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SERVICE INSTRUCTIONS

for

MODEL 672-PR

23 Channel CB Radio

Printed in USA

Printed April 18, 1974

TABLE OF CONTENTS

SECTION I

GENERAL INFORMATION

GENERAL DESCRIPTION

The Hy-Range Model 672 is a full 23-channel transceiver designed and licensed for Class "C" operation as designated by the F.C.C.

This transceiver is completely solid state, and provides you with a 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 a NB (Noise Blanker) switch which reduces undersirable noises and a public address system which utilizes the microphone and the audio stages within the transceiver.

The Hy-Range 672 transceiver is designed to operate from 11.5 to 14.5 volts DC. To obtain the best results from your transceiver, it is suggested that you read all the instructions contained in your manual.

NOTICE

It is illegal to transmit with this transceiver until you obtain your citizens band Class "D" license. You are also required to read and understand Part 95 of the F.C.C. rules and regulations before operation of this unit. License Form 505 and Part 95 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.

MOBILE INSTALLATION

Location - Before installing the transceiver, choose a location which is protected from moisture and excessive heat, and is convenient to the operator. (See "Transceiver Mounting" and Figure 2 for further details.)

Mounting Bracket - The mounting bracket may be used for base type or gimble type overhead mounting. Secure the bracket by using at least four screws or nuts, washers, bolts combinations or selftapping screws.

Power Connection -

CAUTION

As supplied, the Model 672 is wired to operate from a battery source of of 11.5 to 14.5 volts DC, on negative ground systems. Connecting the unit to a positive ground vehicle or boat without making the necessary internal wiring change will severely damage the transceiver. Before making any power connections you must determine whether the vehicle or boat has a negative or positive ground electrical system and follow the appropriate instructions below.

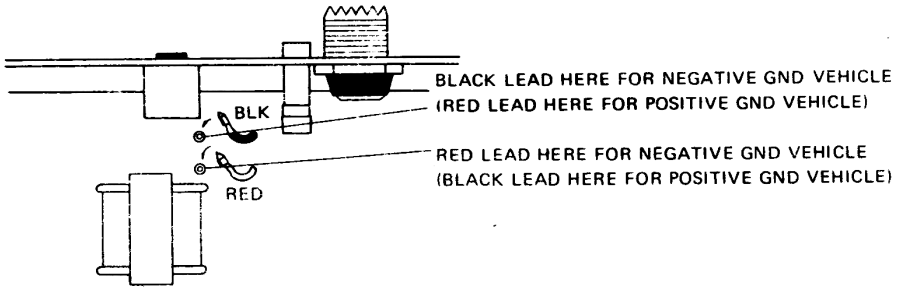
For Negative Ground Vehicles or Boats - Connect the fused power lead (red) of the power cord to the positive terminal of the battery and the negative lead (black) to the vehicle chassis.

For Positive Ground Vehicles or Boats - Before using the Model 672 for operation in vehicles or boats with a positive ground electrical system, the following internal wiring change must be made.

1. Remove the top cover, removing four screws (two at each side of the unit).

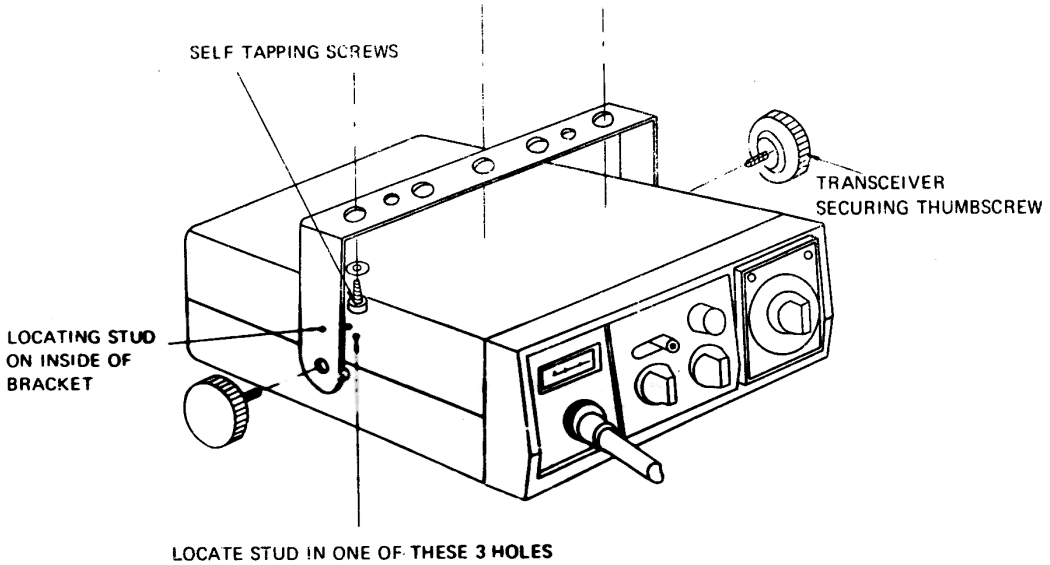
2. Refer to Figure 1 which shows the location of the two leads (red and black) which must be interchanged for positive ground operation. Each lead is attached to its terminal by a push-on type lug.

3. Replace the top cover. Connect the DC power cord as follows: Connect the fused (red) lead to the vehicle or boats positive battery terminal and black lead to the chassis or negative battery terminal.



Internal Wiring Change for Positive Ground System

Figure 1



Transceiver Mounting

Figure 2

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

Attach the bracket to the underside of the instrument panel using four or more screws (see Figure 2). Secure the transceiver to the bracket by means of the large thumbscrews and lockwashers.

SPECIFICATIONS

CB Receiver Section

Circuit Type	Dual conversion superheterodyne with RF stage and RTTkHz mechanical filter
Frequency	23 crystal-controlled channels in the 27 mHz Citizens Band
Sensitivity	0.7uV for 10 db S N/N ratio
IF Frequency	1st IF: 11.275 mHz 2nd IF: 455 kHz
Audio Output	2 watts maximum into external speaker jack
Receiving Current Drain	About 300 mA on Standby (no signal)

CB Transmitter Section

Frequency	23 crystal-controlled channels in 27 mHz Citizens Band
Power Input	5 watts
Emission	8A3
Spurious Response Rejection	All harmonic & spurious suppression better than FCC and D.O.T. requirements
Modulation	AM, 90% typical
Range Boost	Yields high average modulation at average voice levels.
Transmitting Current Drain	Less than 1.2 amp
Antenna	Nominal 50 ohms impedance
Power Source	12VDC, or with optional 117 VAC Solid State Power Supply

SECTION II

OPERATING INFORMATION

FRONT PANEL

Power/Volume Switch - To turn the power on, rotate the knob clockwise. Further rotation will increase the sound output from the speaker. To turn the power off, rotate the knob counter-clockwise until the click, which indicates that the power is cut off from the power supply, is heard.

