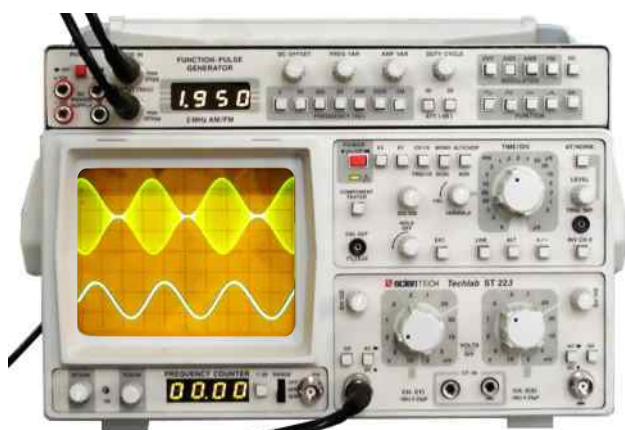


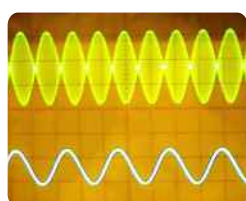
Scientech Techlabs ST221 and ST223 are multiutility Instruments for all Electronics Instrumentation & Electrical Laboratories. They have general purpose instruments like Oscilloscope., Function Generator, DC Power Supply etc. in one space saving housing. In addition any one of the built-in option like Curve Tracer, LogicScope, Digital Voltmeter etc. is available to choose from (Factory Fitted option).

Advanced TechLab ST223

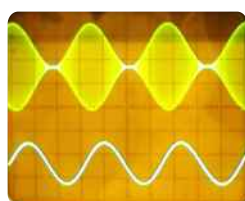


ST 223 with Frequency Counter as Built-in option

- 20 MHz Dual Trace Oscilloscope
- Alternate Triggering, Line Trigger & Variable Hold-Off
- Component & Continuity Tester
- 2 MHz Function- Pulse Generator with AM Balance, AM Standard & FM modulation
- Sine, Square, Triangle, Ramp, Pulse outputs
- 3 Digit Display for Function Generator
- Power Supply $\pm 12V$ & $5V$
- Choice of Frequency Counter/ Logic Scope, Curve Tracer/ Digital Voltmeter as an additional Built-in Option
- Economical & Space Saving



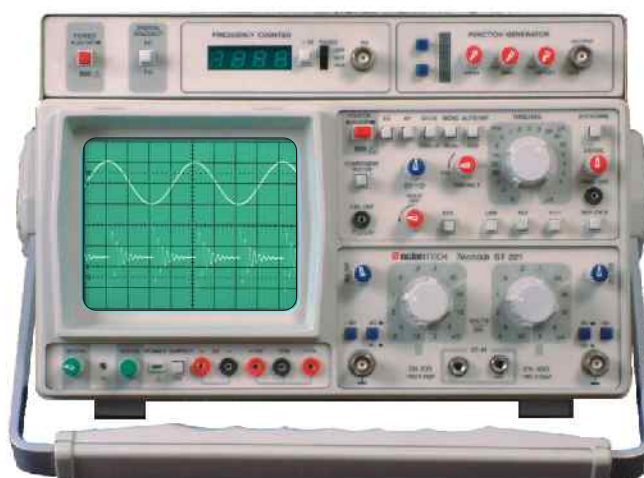
AM Balanced Mod.



AM Standard Mod.

TechLab ST221

- 20 MHz Dual Trace Oscilloscope
- Alternate Triggering, Line Trigger & Variable Hold-Off
- Component & Continuity Tester
- 100 KHz Function Generator
- Sine, Square, Triangle, DC Waveform Outputs
- 30 MHz Frequency Counter
- Digital Display for Frequency Counter & Function Generator
- Choice of Power Supply / Logic Scope/ Curve Tracer/ Digital Voltmeter as an additional Built-in Option
- Economical & Space Saving
- Multi-utility Instrument for all labs and an Excellent Service Station



ST221 with Power Supply as Built-in option

TechLab

Built-in Options for ST221

LogicScope



Logic Inputs : 8 no.s (TTL Timing diagrams)

