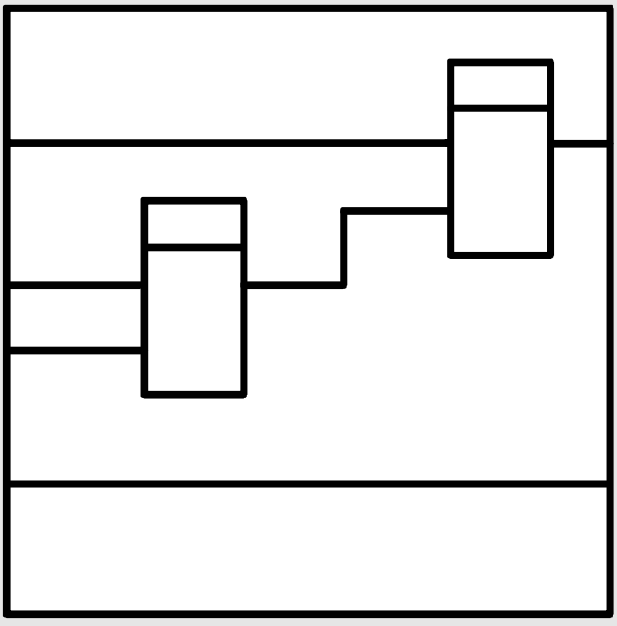
SIEMENS

SIMADYN D
Digital Control System

User Manual

CPU Module PM6



Edition 08.97

DK No. 221941

User Manual, CPU Module PM6

Edition		Status
1	CPU Module PM6	08.97

We have checked the contents of this Manual to ensure that they coincide with the described hardware and software. However, deviations cannot be completely ruled-out, so we cannot guarantee complete conformance. However, the information in this document is regularly checked and the necessary corrections included in subsequent editions. We are thankful for any recommendations or suggestions.

Contents

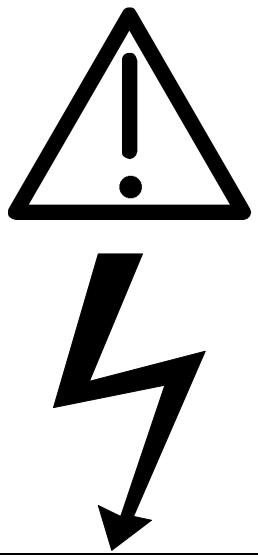
N O T E !

The information in this Manual does not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, please contact your local Siemens office.

Further, the contents of this Manual shall not become a part of or modify any prior or existing agreement, committment or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties nor modify the existing warranty.

Warning information



W A R N I N G !

Electrical equipment has components which are at dangerous voltage levels.

If these instructions are not strictly adhered to, this can result in severe bodily injury and material damage.

Only appropriately qualified personnel may work on this equipment or in its vicinity.

This personnel must be completely knowledgeable about all the warnings and service measures according to this User Manual.

The successful and safe operation of this equipment is dependent on proper handling, installation, operation and maintenance.

Definitions

* **QUALIFIED PERSONNEL**

For the purpose of this User Manual and product labels, a “Qualified person” is someone who is familiar with the installation, mounting, start-up and operation of the equipment and the hazards involved. He or she must have the following qualifications:

1. Trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety procedures.
2. Trained in the proper care and use of protective equipment in accordance with established safety procedures.
3. Trained in rendering first aid.

* **DANGER**

For the purpose of this User Manual and product labels, “Danger” indicates death, severe personal injury and/or substantial property damage will result if proper precautions are not taken.

* **WARNING**

For the purpose of this User Manual and product labels, “Warning” indicates death, severe personal injury or property damage can result if proper precautions are not taken.

* **CAUTION**

For the purpose of this User Manual and product labels, “Caution” indicates that minor personal injury or material damage can result if proper precautions are not taken.

* **NOTE**

For the purpose of this User Manual, “Note” indicates information about the product or the respective part of the User Manual which is essential to highlight.

C A U T I O N !

This board contains components which can be destroyed by electrostatic discharge. Prior to touching any electronics board, your body must be electrically discharged. This can be simply done by touching a conductive, grounded object immediately beforehand (e.g. bare metal cabinet components, socket protective conductor contact).

W A R N I N G !

