RFID JOURNAL

DIGITAL SUMMIT

MAY 10 - 13, 2021

Linking RFID to PLCs to Automate Manufacturing

Kevin Berisso, Ph.D.

Director, University of Memphis AutoID Lab

In the beginning all was darkness…

In the beginning all was darkness...

ZEBRA

The Vorlons have a saying: RFID to PLC comms are a three-edged sword. Serial. Ethernet. And now Direct Comms...

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controlglobal.com/articles/2005/455/

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Fieldbus

Use RFID to improve your automation systems

Senior Technical Editor Dan Hebert, PE, addresses RFID technology and explains how RFID systems are being Inked to process automation systems to deliver process improvements.

Aug 22, 2005

By Dan Hebert, Senior Technical Editor, PE

RFID TAGGING is all the rage thanks to supplier mandates from Wal-Mart and the Department of Defense. Most RFID systems are simply implemented at the back end of processes directly before shipment and have no effect on process automation systems.

Manufacturing | RFID JOURNAL

rfidjournal.com/tag/manufacturing

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RFID technology is being deployed at stores and warehouses around the world to improve item-level in ...

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Manufacturing

NFC with Blockchain Tracks COVID-19 Test Kits, PPEs

Sep 11, 2020 by Claire Swedberg

SUKU and Smartrac have teamed up to build a solution for the authentication and test result verification of goods being manufactured, shipped and purchased around the world, to help combat the COVID-19 pandemic.

RFID News Roundu

Sep 10, 2020 by Rich Handley

Xerafy adds new flexible RFID inlay; Litmus, Oden Technologies offer IIoT smart manufacturing solution; CAEN RFID unveils embedded RFID reader module; Confidex provides washable returnable item tags, durable on-metal tags; Zyter announces IoT connectivity platform for schools.

IoT Enables Pump Health Monitoring

Sep 8, 2020 by Claire Swedberg

Wilden's Safeguard system was released this past spring, using sub-GHz RF transmissions and cellular connectivity to capture cycle counts and leak events on air-operated diaphragm pumps, managed by cloud-based software, to prevent or detect failures.

Rafik Group Automates Manual Processes, Eliminates Errors via RFID

Aug 28, 2020 by Edson Perin

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Rafik Proc

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The company, which produces 60,000 garments a month and sells them at its

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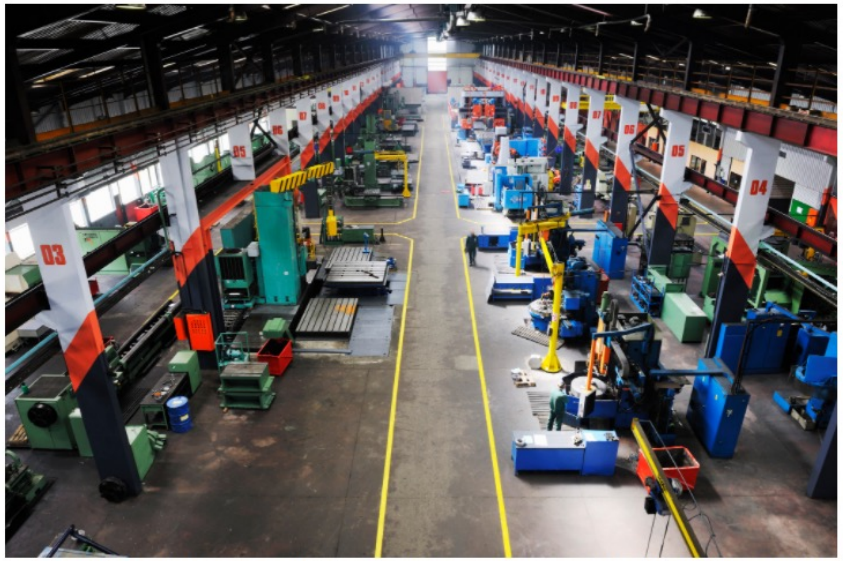
Global Leader Uses RFID To Improve Manufacturing Process



A global leader with increasing demand for their products entrusted Metalcraft and CDO Technologies to collaborate on a solution to increase traceability and accuracy. The goal was to improve efficiency and profitability through automating operations, using Radio Frequency Identification (RFID).

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nd explains how RFID ocess improvements.

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COVID-19 — Impact on manufacturing sector
53%
Anticipate a change in operations due to COVID-19
35%
Face significant supply chain disruptions
78%
Anticipate a financial impact as a result of the crisis
51%
Have an emergency response at their company
Source: National Association of Manufacturers 3/2020

DC VELOCITY

::COVID-19 COVERAGE:: INDUSTRY PRESS ROOM ABOUT CONTACT MEDIA FILE CREATE ACCOUNT SIGN IN FREE NEWSLETTERS

MAGAZINE TRANSPORTATION MATERIAL HANDLING TECHNOLOGY LIFT TRUCKS PODCAST ETC. DCV-TV

American Logistics Aid Network
FREE ACCESS
COVID-19
Supply Chain Intelligence Center

Logistics automation providers add social distancing features to robots, software

As states consider reopening, technology keeps warehouse workers separated to handle booming e-commerce orders.

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I think ... therefore I might be a material handling robot: interview with Ted Stinson

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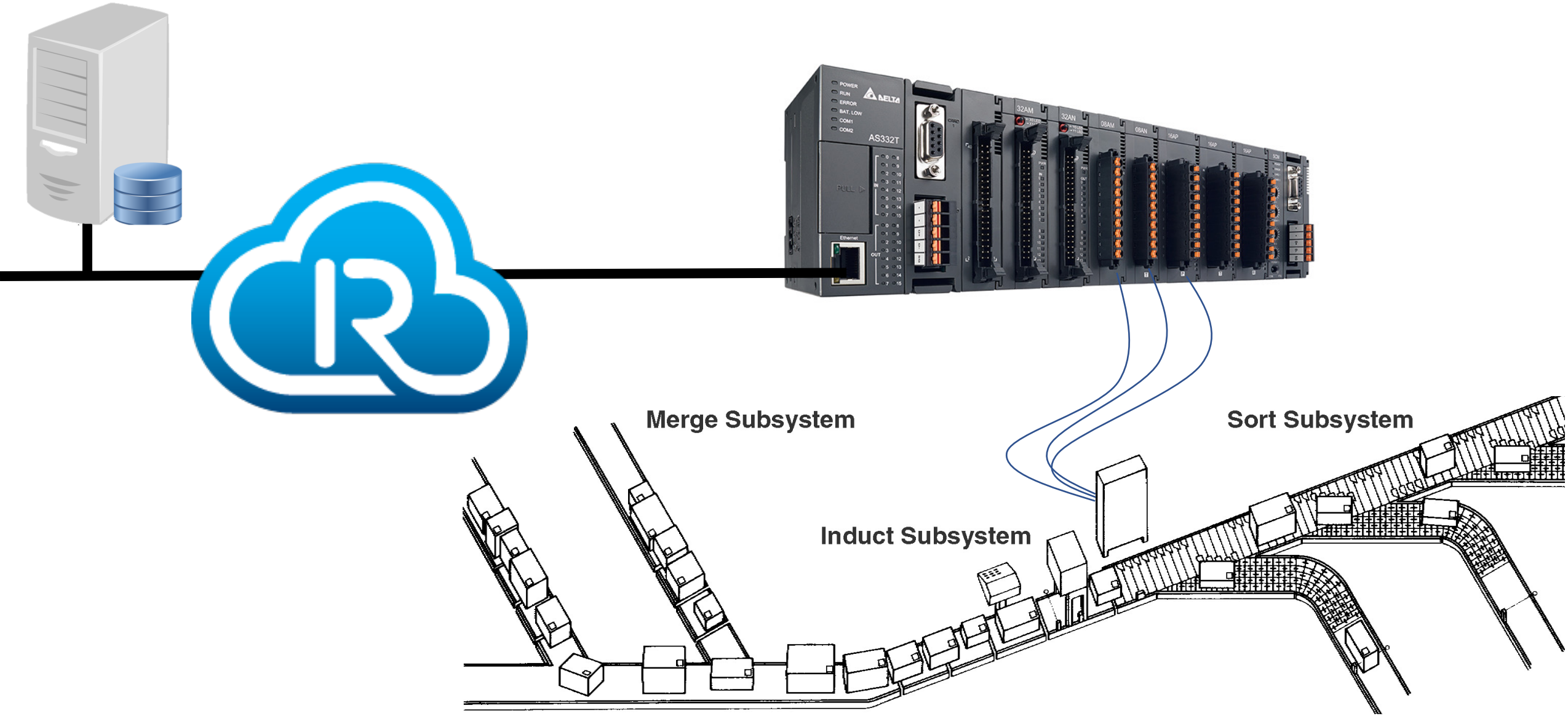
POWER
RUN
ERROR
BAT. LOW
COM1
COM2
AS332T
Ethernet
32AM
32AN
08AM
08AN
16AP
Merge Subsystem
Induct Subsystem
Sort Subsystem

