

TMC SPECIFICATION

NO. S 1146

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COMPILED: WMR

CHECKED: RBY

APPD: *[Signature]*

SHEET 1 OF 12

TITLE:

typed by vita

10/13/66

TEST PROCEDURE

FOR THE

MONITOR CONTROL UNIT

MCU-2 (50-70)

MCU-2A (50-70)

PART OF

ANTENNA TUNING SYSTEM

ATS-2

ATS-2A

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SHEET 2 OF 12

TITLE: TEST PROCEDURE FOR THE MONITOR CONTROL UNIT - P/O ANTENNA TUNING SYSTEM

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I. PURPOSE:

- A. This procedure specifies the method of performing electrical tests for the MCU-2 which is a component of the Antenna Tuning System, ATS-2.
- B. This procedure is equally applicable for both 50 ohm and 70 ohm calibration by using the appropriate load and RF cables.
- C. This procedure is equally applicable for the MCU-2, and MCU-2A. The MCU-2 must be tested with the TU-2, and the MCU-2A with the TU-2.

II. TEST EQUIPMENT REQUIRED:

- A. Directional Coupler Unit, TMC Model CU-2.
- B. Antenna Tuner Unit, TMC Model TU-2, or TU-2A, as applicable.
- C. RF Wattmeter, Bird ThruLine Model 43, or equivalent.
- D. Plug-in elements for the above wattmeter:
 1. 2-30 MHz, 1KW
 2. 2-30 MHz, 100W
- E. General Purpose Transmitter, TMC Model GPT-750, or equivalent transmitter with continuous rating of 1KW (CW) output, 2-30 MHz.
- F. Antenna, RF Dissipator, 50 ohm, unbalanced, 1KW average, Bird Model 8833 (with associated RG-8/U, 50 ohm cables) or equivalent.
- G. Antenna, RF Dissipator, 70 ohm, unbalanced, 1750 watts average, TMC Model TER-3500-70-U (with associated RG-11/U, 70 ohm cables), or equivalent.
- H. ATS-2, -2A interconnecting cable, CA-499.
- I. ATS-2, -2A interconnecting cable, CA-541-XXX.

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III. TEST PROCEDURE:

WARNING: This procedure requires the use of RF energy from the transmitter. Failure to follow safety precautions may result in serious injury, shock, or even death. Use extreme caution around uncovered RF leads in the Directional Coupler Unit, and the Antenna Tuner Unit. Follow instructions carefully. Each time the procedure calls for Transmitter power to be OFF, use the FINAL PLATES switch and turn the DRIVE control fully counter-clockwise. Ensure that the transmitter and all components in the test set-up are well grounded.

NOTE: References in this procedure to the MCU apply equally to both the MCU-2 and the MCU-2A. A special additional test applicable to the MCU-2A will be covered in paragraph III, A.3.

A. PRELIMINARY CHECKS:

1. Inspect the unit for mechanical defects, proper type and placement of vacuum tubes, and obvious wiring errors.
- *2. Set POWER switch to SHORT position. Check power light for indication. If the red and black needles of the VSWR meter do not rest on zero, adjust the screwheads at the needle hubs for a zero indication.

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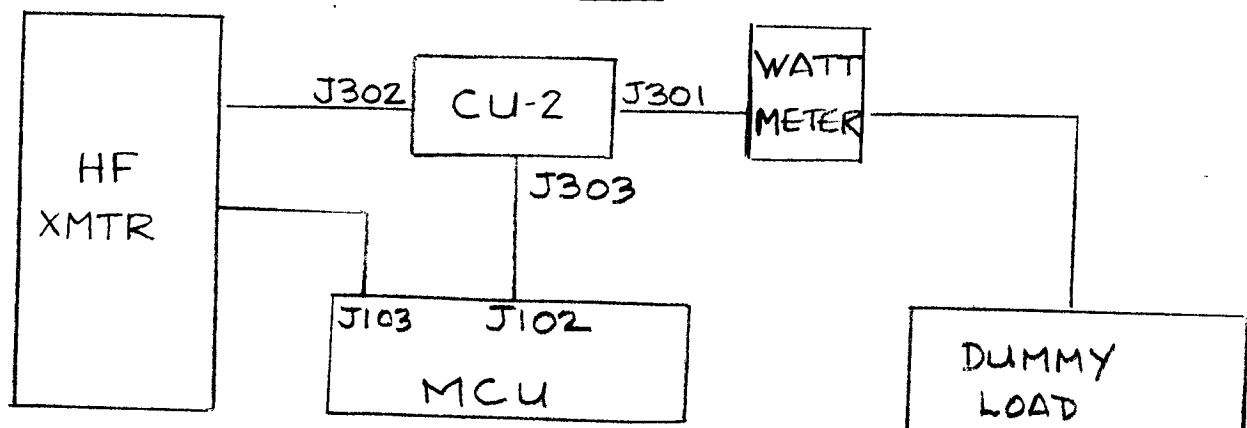
*3. For the MCU-2A only:

Place the MCU Power switch in the OFF position. Use a VOM to check for continuity between pins I and H of J101. Depress resistance switch J201 and check for an infinite reading between pins I and J of J101.

