

SIEMENS

SICAM TM

CP-6014/CPCX65

Processing and Communication



Master control element with:

- up to 4 communication interfaces via installable SM-25xx serial interface modules: serial (end-end, multi-point, dial-up traffic), LAN/WAN (Ethernet), Profibus-DP
- communication with up to 16 SICAM TM peripheral elements based on PE-641x, via the serial Ax 1703 peripheral bus
- open-/closed-loop control functions, freely definable with CAEx plus, IEC 61131-3 compliant
- local and remote engineering, diagnostic, and test using SICAM TOOLBOX II
- data are kept on a Flash Card for Plug&Play module exchange
- function and failure indication via LED
- supply voltage 24VDC ... 60VDC

Table of Contents

| | |
|--|-----------|
| Application | 3 |
| Functions | 4 |
| Configuration | 5 |
| Technical Specifications | 8 |
| Block Diagram..... | 11 |
| Front Panel..... | 12 |
| Pin Assignment..... | 13 |
| System Components | 14 |
| Literature..... | 17 |
| Open Source Software used in SICAM TM | 18 |

Disclaimer of Liability

Although we have carefully checked the contents of this publication for conformity with the hardware and software described, we cannot guarantee complete conformity since errors cannot be excluded. The information provided in this manual is checked at regular intervals and any corrections that might become necessary are included in the next releases. Any suggestions for improvement are welcome.

Subject to change without prior notice.

Document Label: SICRTUS-DSCP6014CPCX65-ENG_V2.05
Issuing date: 2014.03.03

Copyright

Copyright © Siemens AG 2014
The reproduction, transmission or use of this document or its contents is not permitted without express written authority. Offenders will be liable for damages. All rights, including rights created by patent grant or registration of a utility model or design, are reserved.

Application

The system element CP-6014/CPCX65 is used in automation units of the system SICAM TM. It is deployed in the field of telecontrol and automation.

A SICAM TM system consists of a master control element, up to maximum 4 bus interface modules (electrical and/or optical) and up to 16 peripheral elements.

A peripheral element consists of a power supply module, a peripheral control module and up to 8 I/O modules. The modules are mounted on a TS35 rail (DIN rail).

Optional the master control element can be configured with up to 2 serial interface modules (SIM) for the communication with other automation units or control systems.

The master control element operates as bus master one electrical Ax 1703 peripheral bus which can be operated with either 16Mbps or 4Mbps. This bus is available on different connectors:

| Typ | Schnittstelle | Anzahl | Baudrate | Anzahl Peripherieelemente |
|---------|---------------------|--------|-----------------------------|---------------------------|
| CP-6014 | USB Serie A 4-polig | 2 | 16Mbit/s oder 4Mbit/s | bis zu 2 |
| | RJ45 8-polig | 1 | | bis zu 16 |
| | D-SUB 9-polig | 1 | bis zu 16 | |

USB- and patch cables, by means of those the connection between master control element and bus interface is set up, may be maximum 3m long each.

The address of the peripheral elements on the Ax 1703 peripheral bus is determined in SICAM TOOLBOX II, when defining the Ax 1703 peripheral bus configuration. The same address will be set on the peripheral elements.

Functions

- **System functions**
 - central element, coordinating all system services
 - time management
 - central clock of the automation unit
 - setting and keeping the own clock's time with a resolution of 10ms
 - synchronization via serial communication (with another automation unit), via LAN (NTP server), or local (minute pulse or serial time signal)
 - SICAM TOOLBOX II connection
 - storing firmware and parameters on a Flash Card
- **Functions for Telecontrol (Communication)**
 - communication via installable protocol elements to any superior or subordinate automation unit
 - automatic or selective data flow routing
 - priority based data transmission (priority control)
 - own circular buffer and process image for each connected station (data keeping)
 - redundant communication routes
 - communication with redundant remote stations
 - redundant communication with a remote station (load share operation)
 - special application specific functions for dial-up traffic
 - test if stations are reachable
 - an application program may evaluate telephone charges
 - parameter setup allows the telephone line to be used efficiently with respect to connection charges (e.g. command output possible only if a connection exists)
- **Functions for Telecontrol (Process Peripherals)**
 - transmission of spontaneous information objects from and to peripheral elements, via the serial Ax 1703 peripheral bus
- **Functions for Automation**
 - open-/closed-loop control function for the execution of freely definable user programs which are created with CAEX *plus* according to IEC 61131-3, for example using function diagram technology
 - 512 kB for user program
 - approx. 50.000 variables and signals, 2.000 of them retained
 - cycle of 10 ms or a multiple thereof
 - online test
 - loadable without service interruption
 - transmission of periodic process information between the open-/closed-loop control function and the peripheral elements, via the serial Ax 1703 peripheral bus

The above mentioned functions and features are described in detail in the document *SICAM RTUs Common Functions System and Basic System Elements*.

Engineering is done using SICAM TOOLBOX II, including OPM II.

