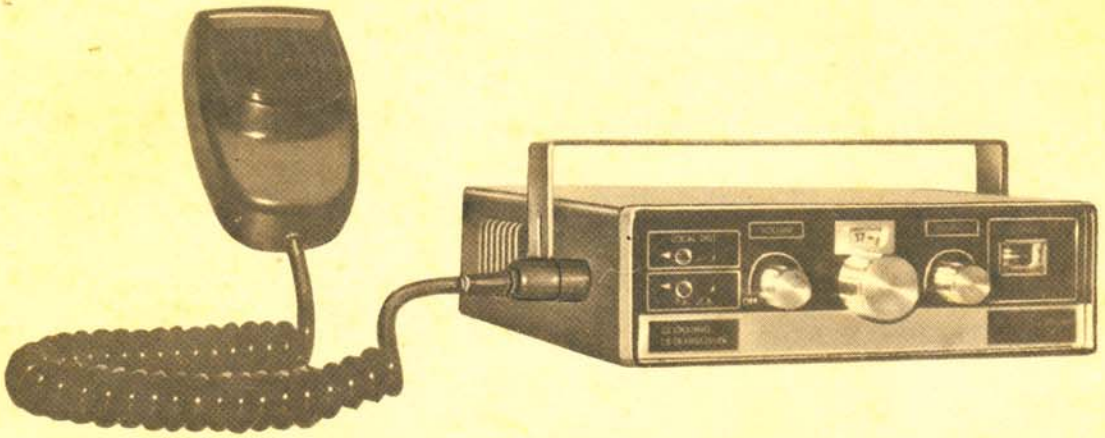
# Seiki HA-23C Owner's Manual

# SEIKI HA-23C

## 23-Channel Mobile Citizens Band 5 watt Transceiver



## OWNER'S MANUAL

## GENERAL INFORMATION

This unit is a transmitter and receiver designed for use in class "D" operation in the 27MHz Citizens Radio Service. Rules part 95 of FCC regulations defines operation in this service and the licensee is required to read and understand these regulations before operating this unit.

Part 95 regulations are available from the Superintendent of Documents, Government Printing Office, Washington D.C. 20402. You are also required to complete F.C.C. form 505 and submit it to the F.C.C. in order to obtain license to operate this unit. It is illegal to operate the transmitter section of this unit prior to receiving a valid station license.

## GENERAL DESCRIPTION

### OUTLINE

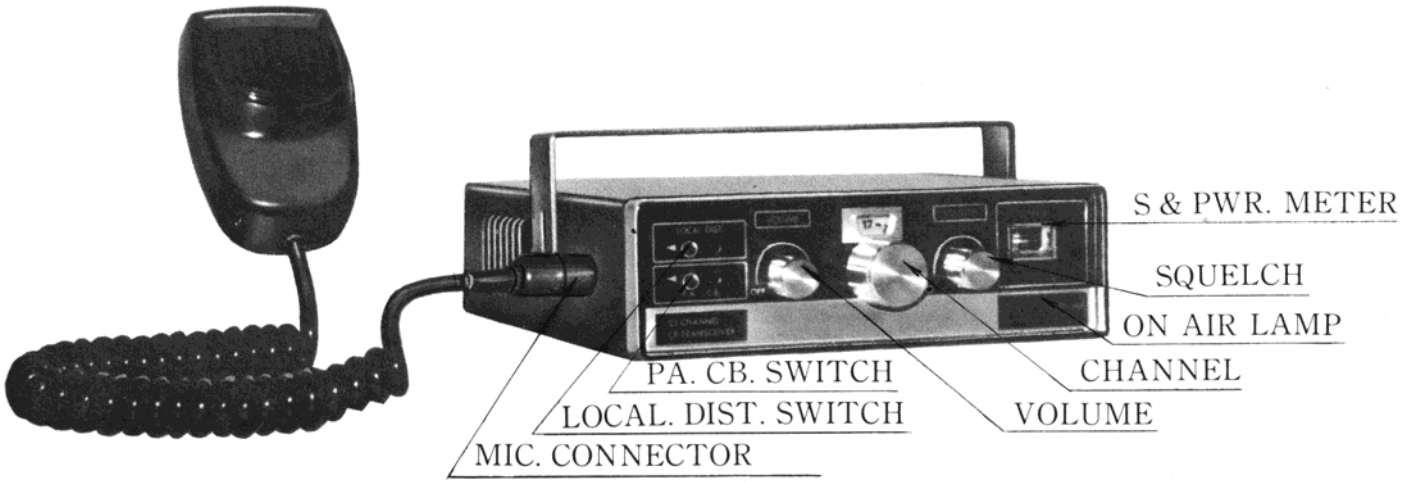
This unit is an extremely compact all solid state 2-way radio providing 23 crystal-controlled transmit and receive channels in the 27MHz citizens band. Apart from communication use, this unit has an additional feature as a Public-Address Amplifier. Latest technique ensures reliable, trouble-free performance which will be found in the provisions following and further technical instruction described in this operation manual.

