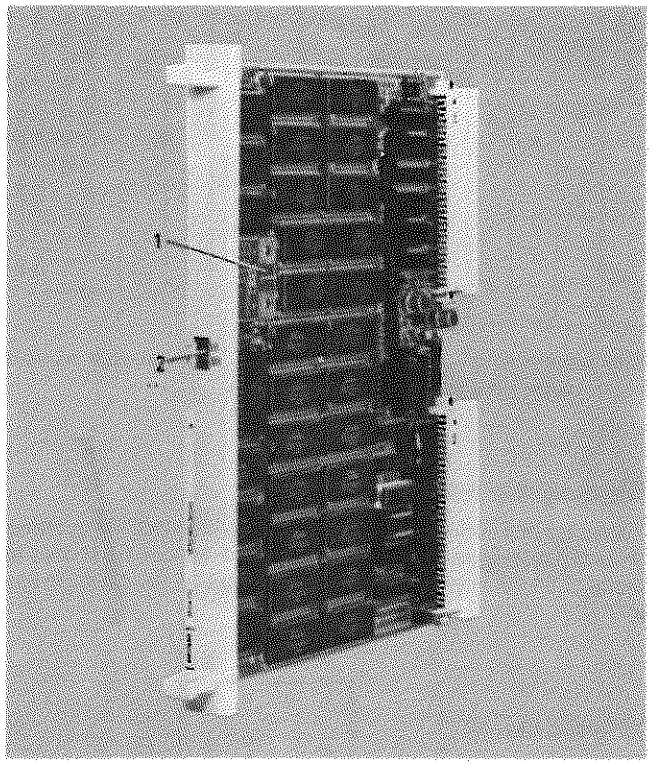
SIEMENS

# SIMATIC S5

## Memory Module 340

**6ES5 340-5AB11/21/31**
**6ES5 340-3KB11/21/31/41**

**Instructions** Ord. No. C79000-B8576-C235-6




1 Location for battery
2 Connection for external back-up voltage

Fig. 1 Memory module 340

## Application

The memory module 340 is used in SIMATIC® S5 systems for storing user programs. The module can be used in the 130 W and 150 A/K/S programmable controllers.

## Design

The memory module 340 is a printed circuit board in double-height Eurocard format with 2 48-way base plugs for the ES 902 packaging system.

CMOS RAM components are used for storing the data. The power supply to these components is supplied by a battery in the event of power failure. The battery is installed in the power supply unit.

The compact design of the memory module 340 provides space for an additional battery on the circuit board. Furthermore, an external back-up voltage can be connected so that no data are lost when replacing the battery or removing the module.

The memory module is matched to the required operating mode and addressing using soldered and plug-in jumpers on the circuit board.

## Technical Data

| | | |
|---|---|---|
| Memory capacity | | |
| Rugged version | | |
| 6ES5 340-5AB11 | $8 \cdot 2^{10}$ statements ($16 \cdot 2^{10}$ byte) | |
| -5AB21 | $16 \cdot 2^{10}$ statements ($32 \cdot 2^{10}$ byte) | |
| -5AB31 | $24 \cdot 2^{10}$ statements ($48 \cdot 2^{10}$ byte) | |
| Compact version | | |
| 6ES5 340-3KB11 | $8 \cdot 2^{10}$ statements ($16 \cdot 2^{10}$ byte) | |
| -3KB21 | $16 \cdot 2^{10}$ statements ($32 \cdot 2^{10}$ byte) | |
| -3KB31 | $24 \cdot 2^{10}$ statements ($48 \cdot 2^{10}$ byte) | |
| -3KB41 | $32 \cdot 2^{10}$ statements ($64 \cdot 2^{10}$ byte) | |
| Power supply $U_V$ | 5 V ± 5% | |
| Back-up voltage $U_{BATT}$ | 2.7 to 5 V | |
| Power consumption | From $U_V$ | From $U_{BATT}$ (with $U_V < 0.8$ V) |
| -5AB11, -3KB11 | ≦ 0.75 A | ≦ 50 µA |
| -5AB21, -3KB21 | ≦ 0.8 A | ≦ 60 µA |
| -5AB31, -3KB31 | ≦ 0.85 A | ≦ 70 µA |
| -3KB41 | ≦ 0.90 A | ≦ 80 µA |
| Life of the battery on the module at ambient temperature of 25 °C | | |
| Unloaded | Approx. 5 years | |
| Loaded (back-up mode) | > 1 year | |
| Access time | ≧ 250 ns after the trailing edge of the $\overline{\text{MEMR}}$ signal | |
| Cycle times | | |
| Writing | $t_{cyc}$ ≧ 400 ns | |
| Reading | $t_{cyc}$ ≧ 400 ns | |
| Mechanical data | | |
| Dimensions (h x d) | 233.4 mm x 160 mm | |
| Front panel width | 24.5 mm (rugged version)<br>20.0 mm (compact version) | |
| Ambient conditions | | |
| Operating temperature | 0 to 55 °C | |
| Storage and transport temperature | −40 to 70 °C | |
| Relative humidity | Max. 95% at 25 °C, no dew formation | |
| Operating height | Max. 3000 m above sea level | |
| Weight | Approx. 0.3 kg | |