- **Safety functions (optional)**
 - Periodical acquisition of process information on the safety I/O modules and forwarding to the safety application
 - Periodical processing of process information by the safety application with settable cycle time
 - 2-channel acquisition and processing of the process data
 - Forwarding of the process information calculated by the safety application to the safety output modules and output to the peripherals.

- Integrated error monitoring and safety mechanisms in the safety firmware
- Integrated error monitoring in the safety I/O modules
- Safety communication between BSE and safety I/O modules with safety-layer via the standard communication channel
- Safety communication between SICAM Safety PLC's
- Segregation of safe and standard firmware
- Recognizability of safety product components
- The safety open-/closed loop control function (sPLC) for automation functions is created with CAEx *plus* in function diagram technology.

Configuration

For process input and output, via the serial Ax 1703 peripheral bus and via up to two CM-6830 modules, up to 16 peripheral elements are connected to the master control element: The following bus interfaces are available:

| Type | Designation | Connection | Number of Peripheral Elements |
|---------|--------------------------------------|------------|-------------------------------|
| --- | Ax-PE 2x USB on CP-6014 | electrical | up to 2 |
| CM-0843 | Bus Interface Ax-PE 4x USB | electrical | up to 16 |
| CM-0842 | Bus Interface Ax-PE 4x optical fibre | optical | up to 16 |

Configurations with CM-0843 and CM-0842 can be found in the *SICAM TM System Data Sheet*, in the document *SICAM RTUs Platforms Configuration Automation Units and Automation Networks* and/or in the bus interfaces data sheets.

Master Control Element Configuration

| Type | Designation | Remarks |
|---|---------------------------------|----------|
| CP-6014/CPCX65 | Processing & Communication | required |
| Flash card | Flash Card | required |
| CM-0843, CM-0842 | Bus Interface Ax-PE *) | optional |
| SM-2551 SM-2558 SM-2558 + SM-0551 SM-2545 SM 2557 | Serial Interface Modules (SIM) | optional |
| AP-0771/SPLC01 | Safety PLC (Safety-Applikation) | optional |

*) Standard patch cable RJ45 cat. 5 3 m max. (e.g. T41-252--)

Permissible **configuration variants** are listed below (supplying power to a time signal receiver or a modem has not been taken into account):

| Variant | SIM0 | SIM1 |
|---------|-------------------|-------------------|
| 1 | SM-2551 | |
| 2 | SM-2551 | SM-2551 |
| 3 | SM-2551 | SM-2545 |
| 4 | SM-2558 | |
| 5 | SM-2558 + SM-0551 | |
| 6 | SM-2558 | SM-2551 |
| 7 | SM-2558 + SM-0551 | SM-2551 |
| 8 *) | SM-2558 | SM-2545 |
| 9 *) | SM-2558 + SM-0551 | SM-2545 |
| 10 *) | SM-2558 | SM-2558 |
| 11 *) | SM-2558 + SM-0551 | SM-2558 |
| 12 *) | SM-2558 + SM-0551 | SM-2558 + SM-0551 |
| 13 | SM-2557 | |
| 14 | SM-2557 | SM-2551 |
| 15 *) | SM-2557 | SM-2545 |
| 16 *) | SM-2557 | SM-2558 |
| 17 *) | SM-2557 | SM-2558 + SM-0551 |
| 18 | SM-2557 | SM-2557 |
| 19 *) | SM-2558 | SM-2557 |
| 20 *) | SM-2558 + SM-0551 | SM-2557 |
| 21 **) | - **) | SM-2545 |

*) maximum ambient temperature + 65°C

**) Due to thermal reasons only one SM-2545 (on SIM1) may be equipped

See also: *System Data Sheet MC6-007-2; Technical Specifications – Climatic Environmental Conditions*

Peripheral Elements

| Type | Designation | Remarks |
|----------------|--|----------|
| AI-6303/TIPS05 | Direct Transformer Input (4x220 V,3x6 A) | optional |
| AI-6304/TIPS05 | Direct Transformer Input (4x220 V,3x6 A) | optional |
| PE-6410/USIO66 | Peripheral Controller (Ax-PE bus el) | optional |
| PE-6411/USIO66 | Peripheral Controller (1x Ax-PE bus opt) | optional |
| PE-6412/USIO66 | Peripheral Controller (2x Ax-PE bus opt) | optional |
| PE-6410/TCIO66 | Peripheral Controller for Turbine Controller (Ax-PE bus el) | optional |
| PE-6411/TCIO66 | Peripheral Controller for Turbine Controller (Ax-PE bus opt) | optional |
| PE-6412/TCIO66 | Peripheral Controller for TC (2xAx-PE bus opt) | optional |

Information on a peripheral element, how I/O modules can be attached to it, and what functionality can be achieved that way can be found in the peripheral element's data sheet (see "Literature").

