

DATE: OCT 27

SHEET 1

TMC SPECIFICATION NO. S - 737

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TITLE: DDR-5A FINAL TEST PROCEDURE

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A. (1) TEST EQUIPMENT REQUIRED

- a) Frequency Counter: H.P. Model 524C or equivalent.
- b) ~~Signal~~ Generators: Measurements Corp. Model 82 or equivalent.
(2 required)
- c) AC VTVM: Ballantine Model 314 or equivalent.
- d) Spectrum Analyzer (TMC Model PTE-3).
- e) 30 db mixing pad (described in two tone test).
- f) 20 db attenuator pad.
- g) VOM: Simpson Model 260 or equivalent.

(2) PRELIMINARY

It is assumed that all units have been tested and installed in the cabinet; ~~that~~ all cables have been connected, and all interconnections made.

(3) Remove the four screws holding the line filter in place at the rear center of the cabinet. Orient the filter so that the cover can be removed. Connect a three wire power cable as follows:

- a) WHITE lead to line lug.
- b) GREEN lug to grounding screw.
- c) BLACK lead to line lug.

Connect the power cable to a 117 volt, 60 cycle, single phase source.

- * d) With a Simpson Model 260 VOM, measure the voltage at the convenience outlets on the front panel of the RCVR #1 rack. The reading should be 117 volts $\pm 10\%$. Leave the filter cover off till after completion of the tests.

(4) Place switches and controls in the following positions:

- * a) HFP-1: (both units)

~~STANDBY OFF~~ switch at rear to STANDBY. The blowers on both racks should commence to operate.

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- b) ~~1~~: (both units)
All switches to the OUT position.
- c) ~~1~~: (both units)
 - (1) DETECTION switch: CW
 - (2) BFO control: "0"
 - (3) STANDBY OPERATE switch: STANDBY
 - (4) LINE LEVEL ADJUST control: Mid-position.
- d) HNF-1: (both units)
 - (1) ON OFF switch: OFF
 - (2) NOTCH ADJUST control: "0"
- e) HFI-1: (both units)
 - (1) MANUAL GAIN control: fully CCW until switch clicks OFF.
 - (2) AGC DECAY controls: Channel A and B fully CCW
 - (3) IF BANDWIDTH selectors: Channel A and B 6 KC DSB.
 - (4) AFC ON OFF switch: OFF
- f) HSP-2: (on RCVR #1 rack)
 - (1) RCVR #1 SPEAKER SELECTOR: Channel A
 - (2) RCVR #1 VOLUME control: fully CW
 - (3) RCVR #2 SPEAKER SELECTOR: Channel A
 - (4) RCVR #2 VOLUME control: fully CW
 - (5) AGC COMBINED SEPARATE switch: separate
- g) AFC-3: (both units)
 - (1) SENSITIVITY control: fully CW
 - (2) TUNING KCS control: "0"
 - (3) CARRIER SELECTOR switch: OSC

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h) ~~DVM-4~~: (RCVR #2 rack)

- (1) RCVR SELECTOR: RCVR #1
- (2) SWEEP RANGE switch: Plus or Minus 5 KC
- (3) CALIBRATE FOR ZERO control: "0"
- (4) POWER ON OFF switch: OFF

i) HFS-1:

The controls are of no significance at this time.

j) HFR-1:

(1) RCVR #1:

BAND: Band 1 (2-3 mcs)

TUNE: 2.0 mcs

TUNE SYNC OPERATE switch: SYNC

NOISE ~~SILENCER~~ OFF ALIGNMENT SIGNAL switch: OFF

(2) RCVR #2:

BAND: Band 1 (2-3 mcs)

TUNE: Away from 2 mcs

TUNE SYNC OPERATE switch: TUNE

NOISE SILENCER OFF ALIGNMENT SIGNAL switch: OFF

B. CHECKOUT PROCEDURE

* (1) On both HFA-1 units, place the STANDBY OPERATE switches to OPERATE. The GREEN standby indicators will go out and the YELLOW time delay indicators will come on. After time delay, approximately 60 seconds, the YELLOW indicators will go out and the RED operate indicators will come on. The NIXIE lights on the HFS-1 will indicate, and the slide rule dials on both HFR-1 units will be illuminated.

* (2) Pull out the HFP-1 units on both racks. With a Simpson Model 260 VOM, check the voltage at test points TP-8001 and TP-8002 on both units. It should be exactly 200 volts. If it is not, adjust R-8014 and/or R-8025 on the appropriate unit(s) until the proper voltage is obtained.

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* (3) ~~Check~~ of Synthesizer, HFO circuits of both RF heads, and Stability:

a) Remove the plug from J-1313 on the RCVR #2 RF head; connect the frequency counter to J-1313.

b) Set the NIXIE selectors on the HFS-1 to 02.0000.

c) Carefully move the TUNE control on the #1 head around 2.0 mcs until a ~~zero~~ beat is obtained. The SYNC light may chatter until the proper point is found.