Squelch Control - This control is used to eliminate annoying background noise at no signal. To adjust the squelch control properly, first, turn the knob counter-clockwise until background noise is heard. Then, rotate the knob slowly clockwise until the background noise just disappears. At this point, the receiver will be relatively quiet under no signal conditions, but an incoming signal will overcome the squelch action and be heard. Since this control is variable, it can be used to provide varying degrees of sensitivity to incoming signals. As the control is advanced from the extreme counter-clockwise position the squelch action is progressively increased and stronger signals are needed to overcome it. To receive extremely weak signals or to disable the squelch circuit, simply turn the control fully counter-clockwise.

Channel Selector - Continuously rotating switch selects any one of 23 channels for transmit and receive operation. The PA position will be used when the transceiver is used as a PA (public address) amplifier.

Signal Strength/RF Power Meter - During reception, the built-in meter provides a relative indication of signal strength in "S" unit on the upper scale and thus offers basis for comparison between one incoming signal and another. During transmit, this will provide an indication of antenna RF power on the lower scale. As you speak, the pointer should "flicker" slightly, indicating that you are modulating the RF carrier.

Fine Tuning - This will be used for clear reception of stations that are slightly off frequency. Rotate the knob for clearer reception.

NB (Noise Blanker) Switch - This switch, when placed in ON position, reduces undesirable noises when the unit is used in noisy areas.

Microphone Jack - Connect microphone supplied.

Modulation Lamp - This lights up when the push-to-talk on the microphone is pressed and flickers according to your voice transmitting (modulating).

Receiver Lamp - This lights up when the transceiver is in receive mode.

REAR PANEL

External Speaker (Ext. Sp) Jack - This will be used for connection of an earphone or speaker having impedance of about 16 ohms. Insertion of an earphone or speaker plug into this jack automatically silences the internal speaker.

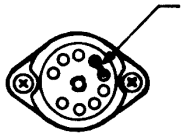
Public Address (PA) Speaker Jack - This will be used for connection of an 16 ohm PA speaker for PA operation.

Antenna Connector -- These antenna connectors will be used for CB antenna connection, see antenna cable connection in this manual.

TVI Trap - Adjustable coil for minimizing TV interference. Preset at factory and does not usually require readjustment.

ANT Load - To obtain the best matching to your antenna system used, this will be adjusted for the best power output. However, this control is preset at the factory and should not be adjusted unless you have precision test equipments.

VFO Connector - This is provided for future connection of an external VFO (optional). When the VFO is not used, the two pin terminals must be connected to each other as illustrated. If they are not connected, you transceiver will not operate.



Connect two (of nine) pin terminals to each other, when the VFO is not used.

Power Connector - Simply connect the power cable to this connector. (See "Power Connection" in this manual).

CB Transmitter Operation -

IMPORTANT

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

1. Connect the microphone to the Microphone Socket.

2. Turn the power on.

3. Turn CB channel selector to a desired channel.

4. Depress the push-to-talk button on the microphone. Hold the microphone 4 to 6 inches from the mouth. Speak at a normal level. During periods of transmission, the receiver is silenced and reception is therefore impossible. In the same way, your signal can not be heard by another station when he is transmitting, each must take turns.

5. To receive, simply release the microphone push-to-talk button.

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 jack on the rear panel.

2. Set the CB channel selector 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 can also control the speaker output during PA operation.

Antenna Cable Connection - The antenna should be connected to the transceiver by means of coaxial cable. Either RG-58 or RF-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.

SECTION III

CIRCUIT DESCRIPTION

SCOPE

Q101, 23 mHz oscillator circuit, Q102, 15 mHz oscillator circuit and Q103, mixer are always operated regardless of transmit and receive mode of operation, when the channel selector switch is placed in the position other than between 22 and 23 channels. The channel selector, rotary switch S2a and S2b, has such mechanism that S2a moves one step at every four steps of S2b. The channel selector switch also has a neutral position between 22 and 23 channel and at that position common terminals are open circuited, making Q101 and Q102 oscillation stop, resulting in no transmit and receive operation.

Q104 is a 11.275 mHz oscillator circuit for transmit and Q110 is a 11.730 mHz oscillator circuit for receive operation. The power supply to both circuits will be closed or opened by the relay which in turn is controlled by the push-to-talk switch on the microphone. Thus, one of two circuits is always being operated.

TRANSMISSION

The power line to the Q104, Q105, Q106, Q107 and Q1 will be closed by the relay when the push-to-talk switch is depressed and the transmitter circuits will operate. When the channel selector switch (S2abc) is placed in CH1 position, the 23.290 mHz and 14.950 mHz crystal will be connected to the base of Q101 and Q102 respectively. These two frequency voltages are fed to the first mixer Q103 through C161 and C156 respectively and converted into 38.240 mHz as follows:

1st Mixer: 23.290 + 14.950 = 38.240 MHz
(L101 is a 23 mHz band oscillator coil.)

Thus obtained, the 38.240 mHz voltage is then added to the 2nd Mixer Q105 through a 38 mHz tuned-circuit consisting of C164, L102, C168, L103, C167 and L104 and a coupling capacitor C170. While Q104 is being oscillated, as previously stated at a frequency of 11.275 mHz this is also fed to the 2nd Mixer, thus two frequencies are converted into the 26.965 mHz transmitting frequency.

2nd Mixer: 38.240 - 11.275 = 26.965 mHz

This 26.965 mHz signal is then amplified by Q106, Q107 and Q1 to the required level for transmission. (L105, L106, L107, L108/C183, L109/C186 and C187 are 27 mHz band filter coils. L110 L111, C190 and VC-2 constitute a pi-type filter for antenna impedance matching.)

When the channel selector switch is placed in the CH2, CH3 or CH4 position, Q102 will oscillate at 14.960 mHz, 14.970 mHz or 14.990 mHz respectively, while Q101 will continuously oscillate at the same frequency, 23.290 mHz, during the above four switch positions.

When the channel selector switch is placed in the CH5 position, Q102 oscillates at a frequency of 14.950 mHz due to the previously stated switching mechanism of S2a and S2b. On the other hand, Q101 changes its oscillating frequency from 23.290 mHz to 23.340 mHz. Then both frequencies are fed to the first Mixer and converted into the following frequency.

1st Mixer: 23.340 + 14.950 = 38.290 mHz

The resulting 38.290 mHz output is fed to the 2nd Mixer as previously described and converted into the CH5 transmitting frequency.

2nd Mixer: 38.290 – 11.275 = 27.015 mHz
(CH5 transmitting frequency)

In a similar manner, each channel frequency will be made as follows!

CH5 23.340 + 14.950 - 11.275 = 27.015 mHz
CH6 23.340 + 14.960 - 11.275 = 27.025 mHz
CH7 23.340 + 14.970 - 11.275 = 27.035 mHz
CH8 23.340 + 14.990 - 11.275 = 27.055 mHz

CH22 23.540 + 14.960 - 11.275 = 27.225 mHz
CH23 23.540 + 14.990 - 11.275 = 27.255 mHz

NOTE

Capacitors, C171 and C198, are inserted to compensate the spread of crystal frequency and they may not be used in some models.

RECEPTION

In reception mode, the power supply to transistors Q104 - Q107 and Q1, is cut off by the relay circuit and the transmitter stops its operation. On the other hand, the power is supplied to transistors, Q108 - Q112 (IC101, Q118 and Q118 are also to be powered through the S2, noise blanker switch at the same time), thus the receiver circuit is ready to operate.

