

Chapter 4 – Scheduled Maintenance

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4.1 INTRODUCTION

4.1.1

The tests prescribed herein provide a systematic and efficient method for checking and performing routine preventive maintenance on Radio Receiver R-390A/URR. These procedures, when performed as directed, will detect areas of subnormal performance, and also provide for systematic preventive maintenance of the equipment. Those tests that are designated “O.M.” may be performed as part of the Operational Maintenance Program by operating personnel. These tests should only be performed when the line voltage is 117 ± 6 VAC.

4.2 MAINTENANCE REQUIREMENTS INDEX.

Frequency	Procedure	Scheduled Equipment Tests	Time Req'd	Personal Requirement
Quarterly	1	Measure receiver sensitivity	45 min.	ETSN
	2	Measure receiver bandwidth	30 min.	ETSN
	3	Measure AGC level operation	15 min.	ETSN
Semi-Annual	4	Clean and inspect receiver	15 min.	RMSN
	5	Inspect and lubricate the mechanical tuning system	10 mm.	RMSN

Table 4-1 - Scheduled Maintenance Index

4.3 SCHEDULED MAINTENANCE PROCEDURES.

Energize the receiver and test equipment and allow 15 minutes warm-up time. Unless specifically instructed in a test procedure, the receiver controls should be set as indicated in table 4-2.

Control		Position
BFO switch	(S101)	OFF
FUNCTION switch	(S102)	MGC
BREAK IN ON-OFF switch	(S103)	OFF
AUDIO RESPONSE switch	(S104)	WIDE
LINE METER switch	(S105)	OFF
OVENS ON-OFF switch	(S106)	OFF
AGC switch	(S107)	MED
LIMITER switch	(S108)	OFF
BANDWIDTH KC switch	(S501)	8 KC
ANT TRIM control	(C225)	Peaked for each frequency
BFO PITCH control	(L508)	0
RF GAIN control	(R103)	10
LINE GAIN control	(R104)	0
LOCAL GAIN control	(R105)	Adjusted for audible signals
DIAL LOCK control		Counterclockwise

Table 4-2 - Maintenance Procedure Control Settings

If any of the preceding settings are changed in the course of a test procedure, the control should be returned to the position given in the table upon completion of the procedure.

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4.3.1 Procedure Q1 - Measure Receiver Sensitivity.

Periodicity: Quarterly
Time Required: 45 min.
Test Equipment: Signal Generator AN/URM-25()

1. Energize and set receiver controls as given in paragraph 4.3.
2. Connect the RF OUTPUT jack of Signal Generator AN/URM-25() to receiver ANTENNA UNBALANCED jack J103.
3. Tune the receiver and signal generator to 750 kHz.
4. Turn BFO switch S101 to ON.
5. Set the signal generator controls for CW operation 100 μ V output, and tune the signal generator frequency control for a zero beat with the receiver. To zero beat, turn LINE METER switch S105 to 0, LINE GAIN control R104 for an indication on LINE LEVEL meter M101 and tune the signal generator frequency for the bottom of the dip between two peaks on LINE LEVEL meter M101.
6. Turn BFO switch S101 to OFF.
7. Turn output of signal generator to minimum.
8. Adjust LINE GAIN control R104 for -10 VU reading on LINE LEVEL meter M101.
9. Adjust the output of the signal generator for 30% modulation at 1000 Hz.
10. Increase the signal generator output until the LINE LEVEL meter M101 reads -5dB and adjust ANT TRIM control C-255 for a peak on the meter.
11. Repeat Step 8¹
12. Increase the signal generator output until a 0 VU indication is read on the line level meter.
13. The signal generator output should be less than 3 μ V.
14. Repeat the procedure for each of the frequencies listed in table 4-3. If these sensitivity requirements are not met, perform trouble isolation procedures given in paragraph 5.5.

