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SERVICE INSTRUCTIONS

for

MODEL 671-PR

23 Channel CB Radio

Printed in USA

Printed April 17, 1974

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SECTION I

GENERAL INFORMATION

GENERAL DESCRIPTION

The Hy-Range Model 671 is a full 23-channel transceiver designed and licensed for Class "D" operation as designated by the F.C.C.

The Hy-Range 671 is completely solid state, and provides you with a compact unit of high reliability and low power consumption. This transceiver utitlizes 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 switch which reduces undesirable noises and a public address system which utilizes the microphone and the audio stages within the transceiver.

The Hy-Range 671 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 the 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 671 is wired to operate from a battery source of 11.5 to 14.5 VDC, 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 671 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.

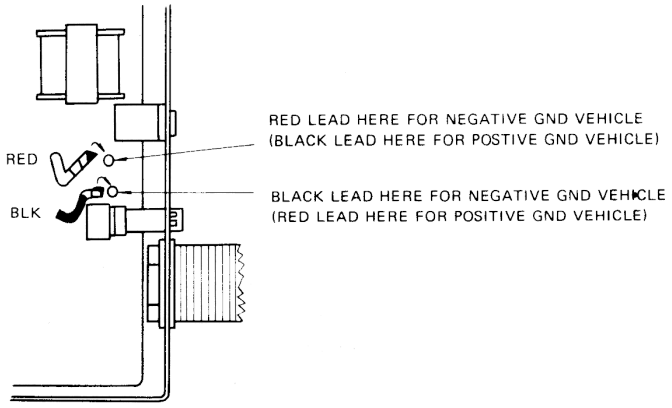
To remove, simply pull steadily on the lug. Interchange the two leads as indicated in the diagram and push each lug down over its assigned terminal.

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.

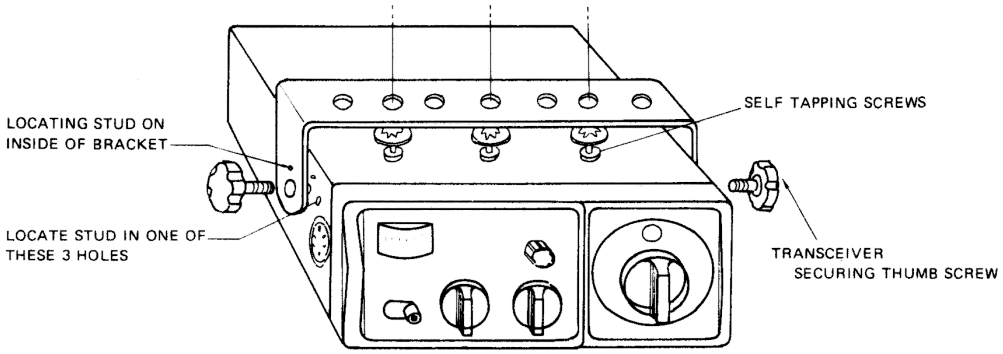
Tran sceiver Mounting - Before installing the transceiver in a car, truck, boat, etc., be sure to choose a location which is convenient to the operating controls, and will not interfere with the normal functions of the driver. The transceiver may be mounted to the underside of the instrument panel or 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 larg thumbscrews and lockwashers.



Internal Wiring Change for Positive Ground System

Figure 1



Transceiver Mounting

Figure 2

SPECIFICATIONS

CB Receiver Section

Circuit Type	Dual conversion superheterodyne with RF stage and 455 kHz ceramic filter
Frequency	23 crystal-controlled channels in the 27 mHz Citizens Band
Sensitivity	0.7 uV 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 100 mA on Standby (no signal)

CB Transmitter Section

Frequency	23 crystal-controlled channels in 27 mHz Citizens 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 amp
Antenna	Nominal 50 ohms impedance
Power Source	12 VDC, 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.

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

REAR PANEL

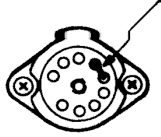
External Speaker (Ext. Sp.) Jack - This will be used for connection of an earphone or speaker having impedance of about 16 ohms. Insertion of an earphone or speaker plug into this jack automatically silences the internal speaker.

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

Antenna Connector - This antenna connector will be used for CB antenna connection, see antenna connection in this manual.

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

VFO Connection - 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, your transceiver will not operate.



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

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 speaker to the 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 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.

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

The Q4 (27 mHz band oscillator circuit), Q9 (14 mHz band oscillator circuit) and Q5 (Mixer) are always operated regardless of the receive and transmit mode. 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 this position common terminals are opened, making Q4 and Q9 oscillation stop. Therefore at this switch position, no receive and transmit operation will be performed. (This position is used for PA system control.)

