

## PCMCIA/JEIDA CARD READER/WRITER WITH SCSI INTERFACE

The MCDISK-E (Memory Card Disk) is a two slot card reader/writer for PCMCIA/JEIDA compatible memory cards. Two card slots allow for simultaneous use of memory cards. The MCDISK-E can handle a wide variety of cards of any size: SRAM, ROM, OTP, E(E)PROM, FLASH, I/O and PC-ATA disks. To interface those cards to the host equipment it has an SCSI interface. The SCSI interface is widely used for connecting mass storage devices like hard disks to microcomputers.

A memory card can be thought of as an extremely fast disk storage device, because there are no latencies for moving mechanical parts like read/write heads. In all other aspects however, a disk device and a memory card are much the same. The MCDISK-E exists in two versions. The first one is equivalent to a 3.5" Floppy drive which can be easily incorporated into OEM products. The second one is a desktop case with built-in power supply for easy connection to all computers with a SCSI interface. However, although the reader/writer device is compact and economically priced, no concessions have been made in its performance. It provides a fully professional yet highly economic solution to demands for data storage in harsh environment. This makes the MCDISK-E ideal for use in many industrial and business applications with SCSI data input and/or output.

### TECHNICAL FEATURES

- Size and mounting compatible to 3.5" floppy disk drive (open-frame with 1" height) for MCDISK-E-1
- Desktop case for horizontal or vertical mounting for MCDISK-E-5
- Interfaces PCMCIA/JEIDA Memory Cards to any system with a SCSI interface
- Double card slot
- Separate SCSI ID for each slot can be configured
- SRAM, ROM, OTP, E(E)PROM, FLASH and I/O card support
- PC-ATA disk support
- Card sizes 512 Byte up to 64 MByte (PC-ATA: 4 GByte)
- Powerless card inserting of PCMCIA cards
- Memory card types I, II and III are supported
- Supports direct access to entire memory card (raw access)
- Hybrid card (mixed memory types) and multiple partition support
- All PCMCIA operations handled automatically by the unit
- Built-in socket and card services feature transparent access to card data for PCMCIA-unaware host systems
- High data security through block check capability
- Local 68HC11 processor
- SCSI-2 interface with a WD 33C93 SCSI controller
- Standard SCSI command set
- Low power consumption, typ. 120mA (no card inserted)
- Fast 2 Mbytes/s transfer rate



### References :

MCDISK-E-1 Open frame Reader/Writer for JEIDA/PCMCIA Memory Cards +5V / +12VDC

MCDISK-E-5 Desktop case Reader/Writer for JEIDA/PCMCIA Cards 100-240VAC / 50-60 Hz

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## INTRODUCTION

### I. ABOUT THIS MANUAL

This manual is written for use by technical personnel responsible for integrating the MCDISK-E reader/writer into their system. The manual assists the installation procedure by providing the information necessary to handle, configure and mount the MCDISK-E reader/writer.

The MCDISK-E reader/writer is designed to work with most host systems which are fitted with an SCSI interface. It is a simple procedure to set up the unit, nevertheless, before attempting any installation, please read through all applicable sections of this manual and follow the instructions herein.

The following publications relate closely to this product and supply information about PCMCIA and SCSI interface. For those involved in writing drivers or special applications that directly interface to the MCDISK-E, a Technical Reference Manual provides information required to drive the MCDISK-E on the SCSI command level.

- MCDISK Technical Reference Manual (supplied by MPL AG or your local MCDISK supplier). The MCDISK Technical Reference Manual is also available on the internet under "<http://www.mpl.ch>" in PDF format.
- PCMCIA PC Card Standard (July 1993, Release 2.1)
- ANSI SCSI-2 Standard (X3.131-199x, Revision 10h)

### II. SAFETY PRECAUTIONS AND HANDLING

For personal safety and safe operation of the MCDISK-E, follow all safety procedures described here and in other sections of the manual.

- Power must be removed from the computer system before installing (or removing) the MCDISK-E reader/writer to prevent the possibility of personal injury (electrical shock!) and/or damage to the unit.
- Handle the unit carefully, i.e. dropping or mishandling the read/write unit can cause damage to internal assemblies.
- Read and follow all the instructions and warnings described herein.
- Keep the MCDISK away from all sources of liquids, such as coffee cups, drinking glasses, washing facilities etc.
- Protect the MCDISK from damp or wet weather.

