Issue 1
24.1.73

DESIGNS DEPARTMENT MANUFACTURING INFORMATION NO. 5.212(71)

Automatic Gain Control Unit UN3/541

Introduction

The UN3/541 is an automatic gain control unit for use in UHF translators and active deflectors type EP7/513 and EP7/514 respectively.

The unit has an input and output impedance of 50 ohms and an attenuation which is variable between 2dB and 20dB. Its attenuation is controlled by the sync pulse level of a video signal (with negative sync pulses) connected to PLC. The video signal should be derived from a UHF signal which has passed through the UN3/541, the UHF output can then be set to the required level (independent of input level, over the specified range) by a preset potentiometer. Alternatively the attenuation of the unit can be controlled manually by setting S1 to **manual** and adjusting the **manual** potentiometer.

When used in a translator or active deflector the video signal is derived from the coupler/detector unit UN24/501. In order to improve the linearity of the video signal from the UN24/501 a d.c. bias is fed via R28 and PLC to the detector diodes in the UN24/501.

Two outputs are provided to drive an AGC meter and a slave AGC unit (UN3/547) respectively.

The unit is housed in a CH1/57B and does not include power supplies.

General Specification

Supply voltages	-6V 12mA +6V 8mA to 30mA
Minimum insertion loss	2dB from 470-860MHz
Maximum insertion loss	20dB from 470-860MHz
Return loss Minimum attenuation Maximum attenuation	 12dB 20dB
Maximum output level swing for UN3/541 and UN3/547 linked together and installed in a translator or active deflector	$\pm \frac{1}{2}$dB for AGC range of +6dB to -10dB $+ \frac{1}{2}$dB -1dB for AGC range of +6dB to -16dB relative to the median input level of the translator.

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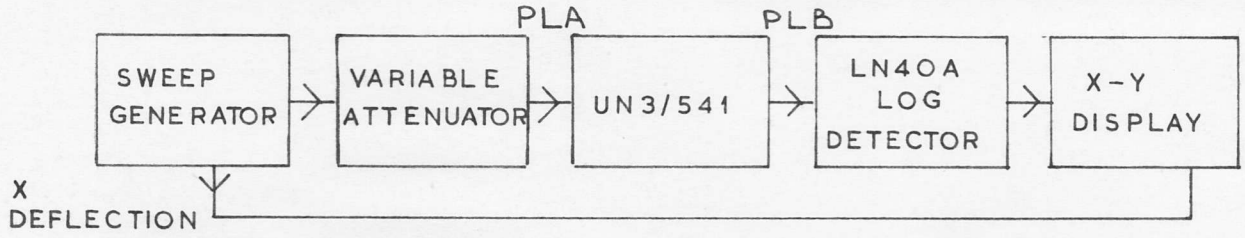
PRODUCTION TEST SCHEDULE

Equipment Required

Sweep Generator 0dBm out, 400-900MHz	(Texcan VS80 or equivalent)
Switched attenuators, 1dB step and 10dB steps, unless incorporated with generator.	
Coupler, 20dB	(Narda Microline or equivalent)
Detector and display of good sensitivity	(Texcan LN40A + 2 x AM14/540)
50 ohms termination, return loss >30dB	

1. Connect to the correct voltage supplies and provide an earth to the earth tags on the box. . Switch on and ensure that the correct current is being drawn. For average current levels see the specification. This test should be done before the SMB connectors are fitted.
2. Set up the test equipment as shown in the following block diagram so that the insertion loss of the unit may be measured.



INSERTION LOSS MEASUREMENT

3. Switch the UN3/541 to the manual function, i.e. set the switch on the frame [illegible] to 'MAN' and feed into PLA a swept UHF signal in the range 470-860MHz at a level of approximately 0dBm.
4. Adjust the potentiometer accessible through the hole in the frame labelled 'MAN:' from one end of its range to the other and check that the insertion loss of the UN3/541 swings from its maximum to minimum, or vice versa, as specified for this unit.
5. Set the switch on the frame to the 'AGC' function and in this state check that the insertion loss is at its minimum.
6. Feed into PLC any inverted video test waveform of 1 volt p-p level complete with syncs. Adjust the potentiometer accessible through the hole in the frame labelled 'AGC' and check that there is a setting where for a very small change in the input level to PLC (i.e. <1dB) the unit swings from minimum to maximum insertion loss, or vice versa.
7. Remove the signal at PLC and switch the unit back to the manual function. Adjust the potentiometer labelled 'MAN' so that the unit has maximum insertion loss. Then by switching from 'MAN:' to 'AGC' it will be seen that the unit goes from maximum to minimum insertion loss, in that order.

