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SBE Sidebander VI Owner's Manual

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SIDEBANDER VI



OWNER'S MANUAL





Base Companion For Your SIDEBANDER VI

SBE CONSOLE VI Keyboard AM/SSB Base



- 40 channels AM, upper & lower sideband PLL synthesized
- Keyboard channel entry — full scan modes
- Brilliant vacuum fluorescent readouts
- Electronic clock/timer with digital vacuum fluorescent readouts
- Keyboard clock data entry system
- Modern function slide switches
- Noise blanker and noise limiter
- Multimode toggle switches
- Triple meter display of RF modulation/ "S" units/SWR forward & reverse/power output/squelch setting

- Dual power supplies for 115VAC or 12VDC
- 10 memory channel scan & instant channel 9
- RF gain control
- High level modulation

Specifications: 40CH AM/SSB • power supply voltage 115VAC \pm 15% and 13.8VDC \pm 15% (emergency DC input only) • transmitter output 4W AM, 12W SSB • receiver usable sensitivity 0.7 μ V AM and 0.25 μ V SSB, minimum audio output 2.0W AM/SSB • adjacent channel selectivity and desensitization at 65dB AM/SSB \pm 10KHz • spurious rejection inband 70dB AM/SSB • cross modulation 65dB AM and 70dB SSB • image rejection 65dB AM/SSB • unwanted sideband rejection 40dB • AGC compression 3 μ V - 0.5V is 10dB AM/SSB • audio output 3.0W AM/SSB at less than 10% T.H.D. • clarifier range \pm 1500Hz AM/SSB • RF gain control range 40dB AM/SSB • squelch threshold 0.7 μ V AM and 0.5 μ V SSB • battery drain on RX squelch 1.5A AM/SSB, on full audio 2.5A AM/SSB • battery drain on TX 3.0A AM, 3.5A SSB • carrier suppression 40dB • unwanted sideband rejection 40dB.



NC-100

MOBILE NOISE CANCELLING MIC.

SBE noise cancelling microphone makes mobile operation far more pleasant, avoids needless repeats by substantially reducing extraneous noise pickup that is ever present in cars, trucks, other vehicles driving on highways. Special acoustic design uses noise input from an extra sound port in the top of the unit to provide a modified cardioid sound pickup pattern. Noise rejection is 10db or more to the front, 20 db or greater to either side. Microphone operates with all SBE transceivers having 4-conductor male microphone input.



M-100X

MOBILE MIC. with amplifier

Conveniently small hand-held mobile microphone has a built-in solid-state amplifier, offers fixed station operating convenience in motion! A rear control with calibrated thumb wheel allows speech gain to be set for optimum modulation under prevailing background noise conditions. Amplifier is powered from internal penlight cells and is capable of more than 15db gain. Microphone has coil cord fitted with 4-conductor plug.

W4 SIDEBANDER

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The CB Story

The Citizens Band lies between the shortwave broadcast and 10 meter amateur bands, and was established by law in 1949. The Class D two-way communications service was opened in 1959. CB also includes Class A business and Class C remote control frequencies. Acquiring a Class D license requires no detailed technical or Morse code knowledge that is required for a Ham license.

Frequency Range

The Sidebander VI transceiver represents one of the most unique advanced two-way citizens band radios ever designed for use as a Class D station in the Citizens Radio Service. The unit features keyboard channel entry through the use of an advanced microprocessor circuit. This allows an operator to channel select with the keyboard and, in addition, provides numerous secondary keyboard functions. The unit features PLL (phase-lock-loop) circuitry which provides complete coverage of the 40 AM and SSB Class D Citizens Band channels shown below.

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	27.255
4	27.005	24	27.235
5	27.015	25	27.245
6	27.025	26	27.265
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

F.C.C. LICENSE

The Sidebander VI transceiver is type accepted by the Federal Communications Commission for operation on any of the 40 Citizens Band channels. You are required to read and understand Part 95 of the F.C.C. rules and regulations prior to operation of this unit. A copy of 95 is enclosed.

You must obtain a Class D station license before transmitting. If you do not have a license, obtain one with the enclosed application Form 505. You may operate under a temporary permit for 60 days after Form 505 is mailed to the F.C.C. provided that you complete and comply with the enclosed Temporary Permit, Form 555-B.

Warning — Transmitter section adjustments must be performed by a qualified technician holding a valid First or Second class F.C.C. radio-telephone license.

The use of substitute components in the transmitter section of this equipment may cause a violation of F.C.C. rules and regulations. Use only the exact replacement parts specified in the parts list with this instruction manual.

GETTING ON THE AIR

You must have an F.C.C. Class D Station License before operating the transmitter section of this unit. If you presently have one, and your Sidebander VI is already installed, you may proceed directly to the next section — OPERATING INSTRUCTIONS. For those who prefer to do their own installation detailed installation instructions are contained on page 9.

