

DATE 10-20-60
SH. 1 OF 12
COMPILED BY
O.P.

TMC SPECIFICATION NO. S 491

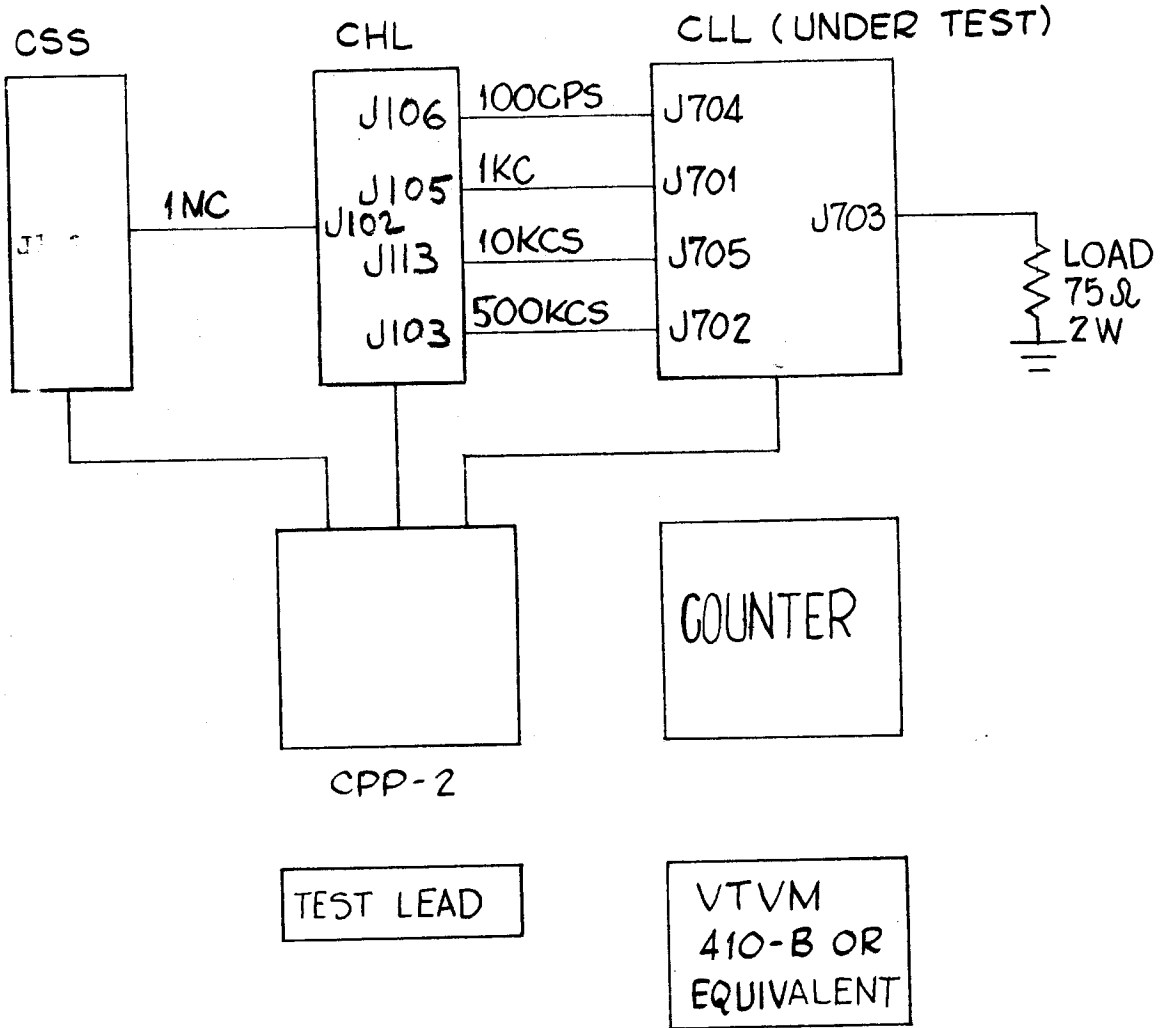
TITLE: COMPLETE TEST INSTRUCTION FOR THE TMC

