SIXNET ® **User Manual**

EtherTRAK

Ethernet Distributed I/O

c(UL)us
LISTED

CE

Class I, Division 2,
Groups A, B, C, and D
Hazardous Locations

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> **Note:** All information in this document applies to EtherTRAK I/O modules and gateways, except where otherwise noted. Refer to the SIXNET I/O Tool Kit software online help systems for detailed product specifications and configuration settings.

Section 1 | General Information

Overview

This manual will help you install and maintain EtherTRAK I/O and gateways. In summary, wiring for power, communications and I/O is connected to each module's base. Then, setup choices are entered using the SIXNET I/O Tool Kit software and the system will be ready to run. Shown below are some typical system configurations using EtherTRAK I/O:
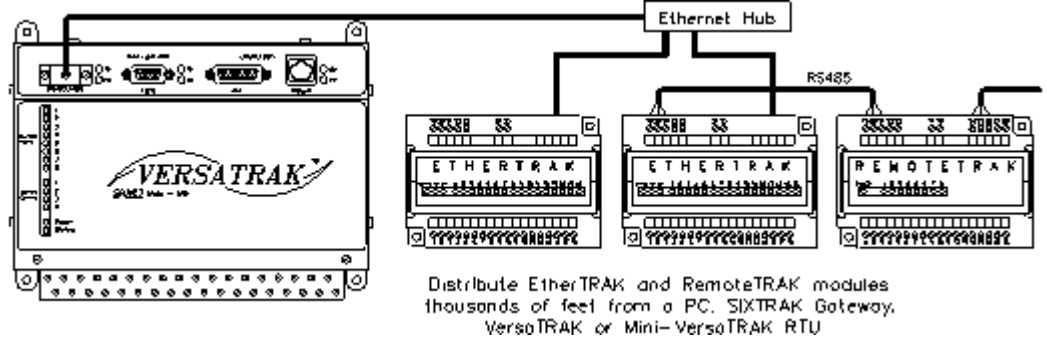
Using EtherTRAK I/O as Expansion I/O for a VersaTRAK RTU
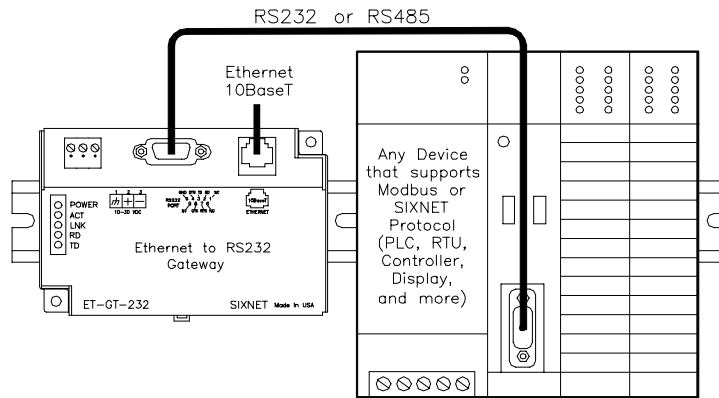
Typical ET-GT-232 Connection
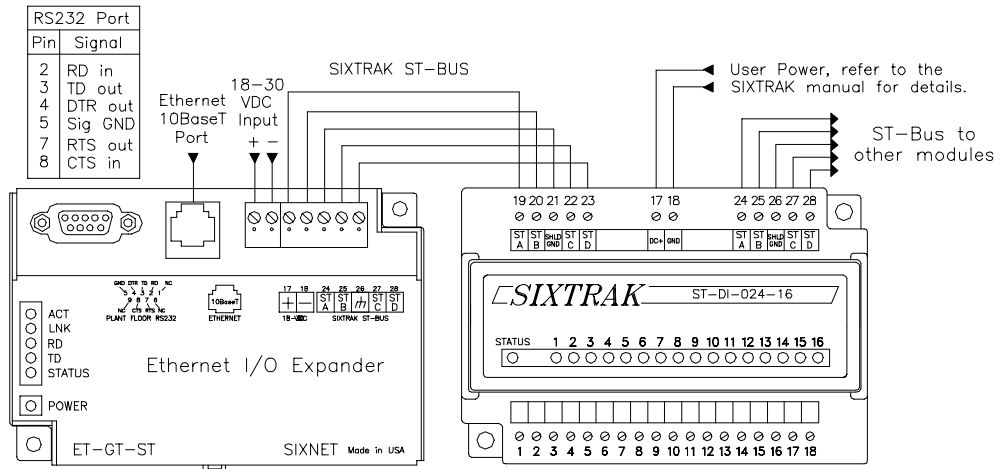
Typical ET-GT-ST-1 Connection

General Specifications

These general specifications apply to all EtherTRAK I/O modules. More detailed product specifications may be found in the online help system of the SIXNET I/O Toolkit configuration utility.

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Supply Voltage	10 - 30 VDC, 1.2 Watt typical per module (48 mA @ 24 VDC – varies by module and load).
RS485 Expansion	Connect up to 32 RemoteTRAK modules or Modbus devices using RS485
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)
Protocols Supported	Modbus /TCP, SIXNET Universal

Note 1: EtherTRAK gateways do not convert protocols. If a 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 SIXNET Passthru protocol then you must communicate to the gateway over Ethernet with the SIXNET protocol.

DC Power Overview

EtherTRAK modules can be powered from the same DC source that is used to power your I/O devices. No separate power supply is required. Typically, 10 to 30 VDC power is applied to terminals 24 and 25 on the base of each module. Refer to the upcoming wiring diagram for each module for power connections.

Note: The ET-GT-ST-1 operates on 18 to 30 VDC. Refer to Section 9 for wiring details.

The RM-PS-024-01 can be used to power your EtherTRAK modules, 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 the figure below for the proper power connections. Tighten the screw terminals to a maximum of 3.48 in-lbs.
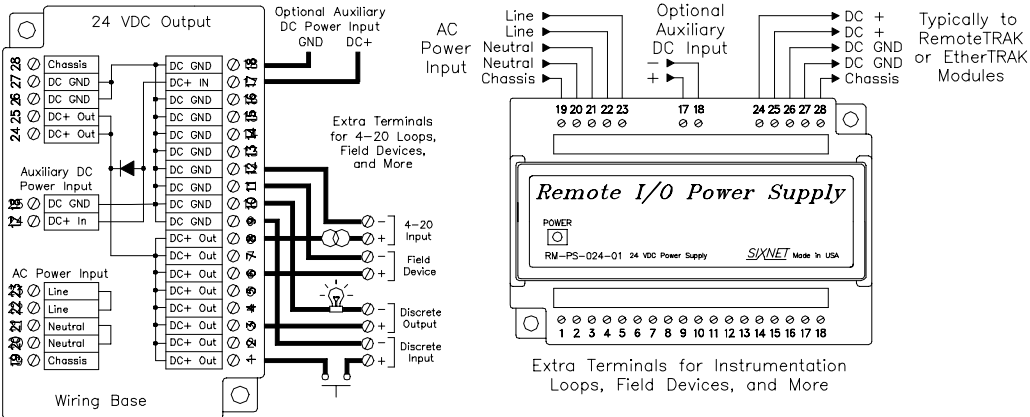
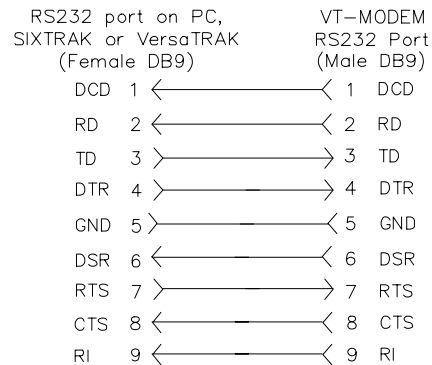# Section 2 | Ethernet, RS232, RS485 Wiring

