BusWorks® XT Series Ethernet I/O

DIN-Rail Mount

USB-Configured

Dual Ethernet

Ethernet Analog and Discrete I/O Modules

Answers @ Acromag

Experience counts: especially when selecting an I/O partner. And with 50 years of I/O experience, Acromag can help you improve reliability, increase productivity and reduce your costs.

2 YEAR WARRANTY

24 HOUR STOCK ITEM

ISO9001 AS9100

MADE IN USA

Acromag: The I/O Leader

Acromag is a customer-driven manufacturer focused on developing embedded I/O products that provide the best long term value in the industry. Compare and you'll find that Acromag products offer an unmatched balance of price, performance, and features.

50 Years of I/O Experience

Acromag has more than 50 years of measurement and control experience. Since 1957, we have delivered nearly a million units to thousands of customers around the globe for manufacturing, power, environmental, transportation, and military applications.

Quality with a 2-Year Warranty

We take every measure to guarantee you dependable operation and products that perform at or beyond the specifications. State-of-the-art manufacturing and military-grade components add an extra degree of ruggedness. Acromag is also certified for ISO9000/AS9100 quality control management procedures.

All trademarks are the property of their respective owners.

Online Ordering

For your convenience, Acromag provides full product documentation and pricing information on our website. You can obtain quotes or even place your order directly on our website.

Fast Delivery from Stock

Most products can be shipped within 24 hours of receiving your order.

Special Services

We are happy to accommodate your special requirements and offer the following services:
• Custom product development
• Custom calibration
• Source inspections, quality audits
• Special shipping, documentation
• Protective humiseal coating
• Plastic and stainless steel tagging

Certification and Approvals

Many Acromag products carry globally recognized agency approvals and safety certifications.

• CE	• Ethernet/IP conformance
• UL, cUL	• Modbus conformance
• Atex	• HART conformance
• CSA	

30765 South Wixom Road, Wixom, Michigan 48393 USA ■ Tel: 248-295-0880 ■ www.acromag.com

BusWorks XT Series Ethernet I/O Modules

Introduction

The BusWorks XT series is a rugged, flexible line of Ethernet I/O modules that features channel versatility with housing to reliably withstand harsh industrial environments.

Rugged construction, high density design, and convenient USB programming make these instruments ideal for many applications including: remote monitoring, distributed control, and SCADA.

Key Features and Benefits

- **Convenient Housing:**
  22.5mm wide with pluggable, front-facing terminals

- **Simple USB Configuration:**
  Free Windows software enables easy setup with a USB-to-PC connection

- **Dual Ethernet:**
  Two 10/100Mbps Ethernet ports with auto-negotiation reduce switch port requirements

- **Peer-to-peer Ethernet Communication:**
  i2o technology in Modbus units enable module-to-module communication without a controller

- **Fully Isolated:**
  I/O, network, and power circuits isolated from each other at 1500V AC for safety and noise immunity

- **Redundant Power:**
  Accepts power via terminal block or DIN rail bus connector for simple backup power supplies

- **Wide Ambient Temperature Range:**
  Provides reliable operation from -40 to 70°C

- **Built Rugged:**
  Shock and vibration resistant, with CE and UL/cUL Class 1 Div 2 Zone 2 approvals and ATEX certification.

Digital I/O	Analog Input		Multi-function
XT1110 **16-ch, sinking**	**XT1210** **8-ch, current**	**XT1220** **8-ch, voltage**	**XT1530** **4-ch, analog current out** **4-ch, discrete I/O**
Input ■ 0-32V DC **Output** ■ 0-32V DC ■ Up to 250mA	**Input** ■ 0 to 11mA, 0 to 20mA, 4 to 20mA, ±20mA ■ 0-20A AC	**Input** ■ ±5V, ±10V, 0-5V, 0-10V	**Analog Output** ■ 0-20mA, 4-20mA **Discrete Input/Output** ■ 0-32V DC
See data sheet	See data sheet	See data sheet	See data sheet
XT1120 **16-ch, sourcing**	**XT1230** **16-ch, current**	**XT1240** **16-ch, voltage**	**XT1540** **8-ch, analog voltage out** **4-ch, discrete I/O**
Input ■ 0-32V DC **Output** ■ 0-32V DC ■ Up to 300mA	**Input** ■ 0 to 11mA, 0 to 20mA, 4 to 20mA, ±20mA ■ 0-20A AC	**Input** ■ ±5V, ±10V, 0-5V, 0-10V	**Analog Output** ■ ±5V, ±10V **Discrete Input/Output** ■ 0-32V DC
See data sheet	See data sheet	See data sheet	See data sheet
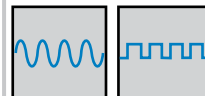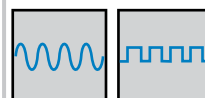
Acromag
THE LEADER IN INDUSTRIAL I/O

Key Features

Time-Critical

Each module utilizes Innovasic PriorityChannel™ for determinism at the device regardless of the network load.

Daisy-Chaining

Dual Ethernet 10/100 ports allow for flexible device cabling to save space and reduce costs.

Simple Configuration

Digital setup and calibration with straightforward Windows (XP, Vista, 7, 8) software via USB.

Rail Power Bus

Accepts power through the DIN rail bus connector for easy installation of a redundant backup power supply or for multiple units to share a power source.

Space Saving

A 22.5mm wide, rugged enclosure easily achieves high-density DIN-rail mounting.

Rugged Design

-40 to 70°C

Wide ambient temperature operation, shock and vibration-resistant, with CE and UL/cUL Class 1, Division 2, Zone 2 approvals and ATEX certification.

C UL US LISTED Class 1 Div 2   CE   Ex

Ethernet I/O: BusWorks® XT Series

Easy Peer-to-Peer Communication with Acromag i2o®

i2o input-to-output communication

Acromag's i2o technology provides the easiest way to link your inputs to your outputs without a PLC, PC or master CPU.
With i2o, many BusWorks XT I/O modules have the ability to operate like a long-distance transmitter. You can convert your sensor inputs at Point A to process control signals at Point B. Or, monitor a discrete device at one site by reproducing the discrete level with a relay output at another location.

Use your existing Ethernet lines to save time and wiring expenses
You can connect the input modules to the output modules using your existing copper/fiber infrastructure or with a single new cable. Multiple I/O modules can be multiplexed through a switch or wireless radios.

No complicated controllers. No software. No programming.
Acromag's Ethernet I/O modules have a built-in web page making it simple to configure using your standard web browser. Just click a few menu settings, enter the IP addresses, and you are done. Fast and easy.

BusWorks XT Series I/O Modules

XT Series Modules with i2o

Discrete I/O Modules
XT1111 16-channel, sinking outputs
XT1121 16-channel, sourcing outputs

Analog Input Modules
XT1211 8 differential current inputs
XT1221 8 differential voltage inputs
XT1231 16 single-ended current inputs
XT1241 16 single-ended voltage inputs

Multi-function Modules
XT1531 4 analog current outputs, 4-channel digital I/O
XT1541 8 analog voltage outputs, 4-channel digital I/O

Wire-saving applications
Our i2o technology lets an input module speak directly to an output module. It is ideal for non-critical projects that don't need a PLC or PC master. Reproduce remote signals based on timed or event updates.

- Remote monitoring of process variables (temperature, pressure, level, flow) and discrete devices
- Remote data display, recording, alarms, or control
- Signal splitters
- Analyzer system monitoring
- Power and water utility monitoring
- Tank level, pump, and valve control
- Remote monitoring of motor loads and contactor status
- Remote control switching stations
- Environmental control systems
- Process shutdown, alarming, and annunciator systems
- RFID systems

Peer-to-Peer Communication

Analog Inputs
±20mA, 4-20mA, 0-20A AC, 0-10V DC ±10V DC
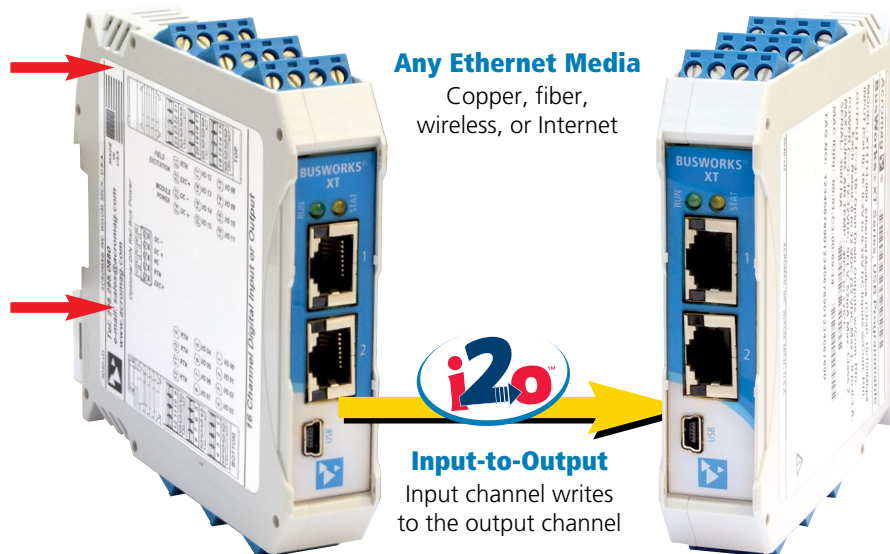
Discrete Inputs
0-32V DC

Any Ethernet Media
Copper, fiber, wireless, or Internet

Analog Outputs
0-20mA, 4-20mA, ±10V, ±5V

Discrete Outputs
0-32V DC, up to 300mA

Input-to-Output
Input channel writes to the output channel

(uni-directional or bi-directional communication)

Tel: 248-295-0880 ■ Fax: 248-624-9234 ■ sales@acromag.com ■ www.acromag.com ■ 30765 S Wixom Rd, Wixom, MI 48393 USA

– 5 –

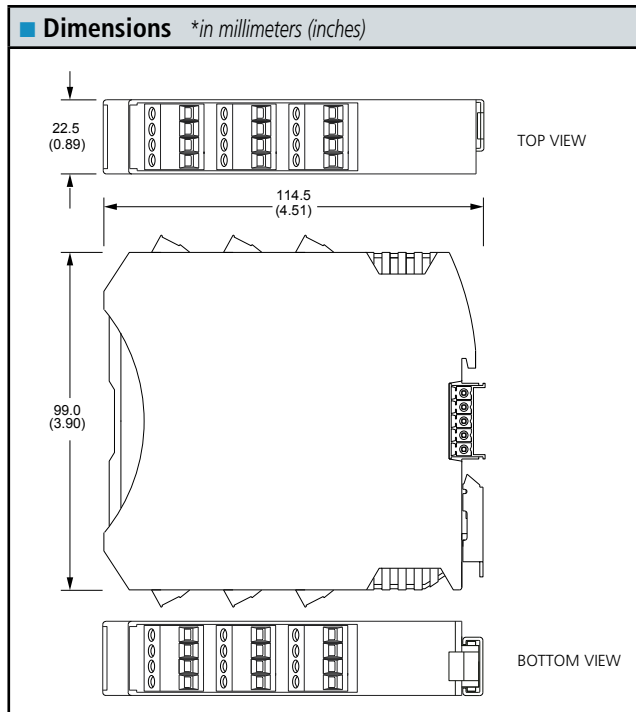# Ethernet I/O: BusWorks® XT Series

General Operation and Performance Specifications

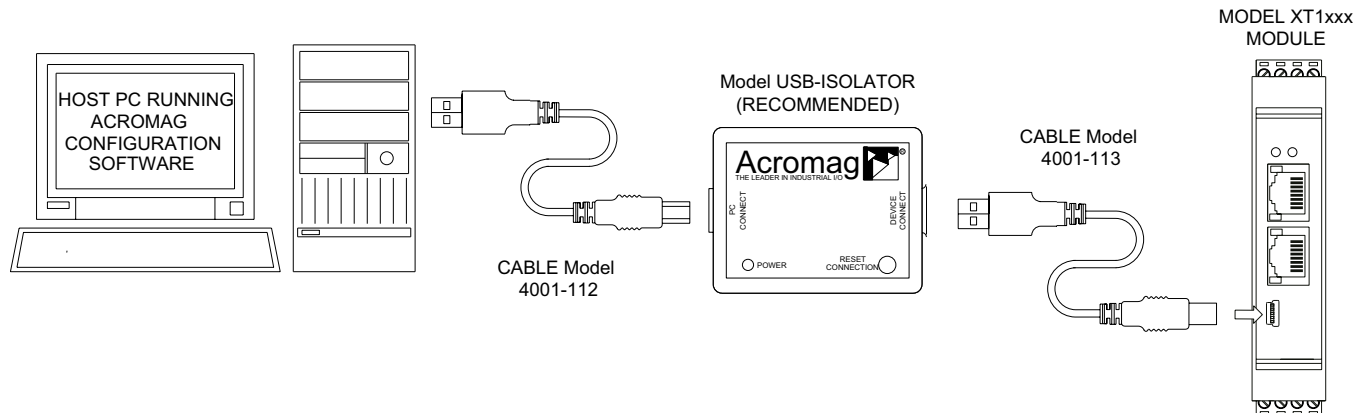The following specifications are common to all XT1000 Series transmitter modules.

