CompactLogix™ 5480 Controller

09.16.2020

Commercial Presentation

Rockwell Automation

General Controller Portfolio
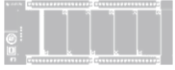
Micro Control Platform
Micro800™ Controller

- Low acquisition cost
- Easy connectivity
- Simple programming tools
- Ideal for standalone machines

Standard Machines
CompactLogix™ Controller

- Multiple control disciplines
- Flexible and scalable
- Real-time information-enabled
- Standard, unmodified Ethernet
- One common integrated design environment
- Local and distributed I/O options
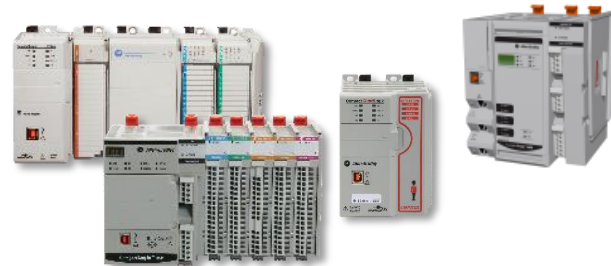
Complex Machines & Process
ControlLogix® Controller

Process Safety
AADvance® /Trusted®
Scalable redundancy for fault tolerance

- Provides safety and availability requirements
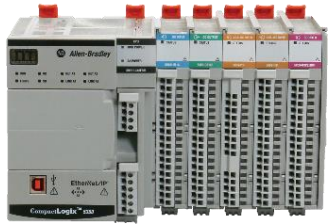- Distributed processing power

CompactLogix™ Controllers

CompactLogix™ 5370

- Integrated Motion on EtherNet/IP up to 16 Axes
- Linear and Device Level Ring network topologies for up to 48 nodes
- Integrated safety up to SIL 3, PLe CAT 4 versions
- On-Machine™ version

CompactLogix™ 5380

- Integrated Motion on EtherNet/IP up to 32 axes
- Two Ethernet ports for dual IP or support for linear and Device Level Ring topologies for up to 80 nodes
- Enables high-speed I/O, motion control
- Enhanced security features

CompactLogix™ 5480

- Enables high-speed I/O, and Integrated Motion on EtherNet/IP up to 150 axes
- Includes 3 GbE Ethernet/IP ports supporting both linear or Device Level Ring topologies up to 250 nodes
- Provides a Logix-based real-time controller that runs in parallel to an instance of Windows 10 IoT (Internet of Things) Enterprise
- Enhanced security features

Multiple disciplines

Flexible and scalable

One common design environment

Why buy the CompactLogix™ 5480 Controller?

Higher Performance Controller

- Complex applications requiring high axis count for motion
- Application requiring high scan rates

Embedded Software

Examples include:

- Using O/S as FactoryTalk® SE Client/Station
- FactoryTalk® Linx Gateway host

Open Core

- Used as interface between communication protocols (MQTT, for example)
- Used as Host for custom applications (MatLab, Maple, etc)

CompactLogix™ 5480 Controllers

Integration of Third-Party Applications

- Run Windows-based software applications alongside the control application on single controller

- Logix runs independently of Windows

- Commercially available CPU for high performance

Simplified Architectures and Smaller Machine Footprint

- Three 1-Gb embedded EtherNet/IP ports for flexible network architectures

- Integrated DisplayPort for direct connection to a high definition industrial monitor

- DisplayPort supports VESA approved converters for HDMI, DVI, VGA displays

- Built-in RSLinx® OPC communication between Logix and Windows

- Dedicated interfaces for Windows 10 IoT Enterprise

Enhanced Security

- Digitally signed and encrypted firmware

- License-based content protection

- Controller-based change detection and logging

- Role-based access control to routines and Add-On instructions

Compact 5000™ Local I/O

- Supports up to 31 local I/O modules

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Windows 10 Internet of Things (IoT) Enterprise

Long-Term Service Branch (LTSB)

What is it and why did we choose it?

