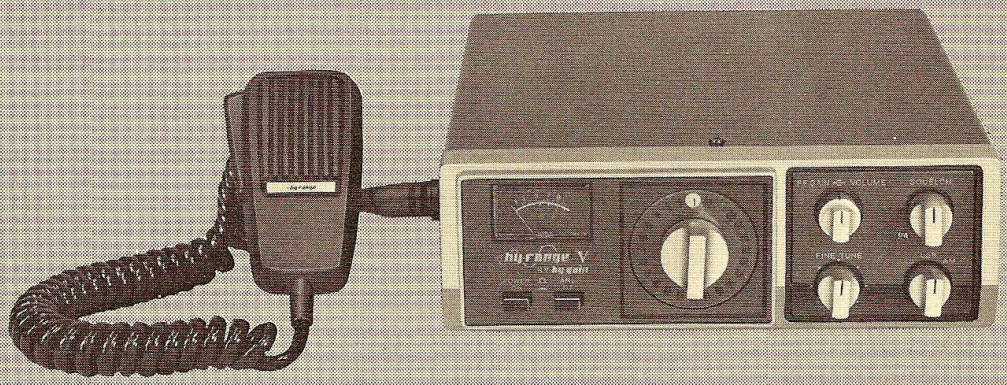
hy-range V
BY hy-gain

23-CHANNEL
SOLID STATE 5-WATT MOBILE
CITIZENS TWO-WAY RADIO



MODEL 674B

INSTRUCTION MANUAL

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General Description

Your Hy-Range V is a full 23-channel AM/SSB transceiver designed and licensed for Class D Citizen Band operation as designated by the Federal Communications Commission (F.C.C.).

The Hy-Range V is a completely solid state compact unit of high reliability and low power consumption. This transceiver utilizes a highly advanced, unique system of frequency synthesization enabling immediate operation on all 23 channels without the need of additional crystals or adjustments. This unit also features a fine tune control allowing you to make adjustments for stations which may operate slightly off frequency. Additional features include an ANL (Automatic Noise Limiter/NS (Noise Silencer) switch which reduces undesirable noises.

The Hy-Range V AM/SSB transceiver is designed to operate from 11.5 to 14.5 VDC. To obtain the best results from your transceiver, it is suggested that you read all the instructions contained in this manual.