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SICK

SIEMENS

TURCK

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CSL CONVERGENCE SYSTEMS LIMITED

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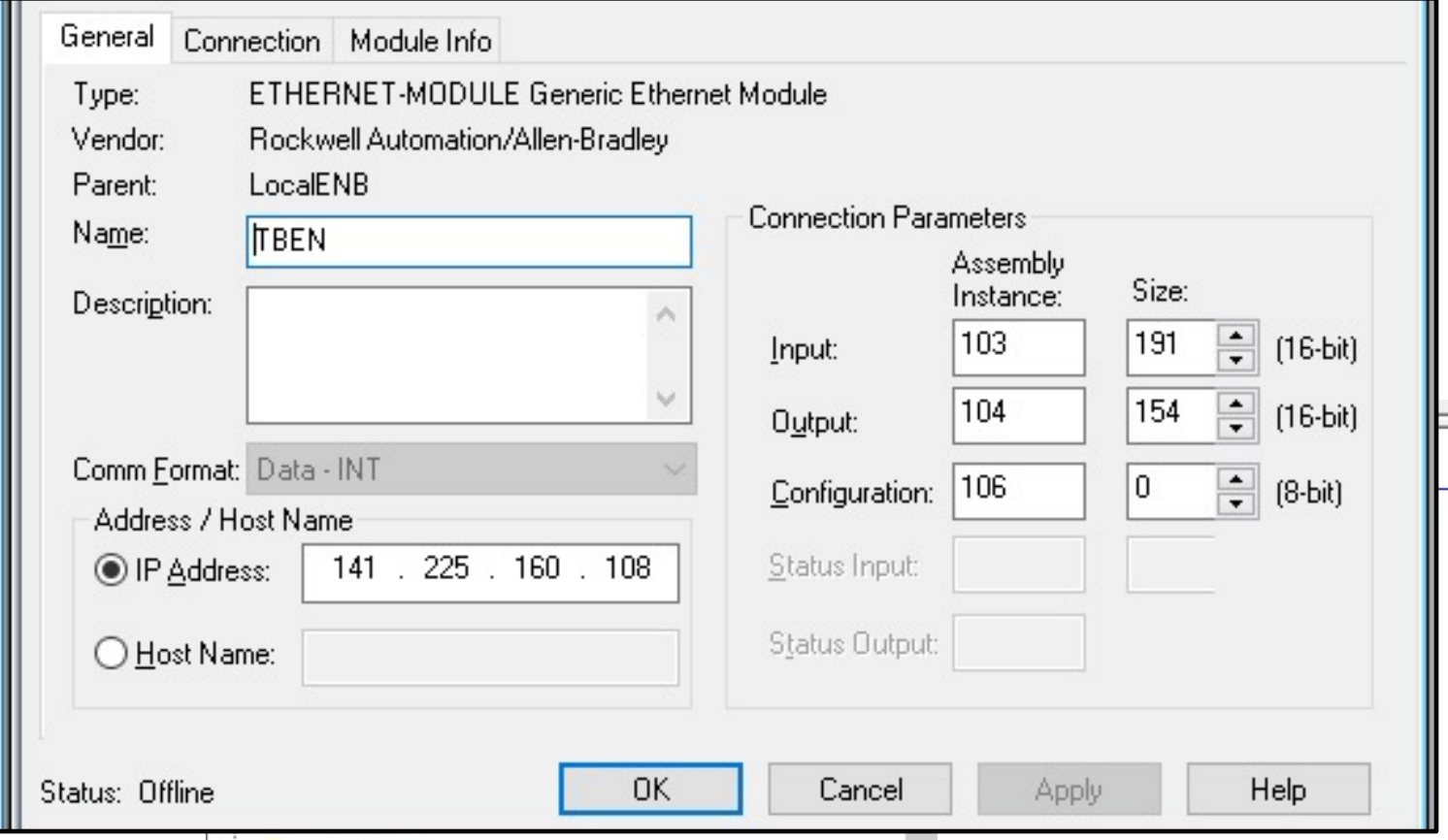
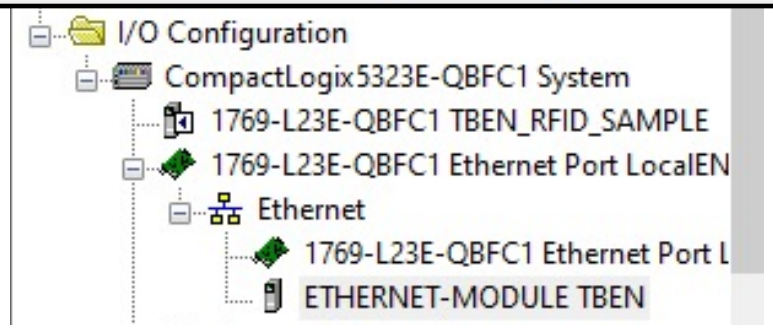
TURCK