NOTE: References to the SYNC light are with respect to RCVR #1. The SYNC light on RCVR #2 will remain on at all times.

d) Place the NOISE SILENCER OFF ALIGNMENT SIGNAL switch on RCVR #2 to the ALIGNMENT SIGNAL position.

e) Carefully move the TUNE control on the #2 head until a "null" is found. On either side of the null, the SYNC light will chatter and a tone of increasing frequency will be heard.

f) Place the TUNE SYNC OPERATE switch on the #1 head to OPERATE. Place the NOISE SILENCER switch on the #2 head to OFF. The system is in synchronism; the SYNC light on the #1 head will come on; read the counter; the reading should be 3.75 mcs.

g) Place the TUNE SYNC OPERATE switch on the #1 head to SYNC; place the 100 KC NIXIE selector to position 1. Carefully move the TUNE control on the #1 head for a zero beat at 2.1 mcs.

h) Place the NOISE SILENCER OFF ALIGNMENT SIGNAL switch on the #2 head to ALIGNMENT SIGNAL. Carefully move the TUNE control on the #2 head for a null at 2.1 mcs.

i) Place the TUNE SYNC OPERATE switch on the #1 head to OPERATE. Place the NOISE SILENCER switch on the #2 head to OFF. The system is in synchronism at 2.1 mcs. The SYNC light will come on; the counter should read 3.85 mcs.

j) Continue this procedure for the remaining positions of the 100 KC NIXIE selector, as shown in the following table. Move the NIXIE selector, to the position shown; with the #1 TUNE SYNC OPERATE switch in SYNC, and the #2 NOISE SILENCER switch at OFF, obtain a zero beat at the indicated frequency with the #1 TUNE control. Then place the #2 NOISE SILENCER switch to ALIGNMENT SIGNAL and obtain a ~~beat~~ null at the indicated frequency with the #2 TUNE control. Place the #1 TUNE SYNC OPERATE switch to OPERATE, the #2 NOISE SILENCER switch to OFF, and read the counter.

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<u>100 KC SELECTOR</u>	<u>TUNE CONTROL</u>	<u>FREQ. COUNTER</u>
2	2.2 mcs	3.95 mcs
3	2.3 mcs	4.05 mcs
4	2.4 mcs	4.15 mcs
5	2.5 mcs	4.25 mcs
6	2.6 mcs	4.35 mcs
7	2.7 mcs	4.45 mcs
8	2.8 mcs	4.55 mcs
9	2.9 mcs	4.65 mcs

k) Place the 10 KC NIXIE selector to position 1; repeat the foregoing procedure with the TUNE controls at 2.91 mcs; the counter should read 4.66 mcs. Continue this procedure through the remaining positions of the 10 KC selector switch, in accordance with the following table:

<u>10 KC SELECTOR</u>	<u>TUNE CONTROL</u>	<u>FREQ. COUNTER</u>
2	2.92 mcs	4.67 mcs
3	2.93 mcs	4.68 mcs
4	2.94 mcs	4.69 mcs
5	2.95 mcs	4.70 mcs
6	2.96 mcs	4.71 mcs
7	2.97 mcs	4.72 mcs
8	2.98 mcs	4.73 mcs
9	2.99 mcs	4.74 mcs

l) Place the 1 KC NIXIE selector to position 1; repeat the foregoing procedure with the TUNE controls at 2.991 mcs; the counter should read 4.741 mcs. Continue this procedure through the remaining positions of the 1 KC selector switch in accordance with the following table:

<u>1 KC SELECTOR</u>	<u>TUNE CONTROL</u>	<u>FREQ. COUNTER</u>
2	2.992 mcs	4.742 mcs
3	2.993 mcs	4.743 mcs
4	2.994 mcs	4.744 mcs
5	2.995 mcs	4.745 mcs
6	2.996 mcs	4.746 mcs
7	2.997 mcs	4.747 mcs
8	2.998 mcs	4.748 mcs
9	2.999 mcs	4.749 mcs

m) Place the .1 KC NIXIE selector to position 1; repeat the foregoing procedure with the TUNE controls at 2.9991 mcs; the counter should read 4.7491 mcs. Continue this procedure through the remaining positions of the .1 KC selector switch in accordance with the following table :

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<u>.1 KC SELECTOR</u>	<u>TUNE CONTROL</u>	<u>FREQ. CONTROL</u>
2	2.9992 mcs	4.7492 mcs
3	2.9993 mcs	4.7493 mcs
4	2.9994 mcs	4.7494 mcs
5	2.9995 mcs	4.7495 mcs
6	2.9996 mcs	4.7496 mcs
7	2.9997 mcs	4.7497 mcs
8	2.9998 mcs	4.7498 mcs
9	2.9999 mcs	4.7499 mcs

n) Place the NIXIE selectors to 03.0000. Repeat the synchronization procedure at this frequency. The counter should read 4.75 mcs.

o) Move the BAND control on both RF heads to Band #2 (3-4 mcs). Repeat the synchronization procedure at 3 mcs. The counter should read 4.75 mcs.

p) Continue this procedure for the remaining positions of the MC NIXIE selector switch, conducting the check at the high and low ends of each band. In each case the counter should read 1.75 mc above the selected RF frequency.

<u>MC SELECTOR</u>	<u>BAND</u>	<u>TUNE CONTROL</u>	<u>FREQ. COUNTER</u>
4	2	4 mcs	5.75 mcs
4	3	4 mcs	5.75 mcs
5	3	5 mcs	6.75 mcs
6	3	6 mcs	7.75 mcs
6	4	6 mcs	7.75 mcs
7	4	7 mcs	8.75 mcs
8	4	8 mcs	9.75 mcs
8	5	8 mcs	9.75 mcs
9	5	9 mcs	10.75 mcs
10	5	10 mcs	11.75 mcs
11	5	11 mcs	12.75 mcs
12	5	12 mcs	13.75 mcs
12	6	12 mcs	13.75 mcs
13	6	13 mcs	14.75 mcs
14	6	14 mcs	15.75 mcs
15	6	15 mcs	16.75 mcs
16	6	16 mcs	17.75 mcs
16	7	16 mcs	17.75 mcs
17	7	17 mcs	18.75 mcs
18	7	18 mcs	19.75 mcs
19	7	19 mcs	20.75 mcs
20	7	20 mcs	21.75 mcs
21	7	21 mcs	22.75 mcs
22	7	22 mcs	23.75 mcs
23	7	23 mcs	24.75 mcs
24	7	24 mcs	25.75 mcs

