



# CompactLogix™ 5380 Controller Technical Presentation

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High Performance Compact Control

# Agenda

1 Benefits

2 Differentiators

3 Features

4 Applications

5 Positioning

6 Technical  
Presentation

# CompactLogix™ 5380 Controller

## Small Control Platform

- High Performance
- Dual Configuration Port





# CompactLogix™ 5380 Controller

## High Performance

Dual 1 gigabit (Gb) embedded Ethernet port

High-speed communication, I/O and motion

Decreased scan times for runtime performance

Core programming languages execute with the same performance

Screw-to-screw performance increased with Compact 5000™ I/O system



# CompactLogix™ 5380 Controller Increased Capacity

Up to 20% increased application capacity

Supports up to 32 axes of motion

Supports up to 180 EtherNet/IP nodes

Supports the increasing number of smart devices



# CompactLogix™ 5380 Controller

## Motion Performance

Supports up to 32 drives in a controller

Increased performance for low axis machines

1 ms for 32axis

Multiple course update rates

Three configurable rates enhance machine performance

Advanced tuning with Load Observer and Tracking Notch Filter

Helps eliminate the required tuning of each axis and adapts to changing frequencies over time



# CompactLogix™ 5380 Controller Enhanced Security

Digitally signed and encrypted firmware

Helps protect against malicious intent

Controller-based change detection

Logging of changes allows added security

Role-based access control to routines and add-on instructions

Mode change switch

Adds a physical layer for security

# CompactLogix™ 5380 Controller

## Hardware Features

- Onboard Display
  - Immediate status of communications, module health and I/O fault activity without opening Studio 5000 Logix Designer® application
- Enhanced Security
  - Features digitally signed controller firmware, controller-based change detection and logging, and role-based access control
  - Three-position mode switch adds a physical layer of security
- USB Port
  - Provides easy programming, troubleshooting and firmware updates
- Power
  - Provides power via RTB for distributed power distribution to I/O reducing wiring cost
- Ports
  - Dual configurable Ethernet port supports DLR/Linear topologies or two IP addresses for network separation between the machine level and the enterprise level
- Compact 5000™ I/O
  - Supports up to 31 local I/O modules
  - AC/DC digital input/output, high-speed counter, EtherNet/IP adapter, analog, digital, universal analog input, address reserve, field power distribution, relay output, serial module



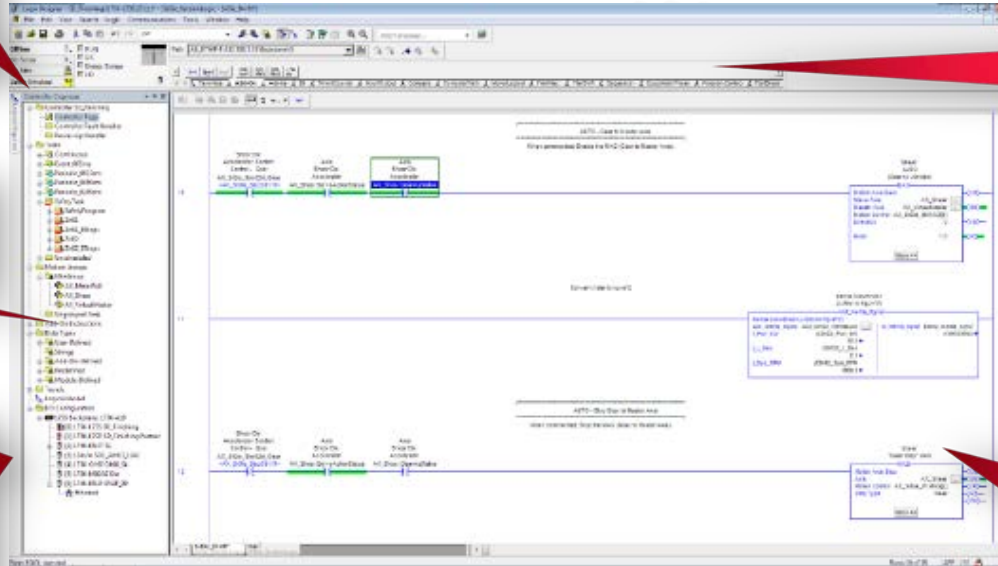
# Studio 5000 Logix Designer® Applications

## Software Features

Controller organizer allows for easy organization of projects

Integrated safety and motion in an intuitive design environment

Simplified device configuration allows for set control and attributes and descriptive tags



Instruction palette contains over 250 predefined instructions

Add-on instructions allow for customization of reusable instruction sets

# CompactLogix™ 5380 Controller Applications



Food & Beverage



Water / Wastewater



Mining / Metals / Cement



Oil & Gas



Semiconductors & Electronics



Automotive



Marine



Life Sciences



# Technical Presentation

# CompactLogix™ 5380 Controller Highlights

The CompactLogix™ 5380 controller is being introduced to enable faster system performance.

- The dual 1-Gb embedded EtherNet/IP port enables The Connected Enterprise by helping customers connect information from across the plant floor to the rest of the enterprise.
- Customers with the following challenges have found the CompactLogix™ 5380 controller exceeds expectations in the following ways:

## Code execution-time limitations

- Structured text = ladder performance

## High axis count applications

- 32 axes per controller supported

## High-performance applications

- Both local and distributed I/O performance increased with Compact 5000™ I/O
- Motion coarse update rate performance increased

Applications	5380	5370
General Purpose	✓	✓
Complex	✓	
High Performance	✓	
Safety	✓	✓
PhaseManager™	✓	✓
Integrated Motion on the EtherNet/IP Network	✓	✓

# CompactLogix™ 5380 System

## Target Applications/Positioning

- CompactLogix™ 5380 Controllers:

Lead with the value of faster system performance, future-proofing your system and enabling The Connected Enterprise.

