

Protek 8000 시리즈 디지털 혼합신호 오실로스코프



특징

- 주파수 대역폭: 70MHz, 100MHz, 200MHz, 300MHz
- 실시간 샘플링 속도, 아날로그 채널: 2GSa/s, 디지털 채널: 500MSa/s (옵션)
- 아날로그 채널: 2 또는 4 개, 디지털 채널: 8개(옵션)
- 25MHz 임의 파형 함수 발생기 (옵션)
- 다양한 직렬 프로토콜 트리거와 디코드 기능 지원 (I2C, SPI, UART/RS232, CAN, LIN)
- 다양한 스카트 트리거 기능 (Pattern, Window, Interval, Drop-Out, Runt)
- HDTV 트리거 지원
- 히스토리 기능, 분할 메모리 기능 지원(기본 80,000 프레임)
- 최고 파형 캡처 속도: 110,000wfs/s
- 하드웨어 기반 줌 기능, 고속 Pass/Fail 기능 기술
- 32가지 종류의 자동 파형 측정, 측정 통계 기능 지원
- 고급 파형 수학 연산 (FFT, Differential, Integral, Square root)
- 완벽 연결성: USB 호스트, USB 디바이스 (USBTMC, Pict-Bridge), LAN(VXI-11), EXT-TRIG,PASS/FAIL,TRIG OUT
- SCPI 원격 조정 명령 지원
- 다국어 사용자 인터페이스, 온라인 도움말 시스템 내장
- 8 인치 TFT-LCD(800*480)

Specifications

Input	
Channels	2/4
Coupling	AC, DC, GND
Impedance	(1MΩ±2%) (20pF ±4pF)
	50Ω: 50Ω±2%
Max.Input voltage	400Vrms, CAT I, 10X, 1MΩ
CH to CH Isolation	>100:1
Probe attenuator	1X, 10X, 50X, 100X, 500X,1000X
Vertical System	
Bandwidth	300MHz (Protek 8304 / 8302)
	200MHz (Protek 8204 / 8202)
	100MHz (Protek 8104 / 8102)
	70MHz (Protek 8074 / 8072)
Vertical Resolution	8 bit
Vertical Scale	2 mV/div ~ 10 V/div
Offset Range	2mV/div ~ 100mV/div: ± 1V
	1.02mV/div ~ 1V/div: ± 10V 1.02V/div ~ 10V/div: ± 100V
Bandwidth Limit	20MHz ±40%
Bandwidth Flatness	DC ~ 10% of BW: ± 1dB
	10% ~ 50% of BW: ± 2dB 50% ~ 100% of BW: + 2dB/-3dB
Low Frequency Response (AC - 3dB)	≤10Hz
Noise	≤0.6 Div for average of 10 Pk-Pk readings, Fixed gain settings
	≤1.0 Div for average of 10 Pk-Pk readings (152mV/div ~ 198mV/div,1.52V/div ~ 1.98V/div)
SFDR including harmonics	≤0.7 Div for average of 10 Pk-Pk readings, variable gain settings
DC Gain Accuracy	≥35dB(≥10mV/div); ≥30dB(<10mV/div)
	≤±3.0%: 5mV/div ~10V/div ≤±4.0%: 2mV/div
DC Measurement Accuracy	±[3%× (Reading + Offset) +1%× Offset +0.2div+2mV] , ≤100mV/div
Offset Accuracy	±[3%× (Reading + Offset) +1%× Offset +0.2div+100mV] , > 100mV/div
Risetime	± (1%*Offset+1%*8*div+2mV)
	<1.2ns (Protek 8304 / 8302)
	<1.7ns (Protek 8204 / 8202)
	<3.5ns (Protek 8104 / 8102) <5.0ns (Protek 8074 / 8072)

Overshoot	<15%
Channel Skew	<200ps

Math Function

Operation	+, -, *, /, FFT, d/dt, ∫ dt, √
FFT	Window: Rectangular, Blackman, Hanning, Hamming Sample points: 1024

Horizontal System

Timebase Scale	1.0ns/div ~ 50s/div
Waveform Capture	110,000 wfm/s
Intensity grading	256 Levels
Display Format	Y-T, Zoom, Roll, X-Y
Timebase Accuracy	±25ppm
Roll mode	100ms/div ~ 50s/div (1-2-5 step)

Trigger System

Trigger Mode	Auto, Normal, Single
Trigger Level	Internal: ±4.5 div from the center of the screen
Range	EXT: ±1.2V ; EXT/5: ±6v
Holdoff Range	100ns ~ 1.5s
	AC, DC, LF Rej, HF Rej
	DC: Passes all components of the signal
	AC: Blocks DC components and attenuates signals below 5.8Hz
Trigger Coupling	LF Rej: Blocks the DC component and attenuates the low-frequency components below 2.08MHz HF Rej: Attenuates the high-frequency components above 1.27MHz
Trigger Accuracy	±0.2div
Trigger Sensitivity	Internal: 0.5 div EXT: 200mVpp DC ~ 10MHz 300mVpp 10MHz ~ BW EXT/5: 1Vpp DC ~ 10MHz 1.5Vpp 10MHz ~ BW
Trigger Jitter	<200ps :
Trigger Displacement	Pre-Trigger: 7 divisions Delay Trigger: 10s ~ 1,000,000,000s