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<u>MC SELECTOR</u>	<u>BAND</u>	<u>TUNE CONTROL</u>	<u>FREQ. CONTROL</u>
24	8	24 mcs	25.75 mcs
25	8	25 mcs	26.75 mcs
26	8	26 mcs	27.75 mcs
27	8	27 mcs	28.75 mcs
28	8	28 mcs	29.75 mcs
29	8	29 mcs	30.75 mcs
30	8	30 mcs	31.75 mcs
31	8	31 mcs	32.75 mcs

q) Place the NIXIE selectors to 15.0000. Place both BAND controls to Band 6 (12-16 mcs). Place the #1 TUNE SYNC OPERATE switch to SYNC. Place the #2 NOISE SILENCER switch to OFF. Move the TUNE control on RCVR #1 for zero beat at 15 mcs. Place the NOISE SILENCER switch on RCVR #2 to ALIGNMENT SIGNAL. With the #2 TUNE control, find the null at 15 mcs. Place the RCVR #1 TUNE SYNC OPERATE switch to OPERATE. Place the RCVR #2 NOISE SILENCER switch to OFF. The system is now in sync at 15.0 mcs.

r) The final adjustment of R3442 is a compromise between the symmetrical swing of SYNC meter and the electrical center for all zeros and nines of the NIXIE INDICATORS. Reasonably symmetrical swing can be obtained with this adjustment. Minimum requirement for swing is the first index on either side of zero.

NOTE: In a dual receiver installation, the #2 SYNC meter, like the #2 SYNC light, is not used in the tuning operation.

s) Remove the frequency counter from J-1313; replace the plug removed previously.

(4) Check of the AFC-3 Unit #1:

a) Place the AFC ON OFF switch on HFI-1 #1 to ON.

b) Place the NOISE SILENCER switch on RCVR #1 to ALIGNMENT SIGNAL.

* c) Depress and hold down the RESET button on AFC-3 #1. Adjust the TUNING KCS control for maximum indication on the CARRIER LEVEL meter, and zero center scale on the DRIFT meter. The CARRIER LEVEL meter should read approximately in the center of the GREEN. Release the RESET button.

* d) Check the FADE and DRIFT ALARM lamps. They should be extinguished. The DRIFT METER should remain at zero center scale.

* e) Place the CARRIER SELECTOR switch to RCC. There should be no change in indications.

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* f) Place the NOISE SILENCER switch on RCVR #1 to OFF. The CARRIER LEVEL meter should fall, and the FADE alarm should light. Return the NOISE SILENCER switch to ALIGNMENT SIGNAL position. Move the SENSITIVITY control fully CCW. The FADE indicator should light and the CARRIER LEVEL meter should fall. Return the SENSITIVITY control fully CW.

g) Return the CARRIER SELECTOR switch to OSC.

h) Place the AFC ON OFF switch on HFI-1 #1 to OFF.

(5) Check of HFI-1 Unit #1:

NOTE: This procedure also checks the HFA-1 #1 in the SSB mode of operation, and checks the tuning of the AFC-3 #1.

a) Check the MANUAL GAIN control on the HFI-1 #1. It should be OFF (CCW).

b) Place the Channel A IF BANDWIDTH selector to 1 KC DSB position.

c) Place the Channel B IF BANDWIDTH selector to a BLANK position.

d) Pull out the HFI-1 #1 unit. Lock in position and remove the top cover.

* e) Note the markings on the input filters or RF XFRMR can. With the operator facing the front panel, these should read from left to right: 1 KC SYM; 6 KC SYM; T-101; 3.5 KC USB; 3.5 KC LSB; 7.5 KC USB; and 7.5 KC LSB.

* f) Adjust R-116 on the 1 KC SYM strip for a reading of 1.0 volt on the Channel A IF LEVEL meter. This corresponds to a level of .007 volts RMS into a 50 ohm load at J-102 on the IF strip. Lock the adjustment.

* g) Place the Channel B IF BANDWIDTH selector to the 1 KC DSB position. Both IF LEVEL meters should read 1.05 volt $\pm 1\%$. Place the Channel B IF BANDWIDTH selector to a BLANK position.

* h) Place the Channel A IF BANDWIDTH selector to the 6 KC DSB position. Adjust R-116 on the 6 KC SYM strip for the 1.05 volt reading. Lock the adjustment.

* i) Place the Channel B IF BANDWIDTH SELECTOR to the 6 KC DSB position. Both IF LEVEL meters should read 1.05 volt $\pm 1\%$. Return the Channel B IF BANDWIDTH selector to a BLANK position.

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* j) Place the Channel A IF BANDWIDTH selector to the 15 KC DSB position. Adjust R-116 on the 15 KC symmetrical strip for the 1.0 volt reading. Lock the adjustment.

* k) Place the Channel B IF BANDWIDTH selector to the 15 KC DSB position. Both IF LEVEL meters should read 1.0 volt $\pm 1\%$. Return the Channel B IF BANDWIDTH selector to a BLANK position.

l) Place the AFC ON OFF switch on HFI-1 #1 to ON.

m) Place the Channel A and B DETECTION switches on the HFA-1 #1 unit to the SSB position.

* n) On AFC-3 #1, depress the RESET button for about 6 seconds; then move the TUNING KCS control midway between the "0" and "-3 KC" positions. The CARRIER LEVEL meter will fall and the FADE indicator will light.

* o) Place the Channel A IF BANDWIDTH selector to the 3.5 KC USB position. Adjust R-116 on the 3.5 KC USB strip for the 1.0 volt reading. Place the Channel B IF BANDWIDTH selector to the 3.5 KC USB position. Both the IF LEVEL meters should read 1.0 volt $\pm 1\%$. Return the Channel B selector to a BLANK position and lock R-116.

