THE REYNOLDS COMPANY
ELECTRICAL SUPPLY

TRC Tech Talks

Online Seminars

Modernization from ControlNet to Ethernet/IP

May 28th, 2020

Introductions

Mark McGinnis
Presenter
Automation Specialist
The Reynolds Company
– Dallas / Fort Worth

Mike Masterson
Panelist
Automation Specialist
The Reynolds Company
– Houston

Brandon Singh
Panelist
Network Specialist
The Reynolds Company
– Dallas / Fort Worth

2020 Online Events - Register to receive a calendar invite

User Group

Thursday, June 18
ControlLogix Redundancy
10:00 am

Tech Talks

Tuesday, June 2nd
Industrial Networking Series Part 2: Secure Cloud Connectivity to Plant Ethernet
10:00 am

Thursday, June 4th
Industrial Networking Series Part 3: Resilient Networks – Device Level Ring (DLR)
10:00 am

Wednesday, June 17th
Industrial Networking Series Part 5: Connected Plantwide Ethernet Architectures
10:00 am

Wednesday, June 3rd
Overload Migration
10:00 am

Tuesday, June 16th
Industrial Networking Series Part 4: Resilient Networks – Parallel Redundancy Protocol (PRP)
10:00 am

Tuesday, June 23rd
Industrial Networking Series Part 6: Securing Control System Network with CIP Security
10:00 am

https://www.reynoldsonline.com/eventsUnit.action

ROKLive

June 10 – 19, 2020
Online/Virtual Seminars & Labs

Modernizing ControlNet to EtherNet/IP

2.10.2020

ControlNet – Why Modernize?

- ControlNet has been a reliable network for 25 years, but customers now need more.
- Customers Require
  - Wired and Wireless technology that enables data connectivity
  - Longterm lifecycle support for multiple decades
  - Open and inter-operable protocol supported by multiple vendors
  - Integration of open standards such as OPC-UA
- All RA ControlNet products going Active Mature
  - Customers do not need to migrate at this time, but must start planning
  - No End of Life announcements are tied to this announcement

ControlNet		Capabilities		EtherNet/IP
RG-6 coax cable and Fiber	✓	**Media**	✓	RJ45 Copper, Fiber,
Not Supported		**Wireless**	✓	Supported
Limited to 99 Nodes on same network	✓	**Nodes**	✓	Nodes can vary based on network design. Built in rotary switches can configure 254 nodes.
No Active Components used in Controlnet Network. Very limited Diagnostics.		**Diagnostics**	✓	Managed switches provide diagnostics such as broken wire detection, port status, timestamping of network alarm & events.
5 Mbps		**Network Speed**	✓	10/100/1000 Mbps supported
Deterministic protocol	✓	**Determinism**	✓	EtherNet/IP leverages IEEE1588:2008 to provide determinism
Redundant Controller and Redundant Media Supported	✓	**High Availability**	✓	Redundant controller and Media supported through PRP and DLR
No CIP Security supported in protocol.		**Industrial Security (CIP Security)**	✓	Extensive support for CIP Security and Defense in Depth strategy and architecture.

ControlNet		Capabilities		EtherNet/IP
No support for Integrated CIP Safety communications		**Integrated Safety (CIP Safety)**	✓	Builtin support for Integrated Safety devices and CIP Safety in protocol.
Limited Multi vendor support		**Multi Vendor Support**	✓	EtherNet/IP is supported by multiple vendors.
No devices available		**Integrated Motion**	✓	Integrated Motion supported
ControlNet products are transitioning to Active Mature status. Few product enhancements are likely.		**Future Product developments**	✓	Development in the future will be focused on EtherNet/IP based products. The integration of Rockwell Automation devices to common standards, such as OPC-UA, will occur through EtherNet/IP.

EtherNet/IP – Critical Benefits

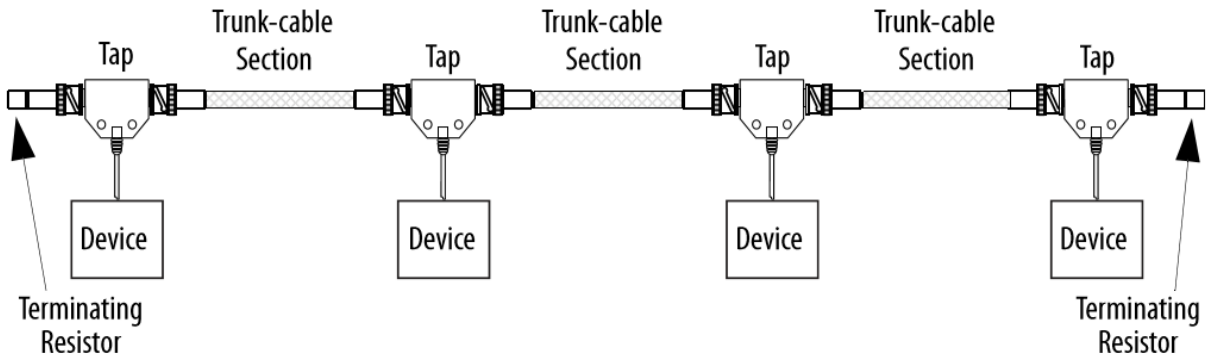
Longterm Availability of Products	Better lifecycle management, longer upgrade cycle
Enhanced and Improved Data Access	Improve maintenance and reduce bottlenecks
Enable Digitization and Digital Transformation	Reduce Downtime and Improve Profitability
Enable Security	Protect critical assets and operations
Enable IT/OT Convergence	Provide Transparency and Improve Productivity
Enable Integrated Safety and Diagnostics	Reduce system cost, downtime and maintenance