## Installation

The memory module may only be removed or inserted with the power supply switch off.

**Connection of the built-in battery** (in -3KB11/21/31/41)

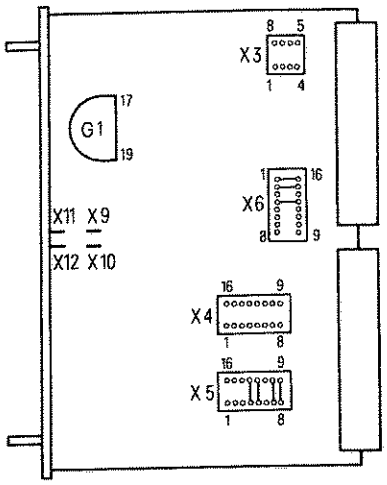
State upon delivery: jumper X9-X10 open.

The jumper X9-X10 is soldered in if the battery on the circuit board for back-up of the CMOS memory components is to be connected. The battery is thus switched on. When storing the module on an electrically conducting surface or in an enclosure for protecting modules from electrical exposure, the battery must be removed so that it is not discharged.

Only install the battery when the memory module is already in use.

Switch off the power supply (5 V) before inserting or removing the memory module.

An voltage of 5 to 30 V DC can be applied via terminals X11 (–) and X12 (+) on the front panel when replacing the battery to prevent data from being lost.




The jumpers are inserted as shown upon delivery.

Fig. 2 Locations of the jumpers and coding bases

## Setting the addresses

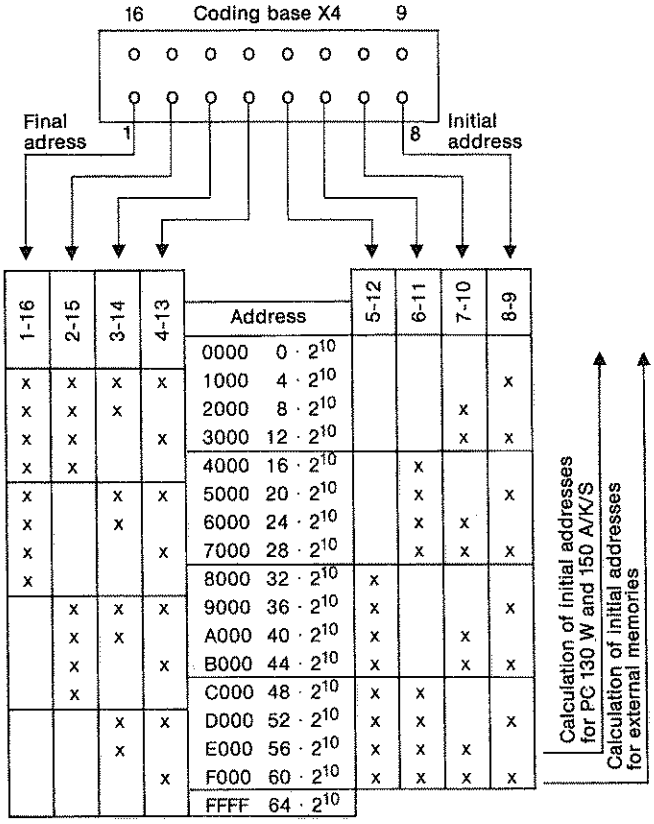
The addresses for the memory module 340 are set on coding base X4 using plug-in jumpers (Fig. 2).