Introduce CompactLogix™ 5380 controller if:

- Customer values faster system performance

- Customer wanted faster I/O performance

- We have not met performance requirements with the CompactLogix™ 5370 controller

- CompactLogix™ 5370 Controllers:

- IP67 requirements

- Customer does not value the CompactLogix™ 5380 controller

- Customer is satisfy with the existing 1769 system performance

## CompactLogix™ 5380



## CompactLogix™ 5370



# Controller Communications

## Communications no longer impacts controller performance!

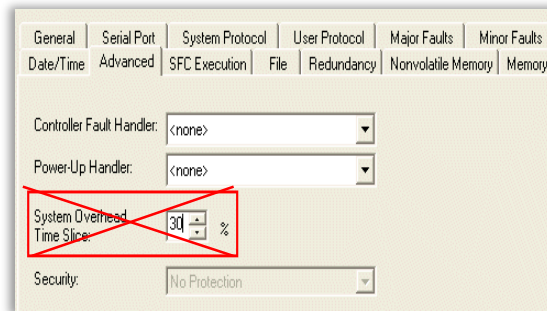
- Communications are separated from control

User control and motion tasks are not interrupted by communications

Previously 20% of the controller scan was used for CPU communications

Provides reduced complexity for user programming and task balancing

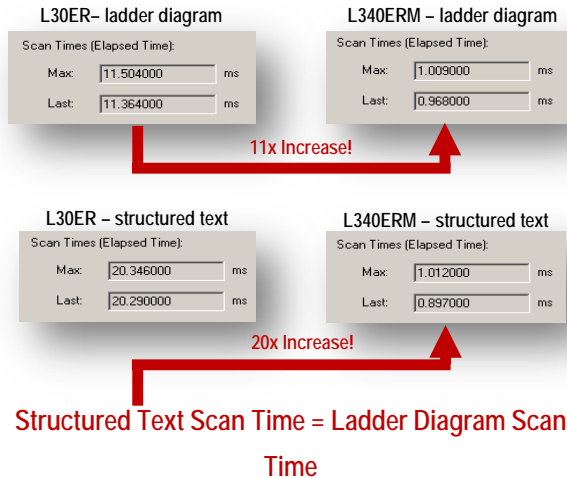
System overhead time slice removed - users are not required to adjust



# Programming Language Execution and Task Switching Enhancements

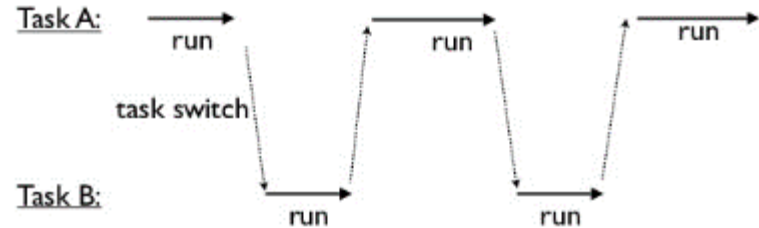
## Controller Language Scan Times

- Five LD routines with 1,000 rungs each
- Five Stratix® routines with 1,000 lines each  
1,000 ADD / SUB / MUL / DIV / MOD instructions
- 15,000 different program scoped tags, ie: worst case



## Controller Task Switching Times

Controller	Task execution scan time	Task Switch Time
L3x	168 ms	165 μs
CompactLogix™ 5370	45 ms	42 - 45 μs
CompactLogix™ 5380	09 ms	09 - 10 μs

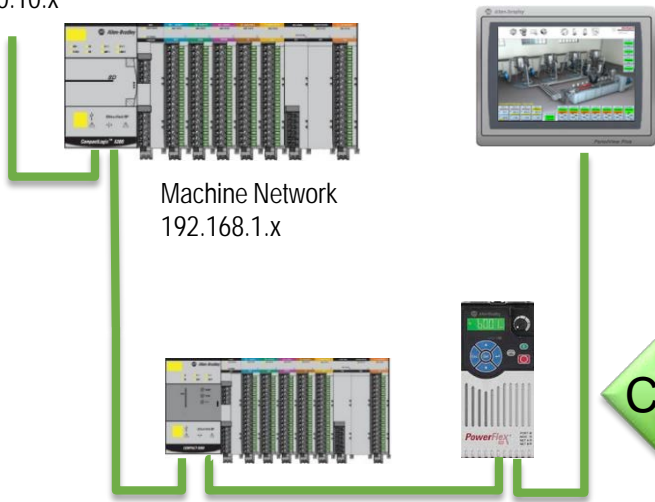


# Dual Configurable Ports for CompactLogix™ 5380 Controller

## Dual IP Mode

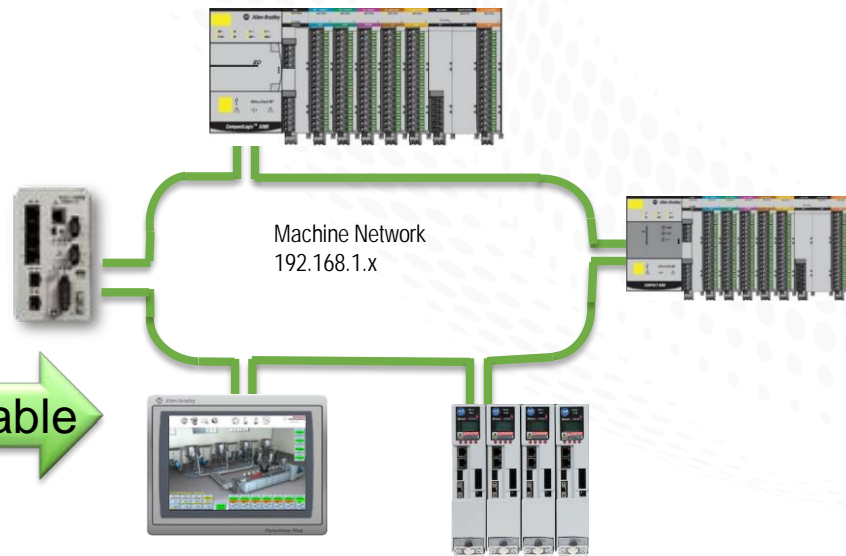
- Machine internal network is isolated from factory network

