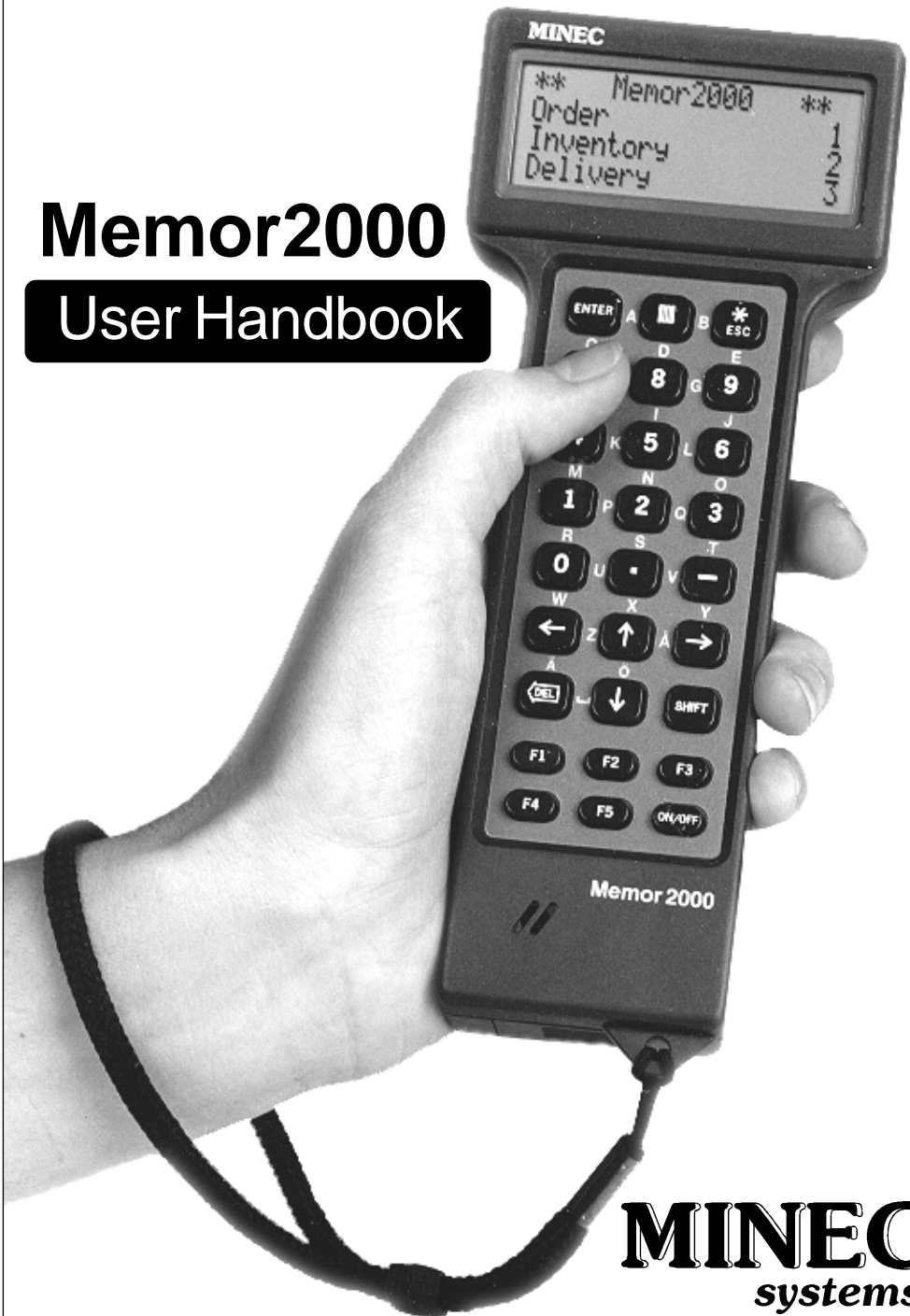


Memor2000

User Handbook



MINEC
systems

Welcome as a Memor2000 user!

