operating Temperature Range	-20°C to +50°C
Microphone	Plug-in type; dynamic with push-to-talk switch and coiled cord
Input Voltage	117VAC nominal. 13.8VDC nominal. (positive or negative ground)
Power Consumption(120-VAC)	Transmit: full mod., 88 watts. Receive: squelched, 45 watts.
Current Drain(13.8 VDC)	Transmit: AM full mod., 3 A; SSB, 12 watts P.E.P. output, 2.8A. Receive: squelched, 1 A; full audio output, 2 A.
Size	5"H, 13"W, 11"L.
Weight	13.3 pounds.
Antenna Connector	UHF, 50-239
Meters	Shows relative power output and received signal strength.
Semiconductors	48 transistors, 7 field effect transistors, 7 integrated circuits, 58 diodes and 4 light emitting diode.

### TRANSMITTER

Power Output	AM, 4 watts SSB, 12 watts, P.E.P.
Modulation	AM, high and low level Class B.
Intermodulation Distortion	SSB: 3rd and 5th order, more than -25dB. 7th and 9th order, more than -35dB.
SSB Carrier Suppression	More than -45dB
Unwanted Sideband	More than -45dB
Frequency Response	AM and SSB: 450 to 2500Hz.
Output Impedance	50 ohms, unbalanced
SSB Filter	7.8MHz, crystal lattice type 6dB @ 4.2 KHz 60dB @ 7.0 KHz

Output Indicator                      Meter shows relative RF output power.  
Red transmit LED

## RECEIVER

Sensitivity                              SSB: Less than .25 $\mu$ V for 10dB (S+N)/N  
at greater than 1/2 watt of audio output  
AM: Less than .75 $\mu$ V for 10dB (S+N)/N at  
greater than 1/2 watt of audio output

Selectivity                                SSB and AM: 6dB @ 4.2 KHz, 60dB @ 7.0  
KHz

Cross Modulation                      More than 55dB

Image Rejection                        More than 60dB

I.F. Frequency                         AM and SSB: 7.8 MHz

AM and SSB RF Gain Control        Adjustable for optimum signal reception.

Automatic Gain Control              (AGC): Less than 10dB change in audio  
output for inputs from 10 to 500,000 micro-  
volts.

Squelch                                  Adjustable; threshold less than .5 $\mu$ V

Noise Blanker                          RF type, effective on AM and SSB.

Clarifier Range                         $\pm$ 1.25 KHz

Audio Output Power                    3.5 watts into 8 ohms

Frequency Response                    300 to 2500 Hz

Distortion                                Less than 10% at 3.0 watts output.

Built-in Speaker                        8 ohms

External Speaker (Not Supplied)    8 ohms, disables internal speaker when  
connected.

## PA SYSTEM

Power Output                            3.0 watts into External Speaker

External Speaker for PA                8 ohms (not supplied)

## INTRODUCTION

PRESIDENT ELECTRONICS has combined superb workmanship and modern styling with the very latest state-of-art circuitry to bring you the new WASHINGTON Citizens Band Transceiver. It has been especially designed to give you maximum performance and reliability. Your WASHINGTON is completely factory aligned and quality assurance tested.

To obtain the maximum benefit and pleasure from your WASHINGTON, please read very carefully the contents of this manual before attempting to install or operate the transceiver.

## FEATURES

- **ALL SOLID STATE:** Transistorized construction with low current drain for a long, trouble-free life.
- **FULL 40-CHANNEL OPERATION:** PLL frequency synthesizer circuitry allows transmission and reception on all 40-channels on both AM, USB and LSB totalling 120 channels without the purchase of any additional crystals.
- **LARGE LED CHANNEL DISPLAY:** Channel number is displayed by use of LED (light emitting diode) display for maximum ease of channel selection.
- **CLEAN SIGNAL:** Transmitter audio processing circuitry produces a clean signal (no adjacent channel splatter) to provide more usable range.
- **A QUIET RECEIVER:** Effective squelch and automatic noise limiting for superior quieting.
- **EFFECTIVE AGC:** Receiver amplified automatic gain control (AGC) reduces "blasting" and "fading" of signals.
- **AN EFFICIENT TRANSMITTER:** Provides four watts maximum power to the antenna.
- **PUBLIC ADDRESS FUNCTION:** Useful for paging and announcements.