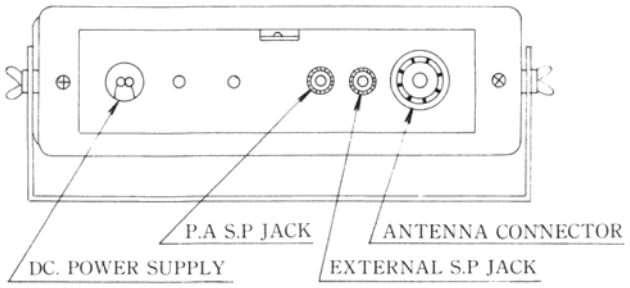
### EQUIPMENT LIST

This unit consists of the following:
Unit, self-contained speaker and crystals.
Microphone, (curl cord with plug)
Mounting bracket.
Fuse (2A) 2 pcs.
Instruction manual.

### NOTE:

Antenna shall be of type accepted for use in mobile and or base station.


S & PWR. METER
SQUELCH
ON AIR LAMP
CHANNEL
VOLUME
PA. CB. SWITCH
LOCAL. DIST. SWITCH
MIC. CONNECTOR


P.A S.P JACK
ANTENNA CONNECTOR
DC. POWER SUPPLY
EXTERNAL S.P JACK

## OPERATION

### PRE-CAUTION

a) Polarity check
b) Never attempt to transmit without antenna connection properly made.
c) PA/CB switch: Make sure switch is placed on CB side. PA is for public address only.

### INSTALLATION

As supplied with mounting bracket and other hard ware, installation is simply made however care must be taken as following procedure.

a) Select the place with front control panel facing you.
b) Position should not disturb driver or operator.
c) Do not place near to heater ducts and or outlet of air conditioner.
d) Mounting place should not be effected by water and dust problems.
e) Prior cable connection, make sure to determine polarity of the cables Red(+) Black(−) and vehicle has a negative or positive ground electrical system.
   Wrong wiring will blow fuse (2A) placed in the cable for protection of internal damages.
   Do not attempt to insert the fuse more than 2A. Make sure to observe the input power voltage should be 12V DC.
f) Antenna must be of type accepted by FCC. Antenna installation is very important to obtain satisfactory communication.

### STAND BY

a) Turn "Volume" knob on the front panel to the clock wise direction until click noise is heard and meter and channel indicator lamps are lit.
b) Squelch control knob: Turn fully to the counter clockwise.
c) Turn volume control slowly to the clockwise until you will start to hear sound from speaker or you may hear others transmitting signals, then place volume control in most audible position.

d) Then turn squelch control slowly to the clockwise direction until you hear suddenly no sound, which is the position the squelch is set on. As further turning of squelch will not activate unless extremely large input power is received, Ideal position is where noise suddenly disappeared.

## TRANSMISSION

a) Connect the microphone to the input positioned at the left side of the unit.
b) Make sure to observe the antenna cable connection is firmly made to the jack "Ant"
c) To transmit, press the push-to-talk switch with approximately 5cm distance. For monitoring, confirm that the red indicator lamp "ON-Air" is lit also "S" meter should be on work.

## CHANNEL SELECTOR

The number through the window on top of the channel switch shows which channel is under operation. Reference for the channels and frequencies, refer attached chart. Desired channel can be selected by rotating the channel knob.

## EXTERNAL SPEAKER

Due to the limited space, the unit incorporates smaller size speaker. However speaker will deliver sufficient power. It is suggested to use external speaker when communication take place where excessive back ground noise exists. For connection of the external speaker be sure to use the connecting plugs supplied with the unit and plug it to the position marked "EXT-SP" on the back panel.

## PUBLIC ADDRESS (P.A.)

For operation as P.A., connect speaker to the JACK marked "PA-SP" on the back panel. Place the CB/PA switch on PA position, then the unit is ready for P.A. amplifier.

## LOCAL-DISTANCE SWITCH

This switch is provided for emphasizing better receiving. It will effect on position "Local" when communicating with short distance where back ground noise is excessively high.