OPERATING INSTRUCTIONS

A more detailed explanation of the capabilities of the Sidebender VI and the method for programming and operating the keyboard of your unit are contained in the CONTROLS AND INDICATORS section in this manual. You should refer to this section before attempting to operate this unit.

To Receive:

1. Set the RF GAIN control to its maximum clockwise position, SQUELCH control to its minimum counterclockwise position.
2. Turn the ON/OFF VOLUME control clockwise. The S/RF meter, channel indicator and keyboard should illuminate. The unit will come up on channel 9.
3. Adjust the volume control until a rush or voice conversation is heard at a comfortable level.
4. Select either AM or SSB mode of operation. If SSB mode is selected then the USB/LSB switch must be placed in the desired sideband mode.
5. If atmospheric or electrical impulse noise is present in the received audio, place the NB/OFF switch to the NB position.
6. Slowly advance the squelch control until the rush or background noise disappears.
7. Select the channel that you desire to monitor by and of the methods described under channel selection.

To Transmit:

You must have a Class D Station License before transmitting. All channels except channel 9 may be used for normal communications. Channel 9 is reserved by the F.C.C. for emergency communications, such as the protection of property or assistance to a motorist.

1. Select the desired channel; listen, and when clear, press the PTT button. The RF power meter will show transmitter power output.
2. Place the microphone so that it is one to two inches away from your mouth and speak in a normal tone of voice.
3. Release the PTT button and listen for a reply.

CONTROLS AND INDICATORS



1. OFF/ON VOLUME CONTROL — turns the radio on and adjusts the volume received audio.
2. MODE SWITCH — selects either of the SSB modes (USB or LSB) or standard double sideband AM. Unless the station with which communications is desired is equipped with SSB, the AM mode is normally used. The mode selector switch changes the mode of operation of both the transmitter and receiver simultaneously. An explanation of how to determine which mode to use is contained in the following paragraphs under Operating Single Sideband.
3. SQUELCH CONTROL — Adjusts level at which weak signals or noise are eliminated.
4. S/RF METER — Indicates relative strength of received signal and output power of the transmitter.
5. RF GAIN CONTROL — The RF Gain control is used to adjust the sensitivity of the receiver during AM or SSB reception. When the control is in its extreme counter-clockwise position, the receiver sensitivity will be minimum. At this setting of the gain control, only the very strongest signals will be heard. As the control is rotated clockwise, weaker signals and noise will be heard. When the control is in its full clockwise position, sensitivity of the receiver will be maximum.
6. NB/OFF — in the NB position, this switch provides additional noise blanking in the receiver to further reduce impulse atmospheric or ignition noise.
7. CB/PA SWITCH — in the PA position, the Sidebander VI may be used with an external PA speaker as a public address system. Press the PTT button and microphone audio will be amplified through the PA speaker; release PTT button and receiver audio will be heard through the speaker. The volume control on the Sidebander VI will control the level of the audio present over the PA speaker.
8. LIGHTS/DIM — a two position switch which reduces illumination of the keyboard, LED display and meter light for nighttime operation.
9. CLARIFIER — the Clarifier permits variation of the receiver operating frequencies above and below the assigned frequencies. Although this control is intended primarily to tune in SSB signals, it may be used to optimize AM signals as described in the operating procedure paragraphs.
10. PA JACK — permits 8 ohm, 4 watt or better PA speaker to be connected.
11. EXT. SPKR. JACK — Permits 4 or 8 ohm, 4 watt or better speaker to be connected. Disables internal speaker when connected.
12. MEMORY POWER TERMINAL — provides connection for a 12 volt power source to be connected directly from the vehicle's battery in order to keep the memory and priority function of the Sidebander VI active when the radio is turned off. If the memory power terminal is NOT connected to the battery, any memory or priority functions will be erased when the unit is turned off.
13. SO-239 — permits connection of a PL-259 antenna connector.
14. KEYBOARD AUDIO LEVEL CONTROL — a variable potentiometer to adjust the level of the keyboard audio tone.

CHANNEL ENTRY/MICROPROCESSOR KEYBOARD FUNCTIONS

The Sidebender VI has two modes of operation; a function mode and a numeric entry mode. The function modes provided by the keyboard are:

1. Channel Stepping — keys **0↑** **1↓**, **2↓** **3↑**.
2. Alternate Channel Selection — key **6**.
3. Memory and Scan Function — keys **5** **7** **8**.
4. Channel 9 Direct Access — key **9**.
5. Priority Channel Selection — key **4**.
6. Function — Numeric Entry Conversion — key **CHANNEL**. The keyboard in the Sidebender VI is normally in the Function mode. To place the keyboard in the numeric entry mode, the **CHANNEL** key must first be depressed.