* p) Place the Channel A IF BANDWIDTH selector to the 7.5 KC USB position. Adjust R-116 on the 7.5 KC USB strip for the 1.0 volt reading. Lock the adjustment. Place the Channel B IF BANDWIDTH selector to the 7.5 KC USB position. Both IF LEVEL meters should read 1.0 volt $\pm 1\%$. Return the Channel B selector to a BLANK position.

q) Move the TUNING KCS control on AFC-3 #1 midway between the "0" and "plus 3 KC" positions.

* r) Place the Channel A IF BANDWIDTH selector to the 3.5 KC LSB position. Adjust R-116 on the 3.5 KC LSB strip for the 1.0 volt reading. Place the Channel B IF BANDWIDTH selector to the 3.5 KC LSB position. Both IF LEVEL meters should read 1.0 volt $\pm 1\%$. Lock the adjustment. Return the Channel B IF BANDWIDTH selector to a BLANK position.

* s) Place the Channel A IF BANDWIDTH selector to the 7.5 KC LSB position. Adjust R-116 on the 7.5 KC LSB strip for the 1.0 volt reading. Lock the adjustment. Place the Channel B IF BANDWIDTH selector to the 7.5 KC LSB position. Both IF LEVEL meters should read 1.0 volt $\pm 1\%$.

t) Place the AFC ON OFF switch on HFI-1 #1 to OFF. Return the TUNING KCS control on AFC-3 #1 to "0". Turn the NOISE SILENCER switch on RCVR #1 to OFF. Replace the cover on the HFI-1, and replace the drawer.

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* (6) Check of AGC DECAY circuit, RCVR #1:

a) Check that the following controls on HFI-1 #1 are in the indicated positions:

1. AGC DECAY: (both channels) fully CCW.
2. MANUAL GAIN: OFF (fully CCW).

b) Move the MANUAL GAIN control slightly clockwise, until the switch clicks on. Note the RF LEVEL meter on HFI-1 #1. It should indicate maximum, and may be pegged.

c) Rotate the MANUAL GAIN control slowly clockwise to the full clockwise position. The RF LEVEL meter should follow to zero. Return the MANUAL GAIN control to the "just on" position. This is the point before the switch clicks off. The RF LEVEL meter should again read maximum.

d) Turn both Channels B AGC DECAY controls fully CW. Turn the MANUAL GAIN fully CCW to OFF. The RF LEVEL meter should decay to zero between 15 to 20 seconds.

(7) Check of HFA-1 unit #1:

a) Check that the following controls on HFA-1 #1 are in the indicated positions:

1. LEVEL ADJUST controls: (both channels) mid-position.
2. LOAD switches: (both channels) OUT when using HSP-2. These switches are on top, rear, inside HFA-1.
3. DETECTION switches: (both channels) CW position.

b) Place the NOISE SILENCER switch on RCVR #1 to the ALIGNMENT SIGNAL position.

c) Adjust both BFO controls on HFA-1 #1 for maximum indication on their respective LINE LEVEL meters.

d) Adjust both LEVEL ADJUST controls for "0 VU" indication on their respective LINE LEVEL meters.

e) Turn the NOISE SILENCER switch on RCVR #1 to OFF.

f) Place both DETECTION switches on HFA-1 #1 to AM position.

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g) Place both IF BANDWIDTH selectors on HFI-1 #1 to the 15 KC DSB position.

h) Connect a signal generator to J-1001 on HFR-1 #1. Adjust the signal generator to a frequency of 15 mcs, modulated 30% with 1 KC. Adjust the signal generator output to 10 uv.

i) Adjust the BAND and TUNE controls on HFR-1 #1 to receive a frequency of 15 mcs. Place the NIXIE selectors on the HFS-1 to 15.0000. Place the TUNE SYNC OPERATE switch on HFR-1 #1 to SYNC. Obtain a zero beat, and throw the switch to OPERATE.

* j) With the RCVR #1 SPEAKER SELECTOR on the HSP-2 to Channel A, adjust the signal generator frequency till a 1 KC tone is heard. Note the RF LEVEL meter on the HFR-1. It will indicate about 20 db above 1 uv, which is 10 uv.

* k) Plug headphones into the Channel A PHONE jack on the HFA-1. Note that the Channel A MONITOR control varies the volume of the 1 KC tone in the phones.

* l) Place the RCVR #1 SPEAKER SELECTOR on the HSP-2 to Channel B. A 1 KC tone should be heard. Plug headphones into the Channel B PHONE jack. Note that the Channel B MONITOR control varies the volume of the 1 KC tone in the phones.

m) Remove the signal generator from J-1001 on HFR-1 #1.

* (8) Check of HAF-1 #1:

a) Place the NOISE SILENCER switch on HFR-1 #1 to ALIGNMENT SIGNAL position.

b) Place both Channel A and B DETECTION switches on the HFA-1 #1 to the CW position.

c) Place both Channel A and B IF BANDWIDTH selector switches on HFI-1 #1 to the 15 KC DSB position.

d) Place the RCVR #1 SPEAKER SELECTOR on the HSP-2 to Channel A.

e) Place the Channel A HIGH and LOW CUTOFF switches on the HAF-1 #1 to the 5 KC position.

f) Adjust the Channel A BFO control for a peak on the Channel A LINE LEVEL meter on HFA-1 #1. The peak should occur with the BFO control at plus AND minus 5 KC approximately.

g) Place the Channel A HIGH and LOW CUTOFF switches to 2.5 KC.

