Quintron Interfacing

01/07/00

All Platforms

All firmware versions

Generic Digital Input Interfacing Procedures

There are essentially four digital input interfacing scenarios that may be encountered when monitoring with the ProTeks. The four scenarios, and their suggested interfacing techniques follow.

Contact closure

This is the standard situation, in which the equipment to be monitored supplies a dry contact closure in response to the monitored parameter. The ProTek expects to see the contacts connected to the digital input and its associated return. With the contact closed, the ProTeks internal 5V pull-up is brought low and the ProTek responds appropriately. If the relay closure in fact switches a voltage, then one of the following situations will occur.

A positive voltage is supplied when active

If a voltage of approximately 3V to 30V DC is presented to the ProTek input when active the following modification must be done to the affected input:

Remove the internal 5V pull up voltage. On the ProTek jr+ Rev B, the pull up may be defeated by removing the appropriate pull up defeat jumper. On all other ProTeks, the specific lead of the resistor pack that supplies the pull up voltage to the affected input may be disconnected as indicated in the chart below.

Jumper the series input protection diode.

If a voltage in excess of 30V is expected the series resistor may be increased in value as indicated by the formula xxxxxxxxxxxx.

Set the input Active Level on the input configuration screen to H.

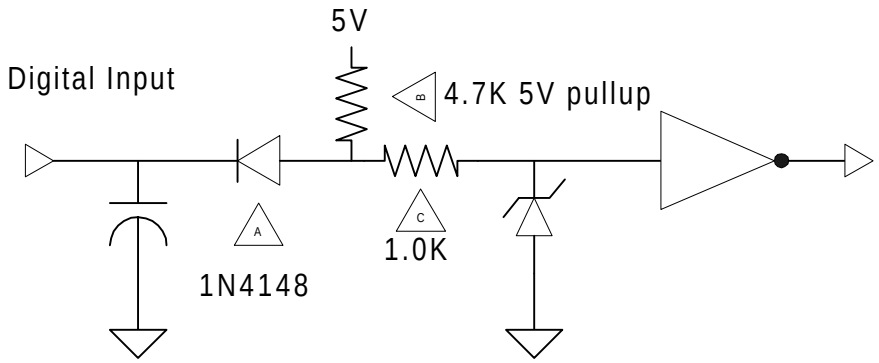
A negative voltage is supplied when active

If a voltage of approximately 0V to -16V DC is presented to the ProTek input when active the following modification must be done to the affected input:

Replace the series input protection diode with a resistor of appropriate value as indicted by the formula xxxxxxxxxxx. Do not defeat the internal pull up.

Set the input Active Level on the input configuration screen to H.

Digital Input Modifications



Quintron Interfacing

Digital Inputs Monitoring of the PTT

We have had reports of inconsistent response by the ProTek digital inputs to Quintron's PTT line. The ProTek may inconsistently sense the PTT line such as provided by the Quintron 250S.

As you know, any TTL compliant data system requires a logic low that is by definition no greater than 0.8VDC. Unfortunately, the PTT access point frequently used when interfacing to a Quintron does not supply this level when the key line is active and there must be a "translation" of levels between the Quintron and the ProTek for consistent results.

The best way to understand the ProTek digital input operation is to notice that rather than sensing the existence of a logic low, the ProTek in fact senses the absence of a logic high. This is because the digital input is pulled high by an internal 5V pull-up voltage supplied through a 4.7k ohm resistor and is looking for an external relay contact closure to pull this voltage to near 0V. This allows the user to connect a digital input across the normally open contacts of an external relay and sense its closure without needing to externally supply a pull-up voltage to the relay. A relay insures maximum isolation between the ProTek and the monitored device, thereby reducing the potential for ground differential or induced surge damage.

The "PTT" frequently used when interfacing to the Quintron, however, often does not consistently supply a logic low but rather a voltage which may not reach the 0.8V threshold due to variations in component specs, temperature, and possible interaction with the ProTek's internal 5V pull-up. We have found that removing our internal 5V pull-up may restore proper sensing, but that driving a small external SPST NO relay with the PTT line is more reliable. While the actual circuitry used by the Quintrons may vary it seems that this is a common complaint with many of the models routinely encountered.

Relay Driver Switching of the PTT

We have also had reports of Quintrons hanging in transmit after the PTT has been temporarily forced by a ProTek relay driver activation. We understand that on some Quintrons, there is approximately 30VDC on the low side of the relay coil when its series switching FET turns off. It is therefore possible that the internal counter-EMF suppression supplied by the ULN2803 IC relay driver would sink sufficient current to keep the Quintron relay latched even after the ProTek relay driver has been commanded off. Defeating this suppression should cure the problem.

There are several ways to sample the PTT line on your Micor. Since the 13.8VDC exceeds the input rating of a standard digital channel (-12VDC to +12VDC) and presents a logic HIGH to the input, qualification will require a deviation from standard practice. Several approaches are possible.

1. The most common approach would be to drive an external relay with the 13.8VDC PTT line of the Micor. The relay, when activated by the PTT, would drive the digital input to a logic LOW. This yields the advantages of complete isolation of the Micor from the ProTek and the ability to retain standard ProTek internal 5VDC pull-up.

2. Alternatively, the SIM card can be configured to respond appropriately to the PTT by replacement of the existing 5V pull-up with a pull down to ground and reversal of the series input diode. The printed circuit board itself would not be modified or damaged by the reconfiguration and could be reconfigured to the original specs in about 5 minutes, though light soldering would be required. If all sites will require the same configuration that could be done to order by us and be ready for install upon delivery. Mapping of the SIM inputs would need to be mutually determined before production begins. Conventional inputs could be retained as needed.

3. The PTT can be correctly sensed by a standard analog input that is in turn used to qualify the RF sensor, but analog inputs will already be fully utilized in your completed site installation when using a single SIM.

4. Opto-isolation of the input would provide the same results. The ProTek does have two opto-isolated digital inputs available at the site interface connector for digital inputs 0D6 and 0D7. One of these inputs could be used to demon strate the functionality immediately. However, it would be preferable to have the qualifiers on the same SIM as the RF sensors and opto-isolation of the SIM inputs would result in increased complexity and reduced robustness.

5. Reversal of polarity of the PTT signal input to the SIM card. This is theoretically possible but may cause problems latter due to the multiplicity of internal returns and grounds possible in the equipment that will be in the same rack.