When there is an input signal of 26.965 mHz (CH1) on the antenna circuit with the channel selector switch in CH1 position, the signal will be fed to the Q1 collector through the pi-type filter circuit consisting of L111, L110, C190 and VC2 (antenna impedance matching circuit). Q1 collector signal is then fed to the Q108 base-grounded amplifier through series-tuned 27 mHz circuit (C101 and L112) and amplified. This output is finally fed to the Q109 Mixer base through L113 27 mHz tuned circuit.

Q109 is a mixer. A38.240 mHz signal is also added to the base of this transistor. Thus the first IF frequency, 11.275 mHz will be made as below.

1st IF frequency: 38.240 – 26.965 = 11.275 mHz

This 11.275 mHz signal is then applied to the mixer diode D109 and D110 through L114 and L115 IF tuned-circuit. At the same time 11.730 mHz signal from Q110 is applied to D109 and D110 through C127, R187 and L116 and the two signals are converted into 455 kHz 2nd IF frequency.

2nd IF frequency: 11.730 – 11.275 = 0.455 mHz

This 455 kHz IF signal is then fed to the L117, L118 455 kHz IF coil, mechanical filter, Q111, Q112, L119 detector coil and finally D106 detector. In this way audible sound will be obtained.

D101 is a switching diode which shorts the receiver input circuit during transmission operation.

D102 is a signal overload protector. R121, R122, R120, D108, R118, R119, D103 and C119 constitute automatic noise limiter.

D104 and D107 are rectifiers to obtain DC voltages for meter drive in both transmit and receive operation.

In a similar way, input signals on other channels will be detected into audible signals as follows:

CH1 23.290 + 14.950 = 38.240 mHz - 26.965 mHz = 11.275 - 11.730 mHz = 455 kHz
CH2 23.290 + 14.960 = 38.250 mHz - 26.975 mHz = 11.275 - 11.730 mHz = 455 kHz
CH3 23.290 + 14.970 = 38.260 mHz - 26.985 mHz = 11.275 - 11.730 mHz = 455 kHz
CH4 23.290 + 14.990 = 38.280 mHz - 27.005 mHz = 11.275 - 11.730 mHz = 455 kHz

↓ ↓ ↓ ↓ ↓ ↓ ↓

CH22 23.540 + 14.960 = 38.500 mHz - 27.225 mHz = 11.275 - 11.730 mHz = 455 kHz
CH23 23.540 + 14.990 = 38.530 mHz - 27.255 mHz = 11.275 - 11.730 mHz = 455 kHz

AUDIO CIRCUIT

The audio circuits consist of a microphone amplifier Q115, preamplifier (for receive) Q114, driver Q116, "B" Class power amplifier Q2/Q3 and squelch transister Q113. The relay also controls the power source to these transistors: Q115 is powered only in transmit operation and Q114/Q113 in receive operation.

In transmit operation, the audio signals from microphone will be amplified through the following path: C132→Q115→C138, R143→Q116→T101→Q2/Q3→T2. The amplified signal obtained from the secondary coil of T2 is then fed to the Q107 and Q1 collector circuit through the relay circuit. At the same time, the power source will also be applied to these transistors, during transmit operation, thus the audio signal will modulate the RF carrier.

RANGE BOOST CIRCUIT

Apart of the output is rectified by D105 and its DC output is applied to the emitter emitter of Q115, decreasing the gain of Q115. Thus overmodulation due to excessive high signal input will be avoided.

In reception, the audio signal is fed to the following circuits: Volume -- C142 -- R154 -- Q114 -- R142/C137 -- Q116 -- T101 -- Q2/Q3 -- T2 -- C143 -- and finally drives the loud speaker.

PA VOLUME CONTROL CIRCUIT

The audio output and DC power voltage are provided on the PC board (35) terminal, EPO-584A. These outputs are then filtered by the R103C, R102C and C104C to obtain the DC output only. This DC output, then, makes the Diode D112 conductive, current flowing to the ground through D112 and R101C. The microphone output is thus connected to the volume control through the diode D112, C103C and C105C. In this way the sound output can be controlled in the range of about 10 - 15 db in PA operation.

NOISE BLANKER CIRCUIT

The noise blanker is a circuit which silences undesirable impulse noises by disabling the receiver circuit for a very short time for which the impulse is being applied to the antenna circuit. This will be done by detecting the incoming pulse noises.

In receive operation, placing the Noise Blanker switch in ON position will supply power source to Q117 and Q118, and the noise blanker circuit will operate.

To detect the impulse noises, frequency components of about 25 mHz will be used in this receiver. (Generally the frequency which is close to 27 mHz but not used in the transceiver is selected. Since if 27 mHz is used to detect the pulse noises, the noise blanker circuit will be actuated by the main 27 mHz signals.)

L122/C107B and L121/301B are tuned to the frequency of 25 mHz L120 and C116B are a trap circuit which protects the 27 mHz main signal from entering to the noise blanker circuit.

When there is an incoming impulse-noise, the frequency components of about 25 mHz in the pulse will be led to IC101 through VC101, C116B/L120 and C301B/L121 and the resulting output is then led to the C107B/L122.

The signal from the secondary coil of L122 is then applied to the diode D111 and detected. The output is, then differenciated by R102B and C108B, and its output is further led to the Q117 through C109B. The amplified output is finally led to the Q118 through C118 and a negative pulse is obtained at the collector of Q118.

Thus obtained, the negative pulse is applied to the second local oscillator through a time constant circuit consisting of C113B and R106B and a resistor R107B, thus cutting off the second local oscillator 11.730 mHz. The cut-off time (the time for which the receiver is selenced) depends upon the time-constant of the C113B and R106B, in this transceiver it is selected as 1000pf x 8.2 ohm = 8u sec.

