PRELIMINARY DRAWING

REQ. PER UNIT	USED ON MODEL	ASS'Y. NO.	DATE	S-725	Ø
	DDR-5B		10-17-62		

Not For Production

Repl. by S-736

(See attached sheets)

OBSOLETE

REPLACED BY S736

ISSUE	ITEM	CHANGED FROM	DATE	CH. NO.	DRAFTS	CHECKER	ENG. APP.
Ø		ORIGINAL RELEASE	11/1/65				Hde

REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL

STOCK SIZE

MATERIAL

TYPE & TEMPER | HEAT TREAT. SPEC.

FINISH & SPEC. NO.

THE TECHNICAL MATERIEL CORP.
MAMARONECK. NEW YORK

System Check Out Procedure

AN-FRR/60(V)

DRAWN	CHECKED	FINAL APPROVAL
	Hde	RMcKay 11/1/65

ELEC. DES. APP. | MECH. DES. APP.

S-725 Ø

TOLERANCES

DEC. DIM. ±
FRAC. DIM. ±
ANGULAR DIM. ±

SCALE:

MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND ANY DEVIATIONS WILL BE CAUSE FOR REJECTION.
REMOVE ALL BURRS AND SHARP EDGES

ML 28

FORM-108-A

PRELIMINARY DRAWING

S-725 A

THIS IS THE ORIGINAL

MODEL DDR-5B

AN-FRR/60(V)

SUPESEDED DIRECTLY REPL. BY S-736

SYSTEM CHECK OUT PROCEDURE

DO NOT ISSUE.

A. Preliminary:

1. It is assumed that individual units have been tested and installed in the cabinet, and that all cables have been connected.

2. Remove the cover from the line filter which is located at the left rear of the cabinet. Connect a three-wire power cord as follows:

a) White lead to line lug,

b) Green lead to grounding screw,

c) d) Black lead to line lug.

Connect power cord to 115V 60 cps 1-phase source. With Simpson Model 260, measure the voltage at the convenience outlets on the front panel. It should read 115V.

Leave the filter cover off till after completion of tests.

3. Test Equipment Required

a) 1 - counter - H/P 524C or equivalent.

b) 2 - Signal Generators - Measurements Corp. - Mod. 82.

c) 2 - 30 db Pads.

d) 1 - 20 db Pad.

e) 1 - Ballantine Meter Model 314.

f) 1 SPECTRUM ANALYZER

4. Place switches and controls in the following positions:

a) HFP-1

1) STANDBY-OFF switch at rear to STANDBY. The blowers should commence to operate.

b) HAF-1

1) All switches in the OUT position.

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c) HPA-1

1) Detection Switch: CW

2) B.F.O. control: 0

3) STANDBY-OPERATE switch: STANDBY

4) LEVEL control: mid-range

d) HNF-1

1) ON-OFF Switch: OFF

2) ~~NOTCH~~ NOTCH ADJUST: 0

e) HPI-1 (Applies to Channel A and B)

1) MANUAL GAIN CONTROL: fully CCW until switch clicks OFF.

2) AGC DECAY: fully CCW

3) I.F. BANDWIDTH SELECTORS: 6 kc D.S.B. (Channel A only) Channel B to Blank position

4) AFC: OFF

f) HSP-2 (Receiver 1 only)

1) Channel Selector: A

2) VOLUME CONTROL: Fully CW

g) AFC-3

1) SENSITIVITY: Fully CW

2) TUNING KCS: 0

3) RCC-OSC: OSC

h) HFP-1

1) BAND: BAND 1 (2-3 mc)

2) TUNE: 2.0 MCS

3) NOISE SILENCER-OFF - ALIGNMENT SIGNAL OFF

4) TUNE-SYNC-OPERATE: OPERATE

B. Check-Out Procedure:

1. On HPA-1, place STANDBY-OPERATE switch to OPERATE. On HPP-1, the GREEN indicator (STANDBY) will go out. The YELLOW indicator (TIME DELAY) will go on. After time delay, approximately 60 seconds, the YELLOW indi-

cator will go out and the RED indicator (OPERATE) will go on.

