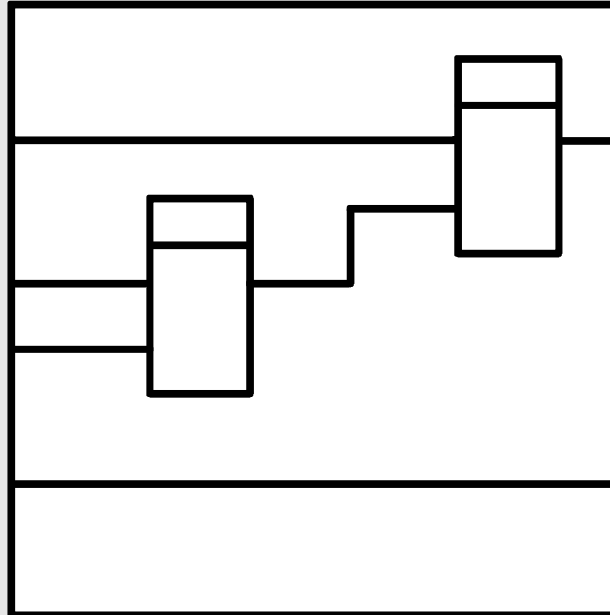


# SIMADYN D

## Digital Control System

User Manual

### Program Memory Sub-Module MS45



## User Manual, Program Memory Sub-Module MS45

Edition		Status
1	Program Memory Sub-Module MS45	10.90
2	Program Memory Sub-Module MS45	05.95

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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.

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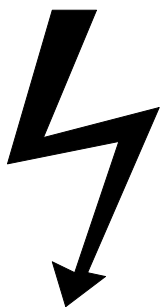


**NOTE !**

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, commitment 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****WARNING !**

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.

	<table><tr><th data-bbox="488 1041 1386 1146"><b>CAUTION!</b></th></tr><tr><td data-bbox="488 1146 1386 1319"><p>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).</p></td></tr></table>	<b>CAUTION!</b>	<p>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).</p>
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	<table><tr><th data-bbox="488 1411 1383 1516"><b>WARNING!</b></th></tr><tr><td data-bbox="488 1516 1383 1774"><p>Hazardous voltages are present in this electrical equipment during operation.</p><p>Non-observance of the safety instructions can result in severe personal injury or property damage.</p><p>It is especially important that the warning information in all of the relevant Operating Instructions are strictly observed.</p></td></tr></table>	<b>WARNING!</b>	<p>Hazardous voltages are present in this electrical equipment during operation.</p> <p>Non-observance of the safety instructions can result in severe personal injury or property damage.</p> <p>It is especially important that the warning information in all of the relevant Operating Instructions are strictly observed.</p>
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<p>Hazardous voltages are present in this electrical equipment during operation.</p> <p>Non-observance of the safety instructions can result in severe personal injury or property damage.</p> <p>It is especially important that the warning information in all of the relevant Operating Instructions are strictly observed.</p>			

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## 1. Ordering information

6DD 1610 - 0AG5                      MS45 memory module  
for software versions from 3.0 onwards

The MS45 memory module can be used in all SIMADYN D processor modules. When writing into or reading from the RAM, no wait cycles are required.

A SIMADYN D programming adapter is always required to program the modules.

Programming adapter UP1	Order No.	6DD 1672-0AB0
Programming adapter UP2	Order No.	6DD 1672-0AC0

## 2. Function description

The MS45 memory module is especially suitable for the start-up phase, as the time-intensive module erasing is eliminated. Thus, program changes are fast and simple.

The MS45 sub-module is inserted into the processor module through an opening in the front panel (X50).

A lithium battery is provided on the board to buffer the RAM thus preventing data loss. This, in conjunction with a data save circuit, ensures that data is reliably backed-up in the RAM when the power supply voltage dips (below 4.75 V), or the board is withdrawn.

