red lion

EtherTRAK®
Industrial Ethernet
Ethernet to Serial Gateways

Ethernet to Serial Converters for Modbus, Red lion and other protocols

Contents at a Glance:

This manual applies to the following Red lion products:
ET-GT-232-1 and ET-GT-485-1

Important Note:
Units prior to Nov. 2004 only support the Modbus and Sixnet protocol. Units shipped after Nov. 2004 (date codes of 239 and higher) have the ability to pass many protocols. Sixnet is offering a 30-day FREE trial for you to see if these units will work in your application. Contact Red lion for details.

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Red lion Controls, manufacturer of Red lion products, warrants to Buyer that products, except software, manufactured by Red lion will be free from defects in material and workmanship. Red lion' obligation under this warranty will be limited to repairing or replacing, at Red lion' option, the defective parts within one year of the date of installation, or within 18 months of the date of shipment from the point of manufacture, whichever is sooner. Products may be returned by Buyer only after permission has been obtained from Red lion. Buyer will prepay all freight charges to return any products to the repair facility designated by Red lion.

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These products must not be used to replace proper safety interlocking. No software based device (or other solid state device) should ever be designed to be responsible for the maintenance of consequential equipment or personnel safety. In particular, Red lion disclaims any responsibility for damages, either direct or consequential, that result from the use of this equipment in any application.
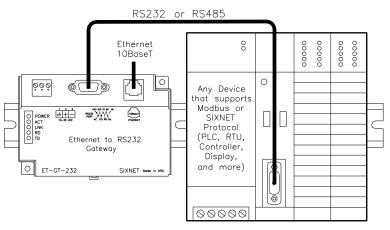
> **Note:** All information in this document applies to EtherTRAK Ethernet to Serial Gateways, except where otherwise noted. Refer to the Sixnet I/O Tool Kit software online help system for detailed product specifications and configuration settings.

Section 1 | General Information

Overview

This manual will help you install and maintain Ethernet to Serial Gateways. In summary, wiring for power, communications and I/O is connected to each unit. Then, setup choices are entered using the Remote I/O Tool Kit software and the system will be ready to run.

Use these EtherTRAK Gateways to connect one or more Modbus or Red lion serial devices to Ethernet via RS232 or RS485.

Performance Specs

These general specifications apply to all EtherTRAK gateways. Refer to the individual data sheets or the Red lion electronic catalog for complete specifications.

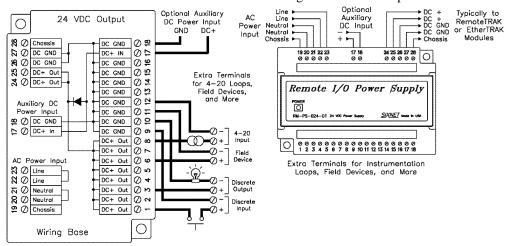|	
Supply Voltage	10 - 30 VDC, 0.5 Watt typical (25 mA @ 24 VDC)
Ethernet Protocols	Modbus/TCP, Modbus/UDP, Sixnet/UDP and others
Serial Protocols	Modbus ASCII, Modbus RTU, Sixnet and others
Ethernet Isolation	1200 Volts RMS (for 1 minute)
Operating Temperature	-30 to 70 °C
Storage Temperature	-40 to 85 °C
Humidity	5 to 95% (non-condensing)
Screw Terminals	14 AWG max. (tighten to 3.48 in-lbs. Max.)

Power Wiring

EtherTRAK gateways can be powered from the same DC source that is used to power your I/O devices. 10 to 30 VDC needs to be applied to terminals 2 and 3 of each gateway. Refer to the wiring diagram for each gateway for more information.

The RM-PS-024-01 can be used to power your EtherTRAK gateways, instrumentation loops, and other devices. It operates on 85-264 VAC (47-63 Hz) or 120-370 VDC and outputs 24 VDC at up to 1 A. Refer to its data sheet for details. Refer to the figure below for the power connections.

Status LED Indication

On, with a quick "OFF" BLINK (1.9 seconds ON, .1 seconds OFF) - The gateway is configured and fully operational, but has not received a valid request from the host for a time longer than the specified time out period. A communication time out has occurred.

Full ON - The gateway is configured, fully operational, and has received communication from the host device before the timeout period expired. **This is the desired LED indication during system operation.**

HALF BLINK (1 second ON, 1 second OFF) - The gateway is not adequately configured and requires a download from the Sixnet I/O Tool Kit program.

Full OFF - There is no power to the gateway, or the status LED is being turned off intentionally by the Sixnet I/O Tool Kit during the module loading operation.

Off, with a quick "ON" BLINK (1.9 seconds OFF, .1 seconds ON) - The gateway failed self-test at initialization. It will not attempt communication and should be replaced.