Q10 is a 11.275 mHz oscillator circuit for transmit and Q18 is a 11.730 mHz oscillator circuit for receive operation. Both circuits are controlled by the push-to-talk switch on the microphone; one of two switching circuits of the push-to-talk switch cuts off or turns on the power line to the Q10 and Q18 and another controls the microphone output.

TRANSMISSION

The transistor Q6 (mixer for both 38 mHz and 11.275 mHz band) and Q7 (27 mHz band amp.) will be powered and operated when the push-to-talk switch is depressed. Q8 and Q1 are the 27 mHz band driver and power amplifier, respectively. However, since they are employing a "C" Class biasing system, they do not operate (transmit) even though the collector voltage is applied to each collector circuit until all pre-stage (Q4 - 7 and Q9, Q10) are operating and a proper level of 27 mHz signal is supplied to the base of Q8. When the channel selector switch (2abc) is placed in CH1 position, 23.290 mHz and 14.950 mHz crystals will be connected to the base of Q4 and Q9 respectively. These two frequency voltages are fed to the first mixer Q5 through C5 and C6 respectively and converted into 38.240 mHz as follows:

1st Mixer: 23.290 + 14.950 = 38.240 mHz

(L1 is a 23 mHz band oscillator coil, L2, L3, & L4 38 mHz filter coils.)
This 38.240 mHz voltage is then added to the 2nd Mixer Q6. While Q10 is being oscillated, as previously stated, with frequency of 11.275 mHz and this is also fed to the 2nd Mixer, these 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 Q7, Q8, and Q1 to the required level for transmission. (L5, L6, L7, L8 and L9 are 27 mHz band filter coils. L10, L11, C31 and C32 constitutes a pi-type filter for antenna impedance matching.)

When the channel selector switch is placed in the CH2, CH3 or CH4 position, Q9 will oscillate at 14.960 mHz, 14.970 mHz or 14.990 mHz respectively, while Q4 will continuously oscillate in the same frequency, 23.290 mHz, during the above four switch positions.

When the channel selector switch is placed in the CH5 position, Q9 oscillates a frequency of 14.950 mHz due to the previously stated switching mechanism of S2a and S2b. On the other hand, Q4 changes its oscillating frequency from 23.290 mHz to 23.340 mHz. Then both frequencies are led 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, then, fed to the 2nd Mixer as previously described and converted into the CH5 transmitting frequency.

2nd Mixer: 38.290 - 11.275 = 27.015 mHz

In the 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			
↓	↓	↓	↓	↓
CH22	23.540	14.960	11.275	27.225 mHz
CH23	23.540	14.990	11.275	27.255 mHz

NOTE

Capacitors C41A and C41B 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 Q6, Q7 and Q10 is cut off, and the transmitter stops its operation. On the other hand, the power is supplied to transistors, Q18, 11.730 mHz receiver local oscillator and to the voltage regulation diode D1 which in turn supplies its regulated voltage to the base of Q11, Q12, Q13 and Q14, thus the receiver circuit will be 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 L10, L11, C31 and C32 (antenna impedance matching circuit).

Q1 collector output is then fed as follows:

Q1 collector -- 27 mHz band tank circuit C46/L13 -- Q11 base-ground amplifier -- L14 27 mHz tank circuit -- Q12 base.

Q12 is a mixer. A 38.240 mHz signal is also be added to the base of this transister. 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 D2 through L15 and L16 IF tuned-circuit. At the same time a 11.730 mHz signal from Q18 is applied to D2 through C56 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 L17 455 kHz IF coil, ceramic filter, Q13, L18, Q14, L19 detector coil and finally D3 detector. In this way audible sound will be obtained.

D10 is a switching diode which shorts the receiver input circuit during transmission operation.

D11 is a signal overload protector. R47, R48, R49, R50, R51, D5 and C65 constitute automatic noise limiter.

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 = 455kHz
CH23 23.540 + 14.990 = 38.530 mHz − 27.255 mHz = 11.275 − 11.730 mHz = 455kHz

AUDIO AMPLIFIER

The audio amplifier consists of Q16 pre-amplifier, Q17 driver, Q2/Q3 "B" Class power amplifier and Q15 squelch circuit.

In transmit operation, the microphone output is applied to the audio amplifier (Q16, Q17, Q2, Q3) and the resultant output is fed to the collectors of Q8 and Q1 through secondary coil of output transformer T2 and switching diode D9 and modulated. D6 is an AGC diode by which a part of output is rectified to supply AGC voltage to the emitter of Q16 (Range Boost Circuit). D12 is a buffer diode which protects the transmitter circuit from the influence of the receiver circuit impedance variation; This is done by reverse-biasing D12 during transmit operation.

