Control Technology Incorporated

A Snapshot of CTI

- Years in business: 32
- History as a supplier of PLC products to Rockwell, Siemens®, Omron
- Main business: 2500 Series® Programmable Controller System: a 100% compatible replacement for Simatic® 505
- Global presence: offices in 22 countries, 125 employees in sales and support (including affiliates)
- Over 110,000 systems installed worldwide (CTI + Siemens®)
- CTI has installed over 120,000 product units worldwide
  - Over 19,000 ethernet connections
  - Over 45,000 serial connections
  - Over 1.3 million points of analog and digital I/O
  - Over 3,300 new 2500-Cx00 processors

CTI: A Brief History
Three Phases of Company Development

Startup

1980	Founded as a spin-off from Computer Concepts Corporation - from the dairy and meat packing process control industry
1983	First industrial products for TI and Allen Bradley
1985	1771-DB Basic Module (Allen-Bradley)

PLC Component Supplier

1990	Isolated analog and discrete modules for TI 500 I/O
1991	First TI505 I/O products
1995	2572 Ethernet Module
1997	Siemens® private labeled analog, discrete, and communications modules

PLC System Supplier

2000	SuperSavers I/O Modules
2001	Siemens® announces exit of 505® business
2002	2572-A Fast Ethernet Module
2004	I/O Bases and Profibus RBC
2005	RS485 RBC
2006	Series 500 I/O Adapters
2007	2500 Series® Processors
2008	Worldwide User Conference – Las Vegas USA
2009	CPU performance improvements & new instructions
2011	2500 Series® HMI

CTI Corporate Headquarters

Tennessee

Knoxville

- Corporate Offices
- Product Development
- Manufacturing
- Sales & Marketing
- Factory Hotline
- Product Training

Factory Overview – Knoxville TN, USA

| solder screen | component placement | solder reflow | automatic test | 100% industrial burn-in |

- **Full industrial surface mount process**
  - solder screen, component placement, solder reflow, automatic test, 100% industrial burn-in
- **RoHS capable process (lead, mercury, cadmium, hexavalent chromium)**
  - Special solders and solding process
  - Special coatings
  - Special paints
- **Products Approvals CE, UL, UL-Canada, Class 1 Div 2**
- **Quarterly audits and certification by UL**

Global Distribution & Support Locations

CANADA

EUROPE
AFRICA
ASIA-PACIFIC
AUSTRALIA

MEXICO
CENTRAL AMERICA
SOUTH AMERICA
CARIBBEAN

Control Technology Inc
Company Introduction

CTi

APA
Master International Distributor

FaSTrak
SoftWorks, Inc.
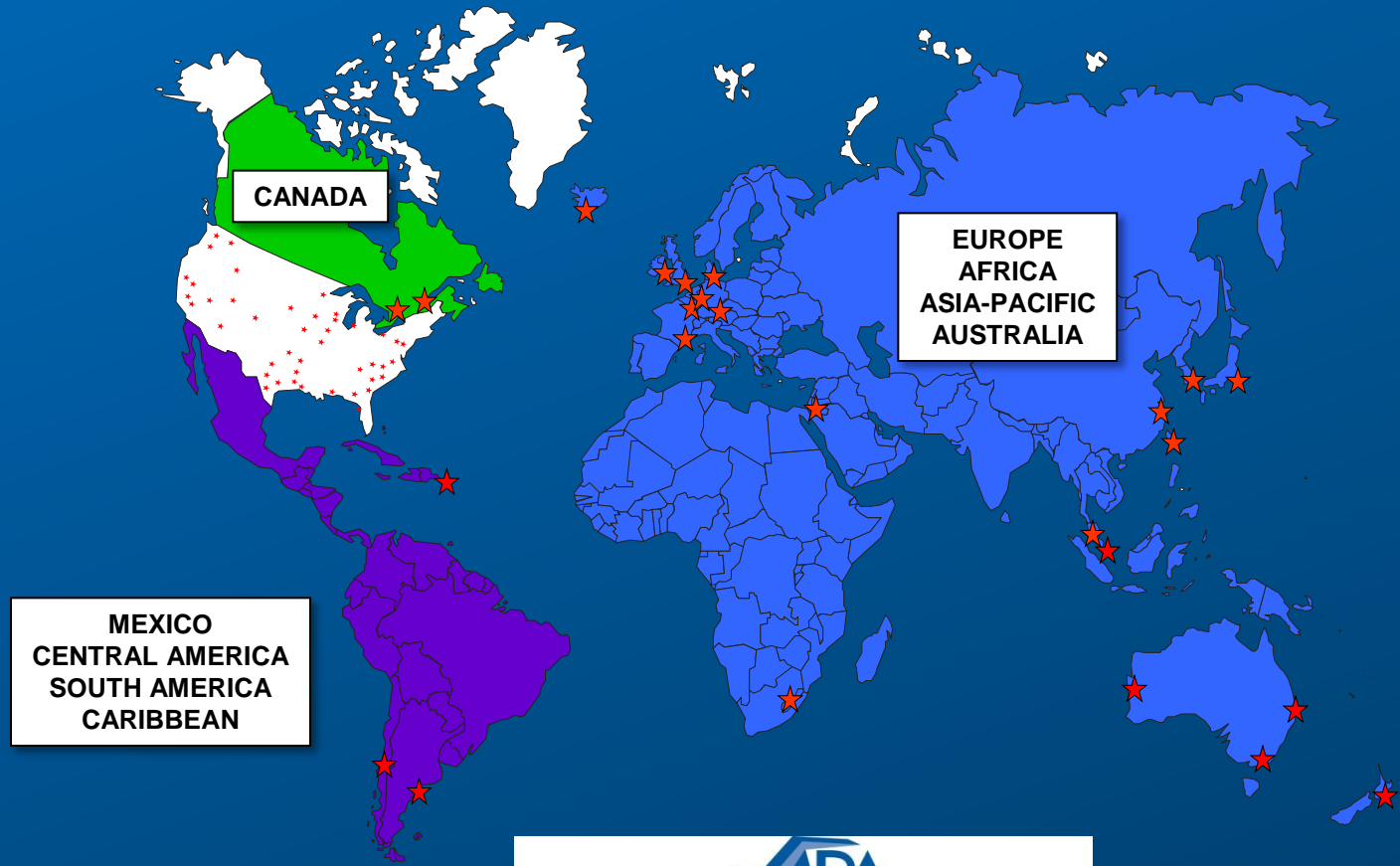
What is the 2500 Series® System?