■ USB Interface

USB Connector	USB Mini-B type socket, 5-pin
USB Data Rate	12Mbps. USB v1.1 and 2.0 compatible

■ Environmental

Operating Temperature	Varies by module, please see datasheet for details
Storage Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	5 to 95% non-condensing
Power Requirement	12-32V DC, see module datasheet for details
Isolation	1500V AC peak. 250V AC (354V DC) continuous isolation between I/O channels, network (each port), and power.
Shock and Vibration Immunity	Vibration: 4g, per IEC 60068-2-64. Shock: 25g, per IEC 60068-2-27.
Electromagnetic Compatibility (EMC) Compliance	Radiated Emissions: BS EN 61000-6-4, CISPR 16. RFI: BS EN 61000-6-2, IEC 61000-4-3. Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6. ESD: BS EN 61000-6-2, IEC 61000-4-2. EFT: BS EN 61000-6-2, IEC 61000-4-4. Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.
Approvals	CE compliant. UL/cUL listing. ATEX Certified. Designed for Class I; Division 2; Groups ABCD; Zone 2. ⟨Ex⟩ II 3 G Ex nA IIC T4 Gc -40°C $\leq$ Ta $\leq$ +80°C

■ Physical

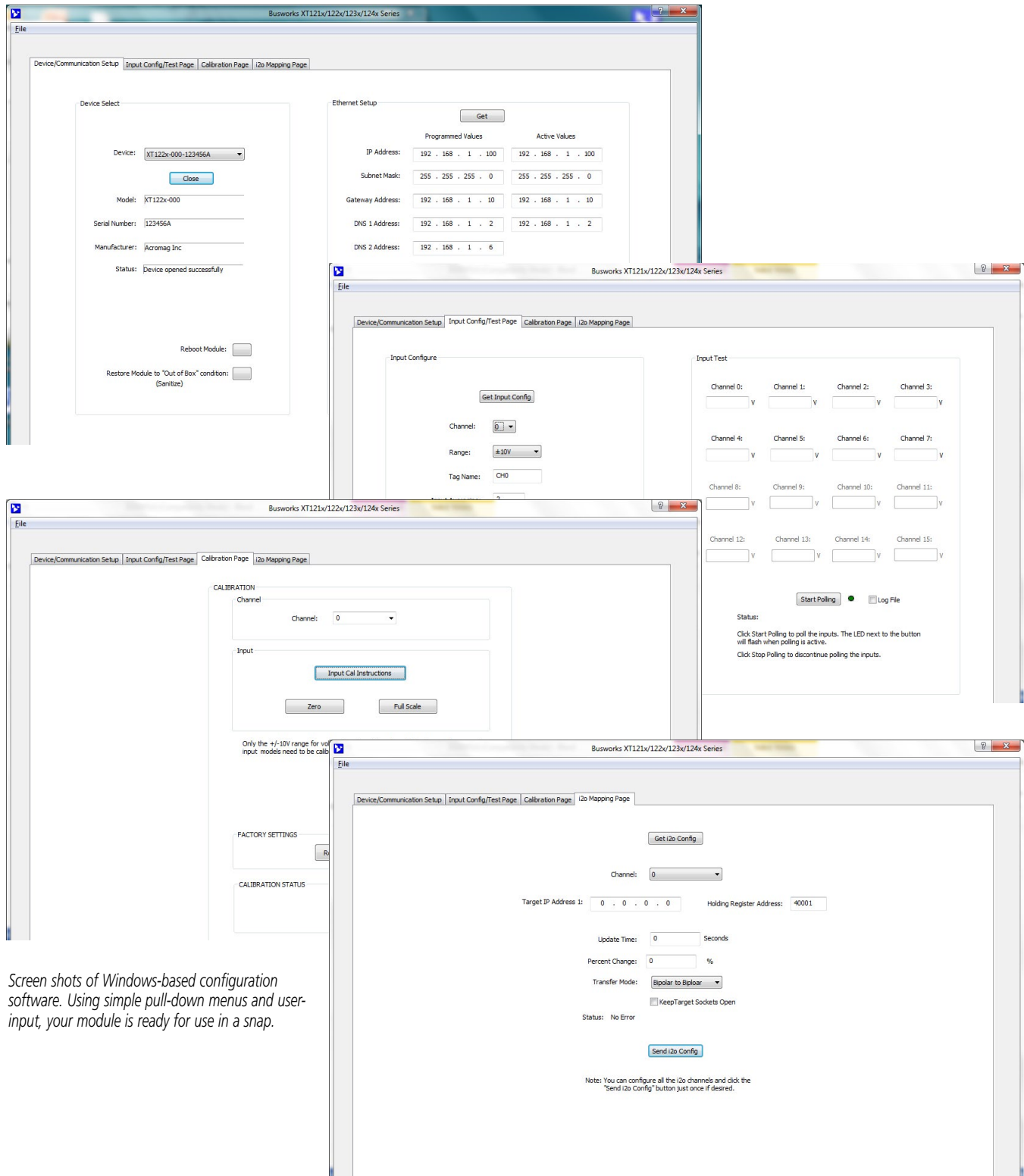|	
General	General-purpose enclosure designed for mounting on 35mm "T-type" DIN rail.
Case Material	Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General-purpose NEMA Type 1 enclosure.
I/O Connectors	Removable plug-in terminal blocks rated for 12A/250V; AWG #26-12, stranded or solid copper wire.
Shipping Weight	0.22 kg (0.5 pounds) packed

■ Dimensions   *in millimeters (inches)*

22.5 (0.89)
114.5 (4.51)
99.0 (3.90)

TOP VIEW
BOTTOM VIEW

TT Series USB Transmitter Connections

HOST PC RUNNING ACROMAG CONFIGURATION SOFTWARE

CABLE Model 4001-112

Model USB-ISOLATOR (RECOMMENDED)

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PC CONNECT
DEVICE CONNECT
POWER   RESET CONNECTION

CABLE Model 4001-113

MODEL XT1xxx MODULE

Module Configuration

Screen shots of Windows-based configuration software. Using simple pull-down menus and user-input, your module is ready for use in a snap.

XTA Relay I/O Modules

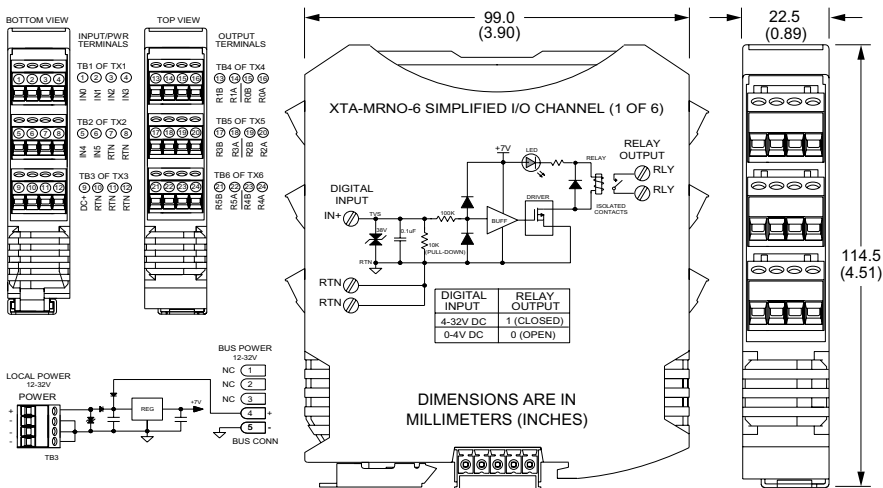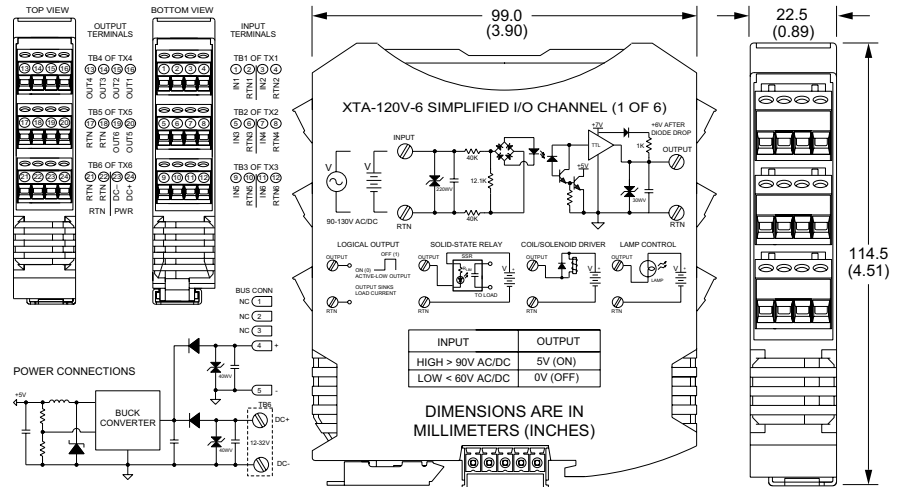### Mechanical Output and Solid-State Input Relay Modules

Acromag's discrete I/O mechanical relay and optocoupler modules pack in 6 isolated channels per unit for a high-density solution in a small, 12.5mm wide package.

Made to work cohesively with Acromag's BusWorkst XT Ethernet I/O line, they also integrate easily with any discrete I/O products. Each module is designed for ATEX and CE and UL/cUL Class 1 Div 2 standards and built rugged for more demanding conditions.

XTA-120V Solid-State Relay

The optocoupler module XTA-120V monitors on-off and power supply voltage levels to drive open-drain outputs. Each channel senses the status from proximity/limit/toggle switches, push buttons, contacts, and other solid-state logic devices.

- Six High-Level Voltage Inputs:
  0-130Vrms or ±130V DC

- Six Logic-Level Outputs:
  Open-drain: 1Kohms pull-up to +5.3V DC
  0-32V DC max, 150mA sink

- Built-In Hysteresis:
  Optimized for mains power at 120Vrms

INPUT	OUTPUT
HIGH > 90V AC/DC	5V (ON)
LOW < 60V AC/DC	0V (OFF)

DIMENSIONS ARE IN MILLIMETERS (INCHES)

DIGITAL INPUT	RELAY OUTPUT
4-32V DC	1 (CLOSED)
0-4V DC	0 (OPEN)

DIMENSIONS ARE IN MILLIMETERS (INCHES)

XTA-MRNO Mechanical Relay

Helping to drive high energy loads, the XTA-MRNO mechanical relay output module serves as an interim digital interface to switch high voltage devices at high currents based on digital logic inputs.

- Six Buffered Digital Logic Inputs:
  4-32V digital logic

- Six Mechanical Relay Outputs:
  Relays drive up to 250V AC/30V DC at 5A

- Mechanical Relay Contacts:
  Normally open, sealed, Form A mechanical relay contacts (SPST-NO)

Accessories

◆ Configuration Software

XT Series Configuration
Simple to use, whether you need the full software interface package (includes USB isolator and cables) or just the configuration software itself. Acromag makes it easy to get started.
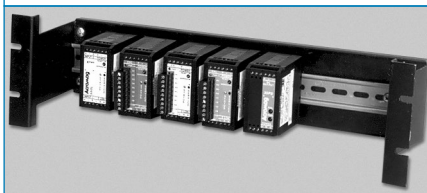
◆ Mounting Hardware

Din-Rail Mounting
For your convenience, Acromag offers several mounting accessories to simplify your system installation. Our 19" rack-mount kit provides a clean solution for mounting your I/O modules and a power supply. Or you can buy precut DIN rail strips for mounting on any flat surface.

◆ Power Supplies

Universal Slimline Power Supplies
Input Power Requirement
85 to 264V AC or 105 to 370V DC

Output
5V DC, 12V DC, or 24V DC
10W to 240W

◆ USB Isolator and Cables

USB-to-USB Isolator

This compact, industrial-grade isolator provides a high-voltage isolation barrier between a computer and a connected USB device; protecting equipment from electrical surges, transient voltage spikes, and ground loop currents.

◆ USB Cables

Cables for both PC-to-USB isolator and USB isolator-to-transmitter connections.

Ethernet I/O: BusWorks® XT Series

XT1110 Ethernet Discrete I/O Modules (sinking outputs)

‹Ex› c UL us LISTED CE /24 HOUR STOCK ITEM *2* YEAR WARRANTY RoHS Compliant

Modbus TCP/IP

EtherNet/IP conformance tested

PROFINET

with PriorityChannel™ Technology

USB Configured

EXAMPLE INPUT CONNECTIONS

NORMALLY OPEN DRY CONTACT

12-32V DC — EXC / DI/O / N.O. / RTN
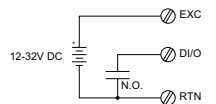
NORMALLY CLOSED DRY CONTACT
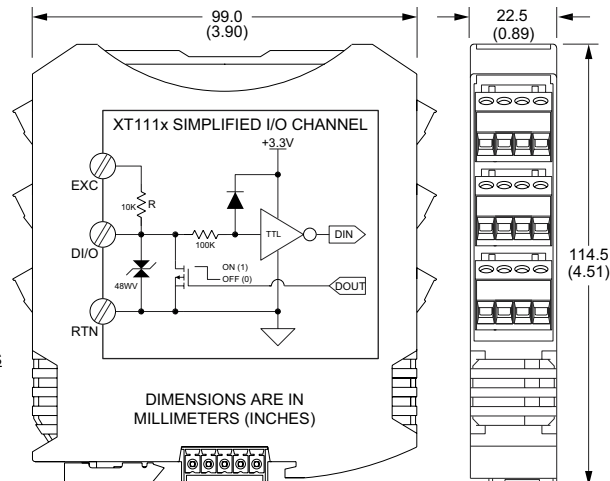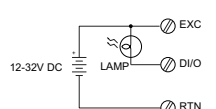
12-32V DC — N.C. / EXC / DI/O / RTN

EXAMPLE OUTPUT CONNECTIONS

12-32V DC — LAMP / EXC / DI/O / RTN

XT111x SIMPLIFIED I/O CHANNEL
+3.3V
EXC 10K R
DI/O 100K TTL DIN
48WV ON (1) OFF (0) DOUT
RTN

99.0 (3.90)   22.5 (0.89)   114.5 (4.51)

DIMENSIONS ARE IN MILLIMETERS (INCHES)

16 discrete tandem input/output channels ◆ **Modbus TCP/IP, Ethernet/IP, Profinet, or i2o communication**

Description

The XT1110 interfaces discrete I/O signals between measurement and control devices over Ethernet. Channels are individually configurable for input or low-side switched output operation.

Rugged construction, high density design, and easy USB-to-PC/Windows setup combine for a very effective I/O solution. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Input/Output Ranges
Input: 0-32V DC, TTL thresholds
Output: 0-32V DC, open-drain, up to 250mA
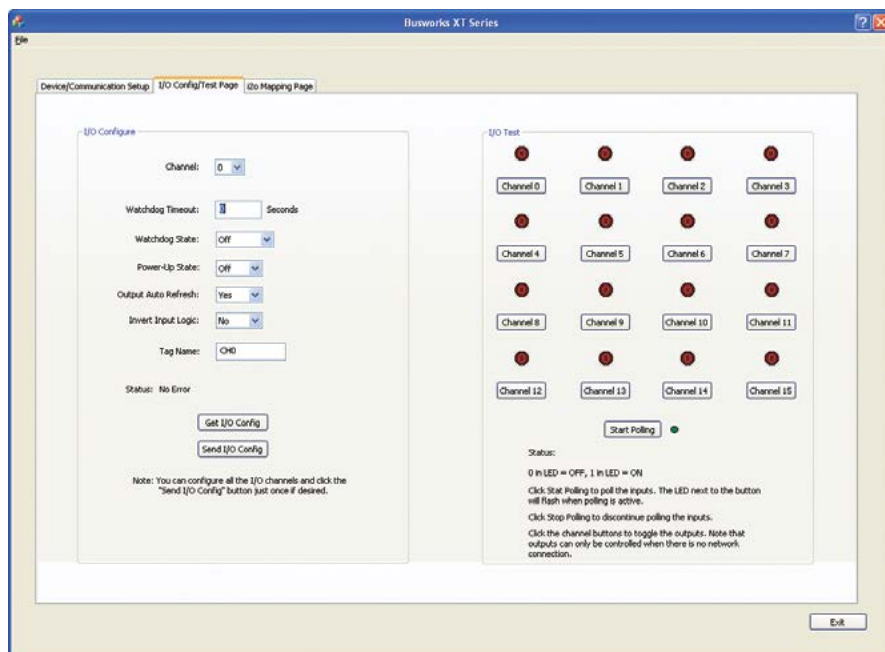
Ethernet Communication
Modbus TCP/IP, Ethernet/IP, Profinet, i2o® peer-to-peer, 10/100Base-T(X) PriorityChannel™ device determinism

Power Requirement
12 to 32V DC (2.5W)

Key Features & Benefits

■ 16 solid-state discrete I/O channels (any mix of inputs or outputs)

■ Built-in 10K ohm pull-up resistors for 2/3-wire sensors (contacts, proximity, TTL)

■ Configurable normal/reverse input logic

■ Outputs include built-in read-back capability

■ Easy setup with Windows software via USB

■ Watchdog timer control of failsafe outputs

■ Continuously changing "heart-beat" register validates module operation

■ High-Density 22.5mm wide package with pluggable, front-facing terminals

■ Dual Ethernet 10/100 ports (auto-negotiation) reduce switch port requirements

■ 1500V AC isolation (between I/O, power, and network ports) and surge/transient protection

■ Supports bussed/rail and redundant power

■ -40°C to +70°C wide temperature operation

■ Withstands 25g shock and 4g vibration

■ CE and UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

BusWorks XT software (download free from www.acromag.com) allows you to configure I/O modules offline with USB, save the file, and download settings into units later, at your convenience.

