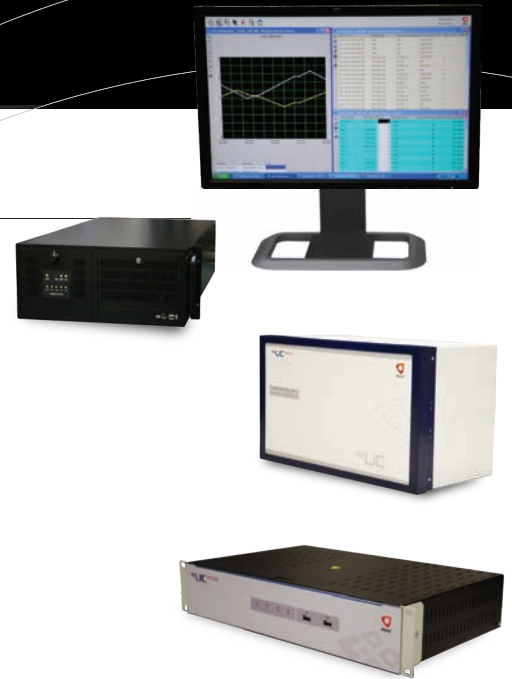


Station and HMI Servers

Overview

The UC 500 server family provides an all-in-one flexible communication gateway, automation platform and HMI solution for utility and industrial applications. The multiple hardware options and its modular and scalable software architecture support the full spectrum of applications from integrated cost effective station servers to high performing distributed applications, such as large substations or power plants.



Product Overview	
<p>UC 500 Station Server</p>	<p>SCADA/HMI server, station controller or gateway/data concentrator. Software product for application to third-party PC-based hardware platforms.</p>
<p>UC 500E Embedded Station Server</p>	<p>UC 500 station server featuring industrial-grade fanless hardware platform, suitable for harsh environments and targeting minimal maintenance.</p>
<p>UC 500H High-availability Station Server</p>	<p>UC 500 high-availability embedded hardware platform, featuring hot swappable power supplies and redundant CPUs.</p>



Key Features

- Single Platform for Station Servers and HMI
- Multiple Communication Options
- IEC 61850 Interface
- Hosts SCADA/HMI Server
- Web-enabled Interface
- IEC 61131-3 PLC Programming
- Multiple Redundancy Options
- Security Features Built-in

Customer Benefits

- Unified Engineering Across all Product Components
- Modular and Scalable Hardware and Software
- Open and User-friendly
- Feature-rich State-of-the-art HMI
- Easily Integrated into IT Infrastructures
- Highly Adaptable to Users' Requirements
- Object and Template-based Database and HMI Configuration
- Long Experience in Substation and Power Plant Automation Systems



Product Overview

The multi-protocol multi-channel gateway provides seamless connectivity options for either station IED data aggregation, connectivity to multiple local or remote control and management systems, RTU/telecontrol gateways or SCADA front-end processors.

The built-in logic engine, fully programmable in IEC 61131-3 languages, allows further application flexibility, either as an application-layer gateway and data processor or as a full automation SoftPLC controller.

The optional HMI 500 server supports alarms and events, data historian as well as multi-client web-based user interface, featuring advanced 2D vector graphics, tagging and pinning and trending. The UC 500 therefore also provides users with a full featured SCADA platform for any utility or industrial application.

Notwithstanding the complete feature set, the UC 500 products, available either with pre-installed or as easy to install software, are configured or managed through the Efacec Automation Studio integrated engineering environment, hence providing application flexibility without compromising engineering efficiency.

Server Components

Enhanced Communications

The available communication software modules support over 50 different serial or IP communication protocols, including all well-established communication standards. Supporting up to 8 control/management center independent channels and up to 256 IED/RTU connections per unit (unit cascading options available), the UC 500 can be setup in different configurations according to application scale and expansion requirements.

Up to 8 different protocols may be active in each unit, hence allowing the integration of a diverse range of remote stations, SCADA software, RTUs, meters, protection relays, controllers or recorders of multiple manufacturers.