VOLTAGE CHART

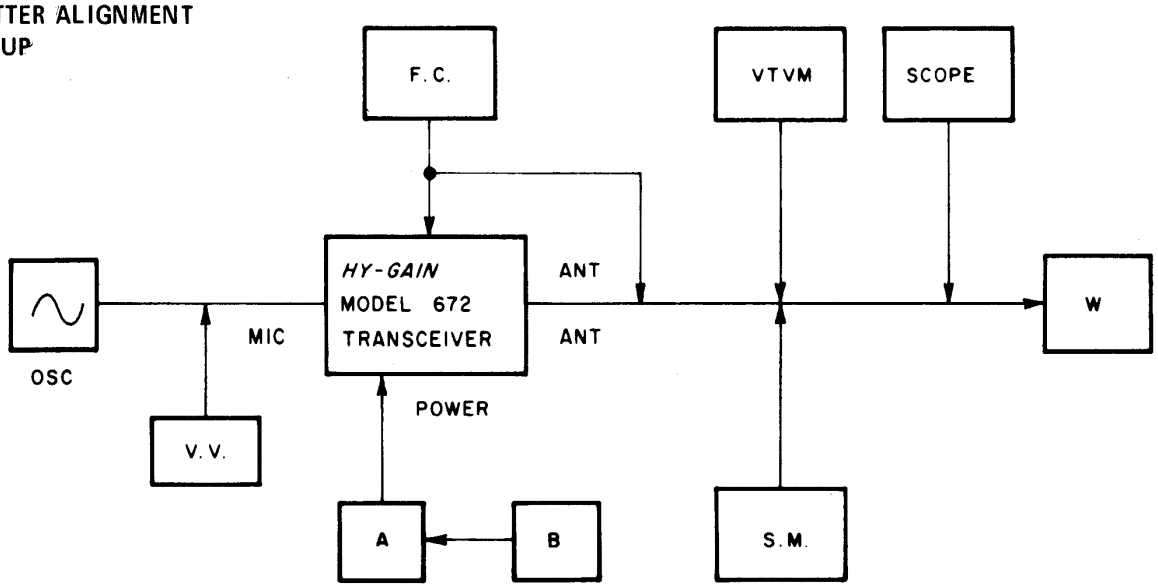
Transistor	Emitter (V)	Base (V)	Collector (V)
Q 1	0	- 0.46*	11.5 *
Q 2, 3	0.07	0.65	12.5
Q101	3.8	4.6	10.0
Q102	2.3	2.9	10.5
Q103	2.7	3.5	10.1
Q104	2.8 *	3.4 *	12.0 *
Q105	0.8 *	1.3 *	12.5 *
Q106	0.6 *	1.2 *	12.0 *
Q107	0	- 0.07 *	10.5 *
Q108	0.9	1.5	11.5
Q109	0.8	1.4	11.0
Q110	2.8	3.4	11.5
Q111	0.8	1.4	12.0
Q112	0.9	1.5	11.5
Q113	0	-0.1 (0.6)	9.0 (0.2)
Q114	2.6	3.2	6.7
Q115	2.3 *	2.9 *	7.0 *
Q116	1.6	2.2	11.0
Q117	0.55	0.6	5.0
Q118	0	0.2	4.5

* Volts at transmit condition
( ) Squelch on

SECTION IV

ALIGNMENT PROCEDURES

TRANSMITTER ALIGNMENT TEST SET-UP



OSC	Audio Signal Generator
V.V.	Audio Level Meter, 1 mV measurable
A	DC Ampere-Meter
B	DC Power Supply
F.C.	Frequency Counter, 0 - 40 mHz
VTVM	RF Volt Meter
SCOPE	Oscilloscope, 30 mHz
SM	Spurious Meter, 27 mHz band, built-in B.E.F. 1 mV measurable
W	Power Meter, 50 ohm, 50W, thermo-couple type

NOTE

When connecting DC ampere-meter, cut a jumper wire (RFC-102) and connect the meter between the both ends of jumper wire. After removing the meter, solder the jumper wire as is. It is recommendable to connect a RF coil/by-pass capacitor in series with the meter.

23 mHz OSCILLATOR CIRCUIT ALIGNMENT

Place the **channel selector in 13CH position.** Slowly rotate L101 core in direction from top **to bottom until the oscillator** just begins to oscillate. This oscillation starting point **will be indicated by** a rapid increase of Q101 emitter voltage (A DC voltmeter **should be connected** between Q101 emitter and chassis ground during this alignment). **Further rotate the** L1 core 1/2 turn in the same direction (clockwise) from that **oscillation starting** point. Finally make sure the oscillating frequency is **within ± 300 Hz** from the standard oscillating frequency (crystal frequency).

15 mHz OSCILLATOR CIRCUIT CHECK

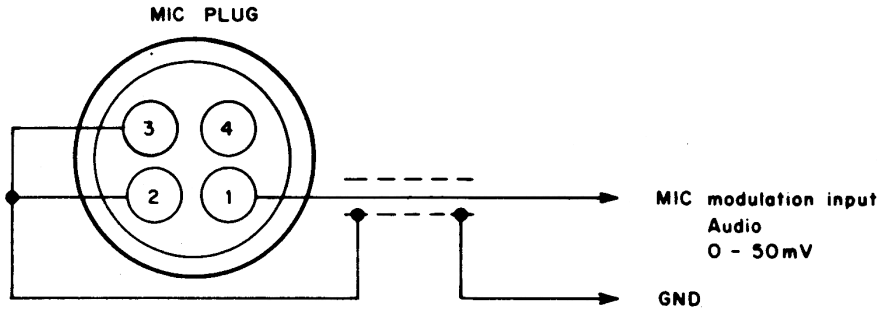
Make sure oscillating **frequency** of Q102 is within ± 300 Hz of the specific frequency.

FIRST MIXER, 38 mHz ALIGNMENT

Connect an oscilloscope to the No. 24 terminal on the printed circuit board and adjust L102, L103 and L104 for maximum amplitude. (It is recommendable that this alignment will be performed in receive mode.)

SECOND MIXER, 27 mHz ALIGNMENT

Set the unit in transmit mode and adjust L105, L106, L107, L108, and L109 for maximum reading on the wattmeter. Moreover, check for no abnormal oscillation using oscilloscope. To set the unit in transmit mode, the following pad will be used.



FINAL STAGE ALIGNMENT

Adjust L110, L111 and VC2 for maximum power output but the collector current of Q1 does not exceed 38 OmA. Next, apply 1 kHz modulating signal to the microphone input terminal and check for normal modulation characteristics, using a oscilloscope.

MODULATION SENSITIVITY ALIGNMENT

Modulate the transceiver as in previous paragraph, feeding 10 mV audio signal and adjust RV103 for 100% modulation.

FREQUENCY CHECK

Set the unit in transmit condition and check transmitting frequency accuracy. Each channel frequency should be within ± 800 Hz from respective channel center frequency. When every channel has a same tendency of rising or falling frequency, they will be corrected within ± 300 or 400 Hz by removing or shorting the one of two capacitors connected to the crystal 101, in series. When the channel frequency of a given channel does not fall within ± 800 Hz, check crystal units according to the following table.

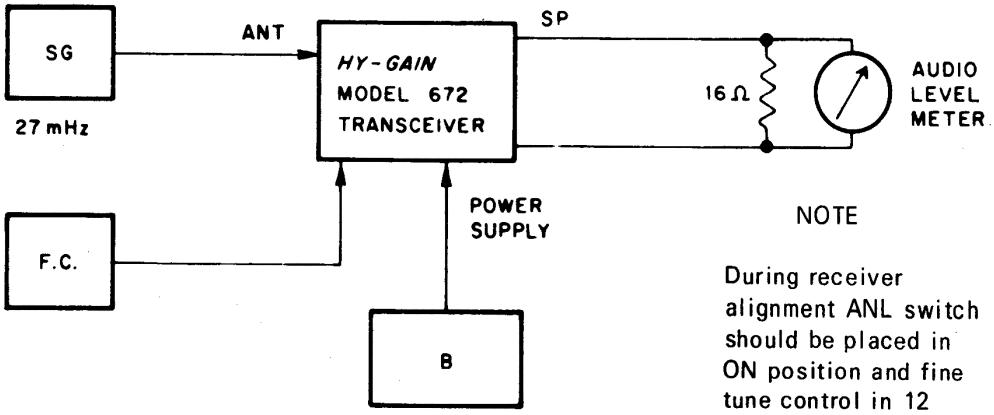
Defective Channel	Check
CH1 - 4	Crystal 201 23.290 mHz
CH5 - 8	Crystal 202 23.340 mHz
CH9 - 12	Crystal 203 23.390 mHz
CH13 - 16	Crystal 204 23.440 mHz
CH17 - 20	Crystal 205 23.490 mHz
CH21 - 23	Crystal 206 23.540 mHz
CH1,5,9,13,17,21	Crystal 207 14.950 mHz
CH2,6,10,14,18,22	Crystal 208 14.960 mHz
CH3,7,11,15,19	Crystal 209 14.970 mHz
CH4,8,12,16,20.23	Crystal 210 14.990 mHz

Connect a spurious meter to the antenna connector and adjust L1 (T.V.I.) for minimum 2nd harmonics (54 mHz) at no modulation.