2. Check of Synthesizer, HFO Circuits and Stability: This procedure consists of checking the synthesizer and the HFO tracking simultaneously, for all positions of the NIXIE selector switchs. Faulty crystals in the HFS-1 will show up in this check.

a) Remove 47 ohm termination from J-1313 on HFR-1, and connect a frequency counter to the jack. (Use a "T" connector on counter with one side terminated by the 47 Ω R.)

b) With the NIXIE selectors set at 02.0000, and the RF tuner at 2.0 mcs, place the TUNE-SYNC-OPERATE switch in the SYNC position.

c) Move the TUNE control until the SYNC tone is heard; adjust the TUNE control for zero beat. Turn TUNE-SYNC-OPERATE switch to OPERATE. ReturnThe counter should read 3.250 mcs. Return switch to SYNC position.

d) Place the 100 kc selector in position 1; move the TUNE control until a zero beat is obtained at 2.1 mcs. Turn the TUNE-SYNC-OPERATE switch to OPERATE. The counter should read 3.85 mcs. REturn switch to SYNC position.

e) Continue this procedure through the remaining positions of the 100 kc selector switch. For each position, move the TUNE control to obtain a zero beat as follows:

100KC SELECTOR	RF TUNING	FREQ. COUNTER
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

f) Place the 10KC selector in position 1. Move the TUNE control to obtain a zero beat at 2.91 mcs. Turn TUNE-SYNC-OPERATE switch to OPERATE. The counter should read 4.66 mcs. Return switch to SYNC position.

g) Continue this procedure through the remaining positions of the 10 KC selector switch. For each position, move the TUNE control to obtain a zero beat as follows:

10KC SELECTOR	RF TUNING	FREQ. COUNTER
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

h) Place the 1KC selector in position 1. Move the TUNE control until a zero beat is obtained at 2.991 mcs. Turn TUNE-SYNC-OPERATE switch to OPERATE. The counter should read 4.741 mcs. Return switch to SYNC position.

i) Continue this procedure through the remaining positions of the 1KC selector switch. For each position, move the TUNE control to obtain a zero beat as follows:

1KC SELECTOR	RF TUNING	FREQ. COUNTER
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

j) Place the 1KC selector in position 1. Move MEccTUNE control until a zero beat is obtained at 2.999. mcs. Turn TUNE-SYNC-OPERATE switch to OPERATE. The counter should read 4.7491 mcs. Return switch to SYNC position.

k) Repeat the procedure for the remaining positions of the 1KC selector switch for each position, move the TUNE control to obtain a zero beat as follows:

.1KC SELECTOR	RF TUNING	FREQ. COUNTER
0	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

l) Place the NIXIE selectors to 03.0000 mcs. Move the RF TUNE control to obtain a zero beat at 3.0 mcs. Turn TUNE-SYNC-OPERATE switch to OPERATE. The counter should read 4.75 mcs. Return switch to SYNC position.

m) Place the BAND control to BAND 2 (3-4 mcs). Move the RF TUNE-SYNC-OPERATE switch to OPERATE. The counter should read 4.75 mcs. R Return switch to SYNC position.

n) Repeat this procedure for the remaining positions of the MC selector switches, conducting thecheck at the high and low ends of each band. In each case, the counter should read 1.75 mcs above the selected Rf frequency.