Actual Protocol Elements

| Type | Designation | Remarks |
|----------------|--|----------|
| SM-x551/BPPA0 | Standard protocol for point-to-point traffic | optional |
| SM-x551/UMPMA0 | Standard protocol for multi-point traffic (Master) | optional |
| SM-x551/UMPSA0 | Standard protocol for multi-point traffic (Slave) | optional |
| SM-x551/SFBMA1 | Standard protocol for field bus (Master) | optional |
| SM-x551/SFBSA1 | Standard protocol for field bus (Slave) | optional |
| SM-x551/DIAMA0 | Standard protocol for dial-up traffic (Master) | optional |
| SM-x551/DIASA0 | Standard protocol for dial-up traffic (Slave) | optional |
| SM-x551/103MA0 | Standard protocol for interfacing of protective devices (Master) | optional |
| SM-2545/DPM00 | Standard protocol for Profibus DP (Master) | optional |
| SM-2558/ETA5 | Standard protocol for Ethernet TCP/IP IEC 61850 Edition 2 | optional |
| SM-2558/ETA4 | Standard protocol for Ethernet TCP/IP IEC 60870-5-104 | optional |
| SM-2558/ETA3 | Standard protocol for Ethernet TCP/IP IEC 61850 | optional |
| SM-2557/ETA2 | Standard protocol for Ethernet TCP/IP IEC 60870-5-104 | optional |
| SM-2557/ET03 | Standard protocol for Ethernet TCP/IP IEC 61850 | optional |

Old Protocol Elements

| Type | Designation | Remarks |
|----------------|--|----------|
| SM-2541/BPP00 | Standard Protocol for Point-to-Point Traffic | optional |
| SM-2541/UMPM02 | Standard Protocol for Multi-Point Traffic (Master) | optional |
| SM-2541/UMPS00 | Standard Protocol for Multi-Point Traffic (Slave) | optional |
| SM-2541/UMPM01 | Standard Protocol for Field Bus (Master) | optional |
| SM-2541/UMPS01 | Standard Protocol for Field Bus (Slave) | optional |
| SM-2541/DIAM00 | Standard Protocol for Dial-up Traffic (Master) | optional |
| SM-2541/DIAS00 | Standard Protocol for Dial-up Traffic (Slave) | optional |
| SM-2541/103M00 | Standard protocol for interfacing of protective devices (Master) | optional |
| SM-2554/ET02 | Standard Protocol for Ethernet TCP/IP IEC104 | optional |
| SM-2554/ET03 | Standard Protocol for Ethernet TCP/IP IEC61850 | optional |
| SM-2556/ET02 | Standard protocol for Ethernet TCP/IP IEC 60870-5-104 | optional |
| SM-2556/ET03 | Standard protocol for Ethernet TCP/IP IEC 61850 | optional |
| SM-2557/ET02 | Standard protocol for Ethernet TCP/IP IEC 60870-5-104 | optional |
| SM-2556/ETA2 | Standard protocol for Ethernet TCP/IP IEC 60870-5-104 | optional |

Information on a protocol element can be found in the relevant data sheet (see "Literature").

Safety Applications

| Type | Designation | Remarks |
|----------------|---------------------------------|----------|
| AP-0771/SPLC01 | Safety PLC (Safety-Application) | optional |