In receive operation D12 will be forward-biased and the receive-signal will be fed to the base of Q16 through C80, D12 & C79 and amplified. The resulting output is applied to the loudspeaker.

Since the base bias of Q15 is supplied only during receive operation, the squelch circuit will only operate in reception mode.

VOLTAGE CHART

Transistor	Emitter (V)	Base (V)	Collector (V)
Q 1	0	-0.2 *	10.2 *
Q 2	0.07	0.6	12.5
Q 3	0.07	0.6	12.5
Q 4	3.4	4.0	10.7
Q 5	2.8	3.4	10.1
Q 6	0.85*	1.3 *	12.5 *
Q 7	0.63*	1.2 *	12,5 *
Q 8	0	-0.1 *	9.0 *
Q 9	2.3	2.8	10.0
Q10	2.3 *	3.2 *	11.8 *
Q11	0.6	1.2	12.0
Q12	0.55	1.1	11.2
Q13	0.6	1.2	12.0
Q14	0.65	1.25	11.5
Q15	0	-0.1	8.0
		(0.6)	(0.1)
Q16	2.3	2.9	10.8
Q17	2.0	2.6	10.7
Q18	2.3	3.2	11.8

* Volts at transmit condition

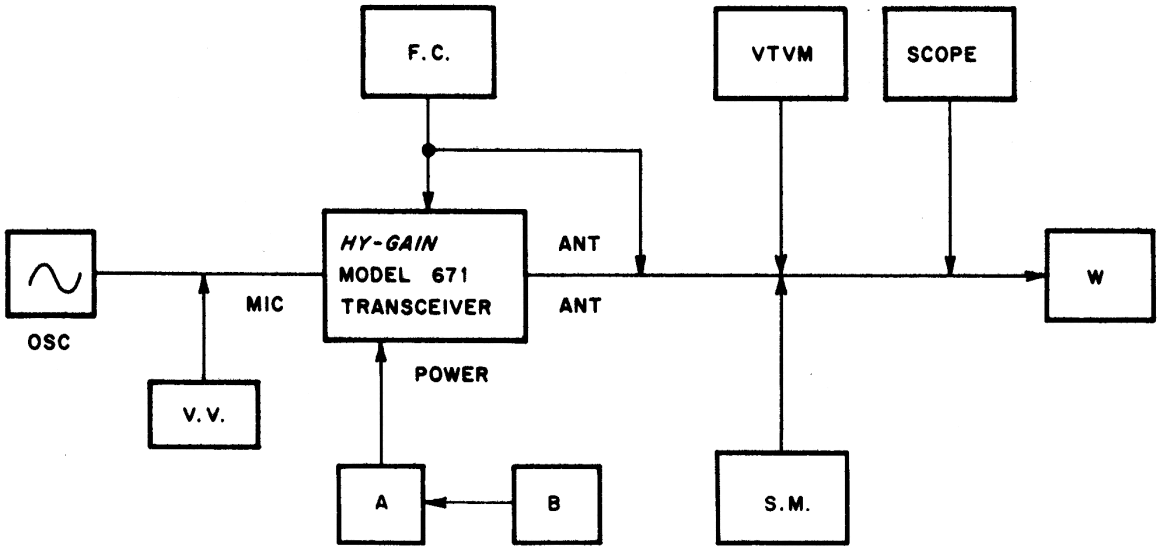
( ) Squelch on

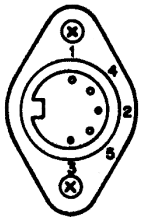
SECTION IV

ALIGNMENT PROCEDURES

TRANSMITTER ALIGNMENT

TEST SET-UP





MIC JACK
Front View

OSC	Audio Signal Generator
V.V.	Audio Level Meter, 1mV 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, 50 W, thermo-couple type

To set the transceiver to transmit mode, connect No. 2 and No. 3 PIN terminals of the DIN type MIC jack to each other by using a wire. When applying modulating signal (MIC input signal), to the unit, connect the signal between the No. 1 and No. 4 (chassis ground) PIN terminals.

23 mHz OSCILLATOR CIRCUIT ALIGNMENT

Place the channel selector in 13CH position. Slowly rotate L1 core in direction from top to bottom until the oscillator just begin to oscillate. This oscillation starting point will be indicated by a rapid increase of Q4 emitter voltage (A DC voltmeter should be connected between Q4 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 Q9 is within ± 300 Hz of the specific frequency.