MC SELECTOR	BAND	RF TUNE	FREQ. COUNTER
4	2 (3-4)	4 mcs	5.75 mcs
4	3 (4-6)	4 mcs	5.75 "
5	3 (4-6)	55 "	6.75 "
6	3 (4-6)	6 "	7.75 "
6	4 (6-8)	6 "	7.75 "
7	4 (6-8)	7 "	8.75 "
8	4 (6-8)	8 "	9.75 "
8	5 (8-12)	8 "	9.95 "
9	5 (8-12)	9 "	10.75 "
10	5 (8-12)	10 "	11.75 "
11	5 (8-12)	11 "	12.75 "
12	5 (8-12)	12 "	13.75 "
12	6 (12-16)	12 "	13.75 "
13	6 (12-16)	13 "	14.75 "
14	6 (12-16)	14 "	15.75 "
15	6 (12-16)	15 "	16.75 "
16	6 (12-16)	16 "	17.75 "
16	7 (16-24)	16 "	17.75 "
17	7 (16-24)	17 "	18.75 "
18	7 (16-24)	18 "	19.75 "
19	7 (16-24)	19 "	20.75 "
20	7 (16-24)	20 "	21.75 "
21	7 (16-24)	21 "	22.75 "
22	7 (16-24)	22 "	23.75 "

(Cont'd),

MC SELECTOR	BAND	RF TUNE	FREQ. COUNTER
23	7 (16-24)	23 mcs	24.75 mcs
24	7 (16-24)	24 "	25.75 "
24	8 (24-32)	24 "	25.75 "
25	8 (24-32)	25 "	26.75 "
26	8 (24-32)	26 "	27.75 "
27	8 (24-32)	27 "	28.75 "
28	8 (24-32)	28 "	29.75 "
29	8 (24-32)	29 "	30.75 "
30	8 (24-32)	30 "	31.75 "
31	8 (24-32)	31 "	32.75 "

m) Place MIXIE selectors to 15.0000, BAND control to BAND 6 (12-16) and TUNE control at 15.0 mcs; obtain a zero-beat. Place TUNE-SYNC-OPERATE switch to OPERATE. Carefully move the TUNE control in both directions, checking for symmetrical swing of the SYNC meter from 0 to either side. If the swing is not symmetrical, adjust R3442 on the 3400 deck of the HFS-1 until a symmetrical swing is achieved.

n) Leave all controls in existing position for the AFC-3 check.

o) Remove Freq. Counter; replace 47 ohm termination at J-1313.

3. Check of AFC-3 Unit:

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

b) Place NOISE SILENCER-OFF-ALIGNMENT SIGNAL switchoon HFR-1 to ALIGNMENT SIGNAL.

c) Place SENSITIVITY control of AFC-3 fully CW.

d) Depress and hold the RESET button on the AFC-3; adjust the TUNING KCS control for maximum indicationoon the LEVEL meter. This will be approximately at the zero position of the TUNING KCS control. The LEVEL meter should read approximately in the center of the GREEN. The DRIFT METER should indicate zero center scale. Release the RESET button.

e) Check the FADE and DRIFT ALARM lamps; they should be extinguished.

f) Place AFC-ON-OFF switch on HFI-1 toOFF. Leave other controls in their present positions for the HFI-1 check.

4. Check of HPI-1 Unit:

a) MANUAL GAIN control should be OFF (extreme CCW)

b) Place Channel A I.F. BANDWIDTH selector to 1KC DSB position.

c) Place CHANNEL B I.F. BANDWIDTH selector to a BLANK position.

d) Pull out HPI-1 drawer; lock in position and remove top cover.

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

f) Adjust R-116 on the 1 KC SYM strip for a reading of 1.0V on the Channel A output level meter; (this corresponds to .707V RMS into a 50 ohm load at J-102 on the strip). Lock the adjustment.

g) Place the Channel A I.F. BANDWIDTH selector switch in the remaining DSB positions; in each position, adjust R-116 on the appropriate strip for a reading of 1.0V on the Channel A output level meter. Lock the adjustments.

h) Place the AFC-ON-OFF switch to ON. On the AFC-3, place the TUNING KCS control midway between the 0 and -3KC position. Depress the RESET button for approximately 6 seconds.

i) Place the Channel A I.F. BANDWIDTH selector switch to 3.5KC USB position. Adjust R-116 on the 3.5KC USB strip for the 1V reading. Lock the adjustment.