## CHANNEL INFORMATION

Channel	Channel Frequency in MHz	Channel	Channel Frequency in MHz
1	26.965	21	27.215
2	26.975	22	27.225
3	26.985	23	27.235
4	27.005	24	27.235
5	27.015	25	27.245
6	27.025	26	27.255
7	27.035	27	27.275
8	27.055	28	27.285
9	27.065	29	27.295
10	27.075	30	27.305
11	27.085	31	27.315
12	27.105	32	27.325
13	27.115	33	27.335
14	27.125	34	27.345
15	27.135	35	27.355
16	27.155	36	27.365
17	27.165	37	27.375
18	27.175	38	27.385
19	27.185	39	27.395
20	27.205	40	27.405

To insure that you obtain the maximum performance from this radio, please read carefully the following descriptions and operating instructions.

**NOTE:** This radio has been designed for FCC Class "D" operation in the 11 meter Citizens Radio Service. It uses a frequency synthesizing circuit with Phase Locked Loop (PLL) techniques to provide crystal controlled transmit and receive operation on all 40 channels. The PLL circuitry assures ultraprecise frequency control. It is designed to meet the Federal Communications Commission requirements applicable to equipment operating in the Class "D" Service, and is not to be used for any other purpose. Part 95 of the FCC regulations defines operation in this service, and you are required to read and understand these regulations prior to operating this equipment. You are also required to complete FCC license application Form 505 and submit it to the FCC GETTYSBURG, PA. 17326 in order to receive your license to operate this unit. While your Form 505 is being processed by the FCC, you may use FCC temporary license Form 555-B as a temporary permit. **YOU WILL BE IN VIOLATION OF PART 95 OF THE FCC REGULATIONS IF YOU OPERATE THIS EQUIPMENT ON THE AIR**

PRIOR TO RECEIVING YOUR LICENSE AND CALL SIGNS OR IF YOU TRANSMIT WITH THIS UNIT WITHOUT COMPLYING WITH THE PROCEDURES EXPLAINED ON FCC TEMPORARY LICENSE FORM 555-B, FCC Forms 505 and 555-B as well as a copy of Part 95 of the Commissions Rules are packed with the transceiver for your convenience.

**Warning:** Transmitter section adjustments must be performed by qualified technician holding a valid First or Second Class FCC Radiotelephone License.

## INSTALLATION

### Location

Prior to beginning operation of the transceiver, a basic installation must be prepared. Installation of the transceiver itself is a rather simple procedure.

In selecting the location for the unit, two factors must be considered:

1. Access to a 117V AC, 60Hz power source for your BASE STATION installation. Be sure to connect the AC power cord to an AC power source, not to a DC power source.
2. The location must be convenient for running the antenna lead-in cable to your transceiver.

### BASE STATION ANTENNA

Since the maximum allowable power output of the transmitter is limited by the FCC, the antenna is the most important factor affecting transmission distance. Only a properly matched antenna system will allow maximum power transfer from the 52 Ohm transmission line to the radiating element.

The recommended method of antenna tuning is to use an in-line watt-meter or SWR bridge to adjust the antenna for minimum reflected power on channel 19.

The radio may be used with any type of 52 Ohm base station antenna. A ground plane vertical antenna will provide the most uniform horizontal coverage. This type of antenna is best suited for communication with a mobile unit. For point-to-point operation where both stations are fixed, a directional beam will usually increase communicating range since this type of antenna concentrates transmitted energy in one direction. The beam antenna also allows the receiver to "listen" in only one direction thus reducing interfering signals.

Antenna height is an important factor when maximum range is desired. Keep the antenna clear of surrounding structures or foliage. FCC regulations limit antenna height to 20 feet above an existing structure.

## MOBILE OPERATION/EMERGENCY POWER OPERATION

It is possible to operate the WASHINGTON from an external 13.8 VDC power supply for emergency power conditions or from an automobile battery for mobile operation. The WASHINGTON is supplied with a polarized plug for operation with an external DC supply.

Negative lead is black.

Positive lead is red and has the in-line fuse holder as an integral part of the positive lead.

## PUBLIC ADDRESS

An external 8 Ohm, 4 watt speaker may be connected to the PA speaker 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 feed-back.

Physical separation or isolation of the microphone and speaker must be used when operating the PA at high output levels.

## REMOTE SPEAKER

The external speaker jack (EXT. SPKR.) 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 4 watts.

## OPERATING INSTRUCTIONS



The WASHINGTON operates on 120 different channels. Namely, 40 AM channels, 40 Upper Side Band channels and 40 Lower Side Band channels. In the AM mode, the WASHINGTON will receive the signal being transmitted on double sideband with full carrier (AM signal). The WASHINGTON may also receive SSB signals in the AM mode but you will not be able to understand the signals.

