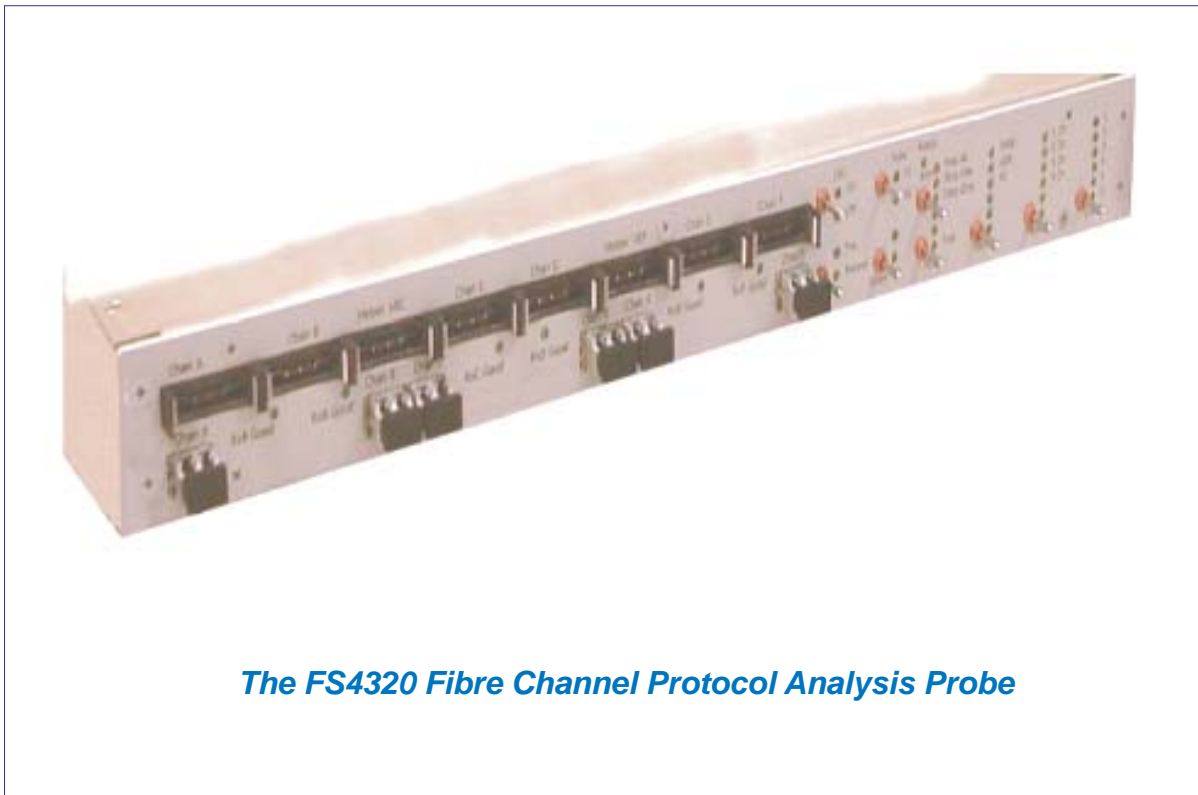


The FS4320 Fibre Channel protocol analysis probe provides a physical and electrical connection between an Agilent Technologies logic analyzer and six Fibre Channel optical links controlled by one common logic analyzer clock. The FS4320 includes protocol decode software that configures the logic analyzer and decodes incoming data. Front panel controls allow user selection of signaling rate, checksum usage, and stripping mode. An optional user-controllable stimulus-software package is available.

## FS4320 Key Features

- Monitors Six 2.125 or 1.062 Gb/s Fibre Channel Optical Links
- Supports FC-AE (ASM) Protocol Decode
- Hardware Idle Stripping
- CRC Checking
- Transmits in TEE and REPEAT Modes
- Front Panel Controls and State Indicators
- Built-in Test Pattern Generator
- Optional User-programmable Traffic Generator
- Built-in Test Pattern Generator
- Supports FC0 Optical and FC1 Layers (physical and signaling)



*The FS4320 Fibre Channel Protocol Analysis Probe*

## FS4320 Description

The FS4320 Fibre Channel State Analysis Probe performs three functions:

- Provides an electrical and mechanical interface from up to six Fibre Channel optical links to an Agilent Technologies logic analyzer.
- Protocol Decode software allows powerful protocol analysis of the Fibre Channel transactions.
- Configuration software quickly sets up your Agilent logic analyzer .

### Protocol Analysis Mode

The software included with the FS4320 contains complete configuration files and a FuturePlus Fibre Channel protocol decoder for your Agilent logic analyzer. The Agilent logic analyzer is used in state analysis mode, where the analyzer master clock is derived from the Fibre Channel protocol. The Fibre Channel serial data is converted to parallel data in the analysis probe. This allows easy triggering, store qualification and performance monitoring of the Fibre Channel. The FS4320 protocol decoder translates the incoming data into a readable display that lists the the Fibre Channel format of Header, Payload, and CRC.