Architectures

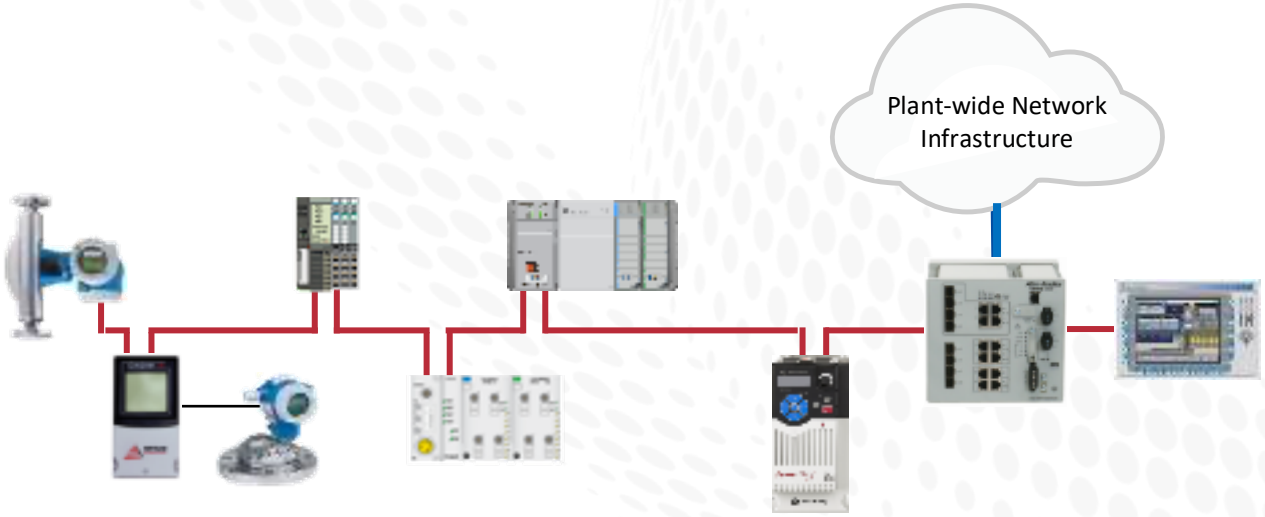
2.10.2020

Linear Architecture

ControlNet

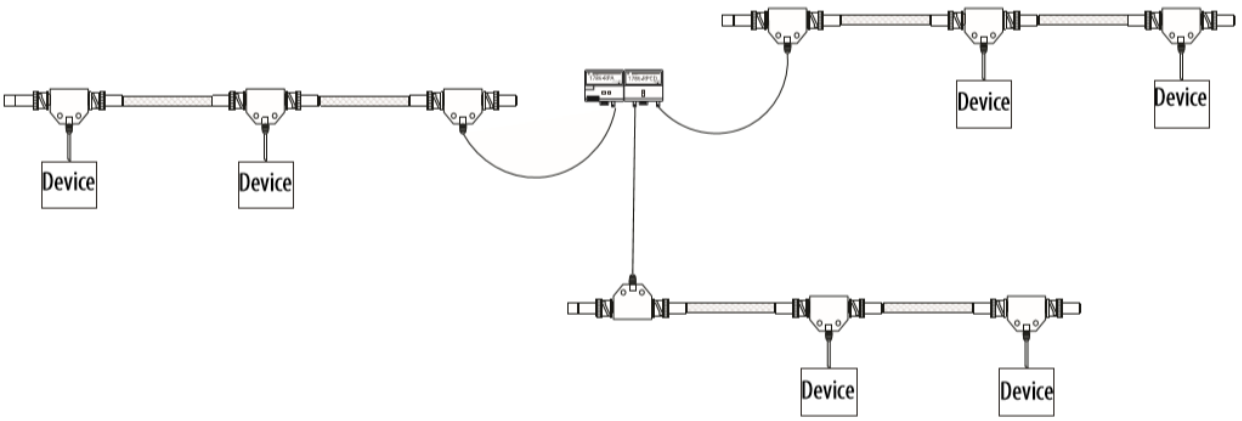


EtherNet/IP

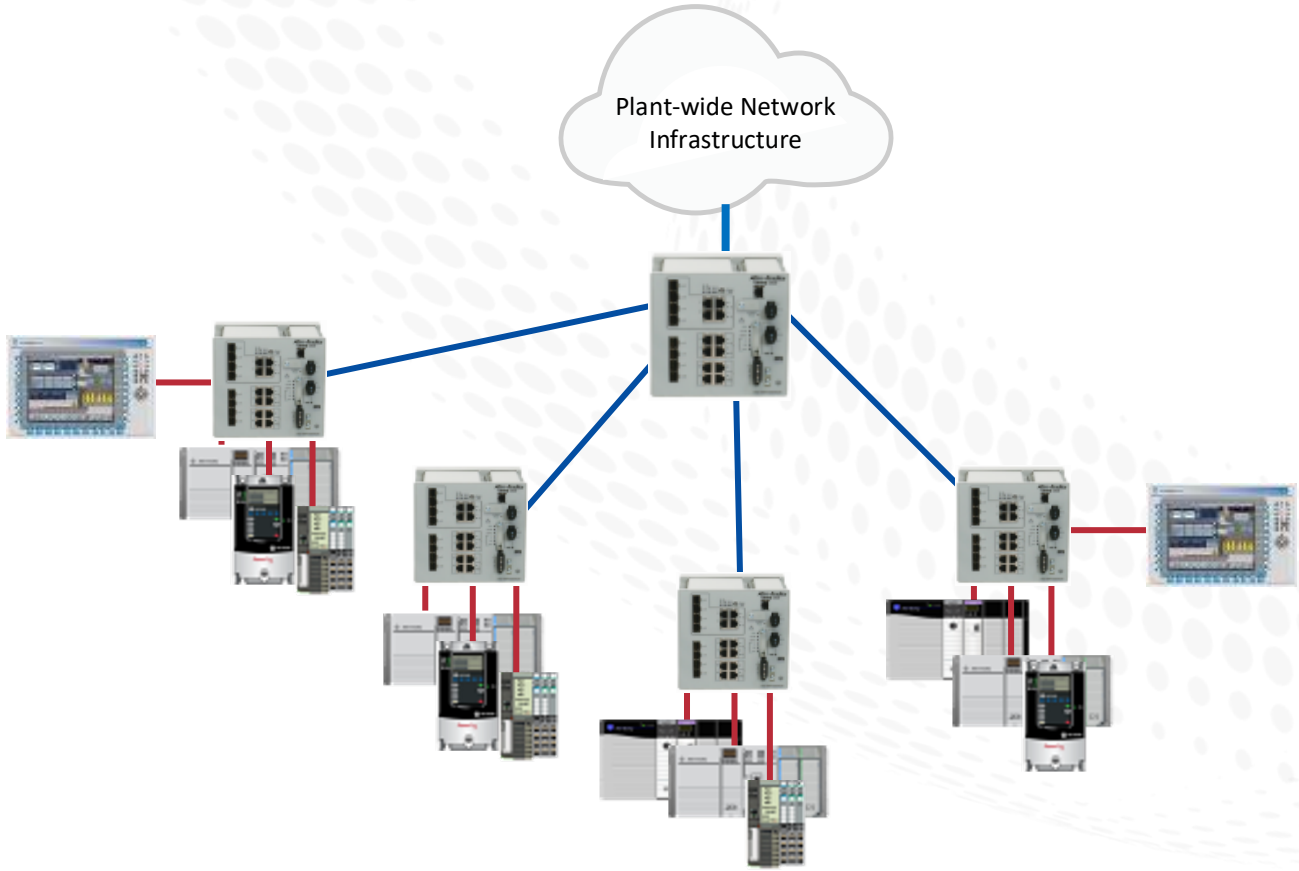


Star Topology

ControlNet

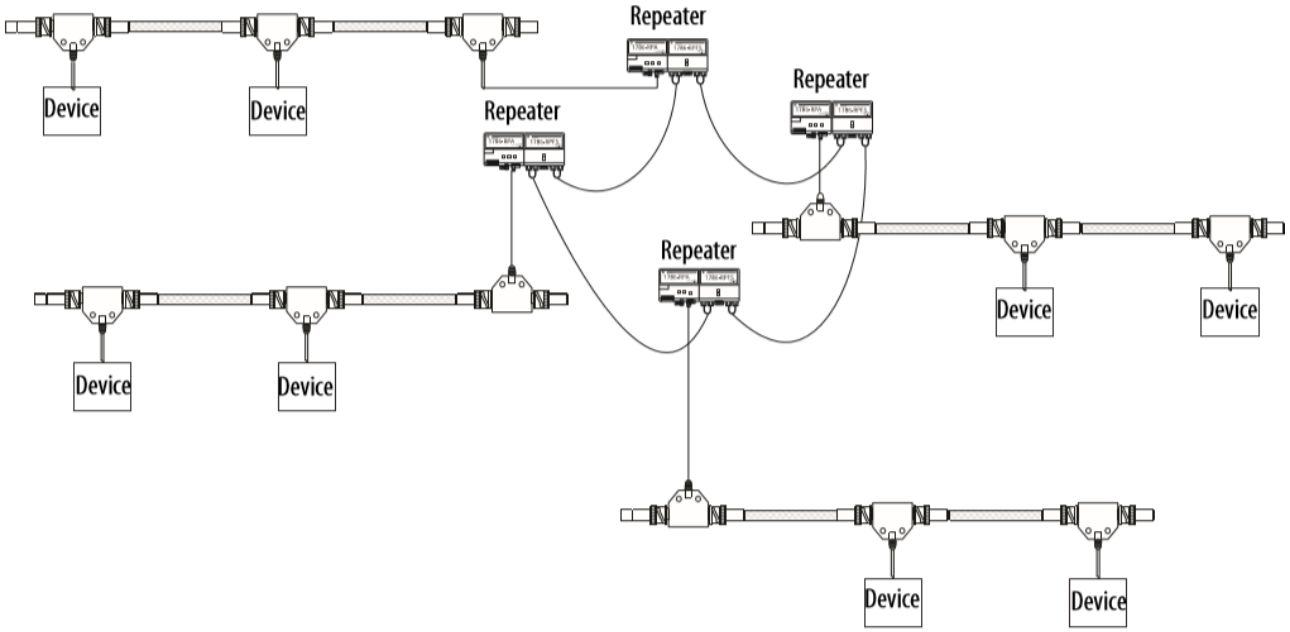


EtherNet/IP

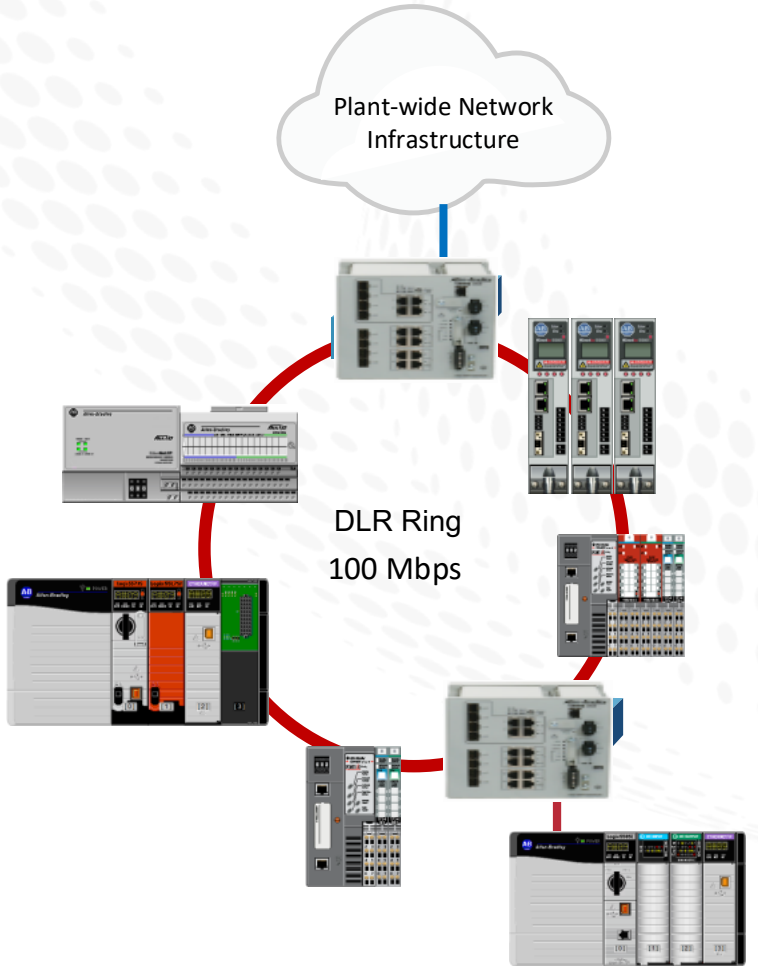


Ring Topology

ControlNet

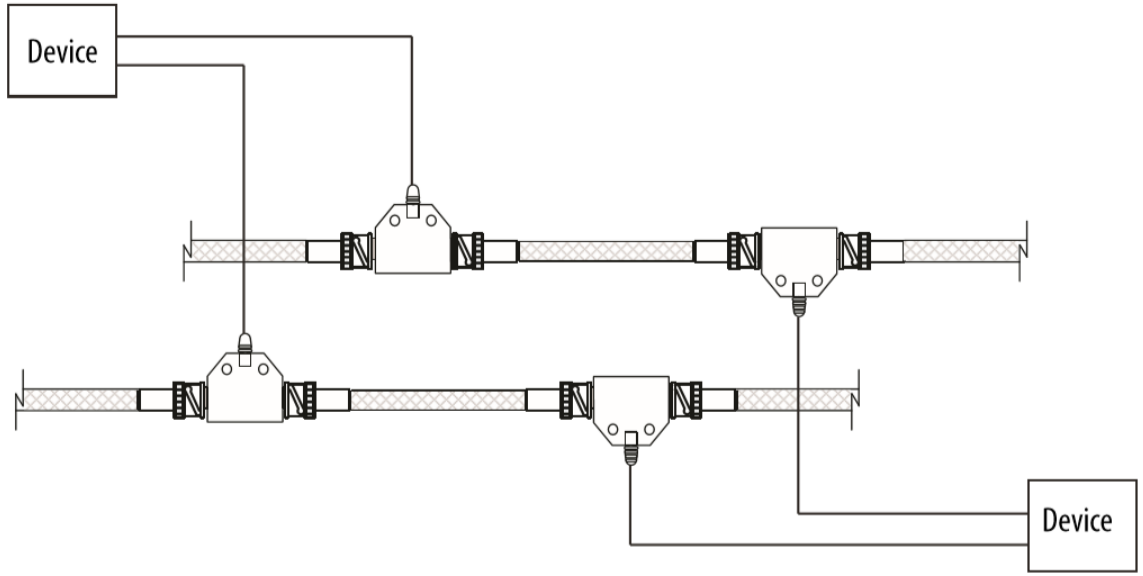


EtherNet/IP

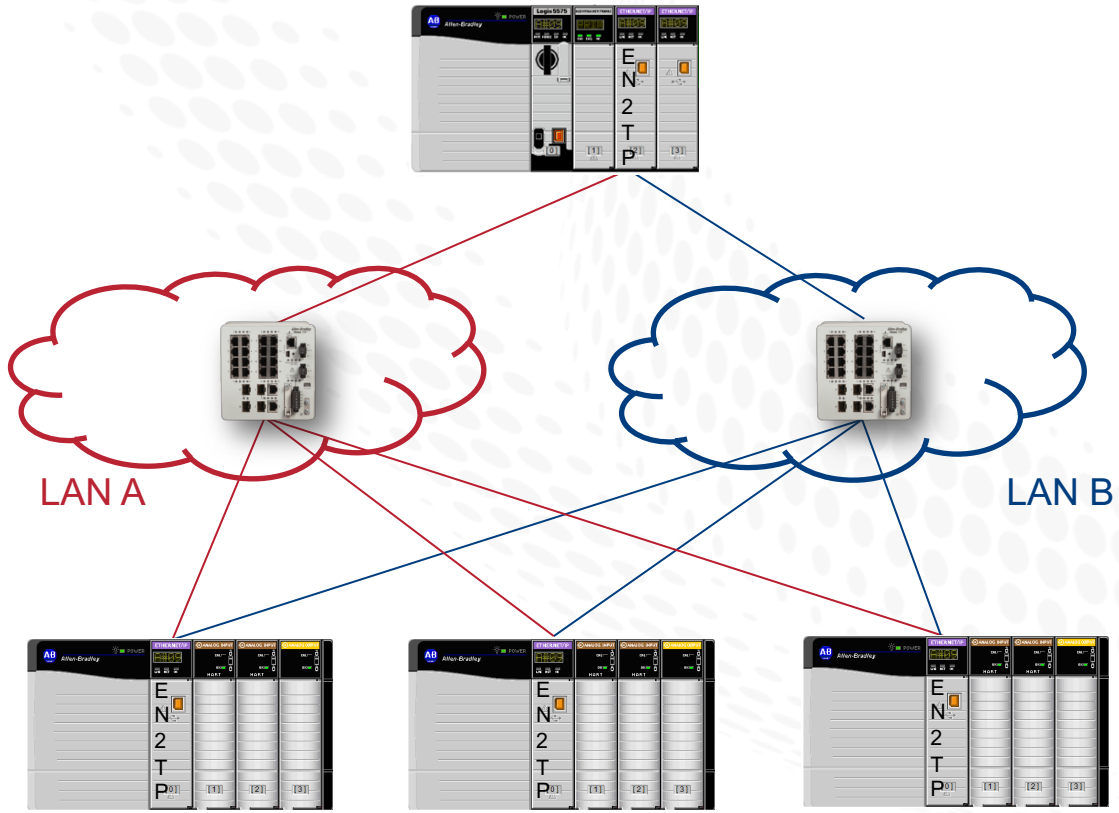


Redundant Media Topology

ControlNet



EtherNet/IP



Network Management, Controller and Communication Migration

	ControlNet	EtherNet/IP
Software	RSNetworx for Controlnet (Required)	FT Network Manager (Optional), Integrated Architecture Builder (Optional)
Items Requiring Configuration	ControlNet Network Keeper ControlNet Network Update Time Scheduled Maximum Node Address Unscheduled Maximum Node Address	EtherNet/IP DLR Supervisor Managed Switches
Communication	Scheduled I/O Unscheduled Messaging	UDP I/O TCP Messaging
CompactLogix & Guard CompactLogix	1769 CompactLogix™ L4 and Compact GuardLogix® L4: • 1768-CNB (Discontinued) • 1768-CNBR (Discontinued) 1769-L32C, 1769-L35CR CompactLogix (End of Life)	1769 CompactLogix or Compact GuardLogix 5370 controller with embedded EtherNet/IP 5069 CompactLogix or Compact GuardLogix 5380 controller with embedded EtherNet/IP
ControlLogix & GuardLogix	1756 ControlLogix and GuardLogix: • 1756-CNB (Active Mature) • 1756-CNBR (Active Mature) • 1756-CN2 (Active Mature) • 1756-CN2R (Active Mature)	1756 ControlLogix and GuardLogix: • 1756-EN2F • 1756-EN2T • 1756-EN2TP • 1756-EN2TR • 1756-EN3TR • 1756-EN4TR • 1756-ENBT

