

Fiber-Fiber™ 1xN Mini Optical Switch

(Large core fiber, Broad, Bidirectional, High power)



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Features

- Unmatched Low Cost
- Very Broad Spectral Range
- High Isolation
- High Reliability
- Epoxy-Free Optical Path

Applications

- Signal management
- Sensor
- Spectroscopy
- High Power Laser
- Instrumentation

The Fiber-Fiber™ Series 1xN Optical Switch connects optical channels by directly aligning a pair of fibers. This achieved by using a precision mini motor. Latching capability preserves the selected optical path after the drive signal has been removed. The compact FF series switches has passed space application qualification. Agiltron unique design offers low insertion loss covering an ultrabroad spectral band from 300 to 5000 nm with various fiber core size from 100µm to 1500µm. The switch is ideal for sensor and spectroscopy applications with bidirectionality.

The driving PCB has interfaces with a computer through USB or RS232.

Lightpath in the device is bidirectional.

Switches with PM fibers transmit both polarizations the same way as the fiber.

Specifications

Parameter	Min	Typical	Max	Unit
Operation Wavelength	300		5000	nm
Insertion Loss ^[1]		0.5	1.0	dB
Wavelength Dependent Loss ^[2]		0.05	0.3	dB
Polarization Dependent Loss		0.03	0.10	dB
Return Loss ^[5]	35			dB
Cross Talk On/Off Ratio	60			dB
Operating Voltage		5	5.5	VDC
Power Consumption			2	W
Switching Type		Latching		
Switching Time ^[3]		0.8		s
Durability	10 ⁷			cycle
Operating Temperature	0		70	°C
Optical Power Handling ^[4]			0.5	W
Storage Temperature	-40		85	°C
Fiber Type		≥ Ø100 µm core fiber		
Package Dimension		See Mechanical Dimensions		

Notes:

- [1]. Measured without connectors for 1xN. For multimode fiber, use a laser source with CPR<15
- [2]. Within 100 nm bandwidth
- [3]. Defined for speed between the adjacent channels
- [4]. High power version available
- [5]. For 50 µm core. Larger core will reduce the value, index matching fluid version increase the return loss

* The switch covers an ultra-broad spectral band that is only limited by the fiber intrinsic transmission properties.

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [\[click this link\]](#):

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Rev 02/21/25

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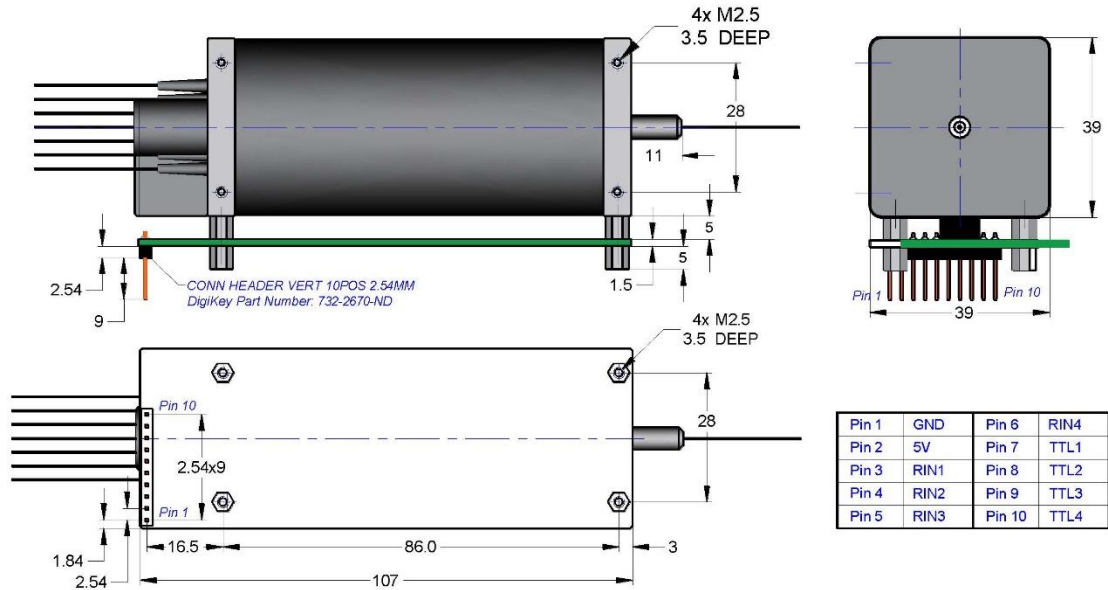
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Mounting and Electrical Connection for Package A/B (Unit: mm)

- The switch can be mounted through the tapped hole on the side or on to a bottom PCB



- The switch can be powered and TTL controlled via the 10 pins

Name	Direction	Description
GND	Ground	Provide power to the switch
5V	Power	
RIN1	Output	I0RTN-I3RTN can be used to read switch position. I3RTN is the highest bit, while I0RTN is the lowest one.
RTN2	Output	
RTN3	Output	
RTN4	Output	
TTL1	Input	I0-I3 set the switch position. Up to 16 different statuses are available for this driver board. I3 is the highest bit of input status, while I0 is the lowest one. For example, I3 -> 0, I2 -> 0, I1 -> 0, I0 -> 1, change to status 2. I3 -> 1, I2 -> 1, I1 -> 1, I0 -> 1, change to status 16.
TTL2	Input	
TTL3	Input	
TTL4	Input	

Computer Interface

Computer controlling kit with USB or RS232 interfaces and Windows™ GUI.

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Ordering Information

Prefix	Type	Test Wavelength ^[4]	Configuration	Optical Power	Fiber Core	Fiber Cover	Fiber Length	Connector
FFMU ^[1]	1x2 = 02	800~1100 = 1	Single = S	0.5 W = 1	50/NA.22 = 5	Bare fiber = 1	0.25 m = 1	None = 1
FFMR ^[2]	1x3 = 03	1500~1700 = 2	Dual = D	Special = 0	62.5/NA.22 = 6	2 mm Jacket = 2	0.5 m = 2	FC/PC = 2
FFMT ^[3]	1x4 = 04	300~600 = 6	Special = 0		105/NA.22 = E	900 um tube = 3	1.0 m = 3	FC/APC = 3
	...	600~800 = 8			200/NA.22 = F	Special = 0	Special = 0	SC/PC = 4
	1x42 = 42	1100~1600 = B			300/NA.22 = G			SC/APC = 5
	2x2 = 2A	Special = 0			400/NA.22 = H			ST/PC = 6
	2x2Bypass = 2B				600/NA.22 = J			LC/PC = 7
	Special = 00				800/NA.22 = K			SMA905 = 9
					SM28 = 1			LC/APC = A
					PM1550 = P			LC/UPC = U
					SM1950 = 9			Special = 0
					PM1950 = M			
					UV180nm = U			
					Special = 0			

[1]. **FFMU**: Fiber-Fiber 1xN Mini Switch with USB driver.

[2]. **FFMR**: Fiber-Fiber 1xN Mini Switch with RS232 driver.

[3]. **FFMT**: Fiber-Fiber 1xN Mini Switch with TTL driver.

[4]. The switch covers an ultra-broad spectral band that is only limited by the fiber intrinsic transmission properties. We typically only test at one wavelength; multiple wavelength tests are available with extra cost.

Note: Red is special order

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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Typical Fiber Transmissions