- <u>New</u> PLC system based on Simatic® 505
- <u>New</u> design based on current technology
- <u>Compatible</u> with your existing Simatic® 505 installations
  - Interchangeable software
    - Same programs and programming tools as your Simatic® 505 systems
  - Interchangeable hardware
    - Simatic® 505 modules can be used in 2500 Series® Systems
    - 2500 Series® modules can be used in Simatic® 505 Systems
    - I/O modules are direct replacements with no wiring changes
  - Simatic® 505 and Series 500 remote I/O networks are supported

Project Highlights - USA

CTi 2500 Series™ System
Application Highlight

Application Highlight:
Replacement of TI560/565 with CTI 2500-C300 on Heidelberg-Harris M1000B Web Printing Press

2500 Series™ PLC System
Application Highlight

Application Highlight:
CTI 2500 Series™ CPU's Save Space, Reduce Cost, Enable MES Interface at Medical Device Manufacturer

2500 Series™ PLC System
Application Highlight

Application Highlight:
CTI 2500 Series™ CPU's Increase Reliability, Reduce Operating Cost, Increase Output at Textile Plant

CTi 2500 Series™ System
Application Highlight

Application Highlight:
2500 Series™ System in Natural Gas Transmission

Spencer Press
Printing press upgrade of 565 CPU and coaxial I/O to 2500-C300 with new RIO system

Medical Device Manufacturer
Upgrade 555 to 2500-C200 and iFIX SCADA
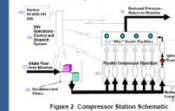
Textile Manufacturer
Upgrade 545 and TIway to 2500-C200 and Ethernet-based SCADA

Natural Gas Pipeline
Engine control, turbine control, gas & flame detection, overall station control at multiple compressor stations on natural gas pipeline

Project Highlights - Europe

Campina (dairy)

Upgrade of 555 CPUs to 2500-C400 using APT®

Air Liquide

New installation with 2500-C100 and CTI I/O

Powerpack (plastics)

Upgrade PM550 to 2500-C200 and CTI I/O with no program changes

Jensen A/S (plating)

Upgrade 555 to 2500-C400 and APT® - achieves 50% more throughput

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Project Highlights - Asia

Tajco (laser cutting)

Upgrade of S7-300 to 2500-C400 for increased throughput

Chang Chun (chemical)

(1) Upgrade of 545/555 to 2500-C400 and SCADA

(2) New installation with 2500-C400 and 2300 points of I/O

NCFC (cellulose)

Upgrade five 565 to 2500-C300 and eight new I/O bases, new programming software

CJ Biotech (fermentation)

Upgrade 545's to 2500-C400, new I/O bases, new iFIX SCADA

Project Highlights - Asia

Plating Plant (auto)

Replace Siemens D7-317 with 2500-C400 and APT®

Semiconductor Plant

Upgrade nine 545 processors to 2500-C200 with no changes in program or SCADA, and only 12 hours downtime

