AN-X2-GENI

AN-X-GENI/B

Genius I/O

Communication Module

User Manual

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Throughout this manual we use notes to make you aware of safety considerations.

WARNING!

Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

These warnings help to:

- identify a hazard
- avoid the hazard
- recognize the consequences

IMPORTANT!

Identifies information that is especially important for successful application and understanding of the product.

TIP

Identifies information that explains the best way to use the AN-X2-GENI gateway

The AN-X2-GENI (AN-X-GENI/B) communications module connects a ControlLogix PLC or other device to a Genius I/O network.

The module supports scheduled connections with a ControlLogix processor, over Ethernet, so the ControlLogix processor can read inputs from the Genius network and write outputs.

The AN-X module acts as a scanner on the Genius network. It supports up to 31 Genius blocks.

The AN-X2-GENI module has a web interface for configuration, for monitoring logs, and for performing other administrative functions. You can communicate with the module using any standard web browser such as Internet Explorer.

The module firmware can be updated over Ethernet using the web interface. Refer to page 55 for details.

Hardware Features

The module has:

- LEDs to indicate the status of the connection to the Ethernet (100 and Link/Act)

- a LED to indicate the module's internal state (SYS or MS)

- a LED to indicate the state of communications on the Genius network (NET or NS)

- an Ethernet connector

- a power connector

- a connector to connect to the Genius network

A watchdog timer is implemented in the module's hardware. If the firmware does not kick the watchdog within the timeout period the watchdog times out and places the module into a safe fatal failure state.

A jabber inhibit timer is implemented in the module's hardware. If the network transmitter is on longer than 150% of the longest network frame time, the transmitter is forced off and the module is placed into a safe fatal failure state.

Package Contents

- AN-X2-GENI module

- CD containing software and documentation

- microSD to SD card adapter

- rubber feet for desktop use

Identifying the AN-X2 versus the Original AN-X

The label on the bottom toward the front says AN-X-GENI/B. Note: AN-X2-GENI and AN-X-GENI/B refer to the same module.

There is a slot at the back for the microSD card.

When initially powered up:

- AN-X2 railroads (alternates) SYS (or MS) and NET (or NS) LEDs green as it starts up

- without the Ethernet cable attached, the Ethernet 10/100 (upper) LED is on for AN-X2 (both Ethernet LEDs are off for the original AN-X)

Comparisons with the Original AN-X

AN-X2 modules have a microSD card for storage of firmware and configuration data.

You no longer need AnxInit; everything can be done from the web interface or by editing files on the microSD card.

Operation is simplified, there are production and maintenance modes only.

The AN-X2 requires firmware version 4 and above.

The AN-X2 uses the same hardware interface to automation networks.

There are no differences for applications once Ethernet and firmware have been configured.

Using the MicroSD Card

The AN-X2 microSD card stores configuration data and firmware.

The are no restrictions on the size or speed of the card. The format must be FAT-16 or FAT-32.

An adapter is provided so you can insert the microSD card in an SD slot in your computer.

The card must be present while the AN-X2 is running.

WARNING!   Do not remove the card while the AN-X2 is powered on!

If the AN-X2 is inaccessible from Ethernet because of its settings, you can remove the card and edit the file config.txt. Refer to page 12 for details.

Insert the card in the slot at the back of the AN-X2, with the pins facing up.

WARNING!   If you remove the card to edit the configuration file, push the card in straight or the card might fall inside the case and you will have to disassemble the AN-X2 to retrieve it .

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AN-X2 Modes of Operation

There are two AN-X2 modes of operation:

- Maintenance mode. The AN-X2 runs the maintenance firmware at startup. It performs diagnostics (memory tests, etc), and copies any changes from the microSD card. If there are no errors, it starts the AN-X2 in production mode.

- Production mode. This is the normal runtime mode of operation.

Installation

Prevent Electrostatic Discharge

The module is sensitive to electrostatic discharge.

WARNING!   Electrostatic discharge can damage integrated circuits or semiconductors. Follow these guidelines when you handle the module:

- Touch a grounded object to discharge static potential
- Do not touch the connector pins

Power

AN-X requires DC power input of anywhere from 12 to 24 VDC
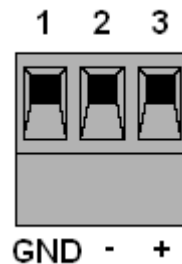
Left to right the pins on the power connector are chassis ground, negative voltage and positive voltage. Pin 1 is closest to the Ethernet connector.

The chassis ground should be connected.

Power consumption internally is 200 mA @ 12VDC or 100 mA @ 24VDC.

The part number for the power connector is Phoenix MSTB 2.5/3-ST-5.08

Genius Cabling and Termination

Refer to Genius I/O System and Communications User's Manual, GEK-90486F-1 for detailed information on Genius cabling and installation.

The module has a 5-pin Phoenix connector for connection to the Genius I/O network. The part number for the Genius bus connector is MSTB 2.5/5-ST-5.08

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1 2 3 4 5

Pin	Assignment
1	Not used
2	Shield out
3	Shield in
4	Serial 2
5	Serial 1

Ensure that the physical ends of the Genius I/O network are properly terminated. The AN-X module does not have any internal termination.

WARNING!   Set the baud rate and serial bus address for the AN-X2-GENI module before connecting it to the Genius network.

Ethernet Cabling

AN-X has a standard RJ-45 connector for connecting to Ethernet.

If you are connecting to the AN-X through a router or switch, use a standard Ethernet cable.

If you are connecting directly to the AN-X module, use a crossover cable.

Software Installation

There is no required software installation for the AN-X2-GENI. All configuration can be done using the web interface.

CE Installations

If you are installing the AN-X2 in a location which requires CE, install the following ferrites or their equivalents on the cables:

Steward 28A3851-0A2 two passes on serial cable 2

Steward 28A2025-0A0 on Ethernet cable

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Steward 28A2024-0A0 two passes on power cable

Quick Start

Step		See page
1	Power up the AN-X, connect it to Ethernet and assign it an IP address	8
2	(Not needed for existing installations) Use the Genius hand-held monitor to assign serial bus addresses to Genius devices and perform any other necessary configuration.	
3	Use the AN-X web interface to set the baud rate and serial bus address for the AN-X2-GENI	16
4	Connect AN-X to the Genius network	5
5	Use the AN-X web interface to autoconfigure the Genius network and ControlLogix configuration	16
6	Configure the AN-X in RSLogix 5000	31
7	Use the web interface to obtain aliases for RSLogix 5000	34
8	Import the aliases into RSLogix 5000	35
9	Use the aliases to access data	

Ethernet Configuration

Before you can use the AN-X2-GENI, you must configure its network properties on Ethernet.

Initial Ethernet Configuration

AN-X can be configured:

- to use a static (unchanging) IP address

- to obtain its IP address from a DHCP server

- to use the fixed link-local address 169.254.42.84

AN-X modules are shipped with the link-local address 169.254.42.84.

Unless you have control of the DHCP server, in most applications you will assign the AN-X a static IP address. Otherwise the DHCP server may assign a different IP address each time AN-X powers up, and any software that accesses the AN-X module would have to be reconfigured.

If you are using multiple AN-X modules, connect and configure one at a time, since initially they will all be set to the same link-local IP address.

IMPORTANT!   If you are connecting AN-X to an existing Ethernet network, consult the network administrator to obtain information about how you should configure AN-X or to obtain a static IP address for AN-X.

You configure the Ethernet properties using the web interface.

Start a web browser and enter the address 169.254.42.84
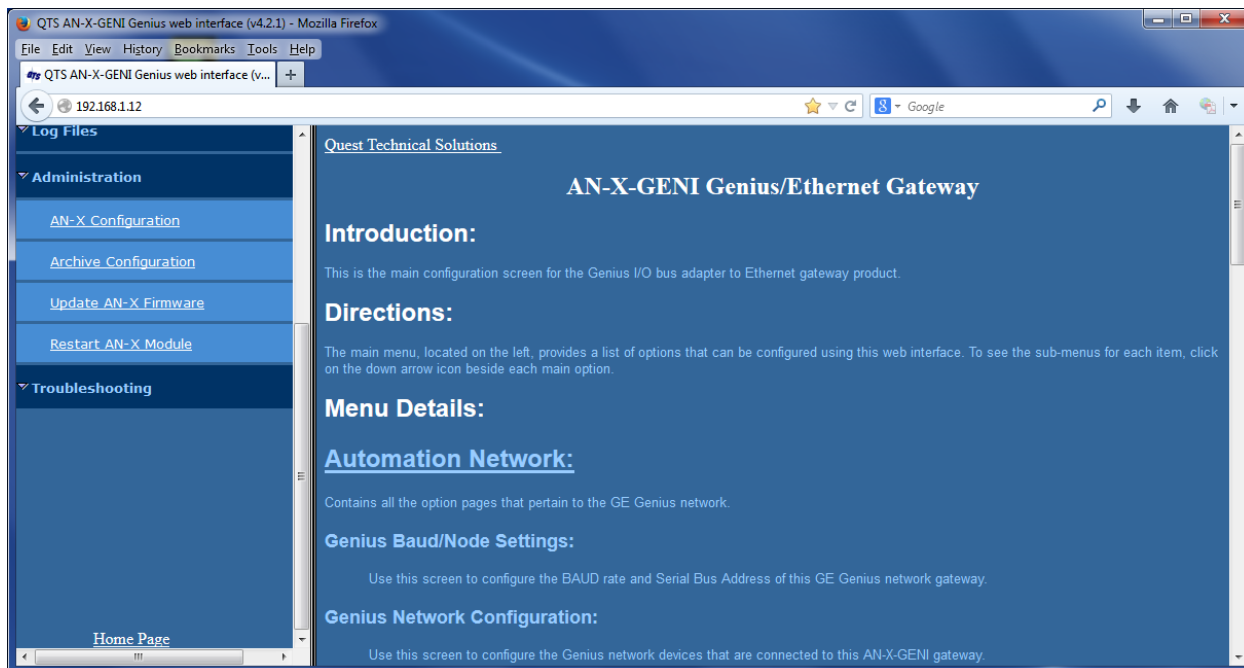
TIP   The AN-X2 must be on the same subnet as the computer to use the link-local IP address. It cannot be connected through a router.

Select *Administration/AN-X Configuration*.

The *AN-X2 Configuration* page appears.
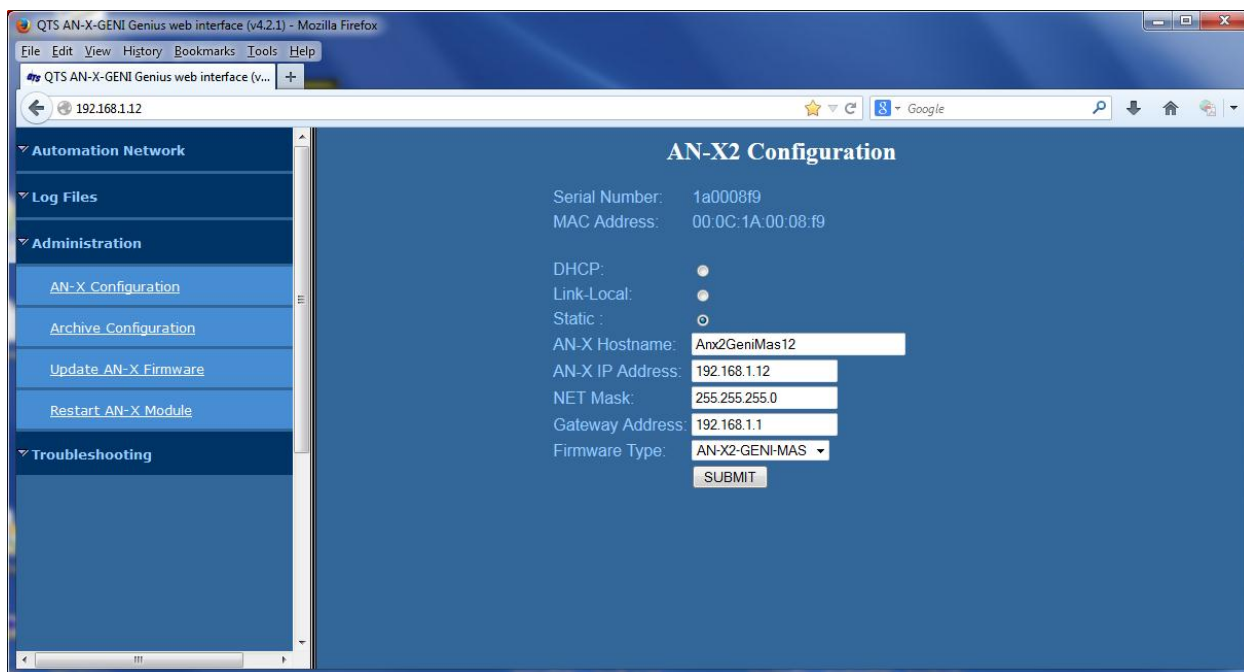
At the top the screen shows the serial number and MAC address of the AN-X being configured.

Check either DHCP or Static.

DHCP

If the AN-X2 finds a DHCP server on the network, it obtains an IP address and other network parameters (netmask and default gateway) from the DHCP server.

To find the address assigned, you have to look at the DHCP server log.

When you submit the changes, if the AN-X2 does not find a DHCP server, it reverts to the default link local address 169.254.42.84 and repeatedly flashes the SYS (or MS) LED 3 times red followed by a pause.