P-RF METER ADJUSTMENT

Adjust RV104 so that the P-RF meter pointer indicates the same level as the reading of the wattmeter connected to the unit.

RECEIVER ALIGNMENT
TEST SET- UP



NOTE

During receiver alignment ANL switch should be placed in ON position and fine tune control in 12 o'clock position.

RECEIVER SENSITIVITY ADJUSTMENT

Connect a signal generator output, 27.115 mHz, 1 kHz 30% mod, to the receiver with the selector switch placed in 13CH position. Adjust L112, L113, L114, L115, MF, L117, L118 and L119 for maximum audio output.

SQUELCH ADJUSTMENT

Connect a level meter across the speaker terminal. Set signal generator attenuator to provide 74 db, 1 kHz, 30% mod. output and receive this signal. Set the squelch volume on the transceiver to minimum and note the level meter reading. Adjust RF101 so that the level meter reading is decreased by 6 db.

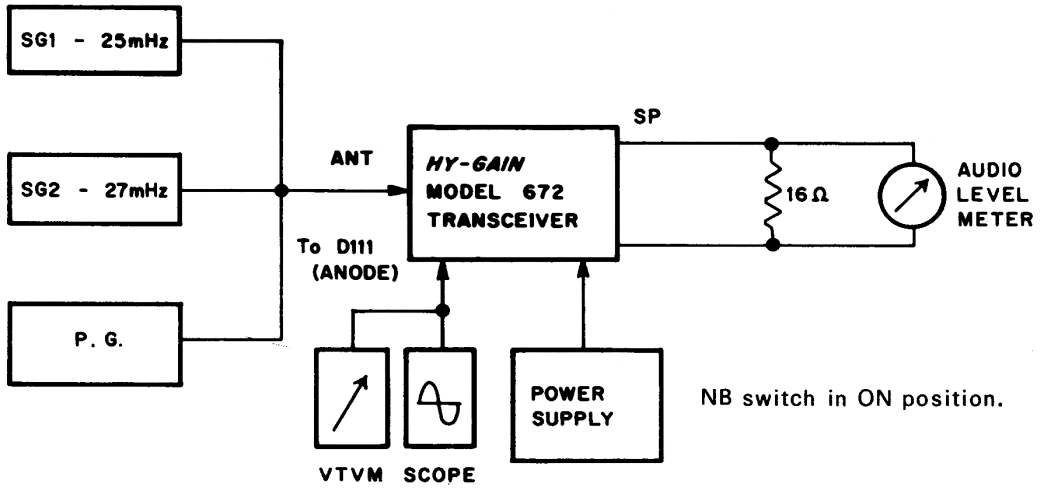
S-METER ADJUSTMENT

Adjust RV102 so that the meter pointer indicates "9" at the RF input signal of 40 db.

27 mHz TRAP COIL ALIGNMENT

Feed 27.105 mHz (1kHz, 30% mod.) signal from SG1 (SG2 & P.F.: no output) and adjust L120 for minimum amplitude of signal display on the scope connected to the anode of D111.

NOISE BLANKER CIRCUIT ALIGNMENT
TEST SET-UP



NB switch in ON position.

25 mHz ALIGNMENT

Feed 25 mHz (1 kHz, 30% mod.) signal from SG2 (SG1 & P.G.: no output) and adjust L121, L122 and VC101 for maximum amplitude of signal display on the scope.

NOTE

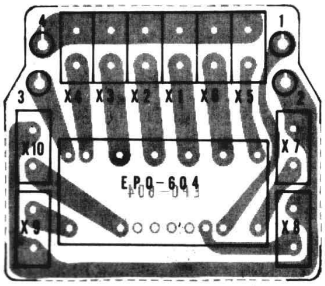
Since the alignments 3.2 and 3.3 are relating to the receiver sensitivity, check that these two alignments have been correctly performed when excessive lower sensitivity is obtained in the paragraph on Receiver Sensitivity Adjustment.

NOISE BLANKER ALIGNMENT

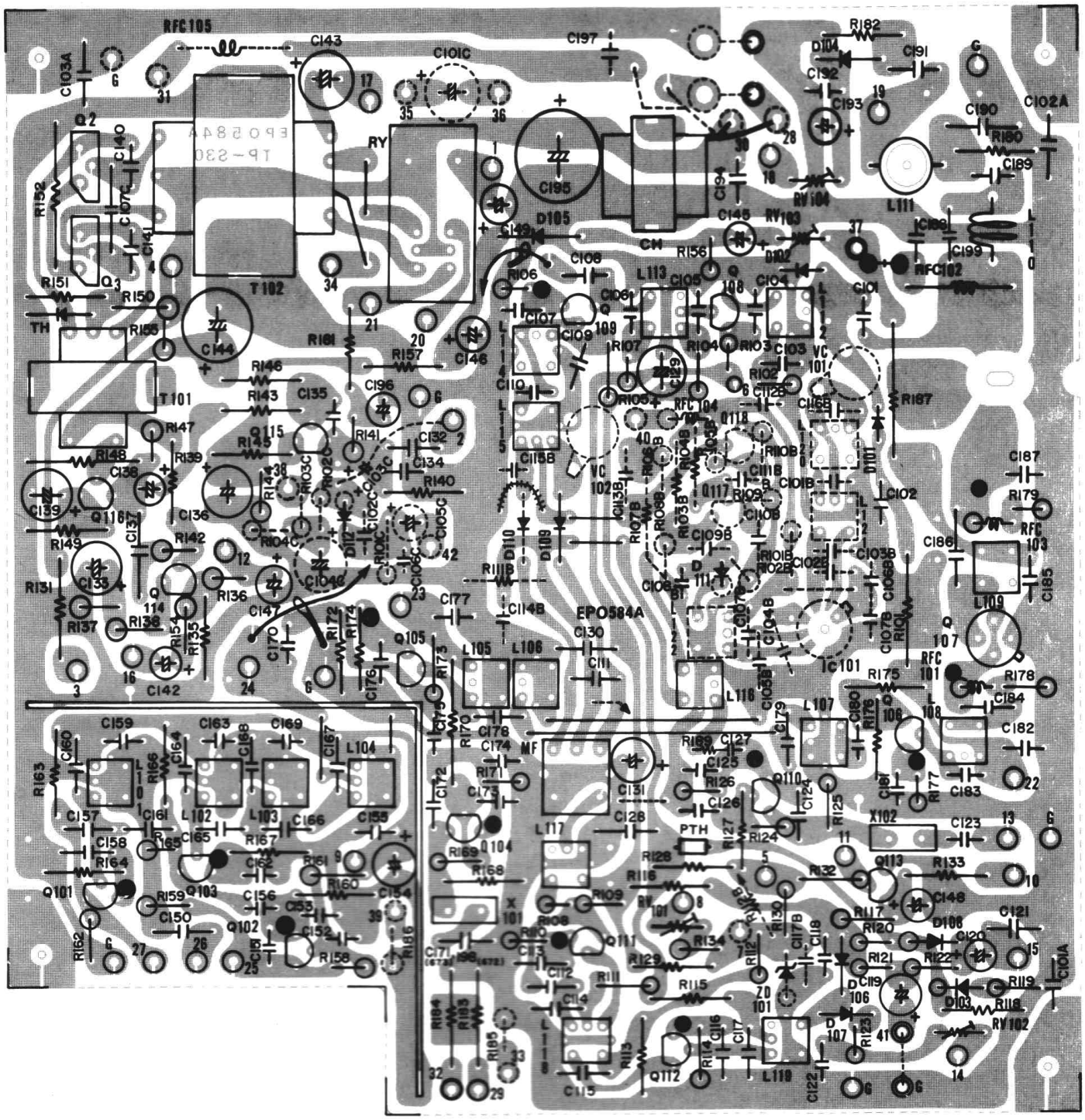
Place the channel selector in CH12. Set SG2 to 27.105 mHz, 1 kHz 30% mod. 6 db output. Also set the pulse generator to provide 0.2V P-P output. Adjust VC102 for minimum pulse-noise and beats from the loudspeaker.