The Memor2000, a Swedish-developed hand-held computer, incorporates the latest semiconductor technology. The Memor2000 is functional, compact and ergonomically designed, and sufficiently robust to withstand a wide variety of environments and working conditions.

This handbook provides a general description of your new hand-held computer. We recommend that you read it carefully. In addition to this handbook you will normally have a separate description of your particular application program*.

We are certain you will find your new hand-held computer extremely useful.

* Application program and other terms are explained in the glossary at the end of this handbook.

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NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

1. General information about the Memor2000

On delivery

The Memor2000 is supplied complete with batteries and is ready to use. Once you have taken the computer out of its box, check immediately that there are no visible signs of transport damage.

Getting started

Start by becoming familiar with the various parts of the hand-held computer.

The Memor2000 has an LCD Supertwist display, which means you never have to set the contrast. The characters on the screen can be clearly read in all light conditions and from all angles. The display is fully graphic, which means figures and symbols can also be shown. There is space to display four lines of twenty normal-size characters per line.

The Memor2000 is held and operated by the same hand. Place the computer (still switched off) in the palm of one hand and practice pressing the number keys with your thumb.



The keyboard is presented below. Any special features are described in your application program documentation.

E

This is the equivalent of the ENTER key on an ordinary PC, and is normally used to confirm data or to scroll to the next menu choice.

Arrow keys

Used to scroll forwards and backwards in menus and entered data.

DEL

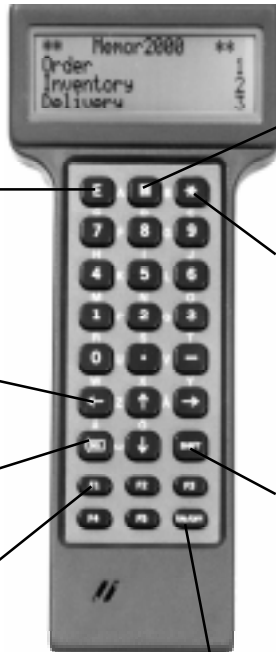
The equivalent of the Backspace-key on an ordinary PC. Erases the previous character.

F1-F5

Function keys that provide different functions depending on the application program.

Letter entering

The method used to enter letters is both simple and unique (patent pending). The required letter is obtained by pressing two adjacent keys at the same time with your thumb. For example, if you wish to enter the letter "K", you will find this letter between key "4" and key "5". You simply press the letter "K". When you do this, adjacent keys "4" and "5" are both pressed, which results in entry of the desired letter.



The key for activating the laser scanner or RFID reader (see Application Modules).

*

This is the equivalent of the Escape-key on an ordinary PC, and is used to discontinue data entry or to return to the previous menu. Simplified you could say that the E-key means "yes" and the *-key means "no".

SHIFT

The shift-key is used to increase the number of functions available. By holding down the shift-key while pressing another key, another function can be obtained.

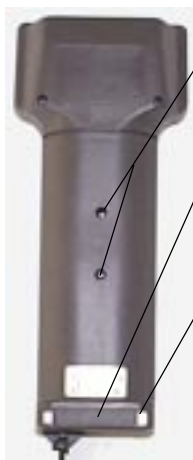
ON/OFF

Press the ON/OFF key to switch the Memor2000 on or off. If no other key is pressed in the space of two minutes, the handheld computer switches itself off automatically to save power. After automatic switch-off the computer is switched on again by using the ON/OFF key. Note: The Memor2000 cannot be switched off while undertaking certain sensitive calculations. In this event wait until the calculation has been completed, after which it will be possible to switch off the handheld computer again as normal. See also "New features..." on page 6.

General information



There are two angled holes below the keyboard. These let out sound from the built-in sounder and should therefore not be covered by the hand.



