

CONNECT X GATEWAY MODULE USER'S MANUAL



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PROPRIETARY DATA

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1. OVERVIEW

The Connect Gateway Module is a CCI Link™ master that has the capabilities to access and control up to ten Control Concepts, Inc. devices using the CCI Link™ network. This manual will give a better understanding of the device including its status indicators, data logging functions, setup, and basic troubleshooting. Feel free to contact Control Concepts, Inc. if further information is needed.

1.1 Control Panel

The Control Panel software provided by Control Concepts, Inc. is a useful tool to assist in installation, setup, operation, and troubleshooting of all Control Concepts, Inc. devices. Connection to the device is accomplished by connecting the Connect Gateway Module to a compatible PC/Laptop/Tablet with Control Panel installed. This also enables the device to log controller data via its Data Logger function and display various status icons and messages such as device faults or tripped alarms, incorrect network configuration, and/or incompatible device firmware.

Note: If further explanation of the Control Panel utilities is necessary, please refer to the official Control Panel User's Manual, which is available for download at www.ccipower.com.

DIMENSIONS

Dimensions:
Inches [mm]

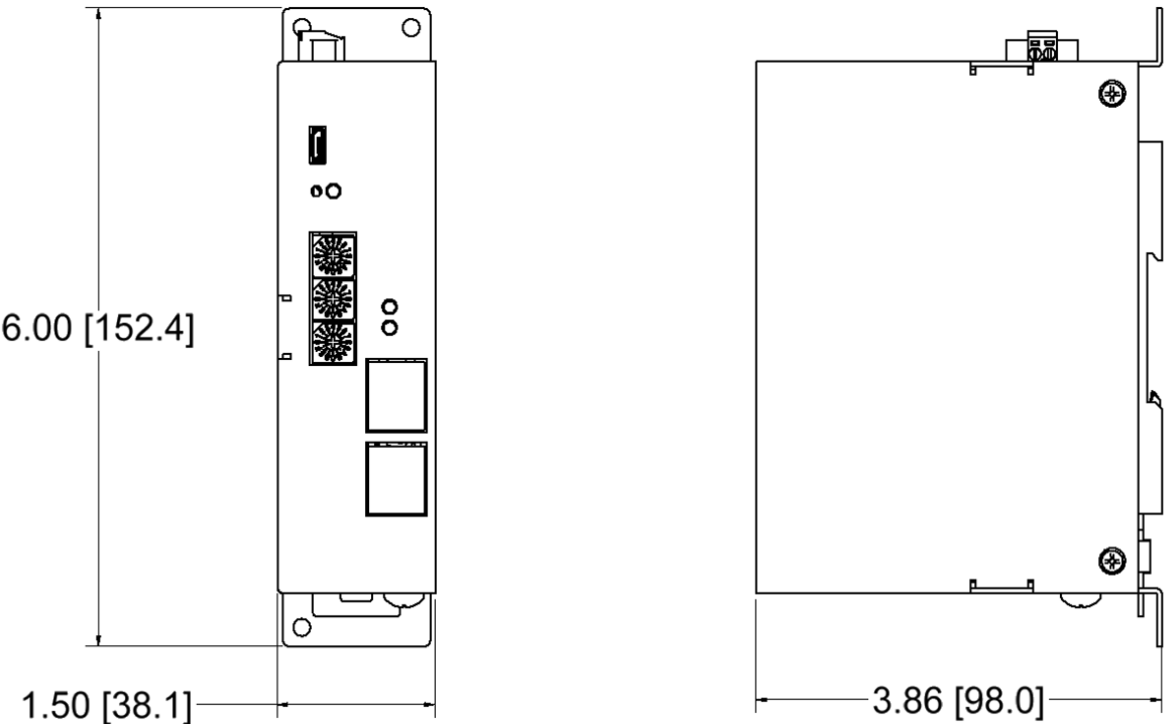


Figure 1.00: A
Connect X Gateway
Module

2. POINTS OF INTEREST

A. 24 VDC Connection

24Vdc input connection, see Section 3:
Connections for more information.

B. CCI Link™

A proprietary deterministic digital bus that enables
multiple Control Concepts, Inc. devices to
communicate with each other.

C. USB Port

Streamlines controller setup with the use of
Control Panel.

D. Reset Button

Connect module can be reset externally.

E. Error LED

Status LED to indicate the presence of an error.

F. Indicator LEDs

Assist with Diagnostics.

G. Communication Port*

Location of communication selected in the model
type, ie. EtherNet, Modbus, PROFINET, EtherCAT
or PROFIBUS.

*** The Connect Gateway Module with EtherCAT has
additional ports and hardware. See the Connect w/
EtherCAT Section in this manual for more information.**

H. Ground

Ground screw connection.

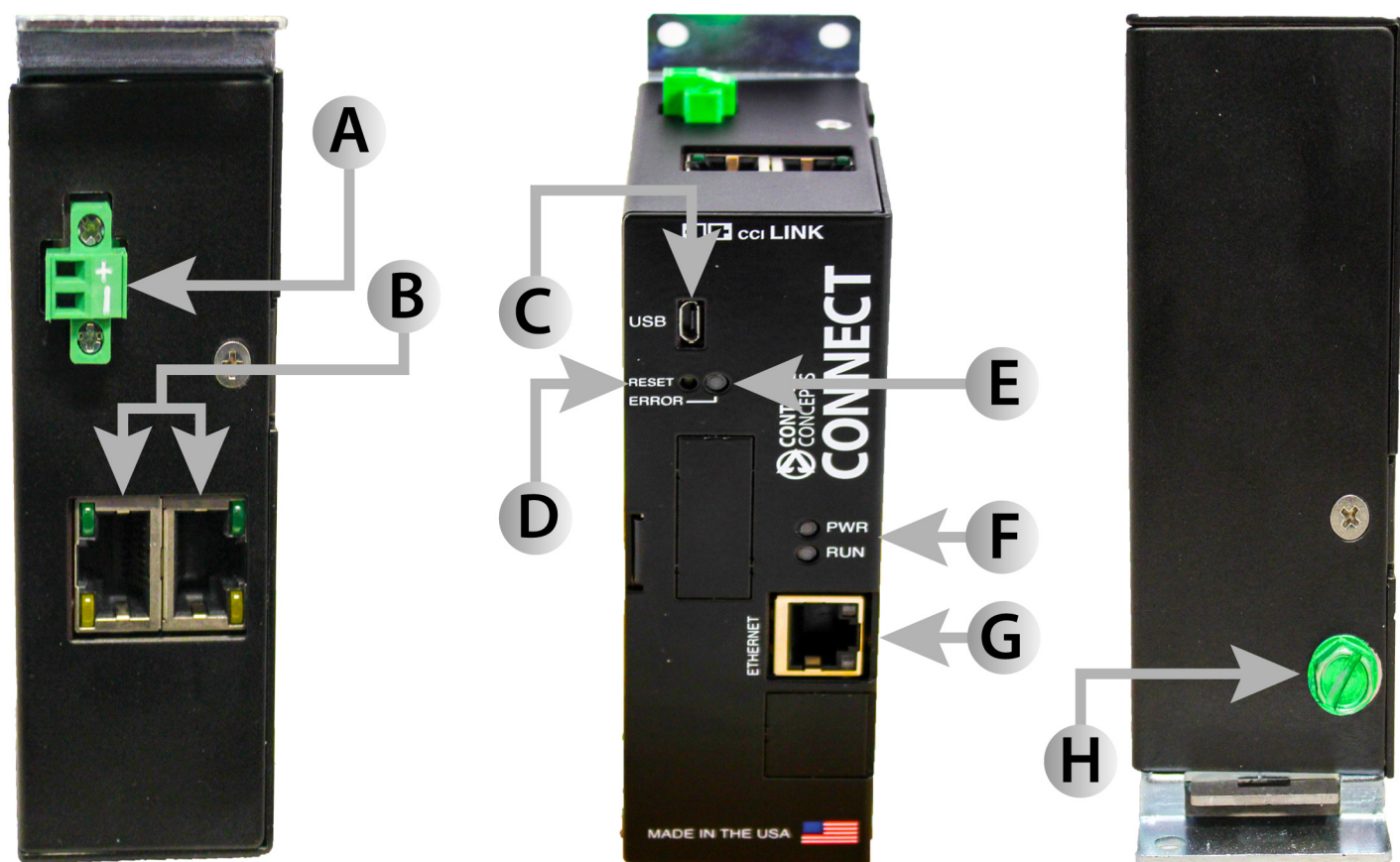


Figure 2.00: Connect Gateway Module connection ports, LEDs, and GND locations

3. CONNECTIONS

The CCI Link™ is a proprietary bus used by the Connect Gateway Module to establish connections with other Control Concepts, Inc. devices. CCI Link™ allows the Connect Gateway Module to manage system configurations, set control values, and monitor runtime data. CCI Link™ connections are made via CAT5e or better, shielded Ethernet cables.

Note: Do not connect CCI Link™ to standard Ethernet networking hardware. Connecting standard hardware may result in damage to either the Connect Gateway Module or the networking hardware.

LED	Color	State	Description
Link	GREEN	OFF	No CCI Link™ Connections
Link	GREEN	ON	CCI Link™ Connections Made
Heartbeat	YELLOW	SOLID OFF	Heartbeat Inactive
Heartbeat	YELLOW	FLASHING	Heartbeat Active
Termination	GREEN	OFF	Connection Termination Inactive
Termination	GREEN	ON	Connection Termination Active

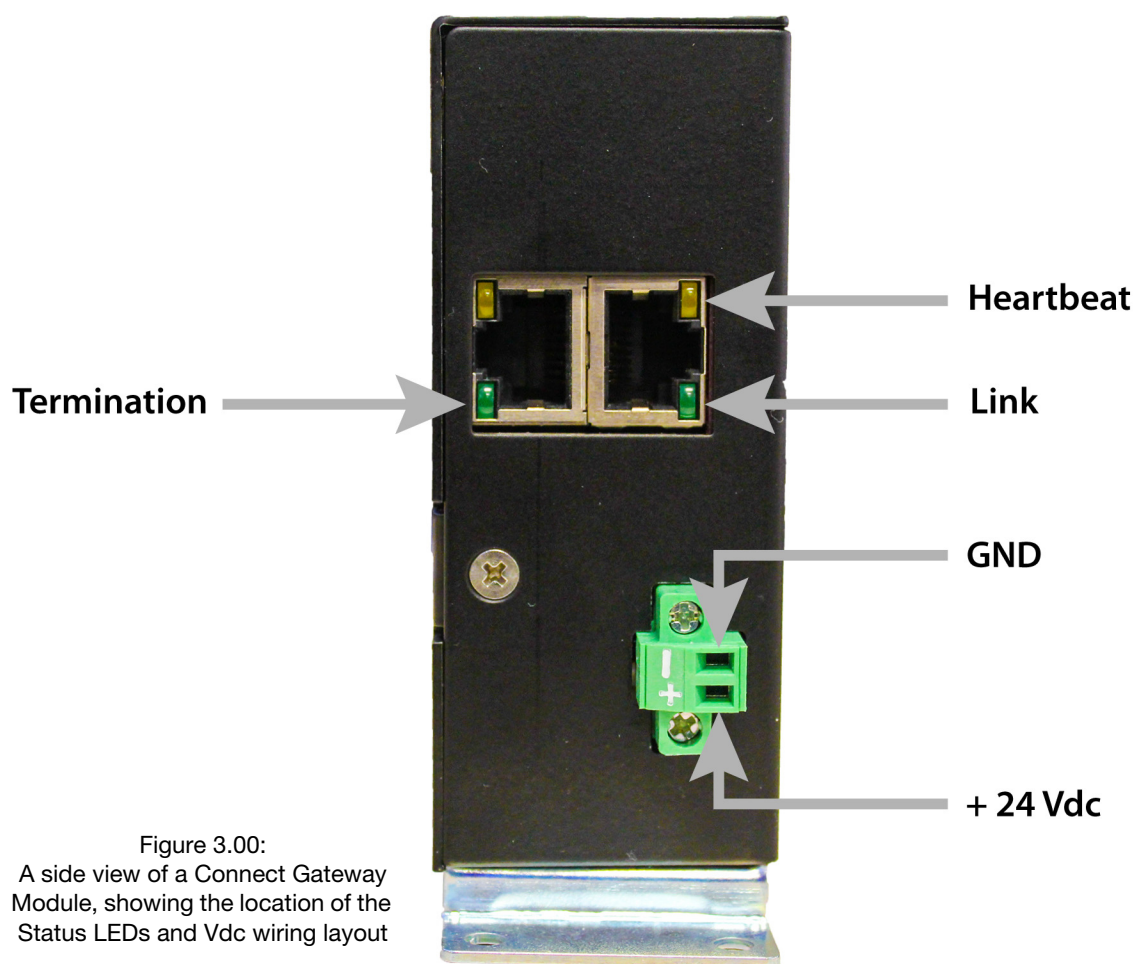


Figure 3.00:
A side view of a Connect Gateway
Module, showing the location of the
Status LEDs and Vdc wiring layout

4. CONTROL PANEL FEATURES

4.1 Control Panel Installation

Download the Control Panel Software (CCIControlPanelSetup.exe) at www.ccipower.com in the Products menu.

