Chapter 7

Circuit diagrams

Circuit notes

COMPONENT VALUES

Resistors : no suffix =ohms, k =kilohms, M =megohms.
Capacitors : no suffix =microfarads, p =picofarads, n =nanofarads.
† value selected during test, nominal value shown.

VOLTAGES

Voltage measurements were made using a 20 kΩ/V meter, and are shown adjacent to the point to which the measurement refers.

WAVEFORMS

Oscillograms were taken using a dual trace, 100 MHz bandwidth, oscilloscope, and a x10 probe. Control settings of the TF 2370 together with oscilloscope triggering information, and horizontal and vertical sensitivities at the probe tip, are shown.

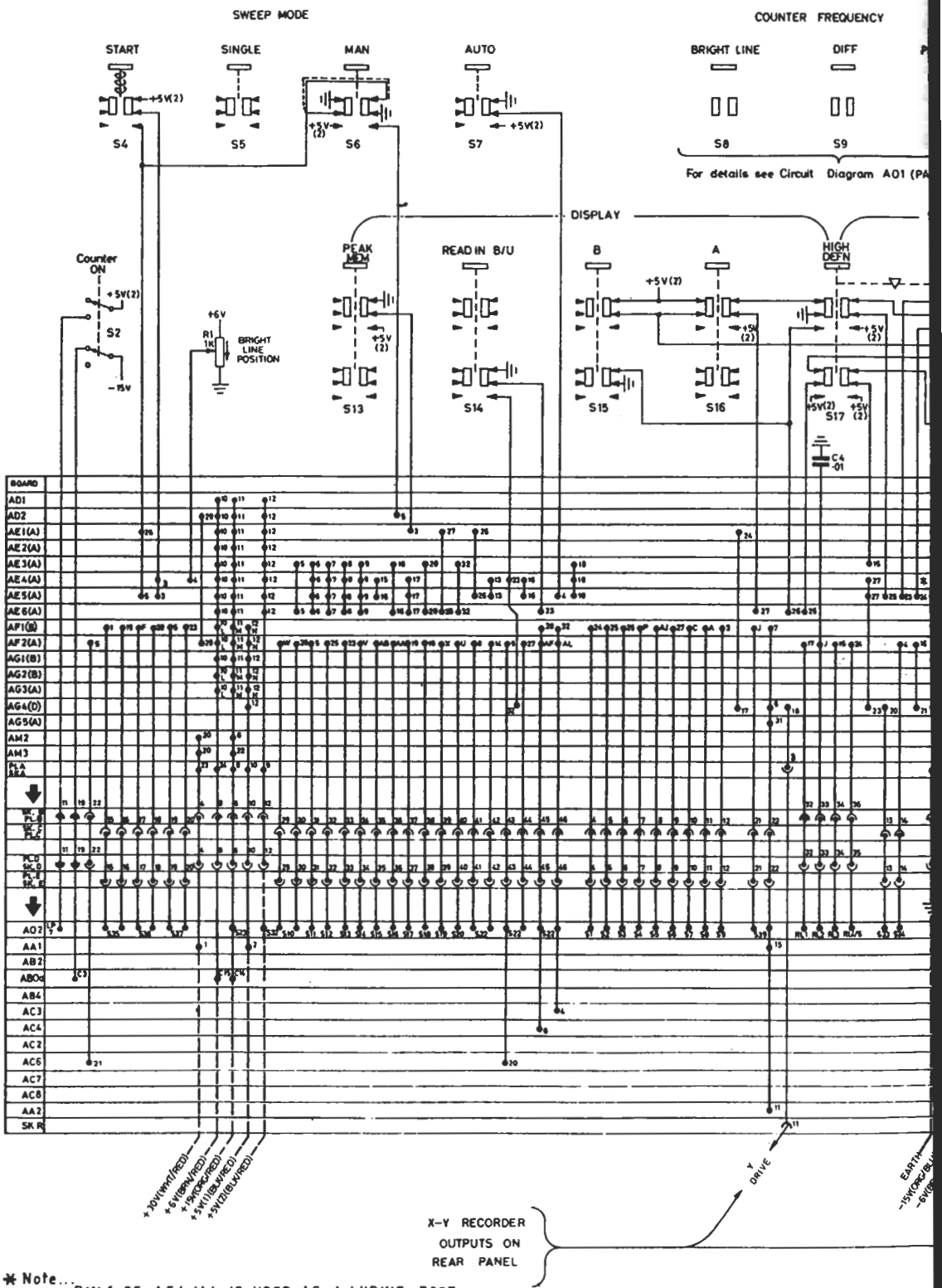
SYMBOLS

Symbols are in accordance with BS 3939 with the following additions :

test point

waveform reference number

sub-assembly designation



* Note... PIN 1 OF AE4 (A) IS USED AS A WIRING POST. THE SIGNAL IS NOT ROUTED ONTO AE4 (A) PCB.

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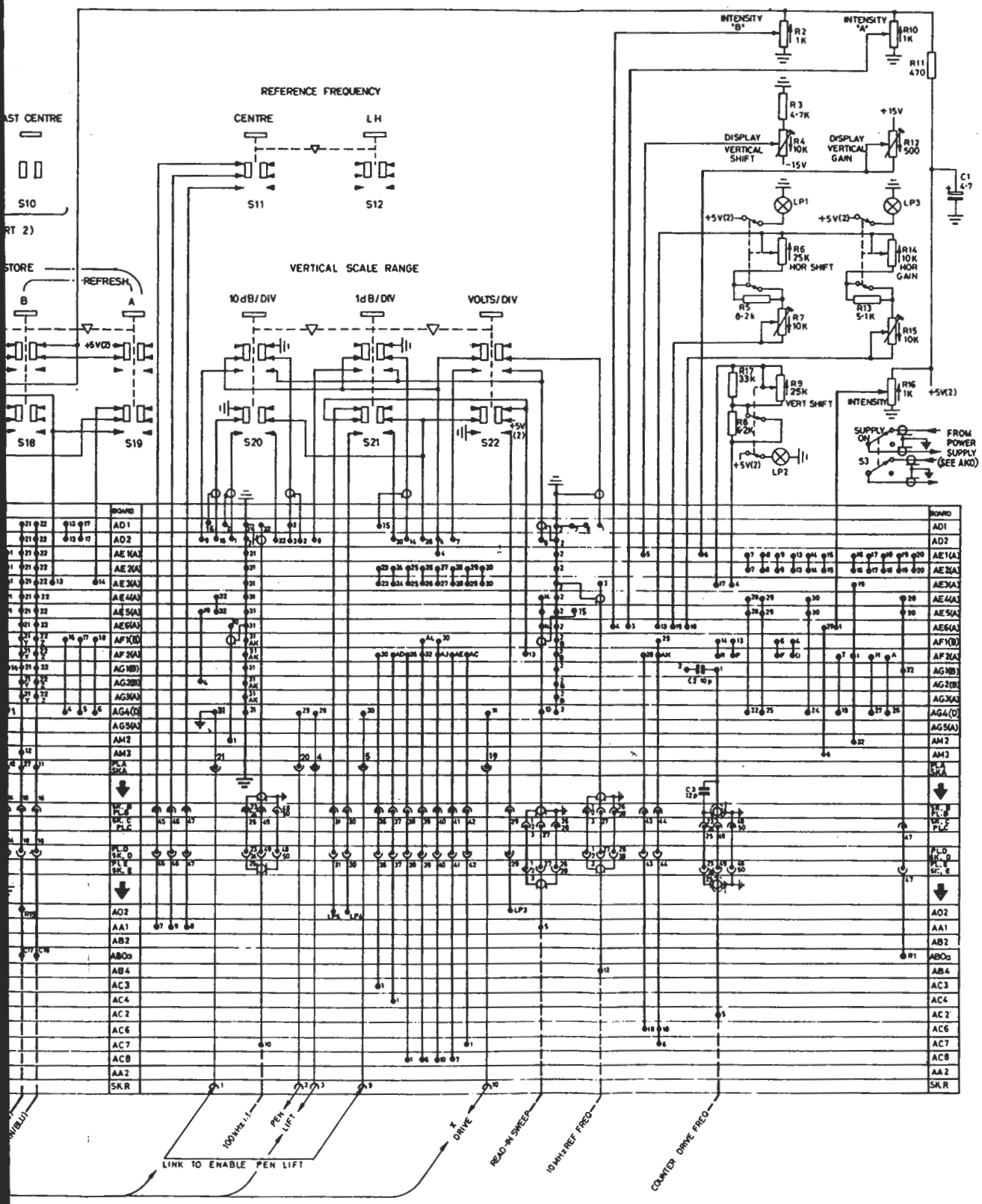
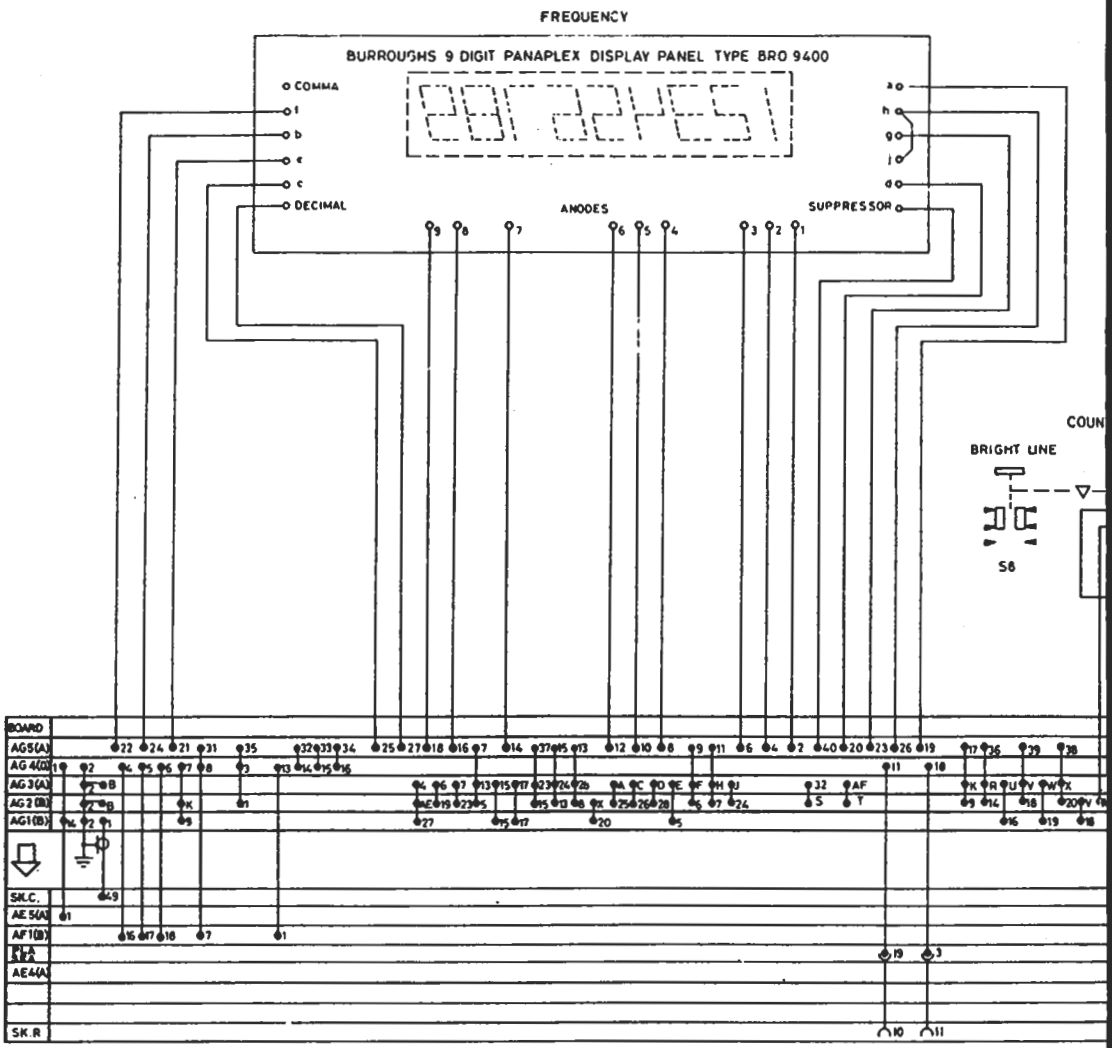


Fig. 7.1 Front panel wiring A01 (part 1)



PL.A WIRING CONNECTIONS

Pin no.	Destination.
1.	Braid of co-ax from pin 25 on AM2.
2.	
3.	Lead to pin 18 on AG4(D)
4.	Lead to pin 28 on AG4(D)
5.	Lead to pin 30 on AG4(D)
6.	
7.	+80V (Red/Green) to:- Pin 8 of AM2 and pin 8 of AM3.
8.	+15V (Red/Orange) to:- (a) Pin 11 on AD1, AD2, AE1(A), AE2(A), AE3(A), AE4(A), AE5(A), AE6(A), AG1(B) & pins 11 & M on AF1(B), AF2(A), AG2(B) & AG3(A). (b) Pin 6 on AM2 and pin 22 on AM3. (c) Pin 6 on SK. B.
9.	+5V(2) (Red/Black with red sleeve) to:- (a) Pin 12 on AD1, AD2, AE1(A), AE2(A), AE3(A), AE4(A), AE5(A), AE6(A). (b) All upper front panel connections (see A01 Part 1.) (c) Pin 12 on SK.B.
10.	+5V(1) (Red/Black with brown sleeve) to;- (a) Pin 12 & N on AF1(B), AF2(A), AG2(B) & AG3(A) and Pin 12 on AG1(B) & AG4(D). (b) Pin 16 on SK. B.

Pin no.	Destination.
11.	-6V (Blue/Brown) to:- (a) Pin 22 on AD1, AD2, AE1(A), AE2(A), AE3(A), AE4(A), AE5(A), AE6(A), AG1(B) & pin 22 & Z on AF1(B), AF2(A) AG2(B) & AG3(A). (b) Pin 16 on SK. B.
12.	Earth.
13.	Lead to c.r.t. heater.
14.	
15.	Mains supply lead (see details on AK0)
16.	Mains supply lead (see details on AK0)
17.	Inner of co-ax from pin 26 of AM2
18.	
19.	Lead to pin 11 on AG4(D)
20.	Lead to pin 29 on AG4(D)
21.	Lead to pin 31 on AG4(D)
22.	+200V to pin 28 of AG5(A) [RED]
23.	+30V (Red/White) to:- (a) Pin 20 of AM2 and pin 20 of AM3 (b) Pin 4 on SK.B.
24.	+6V (Red/Brown) to:- (a) Pin 10 on AD1, AD2, AE1(A), AE2(A), AE3(A), AE4(A), AE5(A), AE6(A), AG1(B) & pin 10 & L on AF1(B), AF2(A), AG2(B) & AG3(A). (b) Pin 8 on SK.B., (c) R1 on A01 (Part 1)

Pin no.
25.
26.
27.
28.
29.
30
31.
32

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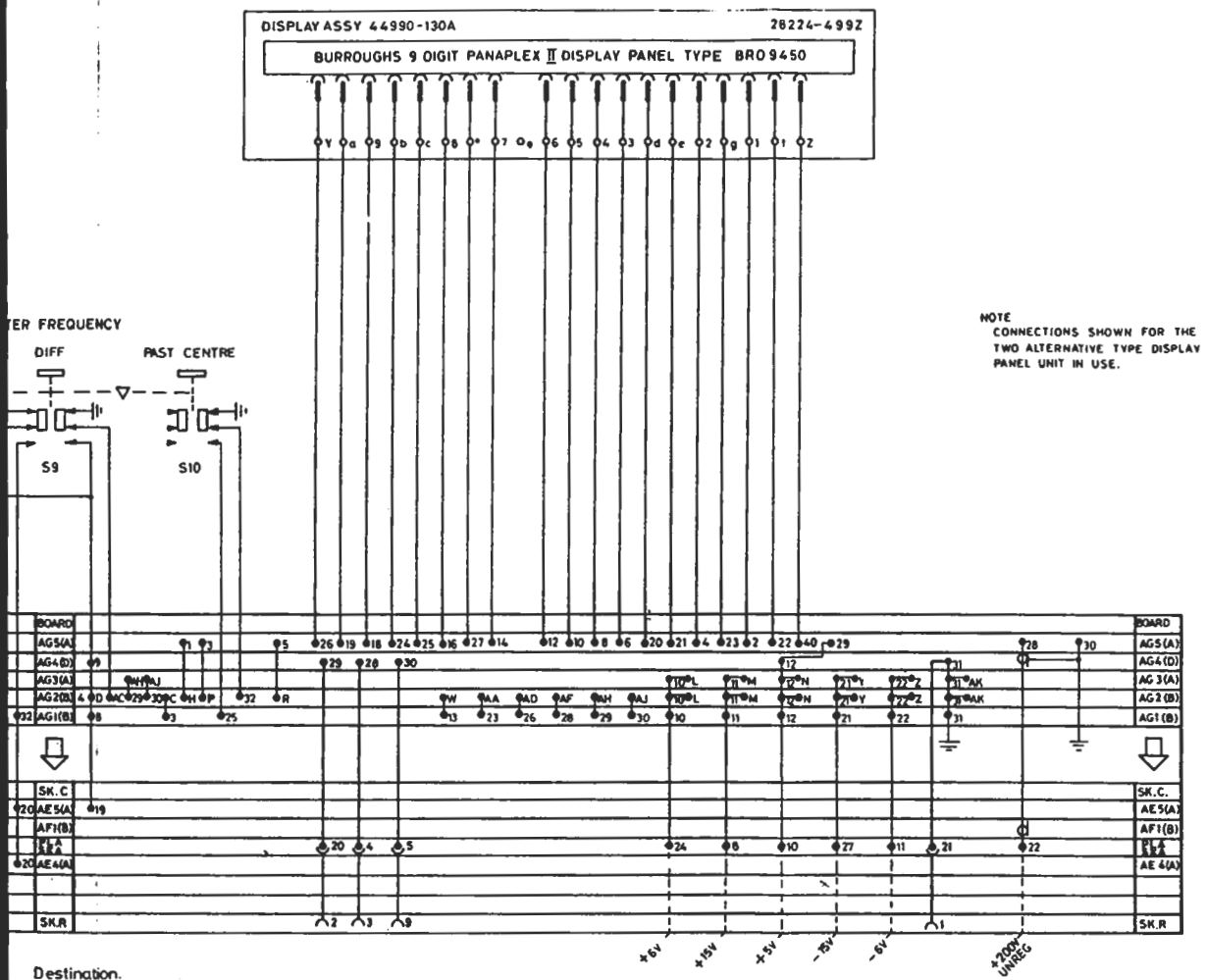
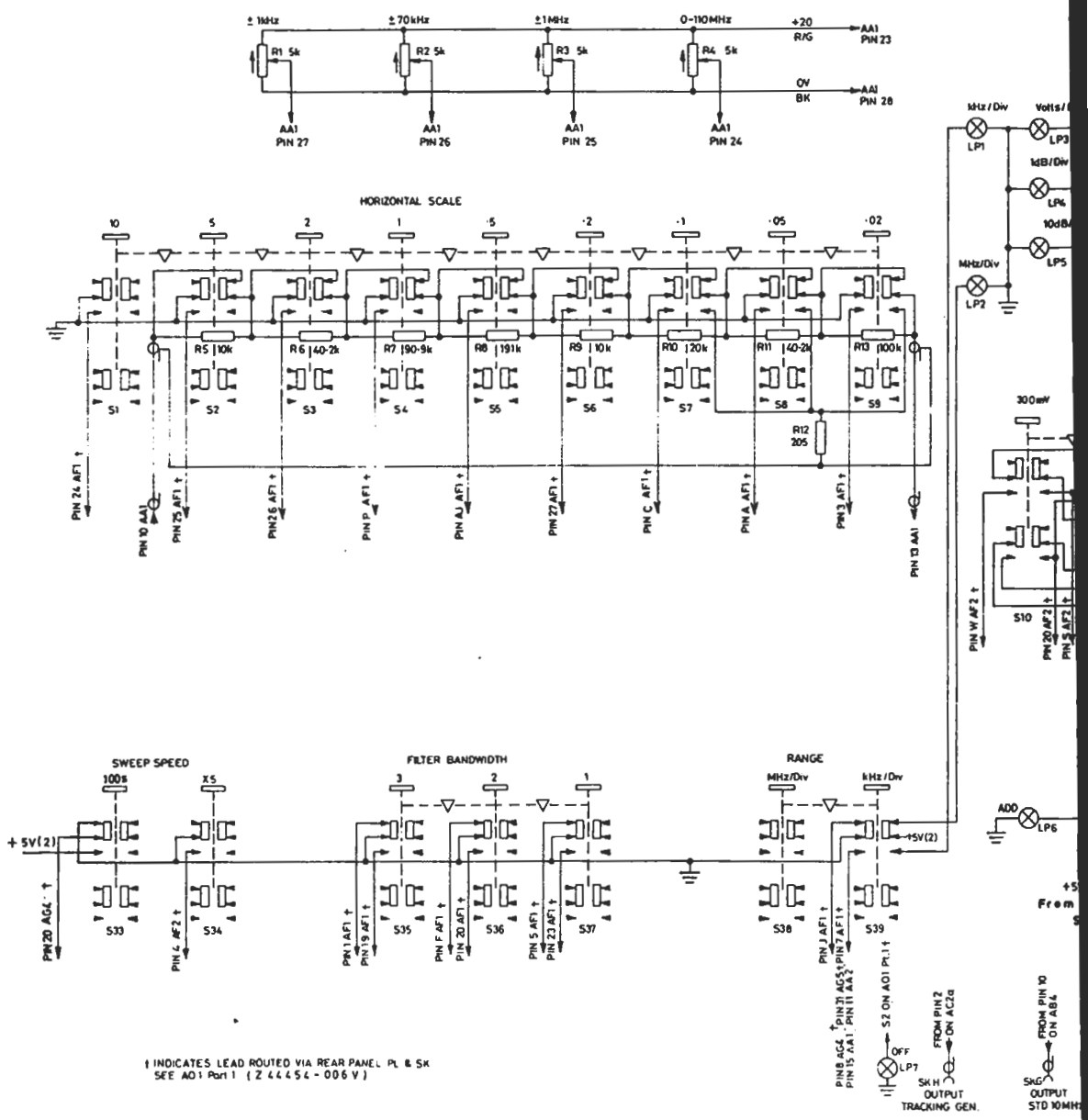


Destination.

