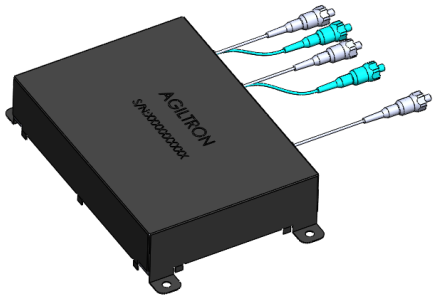
Fiber-Fiber™ 1X4 Fiber Optical Switch

(SM, PM, MM, Bidirectional)

DATASHEET

BUY NOW



The FF Series fiber optic switch connects optical channels by a micro-mechanical fiber to fiber auto-alignment platform and activated via an electrical relay. The advanced design significantly increase the performance, offering unprecedented low optical loss, broad wavelength operation with no coatings, high power handling, as well as an unmatched low cost. Latching operation preserves the selected optical path after the driver signal has been removed. The switch is bidirectional and conveniently controllable by 5V TTL.

Using no lens, the FF Series switch can accommodate all type of fibers, including SM. MM, PM, double cladding, bendable, large core, small core.

Applications

- Protection
- Instrumentation

Features

- Low Optical Distortions
- High Isolation
- High Reliability
- Fail-Safe Latching
- Epoxy-Free Optical Path
- Low Cost

Specifications

Parameter	Min	Typical	Max	Unit
Wavelength	200		2500	nm
Insertion Loss [1]		0.6	1	dB
Cross Talk		50	60	dB
Wavelength Dependent Loss		0.05	0.1	dB
Polarization Dependent Loss			0.1	dB
Polarization Extinction Ratio [2]	18	25	27	
Return Loss	35 [3]	55		dB
Rise/Fall Time (low speed version)	5		40 [4]	ms
Rise/Fall Time (high speed version)	1	2	15 [5]	ms
Repeatability			± 0.02	dB
Durability	10^7			Cycles
Operating Optical Power [2]		0.5		W
Operating Voltage	4.3		4.5	VDC
Operating Current (Latching/Non-Latching)		30	70	mA
Switching Type	Latching / Non-Latching			
Operating Temperature	-20 ~ 80			°C
Storage Temperature	-40 ~ 85			°C

Notes:

[1]. SM 28 fiber, Excluding Connectors. For MM fiber with laser CPR<14

[2]. For PM fiber only

[3]. For MM fiber with laser CPR<14

[4]. For PM type mainly

[5]. For SM, MM type, 15ms including the electrical delay as shown in the testing data

Rev 12/08/23

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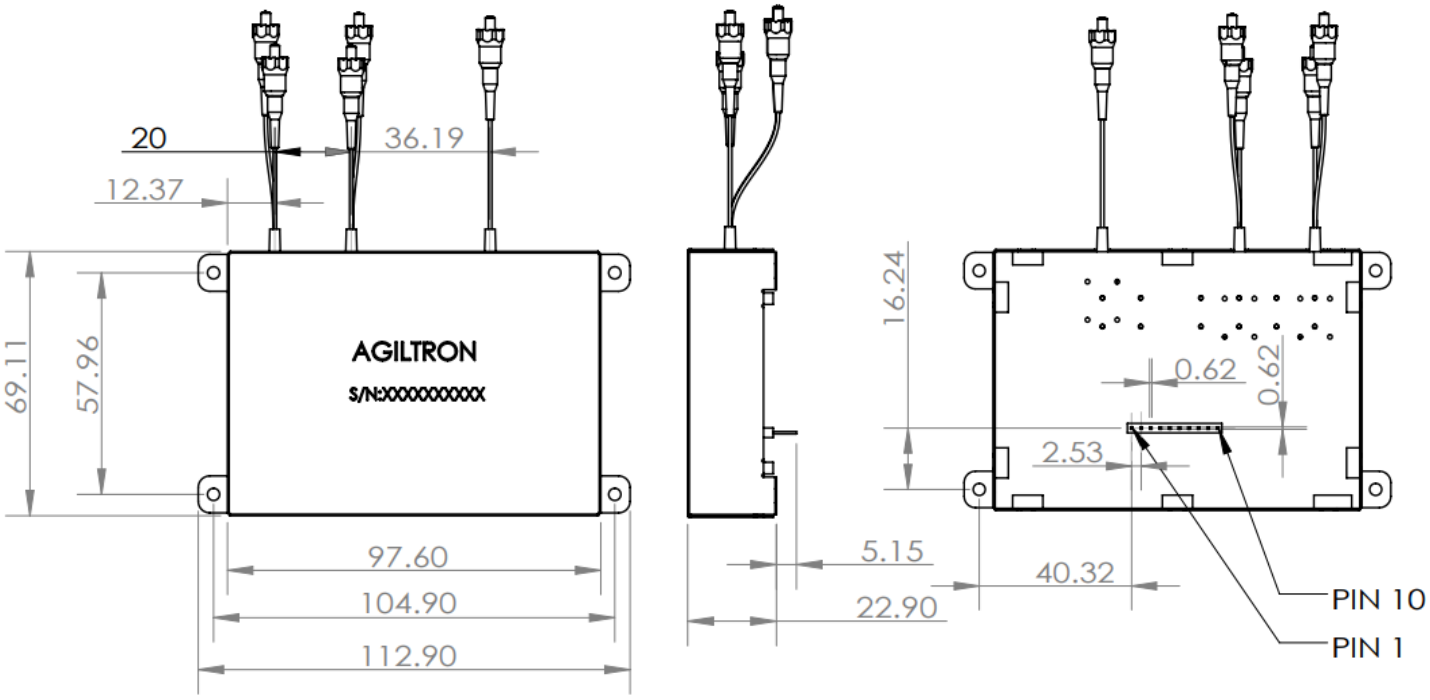
Mechanical Dimensions (mm)



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Electrical Connector Configurations

The load is a resistive coil which is activated by applying 4.5V (draw ~ 40mA). Applying a constant driving voltage increases stability. The switches can also be driven by a pulse mode using Agiltron recommended circuit for energy saving.