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FRONT PANEL

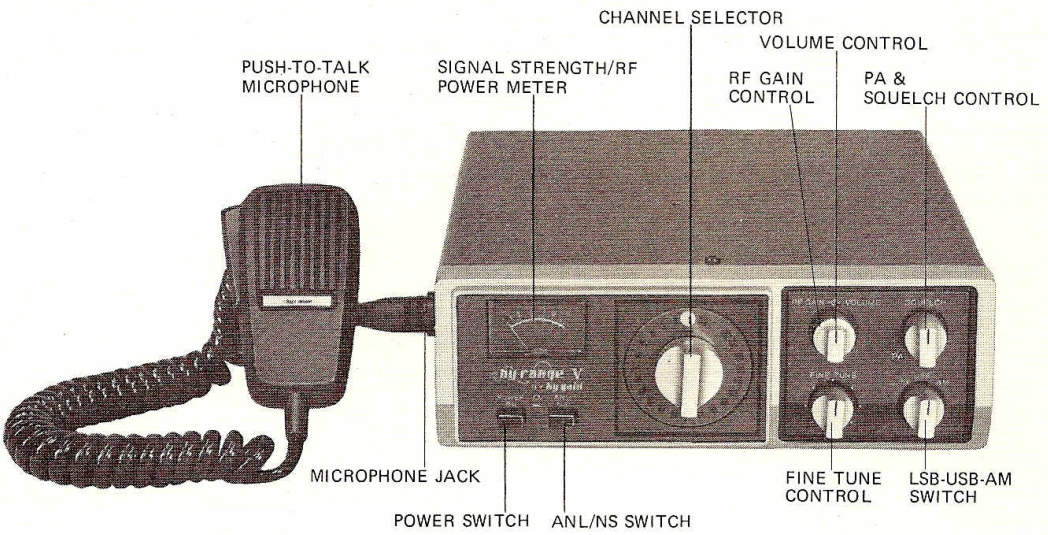


FIGURE 1

REAR PANEL

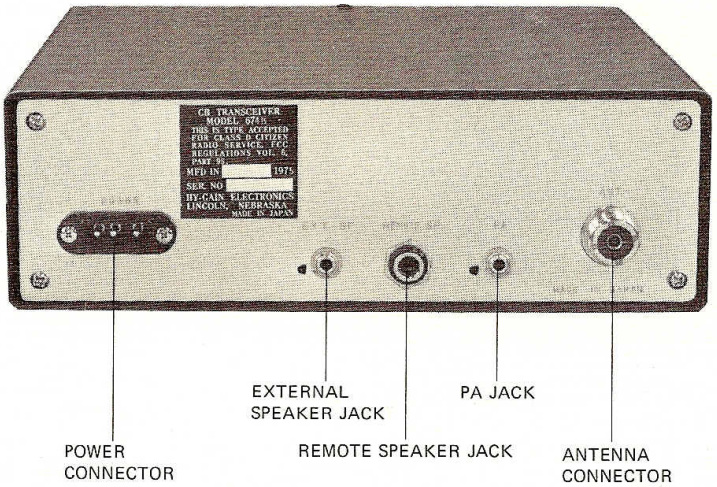


FIGURE 2

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Specifications

Receiver

Receiving system	Single conversion superheterodyne for SSB and AM
Sensitivity	AM : 1 μV for 10 dB (S + N)/N SSB : 0.25 μV for 10 dB (S + N)/N
Selectivity	AM : 7 kHz at 6 dB down SSB : 2.4 kHz at 6 dB down
Fine Tune Range	± 800 Hz
Audio output power	3.0 watts
Squelch range	AM : 1 μV to 10 mV SSB : 0.7 μV to 20 μV
Intermediate frequency	AM : 11.275 MHz SSB : 11.275 MHz

SSB (Single Side Band) Transmitter

SSB generation	balanced ring modulator with crystal latice filter
Frequency response	400 Hz to 2.6 kHz (+3, −10 dB up down)
RF output power	PEP 12 watts
Carrier suppression	40 dB down
Unwanted sideband suppression	40 dB down
Harmonic suppression	50 dB down

AM Transmitter

Modulation	high level class B
Power input	5 watts
RF Power output	4 watts
Harmonic suppression	50 dB down

General

Power source	13.8 VDC (11.5 – 14.5 V)
Speaker	3/4" x 3" 8 ohm
Microphone	dynamic type
Semi-conductors	34 transistors, 38 diodes, 1 IC, 6 FET's
Frequency control	synthesizer crystal controlled
Channels	23 channels all supplied

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Licensing your Citizens Two-way Radio in the United States

NOTICE: It is illegal to transmit with this transceiver until you obtain your citizens two-way radio Class D license. You are also required to read and understand Part 95 of the Federal Communications Commission rules and regulations before operation of this unit. License application Form 505 is packed with your transceiver and Part 95 of the regulations may be available from your dealer; if not, you may obtain copies from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

It is also prohibited by the F.C.C. to adjust the transmitter circuit of this unit unless you hold a current First or Second Class Radiotelephone License.

We recommend that you refer all servicing of any Hy-Gain products to your nearest Hy-Gain warranty service center or consult your Hy-Gain dealer or distributor for the service center location nearest you. Do not tamper with any internal adjustments or settings - - such tampering can adversely affect the performance of your transceiver or may, in fact, cause your unit to operate beyond the limitations set forth for Class D citizens two-way transceivers by the F.C.C.