Status LED Wink Feature

The "Status" LED may be intentionally winked (10 blinks/ second) by the Sixnet I/O Tool Kit program to visually identify the gateway when other modules are present.

TD / RD LEDs

The Receive Data (RD) LED will be ON when characters are being sent out the serial port.

The Transmit Data (TD) LED will be ON when characters are being received into the serial port.

ACT / LNK LEDs

The activity (ACT) LED on an EtherTRAK gateway will flicker anytime there is traffic on the Ethernet network, regardless of whom the network messages are intended for.

The link (LNK) LED will be ON whenever a valid link to another Ethernet device is detected.

The best troubleshooting tools for EtherTRAK gateways are the Status, ACT, and LNK LEDs on each module.

Each EtherTRAK Status LED indicates the health of the module and also the status of communication from the host device. You can use the Wink feature to provide continuous transmission to an EtherTRAK gateway. Note that an EtherTRAK gateway does not send a reply in response to a Wink command.

Section 2 | Ethernet, RS232, and RS485 Wiring

Overview

EtherTRAK gateways communicate with a master device (such as a PC, SIXTRAK Controller, or VersaTRAK RTU) using 10BaseT Ethernet media. Electrical isolation is provided on the Ethernet port for increased reliability. Please follow normal Ethernet wiring practices when installing EtherTRAK gateways.

Each EtherTRAK gateway has either a RS485 (2 wire) port or RS232 port. Follow the wiring guidelines below to achieve reliable RS485 or RS232 communication with your device.
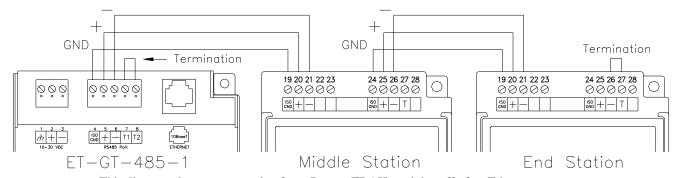
RS232 Wiring Guidelines (ET-GT-232-1)

The RS232 port on the ET-GT-232-1 is a female DB9 that follows the DCE pin-out convention. Refer to the diagrams below for connection details.

Gateway (DCE) RS232 Port	
Pin	Signal
1	DCD out
2	RD out
3	TD in
4	DTR in
5	Sig GND
6	DSR out
7	RTS in
8	CTS out
9	RI out

VT-CABLE-MDM
Cable for ET-GT-232-1 to RS232 Port
on PC, SIXTRAK gateway, or VersaTRAK RTU

RS232 port on PC, SIXTRAK or VersaTRAK (Female DB9)			VT-MODEM RS232 Port (Male DB9)
DCD	1	←	1 DCD
RD	2	←	2 RD
TD	3	→	3 TD
DTR	4	→	4 DTR
GND	5		5 GND
DSR	6	←	6 DSR
RTS	7	→	7 RTS
CTS	8	←	8 CTS
RI	9	←	9 RI

This cable is optionally available from SIXNET.

RS485 Wiring Guidelines (ET-GT-485-1)

The RS485 port on the ET-GT-485-1 supports 2 wire (plus ground) party-line connections. It is recommended that the ground wire be connected to all stations to provide a common return. The RS485 on this EtherTRAK gateway is isolated from its internal circuitry, local power source, and Ethernet port to improve communications reliability. It is recommended that only 32 RS485 devices be connected on any RS485 party-line, and that the termination be installed on the last device on each end of the RS485 network. Limiting the cabling to two network arms (segments) radiating from the master controller will yield the best signal results.

This diagram shows an example of two RemoteTRAK modules off of an Ethernet gateway.

Screw Torque

All the screw terminals on the base should be tightened to a maximum of 3.48 in-lbs.

Section 3 | Configuration

Sixnet I/O Tool Kit

All configuration parameters are entered using the Sixnet I/O Tool Kit software, which stores all setup information into permanent memory in the EtherTRAK gateway. Configuration parameters are loaded to the gateway over Ethernet. Refer to the Sixnet I/O Tool Kit help for details.

Here are the basic steps for configuring an EtherTRAK gateway.

1. Connect power to the gateway.

2. Connect your Ethernet to the gateway. Use a straight-through cable if you are connecting the gateway to an Ethernet hub or switch. Use a cross-wired cable if you are connecting the gateway directly to a PC. Make sure the LNK LED on the gateway is on solid (not blinking).

3. Install and run the Sixnet I/O Tool Kit. Add an EtherTRAK gateway to your project. Select Configure Station/Module to define the parameters for the gateway. Make sure to:

    - Choose an IP address that is appropriate for your network. See the help file for details.

    - Enter in the serial number that is printed on a label on the gateway.

