

DATE <u>2/19/64</u>		TMC SPECIFICATION NO. S -609	E
SHEET <u>1</u> OF <u>15</u>			
COMPILED	REV. <u>B 16</u> CHECKED	TITLE: PRODUCTION TESTING FOR MODEL CHG-2, CHG-2A ,CHG-2B	
<i>[Signature]</i> APPROVED			

COMPLETE INSTRUCTIONS
 FOR
 PRODUCTION TESTING OF THE
 MODEL CHG-2, CHG-2A ,CHG-2B

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Test Equipment Required.

1. Simpson Multimeter Model 260 or equivalent.
2. Hewlett-Packard VTVM Model HP410B or equivalent.
3. Signal generator, Measurements Model 82 or equivalent.
4. Oscilloscope, Tektronix Type 545A or equivalent.
5. Electronic Counter, H.P. 524C or equivalent.
6. Two-Tone 250 kcs. Generator.
7. Panoramic-Analyzor. (PTE)
8. CSS-1A, 1MC Standard, TMC.

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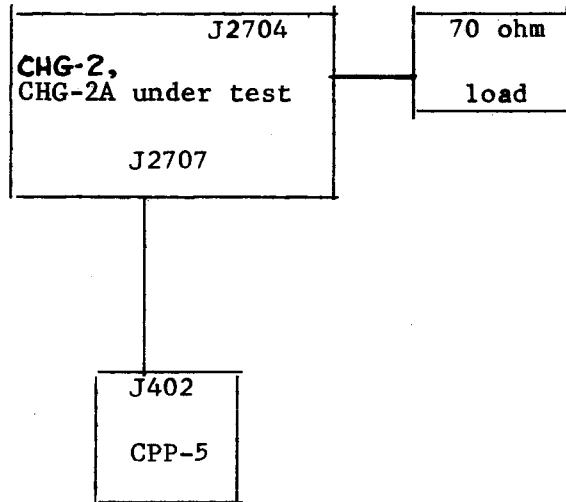
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General Instrument Layout