Modernization Process

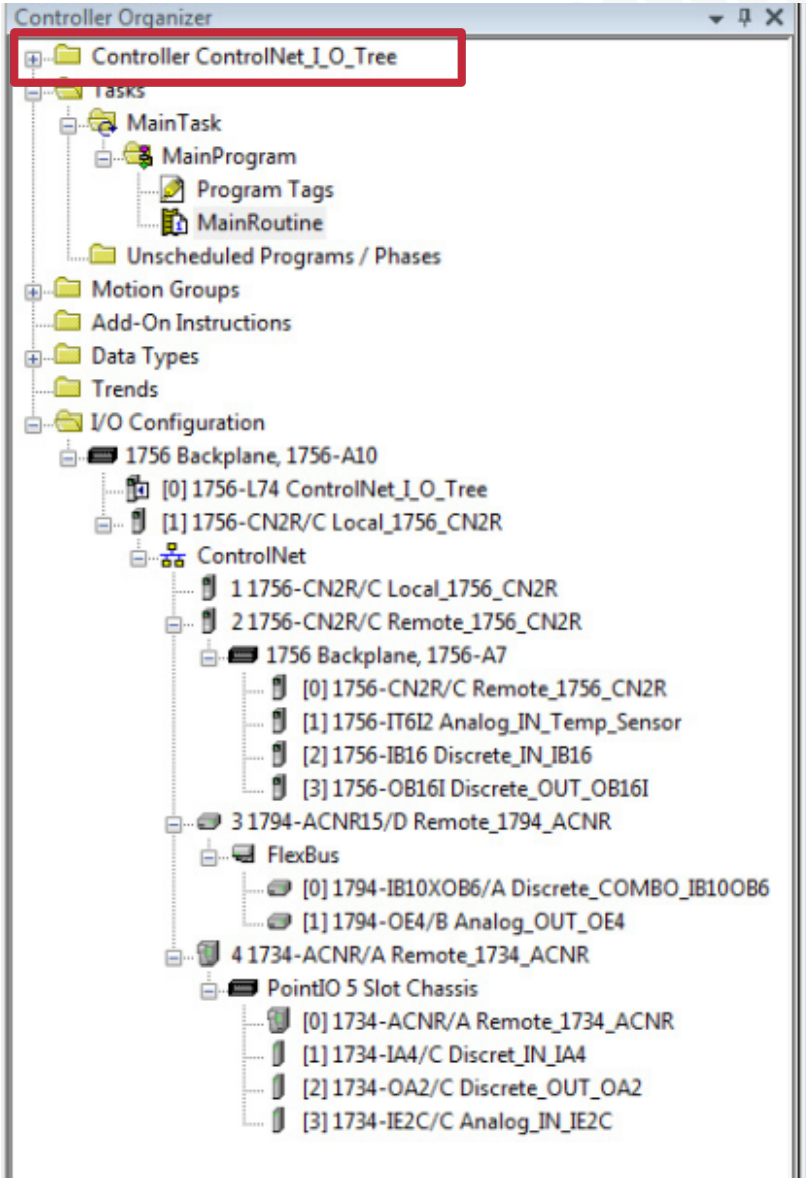
2.10.2020

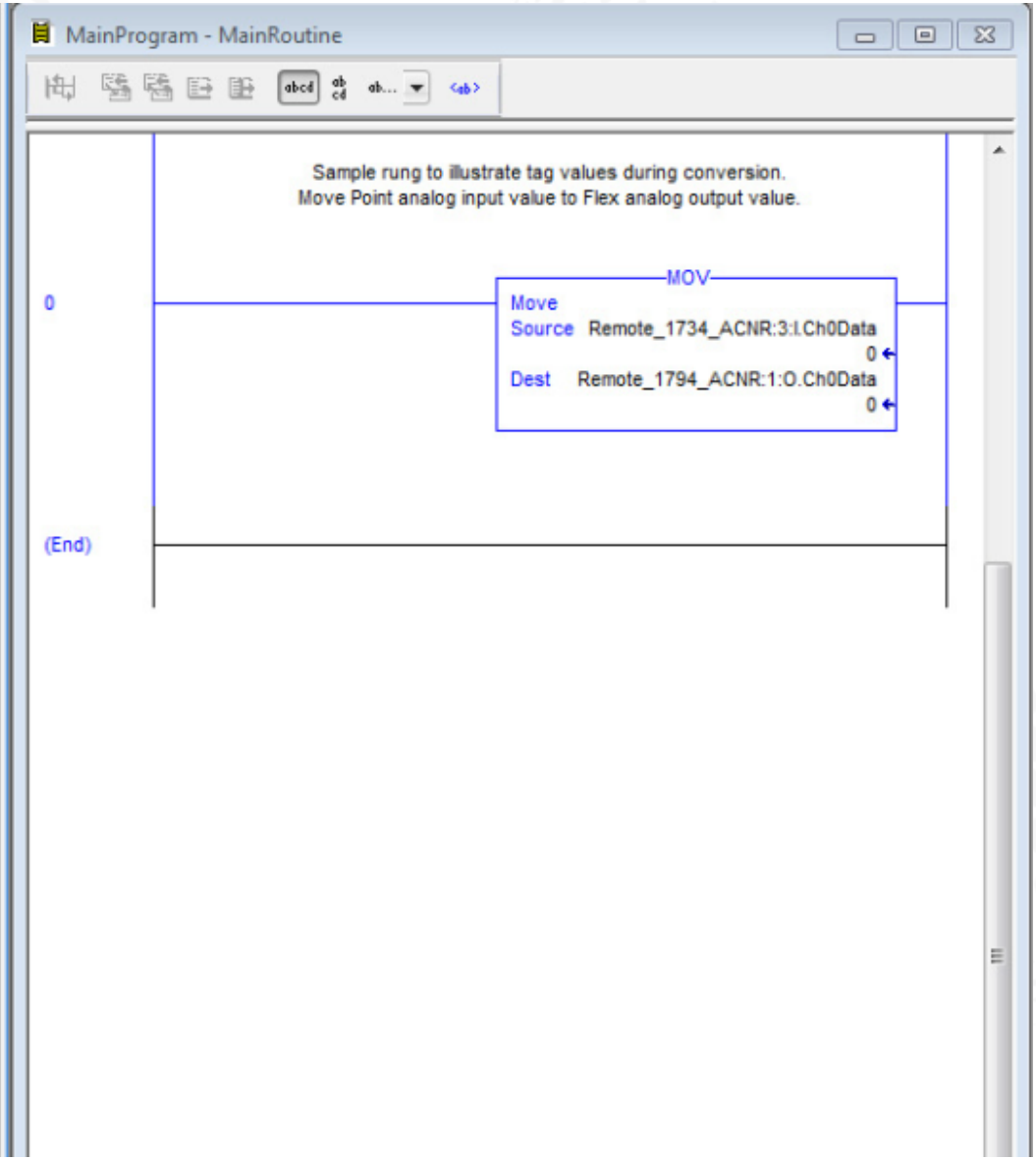
Modernization Process Steps

- Acquire EtherNet/IP hardware (zero to minimal system interruptions)
- Install new infrastructure - such as cables and switches. (zero to minimal system interruptions)
- Convert the I/O configuration tree
- Align tags to the new devices (rename)
- Add new logic, if needed, for new device platforms
- Verify any MSG paths (logic)
- Verify any produced/consumed tags (configuration)