The UC 500 also provides transparent redundant communication channel/port operation for selected protocols such as DNP or IEC protocols (in either serial or IP links). Available for both IED/RTU or master station links and in both standalone and redundant unit configurations, redundant communication links further increase system availability.

The availability of OPC connectivity allows simplified integration with industrial automation systems.



Communication Options	
For Distributed Automation	
IEC 61850-8-1 MMS Client (TCP/IP)	○
IEC 61850-8-1 MMS Server (TCP/IP) and GOOSE publish/subscribe	○
Others (Please Contact)	○
Masters/Clients	
IEC 60870-5-101 (Serial)	○
IEC 60870-5-101 (UDP/IP)	○
IEC 60870-5-103 (Serial)	○
IEC 60870-5-104 (TCP/IP)	○
IEC 61850-8-1 MMS Client (TCP/IP)	○
DNP 3.0 (Serial)	○
DNP 3.0 (UDP/TCP/IP)	○
Modbus (Serial)	○
Modbus (TCP/IP)	○
JBus (Serial)	○
SpaBus (Serial)	○
SNMP / ICMP (UDP/IP)	○
OPC DA/AE Client (TCP/IP)	○
Procome (Serial)	○
Profibus FMS / DP	○
Courier (Serial)	○
4F (Serial)	○
4F (UDP/IP)	○
PUR (Serial)	○
PUR (UDP/IP)	○
MLINK (Serial)	○
SEL FM (Serial)	○
INSUM (Serial)	○
SILCOM (Serial)	○
Others (Please Contact)	○
Slaves/Servers	
IEC 60870-5-104 (TCP/IP)	○
IEC 60870-5-101 (UDP/IP)	○
IEC 60870-5-101 (Serial)	○
DNP 3.0 (Serial)	○
DNP 3.0 (UDP/TCP/IP)	○
Modbus (Serial)	○
Modbus (TCP/IP)	○
OPC AE (TCP/IP)	○
OPC DA (TCP/IP)	○
4F (Serial)	○
4F (UDP/IP)	○
PUR (Serial)	○
PUR (UDP/IP)	○
CETT (Serial)	○
TG809 (Serial)	○
Ferranti (Serial)	○
Others (Please Contact)	○

○ - Optional feature

Server Components

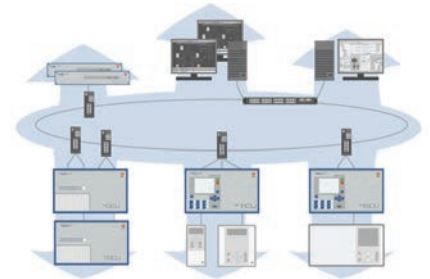
Distributed Control System Integration

For substation and power plant applications the UC 500 station servers fully support IEC 61850 and can be applied as true IEC 61850 gateways, providing open system design and full compatibility with other compliant devices, engineering tools and systems.

From a system engineering perspective the user not only profits from simplified IEC 61850 engineering, but also from the flexibility of defining the logical node classes and logical device allocation in each configuration. This provides unmatched logical configuration capabilities that, together with GOOSE messaging, allow the deployment of versatile automation and supervision applications within an open systems perspective.

Together with IEC 61850 operation, the UC 500 also supports SNMP/ICMP monitoring, hence allowing full supervision of all active assets in the communication system.

Integrating Efacec devices allows further benefits, not only by the use of the common engineering toolset and HMI metaphors, but also by using specific device templates that enable the reduction of errors in system configuration and of engineering times.



Fully-integrated IEC 61850 Automation Systems

Clock Synchronization

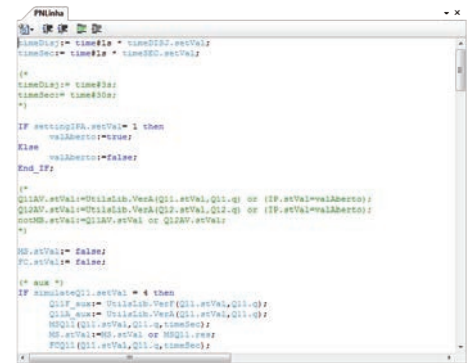
Real-time clock synchronization can be performed via SNTP, IRIG-B or by communication protocol. Multiple clock configurations are possible as well as management of time-stamping offsets either for operation with multiple time zones or multiple remote clocks.

