DM 112 - 5

MODIFIED

WATKINS-JOHNSON UK OPERATIONS

Interdepartmental Correspondence

TO: WERNER SCHMID
FROM: JIM PASSMOOR
SUBJECT: DM 112-5 (MODIFIED) ALIGNMENT PROCEDURE

Date: 6 SEPT. 88
CC:

Werner,

I enclose the alignment / setting up procedure for the modified DM 112-5 s as used by our customers in Berlin.

Please use this procedure whenever a DM 112-5 (modified) is returned to you for repair.

Regards

Jim Passmoor

Royal Air Force

Signals Engineering Establishment

DEMODULATOR DM 112-5 SETTING UP PROCEDURE AND TEST SCHEDULE

Technical Memorandum No 88303

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AMENDMENT LIST RECORD

No	Amendment List Date	Amended By	Date	Checked By (see AP 5086, Chap 3, para 052)	Date

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TECHNICAL MEMORANDUM NO 88303

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DEMODULATOR DM 112-5 SETTING UP PROCEDURE AND TEST SCHEDULE

by

A HOPE

SUMMARY

This document details the seting up procedure and test schedule for alignment and adjustment of demodulator DM 112-5 to give the necessary compromise between optimum tangential sensitvity and dynamic range.

Section Reference (RAFSEE/10491/5/1/SS)

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REFERENCES

	Author	Title
A.	WATKINS - JOHNSON LTD Dedworth Rd, Oakley Green, Windsor, Berks. SL4 4LH	Demodulator DM 112-5 Instruction Manual (WJ No TCC 9/79) Pages 4-3 to 4-12 Paras 4.4.2 to 4.4.11

DEMODULATOR DM 112-5

DESCRIPTION

1. The DM-112 Demodulator provides a.m., f.m. and pulse detection from a 160 MHz IF input signal. A total of five IF bandwidths is provided. Any one of the five bandwidths can be selected for operation by means of a front panel switch.

2. For the three narrow bandwidths the demodulator converts the 160 MHz IF signal to a 21.4 MHz second IF signal. Predetection outputs are available at both IF frequencies as well as a 21.4 MHz signal monitor output.

3. The DM-112 includes a built-in signal monitor operating from the 160 MHz IF input. It provides a visual display of signals in a band around the received signal. The signal monitor has a maximum sweepwidth of 20 MHz.

4. In addition to the predetection and signal monitor outputs, the demodulator provides video, audio, tuner AGC and tuner AFC outputs. The entire package is only 89mm high and 483mm (19") wide for standard rack mounting.

SETTING UP PROCEDURE

Introduction

5. This setting up procedure is to be used with Demoduators DM 112-5 which have been modified to Drawing Number GT18580-8 dated 15.5.81. This modification makes changes in order to:

a. Introduce the pre-set IF and Video Gain controls.

b. Introduce the pre-set Audio Gain controls.

c. Introduce an oscilloscope Z modulation circuit.

d. Introduce a remote IF Pan Sweep disable.

e. Feed the IF input to the demodulator and the display sections from individual inputs.

f. Change the mains input connector.

g. Change the Video Amplifier for cw operation.

h. Change the Vertical deflection diode.

i. Attenuate the horizontal output to the IF Pan display.

j. Change the vertical output response to give an enhanced remote IF Pan display.

k. Permanently enable Aural Enhancement.

6. This procedure proves the alignment of the IF amplifiers and leads to the adjustment of IF and Video gain pre-sets for a compromise between optimum tangential sensitivity and dynamic range. The front panel video gain control is inhibited. The procedure replaces that given in the manufacturer's Instruction Manual for Type DM 112-5 Demodulator, at Reference A.

PRELIMINARY REQUIREMENTS

EQUIPMENT STATE

7. Before being subjectd to this setting up procedure, the demodulator shall have been proved to be fully serviceable and shall have met the requirements of W-7 test schedule RST 47. A copy of this schedule is at Annex A. WJ

8. The requirements of paragraphs 22, 49 and 50 of RST 47 will not be met but the results shall be recorded. Para 34 cannot be checked and shall therefore be disregarded.

9. Test Equipment

Pulse Generator	HP8011A
Frequency Counter	HP5340A
Sweep Oscillator	HP8350A
Signal Generator	HP8640B
Display	HP182T and
Swept Amplitude Analyser	HP8755B
Attenuator	HP8496B
Display	HP1332
Oscilloscope	Tektronix 485
Digital Multimeter	
Detector	HP11664A

10. Demodulator Control Settings

Sweep Width	-	fully clockwise
Centre Freq	-	mid position
Sweep Rate	-	fully clockwise
Gain	-	mid position
Focus	-	as required for clear display
Intensity	-	as required for clear display
Marker	-	off
IF Bandwidth	-	20 MHz
Video Gain	-	mid position
Audio Gain	-	mid position

IF pre-set controls

R11, R12, R13, R14, R15 - fully clockwise

Video pre-set control R16 - mid travel approx.

POWER SUPPLIES

11. With the demodulator connected to 220 V 50 Hz mains supply, and using the multimeter, check and adjust the dc power supplies as follows:

a. Connect the multimeter to A1 pin 18 and adjust A1 R6 for +24 V dc with respect to chassis.

b. Connect the multimeter to A3 TP1 and adjust A3 R7 for +15 V dc with respect to chassis.

c. Connect the multimeter to A4 TP1 and adjust A4 R6 for -15 V dc with respect to chassis.

AM ALIGNMENT

12. 160 MHz IF Amplifier - Module A6. Connect the test equipment as shown in Figure 1 with A6 J3 disconnected.

13. Set up the test equipment as follows, retaining the demodulator setting made in para 10.

14. On the Sweep Oscillator HP8350A:

a. Select the 160 MHz centre frequency.

b. Check that the output is 160 MHz.

c. Select dF 50 MHz.

d. Select Markers at 150, 160, 170 MHz.

e. Select Internal Modulation.

f. Select Display Blank.

g. Select RF Blank.

15. On the Attenuator HP8496B:

    a. Adjust for an indication on the Display HP182T.

    b. The setting will be between -50 dBm and -60 dBm.

16. On the Display HP182T:

    a. Select Input B.

    b. Select dBm ref -40 dBm.

    c. Select 10 dBm/centimetre.

17. 20 MHz Bandwidth. On Module A6:

    a. Adjust C13 for maximum gain.

    b. Adjust C22 and C28 to produce bandwidth of 20 MHz.

    c. Adust C36, C42, C39 and C49 for maximum amplitude, symmetrical response and flatness. Continue to adjust C22, C28, C36, C42 C39 and C49 until a response curve similar to that shown in Figure 2 is obtained.

18. 10 MHz Bandwidth. On the Demodulator:

    Set the IF Bandwidth switch to 10 MHz.

19. On the Sweep Oscillator:

    a. Check that the centre frequency is 160 MHz.

    b. Set dF to 25 MHz.

    c. Set Markers to 155 MHz, 160 MHz and 165 MHz.

20. On Module A6:

Adjust C23 and C29 only for a response curve shown in Figure 3.

21. On the Sweep Oscillator:

a. Check that the centre frequency is 160 MHz.

b. Select dF 50 MHz.

c. Select markers at 150 MHz, 160 MHz and 170 MHz.

22. On the Module A6:

a. Remove the Detector from J4.

b. Reconnect J3 and J4.

23. 10/20 MHz FM Limiter - Module A7. On the Demodulator:

Connect the detector to the A7 TP1.

24. On the Attenuator:

Adjust the attenuator for a display amplitude similar to that in Para 20.

25. On Module A7:

Adjust C1, C8 and C12 only for a flat and symmetrical response curve similar to Fig 2.

26. On the Demodulator:

Disconnect the detector from A7 TP1.

27. 160 MHz/21.4 MHz IF Converter - Module A5

a. Disconnect J2.

b. Connect the detector to J3.

28. On the Attenuator:

Adjust the attenuator setting to maintain the display amplitude during this procedure.

29. On Module A5:

a. Adjust C14 for maximum amplitude.

b. Adjust C13 and C8 for a response curve similar to Fig 3.

30. On the Demodulator:

Reconnect J2 and J3 to Module A5.

31. 21.4 MHz IF Amplifier - Module A13

a. Disconnect J2.

b. Connect the detector to J3.

32. 2 MHz Bandwidth. On the Sweep Oscillator:

a. Check that the centre of frequency is 160 MHz.

b. Select dF 5 MHz.

c. Select Markers at 159 MHz, 160 MHz and 161 MHz.

33. On the Demodulator:

Set the Bandwidth to 2 MHz.

34. On Module A13:

a. Adjust R15 for maximum amplitude resonse.

b. Adjust C18, C24, C30 and C37 for bandwidth, flatness and symmetry as shown in Figure 4.

c. Adjust C59 for maximum gain whilst maintaining the response shown in Figure 4.

35. 4 MHz Bandwidth. On the Sweep Oscillator:

a. Check that the centre frequency is 160 MHz.

b. Select dF 10 MHz.

c. Select Markers at 158 MHz, 160 MHz and 162 MHz.

36. On the Demodulator:

Set Bandwidth to 4 MHz.

37. On the Module A13:

a. Adjust C19, C25, C31 and C38 for bandwidth, flatness and symmetry as shown in Figure 5.

b. Make small adjustments to C59 for maximum gain whilst maintaining the response shown in Figure 5.

Note: Adjustments to C59 may upset the adjustments made in Para 34. Check Para 32 and repeat Para 34 and 35 until the responses meet those shown in Figures 4 and 5 as closely as possible.