QLD Blow Molders

Upgrade 5TI processors to 2500-C200 with no program changes and only 4 hours downtime

2500 Series® System

Worldwide Support

- Global support organization
  - USA support (Knoxville, TN)
  - South America support
    - Buenos Aires (Argentina & Brazil)
    - Santiago, Chile
  - European support
    - Nice, France
    - Copenhagen, Denmark
    - Amsterdam, Netherlands
    - Dublin, Ireland
    - United Kingdom
    - Belgium
    - Germany
  - Africa support (Johannesburg, SA)
  - Asia-Pacific support
    - Brisbane, Melbourne, Perth Australia
    - Taipei, Tainan Taiwan
    - Shanghai, China
    - Seoul, Korea
    - Singapore
    - Malaysia

2500 Series® Product Overview

2500 Series® System Components
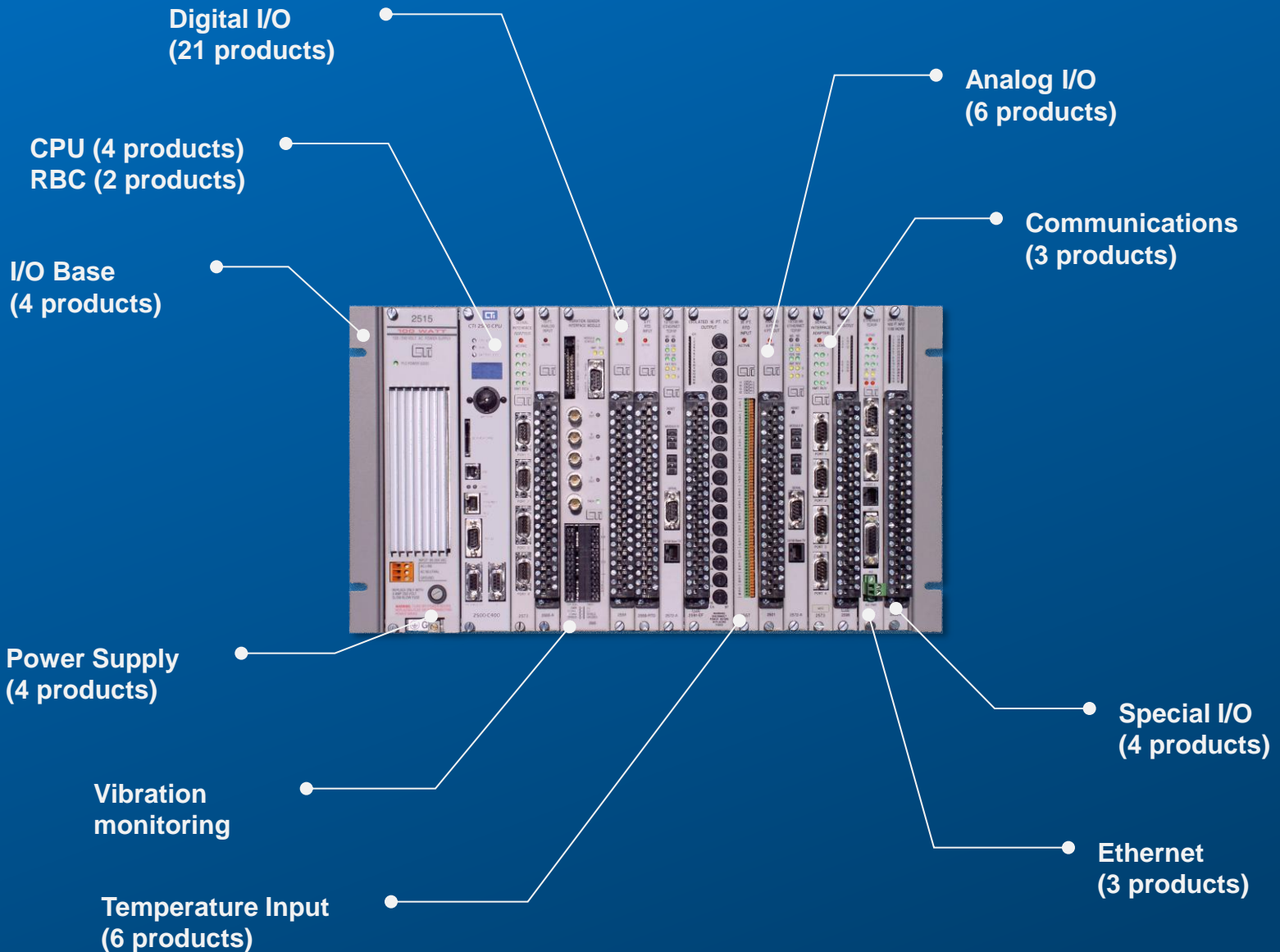
Digital I/O
(21 products)

Analog I/O
(6 products)