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h) Adjust the Channel A BFO control for a peak on the Channel A LINE LEVEL meter on the HFA-1. The peak should occur with the BFO control at plus AND minus 2.5 KC approximately.

i) Continue this procedure for the 1 KC, 500 cycle, 250 cycle and 100 cycle positions of the Channel A CUTOFF switches. The adjustment of the BFO in the 250 cycle and 100 cycle positions will be critical, but sufficient indication to check out the filters will be obtained. Upon completion, return the Channel A HIGH and LOW CUTOFF switches to the OUT position.

j) Place the RCVR #1 SPEAKER SELECTOR on the HSP-2 to Channel B.

k) Repeat the HAF-1 check for Channel B using the Channel B HIGH and LOW CUTOFF switches and the Channel B BFO control and LINE LEVEL meter.

l) Upon completion, return the Channel B CUTOFF switches to the OUT position.

m) Place the following controls and switches to the indicated positions:

1. RCVR #1 NOISE SILENCER switch to OFF.
2. RCVR #1 SPEAKER SELECTOR to Channel A.
3. RCVR #1 AGC DECAY controls (both) fully CCW.
4. MANUAL GAIN control on RCVR #1 OFF (fully CCW).

(9) Receiver #1 Sensitivity and AGC Check:

a) Set the HFR-1 #1 controls to the following positions:

1. BAND: Band 1 (2-3 mcs)
2. TUNE: 2.5 mcs
3. TUNE SYNC OPERATE switch: SYNC
4. NOISE SILENCER OFF ALIGNMENT SIGNAL switch: OFF

b) Set the NIXIE selectors on the HFS-1 to 02.50000.

c) Set the Channel A IF BANDWIDTH selector on the HFI-1 #1 to 6 KC DSB position. Set the Channel B IF BANDWIDTH selector to a BLANK position.

d) Set the Channel A DETECTION switch on the HFA-1 #1 to CW.

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e) Obtain a zero beat with the TUNE control at 2.5 mcs. Place the TUNE SYNC OPERATE switch to OPERATE.

f) Place the NOISE SILENCER switch to ALIGNMENT SIGNAL.

g) With the Channel A BFO control, obtain a zero beat. Then turn the NOISE SILENCER switch to OFF.

h) Connect a 20 db pad to the signal generator output. Connect the output of the pad to J-1001 on HFR-1 #1.

i) Adjust the signal generator to 2.5 mcs, unmodulated, at 100,000 uv output level. Vernier tune the signal generator for a zero beat in the loudspeaker. The RF LEVEL meter on the HFR-1 will read between 60 to 80 db above 1 uv.

j) Reduce the signal generator output to zero. The RF LEVEL meter should fall to zero.

* k) Slowly increase the signal generator output. Watch carefully the RF LEVEL meter. THE INSTANT THE METER DEFLECTS FROM ZERO, read the signal generator output. The deflection should occur at approximately 10 uv output from the signal generator. This corresponds to an actual sensitivity of 1 uv due to the 20 db pad. (Actual sensitivity equals generator output divided by 10)

l) Return the signal generator output to 1 Volt. Adjust the Channel A ~~AGC Control~~ ~~to maximum indication on the Channel A LINE LEVEL meter.~~ Adjust the Ch. A LEVEL ADJUST control for 0 VU indication.

* m) Decrease the signal generator output to 10 uv; observe carefully the LINE LEVEL meter. It should not change more than 3 db from the 0 VU level.

n) Repeat the sensitivity check and AGC check (10 a - m) at the following frequencies:

3.5 mc; 5 mc; 7 mc; 10 mc; 14 mc; 20 mc; and 28 mc.

(10) RCVR #1 Signal Plus Noise/Noise Check:

a) Set the NIXIE selectors to 02.5000. Place the #1 TUNE SYNC OPERATE switch to SYNC. Set the BAND and TUNE controls on RCVR #1 for a frequency of 2.5 mcs. Obtain a zero beat at 2.5 mcs, and place the TUNE SYNC OPERATE switch to OPERATE.

b) Set the Channel A IF BANDWIDTH selector on HFI-1 #1 to the 15 KC DSB position. Place the Channel B IF BANDWIDTH selector to a BLANK position.

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5. NOISE SILENCER: RCVR #1 - NOISE SILENCER
6. RCVR #1 SPEAKER SELECTOR: Channel A
7. RCVR #1 VOLUME: fully CW
8. CHANNEL A IF BANDWIDTH SELECTOR: 15 KC DSB
9. CHANNEL A DETECTION switch: CW
10. CHANNEL A LEVEL ADJUST CONTROL: fully CW
11. CHANNEL A BFO CONTROL: off "0" position to obtain tone, if any.

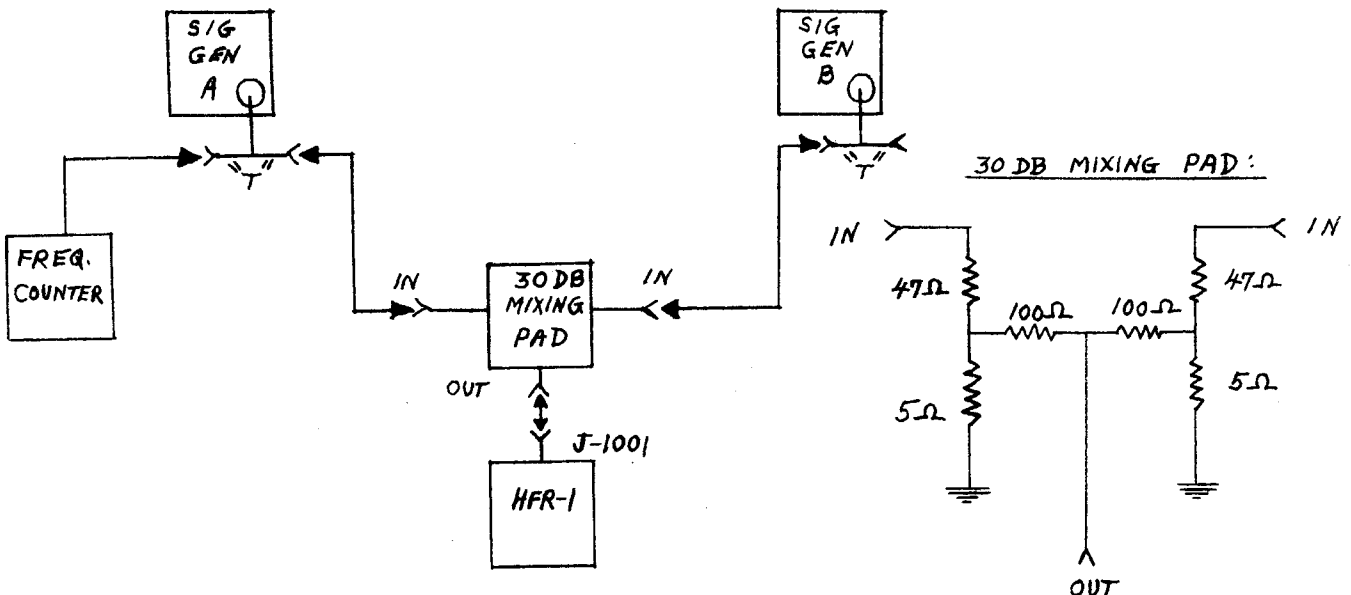
b) With the RCVR #1 TUNE control, obtain a zero beat at 15 mcs. Place the RCVR #1 TUNE SYNC OPERATE switch to OPERATE.

