4 APPLICATION MEMORY

4.1 GENERAL INFORMATION

The application memory (APM) is required to store application programs. The APM modules are inserted into the slot provided in the processor module (CPU or multiprocessor). Operating system ROM, application RAM and application PROM are found in application memory. Both EPROM and also FlashPROM APM can be ordered from B&R.

For EPROM APMs, the operating system ROM **cannot** be deleted by the user. For FlashPROM APMs, the operating system is programmed in a System Flash. The operating system can be downloaded or updated using the programming system (see section "Programming System Flash").

> ⚠ An APM module is only allowed to be inserted or removed when power is turned off.

The buffer time of the lithium battery is influenced by storage or operating temperature. Proper storage of the battery (cool and dry) is recommended so that the buffer time is not negatively influenced.

4.2 TECHNICAL DATA

Module ID	ME910	ME913	ME915
Model Number	2ME910.90-1	2ME913.90-1	2ME915.90-1
Description	2010 Application Memory, 64 KB SRAM, 256 KB FlashPROM with PCC operating system	2010 Application Memory, 512 KB SRAM, 1 MB FlashPROM with PCC operating system	2010 Application Memory, 2 MB SRAM, 2 MB FlashPROM with PCC operating system
C-UL-US Listed	Yes	Yes	Yes
Used for Processor Module	CP10x, CP2x0, MP100	CP10x, CP2x0, MP100	CP10x, CP2x0, MP100
Operating System	PCC-Software	PCC-Software	PCC-Software
User RAM	64 KByte SRAM	512 KByte SRAM	2 MByte SRAM
User PROM	256 KByte Flash	1024 KByte Flash	2 MByte Flash
Erasing PROM	Programming logic in module		

Module ID	ME910	ME913	ME915
FlashPROM Programming	Programming logic in module, LED display		
Write Protection	Switch on module		

Buffering RAM
  Lithium Battery (in APM)
  Gold Foil Capacitor (in APM)
	At least 2 years [1]
	At least 10 min.		

Storage Temperature
  APM without Lithium Battery
  APM with Lithium Battery
  Lithium Battery (not installed)
	-20 to +70 °C
	-20 to +60 °C
	-20 to +60 °C		

Storage Time Lithium Battery (not installed)	Max. 3 years at 30 °C		
Dimensions (H, W, D) [mm]	103, 32, 122		

[1]   The buffer times given refer to application memory modules that are not installed in a processor module (CPU or Multiprocessor). Otherwise, the buffer time is reduced to 1 year since the processor module RAM is also buffered.

4.3 LED AND OPERATIONAL ELEMENTS

The following operational elements are found on the front side of the application memory module:

Release lever

Write protect switch

Programming LED

Cover for
Lithium Battery
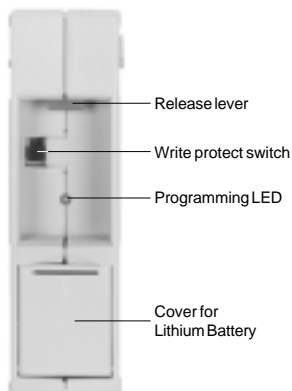
The **Programming LED** is lit if a the application PROM is written to ("burning").

The **Write Protect Switch** is used to protect the PROM from being accidentally written to or deleted.
In position 1 (write position), you can write to the application PROM. In Position 2, writing to or deleting from the PROM is not allowed.

1
2
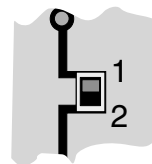
⚠ The position of the write protection switch is not allowed to be changed while programming B&R modules to application PROM!

A lithium battery is found behind the **Battery Cover** which supplies the application RAM **and** the RAM in the processor module (CPU and multiprocessor) when power is removed.

When the APM is stored for long periods of time, the battery should be removed if buffering is not needed to prevent unnecessary discharge.

To remove the APM from the processor module (CPU or multiprocessor), the **Removal Lever** must be pressed lightly downwards.

4.4 CHANGING THE LITHIUM BATTERY

Lithium Battery: 3 V / 950 mAh
Model Number: 0AC200.9   (5 lithium batteries)

Storage Time: Max. 3 years at 30 °C
Relative Humidity: 0 to 95 % (non-condensing)

The design of the product allows batteries to be changed regardless of if the PCC is under power or not. However in some countries, changing batteries under operating power is not allowed. For this reason, B&R recommends batteries be changed when the PCC is not under power.
Changing the lithium battery can be done while the APM is inserted or removed. A gold foil capacitors takes over buffering the RAM on the APM, a gold foil capacitor or a lithium battery takes over buffering the RAM on the CPU.