CPU (4 products)
RBC (2 products)

Communications
(3 products)

I/O Base
(4 products)

Power Supply
(4 products)

Special I/O
(4 products)

Vibration
monitoring

Ethernet
(3 products)

Temperature Input
(6 products)

2500 Series® Processors

	2500-C100	2500-C200	2500-C300	2500-C400
Memory	128K	256K	512K	3072K
Digital I/O	1024	2048	8192	8192
Analog I/O	1024	1024	8192	8192
Loops / Alarms	16 / 32	64 / 128	512 / 512	512 / 512
SFP / SFS	64 / 64	1023 / 1023	1023 / 1023	1023 / 1023
Ethernet	Yes	Yes	Yes	Yes
Remote I/O	No	Yes	Yes	Yes
Profibus	No	Yes	Yes	Yes
SD card	Yes	Yes	Yes	Yes
USB	Yes	Yes	Yes	Yes
Replaces	545-1103* 545-1105*	545-1101 545-1102 545-1104 545-1106	555-1101 555-1103 555-1105	555-1102 555-1104 555-1106

* If Profibus-DP annex card is installed, a 2500-C200 must be used

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Bases

	2500P-R4	2500P-R08	2500-R11-A	2500P-R16-A
I/O Slots	4	8	11	16
Compatible with	505-6504	505-6508	505-6511	505-6516

Power Supplies

	2512, 2512-A	2515-A	2513
Output	75W	100W	75W
Input	90-264 VAC		20-30 VDC
compatible with	505-6660 505-6660A/B*	505-6660 505-6660A/B**	505-6663-A

(*) 2512-A is required if redundancy mode is needed.
Module needs to be installed in redundant 2500-R11-A base.

(**) 2515-A also supports redundancy when installed
in 2500-R11-A base.

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Remote Base Controllers

	2500-RBC	2500-RIO-A
Interface	Profibus-DP	Remote I/O
Compatible with	505-6870	505-6851

Digital Input Modules

	2588-8	2589-A / 2589-B
Channels	8	32 (or 16 or 8)
Login	8 input	32 input (or 16 input)
Isolation in Groups of	2	32pt login: 4 or 8 (selectable) (16pt login: 4) (8pt login: 2)
Voltage rating	11V to 250V AC or DC (selectable by group)	
Compatible with	505-4008-A, 505-4108[(*)], 505-4208-A, 505-4308, 505-4408-A	505-4008-A, 4016-A, 4032-A, 505-4108[(*)], 4116[(*)], 4132[(*)], 505-4208-A, 4216-A, 4232-A, 505-4308, 4316-A, 4332, 505-4408-A, 4416-A, 4432-A

(*) Compatible if used in 12 VDC application or above.

DC Output Modules

	2596-8	2596	2597
Channels	8	16 (or 8)	32 (or 16 or 8)
Type	Sourcing		
Isolation in Groups of	2	16pt login: 4 8pt login: 2	32pt login: 4 or 8 (selectable) 16pt login: 4 8pt login: 2
Voltage rating	11VDC to 125VDC		
Current rating	2A per channel	2A per channel, 32A per module	
compatible with	505-4508 505-4708	505-4516 505-4716	505-4532 505-4732
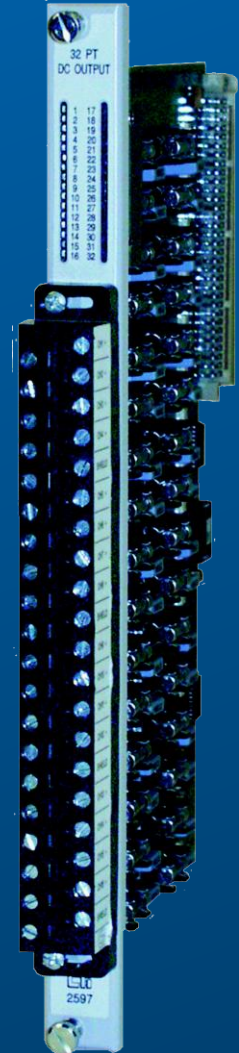
AC Output Modules