The initial address is fixed in a memory area of $64 \cdot 2^{10}$ in steps of $4 \cdot 2^{10}$ from $60 \cdot 2^{10}$ downwards to 0 (Fig. 3). Starting at the initial address, the address area up to $64 \cdot 2^{10}$ is available corresponding to the module configuration if a final address is not set.

When fixing the initial addresses (jumpers X4.5-12 to X4.8-9), the information in the instructions of the central controller concerning the position of inhibited areas must be observed (see Section "Memory assignment"). Byte addresses (byte mode) are set with the 130 W and 150 A/K programmable controllers and instruction addresses (word mode) with the 150 S programmable controller.

Only the first address is set in each step, the other addresses are decoded automatically.

If several memory modules are used in the system, the address areas must be set to follow one another without gaps. If areas overlap, the area of one module must be shifted and limited by fixing the final address of the area (jumpers X4.1-16 to X4.4-13).




| 1-16 | 2-15 | 3-14 | 4-13 | Address | 5-12 | 6-11 | 7-10 | 8-9 |
|---|---|---|---|---|---|---|---|---|
| | | | | 0000 $0 \cdot 2^{10}$ | | | | |
| x | x | x | x | 1000 $4 \cdot 2^{10}$ | | | | x |
| x | x | x | | 2000 $8 \cdot 2^{10}$ | | | x | |
| x | x | | x | 3000 $12 \cdot 2^{10}$ | | | x | x |
| x | x | | | 4000 $16 \cdot 2^{10}$ | | x | | |
| x | | x | x | 5000 $20 \cdot 2^{10}$ | | x | | x |
| x | | x | | 6000 $24 \cdot 2^{10}$ | | x | x | |
| x | | | x | 7000 $28 \cdot 2^{10}$ | | x | x | x |
| x | | | | 8000 $32 \cdot 2^{10}$ | x | | | |
| | x | x | x | 9000 $36 \cdot 2^{10}$ | x | | | x |
| | x | x | | A000 $40 \cdot 2^{10}$ | x | | x | |
| | x | | x | B000 $44 \cdot 2^{10}$ | x | | x | x |
| | x | | | C000 $48 \cdot 2^{10}$ | x | x | | |
| | | x | x | D000 $52 \cdot 2^{10}$ | x | x | | x |
| | | x | | E000 $56 \cdot 2^{10}$ | x | x | x | |
| | | | x | F000 $60 \cdot 2^{10}$ | x | x | x | x |
| | | | | FFFF $64 \cdot 2^{10}$ | | | | |

Calculation of initial addresses for PC 130 W and 150 A/K/S

Calculation of initial addresses for external memories

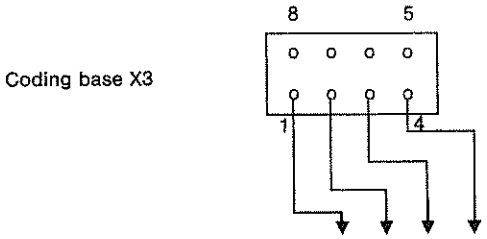
Final address $n \cdot 2^{10} - 1$

x = Jumper inserted

Fig. 3 Setting the addresses

## Shifting the address area

If an extended address area is required in SIMATIC® S5 systems (max. 20 addresses ≙ $2^{20}$), the memory area can be shifted in steps of $64 \cdot 2^{10}$ byte using plug-in jumpers on the coding base X3.




