

electron's techni-guide

Conway Model COS 326 Oscilloscope



The COS 326 oscilloscope is a completely solid-state (except CRT) unit with a 10 MHz bandwidth, an 8 x 10 cm. display area, and dual-trace capability. Complete with a set of input cables, it weighs in at just sixteen pounds.

This instrument uses completely printed circuit construction. While the boards are phenolic rather than glass epoxy, they are well laid out and there is easy access to all calibration controls. The board components are well identified for easy servicing; the majority (including the CRT) are made by Philips, and are easily obtained in Canada.

The manual is clearly written, with adequate descriptions of control functions, calibration procedure, large fold-out schematic diagrams and a complete "parts replacement" list.

Power supplies: The high voltage circuit is a full-wave doubler, working at 120Hz, rather than a high-voltage oscillator. The supplies for all the solid-state circuitry, including the vertical preamplifier, are half-wave rectified.

Calibration controls are provided for Astigmatism and Geometry in the CRT circuit.

Calibrator: The calibrator circuit is quite simple and rather neat. Fifty-one volts, ac, is supplied to the emitter of a transistor, the base and collector of which are both grounded. When the base-emitter junction is forward-biased the negative ac peak is limited to 0.7 volts. When the junction is reverse-biased, the emitter-base junction behaves like a zener diode, clipping the positive ac peak. The resulting waveform is a 60Hz square wave, which can be adjusted to 1 volt peak-to-peak with a calibration control.

Vertical Amplifier: The vertical amplifier is a series of cascaded differential pairs with JFET input. The input stage is well protected against input overload up to ± 400 V dc or 280 V ac input signal. The current source for the input stage includes a voltage dependent resistor, which prevents input stage gain variation with line-voltage changes.

Careful attention has been paid to maintaining high-frequency response, and capacitive compensation on the input attenuators. The actual vertical amplifier bandwidth is slightly better than the 10 MHz specification, and is shown on the manufacturer's test report accompanying this unit as 13.7 MHz at the 3dB points.

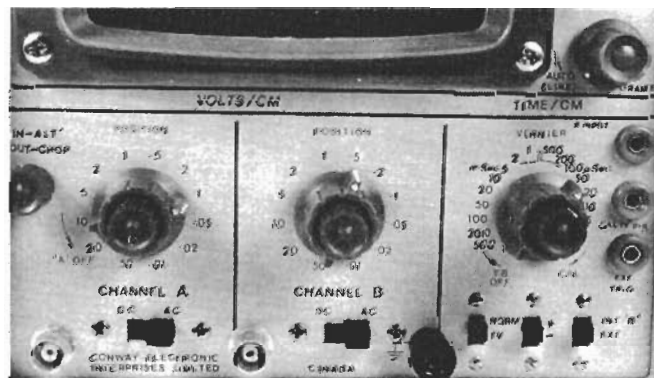
A choice of "CHOP" (for low-frequency dual-trace work) or "ALTERNATE" (for high frequency dual-trace work) is provided. Channel A can be disabled, with a slight gain in beam intensity, for single-trace measurements. Diode gating is used to provide the dual-trace capability.

Trigger Circuit and Time Base: The trigger circuits provide a choice of internal, external, TV line and TV frame triggering. AUTO triggering capability ensures a trace when trigger signals are removed or interrupted, or the desired trigger point can be adjusted using the TRIG-LEVEL control.

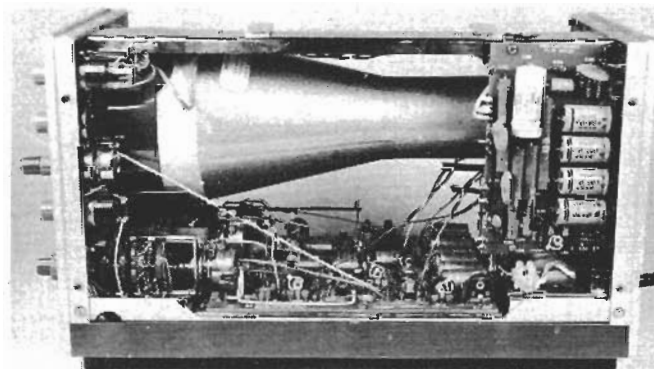
The time-base is the usual Miller run-up circuit, with CRT blanking provided. The specification for calibration accuracy is in the order of 5%, which means, at worst, $\frac{1}{2}$ major graticule division error when making a time measurement over 8 major divisions.

