

# INSTRUCTION MANUAL

MODIFICATION INSERT

Serial Number \_\_\_\_\_

This insert is provided as a supplement to the instruction manual furnished with this modified instrument. The information given in this insert supersedes that given in the manual.

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453

MOD 703K

## 453 MOD 703K

This manual insert describes the features of MOD 703K as installed in the 453 Oscilloscope serial number B20100 and up. The instrument contains the following general changes.

Controls and connectors have been changed as follows:

1. SAWTOOTH OUT facility has been added to the rear panel via BNC connector.
2. CH 1 OUT connector has been moved on the front panel. Amplitude is 200 mV for each division of CH 1 deflection.
3. A GATE and B GATE facilities have been added to the rear panel.
4. The Calibrator Current Loop has been added to the front panel, and the 1 V CAL connector has been moved.
5. A TRACE FINDER control has been added to the front panel.
6. The HORIZ DISPLAY switch has an added position providing X-Y.
7. The light on the RESET control has been deleted.
8. B TRIGGERING (DELAYED SWEEP); COUPLING and SOURCE functions, have been added including an EXT TRIG INPUT or EXT HORIZ connector.
9. Special accessories in lieu of standard are provided. See parts list.

### CHARACTERISTICS

#### SAWTOOTH OUT

Waveform Polarity	Negative-going linear ramp with retrace to a quiescent level of approximately +0.4 V.
Amplitude	Approximately 0.3 V peak to peak.
Source Impedance	Approximately 300 .
Maximum Loading	May be shorted to ground without affecting display accuracy. For best linearity capacitive loading should not exceed 125 pF.
Ch 1 OUT	
Amplitude	Open circuit output amplitude is 200 mV per division of CH 1 deflection when the CH 1 VARIABLE VOLTS/DIV is set to it's CAL position.
Source Impedance	Not more than 500 .
Cascaded Operation	Deleted.
Sweep Length	(Unmagnified) of the A SWEEP display is $11 \pm 1$ div.

7A. Check CHAN 1 OUT amplifier output DC level.

Requirement: 0 V  $\pm$ 1 V DC output level with CH 1 trace centered vertically on the CRT screen.

- a. Center the Channel 1 trace vertically on the CRT screen.
- b. Using a DC voltmeter, measure the voltage at the center conductor of the CH 1 OUT connector. It should be 0 V  $\pm$ 1 V DC.

8. Check Channel 1 and 2 Cascaded Deflection Factor.

Requirement: CH 1 OUT signal increased to 200 millivolt/division of Channel 1 vertical deflection with CH 1 OUT signal not terminated in 50 ohms.

- a. Connect the CH 1 OUT connector to the Channel 2 INPUT connector with an 12 inch 50 ohm BNC cable.
- b. Change the following control settings:  
VOLTS/DIV (CH 1 and 2)      20 mV
- c. Set the standard amplitude calibrator for a ten-millivolt squarewave output.
- d. CHECK-CRT display 5 divisions  $\pm$ 5% in amplitude.

8A. Check Channel 1 and 2 Cascaded Upper Bandwidth Limit.

Requirement: Not more than -3 dB at 5 megahertz with CH 1 OUT unterminated.

- a. Change CH/2 INPUT.
- b. Set the constant-amplitude generator for a four-division display at its reference frequency (50 kHz).
- c. Without changing the output amplitude, increase the output frequency of the generator until the deflection is reduced to 2.8 divisions (-3 dB point; see Fig. 5-7).
- d. CHECK-Output frequency of generator must be 5 megahertz or higher. Actual frequency,      megahertz.
- e. Disconnect the cable from between the CHAN 1 OUT and Channel 2 INPUT connectors.

7. Adjust R390 in the CH 1 OUT amplifier to exactly center CH 2 trace on the CRT presentation.
8. Connect a 10 mV calibrator signal to the CH 1 INPUT connector.
9. Adjust R385 (Gain control) in the CH 1 OUT amplifier for 5 major divisions of vertical deflection.

NOTE: There may be interaction between steps 7 and 10. Therefore, readjustment may be necessary.

10. Change CH 1 VOLTS/DIV to 20 mV.
11. Change CH 2 VOLTS/DIV to 20 mV.
12. Change TIME/DIV switch to .1 $\mu$ sec. Terminate CH 1 OUT with a BNC 50 $\Omega$  term @ CH 2 INPUT.
13. Connect Type 106 Square Wave Generator to CH 1 INPUT connector and obtain 6 major divisions of vertical deflection of 100 kc square wave.
14. Adjust R381, C381, and C377 for optimum flat response.
15. Change CH 2 VOLTS/DIV switch to 20 mV and remove the 50 $\Omega$  termination at the CH 2 INPUT connector. Recheck bandpass for  $\leq$ 5 MHz.

## 453 MOD 703K

Ckt No.		Tektronix Part No.	Description		
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## Connectors

J529	Add	131-0955-00	BNC		
J531	Add	131-0955-00	BNC		
J601	Add	131-0955-00	BNC		
J729	Add	131-0955-00	BNC		

## Resistors

R529	Add	315-0331-00	330	1/4 W	5%
R530F	Delete				
R530G	Delete				
R530H	Delete				
R530K	Change	323-0172-07	1.43 M	1/2 W	1/10%
R530L	Change	323-0711-00	715 k	1/2 W	1/10%
R530M	Change	323-0711-00	715 k	1/2 W	1/10%
R533	Add	315-0103-00	10 k	1/4 W	5%
R601	Add	316-0100-00	10	1/4 W	10%
R613B	Add	301-0914-00	910 k	1/2 W	5%
R613C	Add	301-0114-00	110 k	1/2 W	5%
R615	Add	315-0104-00	100 k	1/4 W	5%
R616	Add	315-0104-00	100 k	1/4 W	5%
R760	Change	311-0386-00	2 k, Var	WW	
R887	Add	308-0092-00	4.5 k	5W WW	5%
R1003	Add	316-0123-00	12 k	1/4 W	