Factory Network  
10.10.10.x



## Device Level Ring Mode

- Increased availability with network resiliency





# Better in a Smaller Package

## Dual IP Mode

- Lower investment cost with higher performance

- Better limits

Nodes up to 180 nodes

Full utilization of user memory

## Device Level Ring Mode

- Reduce panel space with smaller space requirements. Compact 5000™ I/O are also 40% smaller than CompactLogix™ 1769 I/O.
- Better diagnostic with four digit scrolling display on front of CPU
- Better secured with encrypted, Digitally Signed firmware

CompactLogix™ 5370	CompactLogix™ 5380	L4x	CompactLogix™ 5380
1769-L30ER	5069-L310ER	1768-L43	5069-L320ER
1769-PA4		1768-ENBT x 2	
1769-ECR		1768-PA3	
		1769-ECR	
Width: 143 mm	Width: 98.1 mm	Width: 331.58 mm	Width: 98.1 mm
Reduction: ~ 30%		Reduction: ~ 70%	

# Enhanced Diagnostics

CompactLogix™ 5380 controller task monitor is now part of product embedded webpage

Expanded navigation menu on the left side of the webpage:

- Home
- Tasks
- Diagnostics
  - Module Diag
  - EtherNet/IP
  - Network Set
  - Application C
  - Bridge Conn
  - Ethernet Sta
- Advanced Di
  - TCP/IP Ne
  - ICMP S
  - IP Stat
  - UDP X
  - TCP S
  - Interfa
  - ARP Tr
  - IP Rou
  - TCP Co
  - UDP L
  - 1568 PTP
  - Browse Chassis

Home tab selected. Device information table:

Device Name	5069-L340ERM/A
Device Description	
Device Location	
Ethernet Address (MAC)	F4:54:33:92:72:A8
IP Address	192.168.1.23
Product Revision	28.002
Firmware Version Date	Oct 29 2015, 15:20:01
Serial Number	60794C95
Uptime	5 days, 20h:14m:43s

Control Tasks CPU Usage

Control

MSG (Class 3)

IO (Class 3)

Control Task List

Name	Type	Prio	Prk	OK	Run Tm	Sec Run Time (s)	Prk Run Time (s)	Avg Run Time (s)	Priority (s)	Time (s)	Status	Input Address
System	Control	0	0	0	0	0	0	0	0	0	Running	0x00000000
SubModule	Periodic	20000	0	0	0	0	0	0	0	0	Running	0x00000000
IO	Control	0	0	0	0	0	0	0	0	0	Running	0x00000000
Msg	Control	0	0	0	0	0	0	0	0	0	Running	0x00000000
Modbus	Periodic	20000	0	0	0	0	0	0	0	0	Running	0x00000000
Task	Control	0	0	0	0	0	0	0	0	0	Running	0x00000000
IO	Control	0	0	0	0	0	0	0	0	0	Running	0x00000000
Modbus	Periodic	20000	0	0	0	0	0	0	0	0	Running	0x00000000
Task	Control	0	0	0	0	0	0	0	0	0	Running	0x00000000
IO	Control	0	0	0	0	0	0	0	0	0	Running	0x00000000

# CompactLogix™ 5380 Controller Runtime Memory Usage

Previously, design recommendations instructed users to reserve no less than 20% of available memory for future firmware updates and for runtime memory consumers.

- For example: MSG instructions, HMI Trends, Alarms, RSLinx®, Online Edits
- The CompactLogix™ 5380 controller runtime memory is now separated from application memory, freeing up application memory
- In addition, the higher memory version is now available

CompactLogix™ 5370 Controller	Memory Size (MB)	% Utilization Recommended
L30ER	1	80%
L33ER	2	80%
L36ERM	3	80%
L37ERM	4	80%
L38ERM	5	80%

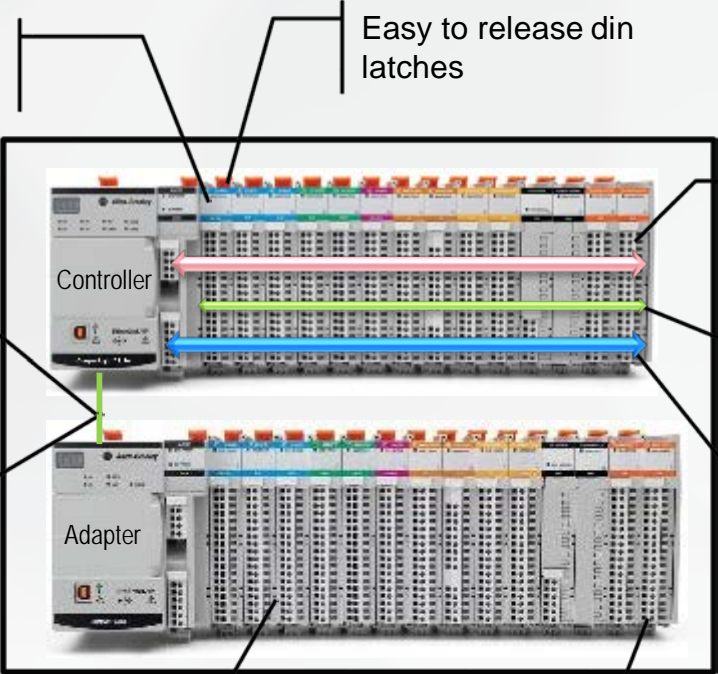
CompactLogix™ 5380 Controller	Memory Size (MB)	% Utilization Allowed
L306ER/ERM	0.6	100%
L310ER/ERM	1	100%
L320ER/ERM	2	100%
L330ER/ERM	3	100%
L340ER/ERM	4	100%
L350ERM	5	100%
L380ERM	8	100%
L3100ERM	10	100%