Converting IO Tree

Open Project

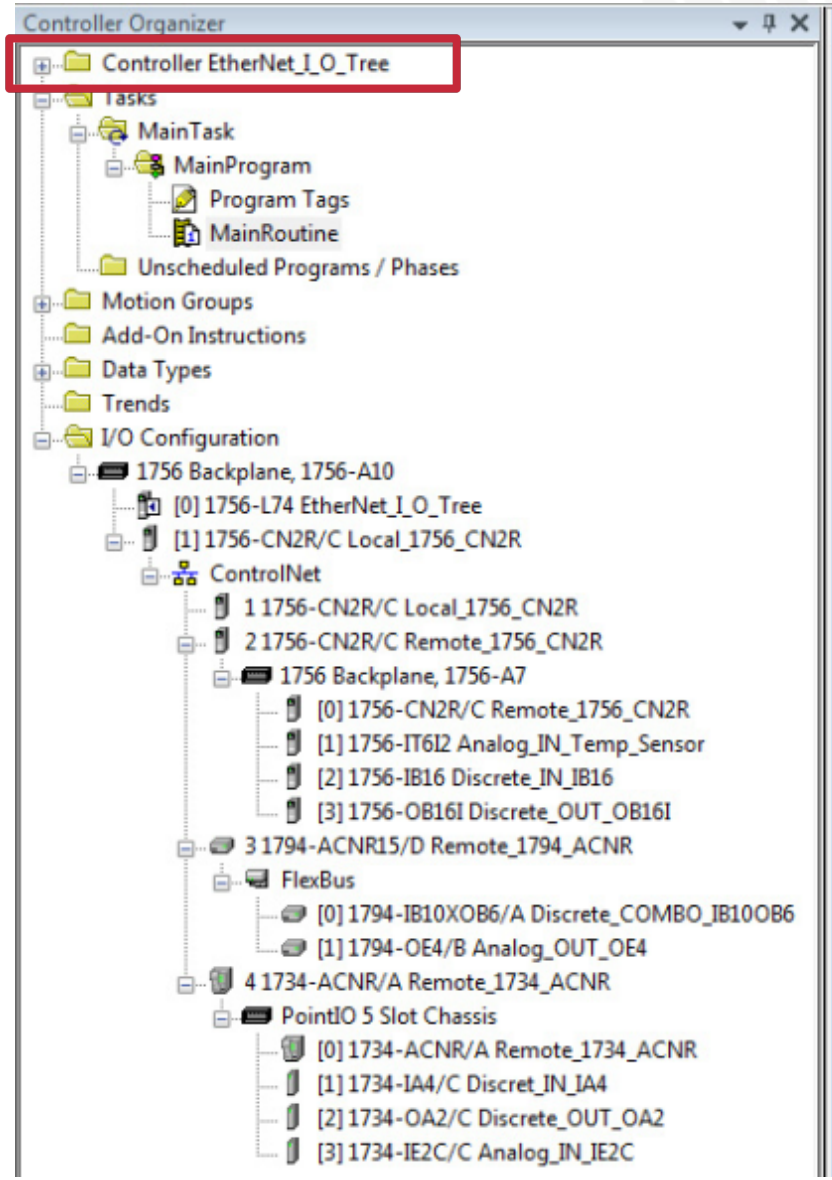


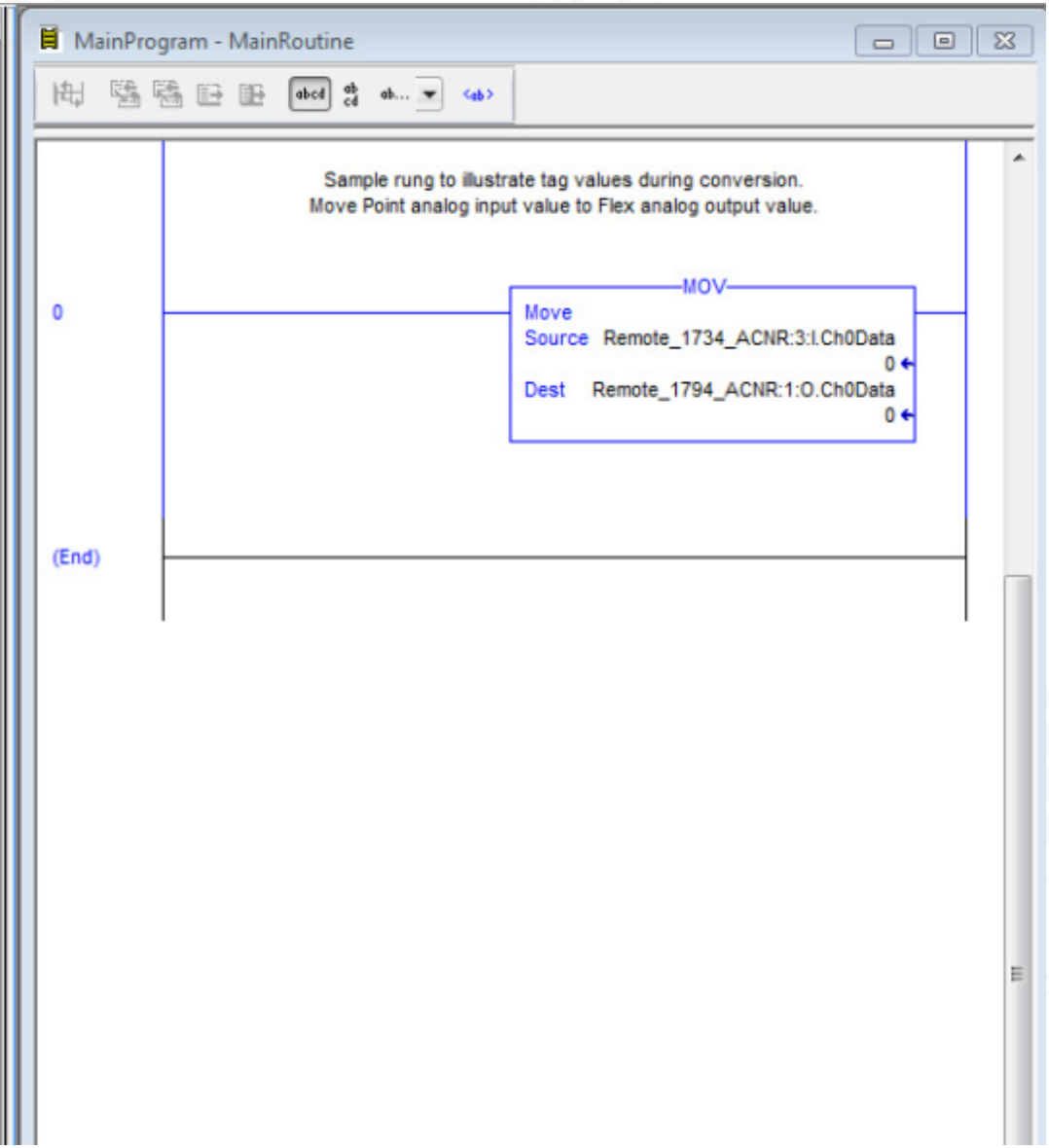


Converting IO Tree

Edit the Name and save as new project.

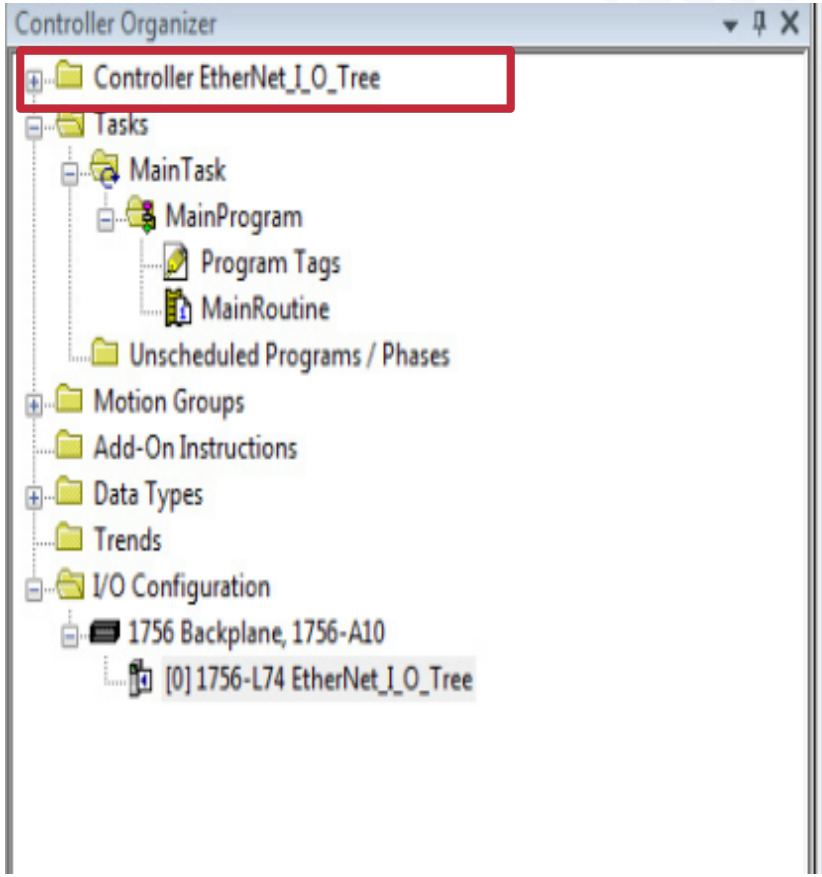
Keep both projects Open.

