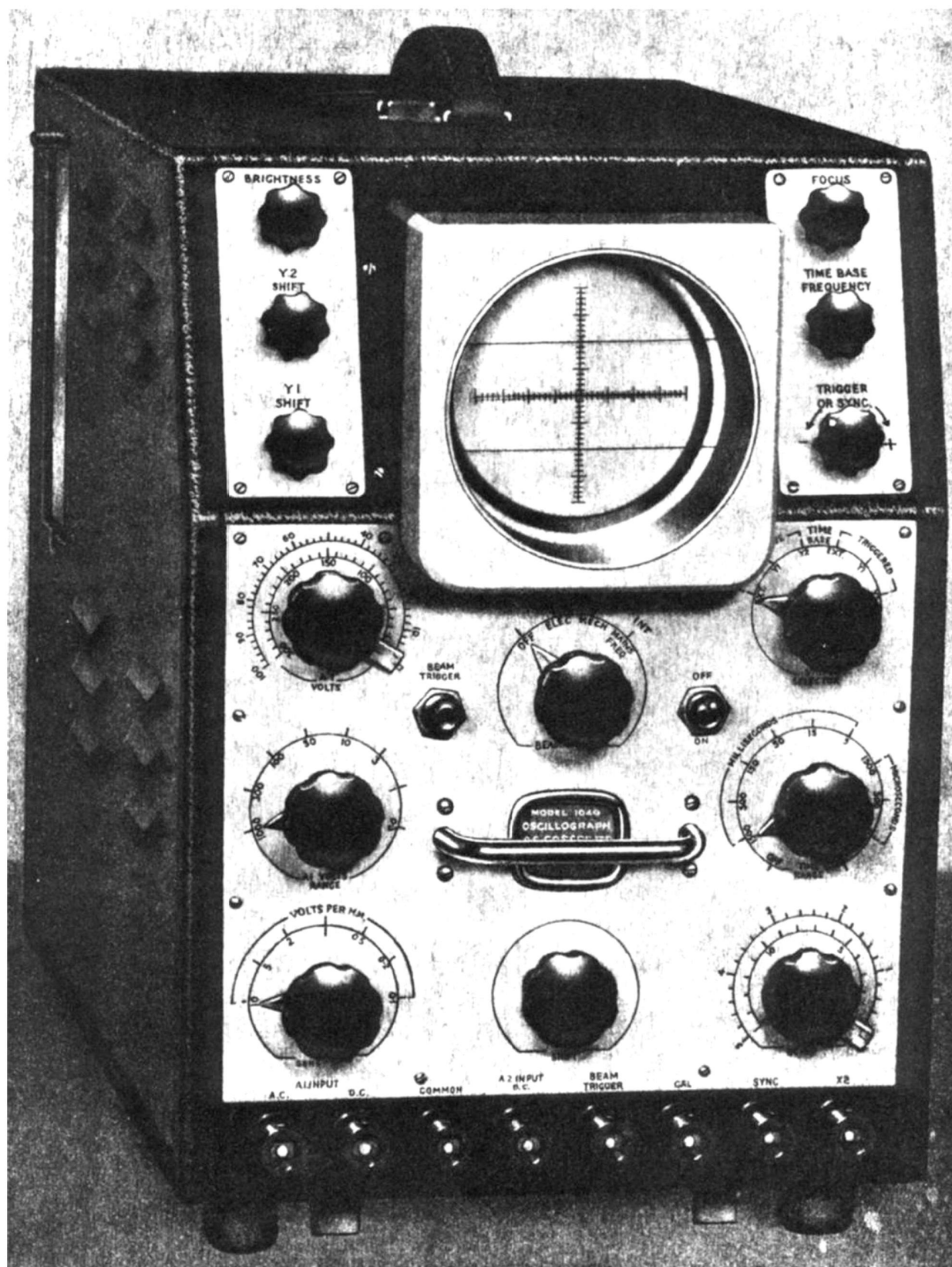


COSSOR
MODEL 1049
OSCILLOGRAPH
MK II

Appologies for the quality of some of the pages as this was
scanned from a ~20 year old photocopy of a photocopy

