Allegato CAPITOLATO TECNICO

"Strumenti per Laboratorio di Elettronica"

Progetto PON Codice 10.8.1.B2-FESRPON-VE-2018-31

N.8 OSCILLOSCOPIO DIGITALE TBS1072B-EDU Tektronix 70 MHz o equivalente

DESCRIZIONE

Oscilloscopio progettato per soddisfare le necessità di scuole e università. Integra al suo interno un corso pratico presentato direttamente sul display. Lo strumento ha un display WVGA TFT a 7" a colori, larghezza di banda 70 MHz, 2 canali, campionamento per ogni canale 1 Gs/s, Lunghezza record 2.5K punti su tutte le basi dei tempi, garanzia 5 anni.

SPECIFICHE TECNICHE

Vertical system – Analog channels

Vertical resolution	8 bits
Input sensitivity range	2 mV to 5 V/div on all models with calibrated fine adjustment
DC gain accuracy	±3%, from 10 mV/div to 5 V/div
Maximum input voltage	300 VRMS CAT II; derated at 20 dB/decade above 100 kHz to 13 Vp-p AC at 3 MHz and above
Offset range	2 mV to 200 mV/div: ±1.8 V >200 mV to 5 V/div: ±45 V
Bandwidth limit	20 MHz
Input coupling	AC, DC, GND
Input impedance	1 MΩ in parallel with 20 pF
Vertical zoom	Vertically expand or compress a live or stopped waveform

Horizontal system — Analog channels

Time base range	2.5 ns to 50 s/div
Time base accuracy	50 ppm
Horizontal zoom	Horizontally expand or compress a live or stopped waveform

Input/Output ports

USB interface	USB host port on front panel supports USB flash drives
	USB device port on back of instrument supports connection to PC

Data storage

Nonvolatile storage	
Reference waveform display	2.5K point reference waveforms
Maximum USB flash drive size	64 GB
Setups without USB flash drive	10 front-panel setup
Setups with USB flash drive	4000 or more front-panel setups per 8 MB
Screen images with USB flash drive	128 or more screen images per 8 MB (the number of images depends on file format selected)
Save All with USB flash drive	12 or more Save All operations per 8 MB
	A single Save All operation creates 3 to 9 files (setup, image, plus one file for each displayed waveform)
Course content	100 MB

Acquisition modes

Peak Detect from 5 μs/div to 50 s/div	High-frequency and random glitch capture. Captures glitches as narrow as 12 ns (typical) at all time base settings
Sample	Sample data only
Average	Waveform averaged, selectable: 4, 16, 64, 128
Single Sequence	Use the Single Sequence button to capture a single triggered acquisition sequence
Roll	At acquisition time base settings of >100 ms/div

Trigger system

External trigger input	Included on all models
Trigger modes	Auto, Normal, Single Sequence

Trigger types

Edge (Rising/Falling) Conventional level-driven trigger. Positive or negative slope on any channel. Coupling selections: AC, DC, Noise Reject, HF Reject, LF Reject

Video Trigger on all lines or individual lines, odd/even or all fields from composite video, or broadcast standards

Pulse Width (or Glitch) Trigger on a pulse width less than, greater than, equal to, or not equal to, a selectable time limit ranging from 33 ns to 10 s

Trigger source Two channel models: CH1, CH2, Ext, Ext/5, AC Line

Trigger view Displays trigger signal while Trigger View button is depressed.

Trigger signal frequency readout Provides a frequency readout of the trigger source.

Waveform measurements

Cursors Types Amplitude, Time

Measurements ΔT, 1/ΔT, ΔV

Automatic measurements Period, Frequency, Pos Width, Neg Width, Rise Time, Fall Time, Maximum , Minimum , Peak-Peak, Mean, RMS, Cycle RMS, Cursor RMS, Phase, Pos Pulse Cnt, Neg Pulse Cnt, Rise Edge Cn, Fall Edge Cn, Pos Duty, Neg Duty, Amplitude, Cycle Mean, Cursor Mean, Burst Width, Pos Overshoot, Neg Overshoot, Area, Cycle Area, High, Low, Delay RR, RF, FR, FF

Waveform math

Arithmetic Add, Subtract, Multiply

Math functions FFT

FFT Windows: Hanning, Flat Top, Rectangular 2048 sample points

Sources Two channel models: CH1 - CH2, CH2 - CH1, CH1 + CH2, CH1 × CH2

Autoset menu

Single-button, automatic setup of all channels for vertical, horizontal, and trigger systems, with undo autoset.