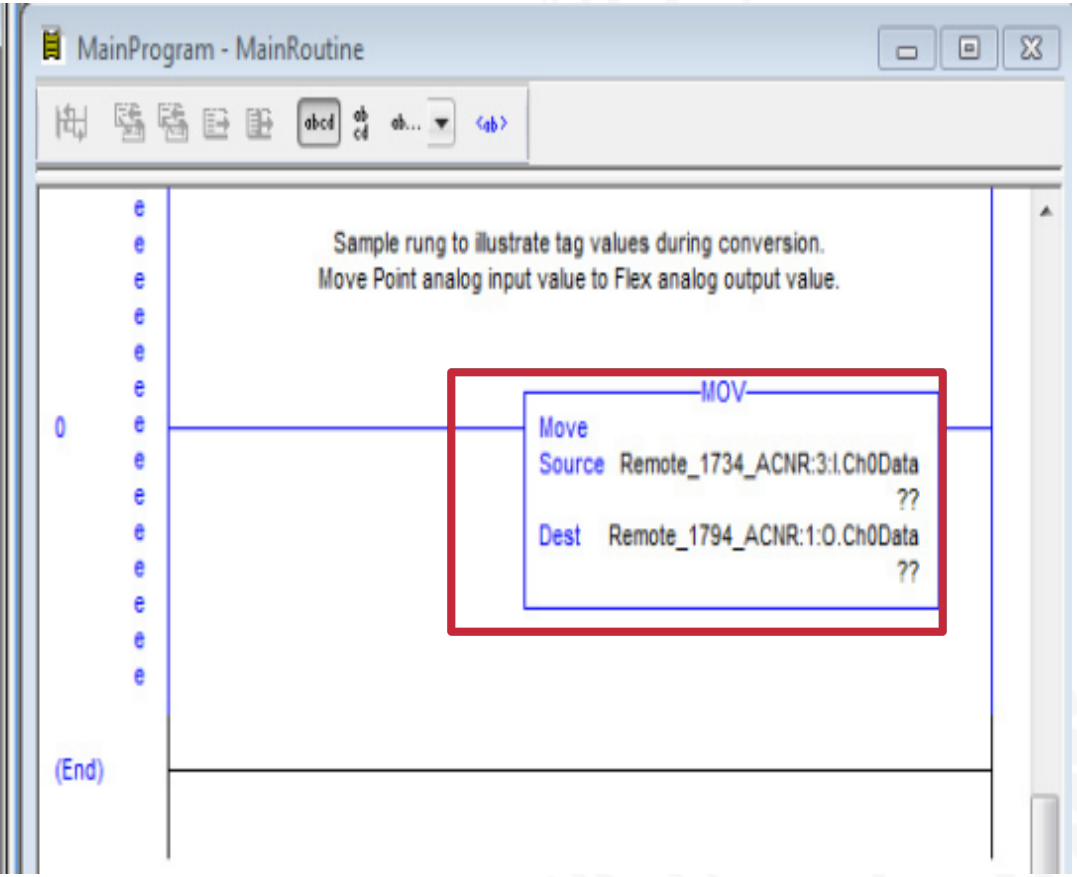




Converting IO Tree

Delete all ControlNet Devices.



