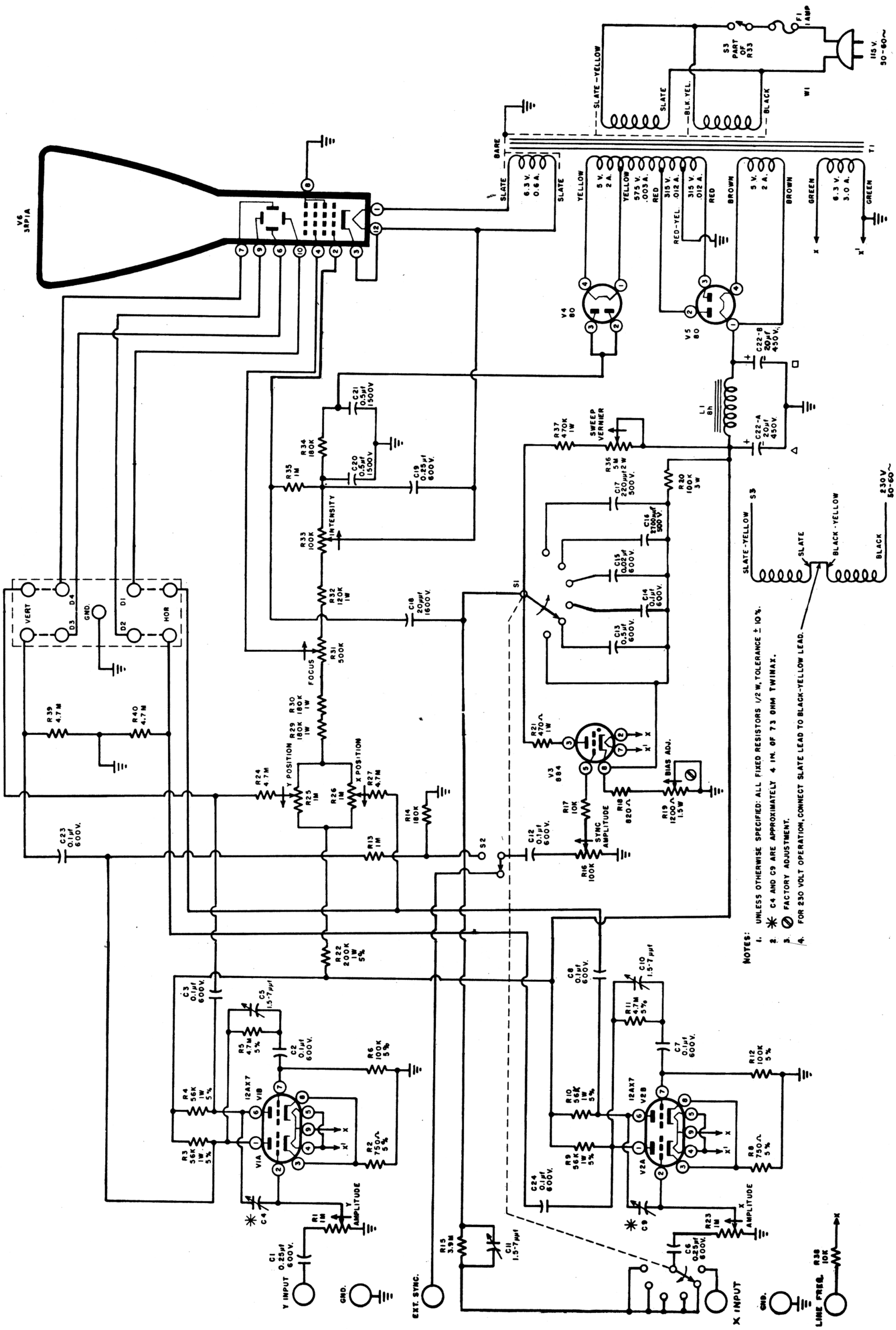

NOTES:

1. UNLESS OTHERWISE SPECIFIED: ALL FIXED RESISTORS 1/2 W, TOLERANCE ± 10%.
2. ✳ C4 AND C9 ARE APPROXIMATELY 4 IN. OF 73 OHM TWINAX.
3. ⊘ FACTORY ADJUSTMENT.
4. FOR 230 VOLT OPERATION, CONNECT SLATE LEAD TO BLACK-YELLOW LEAD.

Fig. 22-20.—Schematic of Du Mont Model 292.

Courtesy Du Mont Labs.

DU MONT MODEL 281-A

DEFLECTION FACTORS
Vertical-Deflection Plates 85 volts/inch
Horizontal-Deflection Plates 90 d-c volts/inch
LINE RATING 115-230 volts, 50-60 cps

TUBE COMPLEMENT

Type	*Function*
2X2A (V1)	Positioning Rectifier
OA2 (V2-V7)	Positioning Voltage Regulators
6NO-20 (V8)	Time-Delay Relay
1B3GT/8016 (V9)	Negative Half-Wave Rectifier
3D21A (V10)	Series Regulator
1B3GT/8016 (V11)	Positive Half-Wave High-Voltage Rectifier
2C53 (V12)	Control
5651 (V13)	Regulator Tube
5RP-A (V14)	Cathode-Ray Tube

The schematic circuit diagram of Model 281-A is shown in Fig. 22-19. This instrument is a basic high-voltage indicator unit consisting of a 5RP-A cathode-ray tube and associated circuits. The regulated high-voltage accelerating potentials, including provisions for connection of an external high-voltage supply, produce intense patterns suitable for observation and photographic recording and projection of transients or signals of short duration. Voltage-regulator tubes are also used to stabilize the positioning potentials for the deflection plate circuits.