Hazardous voltages are present in this electrical equipment during operation.

Non-observance of the safety instructions can result in severe personal injury or property damage.

It is especially important that the warning information in all of the relevant Operating Instructions are strictly observed.

1. Ordering information

6DD 1600 - 0AK0 CPU module PM6

2. Function description

The CPU module processes open- and closed-loop tasks which demand an extremely high computational performance, or where the program is very large. They have

- 8 binary inputs

of which a maximum of 4 can be used to call-up interrupt tasks.

Performance data

Computational performance: 64/128 MHz, 32/64 bit RISC processor
DRAM 8 MByte (SD), version with 16 MByte
SRAM 256 KByte

The CPU module permits extremely fast cycle times of 0.1 ms. A typical application (e.g. control loop) can be configured in approx. 0.5 ms.

DRAM

The DRAM contains:
- Program code (is loaded and expanded when the memory module is initialized)
- Data memory for the operating system, communications, message buffer, trace function

SRAM, buffered

The buffered SRAM (using either a battery in the subrack or an external battery) contains the following data, which are to be saved during and after a power failure:

- Operating system error diagnostics (“exception buffer”)
- Max. 1000 process quantities, configured with the function block **SAV**
- Data recorded/traced using the message system or trace function (can be optionally configured on the SRAM)

Programming

The program, running on the CPU module, is configured on a PC using STRUC G/STRUC L. This is then loaded into an MS5/55 program memory module (or MS51).

The program memory module is inserted in the module receptacle provided on the CPU module. The user program can be loaded in two ways:

- via a PP1X/I (**offline loading**)
- directly from the PC via a serial communications connection in the memory module inserted in the CPU module (**online loading**)

MS5, MS55, MS51

The program is loaded in a program memory module

- MS5 2 MByte Flash-EPROM, 8 KByte EEPROM
- MS55 2 MByte RAM, 8 kByte EEPROM
- MS51 4 MByte Flash-EPROM, 8 KByte EEPROM

Serial service interface

An RS232 interface (V.24) with service protocol DUST1 **with 19.2 kbaud** is permanently installed in **connector X01** (9-pin sub-D socket). It is used to:

- test and commission the user program (using “basis IBS”)

Binary inputs

8 binary inputs can be connected at the 10-pin **connector X5**.

Interface modules

The screw terminals for the binary inputs are available via the interface modules (can be connected using cable SC7):

Interface module	Function
SB10, SU10	Electrical 1:1 connection
SB60, SB61	With electrical isolation (floating) and signal conversion

Tabele 5-1 Possible interface modules for PM6

7-segment display

In normal operation, the configured number of the CPU module (1...8) is displayed. When an error occurs, a letter is displayed, which refers to the error type.

Possible operating- and error statuses:

Display	Operating- and error statuses	Display can be deleted with key
1...8	Configured number of the CPU module in normal operation	-
A	Display caused by the user software (configuring) has no influence on program execution	yes
-	Initialization phase Individual initialization steps are displayed with increasing numbers during the run-up phase	-
.	5V available; no program is being executed	-
0	Initialization error due to erroneous or incorrectly inserted modules for the actual software which has been configured: • flashing “0” : Error on this module • steady “0” : Error on other modules • continuous: Error when loading the system software	no
b	Monitoring error (e.g. missing, discharged buffer battery, overload, binary outputs)	yes
C	Erroneous configured communications or connection	no
E	Operating system alarms, generally, time overrun	yes
H	Fatal system error due to hardware or software problems which ersulted in a program crash: • flashing “H”: Fault/error on this module • steady “H”: Fault/error on another module	no

Button S1

The button has 2 functions:

- Deleting the error display:
  By depressing button S1, sporadic errors (“E”) or non-critical errors (“B”) appearing in the display can be deleted.
  If another error is present, this is displayed after the first has been acknowledged.

- Binary signal input with function block ASI

Real-time clock

Resolution 0.1 ms; e.g. to time stamp messages;

An MM3 communications buffer module must be used as time source if the time is to be backed-up during power failures.

Software protection

A plug-in socket for a 28-pin EPLD device is provided on the module (ALTERA company) so that the user program can be copy-protected (“Hardlock-PAL”).
Using a special function block, this EPLD device can be checked and the program stopped if the code is missing or is incorrect.
Additional information on request.