j) Place the Channel A I.F. BANDWIDTH selector switch to 7.5KC USB position. Adjust R-116 on the 7.5KC USB strip for the 1V reading. Lock the adjustment.

k) Place the TUNING KCS control on the AFC-3 midway between the 0 and +3KC position.

l) Place the Channel A I.F. BANDWIDTH selector to the 3.5KC LSB position. Adjust R-116 on the 3.5KC LSB strip for the 1V reading. Lock the adjustment.

m) Place the Channel A BANDWIDTH selector to the 7.5KC LSB position. Adjust R-116 on the 7.5KC LSB strip for the 1V reading. Lock the adjustment.

n) Place the channel A I.F. BANDWIDTH selector to a BLANK position. Place the Channel B I.F. BANDWIDTH selector to 1KC DSB position. Move TUNING KCS control on AFC-3 to 0 position. Place AFC-ON-OFF switch to OFF position.

o) Carry out the procedure outlined in preceding steps (f) through (m), for Channel B, observing Channel B output LEVEL meter. DO NOT MAKE ADJUSTMENTS OF R-116. Channel B LEVEL meter should read approximately 1V for all steps.

p) Turn AFC-ON-OFF switch to OFF. Place TUNING KCS control on AFC-3 to 0.

q) Place Channels A and B I.F. BANDWIDTH selectors to 6KC DSB position. Both LEVEL meters should read approximately 1V. Replace the HFI-1 cover and slide the drawer into the cabinet. Turn the NOISE-SILENCER-OFF-ALIGNMENT SIGNAL switch to OFF.

5) Check S-Meter AGC Decay Circuits:

a) Check that the following controls on the HFI-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, till the switch clicks on. Note the RF LEVEL meter on the HFR-1; it should indicate maximum, and may be pegged.

c) Rotate the MANUAL GAIN control slowly to full CW position; the RF LEVEL meter should follow to zero. Rotate the MANUAL GAIN control CCW to the "JUST ON" position. This is the point just before the switch clicks OFF. The RF LEVEL meter will again read maximum.

d) Turn both Channel A and B AGC DECAY controls full CW. Turn MANUAL GAIN to OFF position.

e) The RF LEVEL meter should decay to zero in approximately 15 to 20 seconds.

f) Leave HFI-1 switches in the above positions for the HNF-1 check.

6. Check of HNF-1:

a) Turn NOISE-SILENCER-OFF-ALIGNMENT SIGNAL to ALIGNMENT SIGNAL.

b) Turn ON-OFF switch on HNF-1 to ON position.

c) Tune the NOTCH ADJUST control, observing the output level meters on the HFI-1. Carefully adjust the NOTCH ADJUST control to notch out the 250 KC signal; the output level meter should indicate zero. The notch should occur at the approximate center of the NOTCH ADJUST range.

d) Turn ON-OFF switch on HNF-1 to OFF position.

e) Turn both AGC DECAY controls on the HFI-1 fully CCW.

7. Check of HFA-1 Unit:

a) Check that the selector switches and controls for both channels on the HFA-1 are in the following positions:

1) LINE LEVEL adjust; Mid-position

2) LOAD switches (internal) OUT when using HSP-2.

3) DETECTION switches: CW position.

b) Adjust both DFC controls for maximum indication on their respective LINE LEVEL meters.

c) Adjust both LINE LEVEL controls for 0 VU indication on the appropriate LINE LEVEL meters.

d) Turn NOISE SILENCER-OFF-ALIGNMENT SIGNAL to OFF position.

e) Turn Channel B I.F. BANDWIDTH selector to a BLANK position.