* c) Pull out the HFR-1 #1 drawer. Loosen the locknut of L-1203. Adjust L-1203 for minimum background noise and zero indication on the RF LEVEL meter. The background noise will increase on either side of the correct adjustment. Lock L-1203. R-1210 may also have some effect.

d) Return the NOISE SILENCER switch to the OFF position.

(12) Two Tone Test, RCVR #1:

a) Set up the test equipment as shown below. As an alternate method, a Sideband Generator system with Model CBE Sideband Exciter may be used in place of the two signal generators.



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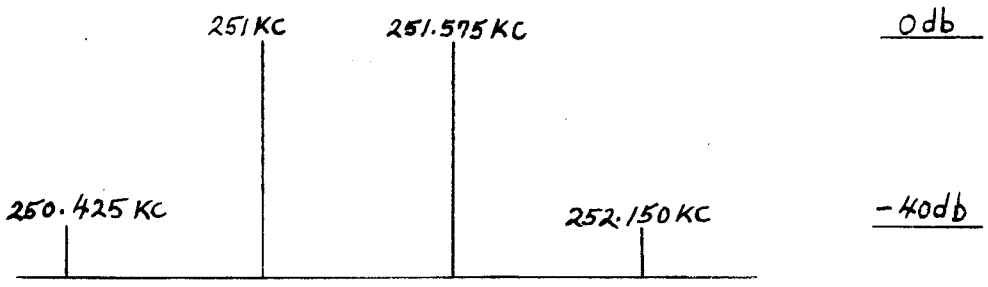
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- b) Set both AGC DECAY controls on HFI-1 #1 fully CW.
- c) Set signal generator "A" to 2.501 mcs, with .3 volts output.
- d) Connect the frequency counter to the "T" at signal generator "B". Adjust signal generator "B" to 2.501575 mcs, with .3 volts output.
- e) Adjust controls and switches on the HPS-1 and HFR-1 #1 to synthesize RCVR #1 at 2.5 mcs; when the system is synchronized, place the TUNE SYNC OPERATE switch to OPERATE.
- f) Connect the Channel A IF output of HFI-1 at J-6203 to the signal input jack of the spectrum analyzer.
- g) Place the CHANNEL A IF BANDWIDTH selector to the 3.5 KC USB position.
- h) Adjust the spectrum analyzer controls for an oscilloscope presentation.
- * i) Measure the amplitude of the third order products; these should be down at least 40 db, as shown on the sketch below:



j) Upon completion, leave the equipment set up for the test of HNF-1 #1.

* (13) Check of HNF-1 #1:

- a) Place the ON OFF switch on the HNF-1 #1 to ON.
- b) Slowly and carefully move the NOTCH ADJUST control to eliminate each tone in succession. This may be observed on the spectrum analyzer.
- c) Remove all test equipment. This completes the alignment check-out of the synthesizer, both RF heads, and the rest of RCVR #1. The check of RCVR #2 and functions common to both will now be conducted.

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- c) Set the Channel A DETECTION switch on HFA-1 #1 to CW.
- d) Slide out the HFA-1 #1 drawer. Connect a Ballantine Model 314 AC VIVM to terminals 5 and 7 of Channel A terminal strip E-7000.
- e) Adjust the signal generator connected at the antenna input through the 20 db pad to 2.5 mcs at 10 uv output.
- f) Turn the NOISE SILENCER switch on RF HEAD #1 to ALIGNMENT SIGNAL.
- g) Adjust the Channel A BFO control for a zero beat in the loudspeaker.
- h) Place the NOISE SILENCER switch on RCVR #1 to OFF.
- i) Adjust the signal generator output frequency to obtain, approximately, a 500 cycle tone in the loudspeaker.
- j) Adjust the Channel A LEVEL ADJUST control on HFA-1 #1 for 0 VU indication on the channel A LINE LEVEL meter.
- k) Set the Ballantine meter for 10 volt full scale range.
- l) Set the MANUAL GAIN control on HFI-1 #1 for full scale reading of 10 volts on the Ballantine meter.
- m) Disconnect the output of the signal generator.
- * n) Note the decrease in the reading on the Ballantine meter. It should be down at least 15 db.
- * o) Repeat the Signal Plus Noise/Noise Check at 14 mc and 28 mcs, using the above procedure at the appropriate frequencies.
- p) Remove the signal generator and the Ballantine meter. Return the MANUAL GAIN control to the fully CCW position.

