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M E S S E N G E R

I I I

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CITIZENS RADIO TRANSCEIVER

MODEL NO. 242-143

MODEL NO. 242-149

MODEL NO. 242-150

TABLE OF CONTENTS

SECTION	SECTION	PAGE	
1 GENERAL INFORMATION	4	4 CIRCUIT DESCRIPTION	15
1.1 SCOPE OF THIS MANUAL	4	4.1 GENERAL	15
1.2 FACTORY CUSTOMER SERVICE	4	4.2 RECEIVER	15
1.3 FACTORY RETURNS	4	4.3 TRANSMITTER	17
1.4 PURCHASE OF PARTS	4		
1.5 DESCRIPTION	4		
2 SPECIFICATIONS	5	5 SERVICING	18
2.1 GENERAL	5	5.1 TRANSISTOR TROUBLESHOOTING	18
2.2 RECEIVER	5	5.2 RECEIVER SERVICING	20
2.3 TRANSMITTER	7	5.3 TRANSMITTER	28
2.4 POWER SOURCE REQUIRED	7		
2.5 ACCESSORIES	7	6 ALIGNMENT	31
3 VEHICLE INSTALLATION	8	6.1 GENERAL	31
3.1 GENERAL	8	6.2 RECEIVER ALIGNMENT CHART	31
3.2 NOISE SUPPRESSION	8	6.3 TRANSMITTER ALIGNMENT CHART	32
3.3 POSITIVE GROUND CONVERSION	12		
3.4 CHANNEL NUMBER INSTALLATION	13	7 PARTS LIST	35

LIST OF ILLUSTRATIONS

FIGURE	PAGE	FIGURE	PAGE
1. Front View	6	12. AGC and Audio Curve	23
2. Rear View	6	13. Test Instrument Connections	25
3. Connections for Accessory Operated Power Relay	9	14. DC Ammeter Connections	27
4. UHF Coaxial Assembly Instructions	10	15. Oscilloscope RF Pick-up Loop	28
5. Positive Ground Conversion	12	16. Audio Generator Connections to P3	29
6. Front Panel Exploded View	13	17. Transmitter Test Instrument Connections	29
7. Block Diagram	14	18. Notching Waveform	32
8. Squelch Voltage in the Squelched and Unsquelched Condition	16	19. RF Probe for AC-VTVM	33
9. Test Connections for In-Circuit Transistor Testing	18	20. Transmitter Current Power Curve	33
10. Receiver Test Instrument Connections	21	21. Alignment Points	33
11. VTVM Test Assembly	21	22. Parts not on Transparency	34
		23. Transistor Case Diagrams	34
		Transparency Schematic	

SECTION 1

GENERAL INFORMATION

1.1 SCOPE OF THIS MANUAL

This service manual includes servicing and alignment instructions for the Messenger III and 300 Transceivers. A special section on installation and mobile noise suppression is included.

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 a complete system diagram. Especially important are accessories used, attachments and modifications effected during or after installation.

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 Business/Industrial 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. In case 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

1.5 DESCRIPTION

The Messenger III, Model 242-150 (eleven channels), Model 242-143 (twelve channels) and Messenger 300, Model 242-149 (twelve channels) are 5 watt DC input to the final RF stage Citizens Radio transceivers. The Messenger III, Model 242-150 has an eight pin power receptacle. The Messenger III, Model 242-143 and Messenger 300, Model 242-149 have single pin power receptacles. The basic transceivers weigh 5 1/2 pounds and are completely solid state. Supply voltages to operate the transceivers are provided by the vehicle's battery in mobile operation or by an AC operated 13.8

DESCRIPTION (cont'd)