When transmitting on SSB, there is no carrier and only one sideband is on the air either upper or lower. Your receiver can hear this sideband signal but can't change it into usable information in the AM mode. You can recognize a sideband signal being received in the AM mode by its fluttering unintelligible sound. A signal transmitted on upper sideband can only be properly received with the mode selector of your transceiver in the upper sideband position.

When you receive the SSB signal in the proper mode, audio sound may be either too high pitched, or low pitched, indicating that your receiver may not be tuned to the exact same frequency as the transmitter it is listening to. The WASHINGTON is equipped with a Clarifier. By tuning the Clarifier, you can slightly change the frequency of the receiver. So, you can get a normal tone.

## OPERATING CONTROLS

Your WASHINGTON designed for ease of operation, is provided with the following operating controls:

1. **OFF/ON VOLUME:** To turn the transceiver on, rotate the control clockwise past click. To turn the transceiver off, rotate the control counterclockwise past click. Rotate the control clockwise for a comfortable audio level. The OFF/ON VOLUME does not affect the transmitted signal in any way.
2. **CHANNEL SELECTOR:** This switch is used to select any one of the 40 Citizens Band channels. Since all necessary crystals are included for 40 channel operation, no additional crystals need to be purchased. Channel 9 has been reserved by the FCC for emergency communications involving the immediate safety of life of individuals or immediate protection of property. Channel 9 may also be used to render assistance to a motorist.
3. **MODE SELECTOR:** This switch selects AM, USB, or LSB mode of operation. This selector changes the mode of operation of both transmitter and receiver simultaneously. Set the selector to the mode you desire to communicate on.
4. **SQUELCH:** The squelch control is normally set to a position which eliminates undesired background noise with no signal present. With the audio adjusted to a satisfactory level, rotate the Squelch control clockwise to the point where the sound from the speaker is out off. In this position, there will be no sound from the speaker until a signal is received. In order to hear weak signals, it may be necessary to rotate the Squelch control counterclockwise, allowing some background noise to be heard.
5. **CLARIFIER:** The clarifier is normally set to the center position. This feature has several uses and can greatly enhance receiver operation. If a received signal is slightly off frequency, this control can be operated to optimize the received signal. This control is primarily intended to tune in SSB signals, but it may be also to optimize the AM signal.



6. **MIKE GAIN:** This control is used to adjust, as required, microphone input sensitivity for optimum amount of modulation in transmit.
7. **RF GAIN:** This control is used primarily to optimize reception in strong signal areas. Gain is reduced by counterclockwise rotation of the control.
8. **PA—CB SWITCH:** This control engages the PA function. The PA function should not be used unless an external speaker is connected. In the CB position, the PA function is disabled and the radio will transmit and receive on the selected channel.
9. **NOISE BLANKER SWITCH:** When the switch is placed in the NB position, the RF noise blanker is activated. The RF noise blanker is very effective for repetitive impulse noise such as ignition interference.

#### **INDICATOR FUNCTION**

1. **S/RF PWR METER:** When the transceiver is in the receive mode, relative signal strength is indicated in S units on the lower scale of the meter. When transmitting, relative power output is indicated on the upper scale of the meter.
2. **TX INDICATOR:** The TX light in the upper right corner of the front panel comes on when the microphone button is pressed and transmitter is in operation.
3. **MODE INDICATOR:** This radio is equipped with mode indicator light for AM, USB and LSB modes. When you set the mode selector to the mode desired, the related indicator light comes on.

#### **PRESS TO TALK MICROPHONE**

The receiver and transmitter are controlled by the press-to-talk switch on the microphone. Press the switch and the transmitter is activated. Release the switch to receive. When transmitting, hold the microphone about three inches from your mouth and speak clearly in a normal voice.

#### **HEADPHONE**

This radio is provided with a headphone jack for your private listening. To use this feature, just plug the headphone plug into the jack labeled "PHONE" on the front panel.

#### **RECEIVE OPERATING PROCEDURE**

1. Place the CB—PA switch in CB position and advance the RF GAIN control fully clockwise.
2. Turn the set on by turning the VOLUME CONTROL clockwise, past click.  
NOTE: Microphone must be plugged in for the receiver to operate.

