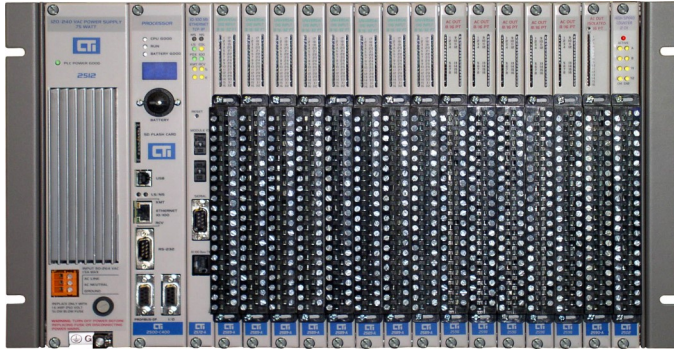




ROCK SOLID PERFORMANCE. TIMELESS COMPATIBILITY.



# 2500 Series® Classic Programmable Automation Control System



## OVERVIEW

The 2500 Series® Classic Programmable Automation Control System is designed for use in a broad range of applications, including those that require both discrete and analog control. 2500 Series® products can be found worldwide in numerous industries, including food and beverage, oil and gas, air separation, pulp and paper, mining and foundry, building products, printing equipment, chemicals, pharmaceuticals, semiconductor, and wastewater/water treatment. CTI designed the 2500 Series® with a focus on operational simplicity, ease of use, and compatibility across successive product generations to deliver unsurpassed reliability and the performance you need at the lowest total cost.

## Continuous Evolutionary Improvement

The 2500 Series® has its roots in the “ahead-of-its-time” Texas Instruments/Simatic 505® Series system known for its robust performance, intuitive design, and elegantly simple PID and special function programming. The 2500 Series® reinvigorates and modernizes this legendary product line with more memory, more speed and many new features while maintaining backwards compatibility.

The most important feature of every product CTI sells is compatibility — both backward and forward. We don’t obsolete our products and expect customers to buy our latest control system. Instead, our products are conceived to allow customers to improve systems incrementally — building on previous investments in equipment, programming and training. A brand new controller with modern features will work seamlessly with I/O modules from

## PAC Performance, PLC Usability

The 2500 Series® Classic Programmable Automation Control (PAC) system is a powerful, flexible, multi-application controls system with unmatched reliability and ease of use. Its modular design and robust process control capability including built-in communications ports and considerable I/O capacity deliver PAC performance, while its operational simplicity and ease of use provide PLC-like usability.

For machine control or for small- to large-scale process control, the CTI 2500 Series® Classic PAC System offers:

- Full-featured performance supporting up to 8192 I/O points\*, including both digital and analog I/O, and hundreds of PID loops and alarms.
- Advanced functionality
- Multiple remote I/O network options
- Easy connection to other 2500 Series® products as well as to many other manufacturers’ products

\*Additional I/O expansion possible using ECC1 and ACP1 coprocessors

ten years ago or from ten years hence. This allows you to upgrade your control system at your own pace and with minimal disruption.



## Simply Seamless™

The 2500 Series® Classic PAC System includes a broad range of products for process control which are designed to work seamlessly across product generations and control layers. From the Device Layer, including a full line of digital, analog, and specialized I/O modules for handling almost any input or output specification, to the Control Layer with its powerful CPUs and rugged HMI Touch-Panels, the 2500 Series® Classic PAC System provides a complete range of options for process control.

Classic 2500 processors, power supplies and bases work seamlessly with Classic and Compact I/O and special function modules, and our Classic I/O, power supplies, bases, and remote Compact I/O work seamlessly with Simatic® 545 and 555 processors to manage everything from small discrete control applications to large process applications with PID loops, alarms, and special mathematical functions.

