DATE 6 March 1964	TMC SPECIFICATION NO. S-829	A
SHEET 1 OF 9		
RDV COMPILED / CHECKED	TITLE:	
APPROVED		

TEST PROCEDURE CSS-2

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 439M

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COMPILED RDV / CHECKED LEL	TITLE: TEST PROCEDURE CSS-2	
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A. TEST EQUIPMENT

1. VTVM - Hewlett-Packard Model 410B or equivalent.
2. Frequency Counter-Hewlett-Packard Model 5245L or equivalent.
3. VOM-Simpson Model 260.
4. 24 volt rechargeable Nickel Cadmium Battery-Sonotone 19-S103-Charged to 24V ±.5V.
5. A-c Power Cable.
6. Battery Connecting Cable.
7. Three 47 ohm ± 10%.5 watt Load Resistors(DS 100-47).
8. One .2 MF 25.V.
9. One PFCB connected to in house 1 MC frequency standard.

B. WARNING

THIS UNIT IS A SOLID STATE DEVICE AND CONTAINS AN EXPENSIVE FREQUENCY STANDARD. ANY INDISCRIMINATE RESISTANCE MEASUREMENT MAY HARM THIS UNIT. MAKE RESISTANCE MEASUREMENTS ONLY WHERE AND WHEN SO INDICATED.

C. PRELIMINARY

1. Inspect the unit for mechanical imperfections such as loose screws, printed circuit boards, cold solder joints etc.
2. Remove fuses F902 and F903 from the unit temporarily.
3. Set the battery switch, SW 904, to OUT.
4. With the ohmmeter d-c setting in the - position, measure 2,400 ohms ±10% from the EMITTER of Q909 to GRND.
5. Reinstall F 902 and F 903 into the unit.
6. Connect the three 47 dummy loads (DL 100-47) to J903,J904 and J905..

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D. D-C POWER

1. Set amplifier switch to STANDBY position.

2. Connect the battery-connecting cable between the battery input, J911, and the battery.

(NOTE: The RED battery light should go on.)

3. Connect the a-c power cable between J910 and an a-c outlet.

(NOTE: The GREEN power light, DS901, should go on and the RED battery light should go off.)

4. Measure 24V $^{+5}_{-0}$% from the EMITTER of Q909 to GRND.

5. Set amplifier switch to the ON position. The RED amplifier light, DS903, should go on.

6. Measure 23.5V $^{+5}_{-0}$% from #21 on PC board to ground.

7. Turn the function switch to 24V and read the voltage obtained in Step #6, ($\pm$ 10% on the front panel meter).

8. Set the battery switch to the IN position; measure 23.5V $\pm$ 5% from #21 on PC board to GRND.

9. Disconnect the power cable from the unit. The voltage measured in Step #7 should stay the same. (NOTE: The GREEN power light should go off, and the RED battery light should go on.)

10. Re-connect the power cable to the unit. Observe that the GREEN power light goes on and the RED battery light goes off.

11. Disconnect the battery cable from the unit. Measure 23.5V $^{+5}_{-0}$% from #21 on PC board to GRND.

12. Re-connect the battery cable to the unit.

13. Set the battery switch to OUT.

E. IMC, 10MC, 100KC ALIGNMENT PROCEDURE

1. 1MC Alignment-

a. Turn the meter function switch to 1MC.
b. Connect the VTVM to J907 and adjust T901 for a maximum reading on the VTVM. A minimum reading of 1VRMS should be obtained.
c. Adjust R948 so that the function meter reads the voltage obtained in Step #2. Lock R948.

d. Connect the counter to J907 and read 1MC±1 cps.

e. Disconnect the counter and VTVM from J907.

2. 10 MC Alignment -

a. Turn the meter switch to 10MC.
b. Connect the VTVM to the collector of Q902.
c. Adjust L901 for a maximum reading on the VTVM.
d. Disconnect the VTVM from Q902 and connect it to the collector of Q903.
e. Adjust L902 to obtain a maximum reading on the VTVM.
f. Disconnect the VTVM from Q903 and connect it to J908.
g. Adjust T902 for a maximum reading on the VTVM.
h. Readjust L901, L902, and T902 for a maximum reading on the VTVM. A minimum reading of 1.VRMS should be obtained.
i. The function meter should read the voltage obtained in Step H (± 10%.)
j. Connect the counter to J908 and read 10MC ±10 cps.
k. Disconnect the VTVM and the counter from J908.

3. 100KC Alignment -

a. Turn the meter switch to 100KC.
b. Disconnect the 1MC coax connector from the Frequency Standard.
c. Connect the signal generator through a .2MF 25V isolation capacitor to the base of Q906.
d. Adjust the signal generator for 1 VRMS@ 100KC ±5 cps.
e. Connect the VTVM to the base of Q907.
*f. Adjust L903 to obtain a maximum reading on the VTVM, and adjust T903 to obtain a maximum reading on the function meter. Disconnect the signal generator and VTVM.
g. Connect the signal generator through the isolation capacitor to the base of Q907.
h. Adjust the signal generator for 1VRMS@ 300KC± 10 cps.
i. Connect the VTVM to the base of Q908.

*NOTE:Adjust slugs of L903,T903,L904 and L905 all the way out prior to adjusting them for maximum indication. This applies on steps 3f,j and n only.