There are two small black discs on the back of the Memor2000. These are infrared (IR) sensors used to transfer data to and from the docking station (DS-S) which is available as an accessory.

There is a battery compartment cover at the bottom of the hand-held computer's "handle". Section two describes how batteries are replaced.

Charging terminals to be used with rechargeable NiMh batteries may be fitted. Never recharge standard alkalines batteries, chemicals leakage and damage to your computer may result.

An exchangeable peripheral module is fitted at the top of the handle behind the display. This special feature of the Memor2000 is described on the next page.

New features in program update 2.21

CPU update 2.0 with M2DOS 2.21 contains the following new features:

- *The computer can be switched on by pressing any key (except the "Shift" key).
- *The computer can be started up at any time pre-set on the real-time clock.
- The battery warning level is selectable from the menu.
- The computer's software decides, with the aid of the Memor2000's serial number, if the CPU-card is version 2.0 or earlier. Serial numbers starting with 3 are interpreted as a CPU-card older than 2.0. All other numbers are regarded as defining CPU-cards with update 2.0. Make sure that the correct serial number has been stored in your Memor2000.

** Does not apply to Memor2000 models with serial numbers beginning with 3.*

Peripheral modules



As the Memor2000 is a hand-held computer with many different uses, it is designed to be fitted with a number of different exchangeable peripheral modules. On delivery the Memor2000 is fitted with the module that has been ordered. Should your requirements change, the existing module can be replaced by another.

The four most common peripheral modules are:

COM-module



Abbreviation of Communication. This module has a port for connection, via a cable, to a PC-computer, printer, barcode readers, modem etc.

IBW-module



Abbreviation of Integrated Barcode Wand. An extension of the COM-module. In addition to the port, this module has a built-in pen for reading barcodes. There is a red diode on the side of the module that flashes every time a barcode has been successfully read.

LASER-module



A module with a built-in laser scanner that enables you to read barcodes from a distance.

The application description gives detailed instructions on how to use your particular module.

RFID-module

Two different RFID modules for Tag reading are available. Most tag types can be read and written.

2. Battery replacement

The Memor2000 is powered by two standard 1.5 volt AA/LR6 batteries. Alkaline or NiMH (rechargeable) batteries should be used. Alkalines give the longest possible operation between battery replacements.

A warning is provided when batteries are low. There is a beep and the message "LOW BATTERY" appears on the display. You acknowledge the message by pressing any key, after which you can continue working as normal. This message indicates that you should replace batteries at the first suitable opportunity. The length of time the batteries last after the warning depends entirely on the application. However, you can expect about a day's further use.

The message is repeated every time you switch the Memor2000 on or off until you replace the batteries. If you don't replace the batteries it will finally be impossible to switch on the hand-held computer. However, there is no risk that data or programs will be lost. When the main batteries are flat, a built-in back-up battery automatically ensures there is no loss of memory.

Battery replacement - step by step

1. Switch off the Memor2000.
2. Press off the battery compartment cover at the end of the Memor2000.
3. Remove the old batteries and replace with new. Make certain the new batteries are inserted correctly according to the markings in the battery compartment.
4. Press back the battery compartment cover.

Depending on how low the old batteries were, one of the following two things will happen:

1. The Memor2000 remains off after you have replaced the batteries. When the computer is switched on again you will automatically come to the menu that was on the display when you last switched off.
2. The Memor2000 starts up automatically when you close the battery compartment. Your application program goes automatically to the main menu.

Regardless of which alternative occurs, you simply continue working with the computer as usual. Rechargeable batteries are available as an option.

3. Accessories

You may have ordered some of the following accessories together with your Memor2000.

PC-connection cable

This is used to connect the Memor2000 to an ordinary PC. If you have a Memor2000 fitted with a COM-module you should connect the cable to this module. If you have a Docking station you can connect the cable to the Docking station. Your application description tells you how to make the connection, and which port on the PC should be connected.

Modem cable. Printer cable.

