

# High Speed Self-Healing (Ring) Multi-Drop Fiber Optic Modem

## Model TC2400/2401

- Async Data Rates to 1 Mbps
- Sophisticated Tx/Rx Upstream, Downstream Fault Detection
- Multimode & Single Mode (850/1300/1550nm)
- Distances up to 100km
- Single or Dual RS-232, RS-422 or RS-485 Ports
- Anti-Streaming (Anti-Jabber)
- Built-In Power Redundancy
- Local Dry Contact Alarm Relay
- Rackmount or Standalone



TC2400S Standalone Unit (Shown with ST Fiber Connectors)

Intended for self-healing ring topologies, the TC2400 High Speed Multi-Drop Fiber Optic Modem links monitoring devices (RTUs or PLCs) fitted with RS-232, RS-422 or RS-485 interfaces to a Host controller or CPU.

Asynchronous data rates can be up to 1 Mbps\*. The RS-485 electrical port can be multi-dropped. There are two optional versions (Model TC2400T) for extreme temperature applications (-20°C to 70°C & -40°C to 80°C).

Each unit comes standard with two pair of fiber interfaces and either one RS-232, RS-422 or RS-485 interface. Units with a second RS-232, RS-422, and RS-485 interfaces are optional. "Anti-Streaming" capability is standard. Anti-streaming prevents a single node failure (e.g. "babbling") from bringing down the entire network.

The Self-Healing Ring scheme is sophisticated, i.e. it detects upstream and downstream failures on both Tx and Rx, and automatically re-routes any cable or equipment failure to insure uninterrupted operation.

Diagnostic LEDs are provided for "Tx," "Rx," "Fault," and "Power" and more. Diagnostic functions include local & remote loopback and a built-in signal generator.

The TC2400 is compatible with all popular types and sizes of fiber optic cable and is available multimode (850/1300nm) or single mode (1300/1550nm). Fiber optic connectors are ST or FC. Electrical connectors are RJ-11 female. Power is 12VDC; optional 24VDC, -48VDC, or 115/230VAC with an external power cube.

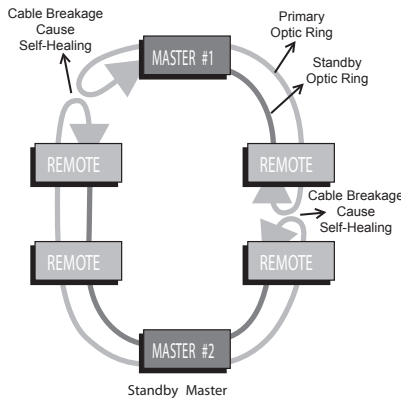
\*Data rates vary according to interface. See specifications.



Renowned for its high reliability, the TC2400 High Speed Multi-Drop Modem is ideal for Self-Healing Ring communication links in SCADA, Traffic Control, Industrial Process Control and security networks. It is frequently used to interconnect Remote Terminal Units (RTUs) or Programmable Logic Controllers (PLCs) in Utility substation SCADA Networks.