**CompactLogix™ 5380 controllers have 20% more memory!**

# System Highlights with Compact 5000™ I/O

Easy identification with clear module type and product catalog number

Easy to release din latches



Instantaneous trigger to controller via events triggers

High-speed backplane of packet transfer rate of 4.4 μs (511 byte packet)

Pass through field power to reduce field power termination to I/Os

Gigabit network

Dual IP address/DLR selectable

Increased embedded functionality for better performance at lower cost

Increased accuracy with time stamping of inputs and scheduled outputs

# Performance & Feature Comparisons

Features	CompactLogix™ 5370 L3	CompactLogix™ 5380 L3
Overall performance	1x	5x-20x
Memory	1-5 MB	0.6-10 MB
Axis per controller	16	32
Axis per ms (50% CPU loading)	2	32
Number of I/O (Class 0&1) connections	512*	
Number of message (Class 3) connections		
Number of unconnected buffers	40	256
Cached message buffers	32	256
Simultaneous messages	16	256
Embedded ethernet port	10/100Mb	100/1000Mb
Ethernet I/O (Class 0/1) packets/sec	10,000	128,000
Ethernet messaging (Class 3) msg/sec	400	2000*
Integrated motion on EtherNet/IP™	Yes	Yes
Analog motion	No	Future
Integrated safety (SIL 2 PLd / SIL 3 PLe)	Yes	PLd Available Now, PLe Future
Studio 5000 Logix Designer® application	V20+	Version 28+

\* Data size = 32 bits / 1-DINT

	Memory Size	I/O Expansion	Ethernet Nodes	Motion Axes
5069-L306ER	0.6 MB	8	16	0
5069-L310ER	1 MB	8	24	0
5069-L320ER	2 MB	16	40	0
5069-L330ER	3 MB	31	60	0
5069-L340ER	4 MB	31	90	0
5069-L310ER-NSE	1 MB	8	24	0
5069-L306ERM	0.6 MB	8	16	2
5069-L310ERM	1 MB	8	24	4
5069-L320ERM	2 MB	16	40	8
5069-L330ERM	3 MB	31	60	16
5069-L340ERM	4 MB	31	90	20
5069-L350ERM	5 MB	31	120	24
5069-L380ERM	8 MB	31	150	28
5069-L3100ERM	10 MB	31	180	32

# Performance Gain versus CompactLogix™ 5370 Controller

## Controller Performance (1,000 rungs of code (3,000 REAL tags))

- Ladder diagram

5370 – 3.25 ms  
(13x Improvement)

5380 – 240 µs

- Structured text

5370 – 5.50 ms  
(21x Improvement)

5380 – 265 µs

- Function Block

5370 – 8.35 ms  
(7.5x Improvement)

5380 – 1.10 ms

- Sequential function chart

5370 – 6.20 ms  
(20x Improvement)

5380 – 300 µs

## Overall task timing with four programming language running (4,000 rungs/lines of codes & 12,000 REAL tags)

- Both controllers running with 50% CPU loading with virtual axis. RPI for the CompactLogix™ 5370 I/O is 0.5 ms

5370 – 82.10 ms

5380 – 4.10 ms

**(20x improvement)**

# Performance Gain versus CompactLogix™ 5370 Controller

## Communication Performance

- Unconnected MSGs per second (20 enabled connecting to L8 controller)

5370 – 80 MSG/s  
**(21x Improvement)**

5380 – 1665 MSG/s

- MSG round-trip time (connecting to L75 x controller)

5370 – 265 ms  
**(18x Improvement)**

5380 – 15 ms

## I/O Performance

- Local DI/DO modules at fastest RPI

IQ16F/OB16 - 5370 (500  $\mu$ s) – 3-4ms  
**(6-7x Improvement)**

IB16F/OB16F – 5380 (200  $\mu$ s) – 400-600 $\mu$ s

## Motion Performance

- CompactLogix™ with 50% motion load with two ms CUR

Number of virtual axes: 30

Motion task scan time: 980  $\mu$ s

Controller utilization: 48.9%

- CompactLogix™ 5380 with 50% motion load with 2 ms CUR

Number of virtual axes: 115

Motion task scan time: 960  $\mu$ s **(4x Improvement)**

Controller utilization: 47.8%

# CompactLogix™ 5380 System

High performance or complex CompactLogix™ L3 applications that require higher CPU scan time, I/O, network and motion performance

- Core programming languages now execute with the higher performance
- Up to 32 motion axes supported per CompactLogix™ 5380 controller (up to 16 axes in the CompactLogix™ 5370 controller)
- Up to 180 network nodes supported per CompactLogix™ 5380 controller (up to 90 nodes in the CompactLogix™ 5370 controller)

Example CompactLogix™ 5370 Architecture:

- 1 x 1769-L36ERM controllers
- 1 x 1769-PA4
- 1 x 1769-ECR



Example L4 Architecture:

- 1 x 1768-L43/45 controllers
- 1 x 1768-M04SE
- 1 x 1768-PA3
- 1 x 1769-ECR
- 1 x 1768-ENBT



- 1 less power supply module
- 1 less end cap cover



- 1 less power supply module
- 1 less SERCOS motion module
- 1 less Ethernet module
- 1 less end Cap cover