    - Choose a station (slave) number for the gateway that is **<u>unique</u>** from other gateways and the device you are interfacing to.

    - Select the appropriate RS232 or RS485 com parameters (protocol, baud rate, etc.) to match the device that you are interfacing to.

4. Once you've completed setting your desired parameters, save your project file, and go to the Operations menu and select Load. This should set the IP address in the gateway and then load down your other parameters.

    If this load fails, here are some items to check:

    - Make sure the LNK LED is on solid. If it's off or blinking then a typical cause is a bad cable, an incorrect cable, or you are plugged into the wrong port on your hub/switch.

    - Try to "ping" the gateway. Ping is a utility that comes with your PC. Go to a DOS window and type "ping" followed by the IP address of the gateway and then hit return. For example, "ping 10.1.0.1" (do not type the quotes). If you get an "unknown command" error then you need to install the TCP/IP Ethernet protocol on your computer. If you get "destination unreachable" then make sure the gateway's IP address is valid with respect to the IP address and subnet mask of your computer. If you get "request timeout" then check all the items above.

5. Once you establish that you can communicate with the gateway from the Sixnet I/O Tool Kit you then should attempt to communicate with your device using your master software (i.e. KepServer, Citect, Intellution, etc.).

Note 1: The EtherTRAK gateways do not convert protocols. If the gateway's serial port is configured for Modbus Passthru protocol then you must communicate to the gateway over Ethernet with Modbus/TCP or Modbus/UDP. If the gateway's serial port is configured for Red lion Passthru protocol then you must communicate to the gateway over Ethernet with the Red lion protocol.

Section 4 | Ethernet Gateways

ET-GT-232-1   Ethernet to RS232 Converter

ET-GT-232-1 Overview

This Ethernet to RS232 gateway is typically used in one of these situations:
- To connect an older Red lion device such as an IOMUX or Versamux to an Ethernet network
- To connect a Modbus RS232 slave device to an Ethernet network
- To connect a Modbus RS232 master device, such as a display, to an Ethernet network
- To connect other slave RS232 devices to an Ethernet network
- To interchange between a telephone modem and Ethernet interface

Ethernet Protocols Supported   **Modbus/TCP, Modbus/UDP, Red lion and others**
Serial Protocols Supported   **Modbus ASCII, Modbus RTU, Red lion and others**
Supply voltage   **10 – 30 VDC, 0.5 watt typical**
Virtual Analog Outputs   **16**
Virtual Discrete Outputs   **16**

More information can be found in the on-line help of the Sixnet I/O Tool Kit program.

Power and RS232 Wiring

This gateway operates on 10 to 30 volts DC. Connect this power to terminals 2 and 3. Connect terminal 1 to a suitable earth ground.
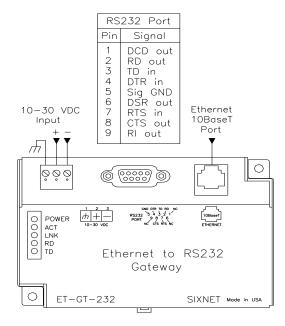
In many cases a straight-through RS232 cable, such as the Red lion VT-CABLE-MDM, can be used to connect the RS232 port of this gateway to a Red lion or Modbus serial device.

This gateway can be connected to an Ethernet hub with a straight-through 10BaseT Ethernet cable. Use a cross-wired cable if you are connecting directly to a PC or other Ethernet master device.

I/O Registers

The ET-GT-232-1 has sixteen virtual discrete output registers and sixteen virtual analog output registers. These are provided so that a master RS232 Modbus device (such as a display) can pass register values over Ethernet to a computer or other device.

Function	Sixnet Registers	Modbus Registers
Discrete Outputs	Y0 – Y15	00001 – 00016
Analog Outputs	AY0 – AY15	40001 – 40016

ET-GT-485-1   Ethernet to RS485 Converter

ET-GT-485-1 Overview

This Ethernet to RS485 gateway is typically used in one of these situations:
* To connect one or more Modbus RS485 slave devices to an Ethernet network
* To connect a Modbus RS485 master device, such as a display, to an Ethernet network
* To connect RemoteTRAK modules to an Ethernet network
* To connect other slave RS232 devices to an Ethernet network

Ethernet Protocols Supported	**Modbus/TCP, Modbus/UDP, Red lion and others**
Serial Protocols Supported	**Modbus ASCII, Modbus RTU, Red lion and others**
Supply voltage	**10 – 30 VDC, 0.5 watt typical**
Virtual Analog Outputs	**16**
Virtual Discrete Outputs	**16**

More information may be found in the on-line help of the Sixnet I/O Tool Kit program.