Cossor Model 1049 Double Beam Oscilloscope



SPECIFICATION

POWER RATING

Mains Volts—110, 125 or 207, 225 and 245. (Separate Instruments).
 Mains frequency—50-100 c/s.
 Power consumption—130 watts (approx.).
 Stabilised for variations of up to $\pm 10\%$ of input volts.
 Stabilised H.T. Voltage :—
 Tube—2 KV and 4 KV. Amplifiers, Time Base, etc.—650 volts.

DIMENSIONS

Height, including feet	...	...	...	...	...	...	...	...	16½ in. (42.0 cm.)
Width	...	...	...	...	...	...	...	...	12 in. (30.5 cm.)
Length, Knobs 2" extra	...	...	...	...	...	...	...	...	19¾ in. (50.1 cm.)
Weight	...	...	...	...	...	...	...	...	75 lb. (34 Kg.)

CATHODE RAY TUBE

Type 89 Double Beam 4" diameter "J" (blue) Screen.
 Y sensitivity direct to Tube : 650 V $\pm 8\%$ 3.1 volts/mm. D.C. (6.2 V at 4 KV).
 X sensitivity direct to Tube : 750 V $\pm 8\%$ 2.7 volts/mm. D.C. (5.4 V at 4 KV).
 The output of the Amplifiers and Time Base and direct access to the Tube Plates and Anode, "E" (Chassis) and "Common" terminals is available at the side of the instrument.

TIME BASE

Repetitive, Triggered or Single Stroke operation.
 Positive or Negative sync. and Trigger by continuously variable control.
 Directly calibrated time scale with 9 ranges from 150 microseconds to 1.5 seconds.

SYNCHRONISATION AND TRIGGER

Switch selection for External sync. or Internal sync. from Y1 or Y2 signals.
 Sync. input impedance, 2 megohms 20 pF.

Y1 D.C. AMPLIFIER

Gain—900, Five valves.
 Frequency response—D.C. to 100 Kc/s. $\pm 15\%$.
 Compensated for H.T. and Heater supply variations.
 Fitted with directly calibrated Y shift control.
 Input Impedance—0.5 to 0.75 megohm, 10 to 40 pF.

Y2 D.C. AMPLIFIER

Gain—25, Two valves.
 Frequency response—D.C. to 100 Kc/s. $\pm 15\%$.
 Fitted with switch attenuator calibrated in the following range of Y2 sensitivity :—