# TECHNICAL PERFORMANCE

## GENERAL

| | | | |
|---|---|---|---|
| 1) | Frequency range | : | 23 channels, between 26.965MHz/27.255MHz |
| 2) | Type of emission | : | A3 |
| 3) | Microphone | : | 600 ohm |
| 4) | Power supply | : | 12V DC, negative or positive ground, contained "Polarity protector" |
| 5) | Power consumption | : | Receive (Squelch ON) approx. 200mA<br>Transmit (Max modulation) approx. 1,500mA |
| 6) | Operating condition | : | |
| | a) Ambient temperature | : | $-10^{\circ}C - +50^{\circ}C$ |
| | b) Relative humidity | : | $+40^{\circ}C$ 95% or less |
| | c) Power variation | : | 11V – 15V |
| 7) | Dimensions and weight | | |
| | a) Dimension | : | 170W x 53H x 210D (m/m) |
| | b) Weight | : | approx. 1.6Kg |

## TRANSMITTER

| | | | |
|---|---|---|---|
| 1) | Frequency stability | : | 0.005% or less ($-30^{\circ}C - 50^{\circ}C$) |
| 2) | RF output | : | 4W max. |
| 3) | Modulation | : | 95% |
| 4) | Harmonics and spurious emission | : | 50db or more below carrier level |
| 5) | Antenna terminal | : | 50 ohm resistive |

### RECEIVER

| | | |
|---|---|---|
| 1) Sensitivity | : | 0.5μV for 10db S/N (30% 1KHz mod.) |
| 2) Selectivity | : | 6db bandwidth: 5.5KHz minimum<br>Adjacent channel rejection: 50db minimum |
| 3) Spurious rejection | : | 50db minimum |
| 4) AGC characteristics | : | Within 10db AF variation for 2μV–0.1V RF.input |
| 5) Squelch | : | Minimum sensitivity: 0.3μV |
| 6) Audio output | : | 3W |
| 7) Speaker | : | 2″ x 3″ Oval dynamic 8 ohm |

## ADJUSTMENT AND CHECK OUT

### PRE-CAUTION IN ADJUSTMENT

As mentioned, this unit is designed to comply with the rules part 95 of the FCC, it is important that servicing must be conducted by qualified servicemen with appropriate test equipment as it may not be only properly repaired but also may disturb others operators by transmitting with improperly aligned oscillator.

### TUNE-UP PROCEDURE

Alignment procedures are as follows:

a) Transmitter alignment:
   Connect 50 ohm dummy load with antenna terminal.

b) Repeated test tune up is recommended as per instruction given in the Tune up procedure table.
   1) Pull-out the chassis toward the front panel after removing 2 screws on the back panel.
   2) Connect 50 ohm dummy load to the antenna terminal.

3) Power consumption under normal operation:
   Reception (Squelch on) . . . . . 200mA approx.
   Transmission (Non mod.) . . . . . 800mA approx.
   Transmission (Full mod.) . . . . . 1,300mA approx.
4) Maximum modulation degree is tuned at 90% and the level setting for the Over Modulation Protector should be performed by VR5.
5) Standard modulated input for the microphone (50% mod.) is 2mV/600 ohm at 1KHz.
6) Alignment of the squelch. Turn the squelch knob to max. position, set VR3 at the point when the squelch opens while tunning VR3 feeding 40db input from SSG which is connected to the antenna terminal. Then remove the input signal and turn the squelch knob full position toward counter-clockwise direction whereby you will hear noise from the speaker. Further, turn knob slowly toward clock-wise direction approximately 1/3 position whereby the squelch is ready to activate. Fix the squelch knob firmly at this point and check whether squelch is properly working by feeding 0db input signal thru SSG.
7) Indicator setting
   i) RF output
      Set the meter reading shows on 2/3 position by VR6 when transmitting thru 50 ohm dummy load.
   ii) "S Meter"
      Set the meter reading shows on 3/4 position by VR1 feeding 90db SSG output when receiving.

## ADJUSTMENT AND CHECK OUT OF TRANSMITTER SECTION

| | Item | Adjusting Point | Measuring Point | Adjusting Measuring Value | Measuring Instrument |
|---|---|---|---|---|---|
| 1 | Oscillator (37MHz) | L6 | TP-6 | Set the channel on Ch.23. Align L6 until Freq. Counter accurately shows 37.850MHz when VTVM is in full scale reading and fix L6. Standard voltage of TP-6 is 0.8-0.9V. | Freq. counter RF VTVM |
| 2 | Mixer | L11 L12 | TP-4 | Set the channel on Ch.9. Align L11, L12 until the VTVM on TP-4 points full scale reading. Standard voltage of TP-4 is 0.35V. | RF VTVM |
| 3 | Exciter | L13 L14 | TP-5 | Set the channel on Ch.9. Align L13, L14 until obtain maximum current connecting DC current meter to TP-5. Standard current at TP-5 is 0.4 Amp. | DC current-meter |
| 4 | Power amp. | L15 L6 | Ant. terminal | Align L15, L16 to obtain maximum reading of the dummy load which is connected to the antenna terminal. L13, L14 to be also aligned to obtain the above result. Standard out is 3-3.2W. | 50 ohm dummy load |

| | Item | Adjusting Point | Measuring Point | Adjusting Measuring Value | Measuring Instrument |
|---|---|---|---|---|---|
| 5 | Modulation | VR5 | Ant. terminal | Feed 2.5KHz AF Oscillator output to the microphone and tune up AF input level until 50% modulation wave is seen through oscilloscope. Increase AF input level 16db (6 times) at 50% modulation. Align VR5 and fix when modulation degree will not exceed 90%. Standard AF input level at 50% modulation is approx. 2mV/600 ohm. | AF oscillator oscilloscope AF VTVM |

Note:

1. All tune-up are performed at channel 9 except 37MHz oscillator at 23 Ch.
2. The polarity of every measuring points are plus(+) except TP-5.
3. The polarity of TP5 is (–) at choke coil, CH3 and (+) at power source.
4. TP-7 is minus(–).

