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M E S S E N G E R

1 2 3

CITIZENS RADIO TRANSCEIVER
MODEL NO. 242-123

TABLE OF CONTENTS

SECTION	PAGE	SECTION	PAGE
1 GENERAL INFORMATION	5	3.8 Noise Suppression	13
1.1 Scope of Manual	5	3.9 Modification for Positive Ground	14
1.2 Factory Customer Service	5	4 CIRCUIT DESCRIPTION	15
1.3 Factory Returns	5	4.1 General	15
1.4 Purchase of Parts	5	4.2 Frequency Synthesizer	15
1.5 Description	5	4.3 Receiver	17
1.6 Serial Number Interpretation	5	4.4 Transmitter	18
2 SPECIFICATIONS	6	4.5 Meter	18
2.1 General	6	5 SERVICING	19
2.2 Receiver	6	5.1 General Servicing Information	19
2.3 Transmitter	6	5.2 Transistor Troubleshooting	19
2.4 Power Source Required	6	5.3 Receiver Performance Test	21
2.5 117 Volt Power Supply	6	5.4 Transmitter Performance Test	25
2.6 Accessories	8	5.5 Synthesizer	26
2.7 Specifications	8	6 ALIGNMENT	28
3 INSTALLATION	9	6.1 General	28
3.1 Vehicle Installation	9	6.2 Receiver	28
3.2 Power Cable Installation	10	6.3 Transmitter Alignment	29
3.3 Antenna Installation	10	6.4 Meter Adjustment	29
3.4 Dash Mounting Installation	10	7 PARTS LIST	30
3.5 Microphone Hanger Installation	12		
3.6 Base Station Installation	12		
3.7 Final Checkout	13		

LIST OF ILLUSTRATIONS

FIGURE	PAGE	FIGURE	PAGE
2-1 Messenger 123, Front View	7	5-2 Noise Limiter Test Generator	21
2-2 Messenger 123, Rear View	7	5-3 Oscilloscope RF Pickup and Method of Connection	25
3-1 Transceiver Dash Mounting Details	10	5-4 Transmitter Waveforms	25
3-2 Items Supplied for Installation	10	5-5 Crystal Mounting Details	26
3-3 UHF Coaxial Connectors Assembly Instructions	11	5-6 Semi-Conductor Case Diagrams	26
3-4 Base Station Mounting Details	12	6-1 Alignment Tool Required	28
3-5 Ignition System Noise Suppression Schematic	12	6-2 Alignment Points	29
3-6 Positive Ground Conversion Details	13	Circuit Board Layout(Transparency)	
4-1 Block Diagram	16	Schematic Diagram	
5-1 Test Connection for In-Circuit Transistor Testing	20		

LIST OF TABLES

TABLE	PAGE	TABLE	PAGE
3-1 Items Supplied For Installation	9	5-4 Typical AGC Levels	24
3-2 Items Supplied For Operation	9	5-5 Typical RF and IF Levels In Receiver	24
4-1 Synthesizer Scheme	15	5-6 Frequency Synthesizer Troubleshooting	26
5-1 Out Of Circuit Transistor Measurements	21	5-7 Limits for Transmitter Variation	27
5-2 Test Instruments Required For Servicing and Alignment	22	5-8 Synthesizer Crystal Troubleshooting	27
5-3 Typical Audio Levels	23	5-9 Typical Component Resistance Readings	27

SECTION 1 GENERAL INFORMATION

1.1 SCOPE OF MANUAL

This service manual includes servicing and alignment instructions for the Messenger 123 Transceiver.

Revision notices will be published as this unit is revised. Insert these notices in order at the back of this service manual.

1.2 FACTORY CUSTOMER SERVICE

A liaison between the customer and the factory is provided by the E. F. Johnson Company Customer Service Department. This department is available for consultation and assistance on technical problems, parts information, and availability of local and factory repair facilities.

If it is necessary to write to the Customer Service Department, please include any information you feel will help solve your problem.

For any of the above requirements contact:

E. F. JOHNSON COMPANY
Customer Service Department
Waseca, Minnesota 56093

1.3 FACTORY RETURNS

Normally, repair service is available locally through authorized Johnson Citizens Band Radio Service Centers; a

list of these service centers is available upon request from the factory Customer Service Department. Do not return any equipment to the factory without authorization from the Customer Service Department.