This is used in the same way as the PC connection cable, but connects the hand-held computer to a modem or a printer.



Docking Station - (DS-S)

The DS-S eliminates the need to connect and disconnect a cable every time communication takes place. The DS-S is permanently connected to a PC (or modem or printer) via a cable, and the Memor2000 is simply placed in the DS-S when a connection is required.



Barcode readers

A number of external barcode readers can be connected to the COM-module socket, including the Cipherlab 1021 contact scanner and WA6101 barcode wand.



Printers

A number of printers such as the Kyoline MTP640, Extech or PENPLUS are available as accessories.

4. Care and maintenance

The Memor2000 is a top-quality product and normally requires no special maintenance. On the other hand the Memor2000, in common with all other electronic products, should be handled with a certain care.

If you keep the following handling instructions in mind it will be easier to meet guarantee requirements, and at the same time your Memor2000 will give any years' of trouble-free use.

- Don't store the Memor2000 under conditions that are too hot or too cold (limits are +55°C and -20°C). High temperatures can damage the electronics or battery, or deform plastic parts. Low temperatures cause condensation when the hand-held computer warms up to normal temperature, which in turn can damage the electronics.
- Don't attempt to take the Memor2000 apart. Leave all service to qualified service personnel.
- Don't expose the Memor2000 to rain, liquids or damp. The salts in liquids can damage the electric circuits inside the Memor2000. If you suspect that damp has entered the Memor2000 you should remove the batteries and contact a service centre.
- Don't expose the Memor2000 to shocks. Harsh handling can result in damage to internal circuits.
- Never use solvents or similar liquids to clean the Memor2000. Use a slightly damp cloth instead, with a mild soap solution if necessary, to clean the keyboard and display.

5. Troubleshooting

Problem

The application program has frozen or is behaving strangely.

It is impossible to switch on the hand-held computer.

Communication via the DS-S doesn't work.

Action

Restart the program by opening and then closing the battery compartment cover.

Check that the batteries are new and correctly inserted.

Check that the Memor2000 is correctly placed in the DS-S, i.e. that the computer rests against the stops in the DS-S.

6. Technical Specification

PHYSICAL CHARACTERISTICS

Display

4 lines with 20 characters per line at default cell size. LCD supertwist.
Active viewing area 56.35 mm x 20.75 mm.
Dot size 0.42 mm x 0.60 mm.
Dot pixels 120 dots x 32 dots.
Cell size 8 x 6 pixels, at default cell size.
Full graphic capability.

Keyboard

With 27 coated rubber keys.
Alpha characters entered by pressing two adjacent keys.

Size and Weight

L: 186 mm H: 27 mm (H: 31 mm display)
W: 52 mm (W: 77 mm display)
200 grams incl batteries

Operating temperature

-10°C to +45°C

Storage temperature

-20°C to +55°C

Other

Withstands a drop from 1 meter onto concrete. Conforms to EN 50 081-1 and EN 50 082-1.
CE marked

OPERATING CHARACTERISTICS

CPU

NEC V25 at 8 Mhz (instruction compatible with Intel's 8088)

Operating System

M/2-DOS or ROM-DOS

Memory

SRAM 256KB--1MB containing disk and executing area.
3-year battery back-up on all RAM.
FLASH 128 KB--256 KB containing disk and operating system. FLASH can be erased and programmed in system.

Power supply

2 AA/R6 Alkaline battery (rechargeable batteries as an option). 3 to 4 weeks operation in normal use. Power consumption in operation is approx 15 mA (without barcode reading device). Battery is field replaceable without loss of data. Multi stage "battery low" warning system.

Sound

Internal sounder, programmable frequency and duration.

Clock

Real time clock with alarm feature.

Input/Output

Built in IR-link, serial channel COM1:, normally 19.200 BPS, for connection to Docking Station. MiniDIN 8 pin connector (option) COM2:, normally 19.200 BPS, for connection to modem, external barcode reading device, printer and PC. Input RS232 levels. Output 0-5 V CMOS levels.