MIXER, 38 mHz ALIGNMENT

Connect an oscilloscope to the No. 20 terminal on the printed circuit board and adjust L2 - L4 for maximum amplitude.

MIXER, 27 mHz ALIGNMENT

Set the unit in transmit mode and adjust L5, L6, L7, L8 and L9 for maximum reading on the watt-meter. Moreover check for no abnormal oscillation using oscilloscope.

FINAL STAGE ALIGNMENT

Adjust L10 and L11 for maximum power output but the total current does not exceed 750 mA. Next, apply 1 kHz modulating signal to the microphone input terminal and check for normal modulation characteristics, using a oscilloscope.

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 in 300 or 400 Hz by removing or shorting the one of two capacitors connected to the crystal 11, 11.275 mHz, in series. When the channel frequency of a given channel does not fall within ± 800 Hz, check crystal units according to the following table.

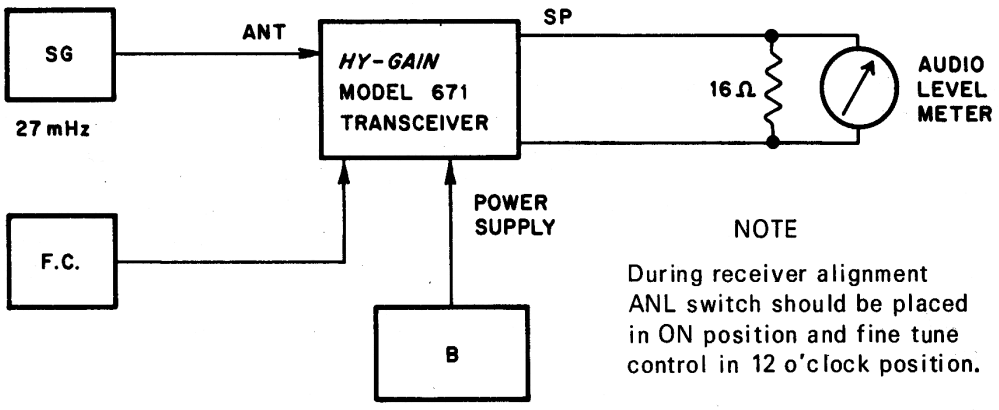
Defect Channel	Check
CH 1 - 4	Crystal 1 23.290 mHz
CH 5 - 8	Crystal 2 23.340 mHz
CH 9 - 12	Crystal 3 23.390 mHz
CH 13 - 16	Crystal 4 23.440 mHz
CH 17 - 20	Crystal 5 23.490 mHz
CH 21 - 23	Crystal 6 23.540 mHz
CH 1, 5, 9, 17, 21	Crystal 7 14.950 mHz
CH 2, 6, 10, 14, 18, 22	Crystal 8 14.960 mHz
CH 3, 7, 11, 15, 19	Crystal 9 14.970 mHz
CH 4, 8, 12, 16, 20, 23	Crystal 10 14.990 mHz

Connect a spurious meter to the antenna connecter and adjust L12 (T.V.I.) for minimum 2nd harmonics (54 mHz) at no modulation.

P-RF METER ADJUSTMENT

Adjust RV3 so that the P-RF meter pointer indicates the same level as the reading of watt meter 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.

To set the unit to the receive mode, connect No. 3 and No. 5 PIN terminals of the DIN MIC jack, to each other.