8. Receiver Sensitivity and AGC Check:

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

1) BAND: BAND 1 (2-3 mcs)

2) TUNE: 2.5 mcs.

b) Set the MINOR selectors to 02.5000 mcs.

c) Set the Channel A I.F. BANDWIDTH selector on the HFI-1 to 6KC DSB position.

d) Set the Channel A DETECTION swithh on the HFA-1 to CW position.

e) Place the TUNE-SYNC-OPERATE switch on the HFR-1 to SYNC. position. Obtain a zero beat at 2.5 mcs; place the TUNE-SYNC-OPERATE switch to OPERATE.

f) Place NOISE SILENCER-OFF-ALIGNMENT SIGNAL switch to ALIGNMENT SIGNAL position.

g) With the Channel A BFO control on the HFA-1, obtain a zero beat; then turn the NOISE SILENCER-OFF-ALIGNMENT SIGNAL switch to the OFF position.

h) Connect a 20 db pad to the signal generator output; Connect the other arm of padto the antenna input jack.

i) Adjust the signal generator to 2.5 mcs output at a 100,000 uuv NVB level. Vernier tune the signal generator for a zero beat in the loud speaker. The RF LEVEL meter on the HFR-1 should read between 60 and 80.

j) Decrease the signal generator output to 1 uv. The RF LEVEL meter should indicate zero.

k) Slowly increase the generator output toward 10 uvs, carefully watching 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 generator; this corresponds to an actual sensitivity of 1 uv due to the 20 db pad (actual sensitivity = generator output ÷ 10).

l) Return the signal generator output to 100,000 uvs. Adjust Channel A BFO control for maximum indication on LINE LEVEL meter. Adjust LINE LEVEL control for 0 VU.

m) Decrease the signal generator output to 10 mvs observing the LINE LEVEL meter. It should not change more than 3 db from the 0 VU level.

n) Repeat the SENSITIVITY and AGC check out procedures (a) through (m) at the following frequencies: 3.5 mc; 5 mc; 7 mc; 14 mc; 20 mc; and 28 mcs.

9. Signal plus noise/noise check:

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

1) BAND: BAND 1 (2-3 mcs).

2) TUNE: 2.5 mcs.

b) Set the MIXER selector to 02.5000

c) Set TUNE-SYNC-OPERATE switch to SYNC; obtain zero beat; set TUNE-SYNC-OPERATE switch to OPERATE.

d) Set Channel A I.F. BANDWIDTH selector on the HFI-1 to 15KC DSB position.

e) Set Channel A DETECTION switch on the HFA-1 to the EXCW position.

f) Slide out HFA-1 drawer.

g) Connect Ballantine MAdel 314 meter to terminals 5 and 7 of Channel A terminal strip E-7000.

h) Connect signal generator to antenna input terminal through 20 db pad; set generator for 2.5 mc output frequency; output level 10uv

i) Place NOISE SILENCER-OFF-ALIGNMENT SIGNAL switch to ALIGNMENT SIGNAL.

j) Adjust Channel A BFO control for zero beat in loud speaker.

k) Place NOISE SILENCER-OFF-ALIGNMENT SIGNAL switch to OFF.

l) Adjust signal generator output frequency to obtain approximate 500 cycle tone in loud speaker.

m) Adjust LINE LEVEL pot for 0 uv on LINE LEVEL meter of Channel A of MFA-1.

n) Set B Wlantine meter at"10V FULL SCALE" range.

o) Set MANUAL GAIN on control for full scale reading (10V)

p) Disconnect signal generator outpt.

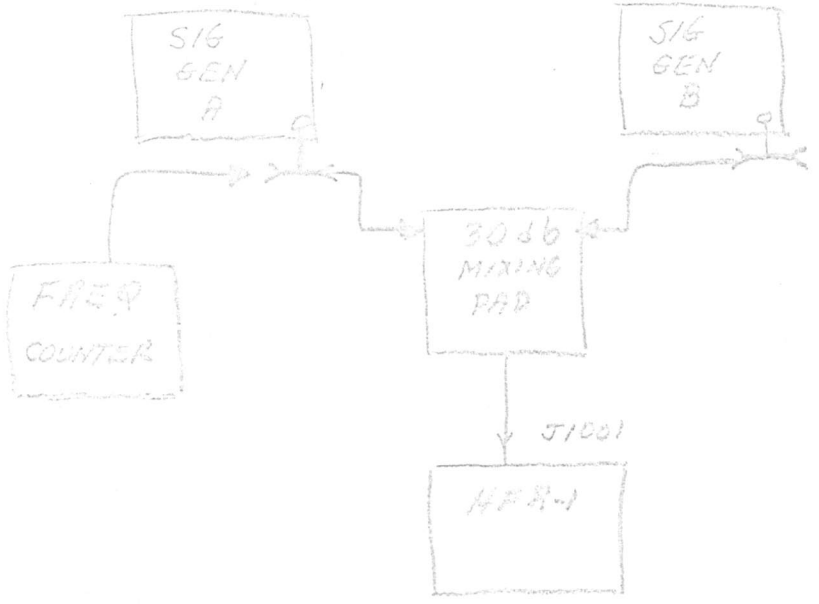
q) REEKNote decrease in Ballantine reading; reading should be down at least 15 db or greater.

