Application Note

SecurLAN® Optical Cutoff Switch Installation

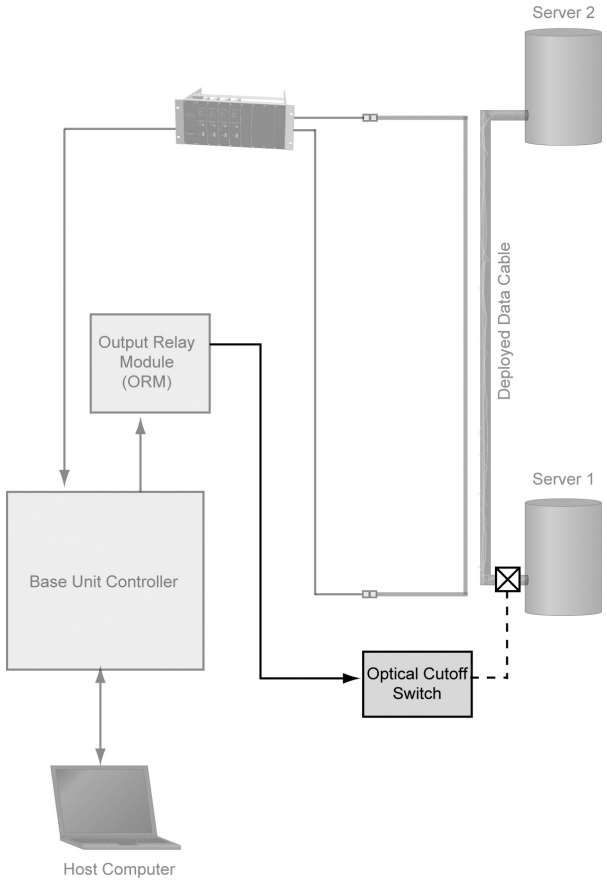
SUMMARY

Connected to the SecurLAN system, the Optical Cutoff Switch option enables the system or the operator to take protective action in the event an intrusion attempt is detected at the physical level of a network's infrastructure. Unlike older versions of the hardware, the new Optical Cutoff Switch is not only capable of disrupting the flow of data through the compromised cable, but certain configurations of the switch are also capable of re-routing data to a secured cable.

INTRODUCTION

The SecurLAN® Optical Cutoff Switch is an option that enables the SecurLAN system to take protective action in the event an intrusion attempt is detected at a protected network data cable (a network configuration known as a Protected Distribution System or PDS). Depending upon its configuration, the Optical Cutoff Switch is able to either halt the flow of data or re-route it to another cable.

Figure 1 - The SecurLAN System Block Diagram



The Optical Cutoff Switch connects to the system through the Output Relay Module (ORM). Alternatively, the Optical Cutoff Switch is capable of connecting to the Base Unit Controller directly provided the Base Unit Controller's port is configured as a "General Purpose I/O Port."

Description

The Optical Cutoff Switch is compatible with either 1310/1550 nm single-mode or 850/1300 nm multimode optical networks, depending upon which option is ordered.

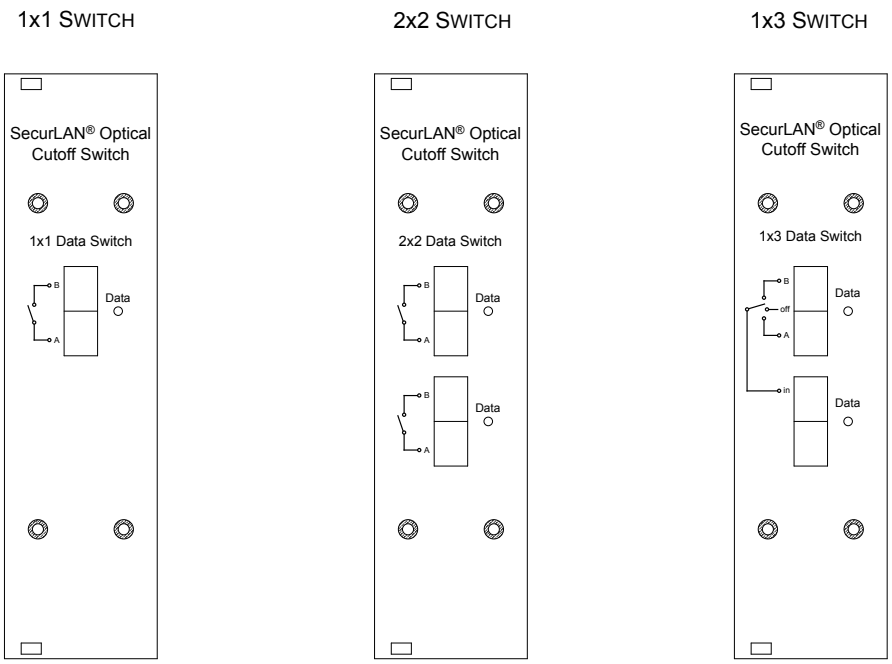
Figure 2 - The Optical Cutoff Switch

Optical Cutoff Switch configurations

The Optical Cutoff Switch has 3 general configurations:

- A 1x1 switch with one pair of direct input-to-output ports
- A 2x2 switch with a dual pair of direct input-to-output ports
- A 1x3 switch with an input port connecting to one of 3 output positions ("Port A," "Port B,", or "Off")

Figure 3 - Optical Cutoff Switch Configuration Options



Compatible connector types

Each optical port is made to accept input from SC or ST-type connectors - specify connector type when ordering.

A tri-color LED next to each optical port indicates the status of data flowing through the port:

Table 1 - Status LED States

LED Color	Indication
Green	Data is transmitting through the primary port OK
Red	No data is transmitting
Amber	Data is transmitting through the alternate port OK

Status LEDs

The Optical Cutoff Switch comes with a front panel designed to facilitate mounting in our 4 U, 19-inch instrument rack, RK-210. The front panel measures 1.78 inches across and 6.82 inches tall. Two captive screws in the upper and lower left-hand corners allow the user to mount the Optical Cutoff Switch in the instrument rack.

A 5-pin terminal block mounted on the rear panel of the Optical Cutoff Switch has connection points for external power as well as input from the SecurLAN system.

Table 2 - Optical Cutoff Switch Rear Panel Pinout

Pin	Description
1	+6 - 15 VDC input power
2	Ground
3	Input 1 (not used)
4	Input 2 (1 x 3 configuration only)
5	Input 3

Rear panel pinout

Input power to the Optical Cutoff Switch is limited to 6-15 VDC, 10 mA. If input voltage drops below 6 VDC, the normally-closed Optical Cutoff Switch opens, disrupting the optical data flow. Input voltage over the 15 volt limit damages the switch.

Note: *If the 15 volt maximum limit is exceeded, the status LEDs blink rapidly to warn the user.*

Input voltage limit

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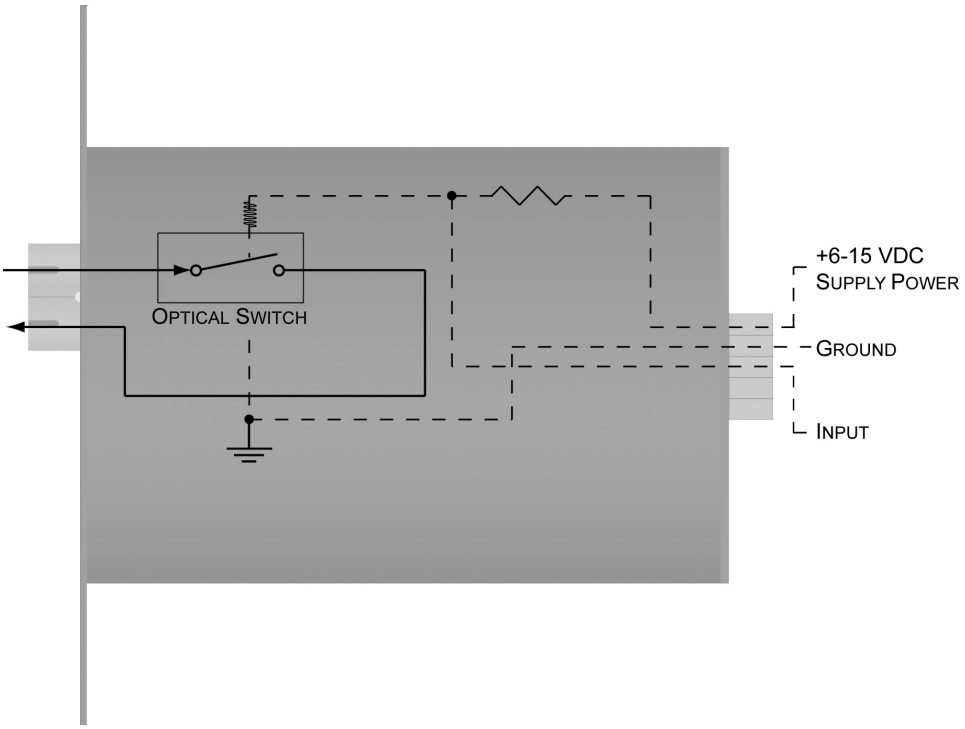
Operating Principles

The Optical Cutoff Switch is designed to pass optical data from the input connector to the output connector on its front panel. Inside the Optical Cutoff Switch, the optical path from the input to the output connector is interrupted only by an internal optical switch. When +6-15 VDC power is applied to the Optical Cutoff Switch, the internal switch is in the “closed circuit” position and data is allowed to pass through uninhibited.