- Keep this manual available for reference.

For your protection and that of your MCDISK disconnect the power input immediately if any of the following conditions exists:

- The power input cable has been damaged.
- Something has been spilt onto the case.
- The MCDISK has been damaged in any way, e.g. through dropping.
- The MCDISK has been exposed to excess moisture or rain.
- You suspect that the unit requires servicing or repair.



**WARNING:** There are no user-serviceable components on the MCDISK-E!

### III. EQUIPMENT SAFETY

Great care is taken by MPL that all its products are thoroughly and rigorously tested before leaving the factory to ensure that they are fully operational and conform to specification. However, no matter how reliable a product, there is always the remote possibility that a defect may occur. The occurrence of a defect on this device may, under certain conditions, cause a defect to occur in adjoining and/or connected equipment. It is the users responsibility to ensure that adequate protection for such equipment is incorporated when installing this device. MPL accepts no responsibility whatsoever for such kind of defects, however caused.

## 1. COMMON FOR ALL MCDISK-E

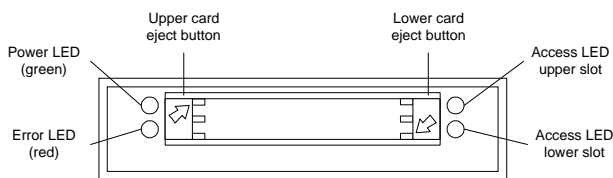
### 1.1 COMPATIBILITY

MCDISK-E operates with various system platforms using standard driver software. Some host systems do not fully support MCDISK-E and require special driver software. MPL AG provides a "Technical Note for MCDISK" that reflects the actual status of software support for different host systems. Additionally, this Technical Note lists PCMCIA card type compatibility tests performed by MPL AG or MCDISK users.

### 1.2 OPERATION

This chapter provides information about the use of the PCMCIA cards and the LED indicators.

The illustration below identifies the items visible on the front panel of the MCDISK-E.



**Fig.1.2: Front view**

### 1.3 PCMCIA CARD TYPES

The MCDISK-E has been designed to accept three different PCMCIA card types:

- Type I: Thickness 3.3 mm, no raised substrate area
- Type II: Thickness 5.0 mm, 48 mm wide raised substrate area
- Type III: Thickness 10.5 mm, 51 mm wide raised substrate area

The lower card slot accepts all three types of cards. Due to the front panel cutout, the upper card slot only accepts type I and II cards.

Type I and II cards can be inserted simultaneously in the lower and upper slot. Type III cards must be inserted in the lower slot, likewise occupying the space of the upper slot.

### 1.4 CARD HANDLING

Follow the instructions as described in this section when inserting and ejecting PCMCIA cards. Refer to Figure 5 to locate indicated items.

#### 1.4.1 INSERTING A CARD

When inserting a card into one of the card slots of the MCDISK-E, care must be taken to ensure that the card is inserted correctly. Follow these steps to insert the card:

1. Orientate the memory card so that the printed surface (e.g. with manufacturer name/logo) is up and the 68-pin connector points towards the MCDISK-E card slot. Note that some cards have an arrow indicating direction of insertion.
2. Insert the card into the slot. It should slide easily into the slot until approx. 15 mm remain exposed and the card comes to a soft stop. At this point gentle pressure is required to make the final connection between the memory card and the card slot connector.  
If the card comes to a sudden stop earlier than described above, do not press any further! Key guides on the card and in the card slot ensure that the card cannot be fully inserted (does not reach the connector) when inserted in the wrong way! Remove the card, check orientation and try again.
3. When the card is fully inserted a small portion of the card will remain exposed from the card slot opening. The red LED on the front of the MCDISK-E will go off indicating that the card is present. If the red LED remains lit then the card has not been inserted correctly or cannot be operated by the MCDISK-E (e.g. bad card type).



**WARNING:** Do NOT use excessive force to overcome any resistance when inserting the card. This should not be necessary and will severely damage both the card and the MCDISK-E.

### 1.4.2 EJECTING A CARD

Each card slot has its own card eject button. The eject button at the left hand side of the card slots serves the upper card slot, the eject button on the right hand side the lower card slot. Arrows are printed on the eject buttons that point to the card slot they serve.