+5V(2)connected to pin9.
+5V(1)connected to pin 10.
-15V (Blue/Orange) to:-
(a) Pin 21 on AD1, AD2, AE1(A), AE2(A), AE3(A), AE4(A), AE5(A), AE6(A), AG1(B) & pin 21 & Y on AF1(B), AF2(A), AG2(B) & AG3(A).
(b)Pin 12 on AM3.
(c)R 4 on AD1 (Part 1)
(d)Pin 18 on SK B.
Earth, connected to pin 12.
Lead to c.r.t. heater

Mains supply lead (see details on AK0)
Mains supply lead (see details on AK0)

Fig. 7.2 Upper front panel wiring A01 (part 2)



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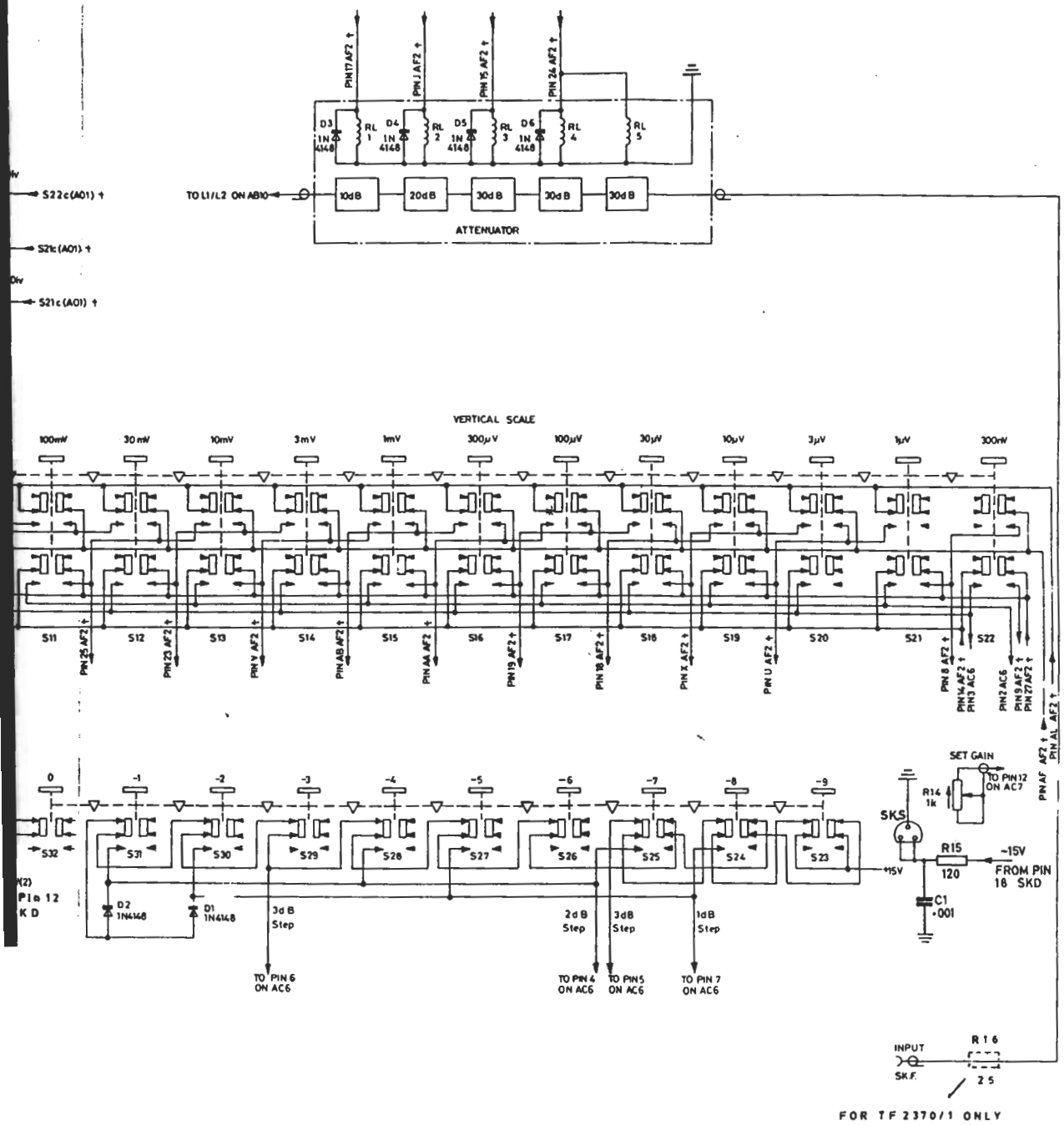
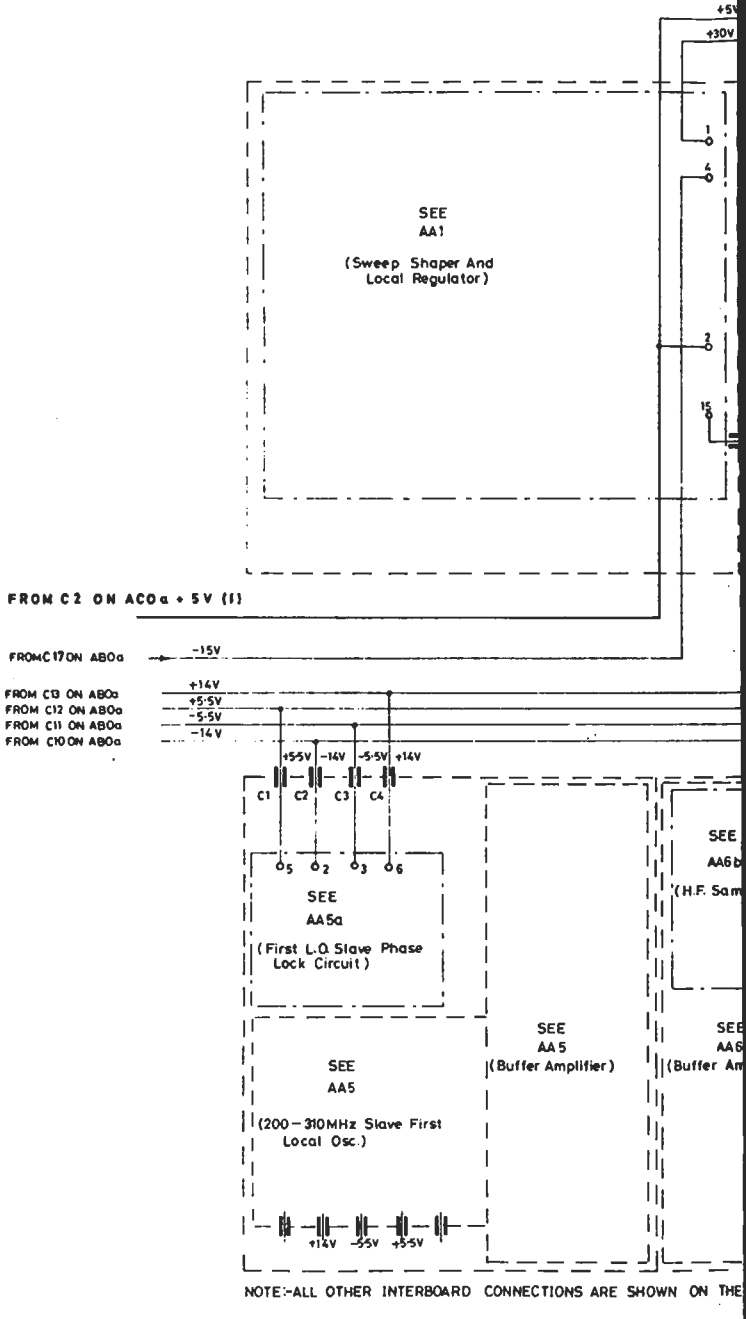


Fig. 7.3 Lower control panel A02



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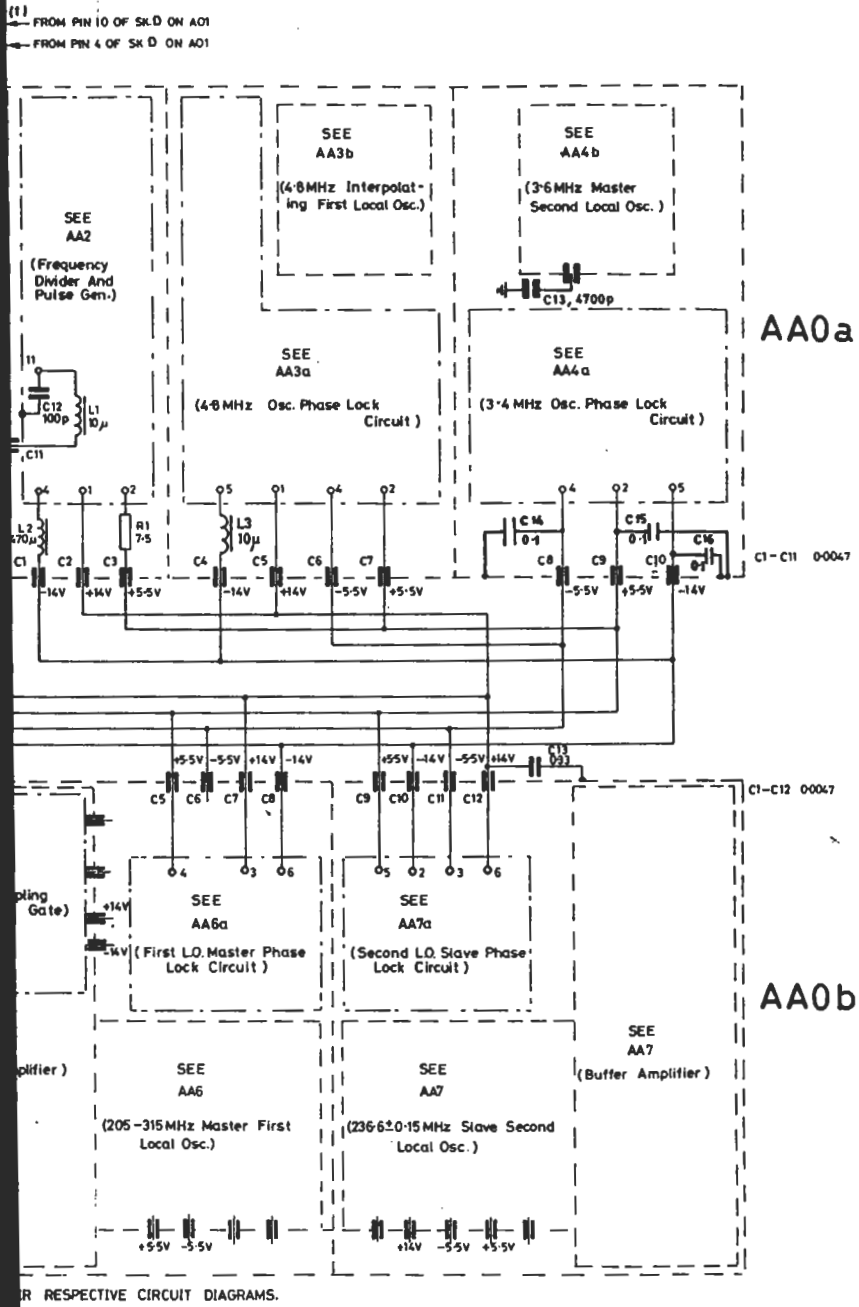
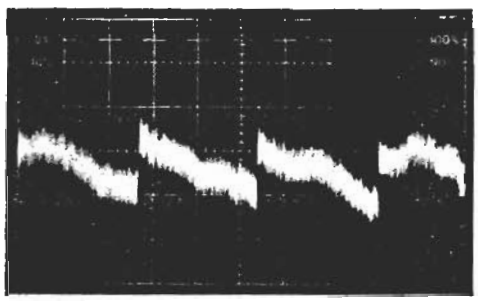
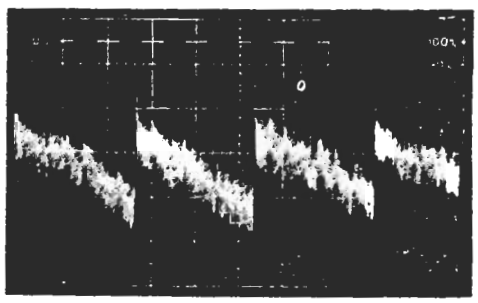
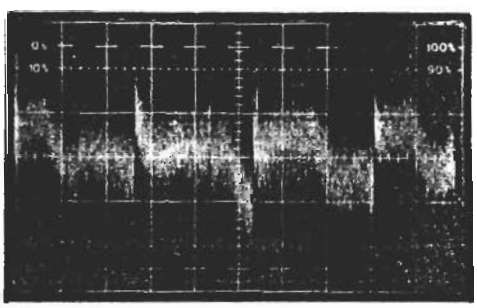
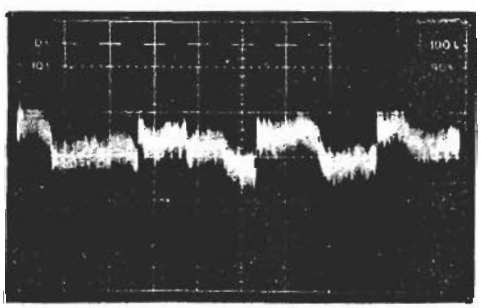
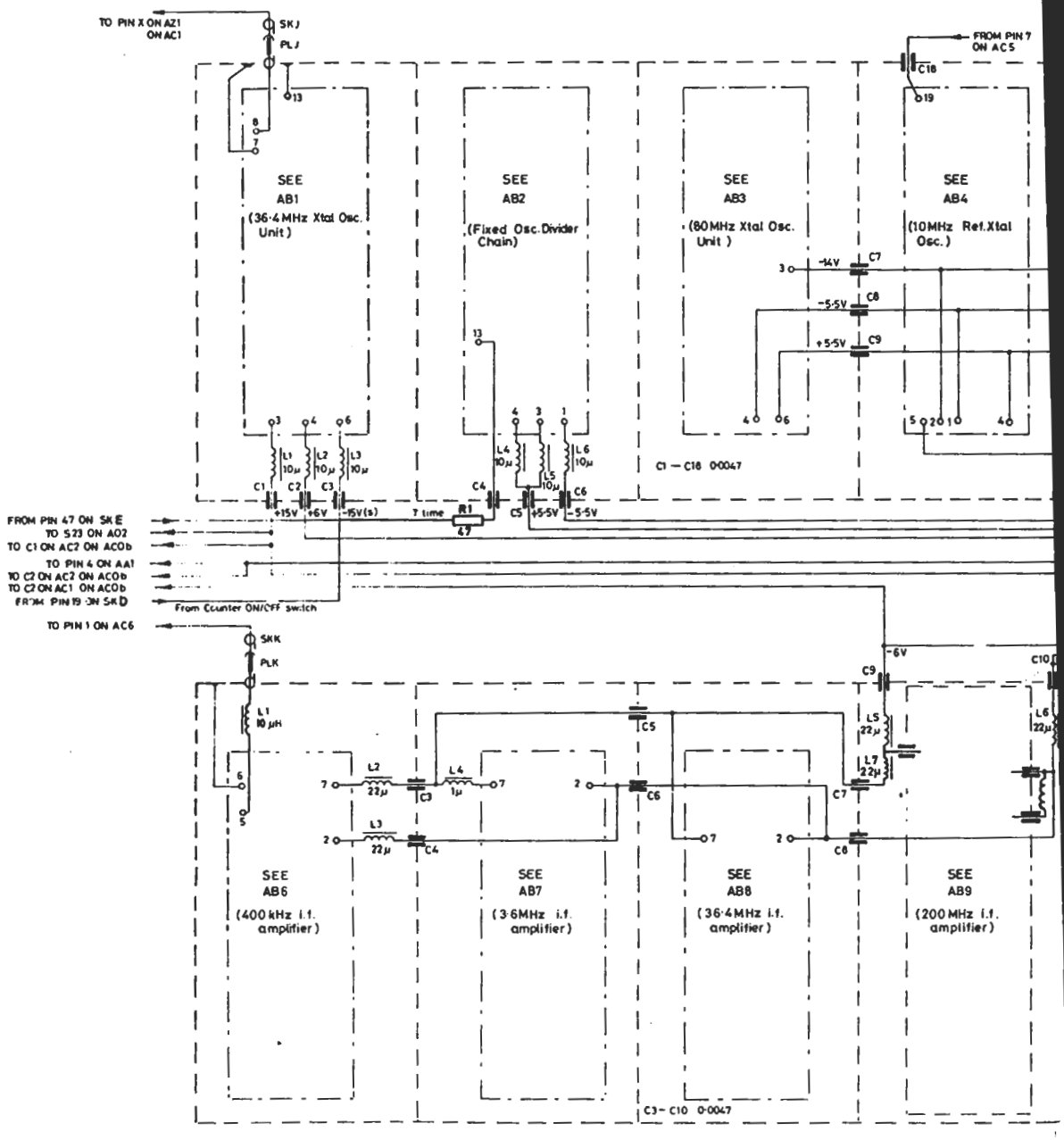


Fig. 7.4 AA tray interconnections

Waveforms for AB5

TF 2370 controls - HORIZONTAL SCALE and RANGE : 10 MHz/DIV
FILTER BANDWIDTH : WIDE
COUNTER ON/OFF : ON

Horizontal scale	*Vertical scale*	*Datum level*	
5 ms/div	50 mV/div	3 V →	 1
5 ms/div	50 mV/div	1.7 V →	 2
5 ms/div	50 mV/div	-0.5 V →	 3
5 ms/div	50 mV/div	-1 V →	 4



NOTE:- ALL OTHER INTERBOARD CONNECTIONS ARE SHOWN ON THEIR RESPECTIVE CIRCUIT DIAGRAMS.

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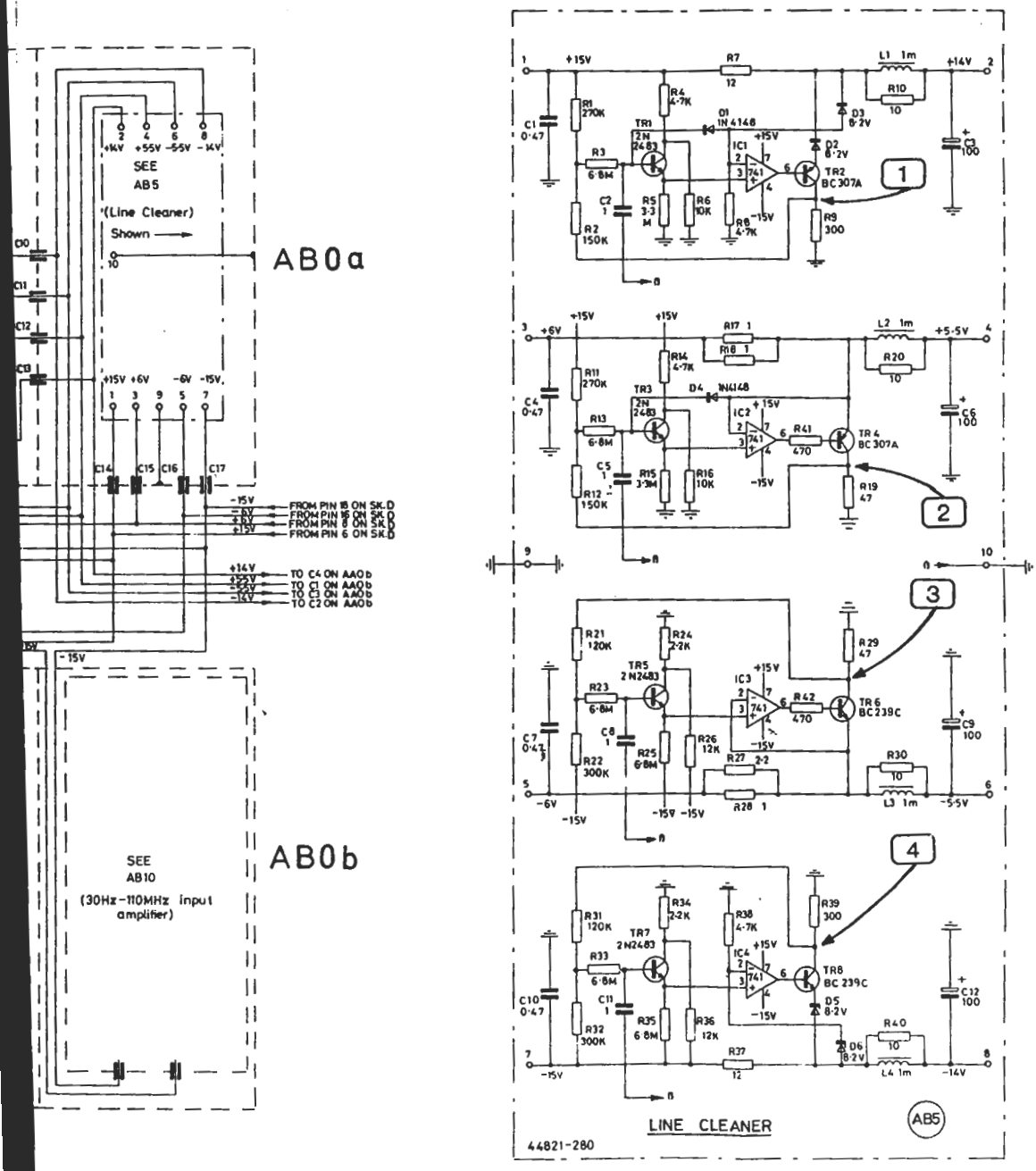
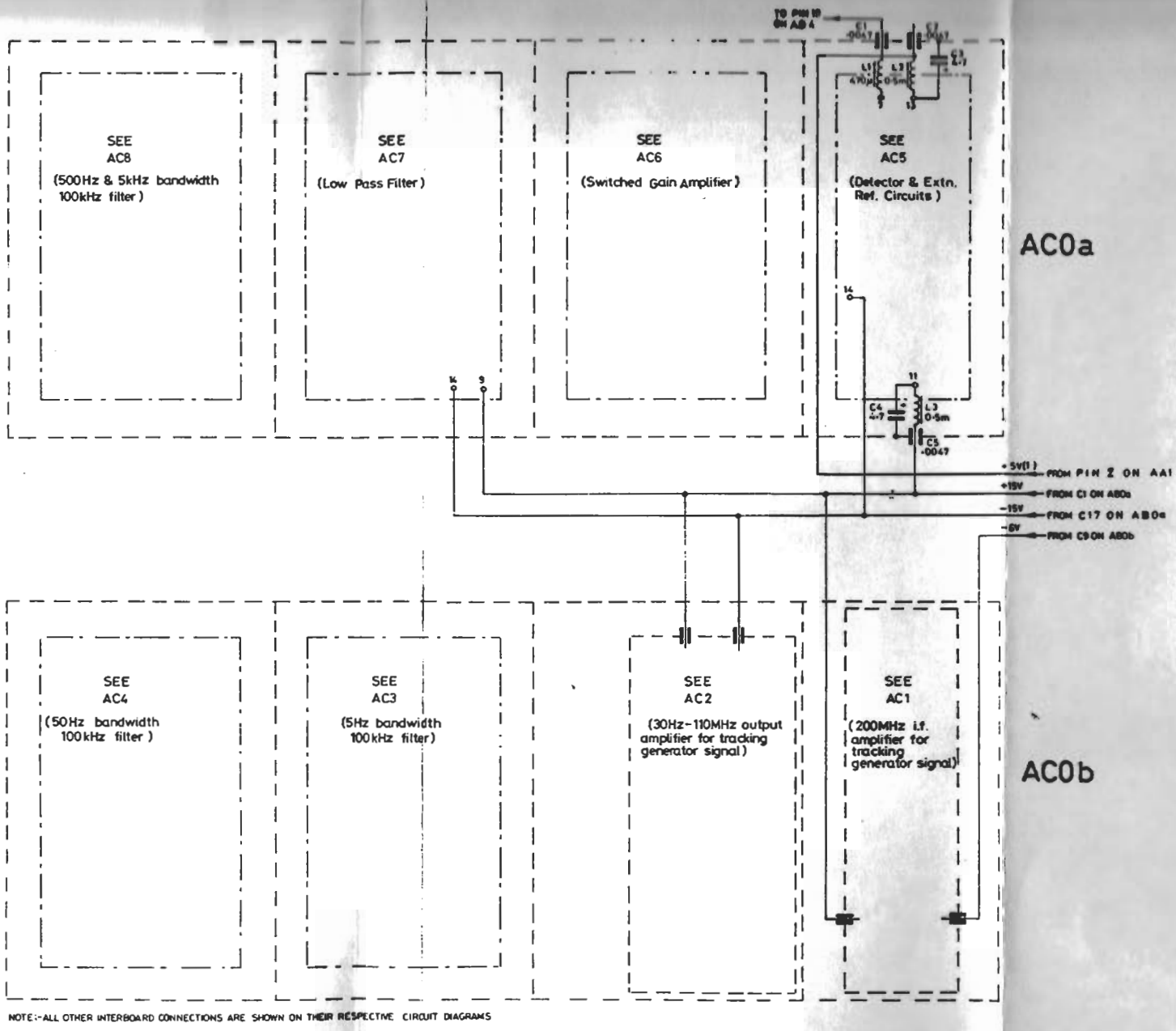
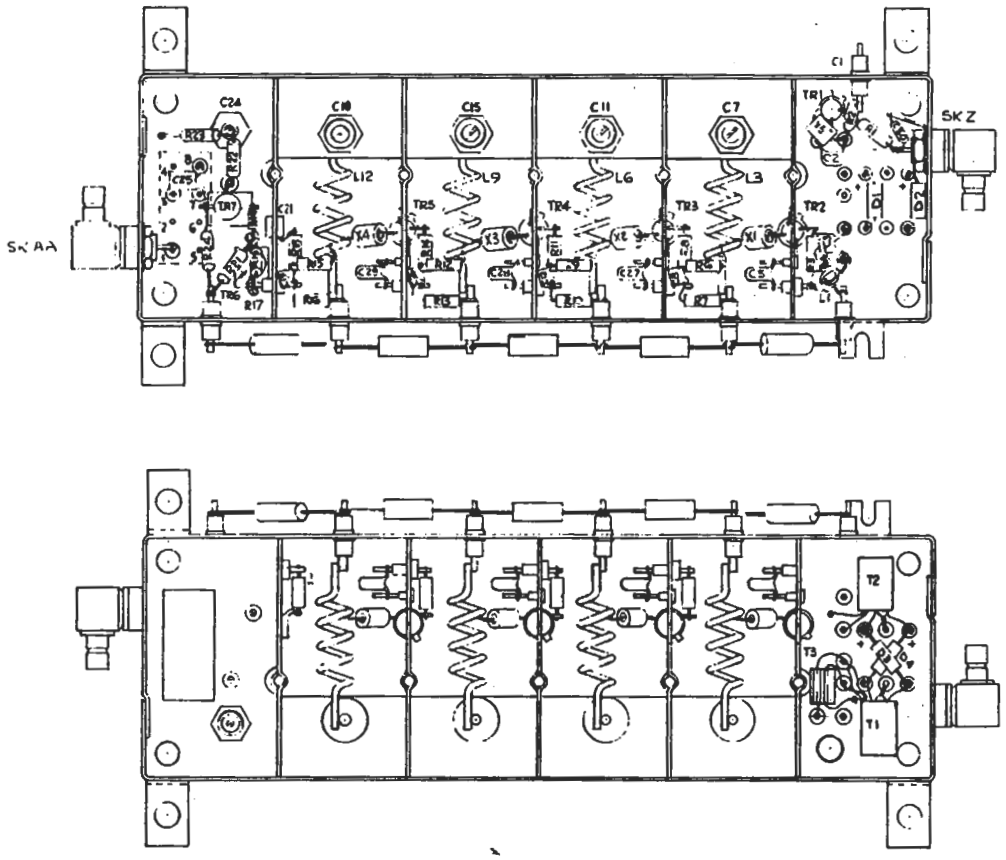


