

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 ± 1 div.

453 MOD 703K

A GATE: B GATE

Waveshape	Rectangular pulse.
Amplitude	Approximately 12 volts peak.
Polarity	Positive going; baseline at about -0.7 volt.
Duration	Same duration as respective sweep.
Output Resistance	Approximately 1.5 kilohms.

CALIBRATOR

Output Voltage	1.0 V \pm 3% fixed value.
Frequency	1 kHz \pm 20%.
Output Current	Five milliamperes through probe loop on front panel.

HORIZ DISPLAY

X-Y Phase Difference	3° or less at 50 kilohertz between X and Y amplifiers.
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B TRIGGERING

Same as A Sweep

OPERATING INSTRUCTIONS

When operating with Channel 1 and 2 cascaded and the CH 1 OUT signal not terminated in 50 ohms, the sensitivity becomes 125 microvolts/division when the VOLTS/DIV switches are both set to 5 mV. Bandpass in this mode of operation is ≥ 5 MHz when the CH 1 OUT signal is driving into a load of 1 megohm paralleled by 50 pF or less.

It is not recommended that the instrument be operated with Channel 1 and 2 cascaded without terminating the CH 1 OUT signal in 50 ohms.

PERFORMANCE CHECK

The following changes to the Performance Check section of the Type 453 Instruction Manual are necessary to permit making a complete performance check on a Type 453 Oscilloscope containing MOD 703K.

Only the affected steps are listed below. For the remainder of the steps, refer to the Performance Check section of your instruction Manual.

Additional equipment required:

One 12'' coaxial cable with BNC connectors on each end part number 034-3017-00.

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.

31A. Check A Sweep Output Signal.

Requirement: Polarity, negative going; amplitude, approximately 0.3 volts; duration, same as A SWEEP.

a. Connect the A SWEEP connector to the test oscilloscope input connector with the BNC cable.

b. CHECK-Test oscilloscope display for a vertical deflection of approximately 0.3 volts. Sweep duration should be the same as A SWEEP.

CALIBRATION

After calibrating the instrument using the standard procedure given in the Instruction Manual, perform the following additional steps:

1. Freerun A Sweep and check at the SAWTOOTH OUT connector for a sweep waveform of approximately 0.3 volts amplitude with a retrace to a quiescent level of about 0.4 volts.

2. Preset the controls as follows:

CH 1 VOLTS/DIV	20 mV
CH 1 POSITION	Centered
AC-GND-DC	DC
CH 2 VOLTS/DIV	20 mV
CH 2 POSITION	Centered
AC-GND-DC	DC
MODE	CH 1
TIME/DIV	.5 ms
SWEEP MODE	AUTO
HOR DISPLAY	A
TRIGGER SLOPE	+
TRIGGER COUPLING	AC
TRIGGER SOURCE	INT

3. Set CH 1 trace to exact graticule center.

4. Switch MODE switch to CH 2.

5. Set CH 2 trace to exact graticule center.

6. Connect CH 1 OUT to CH 2 INPUT with a 12 inch BNC cable.

INSTRUCTION MANUAL

MODIFICATION INSERT

Serial Number _____

TYPE 453
MOD 703H

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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TYPE 453

MOD 703H

Tektronix, Inc.

S.W. Millikan Way • P. O. Box 500 • Beaverton, Oregon 97005 • Phone 644-0161 • Cables: Tektronix
08260

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TYPE 453
MOD 703H

This manual insert describes the features of MOD 703H as installed in the Type 453 Oscilloscope. The instrument contains the following changes:

1. A SAWTOOTH OUT facility is added with its BNC connector mounted on the side panel.
2. Amplitude of CH 1 OUT signal is increased to 200 mV for each division of vertical deflection.
3. The CRT is replaced with a CRT having a special internal rise-time graticule.
4. Two probe tip adapters, two banana plug tips, and a 13.5" BNC to BNC 50 Ω coaxial cable are added to the standard accessories.

CHARACTERISTICS

SAWTOOTH OUT

Characteristic	Performance Requirement
Waveform	
Polarity	Positive going
Quiescent Level	0 volts.
Amplitude	Approximately +11 volts with the A SWEEP LENGTH control set to FULL.
Source impedance	Approximately 330 Ω for passive external loading.
Loading	
Maximum	Externally shorting SAWTOOTH OUT to ground will not damage the instrument.
Capacitive	Capacitive loading should not exceed 125 pF for maximum linearity at fast sweep rates.
Output signal amplitude	
Open circuit	200 mV for each division of CH 1 vertical deflection with Channel 1 VARIABLE VOLTS/DIV in CAL position.
Cascaded operation	Approximately 1 mV/div sensitivity with 25 MHz or greater bandwidth with CH 1 OUT signal terminated in 50 Ω at CH 2 INPUT connector.
Source impedance	Not over 500 Ω .

CATHODE RAY TUBE

All normal specifications apply.

OPERATING INSTRUCTIONS

When operating with Channel 1 and 2 cascaded and the CHAN 1 OUT signal not terminated in 50 ohms, the sensitivity becomes 125 μ V/div when the VOLTS/DIV switches are both set to 5 mV. Bandpass in this mode of operation is ≥ 5 MHz when the CHAN 1 OUT signal is driving into a load of 1 megohm paralleled by 50 pF or less.

It is not recommended that the instrument be operated with Channel 1 and 2 cascaded without terminating the CHAN 1 OUT signal in 50 ohms.

PERFORMANCE CHECK

The following changes to the Performance Check section of the Type 453 Instruction Manual are necessary to permit making a complete performance check on a Type 453 Oscilloscope containing MOD 703H.

Only the affected steps are listed below. For the remainder of the steps, refer to the Performance Check section of your Instruction Manual.

Additional equipment required:

One 12" coaxial cable with BNC connectors on each end; part number 034-3017-00

One 90° BNC elbow; part number 103-0031-00.

16A. Check CHAN 1 OUT amplifier output DC level.

Requirement: 0 V, ± 1 V DC output level with Chan 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 CHAN 1 OUT connector. It should be 0 V, ± 1 V DC.

17. Check Channel 1 and 2 Cascaded Deflection Factor.

Requirement: Approximately 1 mV/div with CHAN 1 OUT terminated in 50 ohms.

- a. Connect the CHAN 1 OUT connector to the Channel 2 INPUT connector with an 18-inch 50-ohm BNC cable and a BNC 50-ohm termination at the Channel 2 INPUT connector.

b. Change the following control settings:

VOLTS/DIV (CH 1 and 2)	5 mV
VARIABLE (CH 1 and 2)	CAL
Input Coupling (CH 1 and 2)	DC

c. Set the standard amplitude calibrator for a five-millivolt square-wave output.

d. CHECK--CRT display five divisions in amplitude (approximately one millivolt/division deflection factor.)

17A. Check Channel 1 and 2 Cascaded Deflection Factor.

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

a. Connect the CH 1 OUT connector to the Channel 2 INPUT connector with an 18-inch 50-ohm BNC cable.

b. Change the following control settings:

VOLTS/DIV (CH 1 and 2)	20 mV
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c. Set the standard amplitude calibrator for a ten-millivolt square-wave output.

d. CHECK--CRT display 5 divisions $\pm 5\%$ in amplitude.

27. Check Channel 1 and 2 Cascaded Upper Bandwidth Limit.

Requirement: Not more than -3 dB at 25 megahertz with CHAN 1 OUT terminated in 50 ohms.

a. Connect the CHAN 1 OUT connector to the Channel 2 INPUT connector with an 18-inch 50-ohm BNC cable and a BNC 50-ohm termination at the Channel 2 INPUT connector.

b. Change the following control settings:

VOLTS/DIV (CH 1 and 2)	5 mV
------------------------	------

c. Set the MODE switch to CH 2.

d. Set the constant-amplitude generator for a four-division display at its reference frequency (50 kHz).

e. 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).

f. CHECK--Output frequency of generator must be 25 megahertz or higher. Actual frequency, _____ megahertz.

27A. Check Channel 1 and 2 Cascaded Upper Bandwidth Limit.

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

- a. Remove the 50-ohm BNC termination from the CHAN 2 INPUT.
- b. Replace the 18-inch BNC cable with the 12-inch BNC cable and the 90° BNC elbow.
- c. Change Chan 2 VOLTS/DIV to 20 mV.
- d. Set the constant-amplitude generator for a four-division display at its reference frequency (50 kHz).
- e. 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).
- f. CHECK--Output frequency of generator must be 5 megahertz or higher. Actual frequency, _____ megahertz.
- g. Disconnect the cable from between the CHAN 1 OUT and Channel 2 INPUT connectors.

73A. Check A Sweep Output Signal.

Requirement: Polarity, positive going; amplitude, 11 volts $\pm 10\%$; duration, same as A SWEEP.

- a. Connect the A SWEEP connector to the test oscilloscope input connector with the 18-inch BNC cable.
- b. CHECK--Test oscilloscope display for a vertical deflection of an amplitude equal to 11 volts $\pm 10\%$ with the bottom of the waveform near the zero-volt level. Sweep duration should be the same as A SWEEP.

CALIBRATION

After calibrating the instrument using the standard procedure given in the Instruction Manual, perform the following additional steps:

1. Freerun A Sweep and check at the SAWTOOTH OUT connector for a sweep waveform of approximately +11 volts amplitude with a retrace to a quiescent level of about 0 volts.
2. Preset the Type 453 MOD 703H controls as follows:

CH 1 VOLTS/DIV	20 mV
CH 1 POSITION	Centered
AC-GND-DC	DC
CH 2 VOLTS/DIV	20 mV
CH 2 POSITION	Centered
AC-GND-DC	DC

TYPE 453
MOD 703H

MODE	CH 1
TIME/DIV	.5 msec
SWEEP MODE	AUTO
HOR DISPLAY	A
TRIGGER SLOPE	+
TRIGGER COUPLING	AC
TRIGGER SOURCE	INT

3. Set CH 1 trace to exact graticule center.
4. Switch MODE switch to CH 2.
5. Set CH 2 trace to exact graticule center.
6. Connect CH 1 OUT to CH 2 INPUT with a 12-inch BNC cable and a 90° BNC elbow.
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. Terminate CH 1 OUT with a BNC 50 Ω termination at the CH 2 INPUT connector.
11. Connect a 100 mV calibrator signal to the CH 1 INPUT connector.
12. Set CH 1 VOLTS/DIV to 10 mV.
13. Set CH 2 VOLTS/DIV to 50 mV.
14. Check for approximately 5 major divisions of vertical deflection.
15. Change CH 1 VOLTS/DIV to 20 mV.
16. Change CH 2 VOLTS/DIV to 20 mV.
17. Change TIME/DIV switch to .2 μ sec.
18. Connect Type 106 Square Wave Generator to CH 1 INPUT connector and obtain 4 major divisions of vertical deflection of 100 kc square wave.
19. Adjust R381, C381, and C377 for optimum flat response.
20. Using a Type 191 Constant Amplitude Signal Generator, check for a bandwidth of 25 MHz or greater with CH 1 and CH 2 VOLTS/DIV switches set to 5 mV.
21. Change CH 2 VOLTS/DIV switch to 20 mV and remove the 50 Ω termination at the CH 2 INPUT connector. Recheck bandpass for \geq 5 MHz.

PARTS LIST

The following changes should be made to the appropriate parts list for this modified instrument. When ordering replacement parts, specify instrument type, serial number, and MOD number. Include the part number, circuit number, and description of the desired item.

NOTE: Circuit numbers for Semiconductor Devices (diodes) are CR and VR numbers in the parts list and D numbers on the schematic. For example, CR204 in the parts list is D204 on the schematic.

CAPACITORS

C375	Add	283-0023-00	.1 μ F	10 V	disc
C377	Add	281-0077-00	1.3-5.4 pF		var
C380	Add	281-0511-00	22 pF		cer
C381	Add	281-0081-00	1.8-13 pF		var
C382	Add	281-0549-00	68 pF		cer
C386	Add	283-0059-00	1 μ F	25 V	disc
C390	Add	283-0059-00	1 μ F	25 V	disc
C902	Change	285-0703-00	.1 μ F	100 V	PTM
C904	Add	285-0703-00	.1 μ F	100 V	PTM

DIODES

CR201	Change	152-0141-00	Silicon	1N4152
CR202	Change	152-0141-00	Silicon	1N4152
CR203	Change	152-0141-00	Silicon	1N4152
CR204	Change	152-0141-00	Silicon	1N4152
CR206	Change	152-0141-00	Silicon	1N4152
CR207	Change	152-0141-00	Silicon	1N4152
CR208	Change	152-0141-00	Silicon	1N4152
CR209	Change	152-0141-00	Silicon	1N4152
CR218	Change	152-0141-00	Silicon	1N4152
CR228	Change	152-0141-00	Silicon	1N4152
VR344	Change	152-0076-00	Zener	1N4372
VR354	Change	152-0076-00	Zener	1N4372
VR375	Add	155-0166-00	Zener	6.2 V
CR385	Change	152-0141-00	Silicon	1N4152
CR408	Change	152-0141-00	Silicon	1N4152
CR541	Add	152-0185-00	Silicon	1N4152
VR544	Change	152-0064-00	Zener	1N961A
CR861	Change	152-0141-00	Silicon	1N4152
CR871	Change	152-0141-00	Silicon	1N4152
VR1043	Change	152-0126-00	Zener	1N3024A
VR1209	Change	152-0213-00	Zener	1N3032

INDUCTORS

L300	Change	119-0029-00	Delay Line
L383	Add	108-0072-00	.75 μ H

TYPE 453
MOD 703H

TRANSISTORS

Q123	Change	151-1011-00	Silicon	FET
Q215	Change	151-0223-00	Silicon	2N4275
Q225	Change	151-0223-00	Silicon	2N4275
Q234	Change	151-0223-00	Silicon	2N4275
Q375	Add	151-0127-00	Silicon	2N2369
Q385	Add	151-0221-00	Silicon	2N4258
Q533	Change	151-1005-00	Silicon	FET
Q542	Add	151-0133-00	Silicon	2N3251
Q743	Change	151-1005-00	Silicon	FET