Power and RS485 Wiring

This gateway operates on 10 to 30 volts DC. Connect this power to terminals 2 and 3. Connect terminal 1 to a suitable earth ground.
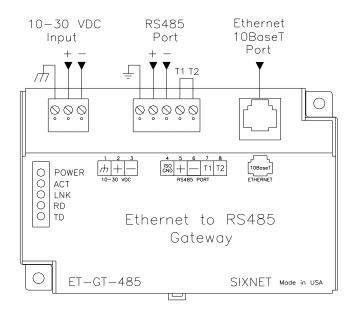
Refer to the diagram below for RS485 wiring.

This gateway can be connected to an Ethernet hub with a straight-through 10BaseT Ethernet cable. Use a cross-wired cable if you are connecting directly to a PC or other Ethernet master device.

I/O Registers

The ET-GT-485-1 has sixteen virtual discrete output registers and sixteen virtual analog output registers. These are provided so that a master RS485 Modbus device (such as a display) can pass register values over Ethernet to a computer or other device.

Function	Sixnet Registers	Modbus Registers
Discrete Outputs	Y0 – Y15	00001 – 00016
Analog Outputs	AY0 – AY15	40001 – 40016

Section 5 | Operational Information

Modes of Operation

The EtherTRAK gateways have the following two main modes of operation:

Passthru Mode – This is the most common mode. In this mode the serial port is configured for Passthru operation and must be connected to a Modbus, Red lion or other <u>slave</u> device. The serial port cannot be connected to a master device in this mode because it will not respond to unsolicited messages. The Ethernet port must be connected to a <u>master</u> device (via a switch or hub) such as a PC, PLC, or Red lion controller/RTU. When the gateway receives a message on the Ethernet port from the master device it will look at the station number (or Modbus slave ID) in the Modbus or Red lion message (embedded in a TCP or UDP packet). If the number is 0 or matches it's own then it will respond directly to the message. If the number is anything else then it will pass the message out the serial port. If the gateway is set for Generic Passthru then it will always pass the content of the Ethernet message. Please note that the gateway does not convert protocols so if the incoming Ethernet message is Red lion protocol then it will get sent out the serial port as Red lion protocol. If the incoming Ethernet message is Modbus then it will get sent out as Modbus ASCII or Modbus RTU depending on how the serial port was configured with the I/O Tool Kit software. The gateway will then send any response it gets on the serial port out the Ethernet port to the IP address of the originator. It will then process the next Ethernet message in its buffer.

Master to Master Mode – This advanced mode allows two master devices to use the EtherTRAK gateway to exchange I/O data. In this mode the serial port is configured for Slave operation and must be connected to a Modbus or Red lion <u>master</u> device. This device then can write/read I/O data to/from the internal registers of the gateway. Another <u>master</u> device can then do the same on the Ethernet side. With this scheme the two ports can be using different protocols. The EtherTRAK gateways have 16 discrete output registers and 16 analog output registers that can be read or written.

Other Protocols

The EtherTRAK gateway supports Modbus, Red lion and many other protocols. Red lion cannot guarantee that all protocols will work. However, Red lion does offer a 30-day FREE trial for you to see if these gateways are suitable for your application.

Section 6 | Service Information

Service Information

We sincerely hope that you never experience a problem with any Red Lion product. If you do need service, call Red Lion at 1-877-432-9908 for Technical Support. A trained specialist will help you to quickly determine the source of the problem. Many problems are easily resolved with a single phone call. If it is necessary to return a unit to us, an RO (Repair Order) can be obtained on the Red Lion website.

Red Lion tracks the flow of returned material with our RO system to ensure speedy service. You must include this RO number on the outside of the box so that your return can be processed immediately.

Be sure to have your original purchase order number and date purchased available.

We suggest that you give us a repair purchase order number in case the repair is not covered under our warranty. You will not be billed if the repair is covered under warranty.

Please supply us with as many details about the problem as you can. The information you supply will be written on the RO form and supplied to the repair department before your unit arrives. This helps us to provide you with the best service, in the fastest manner. Repairs are completed as soon as possible. If you need a quicker turnaround, ship the unit to us by air freight. We give priority service to equipment that arrives by overnight delivery.

We apologize for any inconvenience that the need for repair may cause you. We hope that our rapid service meets your needs. If you have any suggestions to help us improve our service, please give us a call. We appreciate your ideas and will respond to them.

For Your Convenience:
Please fill in the following and keep this manual with your Red Lion system for future reference:

P.O. #:_____ Date Purchased: _____

Purchased From:_____

Product Support

To obtain support for Red Lion products:

Latest product info: http://www.redlion.net

Phone: 1-877-432-9908

Fax: 1-518-877-8346

E-mail: support@redlion.net

Address: Red Lion Controls • 20 Willow Springs Circle • York • PA • 17406 • USA