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XT1110 Ethernet Discrete I/O Modules (sinking outputs)

Performance Specifications

> IMPORTANT: To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an XT1000 I/O module.

■ USB Interface

USB Connector
Type: USB Mini-B type socket, 5-pin.
Data rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.

USB Transient Protection
Transient voltage suppression on power and data lines.

Driver
Not required. Uses Windows HID drivers.

■ Input

Input Type
16 active-low, buffered inputs, with a common connection. Inputs are tied in tandem to output drains for optional loopback monitoring of output state.

Input Signal Voltage Range
0 to 32V DC.

Input Current
280µA, typical at 32V DC.

Input Signal Threshold
1.7V typical with100mV of hysteresis.

Input Resistance
100K ohms, typical.

Input Response Time
10ms, nominal.

■ Output

Output Type
16 open-drain, smart, n-channel mosfet switches with a common source connection. Provides low-side (sinking) switching between the load and return.

Output Voltage
0 to 32V DC.

Output "ON" Resistance
0.8 ohms typical, 1.6 ohms maximum.

Output "ON" Current Range
0 to 250mA DC, continuous (up to 4A total for all 16 channels combined). See Operating Temperature specification for effect of channels at full load. See manual for detailed effects of operating temperature.

Output Response Time
10ms, nominal.

■ Ethernet Communication

Protocols
Modbus TCP/IP, i2o peer-to-peer, Ethernet/IP, or Profinet depending on model number.

Ethernet Communication Controller
Innovasic RapID™ Platform with PriorityChannel™ for determinism at the device regardless of network load.

Modbus TCP/IP (slave)
Port 502 reserved. Supports up to 10 sockets.

i2o Peer-to-Peer (master/slave)
Can map 4-channel input groups to output groups at two destination IP addresses. Timed or change-of-state updates. Supports GPRS/GSM systems.

Ethernet/IP (adapter)
Supports 16 connections. EDS file on website.

Profinet (server)
Supports 1 connection. GSDML file on website.

Connectors
Two shielded 8-pin RJ-45 sockets, 10BaseT/100BaseTX.

Wiring
Auto-crossover for MDI or MDI-X.

IP Address
User-configurable. 128.1.1.100 default static IP address.

Data Rate
Auto-negotiated, 10Mbps or 100Mbps.

Compliance
IEEE 802.3, 802.3u, 802.3x.

■ Environmental

Operating temperature
-40 to 70°C (-40 to 158°F). Max temperature derates -0.625°C per output channel at full load (250mA).

Storage temperature
-40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

Power Requirement
12 to 32V DC (102mA maximum @ 24V).

Isolation
4-way isolation between I/O channels, network (each port), and power.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

Approvals
CE compliant. UL/cUL Class I; Div. 2 Zone 2. ATEX Cert. Ⓔ II 3 G Ex nA IIC T4 Gc -40°C ≤ Ta ≤ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass (IPC-4101/98).

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XT1111-000
Digital I/O module, Modbus/TCP and i2o protocol.

XT1112-000
Digital I/O module, Ethernet/IP protocol.

XT1113-000
Digital I/O module, Profinet protocol.

◆ Software

XT-SIP   (recommend one kit per customer)
Software Interface Package. Includes software (XT-CONFIG), isolator (USB-ISOLATOR), two USB cables (4001-112, 4001-113), Ethernet cable (5035-360).

◆ Accessories

XTA-120V-6
XTA-240V-3
6-channel 120V AC/DC or 3-channel 240V AC/DC discrete input module with 5V DC logic outputs. Interfaces with sinking/sourcing DC Inputs.

XTA-MRNO-6
6-ch mechanical relay output module, Form A, SPST normally open 5A relays (5/12/24V DC logic input).

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).

USB-ISOLATOR
USB-to-USB isolator, includes USB cable (4001-112).

ISO9001
AS9100

MADE IN USA

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▶ Ethernet I/O: BusWorks® XT Series

XT1120 Ethernet Discrete I/O Modules (sourcing outputs)

⟨Ex⟩ c(UL)us LISTED CE /24 HOUR STOCK ITEM ★2★ YEAR WARRANTY ◈RoHS Compliant

Modbus TCP/IP
EtherNet/IP conformance tested
PROFI NET
with PriorityChannel™ Technology

EXAMPLE INPUT CONNECTIONS

LOGIC (TTL)

VOLTAGE ON/OFF

EXAMPLE OUTPUT CONNECTIONS

LAMP CONTROL

XT112x SIMPLIFIED I/O CHANNEL

DIMENSIONS ARE IN MILLIMETERS (INCHES)

99.0 (3.90) 22.5 (0.89) 114.5 (4.51)

USB Configured

16 discrete tandem input/output channels ◆ Modbus TCP/IP, Ethernet/IP or Profinet communication

Description

The XT1120 interfaces discrete I/O signals between measurement and control devices over Ethernet. Channels are individually configurable for input or high-side switched output operation.

Rugged construction, high density design, and easy USB-to-PC/Windows setup combine for a very effective I/O solution. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Input/Output Ranges
Input: 0-32V DC, TTL thresholds
Output: 0-32V DC, open-drain, up to 300mA

Ethernet Communication
Modbus TCP/IP, Ethernet/IP, Profinet, i2o® peer-to-peer, 10/100Base-T(X) PriorityChannel™ device determinism

Power Requirement
12 to 32V DC (2.5W)

Key Features & Benefits

- 16 solid-state discrete I/O channels (any mix of inputs or outputs)
- Built-in 10K ohm pull-up resistors for 2/3-wire sensors (contacts, proximity, TTL)
- Configurable normal/reverse input logic
- Open-drain outputs switch up to 300mA each and include built-in read-back capability
- Easy setup with Windows software via USB
- Watchdog timer control of failsafe outputs
- Continuously changing "heart-beat" register validates module operation
- High-Density 22.5mm wide package with pluggable, front-facing terminals
- Dual Ethernet 10/100 ports (auto-negotiation) reduce switch port requirements
- 1500V AC isolation (between I/O, power, and network ports) and surge/transient protection
- Supports bussed/rail and redundant power
- -40°C to +70°C wide temperature operation
- Withstands 25g shock and 4g vibration
- CE and UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

BusWorks XT software (download free from www.acromag.com) allows you to configure transmitters offline with USB, save the file, and download settings into units later, at your convenience.

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Tel 248-295-0880 ■ Fax 248-624-9234 ■ sales@acromag.com ■ www.acromag.com ■ 30765 Wixom Rd, Wixom, MI 48393 USA

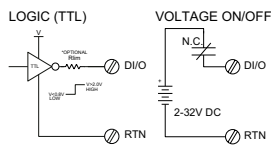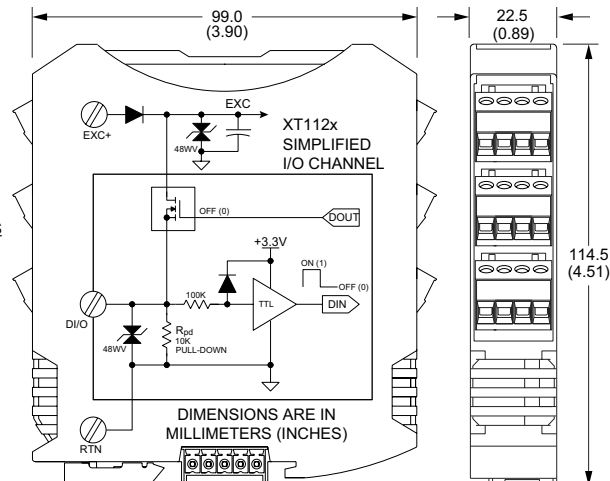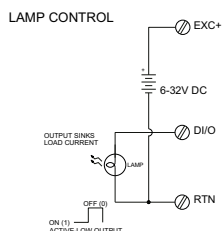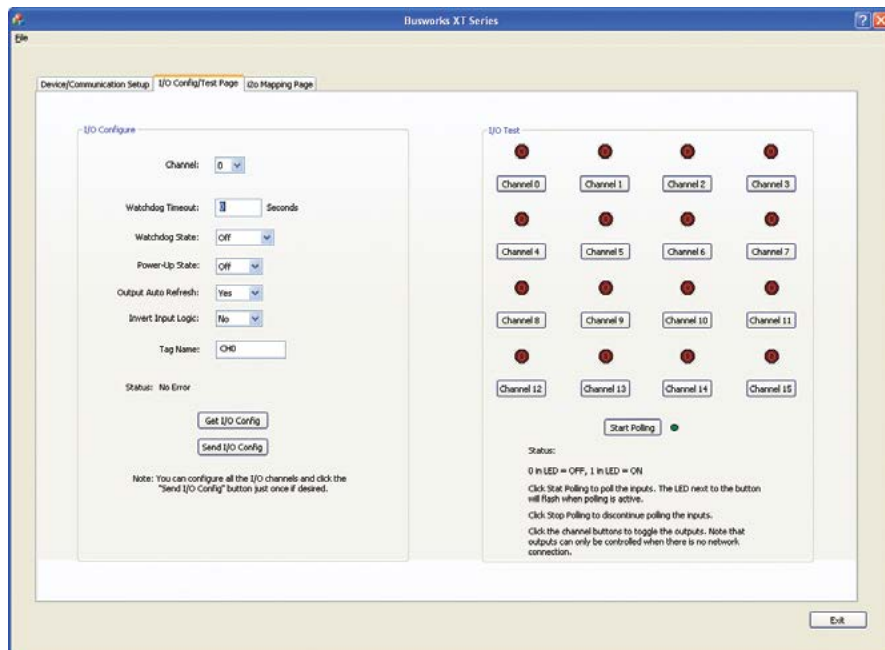# Ethernet I/O: BusWorks® XT Series

XT1120 Ethernet Discrete I/O Modules (sourcing outputs)

Performance Specifications

> **IMPORTANT:** To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an XT1000 I/O module.

■ USB Interface

USB Connector
Type: USB Mini-B type socket, 5-pin.
Data rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.

USB Transient Protection
Transient voltage suppression on power and data lines.

Driver
Not required. Uses Windows HID drivers.

■ Input

Input Type
16 active-high, buffered inputs, with a common connection. Inputs are tied in tandem to output drains for optional loopback monitoring of output state.

Input Signal Voltage Range
0 to 32V DC.

Input Current
280µA, typical at 32V DC.

Input Signal Threshold
1.7V typical with100mV of hysteresis.

Input Resistance
100K ohms, typical.

Input Response Time
10ms, nominal.

■ Output

Output Type
16 open-source, smart, p-channel mosfet switches with a common drain connection. Provides high-side (sourcing) switching between excitation and load.

Output Voltage
0 to 32V DC.

Output "ON" Resistance
0.8 ohms typical, 1.6 ohms maximum.

Output "ON" Current Range
0 to 300mA DC, continuous (up to 4.8A total for all 16 channels combined). See Operating Temperature specification for effect of channels at full load. See manual for detailed effects of operating temperature.

Output Response Time
10ms, nominal.

■ Ethernet Communication

Protocols
Modbus TCP/IP, i2o peer-to-peer, Ethernet/IP, or Profinet depending on model number.

Ethernet Communication Controller
Innovasic RapID™ Platform with PriorityChannel™ for determinism at the device regardless of network load.

Modbus TCP/IP (slave)
Port 502 reserved. Supports up to 10 sockets.

i2o Peer-to-Peer (master/slave)
Can map 4-channel input groups to output groups at two destination IP addresses. Timed or change-of-state updates. Supports GPRS/GSM systems.

Ethernet/IP (adapter)
Supports 16 connections. EDS file on website.

Profinet (server)
Supports 1 connection. GSDML file on website.

Connectors
Two shielded 8-pin RJ-45 sockets, 10BaseT/100BaseTX.

Wiring
Auto-crossover for MDI or MDI-X.

IP Address
User-configurable. 128.1.1.100 default static IP address.

Data Rate
Auto-negotiated, 10Mbps or 100Mbps.

Compliance
IEEE 802.3, 802.3u, 802.3x.

■ Environmental

Operating temperature
-40 to 70°C (-40 to 158°F). Max temperature derates -0.625°C per output channel at full load (300mA).

Storage temperature
-40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

Power Requirement
12 to 32V DC (95mA maximum @ 24V).

Isolation
4-way isolation between I/O channels, network (each port); and power.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

Approvals
CE compliant. UL/cUL Class I; Div. 2 Zone 2. ATEX cert.
⟨Ex⟩ II 3 G Ex nA IIC T4 Gc -40°C $\leq$ Ta $\leq$ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass (IPC-4101/98).

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XT1121-000
Digitial I/O module, Modbus/TCP and i2o protocol.

XT1122-000
Digitial I/O module, Ethernet/IP protocol.

XT1123-000
Digitial I/O module, Profinet protocol.

◆ Software

XT-SIP (recommend one kit per customer)
Software Interface Package. Includes software (XT-CONFIG), isolator (USB-ISOLATOR), two USB cables (4001-112, 4001-113), Ethernet cable (5035-360).

◆ Accessories

XTA-120V-6
XTA-240V-3
6-channel 120V AC/DC or 3-channel 240V AC/DC discrete input module with 5V DC logic outputs. Interfaces with sinking/sourcing DC Inputs.

XTA-MRNO-6
6-ch mechanical relay output module, Form A, SPST normally open 5A relays (5/12/24V DC logic input).

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).

USB-ISOLATOR
USB-to-USB isolator, includes USB cable (4001-112).

ISO9001
AS9100
MADE IN USA

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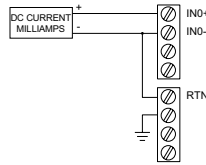
Ethernet I/O: BusWorks® XT Series
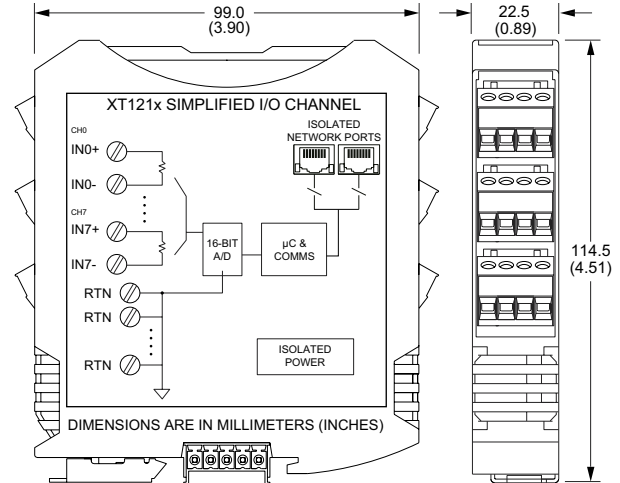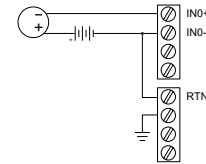
XT1210 Ethernet Analog Current Input Modules

EXAMPLE INPUT CONNECTIONS

SOURCED DC CURRENT

DC CURRENT MILLIAMPS
- IN0+
- IN0-
- RTN

TWO-WIRE CONNECTION
- IN0+
- IN0-
- RTN

XT121x SIMPLIFIED I/O CHANNEL

ISOLATED NETWORK PORTS

CH0
IN0+
IN0-

CH7
IN7+
IN7-

RTN
RTN
RTN

16-BIT A/D

μC & COMMS

ISOLATED POWER

DIMENSIONS ARE IN MILLIMETERS (INCHES)

99.0 (3.90)   22.5 (0.89)   114.5 (4.51)

USB Configured

8-channel differential analog current input ◆ Modbus TCP/IP, Ethernet/IP, Profinet, or i2o communication

Description

The XT1210 offers an isolated Ethernet network interface for up to eight differential current input channels. Isolated differential inputs deliver better measurements, superior noise rejection, and eliminate the need for current loop isolators.