Gateway Ethernet Wiring

EtherTRAK gateways communicate with a master device (such as a PC, SIXTRAK Gateway, 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.

ET-GT-232-1 RS232 Wiring

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

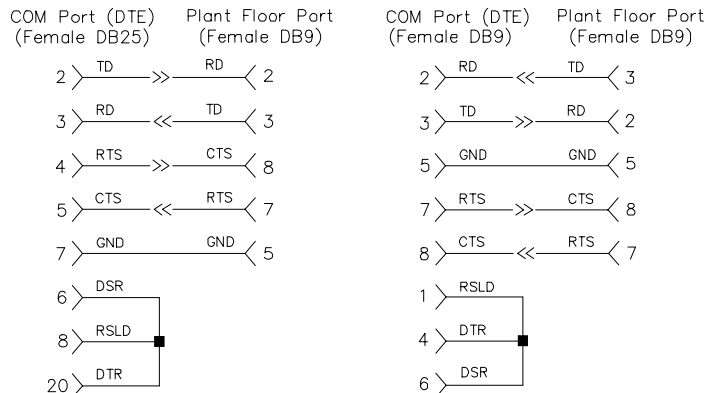| RS232 port on PC, SIXTRAK or VersaTRAK (Female DB9)		VT—MODEM RS232 Port (Male DB9)	
DCD	1	1	DCD
RD	2	2	RD
TD	3	3	TD
DTR	4	4	DTR
GND	5	5	GND
DSR	6	6	DSR
RTS	7	7	RTS
CTS	8	8	CTS
RI	9	9	RI

This cable is optionally available from SIXNET.

ET-GT-ST-1 RS232 Wiring

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

Gateway (DTE) RS232 Port	
Pin	Signal
1	DCD out
2	TD out
3	RD in
4	DTR out
5	Sig GND
6	N/C
7	RTS out
8	CTS in
9	N/C

ST—CABLE—PF
Cable for ET—GT—ST—1 to PC RS232 Port

COM Port (DTE) (Female DB25)   Plant Floor Port (Female DB9)
2	TD	RD	2
3	RD	TD	3
4	RTS	CTS	8
5	CTS	RTS	7
7	GND	GND	5
6	DSR		
8	RSLD		
20	DTR		

COM Port (DTE) (Female DB9)   Plant Floor Port (Female DB9)
2	RD	TD	3
3	TD	RD	2
5	GND	GND	5
7	RTS	CTS	8
8	CTS	RTS	7
1	RSLD		
4	DTR		
6	DSR		

This cable is optionally available from SIXNET.

RS485 Wiring Guidelines

The RS485 party-line consists of two signal wires and a communications ground wire. It is recommended that the RS485 ground terminals of all stations be connected together, and should not be connected to any panel ground or earth ground point. The RS485 port of each RemoteTRAK module is isolated from the module's internal circuitry, local power source, and I/O wiring to improve communications reliability. It is recommended that a maximum of 32 RemoteTRAK modules be connected on any RS485 party-line, and that the termination jumper be installed on the last module 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.
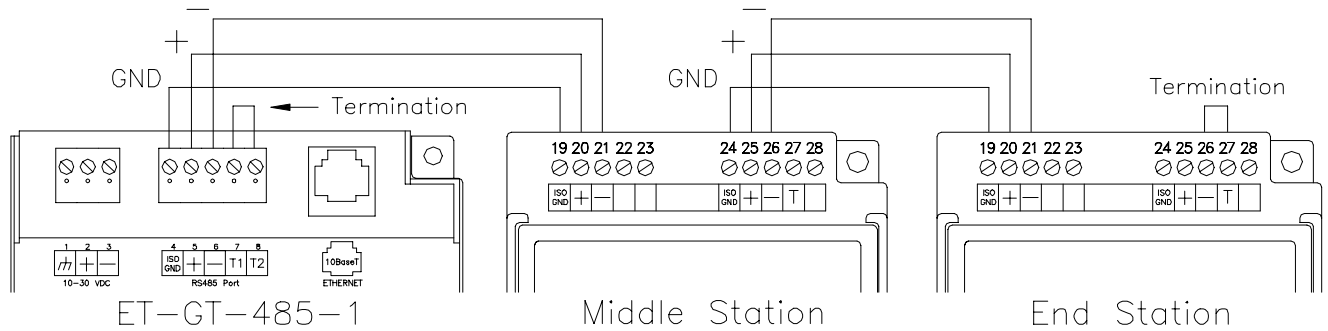
Screw Torque

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

Section 3 | Configuring EtherTRAK I/O

RM-232-SETUP   Remote I/O Setup Module

Operation

This setup tool is recommended to initially configure each EtherTRAK and/or RemoteTRAK I/O module. To use the setup module, simply unplug any EtherTRAK or RemoteTRAK module from its base and insert the setup module into the base.

Note: EtherTRAK and RemoteTRAK "smart bases" allow hot swap of live modules -- an exclusive SIXNET feature that makes it permissible to configure EtherTRAK and RemoteTRAK modules in live systems.

The EtherTRAK or RemoteTRAK module configuration you created the SIXNET I/O Tool Kit program will be written into permanent memory in the module's base. When the EtherTRAK or RemoteTRAK module is reinserted into its base, the module will find and upload the configuration information, instantly configure itself and begin scanning I/O.

Once an EtherTRAK or RemoteTRAK module has been configured with an appropriate station address and IP address (EtherTRAK only), modified configuration data can be downloaded through the Ethernet port or RS485 port into the module base.

More information on the Remote I/O Setup Module can be found in the online help system of the SIXNET I/O Toolkit.

RS232 Wiring

Connect the setup module to your Windows PC using a standard SIXNET ST-CABLE-PF RS232 cable. Only the transmit (TD), receive (RD) and common return (GND) signals are actively used. The RS232 port on this configuration tool is electrically isolated to protect your computer in the event of field wiring errors. The setup module runs on the DC power connected to terminals 17 and 18 of the module base it is plugged into. No other connections are required. (I/O wiring can be left undisturbed.)