Fig. 7.5 AB tray interconnections and line cleaners AB5

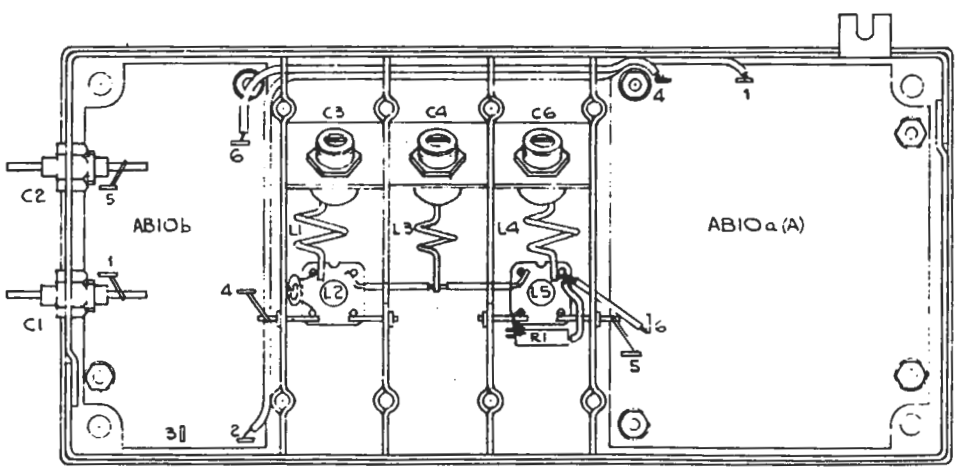


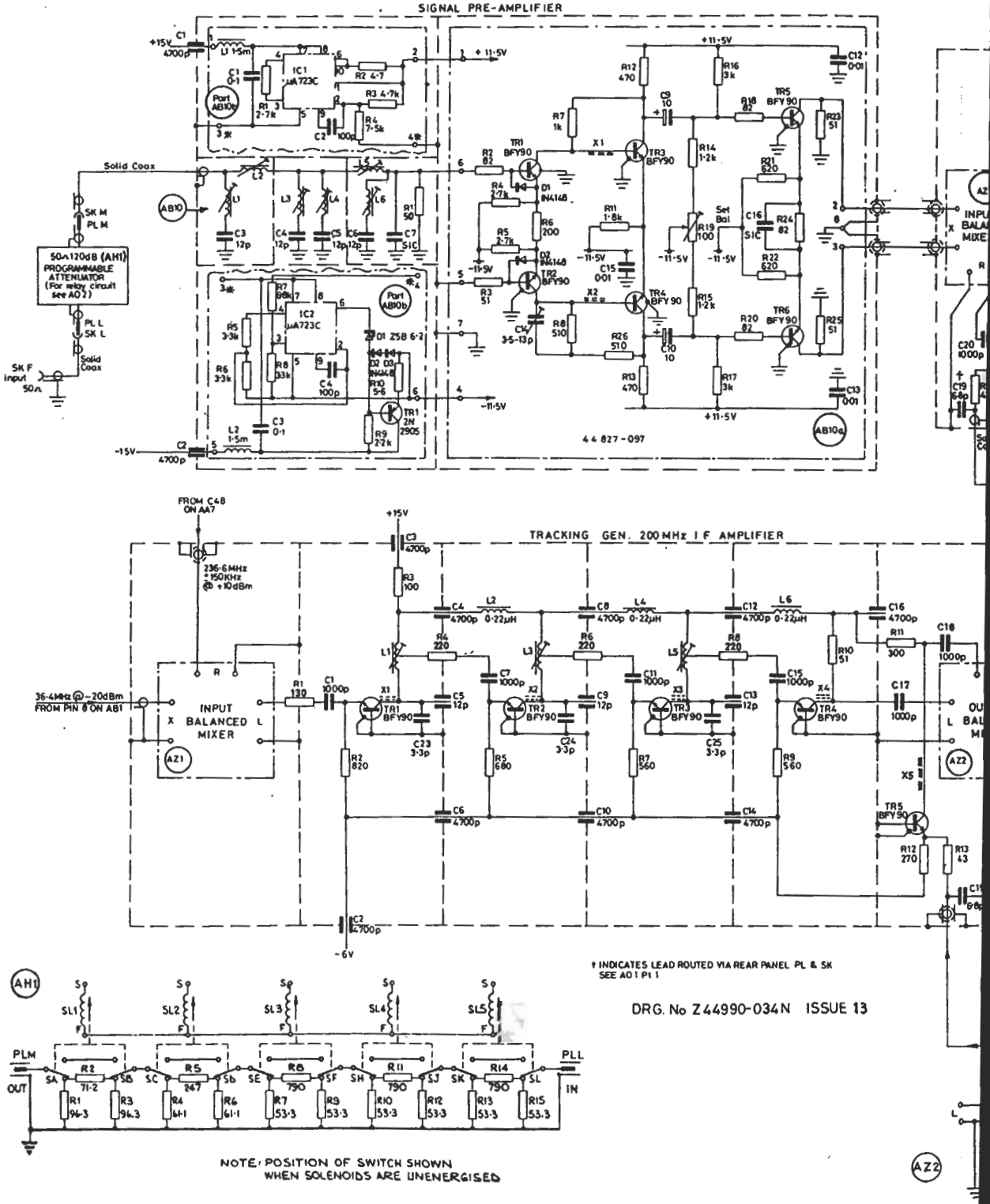
NOTE:-ALL OTHER INTERBOARD CONNECTIONS ARE SHOWN ON THEIR RESPECTIVE CIRCUIT DIAGRAMS

Layout of AB9



Layout of AB10 a





NOTE : SOME SCREW CORES ARE SEALED WITH WAX AND IF ADJUSTMENT IS NEEDED, TO AVOID DAMAGE TO THE CORE, IT IS NECESSARY TO REMOVE THE WAX.

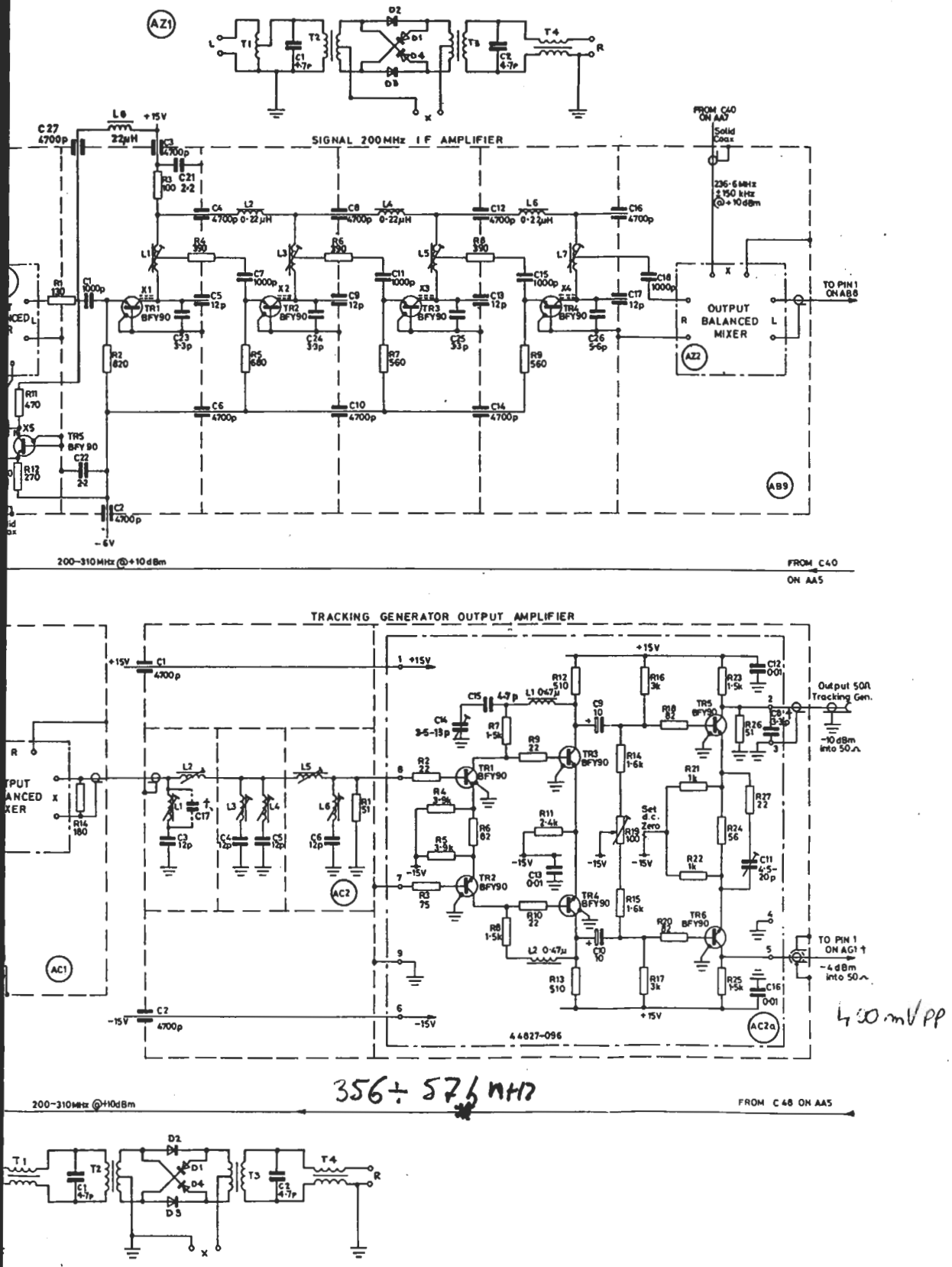
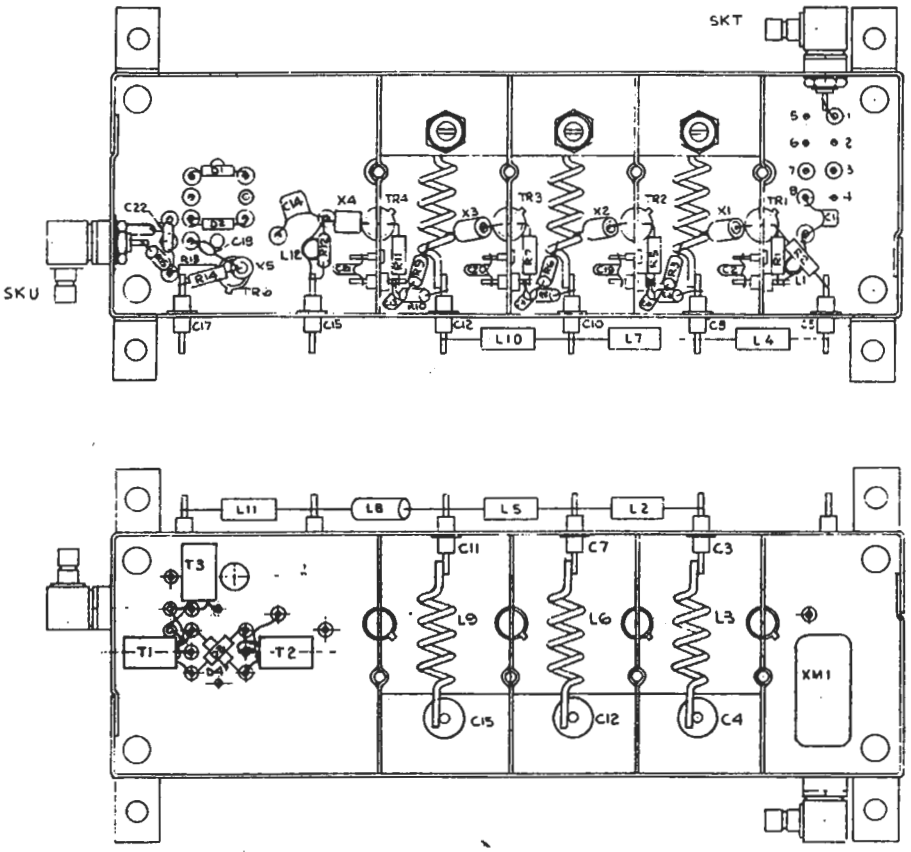
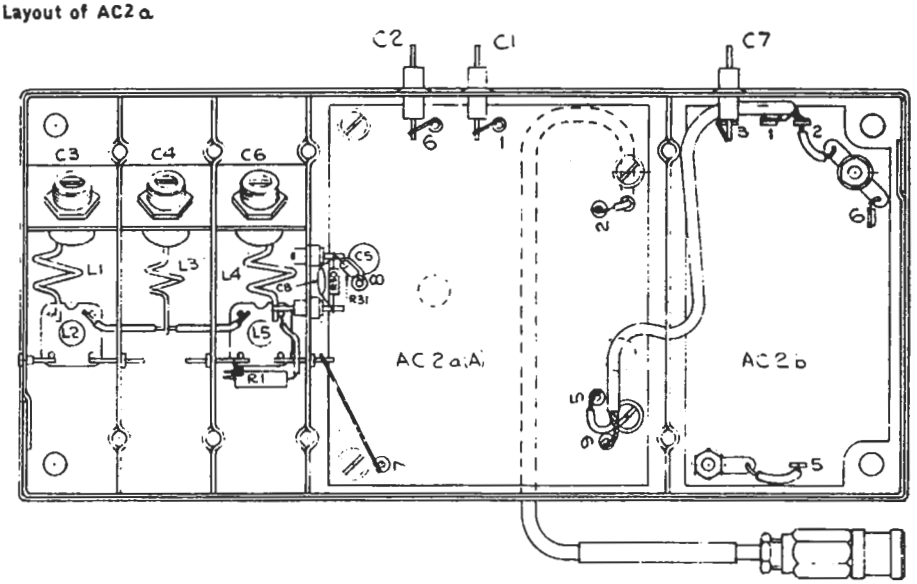


Fig. 7.7 Circuits: AB9, AB10, AC1, AC2 and AH1

Layout of AC1



Layout of AC2a

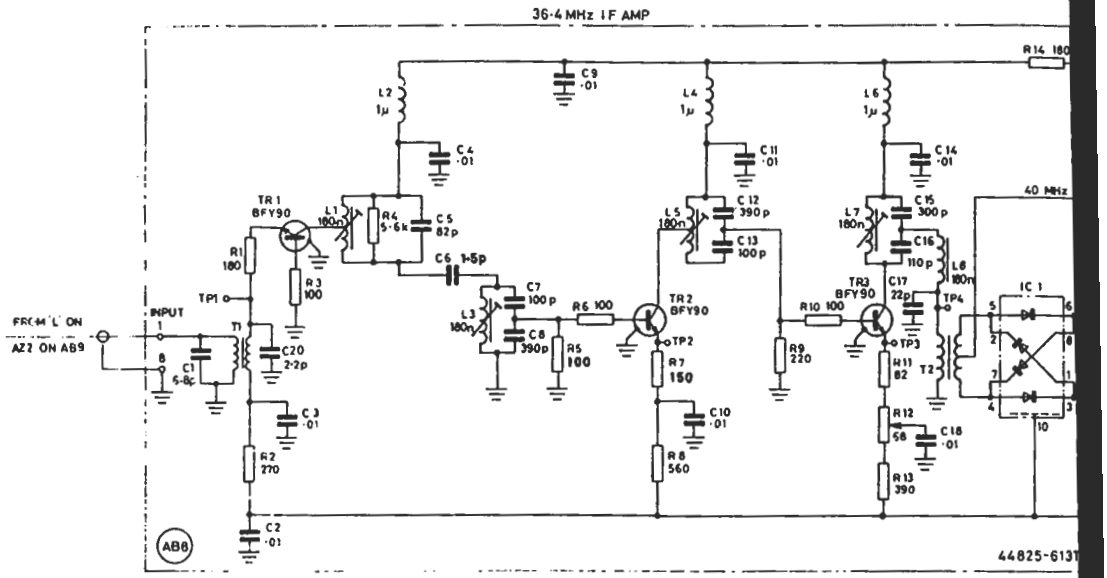


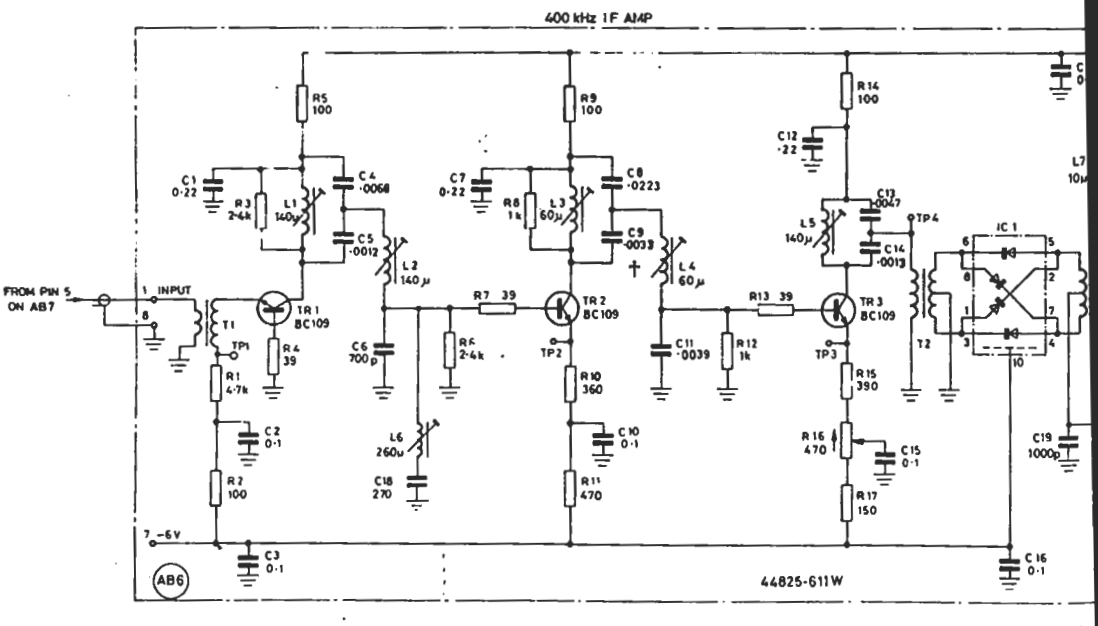
CALIBRATION TABLE

Valid for top of screen signal levels displayed on the 10 dB/DIV position using MANUAL mode.

Input sensitivity for top of screen	Input attenuator setting	Signal level from attenuator	Input amp & 360 MHz i.f. amp gain	Signal level at pin 1 of AB8, AB7, AB6 & AC6*	Gain from pin 1 to TP2 on AC6	Signal level at TP 2 on AC6*	Gain from TP2 to TP6 on AC6	Gain from TP6 on AC6 to pin 10 of AC7	Signal level at pin 32 on AD1*	DC level at pin 4 of AD2	Filter bandwidth selected
+30 dBm	80dB	-50dBm	+13dB	-37dBm(9mV)	x7.1 (+17dB)	64mV	0dB	40dB	6.4V	+2V d.c.	5Hz
	70dB	-40dBm		-27dBm(28.5mV)		200mV	0dB	30dB			50Hz
	60dB	-30dBm		-17dBm(90mV)		640mV	0dB	20dB			500Hz
	60dB	-30dBm		-17dBm(90mV)		640mV	10dB	10dB			5kHz
	60dB	-30dBm		-17dBm(90mV)		640mV	17dB	3dB			50kHz
+20 dBm	70dB	-50dBm	+13dB	-37dBm(9mV)	x7.1 (+17dB)	64mV	0dB	40dB	6.4V	+2V d.c.	5Hz
	60dB	-40dBm		-27dBm(28.5mV)		200mV	0dB	30dB			50Hz
	50dB	-30dBm		-17dBm(90mV)		640mV	0dB	20dB			500Hz
	50dB	-30dBm		-17dBm(90mV)		640mV	10dB	10dB			5kHz
	50dB	-30dBm		-17dBm(90mV)		640mV	17dB	3dB			50kHz
+10 dBm	60dB	-50dBm	+13dB	-37dBm(9mV)	x7.1 (+17dB)	64mV	0dB	40dB	6.4V	+2V d.c.	5Hz
	50dB	-40dBm		-27dBm(28.5mV)		200mV	0dB	30dB			50Hz
	40dB	-30dBm		-17dBm(90mV)		640mV	0dB	20dB			500Hz
	40dB	-30dBm		-17dBm(90mV)		640mV	10dB	10dB			5kHz
	40dB	-30dBm		-17dBm(90mV)		640mV	17dB	3dB			50kHz
0 dBm	50dB	-50dBm	+13dB	-37dBm(9mV)	x7.1 (+17dB)	64mV	0dB	40dB	6.4V	+2V d.c.	5Hz
	40dB	-40dBm		-27dBm(28.5mV)		200mV	0dB	30dB			50Hz
	30dB	-30dBm		-17dBm(90mV)		640mV	0dB	20dB			500Hz
	30dB	-30dBm		-17dBm(90mV)		640mV	10dB	10dB			5kHz
	30dB	-30dBm		-17dBm(90mV)		640mV	17dB	3dB			50kHz
-10 dBm	40dB	-50dBm	+13dB	-37dBm(9mV)	x7.1 (+17dB)	64mV	0dB	40dB	6.4V	+2V d.c.	5Hz
	30dB	-40dBm		-27dBm(28.5mV)		200mV	0dB	30dB			50Hz
	20dB	-30dBm		-17dBm(90mV)		640mV	0dB	20dB			500Hz
	20dB	-30dBm		-17dBm(90mV)		640mV	10dB	10dB			5kHz
	20dB	-30dBm		-17dBm(90mV)		640mV	17dB	3dB			50kHz
-20 dBm	30dB	-50dBm	+13dB	-37dBm(9mV)	x7.1 (+17dB)	64mV	0dB	40dB	6.4V	+2V d.c.	5Hz
	20dB	-40dBm		-27dBm(28.5mV)		200mV	0dB	30dB			50Hz
	10dB	-30dBm		-17dBm(90mV)		640mV	0dB	20dB			500Hz
	10dB	-30dBm		-17dBm(90mV)		640mV	10dB	10dB			5kHz
	10dB	-30dBm		-17dBm(90mV)		640mV	17dB	3dB			50kHz
-30 dBm	20dB	-50dBm	+13dB	-37dBm(9mV)	x7.1 (+17dB)	64mV	0dB	40dB	6.4V	+2V d.c.	5Hz
	10dB	-40dBm		-27dBm(28.5mV)		200mV	0dB	30dB			50Hz
	0dB	-30dBm		-17dBm(90mV)		640mV	0dB	20dB			500Hz
	0dB	-30dBm		-17dBm(90mV)		640mV	10dB	10dB			5kHz
	0dB	-30dBm		-17dBm(90mV)		640mV	17dB	3dB			50kHz
-40 dBm	10dB	-50dBm	+13dB	-37dBm(9mV)	x7.1 (+17dB)	64mV	0dB	40dB	6.4V	+2V d.c.	5Hz
	0dB	-40dBm		-27dBm(28.5mV)		200mV	0dB	30dB			50Hz
	0dB	-40dBm		-27dBm(28.5mV)		200mV	10dB	20dB			500Hz
	0dB	-40dBm		-27dBm(28.5mV)		200mV	20dB	10dB			5kHz
	0dB	-40dBm		-27dBm(28.5mV)		200mV	27dB	3dB			50kHz
-50 dBm	0dB	-50dBm	+13dB	-37dBm(9mV)	x7.1 (+17dB)	64mV	0dB	40dB	6.4V	+2V d.c.	5Hz
	0dB	-50dBm		-37dBm(9mV)		64mV	10dB	30dB			50Hz
	0dB	-50dBm		-37dBm(9mV)		64mV	20dB	20dB			500Hz
	0dB	-50dBm		-37dBm(9mV)		64mV	30dB	10dB			5kHz
	0dB	-50dBm		-37dBm(9mV)		64mV	37dB	3dB			50kHz