Static IP Address

If you select static IP address, enter:

- the IP address for the AN-X.
- the netmask for the AN-X
- the default gateway for your network.

You must enter a valid default gateway address even if there is no device at the gateway address on the network.

Hostname

Enter a *Hostname* for the AN-X2. This name is used internally by AN-X and may be used to identify the AN-X if you have a DNS server on your network. The name can be from 1 to 30 characters long.

The hostname asigned is also used as the default ClxName when you autoconfigure.

Firmware

Select the firmware the AN-X is to load from the list provided. AN-X builds the list from the firmware files on the microSD card that are compatible with the AN-X hardware.

The firmware file for Genius operation is AN-X2-GENI-MAS.v4.x.x.qtf

Submitting the Configuration

Once you have entered all required parameters, click SUBMIT to write the configuration to the file config.txt on the microSD card. The changes do not take effect until the AN-X restarts.

The following page appears when you click SUBMIT.
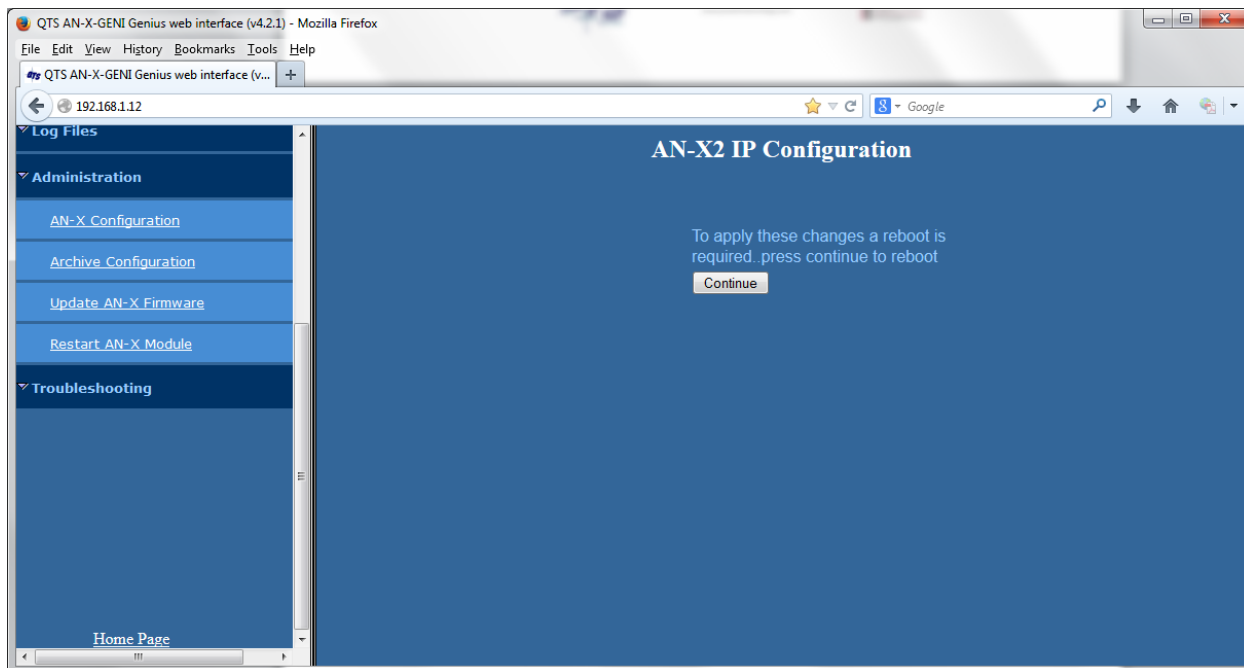
Click *Continue* to restart the AN-X2, then wait until the AN-X has completely restarted before continuing.

If you have changed the IP address, you will have to enter the new IP address in the browser's address field.

Reconfiguring an AN-X from an Unknown State

It sometimes happens that an AN-X has been previously configured with an IP address that causes it to be inaccessible on the current Ethernet network or the IP address is unknown.

Remove the microSD card and edit the file config.txt using a text editor such as Windows Notepad to set the AN-X2 to the desired configuration.

The Configuration File

The Ethernet configuration and the name of the production firmware file to load are stored in the file config.txt on the microSD card.

The file config.txt is a text file that contains the Ethernet configuration and the name of the firmware file to load.

When you perform the *Administration/AN-X Configuration* command from the web interface, it writes the results to config.txt.

Each line consists of a keyword followed by a colon and then a value.

Example:

```
IP: 192.168.1.12
```

Anything after a semicolon on a line is treated as a comment.

Keyword	Possible Values
IP	LOCAL DHCP static IP address
Netmask	Ethernet netmask, used only if IP is a static IP address
DefGtwy	default gateway, used only if IP is a static IP address
Hostname	Ethernet host name, from 1 to 30 characters
Firmware	Firmware file to run at startup, must be present on microSD card

If you edit the file and AN-X2 finds an error during startup, it flashes an error code on the SYS (or MS) LED, see page 54.

Example config.txt files

Example: Link- Local IP address

```
IP: LOCAL
Hostname: ANX2Geni
Firmware: AN-X2-GENI-MAS
```

Example: DHCP

```
IP: DHCP
Hostname: ANX2Geni
Firmware: AN-X2-GENI-MAS
```

Example: static IP address

```
IP: 192.168.1.14
NetMask: 255.255.255.0
DefGtwy: 192.168.1.1
HostName: ANX2Geni
Firmware: AN-X2-GENI-MAS
```

If the link-local address is not accessible…

Addresses 169.254.1.0 to 169.254.254.255 are reserved for use on a local network. AN-X2 modules are shipped set to the address 169.254.42.84 for initial configuration. This address is almost always accessible from a computer on the same local Ethernet as the AN-X.

If you cannot access the AN-X2 at address 169.254.42.84 using a web browser, open a command prompt window and type

route print

The routing table appears

```
===========================================================================
Interface List
0x1 .......................... MS TCP Loopback interface
0x2 ...00 18 8b c5 9d f7 ...... Broadcom 440x 10/100 Integrated Controller -
Packet Scheduler Miniport
===========================================================================
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0       10.10.0.1      10.10.0.20      20
         10.10.0.0    255.255.255.0      10.10.0.20      10.10.0.20      20
        10.10.0.20  255.255.255.255       127.0.0.1       127.0.0.1      20
    10.255.255.255  255.255.255.255      10.10.0.20      10.10.0.20      20
    64.215.255.122  255.255.255.255       10.10.0.1      10.10.0.20      20
         127.0.0.0        255.0.0.0       127.0.0.1       127.0.0.1       1
       169.254.0.0      255.255.0.0      10.10.0.20      10.10.0.20      20
         224.0.0.0        240.0.0.0      10.10.0.20      10.10.0.20      20
   255.255.255.255  255.255.255.255      10.10.0.20      10.10.0.20       1
Default Gateway:        10.10.0.1
===========================================================================
Persistent Routes:
  None
```

If there is no entry in the network destination column that starts with 169.254.0.0 (highlighted above), add a route using

```
route add 169.254.0.0 mask 255.255.0.0 10.10.0.20 metric 20
```

where 10.10.0.20 is replaced with the IP address of the interface in your computer that is connected to the AN-X2.

Repeat the route print command and confirm that the table now has an entry similar to the one shown.

Now try pinging the AN-X2 at 169.254.42.84. You should now be able to access it using a browser to set the desired Ethernet configuration.

Genius Network Configuration

Before you can scan a Genius I/O network, you must set the AN-X module's serial bus address and baud rate and configure the network in the AN-X2-GENI.

Set the baud rate and serial bus address before connecting to the Genius network.

Setting the Bus Address and Baud Rate

From the AN-X web interface, select *Automation Network/Genius Baud/Node Settings*.
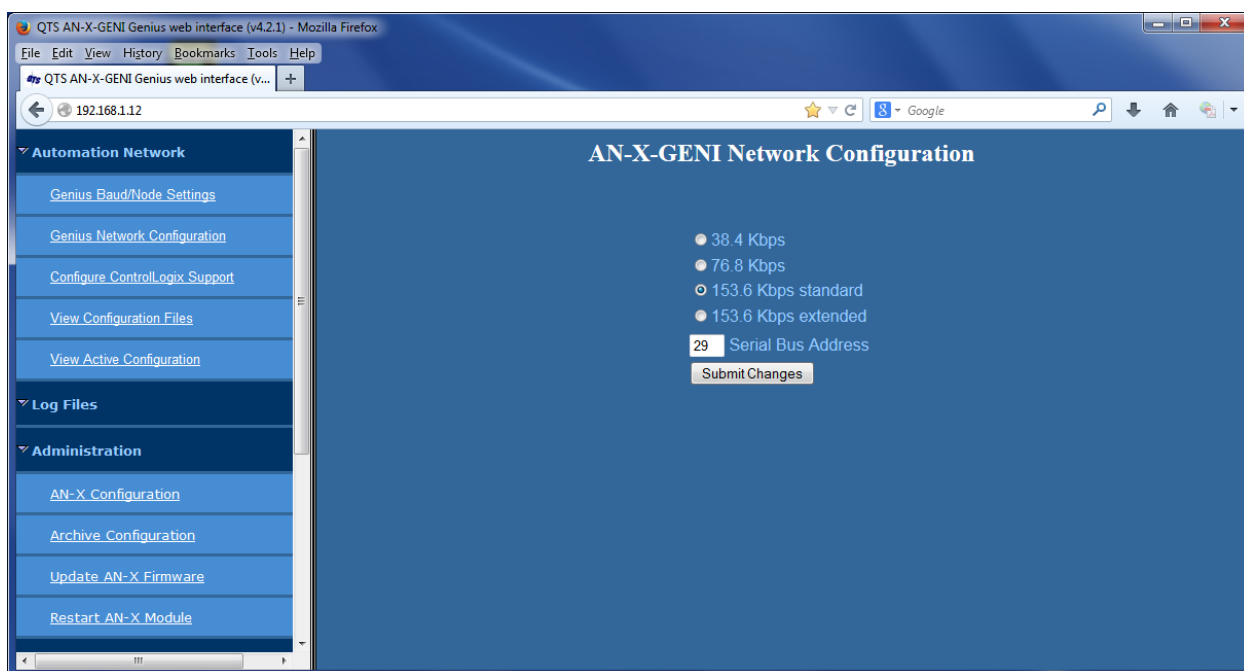
Check the desired baud rate from the four supported baud rates: 38.4Kbps, 76.8 Kbps, 153.6 KBPS standard or 153.6 Kbps extended.

Enter the serial bus address (SBA) for the AN-X, in the range 0 to 31.

Click the *Submit Changes* button to set the Genius bus properties of the AN-X2-GENI.

Configuring the Genius Network

There are two methods of configuring the Genius I/O that the AN-X2-GENI is to scan:

- autoconfiguration. The AN-X2-GENI reads the network contents by sending messages to the attached network.

- manual configuration. You build a configuration file and send it to the AN-X2-GENI.

You can also use autoconfiguration to build an initial configuration file, edit the file to add features, then perform a manual configuration with the modified file.

Autoconfiguration

Before you can perform an autoconfiguration, the Genius network must be connected to the AN-X.

From the AN-X web interface, select *Automation Network/Genius Network Configuration*.
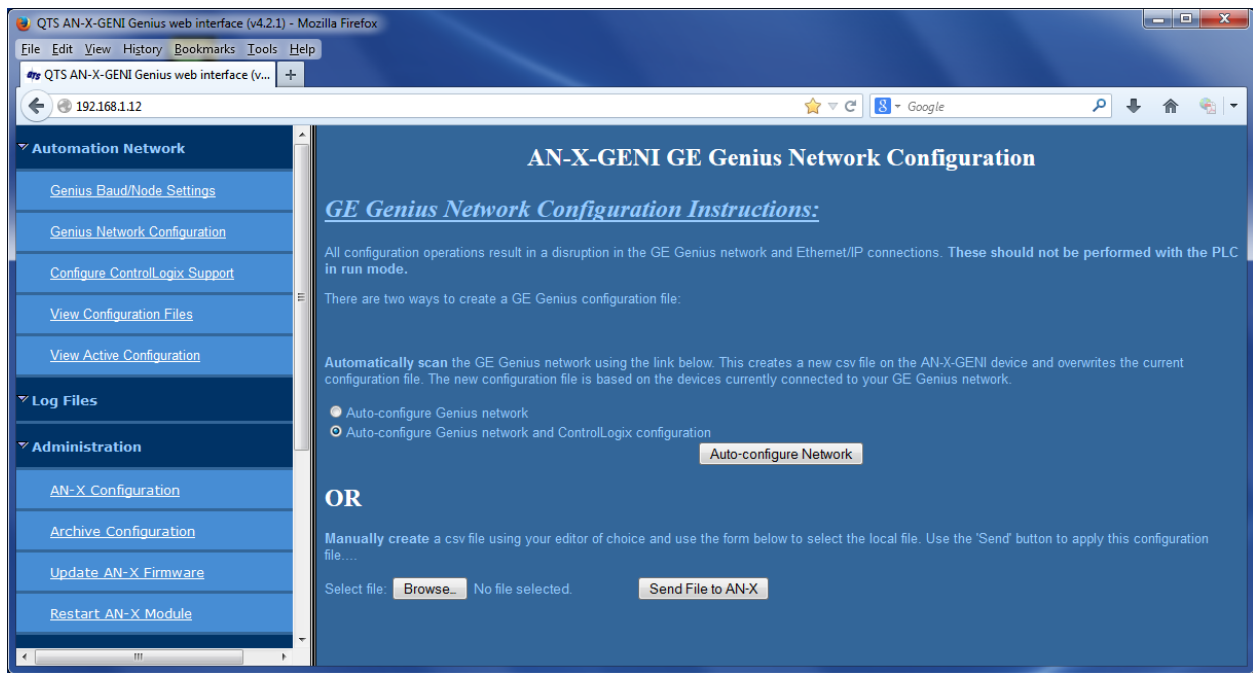
AN-X can generate a default ControlLogix data mapping configuration based on the I/O it finds (see page 21). If you want to have it generate the ControlLogix configuration, check *Auto-configure Genius network and ControlLogix configuration*. Otherwise, check *Auto-configure Genius network* (the default).