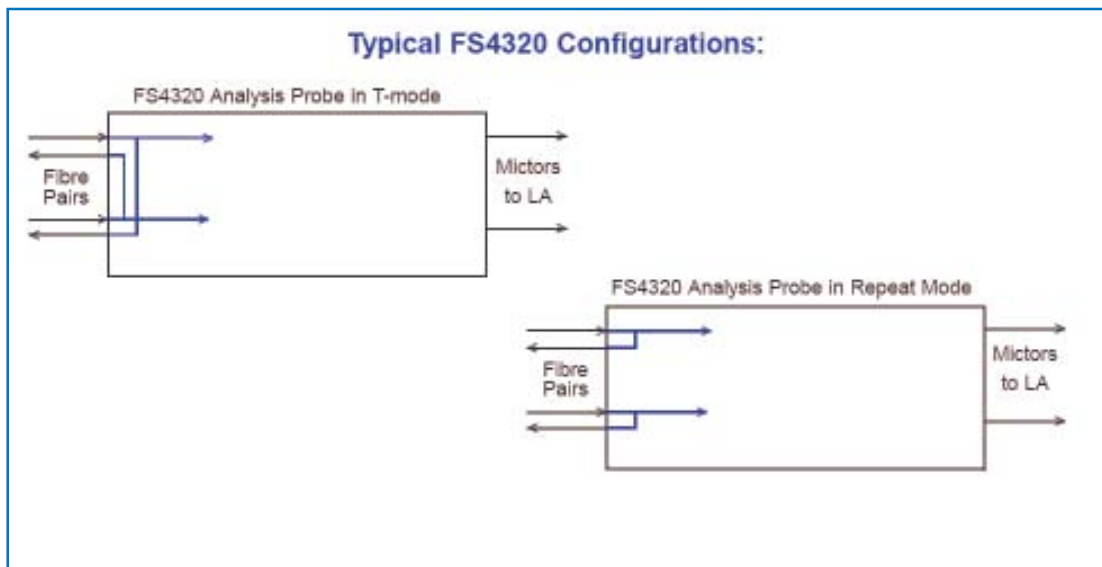
### Triggering, Filtering and Store Qualification

The Agilent logic analyzer may be triggered or qualified on any of the ordered sets such as SOFx, EOFx, IDLE, etc. Additionally, triggering on frame header fields, such as Frame Type, the Source Node ID, or the Destination Node ID is possible. Predefined condensed-acquisition modes can be chosen to prevent Idles and recurring Primitive Sequences from being acquired, thus saving trace memory and providing an easier-to-read state display.

The FS4320 Fibre Channel State Analysis Probe accepts six pairs of fibre optic cable. Each pair consists of a fibre that carries data to the analysis probe (the input or receive fibre) and a fibre that carries data from the analysis probe (the output or transmit fibre). The data must conform to the Fibre Channel FC0 and FC1 layers (physical and signaling). The analysis probe converts the data in each Receive fibre to electrical signals and demultiplexes the bit-serial data to a 32-bit parallel representation. The parallel data and other signals are available on the front panel for connection to an Agilent logic analyzer. Probe-generated control signals are available on separate connectors, one set for each three input fibres. Some of these signals are necessary for protocol decode, and others carry information that is associated with the input fibres passed in through a rear-panel connector from other user provided sources.

### Cross-Domain Analysis

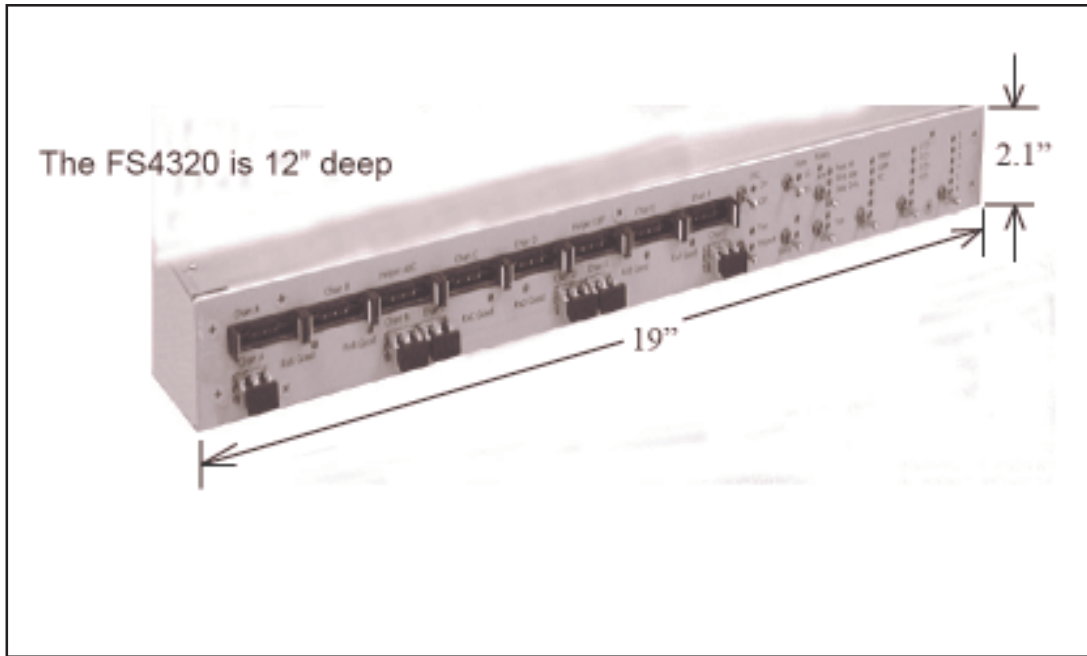
Are you analyzing data in multiple domains? Simply use this analysis probe to monitor a Fibre Channel link, and then use another FuturePlus Systems analysis probe to monitor other buses. We have analysis probes for many other buses, including AGP, PCI, ISA, VME, VXI, PMC, SCSI, USB, Rambus, DIMM and SIMM. You can create your own custom measurement system, trigger between buses, and view data from multiple buses, simultaneously in the same display. In a similar fashion, you could connect an analysis probe for your host processor to another logic analyzer card.



