## 4.1 Coupling memory modules MM11, MM3, MM4

**Order No.**

MM11: 6DD1611-0AD0

MM3: 6DD1611-0AF0

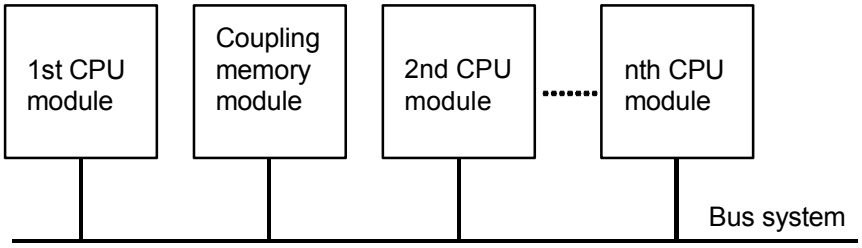
MM4: 6DD1611-0AG0

**Application**

A coupling memory module has a data memory (RAM), which is used to transfer data via the CPU modules. A coupling memory module must always be used if there is more than one CPU module in a subrack, and if the CPU modules wish to transfer data within the module. For instance, using configured „$ connections“, „coupling memory module coupling“ or if several CPU modules access a CS7 serial interface.

**Slot**

A coupling memory module can be inserted at any slot between the first and second CPU module.




**Features**

| | MM11 | MM3 | MM4 |
|---|---|---|---|
| Bus connection | L bus,<br>C bus | L bus,<br>C bus | L bus,<br>C bus |
| Memory size | 2 * 64 Kbytes | 2 * 64 Kbytes | 2 * 2 Mbytes |
| Other functions | | • System error-relay;<br>• Radio clock | System error-relay; |

- Data is buffered against power failure using a back-up battery (3.4 V) in the subrack
- Integrated bus termination for the C bus and L bus

### 4.1.1 Real-time clock in the MM3 coupling memory module

The MM3 coupling memory module includes, in addition to the buffer function, also a real-time clock, which can be set and synchronized via a

- DCF-77 radio signal

An additional dual port RAM connected to the **L bus** provides the clock time to other functions in the CPU modules (e. g. message system). To realize this, the MM3 must be configured as real-time source on the 1st CPU module with function block RTCM.

**Data back-up**

The clock time (time of day) is buffered by the subrack back-up battery.

**MM3 + MM4**

An MM3 can be inserted, **together with an MM4** in a SIMADYN D subrack to use the large MM4 memory, and to utilize the buffered real-time clock of the MM3. In this case, the MM3 can be inserted at any subrack slot. The MM3 memory is not used.

**Front panel elements**

- 10-digit, 7-segment displays H1 - H10 for seconds, minutes, hours, months, days located under one another in pairs (from top to bottom)
- 2 keys to manually set the clock
- 4 LEDs for status displays
- Screw/plug-in terminal (X5) for **system error signal relay**: When a CPU module identifies a fatal error, normal operation is aborted; the subrack goes into the STOP condition, the relay opens when an error occurs
- Screw/plug-in terminal (X6) is prepared for IRIG-B audio signal; this functionality has still not been implemented!
- BNC socket (X7) for DCF-77 antenna connection
- 1 double test socket for the reset signal (X10/X11) to reset the module (caution: This must only be used for test purposes!)

