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Digital Factory

# The Maintenance Pro's Guide to Controller Replacement: Plan Your Strategy

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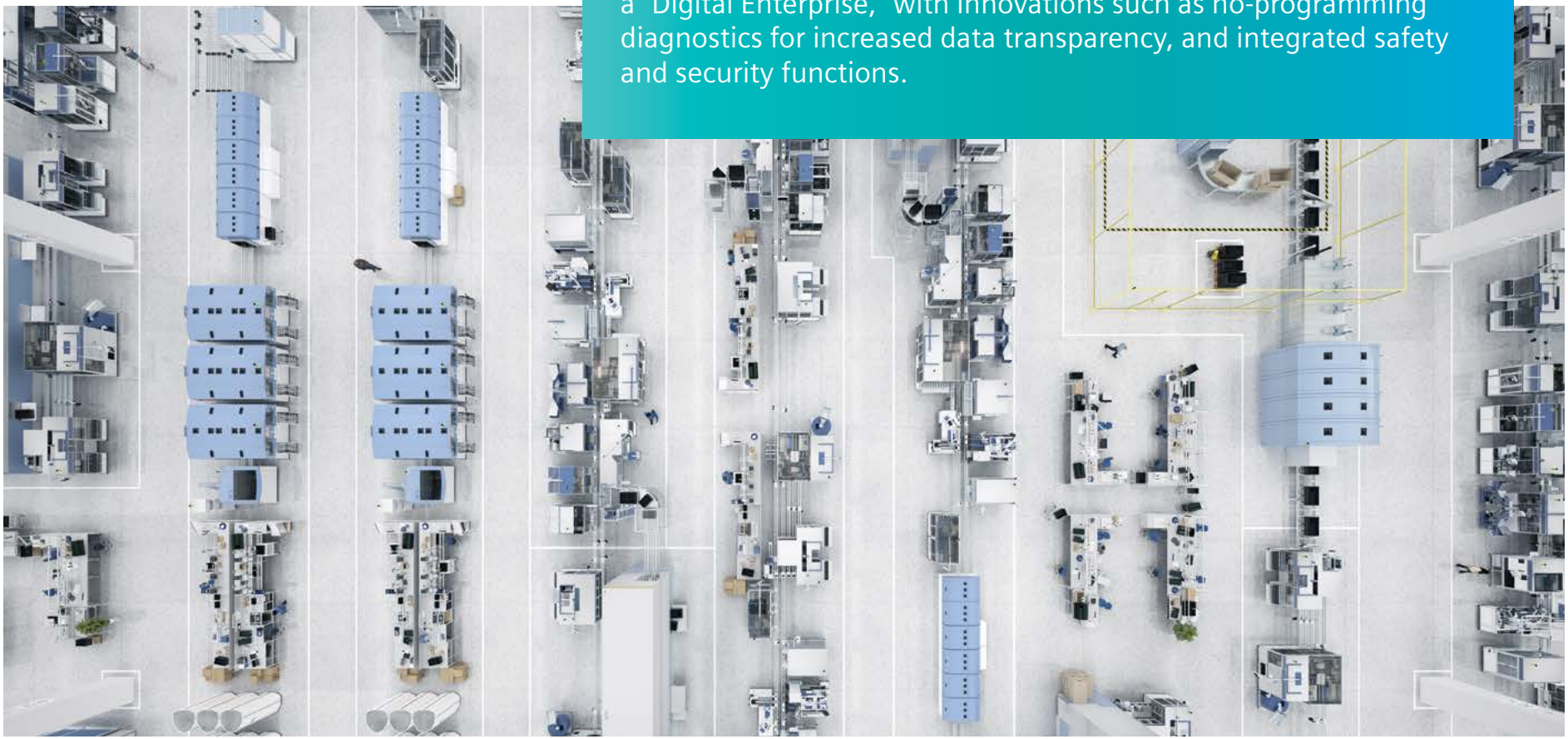
As a maintenance professional, you're constantly seeking ways to boost machine performance and keep the plant running at peak productivity.