RS232 Mode Selection

This module always communicates to the host PC at 9600 baud, with no parity and eight data bits. Be sure to select "Use Setup Module's Settings" as the communication device selection in the SIXNET I/O Tool Kit program.
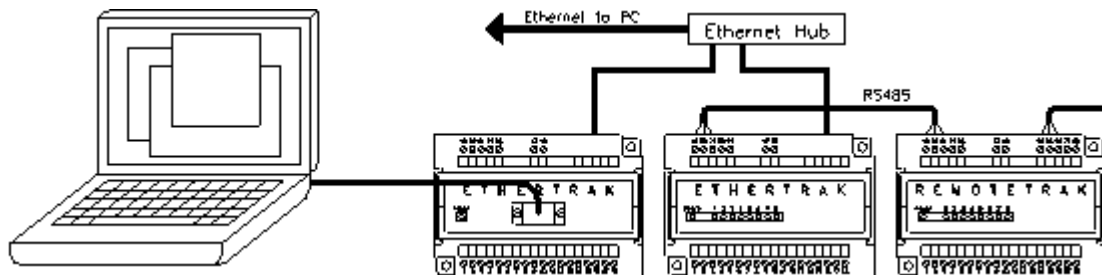
SIXNET I/O Tool Kit

EtherTRAK and RemoteTRAK modules are configured using the SIXNET I/O Tool Kit software. Configuration parameters are written over Ethernet, RS485 or RS232 (setup module only) into permanent memory in the module's base. Refer to the SIXNET I/O Tool Kit help for details.

Here are the basic steps for configuring an EtherTRAK I/O module or gateway.

1. Connect DC power to the module or gateway.

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

3. Run the SIXNET I/O Tool Kit. You can use the Plug & Play Wizard to define the parameters for the module / gateway. Be sure to do the following:

   - 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 module / gateway.

   - Choose a station (slave) number for the module / gateway that is unique from other modules / 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 the wizard, save your project file. Go to the Device menu and choose the appropriate communication device. Then go to the Operations menu and select Load. This should set the IP address in the module / gateway and then load down your other parameters.

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

   - Make sure the LNK LED is on solid. If it is 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. Start an MSDOS prompt and type "ping" followed by the IP address of the gateway and then hit <CR>. For example, "ping 10.1.0.1" (do not type the quotes). If you get an "unknown command" error then you will 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.

     Note: Information on Ethernet networking can be found in the online help system for the SIXNET I/O Toolkit.

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

Reset Button (ET-GT-232, ET-GT-422)

The ET-GT-232-1 and ET-GT-485-1 converters have a reset button that can be used to restore the RS232 or RS485 port to factory defaults. This should only be necessary if the settings for the serial port are unknown or cannot be determined.

The reset button is accessible through a small hole in the cover, just to the right of the DC power terminals. To reset the serial port, insert a paper clip into the hole. Depress and hold the button until the Status LED begins to blink. This will take approximately three seconds. Once the blinking begins, release the button. After approximately two seconds the blinking will stop. At this point the port will have been reset.

EtherTRAK LEDs

Every EtherTRAK I/O module or gateway has a number of LEDs. These LEDs can be useful for system diagnostics. These LEDs can be observed in the following states:

I/O Module Status LED

On, with a quick "OFF" BLINK (1.9 seconds ON, .1 seconds OFF) - The module 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 module 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 module is not adequately configured and requires a download from the SIXNET I/O Tool Kit program.

Full OFF - There is no power to the module, 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 module failed self-test at initialization. It will not attempt communication and should be replaced.

Gateway Status LED

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 of an I/O module or gateway can be intentionally winked (10 blinks/ second) by the SIXNET I/O Tool Kit program to visually identify the module when other modules are present.

Gateway 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 or I/O module 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 and I/O modules 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 or I/O module does not send a reply in response to a Wink command.

Section 4 | Discrete I/O Modules

|	
ET-8DI2-8DO2-H	**8 Discrete Inputs and 8 Discrete Outputs**
ET-16DI2-H	**16 Discrete Inputs**

ET-8DI2-8DO2 Overview

This module provides one terminal for each input or output channel. All inputs may be wired as sourcing or sinking. Outputs are wired in a sourcing (power switching) configuration only. An input count feature uses analog input registers to accumulate the positive transitions of each input. More information can be found in the on-line help in the SIXNET I/O Tool Kit program.

Number of Channels	**8 discrete inputs, 8 discrete outputs (ET-8DI2-8DO2 only)**
Input Voltage Range	**12/24 VDC/VAC**
Input Current @ 24 VDC	**6.7 mA**
Output Voltage Range	**10 – 30 VDC**
Maximum Count Rate	**100 Hz (6000 / minute) each input, plus selectable 2KHz (120,000 / minute) mode for input 1 only**

Wiring and Jumpers

One wire from each sourcing field input should be bussed together and connected to terminal 17 (DC +). One wire from each sourcing field output and/or or sinking field input should be bussed together and connected to terminal 18 (DC GND). Refer to the wiring diagram below. Set jumper W1 to match the wiring configuration of the inputs.

TPO Feature

Time proportioned outputs pulse ON and OFF with a duty cycle proportional to an analog value stored in an analog output register. TPO outputs are a low cost way to get smooth proportional control of heaters and other process variables. Typically, TPO analog output registers are assigned to the output of PID or other control logic in an ISaGRAF or other program. Use the SIXNET I/O Tool Kit to set pulse cycling as fast as 10 mS or as slow (many minutes) as your system dynamics require. Each output may be configured as a TPO or ordinary discrete output.

I/O Registers

Function	SIXNET Registers	Modbus Registers
Discrete Inputs	X0 – X7	10001 – 10008
Discrete Outputs	Y0 – Y7	00001 – 00008
TPO Values	AY0 – AY7	40001 – 40008
Counter Inputs	AX0 – AX7	30001 – 30008
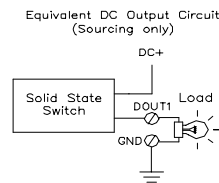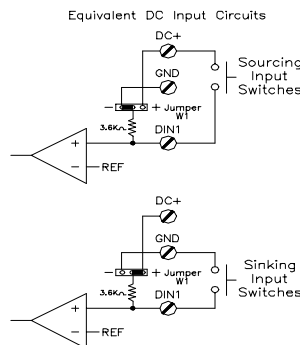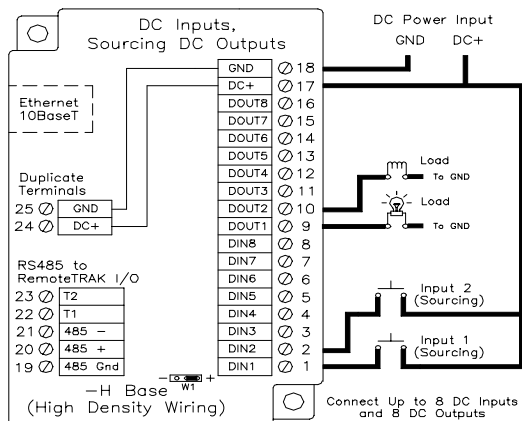
ET-16DI2-H   High Density Discrete Input Module

This module provides sixteen input channels. Inputs may be wired as all sourcing or sinking. An input count feature uses analog input registers to accumulate the positive transitions of each input. More information on this and other features can be found in the on-line help supplied with the SIXNET I/O Tool Kit program.