SoftPLC Processor

The UC 500 products include an optimized logic processor engine with large memory capacity for application of extensive user-defined algorithms programmed in IEC 61131-3. Boolean, integer and floating point logic and arithmetic is available together with the full range of standard function blocks including flip-flops, counters or timers and user-defined reusable function block libraries.

The optimized logic engine supports prioritized cyclic and multi-event scheduling to meet diverse functional needs. Since all data points can be fed to and from the logic engine, the user has the ability to adapt the device to any specific automation or data processing requirement.

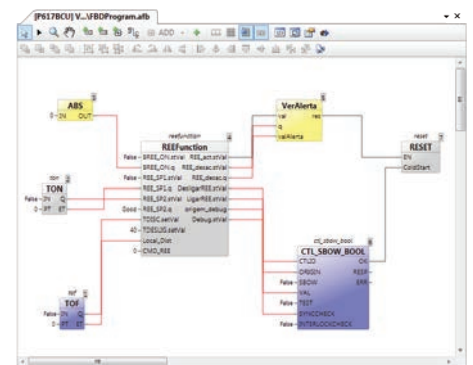
Applications ranging from generation of simple alarm/event grouping, through switching interlocks or switching sequences to sophisticated discrete control logic are possible. Power plant control, substation load shedding or distribution fault isolation and restoration are typical examples of UC 500 SoftPLC applications.



IEC 61131-3 Programming

IED Record Extraction and Handling

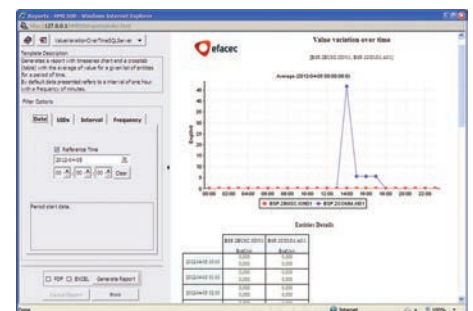
To simplify incident analysis, fault, disturbance, SOE or other data records may be extracted automatically from protection relays or other IEDs via IEC 61850 or other protocols. Locally stored records can then be accessed from the station server and analyzed with the Automation Studio COMTRADE and record viewers as well as other third-party tools.



IEC 61131-3 Programming

Reports

A reports infrastructure is available, which, combined with the data historian, provides a powerful and highly flexible way to create reports with advanced data visualization, including tables and charts, including data processing features which can deal with large datasets. Reports are fully user-designed and include parameterization capabilities enabling the HMI user to specify report output according to simple input parameters such as values, dates or identifiers. Several output formats are available including HTML, Excel or PDF.



HMI 500 Reports

Notifications

A flexible notification mechanism is available, which allows sending template-based messages to configured users, through SMS and/or email. Notification triggering may be time-based or even/alarm triggered to cover both emergency situations and periodic reporting. Together with the reports feature, full-blown pre-configured reports may also be sent as email attachment.

Server Components

Data and Control Processing, Alarms and Events

Core data processing such as unit and linear conversions, measurement filtering, thresholds and alarms levels are available for each data point without requiring any additional IEC 61131-3 programming. Processing of alarms and of alarm acceptance and notification is also included.

Direct or select-operate methods are available together with execution model mapping for multiple protocols as well as control blocking, final state checking and execution signaling in either SCADA, automation or gateway applications. Final state equations and blocking rules can be defined per control point, considering control origin and execution state.

Application Options	UC 500	UC 500E	UC 500H
Data/ Control Points	> 64k	up to 64k	up to 32k
Alarms Management	●	●	●
Data Historian	●	●	●
IED Record Extraction and Handling*	○	○	○
IEC 61131-3 Programming	○	○	○
HMI 500 Server/ Web Server	○	○	○
HMI 500 Client Interface	○		
Number of Simultaneous HMI 500 Clients	up to 64	up to 16	up to 8

○ - Optional feature | ● - Base feature
* Requires IEC 61850 MMS Client Option

Data Historian

A database centered history recording function which includes event data and periodic/statistical data logging is provided. Data records are provided with 1ms resolution time stamping (source and local). Stored data can be extracted for analysis in external tools as well as fed to the SCADA HMI screens for trend displays or data lists.