## Simplicity is Fundamental

One of the design requirements we have for every product we make is that it is simple to use. We have laser-like focus on the needs of industrial process control, including batch, continuous, and low-to-medium-speed discrete manufacturing processes, and we harness the best of today's technology to address core process control needs as simply and efficiently as possible. We design our controllers so that it is easy and straight-forward to perform all of the most widely used process control tasks.

Our goal is to make our products easy to integrate, easy to operate, and easy to maintain. The simple memory layout of our controllers is clean and straightforward. The PLC scan cycle is flexible and deterministic — allowing custom configuration while providing control over absolute worst-case cycle time. All configuration items and operation of control functions such as PID loops and analog alarms can be set and/or modified directly from an HMI without dedicated program logic. We want to get you — and keep you — up and running as quickly and efficiently as possible.

## Cost-Effective Solutions

Recent introductions of two Advanced Function Modules — an Ethernet Communications Coprocessor (the ECC1), and a general purpose Application Coprocessor (the ACP1) provide new options for cost-effective and minimally disruptive process control solutions.

The ECC1 provides sub-second responses to even a large

number of HMI workstations. It has been used numerous times to improve HMI/SCADA response rates and in support of HMI/SCADA migrations. Because it communicates with its host processor over a high-speed Ethernet link instead of the special function I/O interface, items in the data cache can be kept current, even when the number of cached items is large, and the user-friendly configuration interface makes implementation fast and simple. Other ECC1 features allow easy configuration of state-of-change peer-to-peer communications between 2500 Series Systems, requiring no programming in the PLC and minimizing the use of network bandwidth.



The ACP1 is programmed with CTI's new open standards IEC61131-compliant development system. It allows users to add languages, functions and memory organization features to existing CTI 2500 Series® and Simatic 505® controllers and is able to exchange data between the RLL program on the host PLC and the IEC61131 programs. Embedded client/server protocols perform data transfers based on configuration tables without the need for any additional logic in the PLC or ACP1 application program. It has been used to build systems using 2500 Series® Processors to operate dozens of variable speed drives connected over Ethernet/IP and Modbus-TCP to control material movement in the factory. The unique capabilities of Function Block Diagram (FBD) programming in the ACP1 allowed the user to develop a single function block which controlled all the drives in the system. Development and maintenance of the software were dramatically simplified compared to doing the same project in RLL.

## Smart Modernization™

Whether you are an existing user of the 505 Series® or looking for your next control system, CTI's Smart Modernization approach ensures the CTI control system you are investing in will be around for many years to come. Smart Modernization encapsulates our philosophical approach to making control system advancements while ensuring seamless transitions for our customers through the continuous evolutionary improvement of our products.

With many 505 Series® products still in use today—some in use for more than 30 years—the 2500 Series® allows these customers to modernize existing controls without expensive re-wiring, reprogramming, retraining, or product line shutdowns. Upgrading a control system with modern-day replacements of old components and/or enhancing performance with new advanced function modules — all of which are backward compatible — mitigates risk during migration and allows reuse of existing application programs and hardware — reducing cost and downtime. That's what we call Smart Modernization™.



