

SE Laboratories Group

Directors

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 P.A. McDonald, B.Sc., C.Eng., M.I.E.E. B.J. Steel. Secretary: E.L. Gostling, F.A.C.C.A., F.C.W.A.

1971/72

S.E. Laboratories was formed by the present joint managing directors in 1956, to manufacture and develop a range of pressure transducers and solenoid valves for the aerospace industry. The transducers were chosen for the British version (Blue Streak) of the Atlas missile and the Company received a major contract in 1957.

Electronic systems were designed basically around transducers and the rapid growth of the Company led to development of other peripheral equipment in the field of data acquisition and presentation.

From a modest labour force of 6 in 1956, the Company has expanded and with its immediate subsidiaries occupies 6 factories (a total area of about 162,000 sq. ft.), with a total establishment exceeding 750 employees.

With the formation of Meter Flow Ltd in 1960, the Company's activities spread into the field of liquid and gas flow measurement systems.







In August 1963, it was reformed as a public company and the issue was oversubscribed 176 times.

The year 1965 saw the formation of Dynatel Ltd which was later acquired by S.E. Laboratories Ltd in 1968. This new company is engaged in the manufacture of constant bandwidth and I.R.I.G. telemetry equipment.

In October 1966, the Company merged with E.M.I. who purchased 84.5% of the shares. As a result of the merger, S.E. Laboratories has now added oscilloscopes, magnetic instrumentation systems and digital measuring instruments to its already extensive product range.

S.E. Laboratories is heavily backed by the Research Division of E.M.I. employing some 300 scientists. A number of advanced projects are being studied in the area of electron beam recording. A separate facility has been set up to manufacture semi-conductor strain gauge devices with operating temperatures up to 200 °C.

Engineering effort and production have been aided by the recent installation of a computer at the main plant at Feltham, Middlesex.

R. Schild	P.C. Epstein	R.R. Kennedy	M.A. Perry	B. Steel	J. Keat
					
Chairman	Managing Director	Deputy Managing Director	Director, Wells, Somerset Scopes/Tape Systems	Sales Director	U.K. Sales Manager.



Digital Voltmeters



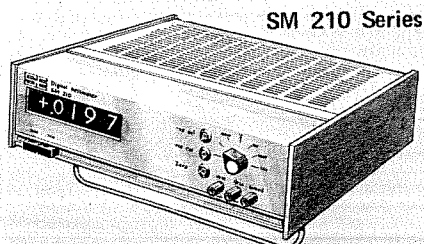
SE Laboratories range of Digital Voltmeters covers all requirements, from the low cost SM 210 series up to the ultimate portable measuring standard, the one in a million SM 215. Even the lowest cost devices in the range retain full four 9's resolution and genuine 0.01% accuracy.

Within the range are high speed, data logging programmable capability, and long scale length, high resolution plus high sensitivity 1 micro volt options if required.

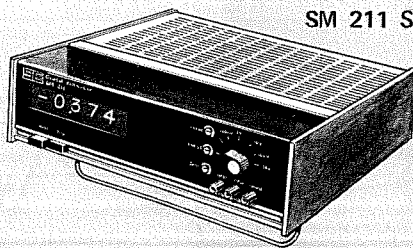
Provision for measurement of a.c., current and resistance is made with the SM 245 which, being a separate unit usable with any D.V.M. provides for maximum flexibility.

With the SM 215, SE undoubtedly provide the finest portable transfer standard available. Stable to 1 part in a million over 24 hours and 10 parts in a million over three months, it covers all operational standardisation requirements.

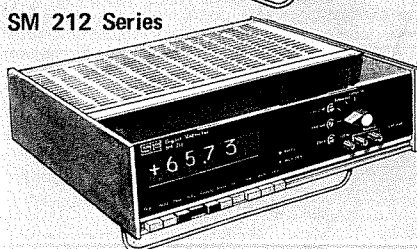
Working with S.E. Labs' DVM's is simplicity itself, there are no division factors to remember, integration times to select or potentiometers which need constant adjustment, so that even an untrained operator is rapidly at home with the instrument. All instruments are available with b.c.d. outputs to reproduce the digitally displayed information on tape, punch cards, hard copy printers and magnetic tape equipment or for direct computer entry.



SM 210 Series



SM 211 Series



SM 212 Series



SM 213 Series



SM 215 Series

All models rack mountable by simple addition of "ears".

These are the front panels of the five completely different models which form the basis of the 9 versions (plus multifunction unit) which are tabulated overleaf. Top left is the 210 which, despite its low cost, retains a true

0.01% accuracy (no doubtful 0.1% in the SE, range!) Right centre is the 215 — ultimate accuracy D.C. Voltmeter and transfer standard — with this one you can carry a standards room from lab. to lab.!