JOB REVE

APPROVED 

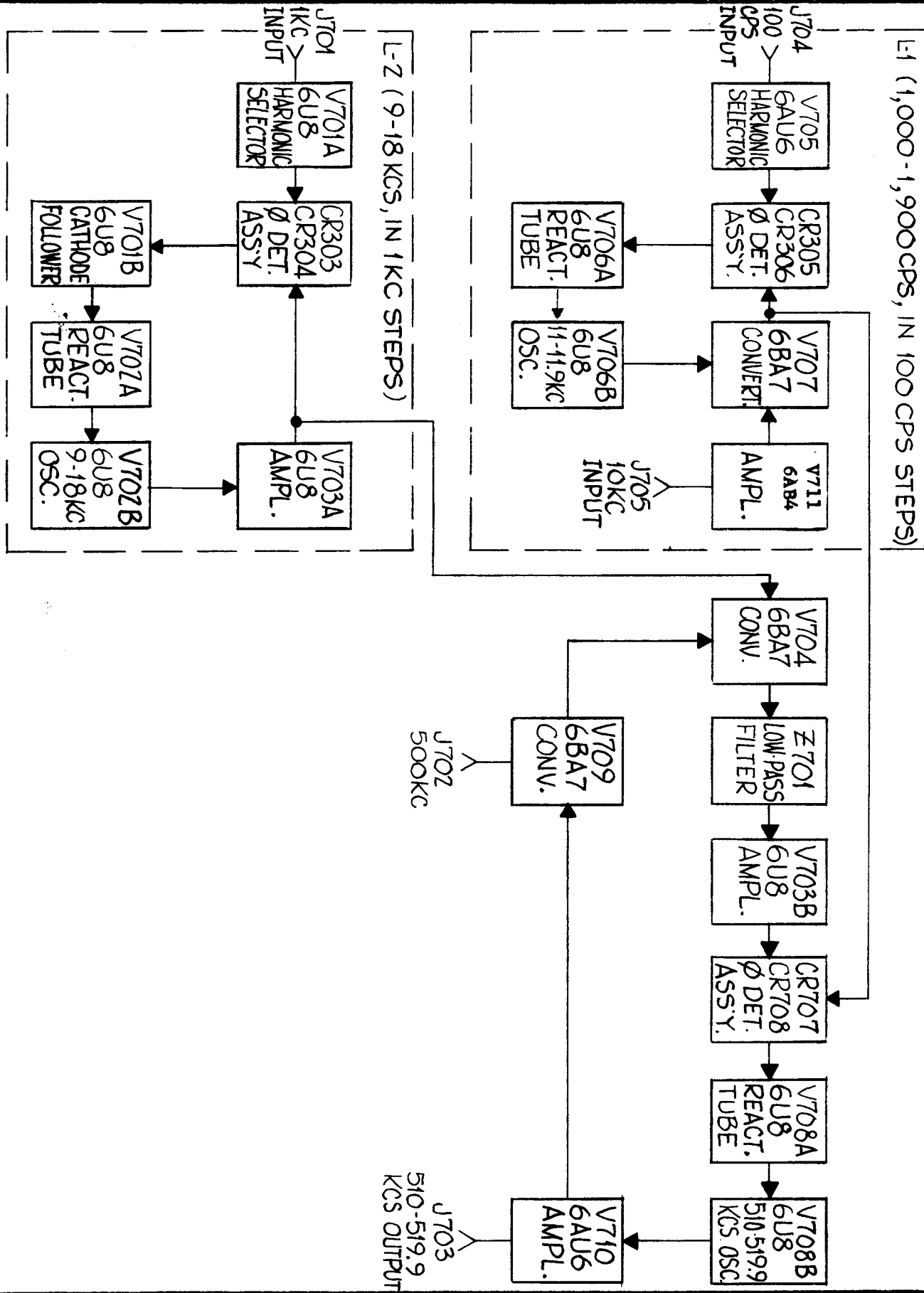
MODEL CLL-1

Instrument Layout



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MODEL CLL-1



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MODEL CLL-1

A. GENERAL INSPECTION

1. Inspect the unit for obvious mechanical and electrical errors.
2. Inspect carefully the 510-520 kcs compartment for shorts and layout of oscillator wires. The solid oscillator wires may not touch the chassis even through they are insulated.
3. Check wiring and jumpers at E701. (Oven heaters and thermostat).
4. Check switches S701 and S702 for proper alignment e.g. The wipers must touch their respective contacts and correspond to the proper position on the detent and dial.
5. Replace all covers except top and bottom outer covers.

