

Analog To IP Upgrade Product Solutions
Video / Up the Coax Control / Contact Closure

Scope:

This application note illustrates several approaches to migrate/ upgrade from a CCTV analog fiber system to IP fiber system maintaining as much of the infrastructure as possible. The example used is for an AFI Series 1690 Analog Video / Up the Coax Control / Contact Closure application but is appropriate for many other AFI video / PTZ bi-directional products.

Example 1: (see Example 1 Diagram)

The DVR/Matrix is replaced with a Network Server and Video Management Software (VMS) which will collectively act as a virtual matrix switch. AFI's VMS platform is Pilot.

The RRM-46 Ethernet media convertor rack cards replace the RRM-1690 rack cards thereby utilizing the existing sub racks and power supplies. The MTM-46-PoE mini-switch module will replace the MTM-1690 modules and also provide PoE power to the IP Camera.

The MTM-46-PoE mini-switch has a second 10/100Base-TX Ethernet Port available. This may be utilized to connect to an AFI Series N-TAH Ethernet Appliance. The N-TAH is an IP based environmental monitoring device which monitors temperature, humidity, and air flow and has two contact inputs and two auxiliary (relay) outputs. The contacts I/O replace the contact function originally provided by the MTM-1690.

Although the IP camera may have contact I/Os available, the upgrade installation may be significantly simplified utilizing the N-TAH. The N-TAH contact I/Os directly replace the original MTM-1690 contacts leaving the existing wiring intact. The N-TAH also adds the benefit of remotely monitoring environmental at the installation site.

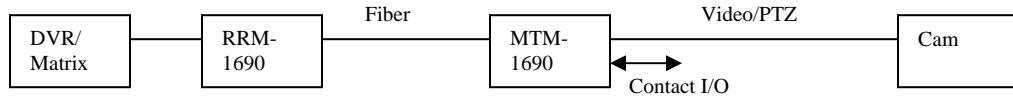
AFI's Pilot VMS system directly supports the AFI Net I/O products. If another VMS system is utilized, a Net I/O API is available to support development of the Net I/O drivers.



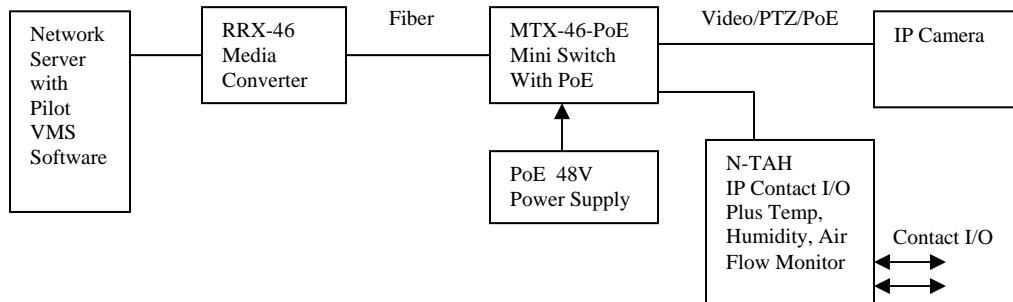
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Example 1 Upgrade to IP – AFI Series 1690 Video / Up the Coax / Contact Closure

Analog Solution



IP Upgrade Approach



Example 2:

The example 2 diagram illustrates an upgrade that utilizes both AFI 3 port (Series 46) and 6 port (Series MX-6p) mini-switches / media converters. The Series 46 has 2 available camera ports and the Series MX-6p has 4 available camera ports thus enabling adding additional IP cameras while still using the existing fibers. In this case, contacts would need to be provided by the IP cameras.

Both series provide POE powering options to the cameras (802.3af, 802.3at, and HP). The HP PoE option provides 60 watts of PoE power and was developed especially for the Axis Series 6032 environmentally hardened line of cameras.

The AFI Series 50 is a rack card 4 port (2 fiber / 2 copper) mini-switch / media converter. These are utilized at the central hub location where all the fiber lines are consolidated. The Series 50 units provide an extremely efficient collection of the IP cameras.

The AFI Series 50 two port copper Ethernet connections may be daisy chained across the back of the sub-rack. This enables the collective Series 50 rackcards to operate as a “virtual switch”.