Technical Specifications

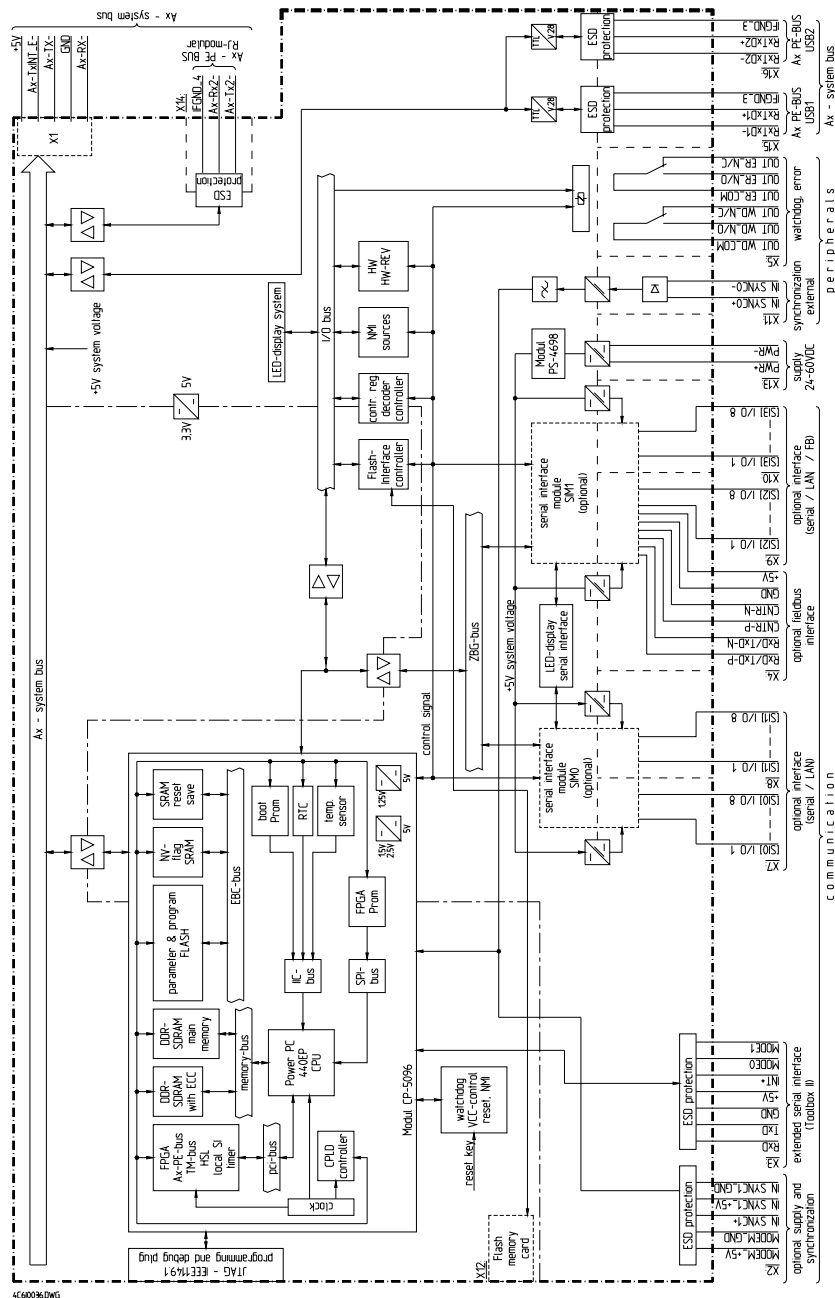
| Processor and Memory | |
|--|---|
| Processor | PPC440EP |
| Clock frequency | 384 MHz |
| Pulse accuracy | 3.5 ppm |
| Parameter/program memory | FLASH-PROM 8 MB |
| Main memory | DDR-SDRAM 64 MB/ECC, 128 MHz |
| Diagnostic memory | SRAM 512 kB |
| Flag memory | NVSRAM 128 kB |
| Application program max. size | 512 kB |
| Number of variables | Approx. 50000, thereof 2000 buffered |
| Cycle time | 10 ms or a multiple thereof |
| Inputs for Synchronization | |
| Transmission rate | <ul style="list-style-type: none"> • 2.4 kbps |
| Internal synchronization (serial time signal, minute pulse) | <ul style="list-style-type: none"> • Input: (IN SYNC1+ / IN SYNC1_GND), (IN SYNC1_T / IN SYNC1_GND) • Voltage range TTL level • The circuit is operated by means of an internal voltage. |
| External synchronization (serial time signal or minute pulse, firmware selectable) | <ul style="list-style-type: none"> • Input galvanically insulated by optocoupler • Filter time of the input circuit <ul style="list-style-type: none"> Make time: 80µs Break time: 80µs Filter tolerance max. 50µs • Input 5 .. 24V (IN SYNC0+ / IN SYNC0-) • Voltage range: 5V-10% .. 24V+30% • Level for logic 0: ≤ 1.0V • Level for logic 1: ≥ 3.5V (typ. 1.3mA) • The circuit is operated by means of an external voltage. |
| Binary Outputs (Relay) | |
| <ul style="list-style-type: none"> • Error • Watchdog | <ul style="list-style-type: none"> • 2 outputs, potential-free • Galvanical insulation • Voltage between the two outputs max. 60 VDC + 30 % • Change-over contact |
| Maximum continuous current | <ul style="list-style-type: none"> • 2 A / 24 VDC • 1 A / 60 VDC • 0.77 A / 78 VDC |
| Maximum switching voltage | <ul style="list-style-type: none"> • 60 VDC + 30 % |
| Switching cycles | <ul style="list-style-type: none"> • 10⁵ with resistive load and nominal switching capacity • 10⁴ with inductive load (L/R = 7 ms) |
| Switching capacity (resistive load) | <ul style="list-style-type: none"> • min. 1 mW • max. 60 W |
| Nominal switching capacity / nominal switching current | <ul style="list-style-type: none"> • 48 W / 24 VDC / 2.00 A • 60 W / 48 VDC / 1.25 A • 60 W / 60 VDC / 1.00 A |
| Output circuits | 18 .. 78 VDC The circuits are operated by means of an external voltage. |

| Communication | |
|---|---|
| Ax 1703 peripheral bus DSUB (X1) | <ul style="list-style-type: none"> • TTL • Transmission rate 16 Mbps or 4 Mbps • Securing of data, hamming distance D=4 |
| Ax 1703 peripheral bus RJ45 (X14) | <ul style="list-style-type: none"> • TTL • Transmission rate 16 Mbps or 4 Mbps • Securing of data, hamming distance D=4 • ESD protection |
| Ax 1703 peripheral bus USB (X15, X16) | <ul style="list-style-type: none"> • RS-485 • Transmission rate 16 Mbps or 4 Mbps • Securing of data, hamming distance D=4 • ESD protection |
| Extended serial interface (TB) | <ul style="list-style-type: none"> • TTL • Transmission rate 38.4 kbps • ESD protection |
| Local serial interface (LOC) | <ul style="list-style-type: none"> • At present, the interface is not used |
| Serial interfaces (SI0, SI1/ET0, SI2/FB, SI3) | <ul style="list-style-type: none"> • The technical specifications depend on which submodules (SM-254x) are mounted as SIM0/SIM1 (see the related data sheet) |