38. On the Demodulator:

Connect J2 and J3 to Module A13.

39. 21.4 MHz IF Amplifier - Module A8. On Sweep Oscillator:

a. Check that the centre frequency is 160 MHz.

b. Select dF 2.5 MHz.

c. Select Markers at 159.5 MHz, 160 MHz and 160.5 MHz.

40. On the Demodulator:

a. Switch Power Off.

b. Remove the screws securing Module A13, lift this Module and lay it over Modules A15 and A16.

c. Set Bandwidth to 1 MHz.

d. Connect the Detector to Module A8 J3.

e. Switch Power ON.

41. On Module A8:

a. Adjust R17 for maximum amplitude response.

b. Adjust C16, C25, C31 and C38 for bandwidth, flatness and symmetry as shown in Figure 6.

42. On the Demodulator:

a. Reconnect Module A8 J3.

b. Do not replace Module A13.

FM ALIGNMENT

43. FM 1 MHz - Module A8 A2. On the Sweep Oscillator:

a. Check that the centre frequency is 160 MHz.

b. Select dF 2.5 MHz.

c. Select Markers at 159.5 MHz, 160 MHz and 160.5 MHz.

d. Select Modulation OFF.

44. On the Oscilloscope:

a. Select function X-Y.

b. Set CH 1 to DC input.

c. Set CH 2 to AC input.

45. On the Demodulator:

a. Connect CH 1 of the Oscilloscope to the rear wiper of R6 (FM GAIN CONTROL situated on the front panel).

b. Set R6 to fully clockwise.

46. On the Attenuator:

Set to -20 dB.

47. On the Oscilloscope:

a. Connect CH2 to Sweep IN/OUT on Sweep Oscillator HP8350B.

b. Connect Z input to Pos Z Blank on HP8350B.

c. Check that the discriminator curve is displayed on the Oscilloscope.

d. Adjust CH1 and CH2 to display the frequency markers as shown in Fig 8.

e. Ensure that the display timebase is centred at 0 v.

48. On Module A8 A2:

a. Adjust C8 to place the 160 MHz marker on OV.

b. Adjust C5 for peak to peak symmetry.

c. Repeat these adjustments until the display resembles Figure 8.

49. On the Demodulator:

a. Switch Power OFF.

b. Replace Module A13.

c. Switch Power ON.

50. FM 4 & 2 MHz - Module A13 A2. On the Sweep Oscillator:

a. Check that the centre frequency is 160 MHz.

b. Select dF 10 MHz.

c. Select Markers at 158 MHz, 160 MHz and 162 MHz.

51. On the Demodulator:

Set the IF Bandwidth to 4 MHz.

52. On the Module A13 A2:

a. Adjust C11 to place the 160 MHz marker on 0 v.

b. Adjust C9 for peak to peak symmetry.

c. Repeat these adjustments until the display resembles Figure 9.

Notes: There are no adjustments for 2 MHz bandwidth. Set the Demodulator Bandwidth to 2 MHz and check that there is a display.

53. FM 20 & 10 MHz - Module A7. On the Sweep Oscillator:

a. Check the output at 160 MHz.

b. Select dF 50 MHz.

c. Select Markers at 150 MHz, 160 MHz and 170 MHz.

54. On the Demodulator:

Set the IF Bandwidth to 20 MHz.

55. On the Module A7:

a. Adjust R27 to place the 160 MHz marker on 0 v.

b. Adjust C20 and C21 for peak to peak symmetry.

c. Repeat these adjustment until the display resembles Figure 10.

Note: There are no adjustments for 10 MHz bandwidth. Set the Demodulator Bandwidth to 10 MHz and check that there is a display.

IF AND VIDEO PRE-SETS ADJUSTMENT

56. IF Pre-Sets. Connect the test equipment as shown in Figure 11.

57. On the Pulse Generator:

    Select 10 u secs pulses at 1kHz with an amplitude of 500 mV.

58. On the Signal Generator:

    a. Select 160 MHz.

    b. Select External AM Modulation at 99%.

    c. Select output to -70 dBm.

59. On the Oscilloscope:

    Select CH1 to DC 50 ohms.

60. On the Demodulator:

    a. Select AM MAN.

    b. Ensure that J17 Pre-set Control input is disconnected.

61. Select 20 MHz Bandwidth:

    a. Set Signal Generator output to -78 dBm.

    b. Adjust "preset" board R11 to give an tangential sensitivity of -78 dBm.

62. Select 10 MHz Bandwidth:

    a. Set Signal Generator output to -81 dBm.

b. Adjust "preset" board R12 to give tangential sensitivity of -81 dBm.

63. Select 4 MHz Bandwidth:

a. Set Signal Generator output to -85 dBm.

b. Adjust "preset" board R13 to give tangential sensitivity of -85 dBm.

64. Select 2 MHz Bandwidth:

a. Set Signal Generator output to -88 dBm.

b. Adjust "preset" board R14 to give tangential sensitivity of -88 dBm.

65. Select 1 MHz Bandwidth:

a. Set Signal Generator output to -91 dBm.

b. Adjust "preset" board R15 to give tangential sensitivity of -91 dBm.

66. Video Pre-set. On the Demodulator:

a. Select 20 MHz Bandwidth.

b. Adjust "preset" board R16 to give a noise output of between 50 mV and 100 mV peak to peak.

67. On the Signal Generator:

Set the output to -20 dBm.

68. On the Demodulator:

Check that the video output is greater than 2 V.

OVERALL CHECKS

69. On the Demodulator.

70. Select 20 MHz Bandwidth.

Check that the tangential sensitivity is greater than -78 dBm and that noise level is between 50 mV and 100 mV.

71. Select 10 MHz Bandwidth.

Check that the tangential sensitivity is greater than -81 dBm and that noise level is between 50 mV and 100 mV.

72. Select 4 MHz Bandwidth.

Check that the tangential sensitivity is greater than -85 dBm and that noise level is between 50 mV and 100 mV.

73. Select 2 MHz Bandwidth.

Check that the tangential sensitivity is greater than -88 dBm and that noise level is between 50 mV and 100 mV.

74. Select 1 MHz Bandwidth.

Check that the tangential sensitivity is greater than -91 dBm and that noise level is between 50 mV and 100 mV.

75. The noise levels at Paragraphs 72, 73 or 74 may exceed that specified when further adustments to Modules A8 and A13 will be required; do not adjust unnecessarily.

76. On the Demodulator select 4 MHz Bandwidth. Adjust A13 R17 for noise level of between 50 mV and 100 mV.

77. On the Demodulator select 2 MHz Bandwidth. Adjust A13 R15 for noise level of between 50 mV and 100 mV.

78. On the Demodulator select 1 MHz Bandwidth. Adjust A8 R17 for noise level of between 50 mV and 100 mV.

79. If any adjustments have been made, repeat Paragraphs 31 to 42 but make no further adjustments to A13 R17, A13 R15 or A8 R17.

80. Repeat Paragraphs 56 to 68 and 69 to 79.

CONCLUSION

81. Using the procedures in the Instruction Manual (Ref A) and obeying the Safety Warning, carry out the alignment from Paragraphs 4.4.12 to 4.5.2 inclusive (pages 4.12 to 4.21).