But in your quest to maximize uptime and efficiency, you face a confusing array of options for replacing underperforming or outdated controllers.

To leverage the full benefits of digitalization, you need a controller-replacement strategy that factors in your current equipment and capabilities, maintenance needs, budget and future operational goals.

**Digitalization** is the convergence of technologies, such as data analytics, the cloud and the Internet of Things, to merge the virtual and real worlds. This enables substantial productivity increases across the entire value chain, from design and engineering to sales, production and service. Digitalization can transform your plant into a "Digital Enterprise," with innovations such as no-programming diagnostics for increased data transparency, and integrated safety and security functions.



# The Challenges of Controller Replacement

## Here are three major hurdles that you're likely to face as you plan a controller-replacement strategy.

| Challenge | Solution |
| --- | --- |
| **1. The need to quickly and easily diagnose, navigate and solve problems to keep your plant running.**<br>You already know that an upgrade is critical because your old controller lacks the ability to pinpoint problems with your process, leaving you to struggle through lines of logic to find the issues. | **Advanced controllers allow you to quickly and easily diagnose, navigate and solve a problem to keep your plant running:**<br>• Easy-to-understand faults are automatically obtained and displayed on the HMI, web server and controller<br>• Allows line operators to diagnose problems before ever leaving the tool crib |
| **2. The need for familiarity with the code, right from the start, for an easy transition.**<br>Although you know that an upgrade to a new vendor's advanced controller would be beneficial, you are concerned about losing current running logic and having to re-program the new controller with unfamiliar software, which leads to longer changeover times. However, even if you stay with the same brand, a code conversion is still required due to differences in programming software and tasks. | **Look for vendors who offer no-charge code conversion services that:**<br>• Retain your current structures and naming conventions<br>• Convert your current logic into a new, state-of-the-art programming tool<br>• Allow you familiarity from the start for an easy transition |
| **3. The need for immediate service and support to avoid costly downtime.**<br>Switching to a new controller, especially one from a different vendor, could result in costly downtime or shutdowns if you do not have access to immediate technical support. | **Partner with a vendor that allows you to keep your systems running by offering:**<br>• No-charge basic technical support<br>• A global network of specialists<br>• Local Application Engineers in your area to assist you |

# Planning Your Controller Replacement Strategy

**To address these challenges, there are a number of key attributes, including integrated controller functionality, that maintenance leaders should consider when selecting a new controller or vendor. Below are three guidelines for planning your strategy.**

# 1. Select a controller that allows you to quickly and easily diagnose, navigate and solve problems to keep your plant running.

Advances in controller technology have eliminated many of the manual diagnostics tasks that drain the time and resources of your maintenance team. With intuitive diagnostics functions and high-quality diagnostics data available over the design, commissioning and maintenance phases, your team would have faster troubleshooting and streamlined maintenance for less downtime.

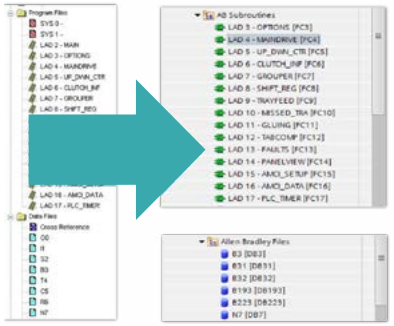
**To be sure your new controller is giving you the most advanced integrated system available, look:**

