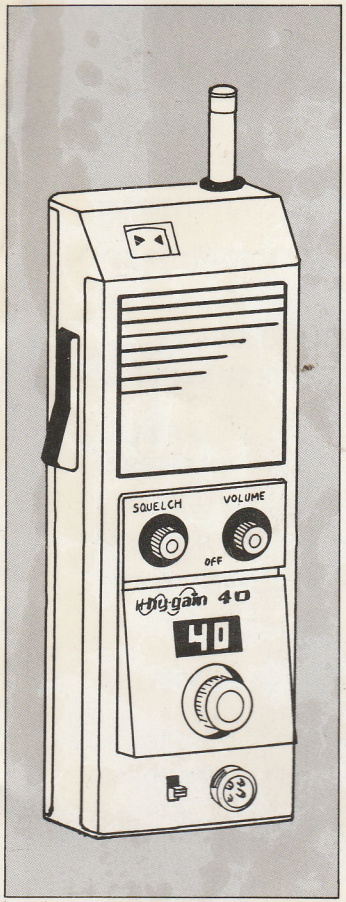
OWNER'S MANUAL



Hy-Gain 40

40 Channel Hand-Held CB 2-Way Radio

hy-gain

Technical Specifications

TRANSMITTER	PLL controlled, amplitude collector modulated.
POWER INPUT	5 Watt input of final RF Power Amplifier.
MODULATION	High level push-pull modulator with RANGE BOOST.
RECEIVER	Dual Conversion Superheterodyne with RF Stage and 455 kHz Ceramic Filter.
SENSITIVITY	1 μV for 10 dB $\frac{S+N}{N}$ or better.
SELECTIVITY (Adjacent-Channel)	±10 kHz, more than **−50 dB**
SQUELCH RANGE	1 μV to **1000** μV ± **6 dB**
AGC FIGURE OF MERIT	**70 dB**
AUDIO OUTPUT	2 Watt
GENERAL	
CIRCUITRY	Digital Phase Lock Loop Synthesizer.
CHANNELS	40 channels in the 27 MHz CB Band.
MODE OF OPERATION	AM
POWER SUPPLY	12.6–15 volts DC (10–1.5V "AA" alkaline batteries, or 12–1.25V "AA" nickel cadmium batteries).
ANTENNA	Total Height, 60 inches Telescoping whip; Height extension from top of chassis 50 inches telescoping whip.
BATTERY DRAIN	Transmit: unmodulated 700 mA. Transmit: 100% modulated 1100 mA. Receive: Squelch on, 200 mA. Receive: Maximum Volume 500 mA.
SEMI-CONDUCTORS	19 Transistors, 3 IC's, 14 Diodes.
DIMENSIONS (overall)	Height 11", Width 3-3/4", Depth 3". H-279 mm, W-95 mm, D-76 mm.
NET WEIGHT	2 lbs. 16 oz./1.3 kg.

ACCESSORIES
1 Shoulder Strap
1 Instruction Manual

General Description

The Hy-Gain 40 is a compact hand-held 40 channel transceiver designed to operate with an input of 5 watts to the final RF power stage for portable two-way radio communication in the Citizens Band (27 MHz). It employs the very latest technology to provide 40 channels of operation by means of digital frequency synthesis with Phase Lock Loop (PLL) circuitry.

Housed in a rugged metal case, the Hy-Gain 40 comprises of a miniature transistorized transmitter and receiver – both PLL-controlled for precise, dependable operation.

