

This Manual is provided by
CBTricks.com

Someone who wanted to help you repair your equipment
scanned this manual.

If you would like to help us put more manuals online support us.

Supporters of CBTricks.com paid for the hosting so you would have this file.

CBTricks.com is a non-commercial personal website was created to help promote the exchange of service, modification, technically oriented information, and historical information aimed at the Citizens Band, GMRS (CB "A" Band), MURS, Amateur Radios and RF Amps.

CBTricks.com is not sponsored by or connected to any Retailer, Radio, Antenna Manufacturer or Amp Manufacturer, or affiliated with any site links shown in the links database. The use of product or company names on my web site is not endorsement of that product or company.

If your company would like to provide technical information to be featured on this site I will put up on the site as long as I can do it in a non-commercial way.

The site is supported with donation from users, friends and selling of the Galaxy Service Manual CD to cover some of the costs of having this website on the Internet instead of relying on banner ads, pop-up ads, commercial links, etc. to pay my costs. Thus I do not accept advertising banners or pop-up/pop-under advertising or other marketing/sales links or gimmicks on my website.

ALL the money from donations is used for CBTricks.com I didn't do all the work to make money (I have a day job). This work was not done for someone else to make money also, for example the ebay CD sellers.

All Trademarks, Logos, and Brand Names are the property of their respective owners.
This information is not provided by, or affiliated in any way with any radio or antenna Manufacturers.

Thank you for any support you can give.

MESSENGER 250 CITIZENS RADIO TRANSCEIVER SERVICE MANUAL ADDITION



GENERAL

This service manual addition contains installation, service and alignment information for the Messenger 250 Citizens Radio Transceiver. Refer to the Messenger 122-123A Service Manual, Part Number 001-0122-001, to be used with this addition for complete installation, service and alignment instructions.

DESCRIPTION

The Messenger 250 Citizens Radio Transceiver, Part Number 242-0250-xxx, is an all solid state, 23 channel base station transceiver with a 3 watt public address feature. All receiver and transmitter frequencies are generated by a 14 crystal frequency synthesizer network.

Other features of the Messenger 250 include a four watt transmitter, a DC power jack, an internally regulated power supply and an S-Meter which indicates receiver signal strength, modulation and relative RF power output.

The transceiver operates on either 117 VAC, 50-60 Hz or 13.8 VDC.

INSTALLATION

Select a location for the transceiver that will allow for the shortest possible transmission line.

- a. Install the antenna and the transmission line.
- b. Connect the power cord to any 117 VAC, 50-60 Hz wall outlet.

- c. Refer to the Messenger 122-123A Service Manual Installation Section for a final checkout procedure.

SPECIFICATIONS (Measurements made per EIA Standard RS-382 and are nominal unless otherwise stated.)

GENERAL

Frequency Range	26.965 to 27.255 MHz
Channels	23
Overall Dimensions	13.6 cm H x 27.9 cm W x 24.7 cm D (5.4 in. H x 11.0 in. W x 9.8 in. D)
Weight	
Unit	5.0 kg (11.0 lbs.)
Shipping	5.68 kg (12.5 lbs.)
Compliance	FCC Type Acceptance Part 95 Canadian DOC Approved RSS-136
Frequency Control	$\pm 0.005\%$ crystal, -30°C (-22°F) to 60°C (140°F) transmit and receive
Antenna Impedance	50 ohms
Circuit Protection	1/2 amp fuse
Circuitry	21 transistors, 25 diodes and 2 thermistors



E. F. JOHNSON COMPANY
WASECA, MINNESOTA 56093

I-74FJ 001-0223-001
Printed in U.S.A.

RECEIVER

Sensitivity	0.5 microvolt
Selectivity	6 kHz bandwidth at -6 dB 30 kHz bandwidth at -60 dB
Spurious Rejection	50 dB except image of 10 dB and 1/2 IF of 35 dB
Audio Output Power	3 watts
Speaker Impedance	3.2 ohms
Tight Squelch	30 microvolts
Squelch Sensitivity	Less than 1 dB
Intermediate Frequencies	455 kHz
AGC Characteristics	Flat within ± 6 dB from 50,000 to 5 microvolts with 12 dB of rolloff from 5 to 0.5 microvolts
Impulse Noise Limiting	3.2 dB
Audio Frequency Response	+2 dB to -16 dB from 300 to 3000 Hz

TRANSMITTER

Modulation	Amplitude modulated (6A3)
RF Power Output	4 watts maximum at 117 VAC
RF Spurious and Harmonic Attenuation	50 dB minimum

Audio Frequency Response +1 dB to -16 dB from 300 to 3000 Hz

MINIMUM PERFORMANCE SPECIFICATION (The specifications listed in this section are absolute service minimums.)