Rugged construction, high density design, and easy USB-to-PC/Windows setup combine for a very effective and reliable module. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Input Ranges
0 to 11mA, 0 to 20mA, 4 to 20mA, ±20mA. 0 to 20 amps AC (with optional AC sensor)
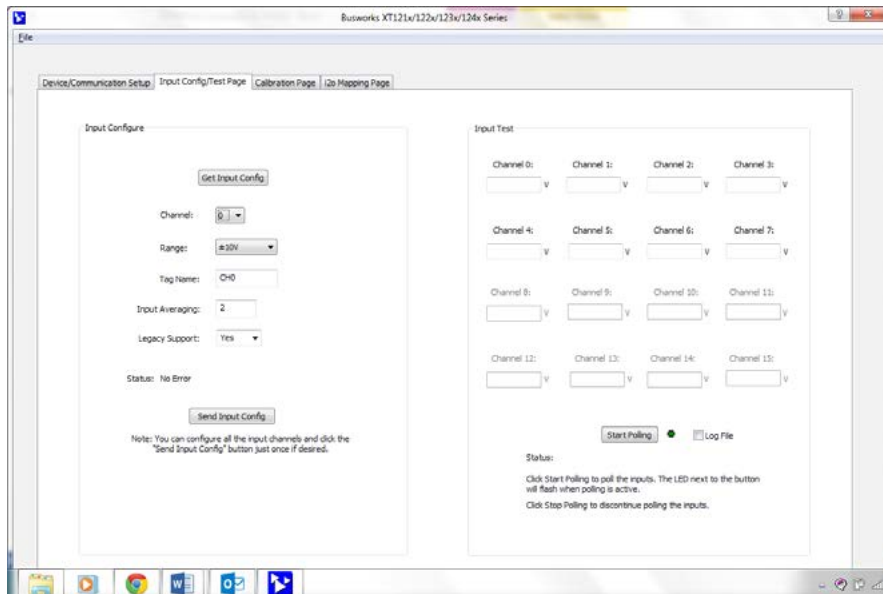
Ethernet Communication
Modbus TCP/IP, Ethernet/IP, Profinet, i2o® peer-to-peer, 10/100Base-T(X) PriorityChannel™ device determinism

Power Requirement
12 to 32V DC (2.8W)

Key Features & Benefits

- Easy setup with Windows software via USB
- Low input impedance (27 ohms) reduces loading on current loops
- User-configurable sample averaging (1-200) on a per-channel basis
- 10ms network updates for all 8 input channels
- i2o peer-to-peer updates based on percent-of-change and/or timed updates
- High-resolution 16-bit Σ-Δ A/D converter ensures precise, high accuracy measurements
- High-Density 22.5mm wide package with pluggable, front-facing terminals
- Dual Ethernet 10/100 ports (auto-negotiation) reduce switch port requirements
- 1500V AC isolation (between I/O, power, and network ports) and surge/transient protection
- Supports bussed/rail and redundant power
- -40°C to +70°C wide temperature operation
- Withstands 25g shock and 4g vibration
- CE compliant. UL/cUL Class 1 Div 2 Zone 2 approval. ATEX Certified.

BusWorks XT software (download free from www.acromag.com) allows you to configure I/O modules offline with USB or save the configuration file and download settings into units later at your convenience.

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Ethernet I/O: BusWorks® XT Series

XT1210 Ethernet Analog Current Input Modules

Performance Specifications

> IMPORTANT: To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an XT1000 I/O module.

■ USB Interface

USB Connector
Type: USB Mini-B type socket, 5-pin.
Data rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.

USB Transient Protection
Transient voltage suppression on power and data lines.

Driver
Not required. Uses Windows HID drivers.

■ Input

Accuracy
±0.05% of span, typical for nominal input ranges.

Analog to Digital Converter (A/D)
16-bit Σ-Δ converter. 1.476uA/bit resolution.

Noise Rejection
Better than -110dB @ 60Hz.

Input Filter Bandwidth
-3dB at 25KHz, typical.

Input Conversion Rate
10ms for all 8 input channels.

Input Impedance
27.4 ohms.

■ Ethernet Communication

Protocols
Modbus TCP/IP, i2o peer-to-peer, Ethernet/IP, or Profinet depending on model number.

Ethernet Communication Controller
Innovasic RapID™ Platform with PriorityChannel™ for determinism at the device regardless of network load.

Modbus TCP/IP (slave)
Port 502 reserved. Supports up to 10 sockets.

i2o Peer-to-Peer (master/slave)
Can map each of 8 analog input channels separately to output channels. Timed (1-65535 sec) or percent-of-change updates. Supports GPRS/GSM systems.

Ethernet/IP (adapter)
Supports 10 connections. EDS file on website.

Profinet (server)
Supports 1 connection. GSDML file on website.

Connectors
Two shielded 8-pin RJ-45 sockets, 10BaseT/100BaseTX

Wiring
Auto-crossover for MDI or MDI-X.

IP Address
User-configurable. 192.168.1.100 default IP address.

Data Rate
Auto-negotiated, 10Mbps or 100Mbps.

Compliance
IEEE 802.3, 802.3u, 802.3x.

■ Environmental

Operating temperature
-40 to 70°C (-40 to 158°F).

Storage temperature
-40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

MTBF: 478,854 hrs. at 25°C.
359,078 hrs. at 40°C.

Power Requirement
12 to 32V DC, 2.8W maximum (116mA maximum @ 24V).

Isolation
4-way isolation between I/O channels, network (each port), and power.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

Approvals
CE compliant. UL/cUL listed. ATEX Certified.
Designed for Class I; Division 2; Groups ABCD; Zone 2.
⟨Ex⟩ II 3 G Ex nA IIC T4 Gc -40°C ≤ Ta ≤ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass (IPC-4101/98).

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XT1211-000
8-channel differential current input module, Modbus/TCP and i2o protocol.

XT1212-000
8-channel differential current input module, Ethernet/IP protocol.

XT1213-000
8-channel differential current input module, Profinet protocol.

◆ Software

XT-SIP   (recommend one kit per customer)
Software Interface Package. Includes software (XT-CONFIG), isolator (USB-ISOLATOR), two USB cables (4001-112, 4001-113), Ethernet cable (5035-360).

◆ Accessories

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).

USB-ISOLATOR
USB-to-USB isolator, includes USB cable (4001-112).

5020-350
AC current sensor (toroidal transformer).
Converts 0-20A AC to 0-11.17mA DC.

PS5R-SD24
Power supply (24V DC, 2.5A).

DIN RAIL 3.0
DIN RAIL 16.7
DIN rail strip, Type T, 3 inches (75mm) or 16.7 (425mm).

20RM-16-DIN
19" rack-mount kit with DIN rail.
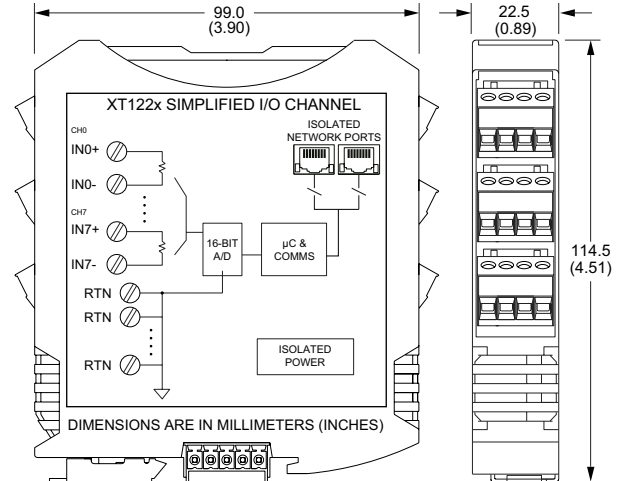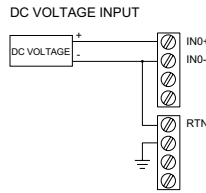
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Ethernet I/O: BusWorks® XT Series

XT1220 Ethernet Analog Voltage Input Modules

EXAMPLE INPUT CONNECTIONS

DC VOLTAGE INPUT

IN0+
IN0-
RTN

XT122x SIMPLIFIED I/O CHANNEL

ISOLATED NETWORK PORTS

CH0
IN0+
IN0-
CH7
IN7+
IN7-
RTN
RTN
RTN

16-BIT A/D
µC & COMMS
ISOLATED POWER

99.0 (3.90)
22.5 (0.89)
114.5 (4.51)

DIMENSIONS ARE IN MILLIMETERS (INCHES)

USB Configured

8-channel differential analog voltage input ◆ Modbus TCP/IP, Ethernet/IP, Profinet, or i2o communication

Description

The XT1220 offers an isolated Ethernet network interface for up to eight differential voltage input channels. Isolated differential inputs deliver better measurements, superior noise rejection, and eliminate the need for signal isolators.

Rugged construction, high density design, and easy USB-to-PC/Windows setup combine for a very effective and reliable module. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Input Ranges
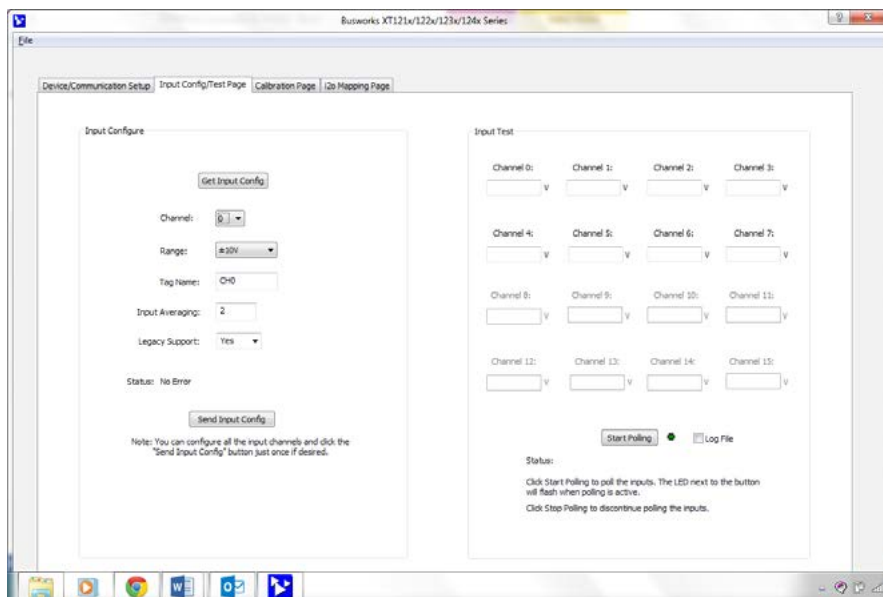±5V, ±10V, 0 to 5V, 0 to 10V.

Ethernet Communication
Modbus TCP/IP, Ethernet/IP, Profinet, i2o® peer-to-peer, 10/100Base-T(X) PriorityChannel™ device determinism

Power Requirement
12 to 32V DC (2.8W)

Key Features & Benefits

■ Easy setup with Windows software via USB

■ High input impedance (100K ohms) reduces loading on voltage loops

■ User-configurable sample averaging (1-200) on a per-channel basis

■ 10ms network updates for all 8 input channels

■ i2o peer-to-peer updates based on percent-of-change and/or timed updates

■ High-resolution 16-bit Σ-Δ A/D converter ensures precise, high accuracy measurements

■ High-Density 22.5mm wide package with pluggable, front-facing terminals

■ Dual Ethernet 10/100 ports (auto-negotiation) reduce switch port requirements

■ 1500V AC isolation (between I/O, power, and network ports) and surge/transient protection

■ Supports bussed/rail and redundant power

■ -40°C to +70°C wide temperature operation

■ Withstands 25g shock and 4g vibration

■ CE compliant. UL/cUL Class 1 Div 2 Zone 2 approval. ATEX Certified.

BusWorks XT software (download free from www.acromag.com) allows you to configure I/O modules offline with USB or save the configuration file and download settings into units later at your convenience.

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XT1220 Ethernet Analog Input Modules

Performance Specifications

> **IMPORTANT:** To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an XT1000 I/O module.

■ USB Interface

USB Connector
Type: USB Mini-B type socket, 5-pin.
Data rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.

USB Transient Protection
Transient voltage suppression on power and data lines.

Driver
Not required. Uses Windows HID drivers.

■ Input

Accuracy
±0.05% of span, typical for nominal input ranges.

Analog to Digital Converter (A/D)
16-bit Σ-Δ converter. 334.85uV/bit resolution.

Noise Rejection
Better than -110dB @ 60Hz.

Input Filter Bandwidth
-3dB at 25KHz, typical.

Input Conversion Rate
10ms for all 8 input channels.

Input Impedance
100.2K ohms.

■ Ethernet Communication

Protocols
Modbus TCP/IP, i2o peer-to-peer, Ethernet/IP, or Profinet depending on model number.

Ethernet Communication Controller
Innovasic RapID™ Platform with PriorityChannel™ for determinism at the device regardless of network load.

Modbus TCP/IP (slave)
Port 502 reserved. Supports up to 10 sockets.

i2o Peer-to-Peer (master/slave)
Can map each of 8 analog input channels separately to output channels. Timed (1-65535 sec) or percent-of-change updates. Supports GPRS/GSM systems.

Ethernet/IP (adapter)
Supports 10 connections. EDS file on website.

Profinet (server)
Supports 1 connection. GSDML file on website.

Connectors
Two shielded 8-pin RJ-45 sockets, 10BaseT/100BaseTX

Wiring
Auto-crossover for MDI or MDI-X.

IP Address
User-configurable. 192.168.1.100 default IP address.

Data Rate
Auto-negotiated, 10Mbps or 100Mbps.

Compliance
IEEE 802.3, 802.3u, 802.3x.

■ Environmental

Operating temperature
-40 to 70°C (-40 to 158°F).

Storage temperature
-40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

MTBF: 486,024 hrs. at 25°C.
365,543 hrs. at 40°C.

Power Requirement
12 to 32V DC, 2.8W maximum
(116mA maximum @ 24V).

Isolation
4-way isolation between I/O channels, network (each port), and power.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

Approvals
CE compliant. UL/cUL listed. ATEX Certified
Designed for Class I; Division 2; Groups ABCD; Zone 2.
⟨Ex⟩ II 3 G Ex nA IIC T4 Gc -40°C ≤ Ta ≤ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass (IPC-4101/98).

