



# OPTICAL SWITCHING APPLICATIONS IN VIDEO PRODUCTION AND BROADCAST

**THE TRINITY™ FAMILY OF ALL-OPTICAL VIDEO ROUTING SWITCHES IS DESIGNED TO MEET THE NEEDS FOR THE VIDEO TRANSPORT, BROADCAST, INTELLIGENCE AND VIDEO POST-PRODUCTION INDUSTRIES. THROUGH ITS ALL-OPTICAL NATURE, TRINITY EXPANDS THE CAPABILITIES OF TODAY'S BROADCAST INFRASTRUCTURE TO MEET THE NEEDS OF EXISTING & FUTURE BROADCAST STANDARDS.**

## Key Optical Switch Features

- Non-blocking matrix switches from 4x4 up to 96x96
- Protocol and data rate agnostic up to 100Gbps and beyond
- Supports all video & audio formats: AES signals, SMPTE-276M, SMPTE-259M, 292M, ASI/DVB, NTSC, PAL, QAM
- Ultra-low insertion loss and superior optical specifications
- Available in symmetric NxN and asymmetric MxN configurations
- Near-zero signal latency
- Dark fiber switching allows setting up switch paths without optical traffic
- Fully bi-directional optics
- Supports single, mixed and multi-wavelength—TDM, CWDM and DWDM
- Optional Optical Power Meters offering real time signal monitoring
- Seamless interface with today's video infrastructure
- Eco-friendly low power consumption

## INTRODUCTION

The major driver for optical switching in video is the growth of fiber in the broadcast plant and the high bandwidth requirements of uncompressed HDTV signals. Polatis' Trinity all-optical routing switch provides remote control and management of high bandwidth audio, video and data signals for broadcast, post production, outside broadcast and satellite applications. Trinity enables routing of intra- or inter-facility fiber in high-definition video networks and are available sizes from 4x4 up to 96x96 ports to suit a wide range of applications. Figure 1 shows a 16x16 Trinity optical switch. The all-optical switch core has no Optical-to-Electrical-to-Optical (OEO) conversions which enable protocol independent switching of all data rates and video formats. This assures maximum flexibility as Trinity works with all existing and emerging video standards and you will not need to replace the switch when the transmission format is upgraded. The optics are fully bi-directional and can be used with single channel or multi-wavelength CWDM and DWDM video formats.

## APPLICATIONS

### Asymmetrical Tie-Lines

In many situations numerous fiber video sources are connected to broadcast centers or outdoor broadcast trucks by a limited number of fibers. In the broadcast center, the optical signals are converted to copper based video. With Polatis' Trinity switch, you can now remotely connect the sources in the field to the processing equipment in the broadcast center. Unlike OEO switches Trinity is protocol independent and isn't limited by specific data rates or signal



FIGURE 1: A 16x16 Trinity All-Optical Video Switch front and back views

types. Today, the connectivity is made by sending an engineer to the venue and making a manual patch. As well as the cost in manpower and lost production time while connections are changed, manual patching also reduces the quality of the optical signal by repetitive connections.

One typical example is outside broadcast for a golf course as shown in Figure 2. Typically the cameras are stationed strategically to cover the golf course or other places of interest. However there aren't an equal number of fibers coming from the field as there are going to the outdoor broadcast trucks. Many camera positions are required but relatively few are needed at the same time. Using Trinity, an optical switch can be placed in the field as an aggregation point for all the camera sources. This allows engineers in the broadcast truck to remotely and quickly access all the camera sources via the limited number of optical fibers available.

A similar example is tying large buildings to the broadcast center. As in the golf course example, there are more camera sources than connecting fiber. Using the Trinity switch, operators can remotely access all the sources without having to

## Applications

- Inter-facility tie lines
- Remote fiber switching
- Line protection
- High density port switching via CWDM or DWDM
- Satellite uplink management
- High performance RF-over-Fiber applications
- Mobile production vans
- Management of cable head-end fiber trunks
- Secure communications or video networks
- Sharing expensive post-processing equipment

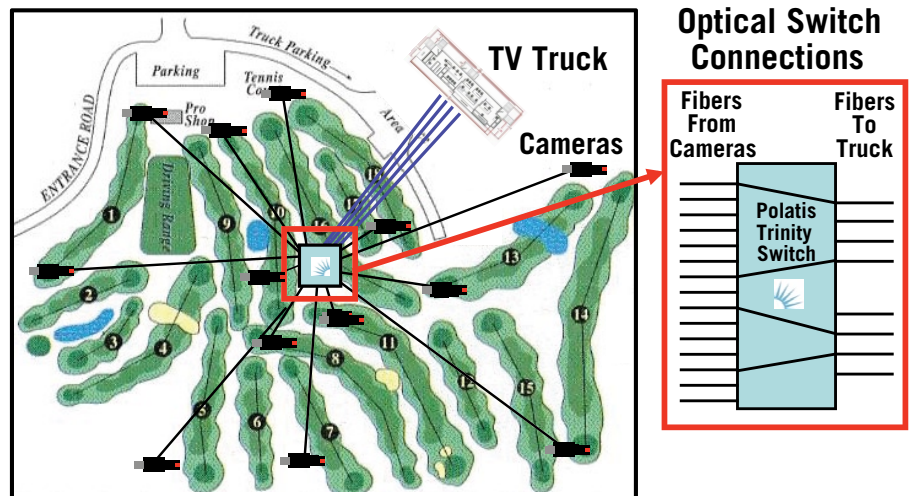


FIGURE 2: Golf course tie-line example connecting many cameras via a limited number of fibers



send an operator to manually make an optical patch. The engineers can remotely and quickly set up the day's shot lowering their manpower costs and giving extra level of flexibility for dynamic situations.

### Multiple Wavelengths and Bi-directional Traffic

Many broadcast installations have multiple signal types originating from a camera position (video, audio and intercom) to the broadcast center. In addition, the broadcast center may transmit intercom and data signals to the camera position. This is often accomplished using coarse wave division multiplexing (CWDM) technology where many optical signals transmitted on a single fiber. Trinity's format independence and low reflectivity allows the switch to work seamlessly with CWDM technology allowing multiple CWDM and bidirectional signals connecting the two sites to be switched using a single fiber input and output port. This is a significant advantage over OEO routers. Using OEO routers, the broadcaster needs to dedicate a port for each wavelength and transmit direction. So in the above case, three or more ports would be needed rather than just one using Trinity.

### Further Benefits of Optical Switching

Routing via optical fiber offers many benefits when compared to coax cable.

Optical fiber permits transmission over far greater distances than coaxial cable and has much lower cross-talk and signal distortion. All-optical switching enables the signal to be routed with universal fiber interfaces capable of handling virtually any audio and video signal, whether analog or digital. The Trinity series supports virtually all protocols and feed rates—AES, SMPTE-276M, 259M, and 292M, ASI/DVB, NTSC, PAL, QAM, and others.

### CONCLUSIONS

The Trinity all-optical video routing switch from Polaris provides an unprecedented ability to control and manage high bandwidth video and audio signals for a wide range of broadcast applications. Polaris switches are currently deployed in numerous video switching applications such as the US White House, and government systems for satellite uplink and secure video routing. Trinity expands the capabilities of today's broadcast infrastructure to meet the needs of existing & future video standards.

To find out more about how Polaris Trinity can help solve your toughest video routing projects please call to schedule a consultation or visit our web site at: <http://www.polaris.com/products/index.asp>.



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