RESISTORS

R40	Change	311-0546-00	10 k Ω	var	
R75	Change	311-0385-01	250 Ω	var	
		(part of S75 and R75 assembly)			
R140	Change	311-0546-00	10 k Ω	var	
R175	Change	311-0835-01	250 Ω	var	
		(part of S175 and R175 assembly)			
R373	Add	315-0100-00	10 Ω	1/4 W	5%
R375	Add	321-0147-00	332 Ω	1/8 W	1%
R376	Add	301-0681-00	680 Ω	1/2 W	5%
R377	Add	315-0680-00	68 Ω	1/4 W	5%
R378	Add	321-0165-00	511 Ω	1/8 W	1%
R379	Add	321-0229-00	2.37 k Ω	1/8 W	1%
R380	Add	307-0106-00	4.7 Ω	1/4 W	5%
R381	Add	311-0515-00	250 Ω		var
R382	Add	315-0822-00	8.2 k Ω	1/4 W	5%
R383	Add	321-0130-00	221 Ω	1/8 W	1%
R384	Add	321-0097-00	100 Ω	1/8 W	1%
R385	Add	311-0514-00	100 Ω		var
R386	Add	307-0106-00	4.7 Ω	1/4 W	5%
R387	Add	322-0197-00	1.1 k Ω	1/4 W	1%
R388	Add	315-0680-00	68 Ω	1/4 W	5%
R389	Add	321-0207-00	1.4 k Ω	1/8 W	1%
R390	Add	311-0658-00	500 Ω		var
R530F	Change	309-0095-00	10 M Ω	1/2 W	1%
R530G	Change	309-0454-00	11.5 M Ω	1/2 W	1%
R530H	Change	309-0453-00	7.15 M Ω	1/2 W	1%
R530J	Change	309-0452-00	3.57 M Ω	1/2 W	1%
R542	Add	301-0331-00	330 Ω	1/2 W	5%
R543	Add	315-0222-00	2.2 k Ω	1/4 W	5%
R545	Add	321-0249-00	4.87 k Ω	1/8 W	1%
R550	Add	321-0258-00	4.75 k Ω	1/8 W	1%
R551	Add	322-0338-00	32.4 k Ω	1/4 W	1%
R555	Change	311-0547-00	10 k Ω		var
R740F	Change	309-0095-00	10 M Ω	1/2 W	1%
R740G	Change	309-0454-00	11.5 M Ω	1/2 W	1%
R740H	Change	309-0453-00	7.15 M Ω	1/2 W	1%
R740J	Change	309-0452-00	3.57 M Ω	1/2 W	1%
R951	Change	308-0427-00	9.3 Ω	1/2 W	1%

TYPE 453
MOD 703H

SWITCHES

S75	Change	311-0385-01	SPST	CH1 CAL
		(part of R75 and S75 assembly)		
S175	Change	311-0385-01	SPST	CH2 CAL
		(part of R175 and S175 assembly)		
S801A S801B	Change	262-0725-02	wired,	HORIZ DISPLAY

TRANSFORMER

T1101	Change	120-0470-00	L. V. Power
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TUBES

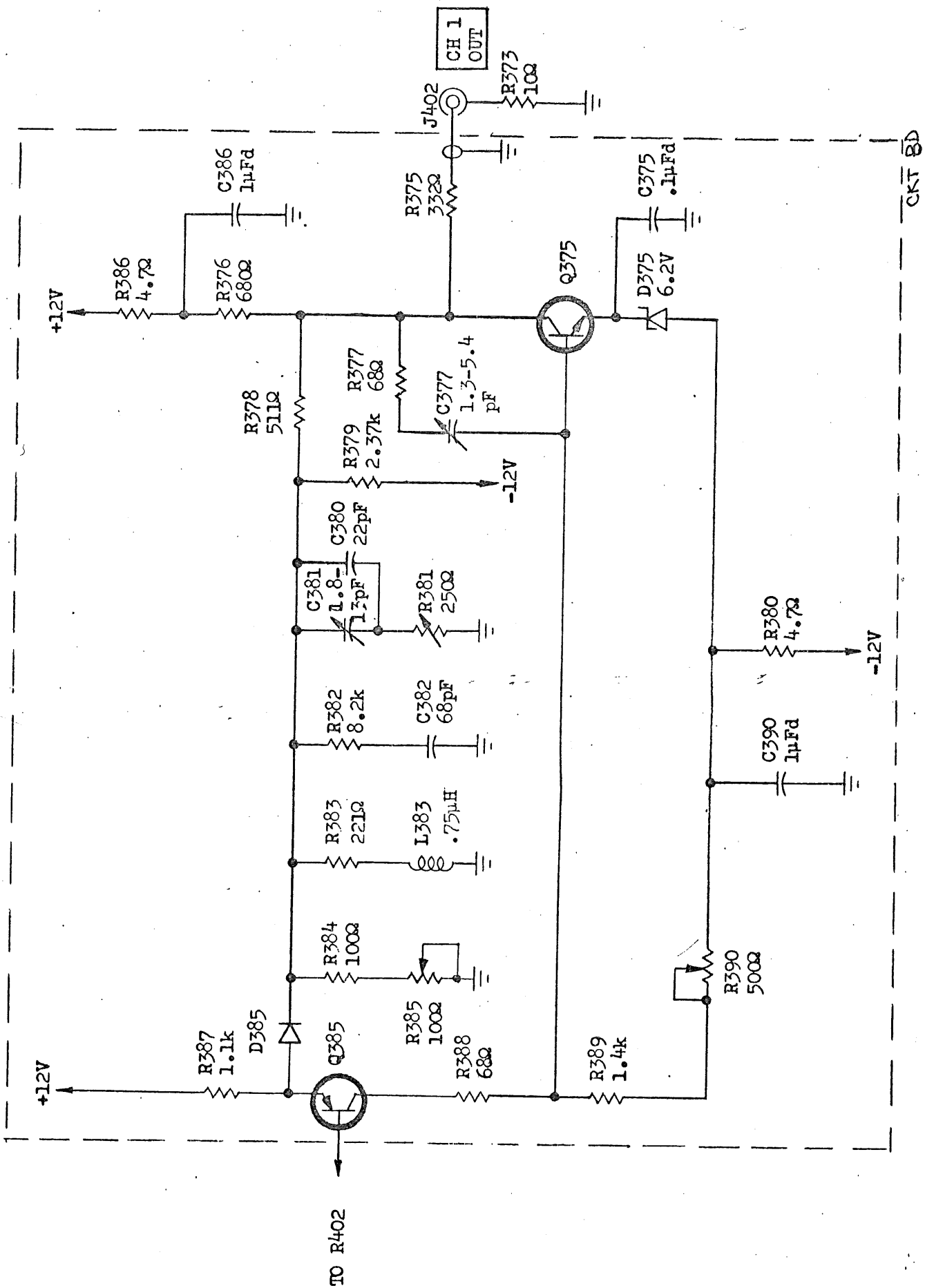
V952	Delete	154-0051-00	
V962	Delete	154-0051-00	
V979	Change	154-0492-06	CRT, T4531-31-9.15

MECHANICAL

BRACKET, sync board	Add	1	407-0454-00
BRACKET, delay line	Delete	1	407-0408-00
BRACKET, delay line	Add	1	407-0145-00
CABLE, "A" Horiz. Dis.	Change	1	179-0993-02
CABLE, "A" Sweep	Change	1	179-0995-03
CABLE, "B" Horiz. Dis.	Change	1	179-0994-01
CABLE, coaxial, 50 Ω	Add	1	175-0469-00
CIRCUIT BOARD, CH 1 Amp	Add	1	388-1284-00
CIRCUIT BOARD, Sawtooth Amp	Add	1	388-1285-00
CONNECTOR, BNC insulated "D"	Add	1	131-0274-00
CONNECTOR, coaxial min., female	Add	2	131-0155-00
CONNECTOR, round pin	Add	6	131-0633-00
CONNECTOR, Selectro, male	Add	2	131-0265-00
CONNECTOR, solderless	Add	1	131-0371-00
CONNECTOR, terminal, cable end	Add	2	131-0512-00
FOOT, body and cord holder	Delete	4	348-0078-00
FOOT, body and cord holder	Delete	4	348-0078-01
FOOT, cap	Delete	4	348-0079-00
FOOT, cap	Delete	4	348-0079-01
HARNESS, cable, A sweep	Change	1	179-0995-03
HARNESS, cable, B sweep	Change	1	179-0994-01
HARNESS, regulator bracket	Change	1	179-0991-00
HEAT SINK	Change	2	214-0317-00
POST, metallic, .406 x .250	Add	1	129-0098-00
PANEL, front (swing out)	Change	1	333-1229-02
ROD, spacing, 5/16 x .812 tapped 6-32	Add	2	385-0160-00
SOCKET, transistor	Add	3	136-0220-00

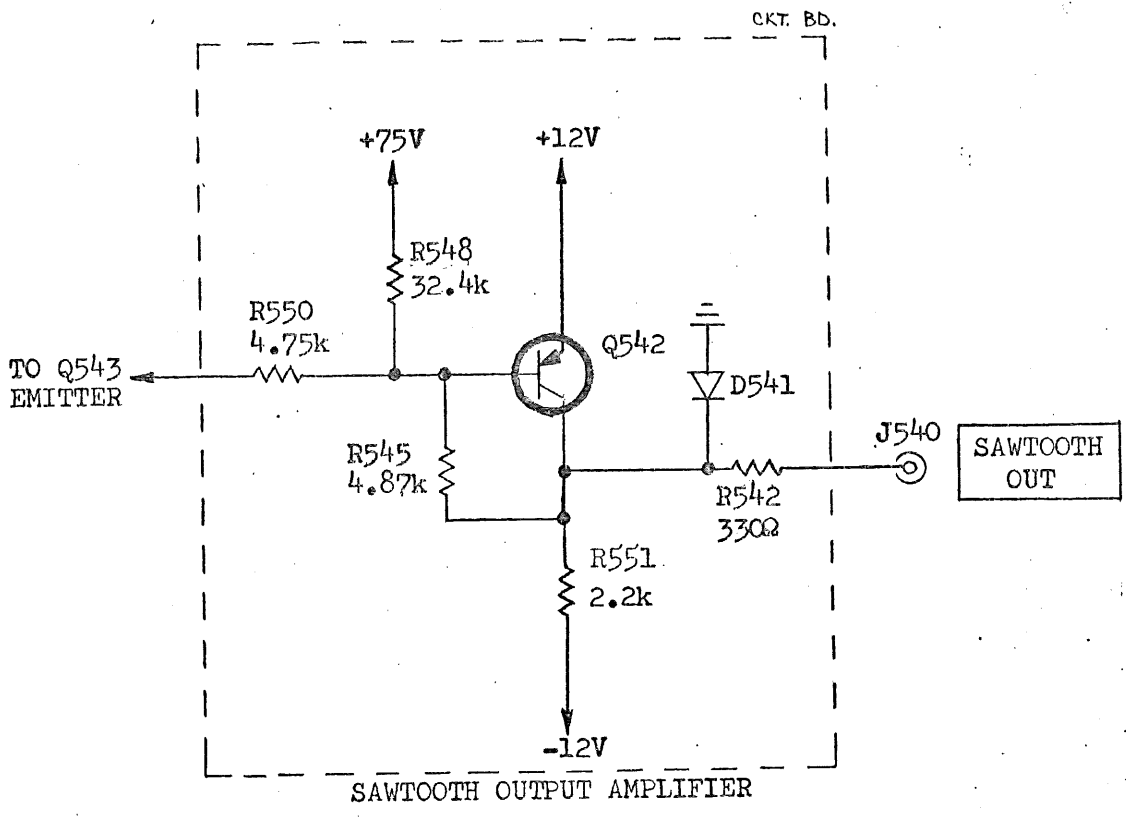
ACCESSORIES

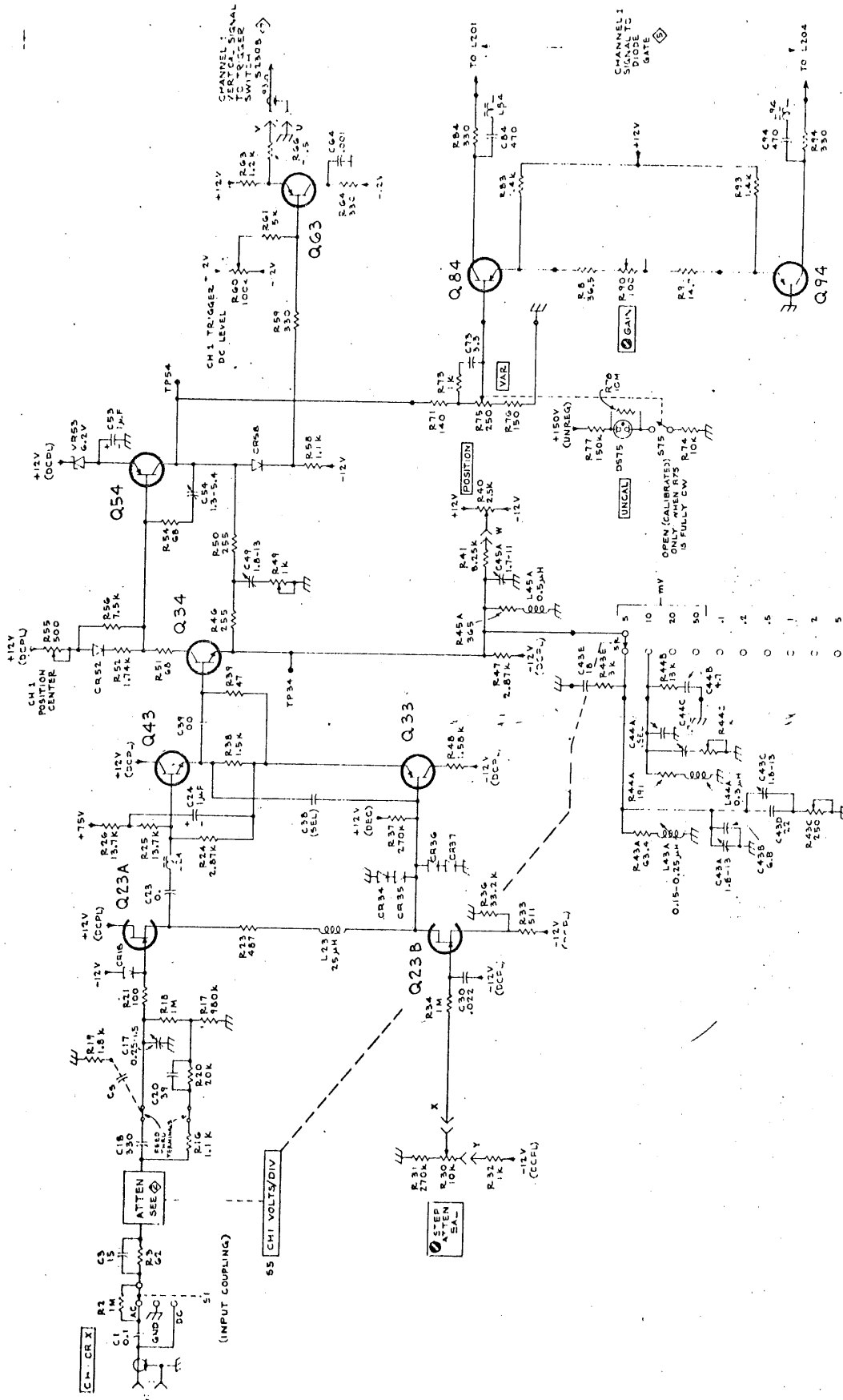
ADAPTER, probe tip	Add	2	103-0051-00
CABLE, coaxial, BNC to BNC, 13.5 in.	Add	1	012-0158-00
PLUG, banana, female	Add	2	134-0013-00



