SICAM A8000
News & Updates

Reinhard Krug,
Head of SICAM A8000 Product Lifecycle Management
September 12-13, 2019 | VAR Partner Day 2019 | Bled, Slovenia
SICAM A8000 Series – Wherever energy flows

Enhanced Feature Set of CP-8050

September 2019
SICAM A8000 Series:
All requirements combined in a single platform

- Rough ambient conditions
- Automation
- Long product lifecycle
- Cyber Security
- Space-saving design
- High electric strength
- Integrated communication
- Scalability
A strong team: 
SICAM A8000 - equipped for any task

- I/O expansion modules combinable as needed
- Detachable expansion module
- Modular processor with external power supply (optional: redundant)
- Ethernet communication module

CI module + CP-8050 + CI module + I/O module
The entire family at a glance:
SICAM A8000 - expansion modules

**DO-8212**
8 binary outputs
DC 24/48/60/110/220 V;
AC 110/230 V

**DO-8221**
Secure command output
DC 24-220 V, AC 230 V
1-of-n monitoring
Continuity check

**AI-8310**
4 analog inputs
(2 groups with 2 AI each) for Pt100/Ni100
in 2-, 3-, or 4-wire design

**AI-8320**
4 analog inputs
-20...0...+20 mA
-10...0...+10 V

**AO-8380**
4 analog outputs
-20...0...+20 mA
-10...0...+10 mA
-10...0...+10 V

**DI-8110**
16 binary inputs
DC 24 V
DC 48/60 V
DC 110 V
DC 220 V

**DI-8111**

**DI-8112**

**DI-8113**

**CM-8820**
3 inputs current
I: 1 A/5 A (parameterizable)
Output: 225 mV in accordance with IEC 60044-8

**CM-8830**
LED module (upgradable) for
local process visualization per
EBIO line (128 LEDs)

**AI-8510**
3 inputs current/voltage
I: 225 mV as per IEC 60044-8
U: 100/√3 VAC, 230 VAC, 400/√3 VAC

**AI-8511**
I: 225 mV as per IEC 60044-8
U: 3.25/√3 VAC

**AI-8512**

**AI-8513**

**DI-8112**

**DI-8113**

**DI-8110**

**DI-8111**

**DI-8112**

**DI-8113**

**CM-8820**
3 inputs current
I: 1 A/5 A (parameterizable)
Output: 225 mV in accordance with IEC 60044-8

**CM-8830**
LED module (upgradable) for
local process visualization per
EBIO line (128 LEDs)
New modules for CT/VT inputs including synch.check

- 2 Modules required
- 2 addresses
- Up to 6 additional modules possible

Firmware equivalent to AI-5313/6303

- accuracy:
  - class 0.2% for measured values
  - class 0.5% for calculated values

- frequency: 50Hz, 16.6Hz

AI-8340:
- 4 x U (max. 250V), galvanic isolated
- 2 x DO for Syn. Check

Can be used stand alone for voltage measurement and syn.chekc

AI-8330
- 3xI (In=1A/5A), 100% overload range
- Can carry up to 25 A

Dedicated bus-coupling module will be delivered with AI-8330 for proper synchronization of current with voltage measurement

Will be available for CP-8050 in first release.
Up to 6 additional can be equipped within the power consumption constraints.
The SICAM A8000 I/O family grows up: SICAM A8000 CM-8830 SICAM I/O LED module

- Up to 8 I/O modules
- DI / DO / AI / AO

Remote I/O Adapter

- Up to 16 remote I/O rows connected to CP-8050 with:
  - CI-8530: DC 24–60 V
  - CI-8532: DC 110–220 V

SICAM I/O row

- Up to 8 I/O modules
- DI / DO / AI / AO

CM-8830

SICAM I/O LED module

- 128 Process LEDs for 8 I/O Modules
- Can be added subsequently to existing I/O rows (FW Update)
- Direct FW support - No dedicated engineering necessary
- Position is free to choose right from PS-86xx/CI-853x
- Power consumption <0,6W
- Process visualization after configuration of I/O modules
- Error LEDs per Module show process errors after engineering
SICAM A8000 CP-8050 grows up
Enhanced Feature-Set

Interface extension modules
- CI-8520 5x Ethernet
- CI-8551 5x Serial

Redundancy
- Device redundancy with PLC and singular I/O module synchronization via IO-bus.
- Device redundancy with PLC synchronization via IP network.
- Redundant power supply.

Performance
- Dual-core CPU
- Up to 4 virtual resources
- Pre-processing on CI-8551

HSR
In conjunction with CI-8520: High Availability Seamless Redundancy.