* Voltages are peak to peak values





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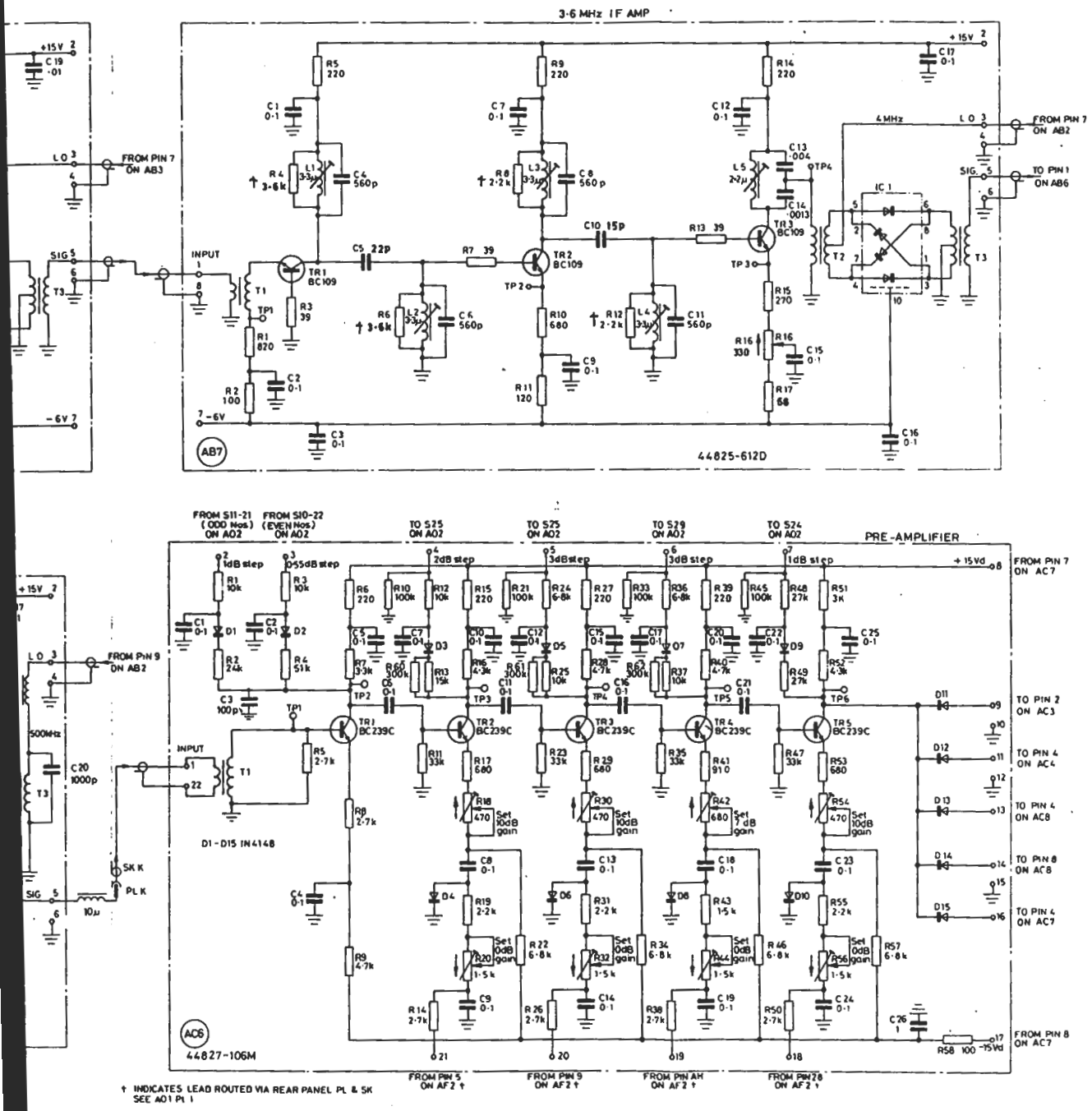
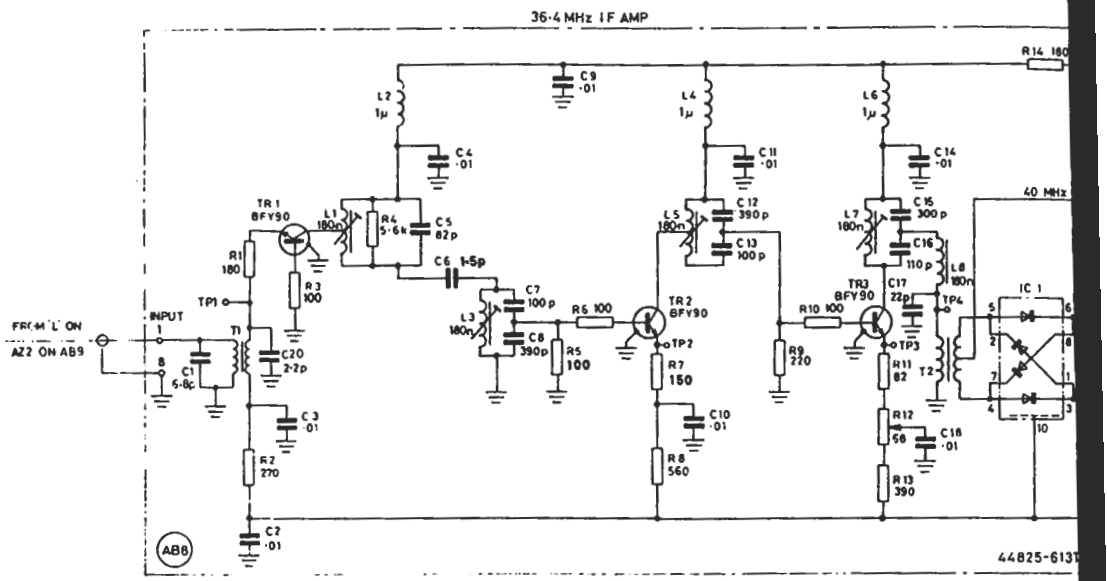
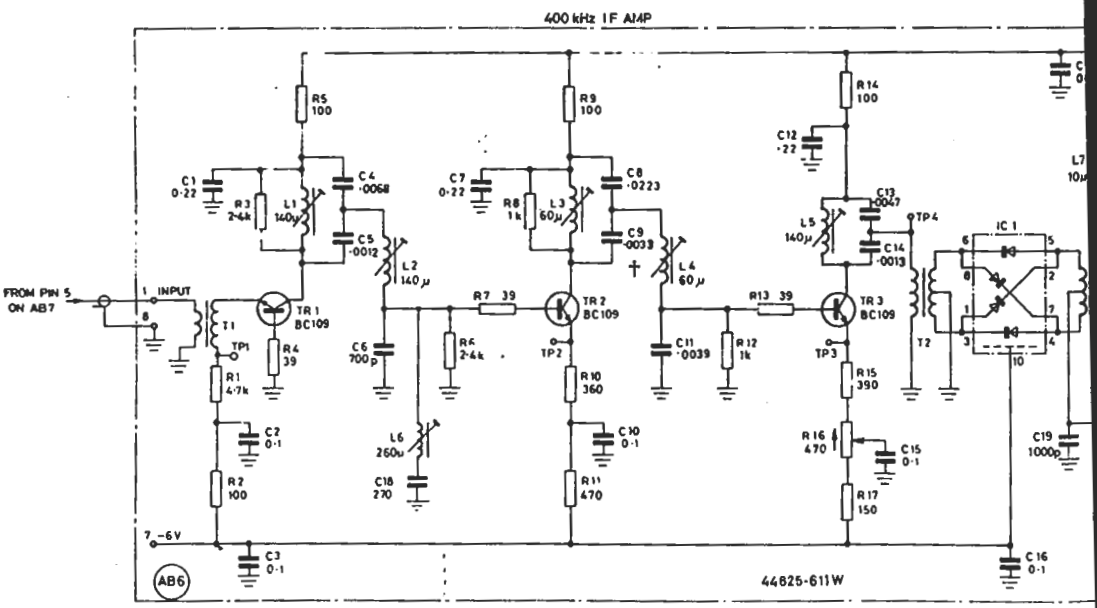


NOTE : SOME SCREW CORES ARE SEALED WITH WAX AND IF ADJUSTMENT IS NEEDED, TO AVOID DAMAGE TO THE CORE, IT IS NECESSARY TO REMOVE THE WAX.

Fig. 7.8 Circuits: AC6, AB6, AB7 and AB8





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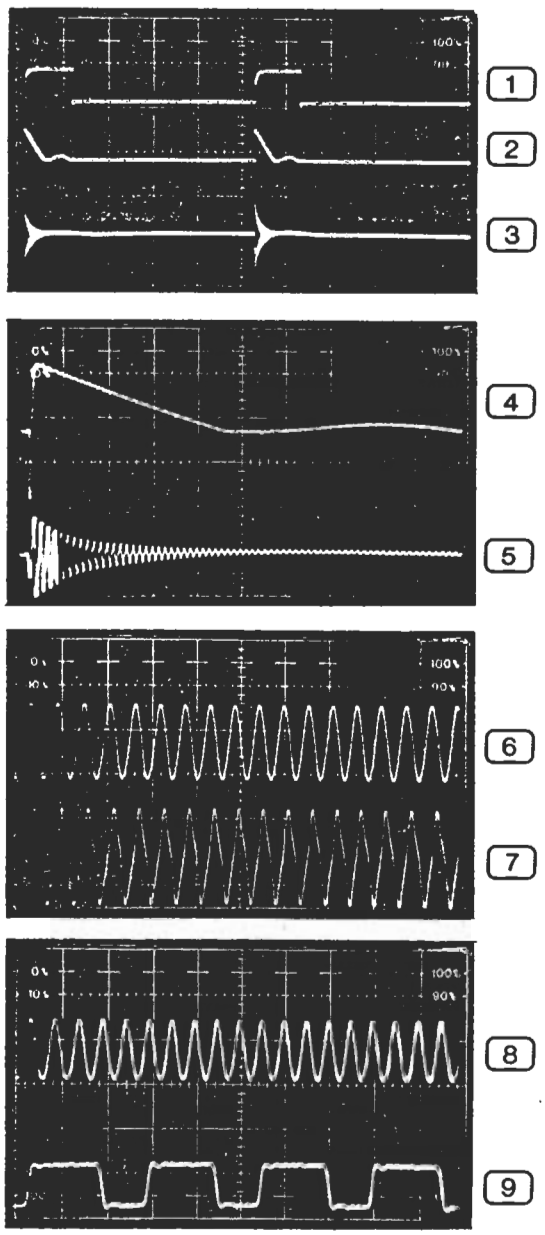
Waveforms for AB1, AB2, AB3 and AB4

Note Probe connections and earth leads should be as short as possible.

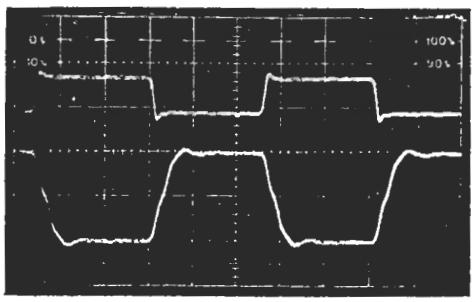
TF 2370 controls - HORIZONTAL SCALE and RANGE : 10 MHz/DIV
FILTER BANDWIDTH : WIDE
For (27), feed a 1 MHz 1 V p-p signal to the EXTERNAL STANDARD INPUT.
Oscilloscope triggering - (2) to (5) from (1) (a.c. positive)
(10) to (13) from (14) (a.c. positive)

Horizontal scale	*Vertical scale*	*Datum level*	
2 µs/div	5 V/div	0 V	1
2 µs/div	5 V/div	0 V →	2
2 µs/div	1 V/div	0 V →	3
0.2 µs/div	2 V/div	0 V →	4
0.2 µs/div	1 V/div	0 V →	5
50 ns/div	1 V/div	-11 V	6
50 ns/div	1 V/div	0 V →	7
50 ns/div	1 V/div	0 V →	8
50 ns/div	1 V/div	0 V →	9



10
11
12
13
NOT USED

50 ns/div 1 V/div 0 V →

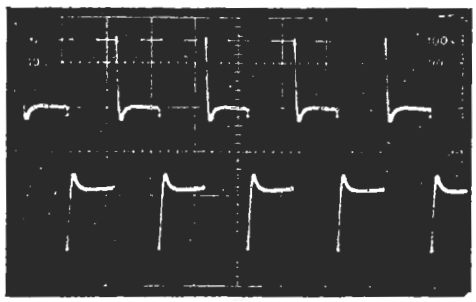


14

50 ns/div 1 V/div 0 V →

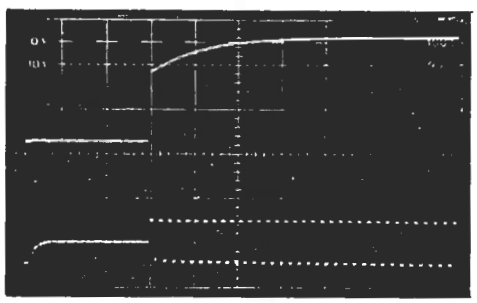
15

1 μs/div 1 V/div 0 V →



16

10 μs/div 1 V/div 0 V →

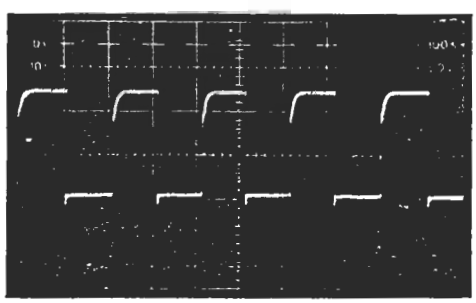


17

10 μs/div 1 V/div 0 V →

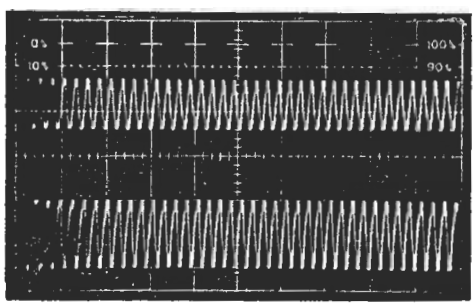
18

1 μs/div 2 V/div 0 V →



19

50 ns/div 1 V/div -9 V →

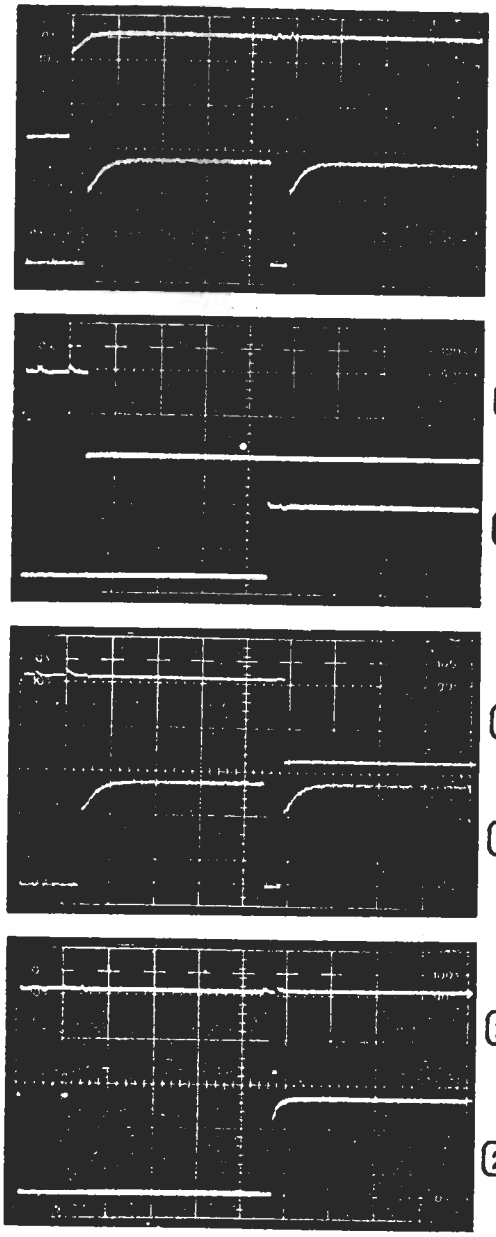


20

50 ns/div 1 V/div 4 V →

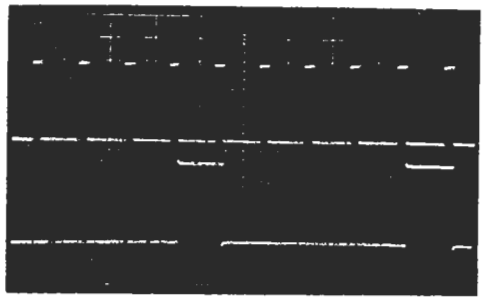
21

5 μs/div	2 V/div	17
5 μs/div	2 V/div	18
5 μs/div	2 V/div	19
5 μs/div	2 V/div	20
5 μs/div	2 V/div	21
5 μs/div	2 V/div	22
5 μs/div	2 V/div	23
5 μs/div	2 V/div	24



0.2 ms/div 2 V/div

0.2 ms/div 2 V/div

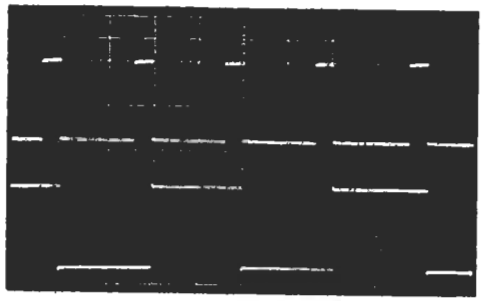


8

9

0.5 ms/div 2 V/div

0.5 ms/div 2 V/div

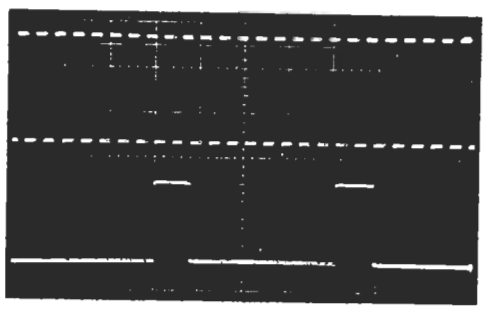


10

11

5 ms/div
50 ms/div
0.5 s/div
50 µs/div
0.5 ms/div

2 V/div



12

13

14

15

16

17

18

19

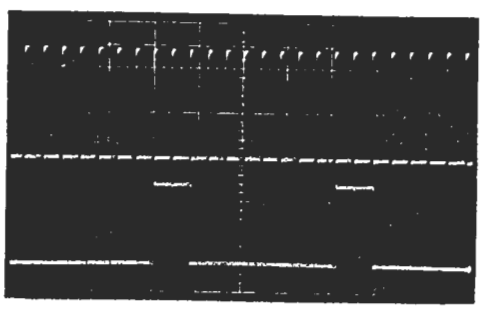
20

21

5 ms/div
50 ms/div
0.5 s/div
50 µs/div
0.5 ms/div

2 V/div

5 µs/div 2 V/div



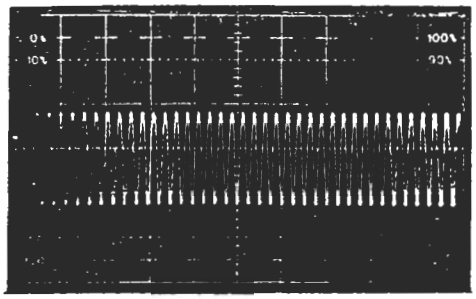
22

23

10 µs/div 2 V/div

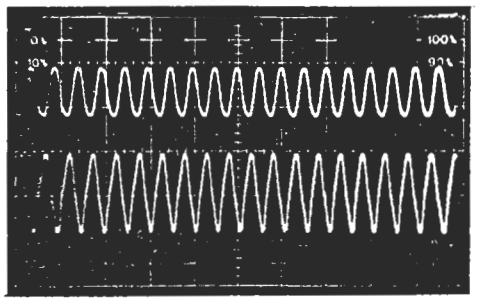
NOT USED

50 ns/div 0.5 V/div 3 V →



22

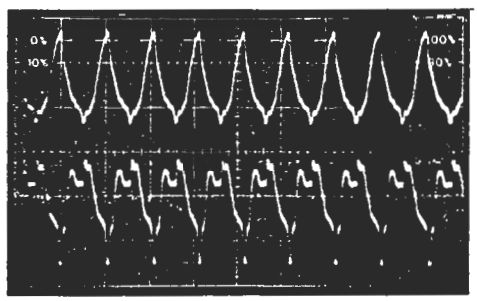
50 ns/div 1 V/div 0 V →



23

50 ns/div 1 V/div 0 V →

24



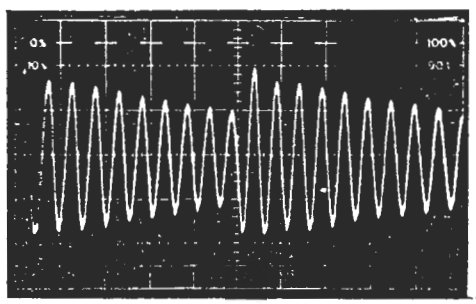
25

0.1 μs/div 0.2 V/div -2 V →

0.1 μs/div 0.2 V/div 0 V →

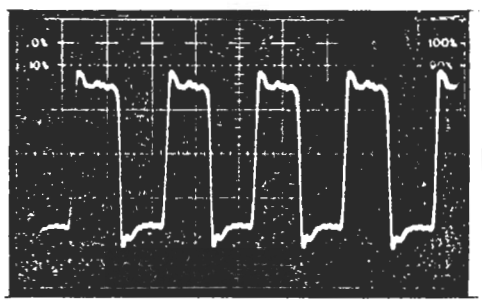
26

0.2 μs/div 0.1 V/div 0 V —



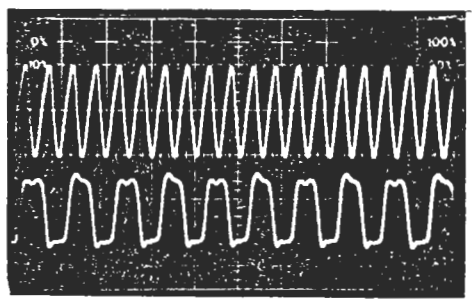
27

50 ns/div 0.2 V/div -3 V



28

50 ns/div 0.5 V/div -1 V →

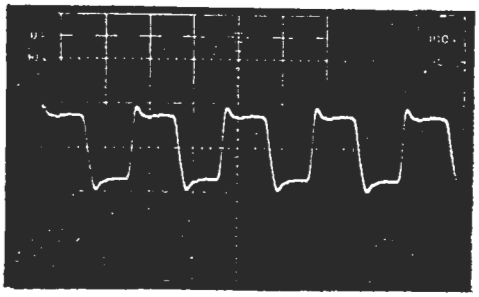


29

50 ns/div 0.5 V/div -1 V →

30

50 ns/div 0.5 V/div 0 V →

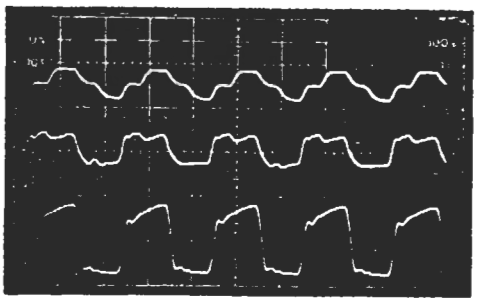


31

50 ns/div 0.5 V/div 0 V →

50 ns/div 0.5 V/div 0 V →

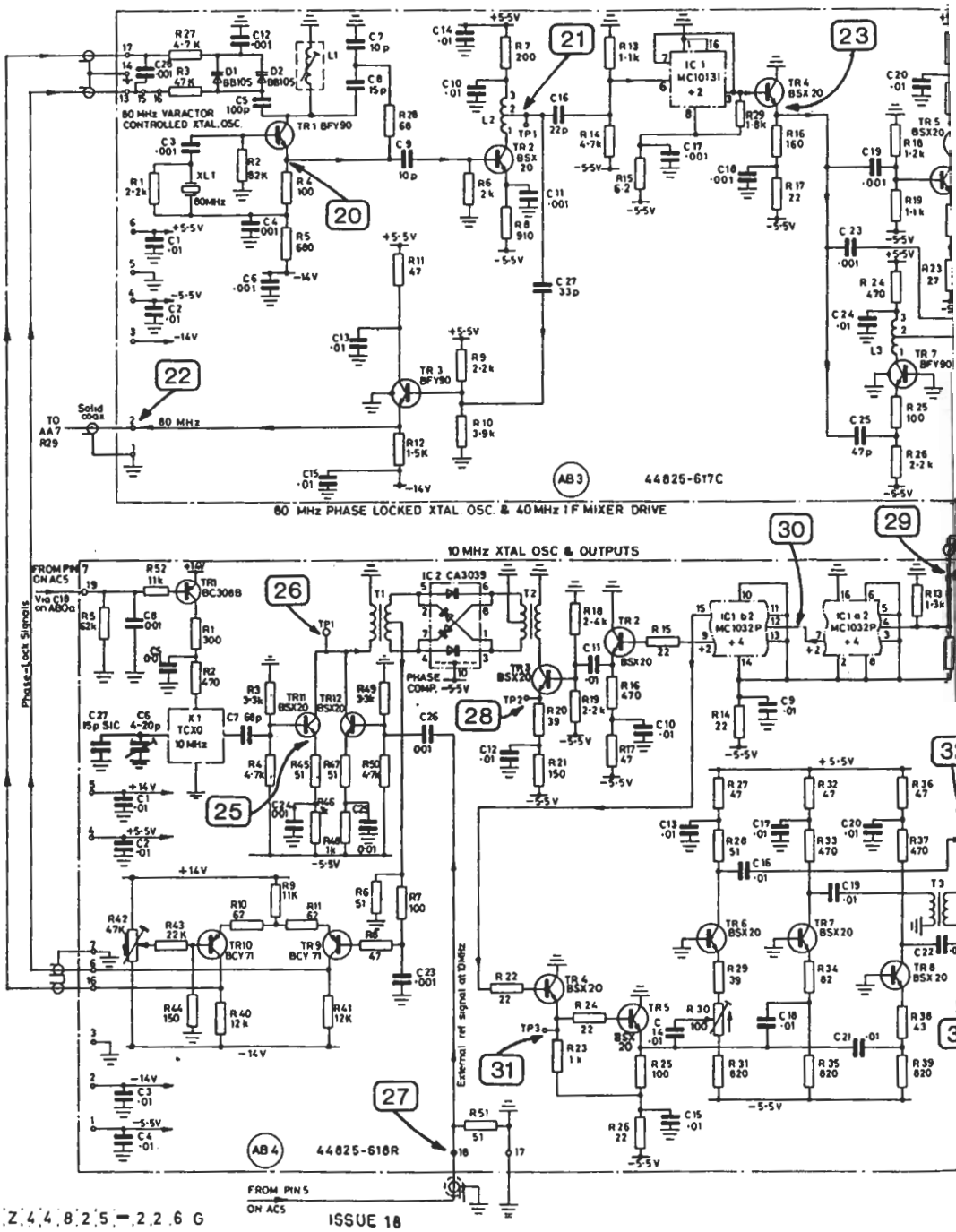
50 ns/div 0.5 V/div 0 V →



32

33

34



Z.4.4.8.2.5.-.2.2.6 G ISSUE 18

NOTE : SOME SCREW CORES ARE SEALE
WITH WAX AND IF ADJUSTMENT
NEEDED, TO AVOID DAMAGE TO
THE CORE, IT IS NECESSARY TO
REMOVE THE WAX.

