

## Using Fiber Optic Contact Closure Systems In Fire Alarm Applications

The use of fiber optic data transmission technology is well known in telecommunications, local area networks, the closed circuit TV security marketplace and in many intelligent transportation system (ITS) highway projects. Even CATV (cable) distribution to various local feed points within a residential community is now routinely accomplished over fiber. There is also an ideal application for fiber optic cable for fire alarm interconnection systems however that warrants looking into.

When a fire alarm is activated, either at the start of a fire or during an actual event, conventional copper conductor wires can easily short circuit as their insulation burns or melts with the result that a critical alarm signal would not be transmitted or would be cut off. A similar occurrence can happen when the interconnecting wires get wet due to floods or become immersed in excessive water after the fire department comes on the scene. Fiber optic cables can solve both of these problems.

Like copper wire fiber optic cable is available in many physical variations. There are single and multiple conductor constructions, aerial and direct burial styles, plenum and riser cables and even ultra-rugged military type tactical cables that will withstand severe mechanical abuse. The decision of which of these to use will obviously depend on the specific requirements of the actual installation. Regardless of the final cable chosen however, it is important to realize that the optical fiber conductors contained within the cable are made of glass and the carrier of information within the actual fiber is light. Furthermore the light within a fiber is "trapped", not by insulation but by the nature of the fiber itself. As long as the actual fiber is physically intact the light will remain in the fiber even if it is in direct contact with other fibers (such as in a multi fiber cable) or totally immersed in water (or for that matter most corrosive liquids) since glass is basically inert to almost all common fluids. To take advantage of these features requires an optical transmitter and a companion optical receiver to interface with the fiber.

Figure 1 is a picture of the **Litelink**<sup>®</sup> CT/CR-7204 fiber optic contact closure transmission system. This system consists of the CT-7204 transmitter and CR-7204 receiver and utilizes digital encoding techniques to transmit and receive four separate contact closures by means of modulated light over a single optical fiber conductor. The CT-7204 inputs are activated via a supervised contact closure and the CR-7204 will reproduce these inputs as isolated output contact closures corresponding to the respective input signal. As shown in figure 2, two common resistors are connected to each input contact with the result that

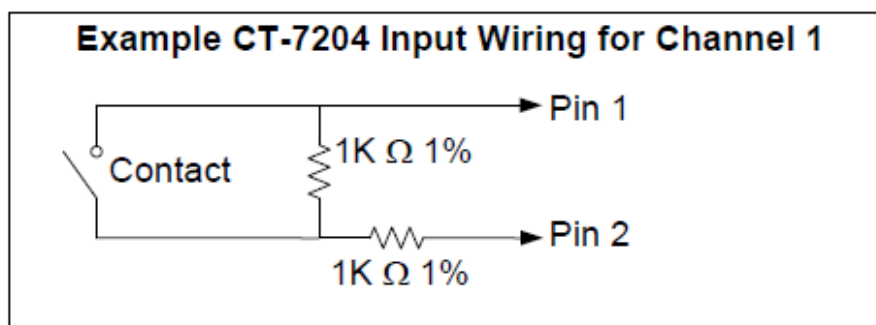
the system must see a specific input impedance in order for a contact to be recognized. Open or shorted contacts will not trigger the transmitter. The system is also completely fail-safe in that a loss of operating power at the transmitter or a broken interconnecting fiber will cause the contacts at the receiver to remain in their last known position, an integral alarm indicator will come on and an alarm (trouble) relay will close. This alarm relay can be used to control external alarms.

All inputs are transient protected against excessive surges present on the signal and power leads and additional integral indicators are provided on both units to continuously indicate the validity of the link and contact closure status as well as proper operating power thereby making system troubleshooting simple.

The CT/CR-7204 system is manufactured and patented in the U.S.A.



**Figure 1, Fiber Optic Supervised Contact Closure Transmitter**  
Note that the receiver unit looks basically the same



**Figure 2, Supervised Contact Connections are Shown Above**

For more information on this system please contact **Liteway Inc.** at 516-931-2800 or at [sales2@liteway.com](mailto:sales2@liteway.com).