Minimum PC Requirements

- 1 GHz Single-Core Processor
- 1GB RAM
- 100 MB of available hard disk space
- 1280 x 768 x 60 Hz Compatible Display Adapter
- Windows 7® (32/64 bit), Windows 8® (32/64 bit), or Windows 10® (32/64 bit) Operating Systems
- Microsoft®.NET Framework 4.0 – Client Profile

Once the download has finished, run CCIControlPanelSetup.exe and follow the prompts.

After Control Panel has finished installing and a Connect Gateway Module and the networked devices are connected, the Connect Module will have the categories Network, Communication, Device Profile, Diagnostics, and Device. The number of Device categories can range from 1 – 10, and will depend on the number of devices connected to the network.

Note: For a more in-depth description refer to the Control Panel User's Manual, found on the Control Concepts, Inc. website.

4.2 Network

The Network category is used to view device data. Use the Logging feature to view and archive information for all networked devices.

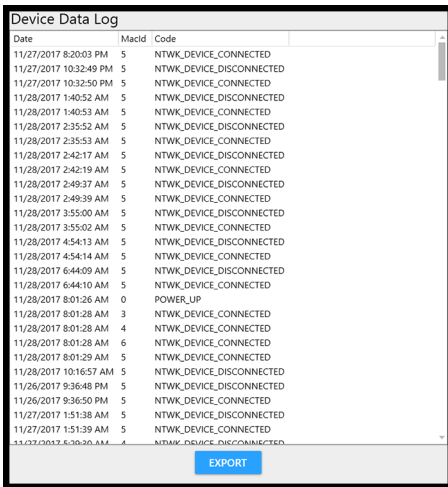
4.2.1 Logging

- The “Logging” function may display the incorrect date and time. To change this to the current date and time, click “NOW”.
- The “Data Logging Frequency” can be set to a rate between 00.10s to 60.00s. (The factory default rate is 01.00 s).
- Setting “Data Logging” to Enable, will enable Synchronous Logging, Disabling will disable Synchronous Logging.

View ASync Log

View ASync Log allows a user to view discrete events such as device connections, fieldbus state changes, and MicroFUSION faults. Each event is timestamped and traceable to an individual device. The Log will display:

- Date: Lists the date and time when the data point was logged.
- MAC ID: Lists the MAC ID of the specific device that the data point originated from.
- Code ID/Name/Value: Lists the event type of the data point.



Date	Macid	Code
11/27/2017 8:20:03 PM	5	NTWK_DEVICE_CONNECTED
11/27/2017 10:32:49 PM	5	NTWK_DEVICE_DISCONNECTED
11/27/2017 10:32:50 PM	5	NTWK_DEVICE_CONNECTED
11/28/2017 1:40:52 AM	5	NTWK_DEVICE_DISCONNECTED
11/28/2017 1:40:53 AM	5	NTWK_DEVICE_CONNECTED
11/28/2017 2:35:52 AM	5	NTWK_DEVICE_DISCONNECTED
11/28/2017 2:35:53 AM	5	NTWK_DEVICE_CONNECTED
11/28/2017 2:42:17 AM	5	NTWK_DEVICE_DISCONNECTED
11/28/2017 2:42:19 AM	5	NTWK_DEVICE_CONNECTED
11/28/2017 2:49:37 AM	5	NTWK_DEVICE_DISCONNECTED
11/28/2017 2:49:39 AM	5	NTWK_DEVICE_CONNECTED
11/28/2017 3:55:00 AM	5	NTWK_DEVICE_DISCONNECTED
11/28/2017 3:55:02 AM	5	NTWK_DEVICE_CONNECTED
11/28/2017 4:54:13 AM	5	NTWK_DEVICE_DISCONNECTED
11/28/2017 4:54:14 AM	5	NTWK_DEVICE_CONNECTED
11/28/2017 6:44:09 AM	5	NTWK_DEVICE_DISCONNECTED
11/28/2017 6:44:10 AM	5	NTWK_DEVICE_CONNECTED
11/28/2017 8:01:26 AM	0	POWER_UP
11/28/2017 8:01:28 AM	3	NTWK_DEVICE_CONNECTED
11/28/2017 8:01:28 AM	4	NTWK_DEVICE_CONNECTED
11/28/2017 8:01:28 AM	6	NTWK_DEVICE_CONNECTED
11/28/2017 8:01:29 AM	5	NTWK_DEVICE_CONNECTED
11/28/2017 10:16:57 AM	5	NTWK_DEVICE_DISCONNECTED
11/26/2017 9:36:48 PM	5	NTWK_DEVICE_DISCONNECTED
11/26/2017 9:36:50 PM	5	NTWK_DEVICE_CONNECTED
11/27/2017 1:51:38 AM	5	NTWK_DEVICE_DISCONNECTED
11/27/2017 1:51:39 AM	5	NTWK_DEVICE_CONNECTED
11/27/2017 5:30:30 AM	4	NTWK_DEVICE_DISCONNECTED

Figure 4.00: Appearance of View ASync Log

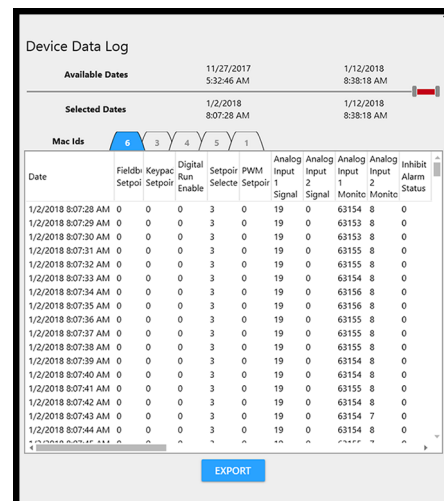
At the bottom of the window, the “EXPORT” button allows the user to send a .CSV file to a user designated location. This data can then be manipulated and viewed by any .CSV compatible program. The Export Feature organizes the data by Date and Time of data instance.

View Sync Log

View Sync Log allows a user to view the data logged from all connected devices. The Sync Log will update data entries as defined by the Data Logging Frequency [SP 30]. Each MAC ID tab represents a device connected to the Connect Gateway Module, with the number of the MAC ID corresponding to the MAC ID of the connected device, as shown in Figure 4.01.

The Device Data Log takes a snapshot of the current data values for a myriad of parameters. To expand a data point, click and drag the data point heading to the desired width. Use the side and bottom scroll bars to navigate and view the parameters and data entry instances.

At the bottom of the window, the “EXPORT” button allows the user to send a .CSV file to a user designated location. This data can then be manipulated and viewed by any .CSV compatible program. The Export feature will save the data instances for all connected devices, and will organize the devices by MAC ID, in the order they appear in the Device Data Log window.



Date	Fieldbus Setpoint	Keypac Setpoint	Digital Run Enable	Setpoint Select	PPM Select	Analog Input 1 Signal	Analog Input 2 Signal	Analog Input 1 Monitor	Analog Input 2 Monitor	Inhibit Alarm Status
1/2/2018 8:07:28 AM	0	0	0	3	0	19	0	63154	8	0
1/2/2018 8:07:29 AM	0	0	0	3	0	19	0	63153	8	0
1/2/2018 8:07:30 AM	0	0	0	3	0	19	0	63153	8	0
1/2/2018 8:07:31 AM	0	0	0	3	0	19	0	63155	8	0
1/2/2018 8:07:32 AM	0	0	0	3	0	19	0	63155	8	0
1/2/2018 8:07:33 AM	0	0	0	3	0	19	0	63154	8	0
1/2/2018 8:07:34 AM	0	0	0	3	0	19	0	63156	8	0
1/2/2018 8:07:35 AM	0	0	0	3	0	19	0	63156	8	0
1/2/2018 8:07:36 AM	0	0	0	3	0	19	0	63155	8	0
1/2/2018 8:07:37 AM	0	0	0	3	0	19	0	63155	8	0
1/2/2018 8:07:38 AM	0	0	0	3	0	19	0	63155	8	0
1/2/2018 8:07:39 AM	0	0	0	3	0	19	0	63154	8	0
1/2/2018 8:07:40 AM	0	0	0	3	0	19	0	63154	8	0
1/2/2018 8:07:41 AM	0	0	0	3	0	19	0	63155	8	0
1/2/2018 8:07:42 AM	0	0	0	3	0	19	0	63154	8	0
1/2/2018 8:07:43 AM	0	0	0	3	0	19	0	63154	7	0
1/2/2018 8:07:44 AM	0	0	0	3	0	19	0	63154	8	0

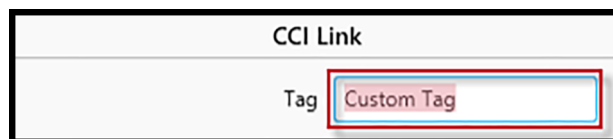
Figure 4.01: Appearance of View Sync Log

4.3 Communication

The Communication category will display the TCP/IP and CCI Link subcategories.

4.2.1 Changing a Tag

The CCI Link subcategory will display the current Tag of the Connect Gateway Module. This Tag can be changed to any 16-character alpha/numeric tag. To assign a new tag, select the default text, and type in the new Tag, as seen in Figure 4.02. To assign the new tag, click outside the “CCI Link” subcategory box, or hit “Enter” on the keyboard.



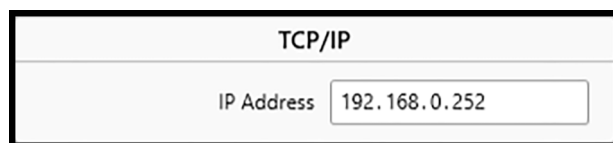
CCI Link

Tag

Figure 4.02: To finalize new tag, click outside the tag box, or hit “Enter” on the keyboard

4.2.2 Changing an IP Address

TCP/IP allows a user to modify the IP Address of the Connect Gateway Module. Only one section of the address can be modified at a time. Highlight a section and enter the desired address, then click outside the text box or push “Enter” on the keyboard. Repeat this process for each section.