3. Supplementary components

- MS5, MS55 and MS51 program memory modules
- Cable SC57 for PC connection, 9-core, 5m
- Cable SC7 to connect an interface module, 10-core, 2m

If additional input/output signals and other functions are required, then these can be implemented by inserting a maximum of 2 **expansion modules**:

- IT41
- IT42

3.1. Application information and noise immunity

- Operation without fan is not possible
- Noise-immune operations is only possible if the module is tightly screwed into the subrack
- Do not insert or withdraw the module when the subrack is powered-up

Other information

For more information regarding EMC and ambient conditions, refer to the section “General technical data”!

3.2. Connector assignments

Serial interface X01 RS232

Pin	Designation	Comment
2	RxD	Receive data
3	TxD	Transmit data
5	M	Ground
7	RTS	Request to Send (“1”)

Tabele 5-2 Connector assignment X01

Binary inputs X5

Pin	Binary input
1	Binary input 1
2	Binary input 2
3	Binary input 3
4	Binary input 4
5	Binary input 5
6	Binary input 6
7	Binary input 7
8	Binary input 8
9	-
10	Ground

Tabelle 5-3 Connector assignment X5

3.3. Technical data

General data

Number of slots occupied	1
Dimensions W x H x D [mm]	20.14 x 233.4 x 220
Weight	approx. 0.51 kg

Power supply

Rated voltage	Min.	Max.	Typical current drain
+5 V	+ 4.75 V	+ 5.25 V	1700 mA
+15 V	+ 14.4 V	+ 15.6 V	50 mA
- 15 V	- 15.6 V	- 14.4 V	30 mA
24 V (external)	20 V	30 V	100 mA + binary output currents

Binary inputs

No.		8 of which, max.4 are interrupt-capable
Input **voltage**		+24 V rated voltage
	for 0 signal	-1 V to +6 V or binary inputs open-circuit
	for 1 signal	+13 V to +33 V
Input **current**		
	for 0 signal	0 mA
	for 1 signal	3 mA typ.
Input delay		max. 20 µs
Electrical isolation		no; only via SB60, SB61 interface modules

