COSSOR MODEL 1035

FREQUENCY RESPONSE
Vertical Amplifier (Y1) 20 cps to 7 Mc (15% down at 7 Mc)
Vertical Amplifier (Y2) 20 cps to 100 kc (15% down at 100 kc)
Sweep Circuit 150 milliseconds to 15 microseconds

DEFLECTION FACTORS
Vertical-Deflection Plates 675 d-c volts/mm
Horizontal-Deflection Plates 800 d-c volts/mm

LINE RATING 105/115, 120/130, 200/215, 216/234, 235/255 volts, 50 to 100 cps

TUBE COMPLEMENT

Type	*Function*
43.1U (V1)	Low-Voltage Rectifier
E.F.50 (V2)	Input Tube, A1 Amplifier
61SPT (V3)	Driver
61.BT (V4)	Cathode Follower
SU2150A (V5)	High-Voltage Rectifier
63SPT (V6)	Voltage Regulator
SD6 (V7)	Clamper
63SPT (V8)	Transitron Oscillator
63SPT (V9)	Time-Base Generator
OM4 (V10)	Buffer
SD6 (V11)	Voltage Limiter
63SPT (V12)	Phase Inverter
61.BT (V13)	Cathode Follower
89D (CRT)	Cathode-Ray Tube

The schematic circuit diagram is shown in Fig. 22-5.

A1 Amplifier

The vertical amplifier uses an input tube *V2,* a driver *V3,* and a cathode-follower output *V4,* and provides negative feedback as a means of gain control. Signals to the *Y1* deflection plate normally pass through the amplifier, although direct connection to the plate is possible at the side of the instrument.

A tapped network applies negative feedback from the cathode of the output tube *V13* to the cathode of the input tube *V2* and is frequency-compensated by capacitors arranged in the plate circuit of *V3,* to avoid the inevitable phase change that would occur in *V13* if they were in the cathode circuit of that tube.

A2 Amplifier

The gain of this single-tube circuit *V4* is adjusted on the 5-volt range by the preset cathode-feedback control *R105*. The sensitivity switch, *S6,* allows five gain settings and gives control ranges from 500-0-500 volts to 5-0-5 volts for full-screen deflection; it is arranged as a frequency-compensated attenuator.

Time Base

The time-base circuit uses five tubes. A Miller integrator is coupled into a series multivibrator, and by means of range switch *S9,* nine basic scanning speeds are possible. The time base operates repetitively or may be triggered by a pulse from the A1 amplifier or from an external source. The triggering signal may be either positive or negative in sign. The polarity is selected by the sync selector switch *S16*. In the free-running condition, the time base can be synchronized by an internal pulse or, as in the case of the trigger pulse, from an external source. The selection of the polarity of the sync signal is provided by the sync selector switch *S16*.

The basic operation of the time base is as follows: Assume the bias potential on the suppressor grid of *V8* results in plate-current cutoff; *V9* is conducting (zero bias); and the capacitor selected by *S9,* say *C34,* is fully charged. At the beginning of the cycle, the suppressor of *V8* is driven positive, causing a drop in anode potential. The signal is transferred to the control grid through *C34*. This initial drop extends only for the duration of the grid base after which the anode current is limited by the negative feedback of *C34*. The *V8* anode voltage falls linearly.

The discharge current from *C34* maintains *V9* at cutoff during this period and ensures that a positive driving voltage is applied to the suppressor via *C43* (that is, there is no potential drop at the *V9* anode transferred to the *V8* suppressor through *S12* and *C43*). The scanning period continues until the linear decay in anode voltage, determined by the time constant of *C34* and *R91,* reaches the bend in the plate characteristic curve of *V8* and the discharge current from *C34* ceases.

As a result, the bias on *V9* is removed and the tube becomes conductive; its plate goes negative and supplies a cutoff voltage to the suppressor grid of *V8*. Capacitor *C34* now becomes recharged due to the current in the *V8* grid circuit and *V9* cathode circuit and is ready for the next forward stroke of operation.

The charging time of *C34* corresponds with the flyback period of the cathode-ray-tube spot. An alternative point of view is that *V8* is cut off during flyback, since *C43* is charging from negative to positive at the suppressor grid point in the circuit.

