



**BusWorks® Series 9xxEN Modules w/Modbus/TCP
BusWorks® Series XT1xx1 Modules w/ Modbus/TCP
EtherStax™ Stackable I/O Family w/ Modbus/TCP
10/100MB Industrial Ethernet I/O**

Application Note – Modbus/TCP

**Setting Up and Communicating with Acromag
Series 9xxEN-40xx and XTxxx1-xxx Modbus/TCP
Modules and EtherStax™ Modbus/TCP
from Ignition Software**

ACROMAG INCORPORATED
30765 South Wixom Road
Wixom, MI 48393-2417 U.S.A.
Tel: (248) 295-0880
email: sales@acromag.com

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This document illustrates a procedure for configuring OPC tags to Acromag Busworks® Modbus/TCP modules using Ignition Software. Acromag assumes no responsibility for any errors that may occur in this document, and makes no commitment to update, or keep this information current. Be sure to visit Acromag on the web at <https://www.acromag.com>.

COMMUNICATING WITH IGNITION SOFTWARE

This document illustrates a procedure for configuring OPC tags intended for Acromag Busworks® Series Modbus/TCP modules using Windows software from Inductive Automation. It is assumed that the user has a working knowledge of OPC, Modbus TCP, and Ignition software.

Configuring Modbus/TCP Connection on Ignition Webpage

The screenshot shows the Ignition software interface. The top navigation bar includes 'HOME', 'STATUS', and 'CONFIGURE' tabs. The 'CONFIGURE' tab is selected. Below it, a green banner displays 'Trial Version' and the time '1:57:33'. A message says 'We're glad you're test driving our software. Have fun.' On the left, a sidebar menu lists 'ALARMING', 'TAGS', 'OPC-UA SERVER', and 'Devices' (which is currently selected). The main content area is titled 'Devices' and shows a table with two entries:

| Name | Type |
|------------|------------|
| 951EN-4012 | Modbus TCP |
| XT1111-000 | Modbus TCP |

A red circle highlights the blue 'Create new Device...' button at the bottom of the table.

1. From the CONFIGURE tab, select Devices under OPC-UA SERVER, and select **Create new Device**.

The screenshot shows the 'Add Device Step1' configuration dialog. The left sidebar lists 'OPC-UA SERVER', 'OPC CONNECTIONS', 'MOBILE', 'ENTERPRISE ADMINISTRATION', and 'SEQUENTIAL FUNCTION CHARTS'. The 'Devices' option is selected. The main panel shows a list of connection types:

- Modbus TCP**
Connect to devices that implement the Modbus TCP protocol.
- Omron NJ Driver
Connect to Omron NJ series PLCs.
- Siemens S7-1200
Connect to Siemens S7-1200 PLCs over Ethernet.
- Siemens S7-1500
Connect to Siemens S7-1500 PLCs over Ethernet.

A red circle highlights the blue 'Next >' button at the bottom right of the dialog.

2. In the **Add Device Step1**, select **Modbus TCP** as shown in the example, and click **[OK]**.

Configuring Modbus/TCP Connection on Ignition Webpage...

The screenshot shows the 'New Device' configuration window in Ignition. It has two main sections: 'General' and 'Connectivity'.
General Tab:

- Name: 951EN-4012
- Description: Acromag 951EN (highlighted with a red oval)
- Enabled: (default: true)

Connectivity Tab:

- Hostname: 192.168.1.120 (highlighted with a red oval)
- Port: 502
Port to connect to.
(default: 502)
- Communication Timeout: 2000
Maximum amount of time to wait for a response.
(default: 2,000)