CHANNEL SELECTION

There are two methods of channel selection in the Sidebender VI:

1. Direct Channel Entry.
2. Stepping.

Direct Channel Entry — To enter channels directly, the **CHANNEL** key must first be depressed. Then simply depress the two keys to enter the desired channel, i.e. **0** **1** for channel 1. Once the last key is struck, this will immediately latch the displayed channel into the microprocessor. For example, depress **CHANNEL** **0** **1**. Channel 1 will now appear in the channel display window and the unit will operate on channel 1.

Attempting to enter an illegal channel into the Sidebender VI will cause the channel display to flash or blink off and on. For example, depress **CHANNEL** **4** **5**. Channel 45 will now appear in the channel display window, however, the channel display will blink off and on. To revert the unit to normal operation, simply select another legal channel, i.e. **CHANNEL** **2** **3**. Channel 23 will now appear in the display window and the unit will be locked on to operation on channel 23. An alternate method would be to strike the **7 NORM** key. This would cause the unit to change to the last legal channel which has been selected. For example, depress **CHANNEL** **1** **3**. Channel 13 would now appear in the channel display. Depress **CHANNEL** **4** **5**. Channel 45 would now appear in the display but would be blinking. Simply depress the **7 NORM** key and channel 13 would once again appear in the channel display and the unit will revert to operation on channel 13.

Channel Stepping — It is possible to step up or down through the channels by using the stepping keys.

- 0↑** FAST — rapid step up
- 1↓** FAST — rapid step down
- 2↓** SLOW — slow step down
- 3↑** SLOW — slow step up

40 CHANNEL AND MEMORY SCAN

The following pages describe the procedure to program the microprocessor in the Sidebender VI for 40 channel and memory scan operation. Once the microprocessor has been programmed for any of the scan modes, all the operator need do is simply adjust the squelch level to mute the background noise and then depress the **[5 SCAN]** key. The Sidebender VI will now commence scan operation. Should the operator wish to manually override the scan function, he may simply depress the **[5 SCAN]** key. This will stop the scan operation of the Sidebender VI. To again commence scan operation, simply depress the **[5 SCAN]** key. The microprocessor in the Sidebender VI has been programmed for occupied channel, continuous scan. In this mode of operation, simply set the squelch control to mute the background noise and depress the **[5 SCAN]** key. The Sidebender VI will now commence searching through the channels until an occupied or busy channel is found. This will be indicated by the squelch breaking and the unit stopping on the channel. The Sidebender VI will remain on this channel until such time as the squelch again closes. After a two or three second delay, the Sidebender VI will once again commence scanning the channels for the next used or occupied channel.

Should the transmitter in the Sidebender VI be keyed during scan operation, the unit will automatically lock onto the channel being scanned at the instant the microphone button was depressed. Once the transmitter is unkeyed, scan operation may be again initiated by depressing **[5 SCAN]** key.

INSTANT CHANNEL 9 ACCESS

Channel 9 may be accessed instantly by depressing the **[9 EMRG]** key. Use of the **[CHANNEL]** bar is not necessary. By depressing the **[9 EMRG]** key, the Sidebender VI will automatically override any other function selected and automatically revert both transmit and receive to channel 9.

MEMORY SCAN

The Sidebender VI has the capability of storing up to 10 channels in its memory register. Once the memory had been programmed for those 10 channels, the Sidebender VI may be directed to scan only those channels rather than all 40 channels.

The Sidebender VI microprocessor will assign a memory location to each memory channel as it is entered into the radio and will scan through those memory channels in the order in which they were programmed into the memory register. The memory register positions in the Sidebender VI are identified as 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. Depressing and holding the **[8 MEMORY]** key will recall the 0 or first position of the memory register. The left hand channel display numeral will show "0" indicating the first memory. Releasing the **[8 MEMORY]** key will then show channel 9, which is automatically programmed in the first memory register position. Depressing and holding the **[8 MEMORY]** key once again will show the numeral 1 in the left hand channel display numeral indicating the second memory register position. Releasing the key will then show "00" in the channel display indicating that no channel has been programmed into that memory register position. Depressing the holding the **[8 MEMORY]** key once again, will cause the numeral "2" to appear on the left hand channel display numeral indicating the third memory register position. Releasing the key will cause the channel display to show "00" indicating that no channel has been programmed into that memory register position. This procedure may be used to step through and recall each of the 10 memory register positions.

The memory positions in the Sidebender VI may be **individually** recalled and reviewed using the following procedure; depress **[8 MEMORY]**, **[6 ALT]**, **[1]**. This will recall the second memory position in the Sidebender VI and any channel programmed into that position will be displayed on the channel display. Should the position be vacant, the digits "00" will appear in the display window. If you now wish to enter a channel in that position or change the channel previously entered, simply depress the **[CHANNEL]** bar and strike the keys for the new channel, i.e. **[CHANNEL]** **[4]** **[0]**. Channel 40 would now be entered into the second memory register position. This procedure may be used to individually recall any of the 10 memory register positions.

