



4351B

Triconex Copper-Ethernet Tricon Communication Module

Product scope

- Provides four configurable RS-232/RS-485 serial ports and two copper Ethernet ports.
- Uses RJ-45 10/100BaseT network connectors and DB-9 serial connectors.
- Supports Tricon system version 10.3 or later under the documented compatibility rules.
- Maps TriStation, TSAA, Modbus, time synchronization and peer-to-peer services to defined ports.

Manufacturer source

Tricon v9–v11 Systems Planning and Installation Guide, Assembly 9700077-019, June 2014

The enclosed manufacturer pages identify 4351B system compatibility, copper Ethernet and serial interfaces, protocol mapping, slot rules and connector information.

Request a fast quote	Product reference	
Email: info@apterpower.com Phone: +86 18106909650 apter.com/inquiry.php	4351B	

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Communication Modules

This section describes the Communication Modules available for use with Tricon v9-v11 systems.

Table 66 Communication Modules for Tricon Controllers

Model	Module Description	System Version Compatibility
4609	Advanced Communication Module (ACM)	10.x or earlier
4119, 4119A	Enhanced Intelligent Communication Module (EICM)	10.x or earlier
4509	Hiway Interface Module (HIM)	10.x or earlier
4329, 4329G	Network Communication Module (NCM)	10.x or earlier
4409	Safety Manager Module (SMM)	9–11.x
4351, 4352	Tricon Communication Module (TCM)	10.0
4351A, 4352A	Tricon Communication Module (TCM)	10.1–11.x
4351B, 4352B, 4353, 4354	Tricon Communication Module (TCM)	10.3–11.x
4610	Unified Communication Module (UCM)	v11.x

Tricon Communication Module (TCM)

The Tricon Communication Module (TCM), which is compatible with only Tricon v10.0 and later systems, allows the Tricon controller to communicate with TriStation 1131, other Tricon or Trident controllers, Modbus master and slave devices, and external hosts over Ethernet networks.

Each TCM contains four serial ports, two network ports, and one debug port (for Invensys use).

Each serial port is uniquely addressed and can be configured as a Modbus master or slave. Serial port 1 supports either the Modbus or the Trimble GPS interface. Serial port 4 supports either the Modbus or the TriStation interface. Each TCM supports an aggregate data rate of 460.8 kilobits per second, for all four serial ports.

Programs for the Tricon system use variable names as identifiers, but Modbus devices use numeric addresses called *aliases*. Therefore, an alias must be assigned to each Tricon variable name that will be read by, or written to, a Modbus device. An alias is a five-digit number which represents the Modbus message type and the address of the variable in the Tricon system. An alias number is assigned in TriStation.

Any standard Modbus device can communicate with the Tricon controller through the TCM, provided that aliases are assigned to the Tricon variables. Alias numbers must also be used when host computers access the Tricon system through other communication modules, such as the NCM.

Each Tricon system supports a total of 16 Modbus masters or slaves – this total includes network and serial ports.

TCM Models 4353 and 4354 have an embedded OPC server, which allows up to 10 OPC clients to subscribe to data collected by the OPC server. The embedded OPC server supports the Data Access standard and the Alarms and Events standard.

Each TCM contains two network ports – NET 1 and NET 2. Models 4351, 4351A, 4351B, and 4353 have two copper Ethernet ports. Models 4352, 4352A, 4352B, and 4354 have two fiber-optic Ethernet ports. See Table 74 for a list of supported protocols on the TCM network ports.

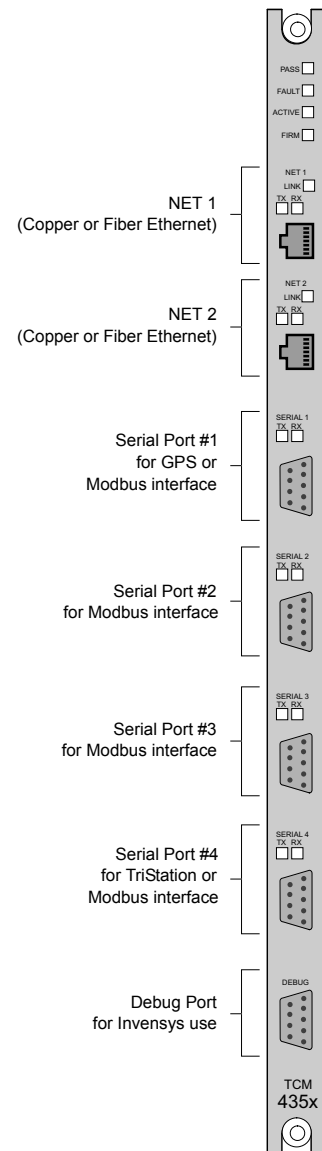


Figure 77 TCM Front Panel

The fiber-optic Ethernet ports on Models 4352, 4352A, 4352B, and 4354 use 1300 nanometer optical transceivers, which are fully compliant with the Optical Performance Requirements of the 100Base-FX version of IEEE 802.3u and ANSI X3.166 - 1990 standards.

