9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

www.aimco-global.com

Mitsubishi PLC CC-Link IE Field Network Configuration with AcraDyne Gen IV Controller

Author: Joshua Wiens

Date: September 25th, 2018

Introduction

AcraDyne Gen IV Controllers are compatible with CC-Link IE Field communication. As such, they can be implemented as an Intelligent Device Station on a CC-Link IE Field Network and be supervised by a Master Station for error proofing and data collection. This document is intended to explain the steps involved in configuring a Mitsubishi Melsec iQ-R Series PLC for communication with an AcraDyne Gen IV Controller via CC-Link IE Field Network, using MELSOFT GX Works3 software.

Equipment/Software

- CC-Link IE Field compatible controller from AIMCO
  - AcraDyne Gen IV Controller
  - Anybus CC-Link IE Field Module (**AB6609**)
- Mitsubishi Melsec iQ-R Series PLC (Base Unit, Power Supply, CPU)
- Mitsubishi R04ENCPU CC-Link IE Master Module
- GX Works3 Software
- USB PLC programming cable
- Ethernet cable(s)

9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

www.aimco-global.com

Initial Setup

- Insert the Anybus CC-Link IE Field Module into the Gen IV Controller
- Connect the PC to the PLC's USB programming port
- Connect P1 of the CC-Link IE Field PLC Module (NOT labeled CPU) to P2 of the Anybus CC-Link IE Field Module in the Gen IV Controller
    - For any additional stations required, connect P1 of the module in the first controller to P2 of subsequent controllers to set up a line network
- Power on all systems

Configuring the Gen IV Controller

- The CC-Link IE Field connection parameters for the Gen IV Controller depend on the assigned Anybus Inputs and Outputs. **Therefore, the Anybus Inputs and Outputs should be configured prior to configuring the connection parameters**
    - Take note of how many bytes or words (2 bytes) are configured for the Anybus Inputs and Outputs for each controller used in the network, as these numbers will be necessary for configuration. The default values are shown below with 7 words of Input data and 7 words of Output data

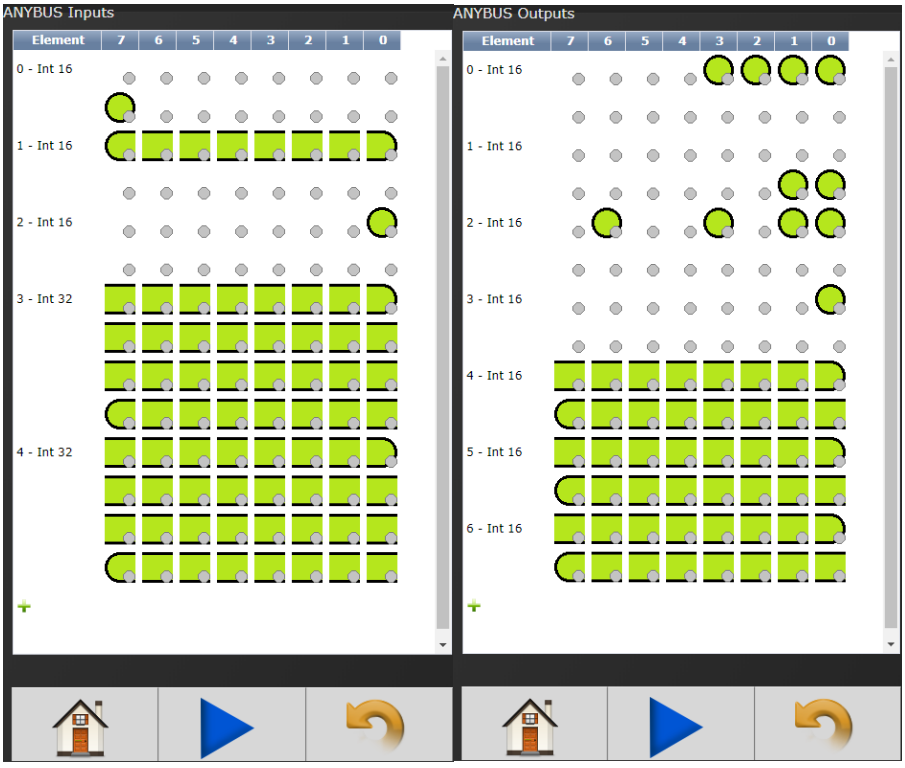


Figure 1. Default ANYBUS Input and Output Values (See Additional Information at end of document for details)