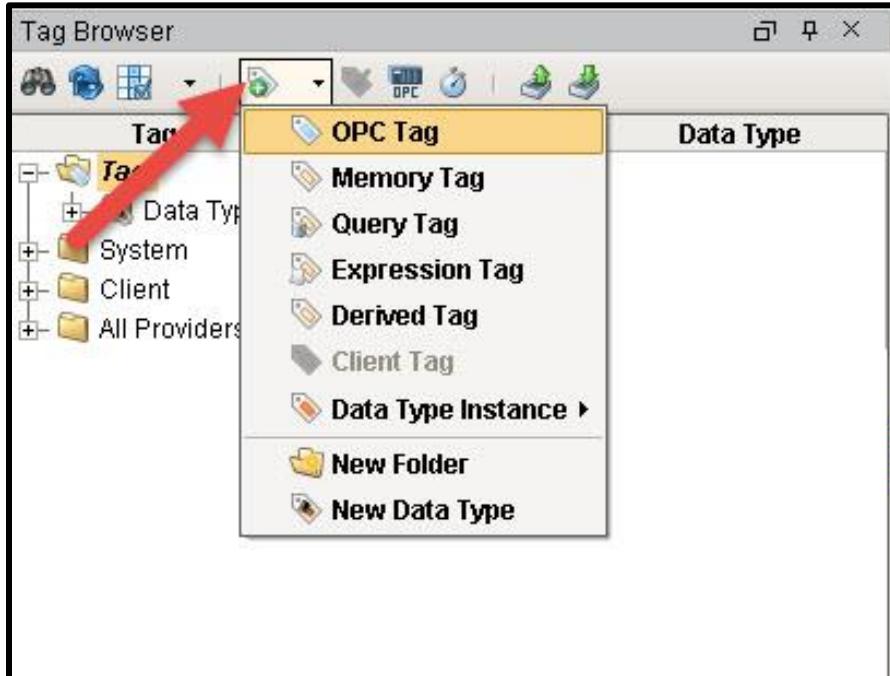
At the bottom left is a 'Show advanced properties' checkbox. At the bottom right is a blue 'Create New Device' button, which is also highlighted with a red oval.

3. In the **New Device** window enter the **Name** and **Description** of the BusWorks® module. Next, enter the IP address of the module in the **Hostname** box. In the example at left, the IP Address of the module is 192.168.1.120, but this will vary depending on the address of your network's addressing scheme.

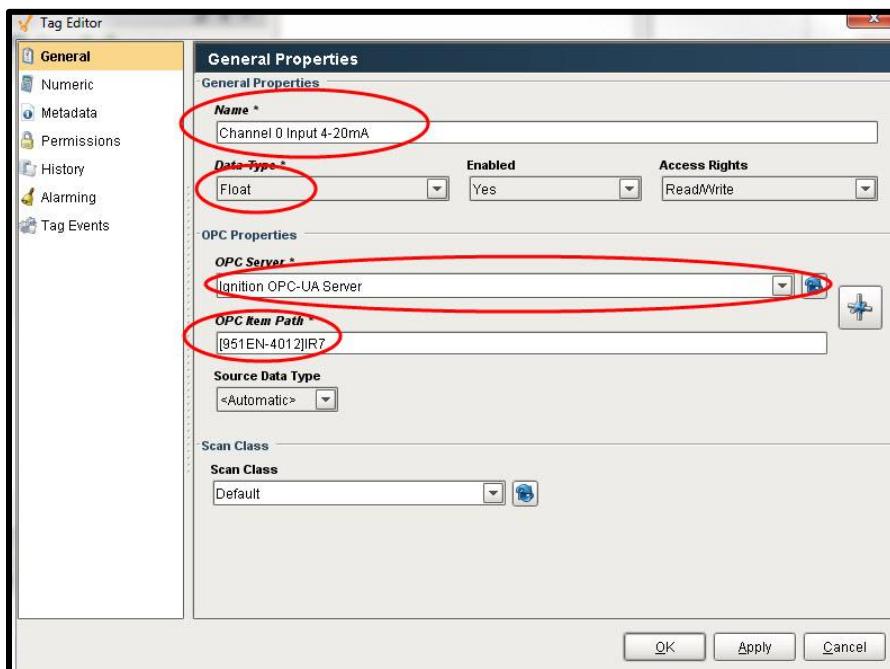
Next, select **Create New Device**.

While able to create OPC tags in the web browser, this application note will show you how to add and manipulate tags in Ignition Designer.