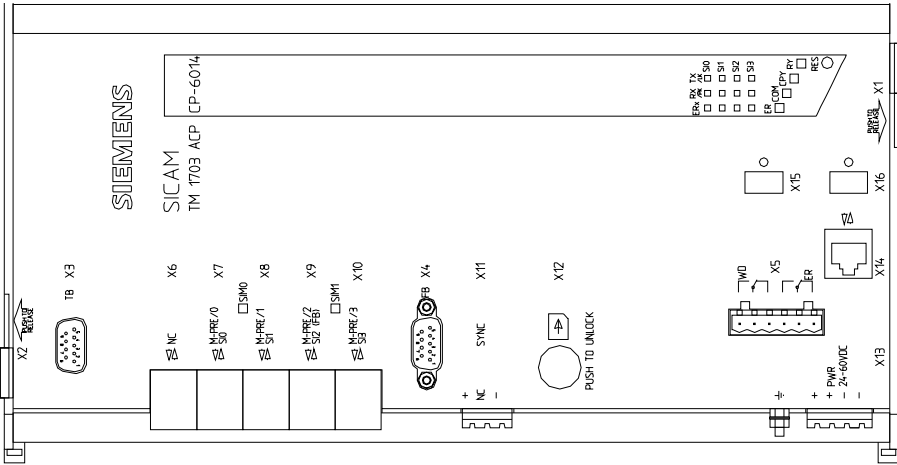
| Power Supply | |
|--|--|
| Operating voltage | <ul style="list-style-type: none"> • 18 .. 78 VDC • The voltage is led to the front panel via the terminals. |
| | <p>The internal power supply module provides a nominal power output of $P_{Nsek} = 17.5W$ (5VDC) and, depending on the configuration, supplies:</p> <ul style="list-style-type: none"> • The base unit (power consumption 4.2W typ, 4.4W max) • Two optionally mountable serial interface modules (SM-25xx) (power consumption P_{SIM0} and P_{SIM1} can be found in the appropriate data sheet) • optionally mountable: DCF77 time signal receiver, CE-070x modem • peripheral elements which are externally connected via the system bus (power consumption can be found in the appropriate data sheet) |
| Primary power consumption | |
| <ul style="list-style-type: none"> • Base unit only • Base unit incl. expansions | <ul style="list-style-type: none"> • 5W typ • 20W max |
| Power available on the system bus | |
| <ul style="list-style-type: none"> • SIMs not installed • SIMs installed | <ul style="list-style-type: none"> • $P_{available} = 13.1W$ • $P_{available} = 13.1W - P_{SIM0} - P_{SIM1}$ (if equipped with DCF77 receiver or CE-070x, its power consumption has to be considered) |
| Polarity reversal protection | <ul style="list-style-type: none"> • yes |
| Interruption time | <ul style="list-style-type: none"> • $\leq 20ms$ at P_{Nsek}; $U_I = 18 .. 78V$ |
| Connection current spikes | <ul style="list-style-type: none"> • Class S1 |
| Efficiency | <ul style="list-style-type: none"> • 0.87 .. 0.89 |

| Mechanics and Connectors | |
|---|--|
| Terminals | Removable screw terminals (grid size 5.08) |
| Connector(s) for <ul style="list-style-type: none"> • Ax 1703 peripheral bus (TTL) • Ax 1703 peripheral bus (TTL) • Ax 1703 peripheral bus (RS-485) • SICAM TOOLBOX II (TB) • Field bus (FB) | D-SUB 9-pin, female (DIN 41652) (right side of the device) RJ45 8-pin (front) for connecting CAT5 cables, 3m maximum length USB / A series, 4-pin (front) for connecting USB cables (USB / A series, 4 pin), 3m max length D-SUB 9-pin, female (DIN 41652) D-SUB 9-pin, female (DIN 41652) |
| Connector(s) for serial interfaces (LOC, SI0, SI1/ET0, SI2/FB, SI3) | 5 x RJ45 8-pin |
| Connector(s) for <ul style="list-style-type: none"> • watchdog • sum error • power supply • external synchronization | Removable screw terminal strips |
| Connector for modem power supply or synchronization | D-SUB 9-pin, female (DIN 41652) (left side of the device) |
| Mechanical design | Compact metal housing with small installation depth, for DIN rail mounting |
| Installation dimensions | 155 x 306 x 75 mm (H x W x D, dimensions w/o DIN rail) |
| Weight | Approx. 1100 g (without serial interface modules) |