Engineering and Troubleshooting

Engineering is fully integrated in the Automation Studio toolset whether a device oriented or a distributed control system approach is required. While being highly adaptable products, configuration and maintenance efforts are reduced with features like template-based engineering, libraries, copy-paste and drag-and-drop, etc.

Automation Studio is a unique easy to use environment providing a range of features from advanced 2D vector graphics editors to simulation as well as data extraction and configuration management. These features are complemented with unified project system integration, comparison and productivity wizards or import/export including IEC 61850 SCL that make enhanced system functions simple to setup, visualize and manage.

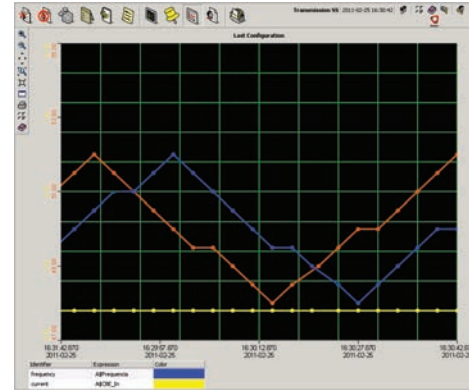
Troubleshooting and administrating UC 500 servers is also simplified with extensive logging, built-in communication protocol tracing, self-monitoring and remote desktop access.

Access Control and System Security

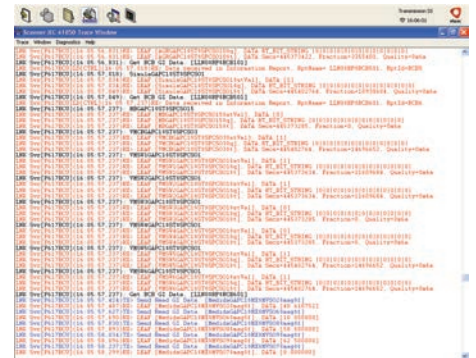
In accordance with security standards the UC 500 software supports encryption for selected protocols such as HTTPS, built-in firewall and anti-virus solutions, port mapping for all communication protocols as well as role-based operating-system managed authentication and access control to all features.

Self-diagnostics

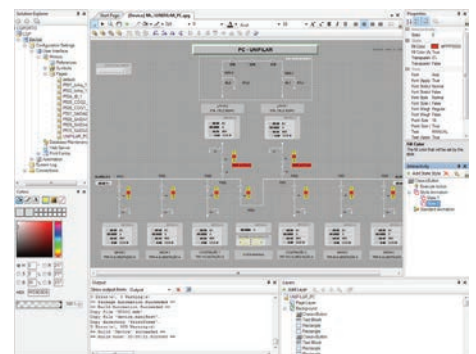
All software modules provide extensive diagnostic data points and management controls, therefore integrating self-monitoring with application data. Independent software and hardware watchdog keep track of process and thread states as well as operating system status.



HMI 500 Trends



Communication Trace



Graphics Editor

Device Platforms

Platform Overview

The UC 500 software runs on standard PC-based platforms running Windows operating system, benefiting from low hardware and software costs, flexibility and usability as well as readily available support. Running on a standard operating system also allows easy integration with corporate systems or third party applications. The UC 500 is delivered as software or in standard or industrial PC configurations.

Based on industrial fanless hardware both UC 500E and UC 500H provide performance and stability together with maintenance free solutions. Both solutions are ideal for harsh utility or industrial environments. Moreover these product variants are based on a tailor made componentized Windows XP operating system that optimizes system performance and reduces cyber security vulnerabilities. Write protection on core disk also ensures that, upon restart, original firmware is reset. Packages including software and operating system updates are made available according to product support options.