1. Set up for oven test.



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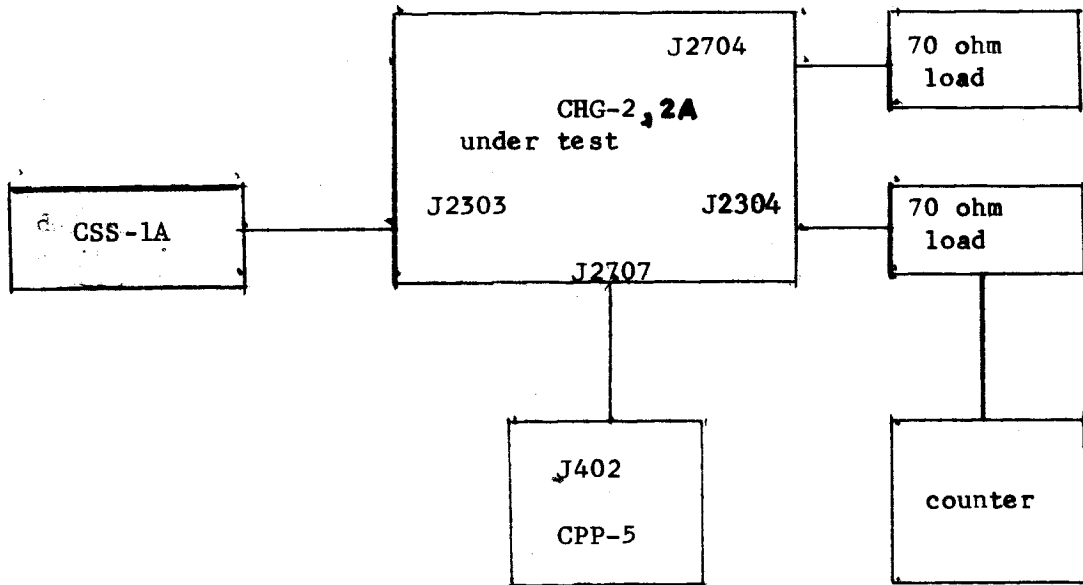
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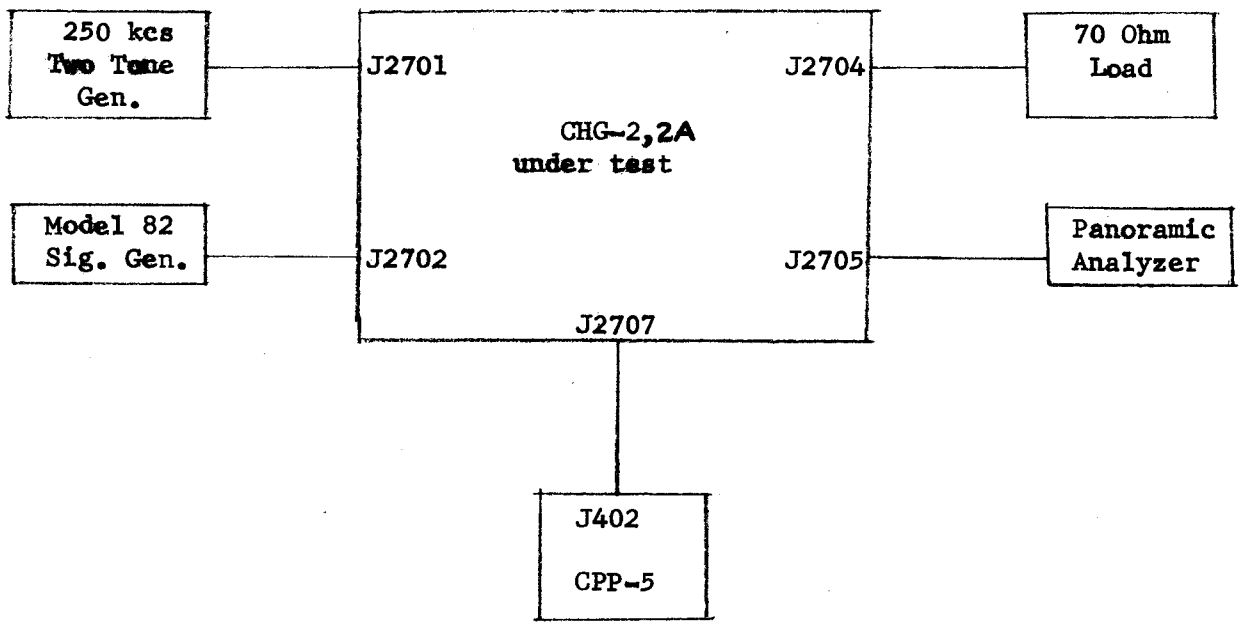
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2. Set-up for 1 mc Standard Test



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3. Set-Up For Distortion Test



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A. General Inspection

1. Inspect the unit for obvious mechanical imperfections.
2. Inspect the unit for obvious electrical imperfections.
3. Inspect the bandswitch, in position "0", T2714, T2710, and T2718 must be in the circuit.
4. In the positions "2" and "4", T2717, T2713, T2709, and T2706 must be in the circuit.
5. In the positions "6" through "12" inclusive, T2716, T2712, T2708, and T2705 must be in the circuit.
6. In the positions "14" through "30" inclusive, T2715, T2711, T2707, and T2704 must be in the circuit.
7. Check output frequency dial alignment. With condensers fully meshed, the marker on the frequency dial must be exactly under the hair line.
8. The mid-frequency knob pointer must be in line with the engraved line on the front panel, when the condensers are fully meshed.

B. Oven

1. Connect units to CPP-5 as shown in paragraph 1, instrument layout.
2. Set power switch to "ON" position.
3. Leave B+ switch in "OFF" position. (This applies B+ to RF sections only).
4. Measure B+ at T2702 (red dot). Reading should be approximately 180 volts. Record on Test Data Sheet.
5. Observe the "oven" pilot light; it must light.
6. Allow the unit to warm-up for approximately two (2) hours. (During the warm-up period, MF Channel may be aligned).
7. After the oven begins to cycle, observe the time "ON" and time "OFF" periods; time "ON" approximately ten (10) minutes and time "OFF" approximately three (3) minutes at room temperature. Record the time intervals in the Test Data Sheet.

