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1. PURPOSE :

Digital Storage Oscilloscope (DSO) is a basic electrical signal measurement and analysis instrument. It shall be used to analyse waveforms and provide numerical values as well as visual displays. These values typically include averages, maxima and minima, root mean square (RMS), and frequencies etc.

The instrument should be compact, light weight with large in-built memory for post processing and data storage. Provision of differential inputs shall be preferred to cater to specialized measurements like Sudden Short Circuit Test, PMG magnetization test etc.

Also, it should have large colour TFT / High-definition display and offer higher vertical resolution to reveal more signal detail and have significantly lower signal to noise ratio to view small detail normally masked by scope noise. The feature like high-voltage differential measurements shall be preferable in place of conventional earth-grounded oscilloscopes for safer and floating signal measurements. There should be Standard USB and LAN ports to provide PC and printer connectivity.

Its specifications are given below:

2. Specifications:

a) Analogue Input Channel: ≥ 4 (preferably differential)
b) Frequency Span : ≥ 500MHz.
c) Impedance:
Input : 1M Ω ±1% or better

d) Input Sensitivity: 1MΩ - 2mV/div to 10V/div or better

e) Input Coupling setting: AC, DC, DC 50Ω, GND(preferably)
f) Bandwidth limit: Can be preferably set for each channel
g) Maximum Sampling Rate: ≥ 2GSa/s

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h) Channel-to-channel isolation: Atleast 40dB or better
i) DC gain accuracy: ±2% of full scale or better
j) Maximum input voltage: 1MΩ: 150Vrms or better

k) Display : ≥ 8.4-inch TFT color
Resolution: ≥1024 pixel horizontally X 768 pixel vertically

l) Functions:
i)Waveform acquisition modes : Normal, Envelope, Average, connected dots
ii)Resolution Mode: ≥ 12 bit
iii)Sampling Modes: Preferably Real time, interpolation, repetitive sampling

m) Computation & Analysis Functions:

i. Parameter measurement: MAX,MIN,P-P, HIGH, LOW,RMS, MEAN, SDEV, Freq, Period, Avg. Freq, Avg. Period, Burst, Rise, Width, Duty, Delay (preferable) etc.
ii. Statistical Computation of parameters : Min, Max, Avg, Cnt, Sdev etc.
iii. Statistics Modes: Continuous, Cycle, History etc.
iv. Computations(MATH): Preferably it should be +, -, X, Filter(Delay, Moving Avg, IIR Lowpass, IIR Highpass), Integ, double Integ, count, user defined math(preferably) etc.
v). Waveform measurements: Can be made on either min or zoom window with simultaneous measurements with statistics.
vi). Voltage(scope channels): Peak-to-peak, minimum, maximum, average, RMS, amplitude, base, top, overshoot, V overshoot etc.
vii). Time(scope channel): Rise time, fall time, period, frequency, positive width, negative width, duty cycle, Tmin, Tmax, set up time, hold time etc.
viii). Frequency domain: FFT frequency, FFT magnitude, FFT delta frequency etc. Other features shall also be considered. Upto two FFT analysis can be analysed simultaneously
ix) Computable no. of traces: 2 or more

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n) Triggers:

i) Trigger sources: Channel 1, channel 2, channel 3, channel 4, aux, line. Logic & EXT etc.

ii) Sensitivity: 1MΩ input, edge trigger – DC to 500 MHz: 0.6 div
50Ω - DC to 2 GHz, 0.5 div
- 2GHz to 4 GHz: 1.0div
Auxiliary - DC to 700 MHz: 300 mV (p-p)
Sensitivity lower than the above mentioned values shall also be considered.

iii) Threshold range CH1 to CH4: ±8.0V in 100mV increments ±4 div from centre of screen or higher shall be preferred.

iv) Threshold level accuracy CH1 to CH4: ±(0.2 div + 10% of trigger level) or better shall be preferred.

v) Trigger modes: Auto, Auto Level, Normal, Single. Etc.

vi) Trigger level setting range CH1 to CH4: ±4 div from centre of screen or better

vii) Trigger level setting resolution CH1 to CH4: 0.01 div or better

viii) Trigger level accuracy CH1 to CH4: ±(0.2 div + 10% of trigger level) or better

ix) Trigger Coupling: 1MΩ : DC, AC, low frequency reject, high frequency reject or any other coupling

o) Built-in printer: Preferably more than 100 mm wide, monochrome, thermal or having better features.

p) USB Peripheral Connection Terminal:
Connector: USB type A connector X 2(front panel X 1, rear panel X 1)
Electromechanical specifications: USB 2.0 compliant
Supported transfer standards: Low Speed, Full Speed, High speed
Supported devices: USB Printer Class ver 1.0 compliant EPSON/HP(PCL) laser jet printers
USB Mass Storage Class: Ver 1.1 compliant or higher

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q) GP-IB Options:

Electromechanical specification: Conforms to at least IEEE std. 488- 1978

Protocol: Conforms to at least IEEE std 488.2 – 1987

r) Auxiliary Input:

Rear panel I/O signal: External trigger input, external trigger output, GO-NOGO output, video output. Any other input/ output shall also be considered.

Probe interface terminal(front panel): 4 terminals preferable

Probe power terminal(rear panel): 2 terminal(/P2 option) preferable

4 terminal(/P4 option) preferable

s) Built-in Storage Capacity: ≥ 100MB or higher

t) Power Input : 100 to 240 V AC 1Φ, 50Hz/60Hz

u) In-built battery powered shall be preferred

v) Weight: compact and light weight

w) Environment :

Operating Temp Range: 5°C to 40°C

Humidity: Preferably upto 95% RH

Safety : Should meet IEC1010-1 second edition, certified

x) Accessories :

1. Differential voltage probes- Isolation voltage upto >500V, with 1/1, 1/10 ratio
2. Current probes

y) General Requirements :

a) The party should quote complete system including the accessories specific to their system.

b) The party is to supply one set of original operation and service manuals(hard copy), detailed calibration certificate traceable to national/international standard.

c) The party should provide guarantee/warrantee minimum for one year from the date of commissioning.

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