## ADJUSTMENT AND CHECK OUT OF RECEIVER SECTION

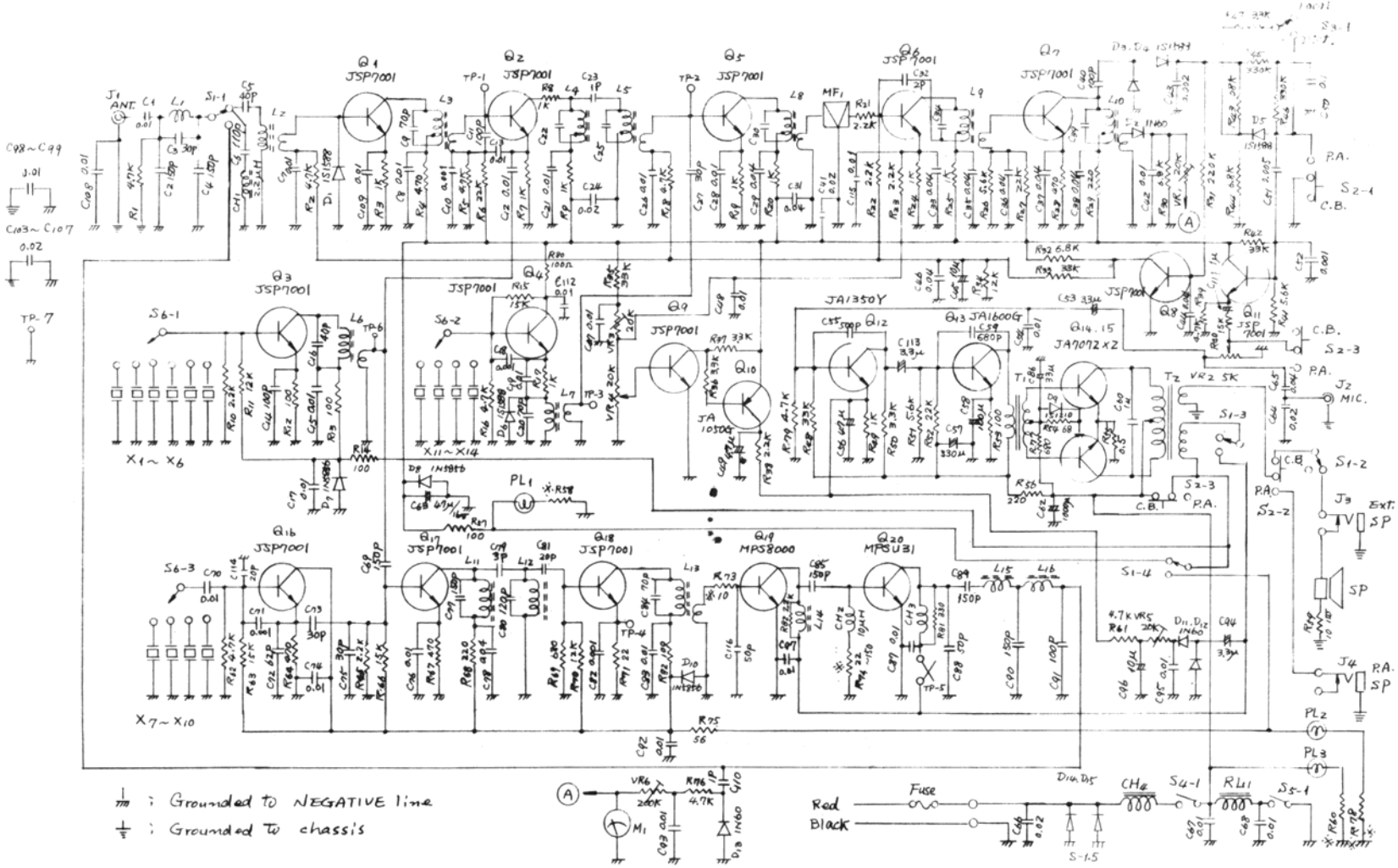
| | Item | Adjusting Point | Measuring Point | Adjusting Measuring Value | Measuring Instrument |
|---|---|---|---|---|---|
| 1 | AF Amplifier | None | Speaker terminal (J3) | Check the wave and output voltage of the speaker terminals feeding with approx. 10mV signal to the both inputs of VR2. The output voltage is approx. 3V. It is satisfactory if no remarkable distorted wave is found. Speaker (8 ohm) | AF oscillator VTVM oscilloscope |
| 2 | 2nd IF | L8<br>L9<br>L10 | J3 | Accurately align SSG freq. to 455KHz and feed 20db output power, at 30% modulation from TP-2. Align L8 - L10 until obtain maximum AF output. It is normal, circuits thereafter the 2nd IF, if AF output at J3 reads 3V/8 ohm when the input at TP-2 lowered to 15db. | SSG, VTVM, oscilloscope |
| 3 | 2nd Local oscillator (10MHz) | L7 | TP-3 | Set the channel on Ch.9. Connect Freq. Counter and VTVM to TP-3. Align L7 and after VTVM indicates max. position and Freq. Counter accurately points 10.180MHz. Standard voltage at TP-3 is 0.4-0.6V. | Freq. Counter VTVM |