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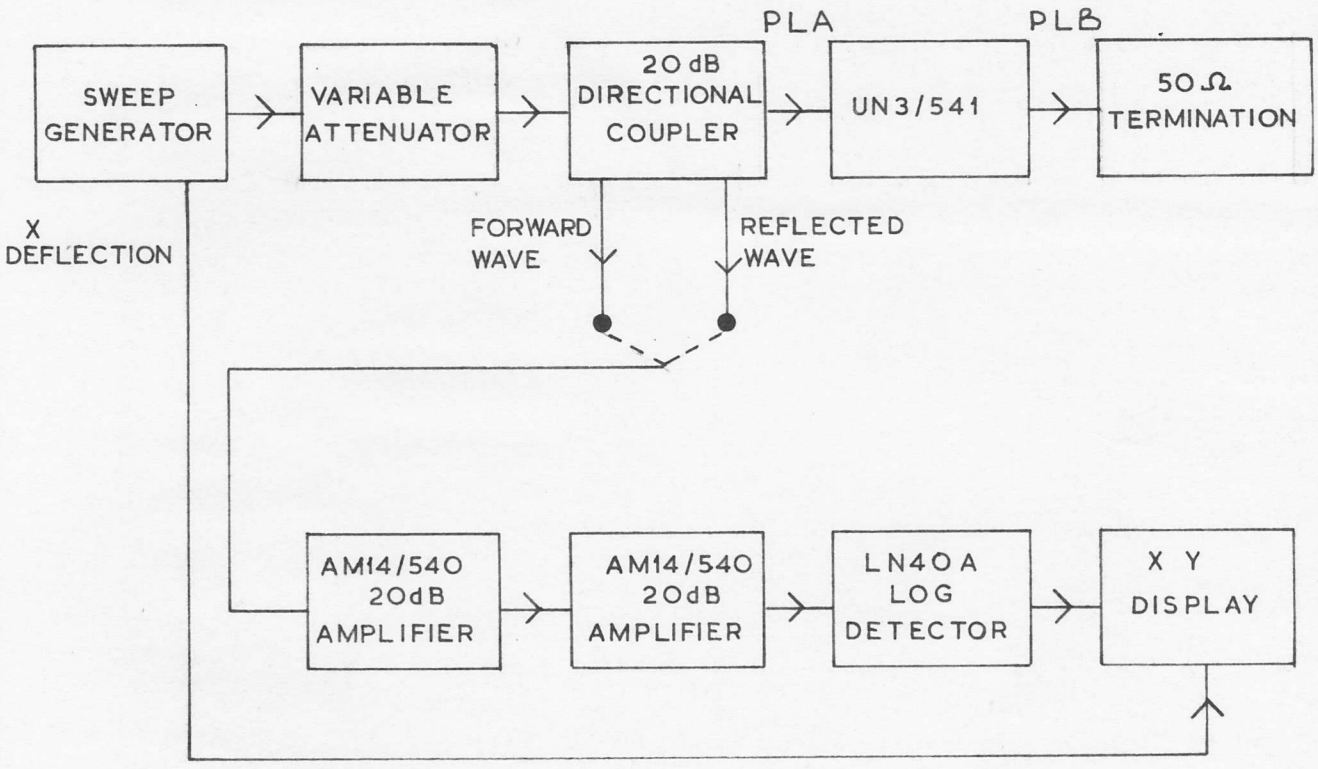
8. Check that the unit has a minimum AGC range i.e. its maximum to minimum insertion loss swing in dBs, in accordance with the specification over the range 470-860MHz.

9. Set up the test equipment as shown in the following block diagram so that the return loss of the unit may be measured.

