N4219A Serial ATA Packet Analysis Probe and N4218A Serial ATA Interposer

Data Sheet

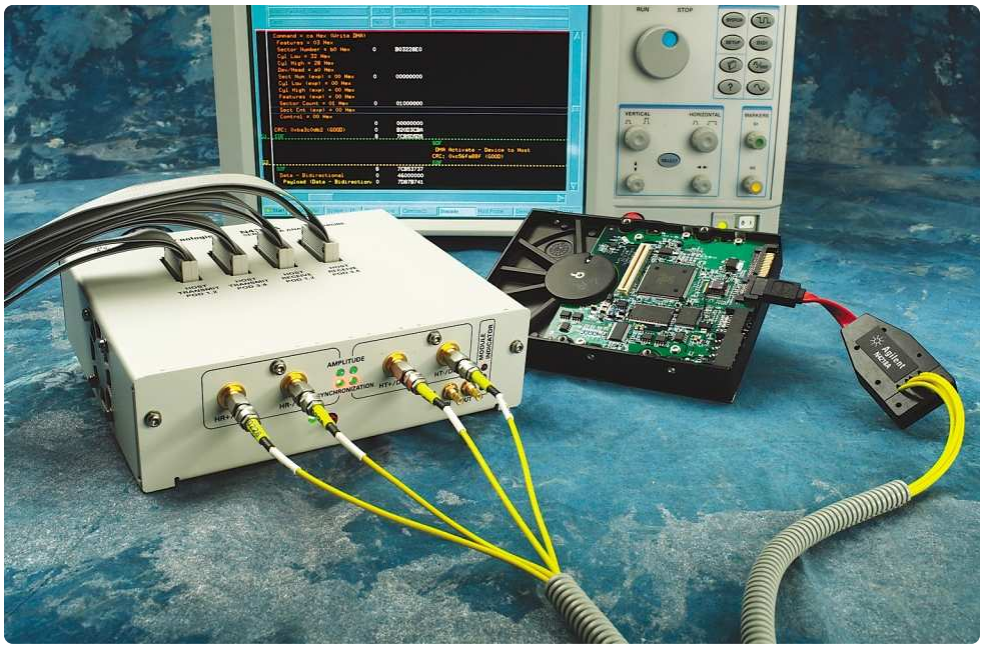

Figure 1. The N4219A packet analysis probe and the N4218A interposer provide digital design engineers who design SATA products with a complete system for debugging SATA system hardware and software

The Agilent Technologies N4219A packet analysis probe with the N4218A interposer capture SATA (Serial ATA) traffic and, in combination with the Agilent Technologies 16700 Series logic analyzer systems, provides triggering, cross-correlation, and detailed measurements. Together they provide digital design engineers who design SATA products with a complete system for debugging SATA system hardware and software. The probe connects to the SATA link through the interposer, allowing the logic analyzer to trace and trigger on SATA traffic from the physical 10b level, through 8b logical, and on to high-level SATA protocol-based measurements.

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Features

Key Features

- Reliably probe 1.5 GHz SATA links
- Passive probe nonintrusively captures exact SATA activity
- Protocol Aware Triggering
- Sequential Triggering
- Packet Decode
- Allows time-correlated measurements across multiple buses in systems
- OOB (Out Of Band) Signal Trigger/Decode
- Spread Spectrum Clock Support
- CRC and Disparity checking
- Extensible to support ATAPI
- LEDs provide loss-of-signal information
- Detects 8b/10b coding, disparity, framing and control symbol errors
- Post process system performance analysis
  - Link Utilization (SPA tool)
  - Packet Latency through Components

Compatibility

The Agilent N4219A is compatible with the Agilent Technologies 16700A/B, 16701A/B, and 16702A/B logic analysis mainframes and 16715/16/17/18/19A or 16740/41/42A or 16750/51/52A/B or 16753/54/55/56A logic analysis modules. The N4219A requires version 2.70 or higher operating software on the logic analyzer.

The N4218A SATA interposer provides differential Host Transmit/Device Receive and Host Receive/Device Transmit signals at a 20 mv level into a 50 ohm load from coax cables with SMA connectors. The N4218A is a passive 8:1 divider of of the SATA link. The output of the N4218A interposer is compatible with the N4219A SATA packet analysis probe, oscilloscopes, BERTs, or Spectrum Analyzers capable of detecting 20 mV signal swings into 50 ohms. The Agilent N4218A can be purchased separately from the N4219A packet analysis probe.

Applications

Validate SATA Traffic

Trigger, capture, and decode SATA traffic at 1.5 Gbit/s. All fields in the SATA protocol up to the transport layer are supported in the trigger macro.

The N4219A records 10b or 8b data. Software on the 16700 Series logic analysis systems provide packet decode.