**\*Reduced system complexity and cost savings**

Example CompactLogix™ 5380 Architecture  
(1) L340ERM controller





# CompactLogix™ 5380 System

High performance or complex CompactLogix™ L3/L4 applications that requires two Ethernet network segments

**\*Reduced system complexity and cost savings**

Example CompactLogix 5380™ Architecture:

- 1 x 1769-L36ERM controllers
- 1 x 1769-PA4
- 1 x 1769-ECR
- 1 x 1783-NATR



Example L4 Architecture:

- 1 x 1768-L43/45 controllers
- 1 x 1768-M04SE
- 1 x 1768-PA3
- 1 x 1769-ECR
- 2 x 1768-ENBT



One less power supply module  
One less end cap cover  
One less network address translator module



One less power supply module  
One less SERCOS motion module  
Two less Ethernet module  
One less end cap cover

Example CompactLogix 5380™ architecture (1) L340ERM controller



# CompactLogix™ 5380 System Benefits

## Number of Nodes

Customers have been asking us to simplify the way we count controller resources

- The CompactLogix™ 5380 controller continues to be scaled on EtherNet/IP nodes just like the CompactLogix™ 5370 controller.

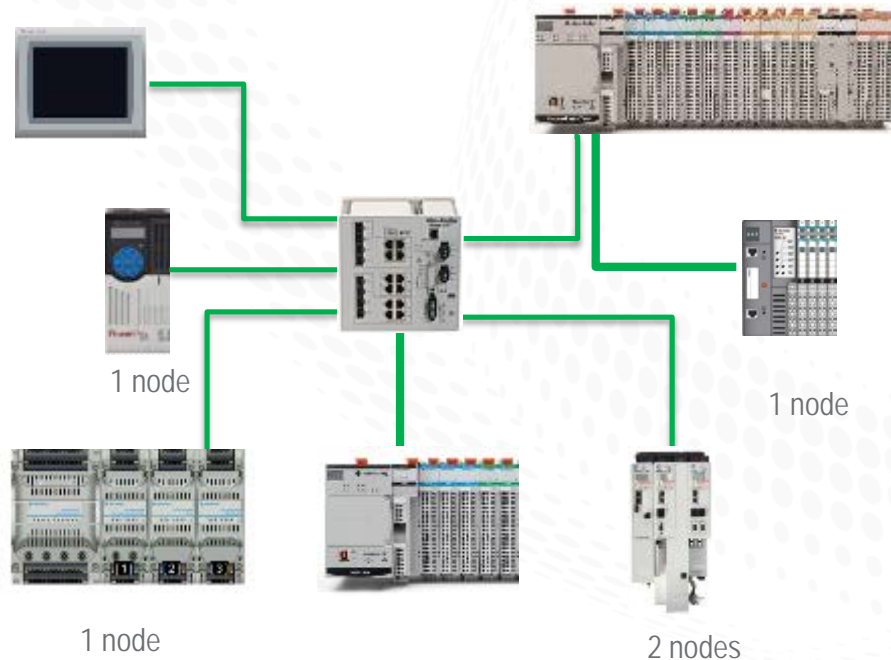
Each CompactLogix™ 5380 controller has a maximum number of EtherNet/IP nodes that are supported

Maximum controller nodes include those connected to the front port and backplane communication modules

Any device added directly to the Ethernet I/O configuration are counted toward the node limits

Standard Ethernet devices that the controller uses a socket interface to communicate with are NOT counted toward the node limits

Example	Memory Size	EtherNet/IP Nodes
5069-L320ER	2 MB	40
5069-L340ERM	4 MB	90



There are 7 EtherNet/IP nodes in this architecture

# CompactLogix™ 5380 Controller Configuration

- What is needed for configuration?
  - Dual IP support – Studio 5000® V29 and above
  - RSLinX® Classic 3.81 and above
- Compatibility Matrix
  - Connects to Compact 5000™ I/O locally and remotely
  - Connects to any other I/O platform via EtherNet/IP

# CompactLogix™ 5380 Controller Important Notes

- DeviceNet® Network

Use EN2DN gateways to connect DeviceNet® devices to the CompactLogix™ 5380 controller

- Applications requiring PhaseManager™ software

It is supported in version 32

- ControlNet® Networks

No plans to support, stay with L4x or ControlLogix® controller

- Serial FW

5069-SERIAL supporting Generic ASCII, Modbus Master/Slave has been released. FW support on DF1 and DH-485 is in development

- Dimension

143.97 x 98.10 x 136.81 mm (HxWxD)

- Accessories

Screw type

5069-RTB64-SCREW (each packaging includes 1 x 6 pin and 1 x 4-pin terminal)

Push-in type

5069-RTB64-SPRING (each packaging includes 1 x 6 pin and 1 x 4-pin terminal)

