350 memory module 2 ($4 \cdot 2^{10}$ statements) subsequent to above:

Initial address to be set: $52 \cdot 2^{10} - 4 \cdot 2^{10} = 48 \cdot 2^{10}$
Insert jumpers 4.4–13 and 4.5–12 (Fig. 8).
Occupied area: $52 \cdot 2^{10} - 1$ to $48 \cdot 2^{10}$

● Occupation of the EPROM areas

The initial addresses of the memory ICs (EPROM) are calculated from $8 \cdot 2^{10}$ upwards.

372 memory IC 1 ($4 \cdot 2^{10}$ statements) on 350 memory module 1:

Initial address to be set: $8 \cdot 2^{10}$
Insert jumper 19.7–10 (Fig. 7).
Occupied area: $8 \cdot 2^{10}$ to $12 \cdot 2^{10} - 1$

372 memory IC 2 ($4 \cdot 2^{10}$ statements) on 350 memory module 1 subsequent to above:

Initial address to be set: $12 \cdot 2^{10}$
Insert jumpers 26.7–10 and 26.8–9 (Fig. 7).
Occupied area: $12 \cdot 2^{10}$ to $16 \cdot 2^{10} - 1$

372 memory IC 1 ($4 \cdot 2^{10}$ statements) on 350 memory module 2 subsequent to above:

Initial address to be set: $16 \cdot 2^{10}$
Insert jumper 19.6–11 (Fig. 8).
Occupied area: $16 \cdot 2^{10}$ to $20 \cdot 2^{10} - 1$

372 memory IC 2 ($4 \cdot 2^{10}$ statements)) on 350 memory module 2 subsequent to above:

Initial address to be set: $20 \cdot 2^{10}$
Insert jumpers 26.6–11 and 26.8–9 (Fig. 8).
Occupied area: $20 \cdot 2^{10}$ to $24 \cdot 2^{10} - 1$

Half of the user memory area is thus occupied.

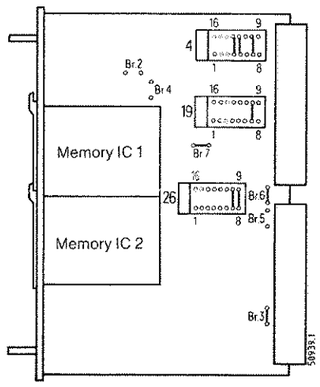


Fig. 7 350 memory module 1

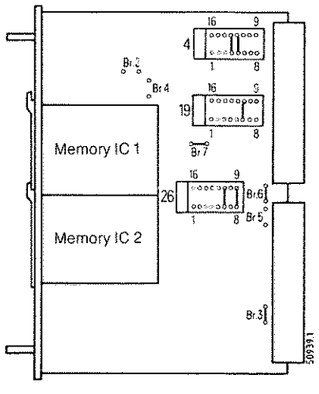


Fig. 8 350 memory module 2

Terminal assignment of plugs

Base plug 1

d	b	z	
	0 V	+5 V	2
UBATT			4
ADB 12	ADB 00		6
ADB 13	ADB 01	$\overline{\text{MEMR}}$	8
ADB 14	ADB 02	$\overline{\text{MEMW}}$	10
ADB 15	ADB 03	$\overline{\text{RDY}}$	12
	ADB 04	DB 0	14
	ADB 05	DB 1	16
	ADB 06	DB 2	18
	ADB 07	DB 3	20
	ADB 08	DB 4	22
	ADB 09	DB 5	24
	ADB 10	DB 6	26
$\overline{\text{DS}}$	ADB 11	DB 7	28
MEMSEL 1			30
	0 V		32

Base plug 2

d	b	z	
	0 V	+5 V	2
	DB 08	DB 12	4
	DB 09	DB 13	6
	DB 10	DB 14	8
	DB 11	DB 15	10
			12
			14
			16
			18
			20
			22
			24
			26
			28
			30
	0 V		32