CH 1 OUTPUT AMPLIFIER

CKT 8D

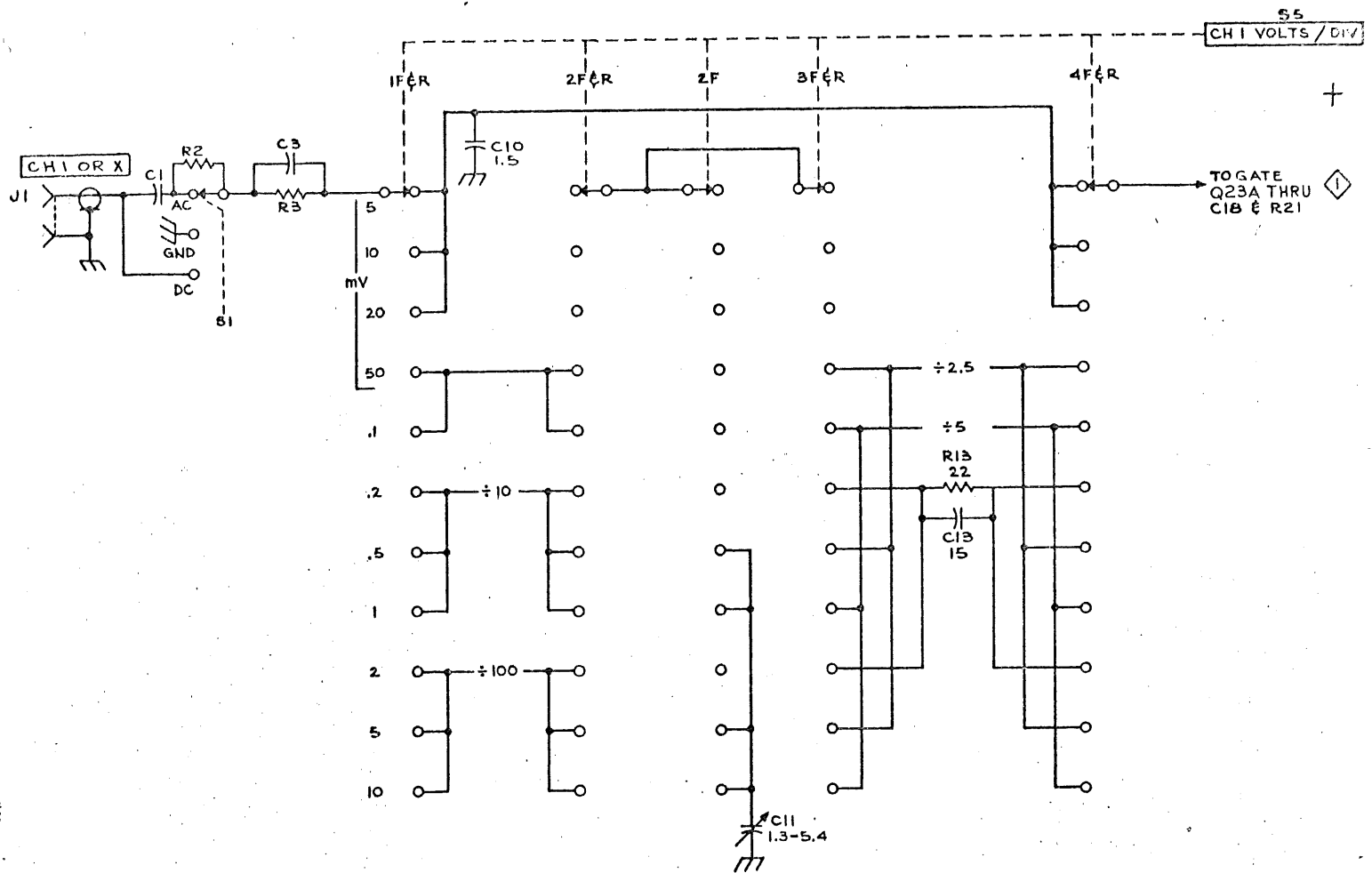




P/O AI VERTICAL PREAMP BOARD

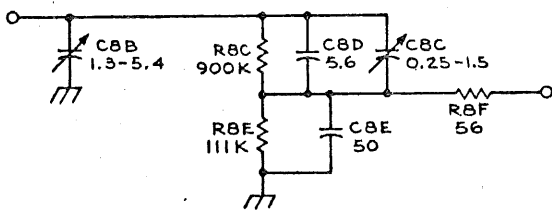
CHANNEL 1 VERTICAL PREAMP

453 MOD703KS/N 5023100 UF

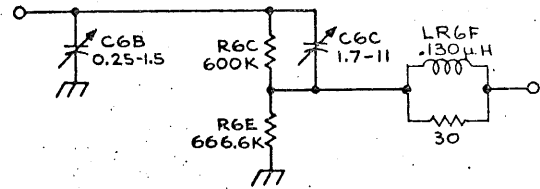


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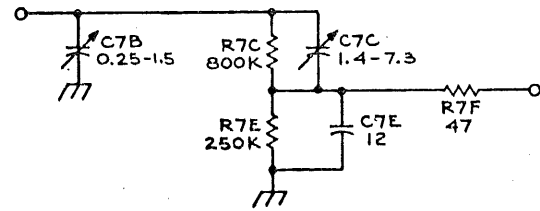
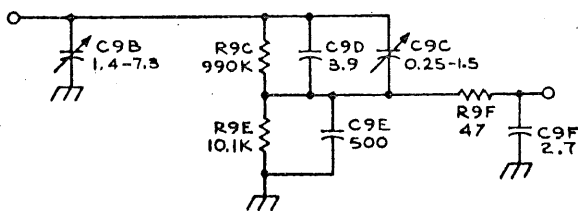
÷2.5



