

# CrystaLatch™

## 1x1, 1x2 Series Fiber Optic Switch

(Full aerospace, OutSpace, and Undersea qualified)  
(SM, PM, High Power, Bidirectional, Isolator/Circulate Build-in)

(Protected by U.S. patents 7224860, 6757101, 6577430 and pending patents)

### Product Description

The CL 1x1, 1x2, 2x1 Series Fiber Optical Switch redirects an incoming optical signal into a selected output fiber, achieved using patented non-mechanical configurations and activated via an electrical control signal. Latching operation preserves the selected optical path after the drive signal has been removed. The all solid state CL 1x1,1x2 fiber optic switch features low insertion loss, high extinction ratio, high channel isolation, and extremely high reliability and repeatability. It is designed to meet the most demanding switching requirements of continuous operation without failure, over 25-year longevity, operation under shock/vibration environment and large temperature variations, and fast response time.

The switch also has build-in circulator and isolator functions. Electronic driver is available for this series of switches.



### Performance Specifications

| CL 1x1, 1x2 Series Switch    | Min                   | Typical | Max  | Unit   |
|------------------------------|-----------------------|---------|------|--------|
| Operation Wavelength [1]     | 1520                  | 1550    | 1580 | nm     |
|                              | 1295                  | 1310    | 1325 |        |
| Insertion Loss [2]           |                       | 0.7     | 1.0  | dB     |
| Cross Talk [2]               | Bidirectional Series  | 35      | 50   | dB     |
|                              | Unidirectional Series | 40      | 50   | dB     |
| Return Loss [2]              | 50                    | 55      |      | dB     |
| PDL (SM Series)              |                       | 0.1     | 0.2  | dB     |
| Extinction Ratio (PM Series) | 18                    | 25      |      | dB     |
| Switch Speed (rise, fall)    | 5                     | 50      | 200  | µs     |
| Repetition Rate              |                       | 2K      |      | Hz     |
| Polarization Mode Dispersion |                       | 0.1     | 0.2  | ps     |
| Switch Type                  | Solid-Stage Latching  |         |      |        |
| Operating Temperature        | -5                    |         | 70   | °C     |
| Storage Temperature          | -40                   |         | 85   | °C     |
| Optical Power Handling [3]   |                       | 300     | 500  | mW     |
|                              |                       |         | 2    | W      |
| Package Dimension            | 58.2L x 8.4W x 8.4H   |         |      | mm     |
| Durability                   | 10 <sup>14</sup>      |         |      | Cycles |

[1]. Agiltron can achieve same SPEC at L band.

[2]. Measured without connectors.

[3]. Special operating temperature -40 to +85 °C is available with Ordering Information.

### Features

- Solid-State high speed
- Ultra-high reliability
- Fail-safe latching
- Low insertion loss
- Direct low voltage drive
- Compact
- Low cost

### Applications

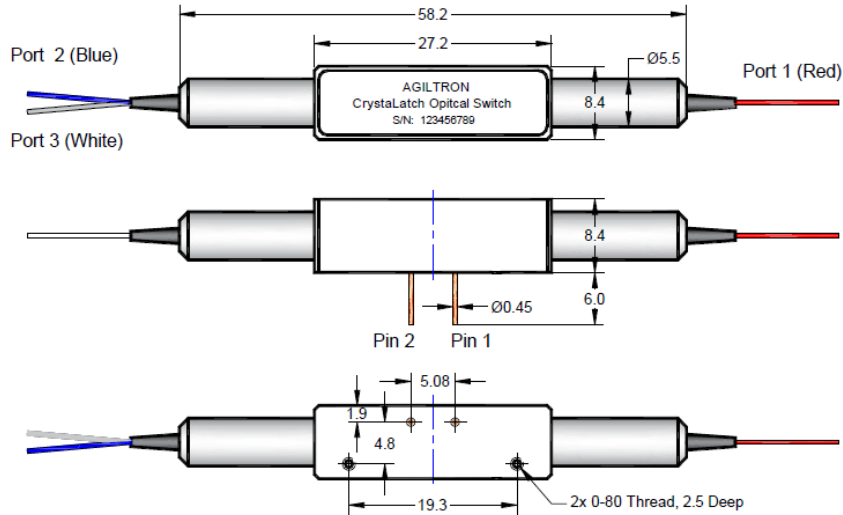
- Optical channel blocking
- Configurable Add/Drop
- System monitoring
- Instrumentation



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### Mechanical Dimensions (Unit: mm)



### Electrical Driving Information

The switch is actuated by applying a voltage pulse. Applying one polarity pulse, one light path will be connected and latched to the position. Applying a reversed polarity pulse, another light path will be connected and latched to the position after pulse removed.

| Parameter                   | Minimum | Typical | Maximum | Unit |
|-----------------------------|---------|---------|---------|------|
| Drive Voltage               | 4.5     | 5       | 5.5     | V    |
| Resistance (each Pin Group) | 15      | 18      | 22      | Ω    |
| Pulse Duration              | 0.2     | 0.3     | 0.5     | ms   |

Driving kit with USB and TTL interfaces and Windows™ GUI is available. We also offer RS232 interface as an option – please contact Agiltron sales.