B. INITIAL CHECK-UP

1. Set-up all equipment as outlined in section instrument layout.
2. Turn on the power and measure B+. It must be 160VDC; if not re-adjust R514 on CPP-2.
3. Measure filament voltage V708; it must be approximately 6.3VDC (Not AC).
4. Using counter check following frequencies:
 - a) At J701 1 KCS
 - b) At J702 500 KCS
 - c) At J704 100 CPS
 - d) At J705 10 KCS
5. Let the unit warm up for at least 2 hours before proceeding with the rest of the test.

C. SCOPE V-713

1. Set scope switch S703 in position "L-1".
2. Adjust intensity R783 and focus R781 for optimum operation.
3. Adjust deflection controls R773 and R774 so that the square will appear approximately in the middle of the screen.
4. Set scope switch to position "L-2" a square must appear.
5. Set scope switch to position "L-3" a square must appear.
6. Set scope switch to position "off" there must be no light on the screen.

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MODEL CLL-1

D. LOW FREQUENCY LOOP, L-1

A. Alignment

1. Place the test lead from TP7 to ground.
2. Place the hundreds of cycles switch S702 in position 5.
3. Measure voltage with AC VTVM at TP8. Minimum voltage 4.0V.
4. Connect counter to TP8.
5. Adjust C815 for 11500 \pm 4 cps on the counter and lock C815.

B. Phase Detector

6. Set DC VTVM on 3V scale and set zero adj. on VTVM so that the pointer is in the middle of the scale, note the reading e.g. 1.5 V.
7. Connect the DC VTVM to TP5.
8. Remove 100 cps input from J704.
9. Turn balance control R755 from one extreme to the other; the DC VTVM must follow from at least -1.5V to +1.5V.
10. Adjust balance control R755 for (Zero) 0V. and lock it. (or, as in example in step 6, set to the noted reading e.g. 1.5V).
11. Replace 100 cps input to J704.
12. Remove test lead from TP7.
13. Set the scope switch S703 to "L-1".
14. Observe the scope; it must show a stationary square pattern.
15. Observing the scope and VTVM for stationary pattern, rotate the hundreds of cycles switch S702 through all positions. In no position the DC VTVM must show a greater deviation than \pm .5V.

E. MID FREQUENCY LOOP, L-2

A. Alignment

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MODEL CLL-1

1. Place the test lead from TP2 to ground.
2. Place the kilocycles switch S701 in position 9.
3. Measure voltage with AC VTVM at TP3. Minimum voltage .4V
- 4.. Connect counter to TP3..
5. Align following trimmers:

S701 in Position	Trimmer	Frequency
9	C739	18,000 \pm 6 cps
8	C735	17,000 \pm 6 cps
7	C733	16,000 \pm 5 cps
6	C731	15,000 \pm 5 cps
5	C729	14,000 \pm 5 cps
4	C727	13,000 \pm 4 cps
3	C725	12,000 \pm 4 cps
2	C723	11,000 \pm 4 cps
1	C721	10,000 \pm 4 cps
0	C719	9,000 \pm 4 cps

B. Phase Detector

6. With VTVM set for phase detector alignment, connect it to TP1..
7. Remove 1 Kcs input from J701.
8. Turn balance control R712 from one extreme to the other; the DC VTVM must follow from at least -1.5V to +1.5 V.
9. Adjust R712 for 0V and lock it.
10. Replace 1 Kcs input to J701.
11. Remove test lead from TP2.
12. Set the scope switch to position "L-2".
13. Observe the scope for stationary square pattern.
14. In position "9", adjust L701 for clearest square pattern obtainable.

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MODEL CLL-1

15. Observing the scope and VTVM for stationary pattern, rotate the kilocycles switch S701 through all positions. In no position the DC VTVM must show a greater deviation than $\pm .5V$.

F. OUTPUT FREQUENCY LOOP, L-3

A. Alignment

1. Place the test lead from TP4 to ground.
2. Place the "Kilocycles" switch S701 in position 9.
3. Place the "Hundreds of cycles" switch S702 in position 9.
4. Connect 70 ohm load to J703.
5. Place AC VTVM to J703 and adjust T702 for maximum output, the voltage must be a ~~minimum~~ of 1.5 VRF.
6. Connect counter to J703.
7. Set L707 to its mid position.
8. Set L708 to frequency of 520 ± 5 Kcs, and lock the coil.
9. Re-Adjust L707 to frequency 519900 ± 10 cps, and lock the coil.