To remove the PCMCIA card push the corresponding eject button. The card is released from the connector inside and it may now be pulled free.

**CAUTION:** Do NOT attempt to pull the card free without first pressing the card eject button!

Do NOT attempt to remove the card when the yellow LED is lit (see also next section)!

**WARNING:** Avoid the situation where foreign objects, dust, liquids etc. can enter the MCDISK-E through the card slot opening. This can cause severe damage.

## 1.5 LED INDICATORS

The MCDISK-E is equipped with four LED indicators. Refer to Figure 1.2 for the location of the indicators.

### 1.5.1 BASIC INDICATIONS

The green LED (upper left hand side) is the power indicator. It is lit whenever the unit is turned on.

The yellow (right hand side) LEDs are the access indicators for the upper and lower slot. They are illuminated whenever an access to the memory card in the corresponding slot takes place.

#### Don't eject the PCMCIA card when the yellow LED is lit!

The red (left hand side) LED is the status indicator. It is illuminated when the MCDISK-E is not operable due to one of the following reasons:

- There is no card inserted. If a card is inserted correctly, the red LED will go off.
- There is a card inserted, but it cannot be accessed by the MCDISK-E. Such errors can have various causes: the unit is attempting to write to a write-protected or read-only card, unknown I/O card, hardware error on a memory card, etc.

During start-up (power up or SCSI bus reset), the MCDISK-E performs some internal self tests. When everything is okay, the red and both yellow indicators will flash twice simultaneously to indicate proper start-up and proper SCSI connection.

### 1.5.2 ERROR SIGNALLING

In case of an error, the red and both yellow indicators will show a diagnostic status:

- All three indicators remain unlit: Ensure that the unit is connected correctly to a powered SCSI bus. Likewise the unit cannot start-up when the SCSI bus is not or not correctly terminated (TERMPWR OK?). If the SCSI bus is okay and the indicators still remain unlit, there may be a hardware problem and the unit requires service.
- All three indicators flash only once and then remain unlit: The internal RAM test has failed. The unit requires service.
- The error LED flashes repeatedly: There is a SCSI hardware problem.
- The error LED double-flashes repeatedly: This indicates a severe SCSI bus protocol error that prevents the MCDISK from continuing SCSI operation. The MCDISK needs to be reset to recover from this error. If the error is permanent, check SCSI cabling, terminators and SCSI ID's.
- The error LED triple-flashes repeatedly: The ROM contents are not okay. The unit requires service.
- The LEDs show some other pattern than those listed above: There is a serious hardware problem, and the unit needs to be returned to your local MCDISK-E supplier for repair.

## 1.6 DRIVER SOFTWARE

If your MCDISK supplier has provided a driver software package with your MCDISK-E, this must be loaded on the host computer before commencing to work with the MCDISK-E. Follow the instructions provided with the driver and/or the procedures laid down for installing software on the host computer provided in the host computer documentation. If you have an Internet access you can visit our Web site at

<http://www.mpl.ch>

There you will find different tools, drivers and additional documentation especially for MCDISKS.

## 2. MCDISK-E-1 OPEN FRAME

### 2.1 SPECIFICATIONS

#### Performance:

Transfer rate	2.5 MByte/sec
Average throughput with SRAM card	2.0 MByte/sec
Latency	0 ms

#### Interfaces:

SCSI standard	SCSI-2
SCSI bus connector	50-pin/male ribbon
SCSI bus configuration	8-bit/single-ended
PCMCIA standard	Release 2.1
PCMCIA card slots	2
PCMCIA card types	Type I - III

#### Power Requirements (without card):

+5 VDC (+/- 5%)	120 mA
+12 VDC (+/- 5%)	depends on card, min. 1mA

#### Operating Environment:

Temperature	0°C ... 70°C
Extended temp. (opt.)	-25°C ... +70°C
Relative humidity (non-condensing)	10% ... 90%

### 2.1.1 PHYSICAL DIMENSIONS

Height	25.4 mm (1.0")
Width	101 mm (4.0")
Length	145 mm (5.75")
Front panel thickness	3.0 mm (0.12")
Weight	0.25 kg (0.55 lbs)

### 2.2 ELECTROSTATIC DISCHARGE (ESD) PROTECTION

Various electrical components within the read/write unit are sensitive to static and electrostatic discharge (ESD). Even a non-sensible static discharge can be sufficient to destroy or degrade a component's operation.