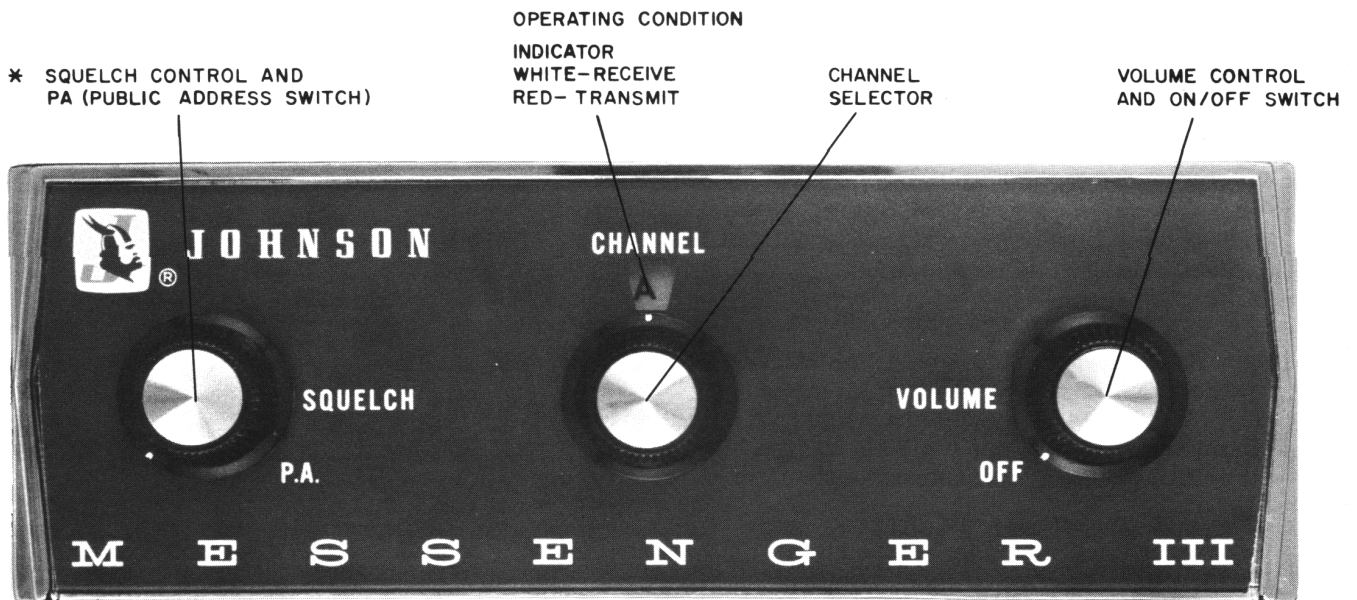
Volt DC power supply in base station operation. Specific reference to any Messenger model will be made only where differences exist.

NOTE:

The Messenger 300, Model No. 242-149, is identical to the twelve channel Messenger III, Model No. 242-143, except for a crystal filter in the Messenger 300 which replaces L4, the Messenger III 4.3 MHz IF transformer.