3. Set the VOLUME CONTROL to a comfortable level.
4. Set the Mode Selector Switch to the desired mode.
5. Listen to the background noise from the speaker. Turn the SQUELCH CONTROL slowly clockwise, until the noise just disappears. The Squelch is now properly adjusted. The receiver will remain quiet until a signal is received. Do not advance the control too far, or some of the weaker signals will not be heard.
6. Set the Channel Selector to the desired channel.
7. Adjust the CLARIFIER to clearly receive SSB or AM signals.

#### TRANSMIT OPERATING PROCEDURE

1. Select the desired channel of transmission.
2. If the channel is clear, depress the push-to-talk switch on the microphone and speak in a normal voice.

### WARNING

Operation of this equipment requires a valid station license issued by the Federal Communications Commission. Do not transmit with your equipment until you have filled out a temporary license Form 555-B. Also, complete F.C.C. form 505 then send it to the F.C.C. office indicated on the application. Illegal operation can result in severe penalties. (A copy of both forms are included with your new transceiver.)

You are required to maintain a current copy of Part 95 of the F.C.C. Rules as part of your station records. A copy of Part 95 is included with your new transceiver. Additional copies of Part 95 are available from the Superintendent of Documents, GPO, Washington, D.C., 20402. Be certain that you have read Part 95 of the F.C.C. Rules and Regulations before operating your station.

Your Station License is to be posted in accordance with paragraph 95.101 of the Rules and an executed Transmitter Identification Card (F.C.C. form 452-C) is to be attached to each transmitter. (A copy of this form is included with your new transceiver.)

F.C.C. Rules require that ALL transmitter adjustments, other than those supplied by the manufacturer as front panel operating controls, be made by or under the supervision of the holder of an F.C.C. issued 1st or 2nd Class Radio Telephone License.

Replacement or substitution of crystals, transistors, regulator diodes or other parts of unique nature, other than recommended by us, may cause violation of the technical regulations of Part 95 of the F.C.C. rules or violation of the Type Acceptance requirements of Part 2 of the rules.

## **MAINTENANCE AND ADJUSTMENT**

This transceiver is especially designed for the environment encountered in mobile installations. The use of all solid state circuitry and its light weight result in high reliability. Should failure occur, however, replace parts only with identical parts. Do not substitute.

### **MAINTENANCE**

All repairs on this radio should be performed by a qualified radio technician, holding an FCC first or second class Radiotelephone License. Repairs or adjustments by unauthorized persons can result in damage to the radio or illegal operation.

### **ADJUSTMENT**

This transceiver is factory aligned and should not require any adjustment when used with a 50 ohm antenna. If an antenna other than 50 ohm impedance is used, adjustment of the transmitter output circuit may be made to obtain optimum power transfer to the antenna. This adjustment should be made only by a licensed person using a high quality in-line RF wattmeter which will not produce standing waves when inserted in the antenna cable.

### **SERVICE**

PRESIDENT ELECTRONICS maintains a factory service center for the repair and service of your radio. If you desire this service, please pack your radio unit in its original shipping container, enclose a note describing the problem and return, (transportation prepaid) to:

PRESIDENT ELECTRONICS, INC.  
16691 HALE AVENUE  
IRVINE, CA. 92714

President Electronics has also established Authorized President Service Stations around the country for the repair and service of your radio. A list of these stations is enclosed. Service is obtained at these stations the same way as at the factory.

### ONE YEAR LIMITED WARRANTY

PRESIDENT ELECTRONICS, INC., warrants to the purchaser of each new PRESIDENT radio that such product shall be free from defects in material and workmanship under normal use and service for a period of one(1) year from the date of sale to the purchaser provided you return your warranty registration card to PRESIDENT ELECTRONICS, INC., within 10 days of date of purchase.

If a defect should be found within the warranty period and if the radio has not been subject to neglect, misuse, accident, improper installation or such defect is caused by service by other than PRESIDENT ELECTRONICS Authorized Service Station, PRESIDENT ELECTRONICS will, at its option, either replace or repair the radio.

To obtain warranty repair, the customer must return the radio properly packed, freight prepaid, to PRESIDENT ELECTRONICS or any Authorized PRESIDENT Service Station. It will be returned freight prepaid. A sales receipt must accompany the radio to validate date of purchase.

Where permitted by law, this warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability. Some states do not allow limitations on implied warranties so the above limitation may not be applicable. You may have rights as defined by each states law.

**PRESIDENT™**  
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16691 HALE AVE. IRVINE, CA 92714 (714)556-7355