82. Replace all covers removed during the procedure.

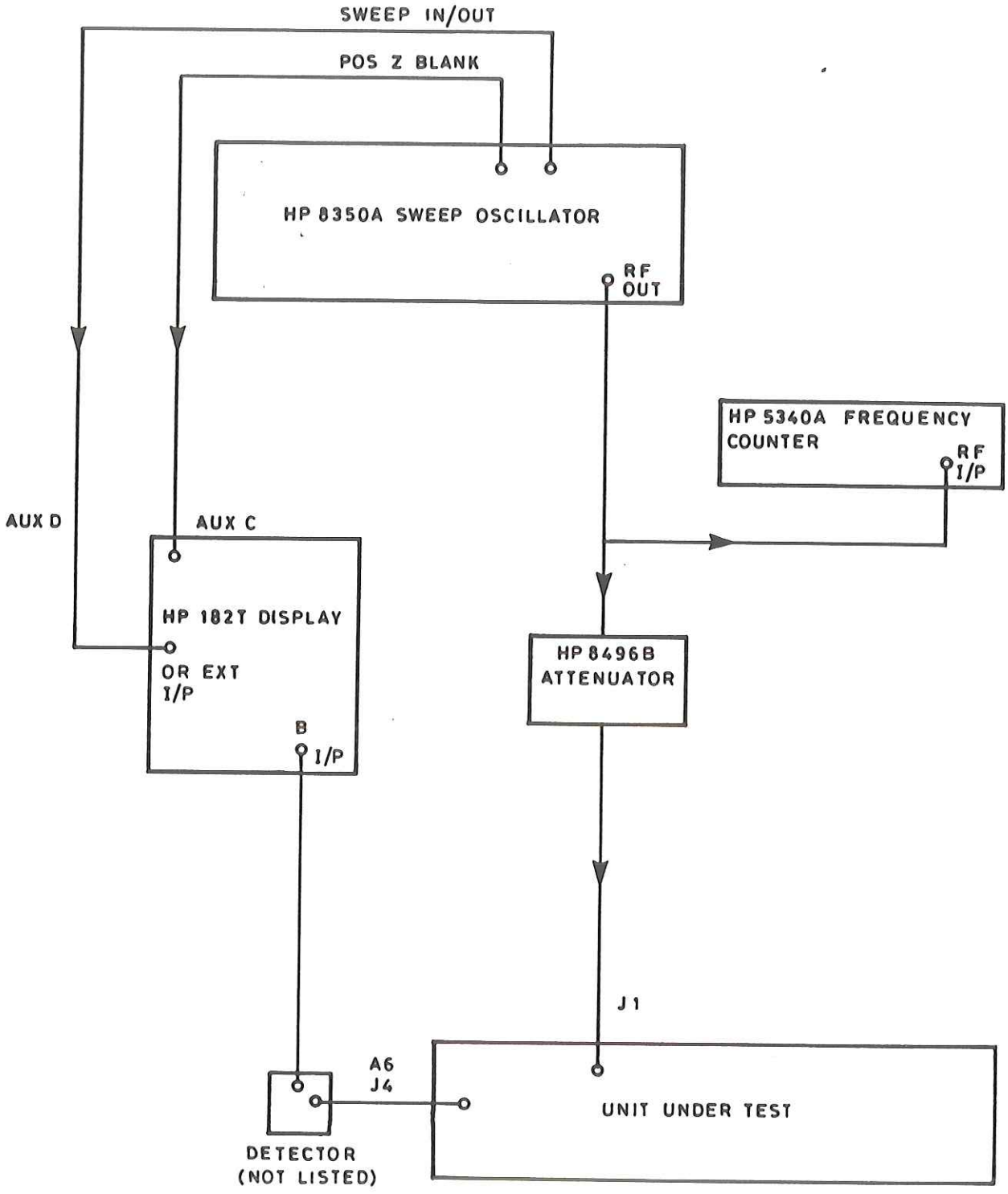

Fig 1 Test set up for AM alignment

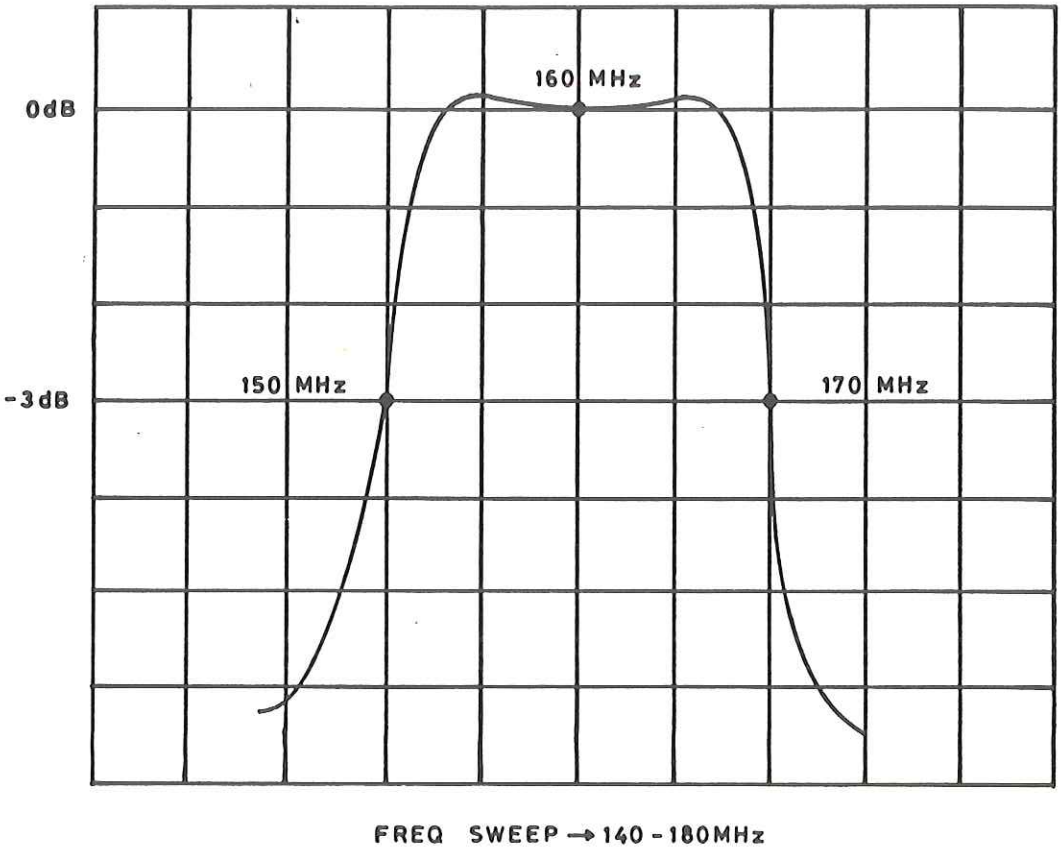

Fig 2 20MHz bandwidth

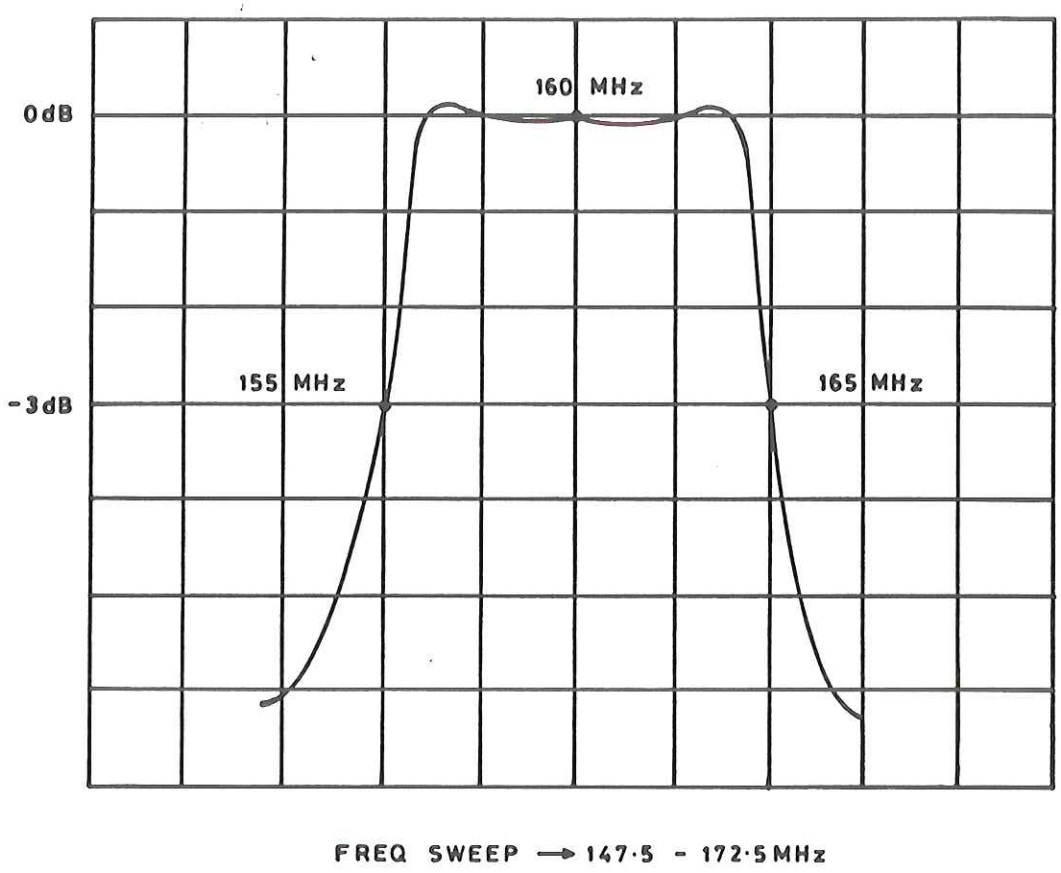

Fig 3 10MHz bandwidth

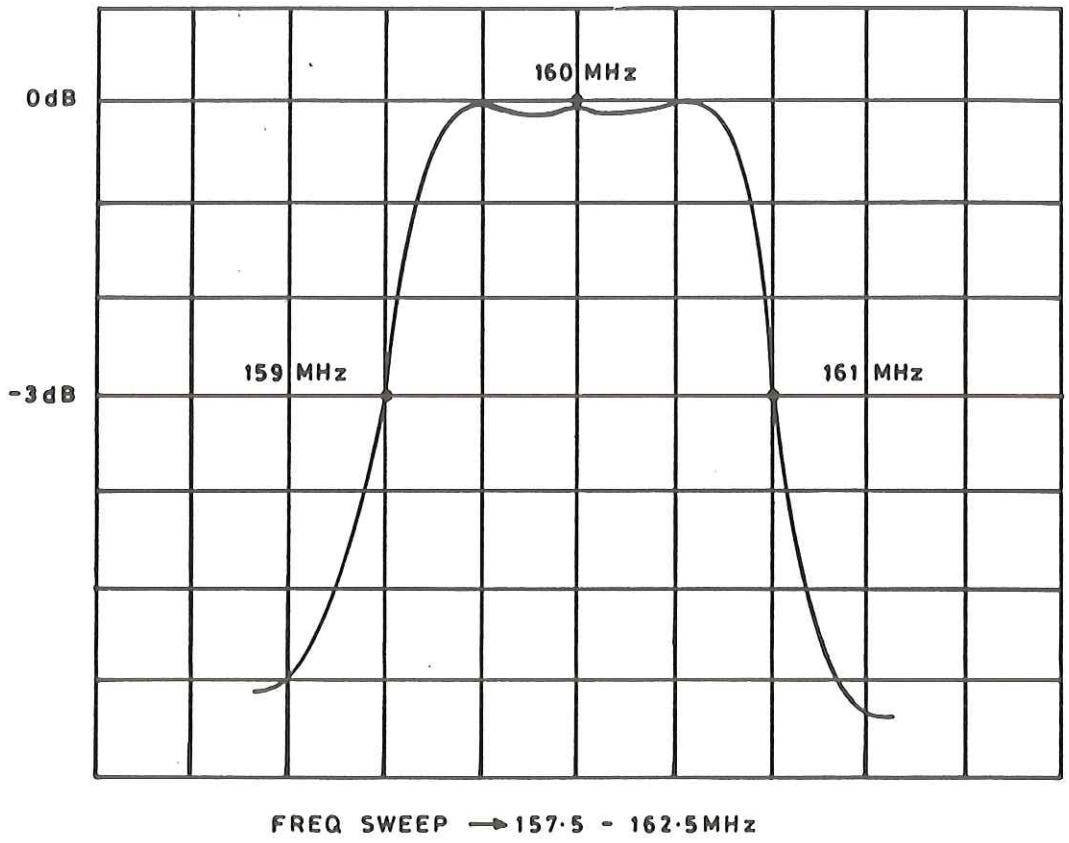

Fig 4 2MHz bandwidth

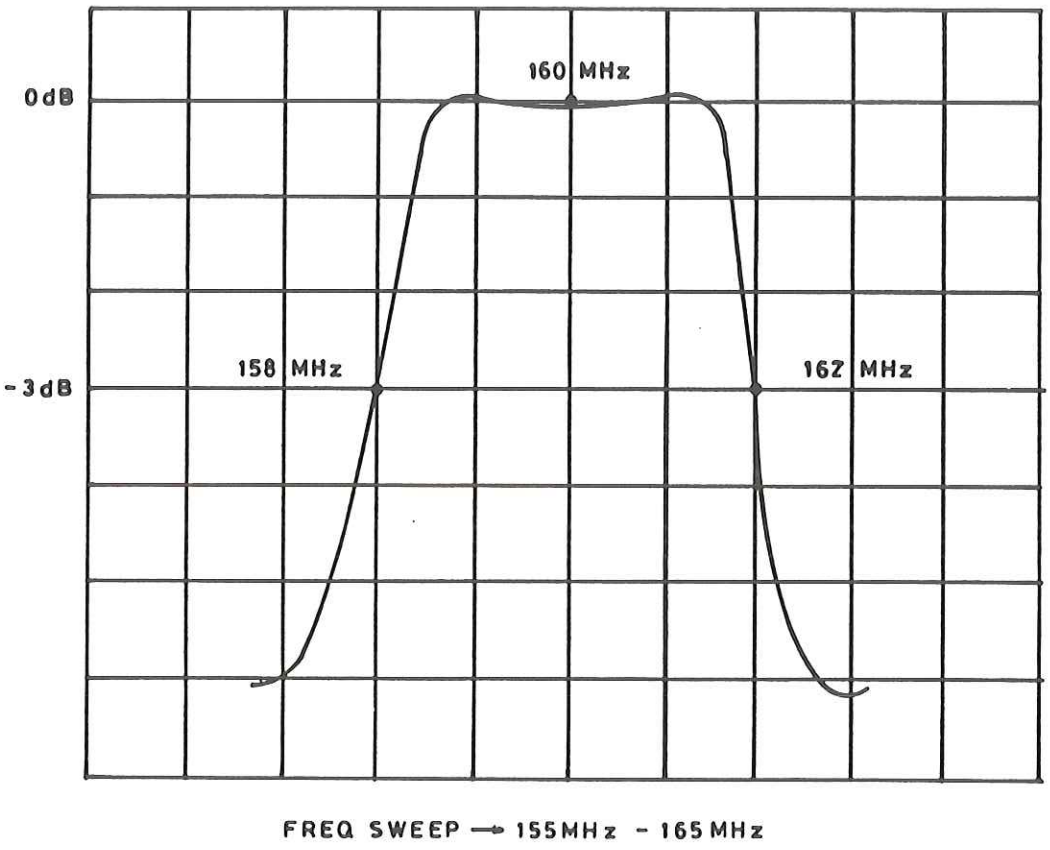

Fig 5 4MHz bandwidth

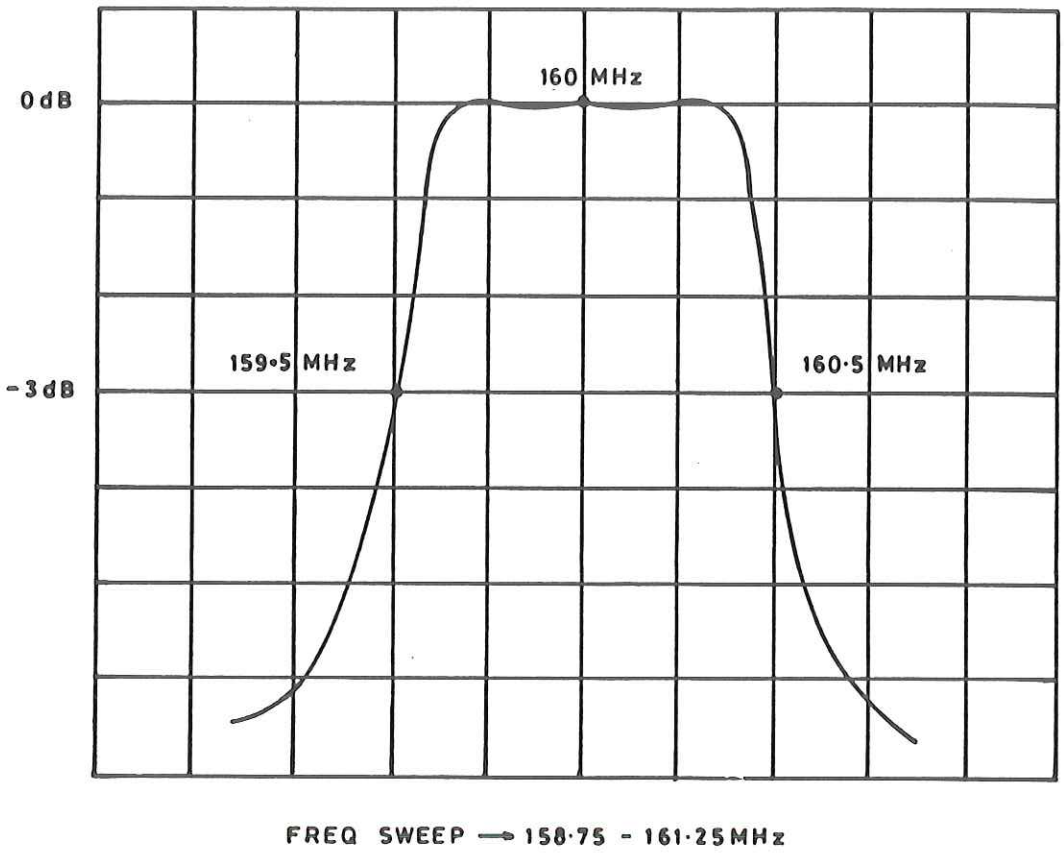

Fig 6 1MHz bandwidth

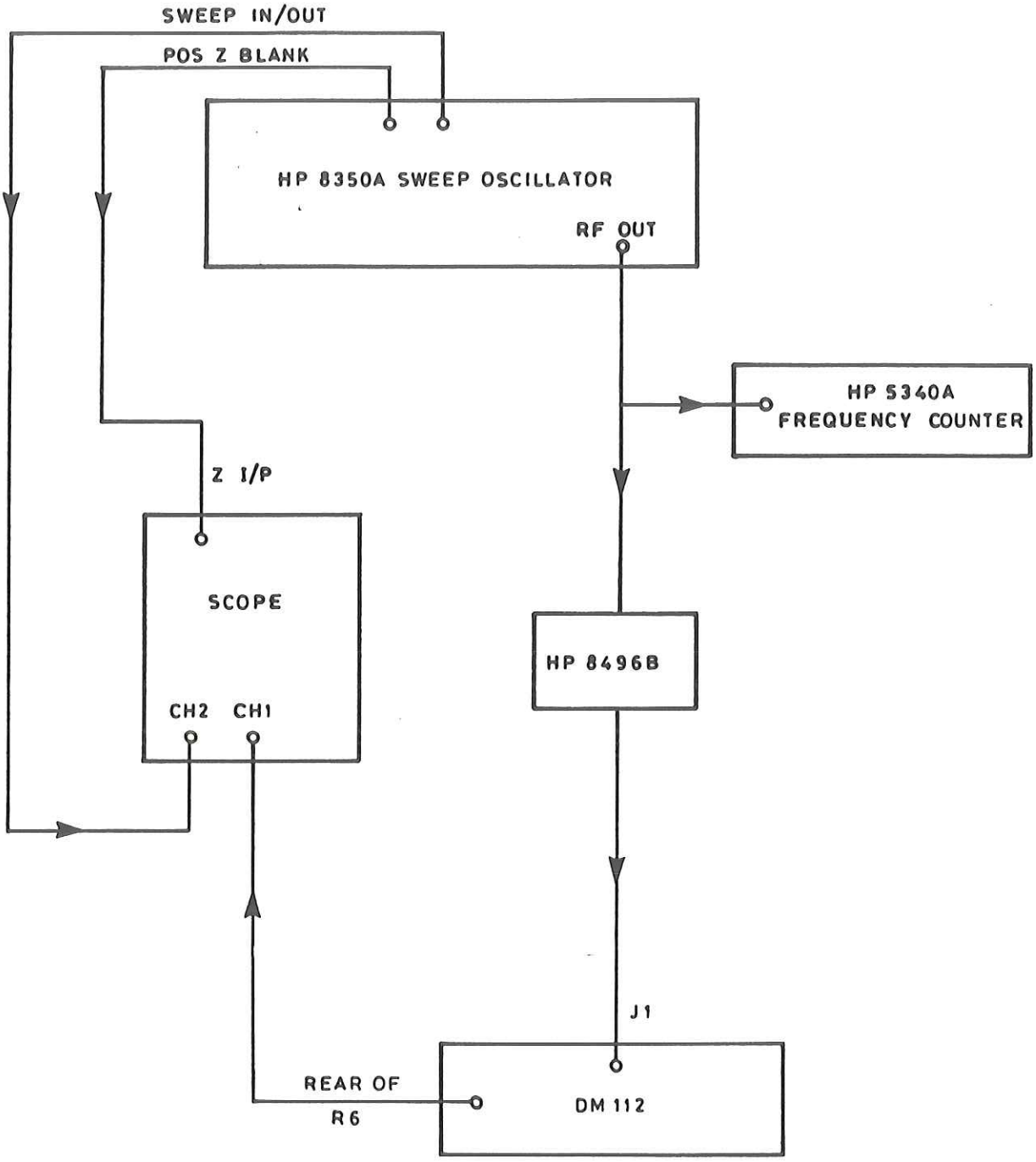

Fig 7 Test set-up for discriminator 'S' curve

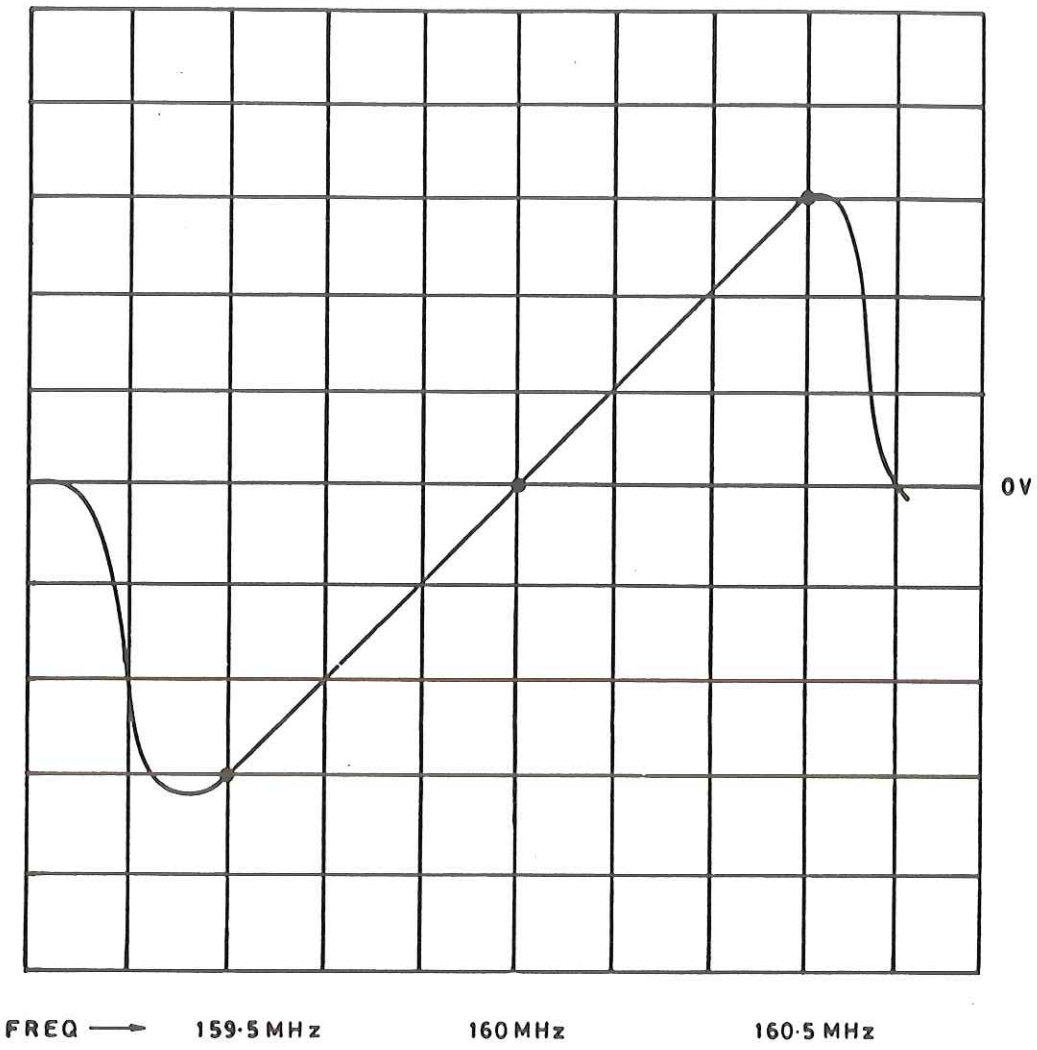

Fig 8 'S' curve 1MHz bandwidth

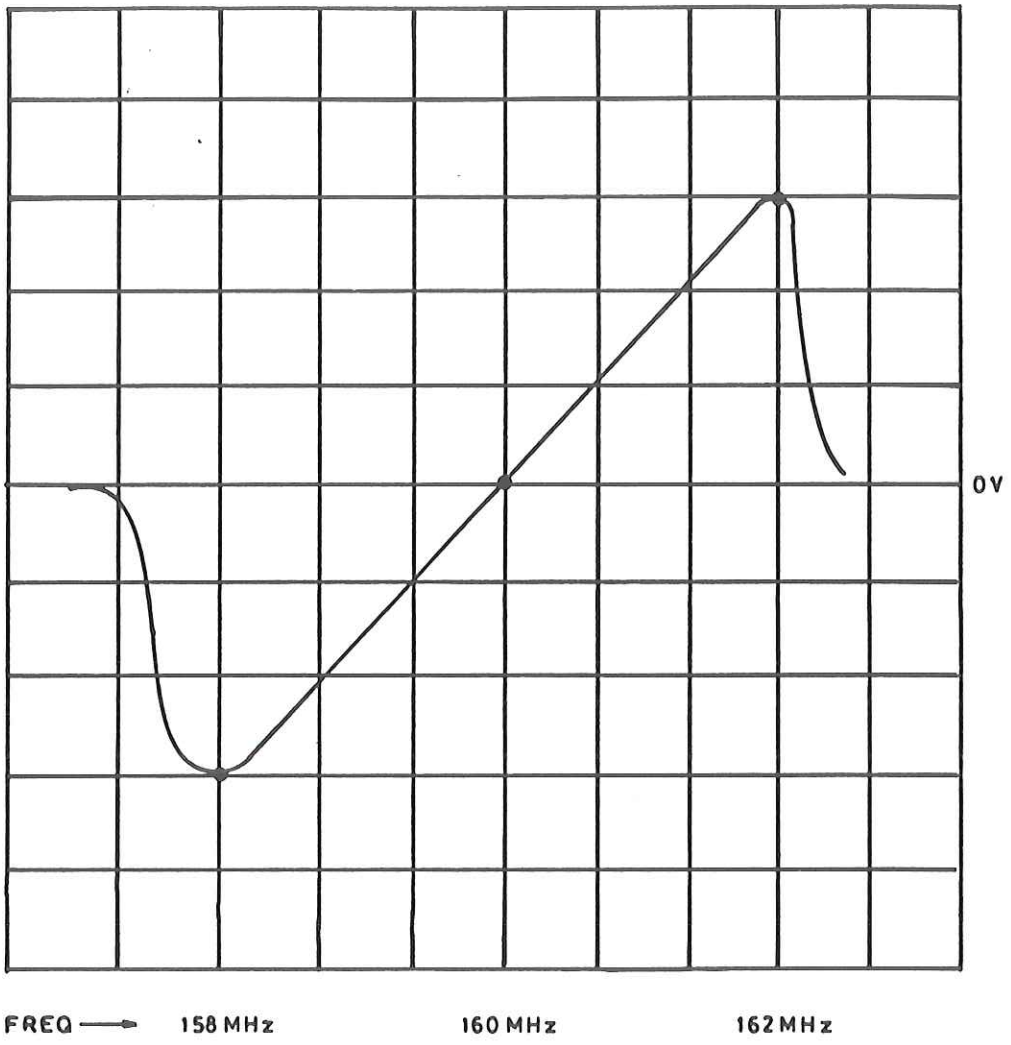

Fig 9 'S' curve 4MHz bandwidth

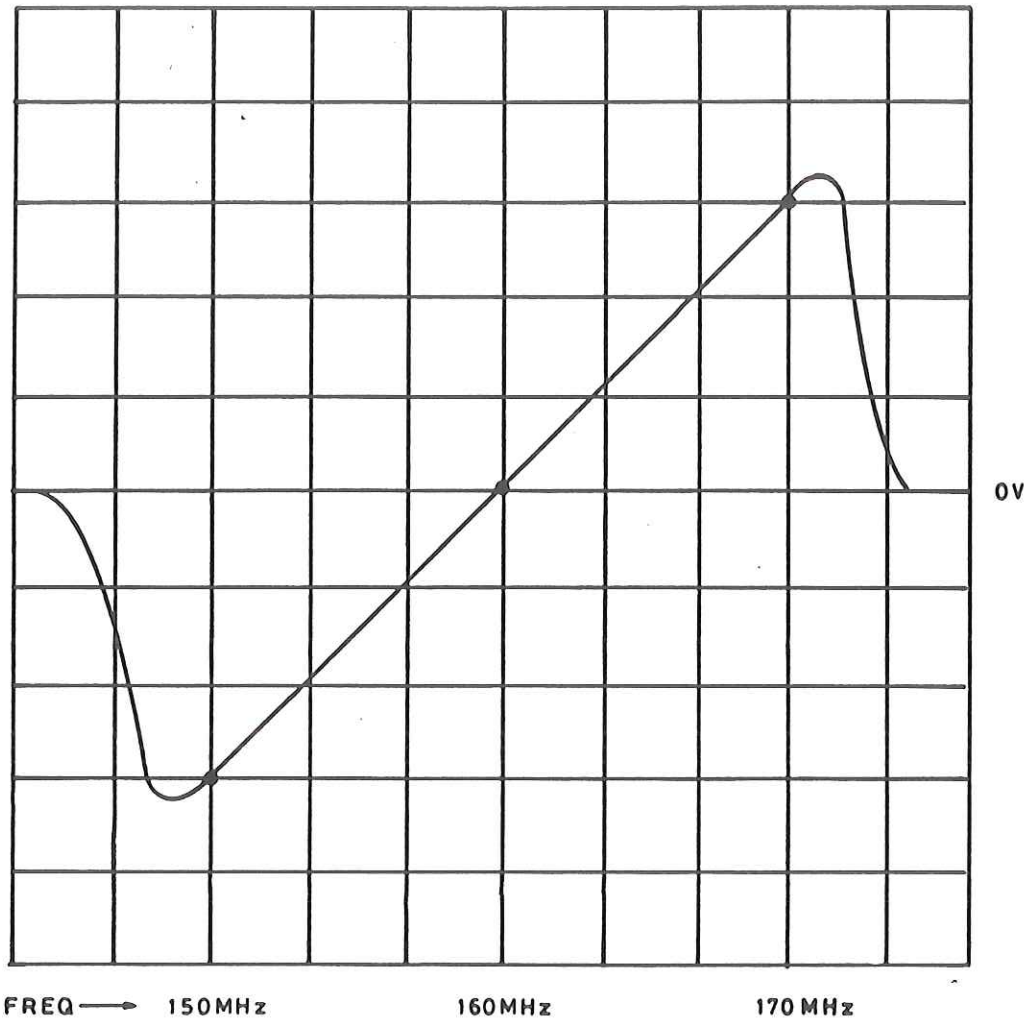

Fig 10 'S' curve 20MHz bandwidth

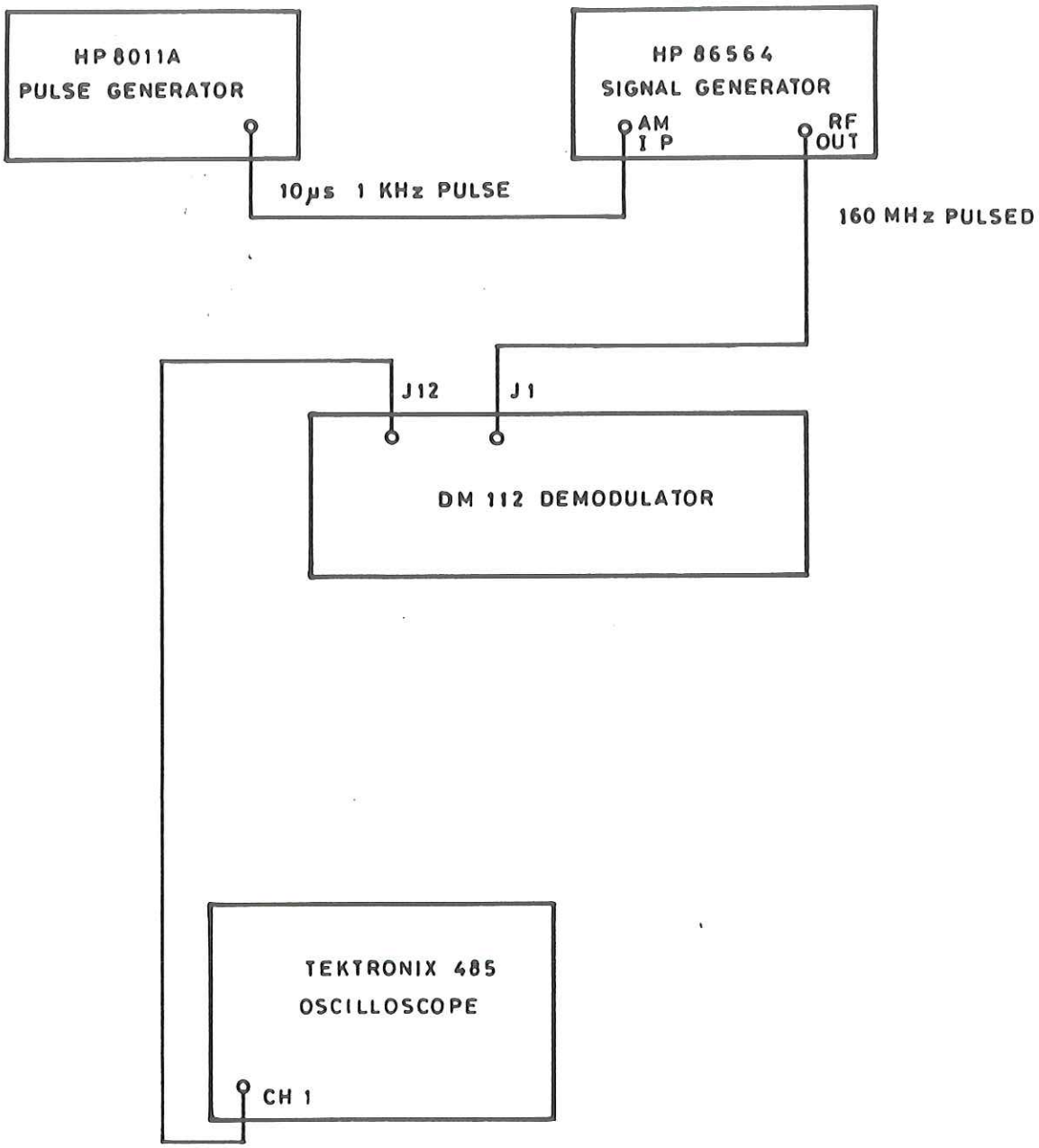

Fig 11 Test set-up for IF and video tests

ANNEX A TO
TECH MEMO NO 88303

W-J TEST SCHEDULE