10. The lead from the coupler to PL'A' must be less than three inches long. With approximately -40dBm from the generator, connect the detector amplifiers input to the forward wave port on the input coupler, and set up a convenient trace on the X-Y display. Increase the generator output by 12dB and transfer the detector amplifiers input to the reflected wave port. This should be below the forward wave trace over the range 470-860MHz for all attenuation settings. Adjust the attenuator to measure the return loss to the nearest dB.



RETURN LOSS MEASUREMENT

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Sheet 1 of 4 Sheets

ISS.	2	3	4	5
CHANGE	REDRAWN. J.H. R.B.A. 7-3-72.	ITEM 15 WAS 1-OFF. + SIGN WERE *. ITEMS 12 & 16 ADDED. C.J.A. 21/11/72	ITEM 4, 5 & 6 WERE SEALECTRIC TYPE 51-045-0000 CF. 7832(4) PH. 7.8.73	ITEMS 13-16 - EMB. LOAN * ADDED. ITEM 12 W.J.M. DELETED. H.J.M. 17-11-73

UN3/541 UNIT A.G.C., U.H.F., PARTS LIST

ITEM No.	No. OFF	SEE NOTES	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
			Drawing Numbers		
			Circuit D.29837 A2		
			Parts List D.29838 A4		
			Assembly & WIRING D.29839 A2		
			Order of Assembly D.29840 A4		
			Details 1 & 2 D.29841 A3		
			Details 3 D.29842 A4		
			P.B. Wiring Side D.29843 A2		
			P.B. Comp. Side D.29844 A2		
			P.B. Comp. Loc. D.29845 A4		
			P.B. Drilling D.29846 A4		
			Further Information Required for Manufacture		
			UNIT WIRING INFORMATION P.BOARD EA10140		
			Unit Assembly Information EA.10484		
			Spec. ED/UN3/541		
1	1	*	Chassis CH1/57B modified by Contractor AS FOLLOWS:- Frame DRILLED TO:-		SPEC. ED/CH1/57 D.29841 A3, Det.1
2					
3					
4	1	*	Bulk Head Receptacle Sealectro Type 51-045-9009	PL.A	1-24682-503
5	1	*	" " " "	PL.B	"
6	1	*	" " " "	PL.C	"
7	1	*	Switch S.P.C.O. Waycom Type MST 105D	S1	
8	1	*	Unit Label		D.29842 A4, Det.3 & ESK2571 A3.
10	1		6BA Solder Tag D/E		
11	2		6BA " " S/E		
~~12~~	~~1~~	~~*~~	~~PRINTED BOARD ASSEMBLY COMPRISING ALL ITEMS MARKED THUS +~~		~~SPEC. ED/PB/5~~
13	8	*	Vero Half Pin TP 11034		
14	1	*	Printed Board		D.29843 A2 D.29844 A2 D.29845 A4 D.29846 A4
15	2	*	Tag, Lead Through		1-28652-002
16	3	*	TRANSISTOR MOUNTING PAD		1-59193-018
17	A/R		Copper for Strip, 0.001" thick x 3/8" wide		
18	A/R		" " " " " x 1/16" wide		

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UN3/541
UNIT A.G.C., U.H.F.
PARTS LIST