Barcode reading

Built in IR-barcode wand (option) for left or right hand operation. Built in laser scanner (option).
RFID Tag reading

Peripherals

Docking Station (DS-S) with double RS232 connections. Cordless IR-connection with the handheld computer. Standard printers and modems can be connected either directly or via the DS-S. Barcode reading devices such as wands, CCD scanners or laser scanners can be connected via the MiniDIN connector.

SOFTWARE

Software development

By using a Borland C/C++ compiler, application programs can be fully developed and tested on an ordinary PC. The resulting program is downloaded to the Memor2000 where it can be stored on the RAM-disk or on the FLASH-disk.

Application generator

An application generator (WIN-MAG) is available for the non programmer. With this tool users can easily develop application programs just by defining display pictures and keyboard functions. The WIN-MAG runs on a PC.

Communication

Communication solutions are available for all types of systems, for example well-proven communication programs like EasyLink, MemorLink2 and MemorLink10.

Barcode

Memor2000 offers decoding routines for all common types of barcodes.

Technical Specification

Memor2000 Laser

Light Source

Visible laser diode, 670 +/-10 nm

Optical Resolution

Element width minimum 0.154 mm

Ambient Light

Artificial: 1600 lux

Sunlight: 86000 lux via indirect exposure

Scan Rate

36 +/-3 scans/sec

Minimum Print Contrast

25% absolute dark/light reflectance at 670 nm

Orientational Tolerance

Pitch +/-55° minimum

Skew +/- 65° minimum

Specular Dead Zone +/- 2°

Size and Weight

L: 186 mm H: 27 mm (H: 38 mm display)

W: 52 mm (W:77 mm display)

260 grams incl batteries

Memor2000 IBW

Optical Resolution

0.19 mm

Light Source

655 nm (red)

Ambient Light

Maximum 100.000 lux

Depth of field

1.0 mm

Tilt angle

Maximum +/- 40°

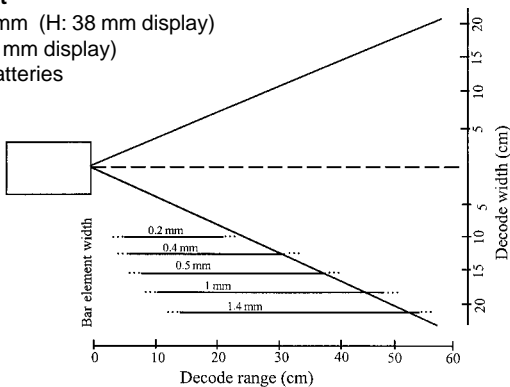
Preferred 10° to 30°

Size and weight

L: 186 mm H: 27 mm (H: 31 mm display)

W:52 mm (W: 77 mm display)

230 grams incl batteries



Other resolutions and ranges available.

7. Glossary

Application program

The Memor2000 is a computer, just like a PC. A computer program is written for each specific application (called the application program). This program, or software, determines what happens to the data that is entered, how communication takes place, etc.

Display

This is the rectangular window above the Memor2000 keyboard which shows the menus.

Exchangeable peripheral module

An exchangeable peripheral module is fitted behind the Memor2000 display. This module contains electronics that vary depending on the particular application. The appearance of the module also varies. See section 1, Application Modules.

Infrared (IR) communication

Communication where data is transferred as short pulses of infrared light. Infrared light is invisible but completely safe.

LCD

Liquid Crystal Display. This is a modern display that contains a liquid that darkens when a voltage is applied. Small dark dots (pixels) are used to build up characters.

Modem

Abbreviation of MOdulator/DEModulator. This unit converts (modulates) data into sound signals that can then be transferred via the ordinary telephone network.

PC

Abbreviation of Personal Computer. A general term for all computers that follow the IBM computer standard.