Outline Specifications of DVM's and Multi-Function unit

MODEL	AC VOLTS	DC VOLTS	CURRENT	RESISTANCE	FULLY FLOATING INPUT	STORED DISPLAY	BCD OUTPUTS	PROGRAMMABLE	AUTO RANGING	ACCURACY (90 days)	SCALE LENGTH	OVERRANGE	RESOLUTION	READING/RATE SEC	INPUT IMPEDANCE	INPUT CURRENT	SIZE	APPROX. WEIGHT
SM210A	•					•				±0.01% ±1 digit	9999	•	10μV	2	>2,500MΩ	<50 pA Typically 20 pA	8.9 x 33 x 29.2cm. 3½" x 13" x 11½"	5.9Kg. 13lb
SM210B	•					•	•			±0.01% ±1 digit	9999	•	10μV	2	>2,500MΩ	<50 pA Typically 20 pA		5.9Kg. 13lb
SM211A	•				•	•				±0.01% ±1 digit	9999	•	10μV	2	>2,500MΩ	<50 pA Typically 20 pA		6.8Kg. 15lb
SM211B	•				•	•	•			±0.01% ±1 digit	9999	•	10μV	2	>2,500MΩ	<50 pA Typically 20 pA		6.8Kg. 15lb
SM212	•				•	•	•	•		±0.01% ±1 digit	9999	•	10μV	25	>2,500MΩ	<50 pA Typically 20 pA		7.3Kg. 16lb
SM212C	•				•	•	•	•		±0.01% ±1 digit	9999	•	10μV	25	>2,500MΩ	<50 pA Typically 20 pA		7.3Kg. 16lb
SM213	•				•	•				±0.005% of FS. ±0.002%R	109999	*	10μV	2	>2,000MΩ	<50 pA Typically 20 pA		6.8Kg. 15lb
SM213B	•				•	•	•			±0.005% of FS. ±0.002%R	109999	*	10μV	2	>2,000MΩ	<50 pA Typically 20 pA	6.8Kg. 15lb	
SM215	•				•	•	•			±0.001%R ±0.001%FS	1,100,000		1μV	2	>100,000MΩ	<5 pA	13.4 x 43.5 x 58.5cm. 5¼" x 17" x 23"	18.2Kg. 40lb
SM245 Multi-Function Unit	•		•		•					±0.1% of FS. ±0.05%R ±0.1% ±200pA ±0.1%	Dependent on DVM		100μV 100pA 0.01Ω	>100MΩ >100mΩ		8.9 x 33 x 29.2cm. 3½" x 13" x 11½"	4.6Kg. 10lb	

* 1 μV with plug-in pre-amplifier SM 241

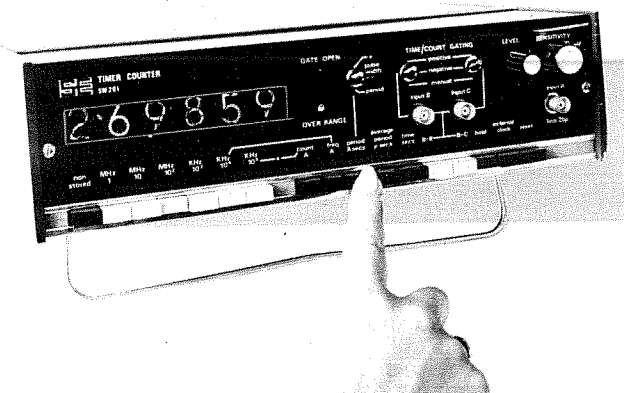
Fully detailed specification sheets are readily available on request.

Universal Timer Counters

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As with the Digital Voltmeters, the operation of SE's Timer/Counters has been simplified as far as possible by the introduction of push button controls. The range at present consists of the general purpose low cost type SM 200 Mk II and the high performance SM 201 giving an upper frequency limit in excess of 100MHz at 20 milli Volt sensitivity. A table of the performance of these units is shown.