Edge Trigger

Slope	Rising, Falling, Rising&Falling
Source	CH1/CH2/CH3/CH4/EXT/(EXT/5)/AC Line

Slope Trigger

Slope	Rising, Falling
Limit Range	<, >, < >, > <
Source	CH1/CH2/CH3/CH4

Time Range	2ns ~ 4.2s
Resolution	1ns
Pulse Trigger	
Polarity	+wid , -wid
Limit Range	<, >, < >, > <
Source	CH1/CH2/CH3/CH4
Pulse Range	2ns ~ 4.2s
Resolution	1ns
Video Trigger	
Signal Standard	NTSC, PAL/Secam,720p/50 , 720p/60,1080p/50, 1080p/60, 1080i/50, 1080i/60,Custom
Source	CH1/CH2/CH3/CH4
Sync	ANY,Select
Window Trigger	
Window Type	Absolute,Relative
Source	CH1/CH2/CH3/CH4
Interval Trigger	
Slope	Rising,Falling
Limit Range	<, >, < >, > <
Source	CH1/CH2/CH3/CH4
Time Range	2ns ~ 4.2s
Dropout Trigger	
Timeout Type	Edge, State
Source	CH1/CH2/CH3/CH4
Slope	Rising,Falling
Time Range	2ns ~ 4.2s
Resolution	1ns
Runt Trigger	
Slope	+wid , -wid
Limit Range	<, >, < >, > <
Source	CH1/CH2/CH3/CH4
Time Range	2ns ~ 4.2s
Resolution	1ns
Pattern Trigger	
Pattern Setting	Invalid, Low, High
Logic	AND, OR, NAND, NOR
Source	CH1/CH2/CH3/CH4
Limit Range	<, >, < >, > <
Time Range	2ns ~ 4.2s
Resolution	1ns
Serial Trigger	
I2C Trigger	
Condition	Start, Stop, Restart, No Ack, EEPROM, 7bits Address&Data,

	10bits Address&Data, Data Length
SPI Trigger	
Trigger Source	MOSI, MISO
Data Length	4 ~ 96 bits
Value	0, 1, X
Bit Order	LSB, MSB
UART/ RS232 Trigger	
Trigger Setting	Trigger Source RX, TX Condition Start, Stop, Data, Check Error
Bus Configure	Baud 600/1200/2400/4800/9600/19200/38400/ 57600/115200/Custom Data Length 5bits, 6bits, 7bits, 8bits Parity Check No, odd, even Stop Bit 1, 1.5, 2 Idle Level Low, High
CAN Trigger	
Trigger Setting	Condition Start, Remote Frame, Data Frame, ID&DATA
Bus Configure	Baud 5kb/s, 10kb/s, 20kb/s, 50kb/s, 100kb/s, 125kb/s, 250kb/s, 500kb/s, 800kb/s, 1Mb/s, Custom
LIN Trigger	
Trigger Setting	Condition Start, ID, ID&DATA, Error
Bus Configure	Baud 600/1200/2400/4800/9600/19200/Custom
Serial Decode	
I2C	
Signal	SCL, SDA
Address	7bits, 10bits
List	1 ~ 7 lines
SPI	
Signal	CLK, MISO, MOSI, CS
Edge Select	Rising, Falling
Idle Level	Low, High
Bit Order	MSB, LSB
Data Length	4 ~ 96 bits
List	1 ~ 7 lines
UART/RS232	
Signal	RX, TX
Configure	Baud 600/1200/2400/4800/9600/19200/38400/ 57600/115200/Custom Parity Check No, odd, even Stop Bit 1, 1.5, 2 Idle Level Low, High Data Length 5bits, 6bits, 7bits, 8bits
List	1 ~ 7 lines

CAN

Signal	CAN_H, CAN_L
Configure	Baud 5kb/s, 10kb/s, 20kb/s, 50kb/s, 100kb/s, 125kb/s, 250kb/s, 500kb/s, 800kb/s, 1Mb/s, Custom
Decode Source	CAN_H, CAN_L, CAN_H – CAN_L
List	1 ~ 7 lines

LIN

Configure	Baud 600/1200/2400/4800/9600/19200/Custom
List	1 ~ 7 lines

Measure System

Auto Measurement (32 Types)	Vpp, Vmax, Vmin, Vamp, Vtop, Vbase, Vavg, Mean, Crms Vrms, ROV, FOV, RPRE, FPRE, Rise time, Fall time, Freq Period, + Wid, - Wid, + Dut, - Dut, BWid, Phase, FRR FRF, FFR, FFF, LRR, LRF, LFR, LFF
Cursor	Time (X1, X2), (X1X2) Voltage (Y1, Y2), (Y1Y2)
Statistics	Current, Mean, Min, Max, Std-Dev, Count

Sample System

Sample Mode	Real Time sample
Sample Rate	2GSa/s
Memory Depth	Max.14Mpts, available
Acquisition	Sample, Peak Detect, Average, High Res
Averages	4, 16, 32, 64, 128, 256, 512, 1024