To program the 10 memory positions, the following procedure should be used; press the **8 MEMORY** key once. This will gain access to the memory function and place you in the first memory register position. Channel 9 should now appear in the display window since this channel is automatically programmed in the number 1 memory register position. If you wish to reprogram the number 1 position, simply depress the **CHANNEL** bar once and then the numerals of the channel you wish to program. For example, **CHANNEL** **1** **2**. Channel 12 should now appear in the channel display window and be locked into the number 1 memory register position.

Depress the **8 MEMORY** key again to select the number 2 memory register position. If nothing has been entered into that position, the digits "00" will appear in the channel display window. To enter a channel, such as, channel 40 into the number 2 position, simply press **CHANNEL** **4** **0**. Channel 40 has now been entered into the number 2 memory position. To access the number 3 memory position, simply press the **8 MEMORY** key again and the third memory position will be recalled. To enter a channel, such as 20, to the third memory register position, simply press **CHANNEL** **2** **0**. Channel 20 has now been entered into the number 3 memory register position. The above procedure may be used to program up to 10 channels into the Sidebander VI memory. It is not necessary that all 10 memory positions be filled. You may program the Sidebander VI memory for anything between 1 and 10 channels.

Once memory channels have been programmed in the Sidebander VI, memory scan may be initiated by setting the squelch control to mute background noise and then depressing the **8 MEMORY** **5 SCAN** keys. The Sidebander VI will commence searching the programmed memory channels until one in use is found. Upon finding an active channel, the unit will stop on that channel and remain there until such time as the conversation on the channel ceases and the squelch once again closes. Approximately 2 seconds after the closing of the squelch, the unit will again commence scanning the memory channels.

PRIORITY CHANNEL OPERATION

The Sidebander VI microprocessor is designed to allow the operator to select any one of the 40 Citizens Band channels as a priority channel in the unit. Once the operator has selected and programmed the priority channel into the Sidebander VI's microprocessor, you may select another channel as a primary operating channel, i.e. the Sidebander VI may be programmed to make channel 9 a priority channel and select channel 19 as the primary operating channel.

The following procedure should be used to program the priority function in the Sidebander VI: Depress the **4 PRI** key. Depress the **CHANNEL** bar and enter the channel number of the priority channel, **4** **0**. Channel 40 has now been selected as a priority channel. Depress the **CHANNEL** bar again and enter your primary operating channel, **1** **0**. Channel 10 has now been entered as the primary operating channel. To commence priority scan, simply set the squelch control and depress **5 SCAN** key and the Sidebander VI will commence scanning the priority channel. Should a conversation break the squelch on the priority channel, the Sidebander VI will latch onto channel 40 and remain there until the conversation ceases. Approximately 2 seconds after cessation of the conversation, the Sidebander VI will commence scanning again.

ALTERNATE CHANNEL OPERATION

The alternate channel function of the Sidebander VI gives the operator the capability to shift back and forth instantaneously between any two preselected channels. Let's assume that contact has been established with a party on a local calling channel (call it channel 11) and that you wish to find a clear channel. Simply press the **6 ALT** (alternate) key once and then step through the channels until a clear channel is found (channel 40). Channel 40 will now be in the Sidebander VI is alternate memory position. Pressing the **6 ALT** key again, will automatically return the unit to channel 11. Once on channel 11, tell your calling party that channel 40 is clear and then press the **6 ALT** key and you will instantaneously return to channel 40.

OPERATING SINGLE SIDEBAND

There are three types of signals presently in use for communications in the Citizens Band radio service. The Sidebender VI's receiver is capable of receiving any of these types when the proper mode of operation is selected. When the Sidebender VI mode switch is placed in the AM position, only standard double sideband full carrier signals will be detected. An SSB signal may be recognized while in the AM mode by its characteristic intermittent pulsing or fluttering and the inability of the AM receiver to produce an intelligible output.

The SSB modes will detect upper sideband, lower sideband, double sideband (DSB) and standard AM signals. In order to determine whether to use upper sideband or lower sideband, the following explanation should be considered.

SSB reception differs from standard AM reception in that the SSB receiver does not require a carrier or opposite sideband to produce an intelligible signal. A single sideband transmitted signal consists only of the upper or lower sideband and no carrier is transmitted. A double sideband (DSB) signal consists of two sidebands, each sideband being equal in amplitude and equally distant in frequency above and below the operating frequency of the transmitter. The operating frequency is defined as the frequency where the carrier would normally be during AM operation. In AM operation a carrier, or reference signal, is transmitted along with two sidebands; each sideband being of equal amplitude and equal distance above and below the carrier frequency. It can be seen that since a single sideband receiver requires only one of the sidebands and no carrier, all modes of transmission may be received since all modes contain at least one sideband. The SSB receiver selects only the required portion of the signal (the sideband) and rejects the carrier and opposite sideband of an AM signal and rejects the opposite sideband of a DSB signal. The method of tuning AM and DSB signals in the SSB mode is explained later on in this chapter.