| Address area | 1-8 | 2-7 | 3-6 | 4-5 |
|---|---|---|---|---|
| $0 \cdot 2^{10}$ to $64 \cdot 2^{10} - 1$ | | | | |
| $64 \cdot 2^{10}$ to $128 \cdot 2^{10} - 1$ | | | | x |
| $128 \cdot 2^{10}$ to $192 \cdot 2^{10} - 1$ | | | x | |
| $192 \cdot 2^{10}$ to $256 \cdot 2^{10} - 1$ | | | x | x |
| $256 \cdot 2^{10}$ to $320 \cdot 2^{10} - 1$ | | x | | |
| $320 \cdot 2^{10}$ to $384 \cdot 2^{10} - 1$ | | x | | x |
| $384 \cdot 2^{10}$ to $448 \cdot 2^{10} - 1$ | | x | x | |
| $448 \cdot 2^{10}$ to $512 \cdot 2^{10} - 1$ | | x | x | x |
| $512 \cdot 2^{10}$ to $576 \cdot 2^{10} - 1$ | x | | | |
| $576 \cdot 2^{10}$ to $640 \cdot 2^{10} - 1$ | x | | | x |
| $640 \cdot 2^{10}$ to $704 \cdot 2^{10} - 1$ | x | | x | |
| $704 \cdot 2^{10}$ to $768 \cdot 2^{10} - 1$ | x | | x | x |
| $768 \cdot 2^{10}$ to $832 \cdot 2^{10} - 1$ | x | x | | |
| $832 \cdot 2^{10}$ to $896 \cdot 2^{10} - 1$ | x | x | | x |
| $896 \cdot 2^{10}$ to $960 \cdot 2^{10} - 1$ | x | x | x | |
| $960 \cdot 2^{10}$ to $1024 \cdot 2^{10} - 1$ | x | x | x | x |

x = jumper inserted

Fig. 4 Shifting the address area

The shifting of the address area can be switched on or off by resoldering a jumper on the coding base X5 (see Fig. 4).

Shifting of the address area is only provided for the memory modules in compact design (-3KB11/21/31/41).

## Jumper settings

| | Function | Coding base | 1-16 | 2-15 | 3-14 | 4-13 | 5-12 | 6-11 | 7-10 | 8-9 |
|---|---|---|---|---|---|---|---|---|---|---|
| State upon delivery for SIMATIC® S5 | Acknowledgement output after valid data | X6 | x | | | x | | | | |
| | Byte mode | X6<br>X5 | | x | o | | x | | | o |
| | Inhibit memory with PESP = 1 | X5 | | | | x | | | | |
| | Shifting of the address area switched off | X5 | | | | | | o | x | |
| | DMAFA/HOLDA switched on | X5 | | | | | | | | x |
| Changed modes | Word mode | X6<br>X5 | | o | x | | o | | | x |
| | Memory enable, any PESP | X5 | | | | o | | | | |
| | Shifting of the address area switched on | X5 | | | | | | x | o | |
| Special functions (e. g. MC 210, TELEPERM®) | Acknowledgement output ≦ 50 ns after request | X6 | x | | | o | | | | |
| | Acknowledgemet output ≦ 130 ns after valid addresses | X6 | o | | | o | | | | |
| | MEMSEL function (memory enable)<br>MEMSEL = 1<br>MEMSEL = 0<br>Any MEMSEL | <br>X6<br>X6<br>X6 | | | | | <br>x<br>x<br>o | <br>x<br>o<br>o | | |

x = Jumper inserted

o = Jumper open

The characters "x" and "o" identify the position of jumpers which must be changed for the various operating modes. The other jumpers remain unchanged.

Fig. 5 Jumper settings

## Examples

### Example 1

Two memory modules 340 are to be used in a programmable controller type 150 A:

1 x 340-5AB11 ($16 \cdot 2^{10}$ byte) and
1 x 340-5AB21 ($32 \cdot 2^{10}$ byte)

According to the instructions for the central controller type 150 A (see Section "Memory assignment"), a user memory area of $48 \cdot 2^{10}$ byte is available. The initial addresses are counted downwards from $56 \cdot 2^{10}$.

Memory module 1 ($16 \cdot 2^{10}$ byte):

Initial address to be set: $56 \cdot 2^{10} - 16 \cdot 2^{10} = 40 \cdot 2^{10}$
Insert jumpers X4.5-12 and X4.7-10 (Fig. 6).
Occupied area: $56 \cdot 2^{10} - 1$ to $40 \cdot 2^{10}$

Memory module 2 ($32 \cdot 2^{10}$ byte) subsequent to the area of memory module 1:

Initial address to be set: $40 \cdot 2^{10} - 32 \cdot 2^{10} = 8 \cdot 2^{10}$
Insert jumper X4.7-10 (Fig. 7).
Occupied area: $40 \cdot 2^{10} - 1$ to $8 \cdot 2^{10}$

The complete user memory area available ($48 \cdot 2^{10}$) is thus occupied.