4. Connect the unit and test equipment as shown in Figure 1 with the CU-2 hooked up in the reversed position; that is, with the dummy load connected to J301 of the CU-2, and the GPT-750 connected to J302. Insert the wattmeter in the coaxial line between the dummy load and the CU-2.

5. Connect the MCU to the CU-2 using ATS-2 interconnecting cable CA-499. Connect interlock cable from the transmitter to J-103 of the MCU.

FIGURE I



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B. CALIBRATION:

1. Turn all pots located on the MCU chassis fully counter-clockwise. Place MCU TUNE/OPERATE switch in the OPERATE position.
2. Turn the MCU Power switch to the X10 position. The Power light on the MCU shall energize.
3. Tune the transmitter for a CW output frequency of 15MHz.
4. With the transmitter output level at minimum, slowly increase the drive until the wattmeter indicates 1000W. The REFLECTED power (red scale) needle shall indicate approximately half scale; the FORWARD power (black scale) needle shall indicate near zero.
- *5. With the transmitter output at 1 KW, adjust R-104 for a 1KW reading of the REFLECTED (red) power needle.
6. Decrease the transmitter power output to minimum. Turn the power switch to the X1 position.
7. Slowly increase the drive until the wattmeter indicates 100W. The REFLECTED power (red) needle shall indicate approximately half scale; the FORWARD power (black) scale needle shall indicate near zero.
- *8. With the transmitter power at 100W, adjust R-105 for a 100W reading of the REFLECTED (red) power needle.
9. Turn the transmitter FINAL PLATES switch to OFF. Reverse the RF cables on the CU-2, by connecting the dummy load to J302, and the transmitter to J301.

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10. Turn the transmitter FINAL PLATES ON. Slowly increase the drive until the wattmeter indicates 100W. The FORWARD power (black) needle shall indicate approximately half scale; the REFLECTED power (red) scale needle shall indicate near zero.

*11. With the transmitter power at 100W, adjust R-102 for a 100 watt reading of the FORWARD power needle.

12. Turn the transmitter output to minimum. Turn the MCU power switch to the X10 position.

13. Slowly increase the drive until the wattmeter indicates 1KW. The FORWARD power (black) needle shall indicate approximately half scale; the REVERSE power (red) scale shall indicate near zero.

*14. With transmitter power set at 1KW, adjust R-103 for a 1000 watt reading of the FORWARD power (black) needle.

15. Turn the transmitter output to minimum.

C. OVERLOAD ADJUSTMENTS:

1. Place TUNE/OPERATE switch in TUNE; POWER switch to X1; turn R-120, R-121 and R-122 fully counter-clockwise; place the transmitter plates switch in STAND-BY/REMOTE.

2. Tune the transmitter for a CW output frequency of 15MHz.

3. With the transmitter output level at minimum, slowly increase the drive until the wattmeter indicates 120 watts.

4. Turn R-122 clockwise until K-103 trips. The MCU OVERLOAD light shall energize, and the GPT-750 TRANSMITTER PLATES light shall de-energize.

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5. Reduce drive to minimum. Press MCU RESET switch. The MCU OVERLOAD light shall de-energize, and the GPT-750 TRANSMITTER PLATES light shall energize.
6. Increase drive for a 100 watt reading on the wattmeter, and readjust R-102 for a 100W reading on the FORWARD (black) scale.
7. Increase drive slowly until K-103 trips.
- *8. Repeat the steps in paragraphs C.4 through C.7 until K-103 trips at 120 watts, and R-102 is set for a full scale 100 watt reading on the FORWARD scale when the wattmeter indicates 100 watts.
9. Decrease transmitter drive to minimum; turn MCU POWER switch to X10, turn MCU TUNE/OPERATE switch to OPERATE.
10. With the transmitter output level at minimum, slowly increase the drive until an output level of 1200 watts is obtained. The MCU (black) needle shall exceed the full scale 100 marking by approximately $1/4$ of an inch.
11. Turn R-121 clockwise until K-103 trips. The MCU OVERLOAD light shall energize, and the GPT-750 TRANSMITTER PLATES light shall de-energize.
12. Reduce drive to minimum. Press RESET switch. MCU OVERLOAD light shall de-energize, and the GPT-750 TRANSMITTER PLATES light shall energize.
13. Increase drive for a 1000 watt reading on the wattmeter, and readjust R-103 for a 1000 watt reading on the FORWARD scale.