Click the *Auto-configure Network* button.

AN-X sends messages to all possible Genius bus addresses and builds a configuration based on the replies it receives. AN-X then displays the configuration it generated.

See page 20 for information on how to upload the configuration from AN-X and save it to a file.

Manual Configuration

Manual configuration is useful when the Genius network is not attached to the AN-X or when you need something other than the default configuration.

Create the configuration file using a text editor and save it as a comma separated variable (CSV) file, with extension *csv*. The file format is described on page 18.

To send the configuration to AN-X:

1. From the AN-X web interface, select *Automation Network/Genius Network Configuration*.

2. Type or browse the configuration file name into the *Select file:* area

3. Click the *Send File To AN-X* button to send the file to AN-X.

AN-X parses the file and displays either the current configuration if the configuration was sent successfully or an error message if there was a problem with the file.

AN-X also reloads the ControlLogix configuration and regenerates tags when you download a Genius bus configuration.

Genius Configuration File Format

The Genius I/O configuration file defines the contents of the Genius network to be scanned.

It is a comma-separated values (csv) text file, which can be created and edited with a text editor such as Windows Notepad.

Anything after a semicolon on a line is treated as a comment. Comments can be inserted at the end of a line or on a separate line.

Genius Block Definitions

Each Genius block on the network is defined by a line in the configuration file. The line contains various parameters that describe the block.

Parameters are identified by keywords and are separated by commas.

Each definition begins with the parameter that defines the serial bus address of the block being configured, for example, Block=7. The serial bus address can be from 0 to 31.

The input length is defined by the keyword Inp= and can range from 0 to 128 bytes. If the input length definition is omitted, the input length defaults to a length of 0.

The output length is defined by the keyword Out= and can range from 0 to 128 bytes. If the output length definition is omitted, the output length defaults to a length of 0.

If the AN-X2-GENI is to control the outputs on a module, include the keyword Scan. If the AN-X2-GENI is only to monitor the inputs on a module, omit the keyword Scan.

The part number for a module is defined by the keyword Part= and can be from 1 to 15 characters long. The part number text must be enclosed in double quotes, for example Part="IC660BBD024".

The description for a module is defined by the keyword Desc= and can be from 1 to 95 characters long. The description text must be enclosed in double quotes, for example Desc="12/24VDC 32 Ckt Source I/O Block".

The part number and description are used for comments only. You can put whatever you want in them.

Each definition ends with the keyword EndBlock, which is required.

Parameter	Keyword	Valid entries
Serial bus address	Block=	0-31
Input length, bytes	Inp=	0-128
Output length, bytes	Out=	0-128
Scan mode	Scan	Scan
Part number	Part=	Maximum 15 characters, enclosed in double quotes
Description	Desc=	Maximum 95 characters, enclosed in double quotes
End of block definition	EndBlock	

Examples:

```
Block=0,Inp=0,Out=0,,Part="IC660HHM501",Desc="Hand-held Monitor",EndBlock
```

```
Block=1,Inp=2,Out=2,Scan,Part="IC660BBR101",Desc="16-Ckt Normally-open Relay Block",EndBlock
```

When AN-X creates a Genius I/O configuration file after an autoconfiguration, it inserts part numbers and descriptions from its internal module database.

Global Data Sent by AN-X2-GENI

If the AN-X2-GENI is to send global data on the Genius network, add a line of the form

```
GlobSend=length
```

to the configuration file. The length can be from 1 to 64. The length of global data is in 16-bit words, not bytes.

Example:

```
GlobSend=4
```

Sample Genius Configuration File

;QTS AN-X2-GENI Scan Configuration Utility

;Copyright (c) 2005 Quest Technical Solutions

;Auto Config Geni I/O File

Block=0,Inp=0,Out=0,,Part="IC660HHM501",Desc="Hand-held Monitor",EndBlock

Block=1,Inp=2,Out=2,Scan,Part="IC660BBR101",Desc="16-Ckt Normally-open Relay Block",EndBlock

Block=2,Inp=2,Out=2,Scan,Part="IC660BBD020",Desc="24/48VDC 16 Ckt Source I/O Block",EndBlock

Block=3,Inp=8,Out=4,Scan,Part="IC660BBA020",Desc="24/48VDC 4In/2Out Analog Block",EndBlock

Block=9,Inp=24,Out=24,Scan,Part="IC670GBI001",Desc="Genius Bus Interface Unit",EndBlock

Block=16,Inp=64,Out=0,,Part="IC693BEM331",Desc="Series 90-30 Bus Controller",EndBlock

Block=22,Inp=4,Out=4,Scan,Part="IC660BBD024",Desc="12/24VDC 32 Ckt Source I/O Block",EndBlock

Block=31,Inp=64,Out=0,,Part="IC697BEM731",Desc="Series 90-70 Bus Controller",EndBlock

GlobSend=24,; Global Data Sent by AN-X (16 bit words)

Viewing the Current Configuration

To view the Genius configuration currently in AN-X, access the web interface and select *Automation Network/View Active Configuration*.

You can also view the configuration file by accessing the web interface and selecting *Automation Network/View Configuration Files*. Click on the *AN-X2-GENI Genius Network Configuration File* link and select *Open* to open the file in whatever application is associated with CSV files on your computer, usually a spreadsheet or a text editor. Details depend on your computer and browser.

Saving the Current Configuration

To save the configuration currently in AN-X to a file, access the web interface and select *Automation Network/View Configuration Files*.

Right click on the *AN-X2-GENI Genius Network Configuration File* link and save the file.

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Exchanging Scheduled Data with a ControlLogix

The AN-X2-GENI supports scheduled connections with a ControlLogix processor over Ethernet.

The AN-X2-GENI behaves like a 17-slot ControlLogix rack with an ENBT/A module in slot 16 and generic modules in slots 0 to 15.

A ControlLogix processor can open a scheduled connection to each of these 16 generic modules. Each scheduled connection consists of up to 248 words of output data from the ControlLogix processor to the AN-X and up to 250 word of input data from the AN-X to the ControlLogix processor.

Each connection can have a different RPI, up to 750 ms.

In general, keep the number of connections small. There is significant overhead in opening and maintaining each connection.

You map the inputs and outputs for the Genius blocks to these scheduled connections. AN-X can create the mappings automatically or you can create a mapping configuration manually.

You can let AN-X create a mapping file automatically, then edit the file to better suit your application. For example, in order to make the most efficient use of the available Ethernet bandwidth, you can organize the data so that items that must update quickly are mapped to connections with short RPIs and items that are less time critical are mapped to connections with longer RPIs.

In addition, the AN-X module has diagnostic data that can be mapped to ControlLogix scheduled input data.

Mapping I/O Data

You map Genius input and output data to the ControlLogix scheduled data by creating a comma separated variable file that defines the mappings and sending the file to the AN-X.

The file contains sections for each scheduled connection. Within each scheduled connection are the definitions for the input and output data for that connection. These definitions refer to the Genius module where the data is to be found.

When you create a mapping for a Genius module, all the input or output data for the module is mapped; you cannot map individual registers.

The file also contains options that apply to the whole configuration.

AN-X can automatically create a default mapping file when you autoconfigure I/O. See page 17 for details.

Anything after a semicolon on a line is treated as a comment.

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ClxName

The first line in the file identifies the AN-X module. AN-X uses this nameas the base tag name portion of the ControlLogix aliases for the Genius data.

The ClxName consists of a line with the keyword ClxName, followed by a comma and the name you give the emulated ENBT (see page 31)

Example:

```
ClxName, AnxGeniMas
```

ClxPrefix

The ClxPrefix is used in the alias names AN-X creates for import into RSLogix 5000. AN-X prefixes each name with the ClxPrefix. The ClxPrefix can be used to distinguish aliases for the same Genius serial bus address on different Genius networks when the ControlLogix processor has connections to more than one AN-X2-GENI.

For example, if the ControlLogix has connections to two AN-X2-GENI modules, each controlling a different Genius network, each Genius network could have a block with the same serial bus address. Using a different ClxPrefix in the configuration file for each AN-X2-GENI makes the aliases for the two AN-X modules distinct.

The ClxPrefix consists of a line with the keyword ClxPrefix, followed by a comma and the prefix text.

Example:

```
ClxPrefix,GENI1_
```

Scheduled Connections

Each scheduled connection to the AN-X begins with a line that consists of the keyword ClxSlot followed by a comma and then a number from 0 to 15

Example:

```
ClxSlot, 0
```

Each scheduled connection consists of output data and input data.

The section that defines the scheduled outputs from the ControlLogix processor for that connection begin with a line with just the keyword DataOutput.

The section that defines the scheduled inputs to the ControlLogix processor for that connection begin with a line with just the keyword DataInput.

Data definitions consist of lines that define the mapping between the ControlLogix data table and the Genius module.

They consist of lines of the form

```
CLX_offset (optional), Genius_Node, tagname
```

The CLX_offset is the offset into the data for the connection. You can select the offset where the data is located or you can leave it blank and AN-X will automatically assign the offset.

The Genius_Node consists of an address in the form bSBA where SBA is the 2-digit serial bus address (SBA) of the module on the Genius bus, from 1 to 31.

Example:

To associate ControlLogix offset 27 with the outputs from the Genius module at serial bus address 4 and assign it tagname Block4Outputs, add the following line to the DataOutput section of the connection

```
27, b4, Block4Outputs
```

Example:

To map the inputs from the Genius module at address 31 to the next available ControlLogix location and assign it tagname Block31Inputs, add the following line to the DataInput section of the connection

```
, b31, Block31Inputs
```

Global Data

Sending Global Data

To map the Global data sent by AN-X to the output data for a connection, add the following line to the DataOutput section of the connection:

```
GlobSend
```

AN-X obtains the length of the global data to map from the Genius I/O configuration file (see page 19).

90-70

To configure the 90-70 to receive global data from the AN-X:

1. Add a Genius device to the bus controller as a Generic I/O device

2. Set the Config mode to manual

3.   Assign a data address and set the length to match the length configured in the AN-X

90-30

To configure the 90-30 to receive global data from the AN-X:

1.   Add a device to the bus controller at the AN-X serial bus address

2.   Set the device type to Generic

3.   Set the %AI address and set the input length to match the data length configured in the AN-X

Series Six

If a Series Six controller will be receiving the global data from the AN-X, add a line to the beginning of the ControlLogix configuration file as follows:

Ge6Addr, nnnnn

nnnn is a number from 0 to 16383 that is the register where the data is to go in the Series Six PLC(s). All Series Six PLCs on the Genius network configured to receive global data will put it in the same place.

Set the Series Six to receive global data as you would from any other node. It will appear at the address you assigned.

Receiving Global Data on the AN-X2-GENI

When you perform an autoconfiguration, if the other node is producing global data when you autoconfigure the AN-X2-GENI, the autoconfiguration will include the global data.

If you are configuring the Genius network manually, add a line of the form

```
Block=nn,Inp=inlength,Out=0,,Part="partnumber",Desc="description",EndBlock
```

where

Block is the Genius serial bus address of the node producing the global data

inlength is the length of the data in bytes

partnumber is a maximum of 15 characters, enclosed in double quotes

description is a maximum of 95 characters, enclosed in double quotes

partnumber and description are used for comments only. You can put whatever you want in them.

To receive the global data in the ControlLogix, you must map the received global data to the input data for a ControlLogix connection.

In the ControlLogix configuration, add a line to the DataInput section of the connection of the form:

CLX_offset (optional), Genius_Location, tagname

The CLX_offset is the offset into the data for the connection. You can select the offset where the data is located or you can leave it blank and AN-X will automatically assign the offset.

The Genius_location consists of an address in the form bSBA where SBA is the 2-digit serial bus address (SBA) of the module on the Genius bus, from 1 to 31.

Controlling Program Mode Behaviour

The ControlLogix processor that is the exclusive owner of the connection to the generic module in slot 0 controls how the AN-X2-GENI module scans the Genius network. For that reason, when you map the data, you must always include a connection to the generic module in slot 0.

When the ControlLogix processor with the exclusive owner connection to slot 0 on the AN-X is in program mode or the connection to slot 0 is stopped or inhibited, the AN-X stops scanning all devices on the Genius network. Even if other ControlLogix processors have exclusive owner connections to other slots on the AN-X and are in run mode, AN-X does not scan the network.

You can override this behaviour by including a line with the keyword ScanGeniProg in the configuration file. This causes the AN-X2-GENI module to continue to communicate with the Genius network when the ControlLogix processor is in program mode but set all outputs to 0. Similarly ControlLogix processors with exclusive owner connections to other AN-X slots will also update. If the exclusive owner connection to slot 0 stops, AN-X stops all communication with the Genius network.