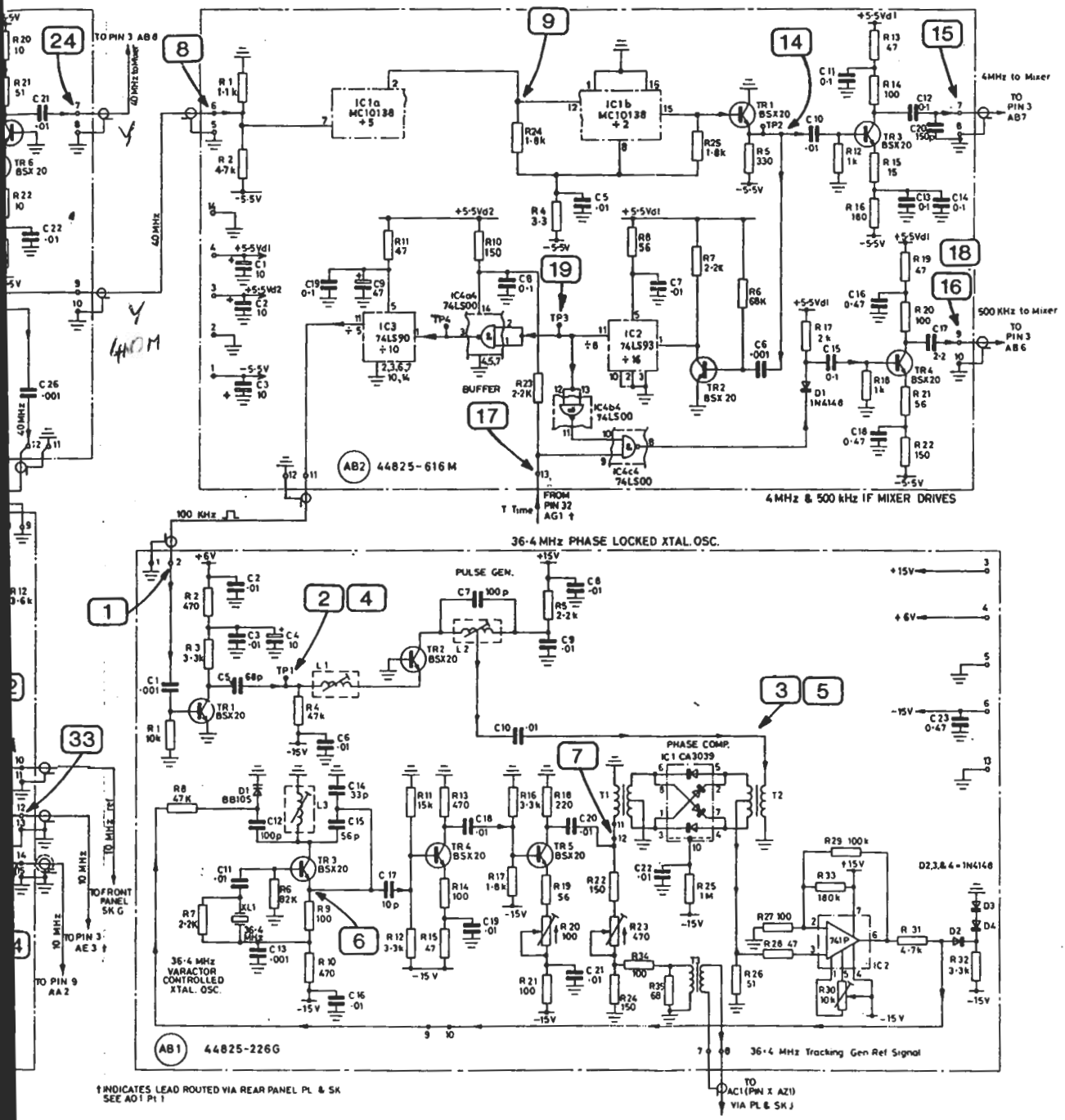


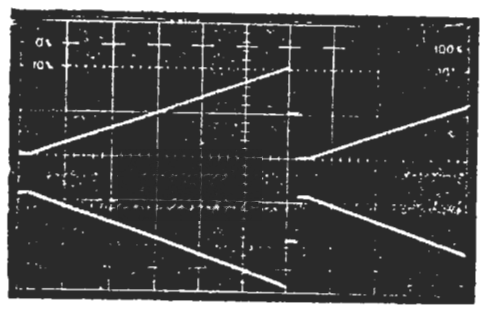
Fig. 7.9 Circuits: AB1, AB2, AB3 and AB4

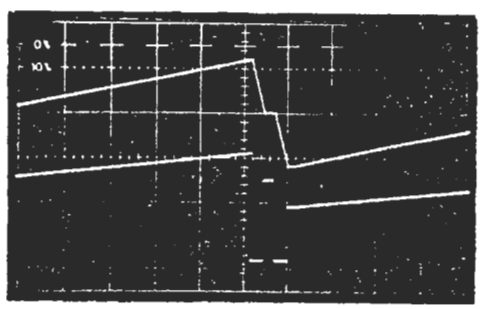
Waveforms for AA1

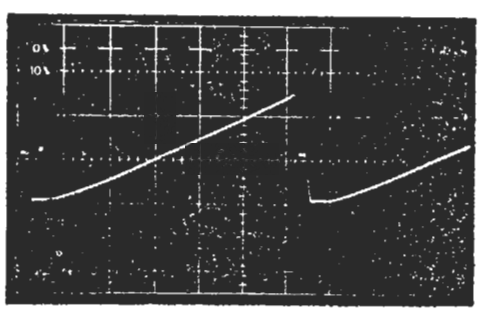
Note Probe connections and earth leads should be as short as possible.

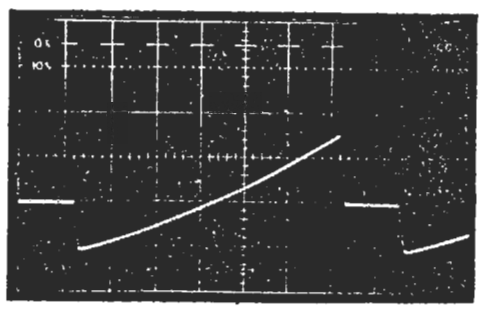
TF 2370 controls - SWEEP MODE : AUTO
HORIZONTAL SCALE and RANGE : (1) to (5) 10 MHz/DIV
(6) 10 kHz/DIV
FILTER BANDWIDTH : WIDE
REFERENCE FREQUENCY : (1) to (5) LH
(6) CENTRE
REFERENCE FREQUENCY 0-110 MHz : Fully counter-clockwise
REFERENCE FREQUENCY ±70 kHz : Fully counter-clockwise

Horizontal scale	*Vertical scale*	*Datum level*	
20 ms/div	5 V/div	0 V	1
20 ms/div	5 V/div	0 V	2
10 ms/div	5 V/div	0 V	3
10 ms/div	10 V/div	0 V	4
20 ms/div	5 V/div	0 V	5
20 ms/div	1 V/div	0 V	6

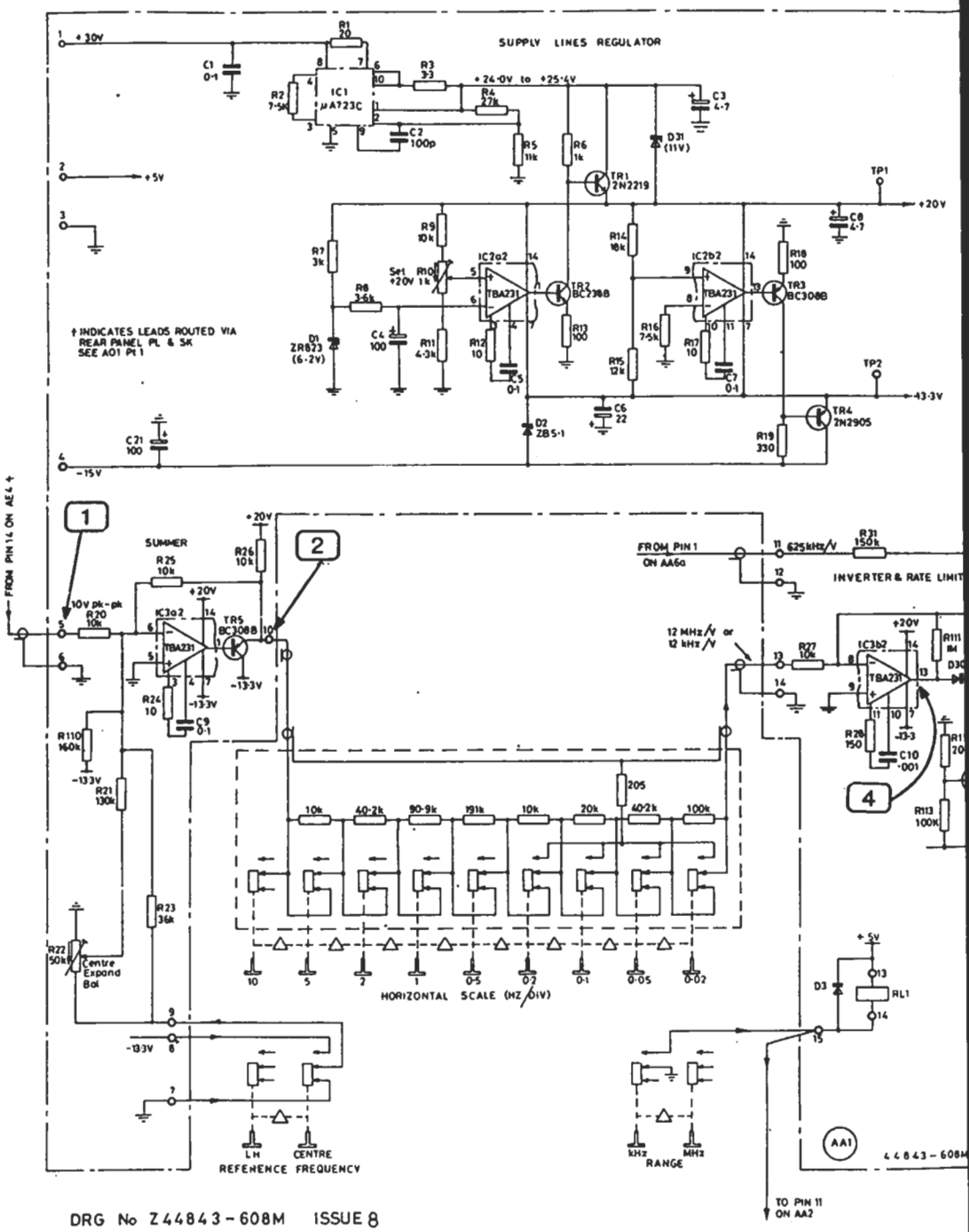








:kwise
ise



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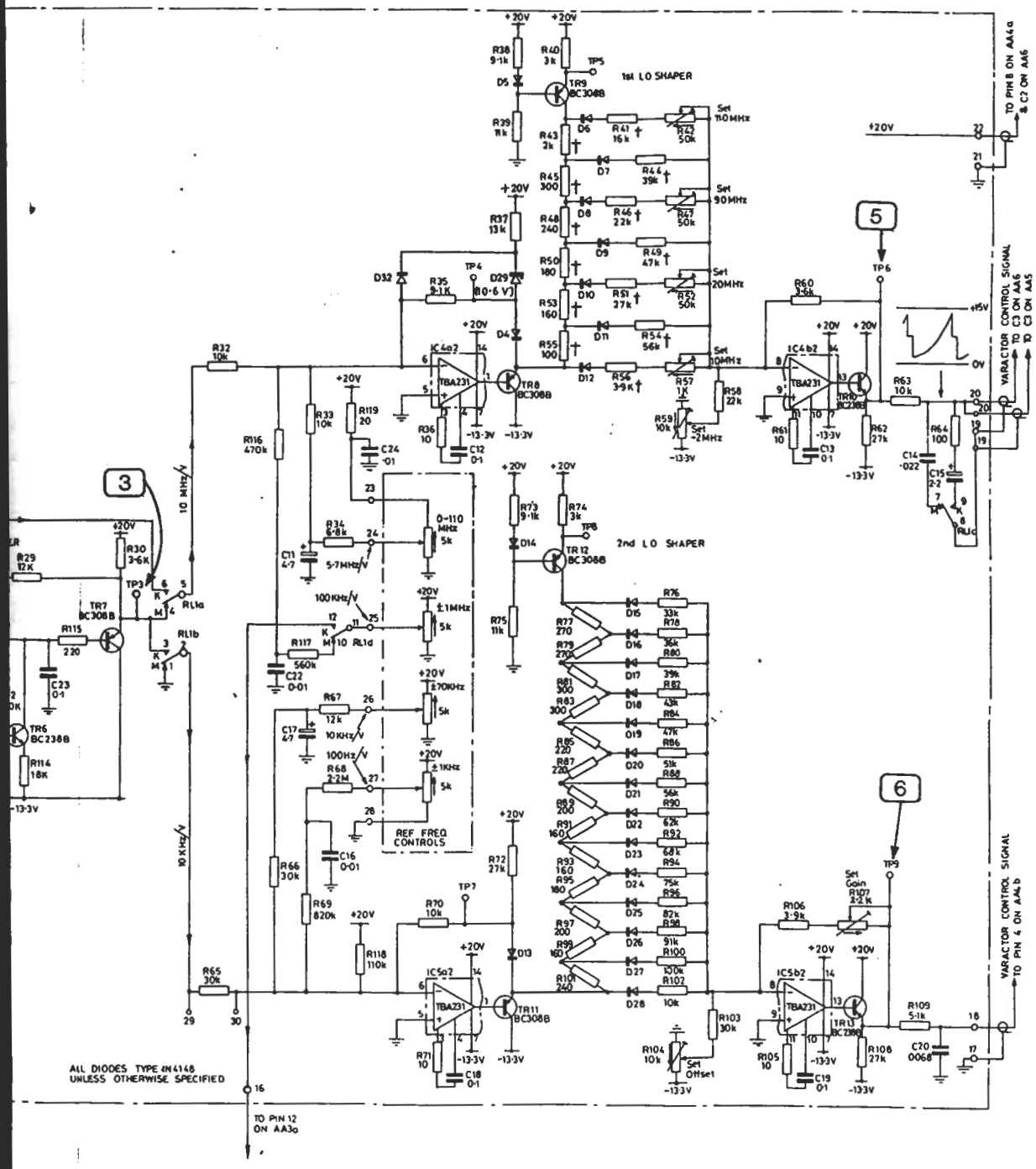


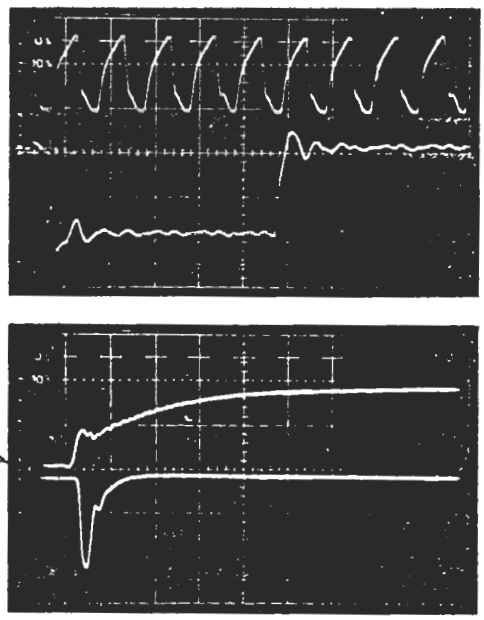
Fig. 7.10 Sweep shaper and local regulator AA1

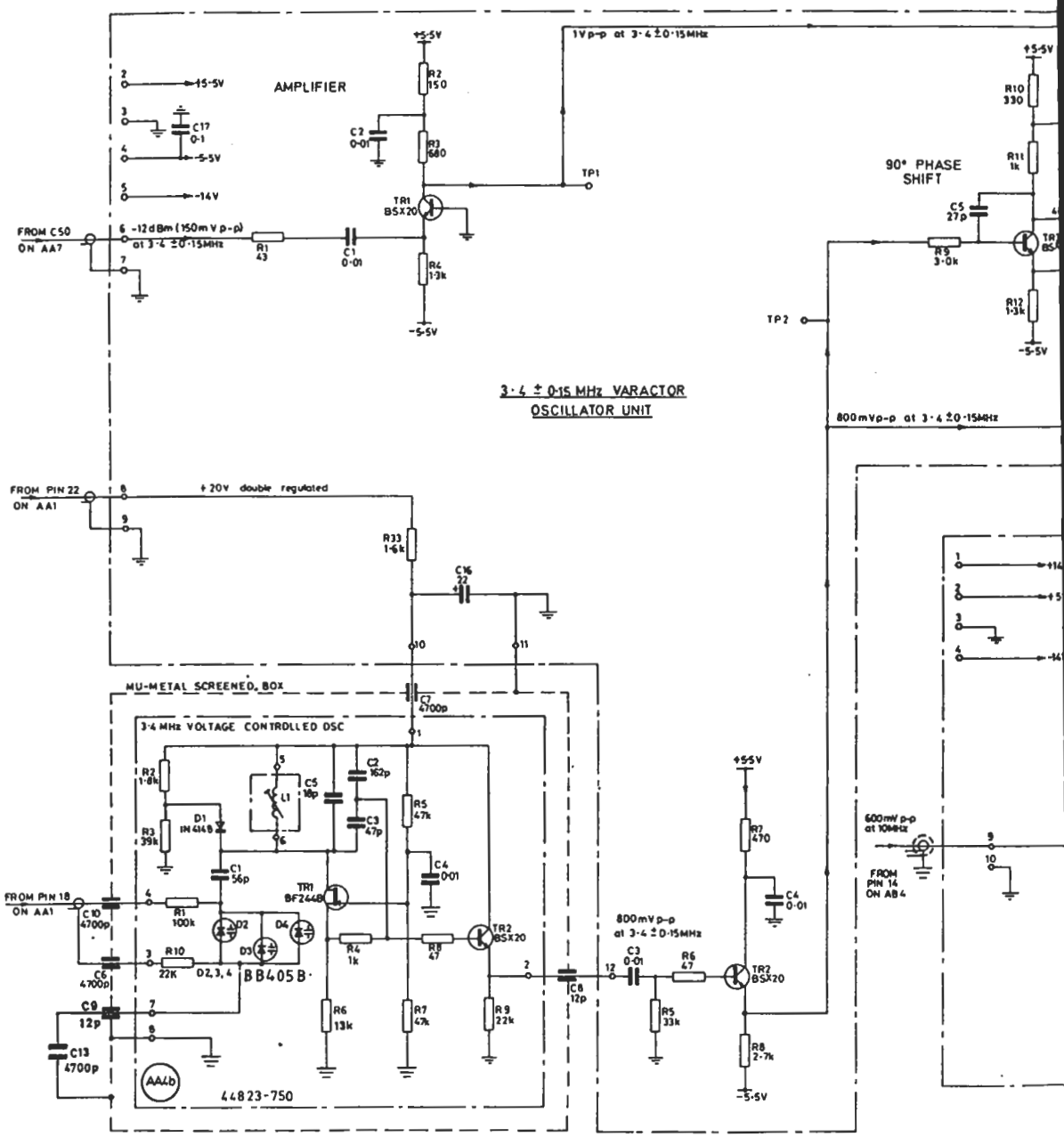
Waveforms for AA2 and AA4

Note Probe connections and earth leads should be as short as possible.