1.4 PURCHASE OF PARTS

The authorized Johnson Service Centers stock commonly needed replacement parts. If a part is not available locally it may be ordered from the Customer Service Department. When ordering please supply the following information:

Model number of the unit
Serial number of the unit
Description of the part
Part number of the part

1.5 DESCRIPTION

The Messenger 123 is a 23 channel Citizens Band transceiver. A 14 crystal, 23 channel solid state frequency synthesizer generates either the transmitter frequency or the mixing frequency for the receiver mixer. The synthesizer outputs are electronically switched between transmit and receive by diodes.

Supply voltage to operate the transceiver is provided by the vehicle battery in mobile operation or by the base station power supply, Model 239-125-1, in base operation.

1.6 SERIAL NUMBER INTERPRETATION

The E. F. Johnson Company utilizes a white adhesive-backed cloth printed with the unit serial number and attached to the back of the transceiver chassis rail. Each serial number contains an alphabetical designator which indicates a major revision. For example: An A in the serial number indicates that the unit includes all the changes specified in revision A. Units with a major revision are referred to by their alphabetical designator in this manual. A unit with revision A is called an A model, with revision B a B model, etc.



SECTION 2 SPECIFICATIONS

Electrical specifications are nominal unless otherwise stated.

2.1 GENERAL

Frequency Range	26,965 - 27,255 MHz
Channels	23
Dimensions of Enclosure	2 1/2" high x 6 3/16" wide x 8 3/4" deep
Unit Weight	Approximately 5 lbs.
Shipping Weight	Approximately 6 lbs.
Metering	S meter and Relative RF Output
Microphone	High capacity ceramic element. Cylolac case. Push-to-talk switch, hang-up stud.
Circuitry	17 transistors, 13 diodes
Compliance	FCC Type Accepted Rule 95 (D) DOT Type Approved RSS 136

2.2 RECEIVER

Sensitivity	10 dB (S + N)/N ratio with 0.5 microvolts at the antenna terminal (30% modulation at 1000 Hz).
Selectivity	6 kHz bandwidth at -6 dB 30 kHz bandwidth at -60 dB
Frequency Control	±0.005% crystal from -30° C to +50° C
Spurious Rejection	47 dB except image of 18 dB
Antenna Impedance	50 ohms
Audio Output Power	3 watts at 10% distortion
Squelch Range	0.3 to 15 microvolts at the antenna terminal
Squelch Sensitivity	1 dB or less signal change for 40 dB of quieting at 1 microvolt at the antenna terminal.
Squelch Noise Immunity	Highly immune to impulse-type noise.

Intermediate Frequencies	455 kHz
AGC Characteristics	Flat within ±6 dB from 250,000 to 5 microvolts at the antenna terminal with 18 dB rolloff from 5 to 0.5 microvolts for superior noise quieting.
Noise Limiting	Series-type, automatic threshold adjustment and IF clipping.
Circuitry	All transistor single conversion.

2.3 TRANSMITTER

Emission	6A3
Frequency Control	±0.005% crystal from -30° C to +50° C
DC Power Input	5 watts maximum at 13.8 VDC
RF Power Output	3.5 watts at 13.8 VDC
RF Spurious and Harmonic Attenuation	Better than FCC and DOT requirements.
Output Impedance	50 ohms
Audio Input Impedance	1000 ohms
Audio Frequency Response	±4 dB 400-3000 Hz
Modulation	High level AM, class B modulator, speech compression, clipping and audio filtering.
Circuitry	All transistor solid state.