An SSB signal may only be received when the listening receiver is functioning in the same mode. In other words, an upper sideband signal (USB) may be made intelligible only if the receiver is functioning in the USB position. A lower sideband (LSB) signal will be heard when the receiver is in the USB mode, however, no amount of tuning will make the signal intelligible. The reason for this may be understood if you consider that when in the USB mode, a transmitter's output frequency is in direct proportion to the modulating tone whereas in the LSB mode the transmitter's output frequency is in inverse proportion to the modulating tone. When modulation is applied to the transmitter's microphone in the USB mode, the transmitter's output frequency is increased whereas in the LSB mode the transmitter's output frequency is decreased. The result in listening to the receiver is that when the mode switch is in the proper position (either USB or LSB), a true reproduction of a single tone of modulation will result, and if the tone is increased in frequency, such as a low pitched whistle to a high pitched whistle, you will hear the increase in the output tone of the receiver. If the incorrect mode is selected, an increase in tone of a whistle applied to the transmitter will cause a decrease in the resultant tone from the receiver. Thus when a voice is used in place of a whistle or tone, in the proper listening mode the voice will be received correctly whereas in the incorrect mode, the voice will be translated backwards and cannot be made intelligible by the clarifier control. When listening to an AM or DSB transmission, a correct sideband is heard in either mode since both an upper and lower sideband are received.

Once the desired SSB mode has been selected, frequency adjustment may be necessary in order to make the incoming signal intelligible. The clarifier control allows the operator to vary frequency above and below the exact center frequency of the received signal. If the sound of the incoming signal is high or low pitched adjust the clarifier to produce the correct sound. In order to understand the operation of the clarifier, consider it as performing the same function as a phonograph speed control. When the speed is set too high, voices will be high pitched and if set too low voices will be low pitched. There is only one correct speed that will make a particular record produce the same sound that was recorded. If the record is played on a turntable that rotates in the wrong direction (opposite sideband) no amount of speed control (clarifier) will produce an intelligible sound.

An AM signal received while listening in one of the SSB modes will produce a steady tone (carrier) in addition to the intelligence unless the SSB receiver is tuned to exactly the same frequency by the clarifier control. For simplicity it is recommended that the AM mode be used to listen to AM signals.

DSB signals may be received in either SSB mode and the clarifier control is adjusted in the same manner as in true single sideband operation.

INSTALLATION

A good installation is the most important factor in achieving maximum performance from your Sidebender VI. Complete installation service is available from many CB radio dealers. While no special tools are needed for installation, the antenna installation should be checked with a good quality VSWR meter. If you do your own installation and do not have access to a VSWR meter, it is recommended that you have the installation checked by a local CB radio dealer.

PERMANENT INSTALLATION

Choose a convenient location for your Sidebender VI. Usually, this is under the dash, but the Sidebender VI may be mounted in any position on a rigid surface. Check to be sure that the radio is not in the direct air stream of the vehicle's heater and that there is sufficient space behind the radio for antenna and accessory cable connections. Make certain that the microphone is easily accessible. The microphone holder may be mounted either on the side of the radio where convenient holes are provided or on any rigid surface.

Attach the bracket to the radio and hold the unit against the planned mounting surface. Draw around the bracket so as to leave an outline on the mounting surface. Check to be sure that holes drilled through the mounting surface to secure the bracket will not damage any of the vehicle's components. Find a clear, accessible path between the antenna and radio mounting locations. Remove the antenna cable from the antenna's packing. Snake the cable along the intended path. Tie or tape the excess cable into a neat roll and tuck into a concealed space. Install the antenna according to the manufacturer's instructions. Detach the bracket from the radio, place into the outline and mark and center punch screw holes. Drill 7/32" clearance. To insure that the drill will not punch through and damage any part of the vehicle, wind a few turns of tape about 1/2 inch from the tip of the drill bit. Mount bracket and then mount radio.

MEMORY POWER VOLTAGE CONNECTION — A continuous 12 volt power source is required in order to keep the memory function of the Sidebender VI active when the unit is turned off. The MEMORY POWER terminal should be connected directly to the positive battery terminal of the vehicle and not to the fuse block or ignition switch. This connection should go to the positive battery terminal regardless of whether the vehicle has a negative or positive electrical system. MEMORY power requirements are 13.8 volts at approximately 60 milliamps. If the MEMORY POWER line is not connected then any memory functions programmed into the unit, in addition to the priority channel, will be lost when the unit is switched off.

In some vehicles, the battery terminal voltage will drop below 9 volts when the starter is engaged. Should this happen in your installation, the low battery terminal voltage condition will result in a loss of any memory functions programmed into the Sidebender VI. Provisions have been made on the rear of the Sidebender VI to install a 9 volt nicad rechargeable battery to provide memory power. If you find that your Sidebender VI loses the memory functions when the starter is engaged, simply install a 9 volt nicad rechargeable battery (GE GC-9 or equivalent) in the battery holder and connect the battery clips provided on the Sidebender VI to the battery.