Table 4-3 - Frequency Chart

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
3.25	15.75	25.75
8.25	18.25	28.25
10.75	20.75	30.75
13.25	23.25	

¹Courtesy of David Wise

4.3.2 Procedure Q2 - Measure Receiver Bandwidth

Periodicity: Quarterly
Time Required: 30 min.
Test Equipment: Signal Generator AN/URM-25()
Electronic Multi-meter AN/USM-116()

1. Energize and set receiver controls as given in paragraph 4.3.
2. Connect the RF OUTPUT jack of Signal Generator AN/URM-25() to receiver ANTENNA UNBALANCED jack J103.
3. Connect Electronic Multi-meter AN/USM-116() to DIODE LOAD jack on the front of the receiver.
4. Set BANDWIDTH KC switch S501 to position 1.
5. Tune both the receiver and signal generator to 1 MHz.
6. Adjust the KILOCYCLE CHANGE control for a peak indication on the electronic multi-meter.
7. Adjust the signal generator output for a reading of 5 volts on the electronic multi-meter.
8. Tune the receiver KILOCYCLE CHANGE control to one side of the center frequency until the multi-meter reads 2.5 volts. Note the frequency indicated on the receiver frequency counter.
9. Tune the receiver KILOCYCLE CHANGE control to the other side of the center frequency until the meter reads 2.5 volts. Note the frequency indicated on the receiver frequency counter.
10. Subtract the lower from the higher of the two frequency readings for the receiver bandwidth.

Repeat this test for the other positions of BANDWIDTH KC switch S501. Refer to table 4 - 4 for the normal bandwidth for each position. If bandwidth is less than the given values, check IF and RF alignment (para. 6.2.7, 6.2.10, 6.2.11, and 6.2.12).

Table 4-4 - Normal Bandwidths

*Bandwidth Settings	Normal Bandwidths
1	0.8 to 1.3
2	1.9 to 2.3
4	3.6 to 4.4
8	7.5 or more
16	12 or more

*No bandwidth test is required for 0.1 KC setting.

4.3.3 Procedure Q3 - Measure AGC Level to Carrier Level.

Periodicity: Quarterly
Time Required: 15 min.
Test Equipment: Signal Generator AN/URM-25()

1. Energize and set receiver controls as given in paragraph 4.3.
2. Connect the RF OUTPUT jack of Signal Generator AN/URM-25() to receiver ANTENNA UNBALANCED jack J-103.
3. Turn FUNCTION switch S102 to AGC position.
4. Tune signal generator and receiver to 15 MHz.
5. Increase signal generator output until a 20 dB reading is indicated on CARRIER LEVEL meter M102.
6. Increase the signal generator output in 20 dB steps and check that the carrier level meter reading increases 20 dB per step ± 2 dB. If readings do not meet these requirements, perform trouble isolation tests in table 5-5, steps 17, 18 and 19.

4.3.4 Procedure SA4 - Operator's Maintenance (O.M.) Clean and Inspect Receiver.

Periodicity: Semi-annual
Time Required: 15 min.
Test Equipment: Dry brush Solvent, Navy type 140 - F
Pressurized dry air

1. Secure main power to receiver.
2. Use a clean, dry, lint-free cloth or a dry brush to remove dirt and accumulated matter from receiver parts. Use cleaning solvent, Navy type 140-F, for especially stubborn deposits. Use clean dry air from portable blower unit for lighter sediments in hard to reach areas.
3. Tighten all loose screws, bolts and nuts.
4. Inspect all cables and wiring for frayed, cut, deteriorated, or cracked insulation. Report all such conditions found.
5. All tubes should be checked for looseness by firm pressure applied downward. All tube shields and clamps must be locked in position.
6. Inspect resistors and other components for indications of overheating. If such indication is observed, further maintenance is necessary.

4.3.5 Procedure SA5 - Inspect and Lubricate the Mechanical Tuning System (O. M.).

Periodicity: Semi-annual
Time Required: 10 min.
Test Equipment: Lubricant MIL-L-7970
Lubricant MIL-G-7421

1. Secure main power to the receiver.
2. Inspect the gear trains and cam racks for lubrication.
3. Turn the MEGACYCLE CHANGE and KILOCYCLE CHANGE controls throughout their ranges and observe that all gears, cams and shafts, bearings and guide slots operate smoothly.
4. Check the operation of BFO PITCH control L508 for free operation.
5. Lubricate in any of the above steps as necessary for proper operation. Use one drop of MIL-L-7970 for cam rollers and shaft bearings. Use MIL-G-7421 sparingly for guide slots and gears.

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