Following the precautions listed below will avoid ESD-related problems:

- Use a properly installed antistatic pad on your work surface.
- Wear wrist straps and observe proper ESD grounding techniques.
- Leave the unit in its antistatic cover until you are prepared to install it in the system. When it is out of its protective cover, place the unit on the properly grounded antistatic work surface pad.



Do not touch any components on the read/write unit. Handle or touch only the unit chassis.

### 2.3 SET-UP

This chapter provides the information required to configure the MCDISK-E reader/writer. It describes the setting of the SCSI ID, local features and configuring the SCSI termination characteristics.

If you have any doubts on configuration, contact your MCDISK-E supplier or an authorized dealer of your host computer.



**WARNING:** Before you begin, review and observe the safety precautions described at the beginning of this manual to avoid personal injury or damage to equipment.

#### 2.3.1 SET-UP OVERVIEW

Set-up of MCDISK-E-1 is a step by step procedure:

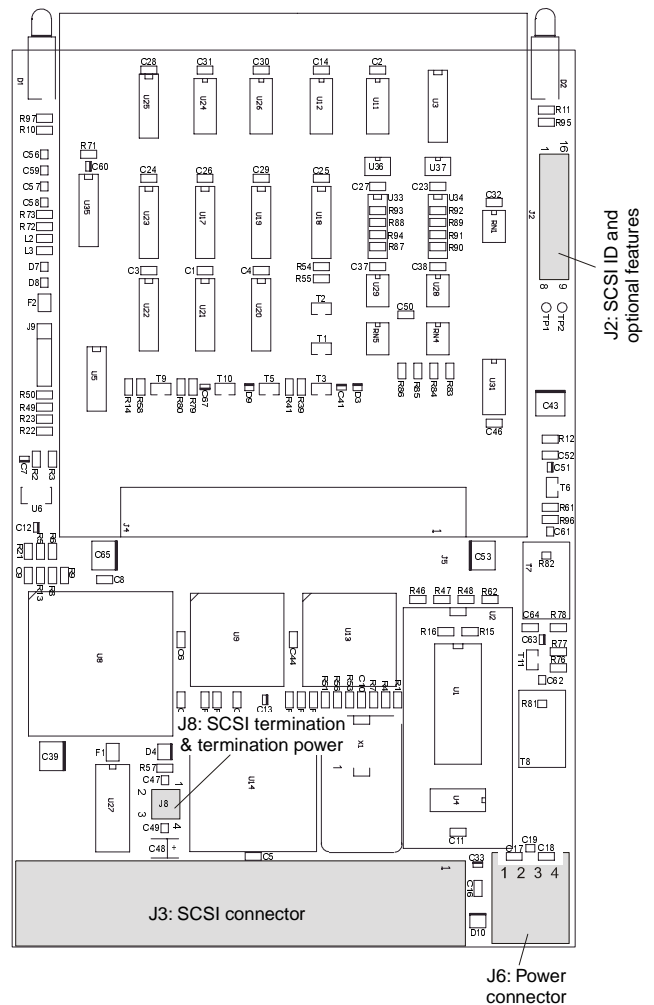
1. Remove the drive from its packing and place it on an appropriate antistatic work surface, following the ESD precautions described in the beginning of this manual.
2. Set the unit's SCSI ID and optional features.
3. Terminate the SCSI bus if required.
4. Mount the unit in the system (see chapter 2.6).
5. Connect DC power and SCSI bus to the unit (see chapter 2.5).

The default factory settings are as follows:

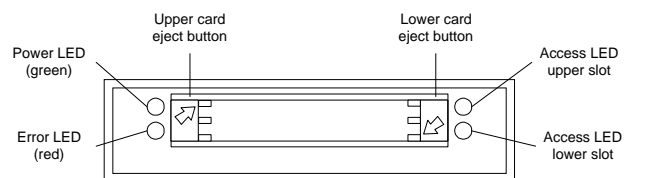
- SCSI ID = 3
- Parity disabled
- Single SCSI ID
- Full CIS mode
- Termination enabled
- Termpower enabled

#### 2.3.2 PARTS LOCATIONS

The following figures show the location of the configuration jumper, connectors, termination resistors as well as a view of the front panel with its indicator LEDs.