Before wiring your Sidebender VI to power, check the ground polarity of your vehicle by consulting the owner's manual or observing which battery terminal is connected to the vehicle's chassis. An additional 2 amp fuse and holder must be wired into the negative (black) power lead in positive ground vehicles. The Sidebender VI may be connected to the accessory side of the ignition switch. If this connection proves to be too noisy, direct connection to the battery is recommended.

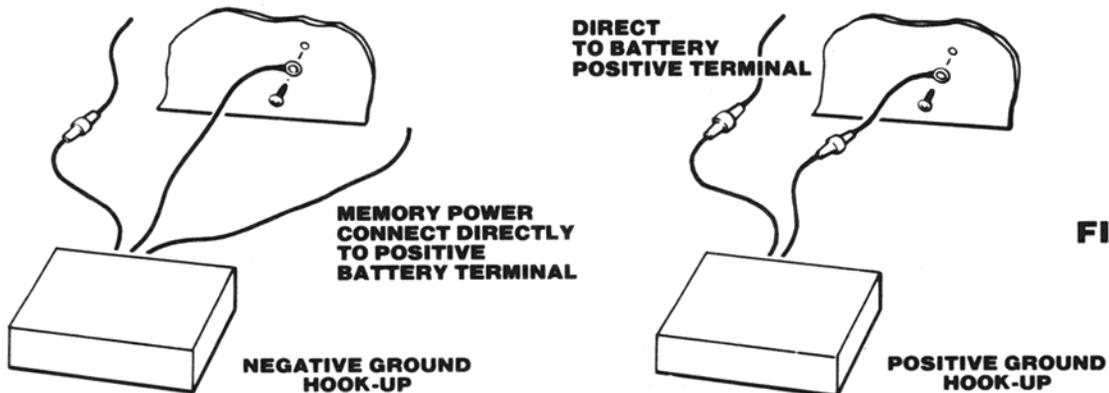


FIGURE 1

CHOOSING AN ANTENNA

The type of antenna and mounting location determines the direction and range of communication. A CO-PHASE antenna gives maximum range to the front and rear of the vehicle, and is best suited for communicating with distant vehicles traveling on the same straight highway. A single antenna mounted on the center of the vehicle gives the best range in all directions and is best suited for city or general purpose communication. A single antenna will be directional when mounted away from the center of the vehicle. Figure 2 shows a method for determining the direction.

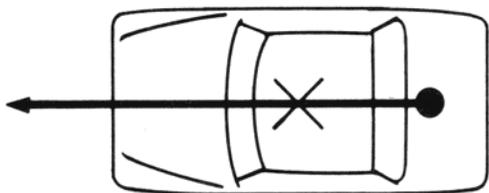
ANTENNA MOUNTING LOCATION

The best antenna location in most vehicles is the center of the passenger compartment roof. The trunk is a satisfactory location, especially if it is large and flat. Due to ignition noise, the antenna should not be mounted over the engine compartment. Various types of clamp-on antennas are available for temporary mounting on side mirrors, luggage racks, raingutters and bumpers. These antennas permit the antenna cable to be dressed through vents, side windows, or under the vehicle without drilling holes. A permanent antenna should be mounted in a location that permits dressing the antenna cable through the vehicle's frame or under its upholstery.

FIGURE 2 Determining Antenna Range Direction

Before installing an antenna, an approximation of the direction of maximum range can be obtained by following these rules.

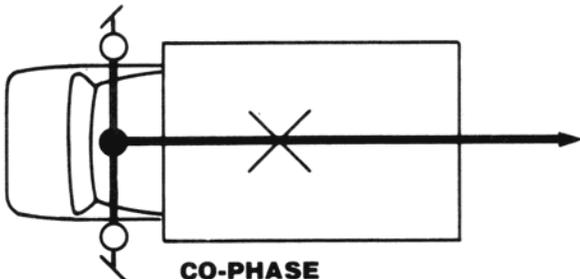
1. Draw a rough silhouette of the vehicle as seen from above.
2. Place a small x in the approximate center of the silhouette.
3. Place a dot on the silhouette where a single antenna is planned, or, if a co-phase is to be used, draw a line connecting the antennas. Place a dot in the center of this line.
4. Draw a line from the dot through the x. This line will point in the predominant direction. The longer the distance between the x and the dot the more predominant will be the range in that direction. A single antenna placed on the x will communicate equally in all directions. If the line connecting co-phase antennas intersects the x, the predominant direction will be in both directions perpendicular to the line.