It is not necessary to set a final address since the memory area is used fully by both modules.

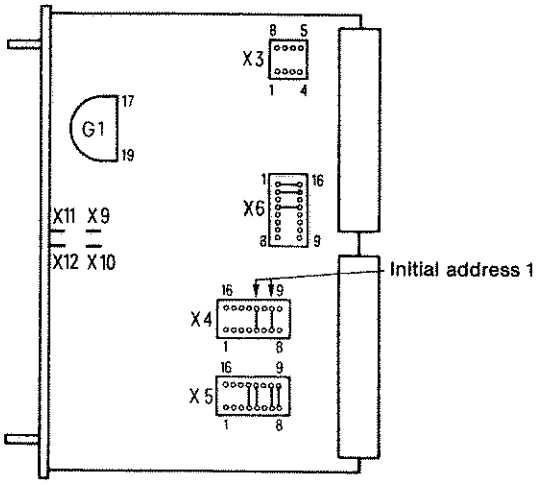



Fig. 6 Memory module 1

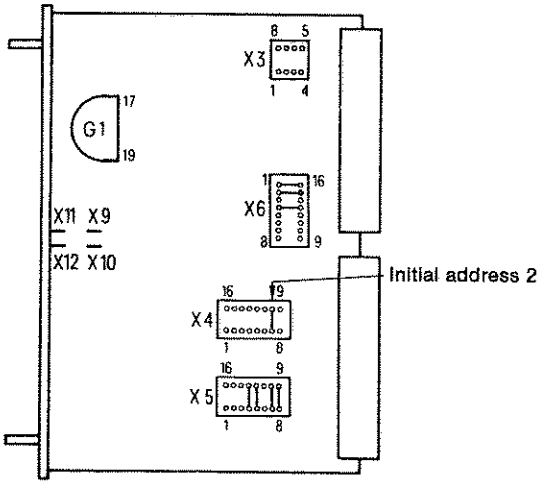



Fig. 7 Memory module 2

Memory modules 340 and 350 (RAM) as well as memory submodules 370 and 372 (EPROM) are combined in the following examples. The EPROM areas from $8 \cdot 2^{10}$ upwards and the RAM areas from $56 \cdot 2^{10}$ downwards must each be fixed without gaps in the process. If the user memory is not fully occupied, the gap must be between the EPROM and the RAM areas. The sequence of the memory modules and submodules in the two areas is irrelevant.

**Example 2**

The following memory modules and submodules are to be used in a programmable controller type 150 K:

1 x 340-3KB21 ($32 \cdot 2^{10}$ byte, RAM) and
1 x 350-3KA21 ($8 \cdot 2^{10}$ byte, RAM) with
2 x 370-0AA41 ($8 \cdot 2^{10}$ byte each, EPROM)

A user memory area of $48 \cdot 2^{10}$ is available according to the instructions for the central controller type 150 K (see Section "Memory assignment").

User memory area

| Address area | Memory module/ submodule | Address to be set | |
|---|---|---|---|
| 0 | | | |
| | Inhibited | | |
| $8 \cdot 2^{10}$ | | | |
| | 1st memory submodule 370 ($8 \cdot 2^{10}$, EPROM) | Initial address | EPROM areas |
| $16 \cdot 2^{10}$ | | | |
| | 2nd memory submodule 370 ($8 \cdot 2^{10}$, EPROM) | Initial address | |
| $24 \cdot 2^{10}$ | | | |
| | Memory module 340 ($32 \cdot 2^{10}$, RAM) | Initial and final address | RAM areas |
| $48 \cdot 2^{10}$ | | | |
| | Memory module 350 ($8 \cdot 2^{10}$, RAM) | Initial address | |
| $56 \cdot 2^{10}$ | | | |
| | Inhibited | | |
| $64 \cdot 2^{10}$ | | | |

● Assignment of the EPROM areas

The initial addresses for the memory submodules (EPROM) are first fixed from $8 \cdot 2^{10}$ upwards (also refer to the memory module 350 instructions).

