HIGH SEAS AND OVERSEAS RADIO
LD-T2 RADIO TRANSMITTER
SERVO SYSTEM ADJUSTMENT

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1. GENERAL

1.01 This section provides the procedures for checking, adjusting, and lubricating the servos used in the J41611A and J41611AA LD-T2 radio transmitters.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 Two types of servo assemblies are used in the transmitter: switching servos and tuning servos. The switching servo assemblies consist of a servo motor which is mechanically coupled to a number of rotary switches, either as a multiple bank single unit, or in combination arrangements. The tuning servo assembly consists of a servo motor coupled to a follow-up potentiometer and one or more tuning capacitors.

1.04 If it is necessary to replace any of the parts of a servo assembly, the assembly must be realigned so that the servo indications conform to those presented in the calibration charts in Section 403-330-502.

1.05 Following the replacement of a component in the servo assembly, it is desirable to check that the servo assembly meets its torque requirement. Torque tests may also indicate the cause of improper servo operation. Procedures are outlined for testing the two types of servos used in this transmitter.

2. PROCEDURES

2.01 Assemble the test fixture shown in Fig. 1.

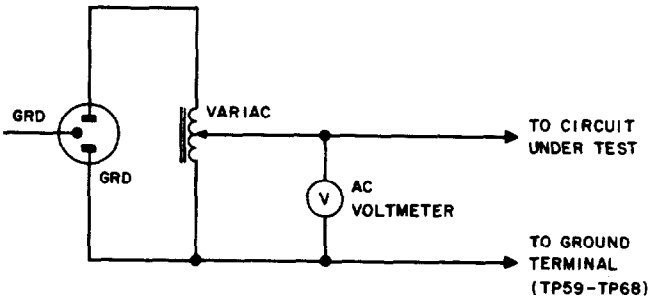

Fig. 1—Servo Test Arrangement

2.02 The apparatus required for these tests is listed below:

APPARATUS:

1—AC Voltmeter, 0-150 volts, ±1%, Weston Model 433

1—Variac, General Radio Co. Model V-5HMT, or equivalent

1—Power Plug, Standard

CHART 1

CONTINUOUS TUNING SERVO CHECKS

STEP	PROCEDURE
1	Set the AC SUPPLY switch to OFF. Open the doors of the transmitter to give access to the rear of bay 4 and to the servo to be tested.
2	At the front of the servo panel, carefully measure the clearance between the front and back contacts of S-type relays S19 through S28 using 0.001-inch lens tissue (such as Sight Savers) as a clearance gauge. If the paper cannot be inserted, contact clearances are out of tolerance and the relay should be checked.
3	Connect the test arrangement shown in Fig. 1 to the connector at the rear of bay 4 of the transmitter. Connect the ground lead to one of the ground terminals (TP59 to TP68) in the block on the fuse panel.
4	Remove fuse F9 from its clip and connect the hot test lead of the test arrangement to TP9.
5	Set the TUNING switch on the servo panel to the ADJ position.
6	Using the variac, increase the output voltage until the ac voltmeter indicates 90 volts. ***Caution: This voltage will appear on the black and black-red leads of all continuous tuning servo motors.***
7	At the servo motor to be tested, short the white lead to either the red or the blue lead. The motor should rotate. The direction of rotation depends on which leads are short circuited. ***Note:*** In the HF modulator compartment, the motor leads are inaccessible. To operate this motor, locate the terminal strip inside the compartment cover and short terminal 109 to either terminal 108 or 110. The servos on the HF modulator unit may also be tested on the bench. In this case, the test voltages from the test assembly must be applied to the black and black-red leads on the motor and the white lead on the servo must be shorted to the red or blue lead to make the servo rotate.
8	Note the dial indication of the servo and test at many points along the scale. From a full stop, start the motor first in one direction and then in the opposite direction. ***Requirement:*** With 90 volts applied, the motor should start from any dial position between 0 and 100 and should rotate freely in both directions. ***Note:*** Misalignment of apparatus, improper torque adjustment of any of the parts, or a faulty motor may cause the servo to fail to meet the requirement.
9	Increase the voltage output of the variac just until the requirement is met and note the voltage at which this occurs.