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XT1221-000
8-channel differential voltage input module, Modbus/TCP and i2o protocol.

XT1222-000
8-channel differential voltage input module, Ethernet/IP protocol.

XT1223-000
8-channel differential voltage input module, Profinet protocol.

◆ Software

XT-SIP (recommend one kit per customer)
Software Interface Package. Includes software (XT-CONFIG), isolator (USB-ISOLATOR), two USB cables (4001-112, 4001-113), Ethernet cable (5035-360).

◆ Accessories

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).

USB-ISOLATOR
USB-to-USB isolator, includes USB cable (4001-112).

PS5R-SD24
Power supply (24V DC, 2.5A).

DIN RAIL 3.0
DIN RAIL 16.7
DIN rail strip, Type T, 3 inches (75mm) or 16.7 (425mm).

20RM-16-DIN
19" rack-mount kit with DIN rail.

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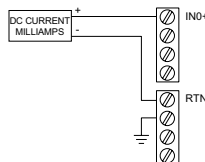
Ethernet I/O: BusWorks® XT Series
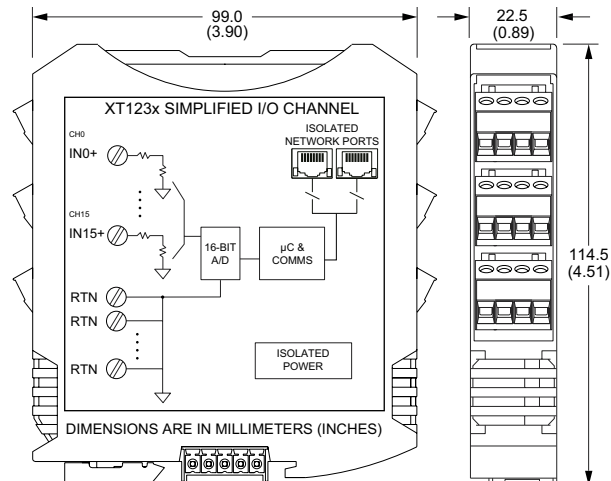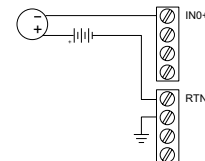
XT1230 Ethernet Analog Input Modules

EXAMPLE INPUT CONNECTIONS

SOURCED DC CURRENT

TWO-WIRE CONNECTION

XT123x SIMPLIFIED I/O CHANNEL

DIMENSIONS ARE IN MILLIMETERS (INCHES)

16-channel single-ended analog current input ◆ Modbus TCP/IP, Ethernet/IP, Profinet, or i2o communication

Description

The XT1230 offers an isolated Ethernet network interface for up to to sixteen single-ended current input channels. Single-ended inputs enable a higher channel density to save space and a lower cost per channel.

Rugged construction, high density design, and easy USB-to-PC/Windows setup combine for a very effective and reliable module. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Input Ranges
DC Current:
0 to 11mA, 0 to 20mA, 4 to 20mA, ±20mA.
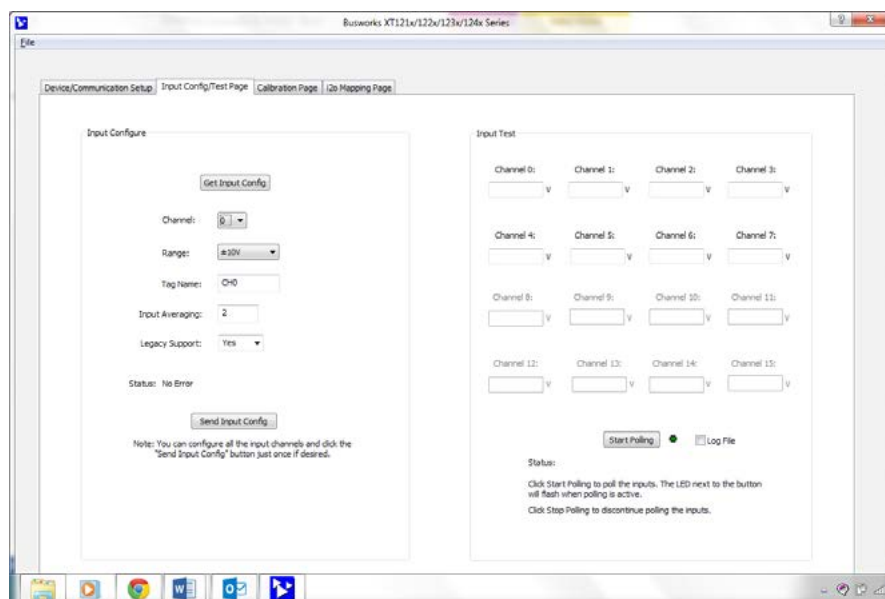0 to 20 amps AC (with optional AC sensor)

Ethernet Communication
Modbus TCP/IP, Ethernet/IP, Profinet, i2o® peer-to-peer, 10/100Base-T(X) PriorityChannel™ device determinism

Power Requirement
12 to 32V DC (2.8W)

Key Features & Benefits

- Easy setup with Windows software via USB

- Low input impedance (27 ohms) reduces loading on current loops

- User-configurable sample averaging (1-200) on a per-channel basis

- 10ms network updates for all 16 input channels

- i2o peer-to-peer updates based on percent-of-change and/or timed updates

- .High-resolution 16-bit Σ-Δ A/D converter ensures precise, high accuracy measurements

- High-Density 22.5mm wide package with pluggable, front-facing terminals

- Dual Ethernet 10/100 ports (auto-negotiation) reduce switch port requirements

- 1500V AC isolation (between I/O, power, and network ports) and surge/transient protection

- Supports bussed/rail and redundant power

- -40°C to +70°C wide temperature operation

- Withstands 25g shock and 4g vibration

- CE compliant. UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

BusWorks XT software (download free from www.acromag.com) allows you to configure I/O modules offline with USB or save the configuration file and download settings into units later at your convenience.

Acromag
THE LEADER IN INDUSTRIAL I/O

Tel 248-295-0880 ■ Fax 248-624-9234 ■ sales@acromag.com ■ www.acromag.com ■ 30765 Wixom Rd, Wixom, MI 48393 USA

XT1230 Ethernet Analog Input Modules

Performance Specifications

IMPORTANT: To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an XT1000 I/O module.

■ USB Interface

USB Connector
Type: USB Mini-B type socket, 5-pin.
Data rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.

USB Transient Protection
Transient voltage suppression on power and data lines.

Driver
Not required. Uses Windows HID drivers.

■ Input

Accuracy
±0.05% of span, typical for nominal input ranges.

Analog to Digital Converter (A/D)
16-bit Σ-Δ converter. 1.476uA/bit resolution.

Noise Rejection
Better than -110dB @ 60Hz.

Input Filter Bandwidth
-3dB at 25KHz, typical.

Input Conversion Rate
10ms for all 16 input channels.

Input Impedance
27.4 ohms.

■ Ethernet Communication

Protocols
Modbus TCP/IP, i2o peer-to-peer, Ethernet/IP, or Profinet depending on model number.

Ethernet Communication Controller
Innovasic RapID™ Platform with PriorityChannel™ for determinism at the device regardless of network load.

Modbus TCP/IP (slave)
Port 502 reserved. Supports up to 10 sockets.

i2o Peer-to-Peer (master/slave)
Can map each of 16 analog input channels separately to output channels. Timed (1-65535 sec) or percent-of-change updates. Supports GPRS/GSM systems.

Ethernet/IP (adapter)
Supports 10 connections. EDS file on website.

Profinet (server)
Supports 1 connection. GSDML file on website.

Connectors
Two shielded 8-pin RJ-45 sockets, 10BaseT/100BaseTX.

Wiring
Auto-crossover for MDI or MDI-X.

IP Address
User-configurable. 192.168.1.100 default IP address.

Data Rate
Auto-negotiated, 10Mbps or 100Mbps.

Compliance
IEEE 802.3, 802.3u, 802.3x.

■ Environmental

Operating temperature
-40 to 70°C (-40 to 158°F).

Storage temperature
-40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

MTBF: 463,547 hrs. at 25°C.
345,200 hrs. at 40°C.

Power Requirement
12 to 32V DC, 2.8W maximum
(113mA maximum @ 24V).

Isolation
4-way isolation between I/O channels, network (each port), and power.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

Approvals
CE compliant. UL/cUL listed. ATEX Certified.
Designed for Class I; Division 2; Groups ABCD; Zone 2.
⟨Ex⟩ II 3 G Ex nA IIC T4 Gc -40°C $\leq$ Ta $\leq$ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass (IPC-4101/98).

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XT1231-000
16-channel single-ended current input module, Modbus/TCP and i2o protocol.

XT1232-000
16-channel single-ended current input module, Ethernet/IP protocol.

XT1233-000
16-channel single-ended current input module, Profinet protocol.

◆ Software

XT-SIP (recommend one kit per customer)
Software Interface Package. Includes software (XT-CONFIG), isolator (USB-ISOLATOR), two USB cables (4001-112, 4001-113), Ethernet cable (5035-360).

◆ Accessories

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).

USB-ISOLATOR
USB-to-USB isolator, includes USB cable (4001-112).

5020-350
AC current sensor (toroidal transformer).
Converts 0-20A AC to 0-11.17mA DC.

PS5R-SD24
Power supply (24V DC, 2.5A).

DIN RAIL 3.0
DIN RAIL 16.7
DIN rail strip, Type T, 3 inches (75mm) or 16.7 (425mm).

20RM-16-DIN
19" rack-mount kit with DIN rail.

ISO9001
AS9100
MADE IN USA

Acromag ▶
THE LEADER IN INDUSTRIAL I/O ®

Ethernet I/O: BusWorks® XT Series

XT1240 Ethernet Analog Input Modules

EXAMPLE INPUT CONNECTIONS

DC VOLTAGE INPUT

DC VOLTAGE → IN0+ / RTN

XT124x SIMPLIFIED I/O CHANNEL

ISOLATED NETWORK PORTS

CH0 IN0+
CH15 IN15+
16-BIT A/D — µC & COMMS

RTN / RTN / RTN

ISOLATED POWER

99.0 (3.90)   22.5 (0.89)   114.5 (4.51)

DIMENSIONS ARE IN MILLIMETERS (INCHES)

USB Configured

16-channel single-ended analog voltage input ◆ Modbus TCP/IP, Ethernet/IP, Profinet, or i2o communication

Description

The XT1240 offers an isolated Ethernet network interface for up to to sixteen single-ended voltage input channels. Single-ended inputs enable a higher channel density to save space and a lower cost per channel.

Rugged construction, high density design, and easy USB-to-PC/Windows setup combine for a very effective and reliable module. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Input Ranges
DC Voltage:
±5V, ±10V, 0 to 5V, 0 to 10V.

Ethernet Communication
Modbus TCP/IP, Ethernet/IP, Profinet, i2o® peer-to-peer, 10/100Base-T(X) PriorityChannel™ device determinism

Power Requirement
12 to 32V DC (2.8W)

Key Features & Benefits

- Easy setup with Windows software via USB
- High input impedance (100K ohms) reduces loading on voltage loops
- User-configurable sample averaging (1-200) on a per-channel basis
- 10ms network updates for all 16 input channels
- i2o peer-to-peer updates based on percent-of-change and/or timed updates
- .High-resolution 16-bit Σ-Δ A/D converter ensures precise, high accuracy measurements
- High-Density 22.5mm wide package with pluggable, front-facing terminals
- Dual Ethernet 10/100 ports (auto-negotiation) reduce switch port requirements
- 1500V AC isolation (between I/O, power, and network ports) and surge/transient protection
- Supports bussed/rail and redundant power
- -40°C to +70°C wide temperature operation
- Withstands 25g shock and 4g vibration
- CE compliant. UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

BusWorks XT software (download free from www.acromag.com) allows you to configure I/O modules offline with USB or save the configuration file and download settings into units later at your convenience.

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XT1240 Ethernet Analog Input Modules
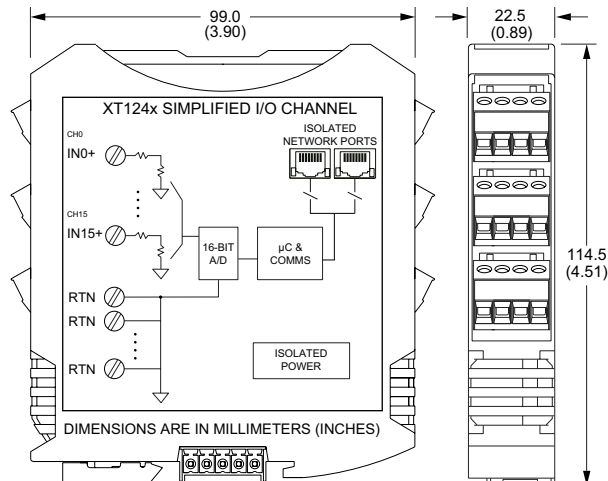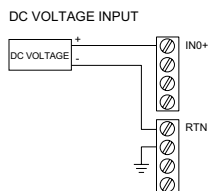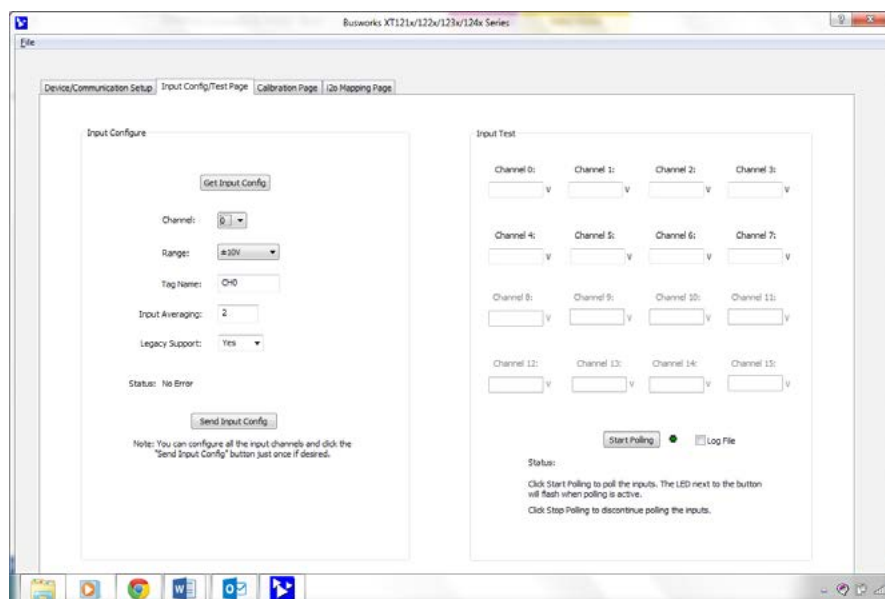
Performance Specifications

> **IMPORTANT:** To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an XT1000 I/O module.

■ USB Interface

USB Connector
Type: USB Mini-B type socket, 5-pin.
Data rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.

USB Transient Protection
Transient voltage suppression on power and data lines.

Driver
Not required. Uses Windows HID drivers.

■ Input

Accuracy
±0.05% of span, typical for nominal input ranges.