REF RST 47

TEST EQUIPMENT

ITEM NO	EQUIPMENT	MANUFACTURER	TYPE
1	Signal Generator	HP	8640B
2	Distortion Analyser	HP	332A
3	Pulse Generator	HP	8007B
4	Sweeper	Telonic	1205A
5	Oscilloscope	HP	1740A
6	D.V.M	Fluke	8050A
7	A C Voltmeter	AVO	8
8	Variable Transformer	Regulac	RB3 - MT

Equivalent test equipment may be used with prior approval from the inspecting authority.

TEST PROCEDURE

POWER SUPPLIES

1. Set the mains selector switch, S2, to 115 V, and adjust the variac output for 115 V.

2. Connect the equipment as shown in Fig A-1.

3. Measure and record the voltages at:

   a. A3 pin 10, +15 V.

   b. A4 pin 19, -15 V.

   c. A1 pin 18, +24 V.

4. Adjust the variac for 105 V and repeat para 3.

5. Adjust the variac for 125 V and repeat para 3.

6. Switch the U.U.T OFF and switch S2 to 230 V. Adjust the variac for 230 V output.

7. Switch the U.U.T ON, and repeat para 3.

FM DISCRIMINATOR SENSITIVITY

8. Connect the equipment as shown in fig A-2a. Select FM and BW1 on the U.U.T.

9. Inject a 160 MHz signal at -40 dBm. Deviate the signal at 30% of the bandwidth under test.

10. Using the oscilloscope, connect to the high side of the video gain potentiometer, measure and record the peak-to-peak level of the signal observed.

11. Repeat para 9 and 10 for bandwidths up to 4 MHz.

12. Connect the equipment as shown in Fig A-2b.

13. Repeat para 9 and 10 for the remaining bandwidths.

AM SENSITIVITY

14. Connect the equipment as Fig A-3, select AM/MAN, bandwidth 1 and rotate the IF GAIN control maximum clockwise.

15. Feed a 160 MHz cw signal to the IF input, adjust the rf level on the signal generator until the DMM indicates 1.8 V dc.

16. Read and record the rf input level.

17. Repeat paras 14 to 15 for all remaining bandwidths.

AUDIO OUTPUT LEVEL

18. Connect the equipment as Fig A-4, select AM/MAN, 20 MHz bandwidth.

19. Feed a 160 MHz signal, amplitude modulated 50% at 1kHz rate, at -60 dBm to the IF input.

20. Observe the audio output on the scope and adjust the IF and AF gain controls for maximum output without clipping.

21. Switch the distortion analyser to VOLTMETER and read the output level.

22. Record this level on the result sheet.

SIGNAL STRENGTH METER

23. Feed a 160 MHz cw -40 dBm signal to the IF input. Selct AM/AGC mode.

24. Check the meter deflection for each bandwidth is greater than 60%.

25. Vary the level of the input signal and check that the signal strength meter responds without sticking. Confirm satisfactory operation with a tick on the result sheet.

TUNING METER

26. Repeat para 23.

27. Tune the IF input signal above and below 160 MHz and observe that the meter deflection is at least the minimum indicated in the result sheet for each bandwidth.