## Switches

S330	Add	260-0688-00	Lever	TRACE FINDER
S530A,B	Change	262-0392-01	Wired	Rotary A&B TIME/DIV
S569	Change	260-0247-00	Push	SPST RESET
S610	Add	260-0968-00	Lever	SOURCE
S615	Add	260-0700-00	Lever	COUPLING
S801	Add	260-1495-00	Lever	HORIZ DISPLAY
S801A	Delete			
S801B	Delete			

## 453 MOD 703K

Ckt No.		Tektronix Part No.	Description
		Semiconductor Device, Diodes	
CR631	Add	152-0246-00	Silicon Low Leakage 40 V, 0.25 W
CR641	Add	152-0185-00	Silicon Replaceable by 1N4152
CR728	Add	152-0185-00	Silicon Replaceable by 1N4152

## Resistors

R531	Delete				
R627	Add	315-0223-00	22 k	1/4 W	5%
R629	Add	301-0105-00	1 M	1/2 W	5%
R641	Add	315-0183-00	18 k	1/4 W	5%
R642	Add	316-0332-00	3.3 k	1/4 W	10%
R644	Add	321-0289-00	10 k	1/8 W	1%
R645	Add	311-1227-00	5 k, Var		
R646	Add	315-0824-00	820 k	1/4 W	5%
R728	Add	315-0331-00	330	1/4 W	5%
R758	Change	311-0514-00	100, Var		
R821	Add	315-0510-00	51	1/4 W	5%

## FIGURE 2 CHASSIS &amp; HIGH VOLTAGE

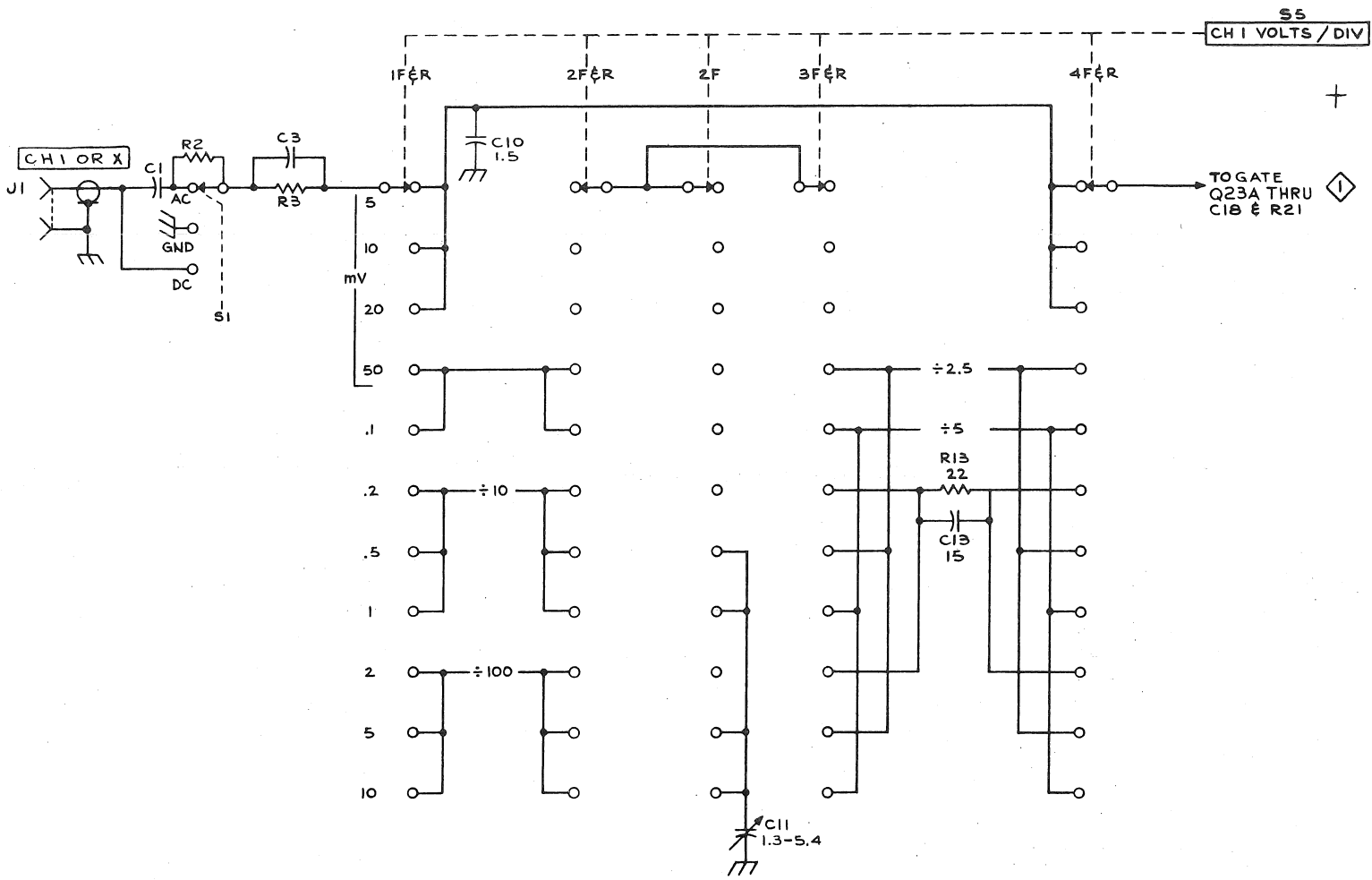
Fig. & Index No.		Tektronix Part No.	Qty	Description
2-35	Change	179-1642-02	1	Wiring Harness, A Sweep
2-112	Delete			
2-113	Delete			
2-161	Change	147-0027-00	1	Motor, fan
2-163	Delete	337-1505-00	1	Shield, motor
2-164				