r) Repeat the complete signal plus noise/noise check at 14 and 28 mcs.

s) Return MANUAL GAIN control to OFF position on HFI-1 (fully CW).

10. 10. Two-Tone Test:

a) Set up the test equipmentaas shown below:



b) Set both AGC DECAY pots on HFI-1 fully CW.

c) Set signal generator A to 2.[illegible] mcs, with .3V output.

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d) Connect the counter to the "T" at signal generator "B". Set signal generator B to 2.501575 mcs, with .3V output.

e) Adjust controls and switches on the HFR-1 and HFS-1 to synchronize the receiver at 2.5 mcs.

c) Connect the Channel A IF output of the HFI-1 at J-6203 to the signal input of the spectrum analyzer.

f) Place the Channel A IF BANDWIDTH selector on the HFI-1 to 3.5 KC USB position.

g) Adjust the analyzer controls for a scope presentation.

h) Third order product (425 cycles) should be down 40 db or more.

i) Repeat the two tone test procedure at 14 and 28 mcs.

j) Disconnect all test equipment.

TESTER CHECK OFF SHEET

STEP		INITIAL
A-4a	Blowers operate	BR
B-1	Standby, Time delay and operate lights function	BR
B-2	Synthesizer, H.F.O. circuits and stability	BR
	Sync Light operates, on all positions	
B-3	AFC Unit:	
B-3d	Level meter indicates in green	BR
B-3e	Fade, Drift Alarm lamps out	BR
B-4E	IF strips installed correctly	BR
B-4f-M	1.0V level obtained; B-116 locked All IF units:	BR
B-40-q	1.0V level obtained for Channel B All IF units	BR
B-5	AGC check	BR
B-6	HNF-1 check	BR
B-7	0 vu level obtained for Channels A & B	BR

STEP			READING
B-3	Sensitivity	2.5 mcs	.5 UVS
	AGC	2.5 mcs	-12 db
B-6	Sensitivity	3.5 mcs	2 UVS
	AGC	3.5 mcs	-3.25 db
	Sensitivity	5 mcs	UVS
	AGC	5 mcs	db
	Sensitivity	7 mcs	UVS
	AGC	7 mcs	db
	Sensitivity	14 mcs	1.4 UVS
	AGC	14 mcs	-4.5 db
	Sensitivity	20 mcs	UVS
	AGC	20 mcs	db

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STEP			READING
D-8 Cont'd.....			
	Sensitivity	28 mcs	.9 uvs
	AGC	28 mcs	-2.25 db
D-9	Signal plus noise/noise	2.5 mcs	26 db
	"	14 mcs	23 db
	"	28 mcs	23.5 db
D-10	Two tone test	2.5 mcs	____ db
		14 mcs	____ db
		28 mcs	____ db

REVISION SHEET	THE TECHNICAL MATERIEL CORP. MAMARONECK NEW YORK	S-725

MODEL DDR-5B PROJECT NO. _____

DATE	REV.	PAGE	EMN #	DESCRIPTION	CHK.	APP.
1/17/63	A	1	8044	Add note: Superseded, Directly Replaced by S-736		