WARNING!
This option is included for debugging since it allows inputs to update in the ControlLogix. It should NOT be used in normal operation.

Other Mappable Data

In addition to the I/O data, there are other items that can be mapped to connection input data.

If you create the ControlLogix configuration automatically when you autoconfigure the Genius network, these items are mapped by default to ClxSlot 15.

TIP
If you map the diagnostic data to a separate connection, use a long RPI to reduce the Ethernet traffic, since the diagnostics do not need to be updated as frequently as I/O data.

Diagnostic Counters

The AN-X2-GENI maintains the following diagnostic counters.

Counter	Offset	Description
TxFrames	0	Transmitted network frames
TxMsgs	1	Transmitted network messages (datagrams)
RxFrames	2	Received network frames
RxMsgs	3	Received network messages (datagrams)
RxDup	4	Received duplicate frames
RxCrcErr	5	Received frames with a CRC error
RxStopErr	6	Received frames with a stop error
RxAbortErr	7	Received frames with an abort error
RxOverrunErr	8	Received frames with an overrun error
NoToken	9	No tokens received from network

To map the diagnostic counters, include a line with just the keyword DiagCtrs in the input section of a connection. This maps all the diagnostic counters (10 words); they cannot be mapped individually.

Example:

```
, DiagCtrs
```

Block Error Table

The block error table consists of 2 16-bit words, one bit per serial bus address. Bit 0 of the first word corresponds to serial bus address 0, bit 1 corresponds to serial bus address 1, and so on.

If a configured block is not active on the network, the bit is 1. If a configured block is active on the network, the bit is 0. The bit is always 0 for an unconfigured block.

To map the block error table, include a line with just the keyword BlockErr.

Example:

```
, BlockErr
```

TIP

Map the block error table to the beginning of input data of each connection. If the connection to the AN-X module is lost, the ControlLogix sets the first 2 words of the connection to FFFF hexadecimal. If your program is monitoring the block error table, it will see all the error bits as set.

Block Fault Table

A Genius block can generate fault messages for a variety of error conditions. If the AN-X2-GENI receives a fault message from a Genius block, it sets the corresponding bit in the block fault table.

The block fault table consists to 2 16-bit words, one bit per serial bus address. Bit 0 of the first word corresponds to serial bus address 0, bit 1 corresponds to serial bus address 1, and so on.

To map the block fault table, include a line with the keyword BlockFlt in the input section of a connection.

Example:

```
,BlockFlt
```

If the block fault bit is set for a block, use the web interface on the AN-X2-GENI to view and clear the fault. Refer to page 45 for details.

Connection Diagnostics

The AN-X2-GENI maintains diagnostics related to the UDP traffic to and from the module. They are mapped using the keyword ConnDiag.

Example:

```
, ConnDiag
```

They consist of:

Offset	Counter
0	UDP Tx count
1	UDP Rx count
2	UDP Eth Error, Ctr (lo) Typ (Hi)
3	UDP PrtErr, Ctr (Lo) Typ/Slt (Hi)
4	UDP Tx Busy
5	UDP Rx Busy

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Connection Statistics

The module maintains statistics for each scheduled connection. In the following table, O represents the connection originator (ControlLogix) and T represents the connection target (AN-X).

The statistics for each connection consists of 10 words of data. Only three words in the ten word block are used.

Offset	Description
0	Average time for last 32 updates
2	Minimum time since the connection statistics were reset
4	Maximum time since the connection statistics were last reset

The units for the times are 0.1 milliseconds. A value of 87 means 8.7 ms.

To map the statistics for a given connection, include a line with the keyword ConnStatsn, where n is the connection number, from 0 to 15, in the input section of a connection.

Example:

```
,ConnStats2
```

Averages are calculated for the last 32 updates.

Connection 15 Mappings

When you autoconfigure the AN-X, it maps the following diagnostics to inputs on connection 15.

Offset	Length	Description
0	2	Block error table
2	8	Connection diagnostics
10	10	Diagnostic counters
20	10	Connextion statistics for connection 0

We recommend that you use the same mappings and do not change them.

Resetting Connection Statistics

To reset the connection statistics, set bit 0 of output word 0 of connection 15. AN-X resets the statistics on the transition from 0 to 1.

Example Configuration File

Example Configuration File:

;QTS AN-X2-GENI Scan Configuration Utility

;Copyright (c) 2005 Quest Technical Solutions

;Auto Config Ethernet/IP File

;ScanGeniProg

ClxName,AnxGeniMas

ClxPrefix,GENI_

ClxSlot,0

DataOutput ; Outputs from ControlLogix

,b1,b01_Out, ; Ofs= 0 Len= 1 IC660BBR101 16-Ckt Normally-open Relay Block

,b2,b02_Out, ; Ofs= 1 Len= 1 IC660BBD020 24/48VDC 16 Ckt Source I/O Block

,b3,b03_Out, ; Ofs= 2 Len= 2 IC660BBA020 24/48VDC 4In/2Out Analog Block

,b9,b09_Out, ; Ofs= 4 Len=12 IC670GBI001 Genius Bus Interface Unit

,b22,b22_Out, ; Ofs= 16 Len= 2 IC660BBD024 12/24VDC 32 Ckt Source I/O Block

,GlobSend; Global Data Sent by AN-X2-GENI

DataInput   ; Inputs to ControlLogix

,BlockErr   ; Map BlockErr here since Clx sets to -0xffffffff on Connection Failure

,b1,b01_Inp, ; Ofs= 2 Len= 1 IC660BBR101 16-Ckt Normally-open Relay Block

,b2,b02_Inp, ; Ofs= 3 Len= 1 IC660BBD020 24/48VDC 16 Ckt Source I/O Block

,b3,b03_Inp, ; Ofs= 4 Len= 4 IC660BBA020 24/48VDC 4In/2Out Analog Block

,b9,b09_Inp, ; Ofs= 8 Len=12 IC670GBI001 Genius Bus Interface Unit

,b16,b16_Inp, ; Ofs= 20 Len=32 IC693BEM331 Series 90-30 Bus Controller

,b22,b22_Inp, ; Ofs= 52 Len= 2 IC660BBD024 12/24VDC 32 Ckt Source I/O Block

,b31,b31_Inp, ; Ofs= 54 Len=32 IC697BEM731 Series 90-70 Bus Controller

;The following map 'Ghost Mode' Monitored Outputs to ClxSlot 8

;They must be 'uncommented' for 'Ghost Mode' Monitoring

;ClxSlot,8   ; This maps monitored 'Ghost Mode' outputs to Slot 8

;DataInput   ; Inputs to ControlLogix

;,BlockErr   ; Map BlockErr here since Clx sets to -0xffffffff on Connection Failure

;,m31>1[1],b01_OutMon, ; Ofs= 2 Len= 1 IC660BBR101 16-Ckt Normally-open Relay Block

;,m31>2[1],b02_OutMon, ; Ofs= 3 Len= 1 IC660BBD020 24/48VDC 16 Ckt Source I/O Block

;,m31>3[2],b03_OutMon, ; Ofs= 4 Len= 2 IC660BBA020 24/48VDC 4In/2Out Analog Block

;,m31>9[12],b09_OutMon, ; Ofs= 6 Len=12 IC670GBI001 Genius Bus Interface Unit

;,m31>22[2],b22_OutMon, ; Ofs= 18 Len= 2 IC660BBD024 12/24VDC 32 Ckt Source I/O Block

;The following lines map Diagnostics into ClxSlot 15

ClxSlot,15

DataInput ; Inputs to ControlLogix

 0,BlockFlt, ; Ofs= 0 Len=2

2, ConnDiag

10,DiagCtrs, ; Ofs= 10 Len=10

;ControlLogix Connection Statistics

,ConnStats0, ; Ofs= 20 Len=10

Viewing the Current Configuration

To view the ControlLogix configuration currently stored in the AN-X, start the web interface and select *View Active Configuration*.

Click the *Ethernet/IP* link to view the current ControlLogix scheduled data configuration.

AN-X2-GENI ControlLogix Config File /home/axctrl/GeniEnetIpSvr.csv

  5: ;DisOutOnProg

  7: ClxName: AnxGeniMas

  8: ClxPrefix: GENI_

  9: ClxSlot 0

 11: DataOutput

 12:   0   1 b01 b01_Out 16-Ckt Normally-open Relay Block

 13:   1   1 b02 b02_Out 24/48VDC 16 Ckt Source I/O Block

 14:   2   2 b03 b03_Out 24/48VDC 4In/2Out Analog Block

 15:   4 12 b09 b09_Out Genius Bus Interface Unit

 16: 16   2 b22 b22_Out 12/24VDC 32 Ckt Source I/O Block

 21: DataInput

22: 0 2 BlockErr

23: 2 1 b01 b01_Inp 16-Ckt Normally-open Relay Block

24: 3 1 b02 b02_Inp 24/48VDC 16 Ckt Source I/O Block

25: 4 4 b03 b03_Inp 24/48VDC 4In/2Out Analog Block

26: 8 12 b09 b09_Inp Genius Bus Interface Unit

27: 20 8 b16 b16_Inp Series 90-30 Bus Controller

28: 28 2 b22 b22_Inp 12/24VDC 32 Ckt Source I/O Block

29: 30 64 b31 b31_Inp Series 90-70 Bus Controller

48: ClxSlot 15

50: DataInput

51: 0 2 BlockFlt

52: 10 10 DiagCtrs

55: 20 10 ConnStats0

......Parse Successful

Each line begins with a line number, from the original ControlLogix configuration file. Each mapping line shows the offset and length of the data in the ControlLogix data connection.

Saving the Current Configuration

To save the ControlLogix configuration currently stored in the AN-X to a file, start the web interface and select *Automation Network/View Active Configuration*.

Right click the *Ethernet/IP* link and select *Save target* to save the current ControlLogix scheduled data configuration to a file.

You can also save the ControlLogix configuration by selecting *Automation Network/View Configuration Files*. Right click on the AN-X2-GENI ControlLogix Configuration File link and select *Save target* to save the current ControlLogix scheduled data configuration to a file.
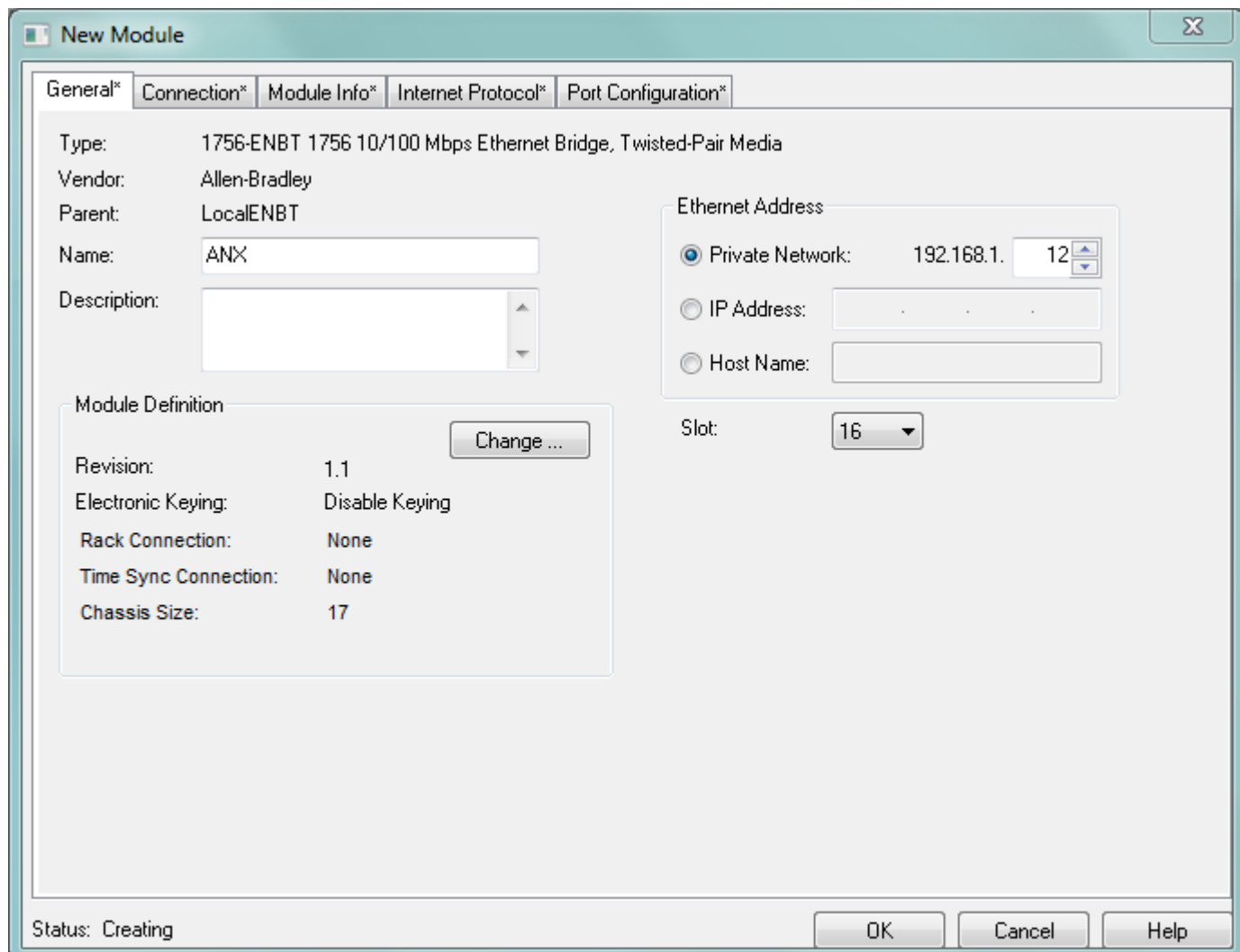
Configuring the AN-X Module in RSLogix 5000

To configure the AN-X2-GENI in RSLogix 5000:

1. Right click on the ControlLogix Ethernet module that will be communicating to the AN-X and select *Add Module*. Add a 1756-ENBT/A module.