TCP/IP

IP Address

Figure 4.03: Appearance of the IP Address text box

4.4 Device Profile

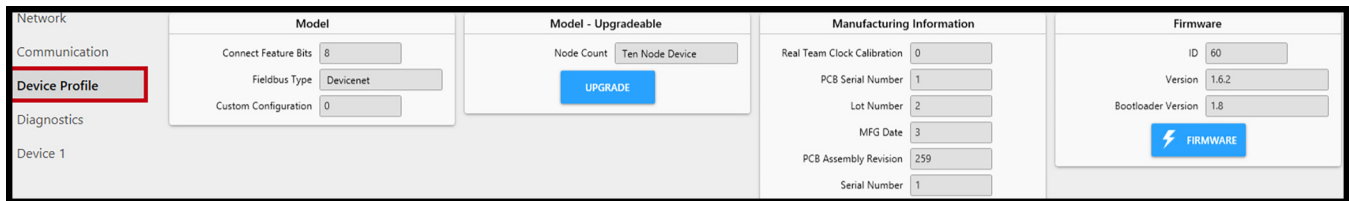


Figure 4.04: Appearance of the Device Profile category

Model

The “Model” subcategory displays the fieldbus type and any custom configuration codes.

Model - Upgradeable

The “Model – Upgrade” subcategory displays the maximum node count allowed on the network. As the title suggests, this feature can upgrade to accommodate up to 10 nodes. Contact Control Concepts, Inc. for more information.

Note: The Connect Gateway Module with PROFINET can accommodate up to 6 networked devices.

Manufacturing Information

The “Manufacturing Information” subcategory displays the serial numbers and manufacturing codes.

Firmware

The “Firmware” subcategory displays the “ID”, “Version”, and “Bootloader Version” of the selected Connect Gateway Module. The “Firmware” can be changed by contacting Control Concepts, Inc.

4.5 Diagnostics

4.5.1 Read Register

Enter the number of the parameter you wish to read into the Register box next to the Read Register button. Selecting this button will read the parameter’s value and display it in the Value box.

‘Long’ Parameters

The ‘Long’ check box is for reading parameters that have MSW and LSW. It calculates the 32 bit value from the parameter entered and the following parameter. When entering the register value, use the parameter’s MSW. Do not use the single length parameters.

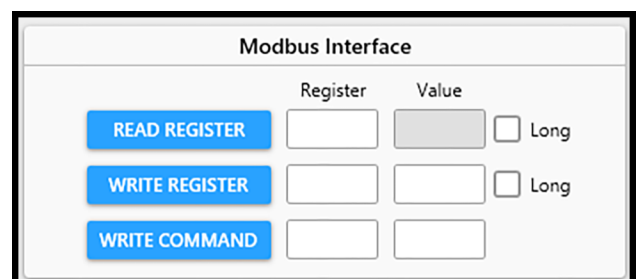


Figure 4.05: Appearance of the Modbus Interface

4.5.2 Write Register

Enter the number of the parameter into the Register box and the value that you wish to write into the Value box next to the Write Register button. Selecting this button will write the value to the parameter.

4.5.3 Write Command

Writes special commands to the controller. **Do not use unless under direct support from Control Concepts, Inc.**

4.6 Device

The Device category contains specific information about each device connected to the network. It will display the current MAC ID, the Tag associated with the selected device, the serial number, and the current CCI Link Status. In addition, the options to Update the MAC ID, Flash the LEDs, or set the fieldbus parameters will also be displayed.

4.6.1 CCI Link Status

The Connect Gateway Module provides independent connection information for each device on the CCI Link™ network. The CCI Link Status is accessible through the Slot Status parameter [XP 1100 - 1109] for MAC IDs 1 - 10.

CCI Link Status (from gateway)
State: Connected

Figure 4.06: CCI Link Status

The CCI Link Status parameter provides an overall Connection State (bits 0-3) and additional Status Information (bits 4-15). The Control Panel software will display the current state of the selected Device as seen in Figure 4.06. The CCI Link Status parameter is also displayed in the Control Panel Dashboard when the child device is selected.

BIT	15	14	13	12	11	10	9	8
	UNDEF	UNDEF	UNDEF	UNDEF	UNDEF	UNDEF	Incompatible Firmware	CFG_FLT
BIT	7	6	5	4	3	2	1	0
	CNT_FLT	CNT_TO	FLSH_ACTV	AUTO_CFG	UNDEF	CONNECTION STATE		

Connection State

STATUS	BIT 2,1,0	DESCRIPTION
Unconnected	000	A device has been detected on the CCI Link bus, but the Connect Gateway Module has not established a connection to it. This can occur if the device has an invalid Mac ID, a duplicate Mac ID, or a version of firmware that is not supported.
Initializing	001	A device has been detected on the CCI Link bus, and the Connect Gateway Module is working to establish a connection with it.
Connected	010	The Connect Gateway Module has an active connection with the device.
Limited	011	Device is incapable of receiving fieldbus information. If there are multiple new devices connected in the network, double check their MAC IDs and verify that they have different IDs.
Fault	100	The connection between the Connect Gateway Module and the device has timed out, and reconnection attempts have failed.
Reconnect	101	A previously timed-out device has been detected on the CCI Link bus, and the Connect Gateway Module is working to establish a connection with it.
Timeout	110	The connection between the Connect Gateway Module and the device has timed out, and the Connect Gateway Module is working to reconnect.

CCI Link Statuses

STATUS	BIT	DESCRIPTION
Autoconfig Enabled (AUTO_CFG)	4	Indicates whether an individual device has the Autoconfig functionality enabled—for the Connect Gateway Module’s automatic device configuration functionality to be active for a device, the device must have a local Autoconfig setting enabled.
Flash Active (FLSH_ACTV)	5	The Connect Gateway Module is storing device information to flash for the device.
Timeout Occurred (CNT_TO)	6	The connection between the Connect Gateway Module and the device has timed out at some point since the connection was established.
Connection Fault (CNT_FLT)	7	The connection between the Connect Gateway Module and the device is currently timed out.
Config Fault (CFG_FLT)	8	The device’s current settings or parameters do not match the values stored in the Connect Gateway Module’s network configuration file.
Incompatible Firmware	9	The device is using a firmware version that is too old to operate over the CCI Link bus.

4.6.2 Serial Number

The frame serial number parameter is also available in the “Device Profile” category in Control Panel when the child device is selected. Each device has a unique serial number which cannot be changed.

4.6.3 Tag Name

Each connected device has a settable tag name for easy identification. The tag name is a 16-character alpha-numeric identifier. Update the value in the text box and hit the “Enter” key to update the tag name for the device. The Tag Name parameter is also displayed in the “Communication” category in Control Panel when the child device is selected.

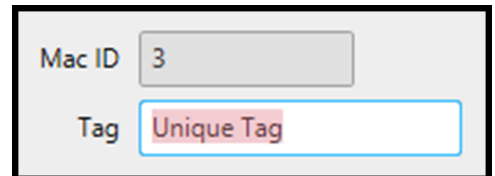


Figure 4.07: Press “Enter” on the keyboard to assign a new tag

4.6.4 MAC ID

The MAC ID is an address used for device identification on the network. The user can set the MAC ID to any number from 1 - 10, however, no two devices on the same network can have the same MAC ID. Set the MAC ID by clicking the “UPDATE MAC ID” button in Control Panel. The MAC ID functionality is also available in the Communication category in Control Panel when the child device is selected.

4.6.5 Flash LEDs

Click the “FLASH LEDS” button to blink the LEDs on the front panel of a connected power controller. This command is useful for visually locating the desired device on the network. The Flash LEDs functionality is also available in the Control Panel dashboard when the child device is selected.

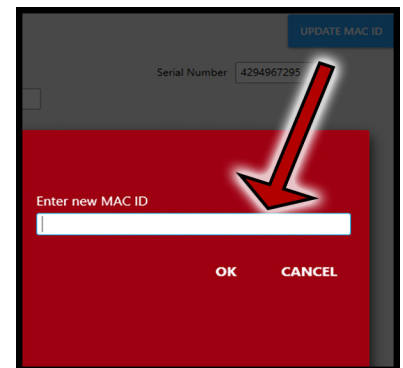


Figure 4.08: MAC ID Update window

5. CONNECT - MODBUS TCP

5.1 Connection Settings

The Control Panel software is used to configure the connection settings for the Connect Gateway Module. Under the Communication category, the IP Address control allows for viewing and updating of the current address of the fieldbus interface.

5.2 Modbus TCP Protocol Overview

The Connect Gateway Module acts as a gateway for MODBUS messages. Devices that are on the Connect Gateway Module network can be accessed by using the MAC ID of the target device as the slave address in TCP/MB messages.

Information local to the Connect Gateway Module is also accessible over TCP/MB. Using the slave address 62, information regarding the configuration of the Connect Gateway Module and the network can be retrieved and set.

Direct MODBUS communication with MicroFUSION controller parameters are typically 16 bit integers. Parameters that are 32 bit require reading both the upper and lower word of the requested data.

5.3 Parameter Read

- MODBUS function 0x03 "Read Holding Registers"
- Allows reading of Multiple Parameters
- Parameter limit of 24 registers per message

5.4 Parameter Write

Parameter Write, Single

- Modbus function 0x06 "Preset Single Register"
- Limited to one parameter

Parameter Write, Multiple

- Modbus function 0x10 "Preset Multiple Registers"
- Allows setting multiple parameters
- Parameter limit of 24 registers per message

5.5 Read Alarm Status, or Read System Status

- Modbus function 0x07 "Read Exception Status"
- Response contains a single byte field that may be used to return 8 status flags to indicate the status of a connected MicroFUSION

5.6 Modbus Wiring

Modbus TCP uses a standard Ethernet pin-out shown in the table below. Control Concepts, Inc. recommends using at least CAT5e shielded cable between the controller and other Ethernet-enabled devices.

Ethernet 10BaseT (Twisted Pair)		
Pin #	Signal Name	Function
1	TD+	Transmit Data
2	TD-	Transmit Data
3	RD+	Receive Data
4	NC	No Connection
5	NC	No Connection
6	RD-	Receive Data
7	NC	No Connection
8	NC	No Connection

6. CONNECT - ETHERNET/IP

The Connect Gateway Module facilitates control and monitoring of the network of CCI Link™ enabled devices. The organization of the input and output assemblies reflects the modular nature of this interface. Data from each device is mapped into static slots based upon the MAC ID of the connected device. The 422 BYTE input assembly contains a status word plus ten 21 WORD slots that are user configurable. The 42 BYTE output assembly contains a “write enable” word plus 2 WORDs for each device.

6.1 Input Assembly

6.1.1 Status Word

*Word 0 Module Communication Status (Read)

BIT	Description for when the bit is set (1), (0) = OK
0	Modbus Error = Controller is responding with error codes
1	Modbus Error = Communication with controller timed out
2	Modbus Error = Cannot communicate with the controller
3 - 7	Reserved (0)
8	Module is currently active with default configuration
9	Module has new configuration that will take effect at reset
10 - 15	Reserved (0)

6.2 Device Slots

Devices connected over the CCI Link™ are mapped according to their MAC IDs into static slots that are visible to the EtherNet / IP connection.

Note: Only Devices with MAC IDs that match the slot numbers will be visible to the EtherNet / IP connection.

6.2.1 Input Slot Data Item

Each input data contains 20 WORDs. The first word in each slot contains the MAC ID and status of the device connected to that slot. If there is no device connected with a MAC ID corresponding to a particular slot then both values will be zero. The status BYTE contains an abbreviated list of device states and faults. The following 20 WORDs are mapped to input parameters that are user configurable.

Item	Data Length	Description
MAC ID/STATUS	UINT	MAC ID and status of mapping slot
INPUT Parameter 1	UINT	First mapped input parameter
...	...	...
INPUT Parameter 20	UINT	Last mapped input parameter

(continued on next page...)

BIT	15	14	13	12	11	10	9	8
MAC ID								
BIT	7	6	5	4	3	2	1	0
	UNDEF	UNDEF	LOCAL	CNT_FLT	CNT_TO	AUTO_CFG	SAVED_CFG	CNT_STATE

Status Item	Description	Details
CNT_STATE	Current state of connection with slave device	1 = Connected 0 = Unconnected
SAVED_CFG	Configuration data present in networking config file	1 = Data Available 0 = No Saved Record
AUTO_CFG	Device's auto-configuration (Parameter 119 is enabled)	1 = Enabled 0 = Disabled
CNT_TO	Connection timeout occurred	1 = Active 0 = Inactive
CNT_FLT	Connection fault occurred	1 = Active 0 = Inactive
LOCAL	Device is under local control	1 = Active 0 = Inactive

6.2.2 Configuration of Input Slot Parameters

When a device is first connected a default list of commonly used parameters will be selected for the 20 data WORDs that make up each slot. If different parameters are desired, the control panel can be used to select different values to be mapped for each device's input assembly.