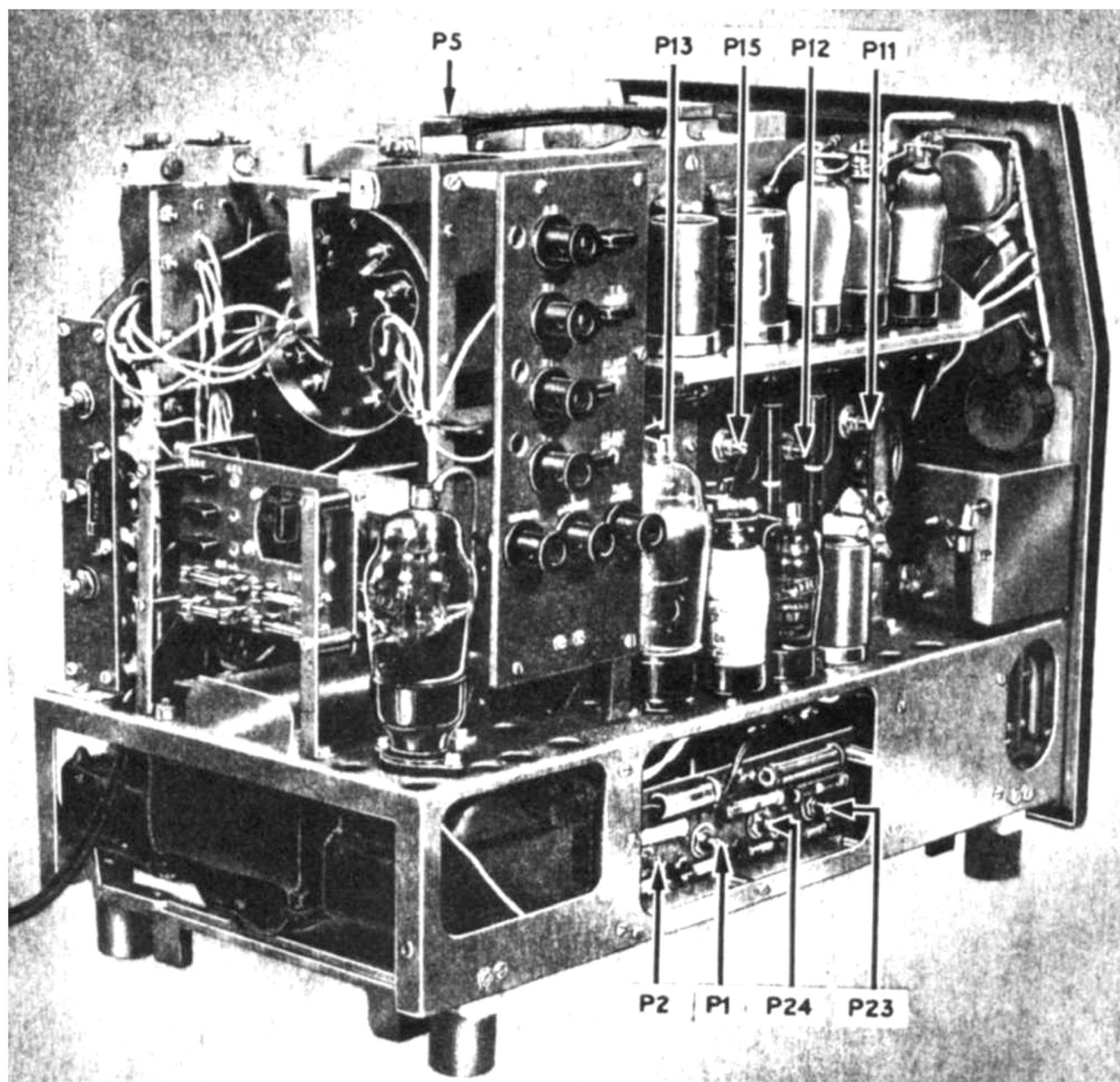
Volts per mm.	Volts per mm.
10.0	0.5
5.0	0.2
2.0	0.1
1.0	

Maximum input—1,000 V D.C., or Peak A.C.
 Input Impedance—0.5 to 1 megohm, 70 pF (Miller Effect).

BEAM TRIGGER

H.F. circuit giving the following facilities :—

1. Beam Trigger off.
 2. Electrical Beam Trigger enabling beam to be switched on and off by the application of D.C. to trigger terminal, and giving beam switching for time marking from an A.C. signal.
 3. Mechanical Beam Trigger enabling beam to be switched by shorting "Beam Trigger" and "Common" terminals.
 4. Mains Frequency Beam Trigger giving blackout pips at Mains Frequency.
- Push-button also provided to facilitate photography and to permit inspection of the trace when required.



Note : P.5 is the potentiometer on the sub-chassis nearest the front panel.

Illustration shows the interior of Model 1049 Double Beam Oscillograph with cover removed. The Tube Connection terminals and the Amplifier and Time Base Output sockets can be seen, as well as the Fuses and Mains Selector Links. The leather carrying handgrip is not mounted to the outer dust cover but directly to the chassis assembly which thus takes the full weight when the instrument is lifted.

TUBE AND AMPLIFIER CONTROLS.