NOTE

Adjusting the VC102 may shift the tuning frequency of L115, so repeat the procedure in Receiver Sensitivity Alignment after completion of this alignment.



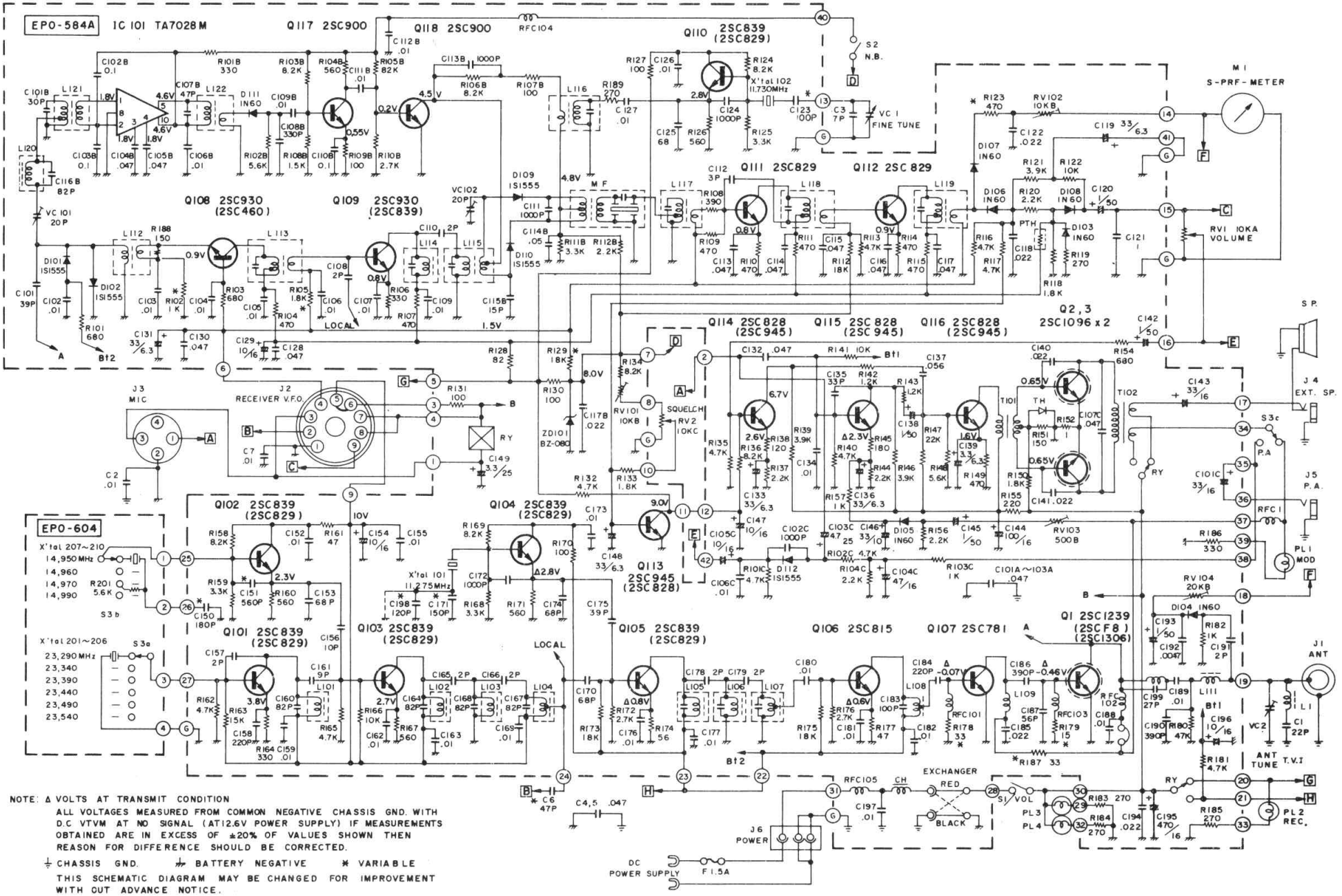
HY GAIN · 672 / 673



HY GAIN 672, 673

NOTE: 1. ALL PARTS INDICATED BY DOTTED LINE BE USED FOR ONLY MODEL 672 AND NOT USED FOR MODEL 673.

2. JUMPER WIRES INDICATED BY +++++ LINE WILL BE USED FOR ONLY MODEL 673.



NOTE: Δ VOLTS AT TRANSMIT CONDITION
ALL VOLTAGES MEASURED FROM COMMON NEGATIVE CHASSIS GND. WITH D.C VTVM AT NO SIGNAL (AT12.6V POWER SUPPLY) IF MEASUREMENTS OBTAINED ARE IN EXCESS OF ±20% OF VALUES SHOWN THEN REASON FOR DIFFERENCE SHOULD BE CORRECTED.

⏚ CHASSIS GND. ⏚ BATTERY NEGATIVE * VARIABLE

THIS SCHEMATIC DIAGRAM MAY BE CHANGED FOR IMPROVEMENT WITH OUT ADVANCE NOTICE.