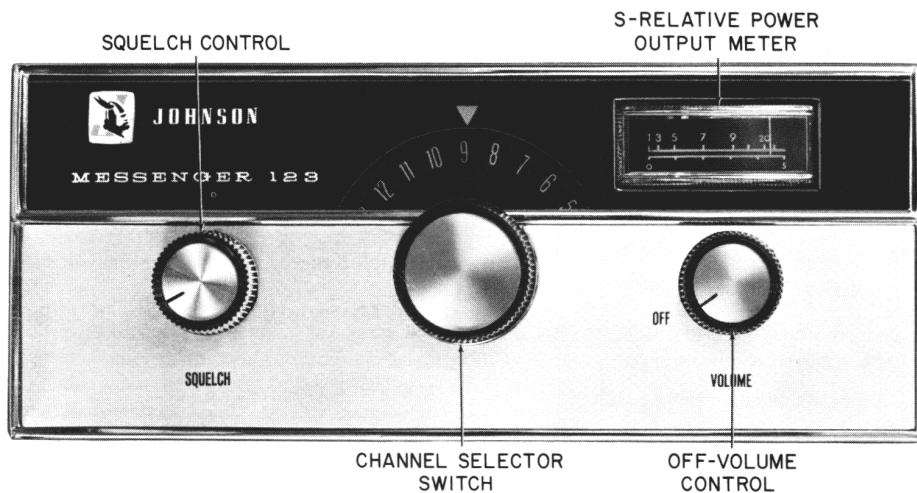
2.4 POWER SOURCE REQUIRED

13.8 volts DC input
 Receive: Squelched .35 ampere
 Transmit: .85 ampere

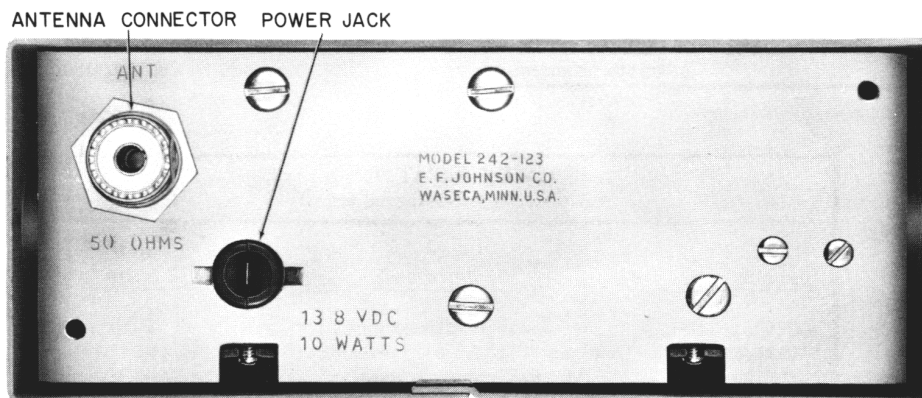
2.5 117 VOLT POWER SUPPLY

117 volt AC, 50-60 Hz. Input with Model 239-125-1 AC Power Supply. 39 watts maximum. Dimensions: 2 1/2" high x 6" wide x 8" deep. Weight: 2 1/2 lbs.

Circuit Protection	0.3 ampere fuse
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FRONT VIEW
FIGURE 2-1



REAR VIEW
FIGURE 2-2

2.6 ACCESSORIES

250-845-2	Power Pack
239-120-1	Inverter
250-49-1	Matchbox, C.B.
250-849-1	Antenna Meter
250-826-1	Ni-Cad Rechargeable Battery
137-828-1	4 ft. fiberglass antenna - 27 MHz
250-1801-1	Car Noise Suppressor Kit
142-1801-5	100 ft. coaxial cable
142-1801-4	50 ft. coaxial cable
239-125-1	117 VAC Power Supply

The E. F. Johnson Company reserves the right to change prices or specifications without notice and without incurring obligation.

2.7 SPECIFICATIONS (MINIMUM PERFORMANCE)

The specifications listed in this section are absolute service minimums. Receiver RF input values are given

at the antenna terminal and are typically 1/2 the level into a 6 dB pad.

2.7.1 RECEIVER

Sensitivity	7 dB minimum at 1.0 microvolt
Audio Output Power	0.09 watts minimum at 0.5 microvolts
Squelch Range	15 microvolts minimum
AGC Characteristics	20 ±10 dB rolloff from 500 to 0.5 microvolts

2.7.1 TRANSMITTER

RF Power Output	2.8 watts minimum and 4.0 watts maximum at 13.8 VDC
Modulation	70% minimum upward

SECTION 3 INSTALLATION

3.1 VEHICLE INSTALLATION

3.1.1 Antenna

A good antenna installation is essential for satisfactory transceiver performance. Consider the easiest route for the transmission line when selecting the antenna location. A level unobstructed area, such as the roof, will generally provide the best ground plane. The trunk area can also be used. Avoid the hood area for antenna mounting.

3.1.2 Transceiver

Mount the transceiver with best maintenance accessibility and operating convenience in mind. The dash mounting bracket necessary for vehicle installation is supplied with the transceiver. Refer to the instructions in section 3.4 when installing the dash mounting bracket.