[Adding and Configuring BusWorks Device Tags in Ignition Designer](#)

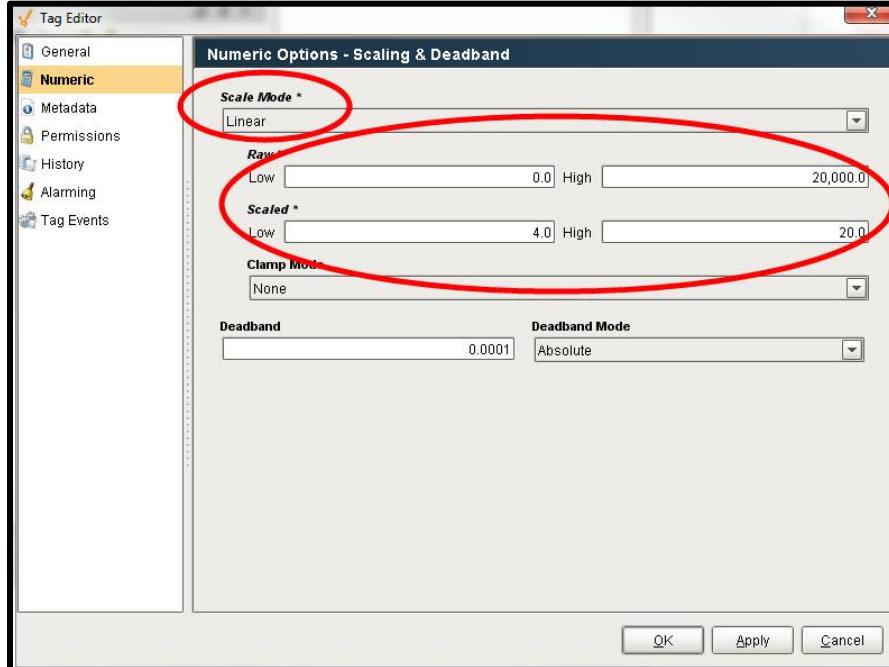


- Once you launch Ignition Designer, either create a new project or select an existing project.
- In the **Tag Browser**, select the Tag dropdown (as shown on the left) and select **OPC Tag**.



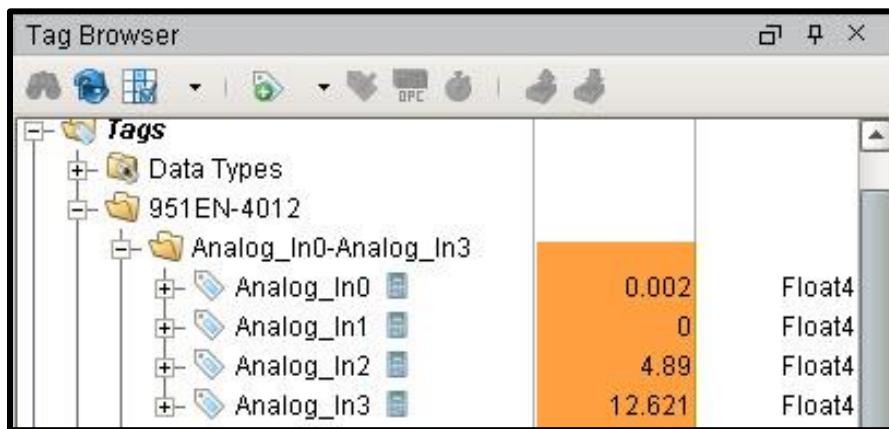
- Enter a description for the data to be read under **Name**. For analog data, select **Float** under **Data Type**. For discrete (digital) signals, select either Boolean or integer. Next, select **Ignition OPC-UA Server** under **OPC Server**. Next, enter the Modbus register address under **OPC Item Path** (see chart on page 7 for **Data Type** and **Modbus Register Addressing**).

Adding and Configuring BusWorks Device Tags in Ignition Designer...



4. In order to properly scale analog I/O values, select the **Numeric** tab and select **Linear** under **Scale Mode**. Next, select low (zero) and high (full scale) values. Click OK when done.

The input data will be continuously updated.