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C. 1 MC Internal Standard

1. Set Standard Selector Switch S2301 to "Std".
2. Connect H.P. VTVM to junction point of W2504 and W2506. Connect CSS-1A to J2303.
3. Adjust L2305 for Max. voltage output. The voltage must be 15V or greater. Record the voltage on the Test Data Sheet.
4. Connect 70 ohm load to J2304.
5. Connect the VTVM to the 70 ohm load.
6. Adjust L2304 for max. output on the voltmeter. The voltage must be 1.0V or greater. Record the voltage on the Test Data Sheet.
7. Set standard selector switch S2301 to "XTAL".
8. Connect the frequency counter to the 70 ohm load.
9. Adjust C2307 until frequency becomes 1,000,000 cycles \pm one count.
10. Measure voltage at J2304; it must be 2.0 V or greater. Record on test data sheet.
11. Set the standard selector switch S2501 to "STD".
12. Lock the coils.

D. Synthesizer Chassis

1. Connect scope to green dot of T2501.
2. Set Bal. Adj. Pot. on T2501 fully clockwise.
3. Tune T2501 for max. 2 mc signal. It must be at least 40 V peak to peak. Lock the coil. Record on Test Data Sheet.
4. Disconnect J2305.
5. Connect scope to top of T2502 (coax cable).
6. Connect signal generator set at 18,000,000 cps \pm 50 kc and approximately 0.1 volts to junction of W2504 and W2506.
7. Tune T2502 for max. output; both primary and secondary. Lock both ends of T2502.

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8. Connect scope to the junction of R2522 and R2525. (Orange dot of T2501).
9. Tune L2502 for maximum signal at the scope.
10. Set Bandswitch to position "2".
11. Tune C2501 for maximum signal at the scope, approximately 1.5 V.P.P. Repeat step 9, lock coil. Record following readings on Test Data Sheet.
12. Set Bandswitch to position "4".
13. Tune C2503 for maximum.
14. Set Bandswitch to position "6".
15. Tune C2505 for max.
16. Set Bandswitch to position "8".
17. Tune C2512 for max.
18. Set Bandswitch to position "14".
19. Tune C2507 for max.
20. Set Bandswitch to position "16".
21. Tune C2515 for max.
22. Set Bandswitch to position "18".
23. Tune C2513 for max.
24. Set Bandswitch to position "30".
25. Tune C2510 for max.
26. Reconnect P2504 to J2305.
27. Measure DC Voltage at junction of R2526 and R2527 (blk dot of T2501). It must be approximately 4 volts. Record the voltage in the Test Data Sheet.
28. Connect VTVM to orange dot of T2501.
29. Set balance adjust on T2501 so that the voltage is the same as obtained in step #27. Lock the balance adjust Pot.
30. Disconnect all equipment from the synthesizer chassis.

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E. H.F. Injection Oscillator

1. Set Scope on DC Range and on .1 Volts per cm. vertical deflection scale.
2. Connect Scope to junction of R2526 and R2527 (blk dot of T2501) and adjust the vertical position control until the horizontal line appears exactly in the center of the screen.
3. Without touching the scope controls, place the scope probe to the junction of R2525 and C2541. (Near orange dot of T2501).
4. Tune crystals as per chart to the same horizontal reference line which was established in section D, Step 38.

NOTE: When audio oscillation appears, tune toward maximum amplitude until oscillation disappears and continue turning the trimmer until the line appears in the center.

BAND SWITCH
POSITION

ADJUST

2	C2401
4	C2403
6	C2405
8	C2411
14	C2407
16	C2415
18	C2413
30	C2409

5. Check the following band positions; the horizontal line must still be in the center within ± 0.25 Volts.

BAND SWITCH
POSITIONS

0
10
12
20
22
24
26
28

6. Disconnect the Scope.

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F. Sync Circuit Indicator

1. Set Bandswitch to "2".
2. Set potentiometer R2520 fully clockwise, and adjust C2538 to 2/3 capacity. Then advance the potentiometer R2520 to the point where the sync light just goes on.
3. Set the Bandswitch in between positions "2" and "4"; the sync light must go off.
4. Check all positions "2" through "30"; in all positions the sync light must go on.