	2598-8	2598	2599
Channels	8	16 (or 8)	32 (or 16 or 8)
Isolation in Groups of	2	16pt login: 4 8pt login: 2	32pt login: 4 or 8 (selectable) 16pt login: 4 8pt login: 2
Voltage rating	11VAC to 240VAC		
Current rating	2A per channel	2A per channel, 32A per module	
Compatible with	505-4608 505-4808	505-4616 505-4816	505-4632 505-4832
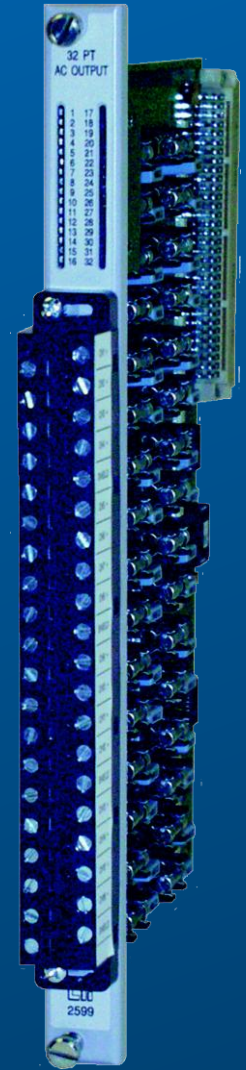
Relay Output Modules

	2534	2532	2531
Channels	8	16	32
Type	Form-C	Form-A	Form-A
Voltage rating	12VDC to 30VDC, 12VAC to 250V AC		
Current rating	4A per channel, 32A per module	4A per channel, 8A per group, 32A per module	
compatible with	505-4908	505-4916-A	505-4932-A

Analog Modules

	2558	2562	2501
Channels	8 input	8 output	8in / 4out
Ranges	0-5V, 0-10V, 0-20mA, 4-20mA, unipolar and bipolar, selectable by channel		
Resolution	16 bits	12 bits	16 bits input, 12 bits output
Update time	4msec		7msec
Compatible with	505-6108-A 505-6108-B	505-6208-A 505-6208-B	505-7012 505-7016

Temperature Modules

	2559-TC	2559-RTD
Channels	8 thermocouple input	8 RTD input
Ranges	J, K, T, E, R, S, N, and mV	100Ω, 200Ω, 500Ω platinum, 120Ω nickel, 10Ω copper
Update time	9msec	
compatible with	505-7028-A	505-7038
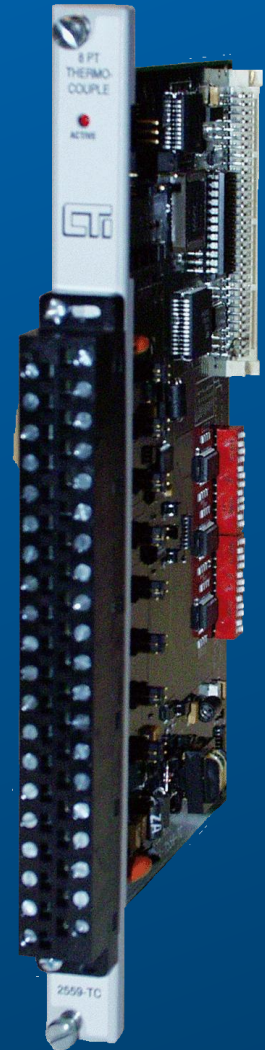
Counter Module

	2502
Channels	2
Counters (per channel)	One 16-bit
Count Inputs (per channel)	2
Control Inputs (per channel)	2
Outputs (per channel)	2
compatible with	505-7002
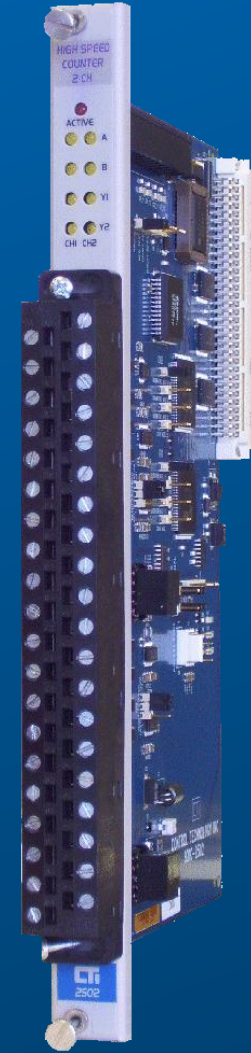
2500P-ECC1 Ethernet Communications Coprocessor

- Advanced Ethernet communications solution for CTI 2500-Cxxx Processors
- CAMP (CTI ASCII Messaging Protocol)
  - Server and Client (includes multicast)
  - Allows communication with 2572, 2572-A, and 2500 Series® Processors, HMI which support CAMP (or OPC)
- Open Modbus (Ethernet)
  - Modbus Server
  - Modbus Client
- Network Data Exchange
  - Shares with other 2500P-ECC1 and CTI HMI panels
  - Publish/ Subscribe Model
  - Publish based on change in value

2500P-ECC1 Ethernet Communications Coprocessor

- High performance connection from PLC to HMIs

- Client/Server connection to legacy PLCs with 2572/2572-A

- Flexible Network Data Exchange to multiple PLCs with 2500P-ECC1s

- Connection to Open Modbus devices using client or server

- All with <u>no</u> programming

2572-A Fast Ethernet Module

- Direct 100Mbit connection using RJ45
- More throughput (2X – 3X) than 2572
- Enhanced PLC access
- New additional protocol support (Modbus TCP and Ethernet/IP
- Web server access for diagnostics and configuration
- Enhanced event logging for troubleshooting
- DHCP with module ID
- Flash upgradeable

And many other solutions . . .

