DATE 6/1/64	TMC SPECIFICATION NO. S-722	F
SHEET 1 OF 11		
COMPILED MOB / CHECKED LEL	TITLE: FINAL PRODUCTION TEST PROCEDURE, HFI-1	
APPROVED RDV		

FINAL PRODUCTION TEST PROCEDURE
FOR THE HFI-1

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 459M

DATE 6/1/64 SHEET 2 OF 11	TMC SPECIFICATION NO. S-722	F
COMPILED / CHECKED	TITLE: FINAL PRODUCTION TEST PROCEDURE, HFI-1	
APPROVED		

A. EQUIPMENT REQUIRED:

1. AC voltmeter, Ballantine 314 or equivalent.
2. Two 50 ohm dummy loads (one of which must have load resistor leads exposed).
3. TMC, HFP-1 power supply or equivalent.
4. Vacuum tube voltmeter, Heath V-7A or equivalent.
5. Two RF signal generators, model 82 equivalent.
6. 100K resistor, 1/2 watt.
7. Frequency counter, CMC model 203BN or equivalent.

B. ALIGNMENT OF CONVERTER (NOTE: Readings or values obtained in paragraph's marked with asterisk's* should be entered on test data sheet.

1. Inspect chassis for obvious wiring errors and foreign material. Check for B+ shorts to ground with ohmmeter.
2. Turn "IF Bandwidth KC" switches to blank position. Turn "AFC" switch to off.
3. Connect 50 ohm dummy load to J-6207.
4. Temporarily connect a lead from chassis ground to terminal of resistor R-6205. (terminal closest to R-6205 lettering on terminal strip).
5. Connect a 100K resistor in series with probe tip of AC voltmeter. Connect this to pin 1 of V-6201 using 10 volt scale.
6. Adjust signal generator to 250KCS at .05 volt output and connect to J-6205
7. Turn top and bottom slug of T-6202 fully counter clockwise.
8. Apply power by connecting plug of HFP-1 power supply to J-6201 on HFI-1.
9. Allow time for equipment to warm up, then adjust top slug of T-6202 for maximum voltage. Between 2 and 4 volts.
10. Adjust bottom slug of T-6202 for minimum voltage. Between .5 and 2.5 volts.

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11. Reduce signal generator to .01 volt output.

12. Remove test probe from pin 1of V-6201. Disconnect 100K resistor from probe. Connect probe to TP-6201.

* 13. Adjust slug at top of T-6203 for maximum deflection. Should be .5 to .7 volts.

14. Leaving AC voltmeter connected to TP6201 connect frequency counter also to TP-6201.

*15. With frequency counter showing 250KCS, Note db reading on AC voltmeter. Reduce frequency of signal generator until db reading on AC voltmeter has been reduced by 3db. Note reading on frequency counter. Must be 10KCS down from 250KCS -2.5KCS,+.5KCS. Readjust signal generator to show 250KCS on frequency counter. Note db reading on AC voltmeter. Increase frequency of signal generator until db reading on AC voltmeter has been reduced by 3db. Note reading of frequency counter. Must be 10KCS up from 250KCS +2.5KCS, -.5KCS. Readjust signal generator to 250 KCS.

16. This completes alignment of converter. Remove all test equipment, dummy load and temporary ground used in step 4.

C. IF AVC ALIGNMENT.

1. Turn manual gain fully counter clockwise, (clicked to off) Turn both "AGC decay, A and B" fully clockwise.

2. Turn R-6212 and R-6213 fully clockwise.

3. Connect a zero centered vacuum tube voltmeter to TP-6202. Use lowest scale without overloading meter.

4. Adjust R-6213 for zero center on VTVM. When zero center cannot be obtained change V-6203.

5. Remove test probe of VTVM from TP-6202 and connect to TP-6203.

6. Adjust R-6212 for zero center on VTVM. When zero center cannot be obtained change V-6203.

*7. Turn "AGC decay" "B" fully counter clockwise. Voltage change on VTVM is not to exceed ± 0.1 volt with any change in "AGC decay" control "B". If voltage change exceeds ± 0.1 volt, repeat steps 3 thru 7.