Memory submodule 1 ( $8 \cdot 2^{10}$ byte):

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

Memory submodule 2 ( $8 \cdot 2^{10}$ byte):

Initial address to be set: $16 \cdot 2^{10}$
Insert jumper 26.6-11 (Fig. 8).
Occupied area: $16 \cdot 2^{10}$ to $24 \cdot 2^{10} - 1$

● Assignment of the RAM areas

The initial addresses of the RAM areas are calculated from $56 \cdot 2^{10}$ downwards (also refer to the memory module 350 instructions).

Memory module 350 ($8 \cdot 2^{10}$ 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. 8).
Occupied area: $56 \cdot 2^{10} - 1$ to $48 \cdot 2^{10}$

The area of the memory module 340 is fixed following the memory module 350. Since the area still available ($24 \cdot 2^{10}$ to $48 \cdot 2^{10} - 1 = 24 \cdot 2^{10}$ byte) is smaller than the memory capacity of the module 340-3KB21 ($32 \cdot 2^{10}$ byte), the initial address of this module cannot be calculated as previously but is fixed subsequent to the last EPROM area at $24 \cdot 2^{10}$ byte.

Initial address to be set: $24 \cdot 2^{10}$
Insert jumpers X4.6-11 and X4.7-10 (Fig. 9).
Occupied area: $24 \cdot 2^{10}$ to $56 \cdot 2^{10} - 1$ (overlapping)

In order to prevent overlapping with the RAM area of the memory module of the 350, the final address of memory module 340 must be fixed before the initial address of memory module 350:

Final address to be set: $48 \cdot 2^{10} - 1$
Insert jumper X4.2-15 (Fig. 9).
Occupied area: $24 \cdot 2^{10}$ to $48 \cdot 2^{10} - 1$

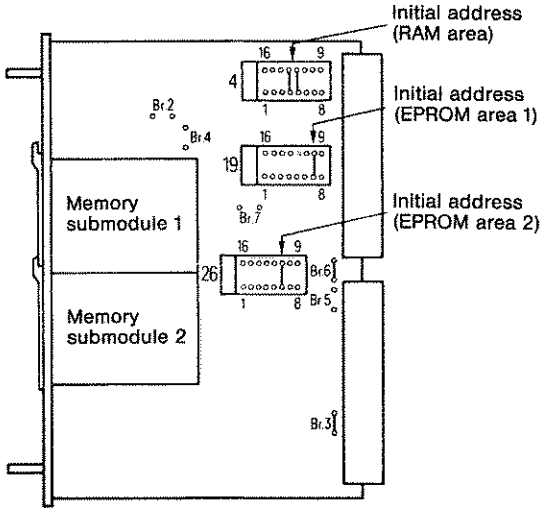



Fig. 8 350 memory module

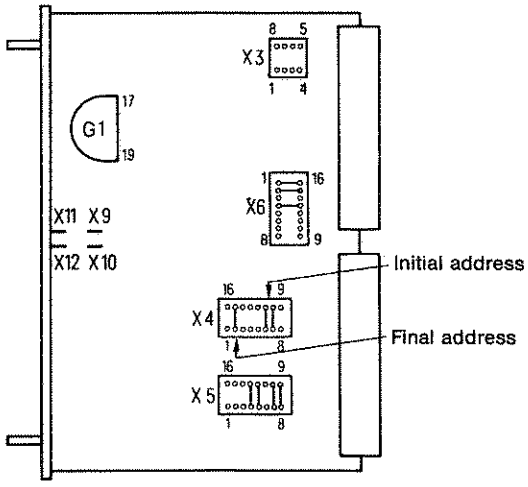
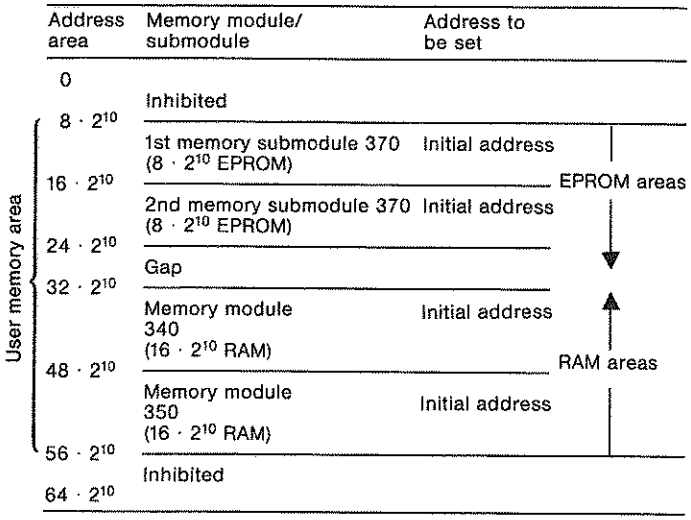