TF 2370 controls - SWEEP MODE : AUTO
HORIZONTAL SCALE and RANGE : 10 MHz/DIV
FILTER BANDWIDTH : WIDE

Horizontal scale	*Vertical scale*	*Datum level*	
0.1 μs/div	2 V/div	0 V →	1
0.1 μs/div	2 V/div	0 V →	2
50 ns/div	2 V/div	0 V →	3
50 ns/div	5 V/div	0 V →	4




AMPLIFIER
+5·5V
R2 150
C2 0·01
R3 680
TP1
TR1 BSX20
1Vp-p at 3·4±0·15MHz
2
+15·5V
3
C17 0·1
4
-5·5V
5
-14V
6
-12dBm (150mV p-p) at 3·4 ±0·15MHz
7
FROM C50 ON AA7
R1 43
C1 0·01
R4 1·3k
-5·5V
90° PHASE SHIFT
R10 330
R11 1k
C5 27p
R9 3·0k
R12 1·3k
TP2
3·4 ± 0·15 MHz VARACTOR OSCILLATOR UNIT
800mVp-p at 3·4 ±0·15MHz
FROM PIN 22 ON AA1
8
+20V double regulated
9
R33 1·6k
C16 22
10
11
MU-METAL SCREENED BOX
C7 4700p
3·4 MHz VOLTAGE CONTROLLED OSC
R2 1·8k
L1
C5 18p
C2 162p
C3 47p
R5 47k
R3 39k
D1 IN4148
C1 56p
C4 0·01
TR1 BF244B
FROM PIN 18 ON AA1
C10 4700p
R1 100k
D2
D4
D3
TR2 BSX20
R10 22K
D2,3,4
BB405B
R4 1k
R8 47
C6 4700p
C8 12p
R6 13k
R7 47k
R9 22k
C13 4700p
AA4b
44823-750
+5·5V
R7 470
C4 0·01
800mV p-p at 3·4 ±0·15MHz
C3 0·01
R6 47
TR2 BSX20
R5 33k
R8 2·7k
-5·5V
600mV p-p at 10MHz
FROM PIN 14 ON AB4
9
10

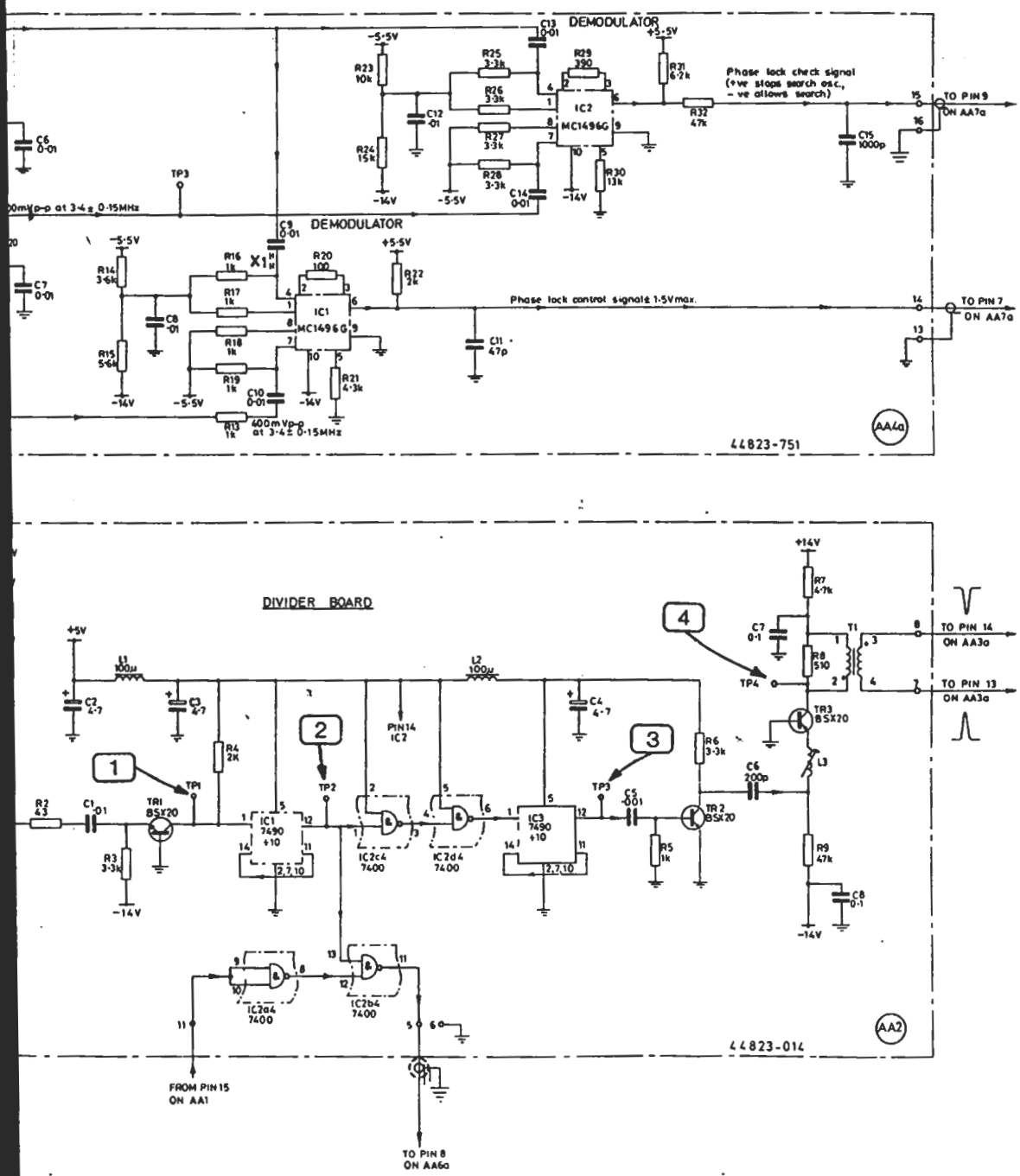


Fig. 7.11 Circuits: AA2, AA4

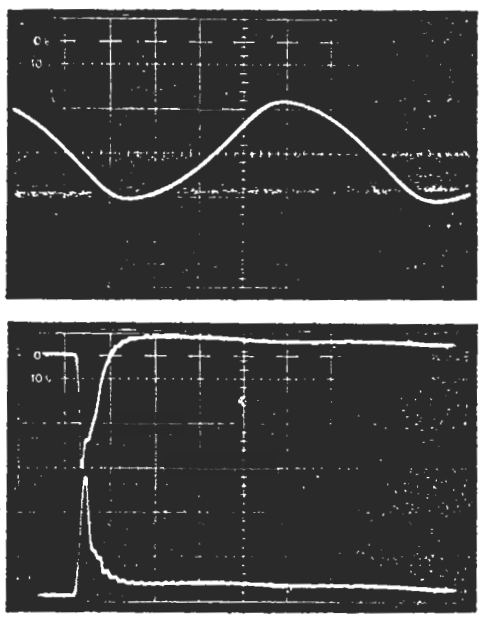
Waveforms for AA3

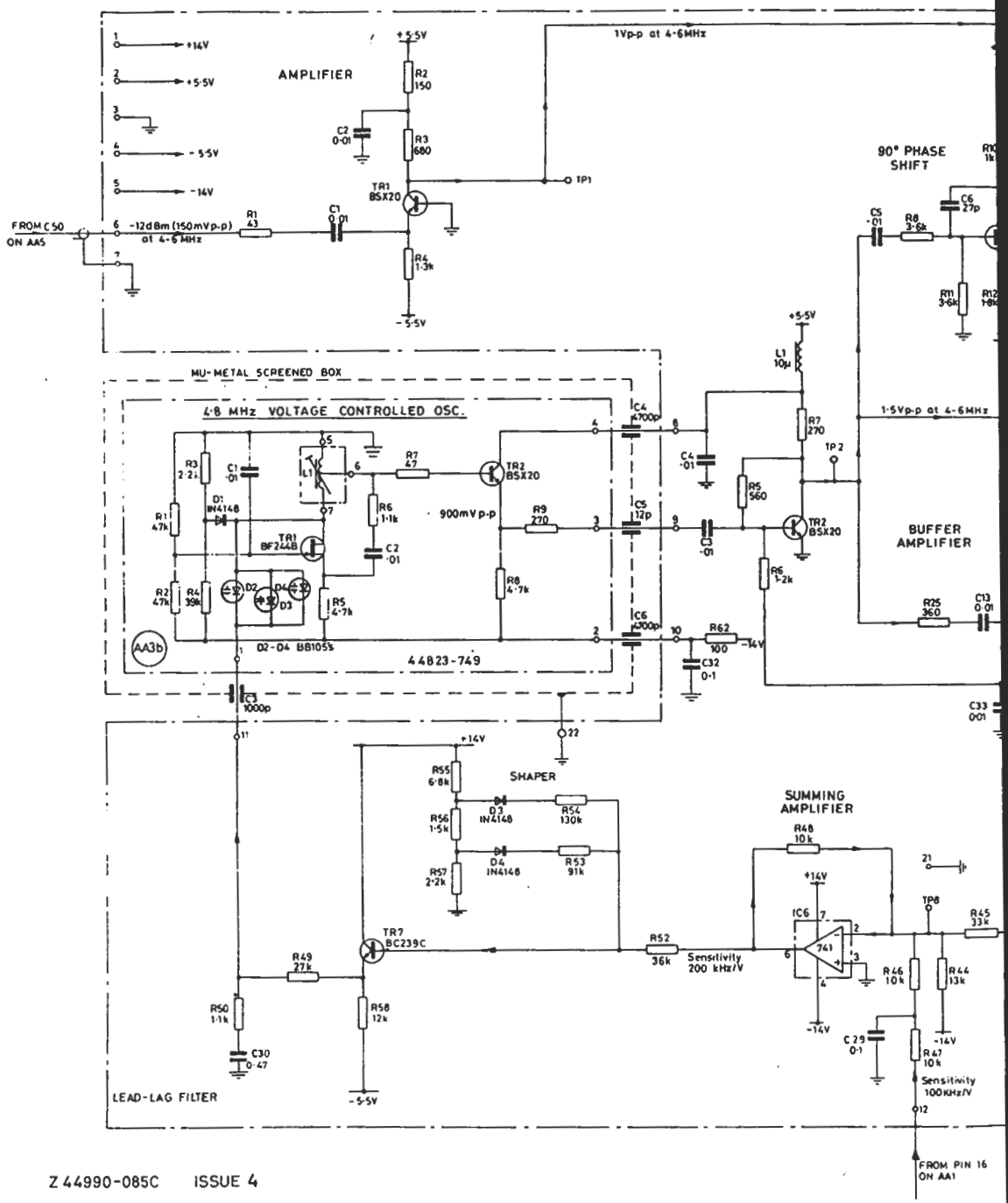
Note Probe connections and earth leads should be as short as possible.

TF 2370 controls - SWEEP MODE : AUTO
HORIZONTAL SCALE and RANGE : 10 MHz/DIV
FILTER BANDWIDTH : WIDE

For (1), connect TP5 to earth.

Horizontal scale	*Vertical scale*	*Datum level*	
20 ms/div	1 V/div	0 V →	1
50 ns/div	2 V/div		2
50 ns/div	2 V/div		3





Z 44990-085C ISSUE 4

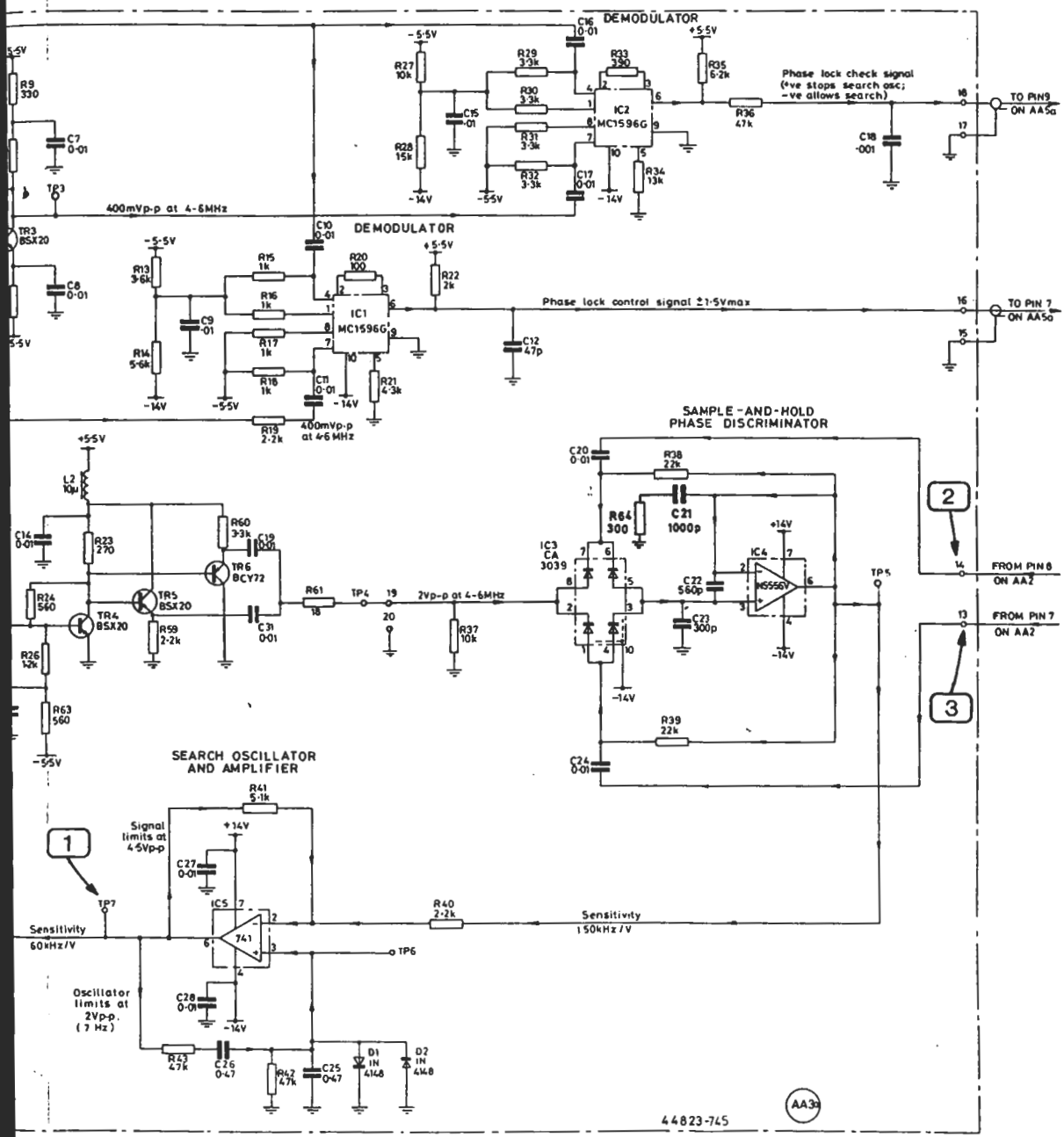
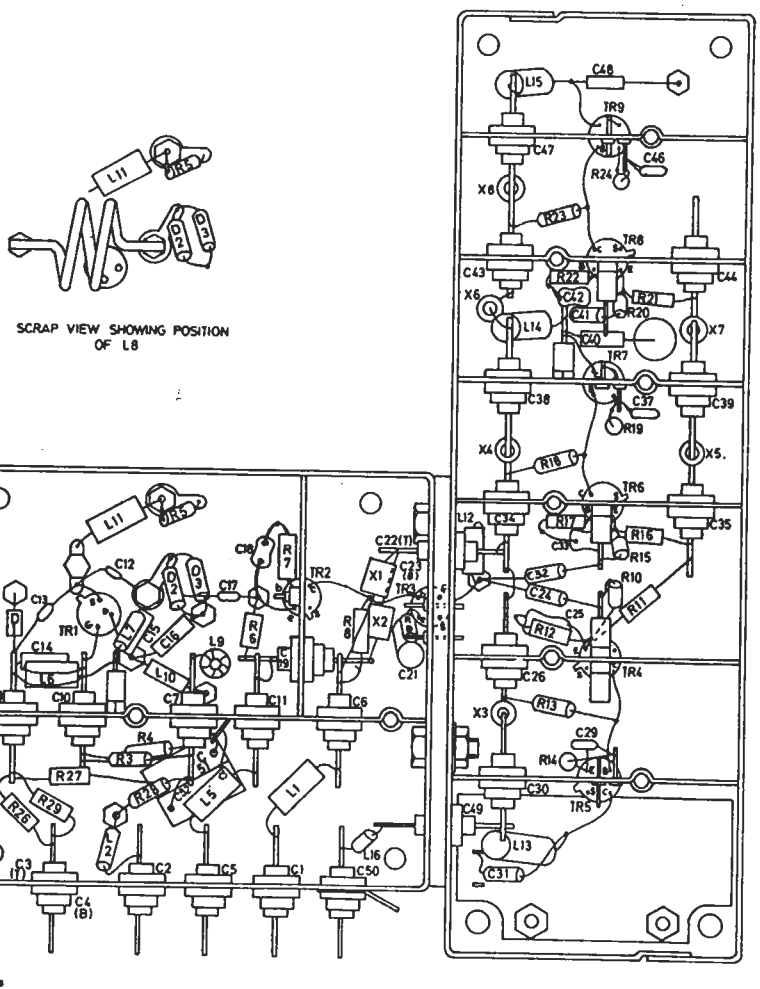


Fig. 7.12 4.8 MHz interpolation oscillator AA3

Layout of AA5



SCRAP VIEW SHOWING POSITION OF L8

TPC 1058

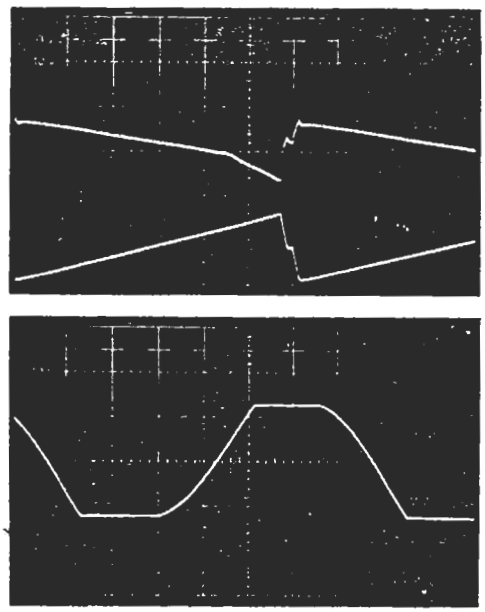
Waveforms for AA5

Note Probe connections and earth leads should be as short as possible.

TF 2370 controls – SWEEP MODE : AUTO
HORIZONTAL SCALE and RANGE : 10 MHz/DIV
FILTER BANDWIDTH : WIDE
REFERENCE FREQUENCY : LH
REFERENCE FREQUENCY 0-110 MHz : One half turn clockwise

For (3), connect pin 9 to earth.

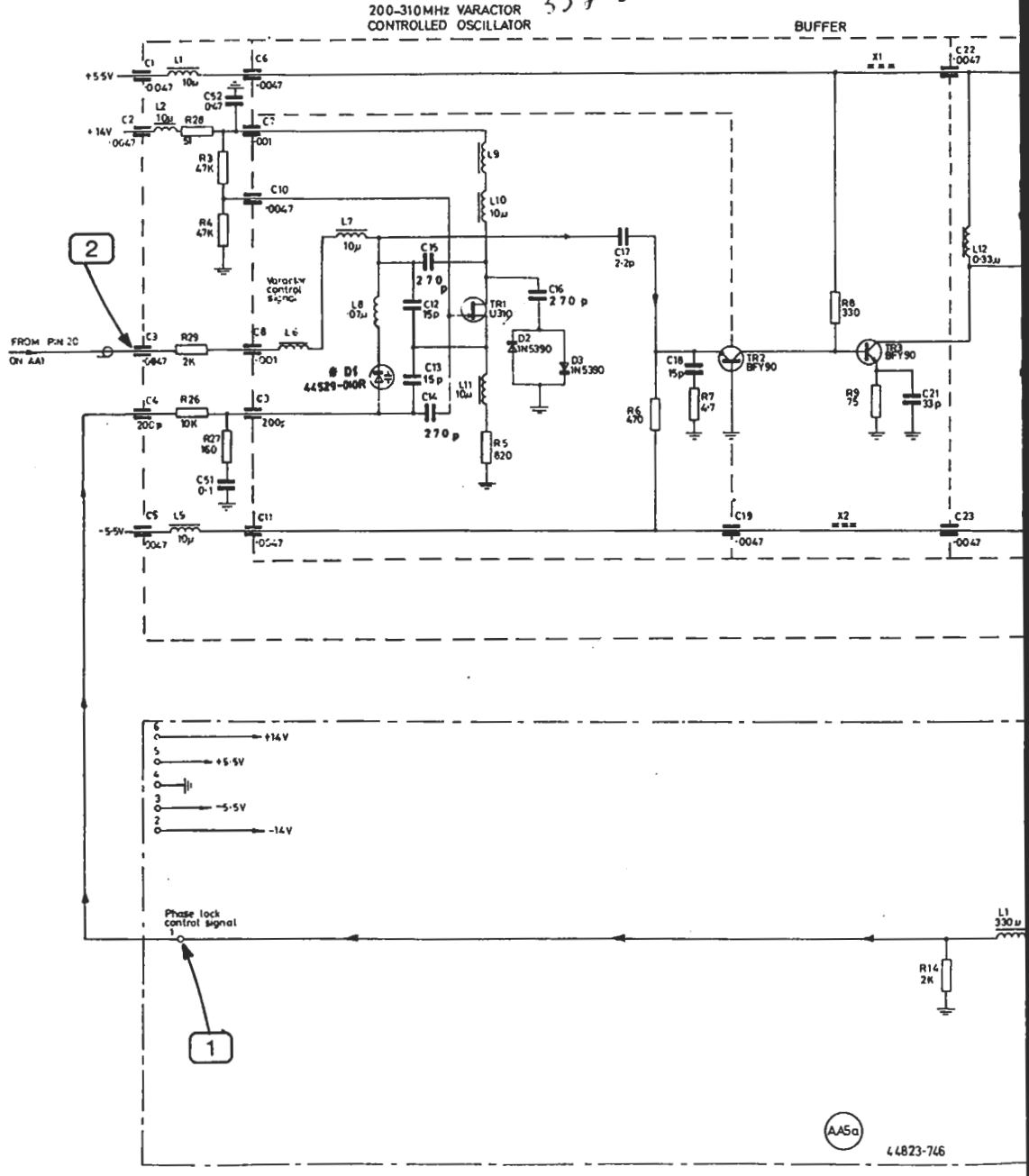
Horizontal scale	*Vertical scale*	*Datum level*	
20 ms/div	0.5 V/div	0 V	1
20 ms/div	10 V/div	0 V	2
10 ms/div	10 V/div	0 V	3



cwise

*D1 is one of a matched pair. The other is fitted in a similar position on AA6.

357-500



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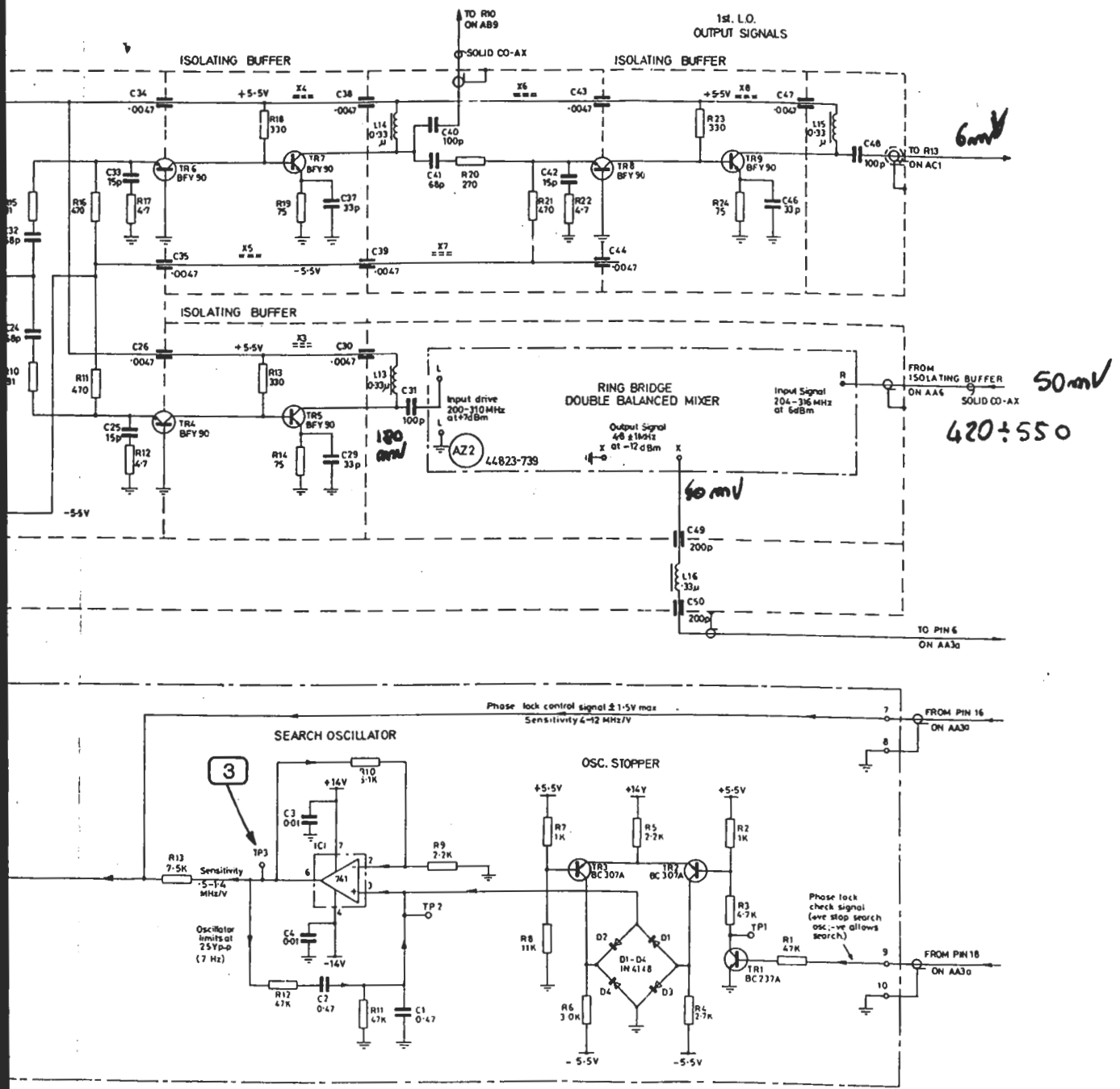


Fig. 7.13 200 to 310 MHz slave first local oscillator AA5

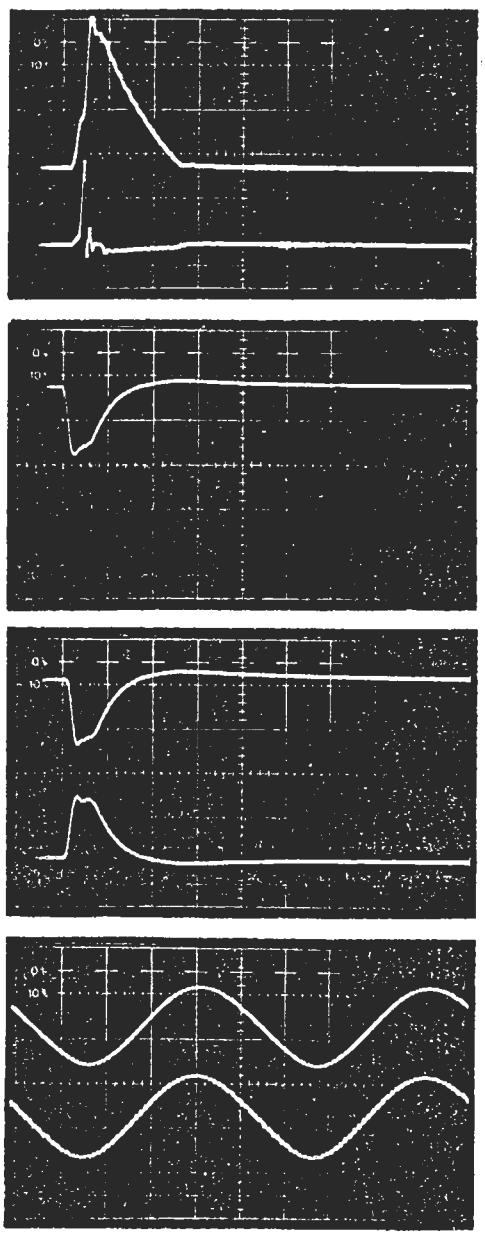
Waveforms for AA6

Note Probe connections and earth leads should be as short as possible.