## FIGURE 3 FRAME &amp; CABINET

3-15	Change	367-0058-00	1	Handle, carrying
3-27	Delete			

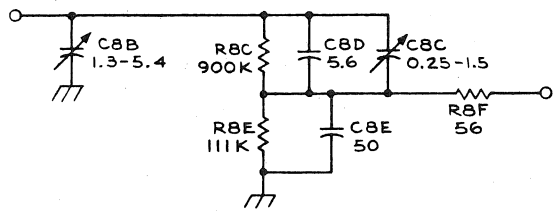
## ADDITIONS

Add	013-0105-00	2	Tip, probe, retractable hook assembly
Add	103-0013-00	1	Adapter, power cord, 3 wire to 2 wire
Add	103-0051-00	2	Adapter, probe tip
Add	134-0013-00	2	Plug, banana, female
Add	206-0104-00	2	Tip, probe, straight
Add	331-0092-00	1	Dial, window knob, clear plastic
Add	136-0252-04	24	Socket, transistor, individual lead
Add	260-0688-00	1	Switch, push, Trace Finder
Add	361-0059-01	1	Spacer, current loop



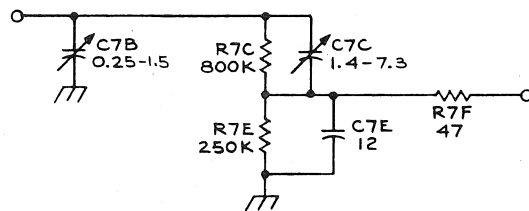
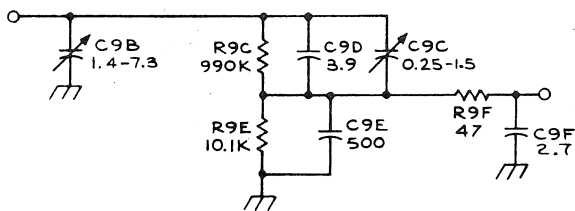
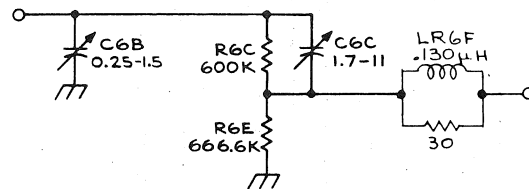
÷10