RECEIVER SENSITIVITY ADJUSTMENT

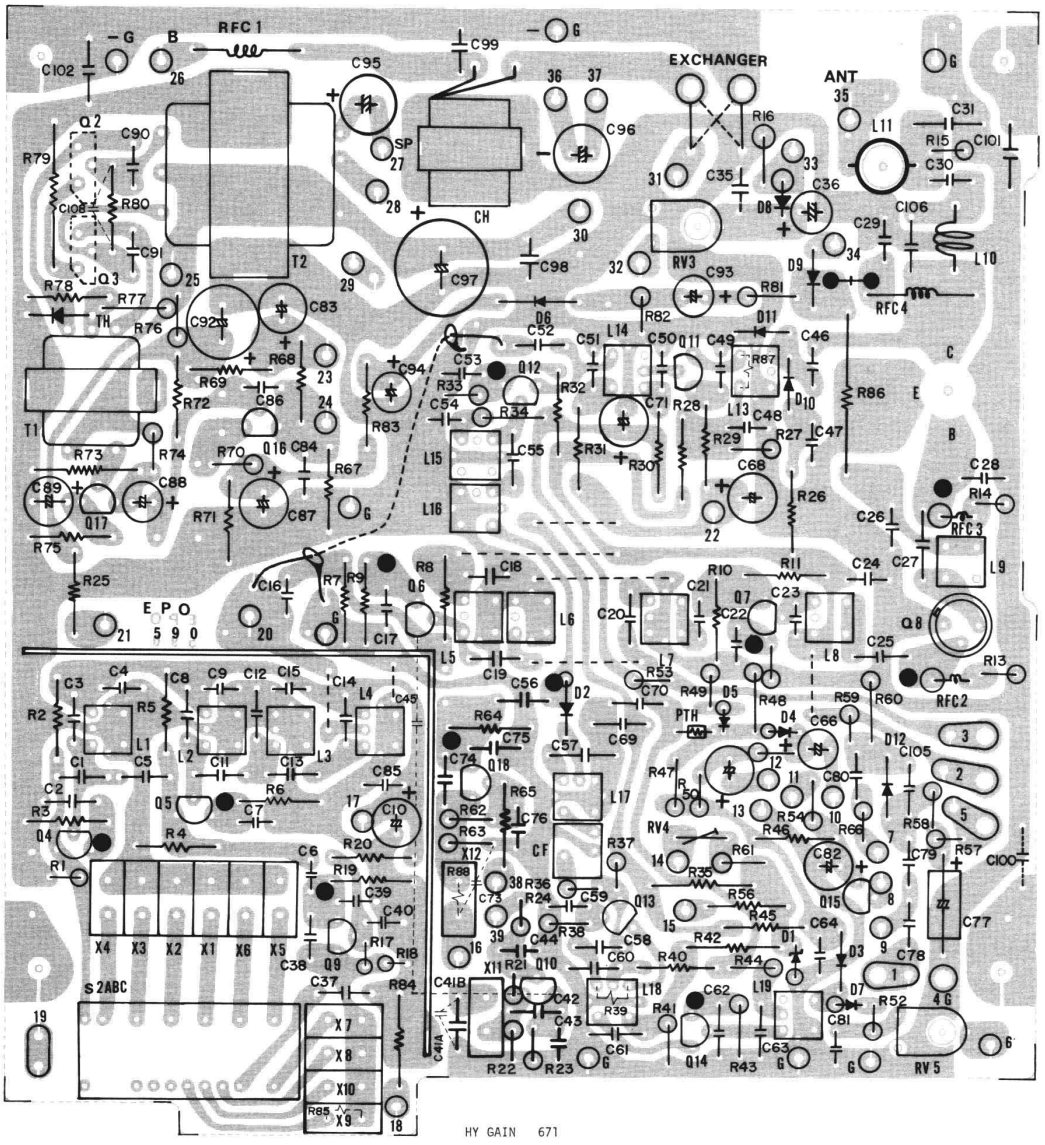
Connect a signal generator output, 27.115 mHz, 1 kHz 30% mod, to the receiver with the selector switch placed in 13CH position. Adjust L 13, 14, 15, 16, 17, 18 and 19 for maximum audio output.

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 RV4 so that the level meter reading is decreased by 6 db.

S-METER ADJUSTMENT

Adjust RV5 so that the meter pointer indicates "9" at the RF input signal of 40 db.