Block Diagram



Front Panel



RY board ready to operate (ready)
 CPY flashing ... parameters being copied
 into FLASH-PROM
 on ... firmware being loaded
 COM communication error
 ER error
 RES pressing triggers a reset (start-up)

SM-2551:

TX / SIO TxD - interface 0
RX / SIO RxD - interface 0
ERx / SIO flashing ... communication error interface 0
 on ... communication failure interface 0

TX/LK / SI1 TxD - interface 1
RX/PK / SI1 RxD - interface 1
ERx / SI1 flashing ... communication error interface 1
 on ... communication failure interface 1

TX / SI2 TxD - interface 2
RX / SI2 RxD - interface 2
ERx / SI2 flashing ... communication error interface 2
 on ... communication failure interface 2

TX/LK / SI3 TxD - interface 3
RX/PK / SI3 RxD - interface 3
ERx / SI3 flashing ... communication error interface 3
 on ... communication failure interface 3

SM-2545:

TX / SIO Profibus ready
TX/LK / SI1 handshake
RX / SIO communication ok
RX/LK / SI1 diagnostics data exchange
ERx / SIO flashing ... communication error interface 0
 on ... communication failure interface 0

TX / SI2 Profibus ready
TX/LK / SI3 handshake
RX / SI2 communication ok
RX/LK / SI3 diagnostics data exchange
ERx / SI2 flashing ... communication error interface 2
 on ... communication failure interface 2

AP-0771/SPLC01

TX / SIO not used
RX / SIO not used
ERx / SIO on -> SPLC not working
TX/LK / SI1 .. not used
RX/PK / SI1 .. not used
ERx/SI1 on -> SPLC not working
TX / SI2 not used
RX / SI2 not used
ERx / SI2 on -> SPLC not working
TX/LK / SI3 .. not used
RX/PK / SI3 .. not used
ERx/SI3 on -> SPLC not working

SM-2557:

TX/LK / SIO Connection to the HUB on HW level available
RX/LK / SIO Ethernet Packet/Frame at own station or
 Broadcast was received
ERx / SIO flashing ... communication error interface 0
 on ... communication failure interface 0

TX/LK / SI1 Connection to the HUB on HW level available
RX/LK / SI1 Ethernet Packet/Frame at own station or
 Broadcast was received
ERx / SI1 flashing ... communication error interface 1
 on ... communication failure interface 1

TX/LK / SI2 Connection to the HUB on HW level available
RX/LK / SI2 Ethernet Packet/Frame at own station or
 Broadcast was received
ERx / SI2 flashing ... communication error interface 2
 on ... communication failure interface 2

TX/LK / SI3 Connection to the HUB on HW level available
RX/LK / SI3 Ethernet Packet/Frame at own station or
 Broadcast was received
ERx / SI3 flashing ... communication error interface 3
 on ... communication failure interface 3

RY1 ... SIM0
 on, flashing ... SIM0 ready
 dark ... SIM0 not ready
RY2 ... SIM1
 on, flashing ... SIM1 ready
 dark ... SIM1 not ready

SM-2558:

TX/LK / SI1 Connection to the HUB on HW level available
RX/LK / SI1 Ethernet Packet/Frame at own station or
 Broadcast was received
ERx / SI1 flashing ... communication error interface 1
 on ... communication failure interface 1

TX/LK / SI3 Connection to the HUB on HW level available
RX/LK / SI3 Ethernet Packet/Frame at own station or
 Broadcast was received
ERx / SI3 flashing ... communication error interface 3
 on ... communication failure interface 3

SM-0551 (in Verbindung mit SM-2558):

TX / SIOTxD - interface 0
RX / SIORxD - interface 0
ERx / SIO flashing ... communication error interface 0
 on ... communication failure interface 0

TX / SI2 TxD - interface 2
RX / SI2 RxD - interface 2
ERx / SI2 flashing ... communication error interface 2
 on ... communication failure interface 2

RY1 ... SIM0
 on, flashing ... SIM0 ready
 dark ... SIM0 not ready
RY2 ... SIM1
 on, flashing ... SIM1 ready
 dark ... SIM1 not ready

Pin Assignment

For the signals of the various pins, abbreviations were used that is explained below.