Number of Channels	**16 discrete inputs (connected to a common source)**
Input Voltage Range	**12/24 VDC/VAC**
Input Current @ 24 VDC	**6.7 mA**

Wiring and Jumpers

Positive DC or AC voltage must be applied to an input to indicate an ON condition. All channels are referenced to a common return or supply, which is connected to the negative side (ground) or positive side (DC+) of the DC power source. One wire from each sourcing field input should be bussed together and connected to terminal 17 (DC +). One wire from each sinking field input should be bussed together and connected to terminal 18 (DC GND). Refer to the wiring diagram below. Set jumper W1 to match the wiring configuration of the inputs.

I/O Registers

| Function	SIXNET Registers	Modbus Registers
Discrete Inputs	X0 – X15	10001 – 10016
Counter Inputs	AX0 – AX15	30001 – 30016
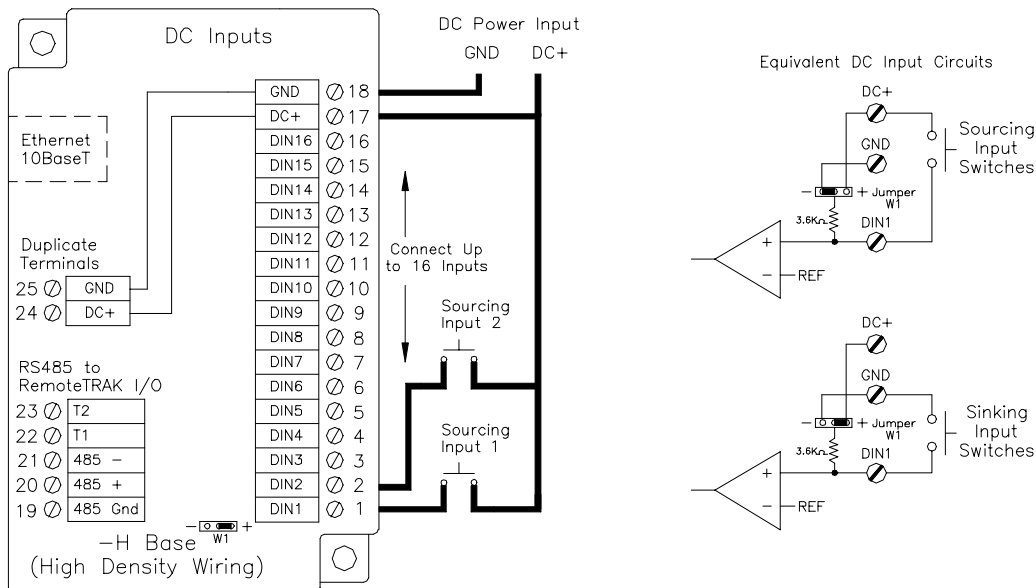
ET-8CNT   High Speed Counter Module

This high-speed counter module has eight isolated circuits that accept pulse inputs from a variety of sources, including quadrature and incremental encoders. Count values are reported in 16 bit analog input registers or 32 bit long registers. The states of the counter inputs are also reported as discrete inputs. Pulse rates up to 50 kHz are supported. The counters can be reset by toggling discrete output bits. Counter modes are selected using the SIXNET I/O Tool Kit program. More information on this and other features can be found in the on-line help supplied with the SIXNET I/O Tool Kit program.

| Number of Channels	8 discrete inputs, isolated
Input Voltage Range	12/24 VDC/VAC
Input Current @ 24 VDC	6.7 mA

Input Wiring

Screw terminal assignments are shown below. For best noise immunity, connect input signals using twisted wire pairs. To maintain the best differential noise rejection, do not connect (-) screw terminals together at the I/O base. Positive DC voltage must be applied to an input to indicate an ON condition. Refer to the wiring diagram below.

Any odd-numbered input can be gated by connecting a gating signal to the next highest even-numbered input. For example, Input 2 can gate the counter for Input 1.
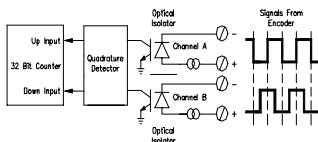
I/O Registers

Function	SIXNET Registers	Modbus Registers
Discrete Inputs	X0 – X7	10001 – 10008
Counter Inputs	AX0 – AX7 or LI0 – LI7	30001 – 30008
		35001 – 35008
Resets	Y0 – Y7	00001 – 00008
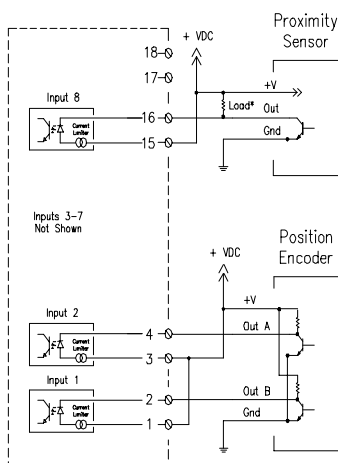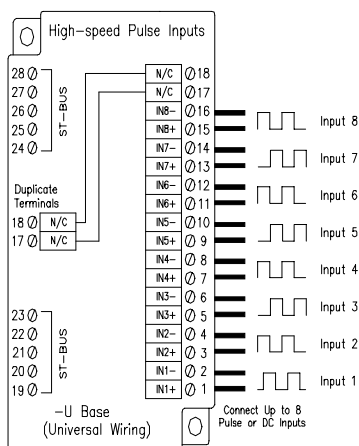
Typical Count/Rate Input Circuit
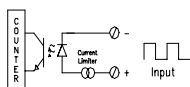
Typical Position Input Circuit

* Populate the appropriate load resistor, unless your sensor does not require one.

