

## Product Datasheet - Technical Specifications



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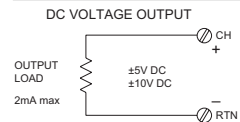
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# Ethernet I/O: BusWorks® XT Series

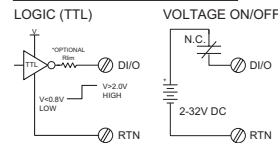
## XT1540 Ethernet Analog Output & Digital I/O Modules



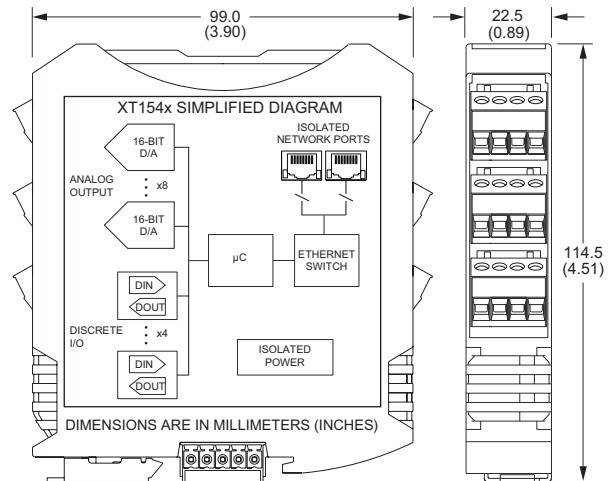
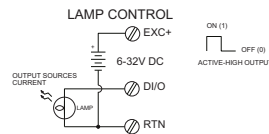
### ANALOG OUTPUT EXAMPLES



### DISCRETE INPUT EXAMPLES



### DISCRETE OUTPUT EXAMPLES



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

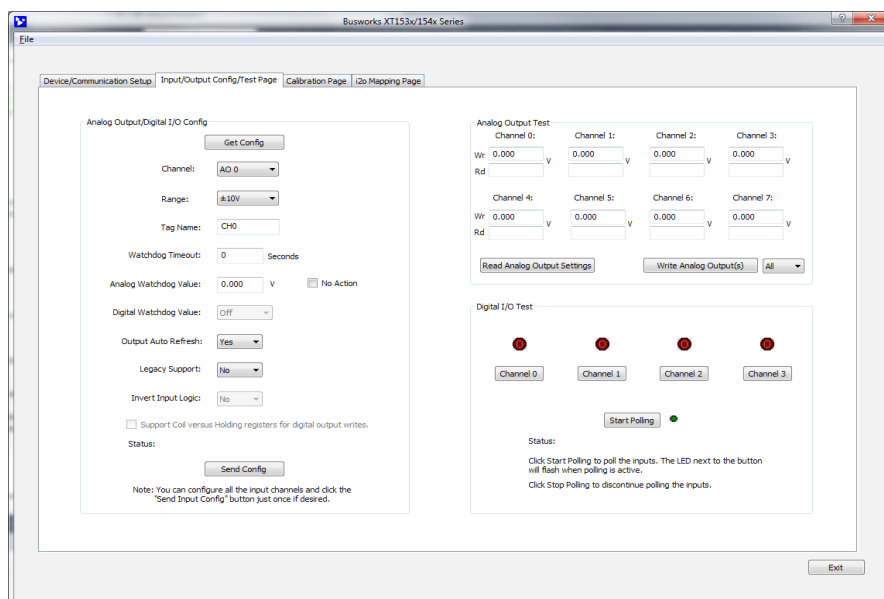
Modbus TCP/IP, Ethernet/IP, Profinet, i2o® peer-to-peer, 10/100Base-T(X) PriorityChannel™ device determinism

### 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](http://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.





# Ethernet I/O: BusWorks® XT Series

## 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 with 100mV 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.  
☞ 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

##### [XT BUS-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)

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