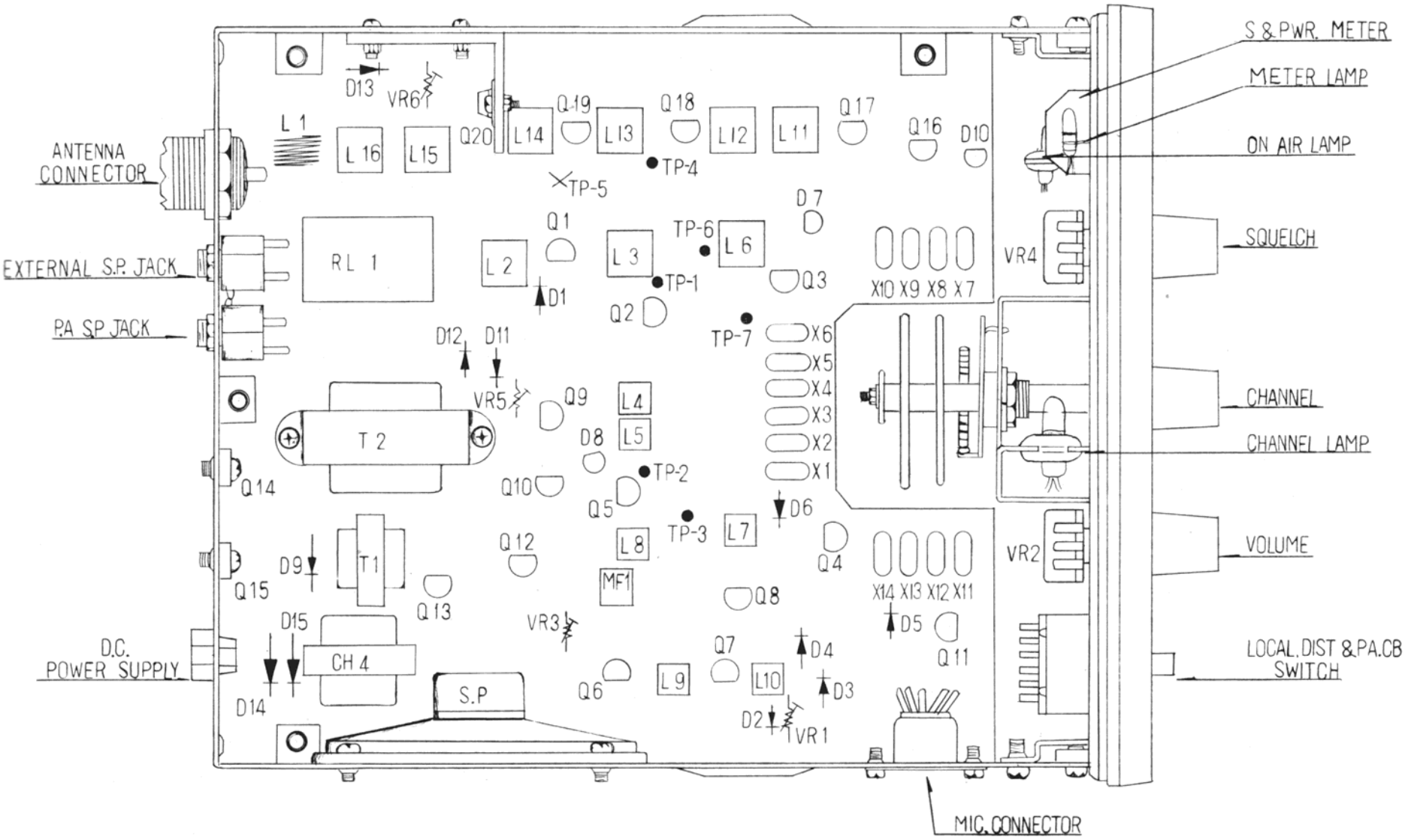
| | Item | Adjusting Point | Measuring Point | Adjusting Measuring Value | Measuring Instrument |
|---|---|---|---|---|---|
| 4 | 1st IF | L4<br>L5 | J3 | Set the channel on Ch.11. Adjust SSG Freq. sharply on 10.615MHz. Align thru L4, L5 until AF output of J3 outputs maximum power by feeding approx. 20db output at 30% modulation to TP-1. It is normal if AF output measured 3V/8 ohm against 10db input to TP-1. | SSG<br>VTVM,<br>oscilloscope |
| 5 | 1st local oscillator (37MHz) | L6 | TP-6 | This stage is common use with the oscillator on transmitter section. For alignment, refer to the instruction given in transmitter section. | Freq. counter<br>VTVM |
| 6 | RF amplifier | L2<br>L3 | J3 | Set the channel on Ch.9. Align SSG freq. to the 9 Ch. frequency. Align L2, L3 until AF output of J3 obtains max. output feeding from antenna terminal J1 with 10db output at 30% modulation. AF output of J3 is 3V/8 ohm against RF input of 2db-3db. | SSG<br>VTVM,<br>oscilloscope |