Spare parts

Coding plug	C79334–A3011–B12
Adapter for 372–0AA61 and 373 memory IC	6ES5 983–0BA11

Siemens Aktiengesellschaft

Ord. No.: C79000–B8576–C236–07
Order from: Gerätewerk Karlsruhe
Printed in the Federal Republic of Germany
AG 0886 0.8 M 14 En

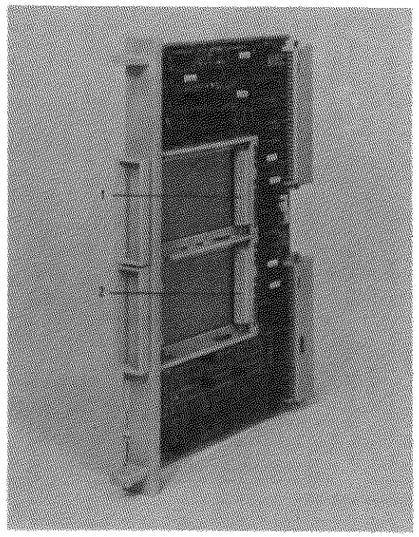
SIEMENS

SIMATIC S5

350 Memory Module
370, 372 and 373 Memory ICs

6ES5 350
6ES5 370/372/373

Instructions Ord. No. C79000–B8576–C236–07



1 Location for memory IC 1
2 Location for memory IC 2

Fig. 1 350 memory module

Application

The 350 memory module and the associated 370, 372 and 373 memory ICs are modules for storing user programs in the SIMATIC® S5 programmable controller system. Memory ICs with EPROMs of type 27128 and higher cannot be used in the memory module 350. The module can be used in the 130 A/K, 130 W, 150 A/K and 150 S programmable controllers.

Caution! To use the 372–0AA61 and 373–0AA21/–0AA41 memory ICs, adapter 6ES5 983–0BA11 is necessary.

Application and possible configurations:

	Programmable controller			
	130 A/K	130 W	150 A/K	150 S
350 memory module	–	×	×	×
370 memory IC	×[1]	×[2]	×[2]	–
372 memory IC	–	–	–	×[2]
373 memory IC	–	–	×[2]	–

1) No adjustmend of the address is required in the central module.
2) Up to two 370 and/or 372/373 memory ICs in the 350 memory module.

Design

The 350 memory module is a double-height printed circuit board from the ES 902 packaging system, with two 48-way base plugs. The memory ICs are inserted through two cut-outs in the front panel.

CMOS RAM components are used as the main memory in the 350 memory module and are supplied with 5 V from a battery in the event of failure of the internal power supply. The battery is installed in the power supply unit.

The 370, 372 and 373 memory ICs are designed using EPROM components.

The memory modules are available in the rugged and compact versions.

Technical data

Memory capacity of the 350 memory module (RAM)

6ES5 350–5AA21 (rugged version)	$4 \cdot 2^{10}$ statements ($8 \cdot 2^{10}$ byte)
350–3KA21 (compact version)	$4 \cdot 2^{10}$ statements ($8 \cdot 2^{10}$ byte)
350–3KA41 (compact version)	–

Memory capacity of the 370/373 memory ICs (EPROM)

6ES5 370–0AA41	$4 \cdot 2^{10}$ statements ($8 \cdot 2^{10}$ byte)
373–0AA21	$8 \cdot 2^{10}$ statements ($16 \cdot 2^{10}$ byte)
373–0AA41	$16 \cdot 2^{10}$ statements ($32 \cdot 2^{10}$ byte)

Memory capacity of the 372 memory IC (EPROM)

6ES5 372–0AA31	$2 \cdot 2^{10}$ statements	only for word mode
372–0AA41	$4 \cdot 2^{10}$ statements	
372–0AA51	$8 \cdot 2^{10}$ statements	
372–0AA61	$16 \cdot 2^{10}$ statements	