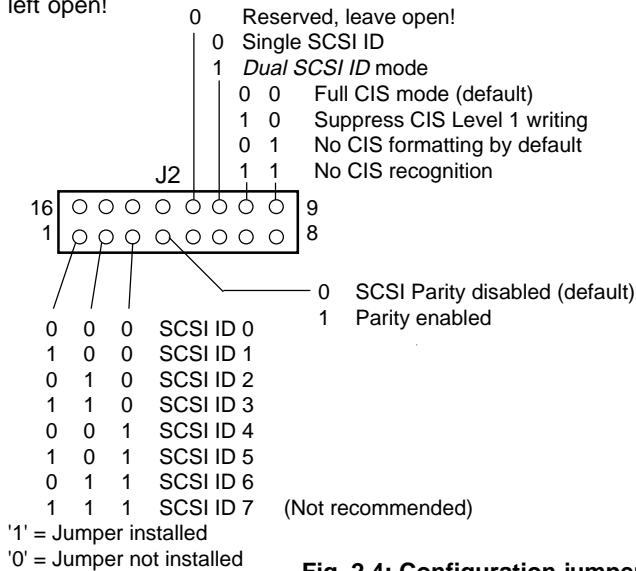
**Fig. 2.3.2.A: Parts location**



**Fig. 2.3.2.B: Front view**

## 2.4 SCSI ID AND OPTIONAL FEATURES

The configuration jumper (J2, refer to figure 2.3.2.A) selects the SCSI ID and the optional features SCSI parity and CIS mode. Note that one jumper position is reserved and must be left open!



**Fig. 2.4: Configuration jumper**

### 2.4.1 SCSI ID

Each device on the SCSI bus must have a unique SCSI ID number. The numbers range from 0 .. 7 which allows for a maximum of eight SCSI devices on the bus. Before setting the SCSI ID for MCDISK-E, an ID must be chosen that is not yet used by other SCSI devices. Usually, most host computer systems already use SCSI ID 0 (internal SCSI hard disk drive) and SCSI ID 7 (host computer itself). Check the documentation of the host computer and the attached peripheral SCSI devices to verify the available SCSI ID numbers.



**WARNING:** Ensure that each SCSI device has a unique SCSI ID number. If not, serious corruption of data and/or failure of the host computer may result!

### 2.4.2 DUAL SCSI ID FEATURE

Note that this feature is available with Firmware V3.3 and newer only.

When J2 6-11 is closed, the MCDISK-E provides accessing each slot through a separate SCSI ID. This is useful for systems with standard SCSI driver software. When the *Dual SCSI* feature is selected, the MCDISK-E occupies a second SCSI ID which is one higher than the SCSI ID selected with the jumpers (see chapter 2.3.1), but only if the selected ID is less than 6. If the selected ID is 6 or 7, the *Dual SCSI* feature is disabled.

## 2.4.3 OPTIONAL FEATURES

Two optional features can be configured at J2: SCSI parity and CIS mode (refer to figure 2.3).

The SCSI parity configuration of the MCDISK-E should match that of the host computer. Check the host computer documentation to verify its setting. On delivery, the MCDISK-E's parity is disabled which should be OK for most system integrations. The parity can be enabled by installing a jumper across the referenced pins.

PCMCIA/JEIDA cards supporting CIS (Card Information Structure) can be automatically identified by the MCDISK-E. On delivery, CIS mode 00 (both jumpers not installed) is set and should not need to be changed. Very special applications might require a different CIS mode. In such a case, refer to the corresponding sections in the 'MCDISK Technical Reference Manual' first.

## 2.5 TERMINATION

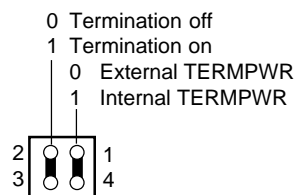
### 2.5.1 SCSI BUS TERMINATION

Both ends of the SCSI bus cable must be terminated. Generally, one end is terminated at the host computer. The other end must be terminated by the last SCSI device on the SCSI bus.



**WARNING:** Ensure that no more than two devices on the SCSI bus are terminated. Otherwise serious corruption of data and/or damage to the SCSI bus devices may result!

When the MCDISK-E is the last device on the SCSI bus, it must be terminated by installing pin 2-3 of jumper J8.