÷100



÷5

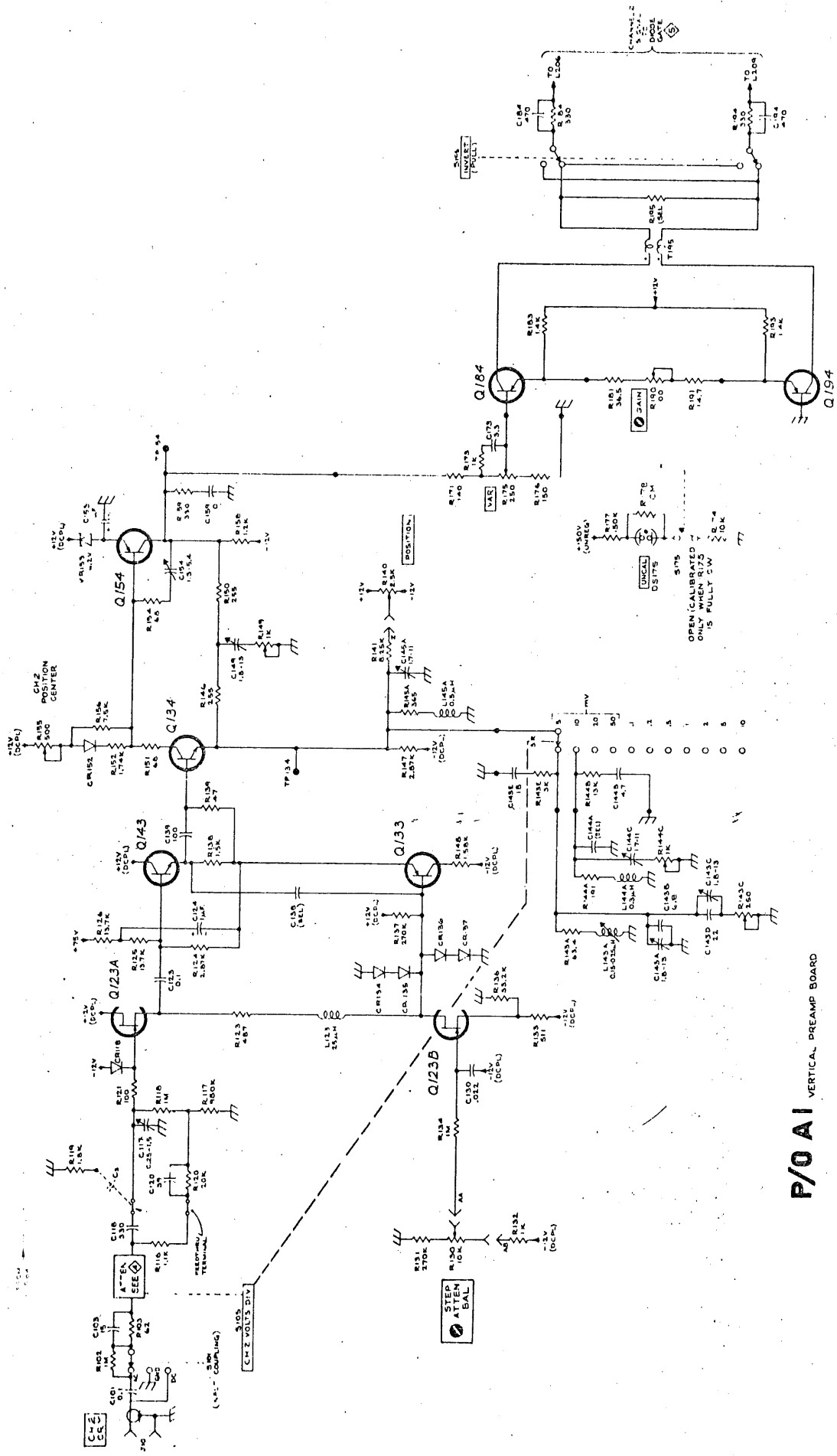


REFERENCE DIAGRAMS

① CHANNEL I VERTICAL PREAMP

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CHANNEL I ATTENUATORS ②

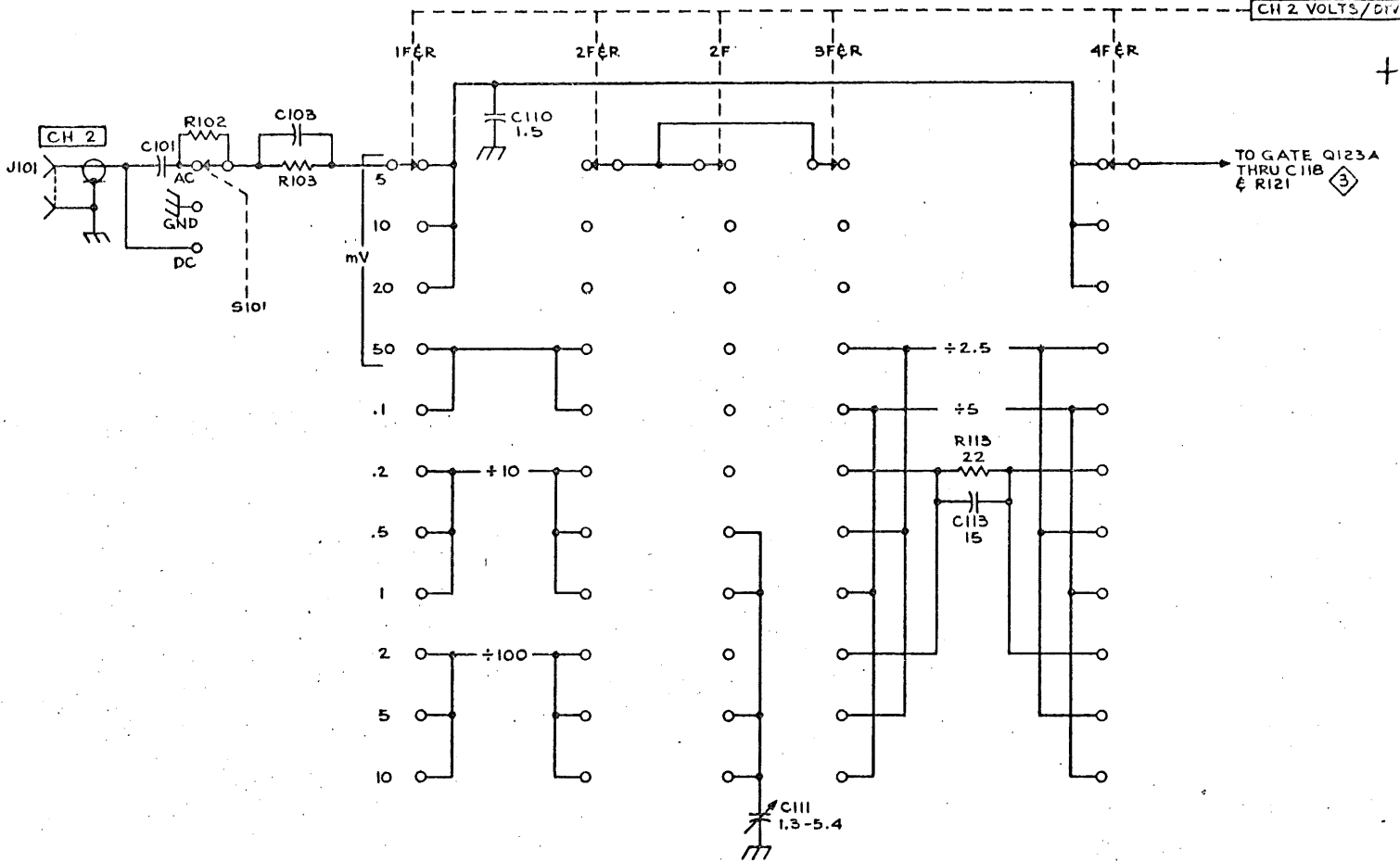


P/O AI VERTICAL PREAMP BOARD

REFERENCE DIAGRAMS
 CHANNEL 2 ATTENATORS
 VERTICAL SWITCHING

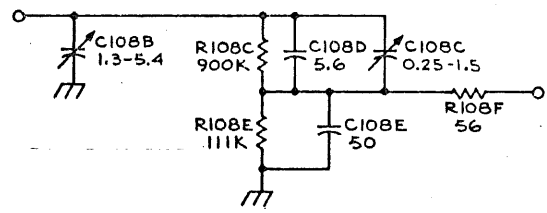
CHANNEL 2 VERTICAL PREAMP

453 MOD 703K E/N E020100 UP

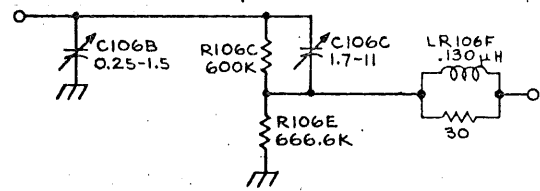


÷10

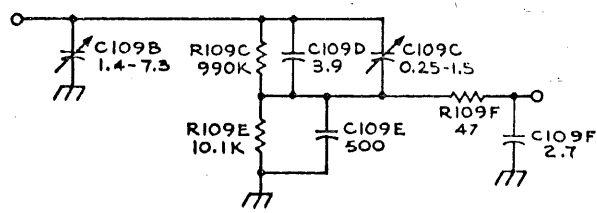
÷2.5



÷100

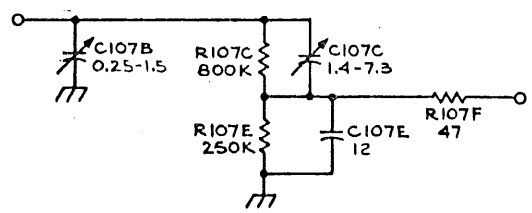


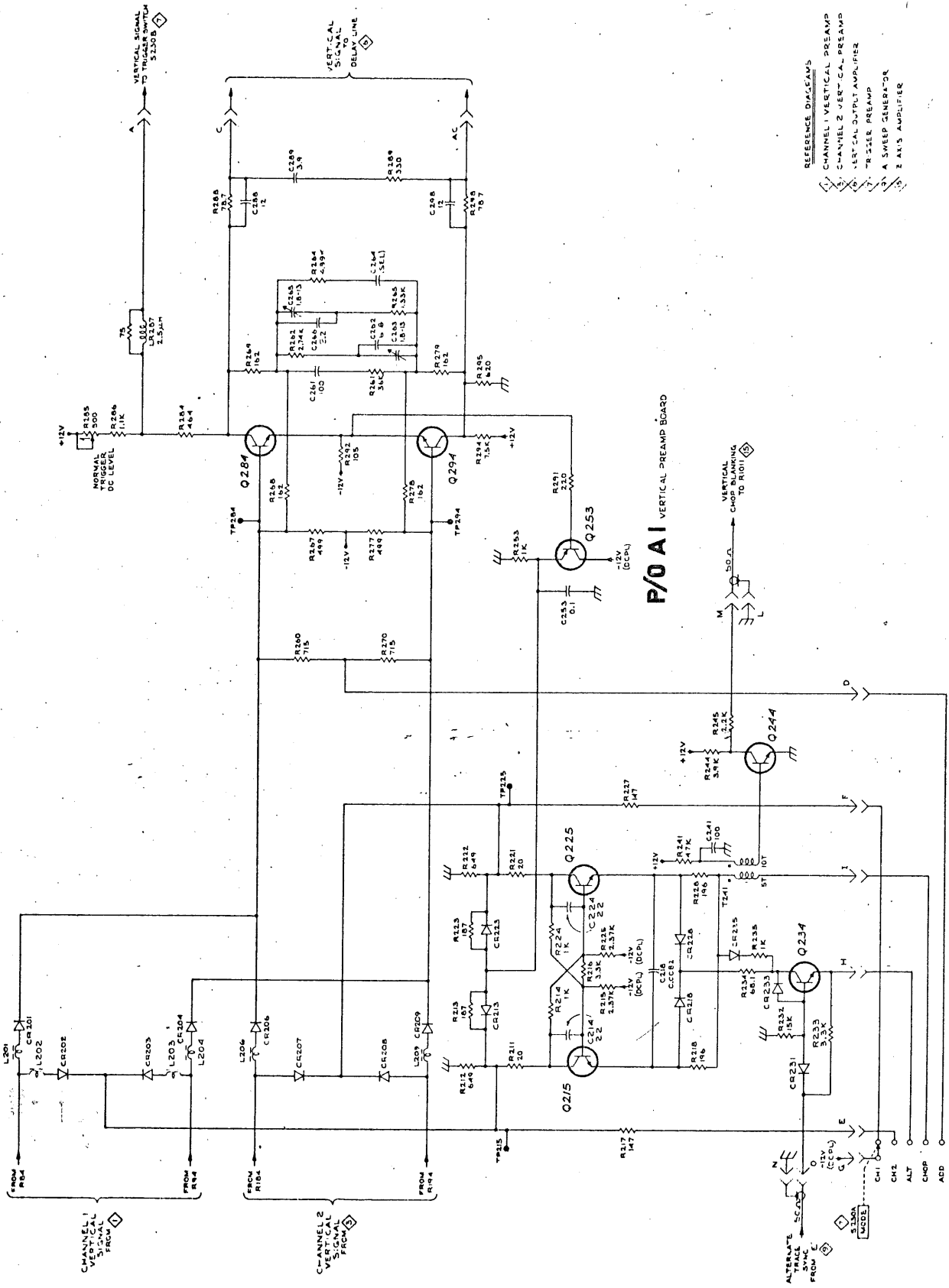
÷5



REFERENCE DIAGRAMS

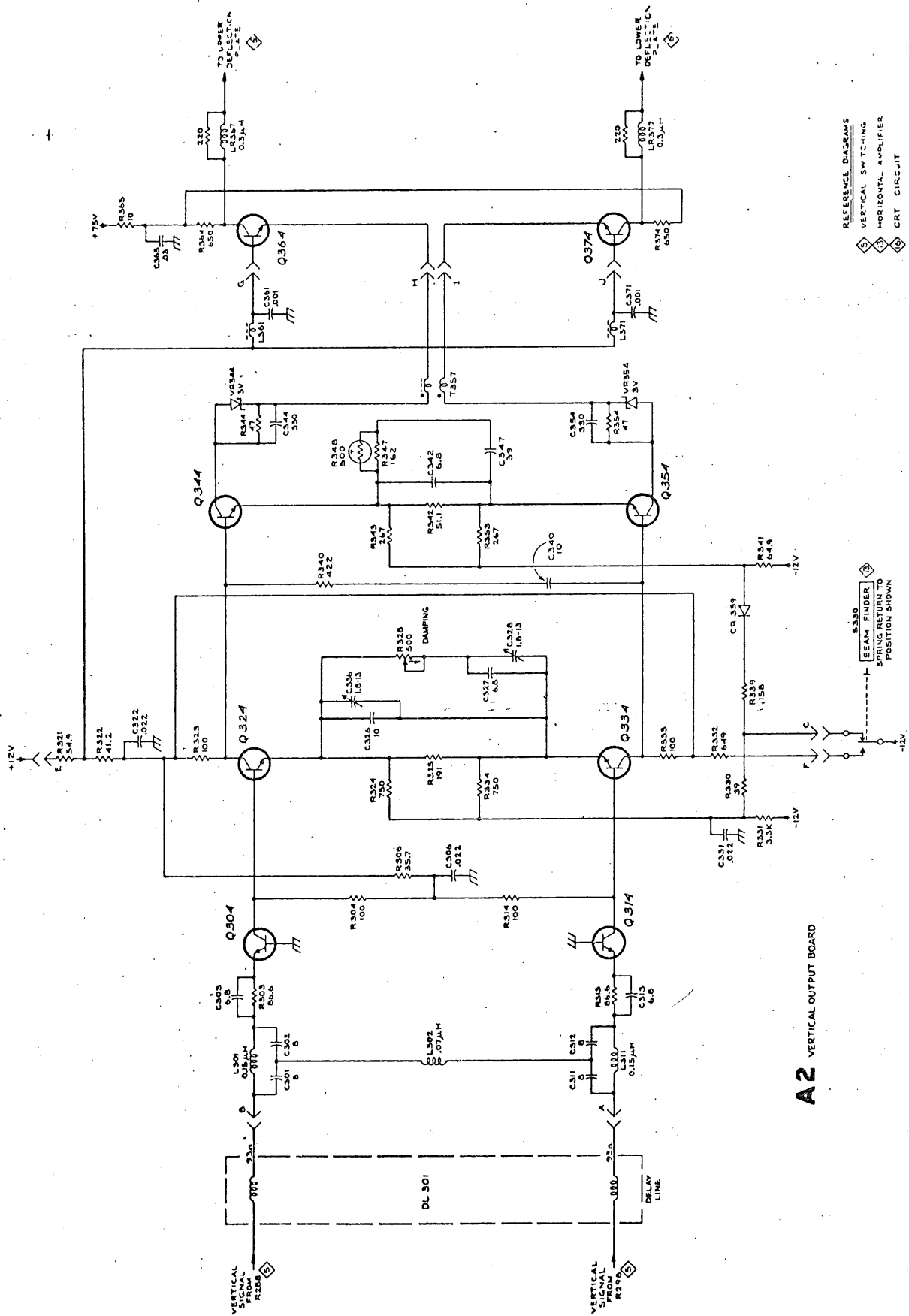
③ CHANNEL 2 VERTICAL PREAMP





P/O A1 VERTICAL PREAMP BOARD

- REFERENCE DIAGRAMS
- 1 CHANNEL 1 VERTICAL PREAMP
 - 2 CHANNEL 2 VERTICAL PREAMP
 - 3 VERTICAL SIGNAL DELAY LINE
 - 4 VERTICAL SIGNAL DELAY LINE
 - 5 A SWEEP GENERATOR
 - 6 2 AXIS AMPLIFIER