Installation

General Considerations

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, boat, etc., by means of the special bracket supplied with your transceiver.

Mounting Bracket

Attach the bracket to the underside of the instrument panel using four or more screws (see Figure 3). Secure the transceiver to the bracket by means of the large thumb screws.

DC Power Connections

The Hy-Range V may be operated from a nominal 12 VDC battery source on negative or positive ground systems.

NOTE: Before making any power connections, determine whether the vehicle has a negative or positive ground electrical system, then make the following connections:

Connect the red lead to the vehicle "+" (positive) side of the electrical system, and the black lead to the vehicle "—" (negative) side of the electrical system.

In the case of negative ground vehicles, the red lead should be connected to the accessory post on the ignition switch, the voltage regulator side of the ammeter or the accessory side of the fuse block. The black lead should be connected to the metal firewall or any other point that is connected to the vehicle chassis (ground).

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In the case of positive ground vehicles, the black lead should be connected to the accessory post on the ignition switch, the voltage regulator side of the ammeter or the accessory side of the fuse block. The red lead should be connected to the metal firewall or any other point that is connected to the vehicle chassis (ground).

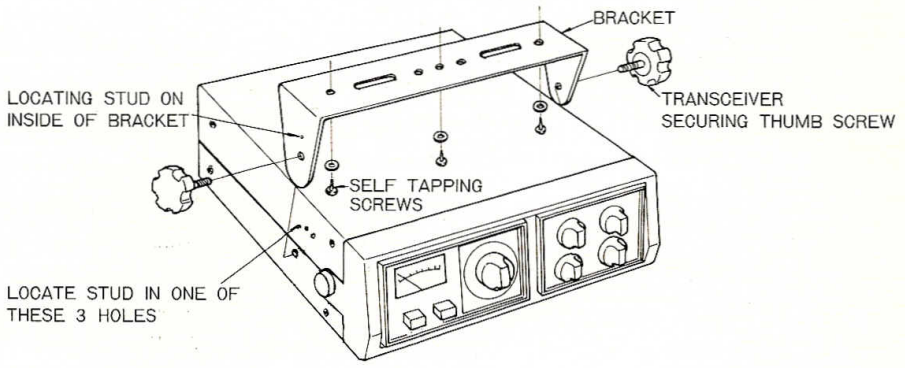


FIGURE 3 Transceiver Mounting

Noise Suppression

Tune-up

In most mobile installations, ignition noise is a problem.

Before beginning any special noise suppression steps, be sure that the vehicle is well-tuned. Clean and tighten all electrical connections, including alternator, battery, regulator and coil connections. Perform the following maintenance steps as necessary. Solder any crimped spark plug or distributor leads; clean and regap or replace spark plugs and ignition points; and check and clean alternator rings or generator brushes. Retune the engine at the manufacturer's recommended intervals.

Corrective Steps

Usually several sources of noise are present in any vehicle, with the strongest covering the others. In order to find and eliminate the maximum number of noise sources, you will have to start with the strong sources and then work back. To be sure the noise you hear comes from your vehicle and not outside it, drive to a relatively quiet location (free of man-made electrical interference such as noisy power lines, industrial noise or other vehicles). Test for noise with a weak signal on the channel and the engine off. Then start the engine. Ignition noise will probably be present at all engine speeds. If it is severe, it may make a normally readable signal unreadable.

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To reduce ignition noise, install resistor-type spark plugs if these are not already installed. If non-resistance ignition wiring is used, install a 10 k-ohm suppressor resistor at each spark plug tower of the distributor. Install a coaxial capacitor at the ignition coil primary as close to the coil primary as possible. This capacitor can be purchased from an electronics parts company or an automotive electrical service company.

A "whining" noise which varies with engine speed and continues with the ignition turned off and the vehicle coasting in gear is characteristic of the alternator. Check and clean it and install an alternator filter (same sources as above).