Fig. 9 340 memory module

**Example 3**

The following memory modules and submodules are to be used in a programmable controller type 150 K:

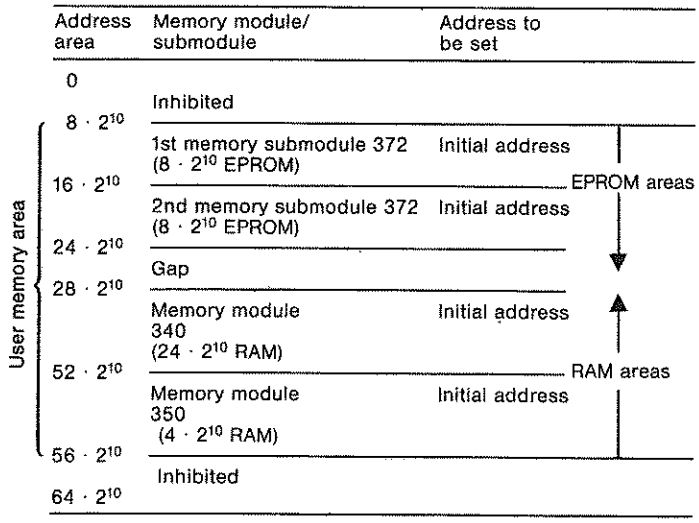
1 x 340-3KB11 ($16 \cdot 2^{10}$ byte, RAM) and
1 x 350-3KA21 ($8 \cdot 2^{10}$ byte, RAM) with
2 x 370-0AA41 ($8 \cdot 2^{10}$ byte each, EPROM)




**Example 4**

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

1 x 340-3KB31 ($24 \cdot 2^{10}$ instructions, RAM) and
1 x 350-3KA21 ($4 \cdot 2^{10}$ instructions, RAM) with
2 x 372-0AA51 ($8 \cdot 2^{10}$ instructions each, EPROM)




**Terminal assignment of plugs**

Base plug 1

| 1d | 1b | 1z | |
|---|---|---|---|
| | 0 V | + 5 V | 2 |
| UBATT | PESP | | 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 16 [1] | ADB 07 | DB 3 | 20 |
| ADB 17 [1] | ADB 08 | DB 4 | 22 |
| ADB 18 [1] | ADB 09 | DB 5 | 24 |
| ADB 19 [1] | ADB 10 | DB 6 | 26 |
| $\overline{\text{DS}}$ | ADB 11 | DB 7 | 28 |
| MEMSEL 1 | | | 30 |
| | 0 V | | 32 |

[1] Only with -3KB11/21/31/41.

Base plug 2

| 2d | 2b | 2z | |
|---|---|---|---|
| | 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 |
| HOLDA | | DMAFA | 20 |
| | | | 22 |
| | | | 24 |
| | | | 26 |
| | | | 28 |
| | | | 30 |
| | 0 V | | 32 |

## Spare parts

| | |
|---|---|
| Coding plug | C79334-A3011-B12 |
| Battery | 6ES5 980-0CA11 |

Siemens Aktiengesellschaft

Ord. No.: C79000-B8576-C235-6
Order from: Gerätewerk Karlsruhe
Printed in the Federal Republic of Germany
AG 384 0.8 SK 6 En