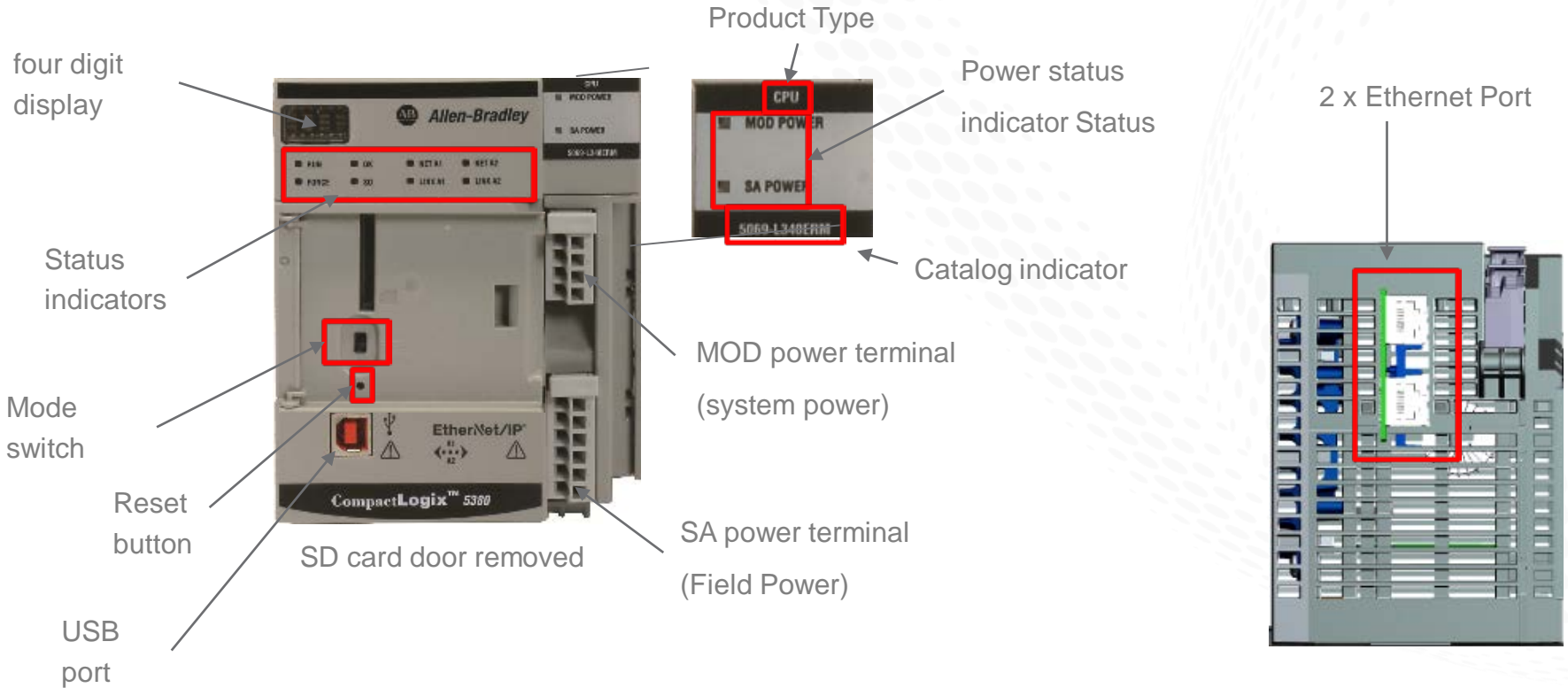
End cap

Included in the controller and adapter

For replacement, please order 5069-ECR



# CompactLogix™ 5380 Controller Anatomy



**Note: Power terminals are sold separately**

# Catalog Nomenclature

5069 - L 3 10 E R M S2 K

## Bulletin number

5069 – Next generation  
CompactLogix™ family

## Catalog Type

L – Controller

## Product Sub Series

3 – CompactLogix™ 5380 L3

## Network Function

R – Dual IP/DLR

## Type

E – Ethernet embedded

## Product Memory Size

06 – 0.6 MB  
10 – 1.0 MB  
20 – 2.0 MB  