An irregular, clicking sound which disappears at a slow idle characterizes the voltage regulator. Install a 4-ohm carbon resistor as close to the field terminal of the regulator as possible, then a .002 μF capacitor in series with and as close to the resistor as possible. Connect the capacitor to ground. See the detail drawings of Figure 4.

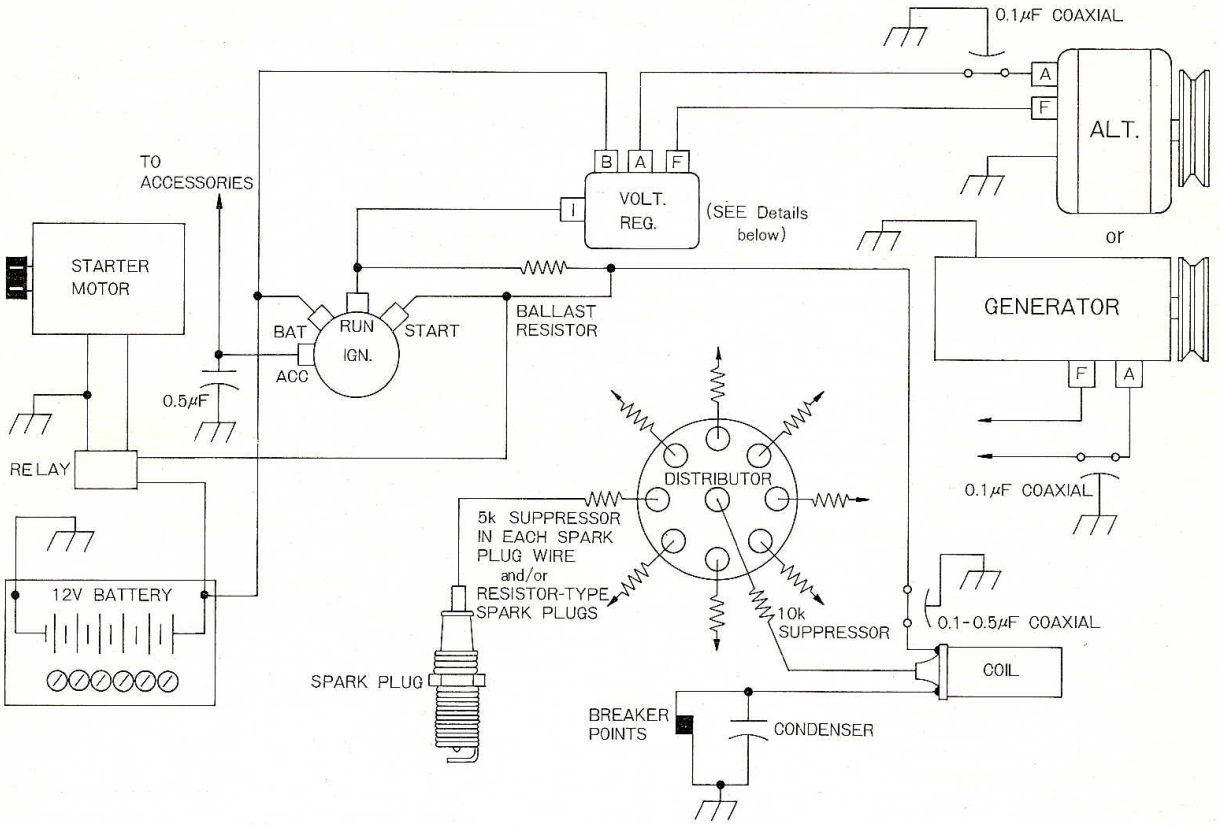
Irregular popping noises which vary with road surfaces indicate static discharge at any of several locations in the vehicle. Tighten loose nuts and bolts and bond large areas such as the fenders, exhaust pipe, firewall, etc. to the frame with lengths of heavy wire braid.