2. Set the Major Rev to 1.

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Set the *Name* to match the hostname of the AN-X in the Ethernet configuration.

Set the chassis size to 17 and the Slot to 16.

Set the revision to 1.1

Set the *Comm Format* or *Rack Connection* to None.

Set the IP address to match the AN-X module.

Set *Electronic Keying* to *Disable Keying*.
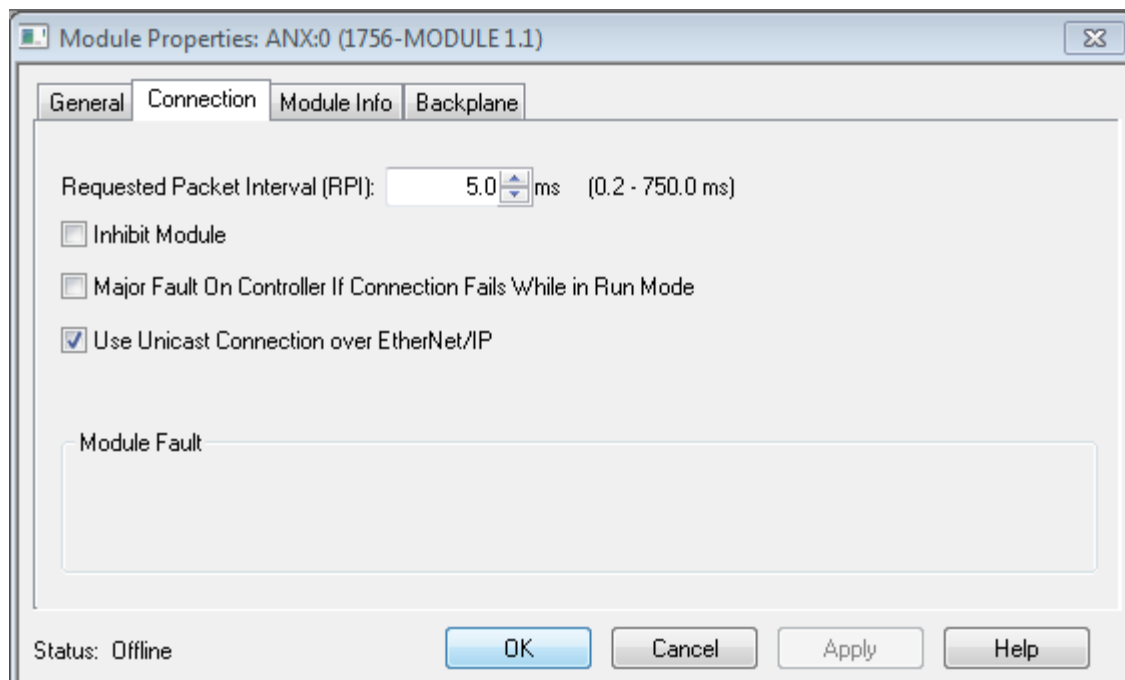
3. Add Generic modules for each required connection

Set the parameters as shown. Set the Slot to 0 for the first connection, 1 for the second connection, and so on.

4. Set the RPI for each connection.

ControlLogix Aliases

AN-X uses the Ethernet/IP configuration to create aliases that can be imported into RSLogix 5000. Use these alias tags in your RSLogix 5000 program to access the data on the AN-X.

There are two sets of alias files, one for exclusive owner connections and one for listen only connections.

In the web interface, select *Automation Network/View Configuration Files*.

To view the files, click either *AN-X2-GENI Ethernet/IP ControlLogix Exclusive Owner Data Tags* or *AN-X2-GENI Ethernet/IP ControlLogix Input Only Data Tags*.

To save the file to your computer, right click on the link and select *Save Target As…*

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Importing Tags in RSLogix 5000

To import the tags into RSLogix 5000, you must be offline. Select *Tools/Import Tags* and import the file.

Using the ControlLogix Log

If there are problems with scheduled connections to the AN-X, use the ControlLogix log to identify the cause.

From the web interface, select *Log Files/ControlLogix Log* to display the log. Look for error messages that describe in detail the cause of any problem with the current configuration.

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Using Ghost Mode

In ghost mode, the AN-X2-GENI monitors inputs and outputs on an existing Genius network and passes the monitored data to a ControlLogix via scheduled connections.

Ghost mode is useful when the AN-X2-GENI and a ControlLogix is to replace an existing control system and you want to verify the data and timing on the existing system before replacing it.

WARNING!

You must be careful in setting up ghost mode that you do not disrupt the existing sytem when you connect and configure the AN-X2-GENI

Configuration is best performed when the existing system is connected but is not running.

The AN-X2-GENI requires an available serial bus address on the Genius network.

You can use the autoconfiguration feature of the AN-X2-GENI to locate all the devices on the network and generate a starting Genius configuration file.

Genius Configuration File

You must configure the Genius I/O on the network being monitored. The configuration file format is the same as described earlier (see page 18). Ensure that the Scan field is removed from all Genius devices so that the AN-X2-GENI doesn't write outputs to the network.

ControlLogix Configuration File

The output data on the Genius network is mapped to ControlLogix scheduled inputs.

Data definitions for the monitored outputs consist of lines that define the mapping of the Genius output data into the ControlLogix data table.

They consist of lines of the form

```
CLX_offset (optional), Genius_Location, tagname
```

The CLX_offset is the offset into the data for the connection. You can select the offset where the data is located or you can leave it blank and AN-X will automatically assign the offset.

The Genius_location consists of an address in the form

```
msourceSBA>destSBA[length]
```

where

sourceSBA is the serial bus address (SBA) of the module on the Genius bus that is sending the data

destSBA is the serial bus address of the destination

length is the length of data in words

Genius bus input data is mapped as before.

Example:

A Genius bus controller at serial bus address 31 is sending 2 words of output data to a Genius block at serial bus address 17. To map this data to a offset 27 in a ControlLogix scheduled connection, and assign it tagname Block17Outputs, add the following line to the DataInput section of the connection

```
27, m31>17[2], Block17Outputs
```

ControlLogix Tags

As before, AN-X can create tags that can be imported into RSLogix 5000 to access the data.

Quick Start

Use the following steps to run the AN-X2-GENI in ghost mode.

1. Use the web interface to set the baud rate and serial bus address

2. Connect AN-X2-GENI to the Genius network.

3. Use the web interface to perform an autoconfiguation and automatically generate a ControlLogix configuration.

4. Save and edit the Genius configuration file. Remove Scan from all network devices.

5. Save and download the modified Genius configuration file to the AN-X2-GENI.

6. Save and edit the ControlLogix confguration file the AN-X2-GENI created when you performed the autoconfiguration. Comment out all the DataOutput sections. Uncomment the ghost mode entries it created and modify them to suit your application.

7. Save and download the modified ControlLogix configuration file.

8. Use the web interface to view the active configuration and locate the data.

9. Use the web interface to export the aliases for the ControlLogix configuration and import them into RSLogix 5000.

Use the aliases to access the data from RSLogix 5000

Accessing Global Data from HMIs

The AN-X2-GENI maps global data from Genius nodes 0 to 31 to integer files N100 to N131. Each file is 64 words long.

To read the global data for any node, create the connection to the AN-X as you would for a PLC-5, and read the data from the appropriate integer file.

You can also use an HMI to write to the global data that the AN-X2-GENI is transmitting, that is, the file that corresponds to the AN-X2-GENI serial bus address. Of course, if the AN-X2-GENI global data is mapped to a ControlLogix connection, the global data you write using the HMI will be overwritten by the data from the scheduled data.

Note:This operation uses the original PLC-5 Ethernet CSP protocol, it doesn't work with the Ethernet IP driver.

Using the Web Interface

The AN-X module contains a webserver capable of communicating with standard web browsers such as Internet Explorer.

The AN-X module contains a webserver capable of communicating with standard web browsers such as Internet Explorer.

Use the web interface to:

- set the baud rate and serial bus address for the AN-X2-GENI

- set the Genius bus I/O network configuration

- set the ControlLogix scheduled data configuration

- view the current configuration

- view AN-X logs

- view and clear faults from Genius blocks

It also contains contact information for support.

To use the web interface, you must know the IP address of the AN-X. To access the web interface, start your web browser and type the AN-X IP address where you normally enter web addresses in the browser.
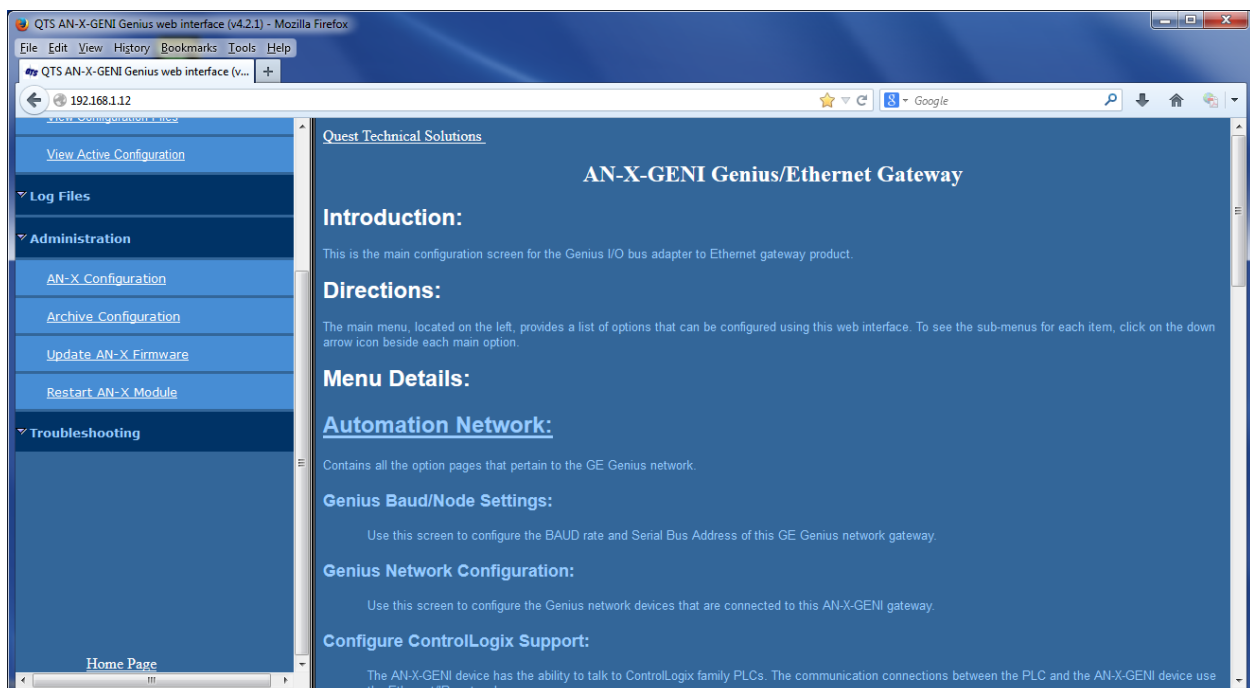
The left pane contains commands. Click on the arrows at the left of the main headings to expand or contract the sections.

The contents of the right pane depend on the current command being executed.

<table>
<tr>
<td>TIP</td>
<td>Browsers may return cached data rather than rereading data that has changed on the AN-X.

Run the browser in a mode where it doesn't cache data (incognito in Chrome, Private browsing in Firefox and Safari, etc.)</td>
</tr>
</table>

Automation Network

Baud Rate and Serial Bus Address

Select *Automation Network/Genius Baud/Node Settings* to set the Genius network baud rate and the serial bus address of the AN-X2-GENI.

To select the baud rate, check the radio button for the desired baud rate, either 38.4 Kbps, 76.8 Kbps, 153.6 Kbps Standard or 153.6 Kbps extended.

Enter the serial bus address (SBA) for the AN-X2-GENI, from 1 to 31.