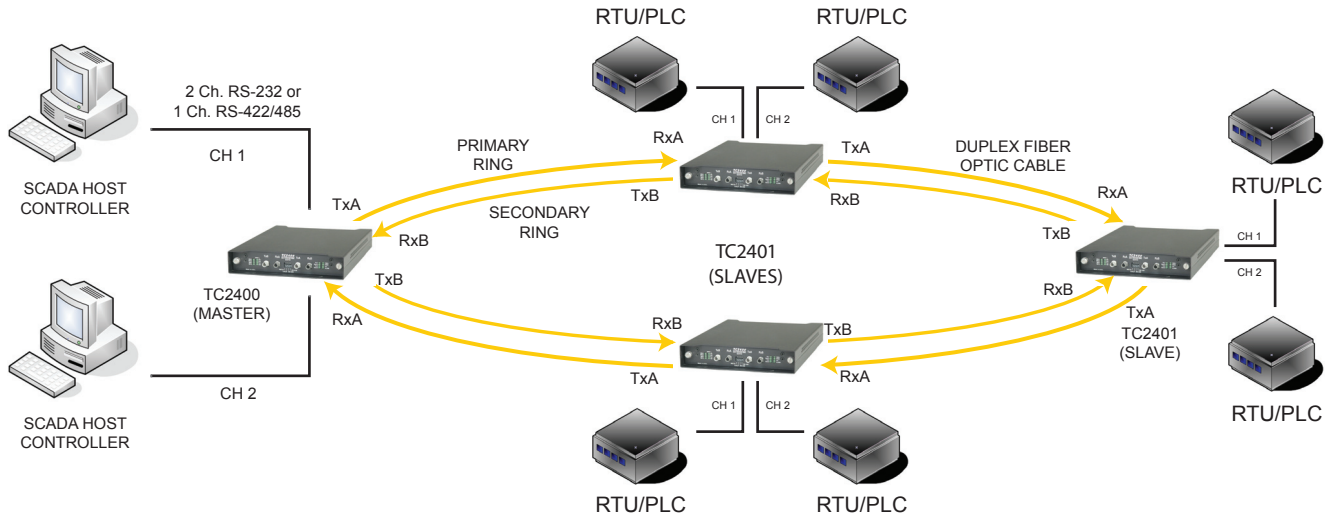
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A Self-Healing ring consists of two data paths, Ring A and Ring B, with each data path running in an opposite direction to the other. Under normal operation only the primary data path (Ring A) is used. When there is a fault (cable or failed device), the data path will turn around before it reaches the fault or failed unit and use the secondary data path to complete the



link. In this manner, the data path will remain intact.

For maximum reliability, the TC2400 is also available in a dual Master version (see diagram at left), providing a back-up Master unit. When a fault condition occurs, the back up Master will start polling the Remote units from the opposite direction. The primary and secondary Master units can be located anywhere on the fiber ring network.



Typical Self-Healing Ring Configuration Using Model TC2400 with Dual SCADA Host Controllers

### Data Rates

Async RS-232 .....up to 120 Kbps  
 Async RS-422/485 "AUX1" port  
 .....up to 1 Mbps  
 Async RS-422/485 "AUX2" port  
 .....up to 256 Kbps

### Optical

Transmitter.....LED/ELED/LASER\*  
 Receiver .....PIN Diode  
 Wavelength  
 .....850/1300nm Multimode  
 .....1300/1550nm Single Mode  
 Fiber Optic Connectors .....ST  
 {trademark of AT&T}; Optional FC  
 Loss Budget\* - 850/1300/1550nm  
 15dB ..... Multimode @62.5/125µm  
 20dB.....Single Mode @9/125µm

### Electrical

Connector.....RJ11 Female  
 Interface .....(DCE or DTE) RS-232,  
 .....RS-422, or RS-485 (2 or 4-wire)

### Diagnostic Functions

.....Local & Remote Loopback,  
 .....Signal Generator, Disable Alarm

### System

Bit Error Rate .....1 in 10<sup>9</sup> or better

### Visual Indicators

.BRD-1, BRD-2, RSP-1, RSP-2, RxA,  
 RxB, Sync-A, Sync-B, Vcc-A, Vcc-B,  
 A2B, B2A, LPA, LPB, PWRA, PWRB

### Alarm

Dry Contact.....Normal OPEN

### Power

Standard .....12VDC @500mA  
 Optional.....24VDC, -48VDC, or  
 .....115/230VAC with power cube

### Temperature

Operating.....-10°C to 50°C  
 Hi-Temp1 (optional) .....-20°C to 70°C  
 Hi-Temp2 (optional) .....-40°C to 80°C  
 Storage.....-40°C to 90°C  
 Humidity.....95% non-condensing

### Physical

Height .....(3.53 cm) 1.4"  
 Width .....(18.10 cm) 7.1"  
 Depth .....(24.80 cm) 9.8"  
 Weight.....(534 gm) 1.2 lbs

\*Contact factory for higher requirements (LASER)



ISO 9001  
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