28. Record the meter deflection for each bandwidth on the result sheet.

AN/AGC VIDEO OUTPUT

29. Connect the equipment as per Fig A-5.

30. Select bandwidth 1 and AM/AGC. Turn the video gain control to maximum clockwise.

31. Inject a 160 MHz signal modulated at 50% with 1 KHz.

32. Increase the signal level until the video output displayed on the oscilloscope starts to limit. Record the input level on the result sheet.

33. Repeat para 29 to 32 for all remaining bandwidths.

AM/MAN VIDEO OUTPUT

34. Connect the equipment as per Fig A-5.

35. Switch to AM/MAN, bandwidth 1 and inject a 160 MHz signal modulated at 50% with 1 KHz. Turn the video gain control to maximum CW.

36. Increase the signal level for maximum undistorted video output, at the same time adjust the IF gain control for maximum signal handling capability.

37. Record on the result sheet the input level for maximum undistorted output.

38. Repeat para 34 to 37 for all remaining bandwidths.

PULSE STABILITY

39. Preliminaries. Monitor the output of the pulse generator as in Fig A-6 and set up for pulses of 2μs and 1 KHz PRF. The pulse generator control settings are given in Fig A-6, adjust the vernier controls to give correct pulsewidth and PRF.

40. Connect the equipment as shown in Fig A-7. Select PULSE on the signal generator and output level of -64 dBm.

41. Select the 1 MHz bandwidth and PULSE on the U.U.T., observe the video output on the oscilloscope. Note this level.

42. Increase the signal generator output -20 dBm. Note the change in the video output, which shall be less than 6dB relative to the level observed in para 41, ie the pulse height should be between one half to twice the original magnitude. Record the change on the result sheet.

43. Repeat para 40 to 42 for the 4 MHz bandwidth with input levels of -58 dBm to -20 dBm.

44. Repeat para 40 to 42 for the 20 MHz bandwidth with input levels of -50 dBm to -30 dBm.

CONTROL FUNCTIONS

45. Check that all controls operate smoothly and correctly. Indicate satisfactory operation with a tick on the result sheet.

SIGNAL MONITOR

46. MARKER ACCURACY. Switch marker on, inject signal into J1 and adjust signal generator frequency until the pips coincide.

47. Record the signal generator frequency on the result sheet.

48. FLATNESS. Set the signal monitor sweep width to maximum. Inject a signal into J1 and tune it between 150-170 MHz. Adjust the signal generator level to maintain a constant signal monitor response as the signal is tuned from 150-170 MHz.

49. Record the variation in signal generator output level on the result sheet.

50. GAIN. Note and record the signal generator level required to produce a 25.4 mm deflection on the signal monitor.

MAINS SELECTOR

51. Ensure that the mains selector (S2) is set to 230 V, indicate compliance with a tick on the result sheet.

Reference Paragraph	Measurement Description	Measurement	Acceptable Limits Minimum	Acceptable Limits Maximum	Units
1	Power Supplies				
3	115 V ac Input +15 V supply		13.5	16.5	Vdc
	-15 V supply		13.5	16.5	Vdc
	+24 V supply		22.8	25.2	Vdc
4	105 V ac Input +15 V supply		13.5	16.5	Vdc
	-15 V supply		13.5	16.5	Vdc
	+24 V supply		22.8	25.2	Vdc
5	125 V ac Input +15 V supply		13.5	16.5	Vdc
	-15 V supply		13.5	16.5	Vdc
	+24 V supply		22.8	25.2	Vdc
7	230 V ac Input +15 V supply		13.5	16.5	Vdc
	-15 V supply		13.5	16.5	Vdc
	+24 V supply		22.8	25.2	Vdc
	FM Discriminator Sensitivity				
8	100 kHz Bandwidth		0.8	-	Vp-p
	500 kHz Bandwidth		0.8	-	Vp-p
	1 MHz Bandwidth		0.8	-	Vp-p
	2 MHz Bandwidth		0.8	-	Vp-p
	4 MHz Bandwidth		0.8	-	Vp-p
	10 MHz Bandwidth		0.8	-	Vp-p
	20 MHz Bandwidth		0.8	-	Vp-p
14	AM Sensitivity				
15	Input level required to Produce 1.8 Vdc				
	at 100 kHz Bandwidth		-76	-72	dBm
	500 kHz Bandwidth		-69	-65	dBm
	1 MHz Bandwidth		-66	-62	dBm
	2 MHz Bandwidth		-63	-59	dBm
	4 MHz Bandwidth		-60	-56	dBm
	10 MHz Bandwidth		-56	-52	dBm
	20 MHz Bandwidth		-53	-49	dBm

Reference Paragraph	Measurement Description	Measurement	Acceptable Limits		Units
			Minimum	Maximum	
18	AF Maximum Output				
22	Maximum audio output		6.5	-	rms
23	Signal Stength Meter				
25	Meter operates satisfactorily		-	-	tick
26	Tuning Meter				
28	Meter deflection				
	100k Bandwidth		±60	-	tick
	500k Bandwidth		±60	-	tick
	1MHz Bandwidth		±60	-	tick
	2MHz Bandwidth		±60	-	tick
	4MHz Bandwidth		±60	-	tick
	10MHz Bandwidth		±20	-	tick
	20MHz Bandwidth		±40	-	tick
29	AM/AGC Video Output				
32	Maximum input level for undistorted output at				
	100kHz Bandwidth		-40	-	dBm
	500kHz Bandwidth		-40	-	dBm
	1MHz Bandwidth		-40	-	dBm
	2MHz Bandwidth		-40	-	dBm
	4MHz Bandwidth		-40	-	dBm
	10MHz Bandwidth		-40	-	dBm
	20MHz Bandwidth		-40	-	dBm

TEST RESULTS

Reference Paragraph	Measurement Description	Measurement	Acceptable Limits		Units
			Minimum	Maximum	
34	AM/MAN Video Output				
37	Maximum input level for undistorted output at				
	100kHz Bandwidth		-40	-	dBm
	200kHz Bandwidth		-40	-	dBm
	1MHz Bandwidth		-40	-	dBm
	2MHz Bandwidth		-40	-	dBm
	4MHz Bandwidth		-40	-	dBm
	10MHz Bandwidth		-40	-	dBm
	20MHz Bandwidth		-40	-	dBm
39	Pulse Stability				
42	Variation in output at 1MHz Bandwidth		-	6	dB
43	4MHz Bandwidth		-	6	dB
44	20MHz Bandwidth		-	6	dB
	Control Functions				
45	All controls operate satisfactorily		-	-	tick
	Signal Monitor				
47	Marker Frequency		159.984	160.016	MHz
49	Flatness of response		-	3	dB
50	Input at J1 for 25.4 mm deflection		-	-67	dBm
51	Mains selector set to 230 V		-	-	tick