If application memory is not inserted, the following points are to be considered:

❍   To guarantee that the gold foil capacitor is charged, the PCC must be turned on for at least 5 minutes without interruption before changing the battery.

❍   After shutting down the system, the battery must be changed within 10 minutes.

Procedure for Changing a Battery

1) Remove voltage to power supply

2) Discharge electrostatic energy by touching the mounting rail or the ground connection (not in the power supply!).

3) Open lithium battery cover and hold open

4) Pull the battery from the compartment using the removal ribbon

5) Disconnect plug (angle slightly)

6) Remove used battery

7) Insert new battery

8) Replace plug (angle slightly)

9) Place battery in compartment (don't forget to replace removal ribbon)

10) Place the remaining bit of removal ribbon between battery and housing

11) Close lithium battery cover

12) Replace voltage to power supply

Lithium Battery Cover
Lithium Battery
Plug Connector
Pull out Strip
Circuit Board
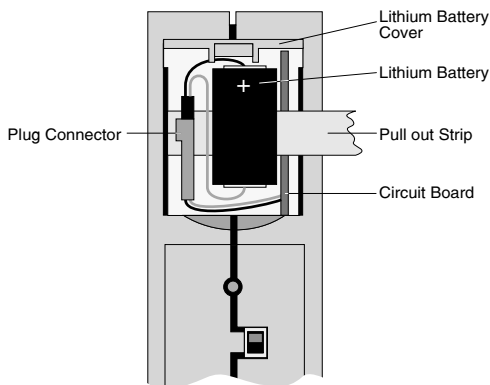
⚠ Lithium batteries are considered hazardous waste! Please dispose of batteries according to the guidelines in your area.

4.5 PROGRAMMING SYSTEM FLASH

4.5.1 General Information

All application memory is delivered without an operating system. An operating system download or a operating system update is carried out with the help of the programming system.

An operating system installation with PG2000 is possible with versions 2.20 or higher.

4.5.2 Operating System Download

All application memory is delivered without an operating system. The following steps should be followed when installing the operating system ("operating system download") for the first time:

1) Switch off voltage supply to PCC. This step is necessary because the application memory must only be inserted when the power is switched off.

2) Insert the new FlashPROM application memory and switch power back on. Do not forget that the write protection switch on the front of the application memory is set to write position.

3) Establish online connection between programming device (PC or Industrial PC) and CPU.

4) Start programming system PG2000

5) Call up the PCCSW update function in PG2000 (see menu item service in the pull down menu system).

6) A dialog box appears in which the baudrate for the download procedure and the PC interface (to be used for the online connection) can be defined (e.g. 57600 baud, COM1).

7) Selecting [OK] opens the next dialog box,

8) In this box, the operating system version can be selected. After closing this box (by choosing "Yes"), the download procedure begins. The progress of the download procedure is displayed in the message line.

 The User Flash is deleted !

9) When the download procedure has finished the PCC must be switched off and on again.

10) The PCC is now ready for operation.

4.5.3 Operating System Update

⚠️ **On the CP100 CPU, the operating system update can only be carried out via application interface IF1!**

When updating the operating system, the following steps should be taken:

1) Turn off the supply voltage to the PCC. This step is necessary because the application memory can only be inserted when the power is switched off.

2) Remove the application memory from the CPU or multiprocessor

3) An operating system update is only possible if the CPU is in bootstraploader mode. Open the FlashPROM side panel of the application memory and set the hardware switch to "ERASE".

4) Re-insert application memory into the CPU or multiprocessor and return power. Do not forget that the write protection switch on the front of the application memory is set to the write position.

5) Establish online connection between the programming device (PC or industrial PC) and the CPU.

6) Start PG2000.

7) Call up the PCCSW update function in PG2000 (see menu item "Service" in the pull down menu "System").

8) A dialog box appears in which the baudrate for the update procedure and the PC interface (to be used for the online connection) can be defined (e.g. 57600 baud, COM1).

9) Selecting OK opens the next dialog box.

10) In this box the operating system version can be selected. After closing this box (by choosing "Yes"), the system ROM is deleted (incl. operating system). The selected version of the operating system is then transferred into the system ROM. The progress of the download procedure is displayed in the message line.

⚠️ **The User Flash is deleted !**

11) When the update procedure is finished, the PCC has to be turned off.

12) Remove the application memory from the CPU and set the hardware switch to "OK"

13) Re-insert the application memory into the CPU and apply power again.

14) The PCC is now ready for operation.