The Brightness, Focus, Vertical Beam Shifts and two Time Base controls are mounted at the top of the front panel. Under these are located the A1 amplifier gain switch and its calibrated voltage scale, the A2 amplifier sensitivity switch, the X shift and, on the right, the main Time Base controls. The central control marked "BEAM TRIGGER" provides beam "on/off" switching or intensity modulation for Time co-ordination; the adjacent push-button is provided to permit examination of the traces which may—through operation of the beam-trigger system—be occulted.

A1 AMPLIFIER

This amplifier comprises an input stage, compensated for heater variations, feeding into a phase-splitter which, in turn, drives the push-pull output stage. The maximum gain is 900 with a frequency response within $\pm 15\%$ from zero to 100 Kc/s. Measurement of the Y1 signal is provided by a calibrated shift control operated in conjunction with the "A1 VOLTS RANGE" switch. Eight sensitivities are provided so that a full screen deflection is obtained with inputs of 300 millivolts up to 1,000 volts. The circuit is so arranged that no damage can result by applying up to 1,000 volts to the input in any sensitivity position of the Range switch. The calibration is valid when the tube operates at either 2 KV or 4 KV.

The measurement of input voltage is made by applying an internal D.C. shift potential to move the oscillogram bodily through a distance equal to the total amplitude of the applied signal. This comparative shift voltage must also, therefore, be equal to the peak-to-peak value of the input voltage and thus is a measure of it.

In practice, the measurement of the peak-to-peak voltage of an input signal is made as follows :—

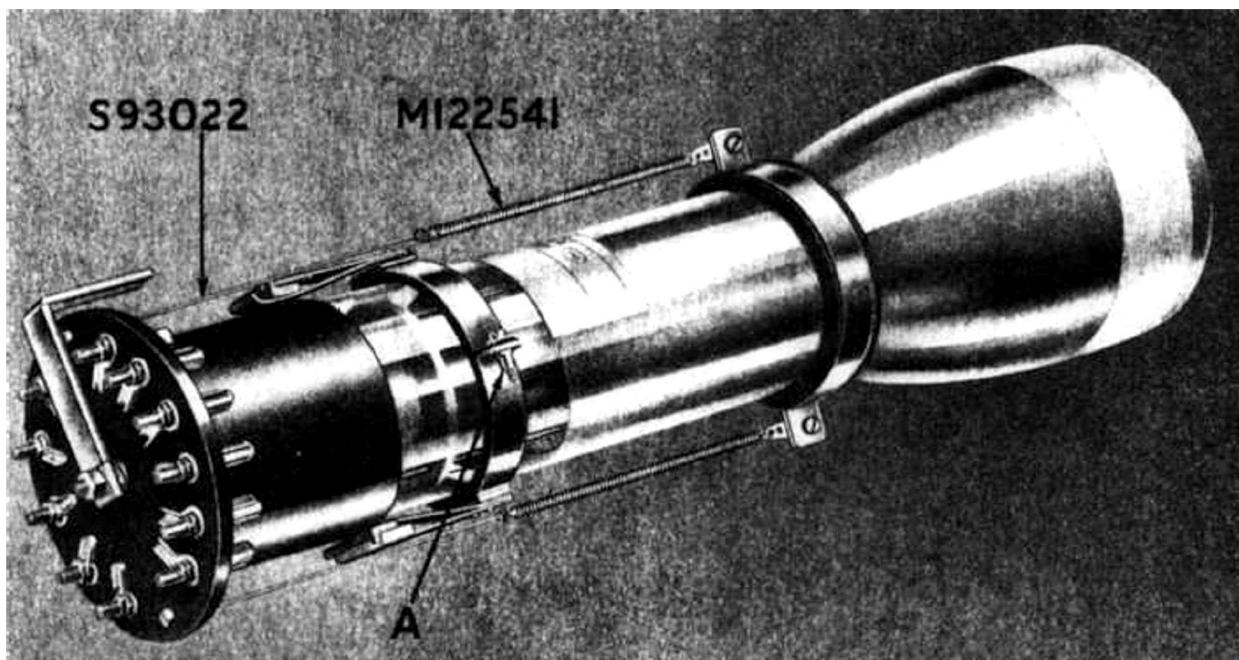
Set the "A1 VOLTS" scale to zero. With the Y1 shift control, position the peak of the signal so that it is coincident with the horizontal datum line of the graticule. Now using the calibrated control, shift the trace until the lower peak reaches the datum line. The voltage of the signal is then read off directly from the dial. The inner scale is read when the "A1 VOLTS RANGE" switch is set to .3, 3, 30 and 300 volts and the outer on the other ranges.