G. Alignment of H.F. Amplifier

1. Connect AC-VTVM to junction of C2777 and C2776.
2. Set Trimmer C2776 to mid-capacity.
3. Follow the chart below. In each case, the output voltage must be 0.5 V RMS. Record on Test Data Sheet.

BAND SWITCH

TUNE FOR MAXIMUM AND LOCK THE COILS

2	L2737
4	L2736
6	L2735
8	L2734
10	L2733
12	L2732
14	L2731
16	L2730
18	L2723
20	L2724
22	L2725
24	L2726
26	L2727
28	L2728
30	L2729

H. Mid-Frequency Channel

1. Connect signal generator to J2702 and set it @ 1.75MC.
2. Set mid-frequency tuning knob to 1.75 mc mark.
3. Set trimmers C2710,C2712, C2717 and C2718 to mid-capacity.
4. Tune T2703, L2708, L2703 and L2702 for max. indication of the MF meter.

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- H. 5. Set signal generator to 3.75 mc and MF knob to 3.75 mark.
 6. Tune trimmers C2710, C2712, C2717 and C2718 for max. indication.
 7. Repeat tuning of low and high ends for max. indications.
 8. Set signal generator for 1.75 mc output, MF knob to 1.75 mark.
 9. Adjust R2703 for minimum indication on MF meter.
 10. Connect coax jumper between J2701 and J2706 on back of unit.
 11. Set signal generator to 4 mc, MF knob to 3.75 mark.
 12. Tune T2701 for maximum indication on MF meter.
 13. Check MF at 1.75 and 3.75 using generator output at 2 & 4 mc respectively, the MF meter should read in the red with an output from the generator between **.03v to .1v.**
- I. R.F. Channel
1. Connect signal generator to J2702 at 2mc. Peak MF at 1.75. Connect 70 ohm load to J2704.
 2. Adjust Bal. Adj. Pot. R2722 fully clockwise.
 3. Set Trimmers C2735, C2736, C2737, C2745, C2746, C2747, C2748, C2755, C2756, C2757, C2758, C2769, C2770, C2771, C2772 to mid-position.
 4. Observe the MF meter and increase the drive from the generator to the meter. Set RF gain to max.
 5. Turn on the B+ switch.
 6. Set the bandswitch to "0" position.
 7. Set dial reading to 1.75 mcs.
 8. Adjust T2718, T2710 and T2714 for maximum.
 9. Set the Bandswitch to "2" position.
 10. Set dial to 3.75 mcs position (Band B)
 11. Tune T2717, T2713, T2709, and T2706 for peak meter reading indication.
 12. Set Bandswitch to "6" position.
 13. Set dial to 7.75 mcs (Band C).
 14. Tune T2716, T2712, T2708 and T2705.

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15. Set Bandswitch to "14" position.
16. Set dial to 15.75 mcs (Band D).
17. Tune T2715, **T2711** and T2707 and T2704.
18. Set generator to 4mc and peak MF on 3.75.
19. Set dial to 33.75 mcs, bandswitch to position 30.
20. Tune C2769, C2755, C2745 and C2735.
21. Set dial to 15.75 mcs. (Band C).
22. Tune C2770, C2756, C2746 and C2736.
23. Set dial to 7.75 mcs, bandswitch to position 4.
24. Tune C2771, C2757 and C2737 for peak meter reading indication.
25. Set dial reading to 3.75 mcs, bandswitch to position 0.
26. Adjust C2772, C2758 and C2748 for maximum.
27. Repeat alignments of bands 0,2,6 and 14 (low ends).
28. Set dial to 10mc (Band C) and Band position to 10. Adjust R2722 for minimum indication on output meter.
29. Repeat alignments of bands 0,4,12 and 30 (high ends).
30. Repeat low and high end alignments, placecover on RF section and touch up ends on each band.