9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

www.aimco-global.com

- From the Home screen on the Gen IV Controller, navigate to the ANYBUS Configuration screen (Controller >> Communication Interfaces >> ANYBUS)
- Set the station number to 1 if this is the first controller in the network, otherwise set it to whichever number station it is in the network. Click the green check mark to save the settings

Configuring the PLC

- Open GX Works3 and create a new project (Project >> New). Example configuration:
  - Series = RCPU
  - Type = R04EN
  - Program Language = Ladder

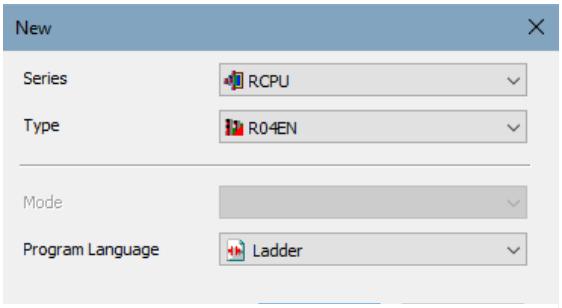
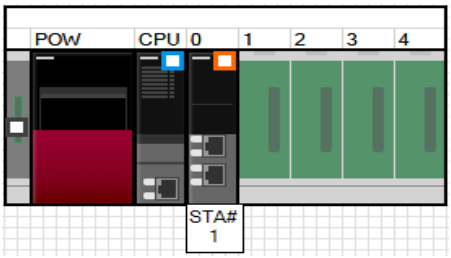


Figure 2. GX Works3 New Project Window

- From the Navigation panel, select Module Configuration and click OK
  - From the Element Selection panel, click the “POU List” tab
  - Select and drag (iQ-R Series >> Main Base >> R35B) into the Module Configuration area
  - Drag the R04ENCPU into the CPU slot (it should already be in the Module Configuration area)
  - From the Element Selection panel, select and drag (iQ-R Series >> Power Supply >> R61P) into the POW slot
  - From the Element Selection panel, select and drag (iQ-R Series >> CPU Extension >> _RJ71EN71(CCIEF)) into the 0 slot
  - Fix Parameters (Edit >> Parameter >> Fix) and click Yes to continue



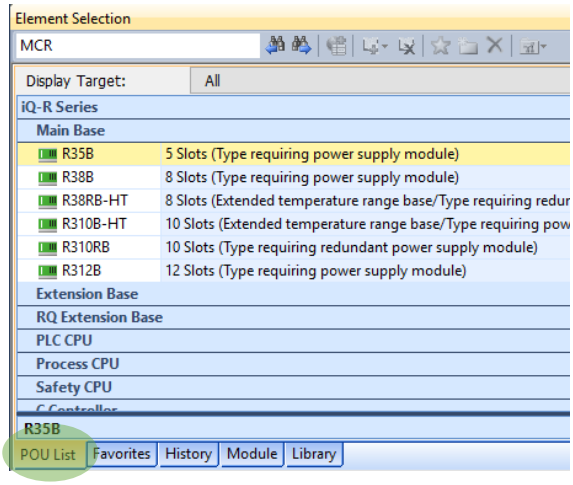


Figure 3. Completed Module Configuration

9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

www.aimco-global.com

- From the Navigation Panel, select (Parameter >> Module Information >> 0000:_RJ71EN71(CCIEF) >> Module Parameter (CC-Link IE Field))
    - From the Item List, click “Required Settings”. Change “Station Type” to “Master Station” and click Yes
    - From the Item List, click “Basic Settings”
        - Edit “Network Configuration Settings” and click Yes. Click “Detect Now”
            - If the station(s) in your network does not come up, ensure it is connected properly. If it is, you may need to manually configure this screen instead of using the “Detect Now” button
        - Edit the settings. For station 1, the following values are used:
            - RX/RY Start = 0100, End = 010F
            - RWw/RWr Start = 0000, End = 0007
        - Click “Close with Reflecting the Setting”