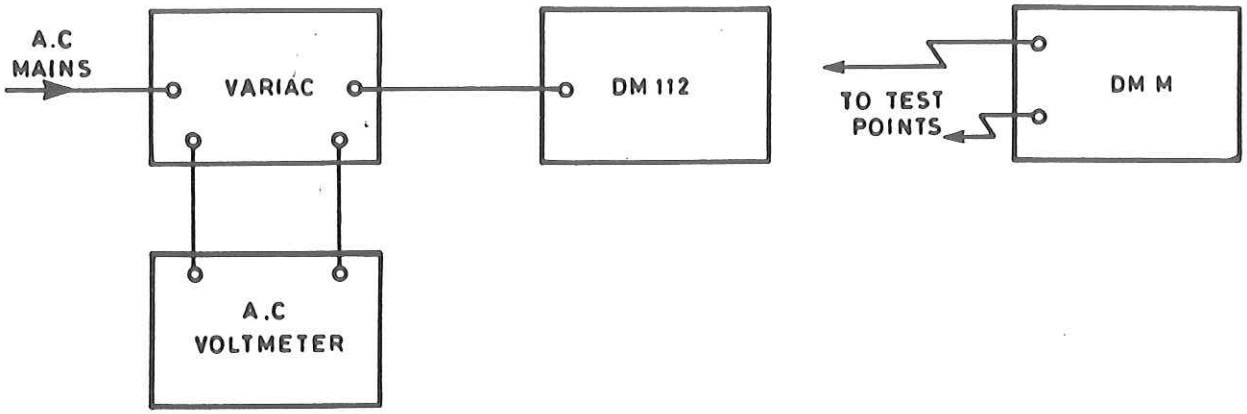

Fig A1 Test set-up: power supplies

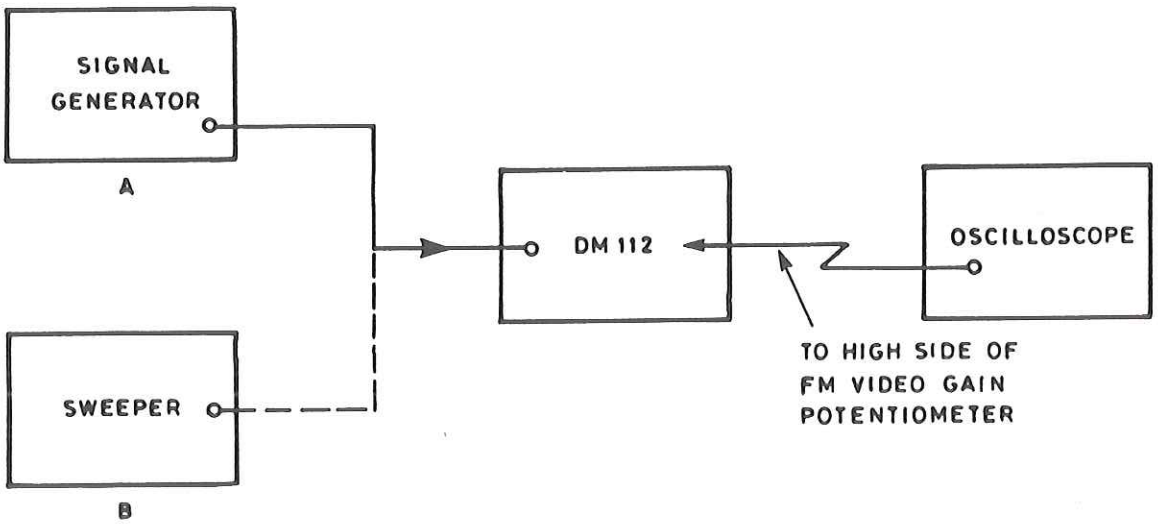

Fig A2 Test set-up: FM discriminator sensitivity

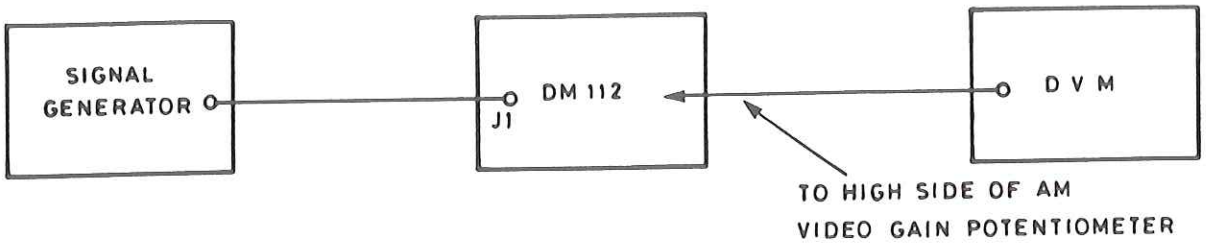

Fig A3 Test set-up: AM sensitivity

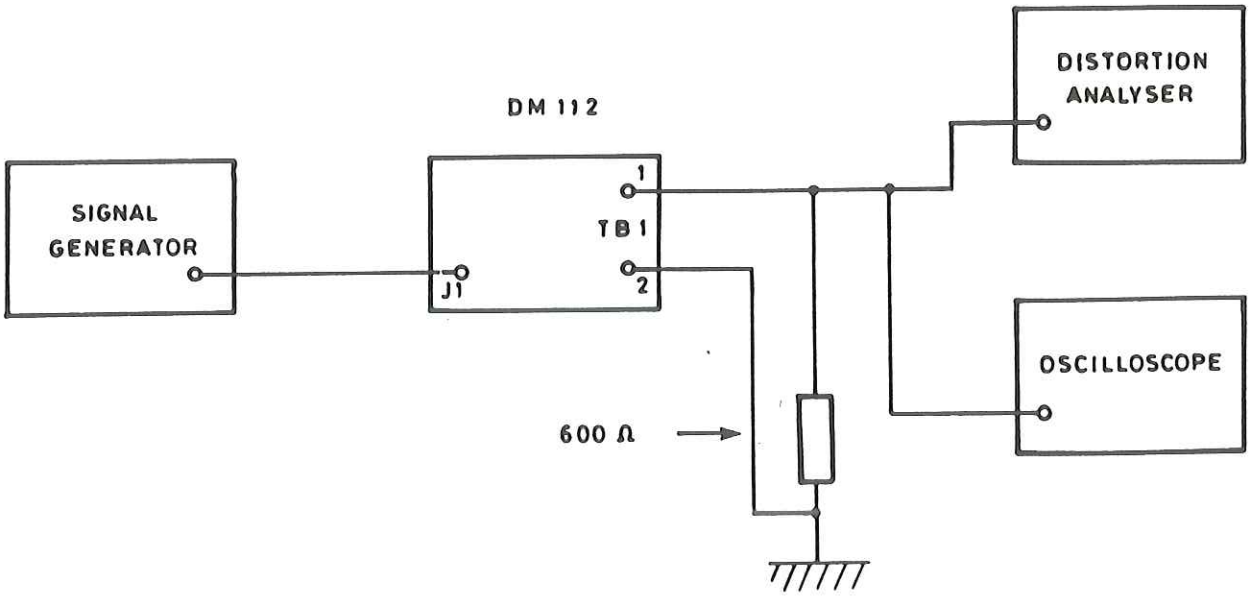

Fig A4 Test set-up: audio output level

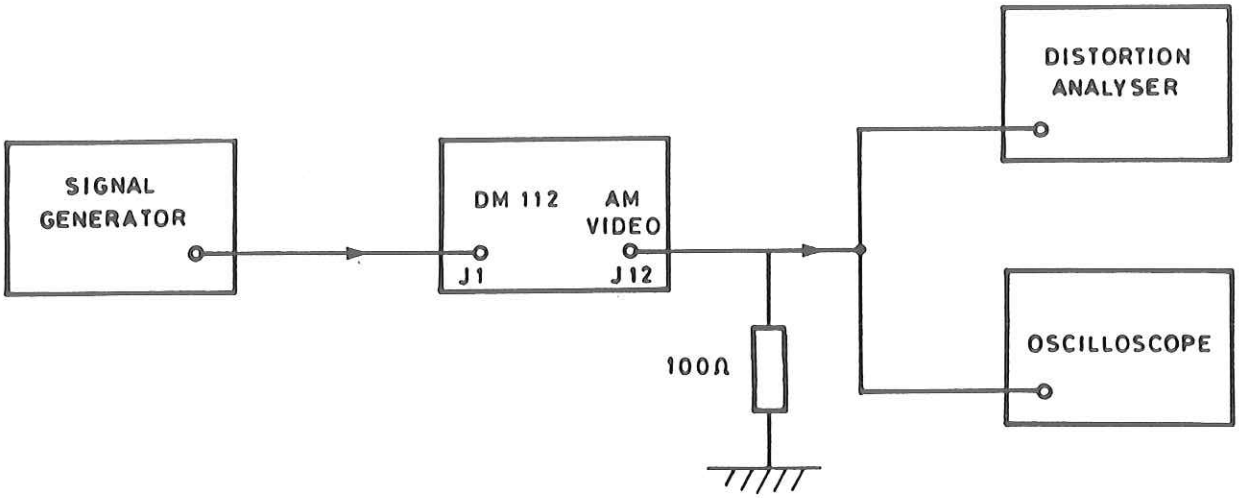

Fig A5 Test set-up: AM/AGC video output

PLUSE GENERATOR CONTROL

NORM

DELAY

RATE (Hz) 10k - 0·3 k

PULSE DELAY 5ns

PULSE WIDTH 1·5 - 50μs

TRANSISTION TIME 0·1 - 5·0μs

LEADING EDGE MAX CCW

TRAILING EDGE MAX CCW

AMPLITUDE 0·5 - 1·0V

OFFSET - OFF

Fig A6 Pulse generator set-up

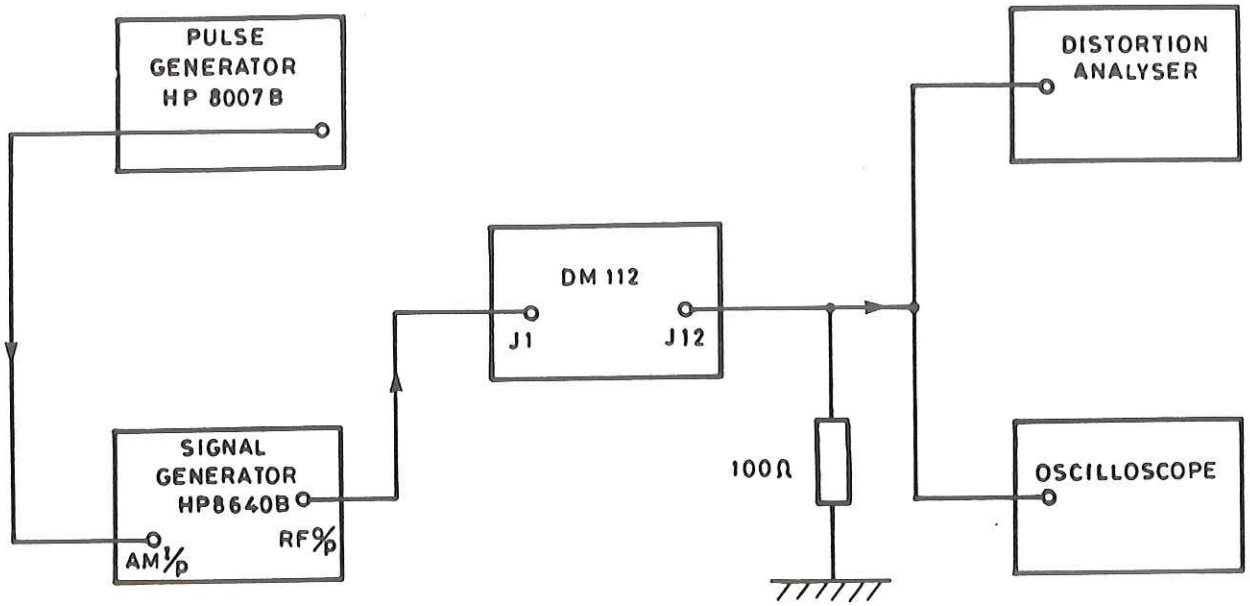

Fig A7 Test set-up: pulse stability