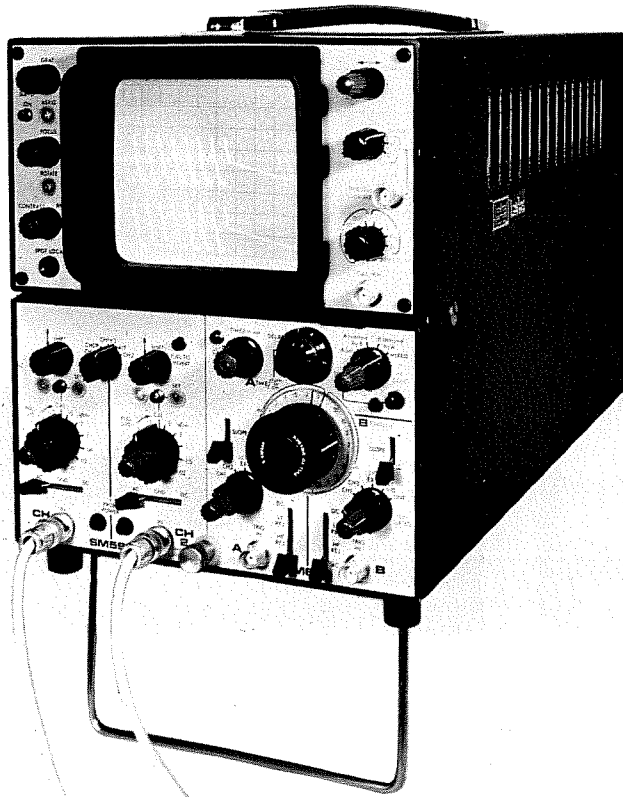
Parameter	SM200 Mk II	SM201
Display	Six side viewing numerical indicator tubes with integral decimal points.	Six side viewing numerical indicator tubes with integral decimal points.
Full Scale Count	999999 plus over-range	999999 plus over-range
Max Sensitivity	100 mV (Impedance 1MΩ - 25 pF)	10 mV (Impedance 1MΩ - 20 pF)
Input Frequency Range	10 Hz to 25 MHz (sine waves)	10 Hz to > 100 MHz (at 20 mV) (sine waves)
Internal Osc. Reference	2 MHz crystal with temp. coeff. less than 1 ppm/°C	* 2MHz crystal with a temp. coeff. less than 1 ppm/°C.
External Clock Input	0.5V r.m.s., impedance 1kΩ frequency 150 Hz to 10 MHz.	0.5V r.m.s., impedance 1kΩ frequency 150Hz to 10MHz
Operating Modes	Count, Frequency, Period, Time.	Count, Frequency, Period, Period Average, Time, Pulse Width, Frequency Ratio.
Stop - Start	Double line. Positive or negative voltage transient or contact closure, (on rear panel).	Double line. Positive or negative voltage transient or contact closure.
Voltage Protection	300 V r.m.s. (Ext. clock 100V r.m.s.)	300V r.m.s. (Ext. clock 100V r.m.s.)
Operating Temperature Range	0 °C to 50 °C	0 °C to 50 °C
Power Requirements	115 or 230V +15% - 20% 45 - 440 Hz, 25VA	115 or 230V + 15% - 20% 45 - 66Hz 25VA.
Dimensions	8" x 3½" x 11" 8lb.	13" x 3½" x 11" 11 lb.

* Higher stability reference oscillator will be available as plug-in option.

Oscilloscope Dual Trace 100MHz SM 112

Price June 1973

with SM599 £850
and SM602



CRT
Ø14-131 or 1474B

The SM 112 is a High Performance Oscilloscope Mainframe with the ability to receive a wide variation of X and Y plug-in modules.

- * 11 kV E.H.T.
- * 10 x 8 cm display
- * Triggering > 120 MHz
- * Calibration, 9 voltage levels with an accuracy of $\pm 1\%$.

Plug-in-units SM 599

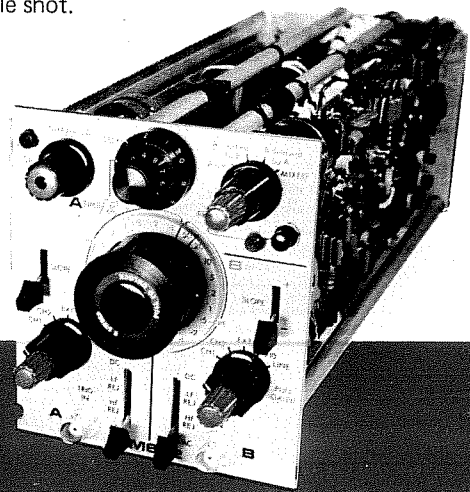
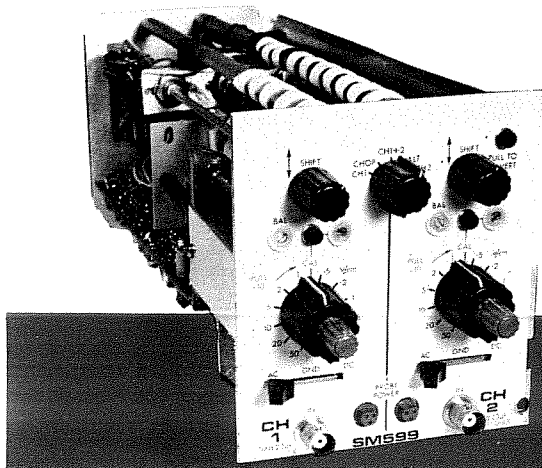
The SM 599 is a Dual Trace High Performance Vertical Amplifier which will plug into any SM 112 mainframe. All power supplies are provided by the mainframe.