A2 VERTICAL OUTPUT BOARD

- REFERENCE DIAGRAMS
- ① VERTICAL SWITCHING
 - ② HORIZONTAL AMPLIFIER
 - ③ CRT CIRCUIT

VERTICAL OUTPUT AMPLIFIER

S/N B020100 UF

453 MOD 703K

A SWEEP MODE
5300

(UNLESS)
+150V

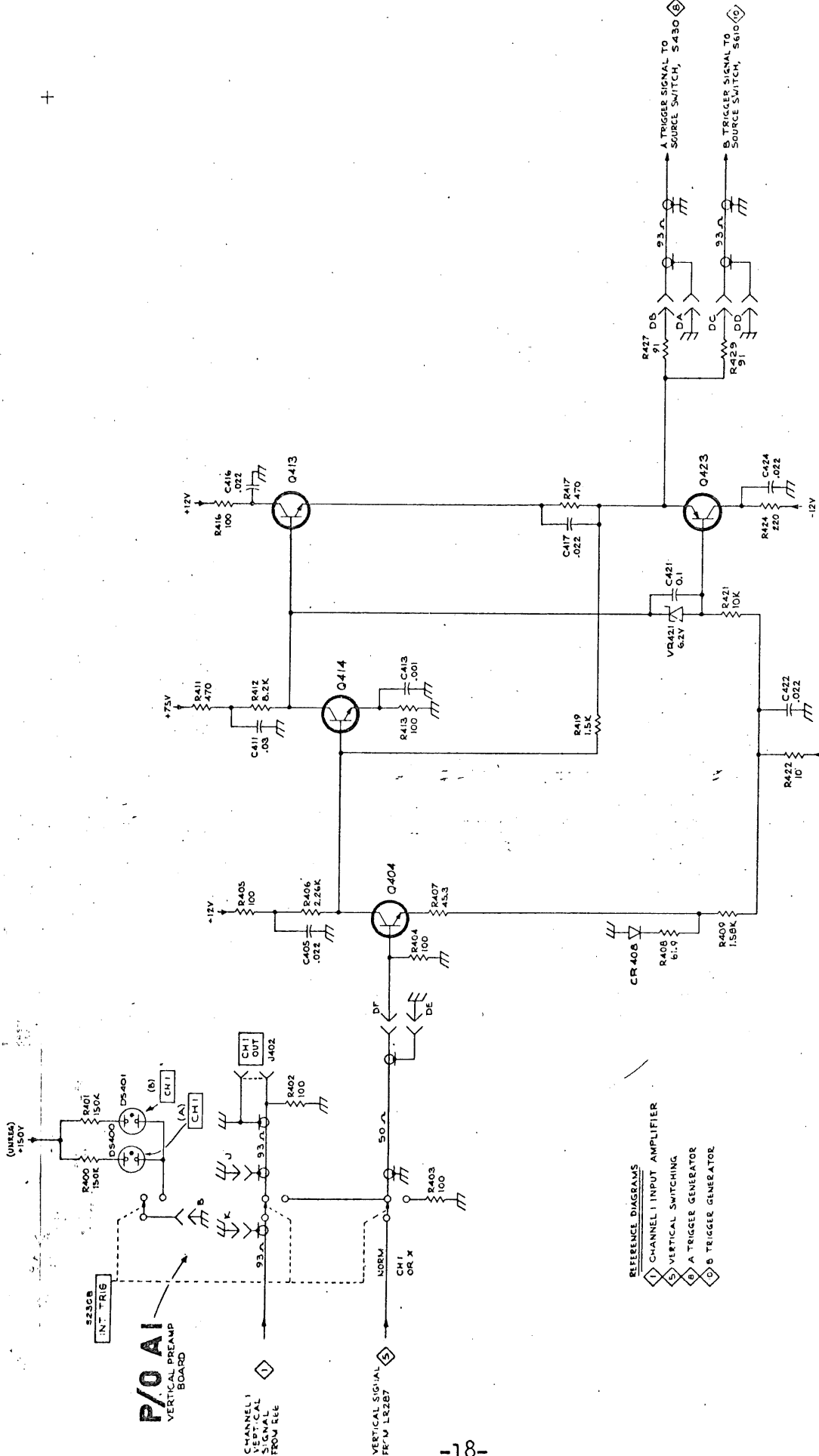
223CB
INT TRIG

P/O A1

VERTICAL PREAMP
BOARD

CHANNEL 1
VERTICAL
SIGNAL FROM ETC

VERTICAL SIGNAL
FROM LEZET



P/O A3

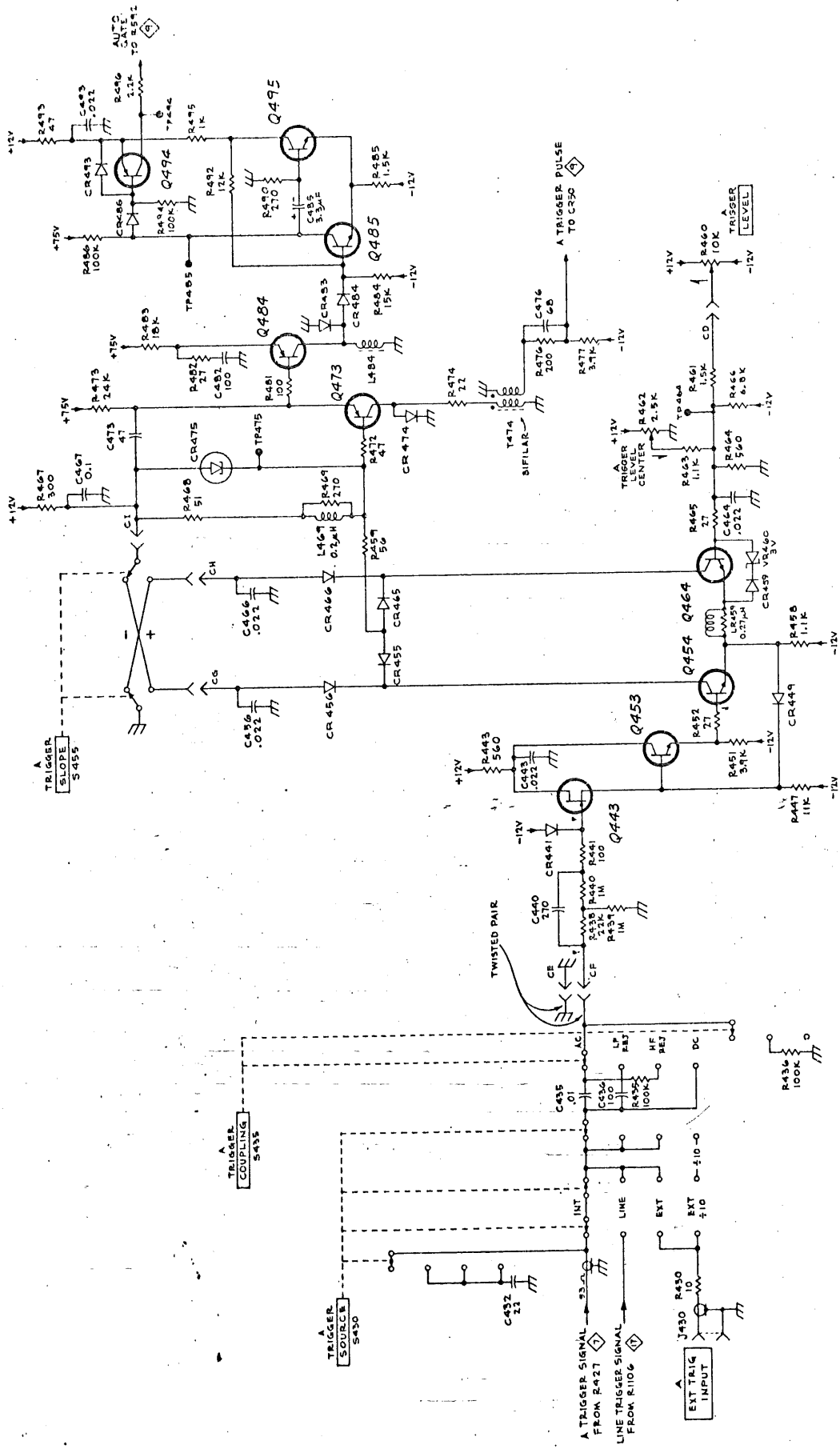
A SWEEP BOARD

+

453MOD703K

S/N B020100 UP

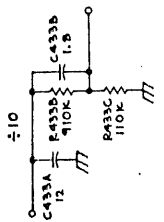
TRIGGER PREAMP



P/O A3 A SWEEP BOARD

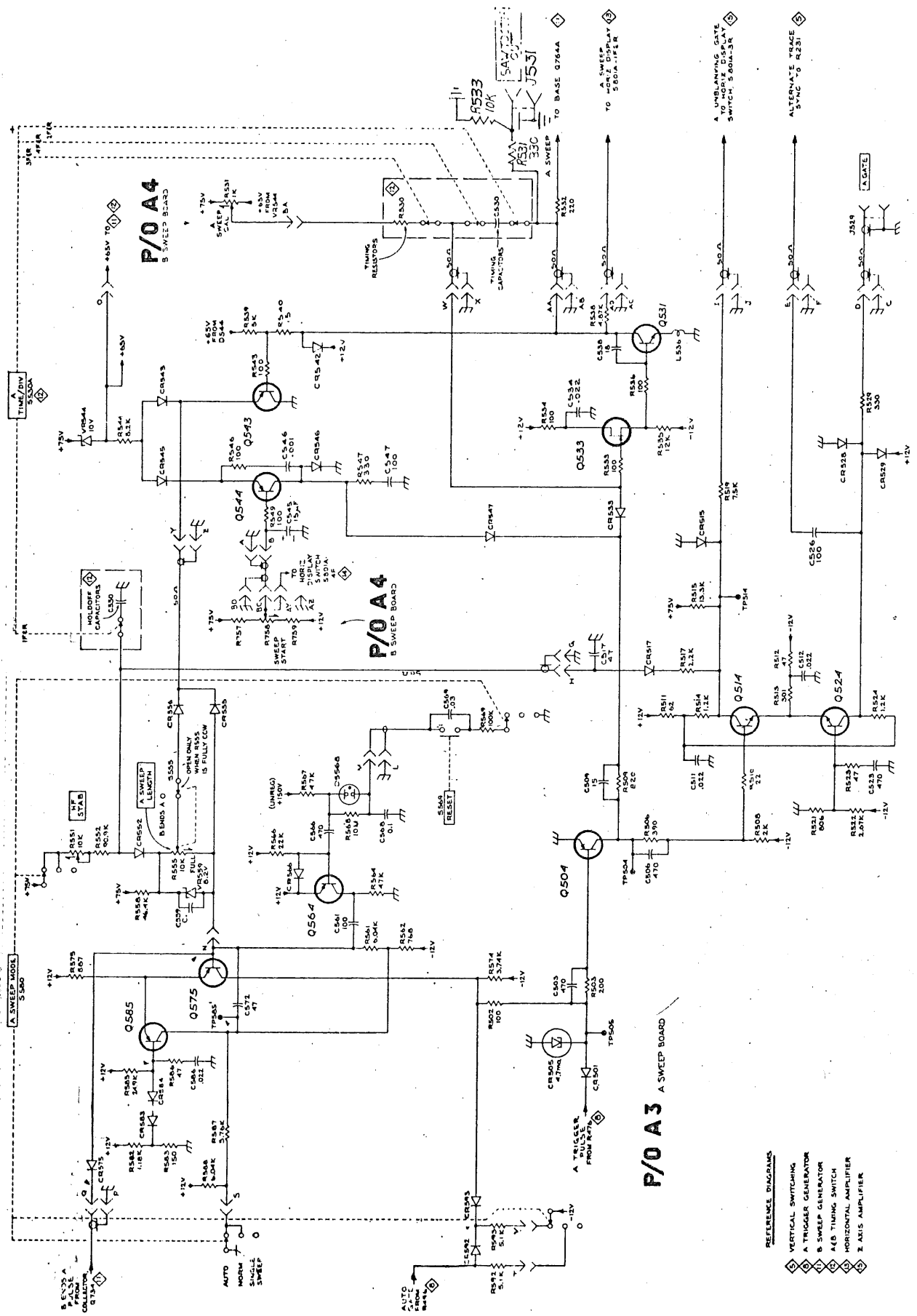
REFERENCE DIAGRAMS

- ⬇ TRIGGER PREAMP
- ⬇ A SWEEP GENERATOR
- ⬇ POWER SUPPLY & DISTRIBUTION