A single Tricon v10.x or v11.x system supports a maximum of four TCMs, which must reside in two logical slots located in chassis 1 or chassis 2 only. You cannot install model 4351/4352 TCMs in a system that also has model 4351A/B, 4352A/B, or 4353/4354 TCMs installed, even if they are installed in different chassis.

Additionally, different TCM models cannot be mixed in the same logical slot. Exceptions to this rule are the 4351A/B and 4352A/B modules, where A and B modules with the same model number can be installed in the same slot.

The hot-spare feature is not available for the TCM, though you can replace a faulty TCM while the controller is online.

This table describes TCM model and Tricon system version compatibility.

Table 72 TCM Model and Tricon System Version Compatibility

Tricon System Version	Compatible TCM Models
10.0	4351, 4352
10.1 or later	4351A, 4352A
10.3 or later	4351B, 4352B, 4353, 4354

For complete compatibility information, see the Tricon Product Release Notices available on the Global Customer Support (GCS) center website. For additional information, see the *Communication Guide for Tricon v9-v11 Systems* and *Replacing TCMs* on page 300.

TCM Specifications

This table lists the specifications for TCM Models 4351, 4351A, 4351B, 4352, 4352A, 4352B, 4353, and 4354.

CAUTION

Different TCM models cannot be mixed in the same logical slot. Exceptions to this rule are the 4351A/B and 4352A/B modules, where A and B modules with the same model number can be installed in the same slot.

Table 73 TCM Specifications

Feature	Description										
Serial ports	4, RS-232/RS-485 ports, DB-9 connectors										
Network ports	2, 10/100BaseT Ethernet ports, RJ-45 connectors (Models 4351, 4351A, 4351B, and 4353) 2, fiber-optic mode Ethernet ports, MT-RJ connectors with 62.5/125 um fiber cables (Models 4352, 4352A, 4352B, and 4354)										
Port isolation	500 VDC										
Communication protocols	TriStation, Embedded OPC Server (Models 4353 and 4354), Modbus, Modbus TCP, TCP/IP, SNTP, TSAA (with support for IP Multicast), Trimble GPS, Peer-to-Peer, Triconex Time Synchronization, Jet Direct (network printing)										
Modbus functions supported	<table> <tr> <td>01 – Read Coil Status</td><td>06 – Modify Register Content</td></tr> <tr> <td>02 – Read Input Status</td><td>07 – Read Exception Status</td></tr> <tr> <td>03 – Read Holding Registers</td><td>08 – Loopback Diagnostic Test</td></tr> <tr> <td>04 – Read Input Registers</td><td>15 – Force Multiple Coils</td></tr> <tr> <td>05 – Modify Coil Status</td><td>16 – Preset Multiple Registers</td></tr> </table>	01 – Read Coil Status	06 – Modify Register Content	02 – Read Input Status	07 – Read Exception Status	03 – Read Holding Registers	08 – Loopback Diagnostic Test	04 – Read Input Registers	15 – Force Multiple Coils	05 – Modify Coil Status	16 – Preset Multiple Registers
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04 – Read Input Registers	15 – Force Multiple Coils										
05 – Modify Coil Status	16 – Preset Multiple Registers										
Communication speed	Copper Ethernet ports: 10/100 Mbps (Model 4353 only supports 100 Mbps connections) Fiber Ethernet ports: 100 Mbps Serial ports: up to 115.2 Kbps per port, aggregate data rate of 460.8 Kbps for all four ports										
Status indicators	PASS, FAULT, ACTIVE, FIRM LINK – 1 per network port TX (Transmit) – 1 per port RX (Receive) – 1 per port										
Logic power	< 10 watts										

This table lists the protocols and standards supported on TCM ports for Models 4351, 4351A, 4351B, 4352, 4352A, 4352B, 4353, and 4354.

Table 74 TCM Protocols/Standards

Protocol or Standard	Network Ports (Models 4351 and 4352)	Network Ports (Models 4351A, 4351B, 4352A, and 4352B)	Network Ports (Models 4353 and 4354)	Serial Ports (All Models)
TriStation	NET 2	NET 1, NET 2	NET 1, NET 2	Port 4
TSAA (UDP/IP)	NET 2	NET 1, NET 2	NET 1	—
TSAA with IP Multicast (UDP/IP)	— ^a	NET 1, NET 2 (Models 4351B and 4352B)	NET 1	—
Peer-to-Peer (UDP/IP)	NET 1	NET 1, NET 2	NET 1	—
Peer-to-Peer (DLC)	NET 1	NET 1	NET 1	—
Embedded OPC Server (OPC Data Access and OPC Alarms and Events)	—	—	NET 2	—
Modbus Slave (ASCII or RTU)	—	—	—	Any port
Modbus Master (RTU)	—	—	—	Any port
Modbus Master or Slave (TCP)	NET 2	NET 1, NET 2	NET 1	—
GPS Time Synchronization	—	—	—	Port 1
Triconex Time Synchronization via DLC	NET 1	NET 1	NET 1	—
Triconex Time Synchronization via UDP/IP	NET 1	NET 1, NET 2	NET 1	—
SNTP Triconex Time Synchronization	NET 2	NET 1, NET 2	NET 1, NET 2	—
Network Printing using Jet Direct	NET 2	NET 1, NET 2	NET 1	—

a. — means the protocol or standard is not supported on these ports.