8. Remove test probe of VTVM from TP-6203 and connect to TP-6202.

9. Turn "AGC decay" "A" fully counter clockwise. Voltage change on VTVM is not to exceed ±0.1 volt with any change in "AGC decay" control "A". If voltage change exceeds ± 0.1 volt, repeat steps 3 thru 9.

10. This completes the IF AVC alignment . Remove all test equipment.

D. FINAL PROCEDURE

1. Connect 50ohm dummy loads to J-6203 and J-6204. Dummy load on J-6204 must have the exposed leads.

2. Connect signal generator to J-6208. Set output frequency to 250KCS and output level to 5 millivolts.

3. Connect AC voltmeter to exposed lead on dummy load of J-6204 and and chassis ground. Use 1 volt scale.

4. Connect frequency counter to dummy load on J-6204.

5. Turn "IF bandwidth KC" switch (channel A) to a blank position.

6. Turn "IF bandwidth KC" switch (channel B) to DSB-1.

7. a. Note: reading on AC VTVM should be approximately 20db. Reading on frequency counter should be 250KCS. Adjust R-116 on DSB-1 IF strip for a 20db indication exactly, on AC VTVM. Reduce frequency of signal generator until reading on AC VTVM is decreased by 3db. Note reading on frequency counter.* Should be 249,500cycles $^{-300\text{ cycles}}_{+0\text{ cycles}}$

Readjust signal generator to 250KCS. AC VTVM should read 20db again. Increase frequency of signal generator until reading on AC VTVM is decreased by 3db. Reading on frequency counter should be 250,500 cycles $^{+300\text{ cycles}}_{-0\text{ cycles}}$ *

Repeat above procedures for the DSB-6 and DSB-15 positions of the "IF bandwidth KC" switch, channel "B". Use the corresponding R-116 control, when necessary, of the IF strip under test. The center and end frequencies of the DSB-6 and DSB-15 positions are listed below.

	CENTER	U/E	L/E
*DSB-6	250KC	253,000 cps	247,000 cps
		at least 3kc from center freq.	
*DSB-15	250KC	257,500 cps	242,500 cps
		at least 7.5kc from center freq.	

7.b. Turn "IF Bandwidth KC"switch channel "B" to 3.5U. Adjust signal generator to approximately 251,875 cycles. Note reading on AC VTVM, vary signal generator to obtain a peak reading on AC VTVM. Note reading on frequency counter. Adjust R-116 on 3.5U IF strip for a 20db indication. Reduce frequency of signal generator until reading on AC VTVM is reduced by approximately 10db. Now increase frequency of signal generator until reading on AC VTVM is 3db less than the original 20db. Note reading on frequency counter.

*Should be 250,250 cycles +150cycles
-200 cycles.

Carefully readjust signal generator to the frequency noted above, which is underlined, insuring that the dips encountered do not exceed 3db less than the original 20db. Now increase signal generator frequency until reading on AC VTVM is decreased by 10db. Now decrease signal generator frequency until reading on AC VTVM is 3db less than the original 20db. Note reading on frequency counter.

*Should be 253,500 cycles +200 cycles
-200 cycles.

Carefully readjust signal generator frequency to the frequency noted above, which is underlined, insuring that the dips encountered do not exceed 3db less than the original 20db.

8. Repeat the procedures in 7.b. for the 3.5L, 7.5U and 7.5L positions of the "IF Bandwidth KC" switch, channel"B". The R-116 potentiometer of the corresponding IF strip under test should be used when necessary. The approximate center frequencies and end frequencies for each remaining band are listed below:

	CENTER	L/E	U/E
*3.5L	248,125 cycles	246,500 cycles +200 cycles -200 cycles	249,750 cycles +200 cycles -150 cycles
*7.5U	253,875 cycles	250,250 cycles +150 cycles -200 cycles	257,500 cycles +200 cycles -200 cycles
*7.5L	246,125 cycles	242,500 cycles +200 cycles -200 cycles	249,750 cycles +150 cycles -200 cycles

*Note: During procedures 7 and 8 above, channel output meter "B" should read 1.4 volts, ±10%.