SCHEMATIC DIAGRAM HY-GAIN 672

SECTION V

PARTS LIST

Parts Name	Description	Part No.	Symbol
Transistor	2SC-1239	EQS-86	Q1
Transistor	2SC-1096	EQS-89	Q2,3
Volume Control	EVHB8BK15A14	ERV-96	RV1/s1
Volume Control	EVHB8AK15C14	ERV-91	RV2
Speaker	EAS-12D51S	EAS-2	SP
Variable Condenser	ECV	ECV-30	VC1
Trimmer Condenser		ECV-7	VC2
Microphone		EAM-14	MIC
Meter		EMM-31	M1 PL4
Toggle Switch		EST-4	S2
Pilot Lamp		EZP-6	PL1,2,3
DC Cable		ENO-48	
T.V.I. Trap Coil		ETR-18	L1
ANT Jack		EZS-66	J1
V.F.O. Jack		EZS-89	J2
MIC. Jack		EZS-60	J3
Earphone Jack		EZS-56	J4,5
Power Jack		EZS-23	J6
Spkr Cord		ENO-13G	
Spkr Cord		ENO-13Y	
Ceramic Capacitor 22pF 50V	ECC-D05220K		C1
Ceramic Capacitor.01uf 50V	RD208YZ103P50		C2
Ceramic Capacitor 7pF 50V	ECC-D05070C		C3
Ceramic Capacitor.047uF50V	ECK-D05473ZV		C4,5
RF Choke Coil		ELR-11	RFC1
FCC Card		EBP-26	
FCC Label		EBP-40	
FCC Application Sheet		EBP-98	
Instruction Manual		EBP-243	
P.C. Board Complete		EC51-L3	
P.C. Board		EPO-584	
Transistor	2SC-829(B)	EQS-5	Q111,112
Transistor	2SC-839(H)	EQS-100	Q101-105,110
Transistor	2SC-828(S)	EQS-9	Q114,115,116
Transistor	2SC-945(P)	EQS-131	Q113
Transistor	2SC-815(K)	EQS-22	Q106
Transistor	2SC-781	EQS-57	Q107
Transistor	2SC-930(B)	EQS-139	Q108,109
Transistor	2SC-900(F)	EQS-78	Q117,118
Diode	1S1555	EDS-1	D101,102,109, 110,112
Diode	1N60	EDG-3	D103-108,111
Diode	BZ-080	EDZ-24	ZD101
Crystal	11.275MHZ	EXT-2	X'tal 101
Crystal	11.730MHZ	EXT-2	X'tal 102
Relay		EZR-6	RY
Posistor		EDP-1	PTH
Thermistor		EDT-15	TH
Input Transformer		ETA-41	T101

Parts Name	Description	Part No.	Symbol
Output Transformer		ETA-42	T102
Audio Choke Coil		ELA-2	CH
Heat Sink (2SC781)		MYO-8	
Shield Plate		MC45P6	
Test Pin		MYO-128	
Tie Point		MYO-9	
Polarity Changer		EZS-25	
Lead Wire W/Pin Plug		ENO-40B	
Lead Wire W/Pin Plug		ENO-40R	
Mechanical Filter		EFC-3	M.F.
Trimmer Capacitor		ECV-9	VC101,102
RF Choke Coil		ELR-11	RFC105
RF Choke Coil		ELR-4	RFC101-104
Potentiometer 100KB 2-leg	EVL-T5AA00B14		RV101
Potentiometer 500KB 2-leg	EVL-T5AA00B52		RV103
Potentiometer 5KB 2-leg	EVL-T5AA00B53		RV102
Potentiometer 200KB 2-leg	EVL-T5AA00B24		RV104
OSC Coil		ETR-247	L101
RF Coil		ETR-248	L102,103
RF Coil		ETR-249	L104
RF Coil		ETR-30	L105,106
RF Coil		ETR-31	L107
RF Coil		ETR-22	L108
RF Coil		ETR-197	L109
RF Coil		ETR-17	L110
RF Coil		ETR-232	L111
ANT Coil		ETR-194	L112
RF Coil		ETR-104	L113
RF Coil		ETR-255	L114
RF Coil		ETR-256	L115
RF Coil		ETR-255	L116
IF Coil		ETI-16	L117
IF Coil		ETI-17	L118
IF Coil		ETI-18	L119
RF Coil		ETR-257	L120
RF Coil		ETR-258	L121
RF Coil		ETR-259	L122
I.C.	TA7028M	EICM-19	IC101
Carbon Resistor ¼W 680 ohm	ERD-14TJ681		R101,103,154
Carbon Resistor ¼W 2.2Kohm	ERD-14TJ222		R102,120,139, 144,156,157,
Carbon Resistor ¼W 470 ohm	ERD-14TJ471		R104,107,109, 110,149,111, 114,115,123
Carbon Resistor ¼W 1.8Kohm	ERD-14TJ182		R105,118,133, 156
Carbon Resistor ¼W 330 ohm	ERD-14TJ331		R106,164
Carbon Resistor ¼W 390 ohm	ERD-14TJ391		R108
Carbon Resistor ¼W 18Kohm	ERD-14TJ183		R112,129,173, 175
Carbon Resistor ¼W 4.7Kohm	ERD-14TJ472		R113,116,117, 132,141,135 140,162,165

Parts Name	Description	Part No.	Symbol
Carbon Resistor ¼W 3.9Kohm	ERD-14TJ392		R131,134,146
Carbon Resistor ¼W 10Kohm	ERD-14TJ103		R122,141,166
Carbon Resistor ¼W 8.2Kohm	ERD-14TJ822		R124,134,136, 158,169
Carbon Resistor ¼W 3.3Kohm	ERD-14TJ332		R125
Carbon Resistor ¼W 560 ohm	ERD-14TJ561		R126,160,169, 171
Carbon Resistor ¼W 100 ohm	ERD-14TJ101		R127, 170
Carbon Resistor ¼W 82 ohm	ERD-14TJ820		R128
Solid Resistor ½W 100 ohm	ERC-12GK101		R130,131,184
Carbon Resistor ¼W 120 ohm	ERD-14TJ121		R138
Carbon Resistor ¼W 1.2Kohm	ERD-14TJ122		R142,143
Carbon Resistor ¼W 180 ohm	ERD-14TJ181		R145
Carbon Resistor ¼W 2.3Kohm	ERD-14TJ223		R147
Carbon Resistor ¼W 5.6Kohm	ERD-14TJ562		R148
Carbon Resistor ¼W 220 ohm	ERD-14TJ221		R151,155
Metal Oxide Resistor 1W, 0.8ohm	ERX-IANJOR8		R152
Carbon Resistor ¼W 1Kohm	ERD-14TJ102		R153,182
Carbon Resistor ¼W 3.3Kohm	ERD-14TJ332		R159,168
Carbon Resistor ¼W 47 ohm	ERD-14TJ370		R161,197
Carbon Resistor ¼W 15Kohm	ERD-14TJ153		R163
Carbon Resistor ¼W 2.7Kohm	ERD-14TJ272		R172,176
Carbon Resistor ¼W 56 ohm	ERD-14TJ560		R174
Carbon Resistor ¼W 68 ohm	ERD-14TJ680		R178
Carbon Resistor ¼W 33 ohm	ERD-14TJ330		R179
Carbon Resistor ¼W 47Kohm	ERD-14TJ473		R180
Solid Resistor ½W 270 ohm	ERC-12GK271		R183,185
Solid Resistor ½W 330 ohm	ERC-12GK331		R186
Carbon Resistor ¼W 330 ohm	ERD-14TJ331		R101B
Carbon Resistor ¼W 5.6Kohm	ERD-14TJ562		R102B
Carbon Resistor ¼W 8.2Kohm	ERD-14TJ822		R103B
Carbon Resistor ¼W 560 ohm	ERD-14TJ561		R104B
Carbon Resistor ¼W 82Kohm	ERD-14TJ823		R105B
Carbon Resistor ¼W 8.2Kohm	ERD-14TJ822		R106B
Carbon Resistor ¼W 100 ohm	ERD-14TJ101		R107B,109B
Carbon Resistor ¼W 2.7Kohm	ERD-14TJ272		R110B
Carbon Resistor ¼W 3.3Kohm	ERD-14TJ332		R111B
Carbon Resistor ¼W 2.2Kohm	ERD-14TJ222		R112B
Carbon Resistor ¼W 4.7Kohm	ERD-14TJ472		R101C,102C
Carbon Resistor ¼W 1Kohm	ERD-14TJ102		R103C
Carbon Resistor ¼W 8.2Kohm	ERD-14TJ822		R104C
Ceramic Capacitor 39pF 50V	ECC-D05390K		C101,105
Ceramic Capacitor.01uF 50V	RD208YZ103P50		C102-107,109,126 134,153,173,176, 179,180,181,182, 189,155,159,162, 163,169,188,199
Ceramic Capacitor 27pF 50V	ECC-D0527OK		C108
Ceramic Capacitor 2pF 50V	ECC-D05020C		C110
Styroflex Capacitor 1000pF	ECQ-S1102KX		C111
Ceramic Capacitor 3pF 500V	ECC-D5030C		C112
Ceramic Capacitor.047uF 25V	DD624BC473M25		C113-117,121, 128,130,132