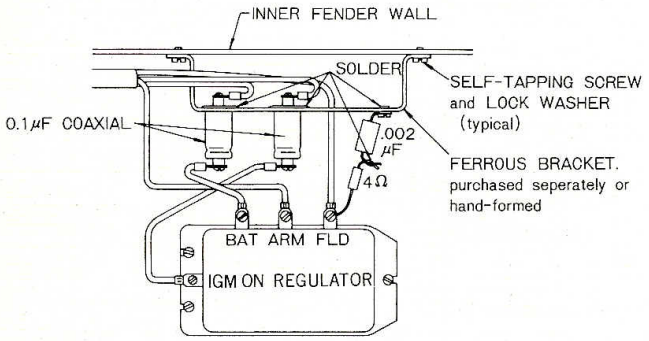
More Help

Figure 4 illustrates these noise suppression steps. Additional information is available in the Radio Amateur's Handbook published by the ARRL.

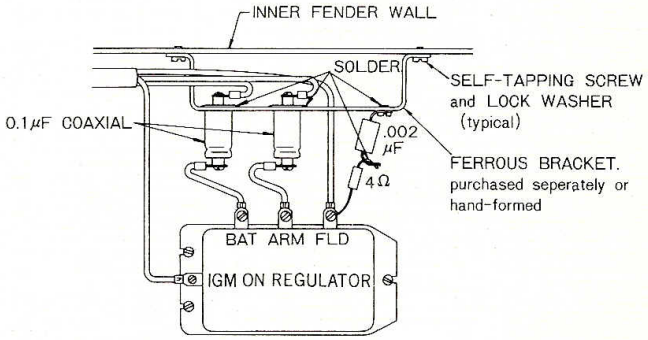
The Hy Range V transceiver does contain a noise silencer for reduction of impulse noise. However, to get the best reception, noise suppression steps should be taken at the source of the noise.

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— FOR CARS EQUIPPED WITH — ALTERNATOR



— FOR CARS EQUIPPED WITH — GENERATOR

FIGURE 4 Noise Suppression Diagram

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Antenna and External Speaker Connections

Antenna Connector.

Used for antenna connection, matches PL-259 standard type.

The antenna should be connected to the transceiver by means of coaxial cable. Either RG-58/u or RG-8/u coaxial cable is ideal for this purpose. The antenna lead-in cable should be terminated with a PL-259 type male coaxial connector which should be attached to the matching ANT connector at the rear of the transceiver.

Public Address (PA) Speaker Jack.

This jack is used for connection of an 8-ohm PA speaker for PA operation.

Remote Speaker Jack.

This will be used to control the built-in speaker when operating the transceiver with the optional telephone handset connected.

External Speaker (EXT. SP.) Jack.

This jack can be used with any 8-ohm earphone or speaker. Inserting a 3.5 mm plug into the jack automatically silences the internal speaker.

DC Power Connector.

This is used for connection of DC Power cord.

Use of Controls

Power Switch.

This turns the power on or off.

ANL/NS (Automatic Noise Limiter/Noise Silencer) Switch.

With this switch placed in the released out position undesirable noise will be considerably reduced in AM or SSB reception. When in the depressed NS position annoying impulse noise will be blanked out.

This noise silencer circuit is effective for both AM and SSB reception.

The noise silencer will suppress much of the pulse-type interference, "ignition noise," that is often a problem when operating mobile (or for that matter, when you are operating as a base station). The depth of the silencer and its relative effectiveness are determined by the signal strength of the stations around you. This is known as the "threshold level." If any station is putting out an S-9 or greater signal on any channel, the effectiveness of the silencer will be at least partially blocked. As far as when to use the silencer is concerned, generally, it is left on all the time when you are operating mobile. But when operating as a base station, you may also find it very helpful.

Don't confuse the action of a noise silencer with a noise limiter. Noise limiters only clip off the peaks of the noise so that it is not as annoying. This is helpful, but a noise silencer is much more effective. It actually turns the receiver off momentarily so that no noise at all is heard.