Adding and Configuring BusWorks Device Tags in Ignition Designer...

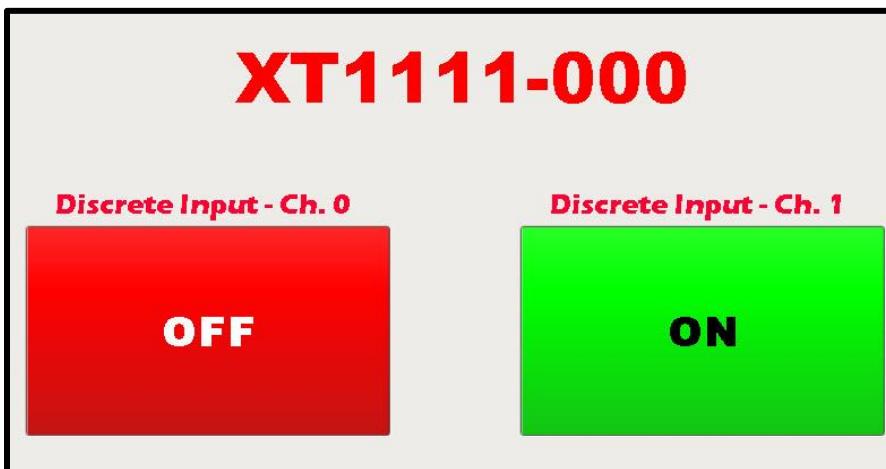
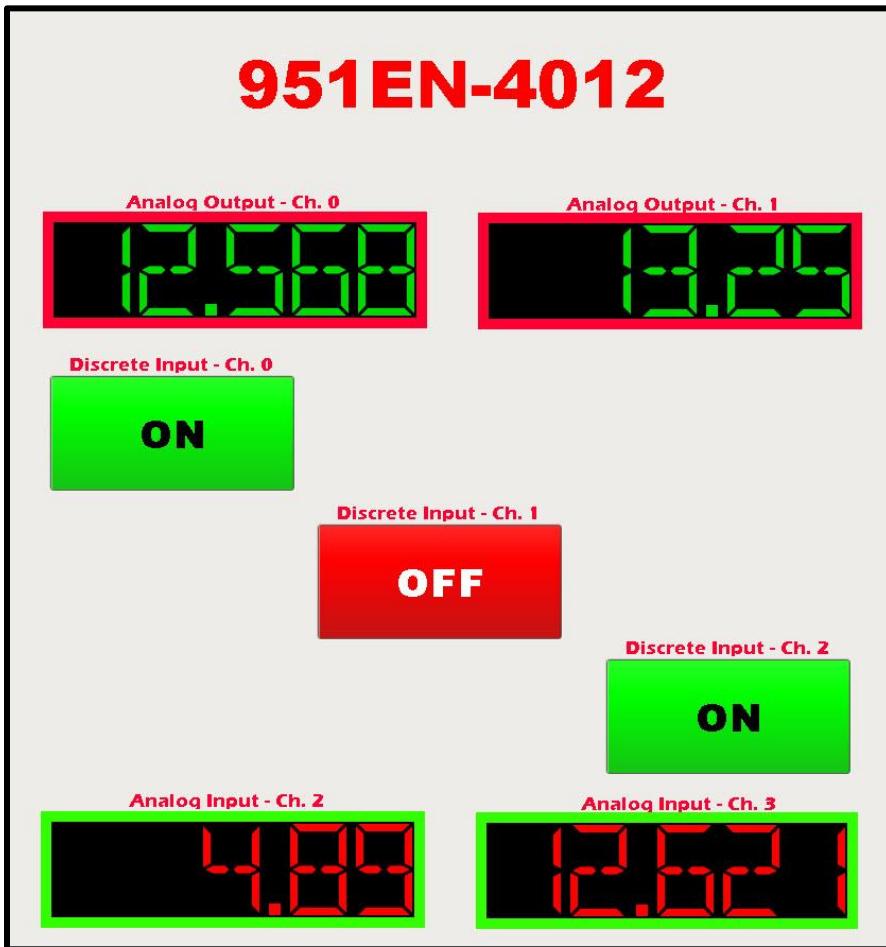
| Module | Input Register (IR) | | Holding Register (HR) | | Coil (C) | Discrete Input (DI) |
|----------------|---------------------|----------|-----------------------|----------|----------|---------------------|
| | Analog | Discrete | Analog | Discrete | | |
| 951/2EN-4012 | x | | x | | x | x |
| 958EN-4x16 | x | | | | | |
| 961/2EN-4006 | x | | | | | |
| 963/4EN-4012 | x | | | | | |
| 965EN-4004/6 | x | | | | | |
| 966EN-4004/6 | x | | | | | |
| 967EN-4x08 | x | | | | | |
| 968EN-4x08 | x | | | | | |
| 972/3EN-4004/6 | | | x | | | |
| 981/2/3EN-4012 | | | | x | x | x |
| 989EN-4x16 | x | | | | x | x |
| 993/4EN-4x16 | x | | | | | |
| XT11x1-000 | | x | | x | | |
| XT12x1-000 | x | | | | | |
| XT1531-000 | | x | x | x | x | x |
| XT1541-000 | | x | x | x | x | x |
| ES2113 | | | | | x | x |
| ES2117 | | | | | x | x |
| ES2151/2 | x | | x | | | |
| ES2153 | x | | | | | |
| ES2161/2 | x | | | | | |
| ES2163/4 | x | | | | | |
| ES2171/2 | x | | x | | | |