Two front panel terminals are provided to the input of this amplifier. One is direct for a D.C. input and the other, for A.C. signals, is blocked by a .1mfd. condenser, the combination giving an input Time Constant of .05 seconds.

BEAM BRIGHTNESS ADJUSTMENT

The Instrument leaves the works embodying a magnetic beam brightness adjusting device and is correctly set for equality of beam current when operating at 2 K.V. The device, at the same time, offers to the user a means of equalising the brightness of both beams when the application of a signal of higher frequency and/or amplitude to one of them, results in a longer excursion of the spot.

The device consists of a brass, felt-lined clamping band in two similar halves from which extend symmetrically two holders, each housing a compensating magnet. The assembly is clamped around the neck of the tube with the magnets pointing towards its base and positioned, radially, so that one of them lies between the Tube-base contacts marked "A2" and "Y2". The exact position will, of course, depend upon the degree of compensation required. The magnets are located with their like poles facing the same direction and if removed from their holders, care must be taken to replace them correctly. The beam brightness adjustment procedure for Model 1049 is as follows :—Remove the Case (see "Presentation"). Withdraw the four screws securing the aluminium casting to which the leather carrying handle is mounted. Access is now possible to an arcuate cover in the mu-metal screen. Remove this and slacken off the two clamp screws of the magnetic adjuster. With the Instrument switched on and the "BRIGHTNESS" control set so that the two traces are just visible, carefully slide the magnet assembly up and down the Tube neck until both beams are of equal brightness. Replace the arcuate cover in the mu-metal screen and re-check.



Note : Slacken screws "A" on either side of clamp to adjust Beam Brightness Device.

Should no further adjustments be necessary, tighten the clamp screws, replace handle casting and Case. If it is desired to correct for difference in beam brightness as the result of a greater trace length of one beam, the procedure already outlined is adopted, but in this circumstance the brightness adjustment is made with the *appropriate signals applied to the input of the amplifiers*. If these adjustments are made when the Oscilloscope is operating at its 2 KV setting, they will have to be re-checked if, subsequently, the instrument is operated at 4 KV. Alternatively, the adjustment may be carried out initially so that at either setting of the Tube supply a reasonable compensation is maintained.

VIEWING HOOD

The cast aluminium Viewing Hood serves not only to locate the graticule but to secure a shielding of the Tube face from unwanted illumination. In the rear face of the Hood, a raised annulus has been machined so that, when mated to the Tube bezel casting, a light-tight joint is assured.

It is held in position by four split pins registering with corresponding sockets in the bezel casting and easily removed by gripping its two sides and exerting a *symmetrical* pull.