X13: PWR

| pin | signal |
|-----|--------|
| 1 | PWR+ |
| 2 | PWR+ |
| 3 | PWR- |
| 4 | PWR- |

X11: SYNC

| pin | signal |
|-----|-----------|
| 1 | IN SYNC0+ |
| 2 | NC |
| 3 | IN SYNC0- |

X5: WD

| pin | signal |
|-----|------------|
| 1 | OUT WD_N/O |
| 2 | OUT WD_COM |
| 3 | OUT WD_N/C |
| 4 | OUT ER_N/O |
| 5 | OUT ER_COM |
| 6 | OUT ER_N/C |

X6: LOC

| pin | signal |
|-----|--------|
| 1 | CTS |
| 2 | RTS |
| 3 | DSR |
| 4 | TxD |
| 5 | RxD |
| 6 | GND |
| 7 | DCD |
| 8 | DTR |

X1: Ax-PE-Bus

| pin | signal |
|-----|-------------|
| 1 | +5V |
| 2 | Ax-TxINT_E- |
| 3 | Ax-TX- |
| 4 | GND |
| 5 | +5V |
| 6 | +5V |
| 7 | GND |
| 8 | Ax-RX- |
| 9 | GND |

X2: SYNC/MODEM

| pin | signal |
|-----|--------------|
| 1 | IN SYNC1_GND |
| 2 | IN SYNC1+ |
| 3 | IN SYNC1_T |
| 4 | NC |
| 5 | MODEM_GND |
| 6 | IN SYNC1_+5V |
| 7 | NC |
| 8 | NC |
| 9 | MODEM_+5V |

X14: Ax-PE-Bus

| pin | signal |
|-----|--------|
| 1 | AX_RX- |
| 2 | GND |
| 3 | GND |
| 4 | NC |
| 5 | NC |
| 6 | NC |
| 7 | GND |
| 8 | AX_TX- |

X15, X16: Ax-PE-Bus

| pin | signal |
|-----|----------|
| 1 | NC |
| 2 | RxTxD_n- |
| 3 | RxTxD_n+ |
| 4 | GND_ |

X12:
Flashcard Interface

X3: TB

| pin | signal |
|-----|--------|
| 1 | NC |
| 2 | MODE0 |
| 3 | GND |
| 4 | MODE1 |
| 5 | +5V |
| 6 | NC |
| 7 | TxD |
| 8 | RxD |
| 9 | INT+ |

X4: FB

| pin | signal |
|-----|-----------|
| 1 | NC |
| 2 | NC |
| 3 | RxD/TxD-P |
| 4 | CNTR-P |
| 5 | GND |
| 6 | +5V |
| 7 | NC |
| 8 | RxD/TxD-N |
| 9 | CNTR-N |

4C60035DWG

The abbreviations have the following meaning:

PWR+ input voltage (plus)
PWR- input voltage (minus)
+5V serial interface - supply +5V
GND serial interface - signal ground
Ax-TX- serial interface (Ax-PE-bus) - transmit data
Ax-RX- serial interface (Ax-PE-bus) - receive data
Ax-TxINT_E- serial interface (Ax-PE-bus) - transmit enable
MODE0 serial interface (TB) - mode 0 for TB-CPU
MODE1 serial interface (TB) - mode 1 for TB-CPU
INT+ serial interface (TB) - interrupt
TxD serial interface (TB, V28) - transmit data
RxD serial interface (TB, V28) - receive data
OUT WD_N/O watchdog, normally open contact
OUT WD_COM watchdog, common contact
OUT WD_N/C watchdog, normally closed contact
OUT ER_N/O sum error normally open contact
OUT ER_COM sum error common contact
OUT ER_N/C sum error normally closed contact
NC not connected
RxTxD_n- receive/transmit data - (n=1, 2)
RxTxD_n+ receive/transmit data + (n=1, 2)
GND_ supply 0V for TM 1703 peripheral module

4C60035DWG

IN SYNC0+ external synchronization voltage (plus)
IN SYNC0- external synchronization voltage (minus)
IN SYNC1_GND ground for synchronization
IN SYNC1+ synchronizing signal
IN SYNC1_+5V +5V for synchronization
IN SYNC1_T SYNC time signal (message)
MODEM_GND ground for modem
MODEM_+5V +5V for modem
RxD/TxD-P serial interface (FB) receive/transmit positive
RxD/TxD-N serial interface (FB) receive/transmit negative
CNTR-P serial interface (FB) control signal positive
CNTR-N serial interface (FB) control signal negative
CTS serial interface (V28) - clear to send
RTS serial interface (V28) - request to send
DSR serial interface (V28) - data set ready
DCD serial interface (V28) - data carrier detect
DTR serial interface (V28) - data terminal ready

System Components

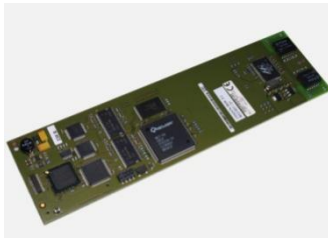
System Elements

Master Control Module



| Designation | Item number/MLFB |
|-------------------------------|-----------------------------|
| CP-6014 Master Control Module | GC6-014 6MF11130GA140AA0 |