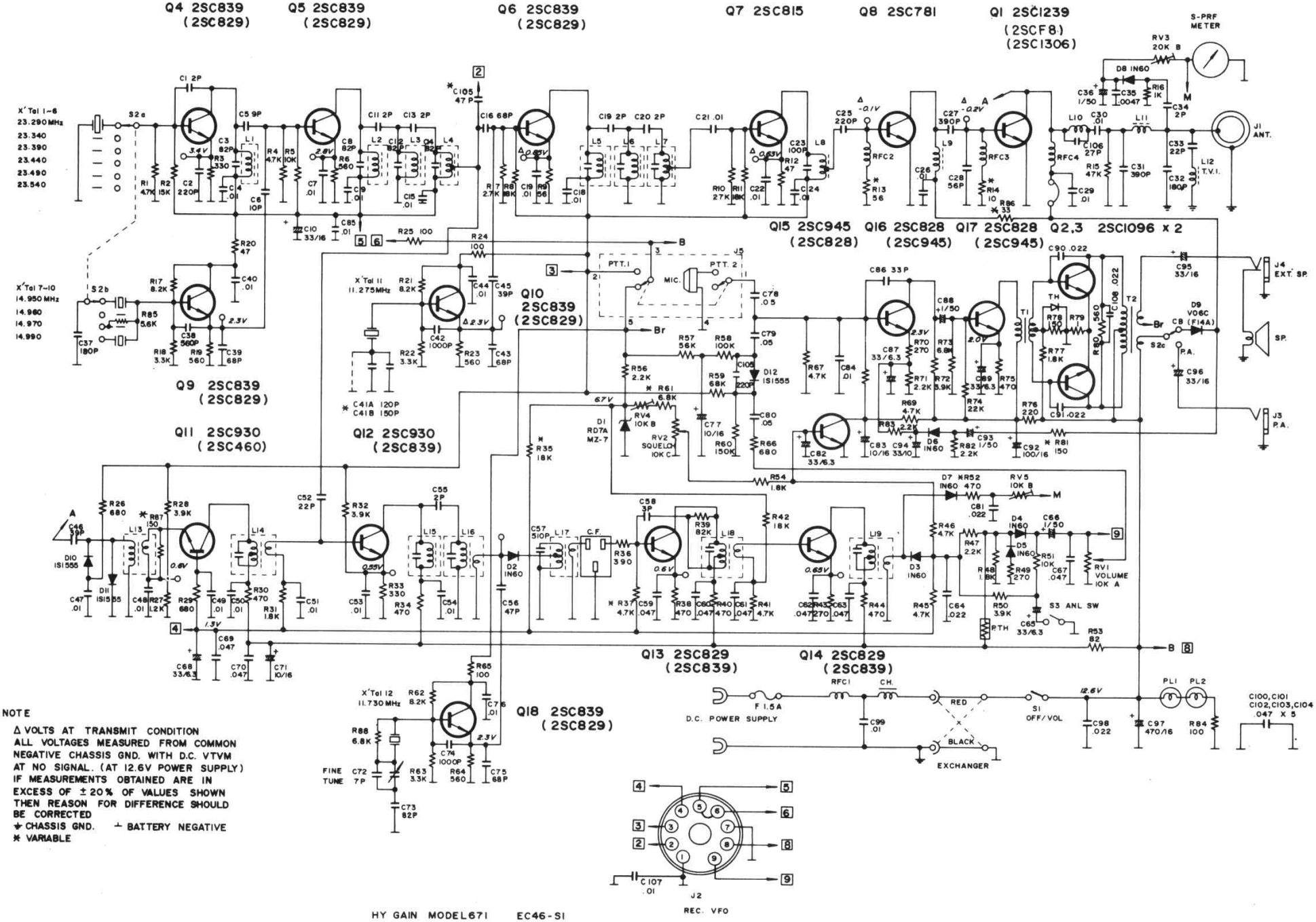


HY GAIN 671

NOTE: 1. R39, R85, R87, R88, C100, C41A, C45 AND C108 ARE MOUNTED ON BOTTOM OF PC BOARD.

2. C32, C33, C34, C67, C72, C73, C103, C104, C105 & C107 ARE NOT MOUNTED ON PC BOARD.

3. R55 IS NOT USED.



HY GAIN MODEL 671 EC46-S1

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/S
Volume Control	RVHB8AK15C14	ERV-91	RV2
Speaker	EAS-9D75S	EAS-14	SP
Microphone		EAM-10A	MIC
Meter		EMM-46	M
ANT. Jack		EZS-66	J1
V.F.O. Jack		EZS-89	J2
Earphone Jack		EZS-56	J3,4
Mike Jack		EZS-84	J4
Pilot Lamp		EZP-6	PL1,2
T.V.I. Trap Coil		ETR-18	L12
DC Power Cable		ENO-43A	F
Rotary Switch		ESR-126	S2
Variable Condenser		ECV-30	VC
Togle Switch		EST-4	S3
Cord Bushing		EZZ-25	
Ceramic Capacitor 22p 50V	ECC-D05220K		C33
Ceramic Capacitor 2p500V	ECC-D05020C		C34
Ceramic Capacitor 7p 50V	ECC-D05070C		C72
Ceramic Capacitor 82p 50V	ECC-D05820K		C73
Ceramic Capacitor.047u25V	DD624BC473M25		C67
Ceramic Capacitor.047u50V	ECK-D05473ZV		C103,104
P.C. Board Complete		EC46-L3	
P.C. Board		EP0-590	
Transistor	2SC-930B	EQS-139	Q11,12
Transistor	2SC-829(B)	EQS-5	Q13,14
Transistor	2SC-839(H)	EQS-100	Q4-6,9,10,18
Transistor	2SC-828(S)	EQS-9	Q16,17
Transistor	2SC-945(P)	EQS-131	Q15
Transistor	2SC-815K	EQS-22	Q7
Transistor	2SC-781	EQS-57	Q8
Diode	V06C	EDS-4	D9
Diode	1N60	EDG-3	D2-8
Diode	1S1555	EDS-1	D10-12
Diode	MZ207-02A	EDZ-20	D1
Input Transformer		ETA-41	T1
Output Transformer		ETA-42	T2
Audio Choke Coil		ELA-2	CH
Ceramic Filter	CFU455G	EFC-23	C.F.
Posistor		EDP-1	PTH
Thermistor	23D25F	EDT-15	TH
Shield Plate		MC45P6	
Crystal	23.290MHz	EXT-2	Xtal1
Crystal	23.340MHz	EXT-2	2
Crystal	23.390MHz	EXT-2	3
Crystal	23.440MHz	EXT-2	4