Note:

1. Make certain that prior to check, the AF output terminal (J3) must be connected with either 8 ohm speaker or non-inductive resistor.
2. SSG connection to TP-1, TP-2 must be made thru 0.04 – 0.1 $\mu$F capacitor.

# SCHEMATIC DIAGRAM




S & PWR. METER
METER LAMP
ON AIR LAMP
SQUELCH
CHANNEL
CHANNEL LAMP
VOLUME
LOCAL, DIST & PA. CB SWITCH
MIC. CONNECTOR
ANTENNA CONNECTOR
EXTERNAL S.P. JACK
PA SP JACK
D.C. POWER SUPPLY
L 1
L 16
L 15
Q20
L 14
Q 19
L 13
Q 18
L 12
L 11
Q 17
Q 16
D10
D13
VR6
TP-5
TP-4
D 7
Q1
TP-6
L 6
VR4
RL 1
L 2
L 3
TP-1
Q3
X10 X9 X8 X7
D1
Q2
TP-7
D12
D11
X6
X5
X4
X3
X2
X1
VR5
Q9
L4
T 2
D8
L5
Q14
Q10
TP-2
Q5
D6
TP-3
L 7
Q12
L 8
Q4
VR2
D9
T1
Q15
MF1
Q8
X14 X13 X12 X11
Q13
VR3
D5
D15
Q7
D4
Q 11
CH 4
Q6
L 9
L10
D3
D14
S.P
D2
VR1

## PARTS LIST

| Symbol No. | Name of Parts | Description | Symbol No. | Name of Parts | Description |
|---|---|---|---|---|---|
| | PC Board | HA-23C | X 2 | Crystal | 37.650 |
| Q 1 | Transistor | JSP-7001 | 3 | Units | 37.700 |
| 2 | | " | 4 | (HC-18U) | 37.750 |
| 3 | | " | 5 | | 37.800 |
| 4 | | " | 6 | | 37.850 |
| 5 | | " | 7 | | 10.635 |
| 6 | | " | 8 | | 10.625 |
| 7 | | " | 9 | | 10.615 |
| 8 | | " | 10 | | 10.595 |
| 9 | | " | 11 | | 10.180 |
| 10 | | JA-1050G | 12 | | 10.170 |
| 11 | | JSP-7001 | 13 | | 10.160 |
| 12 | | JA-1350Y | 14 | | 10.140 |
| 13 | | JA-1600G | | | |
| 14 | | JA-7072 | D 1 | Diode | IS1588 |
| 15 | | " | 2 | | IN60 |
| 16 | | JSP-7001 | 3 | | IS1588 |
| 17 | | " | 4 | | " |
| 18 | | " | 5 | | " |
| 19 | | MPS-8000 | 6 | | " |
| 20 | | MPS-U31-1 | 7 | | IN5856B |
| | | | 8 | | " |
| X 1 | Quartz | 37.600 | 9 | | IS1210 |

| Symbol No. | Name of Parts | Description | Symbol No. | Name of Parts | Description |
|---|---|---|---|---|---|
| D 10 | Diode | IN5856B | CH-2 | Micro-Inductor | HC-10μH |
| 11 | | IN60 | 3 | RF Choke | |
| 12 | | " | 4 | Choke Trans | E-24-001-1 |
| 13 | | " | | | |
| 14 | | S-1.5-01 | T 1 | Input Trans | F-19-004 |
| 15 | | " | 2 | Output Trans | E-35 |
| | | | RL-1 | Relay | AE2341 |
| L 1 | Solenoide Coil | | | | |
| 2 | RXANT Coil | HC-23C-100-1 | VR-1 | Semi-Fixed VR | 20KB |
| 3 | RXRF Coil | 100-2 | 2 | VR (with S) | 5KA |
| 4 | IFT | 100-7301 | 3 | Semi-Fixed VR | 20KB |
| 5 | IFT | " | 4 | VR (without S) | 20KB |
| 6 | OSC Coil | HC-23C-100-7 | 5 | Semi-Fixed VR | 20KB |
| 7 | IFT | 100-7301 | 6 | " | 200KB |
| 8 | " | 100-7103 | | | |
| 9 | " | 100-7101 | R 1 | Resistor | Carbon 4.7K |
| 10 | " | 100-7102 | 2 | | Solidl/4W 4.7K |
| 11 | TXMIX Coil | HC-23C-100-6 | 3 | | Carbon 1K 14VJ |
| 12 | " | " | 4 | | 470Ω |
| 13 | TX Drive Coil | HC-23-100-3 | 5 | | 4.7K |
| 14 | TXRX Coil-1 | 100-4 | 6 | | 22K |
| 15 | " | " | 7 | | 1K |
| 16 | TXRF Coil-2 | 100-5 | 8 | | 1K |
| | | | 9 | | 1K |
| CH-1 | Micro-Inductor | 2.2μH | 10 | | 2.2K |