Serial Interface Modules



| Designation | Item number/MLFB |
|--|-----------------------------|
| SM-2545 Profibus Interface (Master) | BA2-545 6MF10110CF450AA0 |
| SM-2551 Serial Interface Processor 2 SI | BC2-551 6MF10130CF510AA0 |
| SM-2557 Network-Interf. Ethernet 2x100TX | BC2-557 6MF10130CF570AA0 |
| SM-2558 Ethernet-Interf. 1x100TX + 1 serial interface optional | BC2-558 6MF10130CF580AA0 |



| Designation | Item number/MLFB |
|---|-----------------------------|
| SM-0551 Serieller Interface Prozessor 1 SI | BC0-551 6MF10130AF510AA0 |

Accessories

Bus Interface



| Designation | Item number/MLFB |
|---|-----------------------------|
| CM-0842 Ax 1703-Bus-Interface 4x fiber optical | GA0-842 6MF11110AJ420AA0 |



| | |
|---|-----------------------------|
| CM-0843 Ax 1703 bus interface electrical | GA0-843 6MF11110AJ430AA0 |
|---|-----------------------------|

Cable



| Designation | Item number/MLFB |
|--|-----------------------------|
| USB CABLE 1,5M USB-Cable for Peripheral Controller (1,5m) | TC6-201 6MF13130GC010AA0 |
| USB CABLE 2,0M USB-Cable for Peripheral Controller (2,0m) | TC6-202 6MF13130GC020AA0 |
| USB CABLE 3,0M USB-Cable for Peripheral Controller (3,0m) (connection Ax Bus, USB interface with PE-6400) | TC6-203 6MF13130GC030AA0 |



| Designation | Item number/MLFB |
|--|-----------------------------|
| TP-P-01M Twisted pair Patch cable 1m Cat 5 grey | T41-255 (1m) |
| TP-P-02M Twisted pair Patch cable 2m Cat 5, grey | T41-251 (2m) |
| TP-P-03M Twisted pair Patch cable 3m Cat 5, grey (connection Ax Bus, RJ45 interface with CM-0842/CM-0843) | T41-252 (3m) |
| CM-1820 TOOLBOX connection cable | BA1-820 6MF10110BJ200AA0 |
| CM-0820 Toolbox Adapter (connection with Toolbox) | GA0-820 6MF11110AJ200AA0 |

Flash Card



| Designation | Item number/MLFB |
|-------------|-----------------------------|
| Flash Card | CC6-095 6MF12131GA050AA0 |

Literature

| Dokument | Item no. |
|--|-----------------|
| System Data Sheet SICAM TM | MC6-007-2 |
| SICAM RTUs Common Functions Peripheral Elements according to IEC 60870-5-101/104 | DC0-011-2 |
| SICAM RTUs Common Functions System and Basic System Elements | DC0-015-2 |
| SICAM RTUs • Ax 1703 Common Functions Protocol Elements | DC0-023-2 |
| SICAM RTUs Safety Manual | DC0-117-2 |
| SICAM RTUs Platforms Configuration Automation Units and Automation Networks | DC0-021-2 |
| Data Sheet SM-x551/PROTOCOL | MC0-003-2 |
| Data Sheet SM-2558/ETA5 | MC0-057-2 |
| Data Sheet SM-2558/ETA4 | MC0-049-2 |
| Data Sheet SM-2558/ETA3 | MC0-053-2 |
| Data Sheet SM-2545/DPM00 | MC0-007-2 |
| Data Sheet CM-0842 | MC0-021-2 |
| Data Sheet CM-0843 | MC0-022-2 |
| Data Sheet PE-641x/TCIO66 | MC6-036-2 |
| Data Sheet PE-641x/USIO66 | MC6-031-2 |
| Data Sheet AI-630x/TIPS05 | MC6-025-2 |

Open Source Software used in SICAM TM

This product contains, among other things, Open Source Software developed by third parties. The Open Source Software used in this product and the license agreements concerning this software can be found in the `Readme_OSS`. These Open Source Software files are protected by copyright.

Your compliance with those license conditions will entitle you to use the Open Source Software as foreseen in the relevant license. In the event of conflicts between Siemens license conditions and the Open Source Software license conditions, the Open Source Software conditions shall prevail with respect to the Open Source Software portions of the software. The Open Source Software is licensed royalty-free.

Insofar as the applicable Open Source Software License Conditions provide for it you can order the source code of the Open Source Software from your Siemens sales contact - against payment of the shipping and handling charges - for a period of at least 3 years since purchase of the Product.

We are liable for this Product including the Open Source Software contained in it pursuant to the license conditions applicable to the Product. Any liability for the Open Source Software beyond the program flow intended for this Product is explicitly excluded. Furthermore any liability for defects resulting from modifications to the Open Source Software by you or third parties is excluded. We do not provide any technical support for this Product if it has been modified.

The Open Source Software used in this product and the license agreements concerning this software can be found on the SICAM RTUs SD card in the file `ReadmOSS.htm`.

To readout this file, you need an application that you can download from the Internet. You can find details for the download and the use of the application in the following manual: *SICAM TM Operation and Maintenance (DC6-017-2)*.