Use the chart at left when programming tags. Analog inputs and outputs can be scaled as shown in step 4 above.

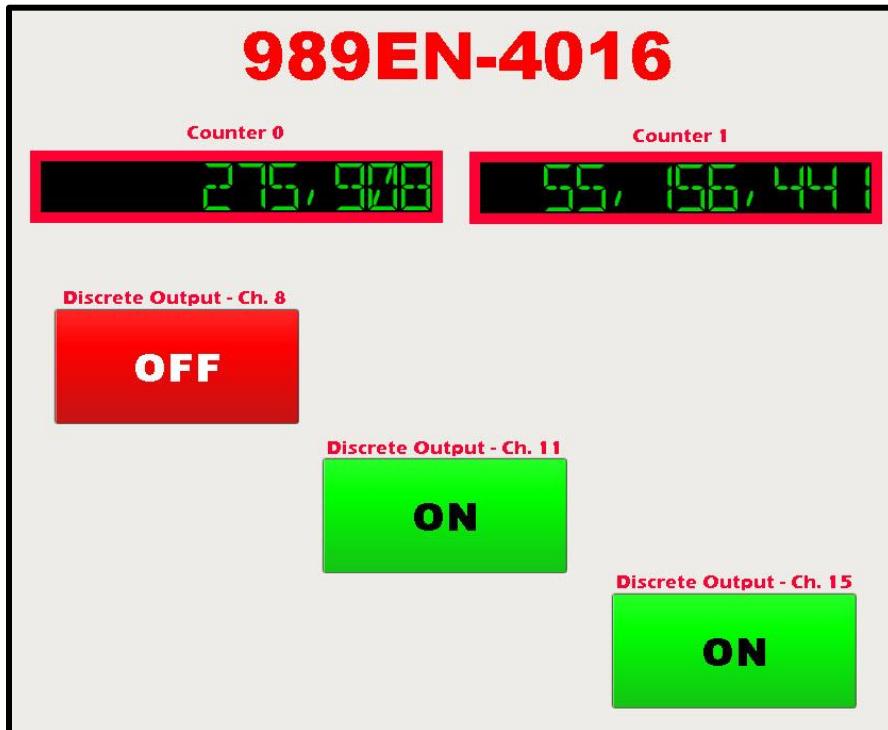
Bit-level addressing is possible with all models listed.

Units with integrators / counters have their 32-bit values stored in two 16-bit registers. These can be accessed using the IRI (input registers) and HRI (output registers) designators. See Ignition user manual for details.

[Example Views in Ignition Designer](#)



Example Views in Ignition Designer...