Power supply	5 V DC ± 5 %
Current consumption from the power supply	
350 memory module	Max. 1.4 A
370/372/373 memory ICs	0.275 A each
Current consumption in battery back-up mode	Max. 0.3 mA
Access time	480 to 520 ns after the negative going edge of the MEMR signal
Cycle time	
Write	$t_{cyc} \geqq 530$ ns
Read	$t_{cyc} \geqq 560$ ns

Mechanical data

Dimensions (h × d) of the 350 memory module	233.4 mm × 160 mm
Front panel width	24.5 mm (rugged version) 20.0 mm (compact version)

Dimensions (h × d) of the 370/372/373 memory ICs	77 mm × 110 mm
Weight of 350 memory module	Approx. 0.3 kg

Ambient conditions

Temperature of use	0 to 55 °C
Storage and transport temperature	−40 to +70 °C
Relative humidity	Max. 95 % at 25 °C, no formation of dew
Operating height	Max. 3500 m above sea level

Installation

The memory module and the memory ICs must only be inserted or removed with the power supply switched off.

Mounting locations of the jumpers and coding sockets

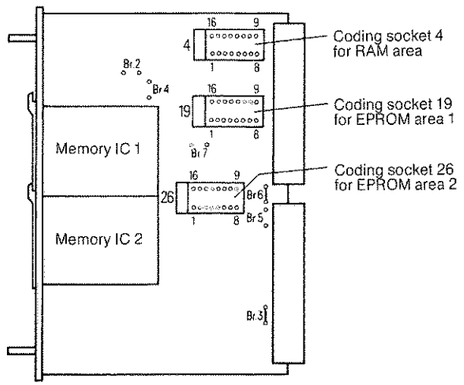


Fig. 2 Mounting locations of the jumpers and coding sockets (condition as delivered)

Condition as delivered: Jumpers 2, 4, 5 and 7 open; jumpers 3 and 6 inserted.

Word mode:
Jumper 7 must be inserted when using the memory module in the 150 S programmable controller (word mode).

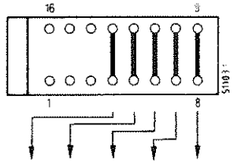
Setting the addresses for the 350 memory module

(RAM area)

The addresses for the 350 memory module (RAM area) are set on the coding socket 4 (see Fig. 2) by inserting jumpers. The RAM area can be selected in the address range from $60{\cdot}2^{10}$ **downwards** to 0 in $2{\cdot}2^{10}$ steps (see Fig. 3). When fixing the addresses, the information in the operating instructions of the central controller concerning the position of inhibited areas must be observed (see example).

Only the first address in each step is fixed. The remaining addresses are automatically decoded. If several memory modules are used in the system, the RAM areas must be set to follow one another without gaps.

Elimination of the RAM area:
The RAM area of the 350 memory module is not addressed if all 5 jumpers are inserted on coding socket 4. The acknowledgement signal $\overline{RDY}$ is not output in this case and no data are connected to the data bus.



Jumper Significance	4-13 32	5-12 16	6-11 8	7-10 4	8-9 2
Initial address					
0 $2{\cdot}2^{10}$ $4{\cdot}2^{10}$ $6{\cdot}2^{10}$				× ×	× ×
$8{\cdot}2^{10}$ $10{\cdot}2^{10}$ $12{\cdot}2^{10}$ $14{\cdot}2^{10}$			× × ×	× ×	× ×
$16{\cdot}2^{10}$ $18{\cdot}2^{10}$ $20{\cdot}2^{10}$ $22{\cdot}2^{10}$		× × ×		× ×	× ×
$24{\cdot}2^{10}$ $26{\cdot}2^{10}$ $28{\cdot}2^{10}$ $30{\cdot}2^{10}$		× × ×	× × ×	× ×	× ×
$32{\cdot}2^{10}$ $34{\cdot}2^{10}$ $36{\cdot}2^{10}$ $38{\cdot}2^{10}$	× × ×			× ×	× ×
$40{\cdot}2^{10}$ $42{\cdot}2^{10}$ $44{\cdot}2^{10}$ $46{\cdot}2^{10}$	× × ×		× × ×	× ×	× ×
$48{\cdot}2^{10}$ $50{\cdot}2^{10}$ $52{\cdot}2^{10}$ $54{\cdot}2^{10}$	× × ×	× ×		× ×	× ×
$56{\cdot}2^{10}$ $58{\cdot}2^{10}$	× ×	× ×	× ×		× ×
$60{\cdot}2^{10}$ $62{\cdot}2^{10}$	× ×	× ×	× ×	× ×	× ×