Parts Name	Description	Part No.	Symbol
Crystal	23.490MHz	EXT-2	5
Crystal	23.540MHz	EXT-2	6
Crystal	14.950MHz	EXT-2	7
Crystal	14.960MHz	EXT-2	8
Crystal	14.970MHz	EXT-2	9
Crystal	14.990MHz	EXT-2	10
Crystal	11.275MHz	EXT-2	11
Crystal	11.730MHz	EXT-2	12
Polarity Changer		EZS-25	
Rest Pin		MW0-128	
Lead Wire W/Pin		ENO-40B	
Lead Wire W/Pin		ENO-40R	
Tie Point		MYO-9	
RF Choke Coil		ELR-11	RFC1
RF Choke Coil		ELR-4	RFC2-4
Potentiometer 200kB	EVN-K4AA00B24		RV3
Potentiometer 100kB 2-leg	EVL-T5AA00B14		RV4
Potentiometer 100kB	EVN-K4AA00B14		RV5
Heat Sink for Tr.(2SC-7821)		MYO-8	
OSC Coil		ETR-247	L1
RF Coil		ETR-248	L2,3
RF Coil		ETR-249	L4
RF Coil		ETR-30	L5,6
RF Coil		ETR-31	L7
RF Coil		ETR-22	L8
RF Coil		ETR-197	L9
RF Coil		ETR-17	L10
RF Coil		ETR-232	L11
ANT Coil		ETR-194	L13
RF Coil		ETR-104	L14
RF Coil		ETR-125	L15,16
IF Coil		ETI-85	L17
IF Coil		ETI-17	L18
IF Coil		ETI-18	L19
Carbon Resistor ¼W 4.7Kohm	ERD-14TJ472		R1,4,37,41,45,46,67,69
Carbon Resistor ¼W 15Kohm	ERD-14TJ153		R2
Carbon Resistor ¼W 330Kohm	ERD-14TJ331		R3,33
Carbon Resistor ¼W 10Kohm	ERD-14TJ103		R5
Carbon Resistor ¼W 560Kohm	ERD-14TJ561		R6,19,23,64,80
Carbon Resistor ¼W 2.7Kohm	ERD-14TJ272		R7,10
Carbon Resistor ¼W 18Kohm	ERD-14TJ183		R8,11,25,42
Carbon Resistor ¼W 56Kohm	ERD-14TJ560		R9,13
Carbon Resistor ¼W 47Kohm	ERD-14TJ470		R12,20
Carbon Resistor ¼W 10Kohm	ERD-14TJ100		R14
Carbon Resistor ¼W 47Kohm	ERD-14TJ473		R15
Carbon Resistor ¼W 1Kohm	ERD-14TJ102		R16
Carbon Resistor ¼W 8.2Kohm	ERD-14TJ822		R17,21,62,68
Carbon Resistor ¼W 3.3Kohm	ERD-14TJ332		R18,22,63
Carbon Resistor ¼W 100Kohm	ERD-14TJ101		R24,65
Carbon Resistor ¼W 680Kohm	ERD-14TJ681		R26,29,66

