

TEKTRONIX

CSA7404B

The Tektronix CSA7404B is a high-performance 4 GHz Communications Signal Analyzer that integrates a real-time oscilloscope, a digital serial analyzer, and an optical reference receiver into a single instrument. Powered by exclusive DPX acquisition technology, it delivers a waveform capture rate of over 400,000 waveforms per second, a maximum real-time sample rate of 20 GS/s, and a record length up to 64 MB. Designed for both circuit development and physical layer testing, it provides built-in compliance mask testing for optical and electrical data streams up to 2.5 Gb/s, an integrated clock recovery system, and a comprehensive suite of eye diagram measurements.

SPECIFICATIONS

General

Interfaces	GPIB, LAN (10Base-T/100Base-TX), 4x USB 1.1, RS-232, Centronics parallel, PS/2, External VGA
Display	10.4-inch (264 mm) active-matrix color LCD, 640 x 480 pixels, with integrated touch screen

Physical

Power Supply	100 to 240 Vrms ($\pm 10\%$), 47 to 63 Hz, or 115 Vrms ($\pm 10\%$), 360 to 440 Hz; <600 W power consumption
Operating Temperature	+5 to +45 °C °C
Dimensions (W×H×D)	455 mm × 277 mm × 426 mm mm
Weight	19 kg kg
Cooling Clearance	76 mm (3 in.) minimum on left, right, and rear

Vertical System (Electrical)

Input Channels	4
Analog Bandwidth	4 GHz
Rise Time (20% - 80%)	72 ps (typical)
Rise Time (10% - 90%)	100 ps (typical)
Input Impedance	50 $\Omega \pm 1\%$
Input Sensitivity Range	2 mV/div to 1 V/div
Vertical Resolution	8 bits (up to 11 bits with averaging)
Max Input Voltage	5 V _{rms} (with peaks $\leq \pm 30$ V)
DC Gain Accuracy	$\pm 2\%$
Position Range	± 5 div
Offset Range (2 mV to 100 mV/div)	± 1 V
Offset Range (101 mV to 1 V/div)	± 10 V
Channel-to-Channel Isolation	$\geq 100:1$ at 100 MHz, $\geq 30:1$ at 4 GHz
Hardware Bandwidth Limits	250 MHz or 20 MHz (selectable)
Probe Interface	TekConnect

Optical Acquisition System

Optical Channels	1 (internally routed to Channel 1)
Optical Bandwidth	2.4 GHz
Wavelength Range	700 nm to 1650 nm
Calibrated Wavelengths	850 nm, 1310 nm, 1550 nm
Optical Fiber Input Type	Single-mode and Multi-mode (9 μm , 50 μm , 62.5 μm compatible)
Optical Return Loss	>14 dB (with FC/PC connector)
Optical Input Connector	FC/PC (standard)

Horizontal System & Timebase

Max Real-Time Sample Rate (1 Channel)	20 GS/s
Max Real-Time Sample Rate (2 Channels)	10 GS/s
Max Real-Time Sample Rate (4 Channels)	5 GS/s
Equivalent-Time Sample Rate (max)	250 GS/s
Standard Record Length	2 MS (1 ch), 1 MS (2 ch), 500 kS (4 ch)
Maximum Record Length	Up to 64 MS total (with Option 2XL)
Timebase Range	50 ps/div to 10 s/div
Timebase Delay Time Range	-10 ns to 250 s
Channel-to-Channel Deskew Range	± 75 ns
Jitter Noise Floor	<1.5 ps RMS (typical)
Timebase Accuracy	± 15 ppm

Trigger System

Trigger Modes	Auto, Normal, Single
Trigger Coupling	DC, AC, HF Reject, LF Reject, Noise Reject
Trigger Holdoff Range	250 ns to 12 s
Trigger Level Range (Any channel)	±12 divisions from center
Trigger Level Range (External)	±5 V
Edge Trigger Sensitivity (Electrical)	0.5 div to 50 MHz, increasing to 2.5 div at 4 GHz
Glitch and Pulse Width Triggering	340 ps to 1 s
Serial Pattern Triggering	64-bit serial pattern trigger
Clock Recovery Range	1.5 Mb/s to 3.125 Gb/s
Trigger Types	Edge, Glitch, Width, Runt, Timeout, Transition, Setup/Hold, Window, Pattern, State, Comm, Serial

Display & User Interface

Display Type	Active-matrix color LCD
Display Size	10.4 in (264 mm)
Display Resolution	640 x 480 pixels
Waveform Capture Rate	>400,000 wfms/s
Waveform Display Styles	Vectors, Dots, Variable Persistence, Infinite Persistence

Measurements & Waveform Analysis

Automatic Measurements	53 standard parameters
Eye Diagram Measurements	Extinction Ratio, Q-factor, Eye Height, Eye Width, Jitter, Noise
Built-in Compliance Mask Testing	Up to 2.5 Gb/s optical and electrical data stream rates
Math Functions	Add, Subtract, Multiply, Divide, Integrate, Differentiate, FFT

Computer & Storage System

Operating System	Microsoft Windows 2000 Professional
Processor	Intel Pentium IV
System Memory	512 MB (standard)
Hard Disk Capacity	≥40 GB
Removable Media Storage	CD-RW drive, 3.5" 1.44 MB floppy drive

Power, Physical & Environmental

Non-Operating Temperature	-22 °C to +60 °C
Operating Altitude	Up to 3,000 m (10,000 ft)

Compliance & Certifications

Safety Standards	UL 3111-1, CSA 22.2 No. 1010.1, EN 61010-1
Electromagnetic Compatibility	EN 61326, FCC Part 15 Subpart B Class A

Vertical System

Input Coupling	50 Ω DC
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Auxiliary Inputs & Outputs

External Reference Input	10 MHz (BNC)
Internal Reference Output	10 MHz (BNC)
Recovered Clock Output	SMA, 50 Ω , AC coupled
Recovered Data Output	SMA, 50 Ω , AC coupled
Auxiliary Trigger Output	BNC, 50 Ω
Fast Edge Output	SMA, 50 Ω , < 200 ps rise time

Connectivity

LAN Port	RJ-45, 10/100 Base-T
GPIB Port	IEEE-488.2
Serial Port	RS-232 (DB-9)
Parallel Port	Centronics (DB-25)

Power Requirements

Power Consumption	600 W maximum
Source Voltage Range	100 V to 240 V AC $\pm 10\%$
Source Frequency Range	47 Hz to 63 Hz

Environmental

Non-Operating Altitude	12,192 m (40,000 ft)
Operating Shock	15 g, 11 ms, half-sine
Non-Operating Shock	30 g, 11 ms, half-sine
Operating Vibration	0.27 g RMS (5 Hz to 500 Hz)
Non-Operating Vibration	2.28 g RMS (5 Hz to 500 Hz)

Clock Recovery

Clock Recovery Lock Range	1.5 MBaud to 3.125 GBaud
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Triggering

Serial Pattern Triggering Max Rate	1.25 Gb/s
Serial Pattern Triggering Length	Up to 64 bits
Trigger Jitter (typical)	8 ps RMS
Trigger Jitter (Enhanced Triggering)	<1.5 ps RMS (typical)

Horizontal

Timebase Jitter (typical)	2.5 ps RMS
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Interfaces

PS/2 Keyboard Port	Rear-panel PS/2 connector
PS/2 Mouse Port	Rear-panel PS/2 connector
Audio I/O Ports	Line In, Line Out, and Microphone 3.5 mm jacks

TECHNOLOGY

DPX Acquisition Technology

APPLICATIONS

Network Communications & Physical Layer Compliance Testing

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