Analog to Digital Converter (A/D)
16-bit Σ-Δ converter. 351.6uV/bit resolution.

Noise Rejection
Better than -110dB @ 60Hz.

Input Filter Bandwidth
-3dB at 25KHz, typical.

Input Conversion Rate
10mS for all 16 input channels.

Input Impedance
105.2K ohms.

■ Ethernet Communication

Protocols
Modbus TCP/IP, i2o peer-to-peer, Ethernet/IP, or Profinet depending on model number.

Ethernet Communication Controller
Innovasic RapID™ Platform with PriorityChannel™ for determinism at the device regardless of network load.

Modbus TCP/IP (slave)
Port 502 reserved. Supports up to 10 sockets.

i2o Peer-to-Peer (master/slave)
Can map each of 16 analog input channels separately to output channels. Timed (1-65535 sec) or percent-of-change updates. Supports GPRS/GSM systems.

Ethernet/IP (adapter)
Supports 10 connections. EDS file on website.

Profinet (server)
Supports 1 connection. GSDML file on website.

Connectors
Two shielded 8-pin RJ-45 sockets, 10BaseT/100BaseTX.

Wiring
Auto-crossover for MDI or MDI-X.

IP Address
User-configurable. 192.168.1.100 default IP address.

Data Rate
Auto-negotiated, 10Mbps or 100Mbps.

Compliance
IEEE 802.3, 802.3u, 802.3x.

■ Environmental

Operating temperature
-40 to 70°C (-40 to 158°F).

Storage temperature
-40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

MTBF: 458,991 hrs. at 25°C.
338,846 hrs. at 40°C.

Power Requirement
12 to 32V DC, 2.8W maximum
(113mA maximum @ 24V).

Isolation
4-way isolation between I/O channels, network (each port), and power.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

Approvals
CE compliant. UL/cUL listed. ATEX Certified.
Designed for Class I; Division 2; Groups ABCD; Zone 2.
⟨Ex⟩ II 3 G Ex nA IIC T4 Gc -40°C ≤ Ta ≤ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass (IPC-4101/98).

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XT1241-000
16-channel single-ended voltage input module, Modbus/TCP and i2o protocol.

XT1242-000
16-channel single-ended voltage input module, Ethernet/IP protocol.

XT1243-000
16-channel single-ended voltage input module, Profinet protocol.

◆ Software

XT-SIP   (recommend one kit per customer)
Software Interface Package. Includes software (XT-CONFIG), isolator (USB-ISOLATOR), two USB cables (4001-112, 4001-113), Ethernet cable (5035-360).

◆ Accessories

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).

USB-ISOLATOR
USB-to-USB isolator, includes USB cable (4001-112).

PS5R-SD24
Power supply (24V DC, 2.5A).

DIN RAIL 3.0
DIN RAIL 16.7
DIN rail strip, Type T, 3 inches (75mm) or 16.7 (425mm).

20RM-16-DIN
19" rack-mount kit with DIN rail.

ISO9001
AS9100
MADE IN USA
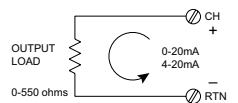
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Ethernet I/O: BusWorks® XT Series

XT1530 Ethernet Analog Output & Digital I/O Modules

ANALOG OUTPUT EXAMPLES

DC CURRENT OUTPUT

OUTPUT LOAD
0-550 ohms
CH +
0-20mA
4-20mA
RTN –

DISCRETE INPUT EXAMPLES

LOGIC (TTL)
TTL
*OPTIONAL Rlim
V<0.8V LOW
V>2.0V HIGH
DI/O
RTN

VOLTAGE ON/OFF
N.C.
2-32V DC
DI/O
RTN

DISCRETE OUTPUT EXAMPLES

LAMP CONTROL
EXC+
6-32V DC
OUTPUT SOURCES CURRENT
LAMP
DI/O
RTN
ON (1)
OFF (0)
ACTIVE-HIGH OUTPUT

99.0 (3.90)　　22.5 (0.89)

114.5 (4.51)

XT153x SIMPLIFIED DIAGRAM

ANALOG OUTPUT
16-BIT D/A
x4
16-BIT D/A

DISCRETE I/O
DIN
DOUT
x4
DIN
DOUT

μC

ISOLATED NETWORK PORTS

ETHERNET SWITCH

ISOLATED POWER

DIMENSIONS ARE IN MILLIMETERS (INCHES)

Modbus TCP/IP

EtherNet/IP conformance tested

PROFINET

with **PriorityChannel™** Technology

USB Configured

4 analog current outputs, 4 discrete I/O channels ◆ Modbus TCP/IP, Ethernet/IP, Profinet, or i2o communication

Description

The XT1530 interfaces analog output and discrete I/O signals between measurement and control devices over Ethernet. Discrete I/O are individually configurable for input or high-side switched output operation.

Rugged construction, high density design, and easy USB-to-PC/Windows setup combine for a very effective I/O solution. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Analog Output Ranges
0-20mA DC, 4-20mA DC

Discrete Input/Output Ranges
Input: 0-32V DC, TTL thresholds
Output: 0-32V DC, open-source, up to 250mA

Ethernet Communication
Modbus TCP/IP, Ethernet/IP, Profinet, i2o® peer-to-peer, 10/100Base-T(X) PriorityChannel™ device determinism

Power Requirement
12 to 32V DC (2.8W)

Key Features & Benefits

■ Multi-function, multi-channel stand alone module is very economical

■ Easy setup with Windows software via USB

■ Dual Ethernet 10/100 ports with built-in switch enables daisy-chain networking to reduce costs

■.i2o technology for peer-to-peer communication without a network controller

■.Four analog output channels (16-bit DACs) to drive remote instruments, controllers, recorders

■ Four discrete input/output channels support loopback monitoring of output levels

■ Built-in 10K ohm pull-down resistors for use with 2/3-wire sensors (contacts, proximity, TTL)

■ Configurable normal/reverse input logic

■.Various diagnostics validate module operation

■ 1500V AC isolation (between I/O, power, and network ports) and surge/transient protection

■ Slim 22.5mm housing with pluggable terminals

■ Supports bussed/rail and redundant power

■ -40°C to +60°C wide temperature operation

■ CE and UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

BusWorks XT software (download free from www.acromag.com) allows you to configure I/O modules offline with USB, save the file, and download settings into units later, at your convenience.

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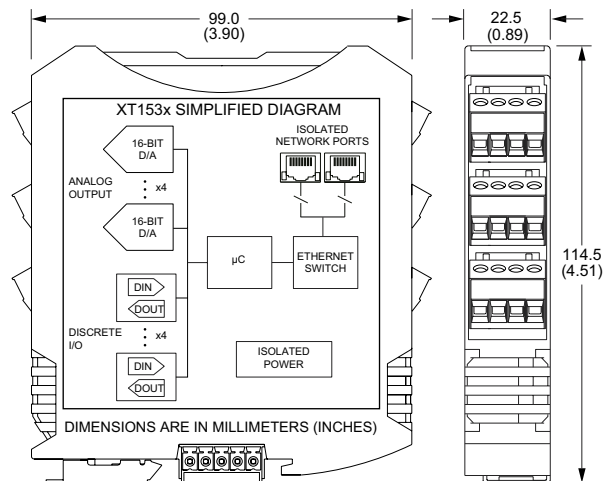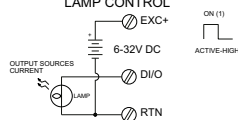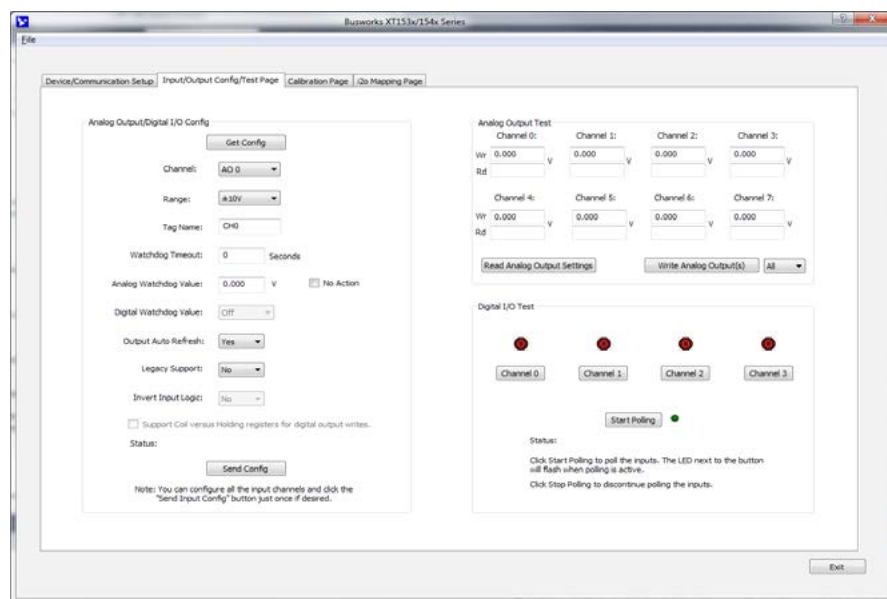## XT1530 Ethernet Multi-Function Analog Output & Digital I/O Modules

Performance Specifications

> **IMPORTANT:** To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an XT1000 I/O module.

■ USB Interface

USB Connector
Type: USB Mini-B type socket, 5-pin.
Data rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.

USB Transient Protection
Transient voltage suppression on power and data lines.

Driver
Not required. Uses Windows HID drivers.

■ Analog Output

Configuration
4 output channels, each with a 16-bit D/A converter.

Output Type
0-20mA DC or 4-20mA DC, configurable by channel.

Accuracy
Better than ±0.1% of span.

Output Excitation
Separate inputs for 12V (10-15V) and 24V (20-28V) power sources. Diode-coupled to support redundancy.

■ Discrete Input

Input Type
4 active-high, buffered inputs, with a common connection. Inputs are tied in tandem to output drains for optional loopback monitoring of output state.

Input Signal Voltage Range
0 to 32V DC.

Input Current
280µA, typical at 32V DC.

Input Signal Threshold
1.7V DC typical with100mV of hysteresis.

Input Resistance
10K ohms, typical.

Input Response Time
10ms, nominal.

■ Discrete Output

Output Type
4 open-source, smart, p-channel mosfet switches with a common drain connection. Provides high-side (sourcing) switching between the load and return.

Output Signal Voltage Range
0 to 32V DC. 6-32V excitation source required.

Output "ON" Resistance
0.5 ohms typical, 1.0 ohms maximum.

Output "ON" Current Range
0 to 250mA DC, continuous (up to 1A total for all 4 channels combined).

Output Response Time
10ms, nominal.

■ Ethernet Communication

Protocols
Modbus TCP/IP, i2o peer-to-peer, Ethernet/IP, or Profinet depending on model number.

Ethernet Communication Controller
Innovasic RapID™ Platform with PriorityChannel™ for determinism at the device regardless of network load.

Modbus TCP/IP (slave)
Port 502 reserved. Supports up to 10 sockets.

i2o Peer-to-Peer (master/slave)
Can map 4-channel input groups to output groups at two destination IP addresses. Timed or change-of-state updates. Supports GPRS/GSM systems.

Ethernet/IP (adapter)
Supports 16 connections. EDS file on website.

Profinet (server)
Supports 1 connection. GSDML file on website.

Connectors
Two shielded 8-pin RJ-45 sockets, 10BaseT/100BaseTX.

Wiring
Auto-crossover for MDI or MDI-X.

IP Address
User-configurable. 192.168.1.100 default static IP address.

Data Rate
Auto-negotiated, 10Mbps or 100Mbps.

Compliance
IEEE 802.3, 802.3u, 802.3x.

■ Environmental

Operating and Storage Temperature
Operating: -40 to 60°C (-40 to 140°F).
Storage: -40 to 85°C (-40 to 185°F).

Relative Humidity
5 to 95% non-condensing.

Power Requirement
12 to 32V DC (110mA maximum @ 24V).

Isolation
I/O channels (as a group), network (each port), and power circuits isolated from each other.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

MTBF: 445,034 hrs. at 25°C.
335,836 hrs. at 40°C.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Approvals
CE compliant. UL/cUL listings. ATEX Certified.
Designed for Class I; Division 2; Groups ABCD; Zone 2.
⟨Ex⟩ II 3 G Ex nA IIC T4 Gc -40°C $\leq$ Ta $\leq$ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass (IPC-4101/98).

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XT1531-000
Multi-function 4-ch analog current output, 4-ch digital I/O module, Modbus/TCP and i2o protocol.

XT1532-000
Multi-function 4-ch analog current output, 4-ch digital I/O module, Ethernet/IP protocol.

XT1533-000
Multi-function 4-ch analog current output, 4-ch digital I/O module, Profinet protocol.

◆ Software

XT-SIP (recommend one kit per customer)
Software Interface Package. Includes software (XT-CONFIG), isolator (USB-ISOLATOR), two USB cables (4001-112, 4001-113), Ethernet cable (5035-360).

◆ Accessories

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).

USB-ISOLATOR
USB-to-USB isolator, includes USB cable (4001-112).

ISO9001
AS9100
MADE IN USA

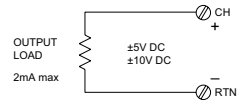**Acromag** ®
THE LEADER IN INDUSTRIAL I/O

Ethernet I/O: BusWorks® XT Series
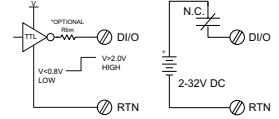
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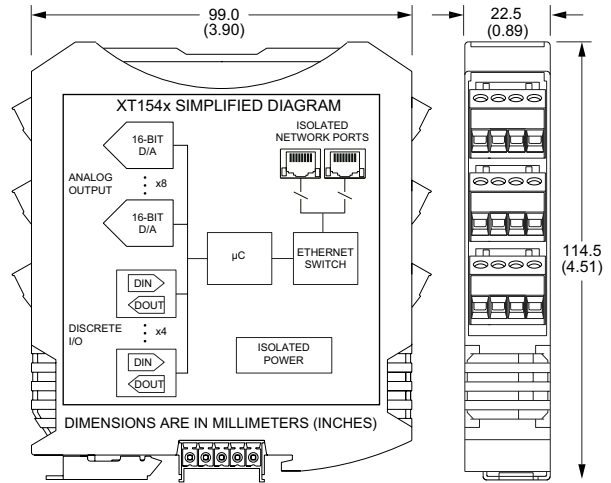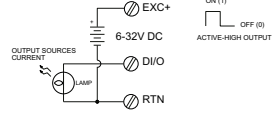

ANALOG OUTPUT EXAMPLES
DC VOLTAGE OUTPUT

DISCRETE INPUT EXAMPLES
LOGIC (TTL)   VOLTAGE ON/OFF

DISCRETE OUTPUT EXAMPLES
LAMP CONTROL

XT154x SIMPLIFIED DIAGRAM

99.0 (3.90)   22.5 (0.89)   114.5 (4.51)

DIMENSIONS ARE IN MILLIMETERS (INCHES)

USB Configured

8 analog voltage outputs, 4 discrete I/O channels ◆ Modbus TCP/IP, Ethernet/IP, Profinet, or i2o communication

Description

The XT1540 interfaces analog output and discrete I/O signals between measurement and control devices over Ethernet. Discrete I/O are individually configurable for input or high-side switched output operation.