Semiconductor technology

The technology used in the electronics industry to produce modern electronic components.

8. Appendix

BIOS Menu

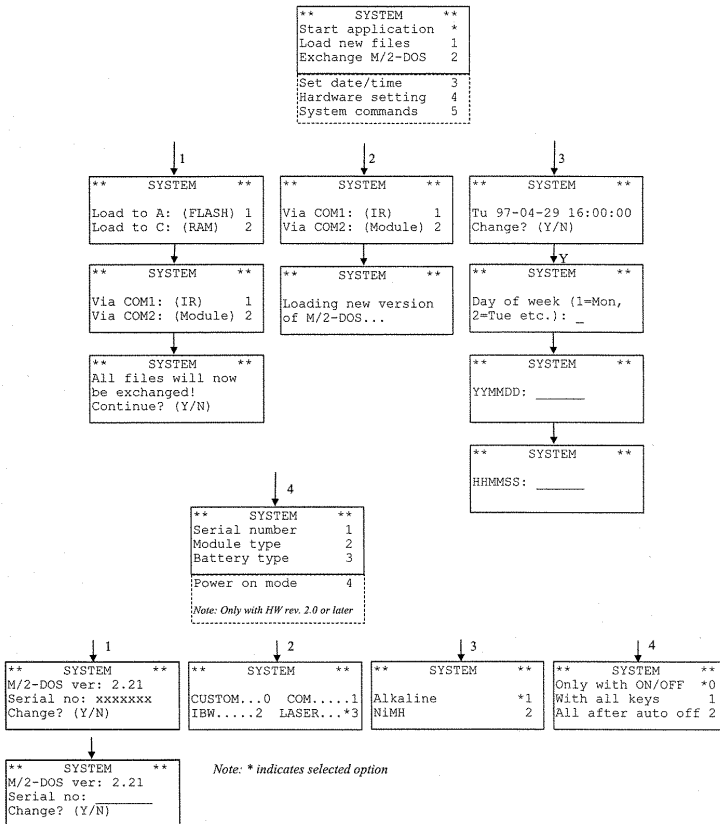
This is where you get access to the system settings. These functions should be operated by the system manager. To enter the system menu: Restart the computer by opening and then closing the battery compartment cover. Press the F1 key once during the 2 second start up picture.

System menu

To enter the system menu:

Restart the handheld by opening and then closing the battery compartment cover.

Press 'F1' key during the 2 second start up picture.



9. New menu functions

Under ****System**** hardware settings:

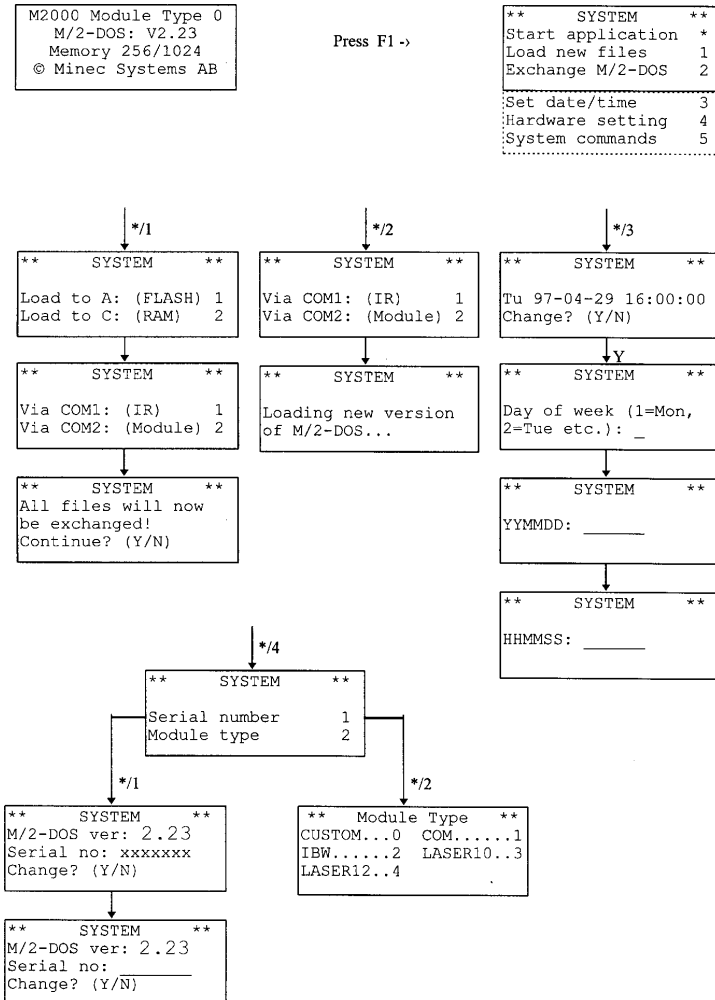
- The **serial number** is used to determine if a CPU-card with update 2.0 is fitted. In menus with selections, the symbol * denotes which alternative is applicable.
- The **module** selection "None" has been replaced by "Custom". In this position the DTR, RTS, DCD and DSR can be freely controlled from the application software.
- **Battery type**. Either "Alkaline" or "NiMH" can be selected. If "NiMH" has been selected, the battery-low warning is given at a lower voltage.
- ***Power-on mode (4)**. There are three alternative ways to switch on the Memor2000:
 - "Only with ON/OFF". The Memor2000 can only be switched on by pressing the ON/OFF key.
 - "With all keys". The Memor2000 can be switched on by pressing any key except SHIFT.
 - "All after auto off". The Memor2000 can be switched on by pressing any key, but only following automatic switch-off after time-out.

** Does not apply to Memor2000 models with serial numbers beginning with 3.*

BIOS M/2-DOS version 2.23

M/2-DOS version 2.23 has been developed so the SE1223 laser scanner can be used. Texts in the system menu have been changed slightly to facilitate settings that depend on the type of module fitted. The label on each module indicates the setting to select. Module type 4 is the setting for laser scanner SE1223, for example. Select from the "Module Type" menu as shown below.

To access the system menu, open and close the battery cover, then press F1 within 2 seconds.



IrDA Communication

The Memor2000 can be equipped with a module containing an IrDA interface. This interface enables the Memor2000 to communicate cordlessly (using infrared light) with other equipment fitted with an equivalent interface, such as a PC, printer or cellular mobile phone. For communication via IrDA to function correctly, the application program in the Memor2000 must be suited to the IrDA module.

There are a number of IrDA standards. The Memor2000 fulfils:

- Hardware (range, angles etc.) conforms to IrFYS (IrSIR max 38,400 bps).
- Software supports IrLAP 1.1, IrLMP 1.1, TinyTP 1.1 and IrCOM 1.0.

The Ir-interface fitted as standard to the Memor2000 does not conform to the IrDA standard.

Using IrDA

As an IrDA connection employs infrared light, an unobstructed line of sight is required between the Ir-windows of the different units. Ir-windows also have a limited angle of vision, about 30°, so it's important to site the units correctly. Best results are achieved at a distance of 5 to 20 cm between units, and the smallest possible angle of deviation, although communication is possible up to a distance of 1 metre.

The drawing gives an idea of the IrDA operating angle from the Memor2000. Note that the Ir-window in the module is angled slightly downwards.

Troubleshooting

If the IrDA link doesn't work, the reason may be among the following:

- Bright ambient light (sunlight, fluorescent light etc.) can sometimes dazzle the IrDA receiver.
- The beam of IrDA light is interrupted by some object.
- The distance between the Ir-windows is too great.
- The angle between the Ir-windows is incorrect.
- The Ir-windows are dirty, scratched or damaged.
- Interference from another Ir-source (TV remote-controller etc.).
- Software in the two units is not compatible.