Occupy RAM areas downwards

(RAM eliminated)

× = Jumper remains inserted

Fig. 3 Setting the addresses in the 350 memory module (RAM area)

Setting the addresses for the 370/372/373 memory ICs

(EPROM areas)

The addresses for the 370, 372 and 373 memory ICs (EPROM areas) are set by inserting jumpers at coding socket 19 (memory IC 1) and 26 (memory IC 2). The memory area can be selected in the address range from 0 **upwards** to $60{\cdot}2^{10}$ in $4{\cdot}2^{10}$ steps (Fig. 4).

Only the first address in each step is fixed. The remaining addresses are automatically decoded.

The EPROM areas must be selected without gaps, but not overlapping.

The corresponding address is not addressed if a memory IC is not inserted. The acknowledgement signal $\overline{RDY}$ is not output in this case and no data are connected to the data bus.

The acknowledgement signal $\overline{RDY}$ appears a maximum of 550 ns after the $\overline{MEMR}$ or $\overline{MEMW}$ signal.

It must be ensured that the address areas of the memory module and the two memory ICs do not overlap. The memory module in the overlapping range cannot be addressed otherwise. An acknowledgement signal $\overline{RDY}$ is not generated in this case and the memories are not connected to the data bus.

Jumper Significance	5-12 32	6-11 16	7-10 8	8-9 4
Initial address				
0 $4{\cdot}2^{10}$ $8{\cdot}2^{10}$ $12{\cdot}2^{10}$			 ×	× ×
$16{\cdot}2^{10}$ $20{\cdot}2^{10}$ $24{\cdot}2^{10}$ $28{\cdot}2^{10}$		× × ×	 × ×	 × ×
$32{\cdot}2^{10}$ $36{\cdot}2^{10}$ $40{\cdot}2^{10}$ $44{\cdot}2^{10}$	× × × ×		 × ×	 ×
$48{\cdot}2^{10}$ $52{\cdot}2^{10}$ $56{\cdot}2^{10}$	× × ×	× × ×	 ×	 ×
$60{\cdot}2^{10}$	×	×	×	×

Occupy EPROM areas upwards

(EPROM eliminated)

× = Jumper remains inserted

Fig. 4 Setting of addresses for the 370/372/373 memory ICs (EPROM areas)

Example 1

The following memory modules and ICs are to be used in a 150 A programmable controller:

2 × 350–5AA21 ($8{\cdot}2^{10}$ byte each, RAM) and

4 × 370–0AA41 ($8{\cdot}2^{10}$ byte each, EPROM)

According to the operating instructions for the 150 A central controller (see Section "Memory assignment"), a user memory area of $48{\cdot}2^{10}$ byte ($8{\cdot}2^{10}$ to $56{\cdot}2^{10} - 1$ byte) is available.

- Occupation of the RAM areas

The initial addresses of the two RAM areas are first calculated from $56{\cdot}2^{10}$ downwards.