The example shown on the left has the following tag details (note that this example addresses 2 consecutive 16-bit registers with 32 bit integer conversion):

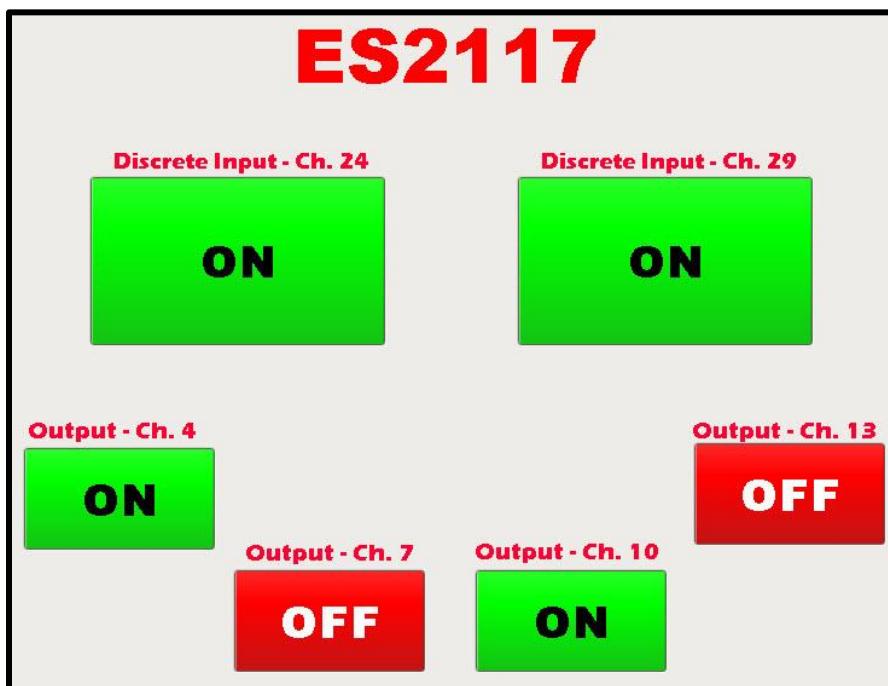
Discrete Input – Ch. 0 Counter
Data Type: Long
OPC Item Path: [989EN-4016]IRI4

Discrete Input – Ch. 1 Counter
Data Type: Long
OPC Item Path: [989EN-4016]IRI5

Discrete Output – Ch. 8
Data Type: Boolean
OPC Item Path: [989EN-4016]C9

Discrete Output – Ch. 11
Data Type: Boolean
OPC Item Path: [989EN-4016]C12

Discrete Output – Ch. 15
Data Type: Boolean
OPC Item Path: [989EN-4016]C16



The example shown on the left has the following tag details:

Discrete Input – Ch. 24
Data Type: Boolean
OPC Item Path: [ES2117]DI25

Discrete Input – Ch. 29
Data Type: Boolean
OPC Item Path: [ES2117]DI30

Discrete Output – Ch. 4
Data Type: Boolean
OPC Item Path: [ES2117]C5

Discrete Output – Ch. 7
Data Type: Boolean
OPC Item Path: [ES2117]C8

Discrete Output – Ch. 13
Data Type: Boolean
OPC Item Path: [ES2117]C14

Notes:

ABOUT ACROMAG

Acromag is a multi-million-dollar international corporation that combines more than 60 years of process monitoring and control experience with a solid background in high-tech computer design.

We are focused on developing industrial I/O solutions that provide the best long-term value in the industry. A complete line of industrial I/O products including process instruments, signal conditioning equipment, data acquisition boards, distributed I/O modules, and network communication devices are available. Industries served include manufacturing, water services, power generation, mining, defense, and transportation.

Acromag I/O is ideal for a broad range of monitoring and control operations where controllers communicate with instrumentation on the plant floor or in the field.

REVISION HISTORY

The following table shows the revision history for this document:

| Release Date | Version | EGR/DOC | Description of Revision |
|--------------|---------|---------|-------------------------|
| 12 DEC 2017 | | AS/ARP | Initial Acromag release |