- * Sensitivities from 1 mV on both channels
- * Bandwidth 100 MHz * 1 M Ω input impedance
- * Power supply socket for active probes.

SM 602

The SM 602 is a Comprehensive Double Time Base Unit with sweep delay and bright-up. All power supplies are provided by the SM 112 mainframe.

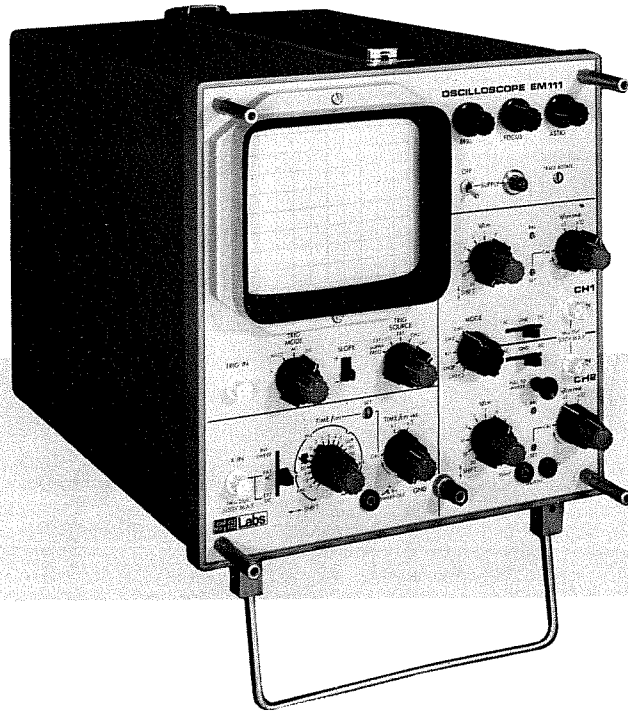
- * 5 ns - 2.5 sec/cm sweep speeds
- * Normal and delayed sweep
- * Gated trigger mode with range of trigger source selection
- * Single shot.



also SM554 50MHz Four Trace Vertical Amplifier. 10 mV/cm

Oscilloscope Dual Trace 18MHz SM111

Price June 1973
£270



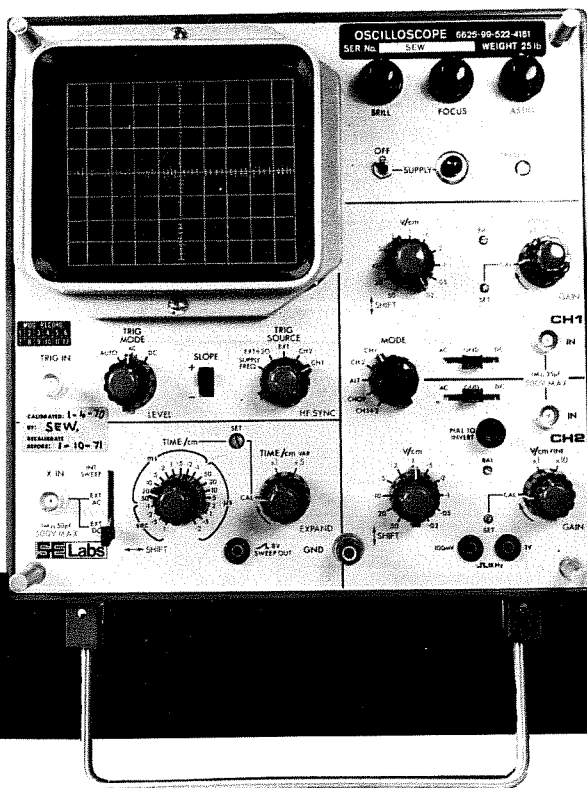
CRT
1424A

The SM 111 is a Switched Beam, General Purpose, Mains or Battery Operated Oscilloscope built to a rugged environmental specification.