Figure 2 - Inside the Optical Cutoff Switch



Operating the switch

With the Optical Cutoff Switch connected properly to the SecurLAN system, an alarm condition causes a relay to close in either the ORM or the Base Unit Controller, placing a ground on the Input pin on the rear panel of the Optical Cutoff Switch. Placing a ground on this pin shunts power away from the internal optical switch, causing the internal switch to open and halt the flow of data.

When powered, the Optical Cutoff Switch operates according to the description in Table 3.

Normal operating states

Table 3 - Normal Operating Positions of the Optical Cutoff Switch

LED Color	Normal (Powered) State	Unpowered State
1 x 1	Closed	Open
2 x 2	Both switches closed	Both switches open
1 x 3	Port A	Off

Operation

This section outlines steps for connecting and operating the Optical Cutoff Switch with the SecurLAN system.

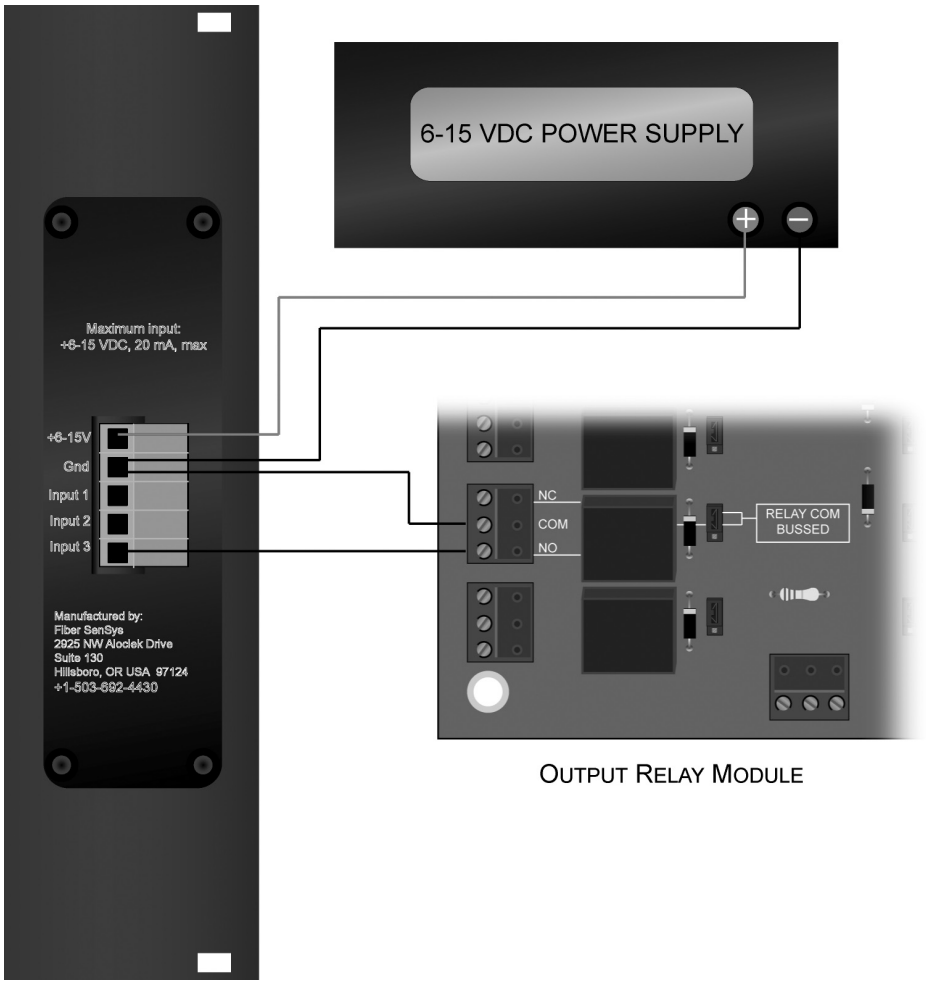
Connecting to the Output Relay Module (ORM)

To connect the Optical Cutoff Switch to the ORM:

1. Connect +6-15 VDC from an external power supply to Pin 1 of the Optical Cutoff Switch.
2. Connect the negative lead of the power supply to Pin 2 of the Optical Cutoff Switch.
3. Select a relay on the ORM to use for activating the Optical Cutoff Switch. Keeping track of the relay number, connect the common pin ("COM") of the ORM relay to Pin 2 (ground) of the Optical Cutoff Switch.
4. Connect the normally-open pin of the ORM to **Pin 5 ("Input 3")** of the Optical Cutoff Switch.