DRN.	DD/JH
TPD.	J.D.
CKD.	D.D.
APPD	D.D

DESIGNS DEPARTMENT

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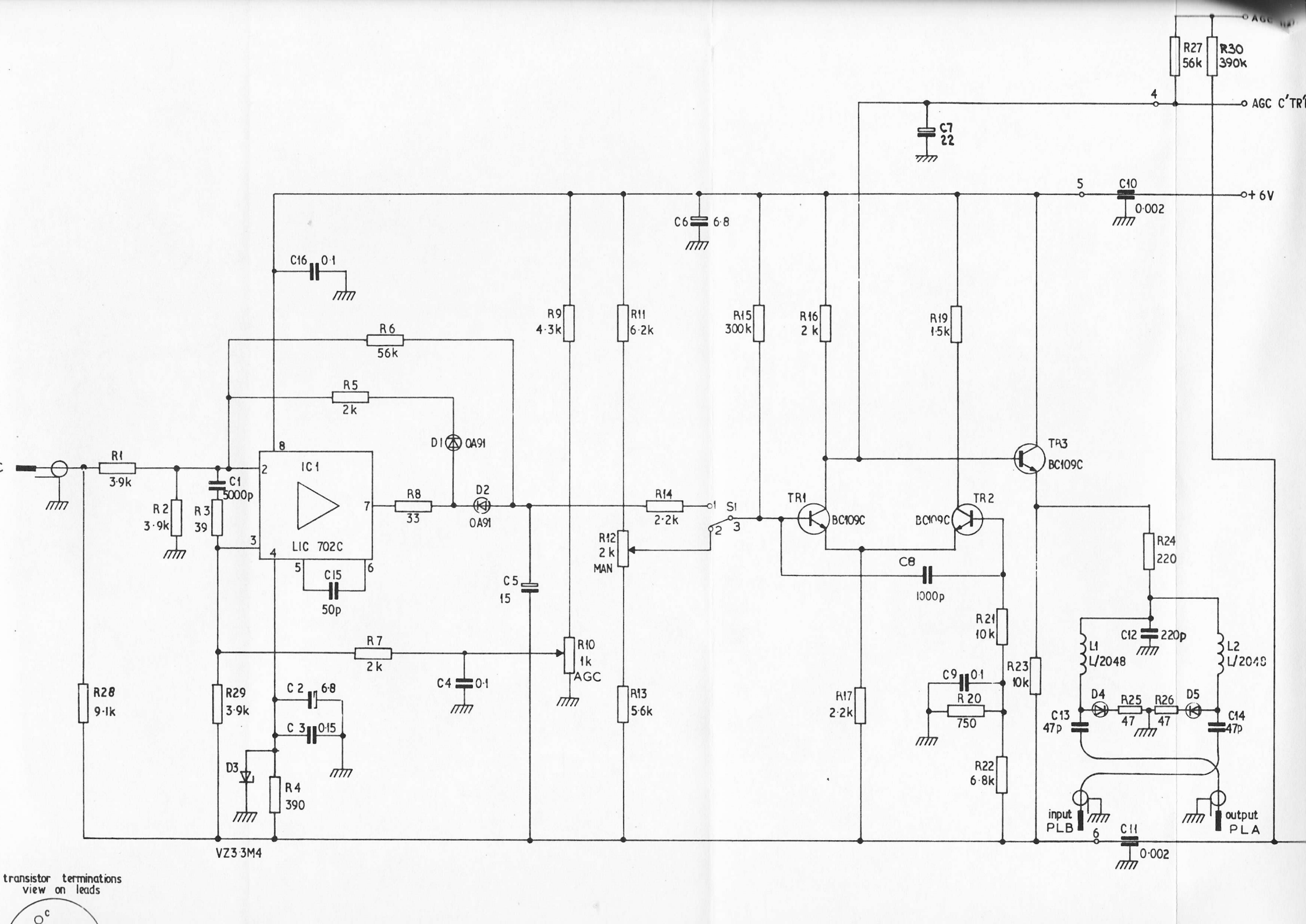
Sheet 1 of 4 SHEETS


R27 56k
R30 390k
AGC C'TR
4
C7 22
5
C10 0·002
+ 6V
C6 6·8
C16 0·1
R9 4·3k
R11 6·2k
R15 300k
R16 2 k
R19 1·5k
R6 56k
R5 2k
D1 OA91
TR3 BC109C
R1 3·9k
IC 1
8
2
7
3
4
LIC 702C
C1 5000p
R2 3·9k
R3 39
R8 33
D2 OA91
R14 2·2k
S1
TR1 BC109C
TR2 BC109C
C15 50p
5
6
C5 15
R12 2 k MAN
C8 1000p
R24 220
R21 10 k
C12 220p
L1 L/2048
L2 L/2048
R7 2 k
R10 1k AGC
C4 0·1
R23 10k
C9 0·1
R20 750
D4
R25 47
R26 47
D5
C13 47p
C14 47p
R28 9·1k
R29 3·9k
C 2 6·8
C 3 0·15
R17 2·2k
R13 5·6k
R22 6·8k
D3
R4 390
input PLB
output PLA
6
C11 0·002
VZ3·3M4
transistor terminations
view on leads
C