- LTSB is a specialized edition of Windows 10 Enterprise that promises the longest intervals between feature upgrades of any Windows operating system (OS)

- Rockwell Automation® worked with Windows to identify the proper OS for industrial control applications

- Supported with security and stability updates for 10 years

What it's not

- Does not have Windows store, Cortana, Edge browser

- Does not have applications like Calendar, Camera, Clock, Mail, Money, Music, OneNote, Sports and Weather

Windows 10 IoT Enterprise
Desktop Shell, Universal Windows Apps, Classic Windows Applications
1 GB RAM, 16 GB Storage
X86

Windows 10 IoT Mobile Enterprise
Modern Shell, Universal Windows Apps
512 MB RAM, 4 GB storage
ARM

Windows 10 IoT Core
No Shell, Universal Windows Apps
256MB RAM, 2GB storage
X86 or ARM

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CompactLogix™ 5480 Controller Ethernet Interfaces

Ethernet Interfaces

B1

- GbE (EtherNet/IP)

- Support for I/O, motion, drives etc.

- Allows domain name, primary and secondary DNS server address attributes ("Uplink" use case)

A1

- GbE (EtherNet/IP)

- Support for I/O, motion, drives etc.

- Individual IP or linear/DLR (w/A2)

A2

- GbE (EtherNet/IP)

- Support for I/O, motion, drives etc.
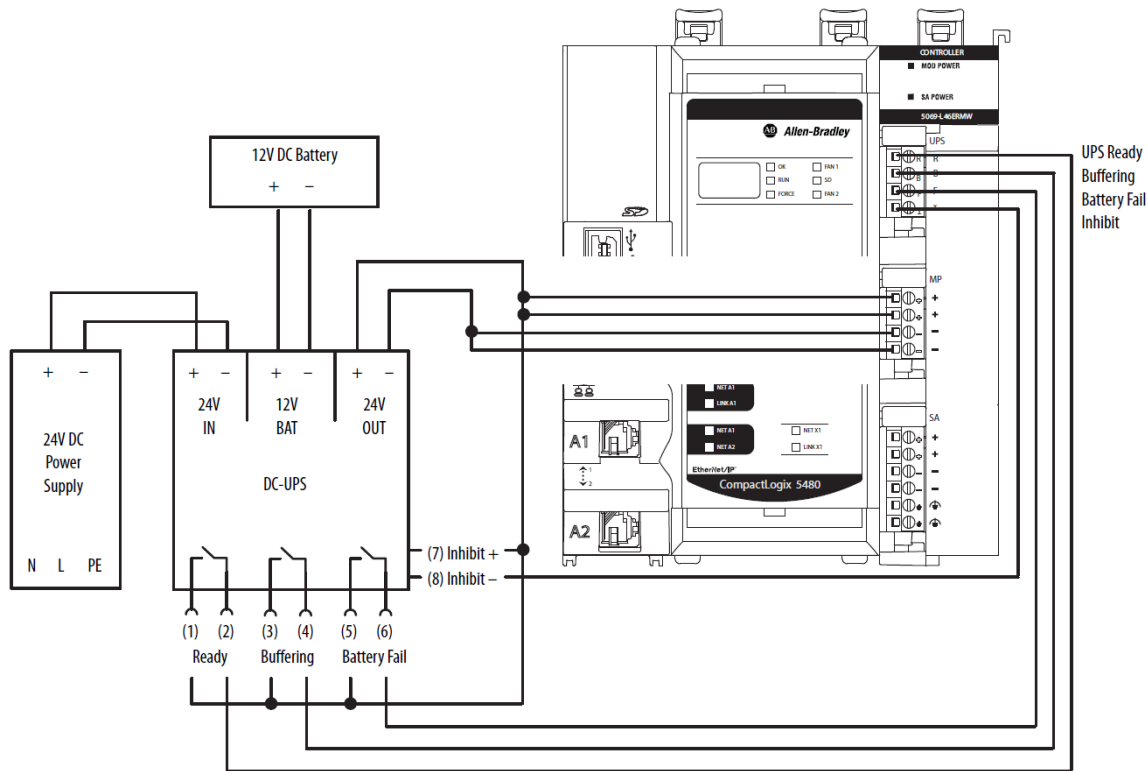
- Individual IP or linear/DLR (w/A1)

X1

- GbE

- Dedicated Windows 10 IoT Interface

- No bridging of I/O

CompactLogix™ 5480 Controller

Uninterruptible Power Supply (UPS)

Why a UPS?