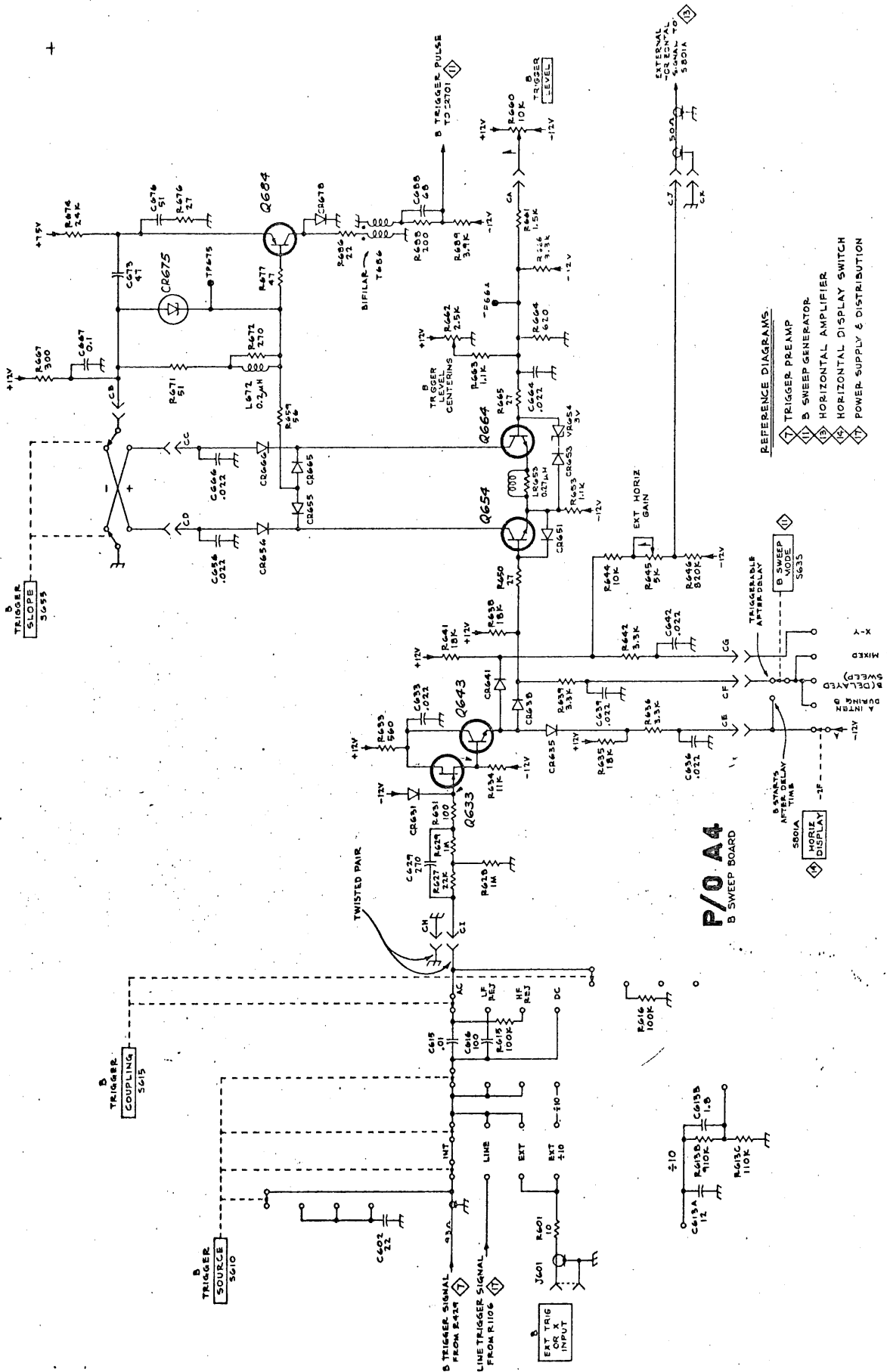
A TRIGGER GENERATOR

453 MOD 703K S/N B020100 UP



453 MOD 703K

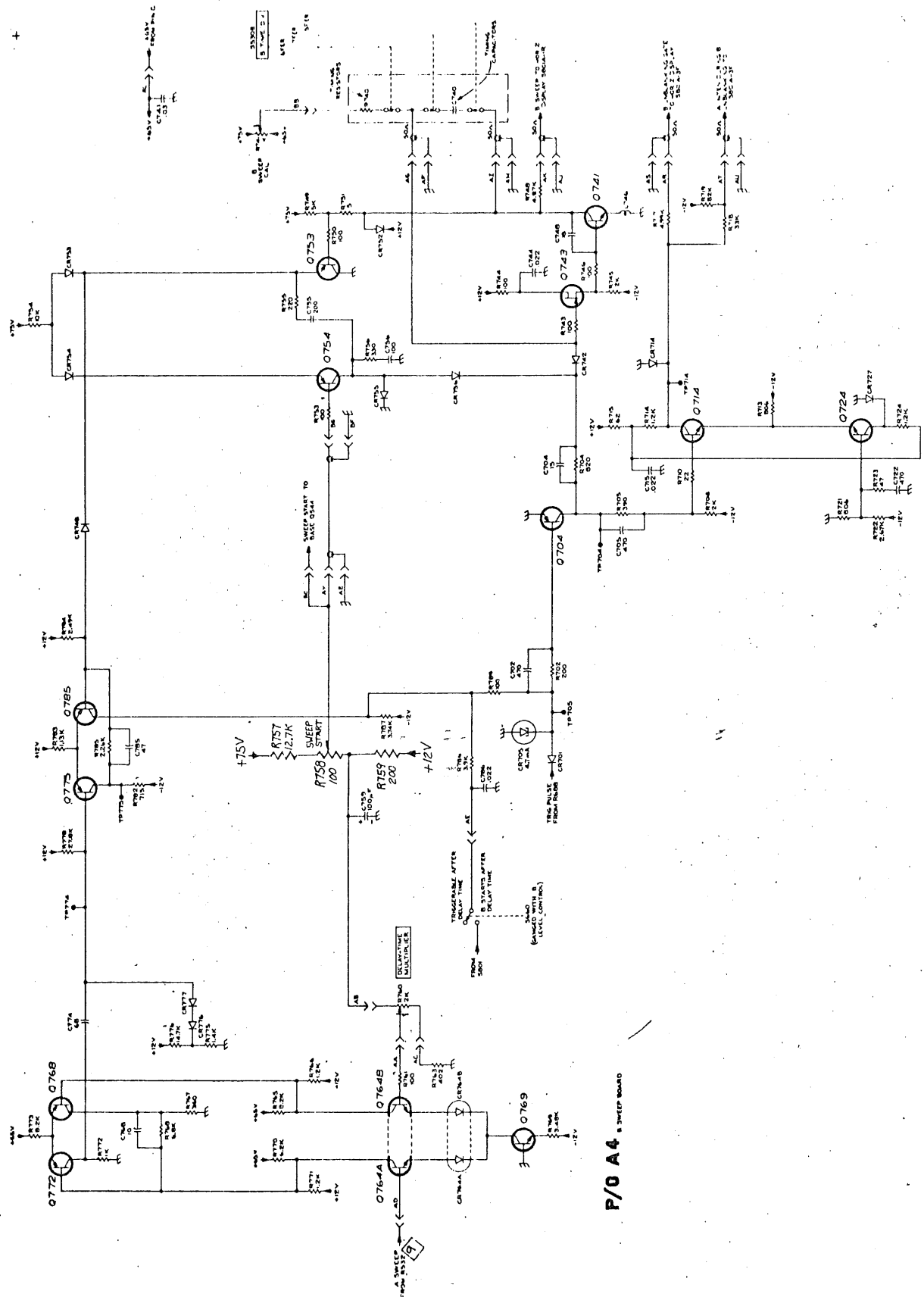
S/N B020100 UP



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

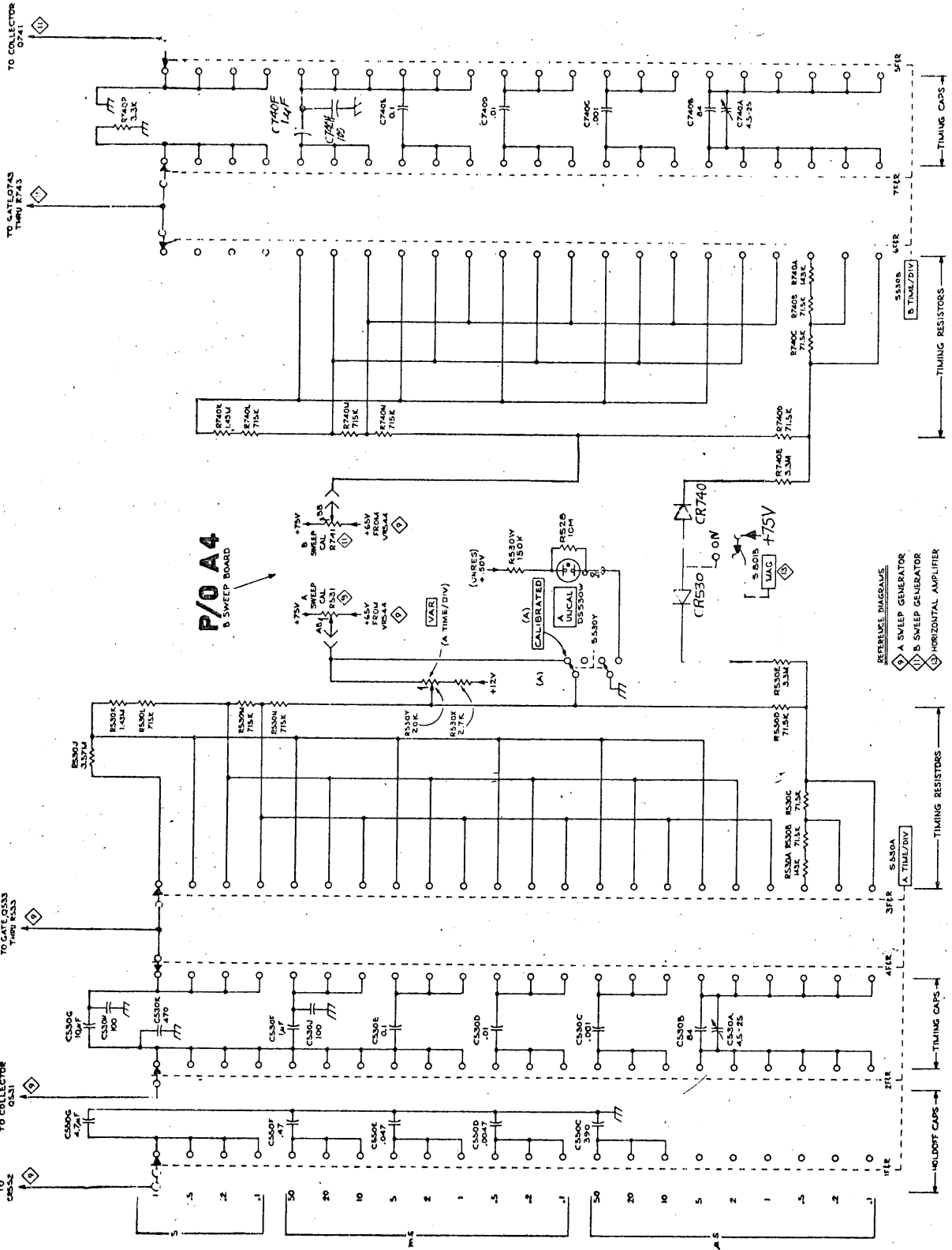


P/O A4 SWEEP BOARD

453 MOD 703K

S/N B020100 UP

SWEEP GENERATOR



TO COLLECTOR 0741

TO GATE/AS THRU 0743

TO GATE/AS THRU 0032

TO COLLECTOR 0331

TO COLLECTOR 0332

P/O A4
B SWEEP BOARD

REFERENCE DIAGRAMS
 A SWEEP GENERATOR
 B SWEEP GENERATOR
 C HORIZONTAL AMPLIFIER

715K
 5.530V
 5 TIME/DIV

3PF
 5.530A
 A TIME/DIV

415K
 TIMING CAPS

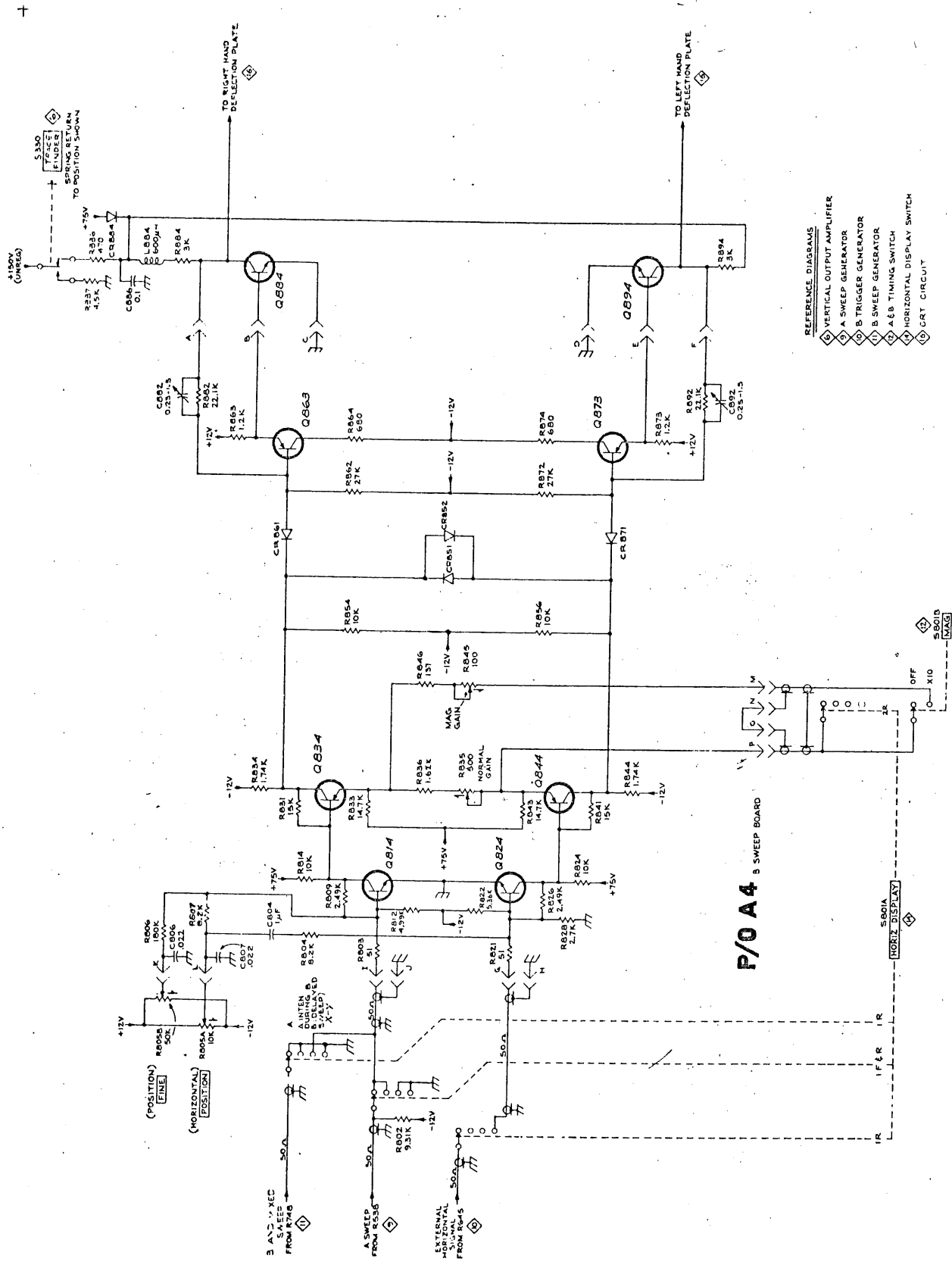
215K
 TIMING CAPS

115K