÷2.5



÷100

÷5

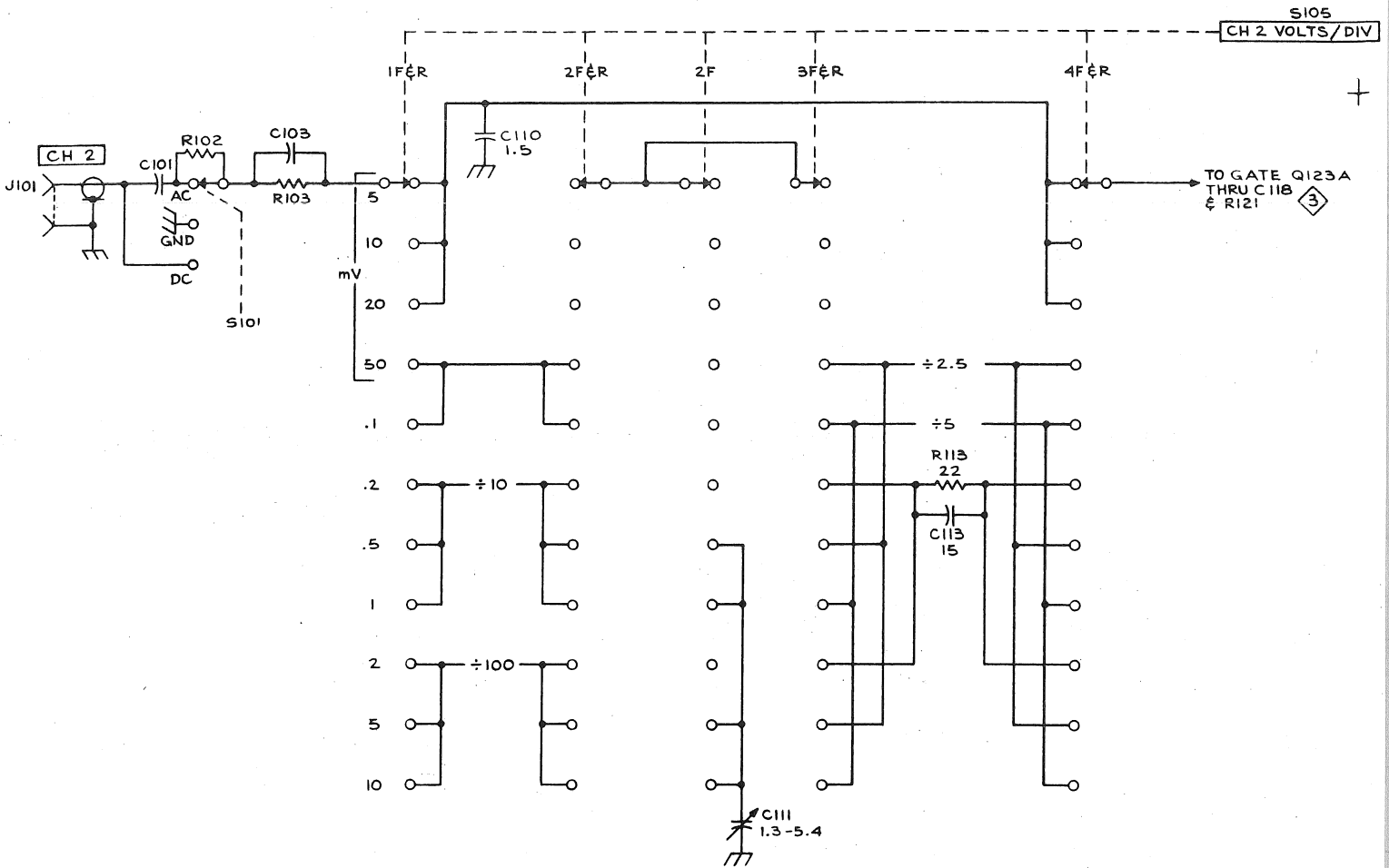


REFERENCE DIAGRAMS

◇ CHANNEL I VERTICAL PREAMP

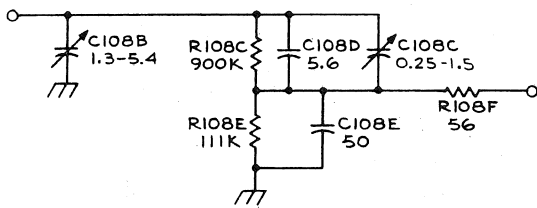
CHANNEL I ATTENUATORS ◇



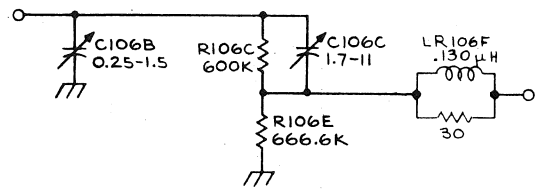


÷ 10

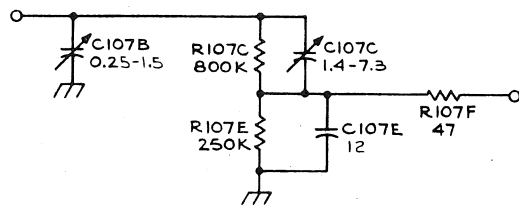
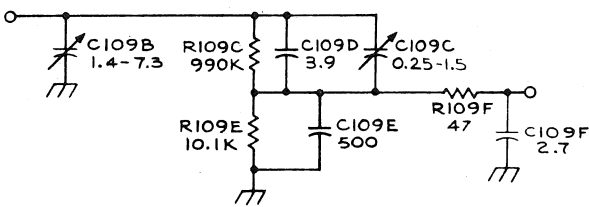
÷ 2.5



÷ 100



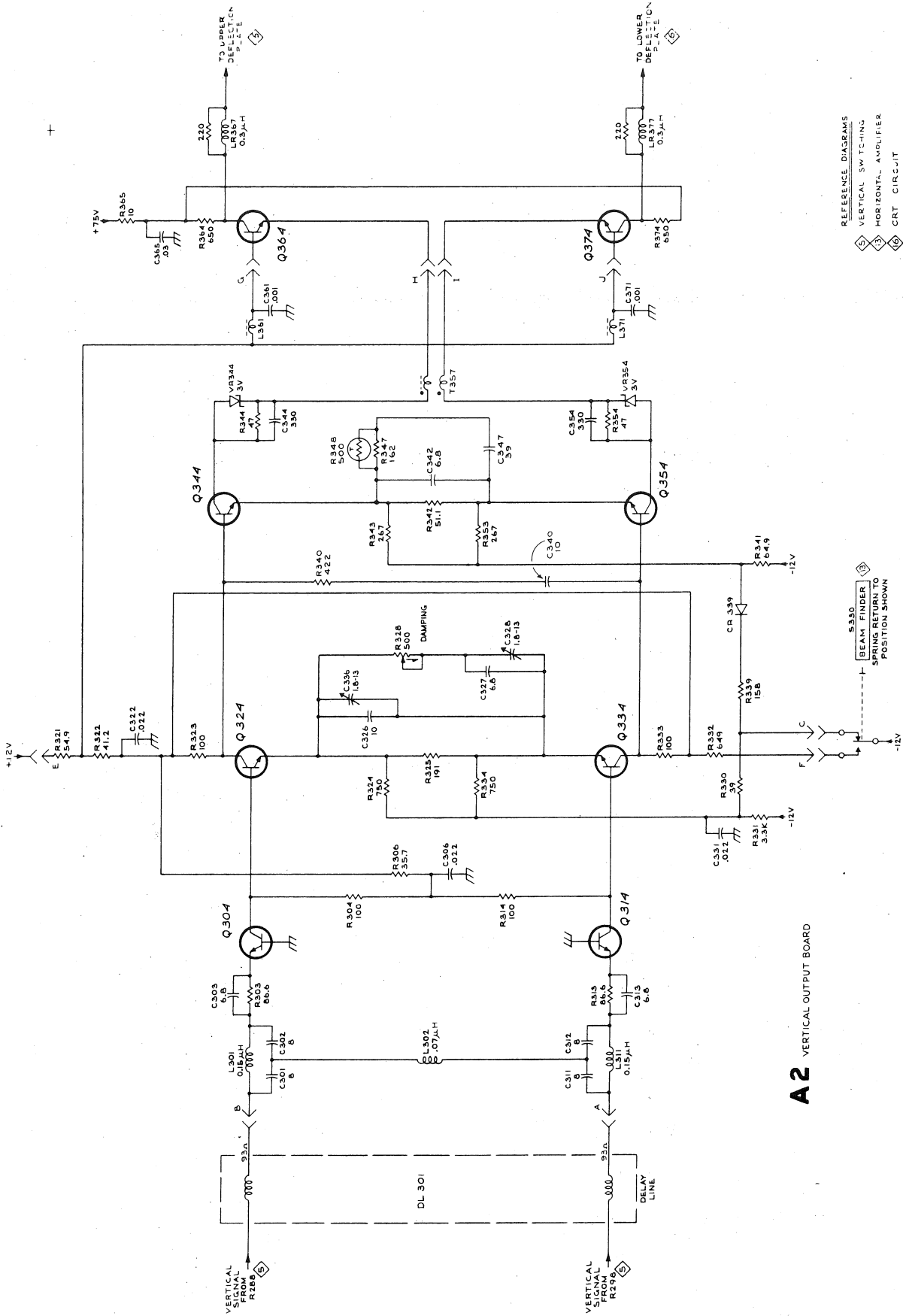
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REFERENCE DIAGRAMS