The time-base drives the CRT through the horizontal amplifier, which includes a x 5 magnifier.

A full calibration procedure is included in the manual and the oscilloscope carries a twelve-month warranty. The COS 326 is one of a line of oscilloscopes made in



The only front panel controls not visible in this view are, upper right, Intensity/Power Switch, Focus, and the combination Horizontal Position/Horizontal Magnitude.



A one piece cover which clips in at the sides is fastened by the handle to the top structural member. The EHT board is mounted vertically.

Australia for Conway Electronic Enterprises of Toronto, and lists at \$488. Other models are COS 316 (\$280), Model 336 (\$446), and a model with 7 interchangeable plug-in modules COS 666, which, with three basic modules, lists at about \$1300.

A Mark 2 version of the COS 326 will be available shortly with response to 12 MHz and with triggering selectable to either A or B inputs. Price will remain the same. ☒

Manufacturer's Specifications

Vertical Amplifier (Channel A & B Identical)
Sensitivity 10mV to 50V per cm. in 12 direct reading steps in a 1,2,5, 10 Sequence.
Bandwidth DC or 2Hz (AC coupled) to 10MHz-3db., referred to 4cm. deflection at 50kHz.
Rise Time 23nSec. for 4 cm. deflection.
Input Impedance 1m Ω and 40pf constant.
Calibration < 5% including 10% line change.
Deflection 8cm. CRT 15cm. amplifier up to 1MHz.
Input Voltage Protection \pm 400V DC or 280V AC RMS.
Display Mode Single beam Channel B only
 Dual trace A & B chopped at 100kHz approx.

Time Base
Range 1uS to .5Sec/cm. in 18 switched ranges with 5-1 vernier extending range down to 2 Sec/cm.
Magnification X1 to X5 continuously variable, calibrated both settings. Max. sweep speed 200nSec/cm. mag. sweep.

Triggering

Selection	Coupling Norm.	Slope +	Source Int. (Chan B) Ext	Mode AUTO Select Level
Sensitivity				
Int. AUTO	1cm. defl.	5Hz to 5MHz		
	2cm. defl.	2.5Hz to > 10MHz (+ ve slope)		
Int. Select	\pm 3cm. max.	5Hz to > 2MHz		
Ext. AUTO	1V RMS	2.5Hz to > 10MHz		
Ext. Select	> 1V RMS	2.5Hz to > 5MHz		
	Max. Ext Input 100V p-p	Max. or 60V RMS.		

TV Sync. Triggers on Line in AUTO position. Triggers on Frame with Trig Level fully clockwise.

Sensitivity 2 cm. to over 8 cm. composite video waveform. Displays frame pulses, equalising pulses, colour burst, etc.

Demodulation or HF Reject. T.V. Selection also provides stable locking of modulated R.F. Waveforms and eliminates HF noise from trigger signals below 2kHz approx.

Horizontal Amplifier

Sensitivity Approx. .70V to approx. 10V/cm. continuously variable.

Bandwidth DC to 750kHz. -3db.

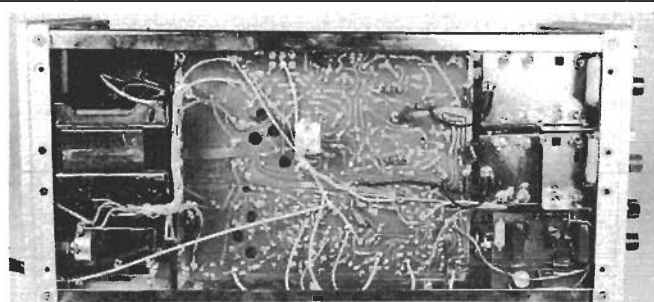
Input Impedance 56K Ω and 10pf approx.