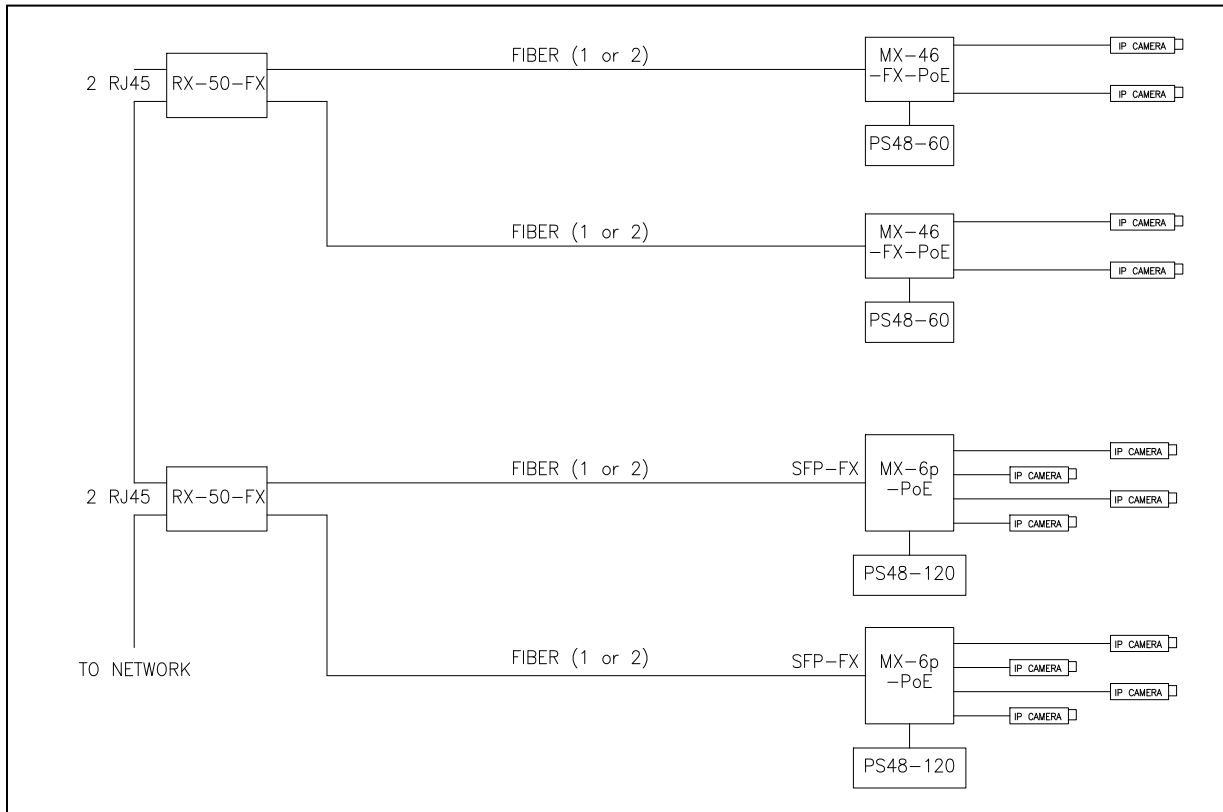
The Series 50 units have (2) 100 Base-FX optical ports and (2) copper 10/100/1000Base-T (triple speed) UTP ports. Each of the Series 50 optical ports are connected to an AFI Series 46 or MX-6p module which has (2 or 4) copper 10/100 Base-TX UTP ports.

Therefore, each RX-50 rack card supports (4 or 8) cameras networked onto each of the RX-50 UTP ports. The bandwidth or cumulative data rate out of each RX-50 cards is ~ the sum of the data rates for the (4 or 8) cameras. Typically each camera’s IP data rate is under 5 Mbs.

The AFI sub-rack can accommodate up to 14 RX-50 rack cards. Therefore, the maximum number of cameras that may be networked in the “RX-50 virtual switch” is 56 using the MX-46 or 112 using the MX-6p units respectively. This final port (shown lower left) is connected to a 1000Base-T port of a network switch. The final data rate on this port would be the sum of all the individual cameras data rate plus overhead.

To protect against the failure of 1 switch card dropping all the ports behind this card, a redundant 1000 Base-T network connection is available to be connected to the network switch (shown top left). However, the network switch does need to be setup in either an STP or RSTP mode to prevent a network looping issue.

Example 2 Upgrade to IP – AFI Series 1690 Video / Up the Coax / Contact Closure



Example 3

The example 3 diagram illustrates an application that utilizes both AFI 3 port (Series 46) and 6 port (Series CX-6p) mini-switches / media converters. This is similar to example 2 except the CX-6p provides several additional features. In addition to providing a 6 port PoE switch (2 optical SFP, 4 copper), the CX-6p includes 4 contact I/Os, 2 USB probe ports, and an RS232 configuration / data channel.

The contact inputs may be setup under user control for supervised or unsupervised operation. The 2 USB probe ports support AFI's environmental P-TAH and P-VFP probes. The P-TAH monitors temperature, airflow, and humidity. Line voltage, frequency and power are be monitored with the P-VFP probe. These probes and contacts are managed with AFI's Pilot software.

The N-664 provides an alternative hardwired contact I/O at the hub. This may be advantageous if the contact I/O management is handled independently of the video. The N-664 would then allow the contact interface at the hub to remain intact thus utilizing the existing infrastructure.

Example 3 Upgrade to IP – AFI Series 1690 Video / Up the Coax / Contact Closure