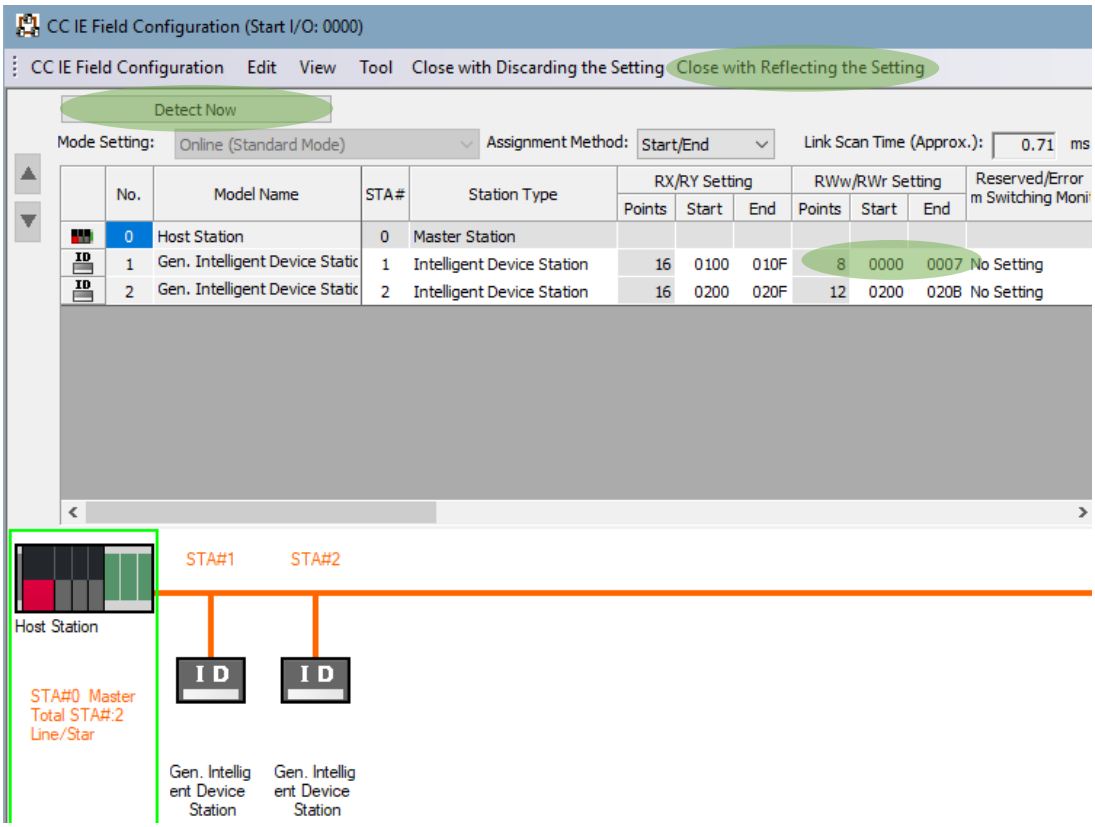


Figure 4. Network Configuration Settings (Station 1 is for default Anybus Input/Output values, Station 2 shows settings for a controller with an additional 4 words of Anybus Inputs/Outputs)

9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

www.aimco-global.com

The number of Points represents the maximum number of Input and/or Output points the station requires. In this example case, station 1 is configured with 7 Input and Output words, so we allocate 8 points for the RWw/Rwr Setting because it must have 4-point granularity.