Select the appropriate controller and open the Communication Category. Then select "SET ETHERNET/IP PARAMETERS".

After selecting "ETHERNET/IP PARAMETERS" the dialog window in Figure 6.00 will appear. The column on the right represents the parameters that are currently programmed to the EtherNet / IP, while the column on the left shows the parameters that are available for programming.

To update/change the parameter list:

- Select any parameter from the left column, and drag it over to the right (vice versa to take a parameter off).
- Select/remove as many parameters as necessary and then select "PROGRAM" at the bottom of the dialog window.
- Control Panel will then ask the user to select which connected controller(s) should be updated with the new parameter list. Select the appropriate controller(s) and select OK. The selected controller(s) will update with the selected parameters.

A list of available input and output parameters is provided in section 6.6 of this guide.

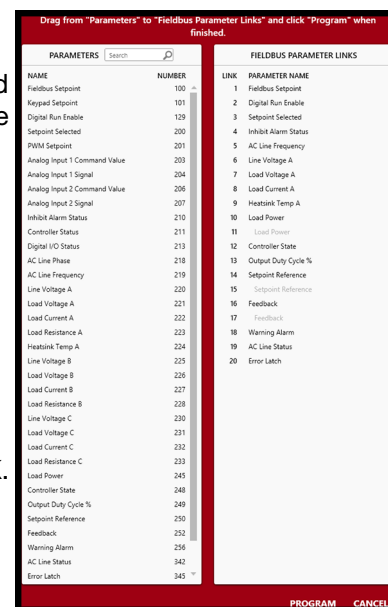


Figure 6.00: Appearance of Parameter List.

6.3 Output Assembly

6.3.1 Write Enable

*WORD 0	Write Enable	(Write)
Units:	N/A	
Minimum:	0	
Maximum:	1	
Representation:		
0	=	Output Assembly values not written to controller
1	=	Output Assembly values written to controller

Note: Writing a '1' to this register enables the values written to the 'output assembly registers' to be written to the controller. Writing a '0' to this register prevents the values written to the 'output assembly registers' from being written to the controller.

6.3.2 Output Slot Data Items

Each connected device only has two parameters that are accessible through the output assembly.

Parameter Number	Description
100	Fieldbus Setpoint
129	Digital Run Enable

6.4 Connection Type

Connect Gateway Module data can be accessed either through explicit messaging or by establishing a class 1 I/O connection. When an class 1 connection is detected the status LED will be illuminated. The I/O connection has the added benefit of allowing the Connect Gateway Module to detect the loss of communication with the PLC.

6.4.1 Loss of Network Behavior

If an I/O connection times out the Connect Gateway Module will issue a command to all of the devices on the network to execute their predetermined network timeout behavior. By default this is set to do nothing. For applications that have special safety concerns, the connected power controllers can be set to go to a safe condition.

6.5 Connection Setup

The Control Panel Software is used to configure the connection settings for the Connect Gateway Module. To set/change the IP Address, navigate to the Communications category, and click on the IP Address text field.

Click in the text field and enter the appropriate IP Address, then click outside the next field or press "Enter" on the keyboard to set the Address.

Note: Only one section of the IP Address can be modified at a time. Repeat process for each section.

6.5.1 RSLogix5000

Using PLC Software: RSLogix 5000, adhere to the following steps to initialize a Connect Gateway Module.

- 1) Right Click on the Ethernet card and select “New Module...”.

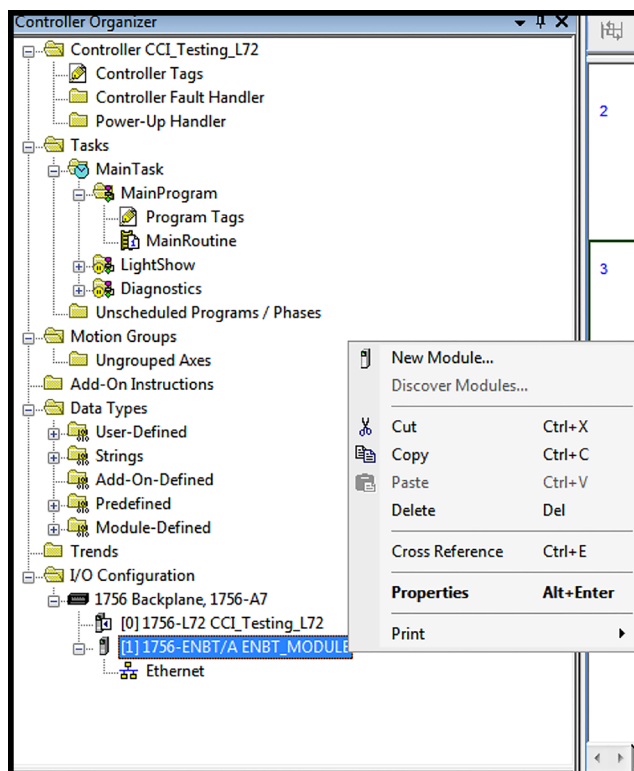


Figure 6.01: Open RSLogix 5000, Navigate to “I/O Configuration” and right click the available Ethernet Card

- 2) From the catalog select “Generic Ethernet Module”, and click “Create”.

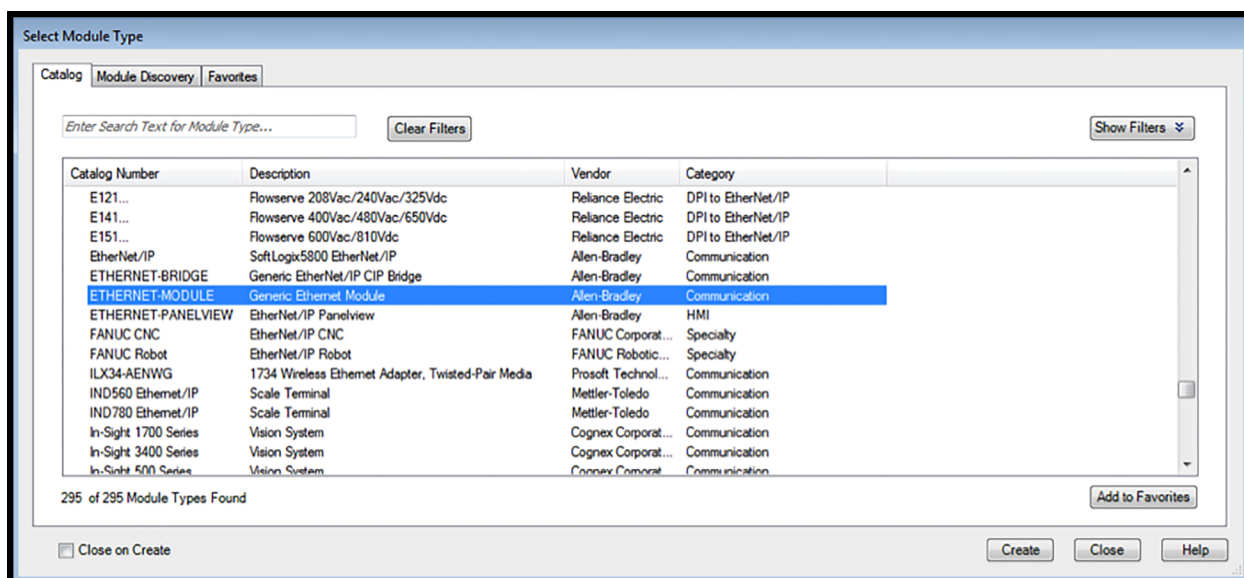


Figure 6.02: Select Generic Ethernet Module

3) Fill in the new module information with the following settings:

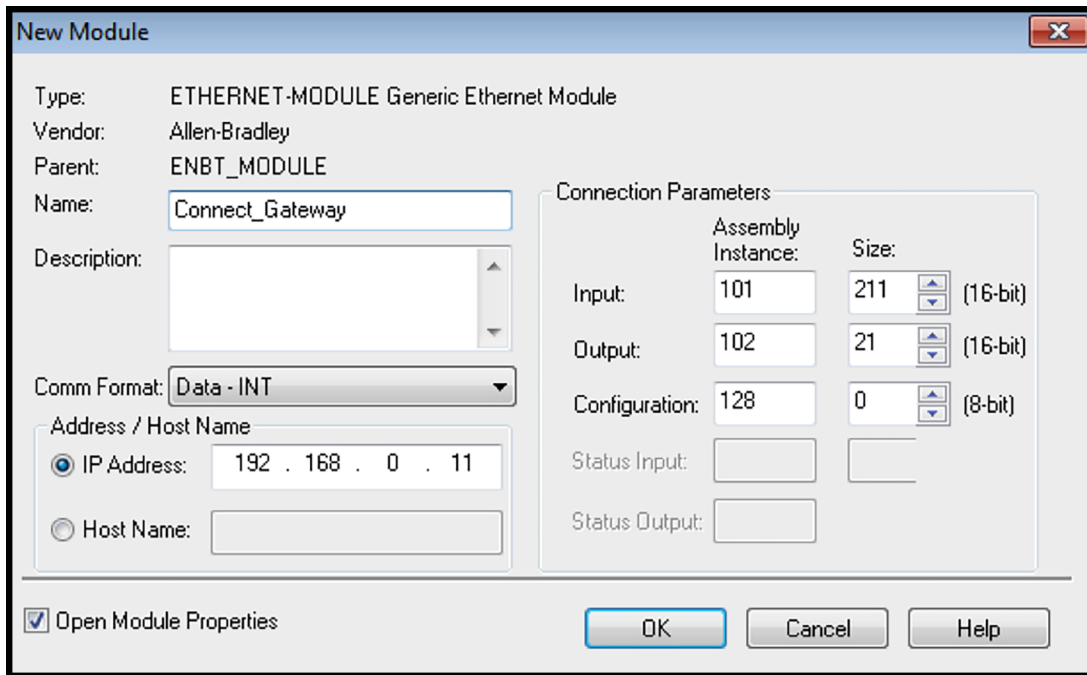


Figure 6.03: Set the New Module settings to the specifications in Step 3

3a) In the “Connection Parameters” section:

	Assembly Instance	Size
Input	101	211
Output	102	21
Configuration	128	0

3b) Set the “Comm Format” to: Data - INT.

3c) The IP Address should match the value set in Control Panel.

3d) Name the New Module. In Fig. 6.03, the unique name is set to “Connect_Gateway”.

6.6 Ethernet/IP Input Parameters

Each device that is linked to the Connect Gateway Module can have up to 20 parameters mapped to the input assembly. When a device is first connected a default list of commonly used parameters will be populated to this list. If different parameters are desired, Control Panel can be used to select different values to be mapped to each devices input assembly. To assign new parameters select the Connect Gateway Module and navigate to the appropriate networked controller. Then select “SET ETHERNET/IP PARAMETERS”, to remove or add a parameter.

6.6.1 Default Parameters

Each device that is linked to the Connect Module has 20 parameters mapped to the input assembly. *

Parameter Number	Description
100	Fieldbus Setpoint
129	Digital Run Enable
200	Setpoint Selected
210	Inhibit Alarm Status
219	Line Frequency
220	Line Voltage A
221	Load Voltage A
222	Load Current A
224	Heatsink Temp
245	Load Power (High Word)
246	Load Power (Low Word)
248	Controller State
249	Output Duty Cycle
250	Setpoint Reference (High Word)
251	Setpoint Reverence (Low Word)
252	Feedback (High Word)
253	Feedback (Low Word)
256	Warning Alarm
342	AC Line Status
345	Error Latch

* A list of word to parameter mapping is provided in appendix B - Word Mapping

6.7 Ethernet/IP Output Parameters

Each device only has two parameters settable with the output assembly.