NOTE: The frequency must be 519900 ± 10 cps, otherwise re-alignment of L-3 will be necessary

10. Align the following trimmers.

NOTE: Leave hundreds of cycles switch in position 9; the sequence of alignment must be followed as per chart

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MODEL CLL-1

S701 in Position (Kilocycles Switch)	Trimmer	Frequency +10 cps
9	----	519900 cps
8	C780	518900 cps
7	C779	517900 cps
6	C778	516900 cps
5	C777	515900 cps
4	C776	514900 cps
3	C775	513900 cps
2	C774	512900 cps
1	C773	511900 cps
0	C772	510900 cps

11. Rotate S701 through all positions and recheck the frequencies.
12. Place S701 in position 5. and adjust following; the sequence of alignment must be followed as per chart. below:

S702 in Position Hundreds of Cycles Switch	Trimmer	Frequency +10 Cps except where noted.
9	----	515900 cps
8	C790	515800 cps
7	C789	515700 cps
6	C788	515600 cps
5	C787	515500 cps
4	C786	515400 cps
3	C785	515300 cps +23 cps
2	C784	515200 cps
1	C783	515100 cps
0	C782	515000 cps

13. Rotate S702 through all position and recheck the frequencies.
14. Check 510000 cps position, it must be within +30 cps.
15. Check 519900 cps position, it now must be within +30 cps.

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MODEL CLL-1

16. Set in frequency output of 515500 cps and re-adjust T702 for maximum output.

b. Phase Defector

17. With VTVM set for phase defector alignment, connect it to TP6.

18. Remove 10 Kcs input from J705.

19. Turn balance control R763 from one extreme to the other; the DC VTVM must follow from at least -1.5V to +1.5V.

20. Adjust R763 for 0V and lock it.

21. Replace 10 Kcs input to J705.

22. Remove test lead from TP4.

23. Set the scope switch to "L-3".

24. Observe the scope, it must show a stationary square pattern.

25. Check following position, in each position scope must show stationary square pattern and the counter must read as follows:

S701 in Position (Kilocycles Switch)	S702 in Position (Hundreds of Cycles Switches)	Counter
0	0	510,000 +1 cps
0	9	510,900 +1 cps
6	9	516,900 +1 cps
6	0	516,000 +1 cps
9	0	519,000 +1 cps
9	9	519,900 +1 cps

Units which have passed specifications above must be prepared for alignment. Fill out two report sheets for each unit and adjust them to your impression.

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MODEL CLL-1

* WITH CHL DISCONNECTED D.C. VOLTAGES

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 10	Pin 11
1/2 V701A (6U8)	-	-0.5	90	A.C.	A.C.	90	0	-	-	XXXX	XXXX
1/2 V701B (6U8)	160	-	-	A.C.	A.C.	-	-	2.8	.3	XXXX	XXXX
1/2 V702A (6U8)	-	0	130	A.C.	A.C.	130	2.8	-	-	XXXX	XXXX
1/2 V702B (6U8)	130	-	-	A.C.	A.C.	-	-	5.6	-28	XXXX	XXXX
1/2 V703A (6U8)	-	.4	130	A.C.	A.C.	115	1.8	-	-	XXXX	XXXX
V704 (6BA7)	100	-15	2.7	A.C.	A.C.	2.7	0	XXXX	95	XXXX	XXXX
V709 (6BA7)	90	-16	1.8	A.C.	A.C.	1.8	0	XXXX	135	XXXX	XXXX
V708A (6U8)	-	-0.1	26	-6.3	0	130	1.8	-	-	XXXX	XXXX
V708B (6U8)	130	-	-	-6.3	0	-	-	.2	-2.5	XXXX	XXXX
V710 (6AU6)	.15	1.6	A.C.	A.C.	144	120	1.6	XXXX	XXXX	XXXX	XXXX
V705 (6AU6)	-0.7	0	A.C.	A.C.	136	136	0	XXXX	XXXX	XXXX	XXXX
1/2 V705A (6U8)	-	0	132	A.C.	A.C.	132	2.2	-	-	XXXX	XXXX
1/2 V706B (6U8)	132	-	-	A.C.	A.C.	-	-	.5	-4.6	XXXX	XXXX
V707 (6BA7)	100	.5	2.9	A.C.	A.C.	2.9	0	XXXX	100	XXXX	XXXX
1/2 V703B (6U8)	85	-	-	A.C.	A.C.	-	-	0	-0.5	XXXX	XXXX
V711 (6AB4)	100	-	-	A.C.	A.C.	-0.4	0	XXXX	XXXX	XXXX	XXXX
V712A (12AT7)	220	0	3	A.C.	A.C.	-	-	-	A.C.	XXXX	XXXX
V712B (12AT7)	-	-	-	A.C.	A.C.	250	-0.25	2.7	A.C.	XXXX	XXXX
V713 (1EP1)	A.C.	A.C.	-480	-420	300	180	180	180	180	180	0
t V713 (1EP1)	A.C.	A.C.	-340	-320	-215	210	210	210	210	210	0