30 – 3.0 MB  
40 – 4.0 MB  
50 – 5.0MB  
80 – 8.0MB  
100 – 10.0MB

## Modifier3

K – Conformal Coated

## Modifier2

S2 – Pld controller  
S3 – Ple controller

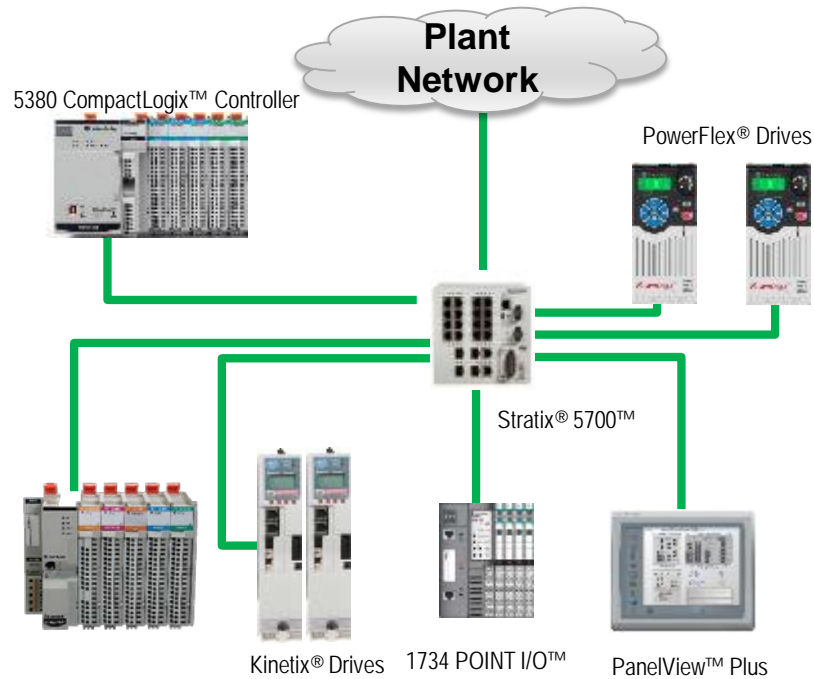
## Modifier1

M – Motion supported  
-NSE – No Storage Energy

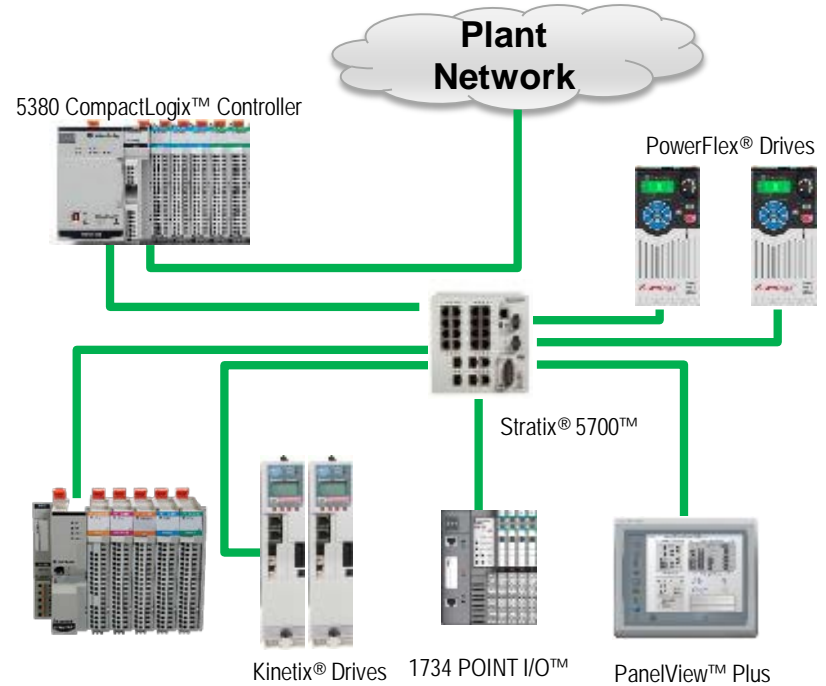
# CompactLogix™ 5380 High Performance Machine Architecture

Star

*Logical separation of control network*



*Physical separation of control network*



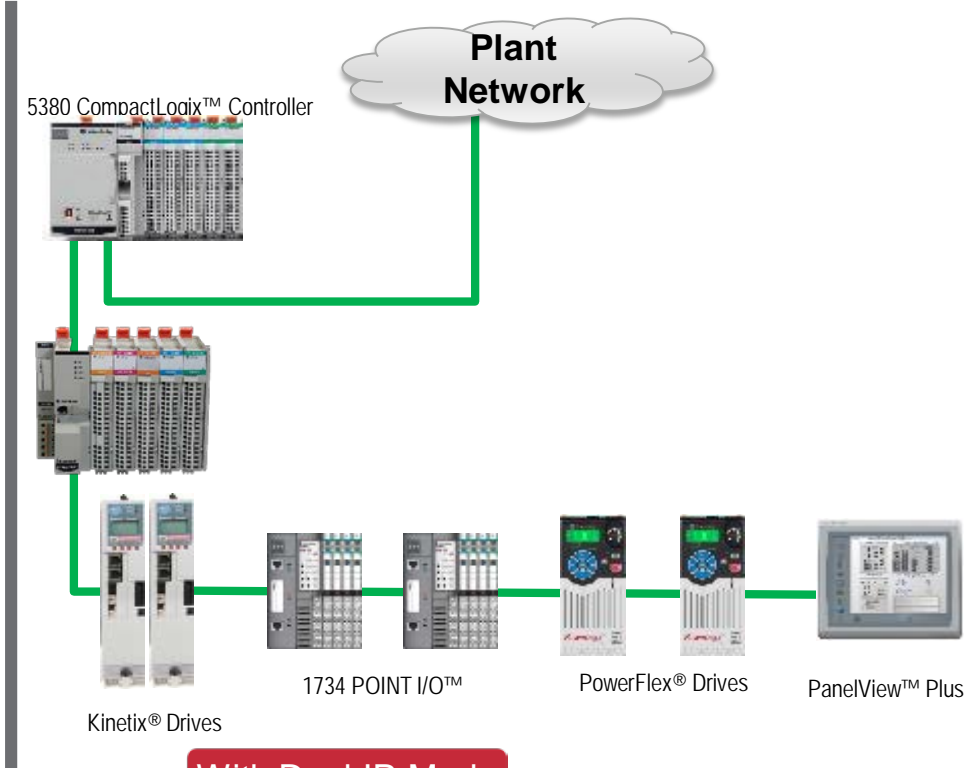
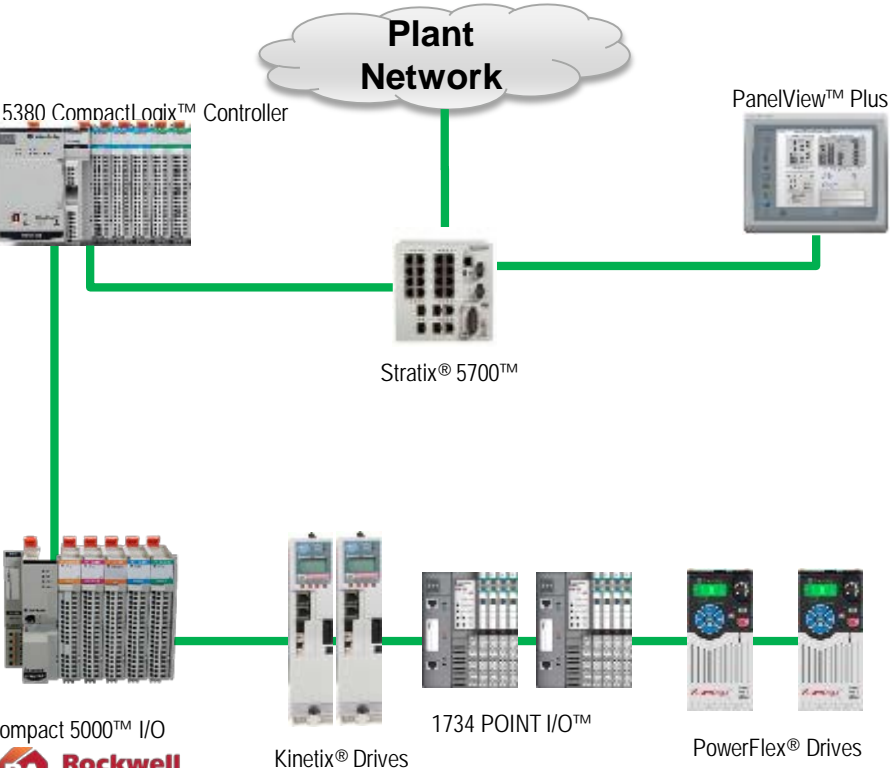
With Dual-IP Mode