3 CHANNEL 2 VERTICAL PREAMP

CHANNEL 2 ATTENUATORS 4



**A2** VERTICAL OUTPUT BOARD

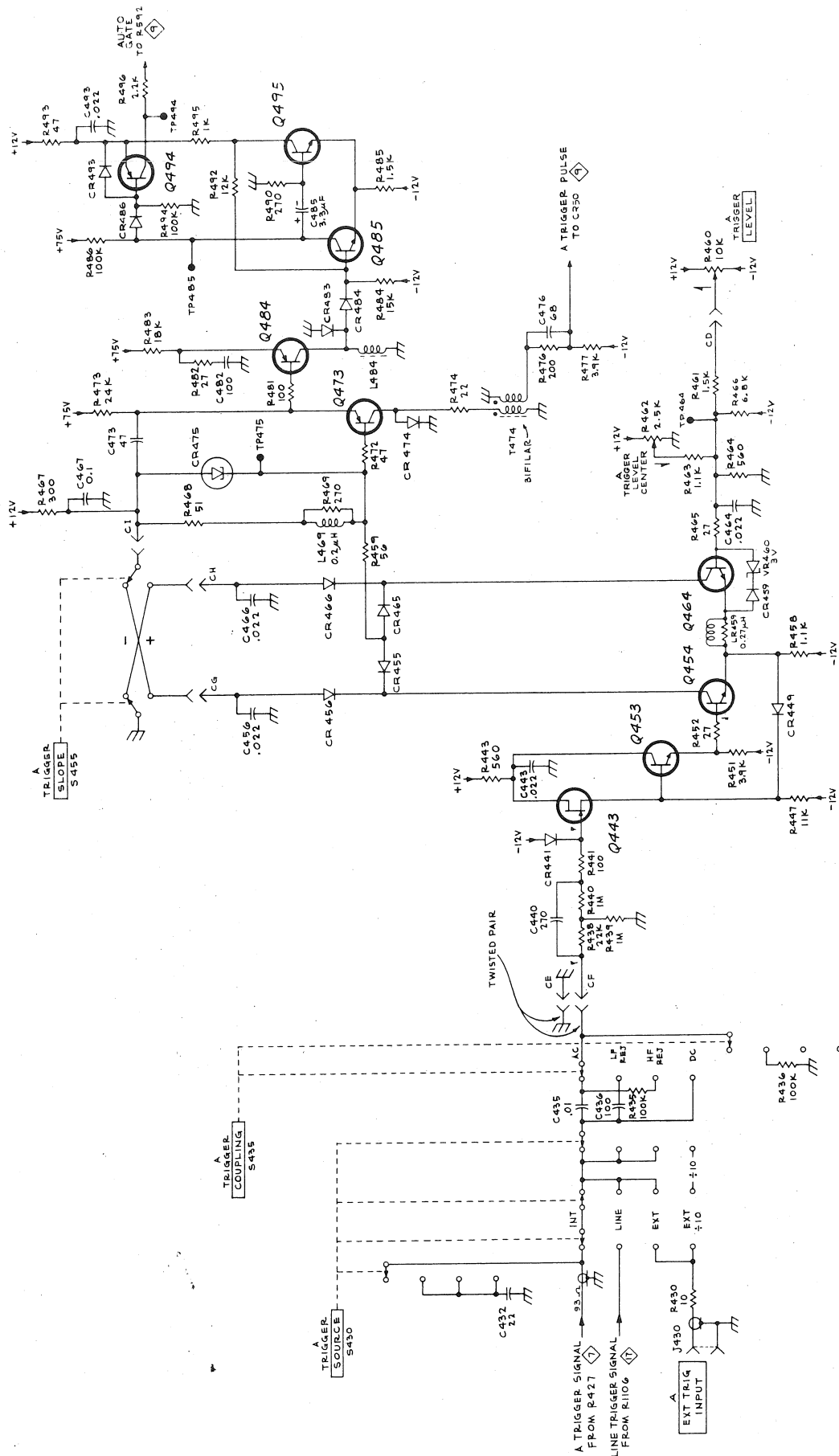
REFERENCE DIAGRAMS  
 5 VERTICAL SWITCHING  
 6 HORIZONTAL AMPLIFIER  
 7 CRT CIRCUIT

S330 BEAM FINDER TO SWITCH FROM TO POSITION SHOWN

VERTICAL OUTPUT AMPLIFIER 6

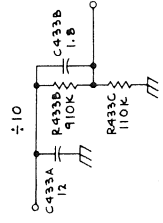
S/N B020100 UF

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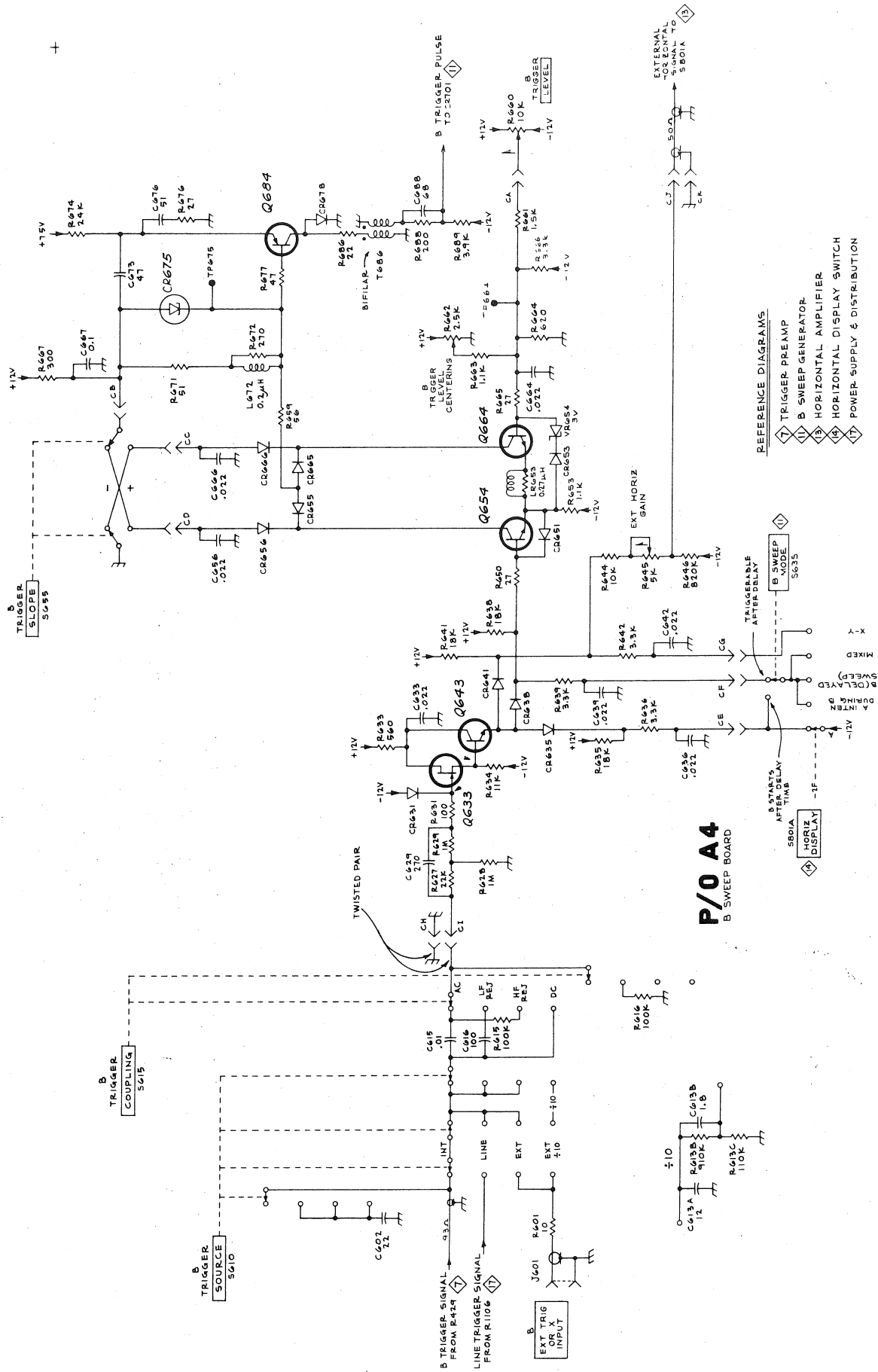
**P/O A3** A SWEEP BOARD