RECEIVER

Sensitivity	7 dB (S+N)/N minimum at 0.5 μ V
Audio Output Power	0.075 watt minimum at 0.5 μ V 2.5 watts minimum at 10% distortion
Tight Squelch	30 microvolts minimum
AGC Characteristics	15 \pm 2 dB rolloff from 500 to 0.5 μ V
Impulse Noise Limiting	Threshold of clipping between 20 and 40% modulation at 30 μ V

TRANSMITTER

Modulation	80% minimum positive and negative
RF Power Output	2.8 watts minimum at 117 VAC

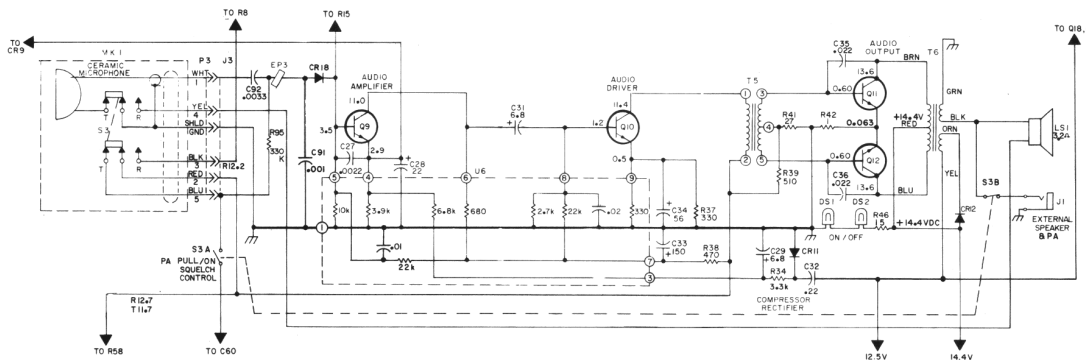
POWER SOURCE REQUIRED

117 VAC, 50-60 Hz - power consumption 30 watts
13.8 VDC, 1.2 nA.

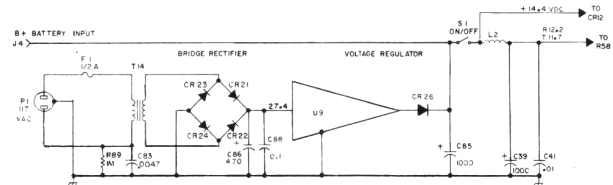
SERVICE

For transceiver servicing information refer to the Messenger 122-123A Service Manual Servicing Section.

For Public Address (PA) and power supply servicing, refer to the simplified schematics.



PUBLIC ADDRESS SIMPLIFIED SCHEMATIC



POWER SUPPLY SIMPLIFIED SCHEMATIC

For crystal switch servicing refer to Figure 1 for the crystal layout and switch wiring.

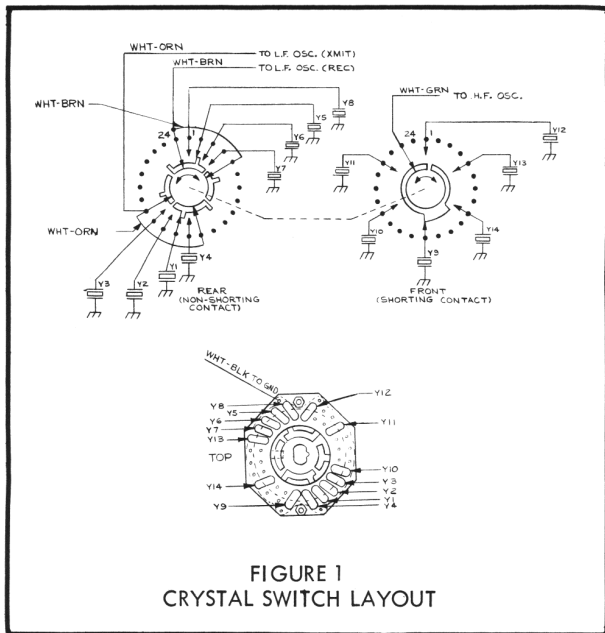


FIGURE 1
CRYSTAL SWITCH LAYOUT

RECEIVER ALIGNMENT

FREQUENCY SYNTHESIZER

- a. High Frequency Oscillator Adjustment
 1. Set the channel selector switch to channel 23 and connect the RF voltmeter to the CR14-CR15 junction.
 2. Adjust T7 1/8 turn beyond the peak RF voltage reading point. A typical reading of approximately 0.4 VRF should be measured.
- b. Synthesizer Mixer Adjustment
 1. Set the channel selector switch to channel 12 and connect the RF voltmeter probe to the case of Q15.
 2. Key the transmitter into an RF load and adjust T8, T9, T10 and T11 for a maximum meter reading. A typical reading of approximately 0.28 VRF should be measured.