Platform Options	UC 500	UC 500E	UC 500H
Chassis Variants			
19" Rack-mounted (2U) [Up to 12 serial ports]		○	
19" Rack-mounted (3U) [Up to 20 serial ports]	*		
19" Rack-mounted (6U)			●
Processor			
CPU (Atom N270 @ 1.6GHz)		●	●
RAM (2GB)		●	●
Core Flash Disk (4GB)	*	●	●
Additional Flash Disk (4GB)		○	○
Additional SSD (64GB)		○	○
Hardware Watchdog		●	●
Interfaces			
IRIG-B input		○	○
USB Ports		2+2	2+2
2 x 10/100/1000BASE-TX		●	●
4 x RS232	*	●	●
Expansion RS232/485 Serial Ports (in modules of 4 or 8 ports, each module RS485 or RS232)	(up to 64 serial ports)	○ (4,8,12 or 16)	○ (4)
Expansion 2 x 10/100/1000BASE-TX		○	○
Watchdog output		●	●
General Purpose Status I/O (6 DI + 4 DO)**		●	●
Operating System			
Windows XP Embedded		●	●
Windows XP	○**		
Windows 7			
Others (Please Contact)			

○ - Optional feature | ● - Base feature

* Multiple hardware options available depending on selected hardware configuration. Please contact Efacec for standard solutions.

** Operating system not included.

*** 6 DI and 4 DO required for redundancy control in hot-standby configurations.

Device Platforms

High-availability and Redundancy Options

Both UC 500 and UC 500E can be deployed in standalone or in hot-standby configurations. All products support software and hardware watchdog for failure detection and recovery.

Hot-standby configurations allow high availability with continuous data point and database synchronization from active to stand-by unit. Failure detection and failover management is handled by an external control panel that also performs serial port switching and manual redundancy control.

The UC 500H variant provides built-in redundant CPU and communication boards as well as active redundancy management ensuring that no control steps are lost during failover. This all-in-one high-availability variant supports field replacement of CPU boards and features hot swappable power supplies for unmatched availability.

Platform Options	UC 500	UC 500E	UC 500H
Availability Configurations			
Hardware Watchdog and Auto-reset (Detection of hardware and OS failures)	● *	●	●
Hot-standby Configuration (2 units with HW Watchdog and I/O, Changeover panel and Serial port switches)	● *	○	
High-availability Configuration (Hot-pluggable Power Supply and Dual-CPU)			●
Second Power Supply			○
Second CPU Card			○
Software Failure Detection and Recovery (Self-healing of software module failures)	●	●	●
Power Supply			
24 V d.c. (19 to 36 V)			
48 V d.c. (36 to 72 V)			
110/125 V d.c. (72 to 144 V)		○	
220 V d.c. (124 to 370 V)	* *		
230 V a.c. (88 to 264 V)			
110/125/220 V d.c. (88 V to 350 V)			○
115/230 V a.c. (80 V to 265 V)			
48/60/110/125 V d.c. (38 V to 150)			

○ - Optional feature | ● - Base feature

* Hardware not included.

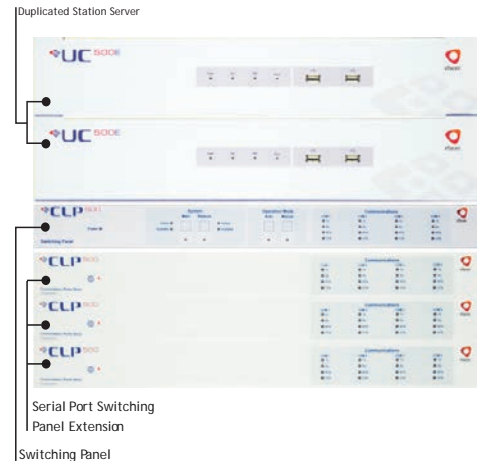
* * Power Supply depends on selected hardware configuration. Please contact Efacec for standard solutions.

User Interface

Equipped with the HMI 500 state-of-the-art SCADA/HMI solution, the UC 500 servers provide a concise process view for operational purposes, operations management as well as for data analysis.

Mimic displays can be setup with full blown 2D vector graphics including gradients and transparencies and high-performance animations ranging from multi-states, style changes or 2D transforms that allow the designer to meet the most demanding interactivity requirements.