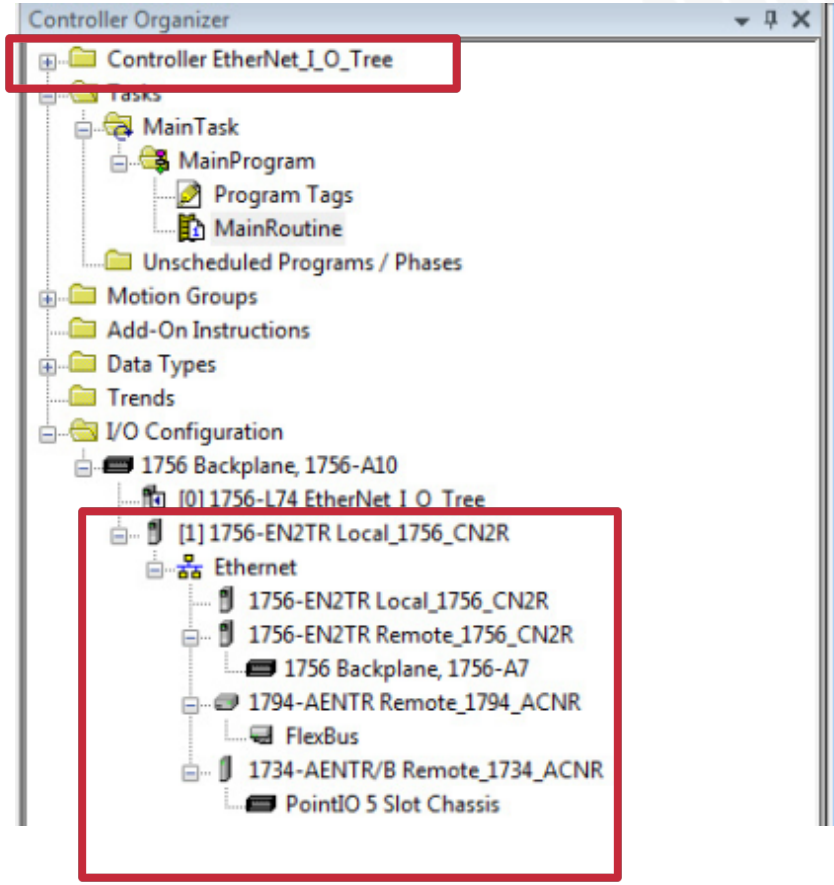


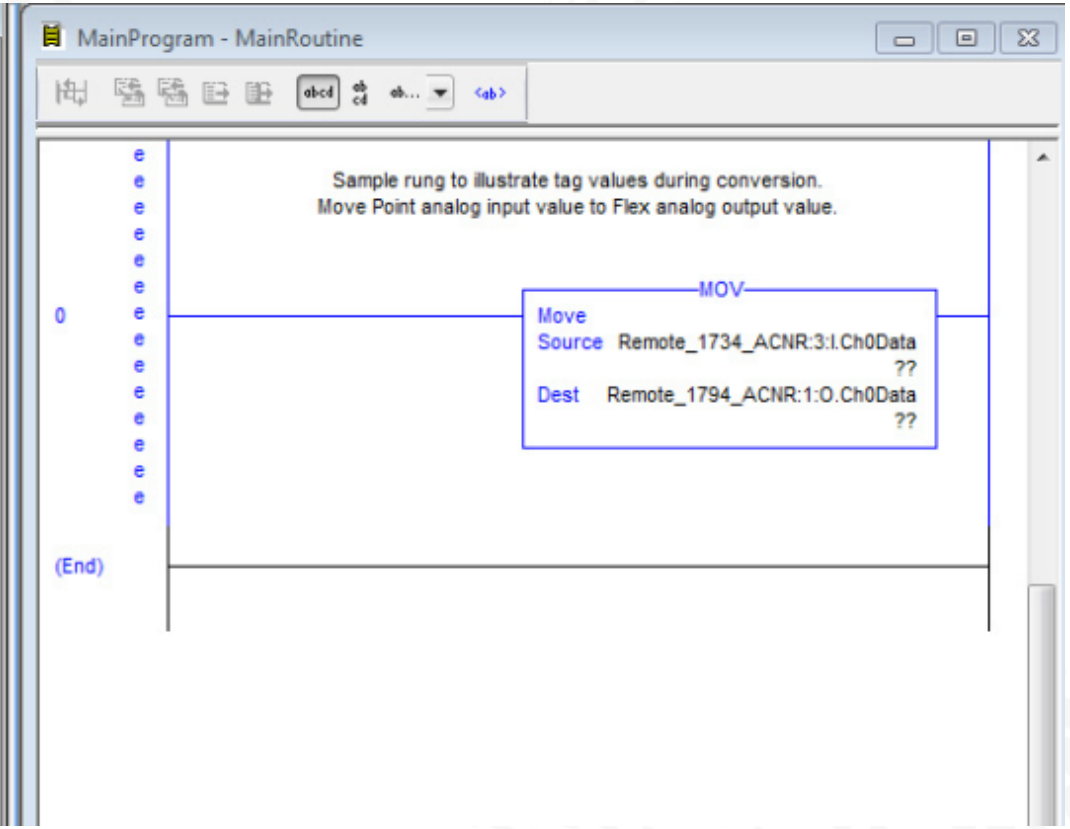
Converting IO Tree

Add EtherNet/IP Network Adapters

Match the new names to old ControlNet device names

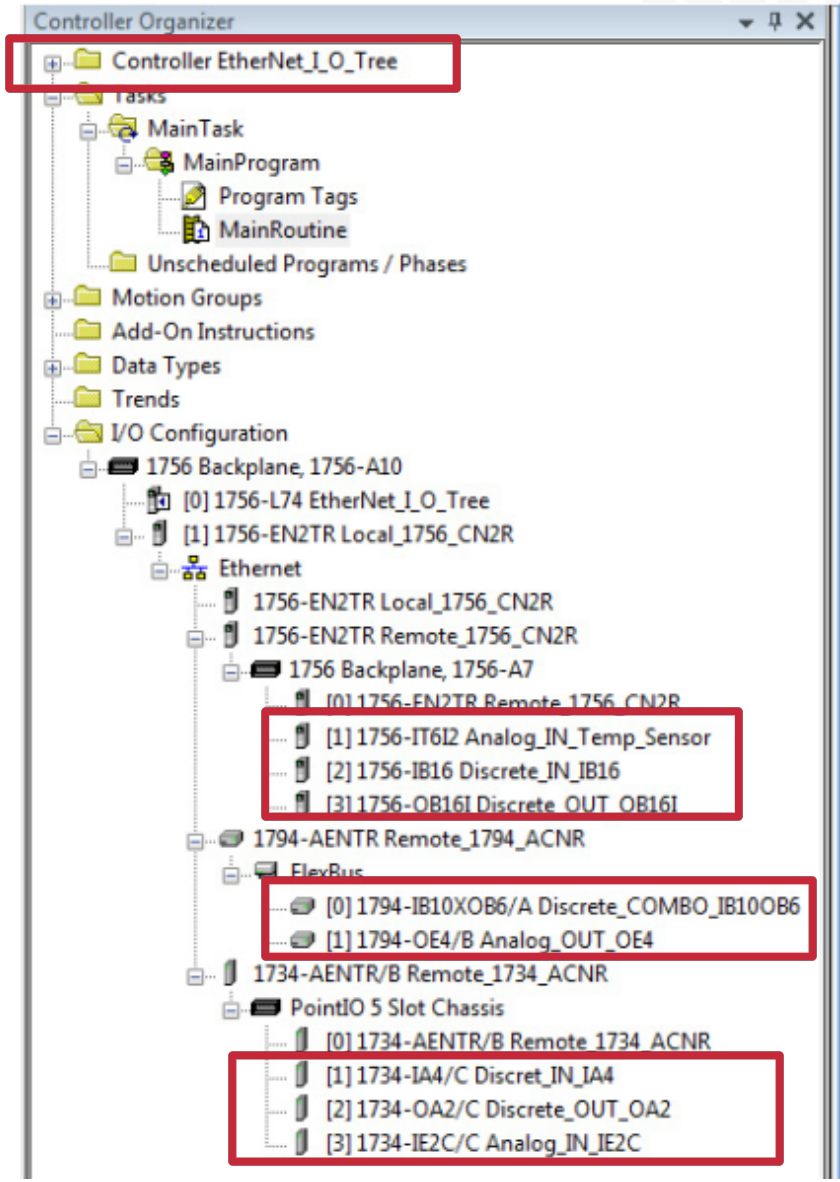
Set new properties such as IP Address and RPI's.

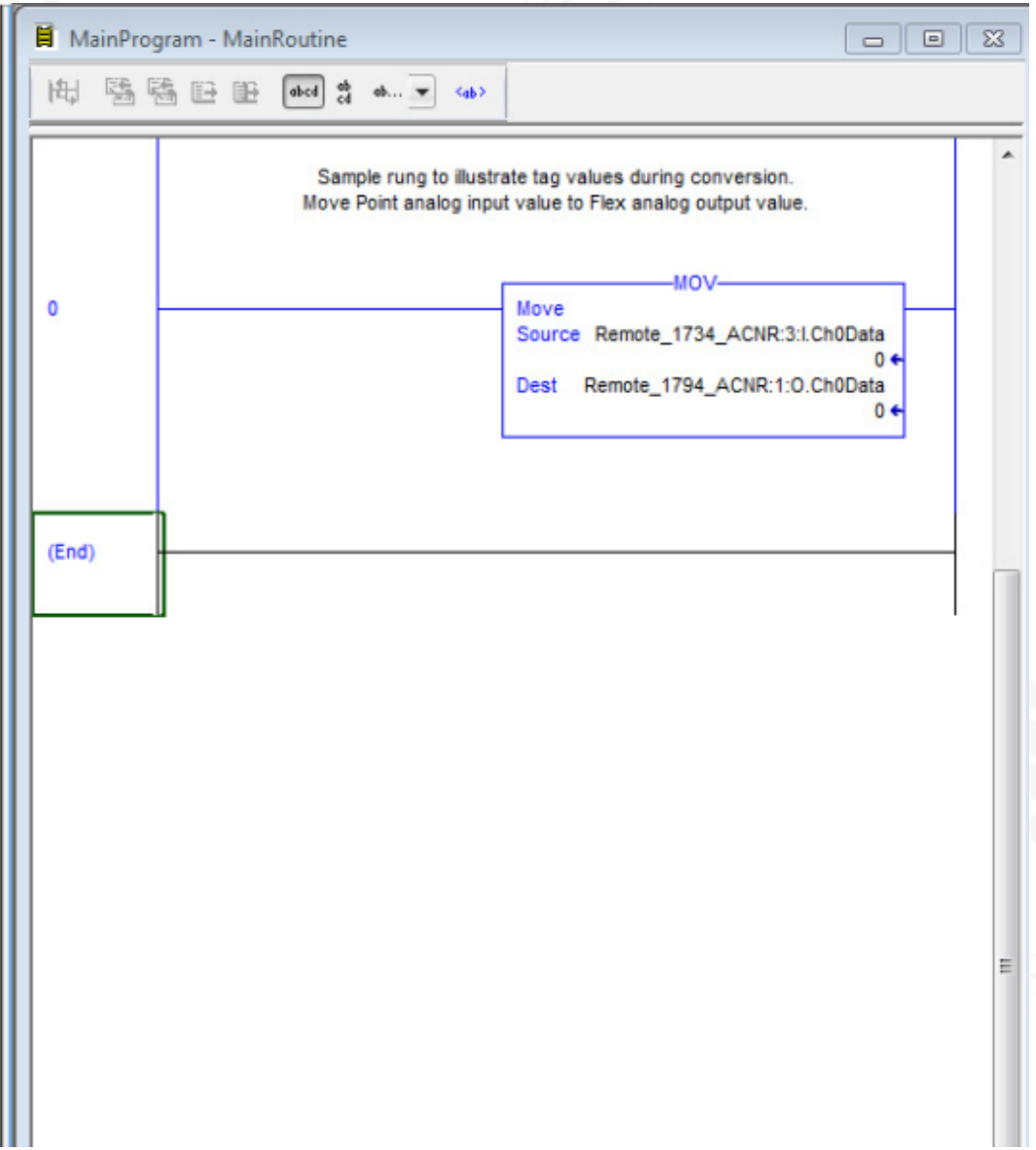




Converting IO Tree

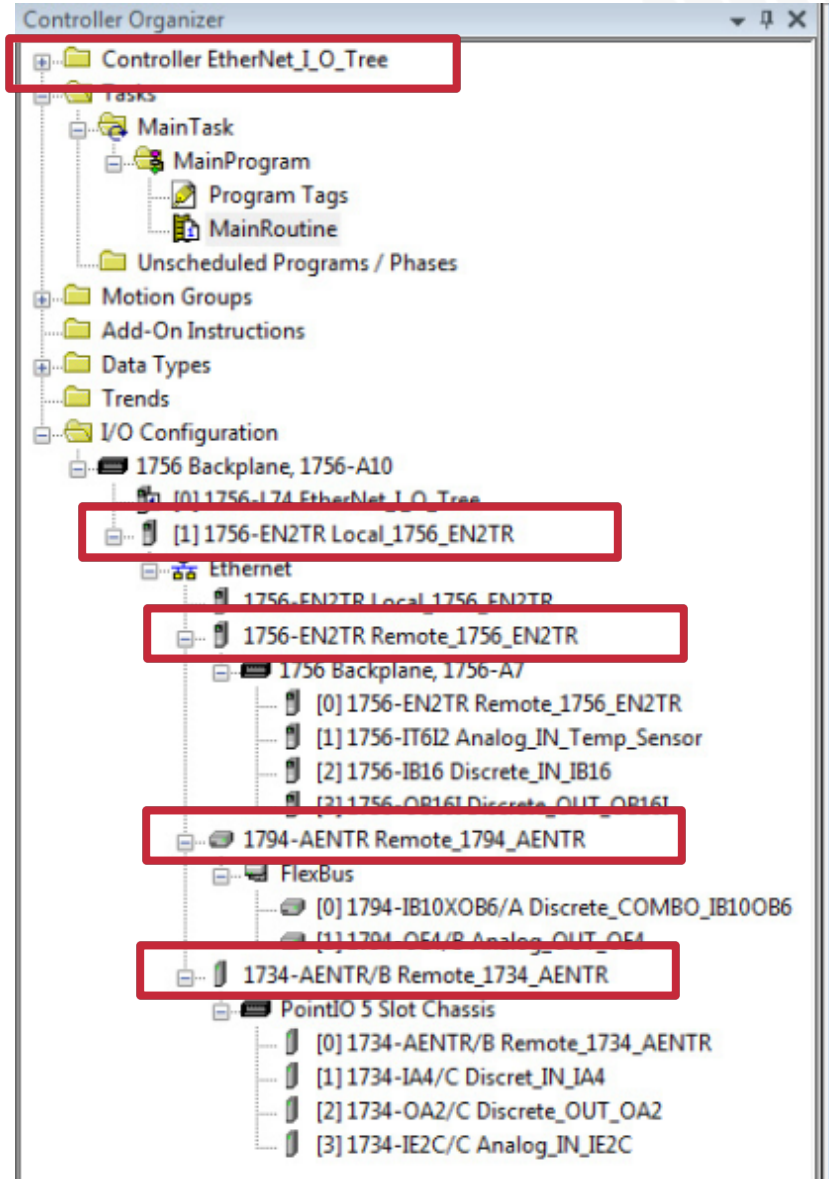
Drag and Drop the IO Modules from Original project.