*ALL VOLTAGES MEASURED WITH RESPECT TO CHASSIS GROUND

**Scope Selector Switch Off

t-Scope Selector Switch In Position L-1

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MODEL CLL-1

* WITH CHL CONNECTED D.C. VOLTAGES

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 10	Pin 11
1/2 V701A (6U8)	-	-6	150	A.C.	A.C.	150	0	-	-	XXXX	XXXX
1/2 V701B (6U8)	160	-	-	A.C.	A.C.	-	-	2.8	-.05	XXXX	XXXX
1/2 V702A (6U8)	-	0	134	A.C.	A.C.	134	2.8	-	-	XXXX	XXXX
1/2 V702B (6U8)	134	-	-	A.C.	A.C.	-	-	5.6	-26	XXXX	XXXX
1/2 V703A (6U8)	-	.4	134	A.C.	A.C.	128	1.8	-	-	XXXX	XXXX
V704 (6BA7)	106	-15	3	A.C.	A.C.	3	-1	XXXX	103	XXXX	XXXX
V709 (6BA7)	92	-15	1.8	A.C.	A.C.	1.8	-1	XXXX	136	XXXX	XXXX
V708A (6U8)	-	-.2	25	-6.3	0	120	.4	-	-	XXXX	XXXX
V708B (6U8)	122	-	-	-6.3	0	-	-	.25	-2	XXXX	XXXX
V710 (6AU6)	.25	1.6	A.C.	A.C.	146	120	1.6	XXXX	XXXX	XXXX	XXXX
V705 (6AU6)	-16	0	A.C.	A.C.	155	153	0	XXXX	XXXX	XXXX	XXXX
1/2 705A (6U8)	-	.06	134	A.C.	A.C.	134	2.3	-	-	XXXX	XXXX
1/2 706B (6U8)	134	-	-	A.C.	A.C.	-	-	2.8	-3.8	XXXX	XXXX
V707 (6BA7)	108	.9	3.1	A.C.	A.C.	3.1	-6.5	XXXX	108	XXXX	XXXX
1/2 V703B (6U8)	102	-	-	A.C.	A.C.	-	-	0	-1.8	XXXX	XXXX
V711 (6AB4)	108	-	-	A.C.	A.C.	-3.8	0	XXXX	XXXX	XXXX	XXXX
V712A (12AT7)	230	0	3	A.C.	A.C.	-	-	-	A.C.	XXXX	XXXX
V712B (12AT7)	-	-	-	A.C.	A.C.	240	-.2	3	A.C.	XXXX	XXXX
V713 (1EPI)	A.C.	A.C.	-480	-425	-320	180	180	180	180	180	0
V713 (1EPI)	A.C.	A.C.	-325	-320	-220	215	215	215	215	215	0

*All Voltages Measured With Respect To Chassis Ground.

**Scope Selector Switch Off

t Scope Selector Switch In Position L-1

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MODEL CLL-1

WITH CHL CONNECTED A.C. VOLTAGES

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 10	Pin 11
1/2 V701A (6U8)	-	4.3	0	6.3	6.3	23	0	-	-	-	-
1/2 V701B (6U8)	0	-	0	6.3	6.3	-	0	0	0	-	-
1/2 V702A (6U8)	0	.48	0	6.3	6.3	25	0	11	15	-	-
1/2 V702B (6U8)	0	-	0	6.3	6.3	-	.4	-	-	-	-
1/2 V703A (6U8)	0	.8	0	6.3	6.3	18	0	-	1.6	-	-
V704 (6BA7)	0	8	0	6.3	6.3	0	1.2	xxxx	3.5	-	-
V709 (6BA7)	1	16.5	0	6.3	6.3	0	3	xxxx	-	-	-
V708A (6U8)	-	.06	0	D.C.	D.C.	7.4	0	-	-	-	-
V708B (6U8)	0	-	-	D.C.	D.C.	-	0	1.4	3.6	-	-
V710 (6AU6)	1.7	.04	6.3	6.3	46	0	.04	xxxx	xxxx	-	-
V705 (6AU6)	11	0	6.3	6.3	10	.4	0	xxxx	xxxx	-	-
1/2 706A (6U8)	-	.4	.03	6.3	6.3	25	0	-	-	-	-
1/2 706A (6U8)	0	-	-	6.3	6.3	-	-	4.4	8.3	-	-
V707 (6BA7)	.02	4.3	.06	6.3	6.3	.06	-	xxxx	23	-	-
1/2 703R (6U8)	42	-	-	6.3	6.3	-	-	0	1.1	-	-
V711 (6BA4)	9.8	-	-	6.3	6.3	2.9	0	xxxx	xxxx	-	-
V712A (12AT7)	15	.55	0	6.3	6.3	-	-	-	6.3	-	-
V712B (12AT7)	-	-	-	6.3	6.3	24	.6	0	6.3	-	-
V713 (1EPI)	6.3	6.3	2	2	3	0	24	0	0	17	-