## 3. Board design

- Small PC circuit board with a 48-pin plug connector

- Memory capacity in Kbyte

Total	520
RAM	512
EEPROM	8

- Starting address, hex

EPROM	80000
EEPROM	7C000

- access time when reading

EEPROM	300 ns
RAM	typ. 85ns (70ns RAM)
	max. 88.5 ns

- Access time when writing

EEPROM	10 ms
RAM	typ. 85ns (70ns RAM)
	max. 88.5 ns

- Data format

EEPROM	8 bit
RAM	16 bit

- Data back-up in the RAM

min. 2375h = approx. 3.2 months  
typ. 118750h = approx. 162 months  
with a full lithium battery

- Data back-up in the EEPROM

min. 100 years

## 4. Application information

The MS45 sub-module has components which could be destroyed by electrostatic discharge. When handling the MS45, the following protective measures must be observed:

- Only touch the board, if a grounded object is simultaneously touched (e.g. cabinet ground, grounding panel)
- Only transport the board in the original conductive packing
- Only set the board down on conductive surfaces
- It must not come into contact with highly insulating materials (e.g. plastics, articles of clothing manufactured from man-made fibers)

The battery should be replaced after 3 months to protect against data loss.

## 5. Connector assignments

The three-row, 48-pin connector has the following assignment:

Pin No.	Row a	Row b	Row c
1	VCC	GND	A12
2	A2	A1	A0
3	A5	A4	A3
4	A8	A7	A6
5	A11	A10	A9
6	*OE1	A14	A13
7	D9	D8	*WR
8	D12	D11	D10
9	D15	D14	D13
10	D2	D1	D0
11	D5	D4	D3
12	A15	D7	D6
13	A16	*CS3	*CS1
14	K3	*CS4	*CS2
15	*OE2	--	BBATT
16	*CS5	GND	--

VCC = 5V power supply voltage  
GND = Ground  
Axx = Address lines 0 to 16  
Dxx = Data lines, 0 to 15  
\*CSx = Chip select 1 to 4 - RAMs  
Chip select 5 - EEPROM  
\*OEx = Output enable 1 and 2  
\*WR = Write enable



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BBATT = Battery voltage

## 6. Technical data

Insulation group	A acc. to VDE 0110 Par.13, Group 2 at 5V DC
Ambient temperature	0 to 55 degrees C
Storage temperature	-40 to +70 degrees C
Humidity rating	F acc.to DIN 40040

Dimensions	101.4 * 53.3 mm
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Weight in kg	0.08
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Current drain P5 in mA	350 typ. (at 16MHz), 490 max.
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## 7. STRUC L mask in the master program

: MS45 "RAM module 512k/8k EEPROM"

## 8. 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.

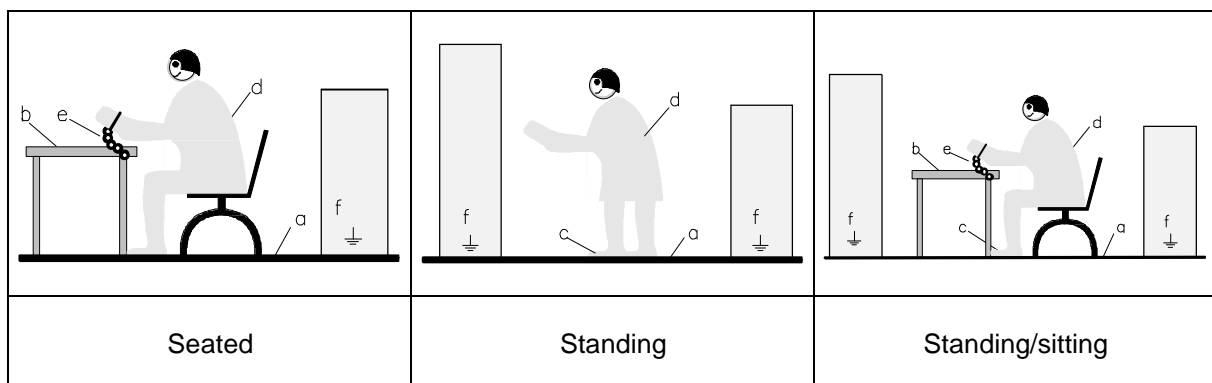
Boards and components should only be stored and transported in conductive packaging (e.g. metalized plastic boxes, metal containers).

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.

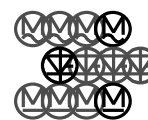
a = Conductive floor surface  
b = ESD table  
c = ESD shoes

d = ESD overall  
e = ESD chain  
f = Cabinet ground connection





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