PRP
In conjunction with CI-8520: Parallel-Redundancy-Protocol according to IEC 62439.

RSTP & Line Mode
In conjunction with CI-8520: Rapid-Spanning-Tree Protocol.
Flexible communication:
Diverse range of interfaces and protocols with SICAM A8000

**CP-8050**
- 2 x Ethernet (RJ45)
- 1 x RS 232 (RJ45)
- 1 x RS 485 (8-Pin)
- Up to 4 Expansion modules
- Up to 24 protocols

**CI-8520 (max. 2x)**
- 5 x Ethernet (RJ45)
- PRP, HSR
- RSTP, Line Mode

**CI-8551 (max. 6x)**
- 5 x Serial (3x RJ45, 2x Push-In)
- 2x RS-232
- 1x RS-485
- 2x Switchable (RS-232/422/485)
- Support of CM-0847

Flexible integration into an existing communications infrastructure through the support of standard protocols, legacy systems, and protocols from third-party manufacturers:
- IEC 61850
- IEC 60870-5-101 / 103 / 104
- DNP3.0 serial / TCP
- Modbus RTU / TCP
- Profibus DP
- Profinet IO
- IoT protocols
- Additional protocols upon request
SICAM A8000 CP-8050
Enhanced Featureset – Extended Processing

- Today’s CP-8050 Base-Firmware CPCI85
  - Limited to 400,000 datapoints
  - Limited to 400 connections
  - Limited to 8 protocols
  - Limited to 1 PLC resource

- Tomorrow’s Extended-Processing-Firmware EPCI85 will offer a scalable feature-set.

<table>
<thead>
<tr>
<th>CPCI85</th>
<th>Up to 4x EPCI85</th>
</tr>
</thead>
<tbody>
<tr>
<td>400,000 datapoints</td>
<td>400,000 datapoints</td>
</tr>
<tr>
<td>400 connections</td>
<td>200 connections</td>
</tr>
<tr>
<td>8 Protocols</td>
<td>4 Protocols</td>
</tr>
<tr>
<td>1 PLC resource</td>
<td>1 PLC resource</td>
</tr>
</tbody>
</table>
With the enhanced feature set of CP-8050, the established SICAM A8000 platform will cover new applications on the highest performance level.

The following features will be released for CP-8050 with V4.00:

• Device Redundancy
• Up to 24 protocols
• Up to 5 PLC-Resources
• Hardware-based Firewall in conjunction with CI-8520

All these features require license keys which can be imported to the device via Engineering Tool and ALM. The license keys will have an 6MF2750-0* ordering-code.
**SICAM A8000 CP-8050**

**Redundancy Configurations**

**Software Voting**
- Exchange Voting information via redundant connection
- Data synchronization via encrypted I/O bus

**Hardware Voting**
- Singular Hardware Voter
- Data synchronization via encrypted I/O bus
- Data synchronization via routed IP network
SICAM A8000 CP-8050
Enhanced Feature Set – Redundancy Concept

Datapoints
Communication (Protocols)
IO acquisition (EBIO ring)

autom. Synchronization
< 20 km via encrypted I/O Bus
> 20 km via routed IP network

Voting
Supported through Firmware
Software or Hardware Voting

Up to 16 I/O rows in ring
SICAM A8000 CP-8050
Enhanced Feature Set – License Import

- 3 Unique license keys for 3 features
  - Redundancy
  - Extended Processing
  - HW-based-FW

- License Management via ALM-Infrastructure

- Load license keys into device / parameter-set

- License key is stored on SD-card

- Parameterization without license key possible
  - 3 weeks trial (Diagnostics-Warning)
  - After 3 weeks, functionality stops
SICAM A8000 CP-8050
Enhanced Feature Set – License Keys

Designation | MLFB
---|---
CP-8050 Redundancy | 6MF27500RE00
CP-8050 Extended Processing | 6MF27500EP00
CP-8050 IEC104 Firewall | 6MF27500FW40

“7” = License Key
“5” = CP-8050
Cyber Security
SICAM A8000 - meeting the requirements of tomorrow

Integrated crypto chip
Protects data in a secure environment

IPSec encryption
Enables secure communication via IP networks

Secure and reliable https protocol
Guarantees the secure transmission of sensitive data

Compliant with BDEW White Paper
Fulfills the recommendations for secure and reliable control and communication systems

Password-protected access to SICAM TOOLBOX II
Ensures that only authorized persons can access your system
Cyber Security
SICAM A8000 - additional features with SICAM CP-8050