- Easy-to-understand faults that are automatically displayed on the HMI, web server and controller display, allowing line operators to diagnose problems before your maintenance personnel even leave the tool crib
- Integrated, no-programming system diagnostics that are automatically generated during device configuration and setup
- Pictorial system overview with online diagnostics
- Download of code modifications without stopping the PLC
- Integrated trace, offering graphical representation of process diagnostics within the controller to aid in finding sporadic faults in the process
- Compatibility with current installed controllers through built-in communication options and connections to share data via EtherNet/IP with existing controllers
- Integrated safety, offering a single controller, communication and programming environment for standard and fail-safe controllers
- Integrated security for built-in protection against illegal copying and manipulation
- Remote monitoring and secured web-server access via PC, smartphone or tablet
- One common tag database for fewer mistakes
- Flexibility to support various network protocols, including PROFINET, PROFIBUS, MODBUS, MODBUS TCP, etc.
- Application-specific software libraries and examples
- Interoperability of system-tested components, which improves overall performance

Integrated diagnostics provides technicians with vital information about system performance. For example, within Siemens Totally Integrated Automation (TIA) Portal, if an input module on a controller fails, identical fault notifications appear on the HMI, in the web server and on the CPU's display, identifying the module has failed. Maintenance technicians, engineers and other responsible parties can receive alerts of this failure on their mobile devices. Upon receiving an alert, they can securely log into the system to assess and make a recommendation to correct the situation using standard Windows tools, such as Internet Explorer, connecting to the on-board web server of the controller.

# 2. Select a vendor with no-charge code conversion services that retain your current structures and naming conventions, allowing you familiarity from the start for an easy transition.

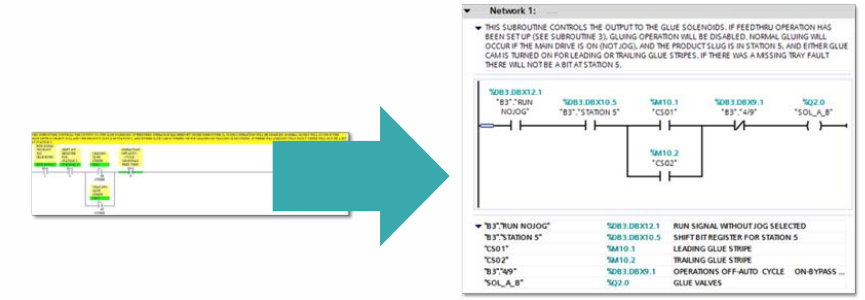
Siemens Migration Studio converts projects to state-of-the-art TIA Portal (S7-1200 or S7-1500), retaining your current structures and naming conventions, allowing familiarity from the start!



Your controllers have gone through many changes during their installed life, and you don't want to lose the preserved knowledge of both current and previous programmers. Choose an automation solution partner that understands the value of your current assets and makes it simple to preserve them as you move to newer, more advanced controller technology.

Siemens offers no-charge code-conversion services, as well as HMI tag converters, I/O conversion tools, control-product cross references and guidelines for selecting replacement parts. Siemens TIA components are designed with the ability to integrate with other brands, regardless of the replacement path. For example, when replacing HMI systems, conversion tools in the TIA Portal allow for existing process data to be imported into the configuration tool. When overlaying a legacy PLC system with a Siemens solution, custom libraries developed within the TIA Portal can mimic the functionality and behavior of older systems to help minimize the learning curve for engineers and maintenance technicians, and reduce future engineering time.

Ladder logic is still ladder logic. All comments are retained.



Tags names are identical and comments are retained.

# 3. Select a vendor that provides immediate service and support to avoid costly downtime.

## You're bound to have inquiries about functionality, handling and fault clearance as you move to more modern controllers. Your vendor should be immediately available whenever you need answers.

Siemens offers no-charge basic technical support until product maturity, access to a global network of specialists, and local Application Engineers in your area to allow you to keep your systems running.

Siemens also provides customers comprehensive service and support. With a presence in 190 countries, Siemens has a worldwide network of resources that includes more than 50,000 specialists in automation, drives, networks, safety, motion control and motor management, across every application and industry. Technical and engineering support specialists provide 24/7 advice and answers for all inquiries about functionality, handling and fault clearance of Siemens industrial products and solutions — via phone, email, support request and remote access. Services also cover obsolete and discontinued products.