- Vibration monitoring
- Analog and digital I/O with individual isolation between channels – 11 products
- TTL inputs & outputs
- 16-point analog and temperature input modules
- Specialized counter modules
- Ethernet (4 solutions), Profibus-DP, Modbus, DeviceNet™
- Processor redundancy

Product Spotlight
Vibration Monitoring

2505 Vibration Sensor Interface Module

- 4 transducer channels + tachometer channel
- Each transducer channel supports proximity, velocity, or accelerometer transducers
- Reports RMS and peak vibration to PLC, along with speed
- Monitors and reports alarm conditions
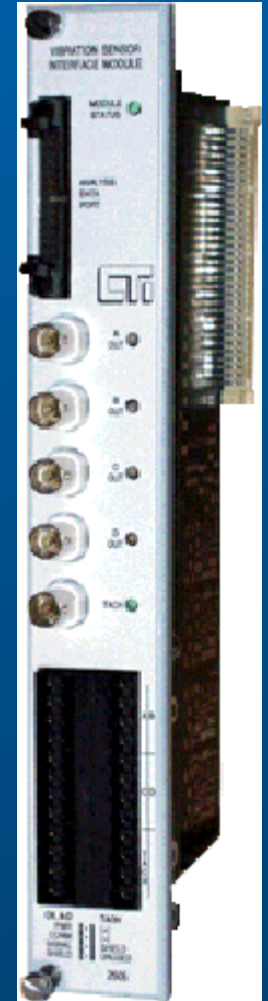
Product Spotlight
Upgrading TI Series 500 Systems

- 2500-IADP I/O Adapter
- 2500-PADP Power Supply Adapter
- 2500-RADP RBC Adapter
- 2500-ADP1 Analog Wiring Adapter
- 2500-ADP2 Discrete Wiring Adapter
- 2500-R4500 Adapter Base
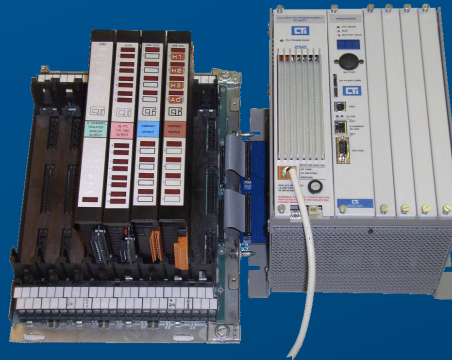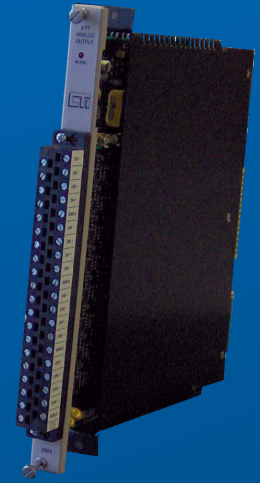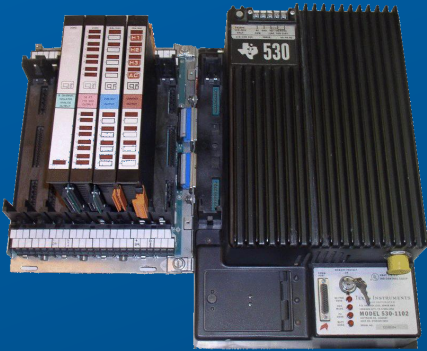
Product Spotlight
Redundancy & Backup Solutions – Remote Bases

- Redundant RBC

- Redundant power

- Redundant power & redundant RBCs

Product Spotlight
Redundancy & Backup Solutions – Processors
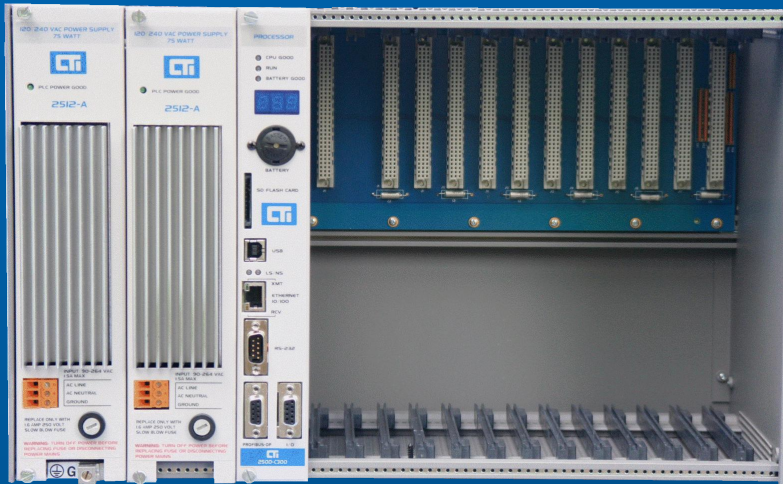
- Redundant power with one CPU