- A UPS functions as the "Remote Energy Storage Module"
- Provides hold up power for the controller and I/O bus during brown out situations

Which UPS do we test with?

- Part Number: 1606-XLS240-UPS

Monitoring via "Get System Value" or GSV instruction

UPS Ready (R), Buffering (B), Battery Fail (F), Inhibit (I)

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What happens when you lose 24V DC power?

- UPS switches to battery power

  Buffering (B): 0 → 1

  UPS Ready (R): 1 → 1 until charge < 85%

- Controller starts a 60-second countdown timer

  Logix and Windows go through controller shutdown

  Adjusting the timer PRE in future release

- Once the timer is done, the controller turns on the Inhibit (I) signal to disable the UPS signal output

Signal	Description
UPS Ready (R)	An input signal from the UPS to the controller that indicates the UPS is working and can buffer during a power failure. The charge level for a UPS to be ready to buffer during a power failure varies. For example, the 1606-XLS240-UPS power supply must be greater than 85% charged to be ready. The letter R indicates the RTB terminal for this signal.
Buffering (B)	An input signal from the UPS to the controller that indicates the UPS battery is providing power because the external power has failed. In this case, the controller stops execution, issues a power fail signal, and begins to save the state of the program. The letter B indicates the RTB terminal for this signal.
Battery Fail (F)	An input from the UPS to the controller that indicates the UPS battery has failed, and the controller cannot operate from stored energy. In this case, the controller does not attempt to save the state of the program when the external power fails. The controller issues alarm if a UPS was previously attached and ready to buffer. The letter F indicates the RTB terminal for this signal.
Inhibit (I)	An output signal from the controller to the UPS that disables the UPS signal output. The INHIBIT signal is triggered after data is backed up and the system is ready to shut down. The letter I indicates the RTB terminal for this signal.

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CompactLogix™ 5480 Controller

Specifications

Feature/Capability	CompactLogix™ 5480
Control Engine	Real time Logix
Operating System	Win 10 IoT Enterprise LTSB
Integrated HMI	Yes
High-Level Languages	Future
CPU	Intel i7 2.4 GHz Quad
Storage	64 GB SSD (Windows)
SDRAM	6 GB (Windows)
GbE Ports	three (Logix) one (OS)
Monitor Interface	one (DisplayPort)
USB Ports	one (Logix) two (USB 3.0)
Operating Temp	0-60°C

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CompactLogix™ 5480 Controller

Catalog Comparison

CompactLogix 5480 Catalog Numbers	Logix Memory	Node Count	I/O Expansion	Motion Physical Axis
5069-L430ERMW	3 MB	60	31	16
5069-L450ERMW	5 MB	120	31	24
5069-L4100ERMW	10 MB	180	31	32
5069-L4200ERMW *(formerly 5069-L46ERMW)*	20 MB	250+	31	150

CompactLogix™ 5480 Controller

Logix features in high-performance motion applications

- Scan time improvement: 5X the ControlLogix® 5580 controller

- 100axis/mS

Proposed motion architecture

V31 Standard Task

V31 Safety Task

Logix/Windows Features

CompactLogix™ 5480 Controller

Logix/Windows Features

- Firmware/OS Updates

  Logix – Firmware updates use ControlFLASH™ similar to other Logix controllers.

  Windows – OS imaging use ControlFLASH™ and the OS maintenance utility to re-image with an approved and tested OS .

  User is <u>unable</u> to re-image the OS outside of ControlFLASH™.

  Microsoft-specific OS updates can be implemented by the user if configured. Out-of-box state has automatic updates disabled.

- Windows Failure

  Real-time control resides in Logix and runs independently of Windows.

  If Windows "blue screens," the Logix controller remains fully operational.

  Any applications running in the Windows environment shuts down.

CompactLogix™ 5480 Controller

Logix/Windows Features

Security

- Logix – the hardware and firmware designs are implemented in a way that helps protect the Logix real-time controller from network and/or local Windows-based attacks.

- Windows – the user is responsible for implementing security functionality similar to other PCs within the plant.