J. Distortion Test

1. Take distortion measurements as shown in the following chart. In each case, the distortion products must be at least 45 db below PEP.
2. Equipment is to be set up as shown in the instrument layout.

FREQ. MC	BAND SW.	GEN. INPUT MC	OUTPUT TUNING DIAL BAND	M.F. TUNING WITHIN WHITE FIELD (MCS)	VOX SETTING	OUTPUT METER BETWEEN (CHG)
2	0	2.25	A	2.00	2500	9-10
4	2	2.25	B	2.00	2250	9-10
6	4	2.25	B	2.00	3250	9-10
8	6	2.25	C	2.00	2125	9-10

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J. (CONTINUED)

12	10	2.25	C	2.00	3125	9-10
16	14	2.25	D	2.00	2062	9-10
24	22	2.25	D	2.00	3062	9-10
32	30	2.25	D	2.00	2031	9-10

* After checking last band, turn B+ switch off. Shorting terminals 1&2 of J2708 should turn the B+ on.

K. 250KC Divider

1. Connect 70 ohm load and AC-VTVM to J2706, voltage should read at least 1 volt.

L. ALDC Test

1. Set CHG-2 for 2 mc operation.
2. Connect a negative 0-7 VDC to J2703.
3. The output meter should read approximately the values given in the chart below.

ALDC INPUT J2703	RF OUTPUT METER
0VDC	8.5
-5VDC	3.0
-7VDC	1.0

M. Recheck the following items before shipment, B+ on.

1. 1mc internal standard. (C)
STEPS C-4,9,10.
2. HF injection oscillator. (E)
ALL STEPS.
3. Sync circuit indicator. (F)
ALL STEPS.

*THIS TEST APPLIES ONLY TO THE CHG-2B.

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TEST DATA SHEET FOR CHG-2, CHG-2A

SERIAL NO.....

MFG. NO.....

1. OVEN:

A. B+ VOLTAGE AT T2702VOLTS

B. OVEN TIME ON.....MIN. TIME OFF.....MIN.

2. 1MC STANDARDS:

A. 1MC OSCILLATOR OUTPUT JUNCTION OF W2504 & W2506VOLTS

B. 1MC "STD" OUTPUT AT J2304VOLTS

1MC "XTAL" OUTPUT AT J2304VOLTS

1MC "XTAL" FREQUENCY AT J2304CPS

3. SYNTHESIZER CHASSIS:

A. 2 MC SIGNAL OUTPUT AT T2501VPP

B. 18 MC SIGNAL AT P2503OK

C. MAXIMUM SIGNAL AT JUNCTION OF R2522 & R2525

BAND SWITCH POSITIONS

PEAK TO PEAK

2..... 14.....

4..... 16.....

6..... 18.....

8..... 30.....

D. VOLTAGE AT JUNCTION OF R2522 & R2525VDC

4. H.F. INJECTION OSCILLATORUNIT OK

5. SYNC. CIRCUIT INDICATOR:

A. LIGHT GOES ON IN ALL POSITIONSOK

B. LIGHT GOES OFF BETWEEN POSITIONSOK

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6. ALIGNMENT OF H.F. AMPLIFIER

A. BANDSWITCH POSITIONS

0.....VOLTS	16.....VOLTS
2.....VOLTS	18.....VOLTS
4.....VOLTS	20.....VOLTS
6.....VOLTS	22.....VOLTS
8.....VOLTS	24.....VOLTS
10.....VOLTS	26.....VOLTS
12.....VOLTS	28.....VOLTS
14.....VOLTS	30.....VOLTS

- 7. MID-FREQUENCY ALIGNMENT:UNIT OK
- 8. R.F. ALIGNMENTUNIT OK
- 9. DISTORTION TEST 45 DB BELOW PEPUNIT OK
- 10. 250 KC REGENERATIVE DIVIDERVOLTS
- 11. ALDC CIRCUITUNIT OK

DATE:.....

TESTED BY:.....