Product Spotlight

CPU Redundancy

2541 Redundant Processor Manager

- Allow use of two 2500 Series® CPUs in a redundant backup configuration
- I/O is connected to the control PLC using relay contacts
- Both PLCs see the inputs all the time
- 2541 monitors both PLCs and switches the I/O to the backup PLC in case of fault
- Critical data is written to the backup PLC
- No change in outputs when switching from primary to backup
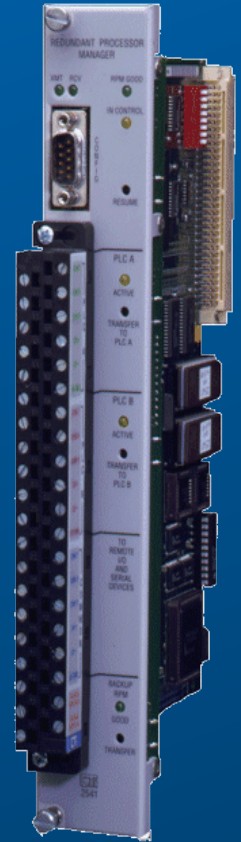
Product Spotlight
Redundancy & Backup Solutions – Processors

- Redundant power & redundant CPUs using Redundant Processor Manager

To remote bases

Backup CPU with Redundant RBCs
Using independent cables to RBCs
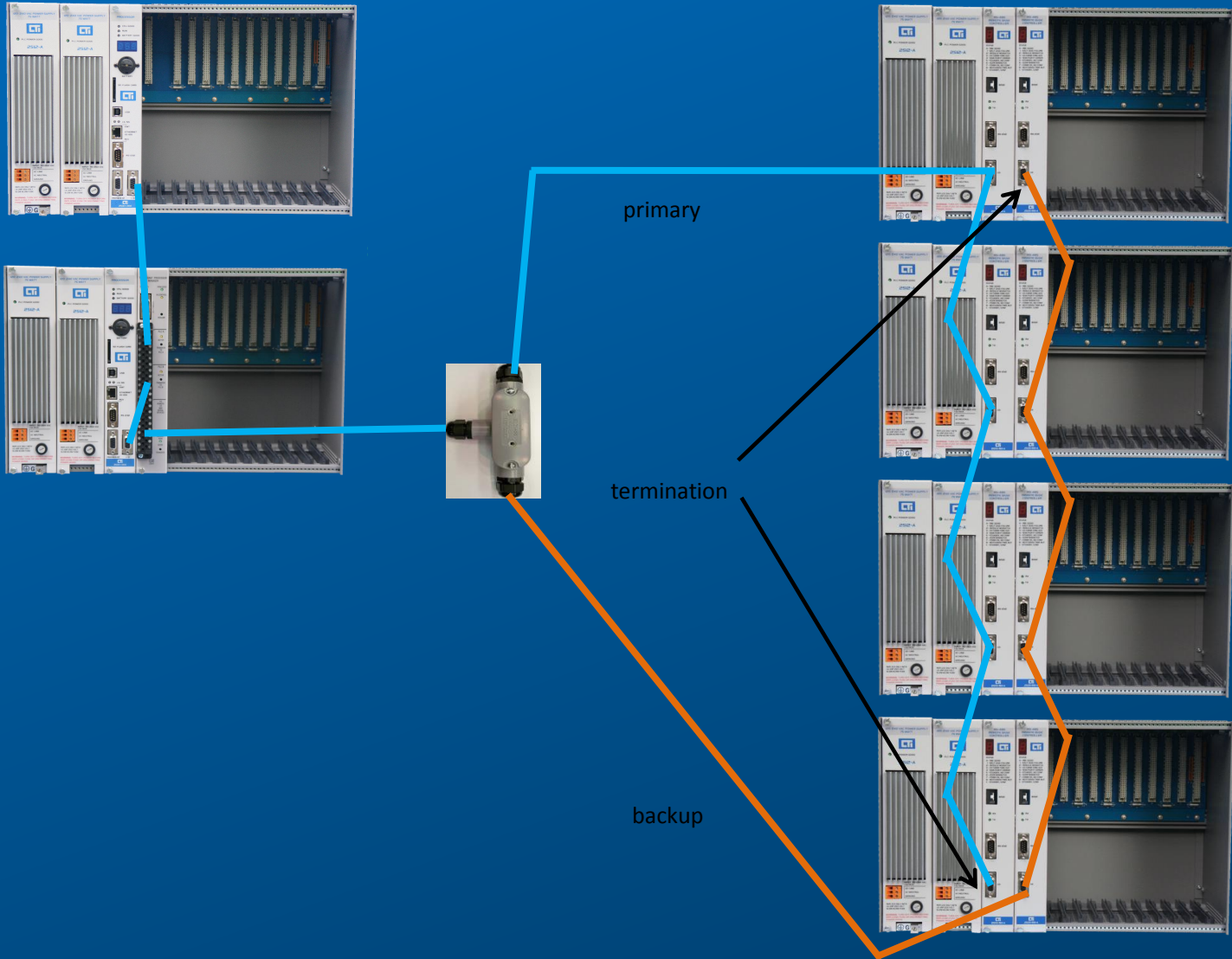
primary