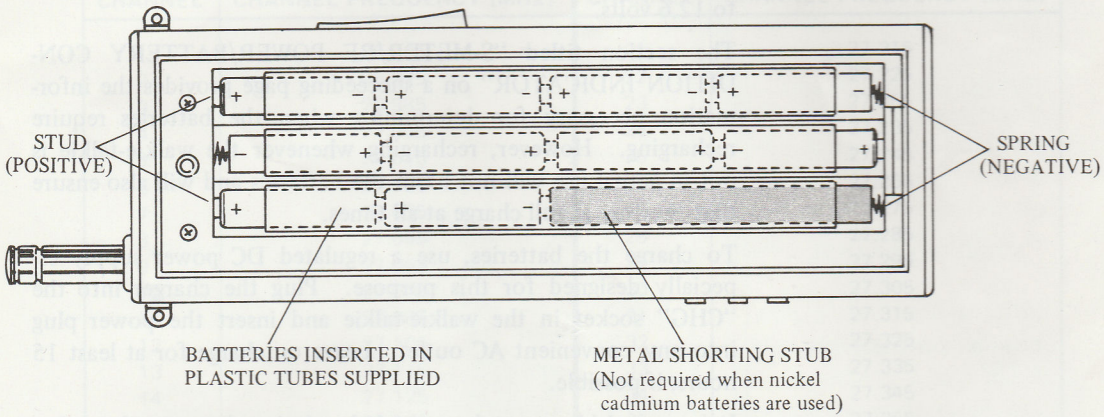
A special feature of the multi-stage transmitter is the full-time "Range-Boost" circuit which concentrates more audio power into the sidebands by providing high average modulation on all syllables. This results in a greater effective range of the trasnmitted signal. The sensitive superheterodyne receiver with RF amplifier includes many other features -- an efficient Squelch control circuit which can be used to silence the receiver when no signals are being received, audio IC for high output and undistorted sound, AGC [automatic gain control] to prevent overloading on strong signals and maintain uniform sound output. Automatic Noise Limiter to reject electrical noise, S-Meter/RF Power and Battery Condition Indicator and LED Digital Channel Read-Out.

Although built to withstand a certain amount of abuse, the Hy-Gain 40 should be treated with the care normally accorded to electronic equipment. Always protect the unit against dirt and water and avoid any severe shocks. If the Hy-Gain 40 is treated with reasonable care, the only maintenance likely to be needed to maintain peak performance is the replacement or recharging of the batteries when necessary.

Battery Installation

The detachable back plate of the walkie-talkie covers the compartment which is used to house twelve battery cells in series (rechargeable nickel cadmium) or 10 cells if heavy-duty alkaline are used. The metal shorting stub supplied is also inserted when alkaline batteries are used, as indicated below.

1. To detach the rear battery cover, loosen the single screw at the upper rear of the walkie-talkie.
2. Refer to below and install the batteries in series as shown.



1. USE 12 NICKEL CADMIUM RECHARGEABLE BATTERIES (1.25 VOLTS EACH)

OR

2. USE 10 HEAVY DUTY ALKALINE BATTERIES (1.5 VOLTS EACH) PLUS SHORTING STUB

CAUTION: Do not leave batteries in the transceiver when unit is not being used for long periods of time. Chemical action of weak or exhausted batteries may cause a leak and result in possible damage to battery holder contacts on compartment.

Battery Recharging

Nickel cadmium rechargeable batteries, although higher in initial cost than other types, should be considered an investment and in the long run are definitely less costly since they can be recharged hundreds of times. They are hermetically sealed in steel cases and never require the addition of water or electrolyte. The voltage of each cell when fully charged is 1.25 volts; discharged 1.05 volts. Since 12 batteries are connected in series, the voltage across the terminals of the plastic battery holder will be 15 volts fully charged and 12.6 volts discharged. To obtain longest life from these batteries, always recharge them before voltage drops to 12.6 volts.

The section titled "S-METER/RF POWER/BATTERY CONDITION INDICATOR" on a succeeding page provides the information necessary for determining when the batteries require recharging. However, recharging whenever the walkie-talkie is not in actual use will not harm the batteries and will also ensure that they are at full charge at all times.

To charge the batteries, use a regulated DC power supply especially designed for this purpose. Plug the charger into the "CHG" socket in the walkie-talkie and insert the power plug into any convenient AC outlet. Leave on charge for at least 15 hours, if possible.