- From the Navigation Panel, select (Parameter >> Module Information >> 0000:_RJ71EN71(CCIEF) >> Module Parameter (CC-Link IE Field))
    - From the Item List, click “Basic Settings”
        - Edit “Refresh Settings”. The following is what is used for this example:

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB									
-	SW									
1	RWr	8	00000	00007		Specify Devi	W	8	00000	00007
2	RWw	8	00000	00007		Specify Devi	W	8	00100	00107
3	RWr	12	00200	0020B		Specify Devi	W	12	00200	0020B
4	RWw	12	00200	0020B		Specify Devi	W	12	00300	0030B

Figure 5. Refresh Settings (Station 1 corresponds to No. 1 and No 2, Station 2 corresponds to No. 3 and No. 4)

In the figure above, we specify where the Input and Output data shall reside in the network memory. RWr corresponds to the Anybus Output data, and RWw corresponds to the Anybus Input data. On the CPU side, we set RWr with a Start address of 0 and RWw with a Start address of 100, and we do the same for the optional second station but with a hexadecimal offset of 200.

Programming the PLC

- From the main window bar, select (Online >> Write to PLC)
    - Click “Select All”
    - Click “Execute” and say Yes/OK to any subsequent dialogs
    - Close the Online Data Operation window
    - Reset or power-cycle the PLC if necessary

9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

www.aimco-global.com

Verifying Communication

- On the Gen IV Controller, navigate to (Controller >> Communication Interfaces >> ANYBUS). The screen should show that Anybus is in the PROCESS ACTIVE state

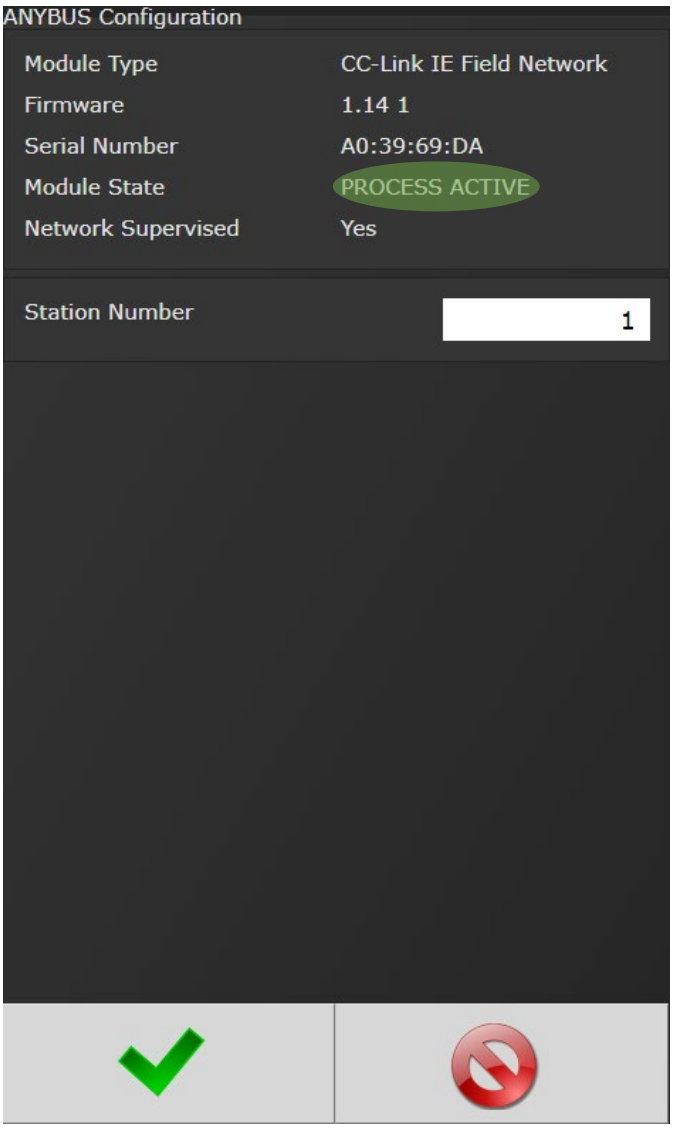


Figure 6. Anybus Configuration showing PROCESS ACTIVE Module State

If the state is not in PROCESS ACTIVE, try setting the Station Number to a temporary value (different than what is currently configured), click the green check-mark, then set it back to the initially configured value. Allow time for the Anybus module to reset (about 20 seconds). Resetting the PLC may also help. If both the PLC and the network is configured properly to match the Gen IV Controller Anybus Input/Output sizes, it should be in PROCESS ACTIVE.