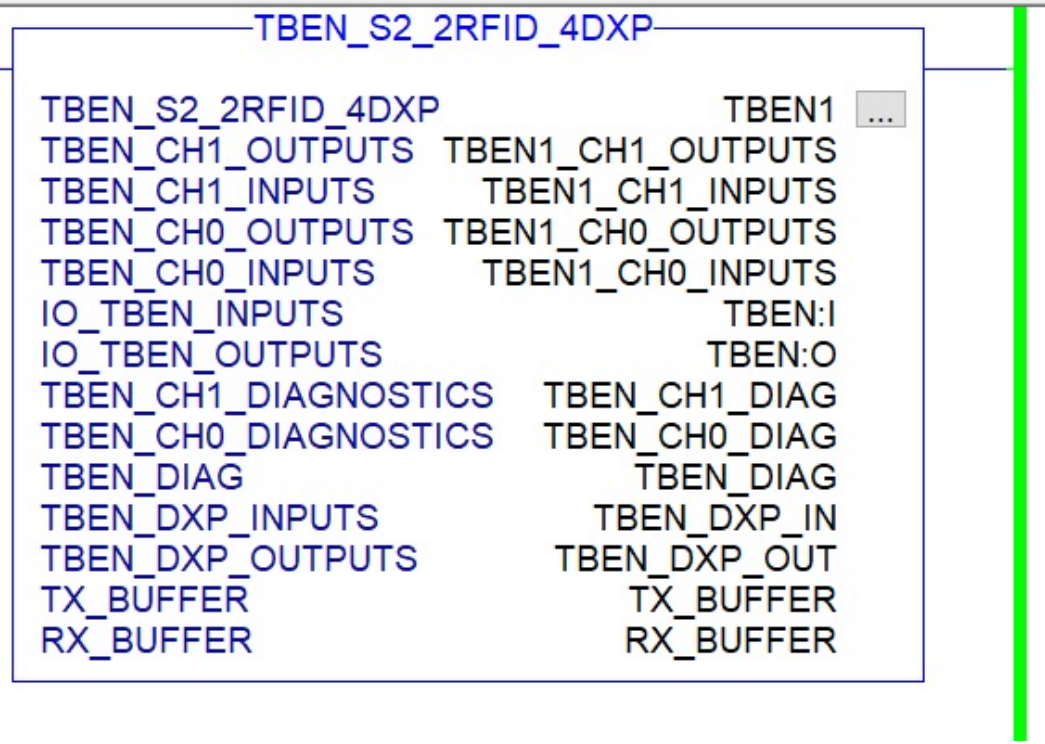
TURCK

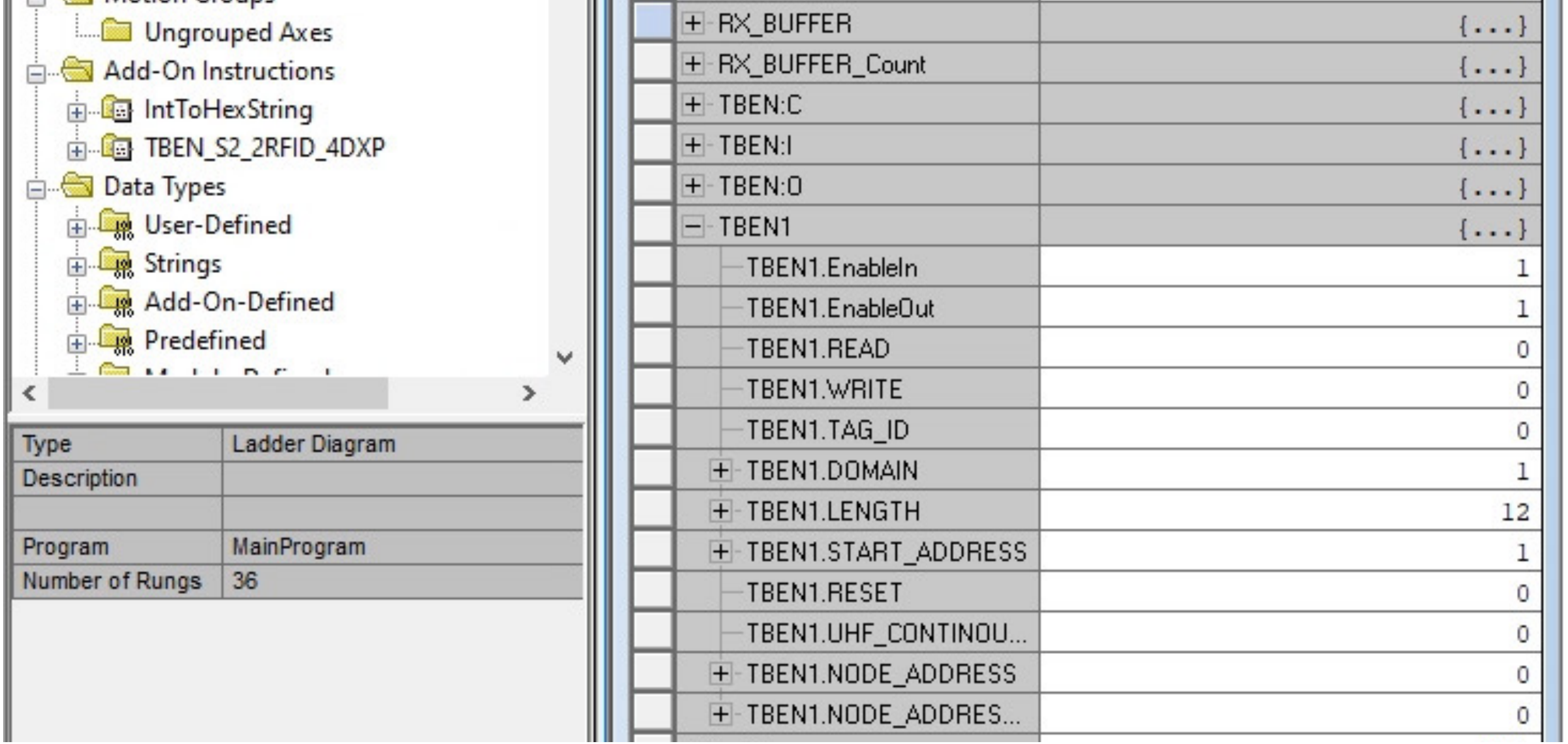
Name	Value
RX_BUFFER	{...}
RX_BUFFER[0]	24
RX_BUFFER[1]	1
RX_BUFFER[2]	-30
UFFER[3]	0
UFFER[4]	-112
UFFER[5]	55
UFFER[6]	-119
UFFER[7]	2
UFFER[8]	2
UFFER[9]	24
UFFER[10]	8
UFFER[11]	0
UFFER[12]	-58
UFFER[13]	-14
UFFER[14]	24
UFFER[15]	-2
UFFER[16]	3
UFFER[17]	0
UFFER[18]	-45
UFFER[19]	-17

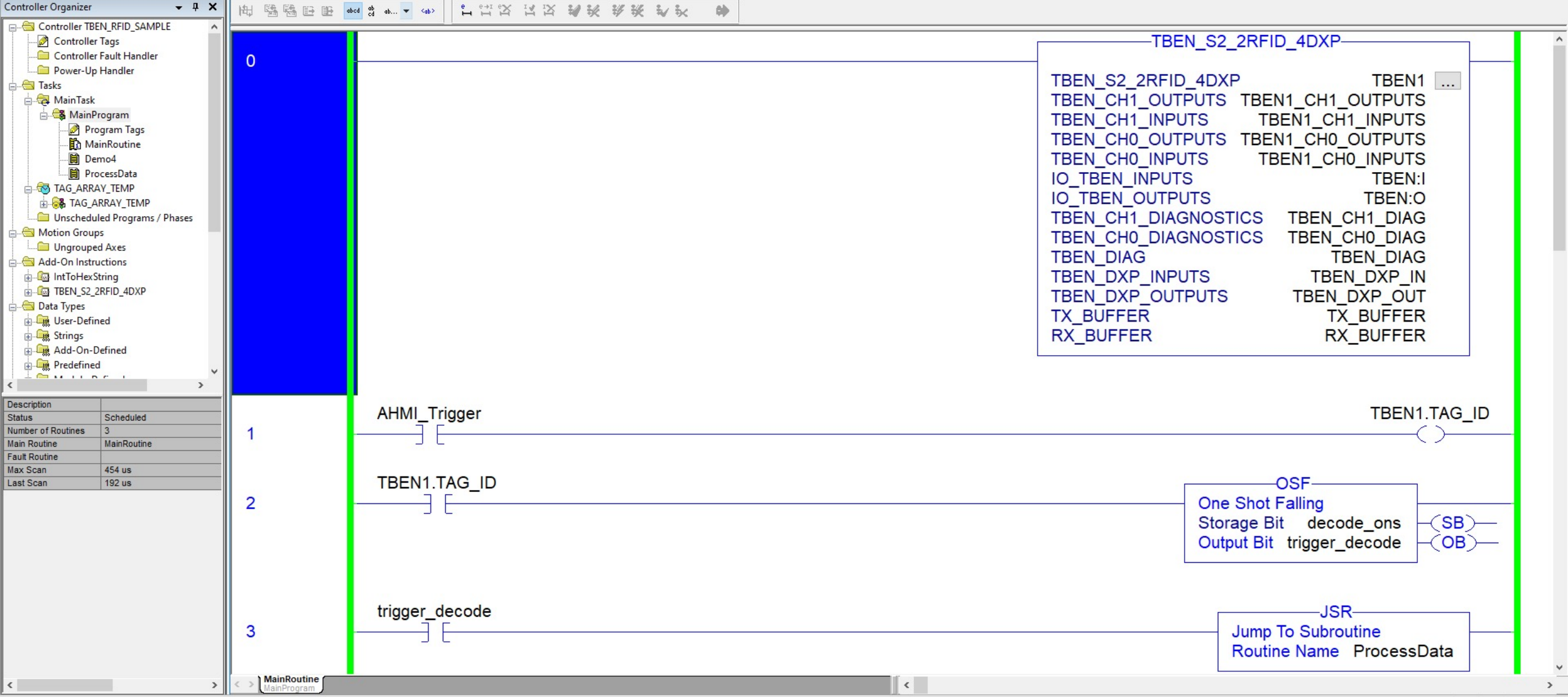
TBEN1	{...}
TBEN1.EnableIn	1
TBEN1.EnableOut	1
TBEN1.READ	0
TBEN1.WRITE	0
TBEN1.TAG_ID	0
TBEN1.DOMAIN	1
TBEN1.LENGTH	12
TBEN1.START_ADDRESS	1
TBEN1.RESET	0
TBEN1.UHF_CONTINOUS_MODE	0
TBEN1.NODE_ADDRESS	0
TBEN1.NODE_ADDRESS_TP	0
trigger	0