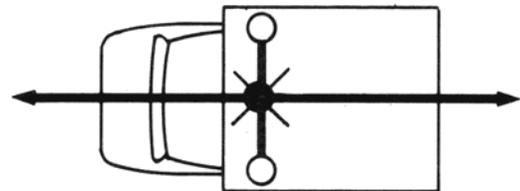
TRUNK MOUNT



PASSENGER COMPARTMENT MOUNT



CO-PHASE MIRROR MOUNT



CO-PHASE SIDE MOUNT

ANTENNA TUNING

The final step in installation is to trim the antenna for minimum S.W.R. The recommended method of antenna tuning is to use an in-line wattmeter or S.W.R. bridge to adjust the antenna for minimum reflected power on channel 20. A properly tuned antenna system will present a suitable load to the transceiver and will insure that maximum power is transferred from the radio to the antenna. If the antenna system in use presents a poor load, as indicated by a high S.W.R. reading, transmitter range will be substantially reduced and damage to the transmitter final amplifier may occur. Poor S.W.R. can usually be corrected by altering the antenna's electrical length in accordance with the manufacturer's instruction. Extremely high S.W.R. readings may be indicative of a defective transmission line, antenna, or connections.

To determine whether the antenna should be lengthened or shortened, test the S.W.R. on channels 1 and 40. If the S.W.R. is the highest on channel 40 the antenna is too long and if highest on channel 1, the antenna is too short. When the antenna system has been tuned correctly, channel 20 should have the lowest S.W.R. and channels 1 and 40 will be slightly higher.

PUBLIC ADDRESS

An external 8 ohm 4 watt speaker may be connected to the PA jack located on the rear panel of the unit when it is to be used as a public address system. The speaker should be directed away from the microphone to prevent acoustical feedback.

EXTERNAL SPEAKER

The external speaker jack on the rear panel is used for remote receiver monitoring. The external speaker may be 4 or 8 ohm impedance and should be rated at 3 watts power dissipation. When the external speaker is plugged in, the internal speaker is disconnected. Suitable units are the model SBE-1SP Non-amplified speaker or SBE-1SSP/AMP Amplified speaker.

ALTERNATE MICROPHONES & INSTALLATION

For best results, the user should select a low impedance dynamic type microphone or a transistorized preamplified microphone. For mobile use the SBE M-100X Mobile Preamplified Microphone or the SBE NC-100 Noise Cancelling Microphone may be used. For base station operation the SBE 100X Preamplified Base Station Microphone or the SBE 200X Non-amplified Base Station Microphone may be used. If another type of microphone is selected, refer to Figure 3 for the proper wiring connections for the microphone jack.