Typical Wiring Models

Section 5 | Discrete Output Modules

ET-16DO2-H High Density Discrete Output Module

Et-16DO2 Overview

Sixteen discrete output channels each provide up to 1 Amp DC to motor contactors, valves, and other loads. Inductive surge protection is provided. Each of the sixteen outputs may optionally be configured as Time Proportioned Outputs that pulse ON at a duty cycle proportional to an analog output register value. Typically these TPO outputs are controlled by a PID loop or other process algorithm in a control program. More information can be found in the on-line help supplied with the SIXNET I/O Tool Kit program.

|	
Number of Channels	**16 discrete outputs connected to a common DC source**
Output Voltage Range	**10 - 30 VDC**
Max. Load per Output	**1 Amp**
Max. Load per Module	**8 Amps**
Max. Inrush Current	**5 Amps (for 100 mS)**

Wiring

A single terminal is provided for each output channel. All outputs are powered from the DC power terminal. All channels are referenced to a common return, which is connected to the negative side (ground) of the DC power source.

TPO Feature

Time proportioned outputs pulse ON and OFF with a duty cycle proportional to an analog value stored in an analog output register. TPO outputs are a low cost way to get smooth proportional control of heaters and other process variables. Typically, TPO analog output registers are assigned to the output of PID or other control logic in an ISaGRAF or other program. Use the SIXNET I/O Tool Kit to set pulse cycling as fast as 10 mS or as slow (many minutes) as your system dynamics require. Each output may be configured as a TPO or ordinary discrete output.

I/O Registers

Function	SIXNET Registers	Modbus Registers
Discrete Outputs	Y0 – Y15	00001 – 00016
TPO Values	AY0 – AY15	40001 – 40016
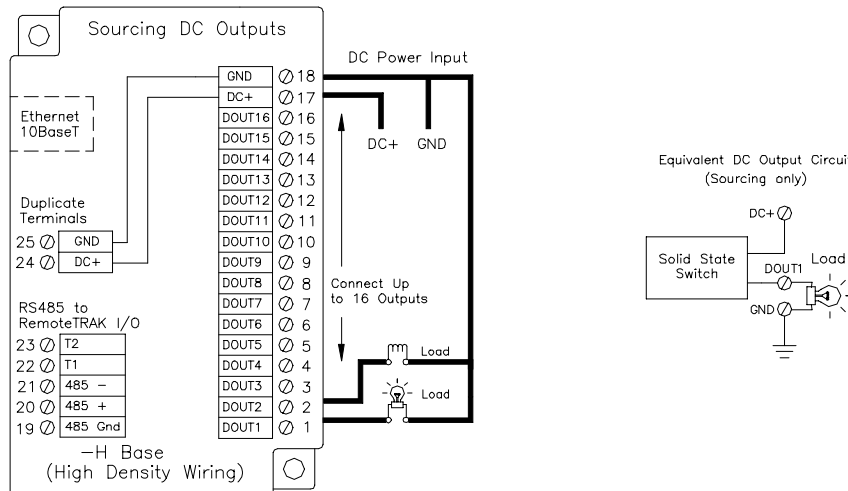
Section 6 | Discrete / Analog Modules

ET-8DI2-8AI2-H   8 Discrete Inputs and 8 4-20 mA Inputs

ET-8DI2-8AI2 Overview

Eight 4-20 mA inputs provide 14 bit analog measurements. Discrete inputs may be wired as all sourcing or sinking. An input count feature uses analog input registers to accumulate the positive transitions of each input. More information on this and other features can be found in the on-line help supplied with the SIXNET I/O Tool Kit program.

|	
Number of Channels	**8 analog inputs (14 bit resolution), 8 discrete inputs**
Input Range	**4 - 20 mA (analog), 12/24 VDC/VAC (discrete)**
Analog Input Impedance	**100 ohms Note:** input voltage drop = 2 volts at 20 mA
Discrete Input Voltage Range	**12/24 VDC/VAC**
Input Current @ 24 VDC	**6.7 mA**

Wiring and Jumpers

Positive DC or AC voltage must be applied to an input to indicate an ON condition. All channels are referenced to a common return or supply, which is connected to the negative side (ground) or positive side (DC+) of the DC power source. One wire from each sourcing field input should be bussed together and connected to terminal 17 (DC +). One wire from each sinking field input should be bussed together and connected to terminal 18 (DC GND). Refer to the wiring diagram below. Set jumper W1 to match the wiring configuration of the discrete inputs. A single input terminal is provided for each analog input channel. Care must be taken to externally provide a suitable instrumentation ground for these single ended input circuits.

Current Shunts

Precision 100 ohm current shunts, beneath the hinged access door in the wiring base, pass current and maintain loop integrity even if the module is unplugged. A spare shunt is provided and may be simply inserted in place of any shunt that open circuits as a result of a current overload.

I/O Registers

| Function	SIXNET Registers	Modbus Registers
Analog Inputs	AX0 – AX7	30001 – 30008
Discrete Inputs	X0 – X7	10001 – 10008
Counter Inputs	AX8 – AX15	30009 – 30016
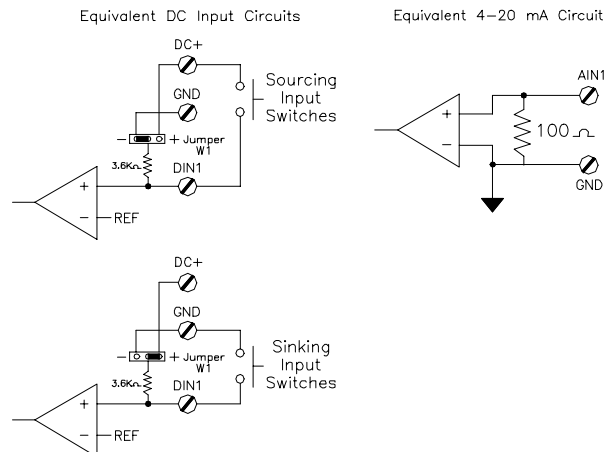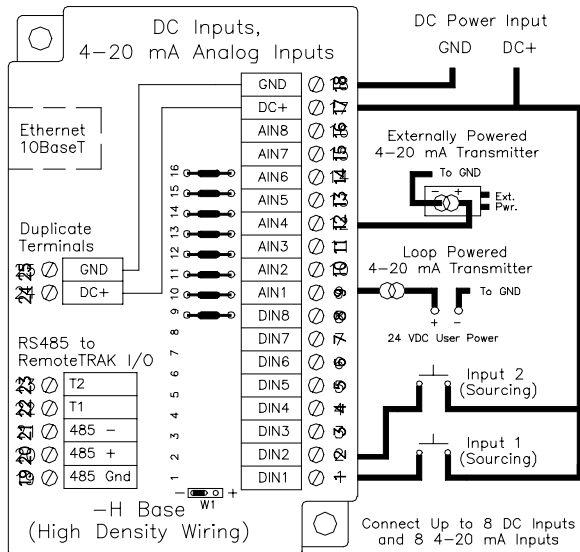
ET-4RTD-4DI2-U   4 RTD Inputs and 4 Discrete Inputs

ET-4RTD-4DI2 Overview

Four RTD inputs provide 16 bit high resolution analog measurements. Discrete inputs may be wired as all sourcing or sinking. An input count feature uses analog input registers to accumulate the positive transitions of each input. More information on this and other features can be found in the on-line help supplied with the SIXNET I/O Tool Kit program.