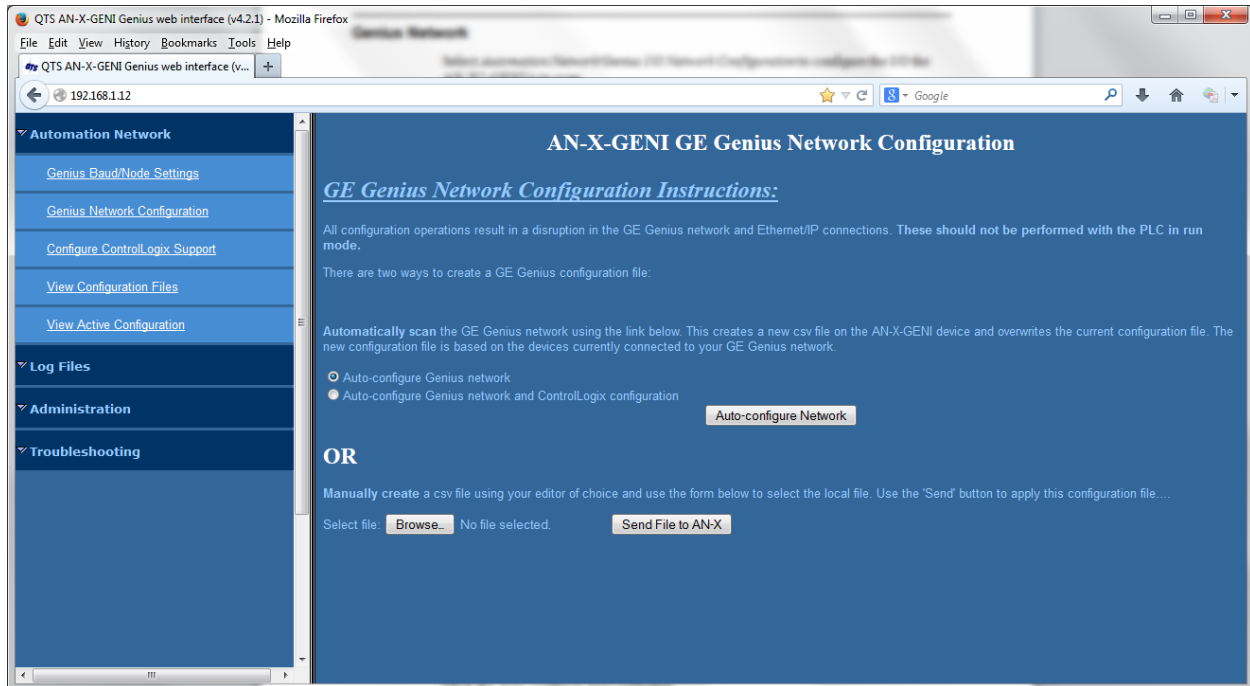Click the SUBMIT button to send the values to the AN-X.

Genius Network

Select *Automation Network/Genius I/O Network Configuration* to configure the I/O the AN-X2-GENI is to scan.

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Autoconfiguration

If you are autoconfiguring the Genius network, connect the Genius network to the AN-X2-GENI.

To configure just the I/O, check *Auto-configure Genius network*.

To configure the Genius network and also generate a default ControlLogix configuration on the AN-X, check *Auto-configure Genius network and ControlLogix configuration*

Click the *Auto-configure Network* button.

Manual Configuration

Manual configuration does not require that the network be online.

Create a configuration file. Refer to page 21 for details on the file format.

Browse or type the file name.

Click the *Send File to AN-X* button to send the values to AN-X.

When you download a Genius network configuration, AN-X reloads the ControlLogix configuration and regenerates ControlLogix tags.

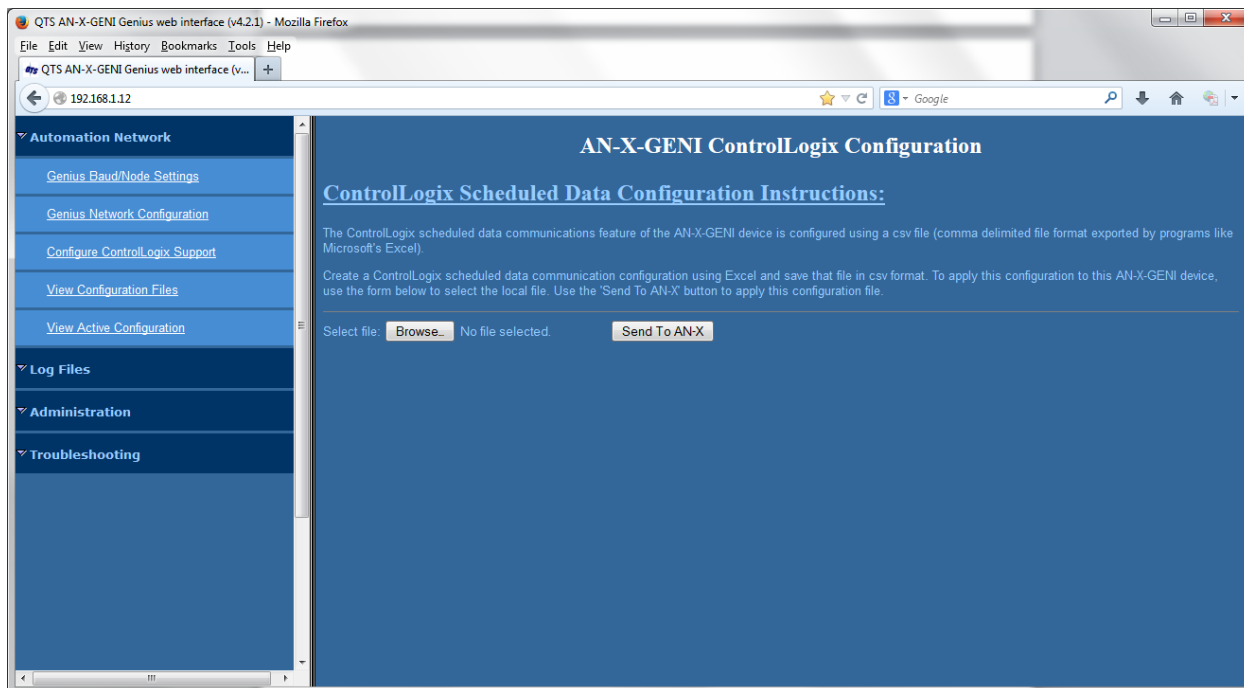## Configure ControlLogix Support

AN-X exchanges scheduled data with a ControlLogix processor over Ethernet. Refer to section Exchanging Scheduled Data with a ControlLogix on page 21 for information on configuring scheduled data exchange.

Select *Automation Network/Configure ControlLogix Support* in the web interface to upload the configuration.

Type or browse the configuration file name into the *Select file:* area. Then click the *Send To AN-X* button to send the file to AN-X.

Check the ControlLogix Log to determine if there have been any errors with the upload.

View Configuration Files

Select *View Configuration Files* to view the Genius and ControlLogix configuration files.

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Click on the links to view the files using the application that is associated with CSV files.

Right click on the links to retrieve the files from AN-X and store them on your computer.

TIP

Browsers may return cached data rather than rereading data that has changed on the AN-X.

Run the browser in a mode where it doesn't cache data (incognito in Chrome, Private browsing in Firefox and Safari, etc.)
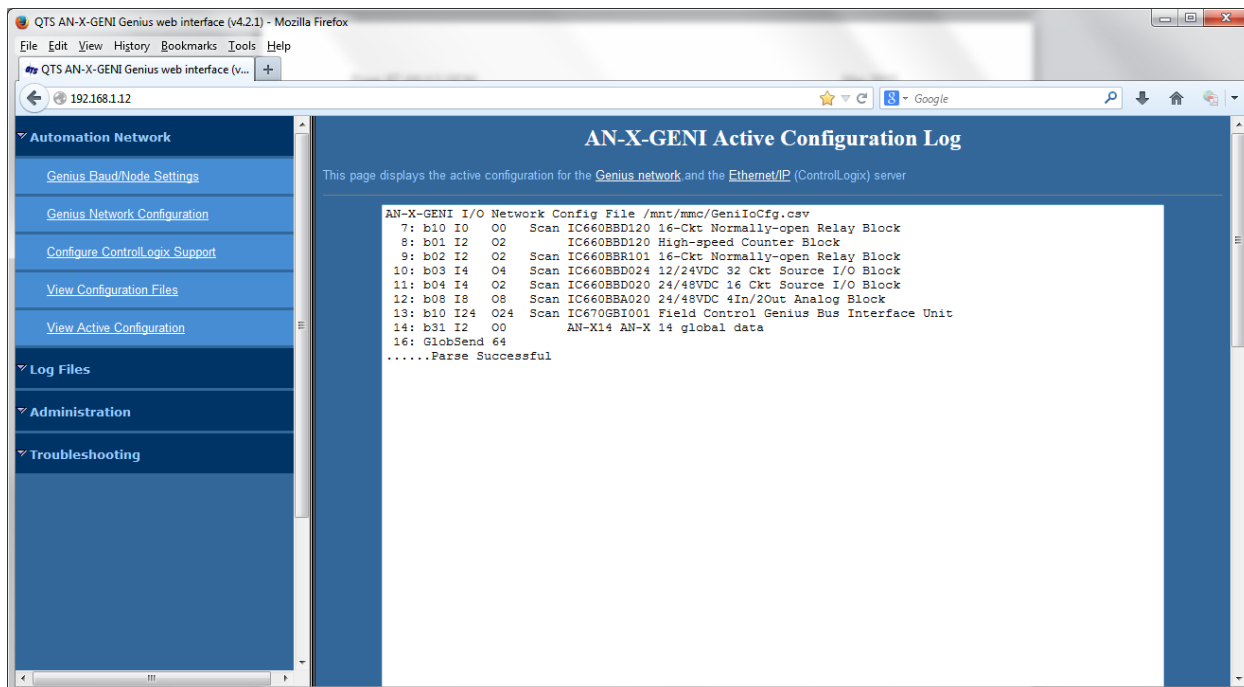
View Active Configuration

Select *View Active Configuration* to view the Genius or ControlLogix configuration file in the web browser.

Click the *Genius network* link to view the current Genius network configuration.
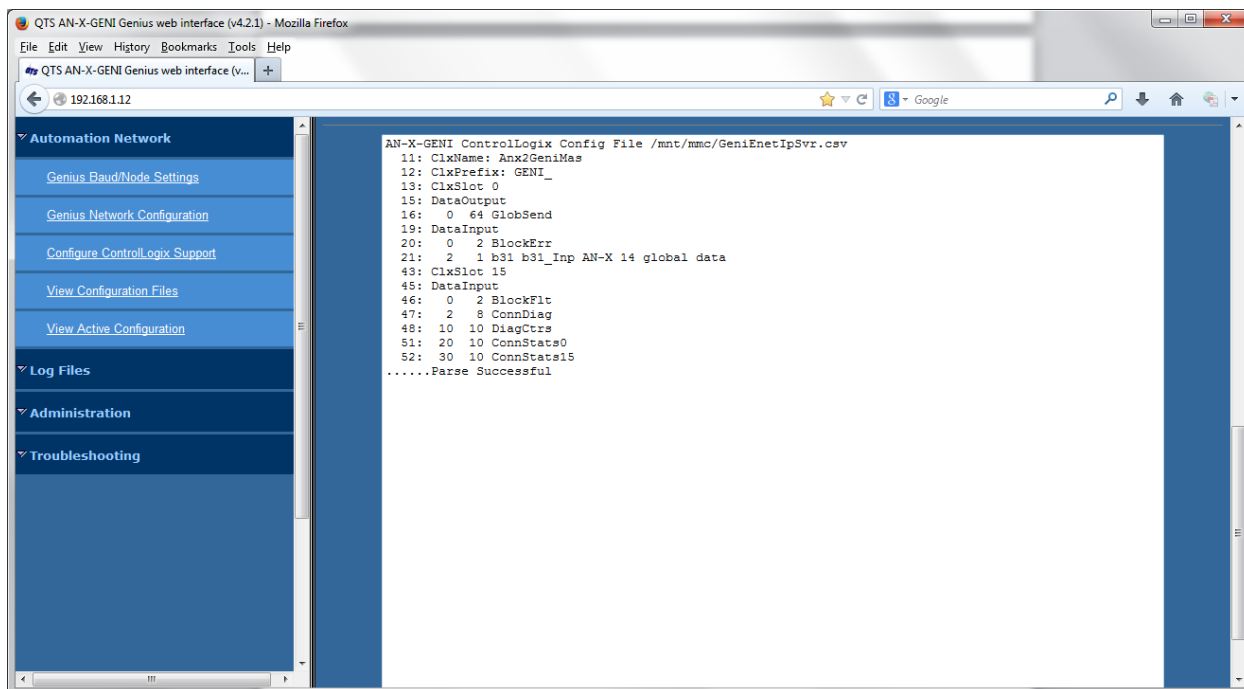
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Click the *Ethernet/IP* link to view the current ControlLogix configuration.

Log Files

AN-X maintains various logs to record diagnostic and error messages. Use the *Log Files* menu in the web interface to view these logs.

Genius I/O Fault Log

Genius bus modules can return fault information. If a module that is being controlled by the AN-X-GENI returns a fault, you can use the web interface to view and clear the fault.