Parameter Number	Description
100	Fieldbus Setpoint
129	Digital RUN/STOP

7. CONNECT - PROFINET

7.1 Connection Setup

The Control Panel Software is used to configure the connection settings for the Connect Gateway Module. To set/change the IP Address, navigate to the Communications category, and click on the IP Address text field.

Click in the text field and enter the appropriate IP Address, then click outside the next field or press “Enter” on the keyboard to set the Address.

Note: Only one section of the IP Address can be modified at a time. Repeat process for each section.

7.2 Temporary vs Permanent IP Address Behavior

With PROFINET, the “Station Name” (sometimes referred to as “Device Name”) is more important than the IP Address in the device identification on the network. Therefore, the Station Name of each device on the network must be unique.

The “DCP Set IP Address” command contains an option to set the IP address as “Permanent” or “Temporary”:

Permanent

The PROFINET module on the controller will save the IP address to non-volatile memory and begin using the IP address immediately.

Temporary

The PROFINET module on the controller will not save the IP address setting, but will begin using the IP address immediately. When the IP address has been set to “Temporary”, PROFINET-IO requires the device to use an IP address of 0.0.0.0 after the next power-cycle or device reset.

Often, PNIO PLCs set the IP address as “Temporary”. The PLC will use the device’s station name and MAC address to identify the device on the network and set the IP address of the device correctly, but as “Temporary”.

This may cause the following scenario to occur (in this scenario it is assumed that the IP address is initially set as permanent):

Example:

- Utilizing Control Panel software, the user sets the IP address of the controller, or using PNIO configuration software, the user searches for the controller device with the unique station name on the network and sets its IP address.
- After power is cycled to the controller, it retains the IP address as expected.
- Once the PLC is configured, it connects to the controller and communicates as expected. Then the PLC is powered down or disconnected, and power is cycled to the controller.
- The user attempts to “ping” the controller on the network at the IP address assigned and it does not respond.
- The user connects with the Control Panel software and finds that the IP address is now 0.0.0.0, then the user attempts to set the IP address of the controller, again, using the Control Panel software. Yet the controller continues to report an IP address of 0.0.0.0.

In this situation, the user will find that when they power-up and connect the PLC everything works as expected, and as long as they don’t cycle power to the controller they can ping it successfully at the expected IP address.

Example Explanation:

The IP address of the controller was set as temporary by the PLC, so after a power-cycle the IP address used by the PROFINET module on the controller is 0.0.0.0. When this happens, the only way to set the IP address of the PROFINET module is through PROFINET either by the PLC or by using the PNIO configuration software. This should not cause a problem since the PLC uses the station name of the controller and sets the IP address according to your network configuration when it establishes communication with the controller.

When the IP address of the PROFINET module on the controller has been set as “Temporary” and power has been cycled, the IP address stored in the controller itself and the IP address used by the PROFINET module on the controller may not match until the PLC sets the IP address of the PROFINET module via DCP set IP address command.

Solution Recommendation:

- 1) Set the IP Address of the controller using the Control Panel software prior to connection and communication with the PLC.
- 2) Use the PNIO configuration software to set/verify the IP address of the controller so that it matches what was set using the Control Panel software prior to connection and communication with the PLC.

7.3 Device Slots

Each input data contains 19 WORDs. The first word in each slot contains the MAC ID and status of the device connected to that slot. If there is no device connected with a MAC ID corresponding to a particular slot then both values will be zero. The status BYTE contains an abbreviated list of device states and faults. The following 20 WORDs are mapped to input parameters that are user configurable.

Item	Data Length	Description
MAC ID/STATUS	UINT	MAC ID and status of mapping slot
INPUT Parameter 1	UINT	First mapped input parameter
...	...	...
INPUT Parameter 20	UINT	Last mapped input parameter

BIT	15	14	13	12	11	10	9	8
MAC ID								
BIT	7	6	5	4	3	2	1	0
	UNDEF	UNDEF	CFG_FLT	CNT_FLT	CNT_TO	AUTO_CFG	SAVED_CFG	CNT_STATE

Status Item	Description	Details
CNT_STATE	Current state of connection with slave device	1 = Connected 0 = Unconnected
SAVED_CFG	Configuration data present in networking config file	1 = Data Available 0 = No Saved Record
AUTO_CFG	Device's auto-configuration (Parameter 119 is enabled)	1 = Enabled 0 = Disabled
CNT_TO	Connection timeout occurred	1 = Active 0 = Inactive
CNT_FLT	Connection fault occurred	1 = Active 0 = Inactive
CFG_FLT	Configuration fault occurred	1 = Active 0 = Inactive

7.4 PROFINET Input Parameters

Each device that is linked to the Connect Gateway Module can have up to 19 parameters mapped to the input assembly. When a device is first connected a default list of commonly used parameters will be populated to this list. If different parameters are desired, Control Panel can be used to select different values to be mapped to each devices input assembly. To assign new parameters select the Connect Gateway Module and navigate to the appropriate networked controller. Then select “SET PROFINET PARAMETERS”, to remove or add a parameter.

7.4.1 Default Parameters

Each device that is linked to the Connect Module has 19 parameters mapped to the input assembly. *

Parameter Number	Description
100	Fieldbus Setpoint
129	Digital Run Enable
200	Setpoint Selected
210	Inhibit Alarm Status
220	Line Voltage A
221	Load Voltage A
222	Load Current A
224	Heatsink Temp
245	Load Power (High Word)
246	Load Power (Low Word)
248	Controller State
249	Output Duty Cycle
250	Setpoint Reference (High Word)
251	Setpoint Reverence (Low Word)
252	Feedback (High Word)
253	Feedback (Low Word)
256	Warning Alarm
342	AC Line Status
345	Error Latch

* A list of word to parameter mappings is provided in Appendix B - Word Mapping

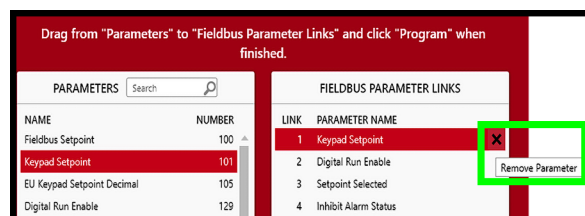


Figure 7.00: Remove a parameter to make room for a new one

- To change a parameter, a user must first remove 1 of the 19 default parameters.
- On the right hand column (“FIELDBUS PARAMETER LINKS”), hover over the right side of a parameter, and click the black ‘X’ (Figure 7.00).
- To add a parameter, click and drag it from the left column into an available slot on the right hand column. Click “Program” to set the new parameters to the controller.

7.5 PROFINET Output Parameters

Each device only has two parameters settable with the output assembly.

Parameter Number	Description
100	Fieldbus Setpoint
129	Digital RUN/STOP

8. CONNECT - ETHERCAT

There are two EtherCAT ports on the front of the device. Port 0 is labeled IN and Port 1 is labeled OUT. The Connect Gateway Module has various LEDs that assist in diagnosing its current State. The following table gives a full list of the LED colors, states, and their respective meanings.

LED	COLOR	STATE	DESCRIPTION
PWR	GREEN	SOLID OFF	No power supplied
PWR	GREEN	SOLID ON	Device powered
RUN	GREEN	SOLID OFF	Device is in INIT
RUN	GREEN	BLINKING	Device is in PREOP
RUN	GREEN	SINGLE FLASH	Device is in SAFEOP
RUN	GREEN	SOLID ON	Device is in OP
RUN	GREEN	FLICKERING	Device is in BOOT
ERROR	RED	SOLID OFF	No error
ERROR	RED	SOLID ON	Critical communication or device fault
ERROR	RED	DOUBLE FLASH	Watchdog Timeout
ERROR	RED	SINGLE FLASH	State machine error
ERROR	RED	BLINKING	General configuration error
ERROR	RED	FLICKERING	Boot error



Figure 8.00: EtherCAT Connect Gateway Module

8.1 Device Slots

The Connect Gateway Module will automatically establish a link with every device that is present on the network that has a valid MAC ID. Each of these devices will be added to an EtherCAT device slot based on their MAC ID. The device slots are used for both SDO and PDO communication with the slaves on the network.

INDEX	NAME	DESCRIPTION
0x16n0	RX Process Data Map	Contains the slot n output parameters mapped to the PDO
0x1An0	TX Process Data Map	Contains the slot n input parameters mapped to the PDO
0x60n0	Slot n Inputs	Contains input runtime data
0x70n0	Slot n Outputs	Contains output runtime data
0x80n0	Slot n Module Identification	Contains high level information about the slave device
0x80n1	Slot n Device Configuration	Contains device configuration parameters

8.2 PDO Mapping

The Connect Gateway Module offers flexible PDO mapping. PDO Values for each slot are selected by inserting the proper index and sub-index in to an assigned PDO mapping object. These values are downloaded during the transition from PREOP to SAFEOP.

8.3 Station Alias

The Connect Gateway Module's station alias is set using the three hex-encoder switches on the front of the device. The switches will be read by the Connect Gateway Module at startup. Any change during runtime will require a device reset.

8.4 FoE

EtherCAT supports the use of FoE for two functions: firmware updates and Configuration File uploading/downloading.

8.4.1 Firmware Update

Both the Connect Gateway Module and slave devices can have their firmware updated using FoE. In both cases the Connect Gateway Module must undergo the following steps:

1. Transition from INIT to BOOT
2. Download the new firmware
3. Transition from BOOT back to INIT
4. Wait for the Connect Gateway Module to return to INIT

When the state machine is commanded from BOOT to INIT, and a firmware update is in process, the boot loader will be called. The firmware image downloaded will be evaluated and loaded to memory if it is valid. The CCI Link™ LED will remain solid while the heartbeat LED will turn off. The heartbeat will flash briefly when the firmware load is complete.

Note: Do not attempt to cycle power during this period.

8.4.2 Configuration File Upload/Download

The configuration file can be uploaded and downloaded when the Connect Gateway Module is in the PREOP state. The file contains a snapshot of most of the settable non-volatile parameters for the devices on the CCI Link Network. It also contains a checksum value that can be easily compared with runtime checksum which is assessable through the COE object 0xFBF3. When the configuration file is downloaded the settable parameters will be pushed to all connected devices.