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Fine Tune Control.

When receiving SSB signals, adjust the FINE TUNE knob carefully and set it where the incoming signal can be heard clearly. Because of the characteristics of a SSB signal, it is extremely important to adjust this control. With improper fine tuning adjustment, the signal will not be intelligible. The sound will be distorted. SSB tuning will become easy as you acquaint yourself with the operation of this control. After adjusting it to clarify once, no adjustment is needed if you stay on the same mode and channel, receiving the same station.

LSB/USB/AM Switch.

This switch controls the mode of operation for the transmitter and receiver simultaneously and allows selection of conventional AM operation or SSB operation on either upper or lower side band. In order to communicate with another transceiver, you must use the same operating mode.

PA/Squelch Control.

When operating the transceiver as a simple public address amplifier, place the control in the PA (fully counterclockwise position). Turning the control clockwise quiets the receiver when signals are not being received and allows a quiet standby operation. It functions only in the receive mode and does not affect the receiver volume when signals are being received. To adjust: When no signals are present, rotate the squelch control clockwise until the receiver is quieted. Incoming signals will automatically release the squelch. The squelch circuit is effective for both AM and SSB reception.

NOTE: For normal CB operation, do not place the control in PA position.

Volume control.

This varies the sound output from the built-in speaker when receiving. To increase the sound output, rotate the knob clockwise and to decrease, turn counterclockwise.

RF Gain Control.

This controls RF gain when receiving. To increase RF gain (reception sensitivity) turn the knob clockwise and to decrease turn counter-clockwise.

Channel Selector.

Continuously rotating switch selects any one of 23 channels for transmit and receive operation.

Signal Strength/RF Power Meter.

During reception, the built-in meter provides a relative indication of signal strength in "S" unit on the lower scale and offers comparison between one incoming signal and another.

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During transmit, the meter will provide an indication of antenna RF power on the upper scale. As you speak, the pointer should "flicker" slightly, indicating that you are modulating the RF carrier.

Microphone Jack.

This accepts the push-to-talk microphone or optional telephone handset.

Operating Procedures

Public Address Operation

Special provision has been made for Public Address operation, utilizing the microphone and audio stages in the unit.

1. Connect a external PA speaker to the PA jack on the rear panel.
2. Place the PA/Squelch control in the PA position.
3. Press the push-to-talk button on the microphone and talk into the mic. Your voice will be heard from the external speaker which may be mounted on the exterior of a car, boat, or building.

NOTE: The volume control on the transceiver does not control the speaker output during PA operation. However, the speaker output can be varied by holding the microphone further away or speaking softly.