Rugged construction, high density design, and easy USB-to-PC/Windows setup combine for a very effective I/O solution. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Analog Output Ranges
±5V, ±10V DC

Discrete Input/Output Ranges
Input: 0-32V DC, TTL thresholds
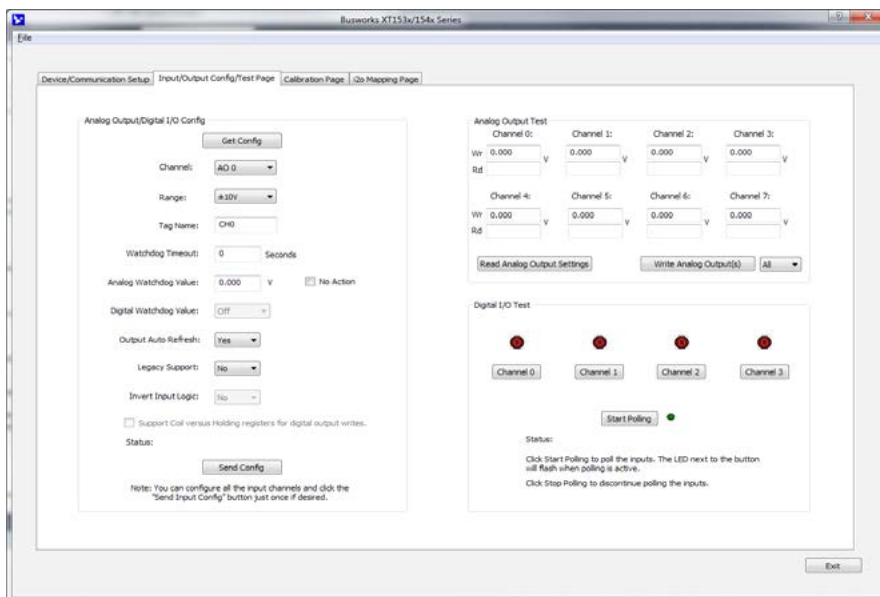Output: 0-32V DC, open-source, up to 250mA

Ethernet Communication
Modbus TCP/IP, Ethernet/IP, Profinet, i2o® peer-to-peer, 10/100Base-T(X) PriorityChannel™ device determinism

Power Requirement
12 to 32V DC (2.8W)

Key Features & Benefits

- Multi-function, multi-channel stand alone module is very economical
- Easy setup with Windows software via USB
- Dual Ethernet 10/100 ports with built-in switch enables daisy-chain networking to reduce costs
- i2o technology for peer-to-peer communication without a network controller
- Eight analog output channels (16-bit DACs) to drive remote instruments, controllers, recorders
- Four discrete input/output channels support loopback monitoring of output levels
- Built-in 10K ohm pull-down resistors for use with 2/3-wire sensors (contacts, proximity, TTL)
- Configurable normal/reverse input logic
- Various diagnostics validate module operation
- 1500V AC isolation (between I/O, power, and network ports) and surge/transient protection
- Slim 22.5mm housing with pluggable terminals
- Supports bussed/rail and redundant power
- -40°C to +65°C wide temperature operation
- CE and UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

BusWorks XT software (download free from www.acromag.com) allows you to configure I/O modules offline with USB, save the file, and download settings into units later, at your convenience.

Acromag
THE LEADER IN INDUSTRIAL I/O

Tel 248-295-0880 ■ Fax 248-624-9234 ■ sales@acromag.com ■ www.acromag.com ■ 30765 Wixom Rd, Wixom, MI 48393 USA

XT1540 Ethernet Multi-Function Analog Output & Digital I/O Modules

Performance Specifications

> **IMPORTANT:** To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an XT1000 I/O module.

■ USB Interface

USB Connector
Type: USB Mini-B type socket, 5-pin.
Data rate: 12Mbps. USB v1.1 and 2.0 compatible.
Maximum cable length: 5.0 meters.

USB Transient Protection
Transient voltage suppression on power and data lines.

Driver
Not required. Uses Windows HID drivers.

■ Analog Output

Configuration
8 output channels, each with a 16-bit D/A converter.

Input Type
±10V or ±5V DC, configurable by channel.

Accuracy
Better than ±0.1% of span.

■ Discrete Input

Input Type
4 active-high, buffered inputs, with a common connection. Inputs are tied in tandem to output drains for optional loopback monitoring of output state.

Input Signal Voltage Range
0 to 32V DC.

Input Current
280µA, typical at 32V DC.

Input Signal Threshold
1.7V DC typical with100mV of hysteresis.

Input Resistance
10K ohms, typical.

Input Response Time
10ms, nominal.

■ Discrete Output

Output Type
4 open-source, smart, p-channel mosfet switches with a common drain connection. Provides high-side (sourcing) switching between the load and return.

Output Signal Voltage Range
0 to 32V DC. 6-32V excitation source required.

Output "ON" Resistance
0.5 ohms typical, 1.0 ohms maximum.

Output "ON" Current Range
0 to 250mA DC, continuous (up to 1A total for all 4 channels combined).

Output Response Time
10ms, nominal.

■ Ethernet Communication

Protocols
Modbus TCP/IP, i2o peer-to-peer, Ethernet/IP, or Profinet depending on model number.

Ethernet Communication Controller
Innovasic RapID™ Platform with PriorityChannel™ for determinism at the device regardless of network load.

Modbus TCP/IP (slave)
Port 502 reserved. Supports up to 10 sockets.

i2o Peer-to-Peer (master/slave)
Can map 4-channel input groups to output groups at two destination IP addresses. Timed or change-of-state updates. Supports GPRS/GSM systems.

Ethernet/IP (adapter)
Supports 16 connections. EDS file on website.

Profinet (server)
Supports 1 connection. GSDML file on website.

Connectors
Two shielded 8-pin RJ-45 sockets, 10BaseT/100BaseTX.

Wiring
Auto-crossover for MDI or MDI-X.

IP Address
User-configurable. 192.168.1.100 default static IP address.

Data Rate
Auto-negotiated, 10Mbps or 100Mbps.

Compliance
IEEE 802.3, 802.3u, 802.3x.

■ Environmental

Operating and Storage Temperature
Operating: -40 to 65°C (-40 to 149°F).
Storage: -40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

Power Requirement
12 to 32V DC (110mA maximum @ 24V).

Isolation
I/O channels (as a group), network (each port), and power circuits isolated from each other.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

MTBF: 457,517 hrs. at 25°C.
339,622 hrs. at 40°C.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Approvals
CE compliant. UL/cUL listings. ATEX Certified.
Designed for Class I; Division 2; Groups ABCD; Zone 2.
〈Ex〉 II 3 G Ex nA IIC T4 Gc -40°C ≤ Ta ≤ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass (IPC-4101/98).

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XT1541-000
Multi-function 8-ch analog voltage output, 4-ch digital I/O module, Modbus/TCP and i2o protocol.

XT1542-000
Multi-function 8-ch analog voltage output, 4-ch digital I/O module, Ethernet/IP protocol.

XT1543-000
Multi-function 8-ch voltage output, 4-ch digital I/O module, Profinet protocol.

◆ Software

XT-SIP (recommend one kit per customer)
Software Interface Package. Includes software (XT-CONFIG), isolator (USB-ISOLATOR), two USB cables (4001-112, 4001-113), Ethernet cable (5035-360).

◆ Accessories

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).

USB-ISOLATOR
USB-to-USB isolator, includes USB cable (4001-112).

ISO9001
AS9100
MADE IN USA

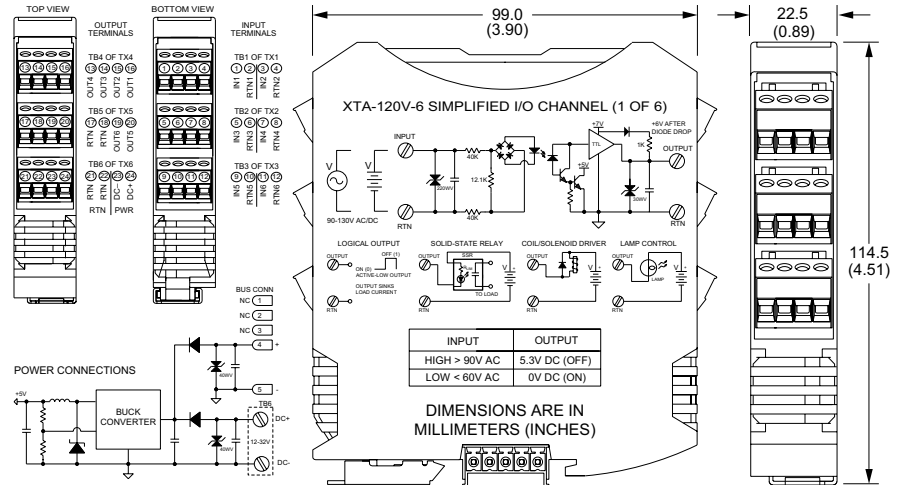**Acromag** ®
THE LEADER IN INDUSTRIAL I/O

XTA-120V-6 Optocoupler Modules

6 discrete input/output channels ◆ **Senses on/off status of AC/DC voltages** ◆ **Supports 5-32V logic output**

Description

The XTA-120V-6 optocoupler module provides six individually isolated 120V AC/DC digital (discrete) inputs to sense on/off levels and drive open-drain outputs. It is intended for use with BusWorks XT Series discrete I/O and other digital input modules to monitor contact closures or mains power supply high/low voltage levels.

Each channel senses the presence or absence of high-level voltage to determine the status of proximity switches, limit switches, toggle switches, push buttons, contacts, and other devices. Opto-isolators control an open-drain output to safely interface the status of the monitored signal.

These modules are very easy to use. Removable front-facing terminal blocks on the module's top and bottom greatly simplify field wiring.

Rugged construction and high density design combine for a very effective I/O solution. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Input Ranges
0-130V$_{RMS}$, 130V DC

Output Ranges
Open-drain: 1KΩ pull-up to +5.3V DC, 0-32V DC maximum, 150mA sink

Power Requirement
12 to 32V DC (0.4W)

Key Features & Benefits

- Six high-level voltage input channels

- Six logic-level output channels (open-drain, low-side switches)

- Built-in hysteresis optimized for mains power at 120V$_{RMS}$

- Outputs include 1KΩ pull-ups to +5.3V DC

- High-density 22.5mm wide package with pluggable, front-facing terminals

- 1500V AC isolation (between each input and power/output) and surge/transient protection

- Supports bussed/rail and redundant power

- -40°C to +70°C wide temperature operation

- Withstands 25g shock and 4g vibration

- CE and UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

Ethernet I/O: BusWorks® XT Series

XTA-120V-6 Optocoupler Modules

Performance Specifications

■ Input

Input Type
Six individually isolated voltage inputs interface voltage levels. Built-in hysteresis provides a sensing threshold for monitoring mains power.

Input Signal Voltage Range
0-130V$_{RMS}$, 130V DC.

Input Signal Threshold
Low-to-High threshold: 90V AC or DC, typical.
High-to-Low threshold: 60V AC (55V DC), typical.

Input Hysteresis
30V DC, typical.

Input Impedance
46K ohms, typical.

Input Over-Voltage Protection
Metal Oxide Varistors (MOV) at every channel input.
Rated Continuous Voltage: 130V$_{RMS}$, 130V DC.
Rated Maximum Clamping Voltage: 340V DC.
Input channels also include capacitive filtering, and series resistance.

■ Output

Output Type
Six open-drain, mosfet switches with a common source connection at output return. Low-side (sinking) switching between load and return for DC voltage and current-sinking applications only. Output channels are pulled up to +5.3V with 1KΩ resistors.

Output "OFF" Voltage Range
0-32V DC maximum.

Output "OFF" Leakage Current
1μA typical, 50μA maximum
(mosfet only, 25°C, 32V DC).

Output Pull-Ups
1KΩ pull-ups to 5.3V DC.

Output Activation

Input	Output
HIGH > 90V AC/DC	5.3V (OFF)
LOW < 60V AC/DC	0V (ON)

Output "ON" Current Range
0 to 150mA DC, continuous, each channel.

Output Rds On Resistance
2.5 ohms, maximum (150mA, 85°C).

Output Response Time
45ms, typical
(measured from input transition to output).

Output Pull-ups
Individual output channels include 1KΩ pull-ups to the internal +5.3V DC rail. If a stronger pull-up (lower resistance) is required, a resistor will have to be wired externally in parallel with the output channel.

Note: Do not exceed 150mA of drain current per output channel.

■ Environmental

Operating Temperature
-40 to 70°C (-40 to 158°F).

Storage Temperature
-40 to 85°C (-40 to 185°F).

Relative Humidity
5 to 95% non-condensing.

Power Requirement
12–32V DC SELV (Safety Extra Low Voltage). Current draw varies with power voltage as follows (current indicated is with all outputs ON).

Power Supply	Current Draw
12V DC	23mA typical, 25mA maximum
15V DC	19mA typical, 21mA maximum
24V DC	13mA typical, 15mA maximum
32V DC	11mA typical, 12mA maximum

Power Supply Effect
Less than ±0.001% of output span effect per volt DC of supply change.

Isolation
Inputs isolated from each other (channel-to-channel) and from output/power.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

Approvals
CE compliant. UL/cUL listings. ATEX Certified.
Designed for Class I; Division 2; Groups ABCD; Zone 2.
⟨Ex⟩ II 3 G Ex nA IIC T4 Gc -40°C ≤ Ta ≤ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass per IPC-4101/98 with humi-seal conformal coating.

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XTA-120V-6
6-channel 120V AC/DC discrete input module with open-drain outputs.

◆ Accessories

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).
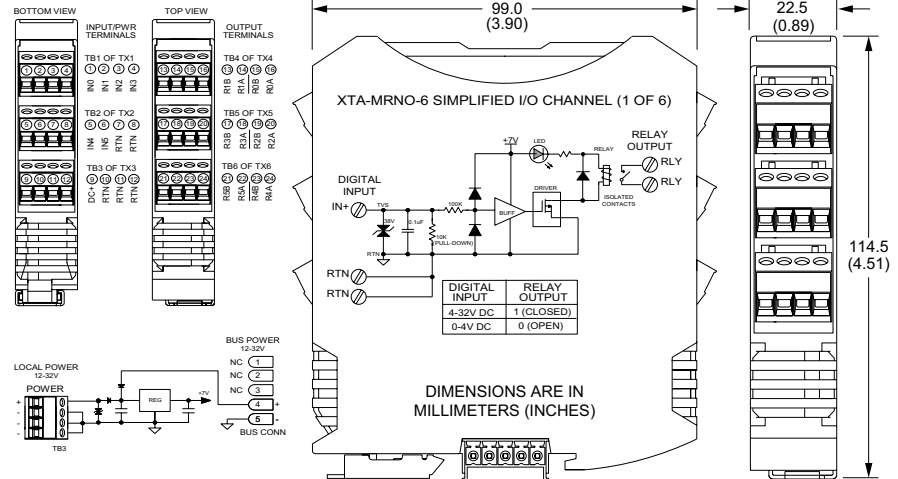
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XTA-MRNO Mechanical Relay Output Modules

6 discrete input/output channels ◆ **Form A normally open SPST 5A relays** ◆ **4-32V logic input**

Description

The XTA-MRNO-6 is an interposing relay module with six digital inputs and six mechanical relay outputs. It is intended for use with BusWorks XT Series discrete I/O or other digital output modules for the purpose of driving high energy loads. This module serves as an interim digital interface to switch high voltage devices at high currents based on digital logic inputs. Each pair of output contacts are individually isolated.