(11) Final Noise Silencer Check, RCVR #1:

a) Check that the following controls and switches are in the indicated positions:

1. BAND; Band 6 (12-16 mcs)
2. TUNE: 15 mcs
3. NIXIE SELECTORS: 15.0000
4. TUNE SYNC OPERATE: RCVR #1 - SYNC

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- * (14) Check of AFC-3 Unit #2: (refer to Step B4): Conduct this check exactly as for AFC-3 #1 except that references to controls and functions on RCVR #1 should be changed to #2. The NOISE SILENCER switch on RCVR #2 should be in the ALIGNMENT SIGNAL position.
- * (15) Check of HFI-1 #2 (refer to Step B5): Conduct this check exactly as for the HFI-1 #1 except that references to controls and functions on RCVR #1 should be changed to #2.
- * (16) Check of AGC DECAY circuit, RCVR #2 (refer to Step B6): Conduct this check exactly as for RCVR #1, except that references to controls and functions on RCVR #1 should be changed to #2.
- * (17) Check of HFA-1 unit #2 (refer to Step B7): Conduct this check exactly as for RCVR #1 except that references to RCVR #1 should be changed to #2. For Step i), concerning synthesis at 15 mcs, use the general procedure to sync first #1 RF head, then #2 RF head. The #2 RF head TUNE SYNC OPERATE switch is left in TUNE at all times.
- * (18) Check of HAF-1 #2 (refer to Step B8): Conduct this check exactly as for RCVR #1 except that references to RCVR #1 should be changed to #2.
- * (19) Receiver #2 Sensitivity and AGC check (refer to Step B9): Conduct this check exactly as for RCVR #1 except that references to RCVR #1 should be changed to #2. Again, the RCVR #2 TUNE SYNC OPERATE switch is left in the TUNE position. All frequencies are set up as in the general synthesizer and RF checkout.
- * (20) RCVR #2 Signal Plus Noise/Noise Check (refer to Step 10): Conduct this check exactly as for RCVR #1 except that references to RCVR #1 should be changed to #2. All frequencies are set up as in the general synthesizer and RF check.
- * (21) Final Noise Silencer Check RCVR #2 (refer to Step 11): Conduct this check exactly as for RCVR #1 except that references to RCVR #1 should be changed to #2. Leave the RCVR #2 TUNE SYNC OPERATE switch in TUNE. Set up the required frequency by the method used previously.
- * (22) Two Tone Test RCVR #2 (refer to Step 12): Conduct this test exactly as for RCVR #1 except that references to RCVR #1 should be changed to #2. Leave the RCVR #2 TUNE SYNC OPERATE switch in the TUNE position. Set up the required frequency by the method employed previously.

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- * (23) Check of HNF-1 #2 (refer to step 13): Conduct this check exactly as for RCVR #2 except that references to RCVR #1 should be changed to #2.

- * (24) Check of Model DVM-4 Diversity Visual Monitor:
 - a) Both RF heads and the synthesizer should be synchronized at 2.5 mcs. Place the Channel A and B IF BANDWIDTH selectors on both receivers to the 15 KC DSB position.
 - b) Place the NOISE SILENCER switches on both receivers to the ALIGNMENT SIGNAL position.
 - c) Place the AFC ON OFF switches on both receivers to the ON position.
 - d) Place the POWER ON OFF switch on the DVM-4 to ON. Wait about 5 minutes for warmup.. Turn the RF GAIN control on this unit fully CW. Adjust it as necessary during the check.
 - e) The SWEEP RANGE switch on the DVM-4 should be in the plus and minus 5 KC position.
 - f) Press the PUSH TO CALIBRATE control. Hold it down while centering the pulse on the screen with the CALIBRATE FOR ZERO adjustment. Release the PUSH TO CALIBRATE button.
 - g) On AFC-3 #1, press and hold down the RESET button for about 6 seconds. Note that the CARRIER SELECTOR switch is in the OSC position.
 - * h) With the Receiver Selector on the DVM-4 in RCVR #1 position, move the TUNING KCS control on the AFC-3 #1 toward the plus 3 KC position. The pulse on the DVM-4 should move left. Return the TUNING KCS control to "0". The pulse on the DVM-4 should center. Move the TUNING KCS control toward the minus 3 KC position. The pulse on the DVM-4 should move right. Return the TUNING KCS control to "0". The pulse on the DVM-4 should center.
 - * i) On the HFI-1 #1 place the Channel A and B IF BANDWIDTH selectors to a BLANK position. The pulse should disappear. Place Channel A selector to 15 KC DSB position. The pulse should reappear. Return the Channel A selector to a BLANK position, and place the Channel B selector to the 15 KC DSB position. The pulse should reappear.
 - * j) Place the SWEEP RANGE switch on the DVM-4 to plus - minus 1 KC position. Repeat Step h).
 - k) Place the AFC ON OFF switch on HFI-1 #1 to OFF.
 - l) Place the RECEIVER SELECTOR on the DVM-4 to RCVR #2.

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* m) Repeat Steps e) through k) for RCVR #2.

n) On completion, place the POWER ON OFF switch on the DVM-4 to OFF. Return the Channel A and B IF BANDWIDTH selectors on both receivers to the 15 KC DSB position. Place both AFC ON OFF switches OFF.

(25) Check of ~~AGC~~ combined - Separate switch on HSP -2:

a) Leave RCR #1 ALIGNMENT SIGNAL on. Turn RCVR #2 NOISE SILENCER switch to OFF.

b) Place AGC COMBINED SEPARATE switch on HSP-2 to SEPARATE.

* c) RF LEVEL meter #1 should indicate.

d) Place the AGC COMBINED SEPARATE switch on HSP-2 to COMBINED.