CB Transmitter Operation

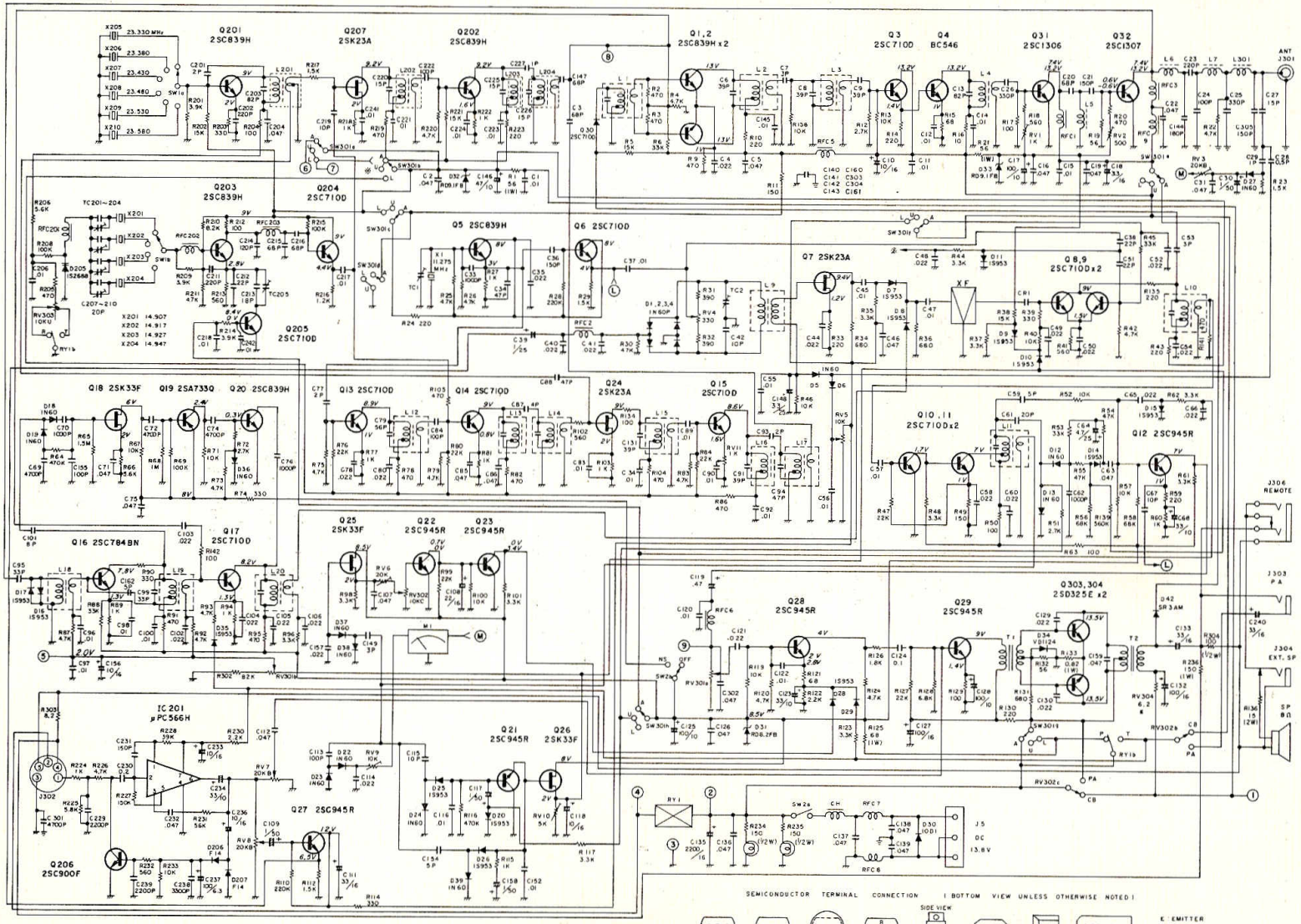
IMPORTANT: Do not try to transmit without the CB antenna connected to the antenna connector on the rear panel.

1. Insert the MIC plug in the MIC jack.
2. Make sure your antenna is securely connected to the ANT connector.
3. Turn the power on as stated in this manual.
4. Set RF GAIN control to maximum temporarily.
5. Turn the SQUELCH knob counterclockwise fully.
6. Place the FINE TUNE knob at center position temporarily. (See description on "FINE TUNE control")
7. Place the LSB/USB/AM switch in the desired position.
8. Place the ANL/NS push switch in either position.
9. Place the channel selector switch to a desired channel.
10. Adjust the VOLUME control for proper sound level.
11. To transmit press the push-to-talk button on the microphone and to receive release the button.

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SCHEMATIC DIAGRAM OF MODEL 674B



SERVICE INFORMATION

Warranty Repair

If your receiver should need servicing under the warranty, contact your Hy-Gain dealer for the Hy-Gain Service Center nearest you. Please contact the Service Center before shipping your transceiver to him. All equipment returned for warranty repair must be accompanied by your sales slip or invoice, or a copy of either.

Units that have been modified cannot be accepted for repair.