It is a good idea to recharge nickel cadmium batteries for a few hours when first installing them in the walkie-talkie as they may have lost some of their charge during shipment from the factory.

Never expose the batteries to excessive heat. Avoid leaving the walkie-talkie in the sun, glove compartment of a car, or other place where excessive heat may develop.

Battery Replacement

When replacement becomes necessary, any of the batteries listed in next page may be used if inserted into the battery compartment properly [see BATTERY INSTALLATION].

BATTERY REPLACEMENT

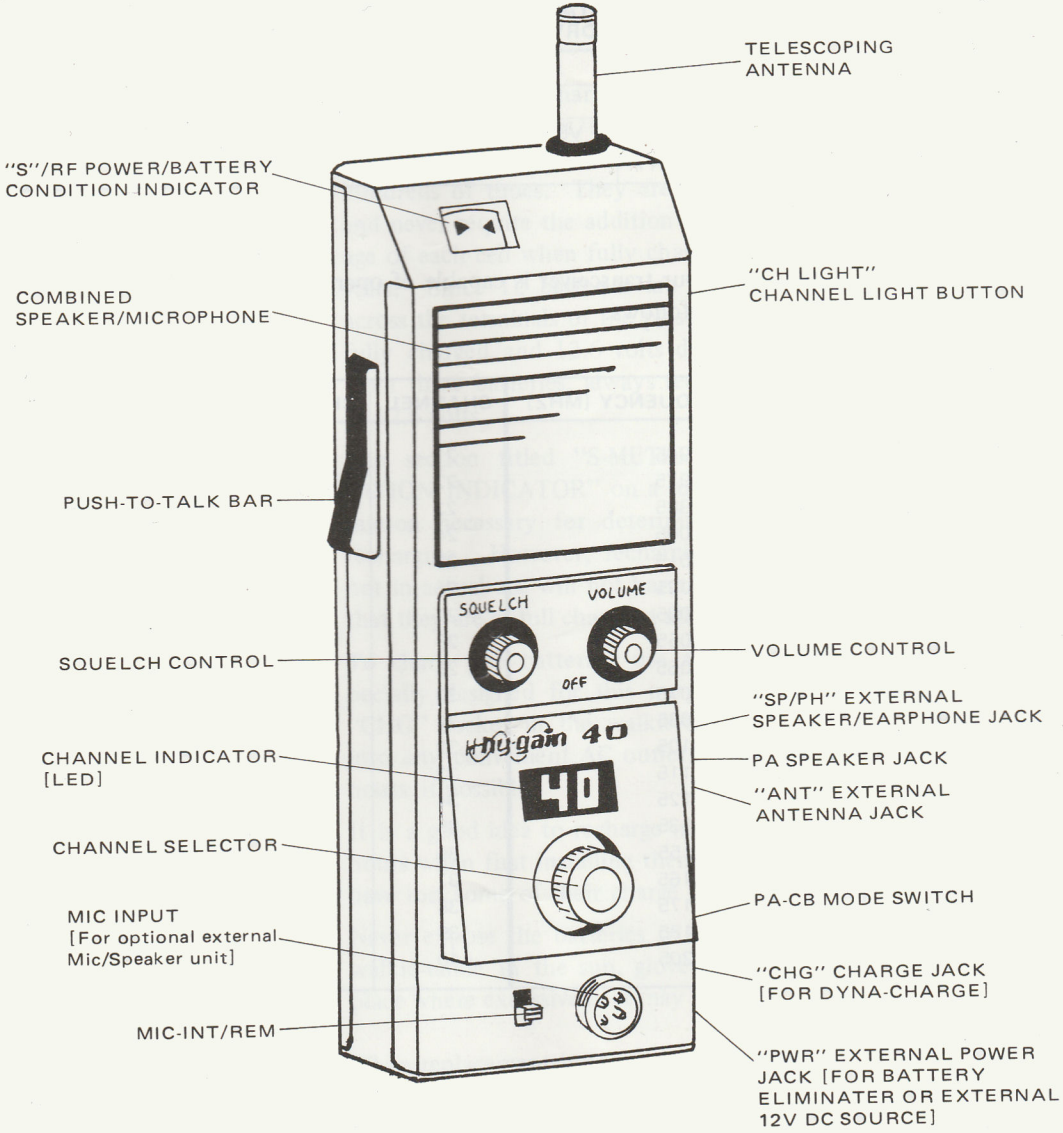
MFR'S NO.	STANDARD DRY CELL	ALKALINE CELL	MERCURY CELL	MICKEL CADMIUM CELL
EVEREADY	915	E-91	E-9	C450
BURGESS	910	AL9	HG9	CD6
RCA	VS034A	VS1334	VS9	–
MALLORY	M15F	MN1500	ZM9	–