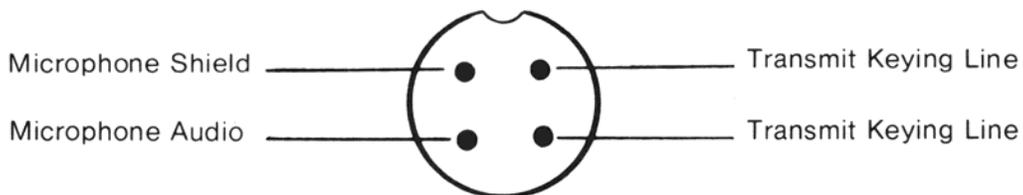


FIGURE 3
MICROPHONE JACK WIRING DIAGRAM
REAR VIEW

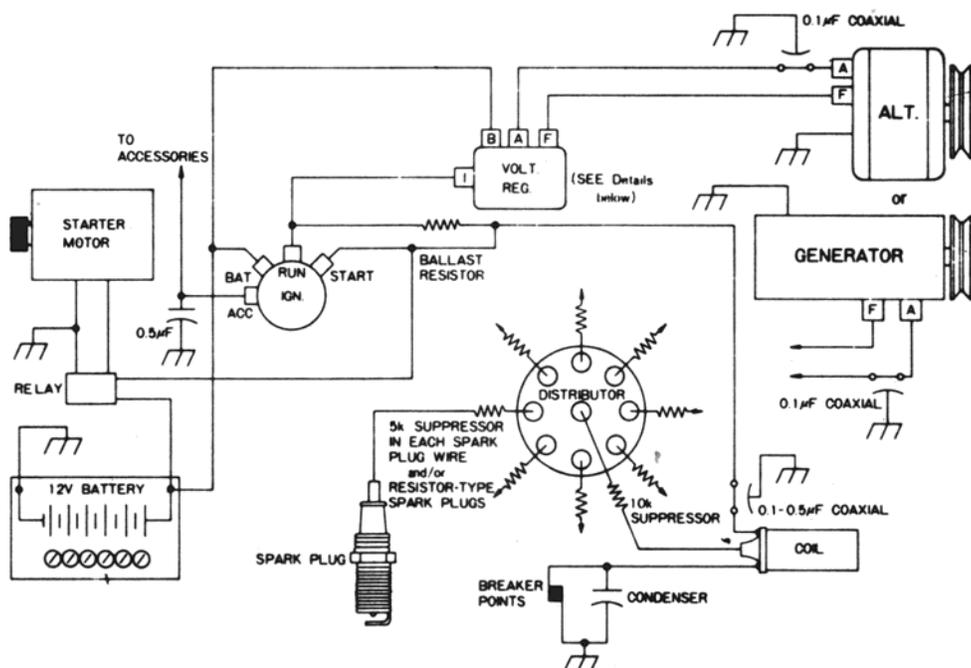
FINAL CHECKOUT

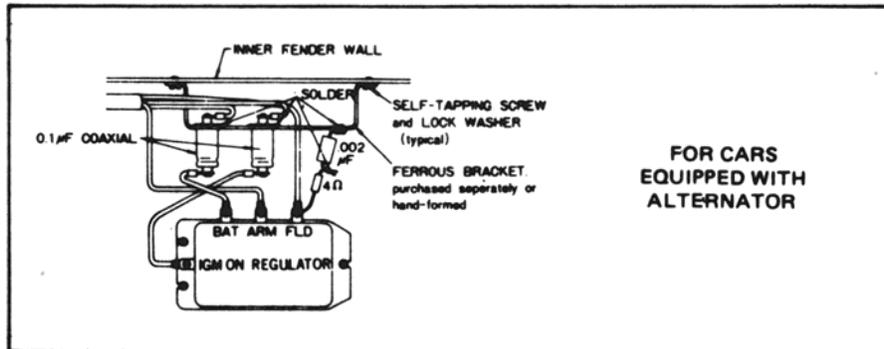
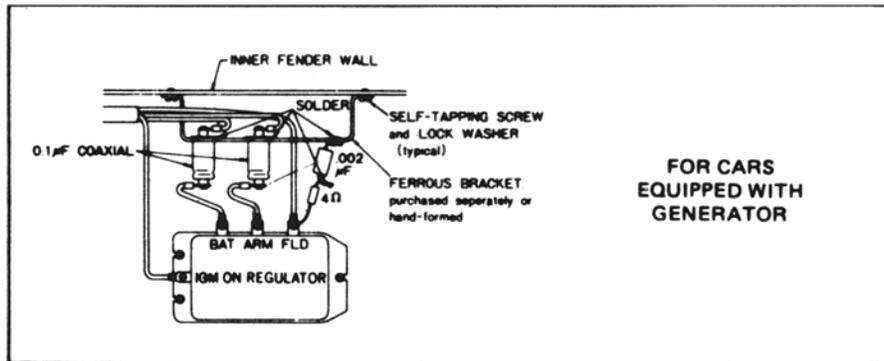
Make an operational checkout of the transceiver to insure operation of it and all the accessories installed. Contact other stations and inquire about their location and their reception of your signal. If an omnidirectional antenna is used, the distance to other stations contacted should be about the same in all directions. A directional antenna should reach more distant stations in the direction in which it is beamed. Also inquire whether the stations contacted are omnidirectional or directional and if directional which way they are beamed.

INTERFERENCE REMEDY CHART

TYPE OF INTERFERENCE	CAUSE	REMEDY
POPPING — increases rate with engine speed. Stops instantly when ignition is shut off.	Ignition	Make certain that engine is properly tuned. Install resistor plug with suppressor cable if vehicle does not already have them.
WHINE — goes up with engine speed. Whines down when ignition is shut off.	Generator or Alternator	Clean commutator or slip rings. Check brushes.
POPPING OR RUSHING — occurs in dry weather at high speeds.	Wheels and Tires	Install static collector rings in front wheel caps or put antistatic powder in inner tube or tire.
NOISE — occurs when accessory is turned on.	Accessory	Install 0.25 MFD capacitor across power terminals at accessory.
CRACKLING, CLICKING — occurs as gauges operate or dash is jarred.	Gauge or Voltage Limiter	Clip 0.25 MFD capacitor across gauges and voltage limiter until interference disappears. Install capacitor at that point.

Noise Suppression Diagrams





TAKING A CB RADIO INTO ANOTHER COUNTRY

Since laws change, always check with a country's Consul General's Office before taking a CB radio into that country. Many countries do not presently offer CB service while others do not offer it on the same frequencies. The CB frequencies used in the United States and Canada are used by some countries for government and commerce.

Persons holding valid U.S. Citizens Band licenses or temporary permits may obtain authority to operate in Canada by requesting D.O.C. Form "APPLICATION FOR REGISTRATION OF RADIO STATION LICENSEE OF UNITED STATES OF AMERICA" from a Canadian consulate and mailing it in at least 60 days prior to entry into Canada. Canadians planning to travel in the United States should obtain F.C.C. Form 410-B, "APPLICATION FOR PERMIT TO OPERATE A CANADIAN GENERAL RADIO SERVICE STATION IN THE UNITED STATES."

Mexico does not have a Citizens Band service. It is against the law to take a Citizens Band transceiver into Mexico.