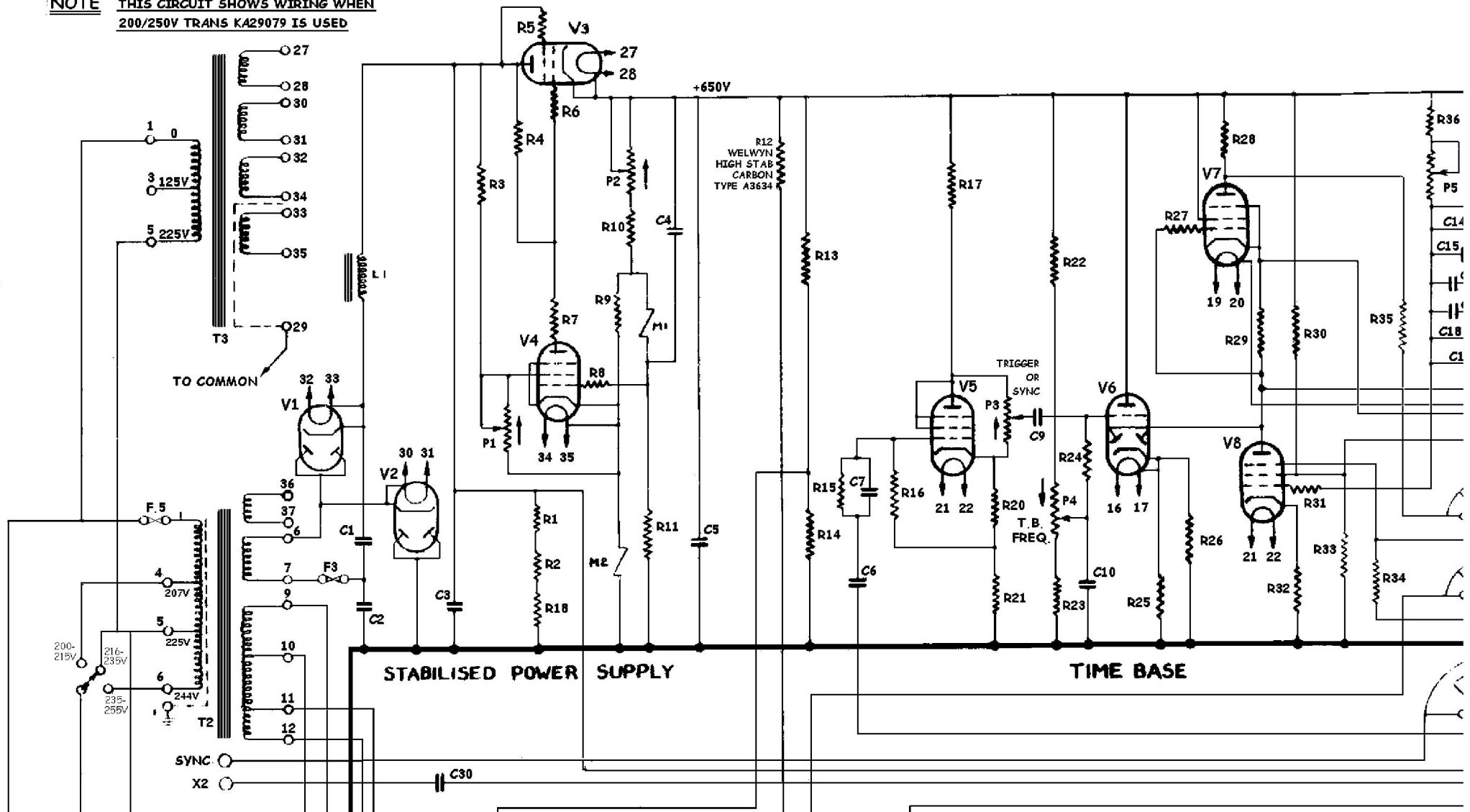
TILTING DEVICE

When this Oscilloscope is standing on an average Laboratory bench, no difficulty will be experienced in reading the calibrated dials but it sometimes happens—particularly in cases where the Instrument is used for checks-on-location—that it must be operated at low eye-levels. A tilting device has, consequently, been provided so that the Front Panel may be inclined to a more convenient viewing angle.