Client-side deployment is seamless by the use of secure web-based technologies both for communication and visualization. Supporting multiple local or distribute operating stations supported by different computing platforms such as smart phones, tablets, desktop or laptop computers, panel PCs, etc.



Hot-standby configuration for UC 500E units, with Switching Panel



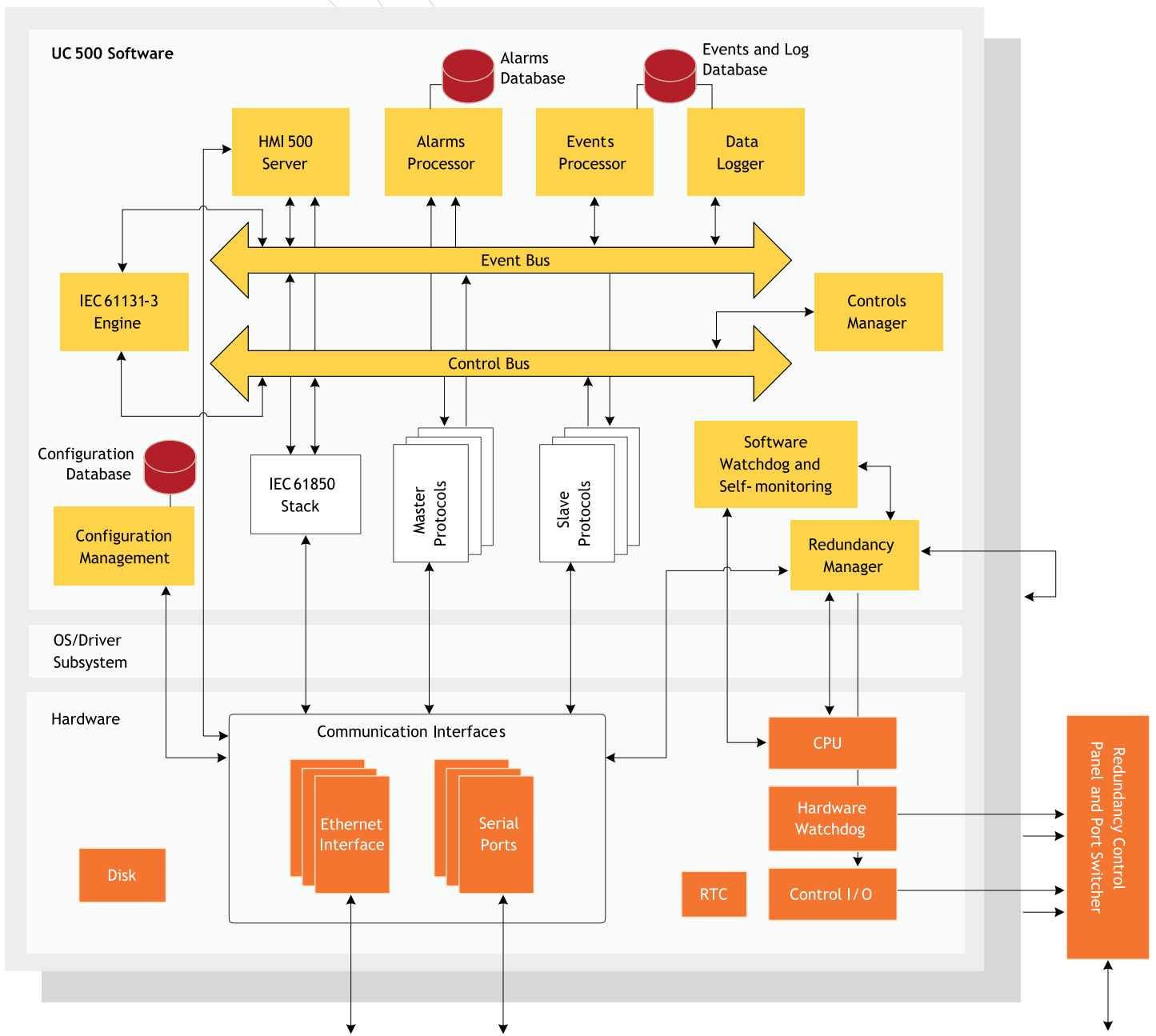
UC 500H Rear Panel



HMI 500 Multi-window View

Product Architecture

The UC 500 features a modular architecture in which software components may be enabled or disabled according to requirements. Customer specific applications can also be developed or integrated on request.



