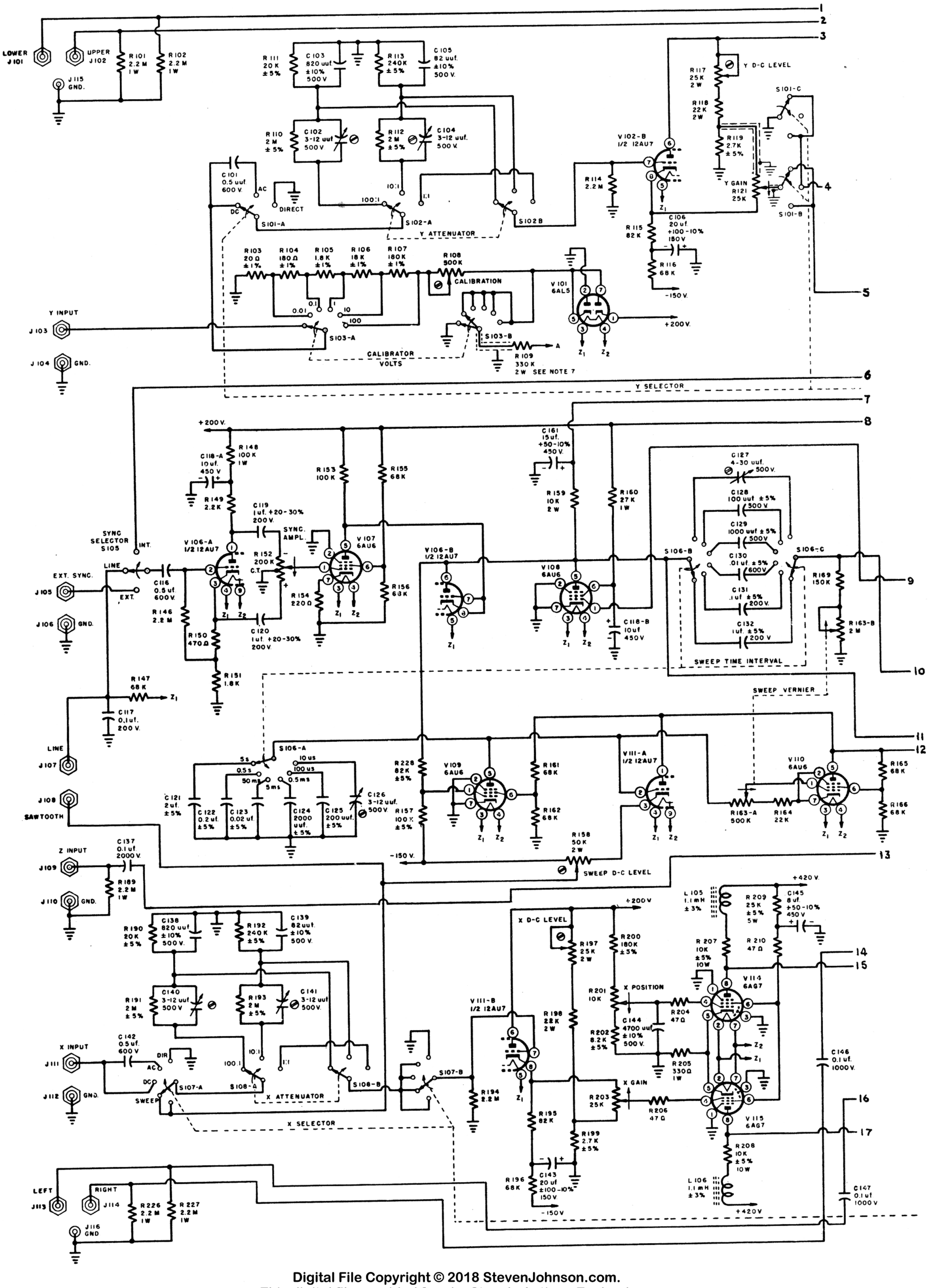

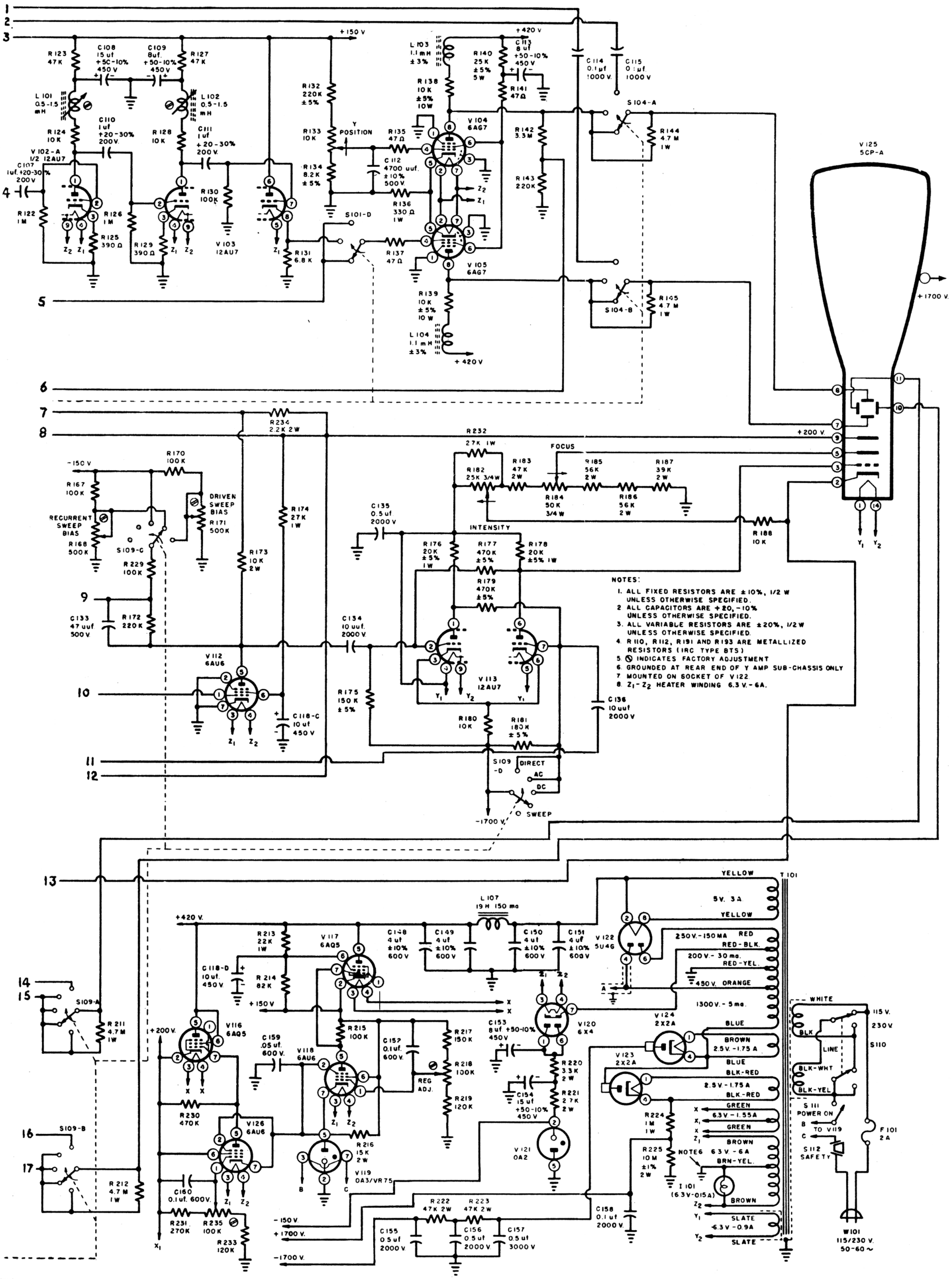

Fig. 22-13.—Schematic of Du Mont Model 250-A.

Courtesy Du Mont Labs.

DU MONT MODELS 250, 250-A, 250-AH, 250-H

SPECIFICATIONS FOR MODEL 250-A

FREQUENCY RESPONSE

Vertical Amplifier (a.c.) 5 cps to 200 kc, within 10%
Vertical Amplifier (d.c.) 0 cps to 200 kc, within 10%
Horizontal Amplifier Identical to above

SWEEP CIRCUIT	MODELS 250 AND 250-H	MODELS 250-A AND 250-AH
Recurrent	1 to 150,000 cps (1 second to 6.7 microseconds)	5 seconds to 10 microseconds
Driven	1 second to 20 microseconds	5 seconds to 10 microseconds

DEFLECTION FACTORS

Vertical Amplifier (a.c.) 15 rms millivolts/inch
Vertical Amplifier with probe 150 rms millivolts/inch
Vertical Plates Direct 21 rms millivolts/inch
Vertical Amplifier (d.c.) 0.9 d-c millivolts/inch
Horizontal Amplifier (a.c.) 0.4 rms millivolts/inch
Horizontal Plates Direct 23 rms millivolts/inch
Horizontal Amplifier (d.c.) 1.1 d-c millivolts/inch