Communication Configuration

This table describes rules and guidelines for using communication modules. For more information, including installation and configuration instructions, see the *Communication Guide for Tricon v9–v11 Systems*.

Table 78 Communication Rules

Component	Description
Chassis	At least one communication module (TCM, UCM, ACM, EICM, or NCM) must be included in the Main Chassis or in Chassis 2, because these modules enable the TriStation PC to communicate with the Tricon controller. However, UCMs can be installed only in the Main Chassis. • If communication modules are housed in Chassis 2, this chassis must be an I/O Expansion Chassis or a primary RXM Chassis that is connected directly to the Main Chassis using I/O communication cables (Model 9001) rather than standard I/O bus cables. • You cannot install an NCM in a Tricon system that also has a TCM and/or a UCM. • You cannot install an EICM in a Tricon system that also has a TCM and/or a UCM. • You cannot install an ACM in a Tricon system that also has a UCM. • You cannot install more than four communication modules in a Tricon system.
COM Slot	In a Model 8110 Main Chassis, the COM 1 slot can be used only for a TCM, EICM, or NCM. In a Model 8120E Enhanced Performance Main Chassis, the COM 1 slot can be used only for a TCM, and the COM 2 slot can be used only for UCMs.
TCM	Up to two logical slots can be configured for TCMs. Matched pairs of TCMs can be installed in the left and right positions of each logical slot, and they can be located in the Main Chassis or Chassis 2. Model 4351A, 4351B, 4352A, and 4352B TCMs cannot be installed into a system with Model 4351 or 4352 TCMs, even if they are installed in different chassis.
UCM	One logical slot is available for UCMs. Matched pairs of UCMs can be installed in the left and right positions of the COM 2 slot in only the Model 8120E Enhanced Performance Main Chassis. Up to one additional slot is available for TCMs, so you will be limited to one TCM if you install it in the COM 1 slot.
NCM	Up to two logical slots can be configured for NCMs. Matched pairs of NCMs can be installed in the left and right positions of each logical slot. If only one logical slot is used, the slot can be in the Main Chassis or Chassis 2. If two logical slots are used, they must be Slots 6 and 7 in the Main Chassis, and Peer-to-Peer cannot be used.
EICM and ACM	One logical slot is available for EICMs or ACMs, respectively. Matched pairs of these modules can be installed in both the left and right positions of one logical slot.
HIM	Up to two logical slots can be configured for HIMs. Both slots must be in the Main Chassis.
SMM	Up to three logical slots can be configured for SMMs. A matched pair of SMMs can be installed in the left and right positions of each logical slot. All three slots must be in the Main Chassis or Chassis 2.

TCM Pin-Outs and Cable Information

This section includes pin-out and cable information for these TCM connectors and cables:

- TCM Copper Ethernet Connectors on page 357
- TCM Serial Connectors on page 357
- TCM Copper Ethernet Cables on page 360
- TCM Fiber-Optic Ethernet Cables on page 361
- TCM Serial Cables on page 361

TCM Copper Ethernet Connectors

This section includes pin-out information for TCM 10BaseT and 100BaseTX RJ-45 Ethernet connectors, which are on TCM Models 4351, 4351A, 4351B, and 4353.

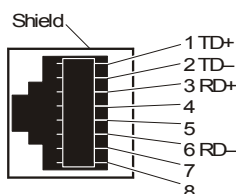


Table 135 TCM RJ-45 Ethernet Connector Pin-Outs

RJ-45 Pin	Signal	Direction	Function
1	TD+	Out	Transmit data +
2	TD-	Out	Transmit data -
3	RD+	In	Receive data +
4	TXCT1	Out	Transmit center tap 1
5	TXCT2	Out	Transmit center tap 2
6	RD-	In	Receive data -
7	RXCT1	In	Receive center tap 1
8	RXCT2	In	Receive center tap 2
Housing	Shield	—	Safety ground

TCM Serial Connectors

This section provides pin-out information for TCM serial connectors. The serial ports on the TCM can be configured in TriStation 1131 as RS-232 or RS-485.

This section includes:

- TCM RS-232 Pin-Outs on page 358
- Behavior and Effects of the TCM RS-232 Signals on page 358
- TCM RS-485 Pin-Outs on page 359
- TCM RS-485 Signal Descriptions on page 359



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