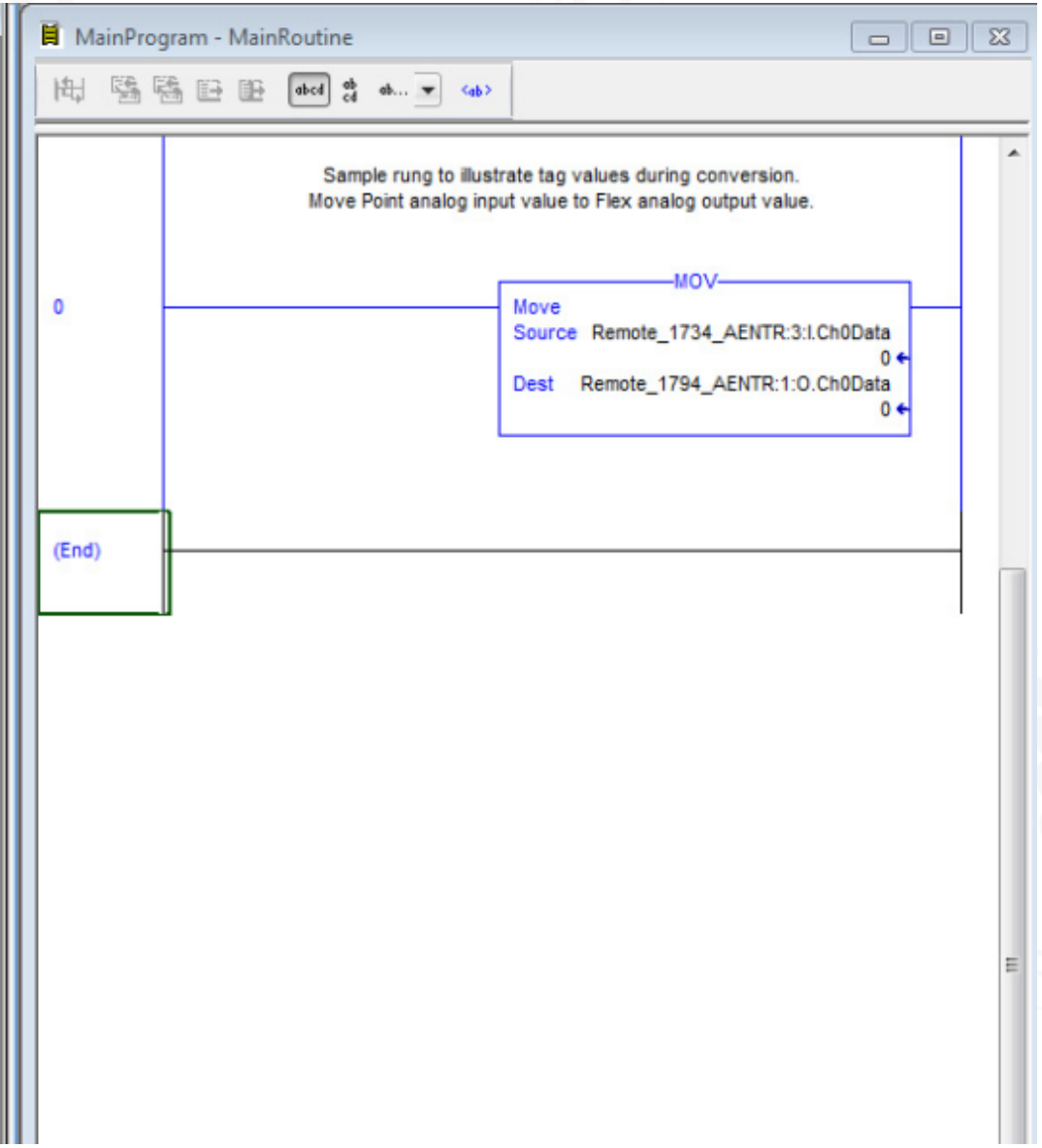




Converting IO Tree

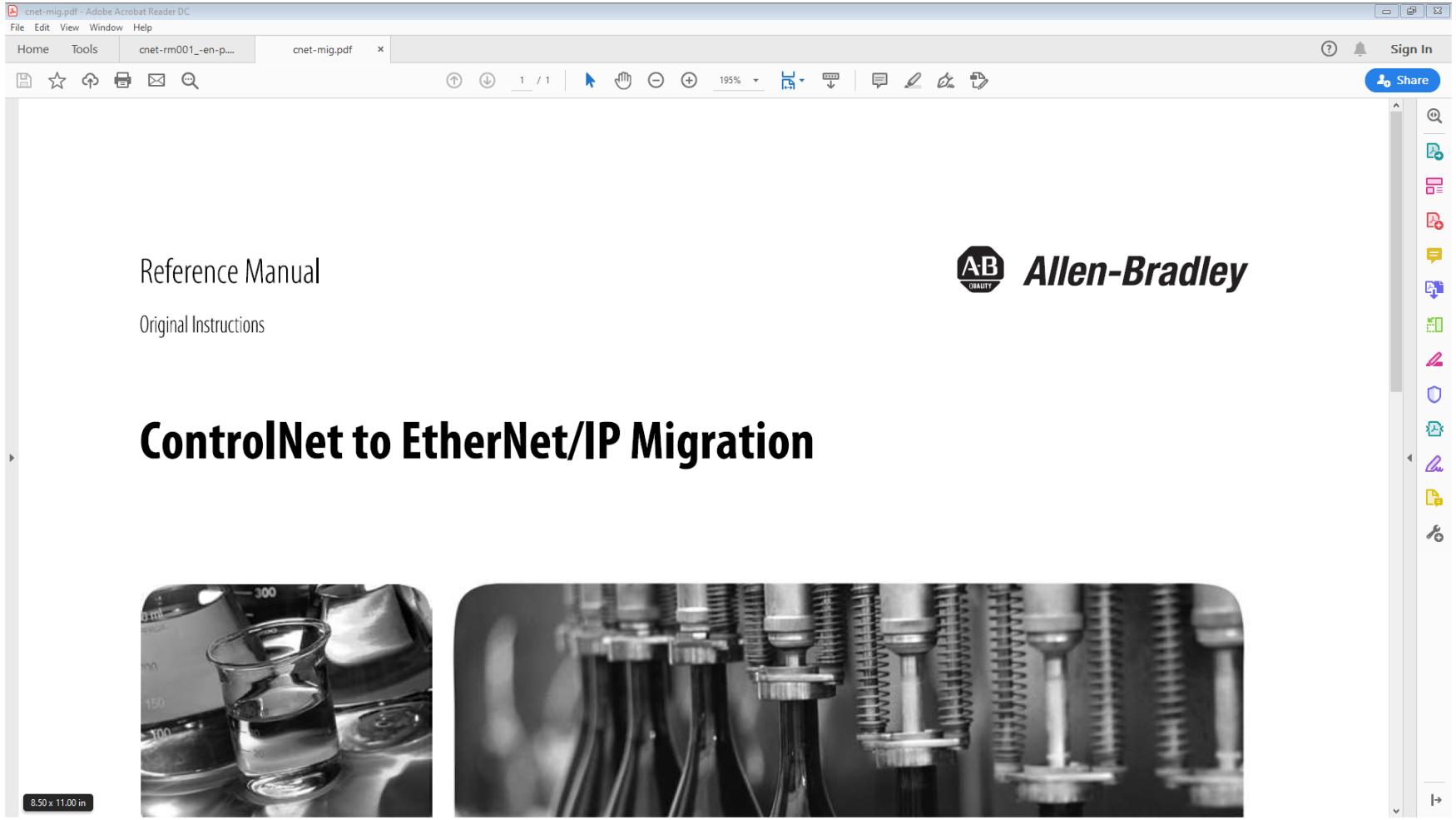
Rename devices in IO tree as appropriate.





ControlNet to EtherNet/IP Migration Guide

Publication CNET-RM001A-EN-P



Thank you

www.rockwellautomation.com