9. Disconnect AC VTVM and frequency counter from J-6204.

10. Remove dummy load from J-6203 and replace with dummy load from J-6204. Place dummy load that was removed from J-6203 on J-6204.

11. Reconnect AC VTVM to exposed leads of dummy load on J-6203.

12. Turn "IF Bandwidth KC" switch, channel "B", to a blank position.

13. Turn "IF Bandwidth KC" switch, channel "A", to DSB-1 position.

14. Adjust signal generator for 250KCS at .3 millivolts. AC VTVM should read approximately 1 volt or 20db on the db scale.

15. Turn "IF Bandwidth KC" switch, channel "A", to DSB-6, then DSB-15, AC VTVM should indicate the same as in step 14 above.

16. Turn "IF Bandwidth KC" switch, channel "A", to 3.5U.

17. Adjust signal generator for approximately 251,875 cycles. Reading on AC VTVM should be about 1 volt or 20db on the db scale.

18. Repeat step 16 and 17 above for the 3.5L, 7.5U and 7.5L switch positions of the "IF Bandwidth KC" channel "A" switch. Readings obtained should be about the same. Use following frequencies for the indicated switch position.
    3.5L 248,125
    7.5U 253,875
    7.5L 246,125

* Note; During procedures 17 and 18 above, channel output meter "A" should read 1.4 volts, ±10%.

19. Set both "IF bandwidth KC" switches to DSB-15.

20. Set signal generator to 250KCS.

21. Remove dummy load from J-6204.

22. Turn manual gain control fully counter clockwise. (clicked off)

23. Connect a DC VTVM to TP-6202.

24. Adjust signal generator output level to obtain a reading of 0.7 volts on the AC VTVM, which is still connected to J-6203.

25. DC VTVM should indicate 0 volts and both output meters on front panel should indicate 1 volt, ±0.1 volt.

26. Repeat steps 24 and 25 using TP6203 for DC VTVM.

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* 27. Leaving DC VTVM on TP-6203, rotate manual gain control. When gain control clicks on, DC VTVM reading should increase from zero to -20 to -25 volts, then gradually return to zero as gain control is rotated to a fully clockwise position. Return manual gain control to full counter clockwise position. (clicked off)

28. Remove DC VTVM from TP-6203 and reconnect to lug of TP6202 (lug nearest label). Increase signal generator output to approximately 30 millivolts. Voltage at TP-6202 should increase to at least -9 volts. Increase signal generator output level again to approximately 300 millivolts. Voltage at TP-6202 should increase to at least -15 volts. Remove DC VTVM from TP-6202 and reconnect to TP-6203.

29. Remove signal generator from J-6208 and connect to J-6205. Adjust frequency for 1.75 MCS at a level of 3.0 millivolts.

30. Connect second signal generator to J-6202. Adjust frequency for 2.0 MCS at a level of 1 volt.

31. Turn "AFC" switch to on.

32. Connect a jumper between J-6207 and J-6208.

*33. AC VTVM should indicate 1 volt at J-6203.

34. Remove generator from J-6202 and connect it to J-6206.

35. Turn "AFC" switch to "off".

36. AC VTVM at J-6203 should indicate 1 volt.

*37. With both "AGC decay" controls fully clockwise, disconnect generator from J-6205, observing DC VTVM which is still connected to TP-6203, note decay time. Should be 5 seconds or greater to return to zero.

*38. Reconnect signal generator to J-6205. With both "AGC decay" controls fully counter clockwise, disconnect signal generator from J-6205. Note decay time on DC VTVM at TP-6203, Should be less than 1 second.