### Bidirectional Series 1x1, 1x2 or 2x1 Switch Driving Table

| Optical Path    |                 | Pin 1 | Pin 2 |
|-----------------|-----------------|-------|-------|
| 1x1             | 1x2 or 2x1      |       |       |
| Port 1 ↔ Port 2 | Port 1 ↔ Port 2 | -     | +     |
| Dark            | Port 1 ↔ Port 3 | +     | -     |

"+" is 4.5 ~ 5.5 V pulse, typical pulse is 5 V. "-" is ground.

### Unidirectional Series 1x1, 1x2 Switch Driving Table

| Optical Path    |                 | Pin 1 | Pin 2 |
|-----------------|-----------------|-------|-------|
| 1x1             | 1x2             |       |       |
| Port 1 → Port 2 | Port 1 → Port 2 | -     | +     |
| Dark            | Port 1 → Port 3 | +     | -     |

"+" is 4.5 ~ 5.5 V pulse, typical pulse is 5 V. "-" is ground.

### Unidirectional Series 1x1, 2x1 Switch Driving Table

| Optical Path    |                 | Pin 1 | Pin 2 |
|-----------------|-----------------|-------|-------|
| 1x1             | 2x1             |       |       |
| Port 2 → Port 1 | Port 2 → Port 1 | +     | -     |
| Dark            | Port 3 → Port 1 | -     | +     |

"+" is 4.5 ~ 5.5 V pulse, typical pulse is 5 V. "-" is ground.

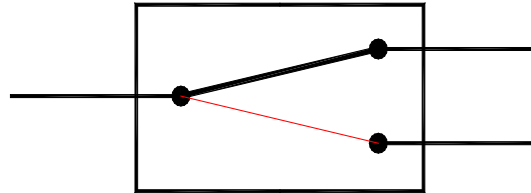


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### Function Diagram



CL 1x2 Series Switch

### Ordering Information

|          | Type       | Wavelength | Switch       | Package     | Fiber Type | Fiber Length       | Connector [9] |
|----------|------------|------------|--------------|-------------|------------|--------------------|---------------|
| CLSW [1] | 1x1=11     | 1310=3     | Dual Stage=2 | Standard=3  | SMF-28=1   | Bare fiber=1       | None=1        |
| CLPM [2] | 1x2=12     | 1550=5     | Special=0    | -40~+85°C=A | PM 250=B   | 900um loose tube=3 | FC/PC=2       |
| CLHP [3] | 2x1=21     | Special=0  |              | -40~+70°C=B | Special=0  | Special=0          | FC/APC= 3     |
| CLBD [4] | Special=00 |            |              | -20~+85°C=C |            |                    | SC/PC= 4      |
| CLPH [5] |            |            |              | -20~+70°C=D |            |                    | SC/APC=5      |
| CLHB [6] |            |            |              | Special=0   |            |                    | ST/PC=6       |
| CLPB [7] |            |            |              |             |            |                    | LC/PC=7       |
| CPHB [8] |            |            |              |             |            |                    | Duplex LC=8   |
|          |            |            |              |             |            |                    | Special=0     |

[1]. **CLSW**: CL 1x1, 1x2 SM **SWITCH**.

[2]. **CLPM**: CL 1x1, 1x2 **PM** Switch.

[3]. **CLHP**: CL 1x1, 1x2 SM **H**igh Power Switch.

[4]. **CLBD**: CL 1x1, 1x2 SM **B**IDIRECTIONAL Switch.

[5]. **CLPH**: CL 1x1, 1x2 **PM** **H**igh Power Switch.

[6]. **CLHB**: CL 1x1, 1x2 **H**igh Power **B**idirectional Switch.

[7]. **CLPB**: CL 1x1, 1x2 **PM** **B**idirectional Switch.

[8]. **CPHB**: CL 1x1, 1x2 **PM** **H**igh Power **B**idirectional Switch.

[9]. There isn't any connector in high power switches. Please contact us for high power connectors.