LINE RATING 115-230 volts, 50-60 cps

TUBE COMPLEMENT FOR MODELS 250-A, 250-AH

Type	*Function*
6AL5 (V101)	Voltage Calibrator
12AU7 (V102)	Vertical Amplifier
12AU7 (V103)	Vertical Amplifier
6AG7 (V104)	Vertical Deflection
6AG7 (V105)	Vertical Deflection
12AU7 (V106)	Sync Input
6AU6 (V107)	Sync Amplifier
6AU6 (V108)	Negative Gate
6AU6 (V109)	Switching Tube
6AU6 (V110)	Sweep Charging Tube
12AU7 (V111)	X Input, Sweep Output
6AU6 (V112)	Negative Signal Amplifier
12AU7 (V113)	Flip-Flop Oscillator
6AG7 (V114)	Horizontal Deflection
6AG7 (V115)	Horizontal Deflection
6AQ5 (V116)	Voltage Regulator
6AQ5 (V117)	Voltage Regulator
6AU6 (V118)	Voltage Regulator
OA3/UR75 (V119)	Voltage Regulator
6X4 (V120)	Low-Voltage Rectifier
OA2 (V121)	Voltage Regulator
5U4G (V122)	Full-Wave Rectifier
2X2A (V123)	Positive High-Voltage Rectifier
2X2A (V124)	Negative High-Voltage Rectifier
5CP-A (V125)	Cathode-Ray Tube
6AU6 (V126)	Voltage Regulator

The following discussion on Models 250-A and 250-AH also applies to early Models 250 and 250-H, respectively. The earlier models have a slightly different tube line-up, but are electrically similar to the latter, with the exception of the modified sweep characteristics, noted in the specifications. A schematic circuit diagram for Model 250-A, which applies with minor modifications to all four models, is shown in Fig. 22-13.

The Model 250-AH (250-H) is identical to the Model 250-A (250) in outward appearance. However, at the back of the cabinet a connector is provided for the external intensifier supply. With a simple jumper arrangement inside the Model 250-AH (250-H) the intensifier of the type 5RP-A cathode-ray tube may be connected from an internal high-voltage supply instead of an external supply. The over-all accelerating potential is then 3,000 volts, and the instrument becomes electrically equivalent to the Model 250-A (250). Low-voltage operation is often desirable for applications where a low deflection factor is more important than high light output from the screen.

The 250-AH (250-H) uses a 5RP-A cathode-ray tube and an accelerating potential of 19,000 volts. The 250-AH (250-H) amplifier (maximum gain) deflection sensitivity is 25 rms millivolts per inch. With probe, it is 250 rms millivolts per inch. The d-c amplifier is rated at 1.7 d-c volts per inch and connection directly to the deflection plates results in 45 rms volts per inch deflection sensitivity.

The 250-AH (250-H) horizontal-deflection factors are as follows:

A-C Amplifier (Maximum Gain) 0.7 rms volts/inch
D-C Amplifier (Maximum Gain) 2 d-c volts/inch
Direct to Deflection Plates 48 rms volts/inch

The 250-A (250) is designed for general-purpose laboratory work. It has both a-c and d-c signal amplifiers. A built-in voltage calibrator allows accurate measurement of input signal amplitudes. The time-base generator furnishes a wide range of linear sweep speeds, both recurrent and driven. The intensity of the cathode-ray beam may be modulated from an external source to produce timing marks or reference points on the trace. The built-in circuit, which automatically controls the beam intensity, greatly simplifies the techniques in making photographic recordings.

Driven (Single) Sweeps

When the X-selector switch *S107* is in the driven-sweep position, a high negative bias potential is applied to the grid of *V108*, thus making the sweep circuit inoperative. The trigger voltage is received by the sync inverter *V106A* so that with the sync amplitude control *R152*, either the same or the opposite polarity of the triggering voltage can be selected for triggering the sweep.

Since a negative triggering voltage of relatively high amplitude is required by the gate generator, *V107* is used to amplify the trigger signal. Therefore, to trigger the circuit, a positive trigger signal is taken from *R152*, amplified, inverted, and fed through a diode *V106B* to the plate of *V108*. This negative signal is coupled to *V112* through the network *C127* to *C132* and *R163B*. This is amplified by *V112* and fed back regeneratively to *V108* to the point where *V108* is conducting and *V112* is cut off. This condition remains until the capacitors *C127* to *C132* discharge sufficiently through *R169* to permit *V112* to conduct again. This occurs in a second regenerative cycle as described above.

A negative trigger voltage is obtained from the plate of *V108* by differentiation of the gate signal. This trigger is fed to pin 7 of *V113*, causing that tube to cut off and the other half of the Eccles-Jordan circuit to conduct. At the same time it permits operation of the cathode-ray-tube grid, allowing the tube to be brightened to that level set by the intensity control. At the end of the gate, a second negative trigger is derived from the plate of *V112* by differentiation of the gate voltage and is fed to pin 2 of *V113*. This causes the Eccles-Jordan circuit to reverse, cutting off the cathode-ray tube and the spot on the screen.

Recurrent Sweeps

The recurrent-sweep operation is similar to the driven-sweep operation except for bias setting. When the gate generator (V108-V112) has recovered, *V108* will be held off until the capacitor *C133* reaches a voltage which allows *V108* to again start conducting, at which time it will repeat the sweep cycle. There is no "return trace blanking." The beam is always off except when it is sweeping from left to right.