39. Repeat steps 36 and 37 using TP-6202 for the DC VTVM.

40. This completes the test for the HFI-1. Disconnect all test equipment, jumpers, dummy loads, etc.

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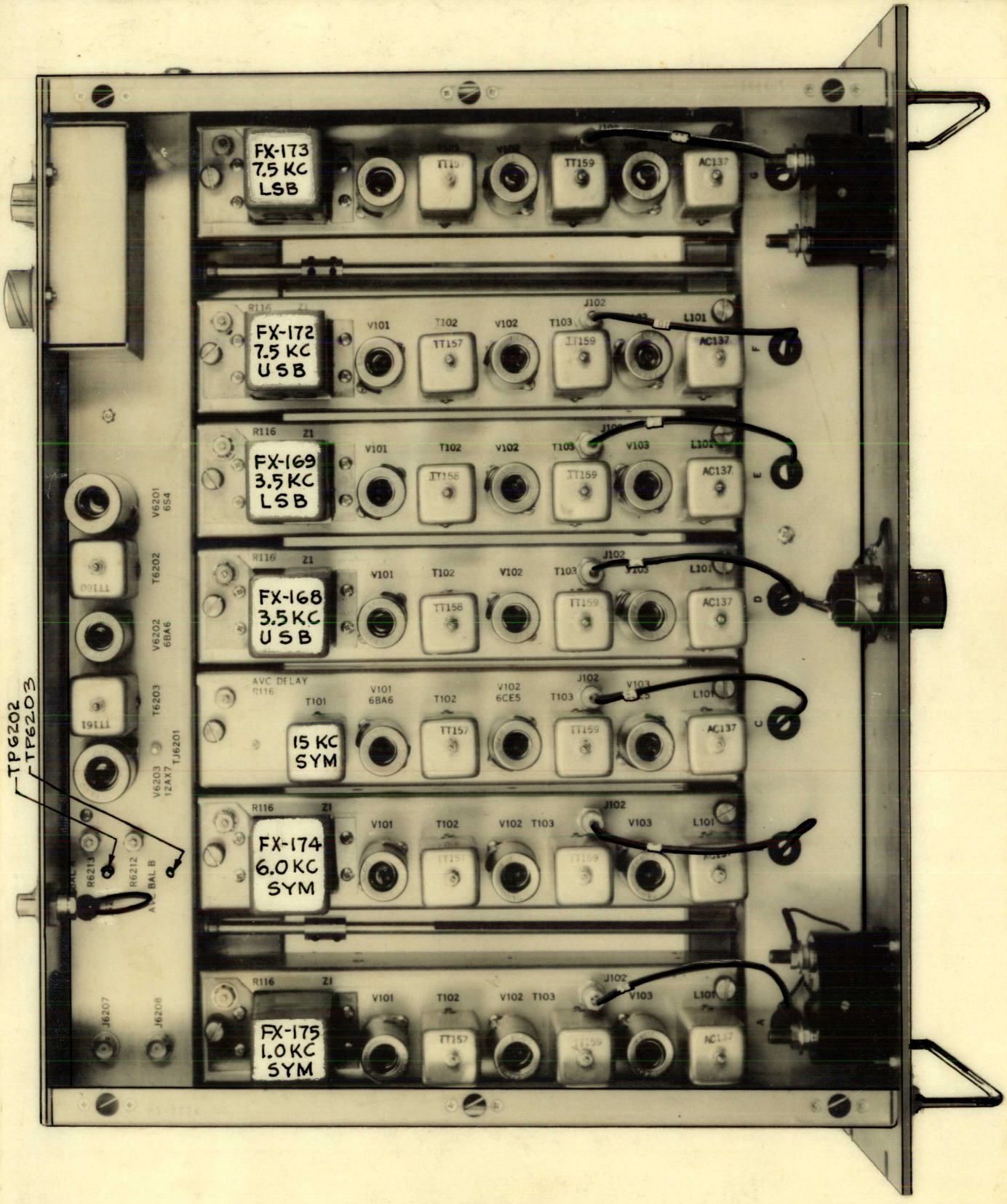
DATE 10/18/62	TMC SPECIFICATION NO. S - 722	F
SHEET 8 OF 11		
FRD COMPILED / CHECKED	TITLE: FINAL PRODUCTION TEST PROCEDURE HFI-1	
APPROVED		