 TIMING CAPS

TO COLLECTOR 0741

S/N B020100 UP

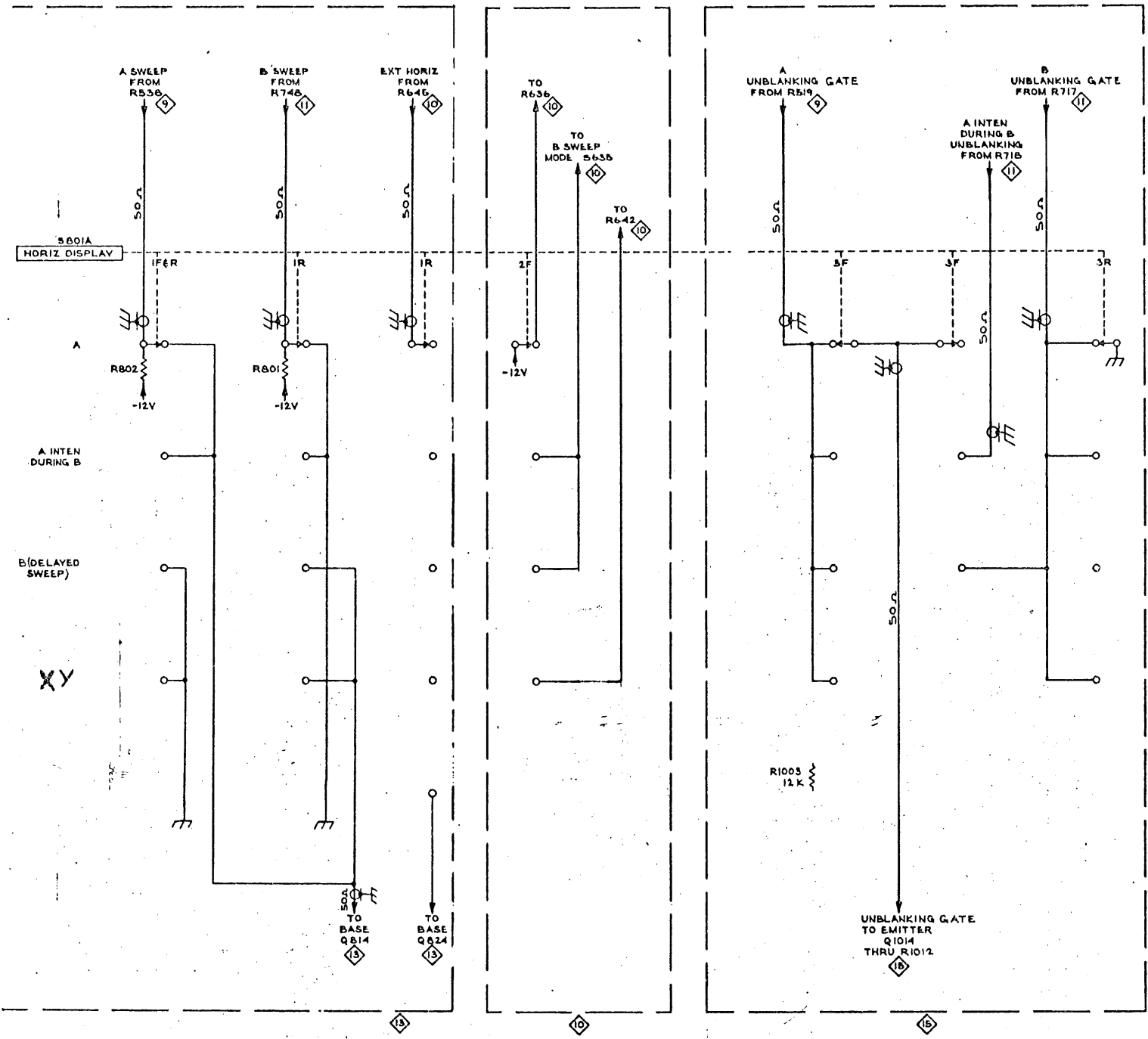
453 MOD 703K



453 MOD 703K

S/N B020100 UP

HORIZONTAL AMPLIFIER

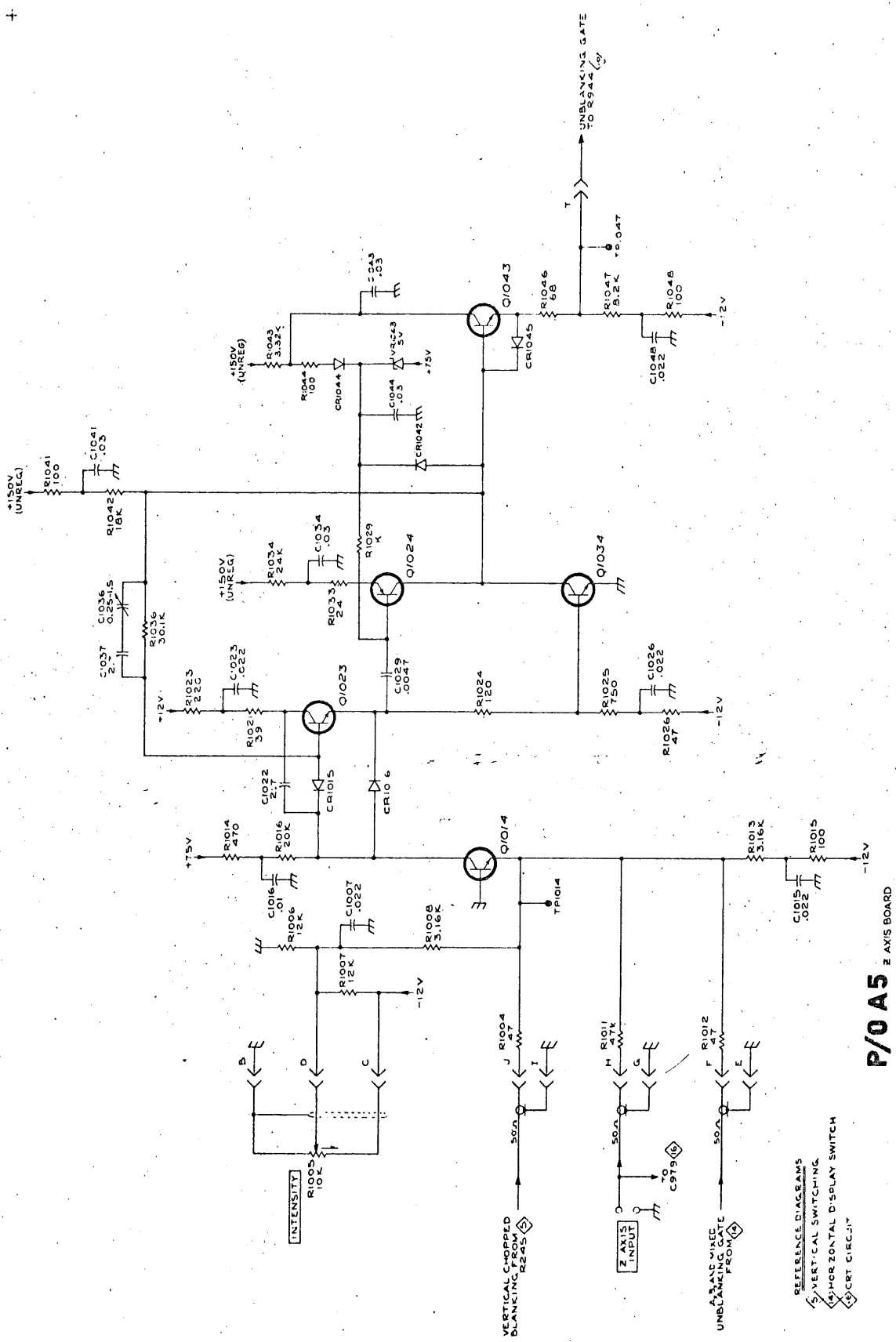


REFERENCE DIAGRAMS

- ⑨ A SWEEP GENERATOR
- ⑩ B TRIGGER GENERATOR
- ⑪ B SWEEP GENERATOR
- ⑬ HORIZONTAL AMPLIFIER
- ⑭ Z AXIS AMPLIFIER

HORIZONTAL DISPLAY SWITCH ⑭

453MOD703K S/N B020100 UP



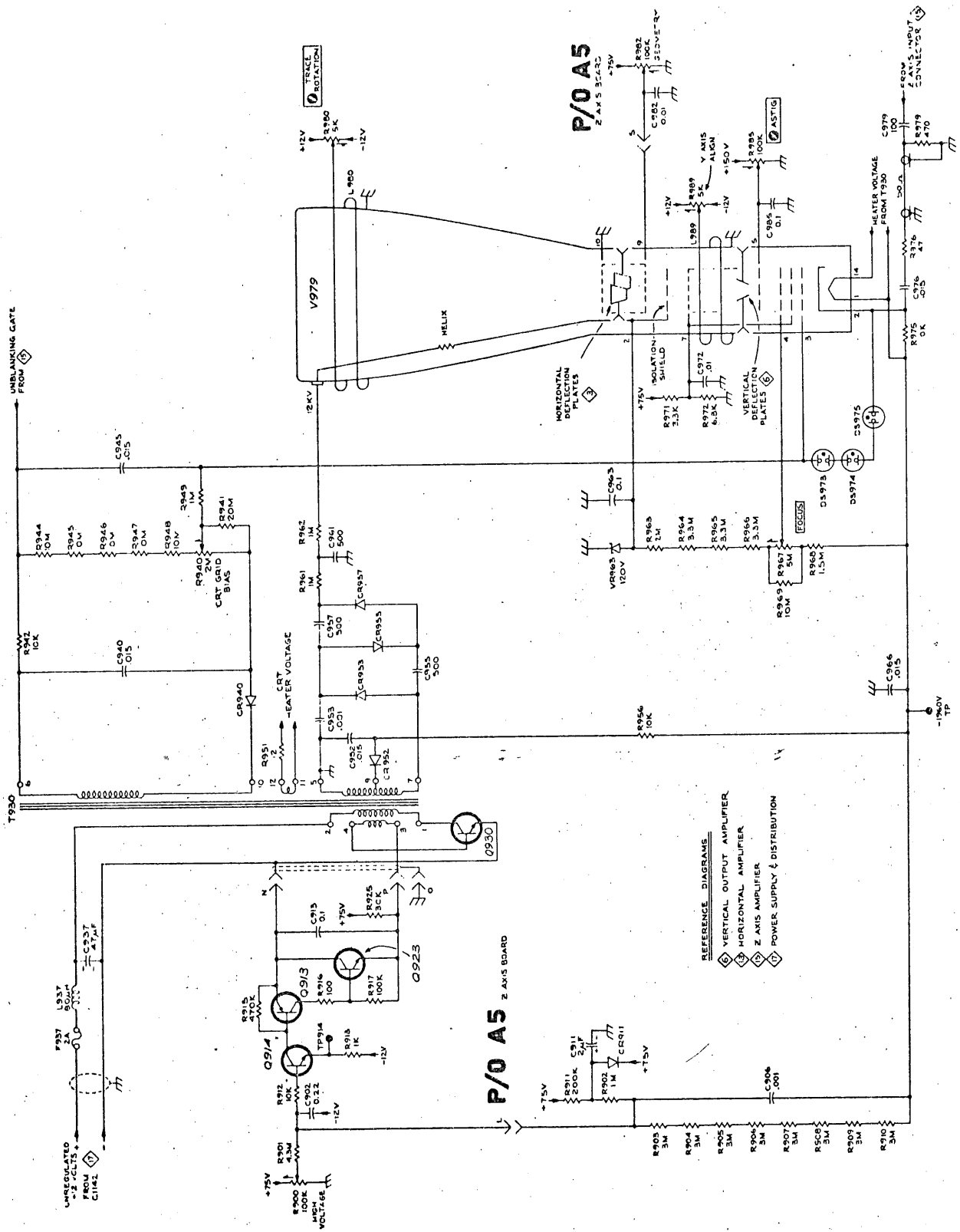
P/O A5 Z AXIS BOARD

- REFERENCE DIAGRAMS
 1 VERTICAL SWITCHING
 2 HORIZONTAL DISPLAY SWITCH
 3 CRT CIRC.J1

Z AXIS AMPLIFIER

S/N B020100 UP

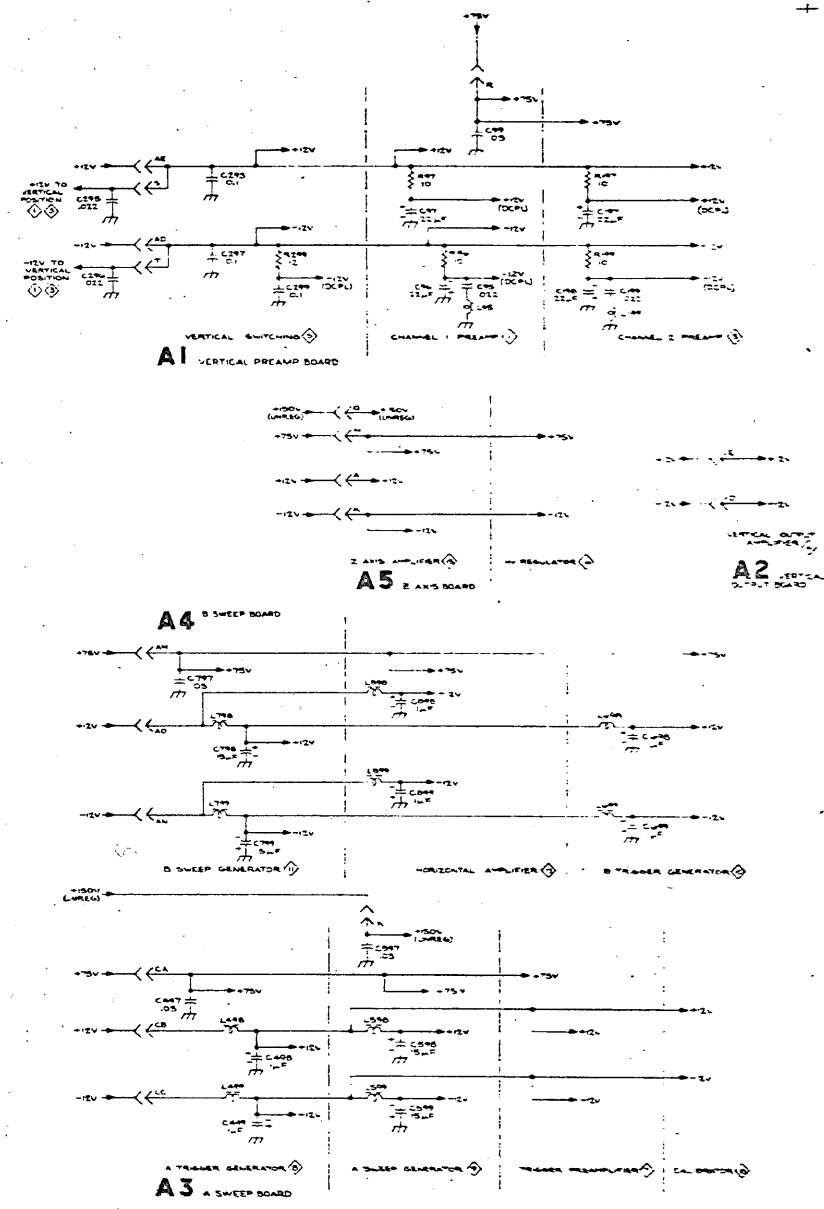
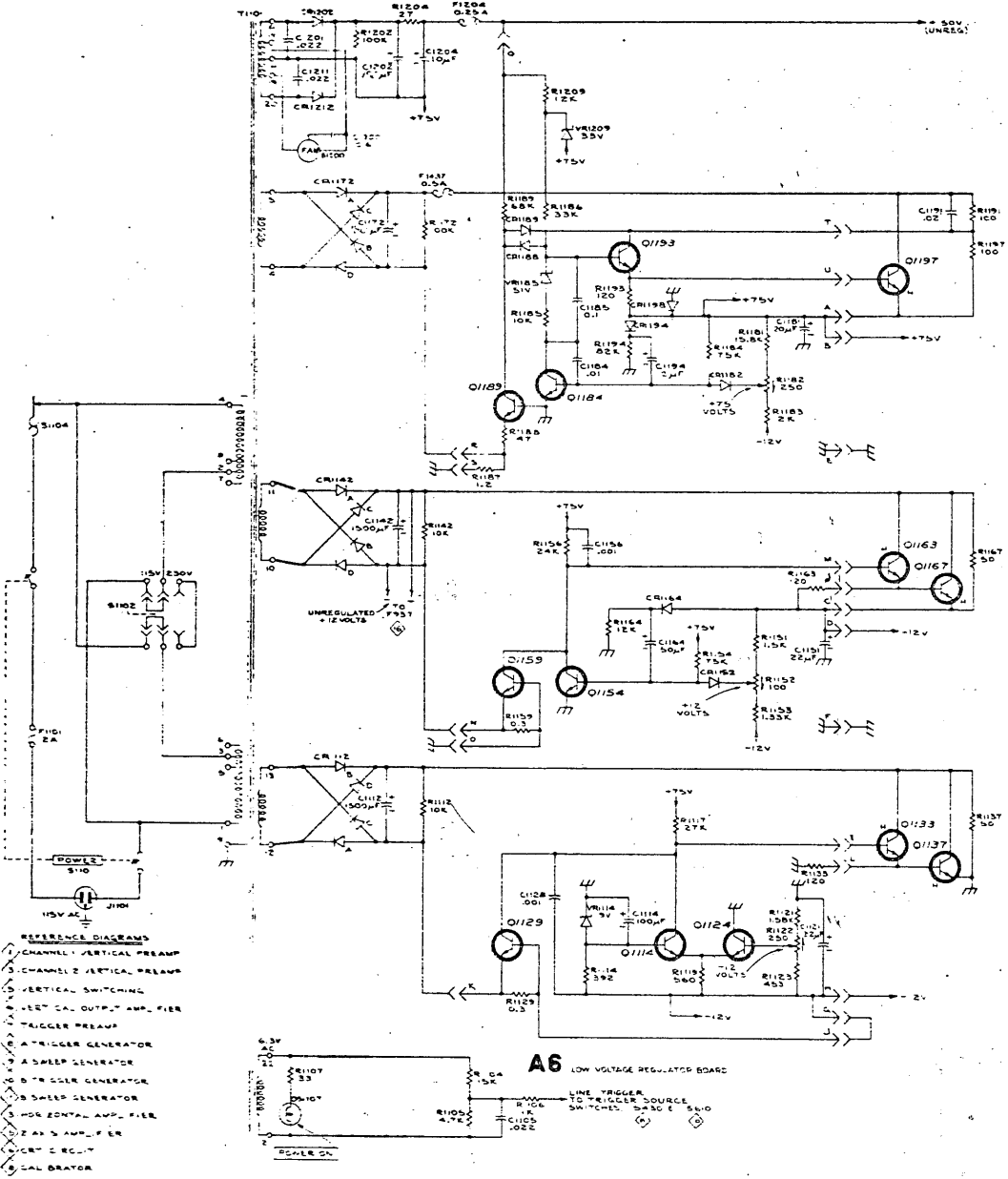
453 MOD703K



