CrystaLatch™
16x16 Non-Blocking Switch System

(SM, PM, 1550nm, 1310nm, 5W)

AGILTRON

The CL Series 16x16 fiber optical switch connects optical channels by redirecting an incoming optical signal into a selected output fiber. This is 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. It is a truly non-blocking switching matrix. The all solid state 16x16 fiberoptic 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, longevity, operation under shock/vibration environment and large temperature variations, and fast response time.

The magneto-optical crystals used in the CL switches have no fatigue nor drift effect.

The order table includes a list of standard control interfaces. Additionally, we provide a list of commands to assist customer engineers in coding. For those who require it, we offer a code-writing service for customer interfaces at an additional charge.

Features

- Moderately Fast Speed
- Non-Mechanical
- High Reliability
- Fail-Safe Latching
- Low Insertion Loss
- Rugged
- Compact
- Cost Effective

Applications

- Optical Signal Routing
- Network Protection
- Configurable Add/Drop
- Signal Monitoring
- Instrumentation

Specifications

Parameter	Min	Typical	Max	Unit
Center Wavelength [1]	1310	1550	1600	nm
	1295	1310	1325	nm
Insertion Loss [2]		3.5	4.5	dB
Uniformity		0.8	1.5	dB
Cross Talk On/Off Ratio	30	35		dB
Extinction Ratio (PM Fiber)	18		23	dB
Optical Switching Speed (Rise, Fall)	5		10	µs
Repetition Rate		2K		Hz
Durability	10^{15}			cycle
Repeatability		0.05	0.1	dB
Polarization Dependent Loss (SM Fiber)		0.2	0.5	dB
Polarization Mode Dispersion			0.4	ps
Polarization Extinction (PM Fiber)	16		25	dB
Return Loss	50			dB
Operating Temperature [3]	-5		65	°C
Optical Power Handling		400		mW
Storage Temperature	-40		85	°C

Notes:

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

[2]. Excluding connectors

[3]. -40°C version is also available

Rev 12/26/24

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Control Interface Information

The standard control interface could be USB or RS232 or Ethernet RJ45. AC source can be either 120V or 220V.

TTL control interface is available at D-shape PIN connector, and the driving table and electric driving information will be provided for the customer's own electronics design. Typically, each switching point is actuated by applying a voltage pulse with the parameters as following.

Mechanical Dimensions

Standard version is 1RU 19" mount rack (dimension of 430mm x 450mm x 50mm)

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

Ordering Information

	1 6	☐	1	☐	☐	3	3	☐
Prefix	**Type**	**Wavelength**	**Switch**	**Optical Power**	**Fiber Type**			**Connector**
CLMS-		1310 = 3 1550 = 5 1600 =6	Single Stage = 1	Regular = 1 5W = 2	SMF-28 = 1 PM1550 = 2			FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 Duplex LC/PC = 8 MTP/MPO = 9 LC/APC = A LC/UPC = U Special = 0

* Rack Mount Depth ~ 430mm.

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.
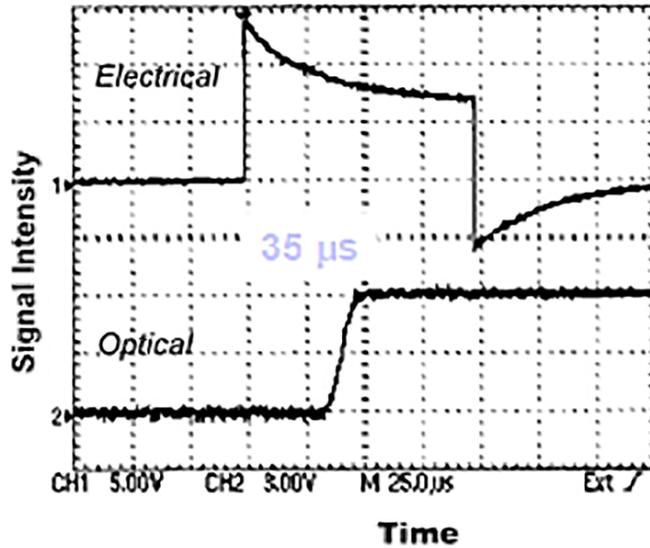
Typical Switching Response