- REFERENCE DIAGRAMS
- ⊠ TRIGGER PREAMP
  - ⊡ A SWEEP GENERATOR
  - ⊢ POWER SUPPLY & DISTRIBUTION



**A TRIGGER GENERATOR**

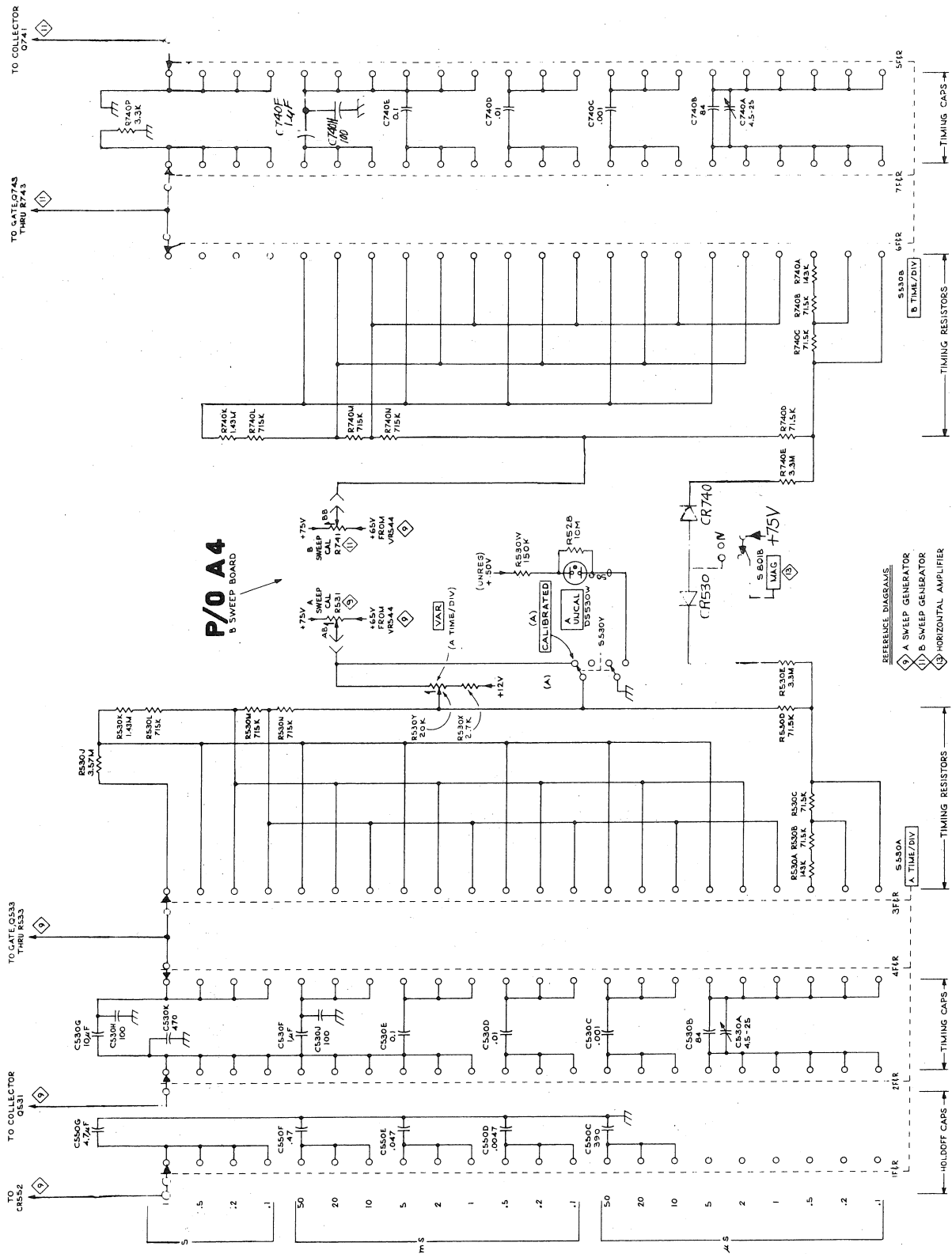
453 MOD 703K S/N B020100 UP



**P/O A4**  
B SWEEP BOARD

- REFERENCE DIAGRAMS
- ① TRIGGER PREAMP
  - ② B SWEEP GENERATOR
  - ③ HORIZONTAL AMPLIFIER
  - ④ HORIZONTAL DISPLAY SWITCH
  - ⑤ POWER SUPPLY & DISTRIBUTION