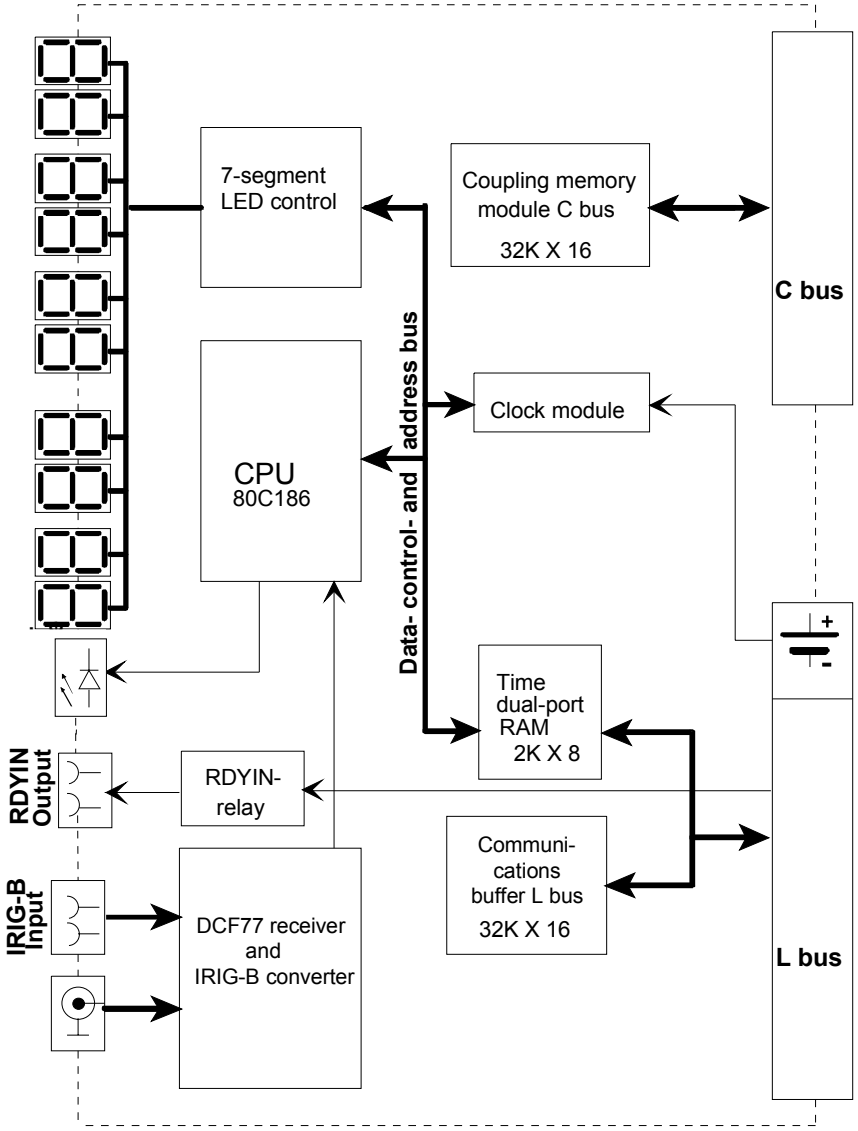



*Fig. 4-1 MM3 block diagram*

***Note: Led H1 (seconds) is located at the top, H10 (days) at the bottom!***

**Radio clock DCF-77**

The time is synchronized (time of day setting) via antenna using the **DCF-77 radio signal**. This signal can be received in Central Europe.

A differentiation is made between the following antennas:

- antenna for inside installation
- antenna for outside installation

The antenna must be aligned so that optimum reception is guaranteed. Generally, this is towards Frankfurt/Main, where the signal transmitter is located. The BNC socket X7 at the front panel is used to connect the antenna.

**NOTE** The **antenna for outdoor installation** normally ensures better reception, as the rooms, in which SIMADYN D is used, are generally screened and/or can accommodate devices/equipment which emit noise radiation.

**Time displayRadio clock DCF-77:Time display**

If the time display flashes, then the time hasn't been set after power-up (voltage on).

**Setting the clock time**

The clock can be set in 3 different ways:

- using the **DCF-77 radio signal**:
  The clock is set using the antenna signal when the appropriate data is configured at the IS input of function block RTCM, an antenna is connected and the reception conditions are OK (refer below).

  The complete time of day is received after approximately 2 minutes as a result of the telegram data transfer time of the DCF-77. The clock display flashes for this time after power-up.

- when the signal at input IS changes from 0 to 1 at **function block RTCM**, the time of day, available at its connections, is transferred.

- the time of day can always be **manually** set using two keys:

  – using upper key S1, all numerical pairs (digit pairs) of the 7-segment display are selected one after the other. They flash after they have been selected.

  – using lower key S2, a „1“ is added to the value in the flashing display, each time the key is depressed. When seconds is selected the value is set to zero.

  – after the seconds display has been selected, the next time that S1 is depressed, the year is displayed on the two upper digit pairs (H1, H2) - the year - can be set.

  – after all of the digit pairs have been selected, the next time that S1 is depressed, the setting mode is exited. The display stops flashing.

**Receive status**

LEDs H20 to H23 are loaded on the front panel. They indicate the status of the clock receiver (time of day receiver).

| LED | Color | Function | Description |
|---|---|---|---|
| H20 | Green | Lit | The module has been initialized to receive the DCF77 signal |
| | | Dark | The module has been initialized to receive the IRIG-B signal |
| H21 | Red | Flashes in a second rhythm | The time signal is received |
| | | Lit | The signal does not contain information - check the signal cable! |
| H22 | Green | Dark | The time signal contains incorrect information |
| | | Lit | The information is received for at least 10 seconds in the correct format |
| H23 | Red | Lit | Time telegram error |
| | | Dark | Decoding running |

**Ordering data, radio clock antenna**

| Order designation | Supplier |
|---|---|
| FG443610 antenna for indoor installation 4436 (long distance) | Hopf Elektronik Nottebohmstr. 41 58511 Lüdenscheid |
| FG441800 antenna for outdoor installation 4418 | |

## 4.1.2 Technical data MM11, MM3, MM4

**General data**

| | |
|---|---|
| No. of slots occupied | 1 |
| Dimensions W x H x D [mm] | 20.14 x 233.4 x 220 |
| Weight | MM11: Approx. 0.51 kg<br>MM3: 0.7 kg<br>MM4: 0.5 kg |

**Power supply voltage**

| **Rated voltage** | min. | max. | **Typ. current drain** |
|---|---|---|---|
| +5 V | +4.75 V | +5.25 V | MM11: 300 mA<br>MM3: 600 mA<br>MM4: 800 mA |
| +15 V | +14.4 V | +15.6 V | MM3: 50 mA |
| Back-up battery | 2.2 V | 3.9 V | 20 µA |

**System error relay**

RDYIN signal output for MM3 and MM4:

| **Description** | **Values** |
|---|---|
| Voltage | max. 60 V DC |
| Switching current | max. 0,5 A |
| NC contact interrupt time | 100 ms |
| Switching power | max. 20 W |