## 2500 Series® Classic Programmable Automation Control System

	Product	Models	Features
	Processors	2500-C100 - CPU w/128K user memory 2500-C200 - CPU w/256K user memory 2500-C300 - CPU w/512K user memory 2500-C400 - CPU w/3072K user memory	Up to 512 loops; 512 alarms; 8192 digital/analog I/O; Built-in: Ethernet; USB; SD card slot; Profibus-DP master and RS485 I/O ports
	Coprocessors	2500P-ACP1 - Application Coprocessor 2500P-ECC1 - Ethernet Communications Coprocessor	High-performance modules offer low-cost, high-performance solutions for computing and communications applications, incl. HMI migrations, RLL to other programming languages data exchanges , etc.
	Bases	2500P-R4 - Four-slot base 2500P-R8 - Eight-slot base 2500-R11-A - Eleven-slot redundant base 2500P-R16 - Sixteen-slot base 2500-SSB - Single-slot blank front panel	Space for power supply, CPU/ RBC, slots for up to 16 I/O modules. R11 allows for 2 PS and 2 RBCs in redundant configuration. 2500P bases have hi-speed channel.
	Remote Base Controllers & Wiring	2500-RBC - Profibus RBC 2500-RIO-B - RS485 RBC 2500-RFC - CPU to RF Modem Cable 2500-TAP - RS485 Network Tap	Allows control of CTI 2500 Series or Simatic 505 I/O bases on either Profibus-DP I/O channel or over RS485 cable
	Power Supplies	2512 - 75-watt AC Power Supply 2512-A - 75W AC PS w/redundancy support 2513 - 24VDC Power Supply 2515-A - 100W AC PS w/redundancy support	75-watt to 100-watt power supplies for AC and DC input power
	Communications	2541 - Redundant Processor Manager Module 2572-B - Fast Ethernet TCP/IP Adapter 2573-MOD - Serial Interface Adapter w/MODBUS 2576 - DeviceNet Scanner Module 2577 - Profibus DP Slave Adapter	Communications adapters/ interfaces for Ethernet, Modbus, DeviceNet, and Profibus
	Digital Inputs	2580 - 16-point Isolated 95-132 VAC Input Module 2581 - 16-point Isolated 12-56 VDC Input Module 2582 - 16-point Isolated 125VDC Input Module 2585 - 16-point TTL/Word Input Module 2588-8 - 8-point Universal Input Module 2589-B - 8/16/32-point Universal Input Module	8– to 32-point digital input modules for AC and DC input.





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	Digital Outputs	2590-A - 16-point Isolated 20-132 VAC Output 2590-EF - 16-point Isolated 20-132 VAC Output w/ front panel accessible fuses 2591-A - 16-point Isolated 11-146 VDC Output 2591-EF - 16-point Isolated 11-146 VDC Output w/ front panel accessible fuses 2595 - 16-point TTL/Word Output Module 2596-8 - 8-point 11-125 VDC Output Module 2596 - 8/16-point 11-125 VDC Output Module 2597 - 8/16/32-point 11-125 VDC Output Module 2598-8 - 8-point 11-240 VAC Output Module 2598 - 8/16-point 11-240 VAC Output Module 2599 - 8/16/32-point 11-240 VAC Output Module	8– to 32-point digital output modules for AC and DC output. Some with front-panel-accessible fuses.
	Relay Outputs	2530 - 8-point Form-C Relay Output Module 2531 - 32-point Form-A Relay Output Module 2532 - 16-point Form-A Relay Output Module 2534 - 8-point Form-C Relay Output Module	8– to 32–point relay outputs for high– and low-current applications (switching on or off external devices)
	Analog Inputs	2501 - 8in/4Out Analog Module 2550-A - 8-Channel Isolated Analog Input Module 2555-A - 16-Channel Analog Input Module 2558 - 8-Channel Analog Input Module	8– and 16-channel analog input modules w/fast 6-4 mSec update times. No external power supply required.
	Analog Outputs	2501 - 8in/4Out Analog Module 2560-A - 8-Channel Isolated Analog Output Module 2562 - 8-Channel Analog Output Module	4 and 8 channel analog output modules w/fast 6 to 0.25 mSec update times. 1500V channel to channel or backplane isolation.
	Temperature Inputs	2551-A - 8-Channel Isolated Thermocouple Input Module 2552-A - 8-Channel Isolated RTD Input Module 2556 - 16-Channel Isolated Thermocouple Input Module 2557 - 16-Channel RTD Input Module 2559-RTD - 8-Channel RTD Input Module 2559-TC - 8-Channel Thermocouple Input Module	Multiple thermocouple types are supported as well as millivolt inputs. Fast 20 to 2 mSec update times. Digital filtering.
	High Speed Counters	2502 - High-speed Counter Encoder Module 2553-A - 2-Channel Mag Meter Input Module 2554-A - 4-Channel Isolated High-speed Counter Module	Various counter modes, including frequency, period, quadrature. 2553-A has N-tooth counting mode to compensate for measurement errors due to wheel wobble.
	Vibration Monitoring	2505 - Vibration Sensor Interface Module	Four channels to interface to any vibration sensor plus a tach input. Configurable to interface to accelerometers, velocity probes, or proximity probes. Overall RMS and true peak vibration levels computed.