# CompactLogix™ 5380 High Performance Machine Architecture

Linear

*Logical separation of control network*

*Physical separation of control network*



**With Dual-IP Mode**

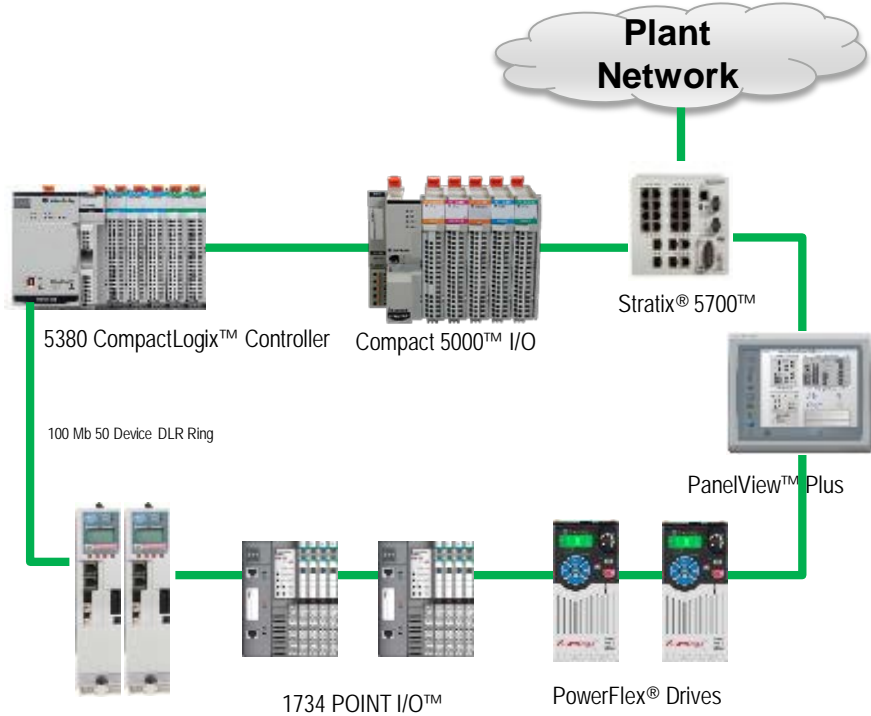




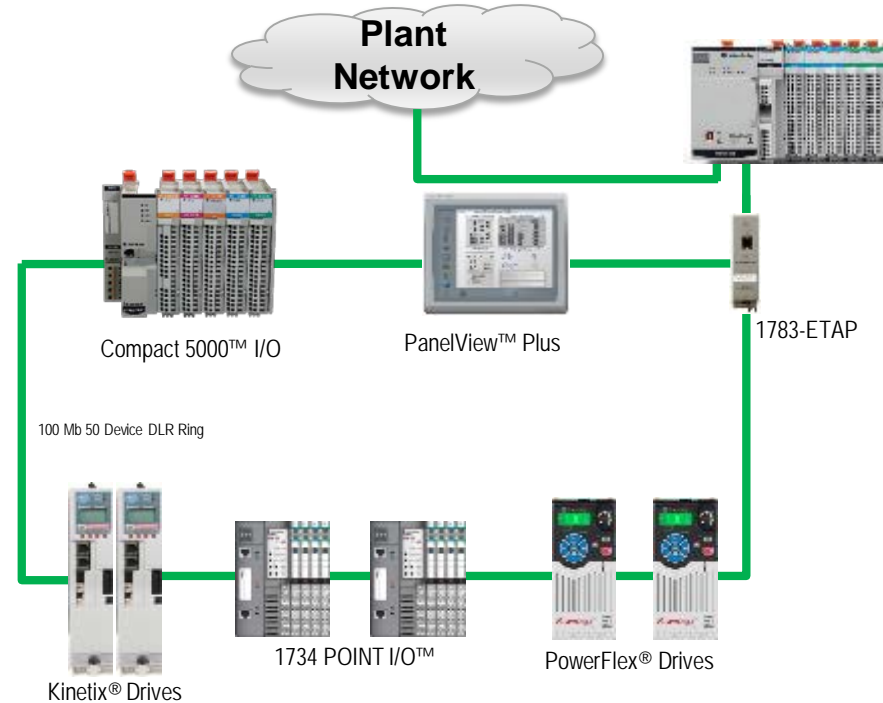
# CompactLogix™ 5380 High Performance Machine Architecture

Device Level Ring

*Logical separation of control network*



*Physical separation of control network*



With Dual-IP Mode

# CompactLogix™ 5380 Controller General Specifications

- Operating temperature
  - 0 °C to + 60 °C (32 °F to +140 °F)
- Storage temperature
  - 25°C to + 85 °C (-40°F to +185 °F)
- Relative humidity
  - 5% to 95% noncondensing
- Maximum altitude
  - 2000 meters (6561 feet)
- Vibration
  - Operating: 5 g, 10 to 500 Hz, 0.030 in. maximum peak-to-peak
- Shock
  - Operating: 30 g DIN rail mounted
  - Nonoperating: 50 g DIN rail mounted

- Certification (At Release)



- Certification (refer to certification website)





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# Thank You

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