8.6 EtherCAT Object Dictionary

INDEX	SI	DATATYPE	ACCESS	NAME	DESCRIPTION
0x1000		UDINT	RO	Device Type	
0x1008		STRING	RO	Manufacturer Device Version	
0x1009		STRING	RO	Manufacturer Hardware Version	
0x100A		STRING	RO	Manufacturer Software Version	
0x100B		STRING	RO	Manufacturer Bootloader Version	
0x1018		IDENTITY	RO	Identity Object	
	1	UDINT	RO	Vendor ID	
	2	UDINT	RO	Product Code	
	3	UDINT	RO	Revision Number	
	4	UDINT	RO	Serial Number	
0x10F8		ULINT	RO	Timestamp Object	in ns
0x16n0				RX Process Data Map	
0x1An0				TX Process Data Map	
0x1C00				SyncManager Type	
0x1C12				SyncManager 2 PDO Assign	
0x1C13				SyncManager 3 PDO Assign	
0x1C32				SyncManager 2 Parameter	
0x1C33				SyncManager 3 Parameter	
0x60n0					See MicroFusion Parameter List
	1	UINT	RO	Line Voltage	
	2	UINT	RO	Load Voltage	
	3	UINT	RO	Load Current	
	4	UINT	RO	Load Resistance	
	5	UINT	RO	Line Frequency	
	6	UINT	RO	Heatsink Temp	
	7	UINT	RO	Line Phase	
	8	UINT	RO	Load Power	
	9	UINT	RO	Load Power Low	
	10	UINT	RO	PWM Setpoint	
	11	UINT	RO	Analog Input 1 Signal	
	12	UINT	RO	Analog Input 2 Signal	
	13	UINT	RO	Analog Input 1 Monitor	
	14	UINT	RO	Analog Input 2 Monitor	
	15	UINT	RO	Inhibit Alarm Status	
	16	UINT	RO	Digital IO Status	
	17	UINT	RO	Controller State	
	18	UINT	RO	Output Duty Cycle	
	19	UINT	RO	Setpoint Reference High	
	20	UINT	RO	Setpoint Reference Low	
	21	UINT	RO	Feedback High	
	22	UINT	RO	Feedback Low	
	23	UINT	RO	Warning Alarm	
	24	UINT	RO	AC Line Status	
	25	UINT	RO	AC Error Latch	

INDEX	SI	DATATYPE	ACCESS	NAME	DESCRIPTION
	26	UINT	RO	Fieldbus Setpoint	
	27	UINT	RO	Keypad Setpoint	
	28	UINT	RO	Digital Run Setpoint	
	29	UINT	RO	Setpoint Selected	
0x70n0					See MicroFusion Parameter List
	1	UINT	RW	Fieldbus Setpoint	
	2	BOOL	RW	Digital Run Enable	
0x80n0					
	1	UINT	RO	Address	
	3	STRING	RO	Name	
	8	UDINT	RO	Serial Number	
	10	UDINT	RO	Module Identity	
	11	UINT	RO	Slot	
0x80n1					See MicroFusion Parameter List
	1	UINT	RW	Feedback Type	
	2	UINT	RW	Firing Mode	
	3	UINT	RW	Control Loop	
	4	UINT	RW	Ramp Time	
	5	UINT	RW	Slew Rate	
	6	UINT	RW	ZCT PA Cycle Threshold	
	7	UINT	RW	Full Scale Voltage	
	8	UINT	RW	Full Scale Current	
	9	UINT	RW	Full Scale Power	
	10	UINT	RW	Voltage Limit	
	11	UINT	RW	Current Limit	
	12	UINT	RW	Current Limit Type	
	13	UINT	RW	Current Trip	
	14	UINT	RW	Power Limit	
	15	UINT	RW	Relay Alarm Mask 1	
	16	UINT	RW	Relay Alarm Mask 2	
	17	UINT	RW	Deviation Band	
	18	UINT	RW	Feedback Source	
	19	UINT	RW	Hero Mode Enable	
	20	UINT	RW	System Relay Mask	
	21	UINT	RW	Three Phase Load Imbalance Threshold	
	22	UINT	RW	Analog Input 1 Type	
	23	UINT	RW	Analog Input 1 Low Command	
	24	UINT	RW	Analog Input 1 Low Out	
	25	UINT	RW	Analog Input 1 High Command	
	26	UINT	RW	Analog Input 1 High Out	
	27	UINT	RW	Analog Input 2 Type	
	28	UINT	RW	Analog Input 2 Low Command	
	29	UINT	RW	Analog Input 2 Low Out	
	30	UINT	RW	Analog Input 2 High Command	
	31	UINT	RW	Analog Input 2 High Out	
	32	UINT	RW	Setpoint 1 Source	
	33	UINT	RW	Setpoint 2 Source	

INDEX	SI	DATATYPE	ACCESS	NAME	DESCRIPTION
	34	UINT	RW	Control Setpoint Select	
	35	UINT	RW	Network Timeout Setpoint	
	36	UINT	RW	Clear Error Latch	
	37	UINT	RW	Link Heartbeat Timeout	
	38	UINT	RW	Network Timeout Action	
	39	UINT	RW	Sync Guard Enable	
	40	UINT	RW	Shorted SCR Check Enable	
	41	UINT	RW	GP Input Function	
	42	UINT	RW	Analog In 1 Monitor Full Scale	
	43	UINT	RW	Analog In 2 Monitor Full Scale	
	44	UINT	RW	Meter 1 Output Type	
	45	UINT	RW	Meter 1 Signal Select	
	46	UINT	RW	Meter 1 CMD Low Value	
	47	UINT	RW	Meter 1 Signal Low Output	
	48	UINT	RW	Meter 1 CMD High Value	
	49	UINT	RW	Meter 1 Signal High Output	
	50	UINT	RW	Meter 1 Out Direct	
	51	UINT	RW	Meter 2 Output Type	
	52	UINT	RW	Meter 2 Signal Select	
	53	UINT	RW	Meter 2 CMD Low Value	
	54	UINT	RW	Meter 2 Signal Low Value	
	55	UINT	RW	Meter 2 CMD High Value	
	56	UINT	RW	Meter 2 Signal High Output	
	57	UINT	RW	Meter 2 Out Direct	
	58	UINT	RW	PWN Input Low Duty Cycle	
	59	UINT	RW	PWM Input Low Command Output	
	60	UINT	RW	PWN Input High Duty Cycle	
	61	UINT	RW	PWM Input High Command Output	
	62	UINT	RW	Transducer MAC ID	
	63	UINT	RW	Feedback Select	
0xF000				Device Profile	
	1	UINT	RO	Index Distance	
	2	UINT	RO	Max Number of Modules	
0xF010			RO	Module Profile List	
0xF030			RW	Configured Module Identity List	
0xF380		USINT	RO	Active Exception Status	Bit 0: Device Warning
					Bit 1: Manufacturer Warning
					Bit 2: Device Error
					Bit 3: Manufacturer Error
					Bit 4 - 7: RESERVED
0xF381		UDINT	RO	Active Device Warning Details	Bit 0: Network Timeout
					Bit 1: Voltage Limit
					Bit 2: Current Limit
					Bit 3: Power Limit
					Bit 4: Heatsink Temp
					Bit 5: Shorted SCR
					Bit 6: Load Imbalance

INDEX	SI	DATATYPE	ACCESS	NAME	DESCRIPTION
					Bit 7: Low Output
					Bit 8 - 15: RESERVED
0xF383		UDINT	RO	Active Device Error Details	Bit 0: Network Fault
					Bit 1: Configuration Fault
					Bit 2: Current Trip
					Bit 3: Heatsink Over-Temp
					Bit 4: PLL Lock Loss
					Bit 5: Line Phase Loss
					Bit 6: Watchdog Timeout
					Bit 7 - 15: RESERVED
0xF390		USINT	RO	Latched Exception Status	Bit 0: Device Warning
					Bit 1: Manufacturer Warning
					Bit 2: Device Error
					Bit 3: Manufacturer Error
					Bit 4 - 7: RESERVED
0xF391		UDINT	RO	Latched Device Warning Details	Bit 0: Network Timeout
					Bit 1: Voltage Limit
					Bit 2: Current Limit
					Bit 3: Power Limit
					Bit 4: Heatsink Temp
					Bit 5: Shorted SCR
					Bit 6: Load Imbalance
					Bit 7: Low Output
					Bit 8 - 31: RESERVED
0xF393		UDINT	RO	Latched Device Error Details	Bit 0: Network Fault
					Bit 1: Configuration Fault
					Bit 2: Current Trip
					Bit 3: Heatsink Over-Temp
					Bit 4: PLL Lock Loss
					Bit 5: Line Phase Loss
					Bit 6: Watchdog Timeout
					Bit 7 - 31: RESERVED
0xF3A1		UDINT	RW	Device Warning Mask	
0xF3A3		UDINT	RW	Device Error Mask	
0xF600					
	1	UINT	RW	Connect Module Status	See Gateway Parameter 8
	2	UINT	RW	Connect Module Faults	See Gateway Parameter 9
0xF610					
	1	UINT	RO	Slot 0 Status	See Gateway Parameter 1100
	2	UINT	RO	Slot 1 Status	See Gateway Parameter 1101
	3	UINT	RO	Slot 2 Status	See Gateway Parameter 1102
	4	UINT	RO	Slot 3 Status	See Gateway Parameter 1103
	5	UINT	RO	Slot 4 Status	See Gateway Parameter 1104
	6	UINT	RO	Slot 5 Status	See Gateway Parameter 1105
	7	UINT	RO	Slot 6 Status	See Gateway Parameter 1106
	8	UINT	RO	Slot 7 Status	See Gateway Parameter 1107
	9	UINT	RO	Slot 8 Status	See Gateway Parameter 1108

INDEX	SI	DATATYPE	ACCESS	NAME	DESCRIPTION
	10	UINT	RO	Slot 9 Status	See Gateway Parameter 1109
0xF6F0		UDINT	RO	Input Local Timestamp	
0xF800					
	1	STRING	RO	Name	
	2	UDINT	RO	Serial Number	
	3	UINT	RW	Data Logging Frequency	Unit: 100s ms
	4	UINT	RO	Autoconfig Enabled	Bit 0: Enabled = 1 Bit 1 - 7: RESERVED
	5	UINT	RO	Network Config Enabled	Bit 0: Enabled = 1 Bit 1 - 7: RESERVED
	6	UINT	RW	Firmware Update Target	RESERVED
0xF801					
	1	STRING	RO	Config File Identifier	Identity of the Config File
0xF9F0		STRING	RO	Manufacturer Serial Number	
0xF9F1	1	UDINT	RO	CDP Functional Generation Number	
0xF9F2		UDINT	RO	SDP Functional Generation Number	
0xF9F3		STRING	RO	Vendor Name	
0xF9F4		STRING	RO	Semiconductor SDP Device Name	
0xF9F5		USINT	RW	Output Identifier	
0xF9F6		UDINT	RO	Time Since Power On	
0xF9F8		UDINT	RO	Firmware Update Functional Generation Number	
0xF9FA		STRING	RO	Module Manufacturer Software Version	
0xF9FB		STRING	RO	Module Manufacturer Serial Number	
0xFBF0				Device Reset Command	
	1	6 BYTES	RW	Command	
	2	USINT	RO	Status	
	3	2 BYTES	RO	Response	
0xFBF1				Exception Reset Command	
	1	5 BYTES	RW	Command	
	2	USINT	RO	Status	
	3	2 BYTES	RO	Response	
0xFBF2				Store Parameters Command	
	1	4 BYTES	RW	Command	
	2	USINT	RO	Status	
	3	2 BYTES	RO	Response	
0xFBF3				Calculate Checksum Command	
	1	4 BYTES	RW	Command	
	2	USINT	RO	Status	
	3	6 BYTES	RO	Response	
0xFBF4				Load Parameters Command	
	1	4 BYTES	RW	Command	
	2	USINT	RO	Status	
	3	2 BYTES	RO	Response	

9. CONNECT - PROFIBUS

To modify basic connection settings, use the Control Panel software. After selecting the appropriate Connect Gateway Module, navigate to the “Communication” category. This category allows the user to set the Comm Address, PROFIBUS Termination Resistance (Enable/Disable), and setting of a unique tag for the device (See Figure 9.00).

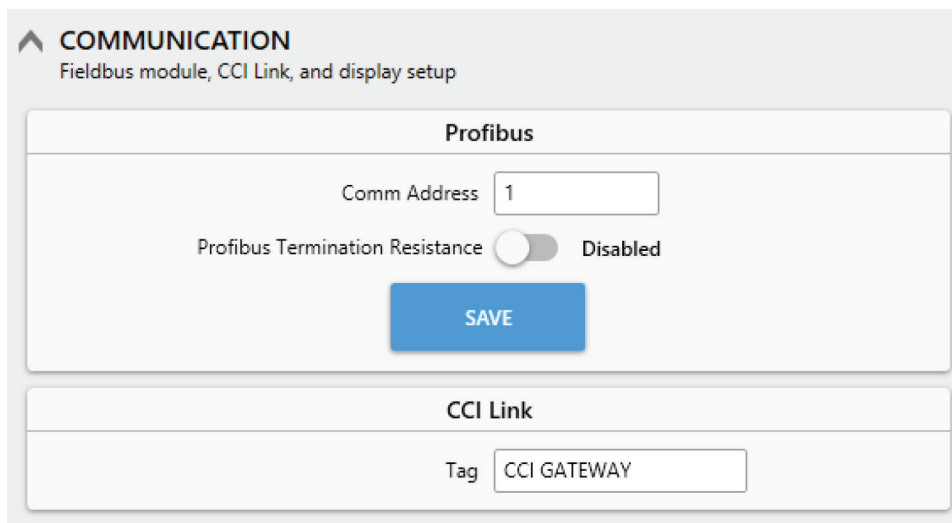


Figure 9.00: Control Panel Communication window for a Connect Module equipped with PROFIBUS.