Resetting To Out-of-box Condition

- Logix – there is an external reset switch that is used to return the Logix controller to the out-of box-state (shipping firmware revision). This is consistent functionality with the ControlLogix® 5580 and CompactLogix™ 5380 platforms.

- Windows – the OS can be reimaged to out-of-box condition via ControlFLASH™ and the OS maintenance utility.

Supported Operating System

- Windows 10 IoT Enterprise LTSB (August 2016 Build) – this version is the complete offering provided by Microsoft

- The OS supports installation of any off the shelf software package (other than software virtualization), provided the CompactLogix™ 5480 controller meets the minimum software requirements.

- The OS license is included in the purchase of the CompactLogix™ 5480 controller.

Windows Industrial Monitor Interface

- DisplayPort (www.displayport.org) connectivity is supported locally on the CompactLogix™ 5480 controller. Use of other connectivity options (VGA, HDMI, DVI etc.) are supported via VESA approved adaptors.

CompactLogix™ 5480 Controller

Logix/Windows Features

Uninterruptible Power Supply (UPS) Support

- The optional UPS acts as a remote energy storage module (ESM) and operates similar to the ESM on the ControlLogix® 5580 and CompactLogix™ 5380 controllers.

- It is recommended that a **UPS** be used to minimize uncontrolled shutdowns of Logix and Windows, upon power loss (UPS catalog# 1606-XLS240-UPS).

- Without UPS connectivity (hold up time), both Logix and Windows shuts down abruptly. If the Logix program is not backed up to the SD card, the Logix program is lost. If the UPS is not used, it is recommended to back up the controller program to the SD card and load the controller program upon power-up. Uncontrolled shutdown of Windows may cause operating system corruption.

- The CompactLogix™ 5480 controller has a dedicated UPS terminal block for connection of the following control signals (UPS Ready (R), Buffering (B), Battery Fail (F), Inhibit (I))

- Hold up time is fixed at 60 seconds. This provides time for the controller to ride-through brown out situations (momentary power quality issues)

CompactLogix™ 5480 Controller

Logix/Windows Features

Hardware Status Indication

- The status of the fans, UPS and controller temperature can be monitored programmatically via Logix and the GSV instruction

- The controller provides visual fan health via status indicators

Logix < = > Windows Communication

- RSLinx® is used to communicate internally via OPC between Windows and Logix

- Once installed locally, the user can create a virtual backplane driver within RSLinx®. The CompactLogix™ 5480 controller shows up under the driver with no need for physical media (ENET/IP, USB, etc.) connections external to the controller.

Fans

- Only one fan is needed to sufficiently cool the controller, but there are two fans present so there is not a single point of failure

- If one fan fails, the second fan can adequately cool the controller

- It is recommended that if one fan fails, replace both fans

- Fan replacement kit: 5069-L4FANKIT

SD Card

- Logix – the SD card can be used to back up the controller program as well as restore the controller program upon power-up. This is consistent functionality with the ControlLogix® 5580 and CompactLogix™ 5380 platforms.

- Windows – the OS does not have read/write access to the SD card.

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Access to the Hardware Status Object

- Used for obtaining status information about the UPS, fans and temperatures for the CompactLogix™ 5480 controller via GSV instruction(s).

- Supported in ladder, structured text routines and in Add-On instructions.

