FIBER OPTIC CCTV TRANSMISSION SYSTEM

The sole purpose of the fiber optic link in a CCTV fiber optic transmission systems is to transfer electrical signals between two remotely separated points, A and B, with no degradation in the transmitted signal quality. In this way the fibre optic link becomes transparent to the user. An analogous situation is with a telephone call where you want to be able to talk to another person anywhere as though they were standing next to you.

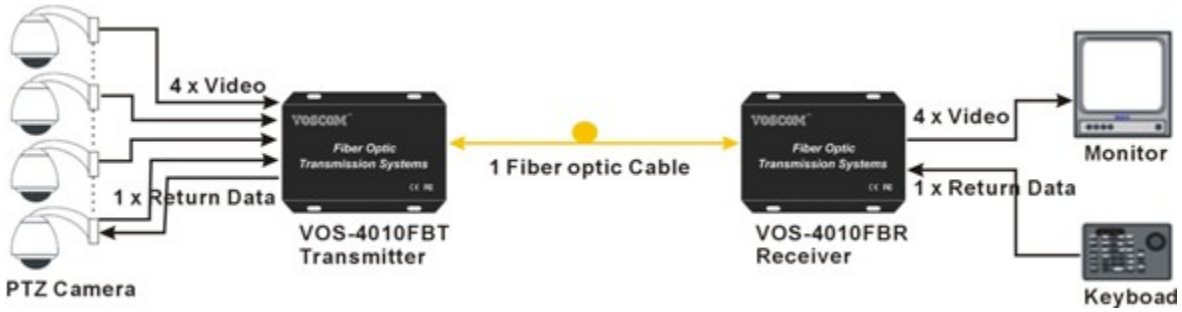
The basic components of a CCTV fibre optic transmission system are as follows:

· Electrical to Optical Converter (Transmitter) at the camera end of the link. This unit takes the analogue 1 v peak to peak signal from the surveillance camera and converts it into a light signal that varies in proportion to the camera output signal. The light signal is generated by an LED (light emitting diode) or laser transmitter which is designed to couple a maximum of the generated light into an optical fibre.

· The optical transmission fiber and fiber optic cable. The optical fibre guides the light from the LED or laser transmitter with a minimum of loss to the monitor or matrix controller end of the link. The optical fibre itself is protected by a variety of sheathing materials to provide a cable construction appropriate to the specific application. The fibre cable is connected to the terminal equipment using de-mountable screw or bayonet fixing connectors.

· Optical to Electrical Converter (Receiver) at the monitor end of the link. This unit takes the optical signal from the optical fibre and converts it into an analogue electrical signal that is compatible with the monitor input requirements. The light to electrical conversion is carried out by a semiconductor detector which is called a photodiode, or an avalanche photodiode. Subsequent electronic circuitry regenerates the output signal. Products from the better quality manufacturers compensate for optical fibre losses and transmitter output intensity variation with time and temperature by providing automatic gain control to give a standard 1 v peak to peak output format as generated at the camera output.

· Control data and audio connections. Cameras in CCTV installations are either fixed, viewing a specific scene, or movable, so that different scenes can be viewed under the direction of the operator who would be sited in the remote control room. In the case of fixed cameras then the fibre optic link is required to transmit video only information from the camera to monitor, this requires only a single fibre link for each camera to monitor path. In the case of a movable camera then a return signal must be provided from the control room to the camera usually over a second optical fibre. It is usual for these return control links to provide remote control of the camera PTZ – pan, tilt and zoom functions plus camera enclosure wash/wipe activation.



If camera control is used then the fibre optic link interface electronics must be compatible with the protocols used by the controller manufacturer. These functions are transmitted over the return fibre link using a standard digital transmission format such as RS232, RS485/422, 20 mA current loop and most recently Echelon Lonworks FTT10A. In addition some controller manufacturers require a return data channel from the camera to confirm camera movement. This return data is usually encoded by the camera optical transmitter electronics and sent over the same fibre as the video signal.

Help point and door entry installations require the transmission of two-way audio signals over the fibre link. Again optical transmitter and receiver units are available to provide this facility in addition to the video and control data links all over the same two fibres. It is also possible to provide all of these video, data and audio transmission functions over one fibre using different wavelength (colour) lights sources to transmit light in each direction. This technique is known as wavelength division multiplexing; it maximises the use of installed fibre cores but at the expense of more costly fiber optic transmitters and fiber optic receivers.

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