Number of Channels	**4 RTD inputs (16 bit resolution), 4 discrete inputs**
RTD Input Type / Range	**100 ohm platinum, -200 to 850 °C**
Discrete Input Range	**12/24 VDC/VAC**
Input Current @ 24 VDC	**6.7 mA**

Wiring and Jumpers

See the wiring diagram below for RTD inputs. Discrete inputs need positive DC or AC voltage applied to an input to indicate an ON condition. All channels are referenced to a common return or supply, which is connected to the negative side (ground) or positive side (DC+) of the DC power source. One wire from each sourcing field input should be bussed together and connected to terminal 17 (DC +). One wire from each sinking field input should be bussed together and connected to terminal 18 (DC GND). Refer to the wiring diagram below. Set jumper W1 to match the wiring configuration of the discrete inputs

I/O Registers

Function	SIXNET Registers	Modbus Registers
RTD Inputs	AX0 – AX3	30001 – 30004
Discrete Inputs	X0 – X3	10001 – 10004
Counter Inputs	AX4 – AX7	30005 – 30008
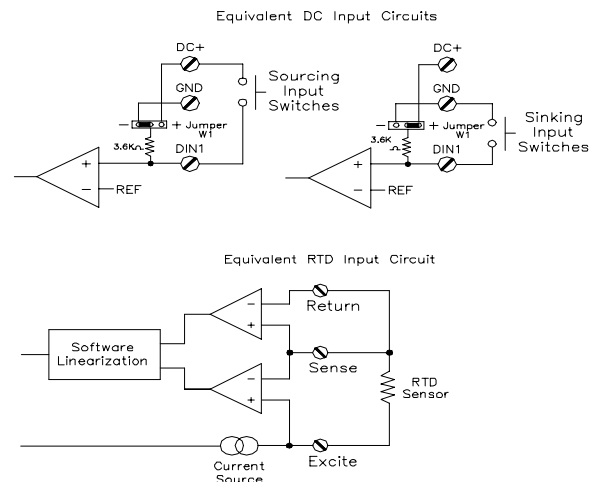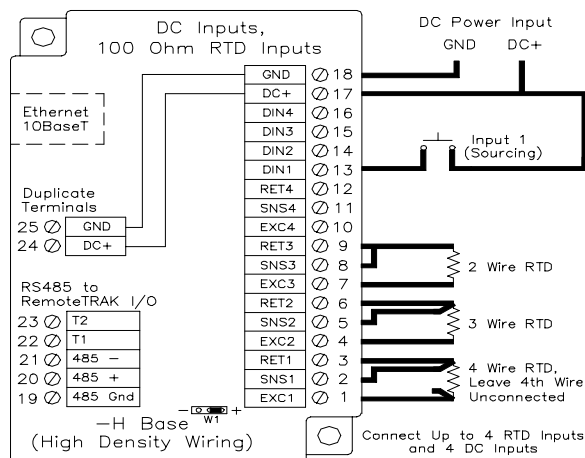
Section 7 | Analog Input Modules

ET-16AI2-H   **High Density 4-20 mA Analog Input Module**

ET-16AI2 Overview

Sixteen 4-20 mA inputs provide 14 bit high resolution analog measurements. More information can be found in the on-line help supplied with the SIXNET I/O Tool Kit program.

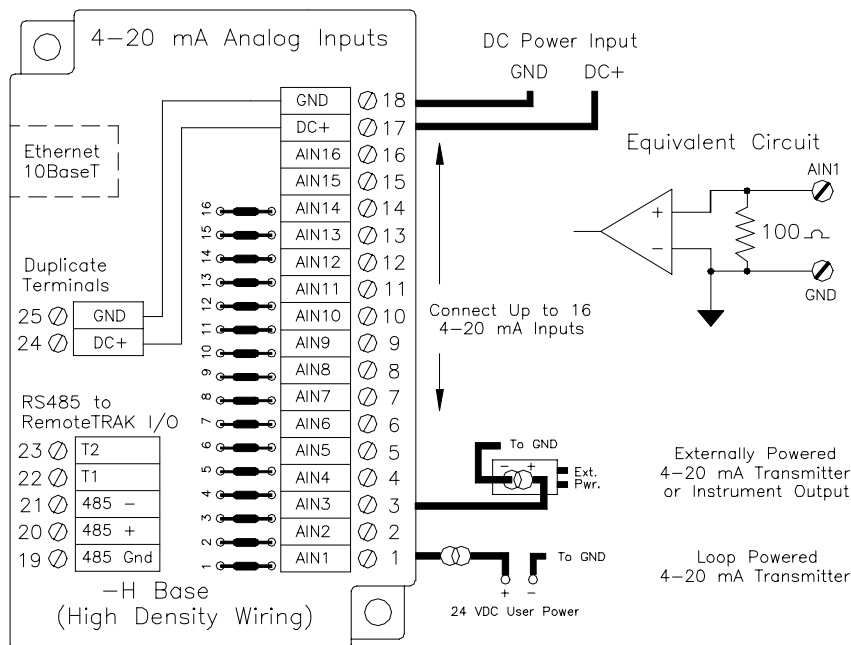|	
Number of Channels	**16 (14 bit resolution)**
Input Range	**4 - 20 mA**
Input Impedance	**100 ohms** **Note:** input voltage drop = 2 volts at 20 mA

Wiring

A single input terminal is provided for each measurement channel. Care must be taken to externally provide a suitable instrumentation ground for these single ended input circuits.

Current Shunts

Precision 100 ohm current shunts, beneath the hinged access door in the wiring base, pass current and maintain loop integrity even if the module is unplugged. A spare shunt is provided and may be simply inserted in place of any shunt that open-circuits as a result of a current overload.

I/O Registers

Function	SIXNET Registers	Modbus Registers
Analog Inputs	AX0 – AX15	30001 – 30016

ET-8INS-U   Instrumentation Analog Input Module

ET-8INS Overview

Eight configurable inputs provide 16 bit high resolution analog measurements. More information can be found in the on-line help supplied with the SIXNET I/O Tool Kit program.

Number of Channels	**8 (16 bit resolution)**
Input Range	**0/4 - 20 mA, 62 mV to 10V, JKERTBCNS thermocouples**
Input Impedance (current)	**100 ohms** **Note:** input voltage drop = 2 volts at 20 mA
Input Impedance (other ranges)	**200K Ohms**

ET-8INS Wiring

Two input terminals are provided for each measurement channel. Channel to channel isolation is provided.

4-20 mA Input Jumpers

This module has a 4-20 mA input enable jumper for each channel. Set each jumper to match the desired input as shown in the diagram below. The jumper setting must match the range selection in the SIXNET I/O Tool Kit.