  FanSpeeds

  FanStatus

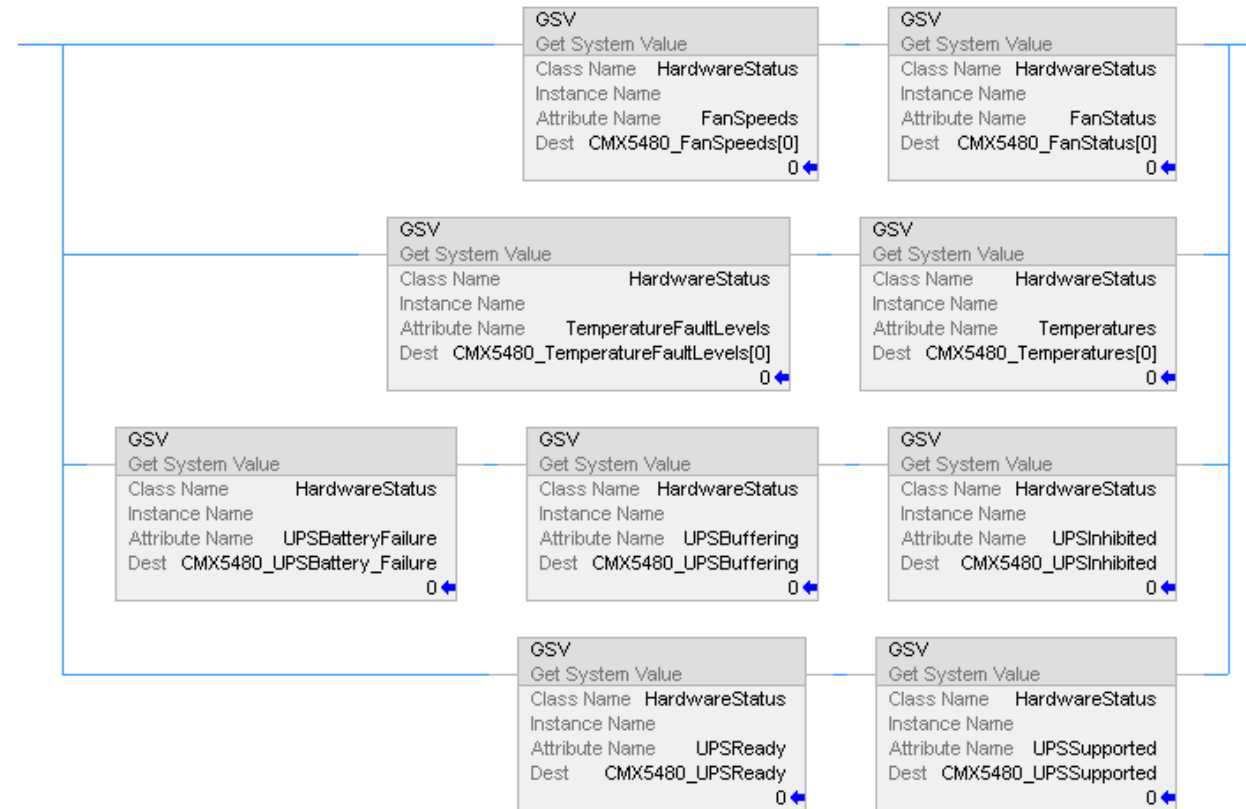 TemperatureFaultLevels

  Temperatures

  UPSBatteryFailure

  UPSBuffering

  UPSInhibited

  UPSReady

  UPSSupported

Scalable Compute

Tested Use Cases

Additional CompactLogix™ 5480 Controller use cases

Software	CompactLogix™ 5480 controller
FactoryTalk® View	Client/station only
ThinManager®	Yes (WinTMC™)
FactoryTalk® Historian	●

For more information on performance characterization, reference KB1084395

Additional CompactLogix™ 5480 Controller use cases

Application-based:
Meeting industry-specific application needs

- Integrated machine vision inspection system

- Web server-based application (e.g. monitor diagnostics, enter recipe value, enable access to third-party devices that support the web server)

- Develop protocols to communicate between Logix and third-party device

- Notifications software (e.g. WIN911)

- Line controller

- High-speed motion

- Model predictive control

* In many cases proof-of-concept testing is required to confirm application-specific use case compatibility with the CompactLogix™ 5480.

Competitive Review

CompactLogix™ 5480 Specification Comparison

Feature/Capability	CompactLogix™ 5480	Siemens 1515SP personal computer	Beckhoff CX2040
Control Engine	Real-time Logix	Real-time control	Real-time Kernel in Windows
Operating System	Win 10 IoT Enterprise	Win 7 Embedded	Win 7 Embedded/Win 10 IoT Enterprise
Integrated HMI	Yes	Yes	Yes
High-Level Languages	Future	Yes	Yes
CPU	Intel i7 2.4 GHz Quad	AMD G 1 GHz Dual	Intel i7 2.1 GHz Quad
Storage	64 GB (SSD not expandable)	30 GB (CFAST expandable)	4 GB or 8 GB (CFAST expandable)
SDRAM	~6 GB (Windows)	4 GB	4 GB
GbE Ports	3 (Logix) 1 (OS)	1	2
Monitor Interface	1 (DisplayPort)	1 (DVI-I)	1 (DVI-I)
USB Ports	1 (Logix) 2 (USB 3.0)	3 (USB 2.0)	4 (USB 2.0)
Operating Temp	0-60°C	0-60°C	-25-60°C