350 memory module 1 ($8{\cdot}2^{10}$ byte):

Initial address to be set: $56{\cdot}2^{10} - 8{\cdot}2^{10} = 48{\cdot}2^{10}$
Insert jumpers 4.4–13 and 4.5–12 (Fig. 5).
Occupied area: $56{\cdot}2^{10} - 1$ to $48{\cdot}2^{10}$

350 memory module 2 ($8{\cdot}2^{10}$ byte) subsequent to above:

Initial address to be set: $48{\cdot}2^{10} - 8{\cdot}2^{10} = 40{\cdot}2^{10}$
Insert jumpers 4.4–13 and 4.6–11 (Fig. 6).
Occupied area: $48{\cdot}2^{10} - 1$ to $40{\cdot}2^{10}$

- Occupation of the EPROM areas

The initial addresses of the memory ICs (EPROM) are calculated from $8{\cdot}2^{10}$ upwards.

370 memory IC 1 ($8{\cdot}2^{10}$ byte) on 350 memory module 1:

Initial address to be set: $8{\cdot}2^{10}$
Insert jumper 19.7–10 (Fig. 5).
Occupied area: $8{\cdot}2^{10}$ to $16{\cdot}2^{10} - 1$

370 memory IC 2 ($8{\cdot}2^{10}$ byte) on 350 memory module 1 subsequent to above:

Initial address to be set: $16{\cdot}2^{10}$
Insert jumper 26.6–11 (Fig. 5).
Occupied area: $16{\cdot}2^{10}$ to $24{\cdot}2^{10} - 1$

370 memory IC 1 ($8{\cdot}2^{10}$ byte) on 350 memory module 2 subsequent to above:

Initial address to be set: $24{\cdot}2^{10}$
Insert jumpers 19.6–11 and 19.7–10 (Fig. 6).
Occupied area: $24{\cdot}2^{10}$ to $32{\cdot}2^{10} - 1$

370 memory IC 2 ($8{\cdot}2^{10}$ byte) on 350 memory module 2 subsequent to above:

Initial address to be set: $32{\cdot}2^{10}$
Insert jumper 26.5–12 (Fig. 6).
Occupied area: $32{\cdot}2^{10}$ to $40{\cdot}2^{10} - 1$

The complete user memory area available is thus occupied. Overlapping does not take place.

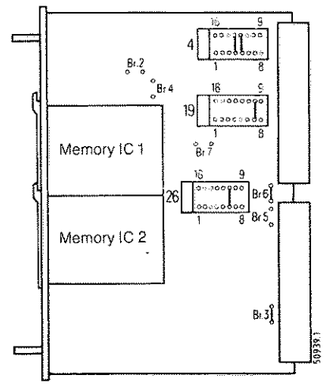


Fig. 5 350 memory module 1

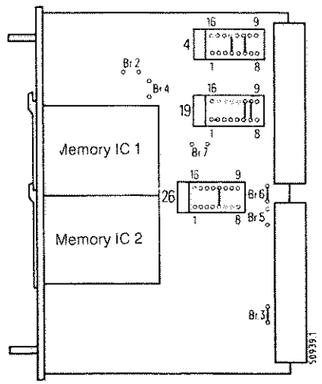


Fig. 6 350 memory module 2

Example 2

The following memory modules and ICs are to be used in a 150 S programmable controller (word mode):

2 × 350–3KA21 ($4{\cdot}2^{10}$ statements each, RAM) and
4 × 372–0AA41 ($4{\cdot}2^{10}$ statements each, EPROM)

The 350 memory modules are set to word mode with the central controller by soldering in the jumpers 7.

According to the operating instructions for the 150 S central controller, a user memory area of $48{\cdot}2^{10}$ statements ($8{\cdot}2^{10}$ to $56{\cdot}2^{10} - 1$ statements) is available.

- Occupation of the RAM areas

The initial addresses of the two RAM areas are first calculated from $56{\cdot}2^{10}$ downwards.

350 memory module 1 ($4{\cdot}2^{10}$ statements):

Initial address to be set: $56{\cdot}2^{10} - 4{\cdot}2^{10} = 52{\cdot}2^{10}$
Insert jumpers 4.4–13, 4.5–12 et 4.7–10 (Fig. 7).
Occupied area: $56{\cdot}2^{10} - 1$ to $52{\cdot}2^{10}$