Select *Log Files/Genius IO Fault Log*.
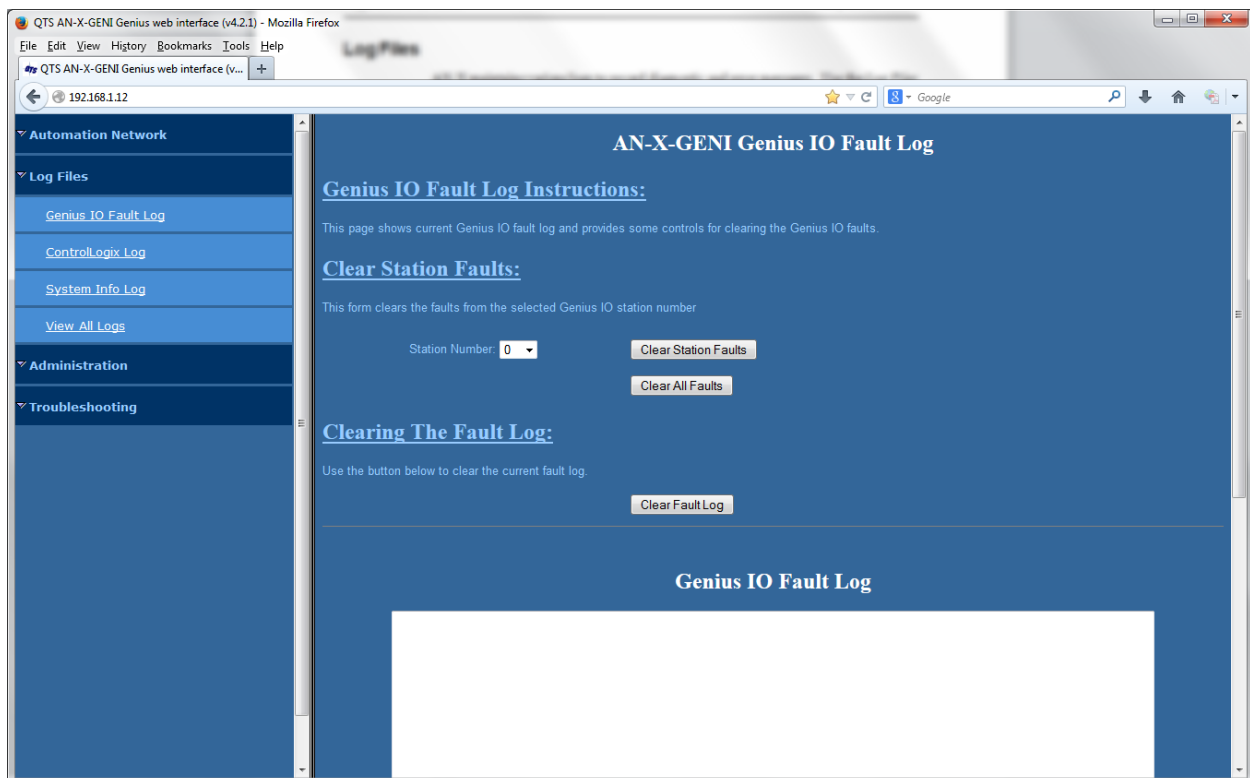
The web interface displays the faults in the Genius IO Fault Log area of the screen. To clear faults for a specific Genius block, select the serial bus address of the module from the *Station Number* list, then click the *Clear Station Faults* button.

To clear the faults on all modules, click the *Clear All Faults* button.

If there is a problem clearing faults, an error message will be displayed in the Fault Log area.

To clear the fault log, click the *Clear Fault Log* button.

See also page 27 for information on how you can monitor faults in your ControlLogix program.

ControlLogix Log

The Ethernet/IP log shows messages and errors associated with the Ethernet communication.

System Info Log

The System Info log records informational messages during startup and normal operation.
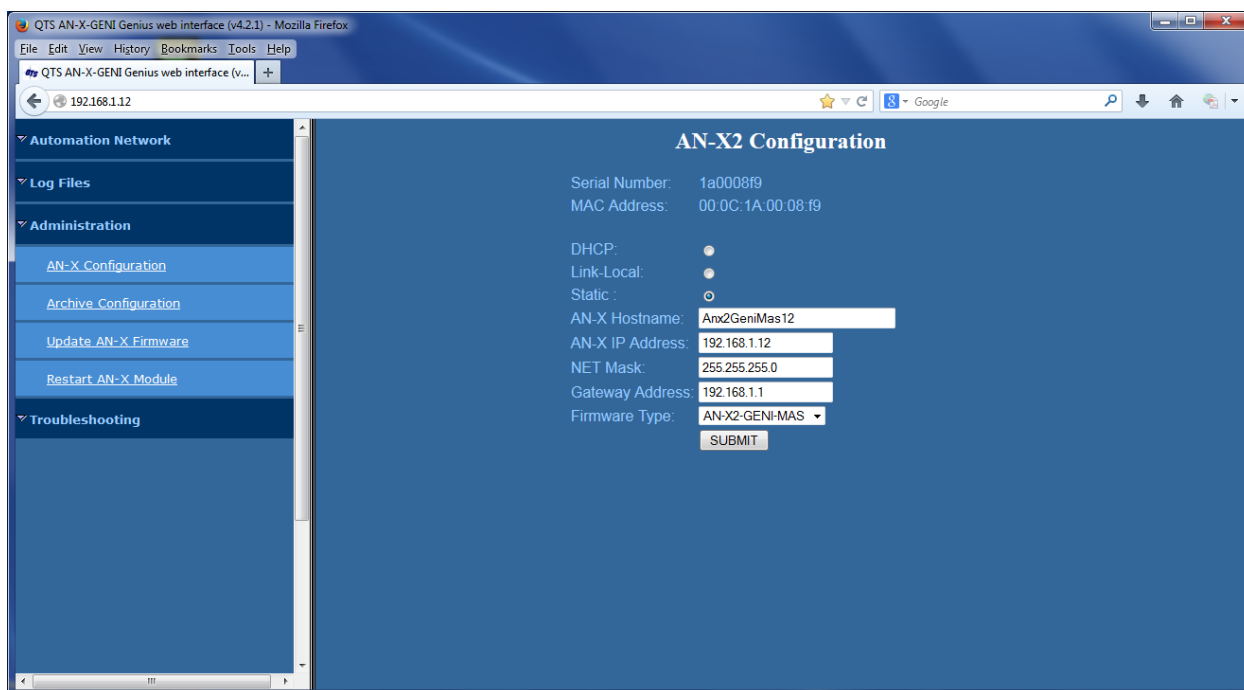
View All Logs

Use *View All Logs* to list and view all the AN-X logs. To view a log file, click on the file name.

Administration Menu

The *Administration* menu contains items used to configure, control and update the AN-X.

AN-X Configuration

Use *AN-X Configuration* to set the AN-X Ethernet properties and to select the firmware the AN-X is to run.

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The top of the screen shows the serial number and MAC Address of the AN-X2 being configured.

Check either DHCP or Static.

DHCP

If the AN-X2 finds a DHCP server on the network, it obtains an IP address and other network parameters (netmask and default gateway) from the DHCP server.

To find the address assigned, you have to look at DHCP server.

When you submit the changes, if the AN-X2 does not find a DHCP server, it reverts to the default link local address 169.254.42.84 and repeatedly flashes the SYS (or MS) LED 3 times red followed by a pause.

Static IP Address

If you select static IP address, enter:

- the IP address for the AN-X.

- the netmask for the AN-X

- the default gateway for your network.

You must enter a valid default gateway address even if there is no device at the gateway address on the network.

Hostname

Enter a *Hostname* for the AN-X2. This name is used internally by AN-X and may be used to identify the AN-X if you have a DNS server on your network. The name can be from 1 to 30 characters long

Firmware

Select the firmware the AN-X is to load from the list provided. AN-X builds the list from the firmware files on the microSD card that are compatible with the AN-X hardware.

Submitting the Configuration

Once you have entered all required parameters, click SUBMIT to write the configuration to the file config.txt on the microSD card. The changes do not take effect until the AN-X restarts.
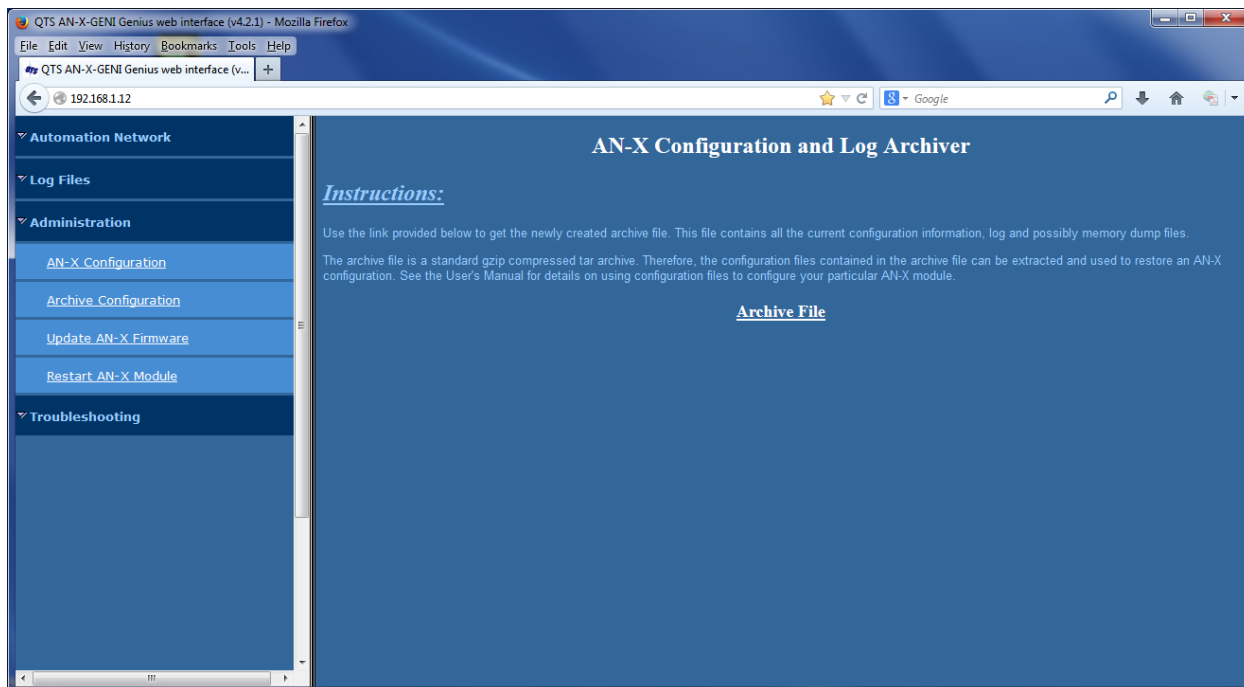
Archive Configuration

Use *Archive Configuration* to create an archive that contains the current AN-X configuration and logs, for use by technical support.

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Click the *Archive File* link and enter a filename and location.

Update AN-X Firmware

Use *Update AN-X Firmware* to download a firmware file to the microSD card on the AN-X. Firmware files for the AN-X2 have names that begin with AN-X2 and have extension *.qtf.
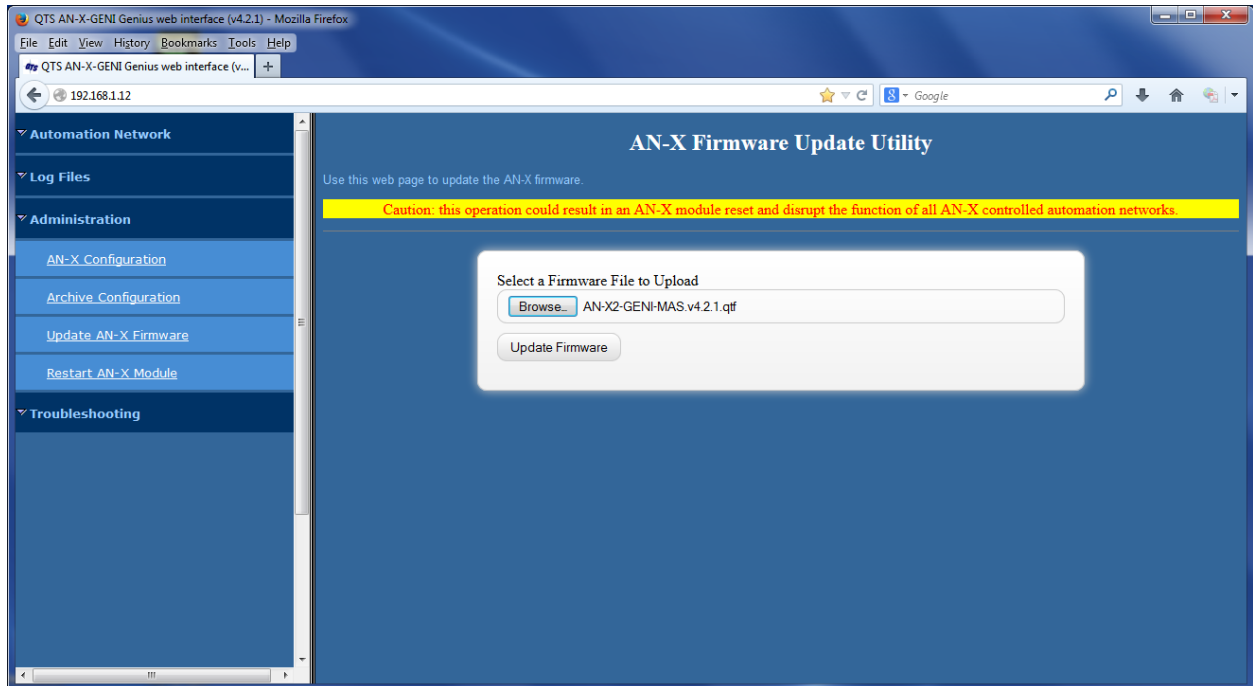
WARNING!   Do not download firmware to the AN-X while applications that use the AN-X are running.

Browse to select the file, then click the *Update Firmware* button to transfer the file.

WARNING!