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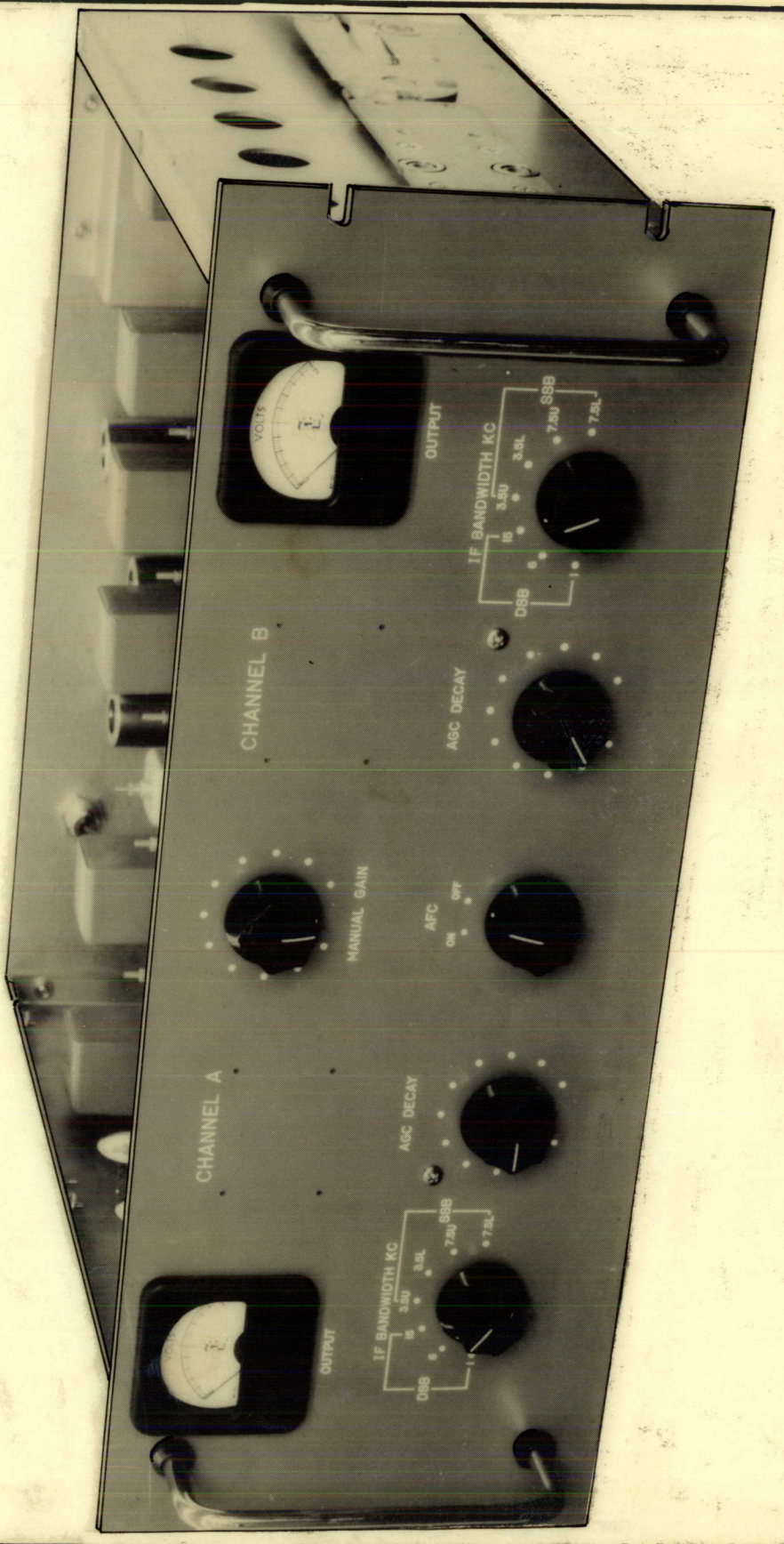
DATE 10/18/62 SHEET 9 OF 11	TMC SPECIFICATION NO. S - 722	F
COMPILED FRD / CHECKED	TITLE: FINAL PRODUCTION TEST PROCEDURE HFI-1	
APPROVED		