Agiltron offers a computer control kit with TTL and USB interfaces and Windows™ GUI. We also offer RS232 interface as an option – please contact Agiltron sales.

Latching Type

Optical Path	Switch 1		Switch 2		Switch 3	
	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
Port 1 → Port 2	L	H	L	H		
Port 1 → Port 3	L	H	H	L		
Port 1 → Port 4	H	L			L	H
Port 1 → Port 5	H	L			H	L

Notes:
H – 4.5V
L – 0V
Empty – Don't care H or L

Non-Latching Type

Optical Path	Switch 1		Switch 2		Switch 3	
	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
Port 1 → Port 2	L	L	L	L		
Port 1 → Port 3	L	L	H	L		
Port 1 → Port 4	H	L			L	L
Port 1 → Port 5	H	L			H	L

Notes:
H – 4.5V
L – 0V
Empty – Don't care H or L

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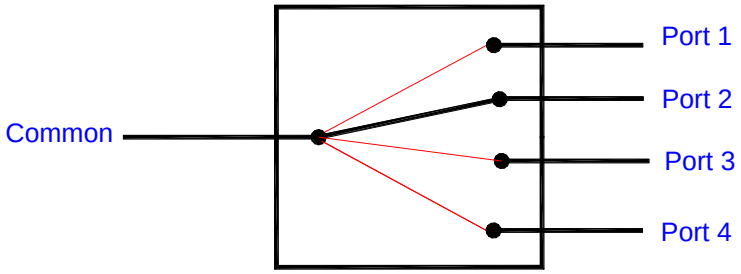
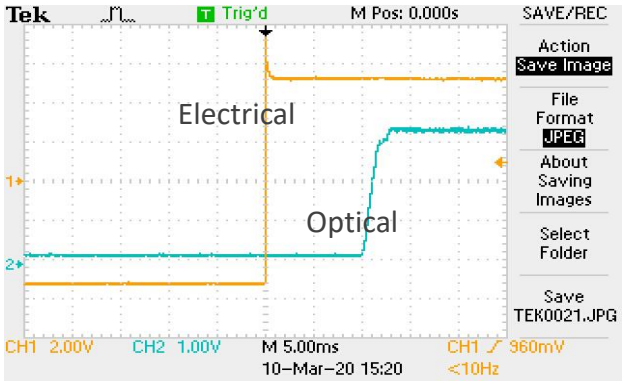
Functional Diagram

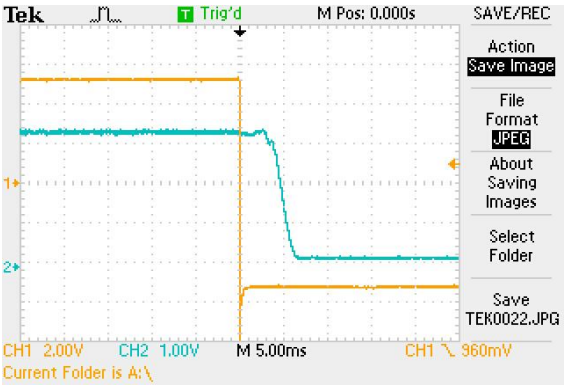


CL 1x4 Series Switch

Manual Operation Instruction



Rise



Fall

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Ordering Information

	☐☐	☐	☐	☐☐	☐	☐	☐
Prefix	**Type**	**Switch**	**Test Wavelength***	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector**
FFSW-	1x4 = 14 1x3 = 13	Fast Latching (F) = 6 Fast Non-Latching (F) = 7 Slow Latching (S) = 2 Slow Non-Latching (S) = 3	488 = 4 532 = 5 630 = 6 780 = 7 850 = 8 980 = 9 1060 = 1 1310 = 3 1550 = C 2000 = 2 Special = 0	Pick from below table	Bare fiber=1 900um tube=3 Special=0	0.25m=1 0.5m=2 1.0m=3 Special=0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 Duplex LC/PC = 8 MTP = 9 LC/UPC = U Special = 0

* The device is ultra-broadband limited by the fiber transmission. However, we only test at one selected wavelength to save cost. If customer needs to test at several wavelengths, the selection is **Special=0** with added cost.

NOTE:

- **PM1550** fiber works well for **1310nm**

Fiber Type Selection Table:

01	**SMF-28**	34	**PM1550**	67	**OM1 (MMF 62.5/125µm)**
02	**SMF-28e**	35	**PM1950**	68	**OM2 (MMF 50/125µm)**
03	**Corning XB**	36	**PM1310**	69	**OM3 (MMF 50/125µm)**
04	**SM450**	37	**PM400**	70	**OM4 (MMF 50/125µm)**
05	**SM1950**	38	**PM480**	71	**GIF50 (GIF 50/125µm)**
06	**SM600**	39	**PM630**	72	**GIF625 (GIF 62.5/125µm)**
07	**Hi780**	40	**PM850**	73	**105/125µm**
08	**SM800**	41	**PM980**	74	**FG105LCA**
09	**Hi980**	42		75	**FG50LGA**
10	**Hi1060**	43	**PM780**	76	
11	**Draka BBE**	44		77	
12		45		78	

Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness

Fibers with smaller core diameters (<5 µm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

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Driver Reference Design