X- and Y-Axis Circuits

There are no amplifiers in either circuit to provide deflection voltages for the cathode-ray tube. Provision is made for capacitive coupling from front panel terminals to deflection plates through capacitors *C7, C8, C9* and *C10,* or direct coupling from rear of instrument to all deflection plates from terminals *D1, D2, D3,* and *D4.*

Z-Axis Circuits

Modulating signals may be fed to the grid and cathode, respectively, of the cathode-ray tube through capacitors *C11* or *C12.* Signals which are not of proper polarity for application to the grid may be applied to the cathode. However, the input impedance to the cathode circiut is much lower than to the grid, and may not be satisfactory for use with some high-impedance signal sources. D-c voltages for the grid and cathode are obtained from the negative high-voltage power supply.

DU MONT MODEL 292

FREQUENCY RESPONSE
Vertical Amplifier 5 cps to 100 kc
Horizontal Amplifier 5 cps to 100 kc
Sweep Circuit 8 cps to 30 kc
DEFLECTION FACTORS
Vertical Amplifier 0.4 rms volts/inch (max)
Vertical-Deflection Plates 22 rms volts/inch
Horizontal Amplifier 0.56 rms volts/inch
Horizontal-Deflection Plates 31 rms volts/inch
LINE RATING 115-230 volts, 50-60 cps

TUBE COMPLEMENT

Type	*Function*
12AX7 (V1)	Vertical Amplifier
12AX7 (V2)	Horizontal Amplifier
884 (V3)	Time-Base Generator
80 (V4)	High-Voltage Rectifier
80 (V5)	Low-Voltage Rectifier

The schematic circuit diagram of Model 292 is shown in Fig. 22-20. This basic oscilloscope unit is conventional, except that it is provided with special high-frequency compensation, obtained by means of capacitive feedback (*C4* and *C9*) between plate and grid circuits of the deflection amplifiers.

DU MONT MODELS 304 AND 304-H

FREQUENCY RESPONSE
Vertical A-C and D-C Amplifier to 100 kc, within 10%
Horizontal Amplifier A-C and D-C Amplifier to 100 kc, within 10%
Sweep Circuit 2 cps to 30 kc

The sweep is expandable to six times the full-screen diameter of the cathode-ray tubes.

DEFLECTION FACTORS
Vertical Amplifier 0.01 rms volts/inch
Vertical-Deflection Plates 18 rms volts/inch
Horizontal Amplifier 0.05 rms volts/inch
Horizontal-Deflection Plates 21 rms volts/inch
LINE RATING 115 volts, 50-60 cps

TUBE COMPLEMENT

Type	*Function*
12AU7 (V1)	Vertical-Amplifier Input
12AU7 (V2, V3, V4)	Vertical Amplifiers
6AQ5 (V5, V6)	Vertical-Amplifier Output
12AU7 (V7)	Sync Selector
6Q5G (V8)	Timing-Axis Oscillator
12AU7 (V9)	Sweep-Cathode-Follower Blanking Amplifier
12AU7 (V10)	Single-Sweep Clipper
12AU7 (V11)	Horizontal-Amplifier Input
6J6 (V12)	Horizontal Amplifier
6J6 (V13)	Horizontal-Amplifier Output
OB2 (V14)	Voltage Regulator
5Y3 (V15)	Low-Voltage Rectifier
2X2 (V16)	High-Voltage Negative Rectifier
2X2 (V17)	Rectifier Auxiliary Intensifier Supply (304-H only)
5CP-A (V18)	Cathode-Ray Tube

The schematic circuit diagram of Models 304 and 304-H is shown in Fig. 22-21. This is a general-purpose instrument incorporating highly sensitive d-c amplifiers to permit observation of phenomena over an extended frequency range. The following description covers both types 304 and 304-H, which are identical, except that Model 304-H has a supplementary high-voltage rectifier circuit to provide an additional +1,200 volts to the intensifier electrode of the 5CP-A cathode-ray tube.

The positioning circuits of these units are broad enough to permit examination of any portion of the sweep on the cathode-ray-tube screen without distortion. The d-c positioning system permits the equivalent of four times full-scale expansion of the signal for the Y-axis. For the X-axis deflection, the d-c positioning system permits the equivalent of six times full-scale expansion of the signal. The expanded sweep is capable of a sweep writing rate of one inch per microsecond or faster.

Y-Axis Deflection

The signal may be applied to the vertical-deflection plates either directly or through a high-gain amplifier. For low-level signals, the type 304 is provided with a stable, high-gain d-c amplifier. The input system to the Y-amplifier utilizes an attenuator which retains the high-gain d-c characteristics. The input attenuator is of the decade type, using *R-C* compensated, stepped attenuators and a linear gain control *R1.*

The last stage of the amplifier is made up of two type 6AQ5 pentodes. The screens of these pentodes are operated from the unregulated supply, so that the sensitivity of the system rises with increases in line voltage, due to increased amplifier gain. This essentially compensates for the reduction in cathode-ray tube sensitivity, which is experienced at higher accelerating potentials resulting from higher line voltages. As a result of these two compensating factors, the sensitivity of the system (through the amplifier) is almost independent of line-voltage variations.

X-Axis Deflection

For deflection along the X-axis, either the internal sweep signal or an external signal may be used. The X-axis positioning system is somewhat different from that employed on the Y-axis. Here the positioning voltage is applied to one grid of the first amplifier stage, while the input signal is applied to the grid of the other half of this stage. The positioning potentiometer is returned to a point near the cathode end of the cathode load of the cathode follower. This tends to increase amplifier stability, since variations in line voltage now produce about the same variations in voltage at the two grids of the first stage of amplification *V12.*