Selecting the Right Controller

User needs:
- Performance requirements
- Size of the application
- Network requirements
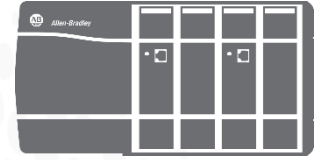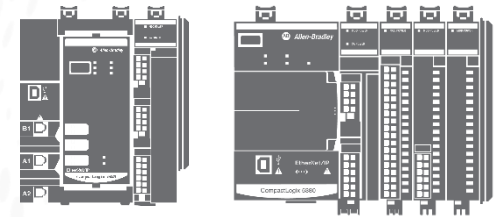- Integration of third-party applications

STEP 1
Determine

the customer requirements

STEP 2
Use Controller At-A-Glance

to compare different products

STEP 3
Identify the product

that best matches

customer needs

Compare Controller Products

What to consider when choosing a controller

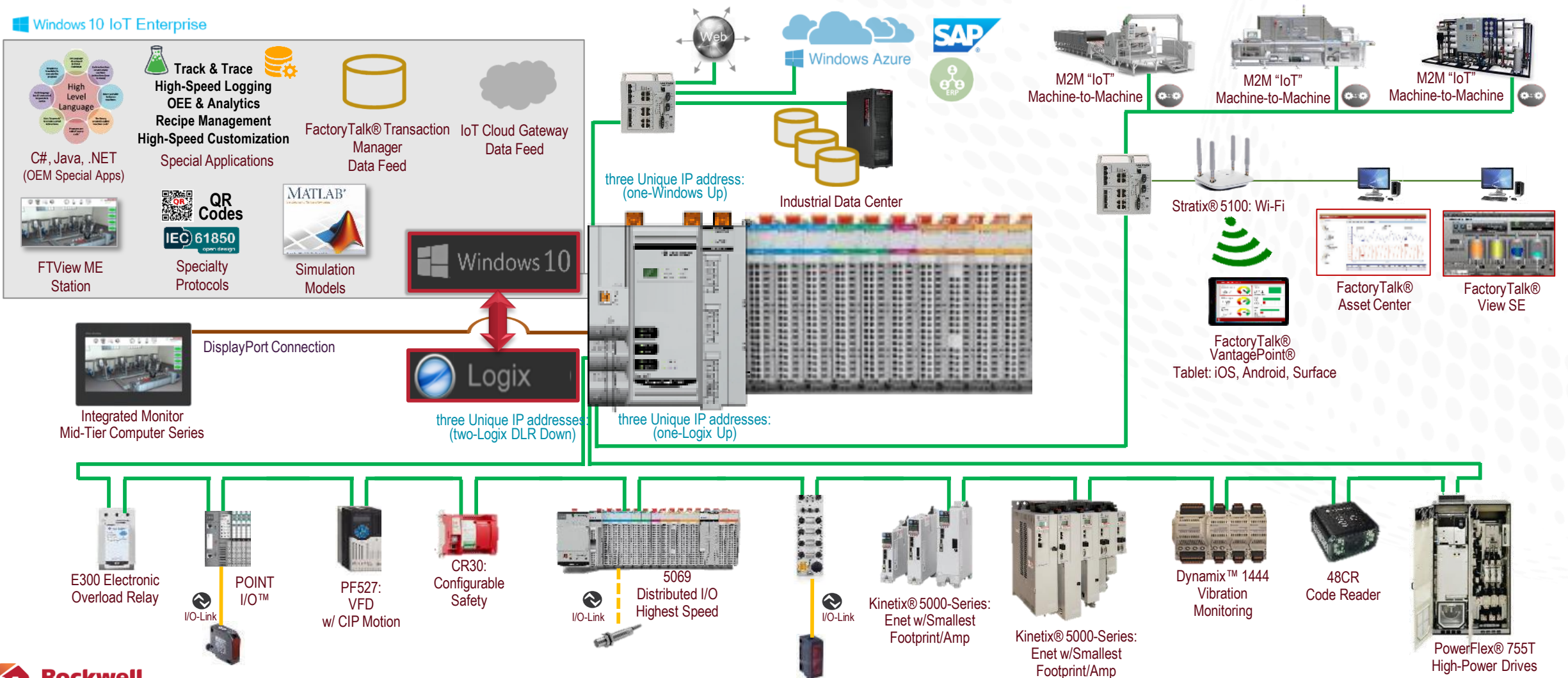## Four questions to ask before choosing a controller:

1. What are the performance requirements of the application?

2. How large is the application? Is integrated safety or an on-machine option needed?

3. Is there value in making decisions right at the machine level by using Windows-based applications in conjunction with the Logix data?

4. Is there a requirement for capabilities such as PhaseManager™ or redundancy?

	CompactLogix 5370 L1	CompactLogix 5370 L2	CompactLogix 5370 L3	CompactLogix 5380	CompactLogix 5480	ControlLogix 5570	ControlLogix 5580
High Performance Features							
Motion performance (EtherNet/IP)	6 axes/ms	6 axes/ms	6 axes/ms	32 axes/ms	100 axes/ms	6 axes/ms	32 axes/ms
< 500 µs screw to screw	--	--	--	✓ with Compact 5000 I/O	✓ with Compact 5000 I/O	✓ With 1756 Enhanced I/O modules	✓ With 1756 Enhanced I/O modules or Compact 5000 I/O
Embedded GbE port(s)	--	--	--	✓	✓	--	✓
50 µs screw to screw (Peer to Peer I/O)	--	--	--	--	--	✓	✓
Hardware Features/Scaling							
Standard Memory	384 KB, 512 KB, 1 MB versions	750 KB, 1 MB versions	1MB, 2 MB, 3 MB versions	600 KB, 1 MB, 2 MB, 3 MB, 4 MB, 5 MB, 8 MB, 10 MB versions	3 MB, 5 MB, 10 MB, 20 MB versions	2 MB, 4 MB, 8 MB, 16 MB, 32 MB versions	3 MB, 5 MB, 10 MB, 20 MB, 40 MB versions
Safety Memory	--	--	0.5 MB, 1 MB, 1.5 MB versions	300 KB, 0.5 MB, 1 MB, 1.5 MB, 2 MB, 2.5 MB, 4 MB, 5 MB versions	Future	1 MB, 2 MB, 4 MB versions	1.5 MB, 2.5 MB, 5 MB, 6 MB versions
Nodes	Up to 8 nodes	Up to 16 nodes	Up to 48 nodes	Up to 80 nodes	up to 250 nodes	500 CIP connections	Up to 300 nodes
Built-in EtherNet/IP ports	Dual-port (DLR)	Dual-port (DLR)	Dual-port (DLR)	dual-port GbE (DLR or dual IP)	dual-port GbE (Logix) + GbE (Logix) + 1 (OS)	--	1 GbE
Supports Expandable Communication modules	--	--	--	--	--	✓	✓
Motion	✓(ERM catalog, 512KB version) Up to 2 axes on EIP, 100 total axes	✓(ERM catalog, 1 MB version) Up to 4 axes on EIP, 100 total axes	✓(ERM catalogs, all versions) Up to 16 axes on EIP, 100 total axes	✓(ERM catalog, all versions) Up to 32 axes on EIP, 256 total axes	✓(ERM catalog) Up to 150 axes on EIP, 512 total axes	✓ Included in standard catalogs, up to 100 axes	✓ Included in standard catalogs, up to 256 axes
Integrated Safety	--	--	✓ (SIL3: ERMS catalogs, all versions)	✓ SIL2 Future: SIL3	Future	✓ SIL3: S +SP	✓ SIL2 (S) ✓ SIL3 (S + SP)
Conformal Coating	Future K catalogs	Future K catalogs	Future K catalogs	--	--	✓ (K & SK catalogs, all versions)	✓ (K & SK catalogs, all versions)
No Stored Energy (NSE)	--	--	✓(NSE catalog, 1MB version)	✓(NSE catalog, 1MB version)		1756-ESMNSE available for controllers with ≤ 8 MB	Future
Extended Temperature (-20 - 70°C)	--	--	--	--	--	✓(XT, 5XT catalogs, 8MB version)	Future
On-Machine	--	--	✓(ERMO & ERMOS catalogs, 1MB, 2MB & 3MB versions)	Future	--	✓(EROM & EROMS catalogs, 4MB & 8MB versions)	--
Redundancy	--	--	--	--	--	✓	Future
Local Expansion I/O	up to 8 local 1734 Point I/O	up to 4 local 1769 Compact I/O	up to (30) 1769 Compact I/O modules	up to 31 local 5069 Compact I/O	up to 31 local 5069 Compact I/O	up to 16 local 1756 ControlLogix I/O	up to 16 local 1756 ControlLogix I/O
Removal and Insertion Under Power (RIUP)	--	--	--	--	--	✓	✓
Power Supply Options	Embedded	Embedded	2 A, 4 A (AC, DC)	Embedded	Embedded	8A, 10A, 13A, XT (AC, DC)	8A, 10A, 13A, XT (AC, DC)
Redundant Power Supply Options	--	--	--	--	--	✓	✓
Embedded Digital I/O	16 Input/16 Output	16 Input/16 Output	--	--	--	--	--
Embedded Analog I/O	--	up to 4 Input / up to 2 Output	--	--	--	--	--
Embedded High Speed Counter		up to 4 counters, up to 1 MHz	--	--	--	--	--
Logix Designer Features							
Studio 5000 Logix Designer version	v20+	v20+	v20+	v28+ (select catalogs) v30+ all catalogs	v30+	v20+	v28+ (select catalogs) v29+ all catalogs
Instruction Based Alarms	✓	✓	✓	✓(v29+)	✓	✓	✓(v29+)
Phase Manager	✓	✓	✓	Future	Future	✓	Future
Sequence Manager	✓	✓	✓	Future	Future	✓	Future
Emulate	✓	✓	✓	Future	Future	✓	Future
Logix Tag-based alarms	--	--	--	✓(v31+)	✓	--	✓(v31+)