Synchronization

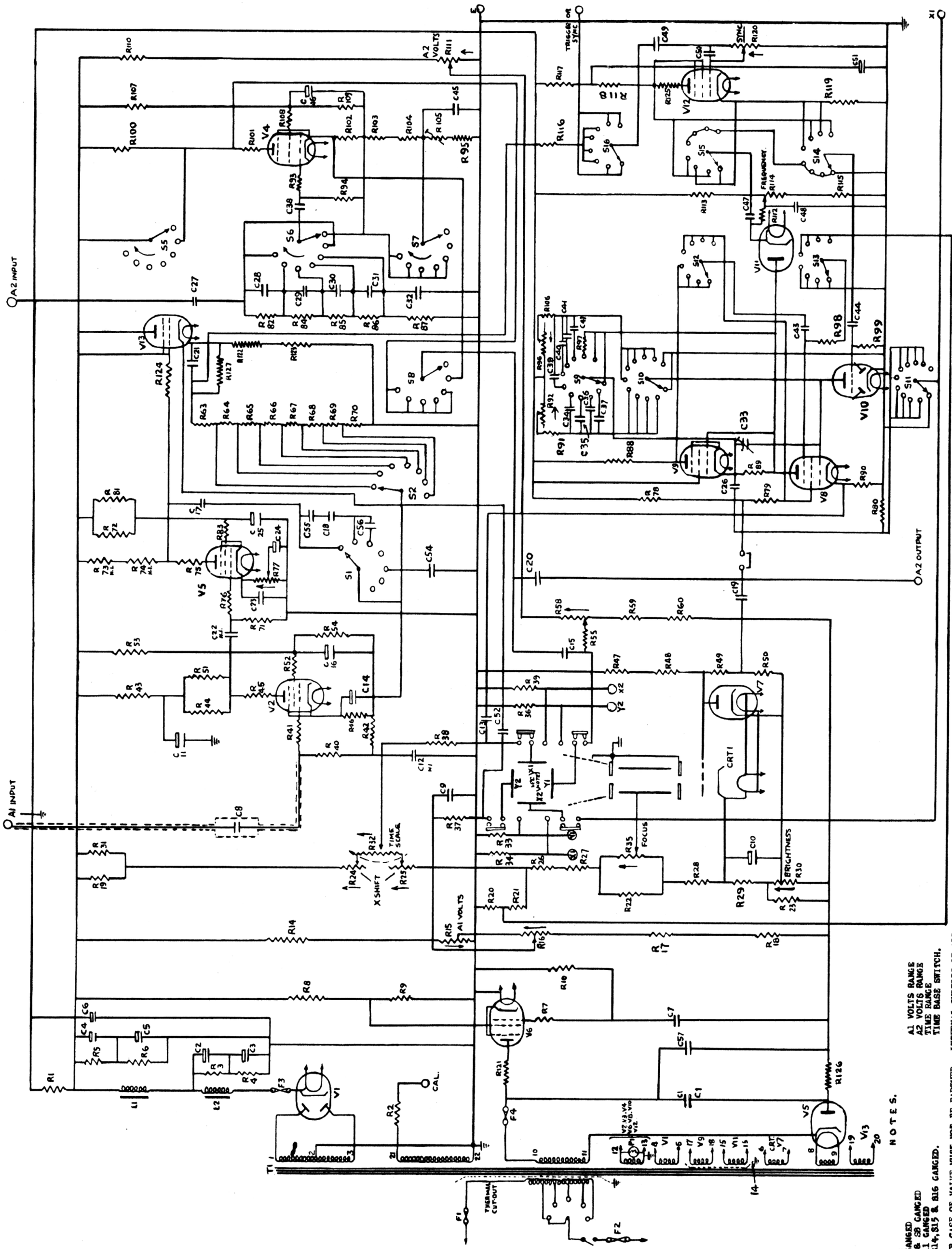
Synchronization is achieved by varying the repetition rate of the time base via the diode circuit *V11* which limits the positive excursion of the anode voltage of *V8* and determines the end of the flyback. The variation of repetition rate, rather than the change of actual spot velocity, is essential in this time base since the time calibration holds good only with constant spot velocity.

Trigger

In the triggered condition of the time base, *V8* is connected as a transitron oscillator biased off on its suppressor and triggered from its control grid. The circuit comprises a phase-inverting tube *V12* and a buffer *V10*. The triggering pulse is fed to the TRIGGER OR SYNC terminal and to the grid of *V12* via *S16, C49,* and potentiometer *R120*. The polarity of the pulse fed to the grid of *V10* is selected by *S16,* which connects either the anode or cathode of *V12* to the buffer stage. The trigger signal is then injected into the control-grid circuit of *V8* via the anode of *V10*. By the control-grid modulation of *V8,* maximum sensitivity to the trigger pulse is achieved with complete isolation from the external pulse circuits by the interposition of the buffer stage.