3.4. Connection diagram

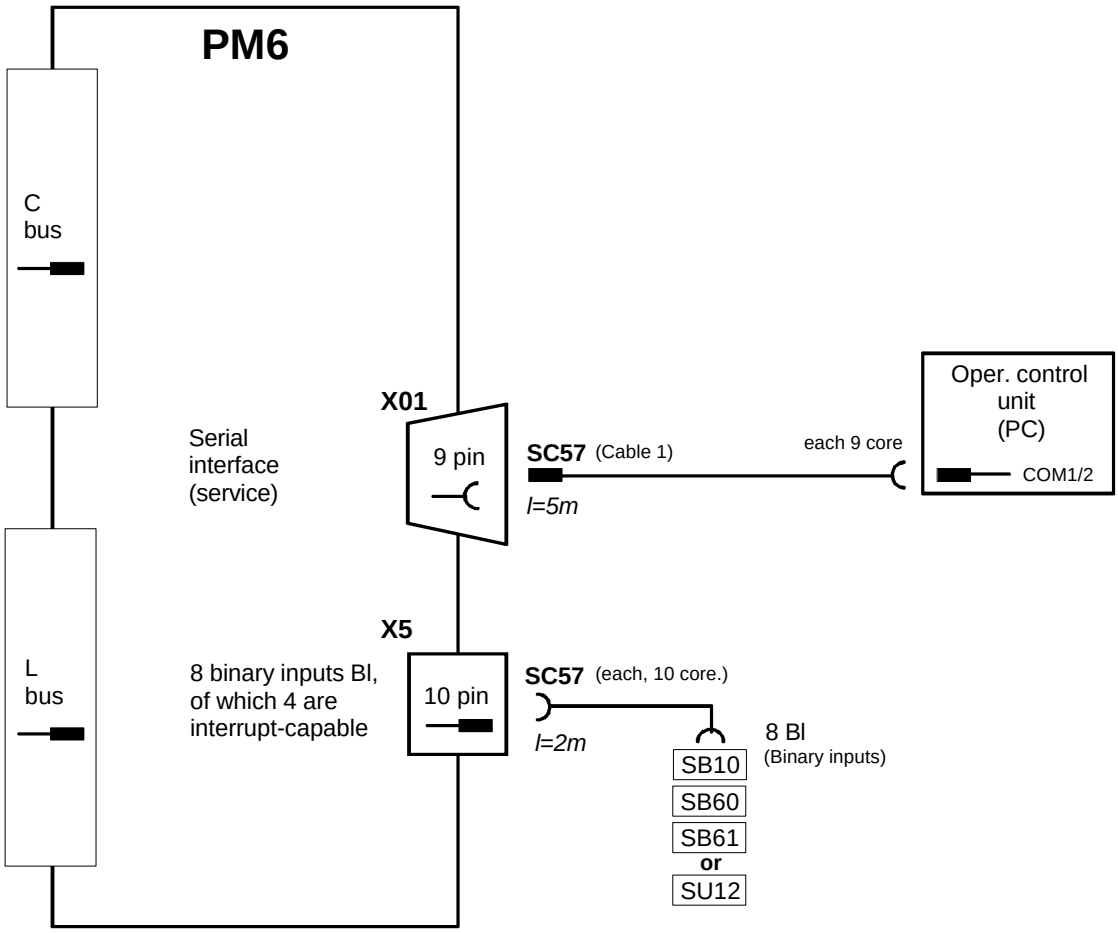


Fig. 5-1 Connecting cables and interface modules

4. Attachments

4.1. Block diagram

Block diagram 3SE.465 600.7009.96 SU

4.2. Dimension drawing and table of the connectors

Dimension drawing with view of the front panel and table of the connectors used: 3SE.465 600.9009.01 MB

4.3. Layout diagram

Layout diagram 3SE.465.600.9009.01 AO

5. ESD instructions

Components which can be destroyed by electrostatic discharge (ESD)

Generally, electronic boards should only be touched when absolutely necessary.

The human body must be electrically discharged before touching an electronics board. This can be simply done by touching a conductive, grounded object directly beforehand (e.g. bare metal cubicle components, socket outlet protective conductor contact).

Boards must not come into contact with highly-insulating materials - e.g. plastic foils, insulated desktops, articles of clothing manufactured from man-made fibers.

Boards must only be placed on conductive surfaces.

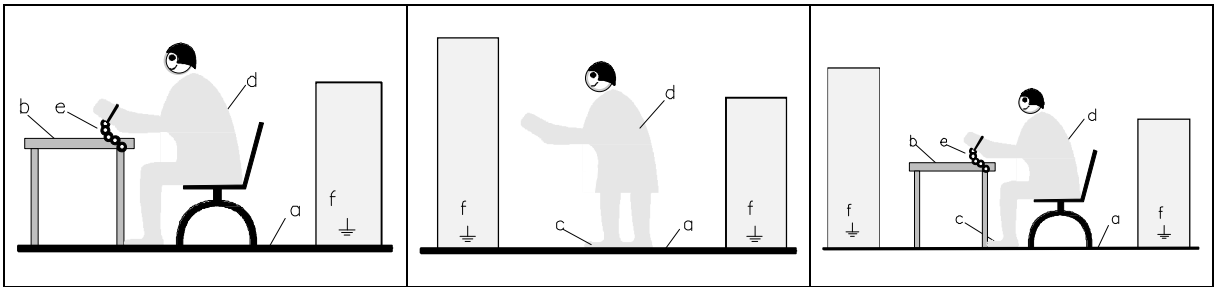
When soldering, the soldering iron tip must be grounded.

Boards and components should only be stored and transported in conductive packaging (e.g. metalized plastic boxes, metal containers).

If the packing material is not conductive, the boards must be wrapped with a conductive packing material, e.g. conductive foam rubber or household aluminum foil.

The necessary ESD protective measures are clearly shown in the following diagram.

a = Conductive floor surface
b = ESD table
c = ESD shoes
d = ESD overall
e = ESD chain
f = Cabinet ground connection



Seated	Standing	Standing / sitting

Drives and Standard Products
Motors and Drive Systems Group
Postfach 3269, D-91050 Erlangen

System-Based
Drive Technology