It is essential that you do not disrupt power while downloading firmware, especially maintenance firmware, to the AN-X2 or while the AN-X2 is restarting following a firmware download.

Interrupting power at some points in the update process could render the AN-X inoperative and it will have to be returned to the factory for reinitialization.
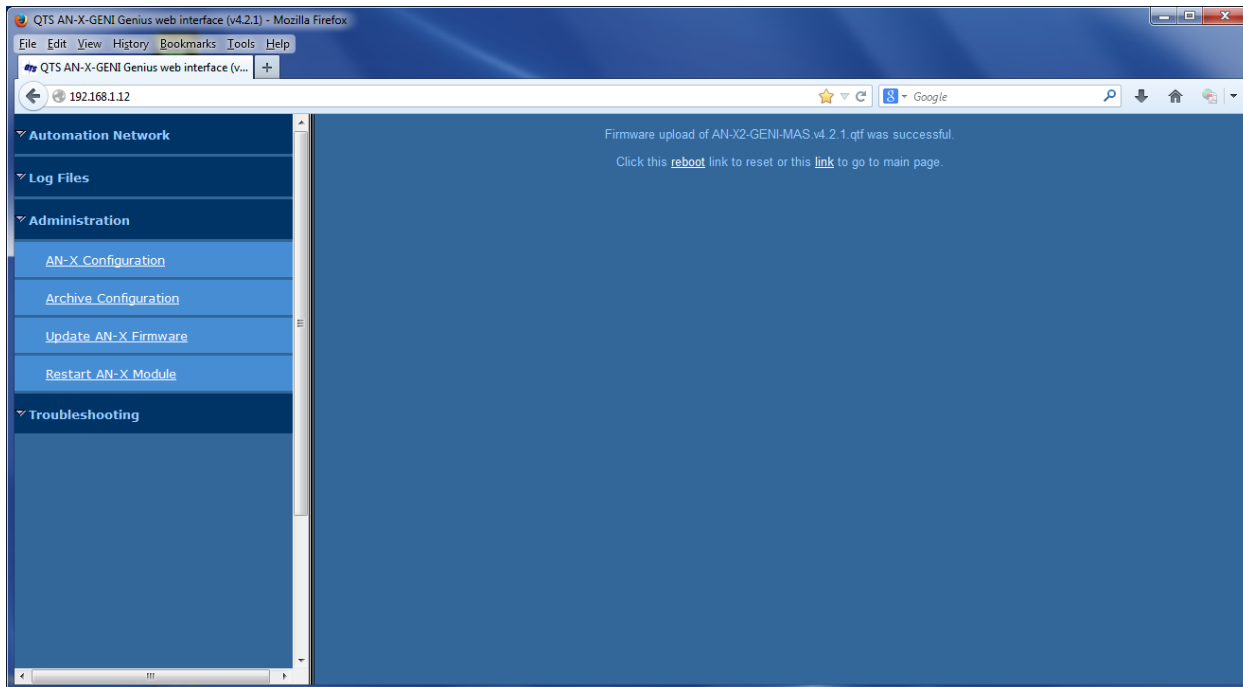
TIP

Look at the lower left corner of the browser window for messages that indicate the progress of the firmware update.

When the download is complete, AN-X displays a message that indicates the success or failure of the download.

If you have other files to download, return to the main page and continue. Otherwise, restart the AN-X in order to run the downloaded firmware.
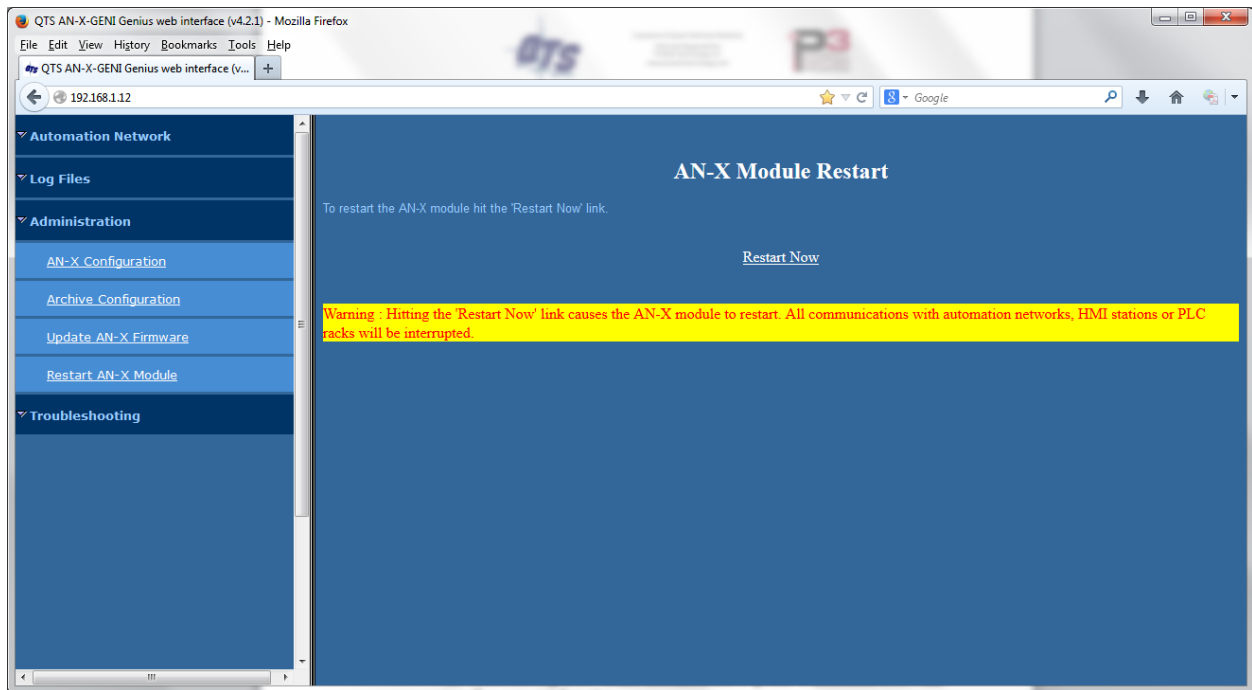
Restart AN-X Module

Use the *Restart AN-X Module* command to restart the AN-X module, for example, after changing Ethernet parameters or after downloading firmware.

.

Click the *Restart Now* link to restart the AN-X.

Troubleshooting Menu

The troubleshooting menu contains information that is specific to an automation network, as well as support information.

Troubleshooting

LEDs

The AN-X2-GENI has LEDs that indicate the state of the Ethernet connection, the overall module state and the connection to the Genius I/O network.

Ethernet LEDs

There are two LEDs that indicate the state of the Ethernet connection.

The upper, yellow LED, labelled 100, is on if the link is running at 100 Mbits/second and is off otherwise.

The lower green Link/Act LED is off if the link is inactive and is on if the link is active. If activity is detected, the link blinks at 30 ms intervals and continues blinking as long as activity is present.

If the AN-X2 is not connected to Ethernet, the 10/100 LED is on.

MS and NS LEDs: Startup

The SYS or MS LED is used by the AN-X operating system and software to indicate the state of operations and errors. Errors or status indication in boot mode cause the LED to flash yellow. Otherwise, the LED flashes red.

The SYS or MS LED should be used in conjunction with the logs to locate the cause of problems.

In the following, red 3 means three red flashes followed by a pause, and so on.

SYS (or MS) LED State	Possible cause
Red 3	DHCP configuration failed
Yellow 2	microSD card not present
Yellow 3	AN-X2 Maintenance firmware file not found on microSD card
Yellow 4	config.txt file not found on microSD card or error parsing file
Yellow 5	Production firmware filename was not specified in config.txt
Yellow 6	AN-X2 production firmware file not found on microSD card
Yellow 7	Production firmware file invalid or error programming to flash
Yellow 8	Daughterboard mismatch
Flashing red/green	Unscheduled messaging, addressing or connection problem
Flashing red/off	Configuration file problem

"Railroading" – SYS (or MS) and NET (or NS) LEDs

AN-X alternates (railroads) flashing the SYS (or MS) and NET (or NS) LEDs to indicate its state.

It railroads the LEDs yellow while it is copying new maintenance or production firmware files from the microSD card to flash memory.

It railroads the LEDs green for 20 to 30 seconds as it starts production mode.

MS and NS LEDs: Runtime

There are two possible runtime LED modes.

IMPORTANT!

Standard mode is the new default mode and is compliant with the Ethernet/IP specification.

Debug mode provides more information about the state of the Genius network.

Debug mode was the mode used in earlier versions of the firmware.

To set debug mode, enter a line with the keyword LedModeDebug in the ControlLogix configuration file.

When you autoconfigure the AN-X, it sets debug mode in the file it creates.

Standard Mode

The MS and NS LEDs are used by the AN-X operating system and software to indicate the state of operations and errors.

In standard mode, the MS and NS LEDs should be used in conjunction with the logs to locate the cause of problems.

Condition	LEDs
All OK	MS Solid Green, NS Solid Green
Missing connections	MS Solid Green, NS Flashing Green
Error event	MS Solid Green, NS Pulses Red
Bad Config	MS Flash Red, NS Flash Green

Error Events:

- Connection Timeout

- Returned error to connection request

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Debug Mode

SYS or MS LED

The SYS or MS LED is used by the AN-X operating system and software to indicate the state of operations and errors.

The SYS or MS LED should be used in conjunction with the logs to locate the cause of problems.

SYS (or MS) LED State	Possible cause
Flashing red/green	Unscheduled messaging, addressing or connection problem
Flashing red/off	Configuration file problem

NET or NS LED – Network Status

The NET (or NS) LED shows the status of Genius I/O communication.

Color	Meaning
Flashing or solid red	One or more configured Genius blocks is not active on the network
	Network error (CRC, stop, abort, etc.)
	Baud rate mismatch
Yellow	No configured Genius I/O, and no Genius network activity
Green	All configured blocks are active on the Genius bus
	Some blocks may be in error

Fatal Errors

AN-X2 monitors its operation for "impossible" conditions and generates a fatal error if it detects one. It generates a fatal error code on the SYS (or MS) LED by flashing 8 bits followed by a pause. The least significant bit is first, with green for 1 and red for 0.

If a fatal error occurs, record the SYS (or MS) LED sequence and contact technical support.

Updating the Firmware

The AN-X2 operating software consists of the maintenance firmware and the runtime firmware.

The maintenance firmware runs at startup.   It performs diagnostics, updates any firmware that has been downloaded, and starts the runtime firmware.

The firmware files are supplied in files that begin with AN-X2 and have extension *qtf* . They are updated using the web interface. Run the command *Administration/Update AN-X Firmware* and select the file you wish to download.

WARNING!   Do not download firmware to the AN-X while applications that use the AN-X are running.

The web page displays the download progress at the bottom left of the page.

You must restart the AN-X2 to run the firmware that you downloaded.

WARNING!   It is essential that you do not disrupt power while downloading firmware, especially maintenance firmware, to the AN-X2 or while the AN-X2 is restarting following a firmware download.

Interrupting power at some points in the update process could render the AN-X inoperative and it would have to be returned to the factory for reinitialization.

The web interface displays the version of the firmware the AN-X2 is running on the tab at the top of the page.

You can also update the firmware by copying qtf files to the microSD card from a computer. If you do, make sure that there is only one version of each qtf file on the microSD card.

Specifications

Parameter	Specification
Function	Bridge between Ethernet and Genius network
Typical Power Consumption	200 mA @ 12 VDC or 100 mA @ 24 VDC
Maximum Power dissipation	2.4W
Environmental Conditions:	
Operational Temperature	0-50°C (32-122°F)
Storage Temperature	–40 to 85°C (–40 to 185°F)
Relative Humidity	5-95% without condensation

Support

How to Contact Us: Sales and Support

Sales and Technical Support for this product are provided by ProSoft Technology. Contact our worldwide Sales or Technical Support teams directly by phone or email:

Asia Pacific

Languages Spoken: Chinese, English

+603.7724.2080, support.AP@prosoft-technology.com

Europe – Middle East – Africa

Languages Spoken: French, English

+33 (0) 5.34.36.87.20, support.EMEA@prosoft-technology.com

North America

Languages Spoken: English, Spanish

+1.661.716.5100, support@prosoft-technology.com

Latin America (Brazil)

Languages Spoken: Portuguese, English

+55.11.5083.3776, dalarcon@prosoft-technology.com

Latin America (Spanish Speaking Countries)

Languages Spoken: Spanish, English

+52.222.399.6565, victor@prosoft-technology.com

Warranty

Quest Technical Solutions warrants its products to be free from defects in workmanship or material under normal use and service for three years after date of shipment. Quest Technical Solutions will repair or replace without charge any equipment found to be defective during the warranty period. Final determination of the nature and responsibility for defective or damaged equipment will be made by Quest Technical Solutions personnel.

All warranties hereunder are contingent upon proper use in the application for which the product was intended and do not cover products which have been modified or repaired without Quest Technical Solutions approval or which have been subjected to accident, improper maintenance, installation or application, or on which original identification marks have been removed or altered. This Limited Warranty also will not apply to interconnecting cables or wires, consumables nor to any damage resulting from battery leakage.

In all cases Quest Technical Solutions' responsibility and liability under this warranty shall be limited to the cost of the equipment. The purchaser must obtain shipping instructions for the prepaid return of any item under this Warranty provision and compliance with such instruction shall be a condition of this warranty.

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