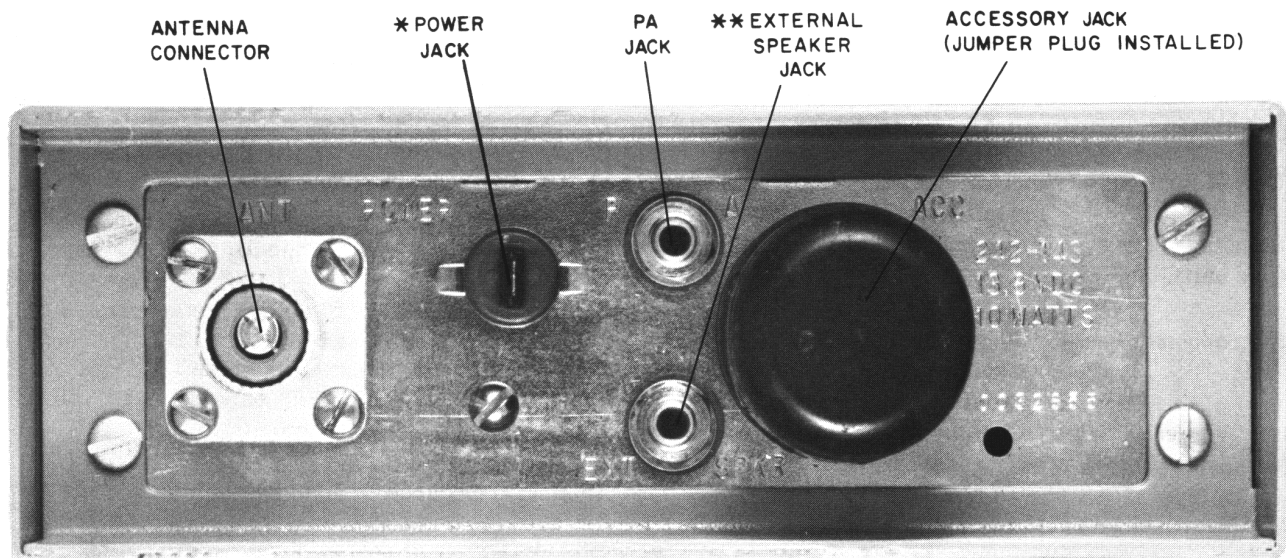
SECTION 2 SPECIFICATIONS

2.1 GENERAL		Sensitivity	8 dB minimum at 0.5 microvolts
Frequency Range	26.965 - 27.255 MHz	Selectivity	
Channels	12 (11 in Model No. 242-150)	Messenger III:	6 kHz bandwidth at -6 dB (nominal) 30 kHz bandwidth at -60 dB (nominal)
Dimensions of Enclosure	2-3/16" high x 6-3/16" wide x 8-3/4" deep	Messenger 300:	7 kHz bandwidth at -6 dB (nominal) 19 kHz bandwidth at -60 dB (nominal)
Unit Weight	Approximately 5 lbs.	Frequency Control	$\pm 0.005\%$ crystal from -30°C to +60°C
Shipping Weight (one unit)	Approximately 7 lbs.	Spurious Rejection	70 dB except image, 50 dB (nominal)
Microphone	High capacity (low impedance) ceramic element. Cyclac case. Push-to-talk switch, hang up stud.	Antenna Impedance	50 ohms (nominal)
Circuitry	18 transistors, 10 diodes and 2 thermistors	Audio Output Power	3 watts minimum at 10% distortion for 1 microvolt input
Compliance	FGC Type Accepted Rule Part 95 DOT Type Approved RSS 136	Speaker Impedance	3.2 ohms (nominal)
2.2 RECEIVER		Squelch Range	15 microvolts minimum
(All microvolts are at antenna terminal; numbers are 1/2 the microvolts into a 50 ohm 6 dB pad)		Squelch Sensitivity	1 dB or less signal change for 40 dB of quieting at 1



* THE TRANSMITTER IS DISABLED WHEN THE SQUELCH CONTROL IS SWITCHED TO PA POSITION

FRONT VIEW
FIGURE 1



* ON THE MESSENGER III, MODEL 242-150 THE POWER RECEPTACLE IS AN EIGHT PIN MALE PLUG.

** THE INTERNAL SPEAKER IS DISCONNECTED WHEN AN EXTERNAL SPEAKER IS CONNECTED.

REAR VIEW
FIGURE 2

SPECIFICATIONS (cont'd)

	microvolt		Transmit: 0.7 amp
Squelch Noise Immunity	Highly immune to impulse-type noise		
Intermediate Frequencies	4.3 MHz and 455 kHz		
AGC Characteristics (See Figure 12)	12 \pm 6 dB roll-off from 500 to 0.5 microvolts		
Noise Limiting	Series-type, automatic threshold adjustment and IF clipping		
2.3 TRANSMITTER		2.5 ACCESSORIES	
Emission	8A3	12" fiberglass antenna - 27 MHz	137-829-xxx
Frequency Control	\pm 0.005% crystal from -30°C to +60°C	4' fiberglass antenna - 27 MHz	137-828-xxx
DC Power Input	5 watts maximum at 13.8 VDC	Tone Alert	250-861-xx
RF Power Output	3 watts minimum at 13.8 VDC	External Speaker	250-822-1
RF Spurious and Harmonic Attenuation	Better than FCC and DOT requirements (FCC and DOT type accepted)	Ni-Cad rechargeable battery	250-826-1
Output Impedance	50 ohms (nominal)	Power Pack for Messenger III, Model 242-143 and Messenger 300, Model 242-149	250-856-2
Audio Input Impedance	1000 ohms (nominal)	Portable Pack for Messenger III Model 242-143 and Messenger 300, Model 242-149	250-825-3
Audio Frequency Response	\pm 4 dB 400-3000 Hz	117 volt power supply and Tone Alert for Messenger III, Model 242-143 and Messenger 300, Model 242-149	239-123-xx
Modulation	High level AM, class B modulator, speech compression, clipping and audio filtering	117 volt AC power supply for Messenger 300 and III, Model 242-143	239-125-1
Circuitry	All transistor solid state	In-Converter	239-120
2.4 POWER SOURCE REQUIRED		Car noise suppression kit	250-801-1
	13.8 volt DC input	100' coaxial cable	142-801-2
	Receive: Squelched 0.2 amp	50' coaxial cable	142-801-1