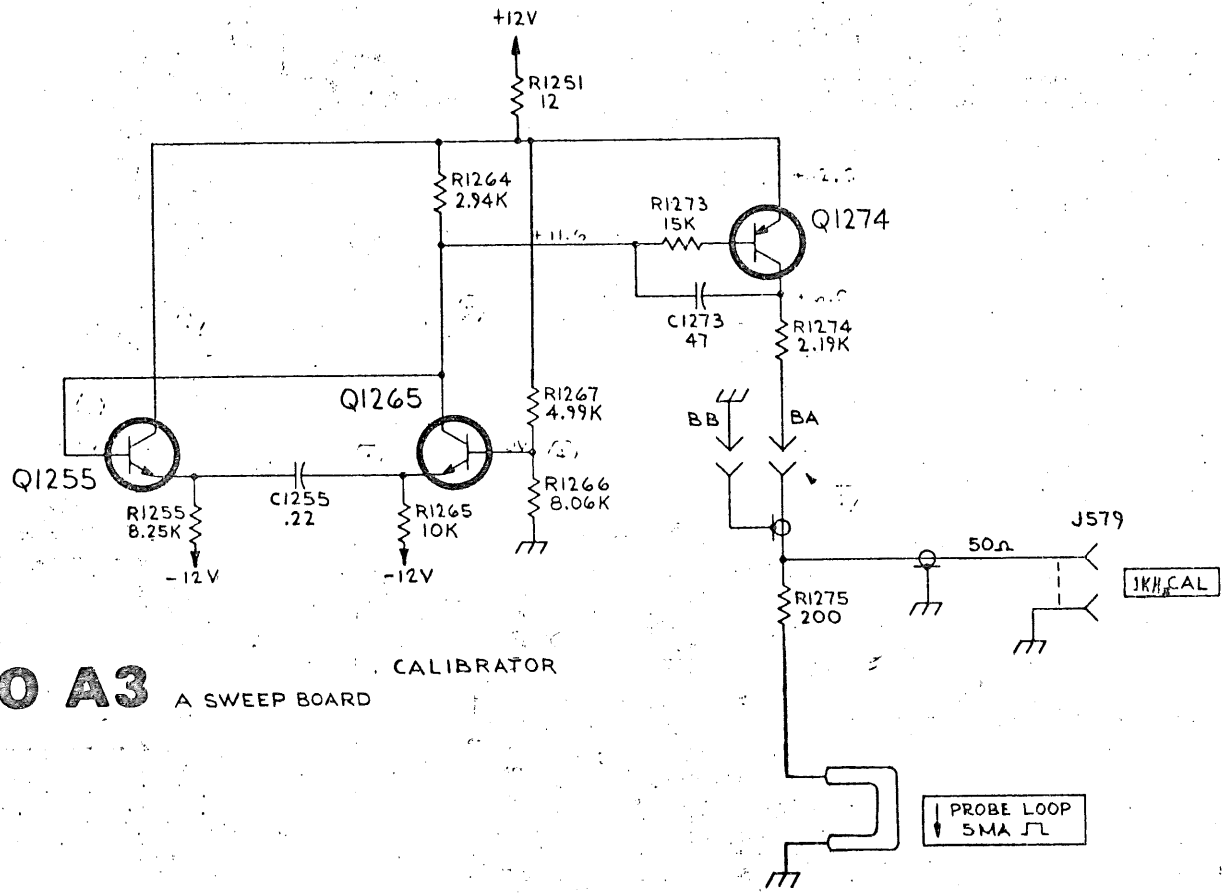
CRT CIRCUIT

S/N B020100 UP

453 MOD703K

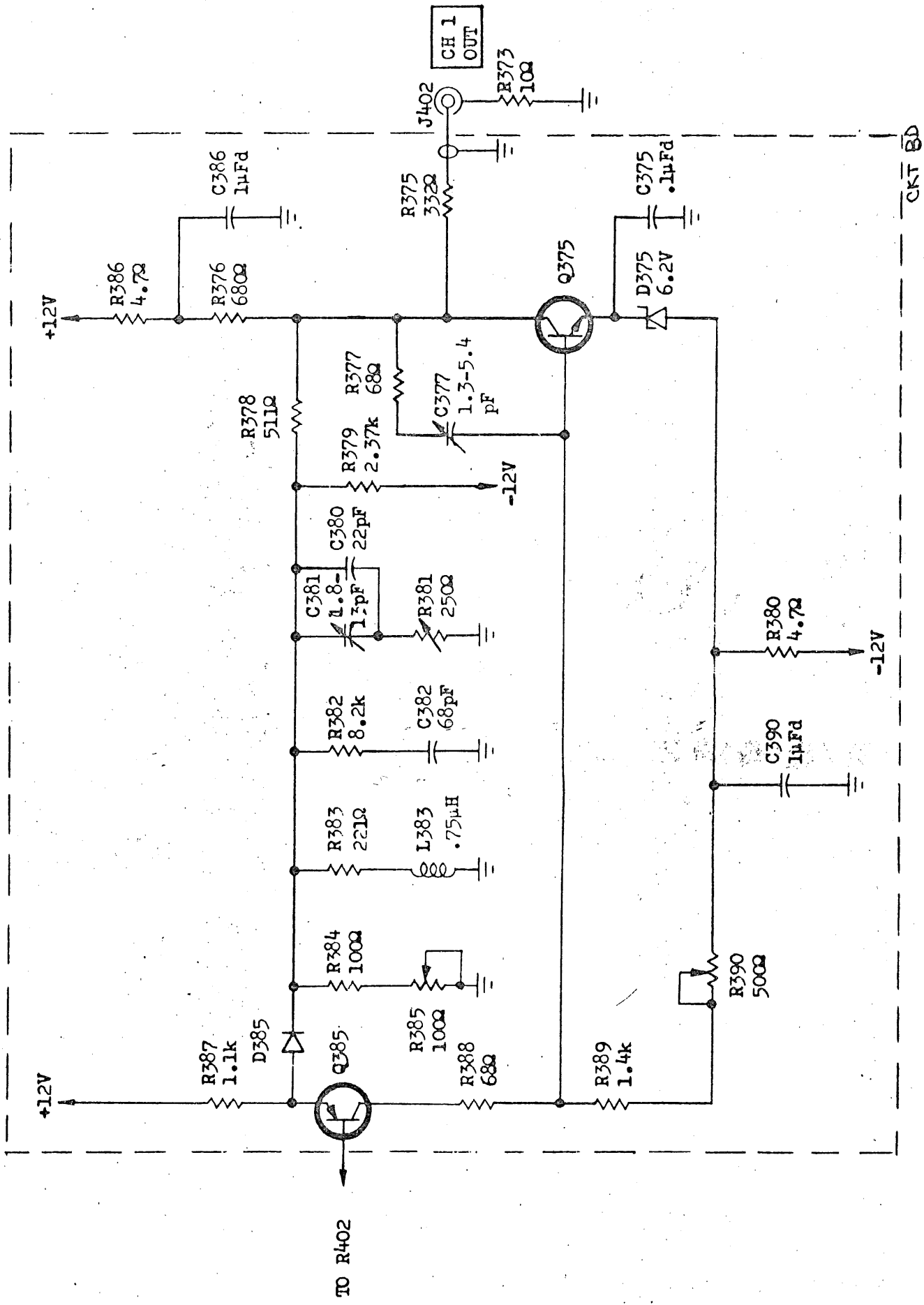


- REFERENCE DIAGRAMS
- 1 CHANNEL 1 VERTICAL PREAMP
 - 2 CHANNEL 2 VERTICAL PREAMP
 - 3 VERTICAL SWITCHING
 - 4 VERTICAL OUTPUT AMP. FILTER
 - 5 TRIGGER PREAMP
 - 6 A TRIGGER GENERATOR
 - 7 A SWEEP GENERATOR
 - 8 B SWEEP GENERATOR
 - 9 B SWEEP GENERATOR
 - 10 HORIZONTAL AMP. FILTER
 - 11 Z AXIS AMP. FILTER
 - 12 CRT CONTROL
 - 13 CAL BRATOR



P/O A3 A SWEEP BOARD

CALIBRATOR



CH 1 OUTPUT AMPLIFIER

S/N B020100 UP

453 MOD 703K

CHANGE NUMBER S24221

NO TRIGGER

INSTRUMENT Customer ServiceLOCATION ECB Assemblies

REASON FOR CHANGE:

Insure correct identification of circuit board assemblies used in 453703H (s/n 60770 and up) and 453703K (s/n B020100 and up).

DESCRIPTION OF CHANGE:

Currently twelve customer service circuit board assemblies are identified by six part numbers. Six of the twelve assemblies are correctly used in the 453A-1, 453A-2, 453A-3 and 453A-4. The other six are used in the 453703H (s/n 60770 and up) and in the 453703K and 453A-5 (s/n B020100 and up).

In order to avoid compromising the information published in a special 453703K support manual, (five) of the six existing circuit board numbers will be used to identify the 453703H/703K and 453A-5 versions. A non-prod part number will be re-instated to identify the sixth circuit board assembly. (This part number is being re-instated for the 453703H/703K only).

There are four, sometimes referred to as "IN HOUSE" or "MANUFACTURING" part numbers involved in this change. They are the same as four of the existing six circuit board assembly part numbers except they have a (-98) suffix. Manufacturing used them to identify BOM's for four of the six 453703H/703K circuit board assembly versions; however they were not used in the manuals, etc.

The remaining two boards were built as standards and then modified per a build procedure maintained by manufacturing.

It should be clearly understood, this change does not change the "configuration" of any of the twelve circuit board assemblies.

The following steps were taken to properly identify the assemblies.

1. Established (5) new circuit board assembly part numbers 670-0414-09, 670-0416-06, 670-0417-08, 670-0418-08, and 670-0419-13.
2. Established BOM's for the new circuit board assembly part numbers that were identical to the existing BOM's for 670-0414-08, 670-0416-05, 670-0417-06, 670-0418-06 and 670-0419-12 respectively. (Done wk 05 period 609).
3. Changed status of 670-0415-02 from NP to CS.
4. Established BOM for 670-0415-02 same as BOM for 670-0415-98. (Done wk 06 period 610).
5. Changed 670-0416-05, 670-0417-06 and 670-0418-06 BOM's to agree with 670-0416-98, 670-0417-98 and 670-0418-98 BOM's, respectively.
6. Modified 670-0414-08 and 670-0419-12 BOM's per manufacturing 703H/703K version build procedure.

*New Tek Made Part

DEPT. OF ORIGIN Central ModsBY Larry WellsDATE SUBMITTED 10-24-75URGENCY # 2MP IRS # 10-27-01LJW
PGS/ds

7. Non-prod 670-0415-98, 670-0416-98, 670-0417-98 and 670-0418-98.

As a result of the above the NPR should be changed to show the following:

Z Axis Circuit Board Ass'y

670-0414-08	Instrument	S/N	
	453-703H	60770	-----
	453-703K	B020100	-----
	453A-5	B020100	-----
*670-0414-09	453A-1	B010100	-----
	453A-2	B010100	-----
	453A-3	B010100	-----
	453A-4	B010100	-----

Low Voltage Regulator Circuit Board Ass'y

670-0415-02	453-703H	607700	-----
	453-703K	B020100	-----
670-0415-04	453A-1	B010100	B069999
	453A-1	B070000	-----
	453A-2	B010100	B069999
	453A-2	B070000	-----
	453A-3	B010100	B069999
	453A-4	B010100	B069999
	453A-4	B070000	-----
	453A-5	B020100	-----
	453A-3	B070000	-----

Vertical Output Amplifier Circuit Board Ass'y

670-0416-05	453-703H	60770	-----
	453-703K	B020100	-----
	453A-5	B020100	-----
*670-0416-06	453A-1	B010100	-----
	453A-2	B010100	-----
	453A-3	B010100	-----
	453A-4	B010100	-----

A Sweep Circuit Board Ass'y

670-0417-06	453-703H	60770	-----
	453-703K	B020100	-----
	453A-5	B020100	-----

*670-0417-08	Instrument	S/N	
	453A-1	B010100	-----
	453A-2	B010100	-----
	453A-3	B010100	-----

B Sweep Circuit Board Ass'y

670-0418-06	453-703H	60770	-----
	453-703K	B020100	-----
	453A-5	B020100	-----

*670-0418-08	453A-1	B010100	-----
	453A-2	B010100	-----
	453A-3	B010100	-----

Vertical Pre-Amplification Circuit Board Ass'y

670-0419-12	453-703H	60770	-----
	453-0703K	B020100	-----
	453A-5	B020100	-----

*670-0419-13	453A-1	B050000	-----
	453A-2	B050000	-----
	453A-3	B050000	-----
	453A-4	B050000	-----

REMOVE:	CKT. NO.	QUANT.	PART NO.	DESCRIPTION	STATUS	KIT	INST.
		1	670-0419-12	Ass'y: 388-0646-02 wired; Vert. Preamp 453A1, 3, 4	CS	644-0413-05	CS
ADD:		1	*670-0419-13	Ass'y 388-0646-02 wired; Vert Preamp 453A1, 3, 4	DR	644-0413-05	CS

INSTRUMENT General
Guernsey-Japan

LOCATION Front Sub-Panels

REASON FOR CHANGE:

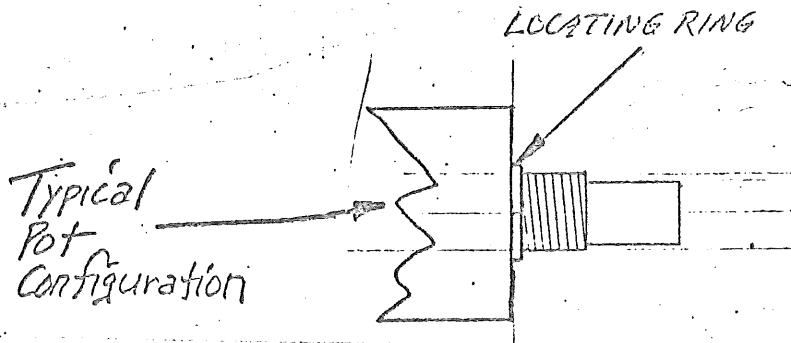
To reduce cost by allowing use of less costly pots 311-0386-00 and 311-1458-00 from alternate vendors. These pots have a locating ring at rear of bushing as shown on sketch.

DESCRIPTION OF CHANGE:

Increase the dia. of the Delay Time pot mounting hole in front sub-panels 386-1779-02, 386-1779-04, 426-0805-01 as follows:

- 386-1779-02 - Change "C" hole .391 +.008 -.003 D. Located 6.176 left of VDL, 5.801 below HDL to "N" .406 +.010 -.002D.
- 386-1779-04 - Change "C" hole .391 +.008 -.003 D. Located 6.176 left of VDL, 5.801 below HDL to "O" .406 +.010 -.002 D.
- 426-0805-01 - Change "T" hole .391 +.010 -.003 D. Located 6.313 right of VDL, 5.760 above HDL to "W" .406 +.010 -.002 D.

	<u>Kit Concerned</u>	<u>Inst.</u>
386-1779-02	614-0070-00	454A/R, 454A-163D/R
	0070-01	454A-1
	0070-02	454A-4
	614-0075-00	454A-210R
	614-0490-07	453A/R, 453A-163D/R
	0490-08	453A-127C/R
386-1779-04	614-0490-09	453A-1
	0490-10	453A-4
	0490-11	453A-703K
426-0805-01	614-0094-00	485
	0112-00	485-2



DEPT. OF ORIGIN P.P. Eng.

BY Merle Nielsen

DATE SUBMITTED 3-21-73

URGENCY # 4