9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

www.aimco-global.com

Verifying Output Data

- Navigate to the Anybus Outputs screen and ensure that outputs are occurring, in order to verify they are being sent through the network. If any changes to the configuration are made, you may need to reset the network and allow for reconfiguration
- From the main window bar, select (Online >> Monitor >> Device/Buffer Memory Batch Monitor)
- In the “Device Name” field, type “W0” and click “Start Monitoring”

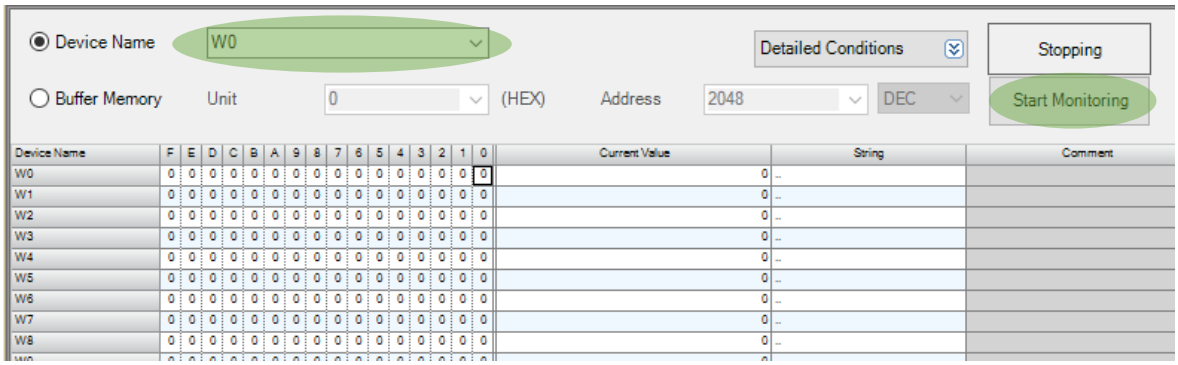


Figure 7. Device/Buffer Memory Batch Monitor

Outputs that are active from the Gen IV Controller configured as Station 1 should appear in the memory from W0 to W7. Example:

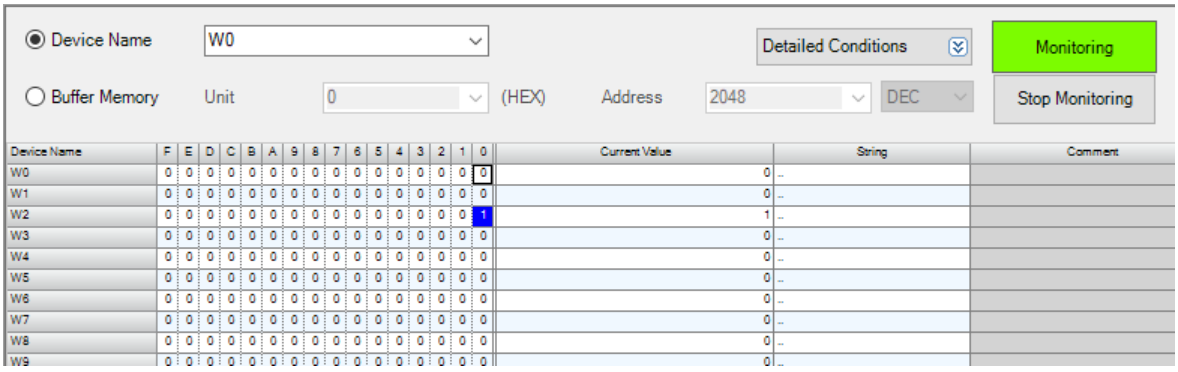


Figure 8. Device/Buffer Memory Batch Monitor showing Output data from Gen IV Controller to PLC