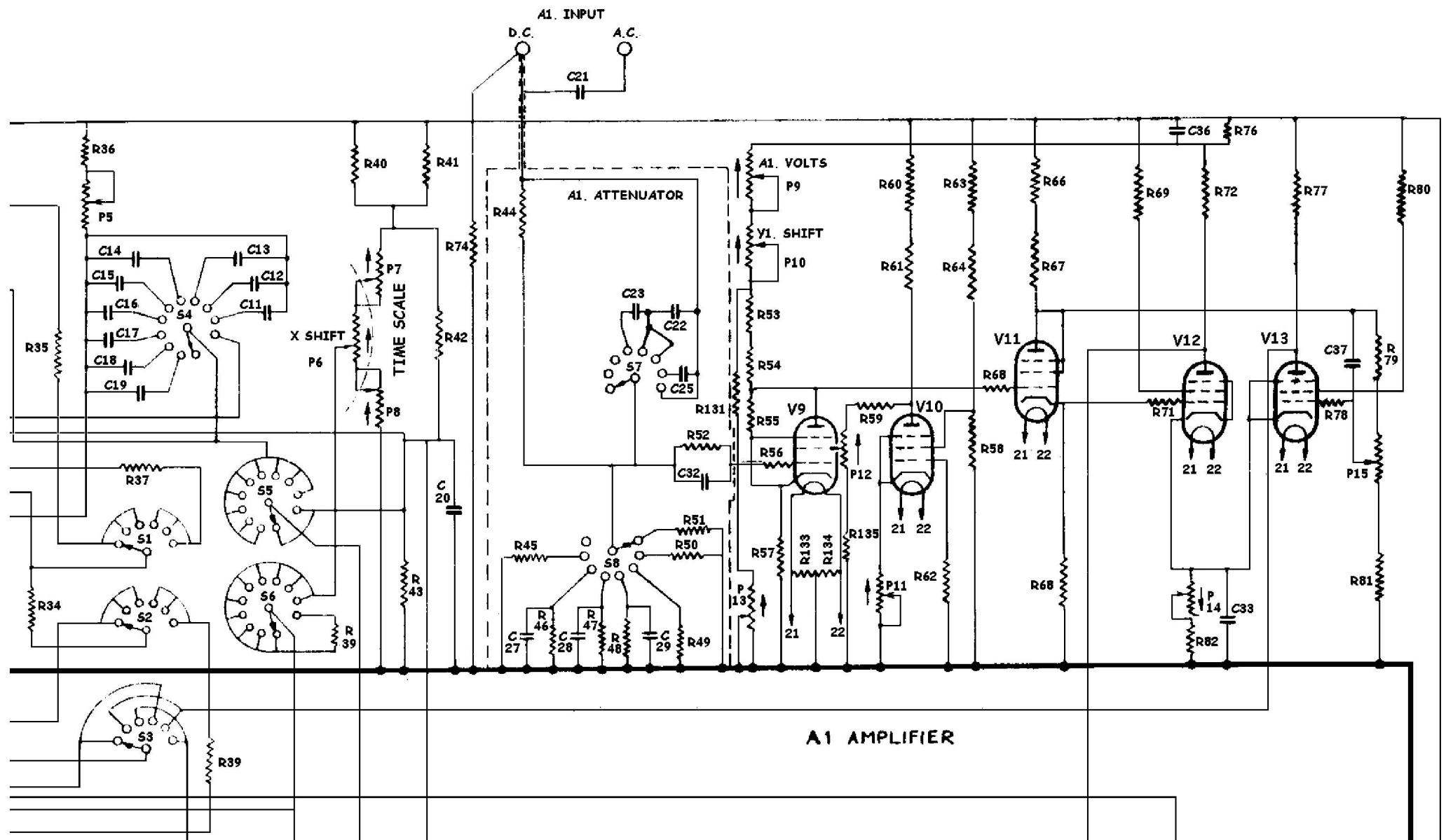
“U”-shaped in appearance, it is fitted under the bottom tray of the Oscilloscope and secured, when not in use, by two spring clips. To operate, raise the front of the instrument by means of the chromium handle on the panel, release the tilting device from its clips and pull it forward to its maximum extent.