B TRIGGER GENERATOR

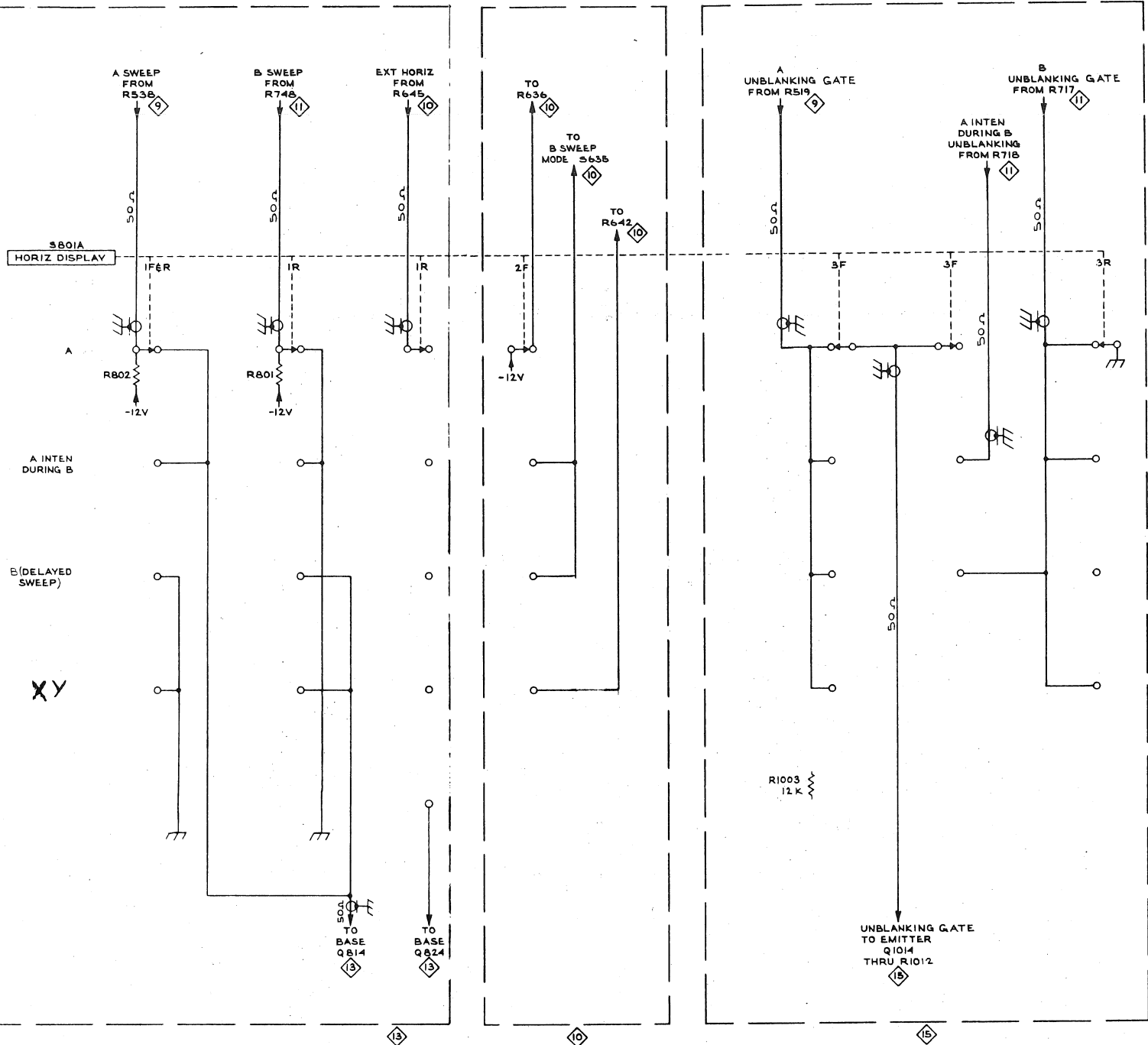


**P/O A4**  
5 SWEEP BOARD

REFERENCE DIAGRAMS  
 (A) SWEEP GENERATOR  
 (B) SWEEP GENERATOR  
 (C) HORIZONTAL AMPLIFIER

A and B TIMING SWITCH

453 MOD 703K S/N B020100 UP

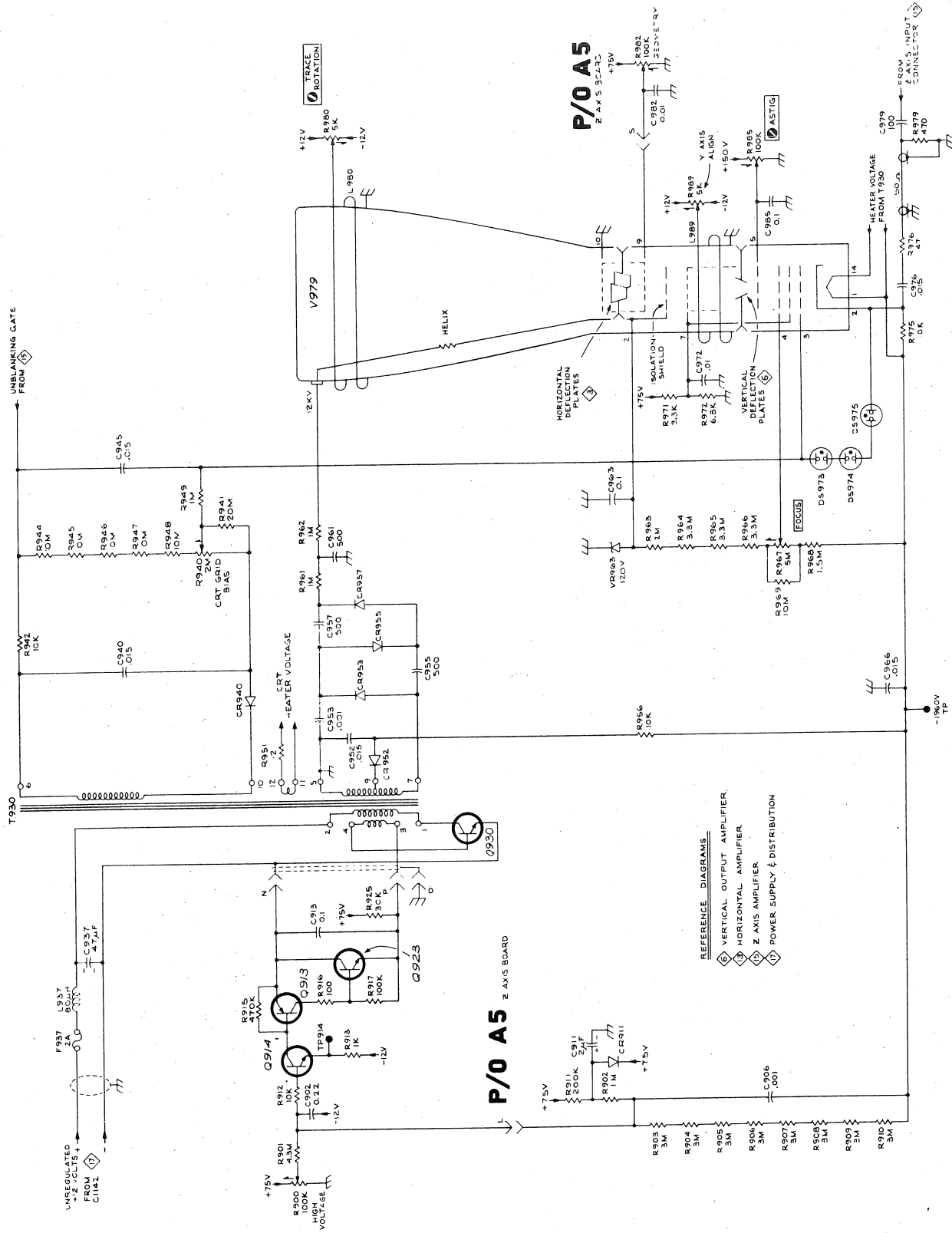


REFERENCE DIAGRAMS