CHART 1 (Cont)

STEP	PROCEDURE
	Note: If this voltage is greatly in excess of the requirement, or if the motor will not turn at all, either the motor is faulty or there is a serious misalignment or friction in the servo apparatus. Grasping the motor gear, try to turn the servo manually. If it turns when the same force is applied as for other servos of this type, motor trouble should be suspected. If greater force is required, further tests should be made to locate the trouble.
10	Disengage the potentiometer gear. If the requirement in Step 8 can now be met, examine the potentiometer for binding or damage. If necessary, replace the potentiometer.
	Note: To reengage the potentiometer gear, first set the dial at 50 and engage the potentiometer gear. Set the winding to its electrical center, then tighten the setscrews.
11	Check the alignment of the servo in accordance with Section 403-330-502.
12	Check the variable capacitors by disengaging the gear at the capacitor. Rotate the capacitor by hand and check for extraordinary stiffness. If stiffness is encountered, measure the torque required to turn the shaft.
	Requirement: The torque required to turn the capacitor shaft should not exceed 1 inch-pound.
13	In the case of the HF GAIN control, the potentiometer cannot be adjusted. If the potentiometer is found to be defective, replace it.

CHART 2

SWITCHING SERVO CHECKS

STEP	PROCEDURE
1	Set the HIGH VOLTAGE switch to OFF. Depress one of the ten pushbuttons and turn the AC SUPPLY switch to OFF. Open the doors at the rear of bay 4 to provide access to the switching servo to be tested.
2	In the rear of the servo panel, locate switching motor relay S1 and either block the relay in the operated position or, using a clip lead, close the circuit between contacts 1 and 2.
3	With the output leads of the variac shown in Fig. 1 free and clear, connect the plug of the test arrangement to the ac power source and adjust the output voltage to 0 volt.
4	Connect the ground side of the test arrangement to one of the ground terminals, TP59-TP68. Remove fuse F22 from its clips and connect the hot lead of the test arrangement to TP28.

CHART 2 (Cont)

STEP	PROCEDURE
5	Increase the output voltage from the variac until the voltmeter indicates 100 volts. ***Caution: This voltage will appear on the black and black-red leads of all the switching motors.***
6	With power applied in this manner to the motors, all switching servos, except the crystal switching servo, will move to the switch position selected by the RANGE switch of the frequency last in use.
7	Further rotation during observations can be produced by moving the RANGE switch to a new position. Continuous rotation can be produced by turning the RANGE switch to an unnumbered (off-scale) position.
8	Observe the servo being tested. ***Requirement:*** The switching motor and associated gear assemblies should turn smoothly at a rate of approximately 4 RPM and will stop at the position selected by the RANGE switch. ***Note:*** If the requirement is not met, check the alignment of the gears and apparatus.
9	To test the crystal switching servo, manually advance the servo selector two steps. ***Requirement:*** The switch should rotate approximately 360 degrees to the next higher numbered contact.

CHART 3

SELECTOR ADJUSTMENTS AND LUBRICATION

STEP	PROCEDURE
1	Check the adjustment of the selector in accordance with Section 026-706-701. ***Note:*** The 32D bank, which is used in the LD-T2 transmitter is similar to the 32C bank except that the 30 terminal per second speed is not required. Adjustments can be made on the 211C selector using the 32D bank and the data supplied for the selector using the 32C bank, but no speed requirement is needed.
2	Remove the screw at the top of the support and swing the selector downward to the position that presents the wiring terminals for inspection. The selector may be fastened in this position if desired.

CHART 3 (Cont)

STEP	PROCEDURE
3	Annually, lubricate the selector as directed in Section 026-706-701.

CHART 4

MOTOR LUBRICATION

STEP	PROCEDURE
1	Turn each of the four fittings by hand until the openings are exposed.
2	Using Terresso 56 oil, place a drop of oil in each opening.
	Note: Servo motors should be lubricated quarterly.
3	Turn the fittings until the openings are closed.