Optical Cutoff Switch connection points

Figure 3 - Wiring up the Optical Cutoff Switch



Output Relay Module

5. For 1x3 Optical Cutoff Switches, repeat Steps 3 and 4, connecting a second relay on the ORM to Pin 4 of the Optical Cutoff Switch ("Input 2"). This second relay is then used to move the internal switch between Port A, Port B, and the Off position in accordance with Table 4.

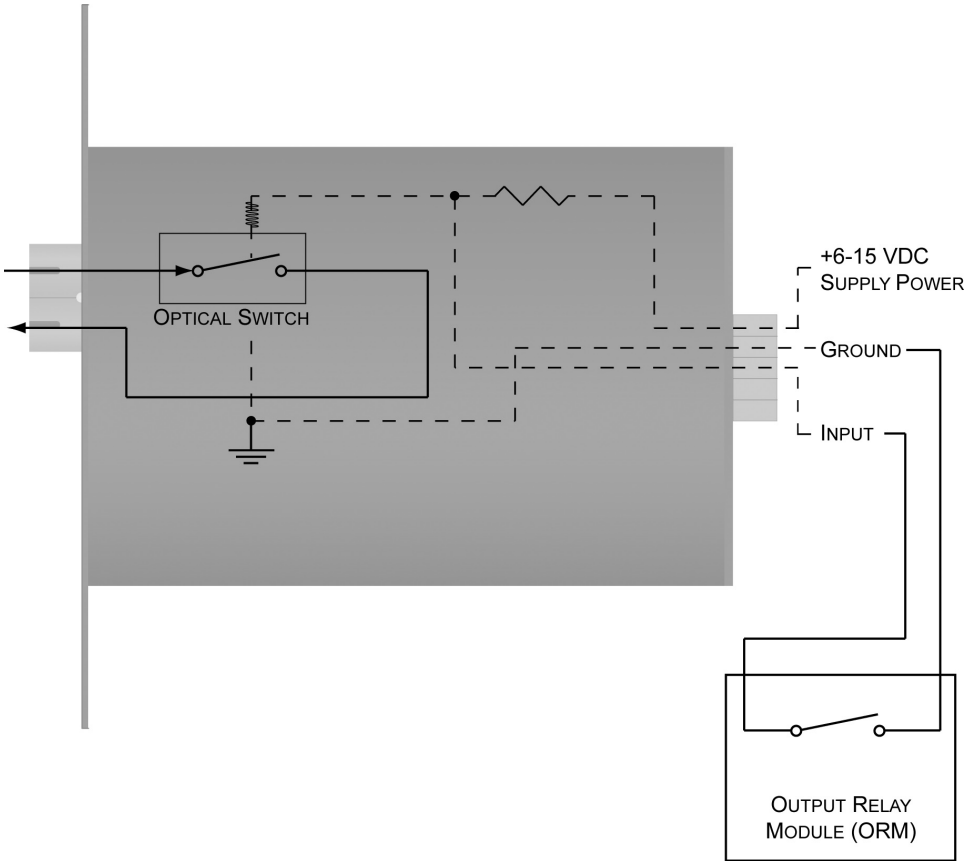
Table 4 - Optical Cutoff Switch Input Truth Table

	Input 3	**Input 2**	**Switch State**
1x1	High	(disconnected)	Closed
	Ground	(disconnected)	Open
2x2	High	(disconnected)	Closed (both)
	Ground	(disconnected)	Open (both)
1x3	High	High	Port A
	Ground	High	Port B
	High	**Ground**	Port A
	Ground	**Ground**	Off

Maximum wiring distance

The maximum wiring distance between the power supply and the Optical Cutoff Switch is 15 meters (50 feet) assuming 22 AWG, 8 conductor, shielded cable is used. Once completed, the Optical Cutoff Switch is connected to the system as shown in Figure 4.

Figure 4 - Optical Cutoff Switch Wiring Diagram



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For more information on installing and using the Optical Cutoff Switch option with the SecurLAN system, please contact Fiber SenSys' sales or technical support team directly at +1-503-692-4430 or by email at info@fibersensys.com.

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