SPECIFICATIONS (cont'd)

Power cable for Messenger III, Model 242-143 and Messenger 300, Model 242-149	023-1652-001	12 VDC battery cable (negative ground), for Messenger III, Model 242-150	023-1657-001
12 VDC battery cable (positive ground), for Messenger III, Model 242-150	023-1658-001	Antenna Meter	250-849
		CB Matchbox	250-49

SECTION 3 VEHICLE INSTALLATION

3.1 GENERAL

A good antenna installation is essential for satisfactory transceiver performance. Select a good antenna location carefully. A level unobstructed area will generally provide the best ground plane. When necessary, the trunk lid area will suffice as an antenna location but generally it is not as desirable as the roof area. In most instances, the hood area is less suitable for antenna installation and use of this area for antenna mounting should be discouraged.

When selecting the antenna location consider the easiest and shortest route for the transmission line.

The transceiver should be mounted with the best maintenance accessibility and operating convenience in mind. Avoid mounting the transceiver in the direct hot air stream of the vehicle's heater.

If possible, connect the power lead to the accessory section of the ignition switch. This gives the operator the added feature of being able to turn the transceiver on and off with the ignition switch.

When installing the Messenger it is recommended that the following sequence of installation operations be followed.

3.1.1 INSTALLATION SEQUENCE

CAUTION:

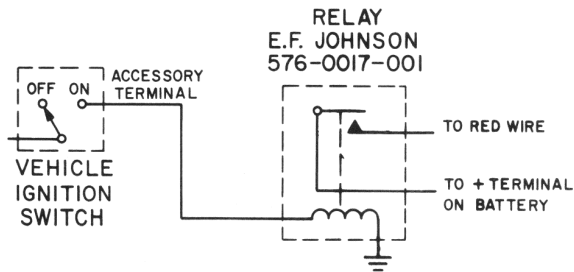
Avoid installing the Messenger in the direct air stream from the vehicle's heater as temperatures in this area can measure to 150°F which can result in component failure.

1. Install the antenna and transmission line.
2. Install the transceiver's dash mounting bracket with the hardware provided.
3. Install the microphone holder.
4. Install the transceiver in the dash mounting bracket.
5. Connect the power lead to the accessories section of the ignition or to the "hot" side of the battery.

NOTE:

In some cases of severe DC line noise, the accessory terminal is not a desirable place to obtain B+ for the transceiver as the windshield wipers, heater, turn signals, air conditioning, windshield washer and ignition sometimes all draw from the same line. Although the transceiver contains a noise filter it may not remove all noise generated on the accessory line. In this case, a direct line to the battery, or an accessory switch operated relay connected directly to the battery, is a good solution. See Figure 3.

VEHICLE INSTALLATION (cont'd)



CONNECTIONS FOR ACCESSORY SWITCH
OPERATED POWER RELAY
FIGURE 3

6. Trim the antenna for minimum VSWR.
7. Test drive the vehicle.
8. Instruct the operator in the proper operation of the Messenger and correct voice communications procedures.