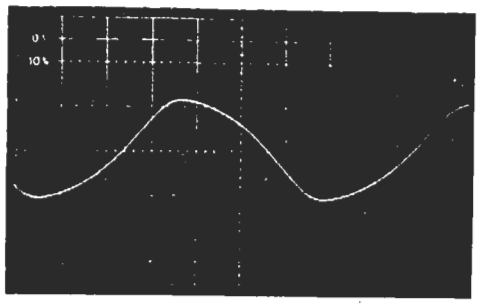
TF 2370 controls – SWEEP MODE : (1) to (5) AUTO
(6) to (8) MANUAL
HORIZONTAL SCALE and RANGE : (1) to (5) 10 MHz/DIV
(6) to (8) 10 kHz/DIV
FILTER BANDWIDTH : WIDE
REFERENCE FREQUENCY 0-110 MHz : For (6) and (7), adjusted to give a maximum amplitude sine wave

For (6) and (7), connect pin 1 on AA6a to earth.
For (8), connect TP2 on AA6a to earth.

Horizontal scale	*Vertical scale*	*Datum level*	
50 ns/div	2 V/div	0 V →	1
50 ns/div	1 V/div	0 V →	2
50 ns/div	2 V/div	0 V →	3
50 ns/div	2 V/div	0 V →	4
50 ns/div	2 V/div	0 V →	5
10 µs/div	1 V/div	0 V →	6
10 µs/div	1 V/div	0 V →	7

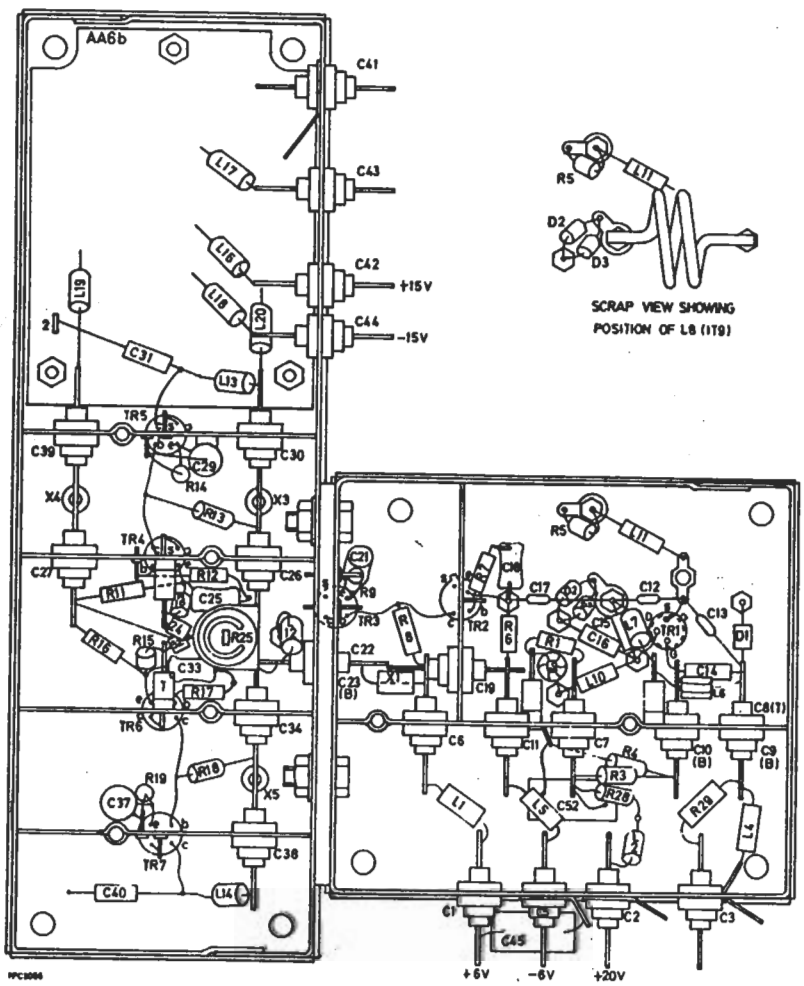


10 ms/div 1 V/cm 0 V →



8

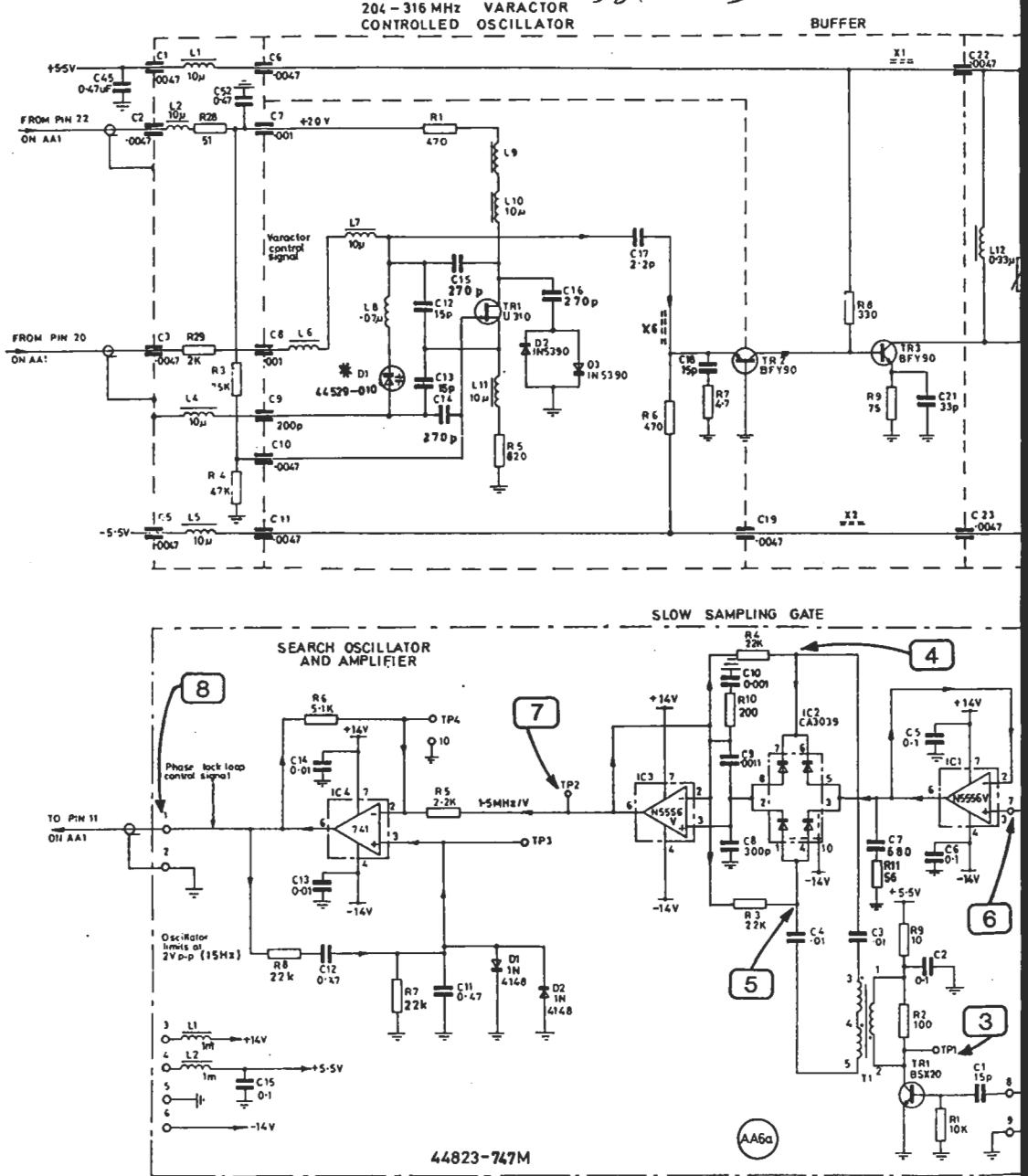
Layout for AA6



8

*D1 is one of a matched pair. The other is fitted in a similar position on AA5.

381-553



DRG No Z44990-071J ISSUE 15

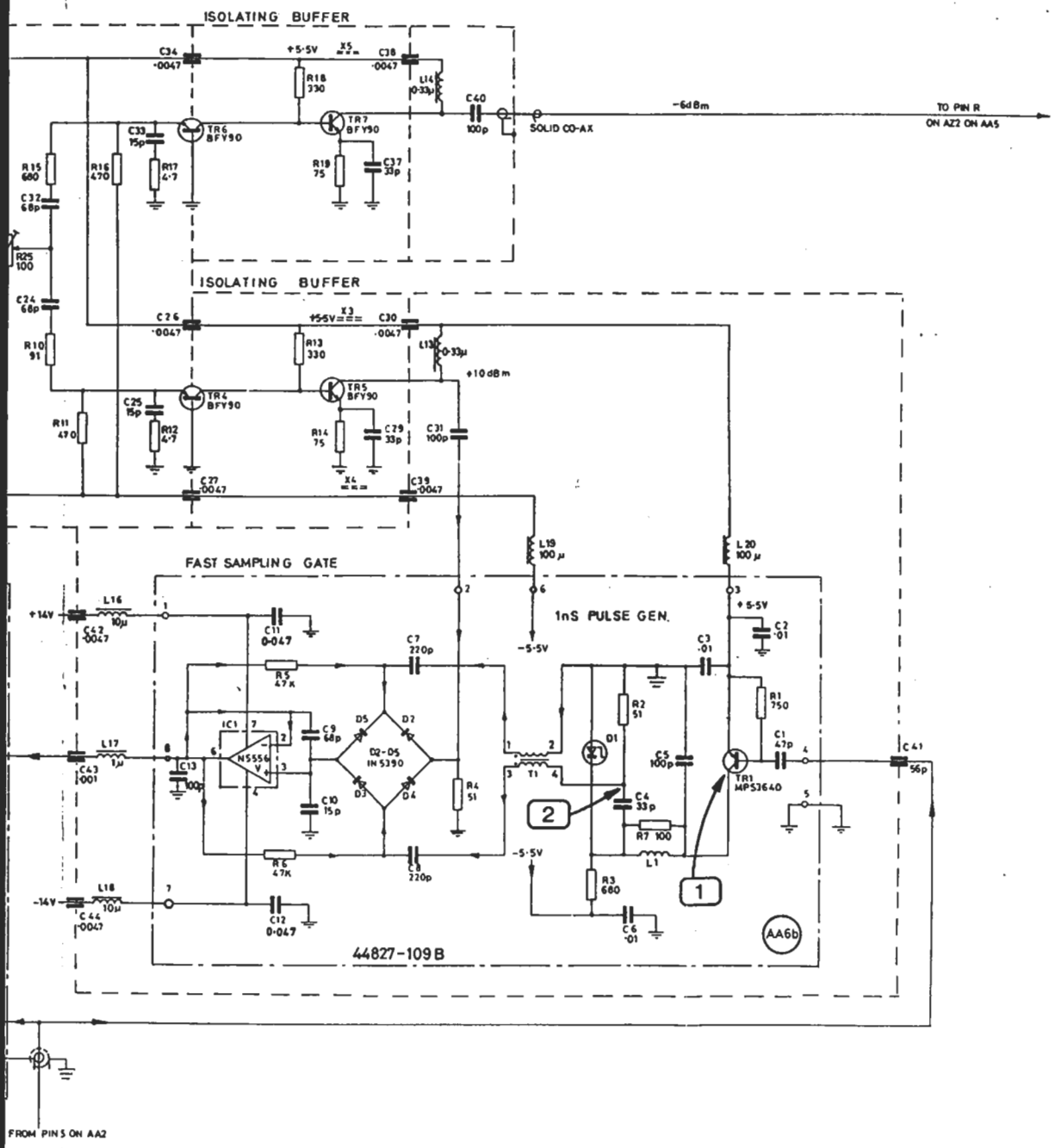
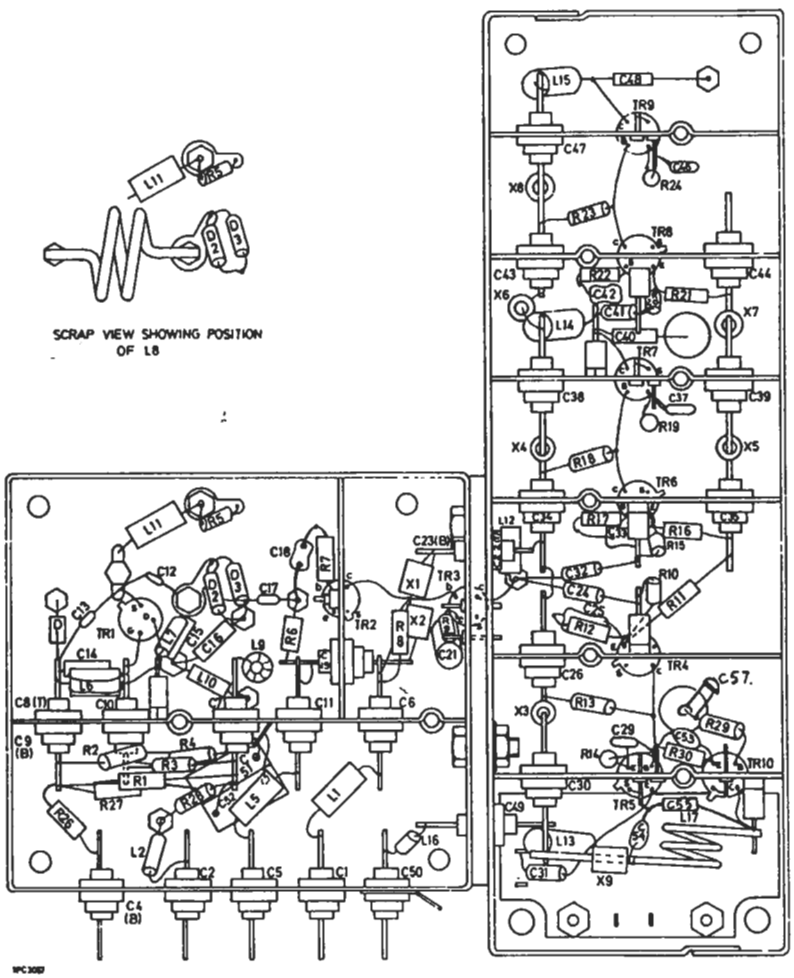


Fig. 7.14 205 to 315 MHz master first local oscillator AA6

Layout for AA7

SCRAP VIEW SHOWING POSITION OF L8



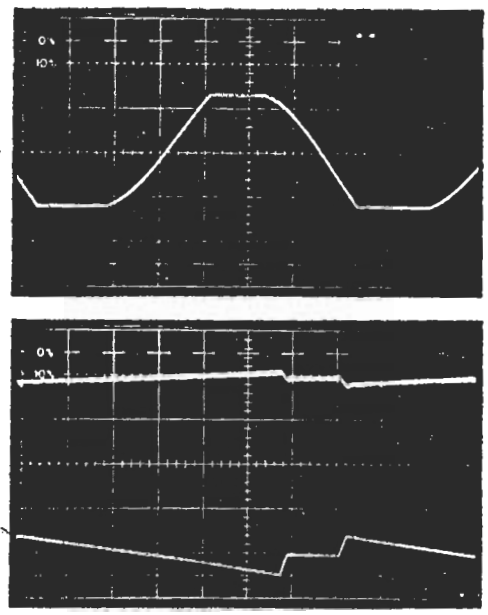
Waveforms for AA7

Note Probe connections and earth leads should be as short as possible.

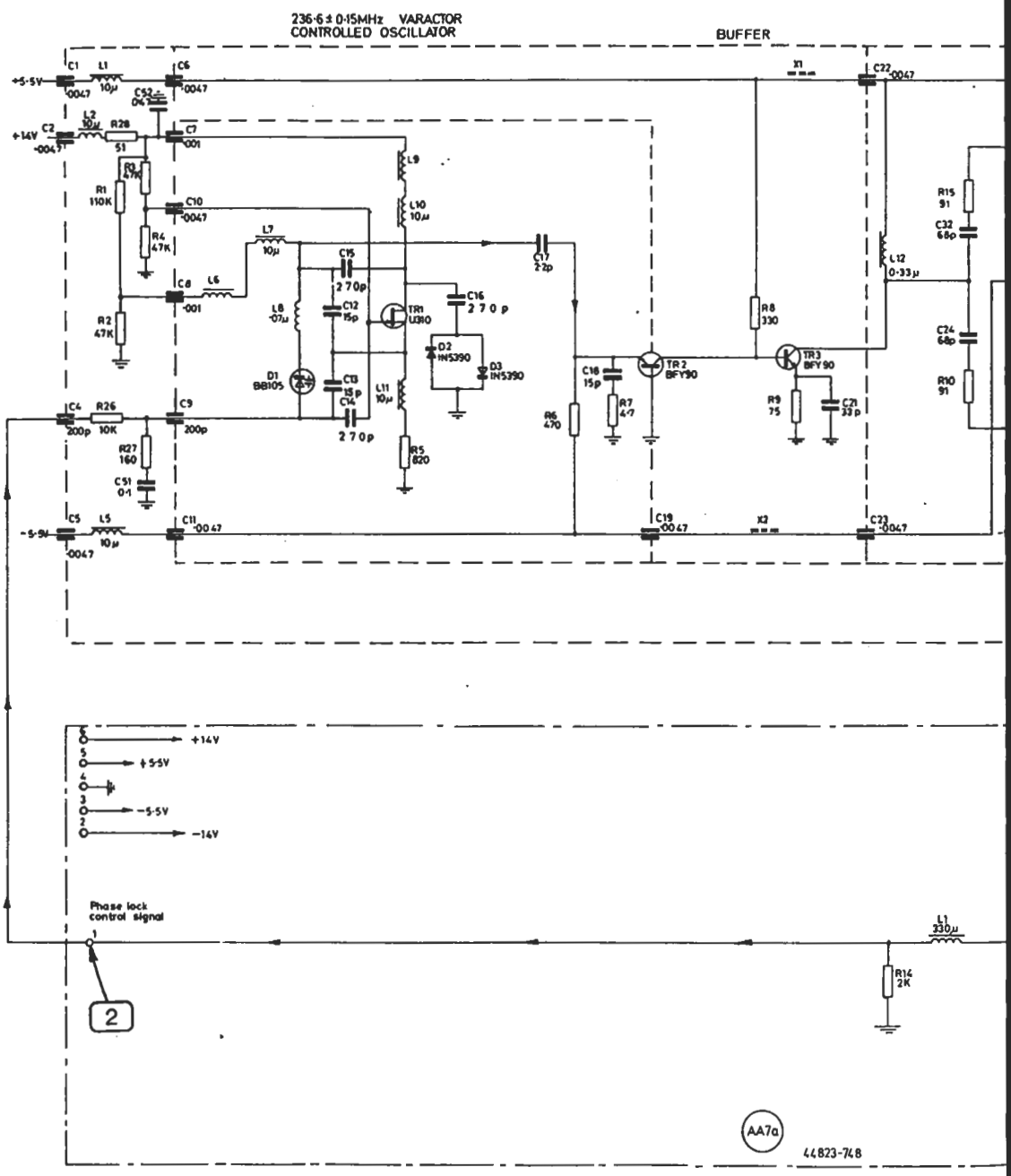
TF 2370 controls - SWEEP MODE : AUTO
HORIZONTAL SCALE and RANGE : 10 kHz/DIV
FILTER BANDWIDTH : WIDE
REFERENCE FREQUENCY : LH
REFERENCE FREQUENCY ±70 kHz : Fully counter-clockwise

For (1), connect pin 9 to earth.