Square wave Single cycle, multicycle, rising or falling edge

Sine wave Single cycle, multicycle, FFT spectrum

Video (NTSC, PAL, SECAM) Field: All, Odd, or Even Line: All or Selectable Line Number

Autorange

Automatically adjust vertical and/or horizontal oscilloscope settings when probe is moved from point to point, or when the signal exhibits large changes.

Frequency counter

Resolution 6 digits

Accuracy (typical) + 51 parts per million including all frequency reference errors and +1 count errors

Frequency range AC coupled, 10 Hz minimum to rated bandwidth

Frequency counter signal source Pulse width or edge selected trigger source

Channels 2 channel

N.2 ANALIZZATORE DI SPETTRO RS Pro RSSA3021X , 9 kHz → 2.1 GHz o equivalente

SPECIFICHE TECNICHE

Numero di canali	1
Frequenza massima	2.1GHz
Frequenza minima	9 kHz
Stabilità in frequenza	< 0.5 ppm
Minimum Resolution Bandwidth	10 Hz
Displayed Average Noise Level	-161 dBm/Hz
Amplitude Accuracy	< 0.7dB
Tipo di display	LCD TFT 10.1" WVGA (1024x600)
Ingresso RF	BNC
Tipo d'interfaccia	RJ45, USB
Modalità di sweep	continua

N.6 GENERATORE DI FORMA D'ONDA ARBITRARIA RS Pro 80MHz, display LCD o equivalente

SPECIFICHE TECNICHE

Numero canali	2	Tipo di display	LCD
Frequenza massima	80MHz	Sweep	Lineare, Logaritmica
Frequenza minima	1 µHz	Massima ampiezza di uscita	20Vpp
Frequenza massima triang. rampa	1MHz	Tipo d'interfaccia	Device USB, Host USB,
Frequenza minima triang. rampa	1µHz	LAN	
Risoluzione	1 µHz	Tipi di modulazione an. e digitali	AM, DSB-AM, FM, PM,
Minima ampiezza di impulso 100ns		PSK, FSK, ASK, PWM	
Forme d'onda arbitrarie	Sì	Display	4.3" touch screen
Velocità di campionamento	1,2 GSamples/s		
Risoluzione verticale	16 bit	Forme d'onda arbitrarie incorporate	196
Tipo di connettore	N-femmina oppure BNC		

N.4 ADATTATORE RF 50Ω DA TIPO N MASCHIO A BNC FEMMINA, 4GHZ

<u>N.10 KIT DI SVILUPPO ATATMEL-ICE PROGRAMMER/DEBUGGER (MICROCHIP TECH.)</u>

DESCRIZIONE
Il programmer-debugger Atmel-ICE è compatibile con Atmel Studio e
supporta le interfacce JTAG, SWD, PDI, TPI, aWire, SPI e debugWIRE.
Contenuto del kit Atmel-ICE Basic (ATATMEL-ICE-BASIC):
Unità Atmel-ICE
Cavo USB (1,8 m, ad alta velocità, micro-B)
Connettore IDC a cavo a nastro a 10 pin e 50 mil e connettore a 6 pin e 100
mil

N.10 MPLAB PICkit4 IN-CIRCUIT PROGRAMMER/DEBUGGER (MICROCHIP TECH.)

DESCRIZIONE
Il programmatore/debugger In-Circuit MPLAB PICkit 4 consente il debug e la programmazione di
microcontrollori flash PIC® e dsPIC®, mediante l'interfaccia grafica utente dell'ambiente di sviluppo
integrato MPLAB X (IDE).

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N.25 MICROCHIP PIC16F88-I/SP PDIP 18 PIN

Microcontrollore Microchip a 18 pin, oscillatore interno,
programmabile in ambiente di sviluppo MPLAB-X con compilatore XC8.
In vendita in tubi da 25.

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N.30 MICROCHIP PIC16F886-I/SP PDIP 28 PIN

Microcontrollore Microchip a 28 pin, oscillatore interno,
programmabile in ambiente di sviluppo MPLAB-X con compilatore XC8.
In vendita in tubi da 15.

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