You may want to consider taking a phased approach to modernizing your controllers. This allows you to upgrade to the latest automation technology on your terms.

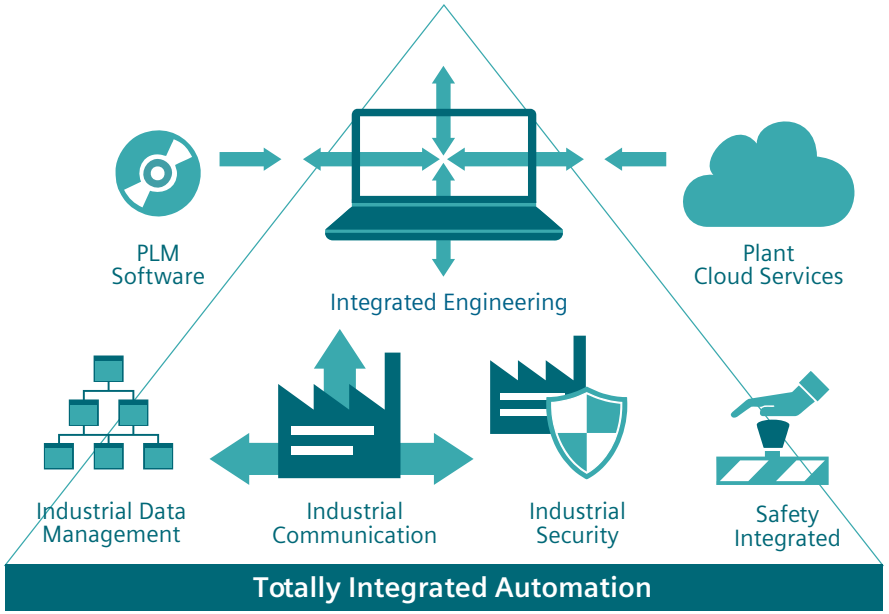
In a phased approach, your plant can decide where to start the modernization process — whether it's with legacy controllers, HMI panels, drives, I/O modules or other components — and can make the replacement process fit into your current shutdown schedule. Be sure your vendor offers advanced controllers that can coexist with your existing controllers while still enhancing performance.

# The Siemens Solution for Modernizing with Ease.

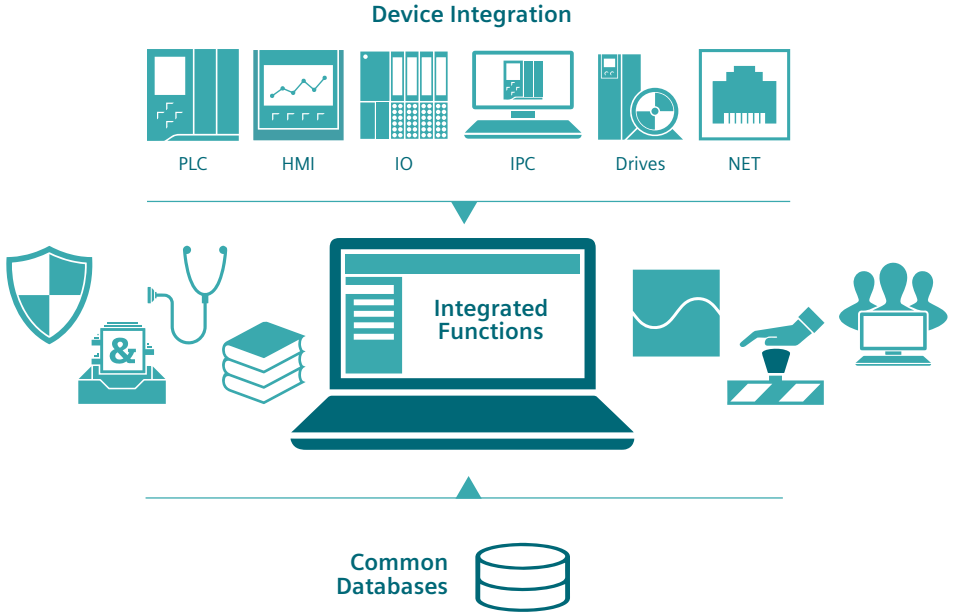
**More broadly, Siemens helps maintenance professionals address the challenges of controller replacement through Totally Integrated Automation (TIA) — a digitally driven, total-systems approach that increases productivity and efficiency through better machine performance, rapid diagnostic capabilities, high system flexibility and improved access to data.**