termination

backup

Product Spotlight
Conformal Coating

- Conformal coating protects against moisture, fungus, dust and corrosion caused by extreme environments

- Should be used especially if the environment has levels of H2S, SO2, CL2, or NO2 in concentrations above the following levels:
  - H_2S >10 ppb
  - SO_2 >1000 ppb
  - CL_2 >2 ppb
  - NO_2 >125 ppb
  - ppb = parts per billlion

2500 Series™ Products Conformal Coating Option

In response to the ever-increasing performance demands of modern electronic circuits, circuit board densities continue to grow and component lead spacings continue to shrink. Because these geometries are so small, the susceptibility of circuits to adverse effects of corrosive environments in industrial settings is higher than it was only a few years ago. Much smaller defects are now capable of causing failures.

At the same time, environmental concerns and regulations world-wide have prompted manufacturers to convert their electronic assembly processes to reduce or eliminate the use of lead. Unfortunately these same lead-based compounds were a major component in improving the resistance of the finished products to corrosion in certain kinds of environments.

In recognition of these industry changes, and in an effort to offer an even better product to certain 2500 Series™ System installations, we now offer a conformal coating option on our 2500 Series™ products.

Conformal Coating FAQs

What does the conformal coating do for me?
Conformal coating protects the circuitry from moisture, fungus, dust and corrosion caused by extreme environments. It also reduces possible damage from handling during construction, installation, and use.

How do I know if I should order conformal coating?
If you're worried about the effects of dust, moisture, and corrosion, particularly if the environment where your equipment is installed has levels of H_2S, SO_2, CL_2, or NO_2 in concentrations above the following levels:

H_2S >10 ppb
SO_2 >1000 ppb
CL_2 >2 ppb
NO_2 >125 ppb
ppb = parts per billion

If my modules are conformally coated, can they operate in a wet environment? No. The conformal coating improves the resistance of the product to severe environments. It is not intended to be a waterproof coating.

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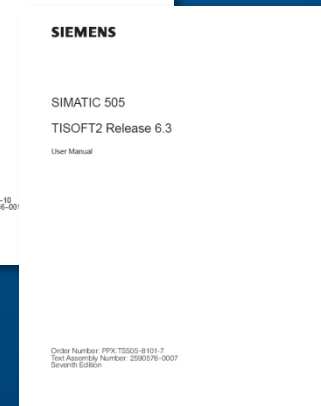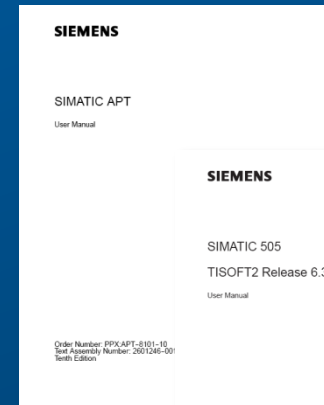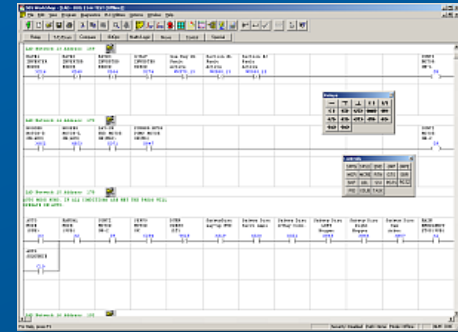
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2500 Series™ System Corrosion Protection

2500 Series® Programming Tools

- PLC Workshop Suite™
  - Primary programming platform
  - Runs under Windows
  - Includes integrated Profibus configurator
  - Ongoing development and enhancement
  - Current version 4.60 includes new instructions
- APT®
  - Enriched programming platform for process control
- TISOFT™
  - DOS-based legacy platform

Thank You!