Output: to Oscilloscope

Ideal for experiments in Digital Laboratories, Project Labs

Curve Tracer



Vce Scan Voltage : 0 - 35V adjustable

Step Base current : 20 μA each Step

Step Amplitude : 0.5 Volts

No. of steps : Adjustable 0 to 7

Step Polarity : Automatically selected with PNP/NPN selection

Display : On oscilloscope

Via Y input - Ch I

X Input - Ch II

Digital Voltmeter



Range : 2 V, 20 V and 200V

Resolution: 1mV, 10mV, 0.1V

Accuracy: $\pm (1\% + 1D)$ of rdg

Maximum Input : 500 V_{pk} for 20 V & 200V, 100V_{pk} for 2 V

Input Impedance: 10 M Ω

Power Supply



Fixed Output Voltage : 5V/500 mA

+12V/200mA

- 12V/ 200mA

Ripple: ≤ 8 mV_{rms}

Tolerance : ± 0.2 V

Line Regulation : 2%

+5V is floating & $\pm 12V$ has common ground but floating from scope chassis.

Built-in Options for ST223

LogicScope



Logic Inputs : 8 no.s (TTL Timing diagrams)

Output: to Oscilloscope

Ideal for experiments in Digital Laboratories

Curve Tracer



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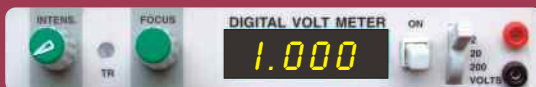
Step Polarity : Automatically selected with PNP/NPN selection

Display : On Oscilloscope

Via Y input - Ch I

X Input - Ch II

Digital Voltmeter



Range : 2 V, 20 V and 200V

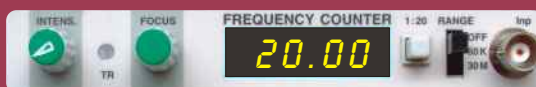
Resolution: 1mV, 10mV, 0.1V

Accuracy: \pm (1% + 1D) of rdg

Maximum Input : 500 V_{pk} for 20 V & 200 V, 100 V_{pk} for 2 V

Input Impedance: 10 M

Frequency Counter



Frequency range: 20 Hz - 30 MHz

Resolution: 10 Hz, 10 KHz

Sensitivity: 0.5 Volts

Accuracy: \pm (0.5% + 1D) of rdg

Attenuation: 1:1, 1:20

Input coupling: AC

Input impedance: 1 M Ω

Max. Input Voltage: 200 V (DC+AC peak)

Display : 4 digit 7 segment LED display

Technical Specifications

Oscilloscope

(Specification common to both ST221 & ST223)

Operating Modes

Channel I, Channel II, Channel I & II Alternate or chopped (approx. 120 KHz), X-Y Operation (Ratio 1:1 Input via CH II), Add/ Sub CH I \pm CH II, Invert CH II.

Vertical deflection (Y)

(Identical channels)

Bandwidth : DC-20 MHz(-3dB)

DC-28MHz(-6dB)

Risetime : 17.5 ns (approx.)

Deflection coefficients : 12 calibrated steps 2mV/cm - 10V/cm (1-2-5 sequence)

Accuracy : \pm 3%

Hold-Off : Variable Control for stable triggering

Input Impedance : 1 M Ω || 25 pF

Input coupling : DC-AC-GND

Input voltage :

Max. 400 V (DC + Peak AC)

Timebase :

Time coefficients : 18 calibrated steps, 0.5 μ s/cm - 0.2s/cm (1-2-5 sequence) with magnifier x 5 to 100 ns/cm, with variable control to 40 ns/cm.

Accuracy : \pm 3% (in Cal position)

Ramp output : 5 V_{pp} (approx.)

Trigger System

Modes : Automatic or Variable Trigger level

Source : CH I, CH II, ALT CH I/CH II, Line, Ext.

Slope : Positive or Negative

Coupling : AC, Line Trigger

Sensitivity: Int 5mm., Ext 0.8V (approx.)