State Number	Fibre Channel	CONTROL1	CommaA	DATA1	CO
Decimal		Hex	Binary	Hex	He
12	Idle	02	1	BC95B5B5	02
13	SOFc1	02	1	BCB51717	02
14	Frame Header	00	0	11222222	02
	R_CTL: 11    D_ID: 222222				
15	S_ID: 444444	00	0	33444444	00
16	TYPE: 55    F_CTL: 666666	00	0	55666666	00
17	SEQ_ID: 77    DF_CTL: 88    SEQ_CNT: 9999	00	0	77889999	00
18	DX_ID: AAAA    RX_ID: BBBB	00	0	AAAABBBB	00
19	Parameter: CCCCCCCC	00	0	CCCCCCCC	00
20	Payload Header	00	0	00005555	00
	Dword: 00005555				
21	CRC: BA2D802E	00	0	BA2D802E	00
22	EOFd1	02	1	BCB59595	02
23	SOFi1	02	1	BCB55757	02
24	Frame Header	00	0	11222222	02
	R_CTL: 11    D_ID: 222222				

An easy-to-read, well organized state transaction listing shows you all the information you need to solve complex hardware and software problems on your Fibre Channel link. The screen capture above shows a standard FC Frame Header with a Payload of 1 word in length. The screen capture below shows a Fibre Channel state listing showing Frame Header with the ASM Header decoded and no Payload.

State Number	Fibre Channel	CONTROL1	CommaA	DATA1	CO
Decimal		Hex	Binary	Hex	He
31	SOFc1	02	1	BCB51717	02
32	Frame Header	00	0	11222222	02
	R_CTL: 11    D_ID: 222222				
33	S_ID: 444444	00	0	33444444	00
34	TYPE: 55    F_CTL: 666666	00	0	55666666	00
35	SEQ_ID: 77    DF_CTL: 88    SEQ_CNT: 9999	00	0	77889999	00
36	DX_ID: AAAA    RX_ID: BBBB	00	0	AAAABBBB	00
37	Parameter: CCCCCCCC	00	0	CCCCCCCC	00
38	ASM Header	00	0	DDDDDDDD	00
	MsgID: DDDDDDD				
39	Resp/SeqID: 00000000	00	0	00000000	00
40	Reserved: 00000000	00	0	00000000	00
41	Priority: 00    Payload Len: 000000	00	0	00000000	00
42	CRC: C9C38FEF	00	0	E9C38FEF	00
43	EOFd1	02	1	BC95D8D5	02
44	SOFc1	02	1	BCB51717	02
45	Frame Header	00	0	11222222	02
	R_CTL: 11    D_ID: 222222				
46	S_ID: 444444	00	0	33444444	00



**Agilent Logic Analyzer Pods Required**

- 1 channel: 4 pods
- 2 channels: 6 pods
- 3 channels: 8 pods
- 4 channels: 12 pods
- 5 channels: 14 pods
- 6 channels: 16 pods

**Agilent Logic Analyzers Supported**

**Agilent 16700A/B and 16702A/B Logic Analysis Systems**

Requires one or more of the following modules:

- Agilent 16715A - 16719A (4 pods)
- Agilent 16750A - 16752A (4 pods)
- Agilent 16753A - 16756A (4 pods)

**Agilent 1680/1690 Benchtop Logic Analyzers**

- Agilent 1680/1690 (8 pods)
- Agilent 1680/1690 (6 pods)
- Agilent 1680/1690 (4 pods)

**Ordering Information**

- FS4320**.....Fibre Channel Analysis Probe. 1 req.
- FS1000**.....(Agilent E5346A) Termination Adapter for Agilent 16717-16752, 1680-1692, 2-8 req.
- FS1023**.....(Agilent E5380A) Termination Adapter for Agilent 16753-16760, 2-8 req.
- FSxxxx** ..... Test Traffic Generator software (optional)
- FS11yy** .....Software license for 1680/1690/Off Line Viewer (one license included with each FS4320)

*FuturePlus Systems provides quick delivery and excellent technical support.*

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