9.1 PROFIBUS Configuration

Connect Module - PROFIBUS slave

- Plug the USB cable into the Connect Module and open the Connect Module Control Panel software.
- Click on the “Connect” button to establish communications with the Connect module.
- Verify that the Fieldbus Type is PROFIBUS.
- Set the PROFIBUS Station Address.
- Enable the Termination resistors if the Connect Module is physically located at the end of the network trunk line and the cable doesn’t have built-in termination resistors.
- Click on the SAVE button.

[SP 80] PROFIBUS Address

- Sets the PROFIBUS network Station Address for the Connect Module

Units: N/A

Minimum: 1

Maximum: 125

Default: 1

Note: It is not recommended that the PROFIBUS master set the slave’s station address, SP-80, above, should be used to set the slave address.

(Continued on next page...)

[SP 81] PROFIBUS Termination Resistor Enable

- Used to enable and disable the termination resistors.

Units: N/A

Minimum: 0

Maximum: 1

Default: 0

Selections:

0 = Disabled

1 = Enabled

- Monitor Parameters -

[MP 82] PROFIBUS Status

Units: N/A

Minimum: 00000000 = 0

Maximum: 00100000 = 32

Representation:

Bit

MSB 7 = Not used

6 = Not used

5 = Unknown Bus state

4 = Bus Error state

3 = Timeout state

2 = Data Exchange state

1 = Wait for Parameterization state

LSB 0 = Wait for Configuration state

9.2 Connect PROFIBUS Wiring

Pin Assignment of the Bus Connector

- 9 pin, D-Sub, Female Connector

Pin	Description
1	Shield
3	Rx / TX + (B)
5	DGND
6	+5 vdc
8	Rx / TX - (A)

9.3 LED Indicators

Power LED (green)

OFF = PROFIBUS board not powered

ON = OK, PROFIBUS board powered

Activity (red)

OFF = No activity, no communication, Timeout

Blink every 1/2 second = Wait for Parameterization state, no PROFIBUS activity

Flashing rapidly = PROFIBUS communication is active = OK

Bus Error (red)

OFF = No bus error, OK
ON = Bus Error

Termination LED (green)

OFF = On board termination resistors not connected
ON = On board termination resistors connected

9.4 MicroFUSION Network Timeout Action Setup

Timeout Action/Indication

Definition of Timeout: loss of communication from the PROFIBUS master after the Connect module is in the Data Exchange state.

The “Network Timeout Action” is the action the controller will take when a timeout occurs. The three options are continuing at the last-known set point, change to use [SP 108] Network Timeout Setpoint, or stopping the output. The default is “Continue.”

When Network Timeout Action [SP 128] is set to Shutdown (1), and PROFIBUS communication ceases after the Connect module was in the Data Exchange state, the display will indicate “NTWK TIMEOUT” and if the controller was in RUN state, the controller state will transition into FAULT state shutting off the output.

9.5 Device Slots

Each input data contains 21 WORDs. The first word in each slot contains the MAC ID and status of the device connected to that slot. If there is no device connected with a MAC ID corresponding to a particular slot then both values will be zero. The status BYTE contains an abbreviated list of device states and faults. The following 20 WORDs are mapped to input parameters that are user configurable.

Item	Data Length	Description
MAC ID/STATUS	UINT	MAC ID and status of mapping slot
INPUT Parameter 1	UINT	First mapped input parameter
...	...	...
INPUT Parameter 20	UINT	Last mapped input parameter

BIT	15	14	13	12	11	10	9	8
MAC ID								
BIT	7	6	5	4	3	2	1	0
	UNDEF	UNDEF	CFG_FLT	CNT_FLT	CNT_TO	AUTO_CFG	SAVED_CFG	CNT_STATE

Status Item	Description	Details
CNT_STATE	Current state of connection with slave device	1 = Connected 0 = Unconnected

Status Item	Description	Details
SAVED_CFG	Configuration data present in networking config file	1 = Data Available 0 = No Saved Record
AUTO_CFG	Device's auto-configuration (Parameter 119 is enabled)	1 = Enabled 0 = Disabled
CNT_TO	Connection timeout occurred	1 = Active 0 = Inactive
CNT_FLT	Connection fault occurred	1 = Active 0 = Inactive
CFG_FLT	Configuration fault occurred	1 = Active 0 = Inactive

APPENDIX A: PARAMETERS

[CP 0] Gateway Feature Bits

Units:	N/A
Range:	0 - 65535
Binary Display Format:	xxxxxxxxxxx
Representation:	
BIT 15 - 8	UNDEFINED
BIT 7	DEV_TYPE_7
BIT 6	DEV_TYPE_6
BIT 5	DEV_TYPE_5
BIT 4	DEV_TYPE_4
BIT 3	DEV_TYPE_3
BIT 2	DEV_TYPE_2
BIT 1	DEV_TYPE_1
BIT 0	DEV_TYPE_0
Example: DEV_TYPE [7:0]	0x01 One Node Device 0x02 Three Node Device 0x04 Six Node Device 0x08 Ten Node Device

[CP 1] Gateway Node Count

Units:	N/A
Minimum:	3
Maximum:	10
Default:	N/A

[SP 2] Time Seconds

Units:	Seconds
Minimum:	0
Maximum:	60
Default:	N/A

Normally [SP 2,3,4,5,6,7] will only need to be set once. [SP 2,3,4,5,6,7] should only be changed if the controller changes time zones.

[SP 3] Time Minutes

Units:	Minutes
Minimum:	0
Maximum:	60
Default:	0

[SP 4] Time Hours

Units:	Hours
Minimum:	0
Maximum:	60
Default:	N/A

[SP 5] Time Day

Units:	Day
Minimum:	0
Maximum:	24
Default:	N/A

[SP 6] Time Month

Units:	Months
Minimum:	0
Maximum:	12
Default:	N/A

[SP 7] Time Year

Units:	Years
Minimum:	0
Maximum:	99
Default:	N/A

[MP 8] Gateway Status

Units:	N/A
Range:	0 - 65535
Binary Display Format:	xxxxxxxxxxx
Representation:	
BIT 15	MFG_ULK
BIT 14	INIT
BIT 13	SAFE_MODE
BIT 12	MEM_WRT
BIT 11	USER_ULK
BIT 10	Not Used
BIT 9	Not Used
BIT 8	Not Used
BIT 7	Not Used
BIT 6	Not Used
BIT 5	Not Used
BIT 4	Not Used
BIT 3	Not Used
BIT 2	Not Used
BIT 1	NET_CFG_F
BIT 0	SD_C

Definition Explanation:

MFG_ULK	Gateway in MFG Unlock Mode = 1
INIT	Gateway Initialized
SAFE_MODE	Gateway in Safe Mode = 1
MEM_WRT	Gateway Flash Write in Process
USER_ULK	Gateway in USER Unlock Mode = 1
SD_C	SD Card Present = 1
NET_CFG_F	Network Config File Present = 1

[MP 9] Gateway Faults	
Units:	N/A
Range:	0 - 65535
Binary Display Format:	xxxxxxxxxxx
Representation:	
BIT 15	Not Used
BIT 14	Not Used
BIT 13	Not Used
BIT 12	Not Used
BIT 11	Not Used
BIT 10	Not Used
BIT 9	Not Used
BIT 8	Not Used
BIT 7	Not Used
BIT 6	Not Used
BIT 5	Network Check Error
BIT 4	Fieldbus Communication Error
BIT 3	SD Card Read Error
BIT 2	Slave Config. Error
BIT 1	Power Link Time Out
BIT 0	Invalid Network Configuration

[CP 10] Fieldbus Type	
Units:	N/A
Range:	0 - 12
Representation:	
BIT 15	FB_TYPE_15
BIT 14	FB_TYPE_14
BIT 13	FB_TYPE_13
BIT 12	FB_TYPE_12
BIT 11	FB_TYPE_11
BIT 10	FB_TYPE_10
BIT 9	FB_TYPE_9
BIT 8	FB_TYPE_8
BIT 7	FB_TYPE_7
BIT 6	FB_TYPE_6
BIT 5	FB_TYPE_5
BIT 4	FB_TYPE_4
BIT 3	FB_TYPE_3
BIT 2	FB_TYPE_2
BIT 1	FB_TYPE_1
BIT 0	FB_TYPE_0

Example:	
FB_TYPE [15:0]	Undefined = 0 TCP/MODBUS = 1 EtherNet/IP = 2 Profinet = 3 EtherCAT = 4 DeviceNet = 5 PROFIBUS = 6 MODBUS = 7

[MP 11] Number of uFUSION Controllers	
Units:	N/A
Minimum:	0
Maximum:	10
Default:	N/A

[SP 12 - 19] Reserved	
Reserved	

[SP 20,21,22,23] IP Address 0.1.2.3	
Units:	N/A
Minimum:	0
Maximum:	255
Default:	0
IP Address = IP Address0.IP Address 1. IP Address 2. IP Address 3	

[SP 24 - 29] Reserved	
Reserved	

[SP 30] Data Logging Frequency	
Units:	10 ms
Minimum:	10
Maximum:	6000
Default:	1 second

[SP 31 - 39] Reserved	
Reserved	

[SP 40] Gateway PCB Serial Number High	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A
MFG_DATE YYYYMMDD	

[SP 41] Gateway PCB Serial Number Low	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 42] Gateway Lot Number High	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 43] Gateway Lot Number Low	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 44] Gateway MFG Date High	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 45] Gateway MFG Date Low	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 46] Gateway SW ID High	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 47] Gateway SW ID Low	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 48] Gateway SW Version Major High	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	

[SP 49] Gateway SW Version Major Low	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 50] Gateway Sw Version Minor High	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 51] Gateway SW Version Minor Low	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 52] Gateway Board Rev	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 53] Reserved	
Reserved	

[SP 54] Gateway Frame SN High	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 55] Gateway Frame SN Low	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 56] Gateway BootLoader Version Major	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 57] Gateway BootLoader Version Minor	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 58] Gateway Custom Config	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[SP 59] Gateway Daughter Board Rev.	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

BCD: Board Rev (A=1, B=2, C=3), Schematic Rev (1,2,3,N)

[SP 60 - 75] Gateway Tag Char 0 - 15	
Units:	N/A
Minimum:	0
Maximum:	90
Default:	N/A

[SP 76 - 1109] Reserved	
Reserved	

[XP 1100] Gateway Slot 1 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 1101] Gateway Slot 2 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 1102] Gateway Slot 3 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 1103] Gateway Slot 4 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 1104] Gateway Slot 5 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 1105] Gateway Slot 6 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 1106] Gateway Slot 7 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 1107] Gateway Slot 8 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 1108] Gateway Slot 9 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

[XP 1109] Gateway Slot 10 Status	
Units:	N/A
Minimum:	0
Maximum:	65535
Default:	N/A