CompactLogix™ 5480 Controller and The Internet of Things Portfolio

Delivering IoT "Connected Node" Fully Integrated with Logix

Windows 10 IoT Enterprise

High Level Language

Track & Trace
High-Speed Logging
OEE & Analytics
Recipe Management
High-Speed Customization

Special Applications

C#, Java, .NET
(OEM Special Apps)

FactoryTalk® Transaction Manager Data Feed

IoT Cloud Gateway Data Feed

FTView ME Station

QR Codes

IEC 61850 open design

MATLAB

Specialty Protocols

Simulation Models

Windows 10

Logix

Integrated Monitor Mid-Tier Computer Series

DisplayPort Connection

three Unique IP addresses: (two-Logix DLR Down)

three Unique IP address: (one-Windows Up)

Web

Windows Azure

SAP
ERP

Industrial Data Center

three Unique IP addresses: (one-Logix Up)

Stratix® 5100: Wi-Fi

M2M "IoT" Machine-to-Machine

M2M "IoT" Machine-to-Machine

M2M "IoT" Machine-to-Machine

FactoryTalk® VantagePoint® Tablet: iOS, Android, Surface

FactoryTalk® Asset Center

FactoryTalk® View SE

E300 Electronic Overload Relay

POINT I/O™
I/O-Link

PF527: VFD w/ CIP Motion

CR30: Configurable Safety

5069 Distributed I/O Highest Speed
I/O-Link

I/O-Link

Kinetix® 5000-Series: Enet w/Smallest Footprint/Amp

Kinetix® 5000-Series: Enet w/Smallest Footprint/Amp

Dynamix™ 1444 Vibration Monitoring

48CR Code Reader

PowerFlex® 755T High-Power Drives

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Thank You

www.rockwellautomation.com