* e) Both RF LEVEL meters should indicate.

f) Place the RCVR #1 NOISE SILENCER SWITCH to OFF. Place RCVR #2 NOISE SILENCER switch to ALIGNMENT SIGNAL.

* g) Repeat Steps b) through e). In Step c) only RCVR #2 RF LEVEL meter will indicate.

* (26) Check of ANT. BOX ASSEMBLY:

a) Connect antenna to RECEIVER 1 ANT. connector on rear terminal box.

b) Tune in WWV on RCVR #1.

c) Adjust for channel A operation and switch channel B off.

d) Set Channel A, LINE LEVEL ADJUST 0 VU on meter.

e) Connect AC VIVM to terminal strip marked RECEIVER 1 CHAN. A. The meter will indicate the signal received.

f) Switch channel A off. Adjust for channel B operation and set LINE LEVEL ADJUST to 0 VU on meter.

g) Move AC VIVM to CHAN. B terminals. The meter will indicate the signal received. Remove antenna, the signal will drop in amplitude.

h) Repeat the above steps for RCVR #2.

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THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N. Y.
DDR-5A TEST DATA SHEET # 1

SERIAL NO. _____
MFG. NO. _____

	RCVR #1	RCVR #2
A-3d Line voltage at convenience outlets is 117VAC+10%	_____	V
A-4a Blower operate	_____	OK
B-1 Standby, Time delay and operate indicators function, with proper timing sequence.	_____	OK
B-2 Voltage at TP-8001 and TP-8002 is exactly 200 V.	_____	OK
B-3 Synthesizer, HFO and Stability check	_____	OK
B-3r Symmetrical swing of SYNC meter	_____	OK
B-4c Carrier level meter reads near center of GREEN	_____	OK
B-4d Drift meter remains at zero center scale	_____	OK
B-4e No change of indications in RCC position	_____	OK
B-4f Carrier Level meter falls, and fade indicator lights with SENSITIVITY control fully CCW	_____	OK
B-5e IF strips properly installed	_____	OK
B-5f-k 1.0 volt reading obtained on symmetrical strips both channels read 1.0 volt ±10%	_____	OK
R116 on symmetrical strips locked	_____	OK
B-5n AFC-3 FADE indicator light	_____	OK
B-5o-s 1.0 volt +10% reading obtained on USB and LSB strips	_____	OK
HFA-1 operates in SSB mode, R116 on USB and LSB strips locked	_____	OK
B-6 AGC check	_____	OK
B-7d OVU level obtained in CW mode	_____	OK
B-7j-1 HFA-1 operates in AM mode. Monitor circuit operation	_____	OK
B-8 HAF-1 check	_____	OK
B-9-k Sensitivity at 2.5MCS (1uv or better)	_____	uv
B-9-m AGC check at 2.5MCS (3db or less)	_____	DB
Sensitivity at 3.5MCS (1uv or better)	_____	uv
AGC check at 3.5MCS (3db or less)	_____	DB
Sensitivity at 5MCS (1uv or better)	_____	uv
AGC check at 5MCS (3db or less)	_____	DB
Sensitivity at 7MCS (1uv or better)	_____	uv
AGC check at 7MCS (3db or less)	_____	DB
Sensitivity at 10MCS (1uv or better)	_____	uv
AGC check at 10MCS (3db or less)	_____	DB
Sensitivity at 14MCS (1uv or better)	_____	uv
AGC check at 14MCS (3db or less)	_____	DB
Sensitivity at 20MCS (1uv or better)	_____	uv
AGC check at 20MCS (3db or less)	_____	DB

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DDR-5A TEST DATA SHEET # 2

	RCVR #1	RCVR #2
B-9-k Sensitivity at 28MCS (1uv or better)	_____	UV
B-9-m AGC check at 28MCS (3db or less)	_____	DB
B-10-n Signal plus noise/noise at 2.5MCS (15db or better)	_____	DB
B-10-0 Signal plus noise/noise at 14MCS (15db or better)	_____	DB
B-10-0 Signal plus noise/noise at 28MCS (15db or better)	_____	DB
B-11-c Noise silencer check and final trap adjustment	_____	OK
B-12-i Two tone test at 2.5MCS (3rd order products)	_____	DB
Two tone test at 14MCS (40db down or better)	_____	DB
Two tone test at 28MCS	_____	DB
B-13 HNF-1 check out	_____	OK
B-24-m DVM-4 check out	_____	OK
B-25ceg AGC combined-seperate switch on HSP-2	_____	OK
B-26e,g,h, Ant. Box Ass'y.	_____	OK

The manufacturing and serial numbers of the units contained in this cabinet, are listed below.

	RCVR#1		RCVR#2	
	MFG #	SERIAL	MFG #	SERIAL
HFR-1	_____	_____	_____	_____
HFS-1	_____	_____	_____	_____
DVM-4	_____	_____	_____	_____
AFC-3	_____	_____	_____	_____
HSP-2	_____	_____	_____	_____
HFI-1	_____	_____	_____	_____
HNF-1	_____	_____	_____	_____
HFA-1	_____	_____	_____	_____
HAF-1	_____	_____	_____	_____
HFP-1	_____	_____	_____	_____
HSS-1	_____	_____	_____	_____
HPP-1	_____	_____	_____	_____

DATE _____

TESTER _____

REVISION SHEET

**THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK**

8-737

LIST NO.

DATE	REV.	SHEET	EMN #	DESCRIPTION	APP.
8-19-63	A /	→	9703	Revised Sh. 8, 9, 10, 21 per EMN	<i>[Signature]</i>
11/15/63	B	14	10416	Revised Sheet 14 per EMN.	<i>[Signature]</i>
5/25/64	C	→	11440	Revised Shts. 9, 10, 21. Per EMN	<i>[Signature]</i>