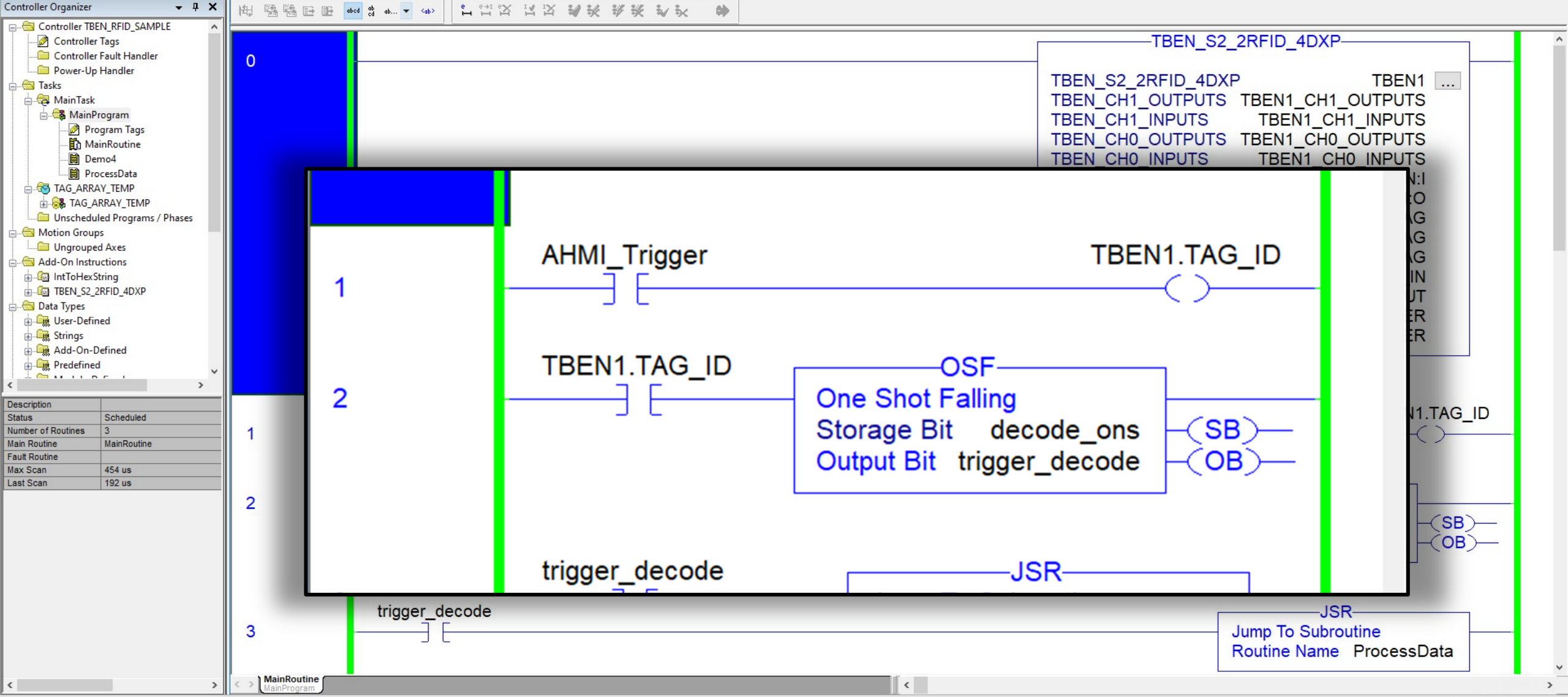

General
Connection
Module Info
Type: ETHERNET-MODULE Generic Ethernet Module
Vendor: Rockwell Automation/Allen-Bradley
Parent: LocalENB
Name: TBEN
Description:
Comm Format: Data - INT
Address / Host Name
IP Address: 141 . 225 . 160 . 108
Host Name:
Connection Parameters
Assembly Instance:
Size:
Input: 103 191 (16-bit)
Output: 104 154 (16-bit)
Configuration: 106 0 (8-bit)
Status Input:
Status Output:
Status: Offline
OK
Cancel
Apply
Help


I/O Configuration
CompactLogix5323E-QBFC1 System
1769-L23E-QBFC1 TBEN_RFID_SAMPLE
1769-L23E-QBFC1 Ethernet Port LocalEN
Ethernet
1769-L23E-QBFC1 Ethernet Port L
ETHERNET-MODULE TBEN


TBEN_S2_2RFID_4DXP
TBEN_S2_2RFID_4DXP TBEN1
TBEN_CH1_OUTPUTS TBEN1_CH1_OUTPUTS
TBEN_CH1_INPUTS TBEN1_CH1_INPUTS
TBEN_CH0_OUTPUTS TBEN1_CH0_OUTPUTS
TBEN_CH0_INPUTS TBEN1_CH0_INPUTS
IO_TBEN_INPUTS TBEN:I
IO_TBEN_OUTPUTS TBEN:O
TBEN_CH1_DIAGNOSTICS TBEN_CH1_DIAG
TBEN_CH0_DIAGNOSTICS TBEN_CH0_DIAG
TBEN_DIAG TBEN_DIAG
TBEN_DXP_INPUTS TBEN_DXP_IN
TBEN_DXP_OUTPUTS TBEN_DXP_OUT
TX_BUFFER TX_BUFFER
RX_BUFFER RX_BUFFER


Ungrouped Axes
Add-On Instructions
IntToHexString
TBEN_S2_2RFID_4DXP
Data Types
User-Defined
Strings
Add-On-Defined
Predefined
Type
Ladder Diagram
Description
Program
MainProgram
Number of Rungs
36
RX_BUFFER
RX_BUFFER_Count
TBEN:C
TBEN:I
TBEN:O
TBEN1
TBEN1.EnableIn
TBEN1.EnableOut
TBEN1.READ
TBEN1.WRITE
TBEN1.TAG_ID
TBEN1.DOMAIN
TBEN1.LENGTH
TBEN1.START_ADDRESS
TBEN1.RESET
TBEN1.UHF_CONTINOU...
TBEN1.NODE_ADDRESS
TBEN1.NODE_ADDRES...
{...}
1
1
0
0
0
1
12
1
0
0
0
0


Controller Organizer
Controller TBEN_RFID_SAMPLE
Controller Tags
Controller Fault Handler
Power-Up Handler
Tasks
MainTask
MainProgram
Program Tags
MainRoutine
Demo4
ProcessData
TAG_ARRAY_TEMP
TAG_ARRAY_TEMP
Unscheduled Programs / Phases
Motion Groups
Ungrouped Axes
Add-On Instructions
IntToHexString
TBEN_S2_2RFID_4DXP
Data Types
User-Defined
Strings
Add-On-Defined
Predefined
Description
Status Scheduled
Number of Routines 3
Main Routine MainRoutine
Fault Routine
Max Scan 454 us
Last Scan 192 us
0
TBEN_S2_2RFID_4DXP
TBEN_S2_2RFID_4DXP TBEN1
TBEN_CH1_OUTPUTS TBEN1_CH1_OUTPUTS
TBEN_CH1_INPUTS TBEN1_CH1_INPUTS
TBEN_CH0_OUTPUTS TBEN1_CH0_OUTPUTS
TBEN_CH0_INPUTS TBEN1_CH0_INPUTS
IO_TBEN_INPUTS TBEN:I
IO_TBEN_OUTPUTS TBEN:O
TBEN_CH1_DIAGNOSTICS TBEN_CH1_DIAG
TBEN_CH0_DIAGNOSTICS TBEN_CH0_DIAG
TBEN_DIAG TBEN_DIAG
TBEN_DXP_INPUTS TBEN_DXP_IN
TBEN_DXP_OUTPUTS TBEN_DXP_OUT
TX_BUFFER TX_BUFFER
RX_BUFFER RX_BUFFER
1
AHMI_Trigger
TBEN1.TAG_ID
2
TBEN1.TAG_ID
OSF
One Shot Falling
Storage Bit decode_ons
Output Bit trigger_decode
SB
OB
3
trigger_decode
JSR
Jump To Subroutine
Routine Name ProcessData
MainRoutine
MainProgram
Display the language elements contained in the group: Compare
Rung 0 of 4
APP
VER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Program Tags
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Strings
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Predefined
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Number of Routines 3
Main Routine MainRoutine
Fault Routine
Max Scan 454 us
Last Scan 192 us
TBEN_S2_2RFID_4DXP
TBEN_S2_2RFID_4DXP TBEN1
TBEN_CH1_OUTPUTS TBEN1_CH1_OUTPUTS
TBEN_CH1_INPUTS TBEN1_CH1_INPUTS
TBEN_CH0_OUTPUTS TBEN1_CH0_OUTPUTS
TBEN_CH0_INPUTS TBEN1_CH0_INPUTS
0
1
AHMI_Trigger
TBEN1.TAG_ID
2
TBEN1.TAG_ID
OSF
One Shot Falling
Storage Bit decode_ons
Output Bit trigger_decode
SB
OB
1
2
trigger_decode
JSR
3
trigger_decode
JSR
Jump To Subroutine
Routine Name ProcessData
MainRoutine
MainProgram
Display the language elements contained in the group: Compare
Rung 0 of 4
APP
VER