Legend:
 System Modules
 Communication Modules
 Hardware Modules


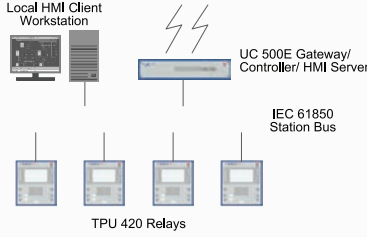

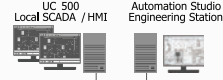

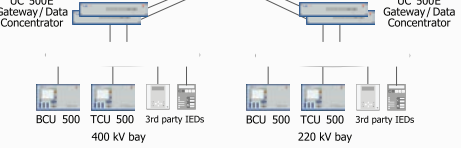

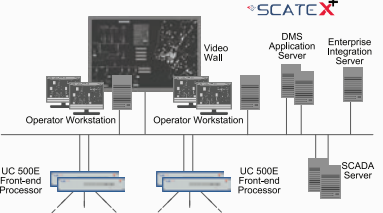

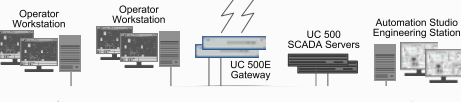

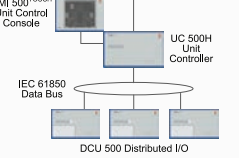

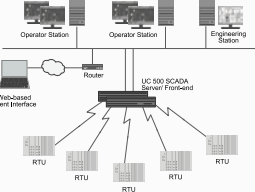
Applications

Application Overview

The UC 500 server products are flexible and scalable, hence allowing best balance between cost and performance in accordance with user requirements. The open nature of the product, the modular architecture, software feature set and hardware options enable multiple applications from simple integrated station HMI/gateway solutions to high-end DCS and small-scale SCADA applications.

Product Enhancements and Life-cycle Support

The field-proven, flexible and open platform ensures that your system is equipped with future-proof technology and that stepwise investment strategies are not hindered. Efacec also provides a full range of services from training and product support, through development of specific software components, to engineering and maintenance that ensures you have the best fitting solution for your requirements considering the full system life-cycle.

Product	Example Application Description	
	Integrated distribution substation gateway and HMI server: <ul style="list-style-type: none"> • IEC 61850 Station Bus • Integrated local SCADA server and historian • IEC 61131-3 programming for station-level functions • Redundant connections to remote control center 	
	Transmission substation local SCADA: <ul style="list-style-type: none"> • Independent communication architecture per voltage-level 	
	Transmission substation redundant gateway and data concentrator: <ul style="list-style-type: none"> • Multiple remote national control centerconnections • IEC 61850 multi-vendor integration 	
	SCADA/DMS/EMS front-end processor: <ul style="list-style-type: none"> • Multi-protocol multi-channel redundant processors • Multiple front-ends per SCADA system 	
	DCS SCADA solution for power plant: <ul style="list-style-type: none"> • Multiple HMI operator stations • Redundant SCADA server • Integrated system configuration workstation with Automation Studio 	
	Hydro power plant DCS system group controller: <ul style="list-style-type: none"> • Open IEC 61850 data and control bus featuring client server and GOOSE messaging • Specific power plant control IEC 61131-3 library functions • High-availability configuration 	
	Small-scale wide-area SCADA: <ul style="list-style-type: none"> • Integrated front-end and SCADA server • Multiple out-stations and RTUs • Free-choice of communication protocol • Operator workstations and remote web-based access 	



Automation Business Unit

Rua Eng. Frederico Ulrich - Ap. 3078 | 4471-907 Moreira Maia | Portugal | Tel: +351 229 402 000 | Fax: +351 229 485 428 | e-mail: ase.eng@efacec.com | web: www.efacec.com



View the product on our website. Due to our policy of continuous development, specifications may change without notice. Not valid as a contractual item.

mod. AS9911104C1