## CASE STUDY

### **Situation:**

A French cheese making company running Simatic 505® and CTI 2500 Series® PLCs had replaced its obsolete Siemens PCS SCADA system with Wonderware Intouch but found that update times were very slow. Certain parts of the process had update times of 10 to 20 seconds making it difficult for plant operators to control the production in an optimized way.

### **Complication:**

Continuous expansion of the plant and an almost continuous production process had led to a complex matrix of interconnected PLCs and a heavy load on the Ethernet network. Getting the Wonderware Intouch system up and running had taken a long time to commission, and the engineering manager was concerned that a replacement of the Ethernet network and/or replacing PLCs would lead again to a long commissioning time and extended production stops — a huge issue for a plant that cannot afford to shut down due to food quality regulations and the continuous nature of the production process (e.g., cows don't stop giving milk).

### **Solution:**

Working through NAPA, CTI's international distribution partner, the plant purchased several ECC1 modules as well as new CTI 2500 Series® Classic C400 CPUs. Because of its advanced dynamic cache communications engine, the ECC1 modules reduced response rates to one second or less instead of 10 to 20 seconds before the upgrade. Its user-friendly programming interface allowed engineers to configure communications between the plant's PLCs in less than a day, while it had taken several weeks of programming the original PLCs to set up that same configuration. Upgrading to CTI's 2500 Series® CPUs delivered better performance and more memory without having to change any of the I/Os or PLC bases, making the investment considerably lower than solutions from other automation suppliers. Engineers were also able to use the program backup from the original CPUs to load the new CPUs without making any changes to the programs, making the process simple and efficient.

### **Implications:**

The installation took place over a weekend with the goal of having production running smoothly again by Monday morning. The critical Pasteurizing Process was limited to a 4-hour downtime. The entire installation was completed by 3PM on Sunday, and the Pasteurization Process was up and running again well within the 4-hour window. In addition to having significantly faster HMI/SCADA response rates, maintenance personnel can now connect to all PLCs via the Ethernet TCP/IP network from their desktop instead of having to connect locally to the CPU every time they are called for troubleshooting, and the CPUs are faster and more capable.

Using CTI's 2500 Series® Automation Solutions, the plant now has a modern automation system for a fraction of the investment in time, money and downtime required by competing automation solutions. That's what we at CTI call Smart Modernization.™



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## The CTI 2500 Series® Automation System

The 2500 Series® has a proud legacy as one of the world’s premier process control platforms and is known for its capability, simplicity and reliability. CTI has modernized this legendary product line with smart enhancements and rich features to create a complete automation solution that helps our customers run their plants as safely, efficiently and seamlessly as possible through:

- Continuous Evolutionary Improvement
- Cost-Effective Solutions
- Simply Seamless™ Architecture
- Smart Modernization™
- Engineering Simplicity

## The BLUE Platform™

CTI 2500 Series® products are built on the BLUE Platform™ — CTI’s seamless systems architecture. Products built on the BLUE Platform™ are engineered with a consistent design philosophy, a common operating system and common communications protocols and interfaces. This approach ensures interoperability between various components of the system as well as between various product generations to deliver seamless operational communications and control and maximum efficiency with minimum process downtime and greatly reduced engineering development time.

Whether you choose Classic, Compact or Slice, the seamless systems architecture of the BLUE Platform™ will ensure seamless integration and powerful process control. Please contact us to learn more.

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