Cossor Model 1049 Double Beam Oscillograph

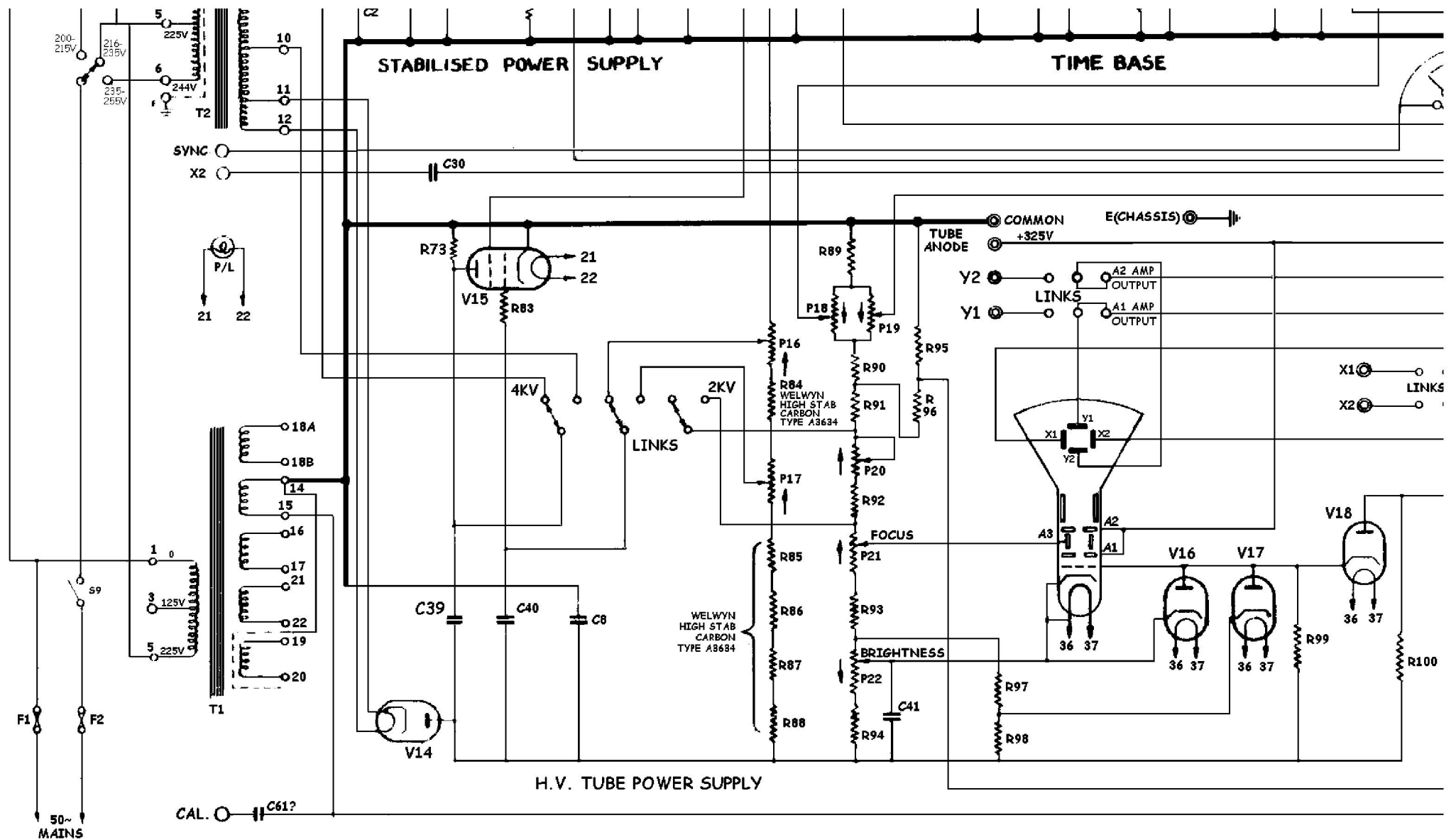
NOTE THIS CIRCUIT SHOWS WIRING WHEN
200/250V TRANS KA29079 IS USED



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