Typical Loss Change of 1x2 vs Switching Numbers
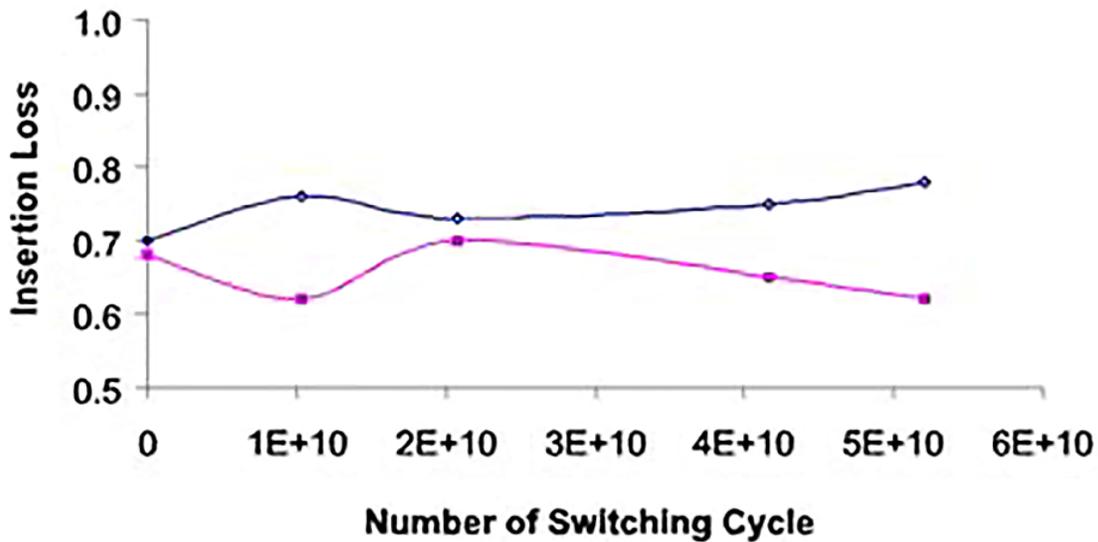
Driver Design Example for 1x4

A recommended +5VDC powered driving circuit is provided. The resistor network R1~R8 is to suppress the driving signal's voltage level to meet the "switch voltage" requirements. In specific applications, users can use lower voltage to eliminate the R1~R8. The Q1~Q8 is the control signal from either a function generator or a microcontroller general purpose I/O. The Q1-Q8 switching speed must meet the specific MOSFET switching requirement and CL 1x4 Switch specific requirement. Usually, the control signal speed is ≤ 2kHz.
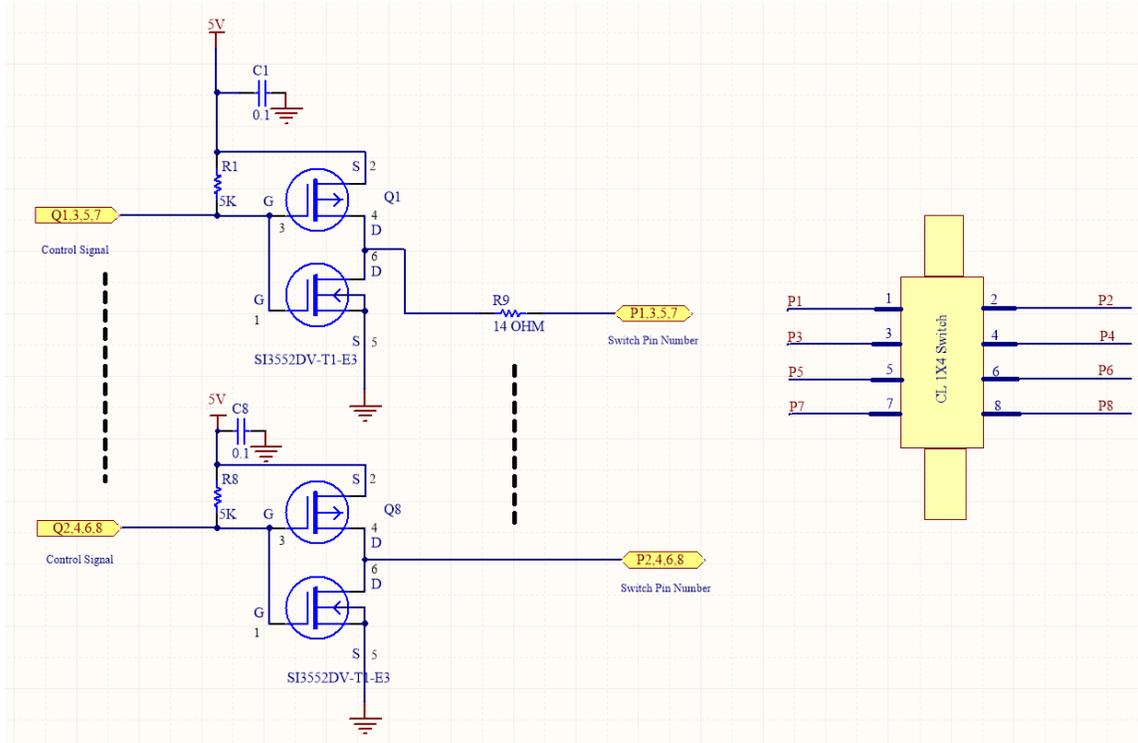
Usually, a clean power supply source will be sufficient. However, decoupling capacitors for the transistor supply rail are recommended depending on different applications. Minimum the current loop on the switching circuits will minimize the switching noise. For other layout recommendations, please refer to books or application notes from the IC manufacturer.