| Symbol No. | Name of Parts | Description | Symbol No. | Name of Parts | Description |
|---|---|---|---|---|---|
| R 11 | Resistor | Carbon 12K | R 36 | Resistor | Carbon 1/4W 3.3K |
| 12 | | 100Ω | 37 | | 3.3K |
| 13 | | 100Ω | 38 | | 2.2K |
| 14 | | 100Ω | 39 | | 4.7K |
| 15 | | 15K | 40 | | 15K |
| 16 | | 4.7K | 41 | | 5.6K |
| 17 | | 1K | 42 | | 33K |
| 18 | | Solidl/4W 4.7K | 43 | | 68K |
| 19 | | Carbon 1/4W 1K | 44 | | 6.8K |
| 20 | | 1K | 45 | | 330K |
| 21 | | 2.2K | 46 | | 330K |
| 22 | | 2.2K | 47 | | 3.3K |
| 23 | | 2.2K | 48 | | 33K |
| 24 | | 1K | 49 | | 1K |
| 25 | | 1K | 50 | | 3.3K |
| 26 | | 5.6K | 51 | | 5.6K |
| 27 | | 22K | 52 | | 22K |
| 28 | | 470Ω | 53 | | 100Ω |
| 29 | | 220Ω | 54 | | 68Ω |
| 30 | | 6.8K | 55 | | 0.5Ω |
| 31 | | 220K | 56 | | 220Ω |
| 32 | | 6.8K | 57 | | Solid 1/4W 100Ω |
| 33 | | 33K | 58 | | Carbon 1/4W *(22Ω) |
| 34 | | 12K | 59 | | 10Ω |
| 35 | | 33K | 60 | | *(22Ω) |

| Symbol No. | Name of Parts | Description | Symbol No. | Name of Parts | Description |
|---|---|---|---|---|---|
| R 61 | Resistor | Carbon 1/4W 4.7K | C 3 | Capacitor | (Ceramic) 30P(CH) |
| 62 | | 4.7K | 4 | | " 150P(CH) |
| 63 | | 15K | 5 | | " 40P(CH) |
| 64 | | 470Ω | 6 | | " 110P(CH) |
| 65 | | 2.2K | 7 | | " 0.01 |
| 66 | | 15K | 8 | | " 0.01 |
| 67 | | 470Ω | 9 | | " 70P(CH) |
| 68 | | 220Ω | 10 | | (Mylar) 0.001 |
| 69 | | 680Ω | 11 | | (Ceramic) 100P |
| 70 | | 12K | 12 | | (Mylar) 0.01 |
| 71 | | 22Ω | 13 | | " 0.01 |
| 72 | | 100Ω | 14 | | (Ceramic) 100P(UJ) |
| 73 | | *10Ω | 15 | | " 0.01 |
| 74 | | *68Ω | 16 | | " 40P(SH) |
| 75 | | 56Ω | 17 | | " 0.01 |
| 76 | | 4.7K | 18 | | " 0.001 |
| 77 | | 680Ω | 19 | | " 0.01 |
| 78 | | *(22Ω) | 20 | | " 70P(CH) |
| 79 | | 4.7K | 21 | | " 0.01 |
| 80 | | 100Ω | 22 | | |
| 81 | | Solid 1/4W 330Ω | 23 | | (Ceramic) 1P(CH) |
| 82 | | 2.2K | 24 | | " 0.02 |
| | | | 25 | | |
| C 1 | Capacitor | (Ceramic) 0.01 | 26 | | (Ceramic) 0.01 |
| 2 | | " 150P(CH) | 27 | | " 30P(CH) |