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14. Increase drive slowly until K-103 trips.
15. Repeat the steps in paragraphs C.10 through C.14, until K-103 trips at 1200 watts, and R-103 is set for a full scale reading on the FORWARD scale when the wattmeter indicates 1000 watts.
16. Turn transmitter output to minimum. Place transmitter FINAL PLATES switch in the OFF position.
17. Disconnect RF cable from the dummy load and connect it to E-203 of the TU. Connect an RF cable from E-206 of the TU to the dummy load. Connect CA-541 interconnecting cable from E-201 of the TU to J-101 of the MCU.
18. Place transmitter FINAL PLATES switch in the ON position. Increase transmitter output sufficiently to tune the TU-2 for a low VSWR at 15MHz.
19. Increase the drive for an output at 1000 watts. Using the REACTANCE switch, change the TU-2 inductance until the VSWR meter indicates a standing wave ratio of 3.0:1. Check the transmitter plate current and screen current meters for excessive readings. The drive should be decreased slightly to keep the FORWARD power reading at 1000 watts, as the inductance is changed for a higher VSWR reading.
20. With a VSWR of 3.0:1, turn R-120 clockwise until K-103 trips.

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21. Reduce drive to minimum. Press RESET switch. Retune TU-2 for a minimum VSWR as in paragraph C.18 using the MCU REACTANCE switch.
- *22. Increase transmitter drive until the FORWARD power scale indicates approximately 900 watts. Increase the inductance by using the REACTANCE switch, until a VSWR of 3.0:1 is once again obtained and the FORWARD power scale indicates 1000 watts. Relay K-103 shall trip. If it doesn't, repeat the steps in paragraph C.19 through C.22 until this setting is achieved.
23. Turn transmitter FINAL PLATES OFF.

D. MULTIMETER CHECKS:

1. Disconnect CA-541 from J-101 on the MCU. With MCU power OFF, check meter M-102 for mechanical zeroing.
2. Hold MCU METER switch in the HUM position. Adjust R-108 for a zero indication on the multimeter, M-102.
3. Reconnect CA-541 to J-101.
- *4. Hold METER switch in the HUM position. Meter shall indicate in lower quarter of scale. (This reading is dependent upon the ambient relative humidity level.)
5. If there is no indication, breathe on R-210 (located below E-201 in the Antenna Tuner Unit, TU), or otherwise cause moisture to come in contact with the sensing element, R-210. A definite increase should be noted on meter M-102.

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- *6. Hold MCU REACTANCE switch in the INCREASE position. As the motor driven roller contact of L-201 moves towards the upper end of the coil, the MCU meter reactance reading shall steadily increase. When the roller contact stops at the upper end of L-201, check the MCU for STOP light indication and a meter reading of 100 or more.
- *7. Hold REACTANCE switch in the DECREASE position. When the roller contact reaches the stop at the lower end of L-201 check the MCU for STOP light indication and a meter reading of \emptyset .
- *8. Depress the RESISTANCE OPERATE button. Check the MCU meter in RESISTANCE position for proper reading in each position of S-201 in the TU. Ensure that position one of the RF portion of S-201 matches with the meter reading of one on the MCU, and so forth for the remaining five positions of S-201.

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TECHNICAL MATERIEL CORPORATION

TEST DATA SHEET FOR

MONITOR CONTROL UNIT

MCU-2() _____

P/O ANTENNA TUNING SYSTEM

MFG # _____

SERIAL # _____

III. A.2. Power Light _____

A.2. VSWR Meter Mechanical Zeroing _____

A.3. MCU-2A Resistance Operate Switch Wiring _____

B.5. X10 Reflected Range _____

B.8. X1 Reflected Range _____

B.11. X1 Forward Range _____

B.14. X10 Forward Range _____

C.8. 100 Watt Forward Power Trip _____

C.15. 1000 Watt Forward Power Trip _____

C.22. VSWR Trip _____

D.4. Humidity Indicator _____

D.6. Stop Light Operation @100 _____

D.7. Stop Light Operation @0 _____

D.7. Reactance Meter Indication _____

D.8. Resistance Switch Meter Indication _____

TESTED BY _____

DATE: _____