Horizontal scale	*Vertical scale*	*Datum level*	
20 ms/div	10 V/div	0 V →	1
20 ms/div	50 mV/div	0 V →	2
20 ms/div	5 V/div		*



* TP7 on AA1, for timing comparison



DRG No Z44990-069F ISSUE 8

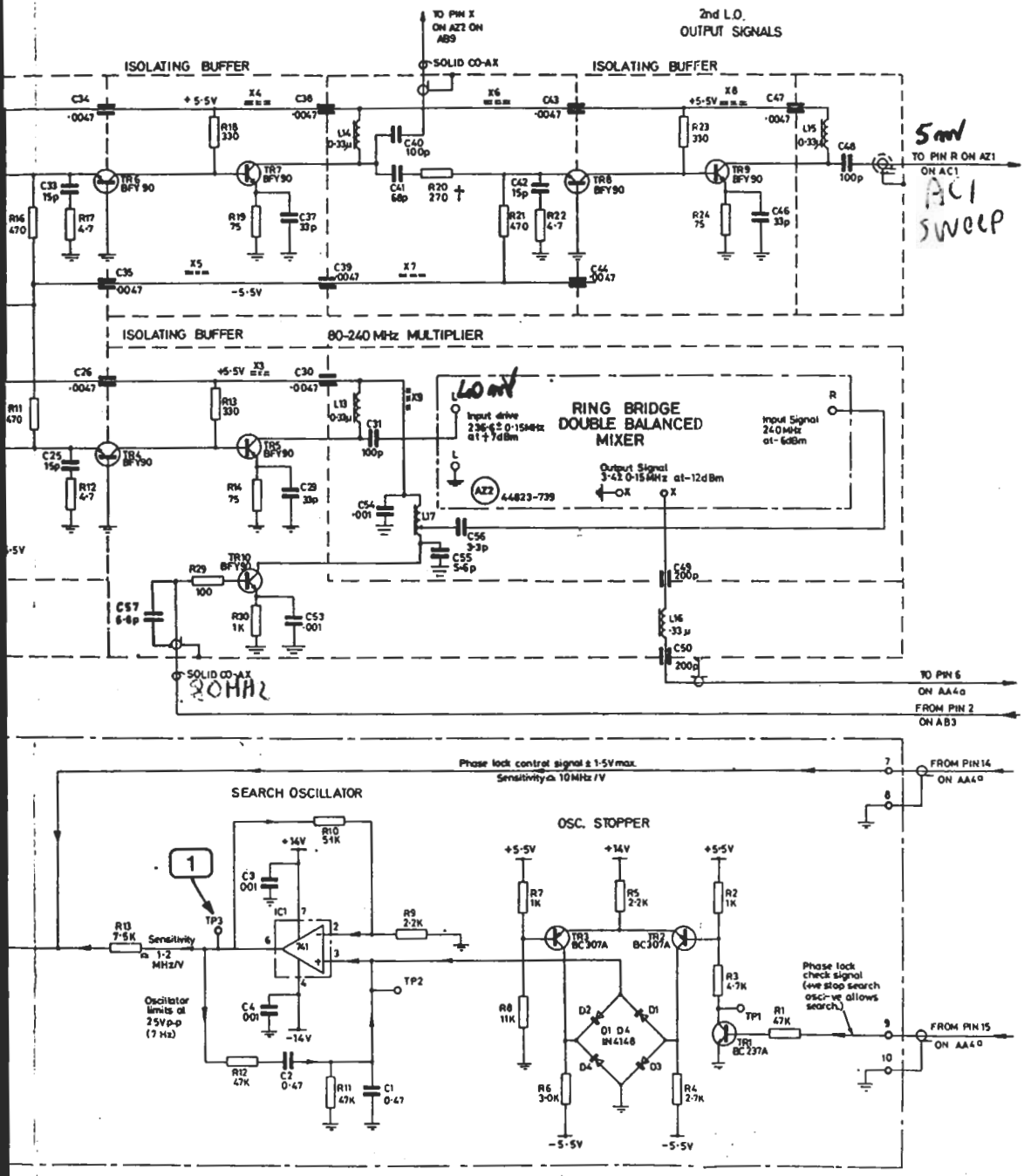


Fig. 7.15 236 MHz slave second local oscillator AA7

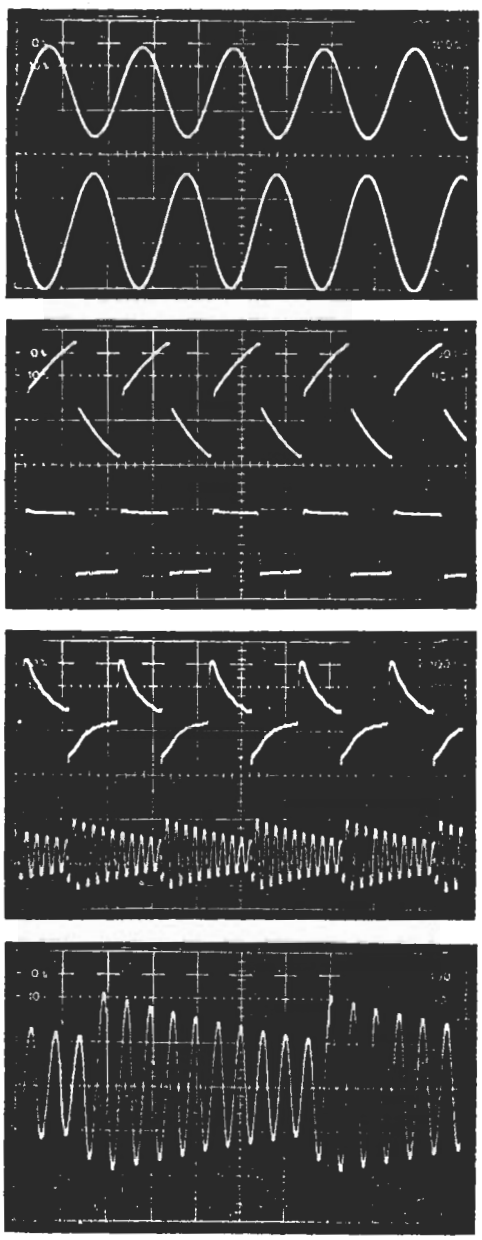
Waveforms for AC5

TF 2370 controls - SWEEP MODE : (8) to (14) AUTO for preliminary adjustments and then MANUAL to display the waveforms
HORIZONTAL SCALE and RANGE : (8) to (14) 10 kHz/DIV
FILTER BANDWIDTH : (8) to (14) WIDE
VERTICAL SCALE and RANGE : (8) to (14) 0 dBm 1 dB/DIV

For (1) to (7), feed a 1 MHz (accuracy better than 1 in 10^7) 1 V p-p signal to the EXTERNAL STANDARD INPUT.

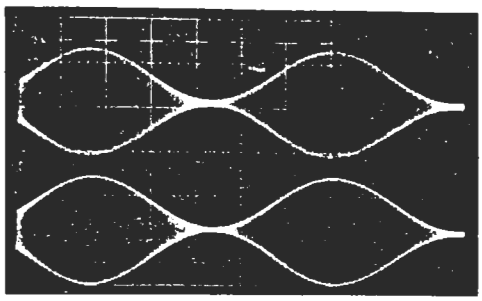
For (8) to (14), feed a 10 MHz signal to the INPUT. Adjust the signal level to give a display on the CATHODE RAY TUBE of the full height of the graticule. Then set the SWEEP MODE to MANUAL and adjust the BRIGHT LINE POSITION to the centre of the signal on display. Also amplitude modulate the 10 MHz signal at 1 kHz to 100% and load the DETECTED OUTPUT with 600 Ω.

Horizontal scale	*Vertical scale*	*Datum level*	
0.5 μs/div	0.5 V/div	0 V →	1
0.5 μs/div	2 V/div	12 V →	2
0.5 μs/div	1 V/div	11.5 V →	3
0.5 μs/div	1 V/div	0 V →	4
0.5 μs/div	1 V/div	0 V →	5
0.5 μs/div	0.5 V/div	4 V →	6
0.2 μs/div	50 mV/div	0 V →	7



0.2 ms/div 50 mV/div 14 V →

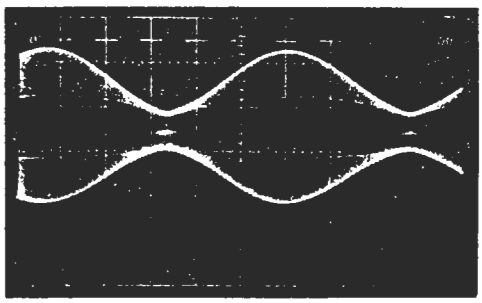
0.2 ms/div 1 V/div 9.5 V →



8

9

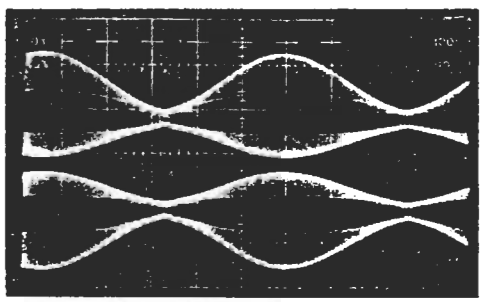
0.2 ms/div 2 V/div 0 V →



10

0.2 ms/div 2 V/div 0 V →

0.2 ms/div 2 V/div 0 V →

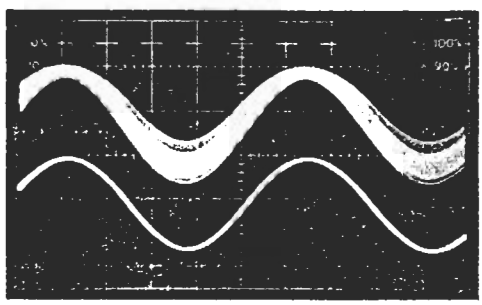


11

12

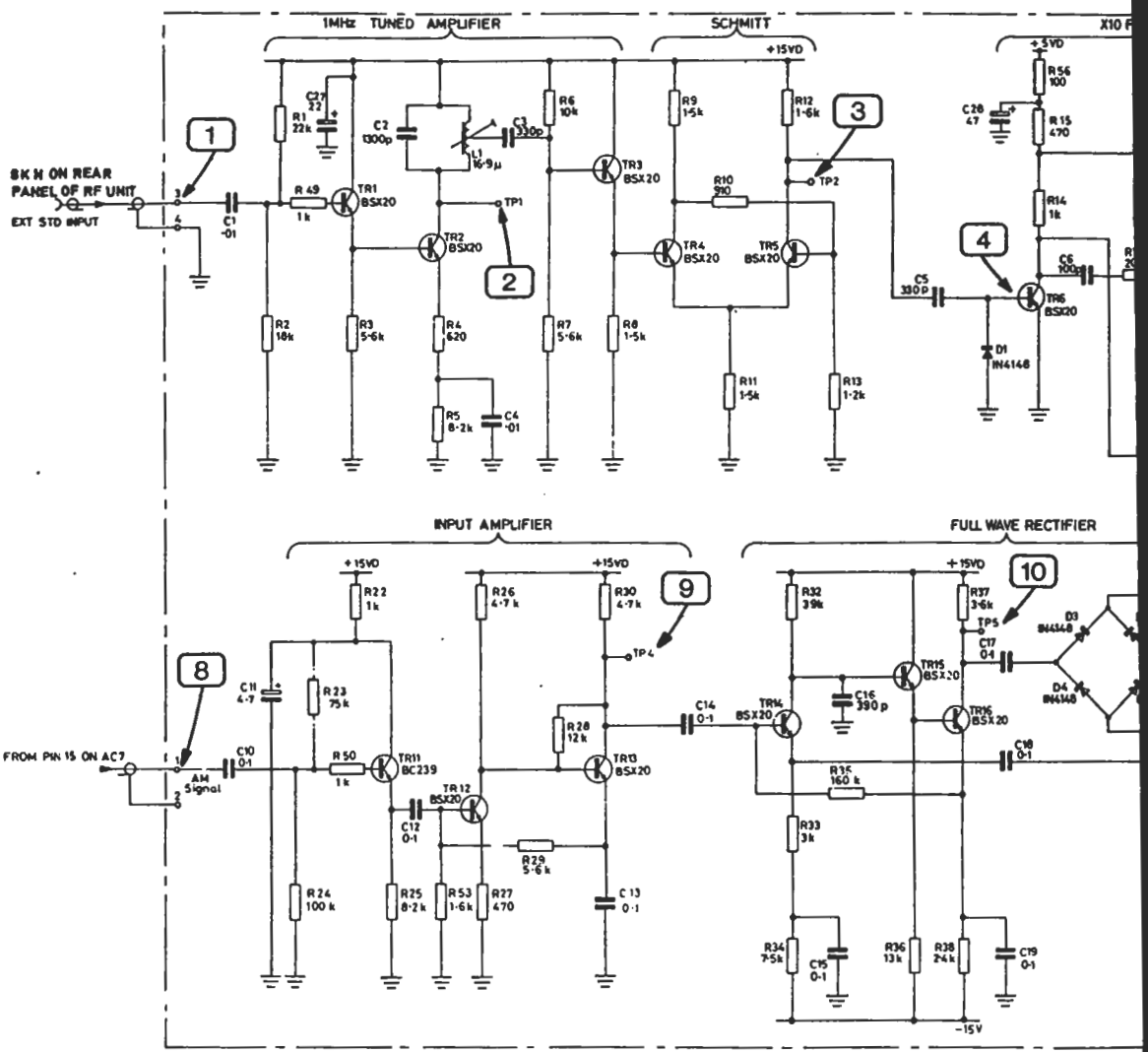
0.2 ms/div 2 V/div 0 V →

0.2 ms/div 1 V/div 0 V →



13

14



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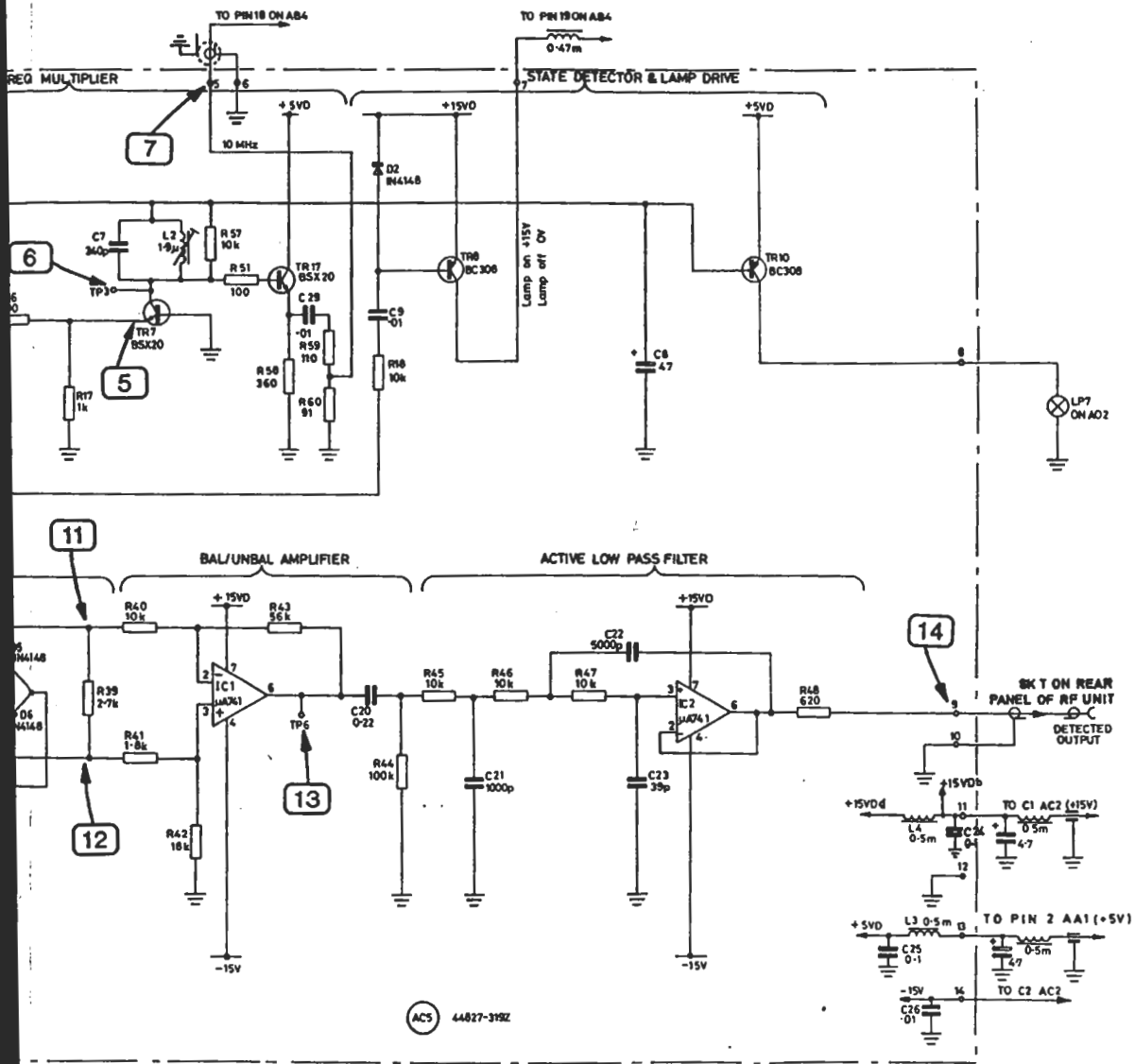
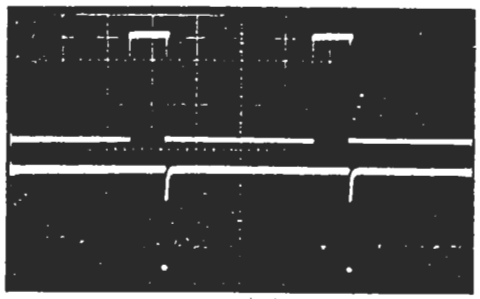


Fig. 7.16 Detector and external reference signal amplifier AC5

50 μs/div 2 V/div

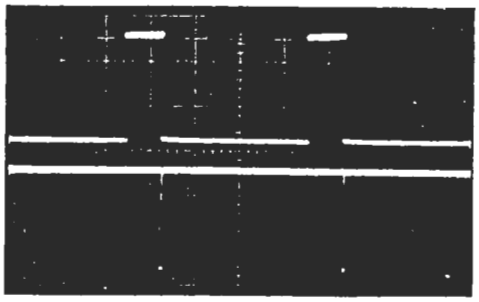


36

50 μs/div 2 V/div

37

0.5 ms/div 2 V/div

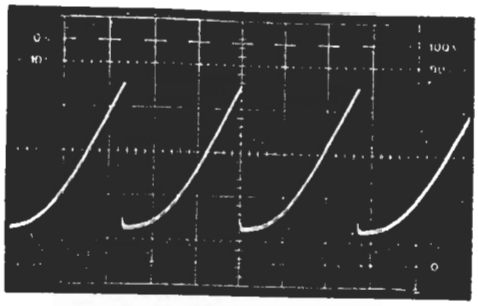


38

0.5 ms/div 2 V/div

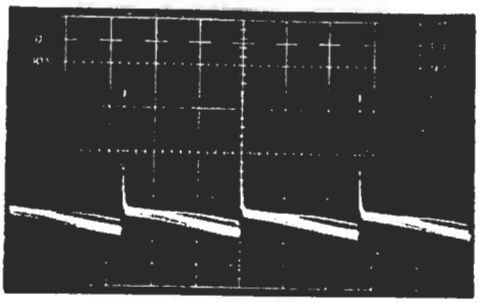
39

5 ms/div 2 V/div 0 V →



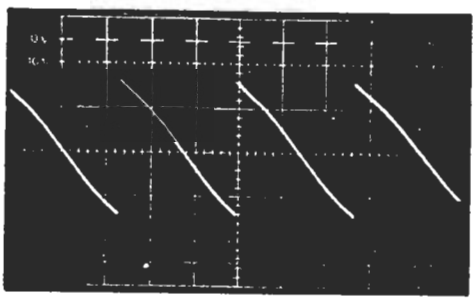
17

5 ms/div 50 V/div 0 V →

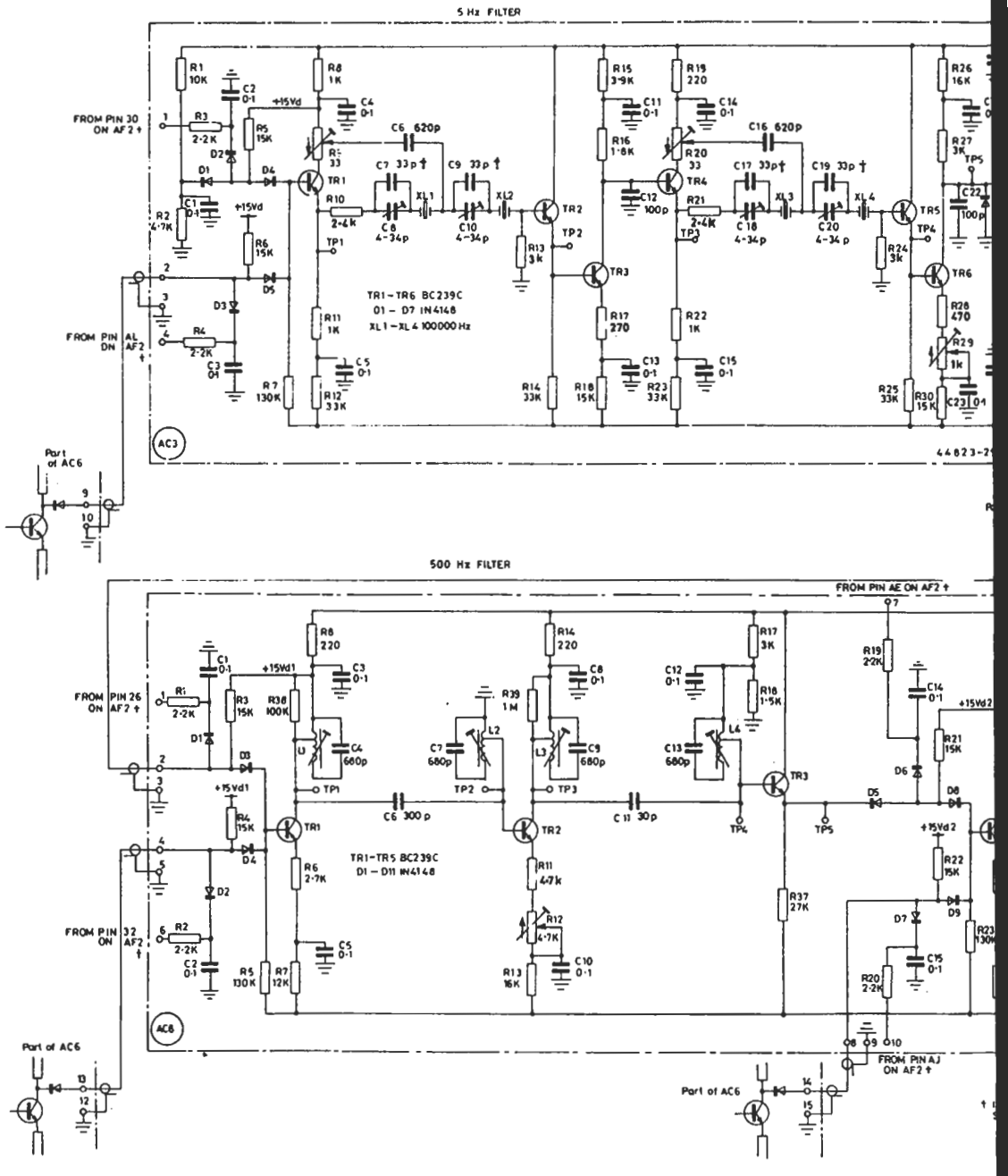


18

5 ms/div 1 V/div 0 V →



19



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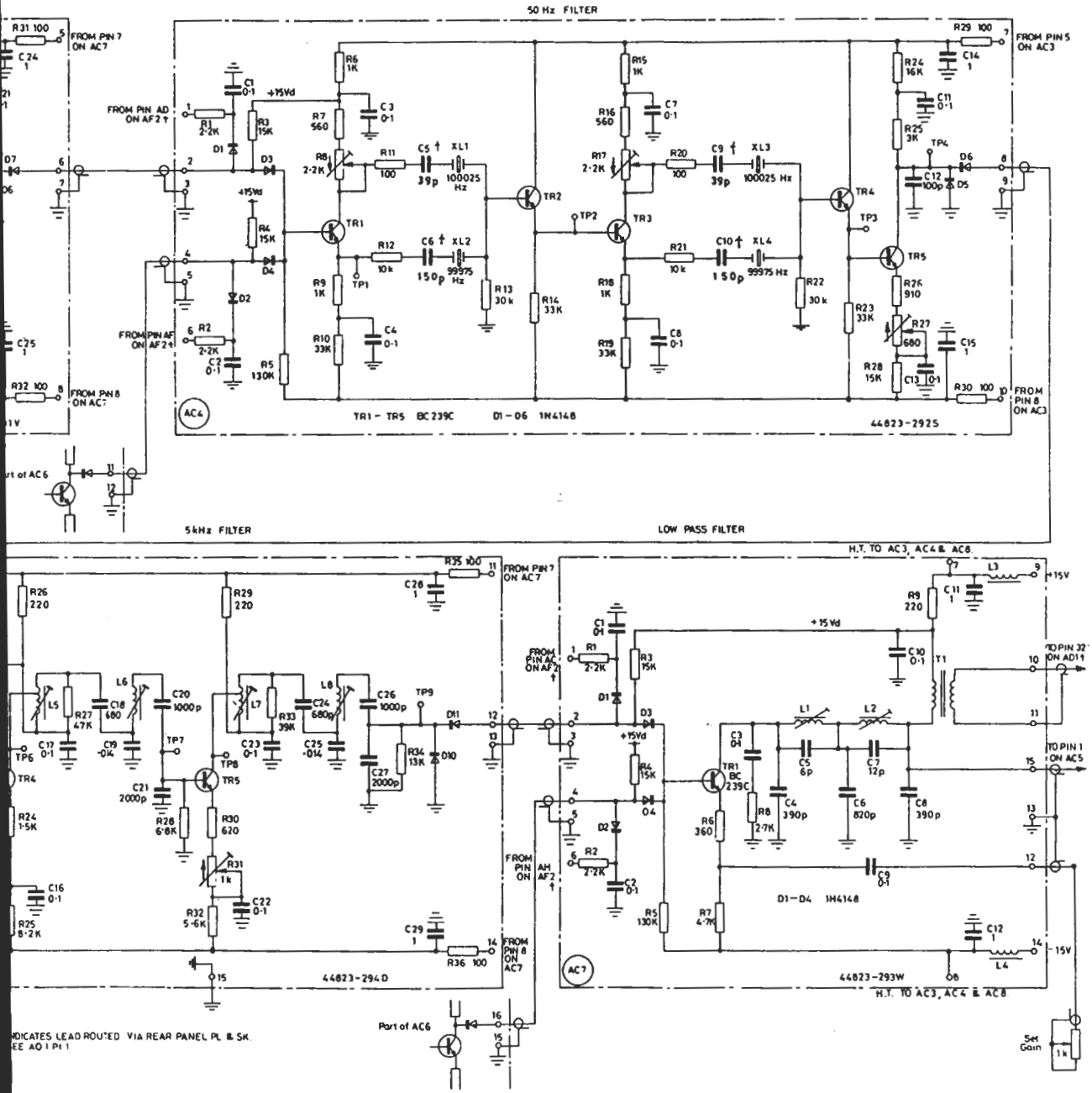

Fig. 7.17 Circuits: AC3, AC4, AC7 and AC8