How to Ship Returns

Include all information requested by the Service Center. Then pack the unit as follows:

Check the unit to see that all parts and screws are in place. Then wrap it in heavy paper or put it in a plastic bag. If the original carton is not available, place the unit in a strong carton that is at least six inches bigger in all three dimensions than the unit. Fill the carton equally around the unit with resilient packing material (shredded paper, excelsior, etc.). Seal it with gummed paper tape, tie it with a strong cord, and ship it by prepaid express, United Parcel Service, or insured parcel post to the Hy-Gain Service Center.

It is very important that the shipment be well-packed and fully insured. Damage claims must be settled between you and the carrier and this can delay repair and return of the unit to you.

Purchase of Parts

Parts can be purchased from the factory Customer Service Department. All parts orders must be prepaid or COD. When ordering, please supply the following information:

1. model number of the unit
2. serial number of the unit
3. description of the part
4. part number. (if available)

Address your letter to:

Hy-Gain Warranty
Service Department
4900 Superior Avenue
Lincoln, Nebraska 68505
Attn: National Service Manager

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90-DAY LIMITED WARRANTY

Hy-Gain Electronics Corporation warrants all products manufactured by it and bearing Hy-Gain model numbers to be free from defective material and workmanship under normal use and service and agrees to repair such products. If investigation discloses the defect to be the fault of our manufacture. Hy-Gain's obligation under this warranty is limited to repairing any such product which, upon our examination, proves to be so defective. All products repaired under such warranty must be returned to the Hy-Gain factory, transportation prepaid by the purchaser, within ninety days from the date of purchase. . 9

This warranty applies only to the original purchser. Upon receipt of equipment, the buyer is responsible for checking the contents for damage. Any shipping damage should be referred to the carrier.

This warranty does not apply to any Hy-Gain products which have been repaired, worked on, or altered by persons not authorized by Hy-Gain to do so, or products to which the repair has injured the stability or reliability of such product, or which has been the subject of mis-use, negligence, or accident, or the serial number of which has been removed, altered, effaced, or in any other way rendered unidentifiable. Neither does this warranty apply to any of our products which have been connected, installed, used, or otherwise adjusted other than in accordance with instructions furnished by Hy-Gain. Nor does Hy-Gain Electronics Corporation assume any liability for consequential damages, and in any event, our liability shall in no case exceed the original purchase price of the product.

Accessories supplied by, but not manufactured by Hy-Gain Electronics Corporation, shall carry only such warranty as is available from the manufacturer of such goods and are specifically excluded from Hy-Gain warranties.

This warranty is void if Hy-Gain shall inspect equipment and find that it has been modified, or improperly installed or used. This warranty is expressly in lieu of all other warranties. Expressed or implied, and all other obligations or liabilities on the part of Hy-Gain. No person, including any dealer, agent, distributor, or representative of Hy-Gain is authorized to assume for Hy-Gain any liability on its behalf, or in its name, except to rerer purchasers to this warranty.

All claims of defect or shortage should be addressed to:

Warranty Service Department
Hy-Gain Electronics Corporation
4900 Superior Avenue
Lincoln, Nebraska 68505

You must mail the warranty card in immediately. Then, in making a claim, you need only furnish the model and serial numbers of the unit. However, if for some reason the card was not mailed, a copy of a document, such as a sales receipt, recording the date, place, and proof of purchase may, at the discretion of the service department, serve to establish your warranty. Your warranty claim letter should include all pertinent details, along with the part or item numbers involved. Do not return anything until requested to do so. You must supply the above information.

Any returned items must have prior authorization. Unexpected returns are greatly delayed in handling. These delays can be avoided by writing in advance, furnishing the necessary information.

Hy-Gain reserves the right to make changes in design and improvements on its products without assuming any obligation to install the same on any of its previously manufactured products. Further, Hy-Gain reserves the right to ship new and/or improved products which are similar to the form, fit, and function of products originally ordered.

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