PARTS LIST FOR COSSOR MODEL 1035

R1	8·2K	R26	82K	R48	3·9 MΩ	R74	3K	R96	¼ MΩ	R118	4·7K	C13	1 μF	C35	·015 μF
R2	2·2K	R27	82K	R49	22K	R75	47 Ω	R97	4·7K	R119	2·2K	C14	50 μF	C36	·05 μF
R3	82K	R28	27K	R50	2·2 MΩ	R76	120 Ω	R98	470K	R120	½ MΩ	C15	·25 μF	C37	·15 μF
R4	82K	R29	330 Ω	R51	82K	R77	200 Ω	R99	56K	R121	2·2K Ω	C16	8 μF	C38	·1 μF
R5	82K	R30	15K	R52	120 Ω	R78	15K	R100	27K	R122	5K Ω	C17	18 pF	C39	·005 μF
R6	82K	R31	82K	R53	100K	R79	15K	R101	120 Ω	R123	5K Ω	C18	5·6 pF	C40	1625 pF
R7	1·5K	R32	50K	R54	330K	R80	3·3 MΩ	R102	270 Ω	R124	330 Ω	C19	·1 μF	C41	450 pF
R8	33K	R33	1 MΩ	R55	1 MΩ	R81	47K	R103	10K	R125	470 Ω	C20	·25 μF	C42	115 pF
R9	68K	R34	1 MΩ	R58	1 MΩ	R82	146K	R104	10K	R126	15K Ω	C21	8 μF	C43	·5 μF
R10	680K	R35	100K	R59	2·2 MΩ	R83	120 Ω	R105	500 Ω	R127	15K Ω	C22	·25 μF	C44	·25 μF
R14	22K	R36	1 MΩ	R60	2·2 MΩ	R84	51K	R106	270K	C1	·25 μF	C23	·01 μF	C45	·005 μF
R15	50K	R37	1 MΩ	R63	13·2K	R85	14·5K	R107	47K	C2	16 μF	C24	1000 μF	C46	8 μF
R16	1 MΩ	R38	1 MΩ	R64	6·3K	R86	5·1K	R108	1000 Ω	C3	16 μF	C25	8 μF	C47	·1 μF
R17	2·2 MΩ	R39	1 MΩ	R65	1·5K	R87	2·2K	R109	180K	C4	32 μF	C26	·25 μF	C48	·25 μF
R18	2·2 MΩ	R40	2·2 MΩ	R66	600 Ω	R88	27K	R110	22K	C5	32 μF	C27	·1 μF	C49	·1 μF
R19	82K	R41	120 Ω	R67	150 Ω	R89	2·7K	R111	50K	C6	8 μF	C28	39 pF	C50	15 pF
R20	120K	R42	1 MΩ	R68	47 Ω	R90	1·5K	R112	22K	C7	·01 μF	C29	47 pF	C51	8 μF
R21	470K	R43	2·2K	R69	18 Ω	R91	1 MΩ	R113	56K	C8	·05 μF	C30	180 pF	C52	·25 μF
R22	100K	R44	82K	R70	2 Ω	R92	½ MΩ	R114	¼ MΩ	C9	·01 μF	C31	820 pF	C54	820 pF
R23	10K	R45	47 Ω	R71	470K	R93	120 Ω	R115	150K	C10	8 μF	C32	2200 pF	C55	6·8 pF
R24	50K	R46	120 Ω	R72	47K	R94	1 MΩ	R116	68K	C11	8 μF	C33	100 pF	C56	3·3 pF
R25	50K	R47	3·9 MΩ	R73	3K	R95	330 Ω	R117	4·7K	C12	1 μF	C34	·005 μF	C57	·1 μF



A1 VOLTS RANGE
A2 VOLTS RANGE
TIME RANGE
TIME BASE SWITCH.

A1 VOLTS RANGE
A2 VOLTS RANGE
TIME RANGE
TIME BASE SWITCH.

V6 - OUTER CASE OF VALVE MUST NOT BE EARTHED - INTERNAL SHIELDS OF ALL EF50 VALVES TO BE EARTHED.

ALL SWITCHES SHOWN IN ANTI-CLOCKWISE POSITION VIEWED FROM CONTROL KNOB.

INTERCHANGE OF TUBE PLATE IS NECESSARY DUE TO MECHANICAL ASSEMBLY.

N O T E S.

SWITCHES:
S1 & S2 GANGED
S5, S6, S7 & S8 GANGED
S9, S10, S11 GANGED
S12, S13, S14, S15 & S16 GANGED.

Courtesy Cossor Ltd.

Fig. 22-5.—Schematic of Cossor Model 1035.