*j. Adjust L904 to obtain a maximum reading on the VTVM. Disconnect the signal generator and VTVM.

k. Connect the signal generator through the isolation capacitor to the base of Q908.

l. Adjust the signal generator for 1. VRMS@ 900KC ± 10cps.

m. Connect the VTVM to that side of R941 (1K) which is connected to L905.

*n. Adjust 1905 to obtain a maximum reading on the VTVM.

o. Disconnect the VTVM and signal generator.

p. Re-connect the 1MC coax connector to the Frequency Standard.

q. Connect the counter to J906 and read 100KC ± .1cps.

r. Adjust T903 for a maximum indication on function meter.

s. Adjust L903, to the center of the range for which the output frequency remains 100KC. Repeat for L904 and L905.

t. Disconnect the counter and VTVM.

F. VARICAP VOLTAGE ADJUSTMENT

1. Measure 8.4V ±5% from the cathode of CR901 to GRND.

2. Turn fine frequency adjust, R952, to the extreme counter-clockwise position.

3. Connect the VTVM to the junction of R905 and R906, and adjust R950 to obtain +3.2V ±5% on the VTVM. Disconnect VTVM.

4. Turn fine frequency adjust, R952, to the extreme clockwise position.

5. Connect the VTVM to the junction of fine frequency adjust, R952, and Pot R951.

6. Adjust R951 to obtain 6.2V ±5% on the VTVM.

G. "FINE FREQUENCY ADJUST" LINEARITY

1. Temporarily connect a 47 ohm ½ watt resistor in parallel with R 907.
2. Turn meter function switch to 10.MC.
3. Connect counter to J905 and adjust the counter to read down to .1 cps. @ 10 MC.
4. Turn fine frequency adjust F.C.W. and record the frequency.
5. Turn "Fine Frequency Adjust" 5 turns C.C.W. so that the zero on the inner dial coincides with the white line at 12 o'clock on the stationary middle ring, and record the frequency.
6. Turn the frequency adjust fully C.C.W. and record the frequency.
7. As an example, Steps 4,5 , and 6 may result in the following:

STEP 4	STEP 5	STEP 6
+1.2 cps	+.4 cps	-.9 cps

Reference point is 10,000,000.0 ±.0 cps.

8. By alternately adjusting R950 for the lower frequency and R951 for the higher frequency, the difference of frequency between Steps 4 to 5, and Steps 5 to 6, should be equalized, and should result in 1 cps from center frequency to upper or lower-frequency. Lock R950 and R951.

EXAMPLE:

+1.3 cps	+.3 cps	-.7 cps

9. Remove the 47 ohm resistor.

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H. OVEN TEMPERATURE ADJUST

1. Turn Function Switch to OVEN TEMPERATURE.

2. After an initial warm-up period of one (1) hour, adjust R949 to obtain a dead center reading (i.e. 1.5) on the function meter. Lock R949.

J. ABSOLUTE FREQUENCY ADJUST

1. Connect a coax cable between J907 and PFCB test input jack.
2. Set PFCB multiplier switch to 10^9.
3. Set parts full scale selector switch to $\pm$ 1 part full scale.
4. Remove screw cover on the back of the frequency standard.
5. With proper tuning tool, adjust trimmer so that with fine frequency adjust control on front panel of the CSS-2 set to 0, the chart on the PFCB is centered.
6. Set PFCB multiplier switch to 10^7.
7. Check to see if fine frequency adjust control is able to produce both + and - full scale deflection.
8. Replace screw cover on frequency standard.
9. Disconnect from all test equipment.

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THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y.

TEST DATA SHEET - CSS-2

SERIAL NO:_____

MFG. NO:_____

MECHANICAL:_____ OK
WIRING:_____ OK

C. Resistance from emitter of Q909 to ground._____ OHMS .

D. D-C POWER

1. With battery connected, and a-c power disconnected from the unit, the battery light should be on, and the power light should be out. _____ OK

2. With a.c power connected to the unit, the power light should be on. _____ OK

3. In all above conditions, the hot side of C922 reads 24.V ±5%. _____ OK

4. With Function Switch in the 24.V position, the function meter reads above voltage ± 10%. _____ OK

E. 1. 1MC Alignment -

Minimum of 1.VRMS @ 1MC ±1 cps on J907. _____ OK

2..10MC Alignment -

Mumimum of 1.VRMS @ 10MC ±10 cps on J908. ___ OK

3. 100KC Alignment -

Minimum of 1. VRMS @ 100KC ±.1 cps on J906.__ OK

F. VARICAP VOLTAGE ADJUSTMENT

8.4V ±5% across CR 901_____ OK

3.2V ±5% @ junction of R 905 and R 906_____ OK

6.2V ±5% @ junction of R 952 and R 951_____ OK

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G. FINE FREQUENCY ADJUST LINEARITY _____ OK

OVEN TEMPERATURE ADJUSTMENT

H. Center meter reading when function meter is in oven temeperature position _____ OK

J. ABSOLUTE FREQUENCY ADJUST

1. Fine frequency control set to +5, PFCB indicates full scale deflection of 1 part in 10^7 _____ OK

2. Fine frequency control set to 0, PFCB indicates 0 deflection of 1 part in 10^7 _____ OK

3. Fine frequency control set to -5, PFCB indicates full scale deflection of 1 part in 10^7 _____ OK

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