Max. Input \pm 10V or 60V RMS.

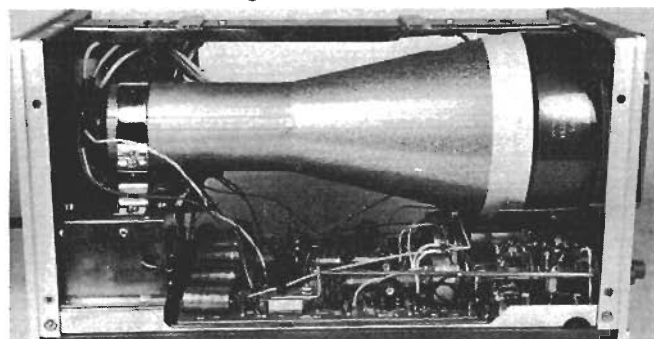
Z Modulation
 Input to CRT grid. 0.01uF + 22K Ω . +30V required blank CRT at normal intensity

Calibrator Line Frequency 1V p-p square wave 2% accuracy.

Time Base Output 0 to 25V positive going saw tooth max. Load 22K Ω



Some of the time base and input attenuator alignment adjustments are accessible from the underside. The pot at the rear is the Astigmatism control.



The CRT base sits on a bracket over the power transformer. Most of the components are on the main printed circuit board. Ahead of the p.c. board are the input attenuator and time base controls.

Power Requirements 30 Watts approx. 85V - 135V in 3 ranges 190V - 265V in

Dimensions 3 ranges — 50 - 60 Hz
 9¼" high x 7½" wide x 16½" deep overall feet, handle, knobs, etc.

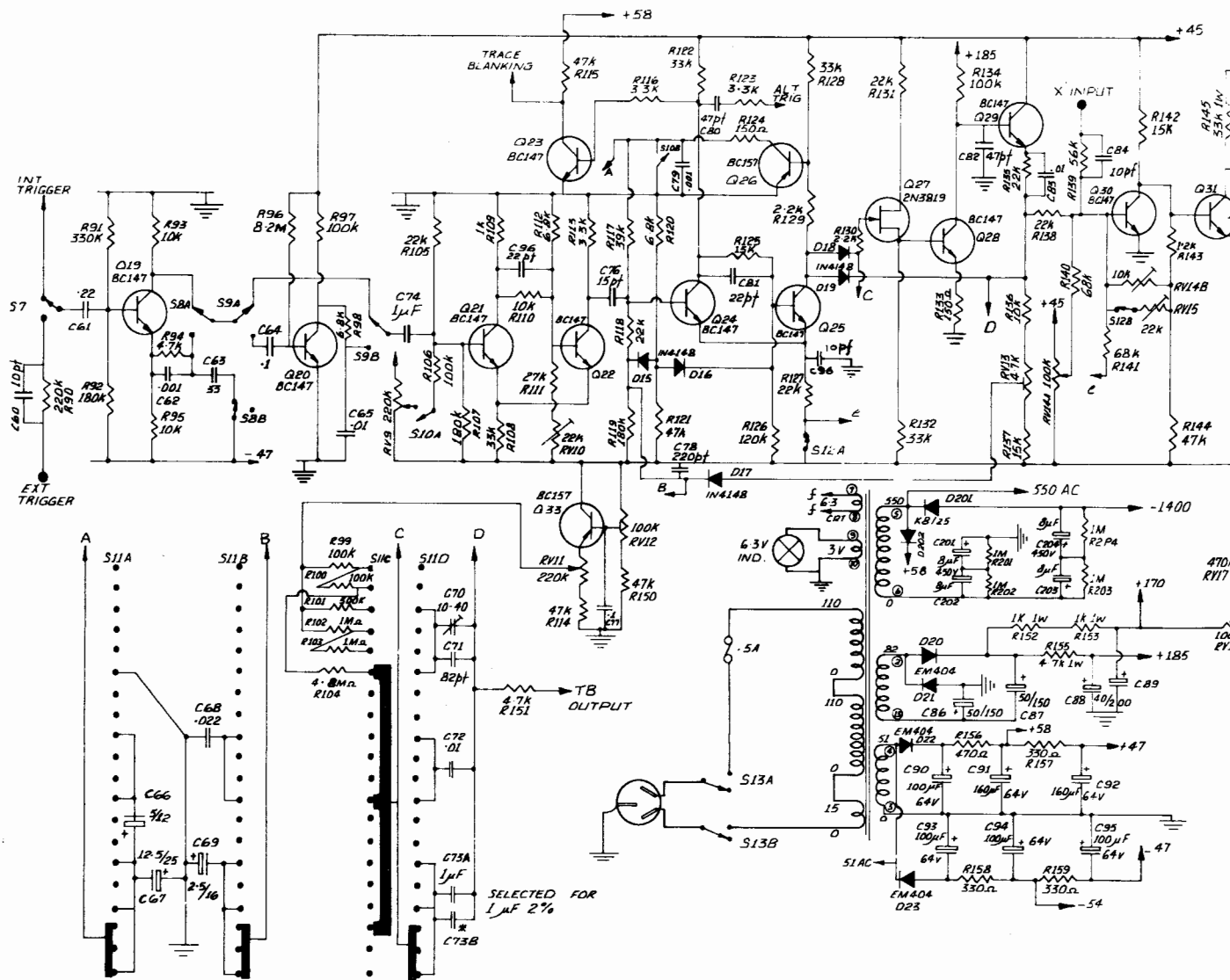
Weight 16 lb. (7kg.).