Channel Frequencies

Your transceiver is capable of operation on all frequencies listed as follows:

CHANNEL	CHANNEL FREQUENCY [MHZ]	CHANNEL	CHANNEL FREQUENCY [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

Operation



WARNING: Do not attempt to transmit until you have fully extended the built-in antenna, or have attached the optional miniature flexible rubber whip antenna.

General Operation

1. Extend the telescoping whip antenna to its full length. Avoid bending the slim, top section of the antenna when extending or collapsing it.
   To extend the antenna, grasp the button-shaped tip and extend the antenna partially. Next, grasp the centersections and extend the lower sections fully. Extend the top sections by pulling gently on tip. To collapse the antenna, grasp the center sections and collapse the lower sections first, then the remainder, with slim top section pushed in by pressing on the tip with the index finger.

2. Turn VOLUME control in a clockwise direction to switch unit on. Set the "CB/PA" mode switch to the "CB" position, set the SQUELCH control to the fully "open" position initially (counter-clockwise), and increase volume until background noise is heard. Select desired channel by rotating the Channel Selector Switch to the desired channel (1-40), as indicated by the LED digital readout indicator providing the Channel Light Button is depressed. Set the MIC switch to "INT".

3. The Walkie-Talkie is equipped with a combined speaker/microphone which is located behind the grille on the unit. To transmit, hold the unit so that the grille is 3 to 5 inches away from your lips and fully depress the push-to-talk bar. Speak clearly and at a normal level. When you have completed your message, release the bar.

NOTE: If you are using the optional external microphone/speaker unit, see "External Mic Jack" for operating information.

4. The squelch circuit in the receiver section of the transceiver is used to eliminate 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 signals should be present]. Rotate the SQUELCH slowly clockwise until the background noise just disappears, then rotate slightly further. At this point, the receiver will be quiet

between transmissions, but a transmitted signal will overcome the squelch actions and be heard. Do not advance the control too far or some of the weaker signals will not be heard. If you wish to receive extremely weak signals, simply turn the control to the fully counter-clockwise position [min squelch].

5. To turn unit off, rotate VOLUME control counter-clockwise to the OFF position.

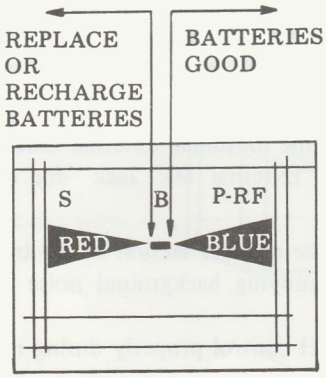
NOTE: If Transceiver has been used in the rain, wipe antenna thoroughly before collapsing it.

Battery/P-RF Indicator

The BATTERY INDICATOR indicates battery voltage when the unit is turned on (the SQUELCH control must be rotated fully clockwise and telescoping antenna is fully depressed). When indicator is in blue area, battery voltage is normal.