9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

www.aimco-global.com

Verifying Input Data

- From the Device/Buffer Memory Batch Monitor, type “W100” in the “Device Name” field and click “Start Monitoring”. Double-click W100.0 and W106.F as shown in the figure below:

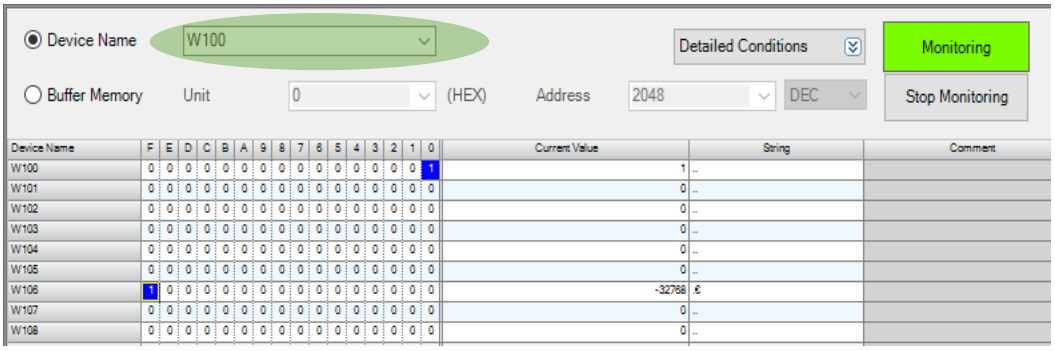


Figure 9. Device/Buffer Memory Batch Monitor with Input bits toggled

- Navigate to the Anybus Inputs screen on the Gen IV controller and verify the inputs:

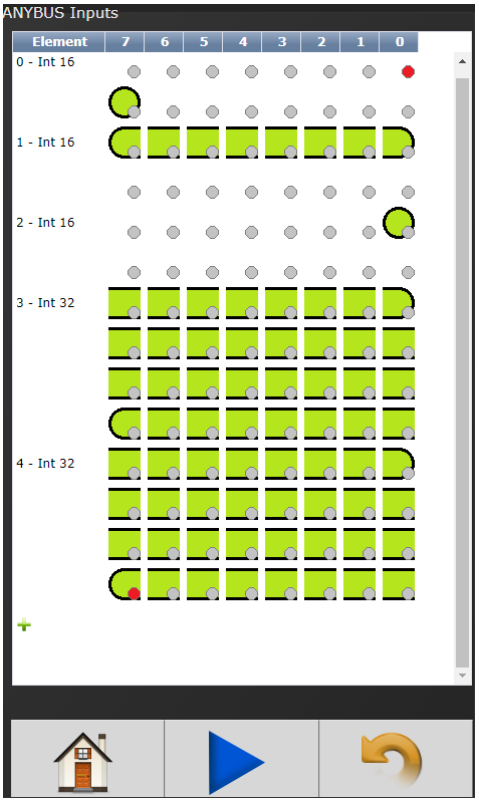


Figure 10. Anybus Inputs showing successful communication from PLC to Gen IV Controller

9948 SE Oak Street

Portland, OR 97216

TEL: 800.852.1368

FAX: 503.262.3410

www.aimco-global.com

Additional Information

ANYBUS Default Inputs							
Element	**Bit**						
	7	**6**	**5**	**4**	**3**	**2**	**1**
0 - Int 16							
	Stop						
1 - Int 16	Select Job						
2 - Int 16							Reset Job
3 - Int 32	Set ID						
4 - Int 32	Set Date/Time						

ANYBUS Default Outputs							
Element	**Bit**						
	7	**6**	**5**	**4**	**3**	**2**	**1**
0 - Int 16				Angle High	Angle Low	Torque High	Torque Low
1 - Int 16							
						Error (N.C)	Tool Enabled
2 - Int 16		External Controlled		Job Complete		NOK	OK
3 - Int 16							OK
4 - Int 16	Torque (x10)						
5 - Int 16	Angle						
6 - Int 16	Angle						

Figure 11. Anybus Default Inputs/Outputs