Parts Name	Description	Part No.	Symbol
Ceramic Capacitor.0022uF 50V	RD209YZ223P50		C118,122
Elyt. Capacitor 33/6V	ECE-A6V33N		C119,131,133, 136,139,148
Elyt. Capacitor 1/50V	ECE-A50V1N		C120,132,142, 143,145
Mylar Capacitor.001uF 50V	ECQ-M05102KZ		C124,151,172
Ceramic Capacitor 68pF 50V	ECC-D05680K		C125,123,153, 194
Ceramic Capacitor 56pF 50V	ECC-D05560K		C127,187
Elyt. Capacitor 10/16V	ECE-A16V10N		C129,147,154, 146
Ceramic Capacitor 33pF 50V	ECC-D05330K		C135
Mylar Capacitor.056uF 50V	ECQ-M05563KZ		C137
Ceramic Capacitor.022uF25V	DD610BC223M25		C140,141
Elyt. Capacitor 33/16V	ECE-A16V33N		C143
Elyt. Capacitor 100/16V	ECE-A16V100N		C144
Elyt. Capacitor 33/10V	ECE-A10V33N		C145
Elyt. Capacitor 3.3/25V	ECE-A25V3R3N		C149
Ceramic Capacitor 270pF 50V	ECC-D05271K		C150,171
Ceramic Capacitor 10 pF 50V	ECC-D05100K		C156
Ceramic Capacitor 2pF 500V	ECC-D5020C		C157,165,166, 178,179,141
Ceramic Capacitor 220pF 50V	ECC-D05221K		C158,184
Ceramic Capacitor 82pF 50V	ECC-D05820K		C160,164,168, 169
Ceramic Capacitor 9pF500V	ECC-D5090D		C161
Ceramic Capacitor 100pF 50V	ECC-D05101K		C183
Ceramic Capacitor.022uF 50V	RD209YZ223P50		C185,194
Ceramic Capacitor 390pF 50V	ECC-D50391K		C186,190
Ceramic Capacitor.0047uF 50V	RD204YZ472P50		C192
Elyt. Capacitor 470/16V	ECE-A16V470L		C195
Ceramic Capacitor.047uF 50V	RD209YM473P50		C101A-103A
Ceramic Capacitor 38pF 50V	ECC-D0533OKZ		C101B
Ceramic Capacitor .1uF 12V	DD600-450BC104M12		C102B,103B, 110B
Ceramic Capacitor.047uF 25V	DD624BC473M25		C104B,105B
Ceramic Capacitor .01uF 50V	RD208YZ103P50		C106B,107B, 111B,112B
Ceramic Capacitor 56pF 50V	ECC-D05560KZ		C107B
Styroflex Capacitor 330pF	ECQ-S1331KX		C108B
Mylar Capacitor 1000pF	ECQ-M05102KZ		C113B
Ceramic Capacitor .05uF 12V	DD601-450BC503M12		C114B
Ceramic Capacitor 15pF 50V	ECC-D0515OK		C115B
Ceramic Capacitor 82pF 50V	ECC-D05820KZ		C116B
Ceramic Capacitor.0022uF 50V	RD209YZ223P50		C117B
Elyt. Capacitor 33/16V	ECE-A16V33N		C101C
Ceramic Capacitor 330pF 50V	ECC-D05331K		C102C
Elyt. Capacitor 10/16V	ECE-A16V10N		C103C,105C
Elyt. Capacitor 47/16V	ECE-A16V47N		C104C
Ceramic Capacitor.001uF 50V	RD200YZ102P50		C106C
Ceramic Capacitor.01uF 50V	RD208YZ103P50		C107C
P.O. Board Completed		EC51-L4	

Parts Name	Description	Part No.	Symbol
P.C. Board		EPO-604	
Rotary Switch		ESR-126	S3a,b,c
Tie Point		MYO-8	
Crystal 23.290MHZ		EXT-2	Xtal 201
Crystal 23.340MHZ		EXT-2	202
Crystal 23.390MHZ		EXT-2	203
Crystal 23.440MHZ		EXT-2	204
Crystal 23.490MHZ		EXT-2	205
Crystal 23.540MHZ		EXT-2	206
Crystal 14.950MHZ		EXT-2	207
Crystal 14.960MHZ		EXT-2	208
Crystal 14.970MHZ		EXT-2	209
Crystal 14.990MHZ		EXT-2	210
Front Panel Assembly		MC45A1	
Bracket (Front Panel)		MC45P1	
Chassis		MC45P2	
Cage (Upper)		MC45P3	
Cage (Lower)		MC45P4	
Channel Plate		MC45P5	
Bracket (Meter Hold)		MC45P6	
Bracket (Meter Mount)		MC45P7	
Mobile Mounting Bracket		MC45P8	
Indicator (Plastic)		MMO-133	
Indicator (Plastic)		MMO-168	
Lamp Holder (Rubber)		MWO-395	
Heat Sink		MYO-26	
Mylar Sheet for Tr.		MWO-104	
Mic. Clip		MYO-25	
Spkr Cap		MMO-18	
Bracket (Trimmer Mount)		MYO-29	
Knurled Screw		MMO-108	
CH Knob		MNO-115	
VR Knob		MNO-116	
Knob		MNO-117	
Felt (Sw. Masking)		MWO-359	
Serial Number Label		MC51B1	
Inner Carton		KC51P01	
Partioner		KC51P02	
Partioner		KC51P03	
Partioner		KC51P04	