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TMC SPECIFICATION NO. S ₄₉₁

TITLE: COMPLETE TEST INSTRUCTION FOR THE TMC

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MODEL CLL-1

TEST REPORT SHEET TMC MODEL CLL-1

ACCEPT

A. General Inspection _____

B. Initial Check-up _____

C. Scope V713 _____

D. Low Frequency Loop L-1 _____

1. Alignment _____ (11,500 ± 4CPS) _____

2. Phase Detector Set for 0 Volts _____

E. Mis Frequency Loop L-2: _____

1. Alignment: _____ (18,000 ± 6 CPS) _____

_____ (17,000 ± 6 CPS) _____

_____ (16,000 ± 5 CPS) _____

_____ (15,000 ± 5 CPS) _____

_____ (14,000 ± 5 CPS) _____

_____ (13,000 ± 4 CPS) _____

_____ (12,000 ± 4 CPS) _____

_____ (11,000 ± 4 CPS) _____

_____ (10,000 ± 4 CPS) _____

_____ (9,000 ± 4CPS) _____

2. Phase Detector: Set for 0 Volts _____

F. Output Frequency Loop L-3 _____

1. Alignment: _____

a. L707 _____ (519,900 ± 10CPS) _____

2. Phase Detector Set for 0 Volts _____

3. Synthesized Output Frequency: _____

_____ (510,000 ± 1CPS) _____

_____ (510,900 ± 1CPS) _____

_____ (516,900 ± 1CPS) _____

_____ (516,000 ± 1CPS) _____

_____ (519,000 ± 1CPS) _____

_____ (519,900 ± 1CPS) _____

Tested By _____

Date _____

Approved By _____

REVISION SHEET

THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK

S 491

MODEL CLL-1 PROJECT NO _____

DATE	REV.	PAGE	EMN#	DESCRIPTION	CHK.	APP.		
11-21-60	1	1		Added 102 to J in 103 block				
11-21-60	2	2	A	Delete V703B 6H8 from block J705, added V711 6A84	}			
11-21-60	3	3		Added in A item 5. Replace all covers except top				
				and bottom outer covers.				
11-21-60	4	4		Added in D. item 3,4,6V				
11-21-60	5	5		Added in item 3, .7V				
11-21-60	9	9		Voltage charts completely revised.				
11-21-60	10	10		Voltage charts completely revised.				
11-21-60	11	11		Voltage charts completely revised.				
11-23-60	8	8	B	Item 25 change counter reading from 119,900 to 519,900			SD 16	16
11-23-60	12	12		Completely revised p. 12				
-1-19-61		4	C	Item 1, chg. test lead from J713 to TP7.			}	
"	"	"		Item 3, chg. J714 to TP8.				
"	"	"		Item 4, chg. J714 to TP8; item 7, chg. J711 to TP5.				
"	"	"		Item 12, chg. J713 to TP7.				
"	5	5		Item 1, chg. J708 to TP2; item 3, chg. from J709 to TP3.				
"	"	"		Item 4, chg. J709 to TP3; item 6, chg. from J707 to TP1.				
"	"	"		Item 11, chg. J708 to TP2.				
"	6	6		Item 1, chg. J710 to TP4.				
"	8	8		Item 17, chg. J712 to TP6; item 22, chg. J710 to TP4.				
9/12/62	D	7	7345	On Item 12, Pos. 3, Add: +23 cps.		16		
2/16/66	E	4,5,6	15790	Revised per EMN		16		