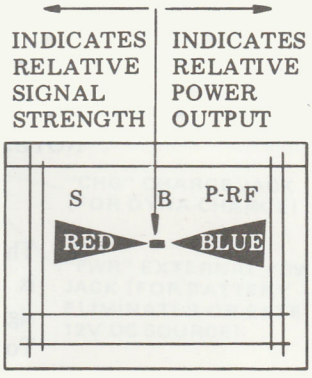
Black indicates voltage is on the border line and if rechargeable batteries are used, they should be recharged.

Red indicates battery voltage is low and batteries should be replaced or recharged.



A.

BATTERY CONDITION INDICATOR



B.

"S" METER OR RF POWER OUTPUT INDICATOR

S-Meter

Incoming signals will cause the pointer to deflect toward "S" on the left side of the meter. The stronger the signal, the farther to the left the pointer will move, giving an indication of relative strength of the received signal.

RF Power Output Indicator

When the push-to-talk bar is depressed, the meter will show whether RF power is being radiated from the antenna during transmission. Generally, the meter pointer will swing into the blue portion of the scale [P-RF] when the push-to-talk bar is depressed. For a number of reasons, however, the pointer may not always go to the extreme right of the scale. This does not necessarily indicate that less RF output is being radiated. When doubtful, simply check the battery condition. When no RF output is indicated by the meter pointer during transmit [and battery condition is good], trouble in the transmitter should be suspected.

Squelch Control

This control is used to eliminate any annoying background noise when no signals are present.

Volume Control

This control varies the sound output from the speaker. Also incorporates an "ON-OFF" power switch at the extreme counter-clockwise position.

Channel Selector

The CHANNEL selector switch enables you to select one of 40 channels for transmit and receive operation. The selected channel will be digitally displayed on the LED Channel Indicator as long as the Channel Light Button is depressed.

External MIC Jack

The MIC jack on the walkie-talkie will permit the use of an external microphone/speaker. Simply plug the external mic/speaker into this jack and set the MIC switch to "REM".

To operate with the external mic/speaker unit, simply depress the push-to-talk bar on the mic/speaker to transmit, and speak into it in the normal manner. When the bar is released, the walkie talkie will return to the receiving mode and the receiver output will be reproduced through the mic/speaker unit.

External Speaker/ Earphone [SP/PH] Jack

The matching plug for the SP jack is a subminiature phone plug. The impedance of speakers connected to this jack should be 6–16 ohms. Accessory earphones for this jack are available nationwide.

When an earphone or external speaker is connected to this jack, the built-in microphone/speaker functions only as a microphone. On receive, the sound output will be heard in the earphone or external speaker only.

External Antenna ["ANT"] Jack

The Walkie-Talkie is equipped with an "ANT" jack for the connection of an external antenna, either one presently installed on a car, boat, etc., or a fixed station types. Such an arrangement will usually increase the operating range considerably. This jack offers an impedance of 50 ohms. A subminiature phone plug will fit this jack and can be used with RG-58/U coaxial cable. An adapter cable is also available which permits a PL-259 plug to be connected to the external antenna jack on the transceiver without any rewiring.