Firewall
For the separation of TCP/IP networks via integrated software firewall or additional hardware-based application firewall

Firmware Signature
Protection against firmware manipulation

Security Logbook
Non-volatile storage of SYSLOG events

TLS encryption
Acc. To IEC 62351-3
For IEC104 & IEC61850

Role Based Access Control
RBAC in accordance with IEC 62351-8 ensures that users may exercise only the rights that correspond to their assigned role

Configurable System Functions
Selective activation of individual or multiple system functions per communications interface

Certificate Exchange
Via EST & SICAM GridPass
Comparison encryption
IPSec vs. TLS

Key features IPSec:
- only IPSec enabled router required
- Pre-shared Key
- all services encrypted

Key features „T-Profile“:
- fewer IP-network know how required
- no firewall required
- deployment of X.509 certificates
- can be selected for each -104 connection separately
- uses TLS 1.2

End to End Security acc. to IEC 62351-3 „T-Profile“ for IEC 60870-5-104

End to Site Security with IPSec for all services. Including NTP, SNMP etc…
SICAM GridPass V1 with SICAM A8000-CP8050
Automated Certificate Management for Secure IEC 104

With V2.0 firmware, CP-8050 devices can automatically obtain certificates from SICAM GridPass for securing IEC 104

1. EST: Enrollment over Secure Transport protocol, IETF Standard RFC 7030
Service Forwarding and Firewall

Automatic rule allows only required services

Service forwarding shall be configured for each required service

Process LAN  IEC 61850

SCADA Front End

Process WAN  IEC 60870-5-104

SYSLOG Server

Service WAN

SNMP Server

Service WAN

Service forwarding  SNMP, SYSLOG

Service forwarding shall be configured for each required service

Process LAN  Service WAN
Authentication with LDAP or RADIUS

Process WAN
IEC 60870-5-104

Service WAN

Username
Password

User Certificate

Active Directory
Cyber Security
SICAM A8000 – Secure services with SICAM CP-8050 V3.00

Secure NTP
- Released
- Client & Server

LDAP Client
- Released
- Certificate based LDAP authentication acc. to IEC 62351-8

SNMPv3 Cipher
- Released
- SNMPv3 with AES256 encryption
Great benefits right from the factory:
SICAM A8000 - well-designed for practical use

1. Platform modularity for **versatile application options and reduced inventory**
2. Extended temperature range of -40°C to +70°C for **rough ambient conditions**
3. Highest EMC stability up to 5 kV (IEC 60255) for **direct use in substations**
4. Integrated short-circuit indicator functionality for **use in cable network monitoring**
5. Use of international standards such as IEC 61850 for **high investment security**
6. Integrated crypto chip and IPSec encryption to fulfill the high cyber security requirements
7. Multitude of interfaces and integrated GPRS module for **simple adaptation to existing communication infrastructures**
8. Integrated web server for **simple engineering**
9. Plug-and-Play functionality of the modules for **time and cost savings**
Summary

Standards
- Standard cable (RJ45, CAT5e)
- Standard technology (Ethernet, Webserver)

Compatibility
- SICAM TOOLBOX II integration
- Further use of CAExplus Logic
- TM I/O module

Reduced complexity
- No proprietary bus hubs (CM-084x)
- SICAM WEB online functions in the device available without a license

Standards
- No proprietary bus hubs (CM-084x)
- SICAM WEB online functions in the device available without a license

Compatibility
- SICAM TOOLBOX II integration
- Further use of CAExplus Logic
- TM I/O module

Reduced complexity
- No proprietary bus hubs (CM-084x)
- SICAM WEB online functions in the device available without a license

SICAM A8000

CP-8021
Integrated GPRS modem

CP-8022

CP-8000
Compact design
- SICAM I/O modules are only 30 mm wide

CP-8050

Performance
- Remote installation of SICAM I/O module possible up to 100 m (electrically)
- Dual core CPU & memory

Cyber Security
- Meets future security requirements

Interfaces x4
- Up to 12x Ethernet
- Up to 32x serial
- Network functionality (TCP/IP protocol architecture, switching, HSR, PRP, RSTP)
Contact

Reinhard Krug
Siemens Smart Infrastructure / Digital Grid
Head of Product Lifecycle Management (SICAM A8000)

SI DG SA&P PR AT-PLM
Siemensstraße 90
1210 Wien, Austria

Mobile: +43 (0) 664 80117 31275
E-mail: krug.reinhard@siemens.com

siemens.com/energy-automation-products