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- Home
- Status
- Operation Statistics
- Configure Reader
- Read Tags
- Communication
- Date Time
- IP Sec
- License Manager
- Change Password
- GPIO
- Applications
- Profiles
- Firmware
- Commit/Discard
- System Log
- Diagnostics
- Shutdown
- Logout

User Application Page

Existing Packages:

List of Installed apps	Start/Stop	AutoStart	Uninstall
RFIDSample4App			Uninstall

Meta Data

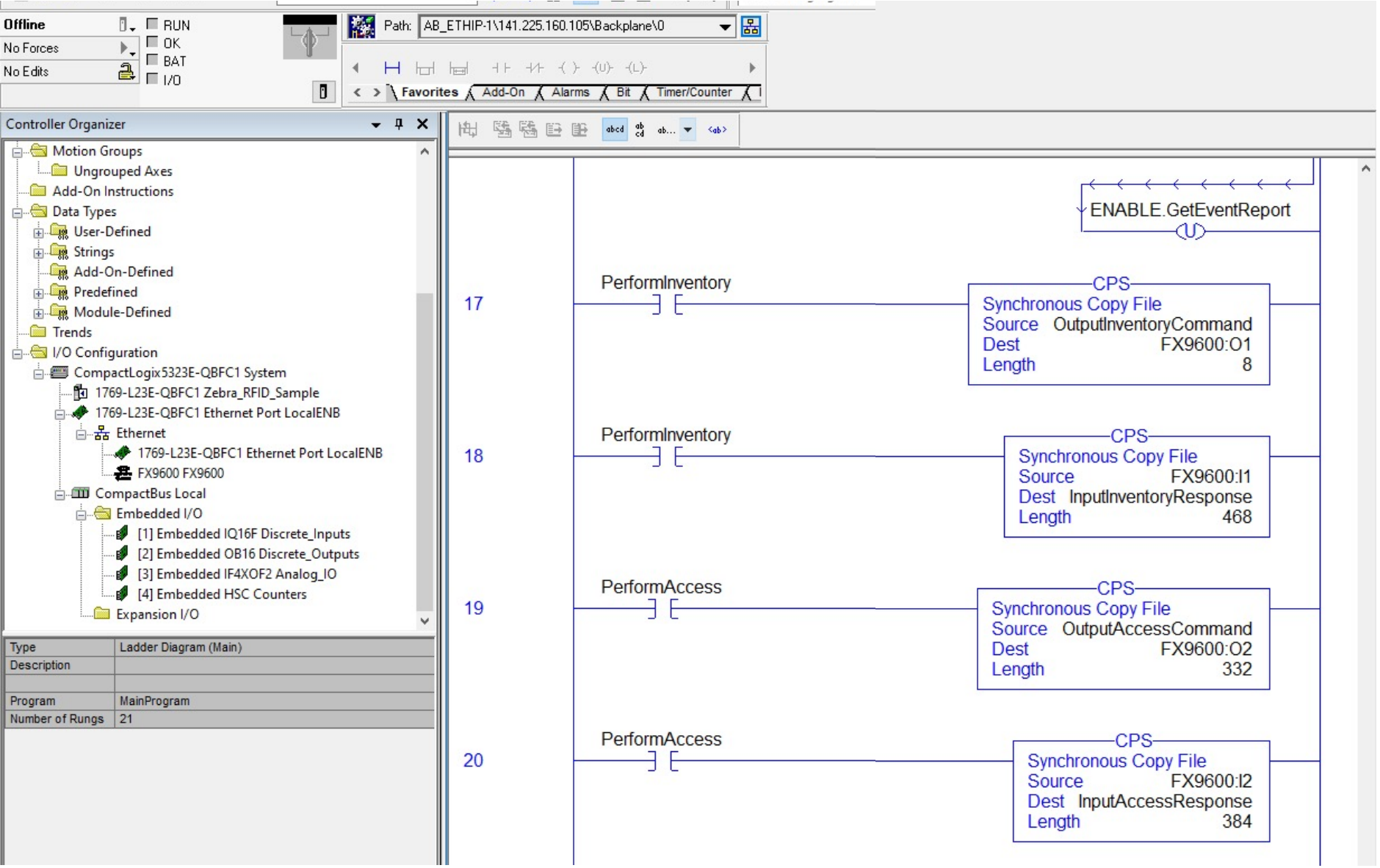
Package Name:RFIDSample4App
Package Version: 1.0
Status: install user installed
architecture: all

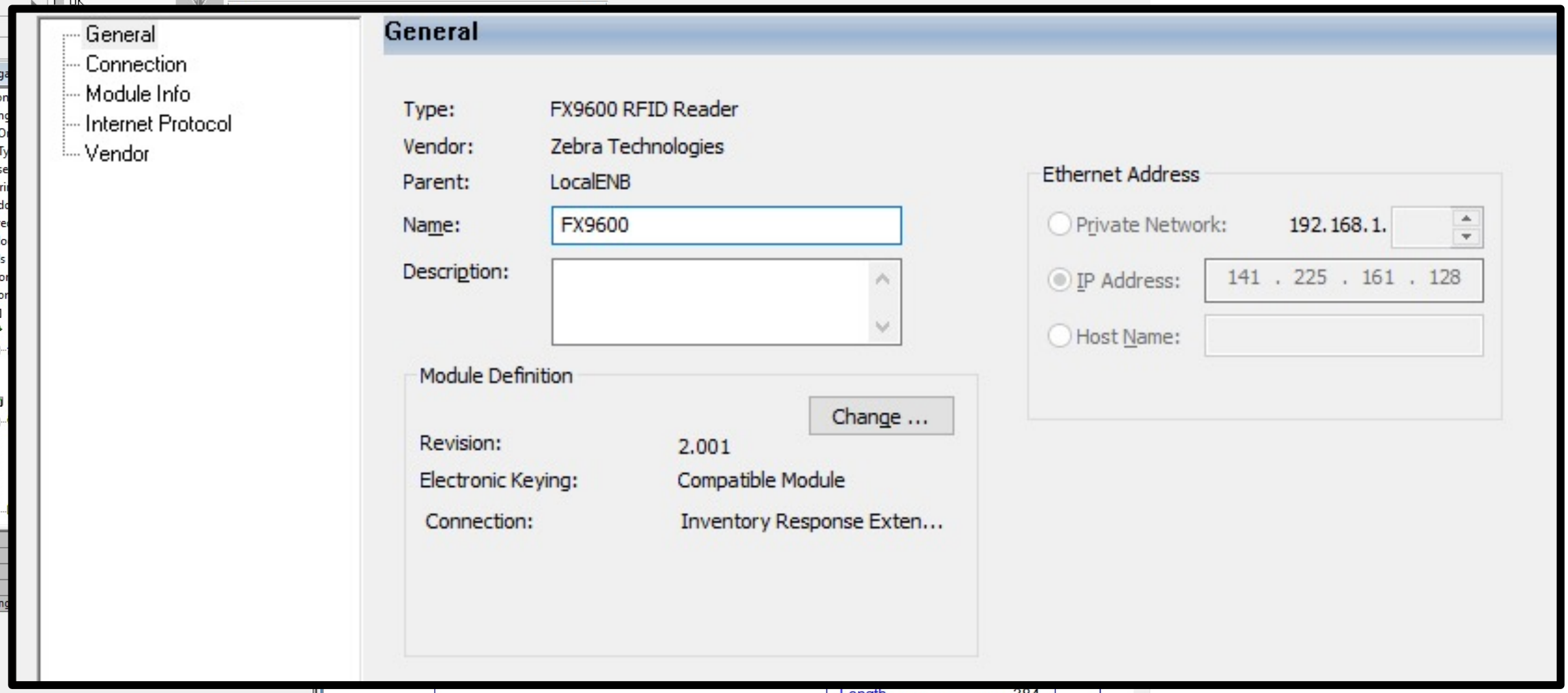
Install New Package:

Current Status: Select package from the browser button

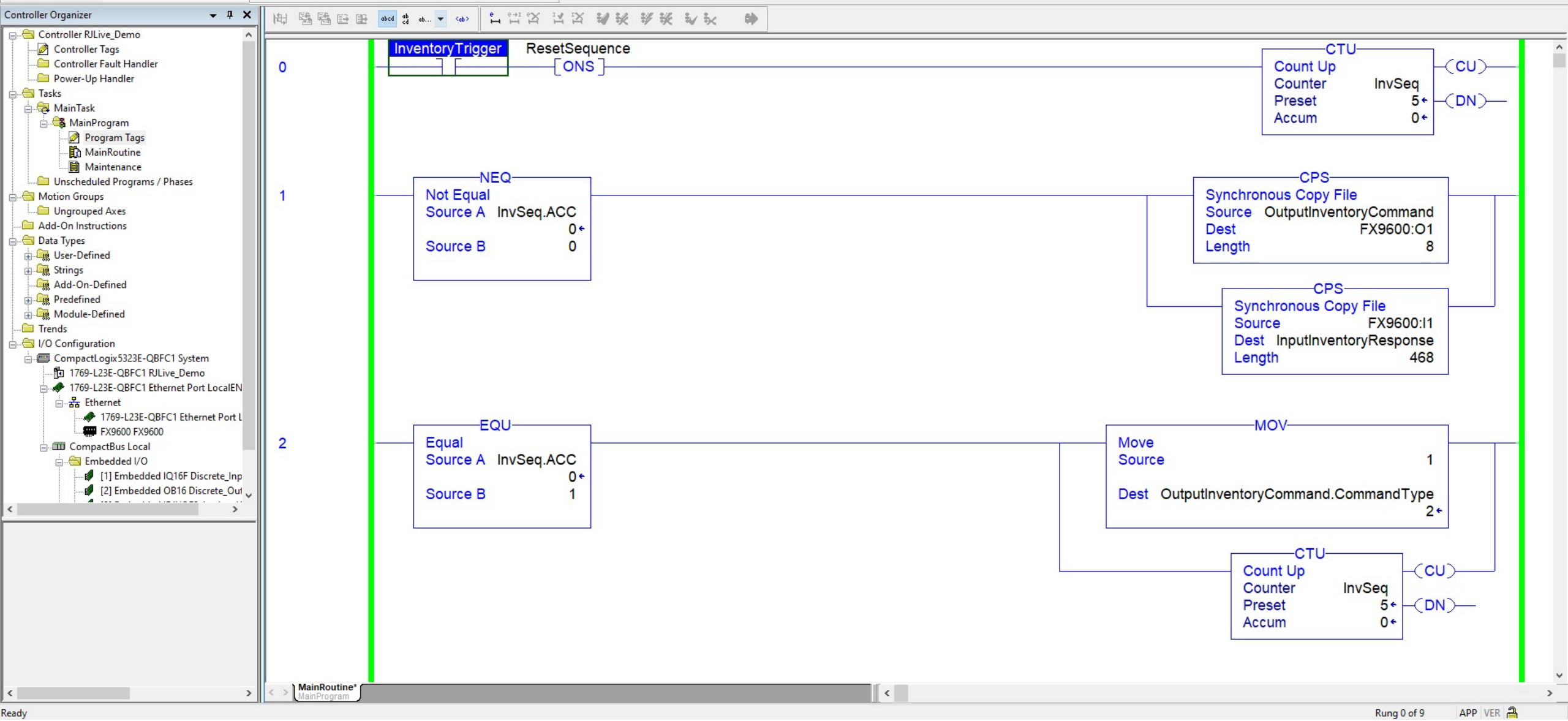
package: Browser

Install


Offline
No Forces
No Edits
RUN
OK
BAT
I/O
Path: AB_ETHIP-1\141.225.160.105\Backplane\0
Favorites
Add-On
Alarms
Bit
Timer/Counter
Controller Organizer
Motion Groups
Ungrouped Axes
Add-On Instructions
Data Types
User-Defined
Strings
Add-On-Defined
Predefined
Module-Defined
Trends
I/O Configuration
CompactLogix5323E-QBFC1 System
1769-L23E-QBFC1 Zebra_RFID_Sample
1769-L23E-QBFC1 Ethernet Port LocalENB
Ethernet
1769-L23E-QBFC1 Ethernet Port LocalENB
FX9600 FX9600
CompactBus Local
Embedded I/O
[1] Embedded IQ16F Discrete_Inputs
[2] Embedded OB16 Discrete_Outputs
[3] Embedded IF4XOF2 Analog_IO
[4] Embedded HSC Counters
Expansion I/O
Type
Ladder Diagram (Main)
Description
Program
MainProgram
Number of Rungs
21
ENABLE.GetEventReport
17
PerformInventory
CPS
Synchronous Copy File
Source OutputInventoryCommand
Dest FX9600:O1
Length 8
18
PerformInventory
CPS
Synchronous Copy File
Source FX9600:I1
Dest InputInventoryResponse
Length 468
19
PerformAccess
CPS
Synchronous Copy File
Source OutputAccessCommand
Dest FX9600:O2
Length 332
20
PerformAccess
CPS
Synchronous Copy File
Source FX9600:I2
Dest InputAccessResponse
Length 384


General
Connection
Module Info
Internet Protocol
Vendor
General
Type: FX9600 RFID Reader
Vendor: Zebra Technologies
Parent: LocalENB
Name: FX9600
Description:
Module Definition
Change ...
Revision: 2.001
Electronic Keying: Compatible Module
Connection: Inventory Response Exten...
Ethernet Address
Private Network: 192.168.1.
IP Address: 141 . 225 . 161 . 128
Host Name:

FX9600:I1	{...}	{...}	
FX9600:I1.ConnectionFaulted	0		Decimal
FX9600:I1.StatusMask	{...}	{...}	
FX9600:I1.PacketSequenceNumber	119		Decimal
FX9600:I1.NumberOfTagReports	0		Decimal
FX9600:I1.TagReports	{...}	{...}	
FX9600:I1.TagReports[0]	{...}	{...}	
FX9600:I1.TagReports[0].TagEPC	{...}	{...}	
FX9600:I1.TagReports[0].TagPC	0		Decimal
FX9600:I1.TagReports[0].TagCRC	0		Decimal
FX9600:I1.TagReports[0].AntennaID	0		Decimal
FX9600:I1.TagReports[0].RSSI	0		Decimal
FX9600:I1.TagReports[0].ChannelIndex	0		Decimal
FX9600:I1.TagReports[0].SeenCount	0		Decimal
FX9600:I1.TagReports[0].PhaseInfo	0		Decimal
FX9600:I1.TagReports[0].FirstSeenTimeStamp	{...}	{...}	
FX9600:I1.TagReports[0].LastSeenTimeStamp	{...}	{...}	
FX9600:I1.TagReports[0].AccessStatus	0		Decimal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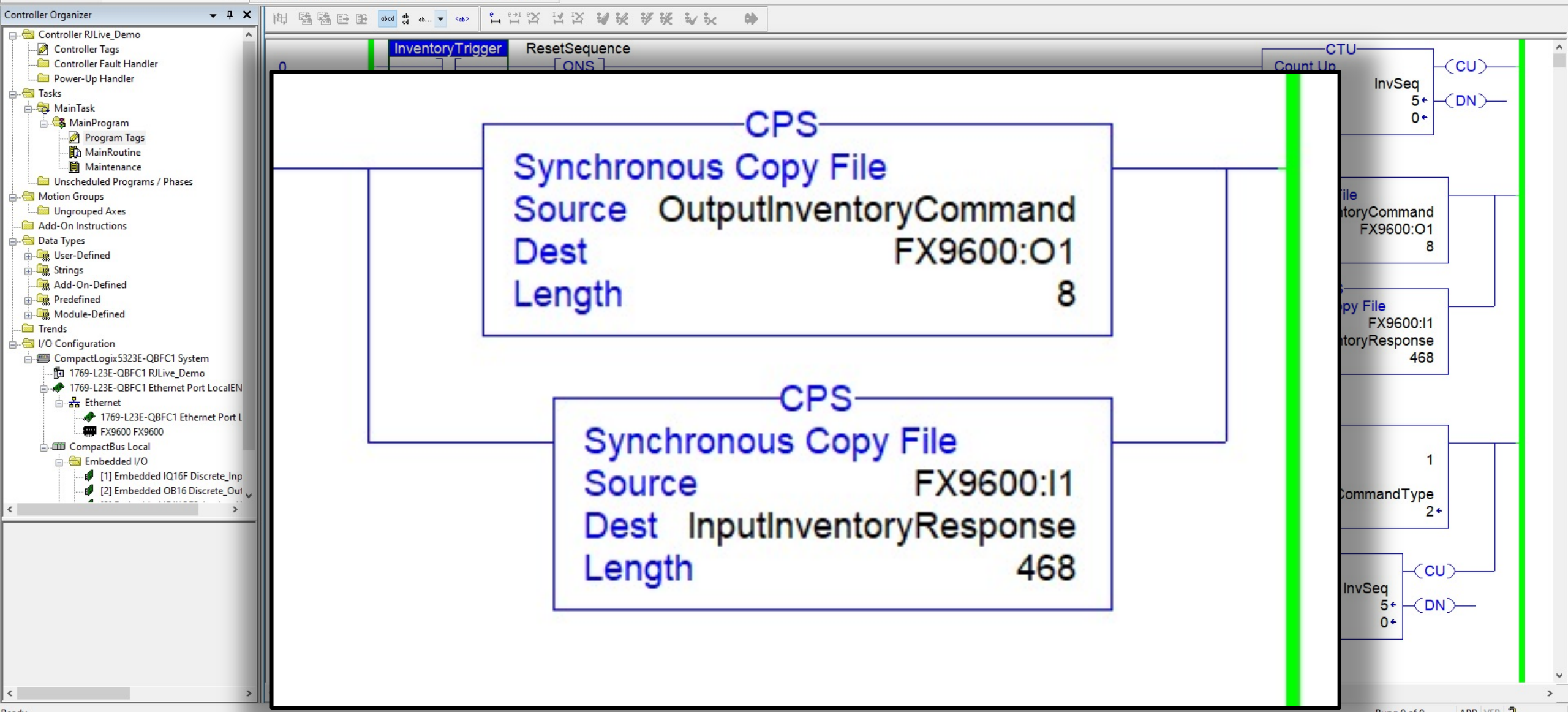
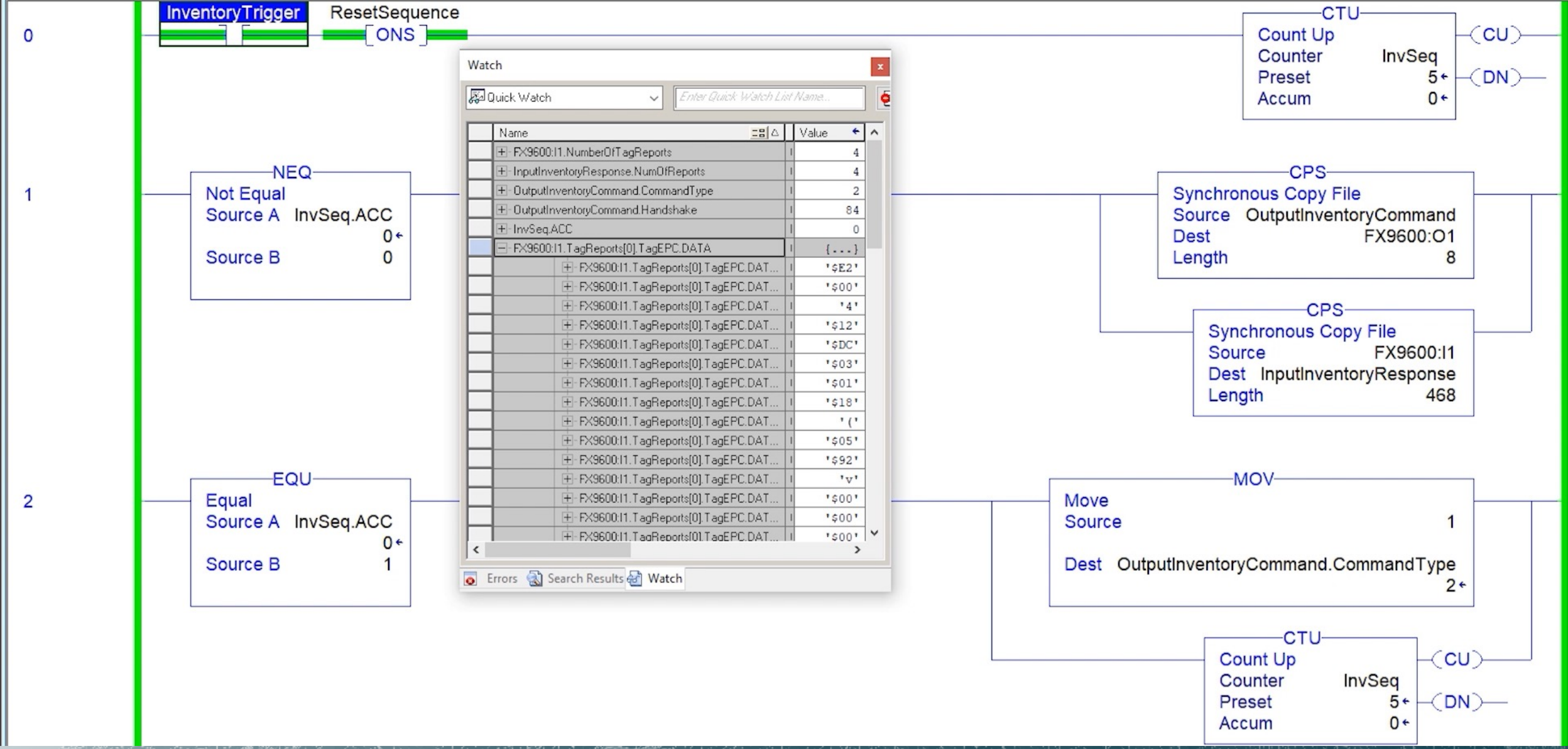
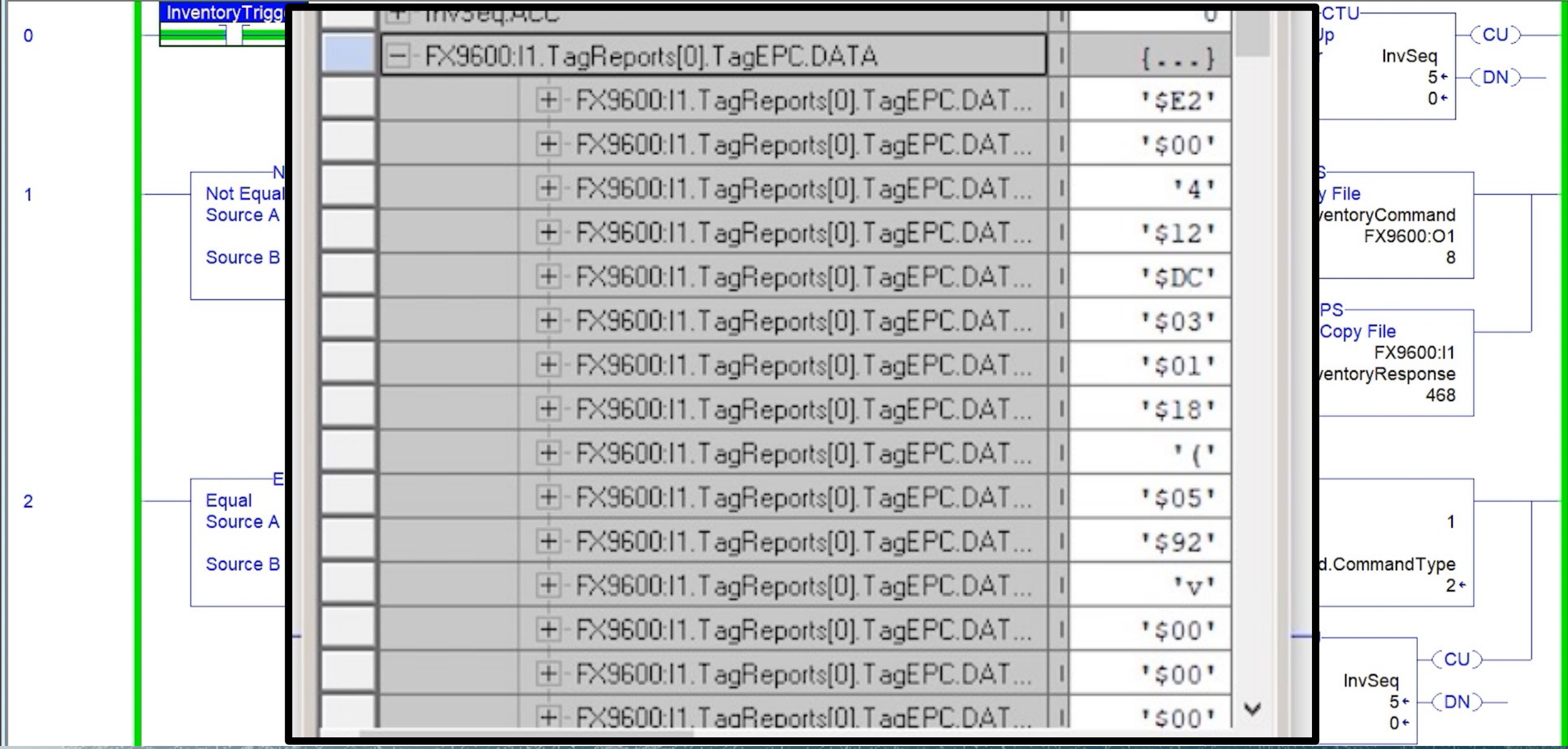
CompactLogix5323E-QBFC1 System
1769-L23E-QBFC1 RJLive_Demo
1769-L23E-QBFC1 Ethernet Port LocalEN
Ethernet
1769-L23E-QBFC1 Ethernet Port L
FX9600 FX9600
CompactBus Local
Embedded I/O
[1] Embedded IQ16F Discrete_Inp
[2] Embedded OB16 Discrete_Out
0
InventoryTrigger
ResetSequence
ONS
CTU
Count Up
Counter InvSeq
Preset 5
Accum 0
CU
DN
1
NEQ
Not Equal
Source A InvSeq.ACC
0
Source B 0
CPS
Synchronous Copy File
Source OutputInventoryCommand
Dest FX9600:O1
Length 8
CPS
Synchronous Copy File
Source FX9600:I1
Dest InputInventoryResponse
Length 468
2
EQU
Equal
Source A InvSeq.ACC
0
Source B 1
MOV
Move
Source 1
Dest OutputInventoryCommand.CommandType
2
CTU
Count Up
Counter InvSeq
Preset 5
Accum 0
CU
DN
MainRoutine*
MainProgram
Ready
Rung 0 of 9
APP
VER