Current Shunts

Precision 100 ohm current shunts, beneath the hinged access door in the wiring base, pass current and maintain loop integrity even if the module is unplugged. A spare shunt is provided and may be simply inserted in place of any shunt that open-circuits as a result of a current overload.

I/O Registers

Function	SIXNET Registers	Modbus Registers
Analog Inputs	AX0 – AX7	30001 – 30008
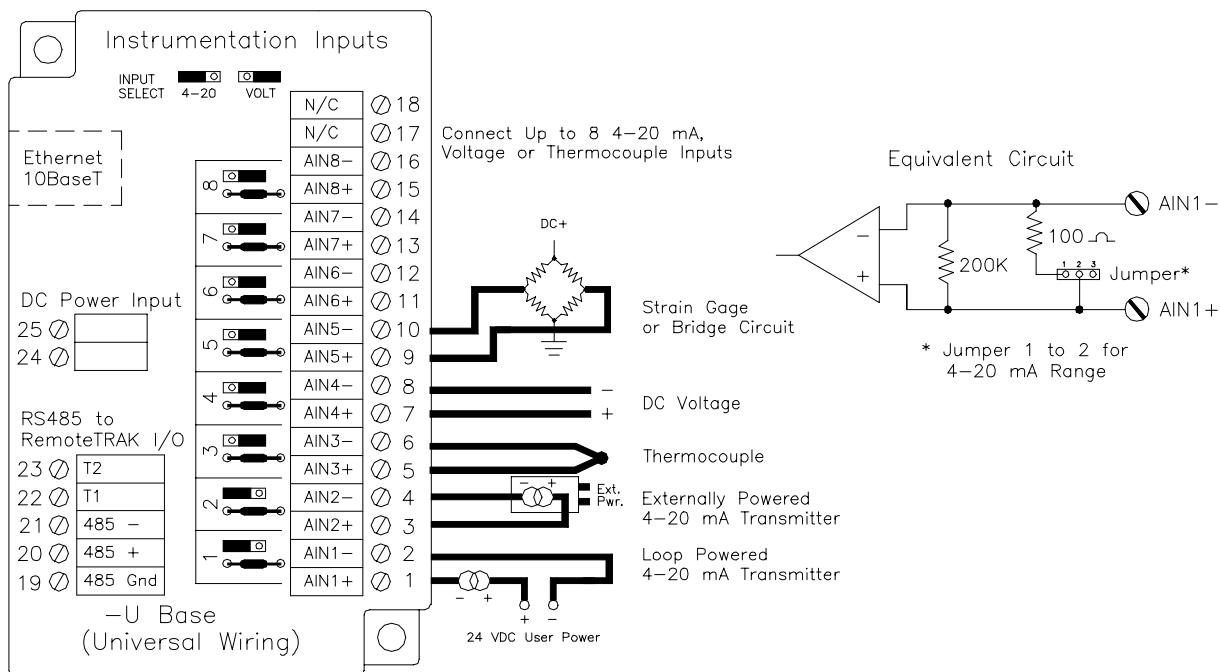
Section 8 | Analog I/O Module

ET-8AI2-4AO2-H   Combined Analog Input and Output Module

ET-8AI2-4AO2 Overview

This module combines eight 4-20 mA analog inputs and four 4-20 mA outputs. More information can be found in the on-line help supplied with the SIXNET I/O Tool Kit program.

Number of Analog Inputs	**8 (14 bit resolution)**
Input Range	**4 - 20 mA**
Input Impedance	**100 ohms** **Note:** input voltage drop = 2 volts at 20 mA
Number of Analog Outputs	**4 (16 bit resolution)**
Output Range	**4 - 20 mA**

Wiring

A single input terminal is provided for each input and output channel. Care must be taken to externally provide a suitable instrumentation ground for these input and output circuits.

I/O Registers

Function	SIXNET Registers	Modbus Registers
Analog Inputs	AX0 – AX7	30001 – 30008
Analog Outputs	AY0 – AY3	40001 – 40004
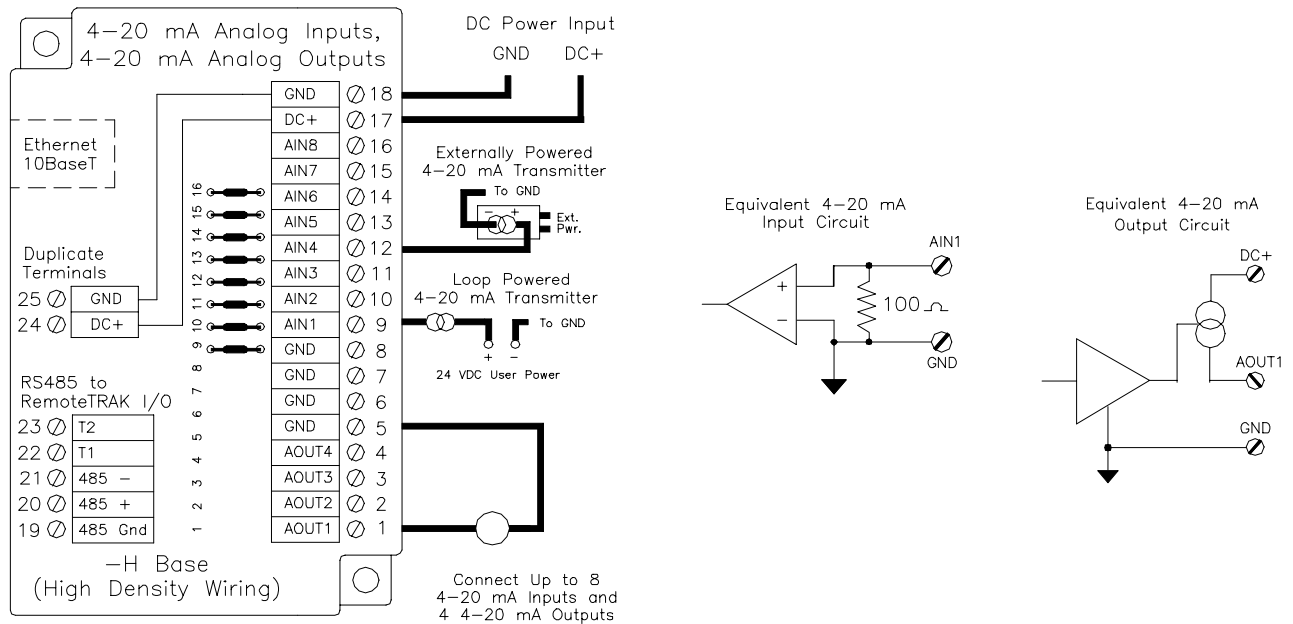
Section 9 | Ethernet Gateways

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 SIXNET 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 interchange between a telephone modem and Ethernet interface