APPENDIX B: WORD MAPPING

WORD	Description	μFusion Parameter
1	Status	
2	Device Status/MAC ID 1	
3	Fieldbus Setpoint (MAC ID 1)	100
4	Digital Run Enable (MAC ID 1)	129
5	Setpoint Selected (MAC ID 1)	200
6	Inhibit Alarm Status (MAC ID 1)	210
7	Line Frequency (MAC ID 1)	219
8	Line Voltage A (MAC ID 1)	220
9	Load Voltage A (MAC ID 1)	221
10	Load Current A (MAC ID 1)	222
11	Heatsink Temp A (MAC ID 1)	224
12	Load Power High WORD (MAC ID 1)	245
13	Load Power Low WORD (MAC ID 1)	246
14	Controller State (MAC ID 1)	248
15	Output Duty Cycle (MAC ID 1)	249
16	Setpoint Reference High WORD (MAC ID 1)	250
17	Setpoint Reference Low WORD (MAC ID 1)	251
18	Feedback High WORD (MAC ID 1)	252
19	Feedback Low WORD (MAC ID 1)	253
20	Warning Alarm (MAC ID 1)	256
21	AC Line Status (MAC ID 1)	342
22	AC Error Latch (MAC ID 1)	345
23	Device Status/MAC ID 2	
24	Fieldbus Setpoint (MAC ID 2)	100
25	Digital Run Enable (MAC ID 2)	129
26	Setpoint Selected (MAC ID 2)	200
27	Inhibit Alarm Status (MAC ID 2)	210
28	Line Frequency (MAC ID 2)	219
29	Line Voltage A (MAC ID 2)	220
30	Load Voltage A (MAC ID 2)	221
31	Load Current A (MAC ID 2)	222
32	Heatsink Temp A (MAC ID 2)	224
33	Load Power High WORD (MAC ID 2)	245
34	Load Power Low WORD (MAC ID 2)	246
35	Controller State (MAC ID 2)	248
36	Output Duty Cycle (MAC ID 2)	249
37	Setpoint Reference High WORD (MAC ID 2)	250
38	Setpoint Reference Low WORD (MAC ID 2)	251
39	Feedback High WORD (MAC ID 2)	252
40	Feedback Low WORD (MAC ID 2)	253

41	Warning Alarm (MAC ID 2)	256
42	AC Line Status (MAC ID 2)	342
43	AC Error Latch (MAC ID 2)	345
44	Device Status/MAC ID 3	
45	Fieldbus Setpoint (MAC ID 3)	100
46	Digital Run Enable (MAC ID 3)	129
47	Setpoint Selected (MAC ID 3)	200
48	Inhibit Alarm Status (MAC ID 3)	210
49	Line Frequency (MAC ID 3)	219
50	Line Voltage A (MAC ID 3)	220
51	Load Voltage A (MAC ID 3)	221
52	Load Current A (MAC ID 3)	222
53	Heatsink Temp A (MAC ID 3)	224
54	Load Power High WORD (MAC ID 3)	245
55	Load Power Low WORD (MAC ID 3)	246
56	Controller State (MAC ID 3)	248
57	Output Duty Cycle (MAC ID 3)	249
58	Setpoint Reference High WORD (MAC ID 3)	250
59	Setpoint Reference Low WORD (MAC ID 3)	251
60	Feedback High WORD (MAC ID 3)	252
61	Feedback Low WORD (MAC ID 3)	253
62	Warning Alarm (MAC ID 3)	256
63	AC Line Status (MAC ID 3)	342
64	AC Error Latch (MAC ID 3)	345
65	Device Status/MAC ID 4	
66	Fieldbus Setpoint (MAC ID 4)	100
67	Digital Run Enable (MAC ID 4)	129
68	Setpoint Selected (MAC ID 4)	200
69	Inhibit Alarm Status (MAC ID 4)	210
70	Line Frequency (MAC ID 4)	219
71	Line Voltage A (MAC ID 4)	220
72	Load Voltage A (MAC ID 4)	221
73	Load Current A (MAC ID 4)	222
74	Heatsink Temp A (MAC ID 4)	224
75	Load Power High WORD (MAC ID 4)	245
76	Load Power Low WORD (MAC ID 4)	246
77	Controller State (MAC ID 4)	248
78	Output Duty Cycle (MAC ID 4)	249
79	Setpoint Reference High WORD (MAC ID 4)	250
80	Setpoint Reference Low WORD (MAC ID 4)	251
81	Feedback High WORD (MAC ID 4)	252
82	Feedback Low WORD (MAC ID 4)	253
83	Warning Alarm (MAC ID 4)	256
84	AC Line Status (MAC ID 4)	342
85	AC Error Latch (MAC ID 4)	345
86	Device Status/MAC ID 5	
87	Fieldbus Setpoint (MAC ID 5)	100

88	Digital Run Enable (MAC ID 5)	129
89	Setpoint Selected (MAC ID 5)	200
90	Inhibit Alarm Status (MAC ID 5)	210
91	Line Frequency (MAC ID 5)	219
92	Line Voltage A (MAC ID 5)	220
93	Load Voltage A (MAC ID 5)	221
94	Load Current A (MAC ID 5)	222
95	Heatsink Temp A (MAC ID 5)	224
96	Load Power High WORD (MAC ID 5)	245
97	Load Power Low WORD (MAC ID 5)	246
98	Controller State (MAC ID 5)	248
99	Output Duty Cycle (MAC ID 5)	249
100	Setpoint Reference High WORD (MAC ID 5)	250
101	Setpoint Reference Low WORD (MAC ID 5)	251
102	Feedback High WORD (MAC ID 5)	252
103	Feedback Low WORD (MAC ID 5)	253
104	Warning Alarm (MAC ID 5)	256
105	AC Line Status (MAC ID 5)	342
106	AC Error Latch (MAC ID 5)	345
107	Device Status/MAC ID 6	
108	Fieldbus Setpoint (MAC ID 6)	100
109	Digital Run Enable (MAC ID 6)	129
110	Setpoint Selected (MAC ID 6)	200
111	Inhibit Alarm Status (MAC ID 6)	210
112	Line Frequency (MAC ID 6)	219
113	Line Voltage A (MAC ID 6)	220
114	Load Voltage A (MAC ID 6)	221
115	Load Current A (MAC ID 6)	222
116	Heatsink Temp A (MAC ID 6)	224
117	Load Power High WORD (MAC ID 6)	245
118	Load Power Low WORD (MAC ID 6)	246
119	Controller State (MAC ID 6)	248
120	Output Duty Cycle (MAC ID 6)	249
121	Setpoint Reference High WORD (MAC ID 6)	250
122	Setpoint Reference Low WORD (MAC ID 6)	251
123	Feedback High WORD (MAC ID 6)	252
124	Feedback Low WORD (MAC ID 6)	253
125	Warning Alarm (MAC ID 6)	256
126	AC Line Status (MAC ID 6)	342
127	AC Error Latch (MAC ID 6)	345
128	Device Status/MAC ID 7	
129	Fieldbus Setpoint (MAC ID 7)	100
130	Digital Run Enable (MAC ID 7)	129
131	Setpoint Selected (MAC ID 7)	200
132	Inhibit Alarm Status (MAC ID 7)	210
133	Line Frequency (MAC ID 7)	219
134	Line Voltage A (MAC ID 7)	220

135	Load Voltage A (MAC ID 7)	221
136	Load Current A (MAC ID 7)	222
137	Heatsink Temp A (MAC ID 7)	224
138	Load Power High WORD (MAC ID 7)	245
139	Load Power Low WORD (MAC ID 7)	246
140	Controller State (MAC ID 7)	248
141	Output Duty Cycle (MAC ID 7)	249
142	Setpoint Reference High WORD (MAC ID 7)	250
143	Setpoint Reference Low WORD (MAC ID 7)	251
144	Feedback High WORD (MAC ID 7)	252
145	Feedback Low WORD (MAC ID 7)	253
146	Warning Alarm (MAC ID 7)	256
147	AC Line Status (MAC ID 7)	342
148	AC Error Latch (MAC ID 7)	345
149	Device Status/MAC ID 8	
150	Fieldbus Setpoint (MAC ID 8)	100
151	Digital Run Enable (MAC ID 8)	129
152	Setpoint Selected (MAC ID 8)	200
153	Inhibit Alarm Status (MAC ID 8)	210
154	Line Frequency (MAC ID 8)	219
155	Line Voltage A (MAC ID 8)	220
156	Load Voltage A (MAC ID 8)	221
157	Load Current A (MAC ID 8)	222
158	Heatsink Temp A (MAC ID 8)	224
159	Load Power High WORD (MAC ID 8)	245
160	Load Power Low WORD (MAC ID 8)	246
161	Controller State (MAC ID 8)	248
162	Output Duty Cycle (MAC ID 8)	249
163	Setpoint Reference High WORD (MAC ID 8)	250
164	Setpoint Reference Low WORD (MAC ID 8)	251
165	Feedback High WORD (MAC ID 8)	252
166	Feedback Low WORD (MAC ID 8)	253
167	Warning Alarm (MAC ID 8)	256
168	AC Line Status (MAC ID 8)	342
169	AC Error Latch (MAC ID 8)	345
170	Device Status/MAC ID 9	
171	Fieldbus Setpoint (MAC ID 9)	100
172	Digital Run Enable (MAC ID 9)	129
173	Setpoint Selected (MAC ID 9)	200
174	Inhibit Alarm Status (MAC ID 9)	210
175	Line Frequency (MAC ID 9)	219
176	Line Voltage A (MAC ID 9)	220
177	Load Voltage A (MAC ID 9)	221
178	Load Current A (MAC ID 9)	222
179	Heatsink Temp A (MAC ID 9)	224
180	Load Power High WORD (MAC ID 9)	245
181	Load Power Low WORD (MAC ID 9)	246

182	Controller State (MAC ID 9)	248
183	Output Duty Cycle (MAC ID 9)	249
184	Setpoint Reference High WORD (MAC ID 9)	250
185	Setpoint Reference Low WORD (MAC ID 9)	251
186	Feedback High WORD (MAC ID 9)	252
187	Feedback Low WORD (MAC ID 9)	253
188	Warning Alarm (MAC ID 9)	256
189	AC Line Status (MAC ID 9)	342
190	AC Error Latch (MAC ID 9)	345
191	Device Status/MAC ID 10	
192	Fieldbus Setpoint (MAC ID 10)	100
193	Digital Run Enable (MAC ID 10)	129
194	Setpoint Selected (MAC ID 10)	200
195	Inhibit Alarm Status (MAC ID 10)	210
196	Line Frequency (MAC ID 10)	219
197	Line Voltage A (MAC ID 10)	220
198	Load Voltage A (MAC ID 10)	221
199	Load Current A (MAC ID 10)	222
200	Heatsink Temp A (MAC ID 10)	224
201	Load Power High WORD (MAC ID 10)	245
202	Load Power Low WORD (MAC ID 10)	246
203	Controller State (MAC ID 10)	248
204	Output Duty Cycle (MAC ID 10)	249
205	Setpoint Reference High WORD (MAC ID 10)	250
206	Setpoint Reference Low WORD (MAC ID 10)	251
207	Feedback High WORD (MAC ID 10)	252
208	Feedback Low WORD (MAC ID 10)	253
209	Warning Alarm (MAC ID 10)	256
210	AC Line Status (MAC ID 10)	342
211	AC Error Latch (MAC ID 10)	345

APPENDIX C: MODEL NUMBERS

FG - X - - -

Communication

L = Data Logger Only

E = Modbus TCP

C = EtherCAT

I = EtherNet / IP

N = PROFINET

S = PROFIBUS

Contact Factory for additional fieldbus interfaces

Nodes

03 - Communicate with up to three nodes

06 - Communicate with up to six nodes

10 - Communicate with up to ten nodes

Configuration Data

Supplied by Control Concepts, Inc. Default is 0000 if not supplied by CCI.

Connect Gateway Module Specifications

The following specifications are applicable to all Connect Gateway Modules with optional communication cards.

Environmental	
Power Consumption	200 mA at 25 Vdc - Powered from CCI Link™
Surrounding Air Operating Temperature	32F [0C] - 122F [50C]
Humidity	20% to 90% RH Non-Condensing
Rated Operating Altitude	Up to 6000 Ft [1750 m]
Contaminates	ROHS Compliant, CE Pollution Degree 2
Storage Temperature	-4 to 176F [-20 to 80C]
Mounting Options	Panel Mount or Din Rail Mountable