System Level Debug

For efficient development of SATA systems, extract useful information from a crowded stream of traffic, and accurately identify and selectively record what interests you most. Setting up complex recording, triggering and filtering options is easy and powerful.

Capture time-correlated measurements with other system buses or multiple nodes of the SATA link. The complex triggering capabilities of the Agilent 16700 Series allow cross-bus triggering and sequential triggering of series of packets or events. Global markers allow measurements between system buses enabling latency measurements through system components.

Features (continued)

Product Structure

N4219A Includes:
One SATA packet analysis probe
Operating software CD
User's manual

Mandatory Purchase with N4219A:
One N4218A SATA interposer per N4219A SATA packet analysis probe

Not Included:
The N4219A requires probes to connect between the 100-pin Samtec connectors and the logic analyzer module(s). The E5385A or E5378A probes are purchased separately from the N4219A.
E5385A 100-pin probe required for use with 16715/16/17/18/19A, 16740/41/42A, or 16750/51/52A/B modules.
E5378A single-ended probe required for use with 16753/54/55/56A logic analyzer modules.

Figure 2. The N4218A interposer connected to the 16700 logic analysis system through the N4219A packet analysis probe

Logic Analyzer Configurations for Use with the N4219A

Single logic analyzer module configuration: One module configured as two machines

One N4219A SATA packet analysis probe	
One N4218A SATA interposer	
One mainframe: 16700A/B or 16702A/B	
One logic analyzer module: 16715/16/17/18/19A* or 16740/41/42A or 16750/51/52A/B or 16753/54/55/56A	with two probes (purchased separately): with two E5385A 100-pin probes with two E5385A 100-pin probes with two E5385A 100-pin probes with two E5378A single-ended probes

* 16715/16/17/18/19A loose timers and ability to set flags in trigger

Two logic analyzer module configuration: Two individual modules for transmitter/receiver

One N4219A SATA packet analysis probe	
One N4218A SATA interposer	
One mainframe: 16700A/B or 16702A/B	
Two logic analyzer modules: 16715/16/17/18/19A* or 16740/41/42A or 16750/51/52A/B or 16753/54/55/56A	with four probes (purchased separately): with four E5385A 100-pin probes with four E5385A 100-pin probes with four E5385A 100-pin probes with four E5378A single-ended probes

* No restrictions on 16715/16/17/18/19A triggering

All configurations will trade 1/2 memory depth of any module to enable time tags.

Figure 4. N4219A SATA packet analysis probe

Figure 5. N4218A SATA interposer

Technical Specifications

Agilent Technologies N4219A specifications and characteristics

N4219A mechanical characteristics

Weight	648 g

N4219A Connectors

Inputs	Four SMA female connectors from N4218A SATA Interposer to N4219A SATA packet analysis probe SATA rate supported is 1.5 Gb/s
Outputs	Four 100-pin Samtec connectors
Serial port	RJ12 connector, RS-232 DCE to 115.2 kbaud
LAN port	IEEE 802.3 Type 10/100Base-TX LAN Port. RJ-45 connector is compatible with both 10 Mbps (10Base-T) and 100 Mbps (100Base-TX) twisted-pair ethernet LANs.

N4218A Connectors

Inputs	Serial ATA connector SATA rate supported is 1.5 Gb/s
Outputs	Serial ATA connector Four SMA male connectors providing 20 mV into 50 Ω (8:1 passive divider off SATA link) HR+ DT+ HR- DT- HT+ DR+ HT- DR- SATA rate supported is 1.5 Gb/s
Serial port	RJ12 connector, RS-232 DCE to 115.2 kbaud
LAN port	IEEE 802.3 Type 10/100Base-TX LAN Port. RJ-45 connector is compatible with both 10 Mbps (10Base-T) and 100 Mbps (100Base-TX) twisted-pair ethernet LANs.

Environmental Characteristics (Operating)

Temperature	20° to + 30° C (+68° to +86° F)
Altitude	4,600 m (15,000 ft)
Humidity	Up to 50% noncondensing. Avoid sudden, extreme temperature changes which could cause condensation on the circuit board. For indoor use only.