**TIA optimizes the entire manufacturing process, leading to improved productivity by:**

- Minimizing downtime by applying integrated diagnostic functions
- Improving engineering efficiency for lower design costs
- Boosting production flexibility through the use of integrated communication tools
- Enhancing plant and network security through integrated security functions
- Improving safety with technologies that protect personnel, machinery and the environment
- Optimizing data quality with a single, streamlined database
- Improving access to data for smarter decisions
- Simplifying implementation of automation solutions with global standards
- Improving overall performance through the interoperability of system-tested components




Totally Integrated Automation (TIA) is an open system architecture that covers the entire production process and offers maximum interoperability across all automation components. This is accomplished by the following shared characteristics: consistent data management, global standards, and uniform hardware and software interfaces — which minimize engineering time, reduce costs and boost flexibility.



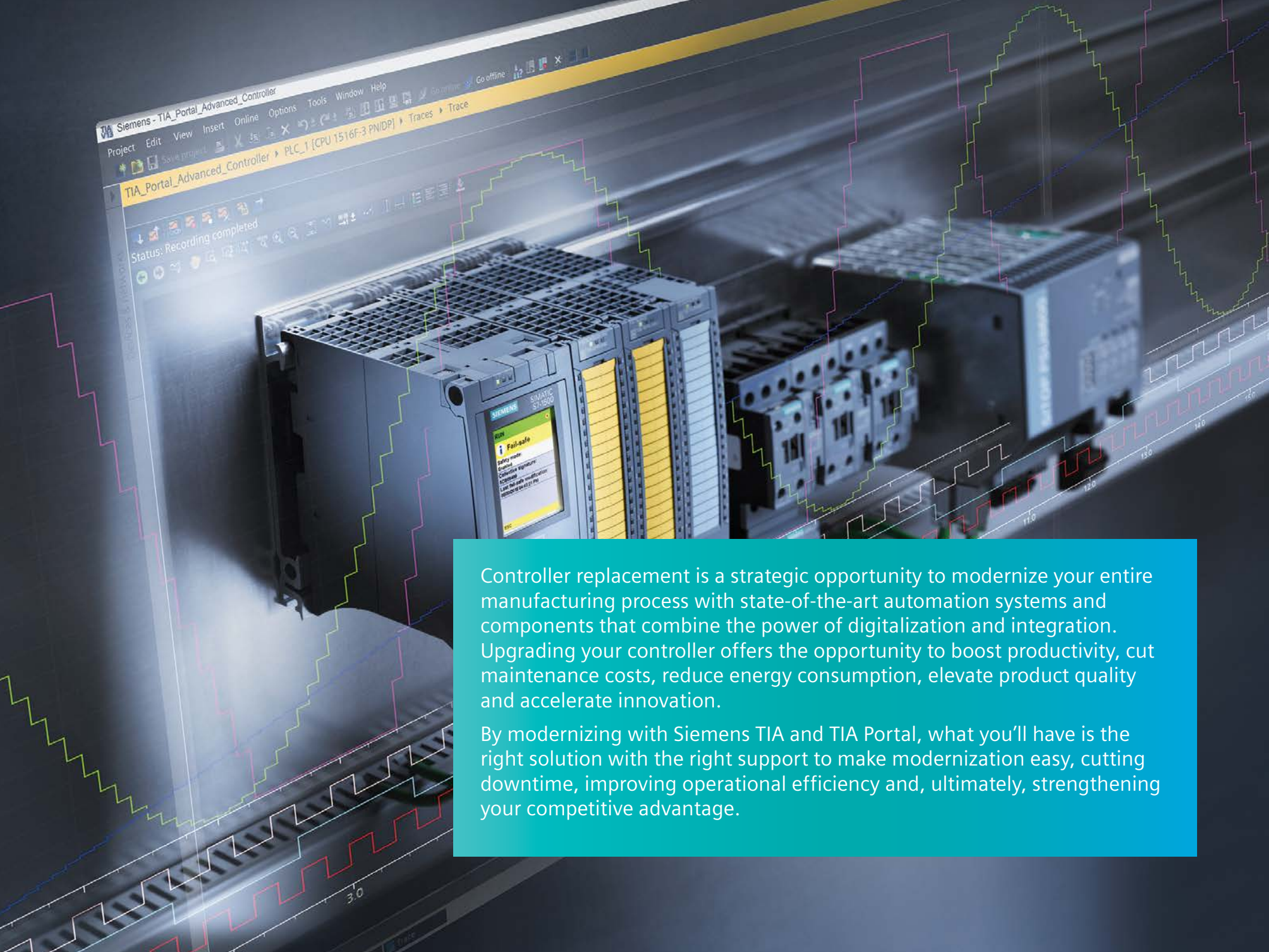

The key to unlocking the full potential of TIA is our TIA Portal — a single engineering framework that seamlessly integrates controllers, distributed I/O, HMI, drives, motion control and motor management — allowing you to reduce your engineering time by up to 30%. The TIA Portal offers no-programming diagnostics, seamless program logic and intuitive functions, such as implementation wizards and drag-and-drop between editors.

# Significant TIA Portal features and benefits that enable you to reduce your engineering time while increasing your level of transparency and diagnostics include:

- Integrated "no-programming" system diagnostics, automatically generated during device configuration
- One common tag database for fewer mistakes
- Ability to create custom libraries to be shared across your corporate servers for easy creation of company standardization for projects
- An overall project management tool that allows for complete system (multiple controllers, HMIs, networks, etc.) to be programmed, monitored, saved and stored all in one software package