| Symbol No. | Name of Parts | Description | Symbol No. | Name of Parts | Description |
|---|---|---|---|---|---|
| C 28 | Capacitor | (Ceramic) 0.01 | C 53 | Capacitor | (Electro)3.3μF-16V |
| 29 | | " 0.04 | 54 | | (Ceramic) 0.01 |
| 30 | | | 55 | | " 500P |
| 31 | | (Ceramic) 0.04 | 56 | | (Electro)47μF-16V |
| 32 | | " 2P | 57 | | " 330μF-16V |
| 33 | | " 0.04 | 58 | | " 100μF-16V |
| 34 | | | 59 | | (Mylar) 680 |
| 35 | | (Ceramic) 0.04 | 60 | | (Electro) |
| 36 | | " 0.04 | 61 | | |
| 37 | | " 0.04 | 62 | | (Electro)1000μF-16V |
| 38 | | | 63 | | " 47μF-16V |
| 39 | | | 64 | | (Ceramic) 0.02 |
| 40 | | (Ceramic) 100P(CH) | 65 | | " 0.04 |
| 41 | | " 0.02 | 66 | | " 0.02 |
| 42 | | " 0.01 | 67 | | " 0.01 |
| 43 | | (Mylar) 0.002 | 68 | | " 0.01 |
| 44 | | (Ceramic) 0.04 | 69 | | " 150P(CH) |
| 45 | | (Electro)10μF-16V | 70 | | " 0.01 |
| 46 | | (Ceramic) 0.04 | 71 | | " 0.001 |
| 47 | | " 0.01 | 72 | | " 62P(CH) |
| 48 | | " 0.01 | 73 | | " 30P(CH) |
| 49 | | (Electro)4.7μF-16V | 74 | | " 0.01 |
| 50 | | (Ceramic) 0.1 | 75 | | " 30P(CH) |
| 51 | | (Mylar) 0.005 | 76 | | " 0.01 |
| 52 | | " 0.001 | 77 | | " 150P(CH) |

| Symbol No. | Name of Parts | Description | Symbol No. | Name of Parts | Description |
|---|---|---|---|---|---|
| C 78 | Capacitor | (Ceramic) 0.04 | C103 | Capacitor | (Ceramic) 0.02 |
| 79 | | " 3P(CH) | 104 | | " 0.02 |
| 80 | | " 120P(CH) | 105 | | " 0.02 |
| 81 | | " 20P(CH) | 106 | | " 0.02 |
| 82 | | (Mylar) 0.001 | 107 | | " 0.02 |
| 83 | | (Ceramic) 0.01 | 108 | | " 0.01 |
| 84 | | " 70P(CH) | 109 | | " 0.01 |
| 85 | | " 150P(CH) | 110 | | " 1P(CH) |
| 86 | | (Electro)33μF6.3V | 111 | | (Electro)1μF-16V |
| 87 | | (Ceramic) 0.01 | 112 | | (Ceramic) 0.01 |
| 88 | | " 50P(CH) | 113 | | (Electro)3.3μF16V |
| 89 | | " 150P(CH) | 114 | | (Ceramic) 20P(CH) |
| 90 | | " 150P(CH) | 115 | | " 0.001 |
| 91 | | " 100P(CH) | 116 | | " 50P(CH) |
| 92 | | " 0.01 | MF 1 | | (Ceramic filter) |
| 93 | | " 0.01 | | | CFU455H-2 |
| 94 | | (Electro)3.3μF16V | | | |
| 95 | | (Ceramic) 0.01 | | | |
| 96 | | (Electro)10μF-16V | | | |
| 97 | | (Ceramic) 0.01 | | | |
| 98 | | " 0.01 | | | |
| 99 | | " 0.01 | | | |
| 100 | | | | | |
| 101 | | | | | |
| 102 | | | | | |

Note:

The technical information, circuit diagram, adjustment & check out chart and parts list are only for the use of qualified person with a first or second class radiotelephone license in servicing this transceiver. It is the users responsibility to operate this unit at all times in accordance with the requirements of F.C.C. Citizens Radio Service regulations.

Do not attempt to make any transmitter tunning adjustment. Transmitter adjustments are profibited by the F.C.C. unless the unit is adjusted by a first or second class radiotelephone license holder. A Citizens Band or amateur license is not applicable.

## CITIZENS BAND FREQUENCIES PROVIDED BY F.C.C.

| CHANNEL | CHANNEL FREQUENCY | CHANNEL | CHANNEL FREQUENCY | CHANNEL | CHANNEL FREQUENCY |
|---|---|---|---|---|---|
| 1 | 26.965 (MHz) | 9 | 27.065 (MHz) | 17 | 27.155 (MHz) |
| 2 | 26.975 | 10 | 27.075 | 18 | 27.165 |
| 3 | 26.985 | 11 | 27.085 | 19 | 27.175 |
| 4 | 27.005 | 12 | 27.095 | 20 | 27.185 |
| 5 | 27.015 | 13 | 27.105 | 21 | 27.205 |
| 6 | 27.025 | 14 | 27.115 | 22 | 27.215 |
| 7 | 27.035 | 15 | 27.125 | 23 | 27.225 |
| 8 | 27.055 | 16 | 27.135 | | |

**SEIKI ELECTRONICS INC.**
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