Trigger Bandwidth : 40 MHz

Horizontal Deflection (x)

Bandwidth : DC-2.3 MHz (-3 dB)

X-Y mode : Phase Shift $<$ 3 $^\circ$ at 60 KHz

Deflection coefficients : 12 calibrated steps 2mV/cm-10 V/cm (1-2-5 sequence)

Input Impedance : 1 M Ω || 25 pF.

Component Tester

Test Voltage : Max 8.6 V_{rms} (Open)

Test Current : Max 8 mA_{rms} (Shorted)

Test Frequency : 50Hz, Test circuit grounded to chassis

Continuity Tester :

Beeper sounds $<$ 75 Ω approx.

General Information

Cathode Ray Tube : 140 mm Rectangular tube with internal graticule, P31 Phosphor

Accelerating potential : 2000 V

Display : 8 x 10 cm

Trace rotation : Adjustable on front panel

Calibrator : Squarewave generator 1KHz (approx.), 0.2 V \pm 1% for probe compensation

Z Modulation : TTL level

Stabilized Power Supply :

All operating voltages including the EHT.

Mains voltage : 220 V-240V \pm 10%, 50Hz. (Switch at back)

Power Consumption : 42 VA (Approx.)

Weight (approx) : 11 Kg.

Dimensions (mm) : W285-H185-D380

Operating Temperature: 0-40 $^\circ$, 95%RH

Finish : Off white with handle and tilt stand.

Included Accessories:

- | | |
|--------------------------|--------|
| 1. Manual | 1 No. |
| 2. BNC-Test Prod | 1 No. |
| 3. BNC - Crocodile Cable | 1 No. |
| 4. Test Prods | 1 pair |

ST223

Function- Pulse Generator

Operating Modes: Sine, Square, Triangle, Ramp, Pulse

Frequency Range: 0.2Hz - 2MHz in 7 steps & variable in between

Frequency Accuracy: \pm 2% (\pm 7digits)

Sine wave Distortion: 1.5% typical

Square wave / Pulse Rise & Fall time: \leq 50ns

Pulse Duty Cycle: 15% - 85% var. (min width 200ns)

Triangle Non-Linearity : $<$ 1% typical

Display: 3 $\frac{1}{2}$ digit LED

Output impedance : 50 Ω

Output Voltage : 20V $_{pp}$ O.C.

Attenuation : 20dB, 40dB, 60dB (variable in between)

Level Flatness : 2dB (typical)

DC Offset : \pm 5V(approx.) adjustable

Modulation : AM Standard, AM Balance & FM

Modulation Frequency Range: DC to 20kHz

Modulation Input : 2V $_{pp}$ max.

Power Supply

Fixed Output Voltage : 5V/1A \pm 12V/250mA

Ripple: \leq 8 mV $_{rms}$

Tolerance : \pm 0.2 V

Line Regulation : 2%

+5V & \pm 12V has common ground but floating from scope chassis.

ST221

Function Generator

Modes: Sine, Square, Triangle, DC DC Offset (Switchable)

Frequency: 10 Hz to 100 KHz in 4 steps

Output Voltage: 10 V_{pp} into 50 Ω

Sinewave Distortion: \leq 3%

Square wave Risetimes: \leq 150 ns

Output Short Circuit Proof

Frequency Counter

Frequency range: 20 Hz - 30 MHz

Resolution: 10 Hz, 10 KHz

Sensitivity: 0.5 Volts

Accuracy: \pm (0.5% + 1D) of rdg

Attenuation: 1:1, 1:20

Input coupling: AC

Input impedance: 1 M Ω

Max. Input Voltage: 200 V (DC+AC peak)

Display : 4 digit 7 segment LED display

Built-in Options (Details on Flap)

For ST223

LogicScope, Curve Tracer, Digital Voltmeter, Frequency Counter

For ST221

LogicScope, Curve Tracer, Digital Voltmeter, Power Supply

(Subject to change)

scienTECH
Technologies Pvt.Ltd.

94-101, Electronic Complex, Pardesipura
Indore - 452 010 INDIA.
Ph. 91-731-2576472, 5032286, 2556638
Fax : 91-731-2555643
E-mail: info@scientechn-india.com
Web : www.scientechn-india.com