- Easy-to-use, intuitive system functions, such as implementation wizards and drag-and-drop between editors, for fewer clicks and faster engineering
- Additional time-saving functions, such as online/offline comparisons, pictorial system view with online diagnostics, no-PC-required trace functions and the ability to make code modifications while in "run" state without stopping the PLC

The TIA Portal takes advantage of the fact that all Siemens devices are engineered at the firmware level to share information with each other. The controller knows the state of every device on the network automatically, without engineers having to write any programming. Since this is independent of the program, these functions continue even when the system is in stop mode. Problems on the network appear in the pictorial diagram describing exactly what's wrong, such as a wire break on I/O Card 6, Channel 2.

Pictorial diagrams offer a bird's-eye view of complex networks by showing how all the devices are interconnected. These diagrams can become active even when the equipment is in operation, providing a clear, real-time picture of what's happening on the networks. When faults or connection problems occur, the diagram pinpoints exactly where they are in the actual equipment.




Controller replacement is a strategic opportunity to modernize your entire manufacturing process with state-of-the-art automation systems and components that combine the power of digitalization and integration. Upgrading your controller offers the opportunity to boost productivity, cut maintenance costs, reduce energy consumption, elevate product quality and accelerate innovation.

By modernizing with Siemens TIA and TIA Portal, what you'll have is the right solution with the right support to make modernization easy, cutting downtime, improving operational efficiency and, ultimately, strengthening your competitive advantage.

## Contact Siemens today for a free consultation!

Locate a Siemens Migration Partner near you by calling **1-888-454-4704** or visiting the web:

- Siemens Sales Representative: **usa.siemens.com/saleslocator**
- Siemens Distributor: **usa.siemens.com/distributorlocator**
- Siemens Solution Partner: **usa.siemens.com/solutionpartnerlocator**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support.automation.siemens.com.

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