Parts Name	Description	Part No.	Symbol
Carbon Resistor ¼W 1.2Kohm	ERD-14TJ122		R27
Carbon Resistor ¼W 3.9Kohm	ERD-14TJ392		R28,32,50,72
Carbon Resistor ¼W 470Kohm	ERD-14TJ471		R30,34,38,40, 43,44,52,95
Carbon Resistor ¼W 1.8Kohm	ERD-14TJ182		R31,48,54,99
Carbon Resistor ¼W 390Kohm	ERD-14TJ391		R36
Carbon Resistor ¼W 82Kohm	ERD-14TJ823		R39
Carbon Resistor ¼W 2.2Kohm	ERD-14TJ222		R47,56,71,82,83
Carbon Resistor ¼W 270Kohm	ERD-14TJ271		R49,90
Carbon Resistor ¼W 10Kohm	ERD-14TJ103		R51
Carbon Resistor ¼W 82Kohm	ERD-14TJ820		R53
Carbon Resistor ¼W 56Kohm	ERD-14TJ563		R57
Carbon Resistor ¼W 100Kohm	ERD-14TJ104		R58
Carbon Resistor ¼W 68Kohm	ERD-14TJ683		R59
Carbon Resistor ¼W 150Kohm	ERD-14TJ154		R60
Carbon Resistor ¼W 6.8Kohm	ERD-14TJ682		R61,73
Carbon Resistor ¼W 22Kohm	ERD-14TJ223		R74
Carbon Resistor ¼W 220Kohm	ERD-14TJ221		R76,78
Metal Oxide Resistor 1W 0.8ohm	ERX-1ANJ0R8		R79
Carbon Resistor ¼W 150 ohm	ERD-14TJ151		R81
Solid Resistor ½W 100 ohm	ERC-12GK101		R84,25
Ceramic Capacitor 2p 500V	ECC-D5020C		C1,11,13,19, 20,55
Ceramic Capacitor220p 50V	ECC-D05221K		C2,25,105
Ceramic Capacitor 82p 50V	ECC-D05820KR		C4,7,9,15,17, 18,21,22,24, 26,29,30,40, 44,47,48-51, 53,54,76,84, 85,79
Ceramic Capacitor 9p500V	ECC-D05090C		C5
Elyt. Capacitor 33/16V	ECE-A16V33N		C10
Ceramic Capacitor 68p 50V	ECC-D05680K		C16,39,43,75
Ceramic Capacitor100p 50V	ECC-D05101K		C23
Ceramic Capacitor390p 50V	ECC-D05391K		C27,31
Ceramic Capacitor 56p 50V	ECC-D05560K		C28
Ceramic Capacitor180p 50V	ECC-D05181K		C32
Ceramic Capacitor.0047u50V	ECK-D05472PJ		C35
Elyt. Capacitor 1/50V	ECE-A50V1N		C36,66,88,93
Ceramic Capacitor270p 50V	ECC-D05271K		C37,41
Mylar Capacitor.001u 50V	ECQ-M05102KZ		C38,42,74
Ceramic Capacitor 39p 50V	ECC-D0539OK		C45,46
Ceramic Capacitor 22p 50V	ECC-D05220K		C52
Ceramic Capacitor 47p 50V	ECC-D05470K		C56
Styroflex Capacitor 510p50V	ECQ-S1511JX		C57
Ceramic Capacitor.047u 25V	DD624BC473M25		C59,60-63,69,70
Ceramic Capacitor.022u 50V	RD209YZ223P50		C64,81,98
Elyt. Capacitor 33/6V	ECE-A6V33N		C65,68,82,87,89
Elyt. Capacitor 10/16V	ECE-A16V10N		C91,83
Ceramic Capacitor.05u12V	DD601-450BC503M12		C78-80
Ceramic Capacitor 33p 50V	ECC-D0533OK		C86
Ceramic Capacitor.022u25V	DD610BC223M25		C90,91
Elyt. Capacitor 100/16V	ECE-A16V100N		C92

Parts Name	Description	Part No.	Symbol
Elyt. Capacitor 33/10V	ECE-A10V33N		C94
Elyt. Capacitor 33/16V	ECE-A16V33N		C95,96
Elyt. Capacitor470/16V	ECE-A16V470N		C97
Ceramic Capacitor.047u 50V	ECK-D05473ZV		C100,101,102
Elyt. Capacitor 10/16V	ECE-B16V10N		C77
Escutcheon		MC46A1	
Chassis		MC46P2	
Front Panel Mtg. Bracket		MC46P3	
Cage (Upper)		MC46P4	
Cage (Lower)		MC46P5	
Mobile Mtg. Bracket		MC46P6	
Channel Plate		MC46P7	
Mic. Holder		MC46P8	
Spkr Net		MC46P9	
Bracket (Meter hold)		MC46P10	
Felt Sheet		MC46P11	
Serial Number Label		MC46B1	
Lamp Holder (Rubber)		MW0-345	
Lamp Holder (Rubber)		MW0-346	
CH Knob		MN0-115	
VR Knob		MN0-116	
Knob		MN0-117	
Knurled Screw		MM0-108	
Heat Sink		MY0-26	
Mylar Sheet for Tr.		MW0-104	
Mic. Clip		MY0-25	
Spkr Cap		MM0-18	
Felt Sheet (Sw. Masking)		MW0-359	
Inner Carton		KC46P01	
Partitioner		KC46P02	
Partitioner		KC46P03	