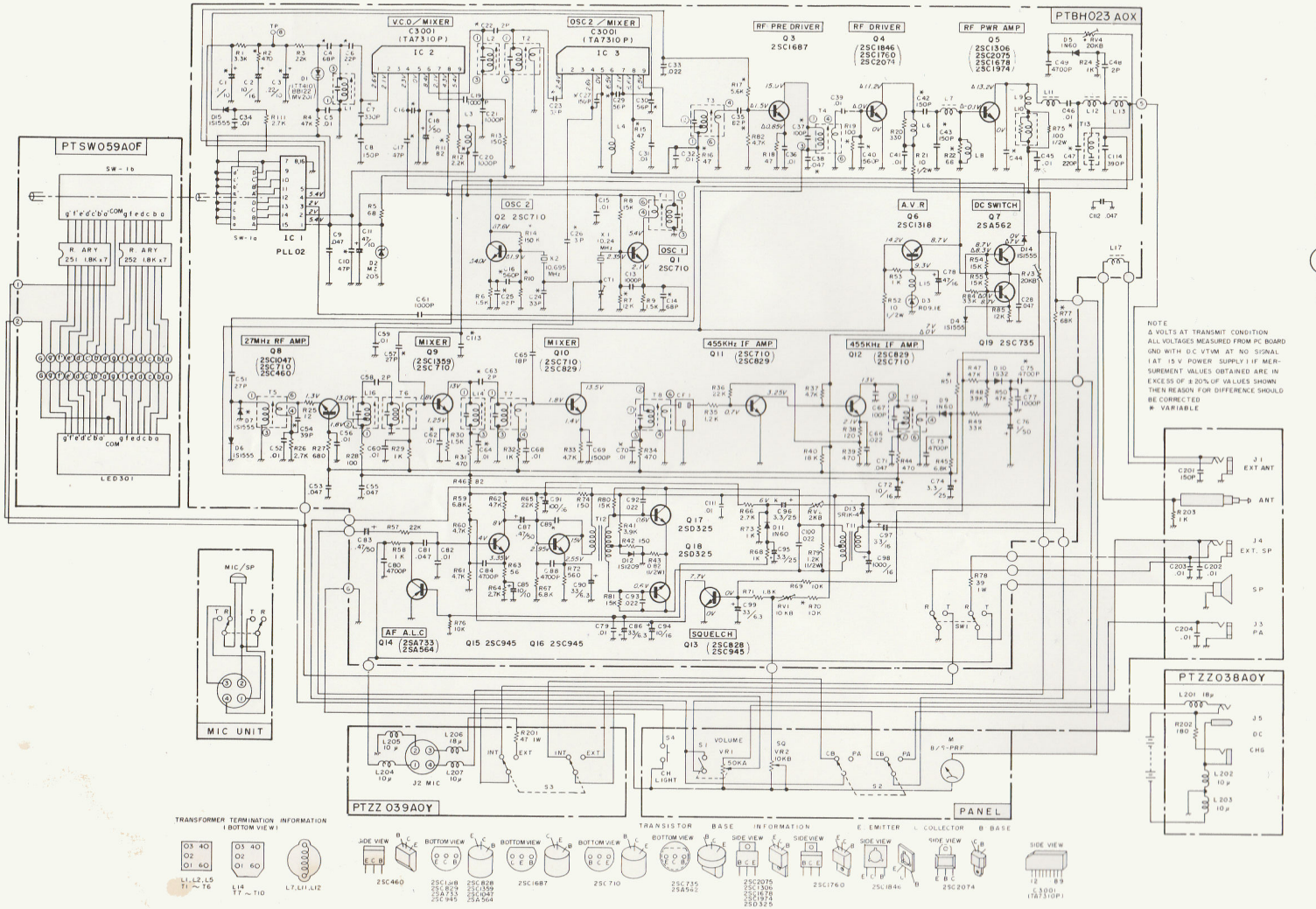
Public Address Operation

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 6–16 ohm speaker connected to the "PA" jack (located at the side of the unit). The recommended plug for the "PA" jack is a subminiature phone plug. To set the transceiver to the PA mode, set the "CB/PA" mode switch to the "PA" position. To operate the PA circuit, fully depress the push-to-talk bar on the Walkie Talkie and talk into the built-in Microphone/Speaker – your voice will be heard from the external speaker:

NOTE: During PA operation, the VOLUME control on the unit is inoperative.

To reduce acoustic feedback, the Walkie-Talkie and PA speaker should be operated in an open area; also turn the speaker away from the transceiver so they are not facing each other.

Schematic Diagram



KTHYGN40XX

Printed in Japan