Ethernet Protocols Supported	**Modbus/TCP (Open Modbus) and SIXNET**
Serial Protocols Supported	**Modbus ASCII, Modbus RTU and SIXNET**
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 SIXNET VT-CABLE-MDM, can be used to connect the RS232 port of this gateway to a SIXNET 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 this gateway directly to a computer 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
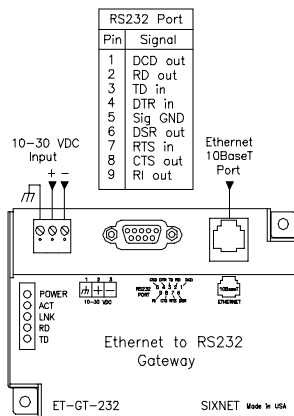
ET-GT-485-1   **Ethernet to RS485 Converter**

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

Ethernet Protocols Supported	**Modbus/TCP (Open Modbus) and SIXNET**
Serial Protocols Supported	**Modbus ASCII, Modbus RTU and SIXNET**
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 this gateway directly to a computer 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
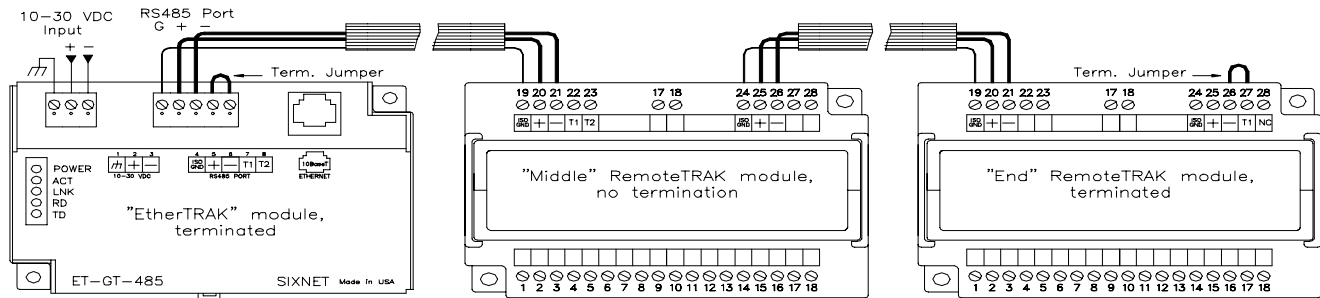
ET-GT-ST-1   Ethernet to SIXTRAK Converter

ET-GT-485-1 Overview

This Ethernet to SIXTRAK gateway is typically used connect one or more SIXTRAK modules to an Ethernet network.

Ethernet Protocols Supported	**Modbus/TCP (Open Modbus) and SIXNET**
Serial Port Protocols Supported	**Modbus ASCII / RTU and SIXNET**
Maximum number of SIXTRAK modules	**20 without expander, 128 using expanders**
Maximum number of I/O	**1024**
Supply voltage	**18 – 30 VDC**
Power Consumption (less modules)	**2.5 watts**

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

Power, ST-Bus Wiring

This gateway operates on 18 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 ST-Bus 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 this gateway directly to a computer or other Ethernet master device.

ST-Bus Wiring Guidelines

The ET-GT-ST-1 supports up to 128 SIXTRAK I/O modules using expanders. Refer to the SIXTRAK User Manual for more ST-Bus wiring information.
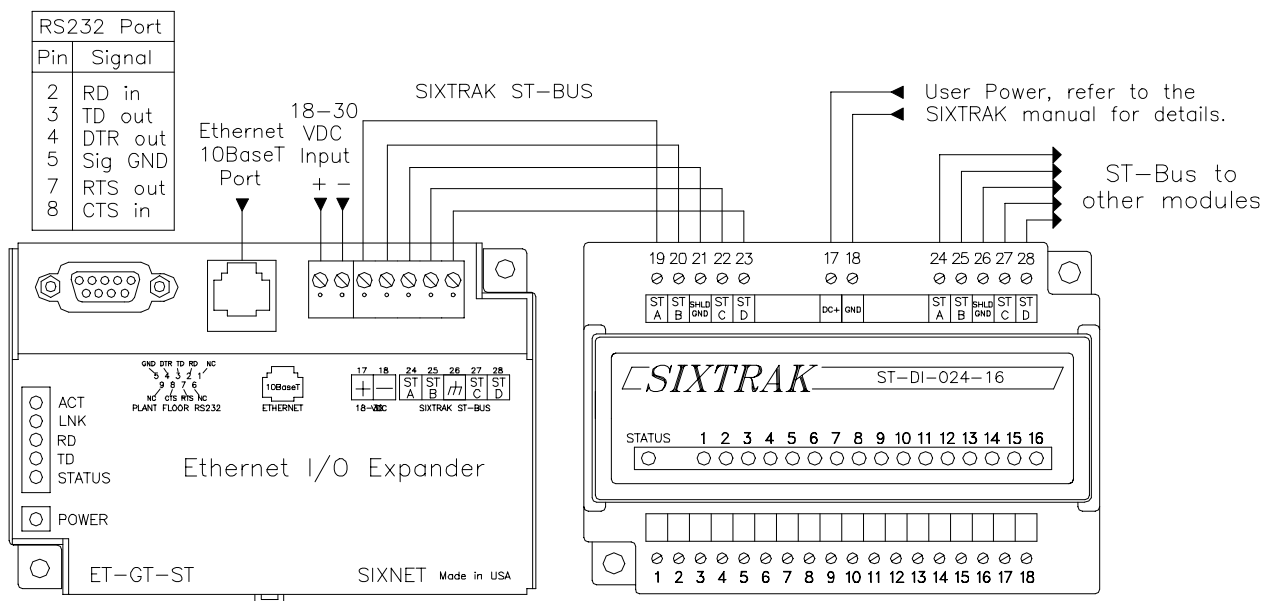
| **Section 9** | # Service Information |

We sincerely hope that you never experience a problem with any **SIXNET** product. If you do need service, call **SIXNET** at (518) 877-5173 and ask for Applications Engineering. 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 RMA (Return Material Authorization) number will be given to you.

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

The applications engineer you are speaking with will fill out an RMA request for you. If the unit has a serial number, we will not need detailed financial information. Otherwise, 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 RMA 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. Normally, repairs are completed in two days. Sometimes difficult problems take a little longer to solve.

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. Many repairs received by mid-morning (typical overnight delivery) can be finished the same day and returned immediately.

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 **SIXNET** system for future reference:

P.O. #:_____   Date Purchased: _____

Purchased From:_____

Product Support

To obtain support for SIXNET products, call SIXNET and ask for applications engineering. Our phone numbers are:

> +1 (518) 877-5173 Office
> +1 (518) 877-8346 Fax
> e-mail: support@sixnetio.com

> Our mailing address:
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>   331 Ushers Rd.
>   P.O. Box 767
> Clifton Park, NY 12065