3.1.3 Items Supplied for Installation and Operation

Check the items listed in Table 3-1 against the items supplied with the transceiver to insure that the necessary items are on hand for installation and operation.

3.1.4 Special Tools Required

The following tools should be on hand when installing the transceiver.

center punch

1/4" electric drill

No. 43 drill (0.089 inch diameter) for drilling starter holes for the No. 4 self-tapping sheet metal screws used to mount the microphone hanger if the holes provided in the cabinet shell are not used.

No. 21 drill (0.159 inch diameter) for drilling holes for the No. 10 transceiver mounting bracket screws.

TABLE 3-2
Items Supplied for Operation

	<u>Part Number</u>
Operating Manual	002-0071-001
Part 95 - FCC Rules	022-1635-001
FCC Form 505	022-1636-001
License application form	
Transmitter identification card	564-1001-001
Warranty registration card	041-0419-014
Schematic diagram	564-3001-123

TABLE 3-1
Items Supplied for Installation

<u>Item in Figure 3-1</u>	<u>Qty.</u>	<u>Description</u>	<u>Part Number</u>
1	1	Dash Mounting Bracket	017-1363-001
2	2	Screws, 1/4-20 (3/8" hex head) for dash mounting bracket.	011-0322-012
3	2	Cushion washers for dash mounting bracket.	018-0822-001
4	2	Screws, 10-32 x 5/8, for dash mounting bracket.	011-0229-020
5	2	Lockwashers, No. 10, for dash mounting bracket.	029-0001-003
6	2	Nuts, No. 10, for dash mounting bracket.	012-0109-002
7	1	Microphone hanger	537-9004-002
8	2	Screws, No. 4 self-tapping, for microphone hanger.	011-0807-006
9	1	Tap connector for connecting power lead from transceiver to ignition switch.	023-2209-001
10		Power cable	023-1652-001

3.2 POWER CABLE INSTALLATION

CAUTION

The Messenger 123 is wired for negative ground operation at the factory. Serious damage will result if it is installed in a positive ground vehicle without first performing the modification outlined in Section 3-9. If desired, an E. F. Johnson Inverter, Model 239-120, can be substituted for the positive ground modification.

- a. Connect the cable to the accessory terminal of the vehicle ignition switch or to another 12 VDC source using the tap connector illustrated in Figure 3-2. Installation instructions are on the front of the tap connector package.
- b. The power cable does not contain a ground lead. The ground is obtained through the outer connector of the transmission line or the dash mounting bracket.

3.3 ANTENNA INSTALLATION

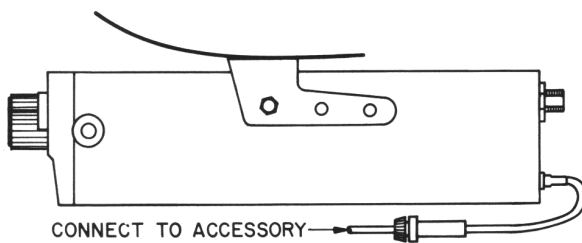
- a. Refer to the instructions included with the antenna for installation details.
- b. Route the transmission line.
- c. Install the coaxial connectors. Refer to Figure 3-3 for details.

3.4 DASH MOUNTING INSTALLATION

(Refer to Figure 3-1)

CAUTION

Avoid installing the transceiver in the direct air stream of the vehicle heater. Temperatures in this area can measure up to 150° F and can cause component failures.



TRANSCEIVER DASH MOUNTING DETAILS
FIGURE 3-1

- a. Determine the transceiver location.
- b. 1. Hold the transceiver in its proposed location with the mounting bracket (item 1 in Figure 3-2) attached. Mark the mounting bracket location.
2. Remove the mounting bracket from the transceiver.
3. Hold the mounting bracket up to the dash at the location you marked. Mark the mounting bracket slot positions. Check for a free space behind the dashboard in the area marked (no obstructions such as wires, brackets, etc.)
4. Center punch and drill two holes separated as much as the mounting bracket and area selected allow, using a No. 21 drill.
- c. Install the mounting bracket. Use the No. 10 hardware illustrated by items 4, 5 and 6 in Figure 3-2.
- d. Install the transceiver in the mounting bracket. Use items 2 and 3 illustrated in Figure 3-2.

NOTE

Do not connect transmission line to the transceiver antenna terminal until after final checkout.

- e. Attach the power cable to the transceiver power jack.
- f. Perform the steps in section 3.7.