- 9 A SWEEP GENERATOR
- 10 B TRIGGER GENERATOR
- 11 B SWEEP GENERATOR
- 13 HORIZONTAL AMPLIFIER
- 15 Z AXIS AMPLIFIER

HORIZONTAL DISPLAY SWITCH 14

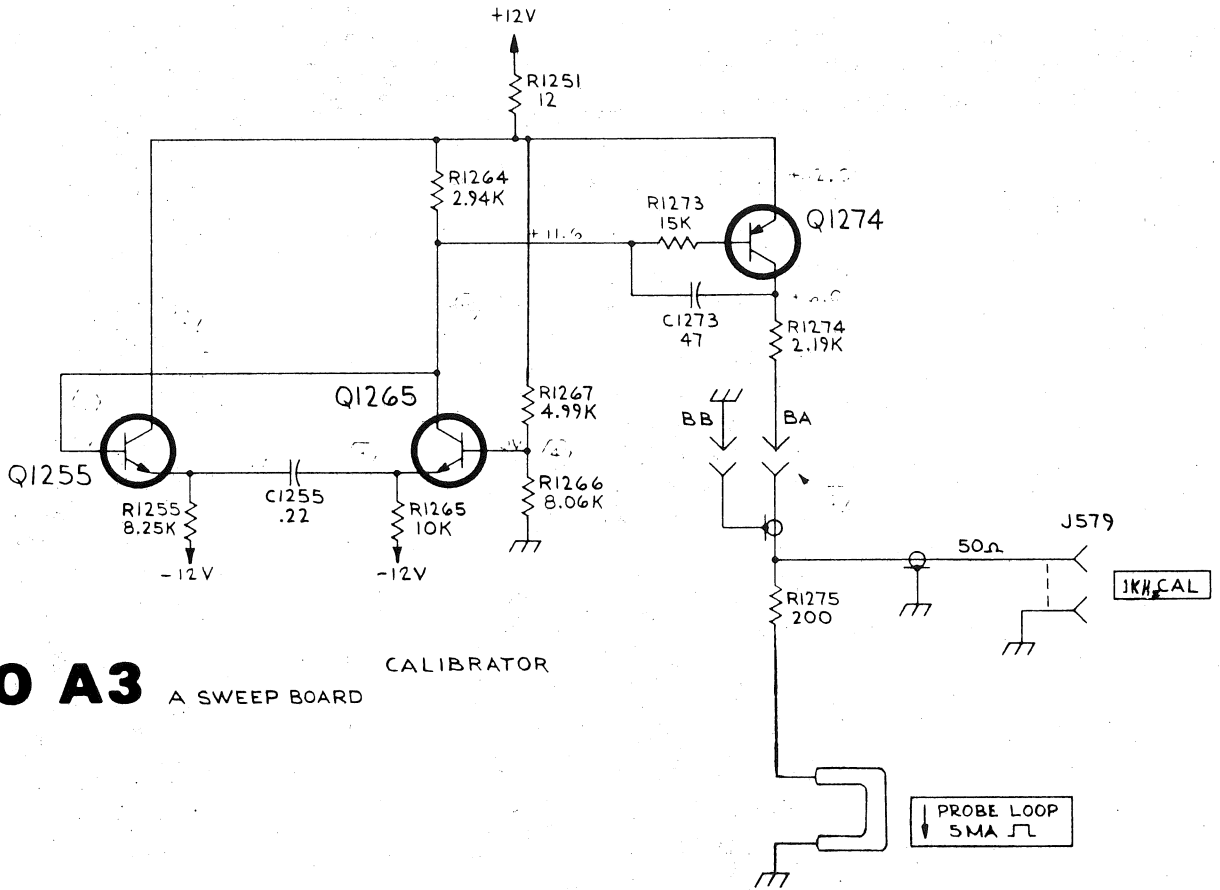
453MOD703K S/N B020100 UP



CRT CIRCUIT

S/N B020100 UP

453 MOD703K



**P/O A3** A SWEEP BOARD

CALIBRATOR