Waveform Generator

Channels	1
Max. Frequency	25MHz
Sample Rate	125 MSa/s
Arb waveform length	16 kpts
Frequency Resolution	1 μ Hz
Vertical Resolution	14 bits
Amplitude Range	2 mVpp ~ 3 Vpp (50 Ω) 4 mVpp ~ 6 Vpp (High-z)

Sine Wave

Frequency	1 μ Hz ~ 25MHz
Offset Accuracy (100 kHz)	\pm (0.3dB of Setting Value + 1mVpp)
Amplitude flat (100 kHz, 5Vpp)	\pm 0.3 dB
SFDR	DC ~ 1 MHz -60dBc 1 MHz ~ 5 MHz -53dBc 5 MHz ~ 25 MHz -35dBc

Square/Pulse Wave

Frequency	1 μ Hz ~ 10MHz
Duty Cycle	20% ~ 80%
Rise/Fall time	< 24 ns (10% ~ 90%)
Overshoot	< 5%(1kHz, 1Vpp, Typical)
Pulse Width	48ns~1ms
Jitter	8ns

Ramp Wave

Frequency	1 μ Hz ~ 300kHz
Linearity	< 0.1% of Pk-Pk value
Symmetry	0% ~ 100%

DC Offset

Range	± 1.5 V (50 Ω) ± 3.0 V (High)
Offset Accuracy	$\pm (\text{setting value} *1\%+3 \text{ mV})$

Noise

Bandwidth	>20MHz (-3dB)
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Cardiac

Frequency	1 μ Hz ~ 5MHz
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Gaus Pulse

Frequency	1 μ Hz ~ 5MHz
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Exp Rise

Frequency	1 μ Hz ~ 5MHz
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Exp Fall

Frequency	1 μ Hz ~ 5MHz
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I/O

Standard Ports	USB Host, USB Device, LAN, Pass/Fail, Trigger Out
Pass/Fail	3.3V TTL Output

General Specifications

Display

Display Type	8.0 inches TFT LCD
Resolution	800 (Horizontal) × 480 (Vertical) pixel
Color	24 bit
Contrast	500:1
Backlight	300nit
Range	8 x 14 div
Display Mode	Dot, Vector
Persist	Off, 1 sec, 5 sec, 10 sec, 30 sec, Infinite
Color Display	Normal, Color
Screen Saver	1min, 5min, 10min, 30min, 1h, Offset
Language	Simplified Chinese, Traditional Chinese, English, French, Japanese, Korean, German, Spanish, Russian, Italian, Portuguese

Environments

Temperature	Operating: 10°C ~ +40°C
	Non-operating: -20°C ~ +60°C
Humidity	Operating: 85%RH, 40°C, 24 Hours
	Non-Operating: 85%RH, 65°C, 24 Hours
Height	Operating: ≤3000m
	Non-Operating: ≤15,266m
Electromagnetic Compatibility	2004/108/EC Directive
	Applicable standards EN 61326-1:2006
	EN 61000-3-2:2006 + A2:2009 EN 61000-3-3:2008
Safety	2006/95/EC Low Voltage Directive EN 61010-1:2010/EN 61010-2-030:2010

Power Supply

Input Voltage	100 ~ 240 VAC, CAT II, Auto selection
Frequency	50/60 Hz
Power	80W Max

Mechanical

Dimensions	Length 352mm
	Width 112mm
	Height 224mm
Weight	N.W. Two channels model: 3.4 kg
	Four channels model: 3.6 kg
	G.W. Two channels model: 4.9 kg
	Four channels model: 5.2 kg

Ordering information

	Description
Model	Protek8304(300MHz, 4 Channels)
	Protek8204(200MHz, 4 Channels)
	Protek8104(100MHz, 4 Channels)
	Protek8074(70MHz, 4 Channels)
	Protek8302(300MHz, 2 Channels)
	Protek8202(200MHz, 2 Channels)
	Protek8102(100MHz, 2 Channels)
	Protek8072(70MHz, 2 Channels)
Standard Accessories	A Quick Start
	Two pieces 1:1/(10:1) Passive Probe
	A Certification
	An CD(including EasyScopeX computer software system)
	A Power Cord that fits the standard of destination country
Optional Accessories	A USB Cable
	AWG Function
	Decode Function
	MSO Function
	Power Analyse Software

주의 사항

아래 모든 사양은 자사 10X 프로브를 기준으로 하며 아래 조건을 만족한 상태 입니다.

- ◆ 특정 동작 온도에서 약 30분이상 제품 구동을 실시 해야 합니다.
- ◆ 주변온도가 5도 이상 차이 나는 경우 Self Cal 동작을 수행 후 제품을 구동 해야 하며, 측정 환경에 따라 제품 성능은 달라질 수 있습니다.
- ◆ 오실로스코프는 공장 출하 후 교정 주기 이내에 있어야 합니다.
- ◆ 하기 사양서는 제품 성능 향상 및 품질 개선에 따라 달라질 수도 있습니다.

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