- * Bandwidth d.c. to 18 MHz
- * Sensitivity from 2 mV per cm
- * 10 x 8 cm display
- * Four hours operation from clip-on battery pack.

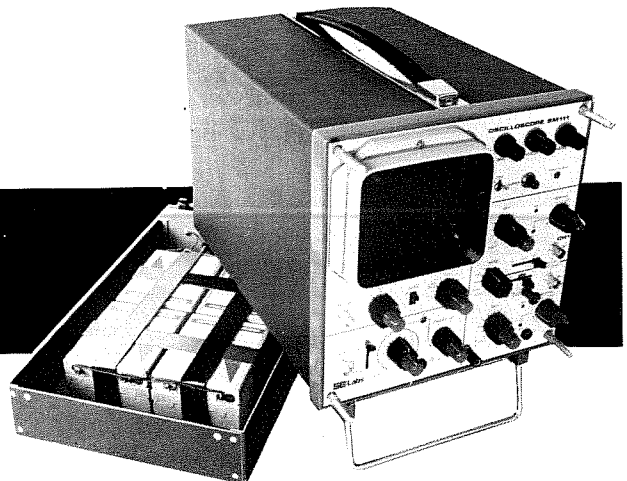
SM111 N.A.T.O. Version

Price June 1973
from £320



The SM 111 with some component changes was chosen for services use by the British Ministry of Defence because of its high environmental specification. This led to the granting of the following NATO numbers:

- * Oscilloscope Set 6625-99-522-4160.
- comprising:
- Oscilloscope SM 111 6625-99-522-4161
- Plug for d.c. operation 6625-99-522-4163
- Polaroid Filter 6625-99-522-4164
- Protective Cover 6625-99-522-4165
- Two Probe Kits 6625-99-522-4166
- Mains lead and Plug 6625-99-522-3660
- Also available:
- Console Mounting Adaptor 5895-99-522-6361



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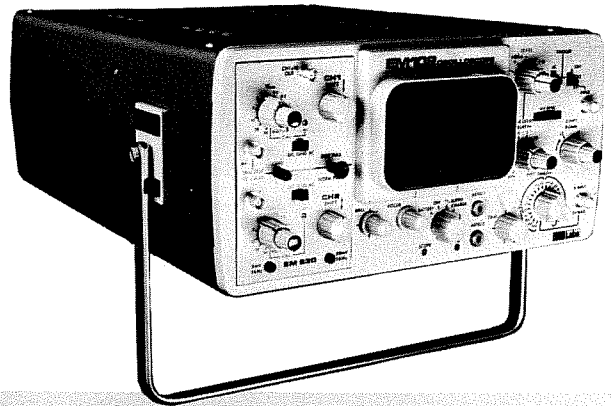
Oscilloscope Dual Beam 30MHz

EM 102

An inexpensive True Dual Beam Oscilloscope Mainframe with comprehensive easy to use features and a range of three Plug-in Modules (EM 505, EM 515, EM 530). The oscilloscope also offers the advantage of 11 – 16 V d.c. operation.

- * 10 kV E.H.T.
- * Simple delay trigger. (100 μ s to 100 ms)
- * 50 MHz Trigger capability.
- * Internal battery facility
- * Sweep range 0.5 S/cm to 20 ns/cm.

CR5-1374P



EM 102D

A True Dual Beam Oscilloscope extending the capability of the EM 102 to offer a comprehensive delayed sweep facility with bright up.

- * 10 kV E.H.T.
- * New improved delayed sweep (300 ns to 100 ms)
- * 50 MHz trigger capability
- * Sweep range 0.5 s/cm to 20 ns/cm
- * Internal battery facility,



Plug-in-units

EM 505

A High Differential Amplifier which will plug into any EM 102 or EM 102D mainframe. This module retains the Dual Beam operation by the introduction of a simple general purpose (EM 515) amplifier on channel 2.

- * Sensitivities from 50 μ V/cm
- * Bandwidth > 500 kHz
- * Noise < 30 μ V measured tangentially
- * Common mode rejection: > 100 dB @ 1 kHz
- > 94 dB @ 100 kHz

EM 515

A simple Dual Channel Y-Amplifier Module with good sensitivity on both channels.

- * Sensitivities from 1 mV/cm on both channels
- * Bandwidth 15 MHz
- * Differential facility
- * High accuracy voltage and time calibrator.

EM 530

A High Performance Dual Channel Y-Amplifier Module with good sensitivity and the additional advantage of signal delay.

- * Sensitivities from 1 mV/cm by cascading
- * Signal delay
- * Bandwidth 30 MHz
- * Differential facility.