DATE 6/16/64 SHEET 10 OF 11	TMC SPECIFICATION NO. S	F
COMPILED / CHECKED	TITLE: HFI-1 TEST DATA SHEET	
APPROVED		

THE TECHNICAL MATERIEL CORPRATION
MAMARONECK,N.Y.
HFI-1 TEST DATA SHEET

SERIAL NO:_____
MFG.NO:_____

B. 13. TP6201 output voltage with .01 VRMS input_____VRMS

15. Total bandwidth at 3db points _____KC
Converter alignment_____OK

C. 7. AVC test point voltage change for maximum time constant change
_____VDC

D.

	IF STRIP	-3dbPOINTS
7.a	1KC-DSB	___KC_____KC
7.a	6KC-DSB	___KC_____KC
7.a	15KC-DSB	___KC_____KC
7.b	3.5KC-USB	___KC_____KC
8	3.5KC-LSB	___KC_____KC
8	7.5KC-USB	___KC_____KC
8	7.5KC-LSB	___KC_____KC

METERS

D. 8. Output channel "A"_____OK
18. Output channel "B"_____OK

AGC

D. 27. "MANUAL GAIN"control:0 volts-_____volts

37. "DELAY"time:slow_____seconds

38. "DELAY"time:fast_____seconds

33. "AFC" switch_____OK

TOTAL GAIN_____db (output for 3.0 MV input)

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

DATE 10/9/62 SHEET 11 OF 11	TMC SPECIFICATION NO. S-722	F
COMPILED / CHECKED	TITLE: FINAL PRODUCTION TEST PROCEDURE, HFI-1	
APPROVED	VOLTAGE-RESISTANCE CHART (FOR REFERENCE ONLY)	

250KC IF AMPLIFIER

All units except input signal connected, however B+ and filaments turned off for resistance checks.

	V101/6BA6		V102/6CE5		V103/6CE5	
PIN NUMBER	VOLTS DC	RESISTANCE	VOLTS DC	RESISTANCE	VOLTS DC	RESISTANCE
1	0	280K	0	72	0	6
2	.98	68	1.32	100	3.1	430
3	6.3VAC	-	6.3VAC	-	6.3VAC	-
4	0	0	0	0	0	0
5	144	42K	155	39K	180	40K
6	88	62K	130	58K	160	44K
7	.98	68	1.32	100	3.1	430

250KC CONVERTER

All units except input signal connected, however B+ and filaments turned off for resistance checks.

	V6201/6CM7		V6202/6BA6		V6203/12AX7	
PIN NUMBER	VOLTS DC	RESISTANCE	VOLTS DC	RESISTANCE	VOLTS DC	RESISTANCE
1	181	10K	0	210K	195	3.2K
2	126	12K	1.8	390	0	4.6K
3	2.5	330	6.3VAC	-	*	*
4	0	0	0	0	6.3VAC	-
5	6.3VAC	-	180	6.5K	6.3VAC	-
6	140	12K	60	25K	195	3.2K
7	0	47	1,8	390	0	4.6K
8	0	0.8	-	-	*	*
9	9.2	4K	-	-	0	0

* Depends upon tube and settings of R6212 and R6213. Approximately 120K ohms and 0.5 volts.DC

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REVISION SHEET	THE TECHNICAL MATERIEL CORP. MAMARONECK NEW YORK	S-722

MODEL HFI-1 PROJECT NO. _____

DATE	REV.	PAGE	EMN#	DESCRIPTION	CHK.	APP.
11/9/62	A	all pages	7664	Completely revised and rewritten to include S-623		16
				and S-624		
12/3/62	B	9	7814	Add sheet 9, Voltage Resistance Chart		16
				Renumber Spec. accordingly		
9-18-63	C	3	10,009	Revised Sheet 3 per EMN		16
4/23/64	D	2	11283	Revised SHt.2 per EMN		16
6/1/64	E	-----	11470	Revised and retyped completely per EMN		16
7/21/64	F	2,3,4	11760	Revised sht. 2,3,4,10		16