3.1.2 ANTENNA AND TRANSMISSION LINE INSTALLATION

1. Drill the holes necessary to mount the antenna.
2. Route the transmission line from the antenna location to the transceiver. Keep the transmission line as short as possible. Refer to Figure 4 for the correct method of installing UHF connectors. When the installation of the transmission line is complete, check for continuity between the center conductor and the antenna with the antenna end of the transmission line connected. Also check for a shorted transmission line by disconnecting both ends of the line and measuring the resistance between the inner and outer conductors.
3. Install the antenna, following the manufacturer's instructions.

3.1.3 TRANSCEIVER INSTALLATION

1. Select the transceiver's mounting location. Make sure it is not in the direct air stream

of the vehicle's heater. Using the mounting bracket as a guide drill the bracket mounting holes. Secure the mounting bracket.

2. Install the transceiver in the mounting bracket. Tighten the mounting bracket to the transceiver's cabinet.
3. Install the microphone holder.

3.1.4 ANTENNA TRIMMING

1. Insert a Johnson Model 250-849 Antenna Meter into the transmission line.
2. Key the transmitter and trim the antenna for the best VSWR. This should be a ratio of 1.5:1 or better.

3.1.5 OPERATIONAL CHECKOUT

1. While test driving the vehicle give the transceiver a complete operational checkout. Make several contacts with the base station. If vehicle noise degrades the transceiver's performance, read the section on noise suppression and take appropriate action to correct any noise suppression deficiencies.

3.2 NOISE SUPPRESSION

3.2.1 NEED FOR NOISE SUPPRESSION

Any radio installed in an automobile or truck has to contend with electrical noise generated by the engine's ignition system and generator system when the engine is running. Of course, when the engine is not running, the noise is not present. However, if the radio is to be really useful and versatile, it must be able to receive weaker radio signals while the vehicle is traveling at reasonably high rates of speed. Unfortunately, the electrical noise from the engine increases as the engine speed increases. This noise takes the form of whining, popping, crackling, etc. and can make it difficult to understand a voice through the interference. It can completely "cover up" weak signals when the vehicle is operating at extended distances from the base station or other mobile stations (in "fringe areas"). Therefore, the electrical noise from the engine will materially determine the amount of "range" that the mobile station has

RG-8/U



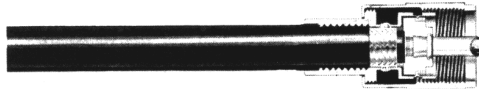
Cut end of cable even. Remove vinyl jacket 1-1/8", except 83-1SP plug remove vinyl jacket 1-1/4".



Bare 5/8" of center conductor. Trim braided shield. Slide coupling ring on cable. Tin exposed center conductor and braid.

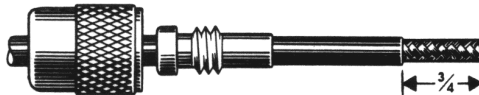


Screw the plug sub-assembly on cable. Solder assembly to braid through solder holes, making a good bond between braid and shell. Solder conductor to contact. Do not use excessive heat.



For final assembly, screw coupling ring on plug sub-assembly.

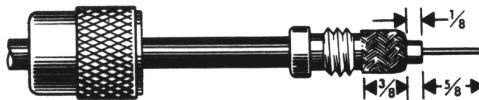
RG-58A/U



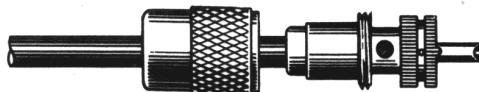
Cut end of cable even. Remove vinyl jacket 3/4". Slide coupling ring and adapter on cable.



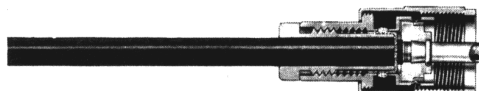
Fan braid slightly and fold back as shown.



Position adapter to dimension shown. Press braid down over body of adapter and trim to 3/8". Bare 5/8" of conductor. Tin exposed center conductor.



Screw plug sub-assembly on adapter. Solder braid to shell through solder holes. Use enough heat to create bond of braid to shell. Solder conductor to contact.



For final assembly, screw coupling ring on plug sub-assembly.

UHF COAXIAL CONNECTORS ASSEMBLY INSTRUCTIONS FIGURE 4

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