RF AND IF SECTION (CHANNEL PEAKING METHOD)

- a. RF Adjustment
 1. Set the channel selector switch to channel 12 and connect a 1 kHz, 30% modulated RF signal to the antenna connector.

2. Adjust T1 and T2 for a maximum audio output while keeping the RF signal generator output at a minimum.

b. IF Adjustment

1. Test setup same as a.1.
2. Adjust Z1A, Z1B, T3 and T4 for a maximum audio output while keeping the RF signal generator output at a minimum.
3. Set the RF signal generator output level to 0.5 μ V, modulated 30% at 1 kHz.
4. Readjust T1, T2, Z1A, Z1B, T3 and T4 for a maximum audio output and make final adjustment of T1 for best signal to noise ratio.

RF AND IF SECTION (455 kHz GENERATOR METHOD)

a. IF Adjustment

1. Connect a 455 kHz signal generator through a 22 μ F coupling capacitor to the base of Q2.
2. Adjust Z1A, Z1B, T3 and T4 for a maximum audio voltmeter indication while reducing the generator output level (an excessive generator output level will cause improper IF amplifier alignment.)

b. RF Adjustment

1. Remove the 455 kHz signal generator and connect the RF signal generator to the antenna connector. Set the generator output level to 0.5 μ V, modulated 30% at 1 kHz on channel 12 frequency.
2. Adjust T1 and T2 for maximum audio output and make final adjustment of T1 for best signal to noise ratio.

METER

a. S-Meter Zero Adjust

1. Couple an on frequency, 0.5 μ V signal to channel 12.
2. Adjust R86 for an S1 meter indication.

b. S-Meter Adjust

1. Couple an on frequency, 50 μ V signal to channel 12.
2. Adjust R91 for an S9 meter indication.

TRANSMITTER TUNEUP

PREDRIVER AND POWER AMPLIFIER AND FILTER

- a. Predriver
 1. Tune T12 and T13 for maximum power output.
 2. Tune T10 and T11 for maximum power output.
- b. Power Amplifier
 1. Tune L6 and L7 for a power output between 2.8 and 3.8 watts.
 2. Tune L6 for minimum transmitter current while maintaining a power output between 2.8 and 3.8 watts.

TRANSMITTER FREQUENCY CHECK

To check the transmitter frequency, proceed as follows:

1. Loop couple a frequency counter or meter to L7.
2. Refer to Table 1 for channel frequencies and replace crystals as necessary to maintain a channel frequency tolerance of $\pm 0.005\%$.

TABLE 1 CHANNEL FREQUENCIES			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	26.965	13	27.115
2	26.975	14	27.125
3	26.985	15	27.135
4	27.005	16	27.155
5	27.015	17	27.165
6	27.025	18	27.175
7	27.035	19	27.185
8	27.055	20	27.205
9	27.065	21	27.215
10	27.075	22	27.225
11	27.085	23	27.255
12	27.105		

Note:
FCC Regulations require all measured channel frequencies to be within $\pm 0.005\%$ from these listed channel center frequencies.

CRYSTAL STARTING AND MODULATION CHECK

- a. Switch between channels 1 and 23 and check for normal crystal starting.
- b. Check for normal waveform and percent of modulation.
 1. Couple the oscilloscope RF pickup loop to L7. Refer to Figure 5-4 in the Messenger 122-123A Service Manual.
 2. Set the audio generator frequency to 1 kHz and couple a -33 dB audio input through a 6800 pF series capacitor to the base of Q9. The oscilloscope should indicate at least 50% modulation.
 3. Increase the audio generator level to -17 dB. The oscilloscope should indicate not less than 80% or more than 100% modulation on both negative and positive peaks.
- c. Check each channel for clean modulation and absence of oscillations.
 1. Adjust T12 and T13 as necessary to eliminate modulation distortion.
- d. Speak into the microphone and check for normal modulation.

FINAL CHECKOUT

- a. Connect a Bird Model 43 with a 10A element or equivalent wattmeter into the transmission line.
- b. Adjust the antenna for best VSWR following the manufacturer's instructions. The transceiver has been aligned at the factory and the output network will not normally require tuning to match it to the antenna. The measured VSWR should be 1.5 to 1 or less.
- c. Check the transmitter power output. Typical power is 3.5 watts.
- d. Check the transmitter frequency, the maximum allowable tolerance from the center frequency is $\pm 0.005\%$.
- e. Check the modulation, minimum acceptable is 80% upward and downward.
- f. Give the transceiver a complete operational checkout. Make several contacts with other units in the system and correct any noise suppression problems that may affect transceiver performance.