TEST REPORT
 MODEL bwd 539.

SERIAL NUMBER 13089
 TESTER J L GRAHAM
 DATE 25th MAY 1971

FUNCTION	SPEC.	ACTUAL	
		A	B
VERTICAL AMPLIFIER			
Attenuator	Compensation	—	—
	Calibration at .01V	5%	< 4% / < 4%
	Input Capacitance	Approx. 40pf	420f / 410f
	Bandwidth (50kHz = 4 Cm Ref.)	10MHz - 3db	13.7MHz / 13.7MHz
	AC - DC Check		— / —
TIME BASE			
	Calibration X1 Exp.	5%	< 4%
	Vernier Range	5 - 1 Approx.	6.5 - 1
	Horizontal Expansions at 1mSec.	X5	X5
TRIGGER			
	INT. AUTO 2Cm Defl.	2.5Hz - 10MHz	— / —
	Int. Level Range, >3cm	5Hz - 2MHz	— / —
	Ext. AUTO + or - 1V RMS	2.5Hz - 10MHz	— / —
	Ext. Level Range >1V RMS	2.5Hz - 5MHz	— / —
	TV Check		— / —
HORIZONTAL AMPLIFIER			
	Sensitivity	.7V to 10V Approx.	0.8V to 9V
	Bandwidth (50kHz = 6cm Ref.)	750kHz	1.12MHz
GENERAL			
	Cal. out	1V p-p	— / —
	T. B. out (Approx.)	40 to +25V	0V to +28V
	'Z' Modulation	30V p-p	— / —
	Intensity & ON-OFF Switch		— / —
	Focus		— / —
	Horizontal Shift Y. B.		— / —
	Horizontal Shift XI EXT Ampl.		— / —
	Vertical Shift		— / —

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TIME BASE & POWER

NOTE : COMPONENTS MAY OCCASIONALLY VARY FROM THOSE DESIGNATED DUE TO AVAILIBTY OR TO OPTIMISE PERFORMANCE.