These modules are very easy to use. Removable front-facing terminal blocks on the module's top and bottom greatly simplify field wiring. Individidual channel LEDs indicate the output state for convenient troubleshooting.

Rugged construction and high density design combine for a very effective I/O solution. These units are ideal for remote monitoring, distributed control, or SCADA applications.

Input Ranges
4-32V digital logic (0V OFF, 4-32V ON)

Output Ranges
Relays drive up to 250V AC / 30V DC at 5A

Power Requirement
12 to 32V DC

Key Features & Benefits

- Six buffered digital logic inputs
- Six mechanical relay outputs
- Normally open, sealed, Form A mechanical relay contacts (SPST-NO)
- Switches both AC and DC voltage loads
- 1500V AC isolation (between each I/O channel and power) and surge/transient protection
- High-Density 22.5mm wide package with pluggable, front-facing terminals
- Individual LEDs for each channel
- Supports bussed/rail and redundant power
- -40°C to +80°C wide temperature operation
- Withstands 25g shock and 4g vibration
- CE and UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

XTA-MRNO   Mechanical Relay Output Modules

Performance Specifications

■ Digital Inputs (Logic Side)

Configuration
Six DC voltage inputs share return with power.

Input Signal Voltage Range
0 to +32V DC, 36V peak.

Input Signal Threshold
4V DC typical w/100mV hysteresis.

Input Impedance
10KΩ typical, input includes 10KΩ pull-down to return.

Input Response Time
See Output Response Time.

Input Over-Voltage Protection
Bipolar transient voltage suppression (TVS diodes) and capacitive filtering (0.1μF) is included at every input. TVS diodes are rated for a working voltage up to 38V DC, a breakdown voltage of 72V DC, and a clamping voltage of 100V DC.

Input Current
3.2 mA at 32V DC, typical. Inputs include 10KΩ pull-downs to return.

■ Relay Outputs (Field Side)

Configuration
Six normally open, isolated, SPST, mechanical relay contacts.

Contact Type
1 Form A (Six Channels), plastic-sealed contacts.

Contact Material
Gold overlay silver-Nickel alloy (Au + Ag 90 Ni 10).

Maximum Switching Voltage
Up to 277 V AC or 125V DC, maximum.

Maximum Switching Current
5A maximum.

Minimum Load
1mA, 5V DC

Maximum Switching Power
Up to 1,250VA or 150W, maximum.

Contact Resistance
1000mΩ at 500V DC, minimum (initial contact resistance).

Dielectric Strength
750V AC (50/60Hz) for 1 minute between open contacts, 3000V AC (50/60Hz) for 1 minute from contacts to input coil.

Mechanical Life
20×10^6 operations, minimum. External contact protection is required for use with inductive loads.

Electrical Life
100×10^3 operations, minimum at 3A & 250V AC, 30V DC resistive. 50×10^3 operations, minimum at 5A & 250V AC, 30V DC resistive w/ switching frequency at 20 times/minute.

Note: It is not recommended to switch mechanical relay contacts at high frequencies for long periods of time as this will quickly degrade the life of the relay.

Output Response Time
5.25ms typical, 10ms maximum, no bounce measured from input trigger to corresponding output contact closure.

Note: External relay contact protection is required for use with inductive loads. Failure to use adequate protection may reduce contact life or damage the unit.

■ Environmental

Operating Temperature
-40 to 80°C (-40 to 176°F).

Storage Temperature
-40 to 80°C (-40 to 176°F).

Relative Humidity
5 to 95% non-condensing.

Power Requirement
12–32V DC SELV (Safety Extra Low Voltage), 0.9W. Current draw varies with power voltage as follows (current indicated is with all six relays energized).

Power Supply	Current Draw
12V DC	62mA typical, 68mA maximum
15V DC	50mA typical, 55mA maximum
24V DC	32mA typical, 35mA maximum
32V DC	25mA typical, 27mA maximum

Isolation
Channel-to-channel and power isolation.
Peak: 1500V AC, ANSI/ISA-82.01-1988.
Continuous: 250V AC, 354V DC.

Shock and Vibration Immunity
Vibration: 4g, per IEC 60068-2-64.
Shock: 25g, per IEC 60068-2-27.

Electromagnetic Compatibility (EMC) Compliance
Radiated Emissions: BS EN 61000-6-4, CISPR 16.
RFI: BS EN 61000-6-2, IEC 61000-4-3.
Conducted RFI: BS EN 61000-6-2, IEC 61000-4-6.
ESD: BS EN 61000-6-2, IEC 61000-4-2.
EFT: BS EN 61000-6-2, IEC 61000-4-4.
Surge Immunity: BS EN 61000-6-2, IEC 61000-4-5.

Approvals
CE compliant. UL/cUL listings. ATEX Certified.
Designed for Class I; Division 2; Groups ABCD; Zone 2.
⟨Ex⟩ II 3 G Ex nA IIC T4 Gc -40°C ≤ Ta ≤ +80°C

■ Physical

General
General purpose plastic enclosure for mounting on 35mm "T-type" DIN rail.

Case Material
Self-extinguishing polyamide, UL94 V-0 rated, color light gray. General purpose NEMA Type 1 enclosure.

Circuit Board
Military grade fire-retardant epoxy glass per IPC-4101/98 with humi-seal conformal coating.

I/O Connectors
Removable plug-in type terminal blocks rated for 12A/250V; AWG #26-12, stranded/solid copper wire.

Dimensions
Width = 22.5mm (0.9 inches), Length = 114.5mm (4.51 inches), Depth = 99.0mm (3.90 inches).

Shipping Weight
0.5 pounds (0.22 Kg) packed.

Ordering Information

◆ Models

XTA-MRNO-6
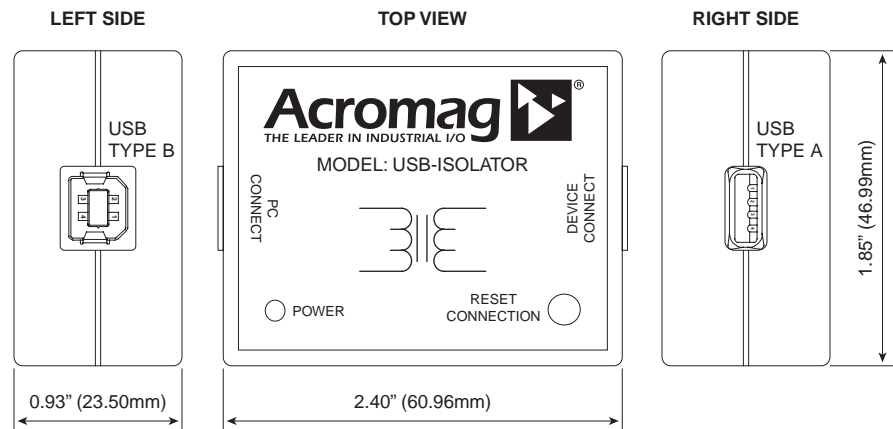6-channel mechanical relay output module

◆ Accessories

XTBUS-KIT
DIN rail bus power/excitation connector kit. Includes one DIN rail bus connector (1005-070), one left-side female connector terminal block (1005-220) and one right side male connector terminal block (1005-221).

ISO9001
AS9100
MADE IN USA

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USB-ISOLATOR   USB-to-USB Isolator

LEFT SIDE — USB TYPE B — 0.93" (23.50mm)

TOP VIEW — Acromag THE LEADER IN INDUSTRIAL I/O — MODEL: USB-ISOLATOR — PC CONNECT — DEVICE CONNECT — POWER — RESET CONNECTION — 2.40" (60.96mm)

RIGHT SIDE — USB TYPE A — 1.85" (46.99mm)

USB-powered, USB 2.0 and 1.1 compatible ◆ 1500V AC / 2100V DC isolation ◆ No drivers required

Description

This compact, industrial-grade isolator provides a high-voltage isolation barrier between a computer and a connected USB device. The isolation protects equipment from electrical surges and transient voltage spikes. It also eliminates ground loop currents flowing between the PC and peripherals which can cause damage and inaccurate measurements. Additionally, isolation minimizes conducted noise from static discharge, magnetic fields, and radio frequency interference.

Acromag's USB isolator is very easy to use. The isolator inserts in-line with the USB connection and operates transparently. No special software drivers are required. The unit receives power from the PC's USB port and isolates that power to the connected device. High noise immunity and low radiated emissions ensure reliable data transfer in sensitive applications.

A number of high-performance features help provide convenient and dependable operation. The green LED indicates that power is being received and blinks if the connected device draws too much current. An internal jumper lets you switch from Full Speed (12 Mbps) to Low Speed (1.5 Mbps) communication. The reset button offers a simple way to reinitialize a connected device without breaking the cable connection. High-retention USB sockets keep cables securely attached under shock and vibration.

Key Features & Benefits

- Isolates and protects a USB peripheral from a USB host
- Electrical isolation up to 1500V AC / 2100V DC
- Common mode filtering on all data lines
- Built-in surge/transient suppression up to 8kV on all ports
- Self-powered through the USB port
- Supports USB 2.0 full speed (12 Mbps) and USB 1.1 low speed (1.5 Mbps) data rates with jumper-selection
- LED for power indication and diagnostics
- Reset button to reinitialize and re-enumerate peripheral devices
- Output short circuit protection with auto-retry
- No software or configuration required (transparent operation)
- Uses standard high-retention USB Type A/B cable connections (includes 1m cable)
- Compact size and rugged design for harsh environments
- Wide ambient temperature operation -40 to 70°C (-40 to 158°F)
- CE, FCC, UL/cUL approvals

Ordering Information

Models

USB-ISOLATOR
USB isolator, includes USB cable (Part # 4001-112) for isolator-to-PC connection

XT-SIP
CD-ROM (Part #5041-094), USB isolator, two USB cables (Part # 4001-112, 4001-113),and one Ethernet cable (Part # 5035-360) for configuration of Acromag BusWorks XT Series Ethernet modules.

Accessories

4001-112
USB cable, 1 meter, with Type A to Type B plugs

4001-113
USB cable, 1 meter, with Type A to Mini-B plugs

5035-360
Ethernet crossover cable, 5 feet, Single-shielded category 5e STP cable with a drain wire and an RJ45 plug at each end.

Accessories

USB-ISOLATOR   USB-to-USB Isolator

Performance Specifications

■ USB Port Interface

Standards
USB 1.1 and 2.0 compatible, full speed (12Mbps, default) and low speed (1.5Mbps) data rates supported. For low speed data rates, an internal jumper is provided for user setting. Connection is transparent, no software or configuration is required. Isolator will not be enumerated in the device manager.

■ Physical

Dimensions
2.40″ Length x 1.85″ Wide x 0.925″ High (60.96mm x 46.99mm x 23.495mm).

Connectors
Standard high retention USB A/B connectors with minimum withdrawal force of 15 Newtons. 1 meter A/B cable included.

PC Connector
USB Type B receptacle

Device Connector
USB Type A receptacle

LED Indicator
Green LED indicates isolator receiving 5V power from the USB computer bus. Flashing indicates short circuit/retries on peripheral side.

Reset Button
Resets the connection to the USB peripheral device for reinitialization and re-enumeration.

Enclosure Material
ABS Resin, UL94 rated, IP30 plastic case.

■ Environmental

Operating temperature
-40 to 70°C (-40° to 158°F).

Storage temperature
-40 to 85°C (-40 to 185°F).

Relative humidity
5 to 95% non-condensing.

Power
PC Connect Side: Standard USB bus power (5V DC).

Device Connect Side: 5V DC / 120mA with full power connection from PC. Includes over-current protection with auto-retry.

Isolation
1500V AC / 2100V DC peak isolation.
250V AC continuous safety isolation.

Agency Approvals:
CE and FCC compliant. UL/cUL Class 1 Div. 2 Zone 2.

Radiated Field Immunity (RFI)
Designed to comply with IEC1000-4-3 Level 3 and EN50082-1.

Electromagnetic Compatibility (EMC)
Minimum immunity per EN61000-6-2:2001

Electrostatic Discharge (ESD) Immunity
Per IEC61000-4-2.

Radiated Field Immunity (RFI)
Per IEC61000-4-3.

Electrical Fast Transient Immunity (EFT)
Per IEC61000-4-4. Complies with IEC1000-4-4 Level 3 and EN50082-1.

Surge Immunity
Complies with IEC1000-4-5 Level 3 and EN50082-1. Per IEC61000-4-5.

Conducted RF Immunity (CRFI)
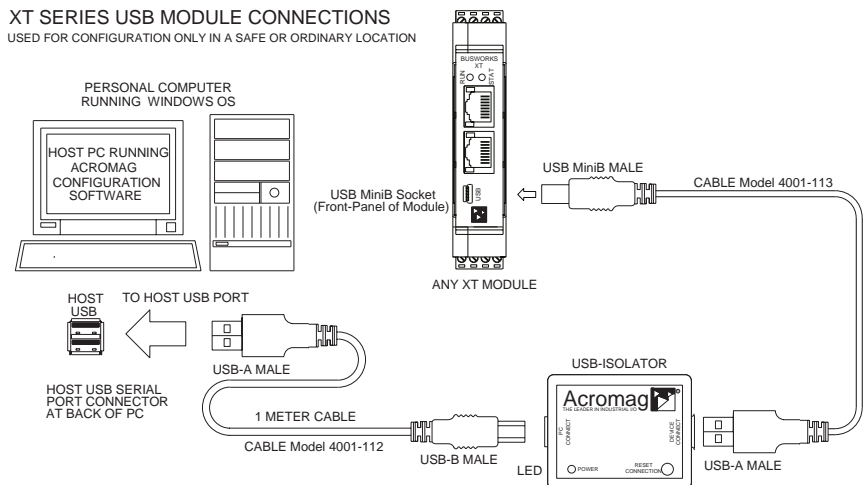Per IEC61000-4-6.

Emissions
Per EN61000-6-4:2001.

Radiated Frequency Emissions
Per CISPR11 Class A. Meets or exceeds EN50081-1 for Class B equipment.

XT SERIES USB MODULE CONNECTIONS
USED FOR CONFIGURATION ONLY IN A SAFE OR ORDINARY LOCATION

PERSONAL COMPUTER RUNNING WINDOWS OS

HOST PC RUNNING ACROMAG CONFIGURATION SOFTWARE

USB MiniB Socket (Front-Panel of Module)

USB MiniB MALE

CABLE Model 4001-113

BUSWORKS XT
RUN   STAT

ANY XT MODULE

HOST USB

TO HOST USB PORT

HOST USB SERIAL PORT CONNECTOR AT BACK OF PC

USB-A MALE

1 METER CABLE

CABLE Model 4001-112

USB-B MALE

USB-ISOLATOR

Acromag
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PC CONNECT   DEVICE CONNECT

POWER   RESET CONNECTION

LED

USB-A MALE

ISO9001
AS9100
MADE IN USA

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