Technical Specifications (continued)

Power

Power supply	12 Vdc, maximum current = 1.5A External module, 100-240 V input auto sensing 50/60 Hz, IEC 320 connector
Physical size	40 mm (1.57 inch) height 105 mm (4.13 inch) width 151 mm (5.94 inch) depth
Weight	314 g

Product Regulations

EMC	**IEC 61326-2:2002 / EN 61326-1:1997** CISPR 11:1997+A1:1999 / EN 55011:1991-Group 1 Class A IEC 61000-4-2:1995+A1:1998+A2:2000 / EN 61000-4-2:1995 (ESD 4kV CD, 8kV AD) Performance Criteria A IEC 61000-4-3:1995+A1:1998+A2:2000 / EN 61000-4-3:1995 (3V/m 80% AM) Performance Criteria A IEC 61000-4-4:1995+A1:2000+A2:2001 / EN 61000-4-4:1995 (EFT 0.5kV line-line, 1kV line-earth) Performance Criteria A IEC 61000-4-5:1995 / EN 61000-4-5:1995 (Surge 0.5kV line-line, 1kV line-earth) Performance Criteria A IEC 61000-4-6:1996+A1:2000 / EN 61000-4-6:1996 (3V 80% AM, power line) Performance Criteria B IEC 61000-4-11:1994 / EN 61000-4-11:1994 (Dips 1 cycle, 100%) Performance Criteria A **Regulatory Information for Canada** ICES/NMB-001:1998 This ISM device complies with ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada **Regulatory Information for Australia/New Zealand** This ISM device complies with Australian/New Zealand AS/NZS 2064.1
Safety	IEC 61010-1:1990+A1:1992+A2:1995 / EN 61010-1:1993+A2:1995 Canada: CSA C22.2 No. 1010.1:1992
Additional information	The product here with complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (including 93/68/EEC) and carries the CE Marking accordingly (European Union).
Sound pressure level	Less than 60 dBA

[1] Performance Criteria
A Pass: Normal operation, no effect
B Pass: Temporary degradation, self recoverable
C Pass: Temporary degradation, operator intervention required
D Fail: Not recoverable, component damage

Technical Specifications (continued)

Basic Trigger and Decoded Events

Protocols	Serial ATA Primitive Layer
	Serial ATA Primitive Layer
	Register Host to Device
	Register Device to Host
	DMA Activate - Device to Host
	DMA Setup - Bidirectional
	BIST Activate - Bidirectional
	Data - Bidirectional
Conditions: Primitives	R_RDY
	PMREQ_S
	PMACK
	SYNC
	PMNAK
	HOLDA
	CONT
	HOLD
	PMREQ_P
	R_OK
	DMAT
	SOF
	R_IF
	R_ERR
	X_RDY
	WTRM
	EOF
	ALIGN
Conditions: Register Host to Device	Command Bit
	Reserved Bits
	Commands:
	NOP
	CFA Request Extended Error Code
	Device Reset
	Read Sector(s)
	Read Sector(s) Ext
	Read DMA Ext
	Read DMA Queued Ext
	Read Native Max Address Ext
Conditions: Register Host to Device	Commands: (continued)
	Read Multiple Ext
	Read Log Ext
	Write Sector(s)
(continued)	Write Sector(s) Ext
	Write DMA Ext
	Write DMA Queued Ext
	Set Max Address Ext
	CFA Write Sectors without Erase
	Write Multiple Ext
	Write Log Ext
	Read Verify Sector(s)
	Read Verify Sector(s) Ext
	Seek
	CFA Translate Sector
	Execute Device Diagnostic
	Initialize Device Parameters
	Download Microcode
	Packet
	Identify Packet Device
	Service
	Smart
	Device Configuration
	CFA Erase Sectors
	Read Multiple
	Write Multiple
	Set Multiple Mode
	Read DMA Queued
	Read DMA
	Write DMA
	Write DMA Queued
	CFA Write Multiple without Erase
	Check Media Card Type
	Get Media Status
	Media Lock
	Media Unlock
	Standby Immediate
	Idle Immediate
	Standby
	Idle
	Read Buffer
	Check Power Mode
	Sleep
	Flush Cache
	Write Buffer
	Flush Cache Buffer
Conditions: Register Host to Device	Commands: (continued)
	Identify Device
	Media Eject
	Set Features
(continued)	Security Set Password
	Security Unlock
	Security Erase Prepare
	Security Erase Unit
	Security Freeze Lock
	Security Disable Password
	Read Native Max Address
	Set Max
	Features
	Sector Number
	Cyl Low
	Cyl High
	Dev/Head
	Sect Num (exp)
	Cyl Low
	Cyl High
	Features (exp)
	Sector Count
	Sector Cnt (exp)
	Reserved Byte
	Control
	Reserved Bytes
Conditions: Register Device to Host	Reserved Bit
	Interrupt Bit
	Reserved Bits
	Status
	Error
	Sector Number
	Cyl Low
	Cyl High
	Dev/Head
	Sect Num (exp)
	Cyl Low (exp)
	Cyl High (exp)
	Reserved Byte
	Sector Count
	Sect Cnt (exp)
	Reserved Bytes
Errors	R-ERROR

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Product specifications and descriptions in this document subject to change without notice.

Printed in USA September 4, 2002
5988-7634EN

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