Controller Organizer
Controller RJLive_Demo
Controller Tags
Controller Fault Handler
Power-Up Handler
Tasks
MainTask
MainProgram
Program Tags
MainRoutine
Maintenance
Unscheduled Programs / Phases
Motion Groups
Ungrouped Axes
Add-On Instructions
Data Types
User-Defined
Strings
Add-On-Defined
Predefined
Module-Defined
Trends
I/O Configuration
CompactLogix5323E-QBFC1 System
1769-L23E-QBFC1 RJLive_Demo
1769-L23E-QBFC1 Ethernet Port LocalEN
Ethernet
1769-L23E-QBFC1 Ethernet Port L
FX9600 FX9600
CompactBus Local
Embedded I/O
[1] Embedded IQ16F Discrete_Inp
[2] Embedded OB16 Discrete_Out
InventoryTrigger
ResetSequence
ONS
CPS
Synchronous Copy File
Source OutputInventoryCommand
Dest FX9600:O1
Length 8
CPS
Synchronous Copy File
Source FX9600:I1
Dest InputInventoryResponse
Length 468
CTU
Count Up
InvSeq
5
0
CU
DN
FX9600:O1
8
FX9600:I1
468
1
2
Ready
Rung 0 of 9
APP
VER


InventoryTrigger
ResetSequence
ONS
0
CTU
Count Up
Counter InvSeq
Preset 5
Accum 0
CU
DN
Watch
Quick Watch
Enter Quick Watch List Name...
Name
Value
FX9600:I1.NumberOfTagReports 4
InputInventoryResponse.NumOfReports 4
OutputInventoryCommand.CommandType 2
OutputInventoryCommand.Handshake 84
InvSeq.ACC 0
FX9600:I1.TagReports[0].TagEPC.DATA {...}
FX9600:I1.TagReports[0].TagEPC.DAT... '$E2'
FX9600:I1.TagReports[0].TagEPC.DAT... '$00'
FX9600:I1.TagReports[0].TagEPC.DAT... '4'
FX9600:I1.TagReports[0].TagEPC.DAT... '$12'
FX9600:I1.TagReports[0].TagEPC.DAT... '$DC'
FX9600:I1.TagReports[0].TagEPC.DAT... '$03'
FX9600:I1.TagReports[0].TagEPC.DAT... '$01'
FX9600:I1.TagReports[0].TagEPC.DAT... '$18'
FX9600:I1.TagReports[0].TagEPC.DAT... '('
FX9600:I1.TagReports[0].TagEPC.DAT... '$05'
FX9600:I1.TagReports[0].TagEPC.DAT... '$92'
FX9600:I1.TagReports[0].TagEPC.DAT... 'v'
FX9600:I1.TagReports[0].TagEPC.DAT... '$00'
FX9600:I1.TagReports[0].TagEPC.DAT... '$00'
FX9600:I1.TagReports[0].TagEPC.DAT... '$00'
Errors
Search Results
Watch
1
NEQ
Not Equal
Source A InvSeq.ACC
0
Source B 0
CPS
Synchronous Copy File
Source OutputInventoryCommand
Dest FX9600:O1
Length 8
CPS
Synchronous Copy File
Source FX9600:I1
Dest InputInventoryResponse
Length 468
2
EQU
Equal
Source A InvSeq.ACC
0
Source B 1
MOV
Move
Source 1
Dest OutputInventoryCommand.CommandType
2
CTU
Count Up
Counter InvSeq
Preset 5
Accum 0
CU
DN


InventoryTrigg
0
1
Not Equal
Source A
Source B
2
Equal
Source A
Source B
FX9600:I1.TagReports[0].TagEPC.DATA {...}
FX9600:I1.TagReports[0].TagEPC.DAT... '$E2'
FX9600:I1.TagReports[0].TagEPC.DAT... '$00'
FX9600:I1.TagReports[0].TagEPC.DAT... '4'
FX9600:I1.TagReports[0].TagEPC.DAT... '$12'
FX9600:I1.TagReports[0].TagEPC.DAT... '$DC'
FX9600:I1.TagReports[0].TagEPC.DAT... '$03'
FX9600:I1.TagReports[0].TagEPC.DAT... '$01'
FX9600:I1.TagReports[0].TagEPC.DAT... '$18'
FX9600:I1.TagReports[0].TagEPC.DAT... '('
FX9600:I1.TagReports[0].TagEPC.DAT... '$05'
FX9600:I1.TagReports[0].TagEPC.DAT... '$92'
FX9600:I1.TagReports[0].TagEPC.DAT... 'v'
FX9600:I1.TagReports[0].TagEPC.DAT... '$00'
FX9600:I1.TagReports[0].TagEPC.DAT... '$00'
FX9600:I1.TagReports[0].TagEPC.DAT... '$00'
CTU
Up
InvSeq
5
0
CU
DN
File
ventoryCommand
FX9600:O1
8
PS
Copy File
FX9600:I1
ventoryResponse
468
1
d.CommandType
2
CU
InvSeq
5
0
DN

YouTube

Zebra FX9600 Ethernet/IP Tutorial
ZEBRA
FX9600F83ED1
0:12 / 21:38

Closing thoughts…

- Great first steps
- Demand better adoption
- Inherent SINT to Hex string conversion
- Common reader control access

Questions?

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THANK YOU

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