# Product Specifications

## Remote Extender Module (RXM)

RXMs and chassis allow I/O modules to be located several kilometers from the Main Chassis. RXM sets, consisting of three identical modules, serve as repeaters and extenders of the Tricon I/O bus and provide ground loop isolation. A primary RXM set supports three remote locations by connecting to three remote RXM sets housed in a remote chassis. See "System Configuration" on page 11 regarding configurations that use RXMs.

RXM sets are available for fiber-optic cables with a communication rate of 375 kilobits per second. These sets provide maximum immunity against electro-static and electro-magnetic interference, and support configurations with optical modems and fiber-optic point-to-point cabling. Remote sites can be located as far as 7.5 miles (12 kilometers) from the primary site.

The figure at right shows uni-directional cabling for three channels of a remote location. For each channel, one cable carries data transmitted from the primary RXM to the remote RXM, and the other cable carries data received by the primary RXM from the remote RXM. A pair of modules must be wired for each of the three channels, amounting to a total of six cables for each remote location.
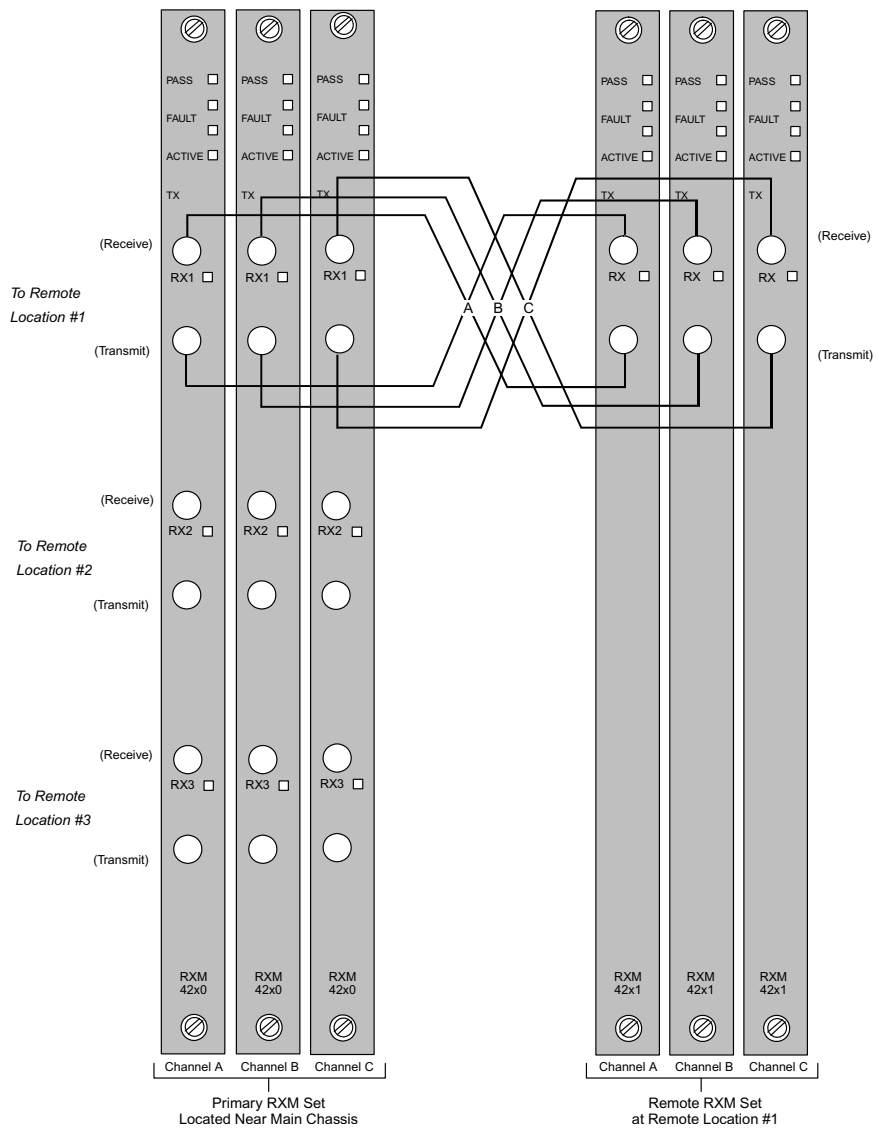


**Sample Wiring for One Remote Location**

*NOTE: The selection and installation of fiber-optic cabling requires specialized knowledge, training and tools. Triconex recommends hiring a fiber-optic specialist to handle these tasks.*

## RXM Specifications

| RXM Model | 4200-3 | 4201-3 | 4210-3 | 4211-3 |
|---|---|---|---|---|
| RXM Chassis Location | Primary | Remote | Primary | Remote |
| Cable Type | Multi-mode | Multi-mode | Single-mode | Single-mode |
| Cable Length Limit | 1.2 miles (2 kilometers) | 1.2 miles (2 kilometers) | 7.5 miles (12 kilometers) | 7.5 miles (12 kilometers) |
| Connectors | 6/remote site | 6 | 6/remote site | 6 |
| Remote Sites Supported | 3 | n/a | 3 | n/a |
| Modem Ports | Fiber Optic with ST connectors | Fiber Optic with ST connectors | Fiber Optic with ST connectors | Fiber Optic with ST connectors |
| Diagnostic Indicators | PASS, FAIL, ACTIVE, TX, RX1, RX2, RX3 | PASS, FAIL, ACTIVE, TX, RX1, RX2, RX3 | PASS, FAIL, ACTIVE, TX, RX1, RX2, RX3 | PASS, FAIL, ACTIVE, TX, RX1, RX2, RX3 |

## TMR Digital Input Modules

Each TMR Digital Input (DI) module has three isolated input channels which independently process all data input to the module. A microprocessor on each channel scans each input point, compiles data, and transmits it to the Main Processors upon demand. Then input data is voted at the Main Processors just prior to processing to ensure the highest integrity. All critical signal paths are 100 percent triplicated for guaranteed safety and maximum availability. Each channel conditions signals independently and provides optical isolation between the field and the Tricon.

All TMR Digital Input Modules sustain complete, ongoing diagnostics for each channel. Failure of any diagnostic on any channel activates the module Fault indicator, which in turn activates the chassis alarm signal. The module Fault indicator points to a channel fault, *not* a module failure. The module is guaranteed to operate properly in the presence of a single fault and may continue to operate properly with certain kinds of multiple faults.

Models 3502E, 3503E, and 3505E can self-test to detect stuck-On conditions where the circuitry cannot tell whether a point has gone to the Off state. Since most safety systems are set up with a

de-energize-to-trip capability, the ability to detect Off points is an important feature. To test for stuck-On inputs, a switch within the input circuitry is closed to allow a zero input (Off) to be read by the optical isolation circuitry. The last data reading is frozen in the I/O communication processor while the test is running.

All TMR Digital Input Modules support hot-spare capability, and require a separate external termination panel (ETP) with a cable interface to the Tricon backplane. Each module is mechanically keyed to prevent improper installation in a configured chassis.

## 32-Point Digital Input Module Specifications

| Model Number | 3501E/3501T | 3502E | 3503E | 3505E |
|---|---|---|---|---|
| Type | TMR | TMR with Self-Test | TMR with Self-Test | TMR, Low Threshold |
| Voltage | 115 VAC/VDC | 48 VAC/VDC | 24 VAC/VDC | 24 VDC |
| Points | 32, non-commoned, isolated | 32, commoned in groups of 8 | 32, commoned in groups of 8 | 32, commoned in groups of 8 |
| AC Range/DC Range | 90-155 VAC/VDC | 35-95 VAC/VDC | 20-42.5 VAC/VDC | 20-42.5 VDC |
| Frequency Range | DC or 47-63 Hz | DC or 47-63 Hz | DC or 47-63 Hz | n/a |
| Maximum Voltage | 155 VAC/VDC | 95 VAC/VDC | 42.5 VAC/VDC | 42.5 VDC |
| Switching Level | | | | |
|   Off to On | > 86 VAC/VDC | > 32 VAC/VDC | > 18 VAC/VDC | > 12 VDC |
|   On to Off | < 28 VAC/VDC | < 11 VAC/VDC | < 6 VAC/VDC | < 4 VDC |
| Nominal Turn-On | 6-9 mA | 6-9 mA | 6-9 mA | 3 mA to 5 mA |
| Typical Hysteresis | 32 VAC/VDC | 7 VAC/VDC | 4 VAC/VDC | 2 VDC |
| Input Delay | | | | |
|   OFF to ON/ON to OFF | < 8 ms/< 15 ms | < 8 ms/< 15 ms | < 8 ms/< 15 ms | < 8 ms/< 15 ms |
| Point Isolation | 1,500 VDC/ 2500 VDC[1] | 1,500 VDC | 1,500 VDC | 1,500 VDC |
| Nominal Input Impedance | > 8.5 KΩ | > 2.9 KΩ | > 1.25 KΩ | > 1.25 KΩ |
| Nominal Field Power Load | | | | |
|   Per On point | 1.5 watts | 1.0 watts | 0.5 watts | 0.5 watts |
|   @ max. field voltage | 2.9 watts | 3.2 watts | 1.5 watts | 1.5 watts |
| Diagnostic Indicators | | | | |
|   Input Status | 1 per point | 1 per point | 1 per point | 1 per point |
|   Module Status | PASS, FAULT, ACTIVE | PASS, FAULT, ACTIVE | PASS, FAULT, ACTIVE | PASS, FAULT, ACTIVE |
| Stuck Test | n/a | On | On | On |
| Color Code | Red | Dark Red | Dark Red | Dark Red |

1. For 3501T.