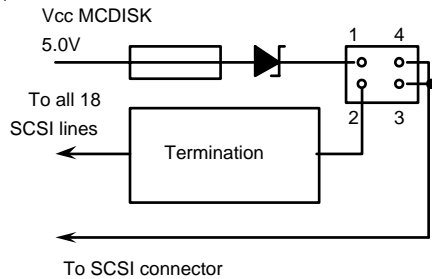


### 2.5.2 TERMINATOR POWER (TERMPWR)

Generally, the host computer is the only device on the SCSI bus required to provide termination power for the bus. In special cases like some notebooks it's necessary to supply the termination power via a peripheral device. If the MCDISK-E is jumpered correctly, it can be used to supply the termination power to the SCSI bus.

The MCDISK-E contains internal components to provide Active Termination of the SCSI bus. Compared to Passive Termination, Active Termination is far less sensitive to TERMPWR voltage variations, which, amongst other things, increases data security.

Figure 2.5.2 shows the terminator circuit as used on the MCDISK-E:



**Figure 2.5.2: Active termination**

If the MCDISK is the only device with an active termination, it is recommended to connect it at the end of the chain.

## 2.6 MOUNTING

This chapter provides the procedure for mounting and fixing the read/write unit.



**WARNING:** Before commencing, verify that the host system is switched off and disconnected from the mains power. Review and observe the safety precautions described at the beginning of this manual to avoid personal injury or damage to equipment.

## 2.6.1 GENERAL HINTS

You can mount the MCDISK-E in any position. The read/write unit's placement must permit sufficient airflow to ensure that it operates within the environmental limits listed in Chapter 1 under 'Specifications'.

Depending upon your specific system, you may wish to attach the power and SCSI cable before mounting the unit in the system. In such a case, read Chapter 2.8 first.

## 2.6.2 HARDWARE REQUIRED

The MCDISK-E-1 can be installed in a 3.5" bay or any custom manufactured support with only four M3 screws. Typically, screw length is 6 mm, but can vary depending upon enclosure or support thickness.



**CAUTION:** Ensure that screws used to mount the read/write unit do not extend beyond the frame into the PCB cavity, otherwise damage to the PCB may result.

## 2.6.3 MOUNTING THE UNIT

The MCDISK-E is equivalent (in size and mounting) to a standard 3.5" slim-line floppy disk drive. In most cases, this simplifies the installation of the read/write unit. To mount the unit:

- Position the unit in the 3.5" bay (and the enclosure cutout) and gently move it until the four screw holes are aligned.
- Insert and secure the screws at these locations.

## 2.7 POWER AND SCSI BUS CONNECTION

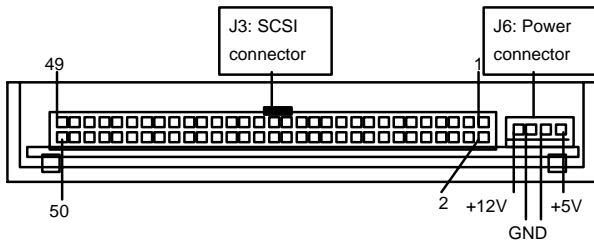
This chapter provides directions for connecting the SCSI bus cable and the power cable to the MCDISK-E.



**WARNING:** Before you begin, review and observe the safety precautions described at the beginning of this manual to avoid personal injury or damage to equipment.

### 2.7.1 SCSI BUS CONNECTION

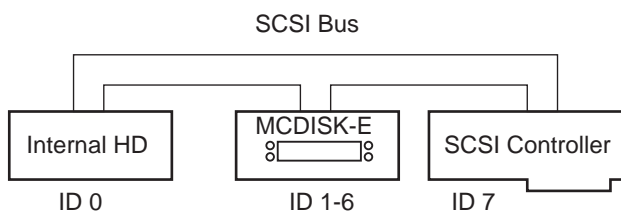
The SCSI bus connector J3 is located at the rear of the unit. It accepts 50-pin flat ribbon cables with a standard female connector. When connecting the SCSI bus cable to connector J3, carefully align both connectors to avoid bending or damaging the connector pins.



**Fig. 2.7.1: Rear view**

### 2.7.2 SCSI Chain

The following figure shows a typical SCSI connections.



**Fig. 2.7.2 SCSI chain**

### 2.7.3 POWER CONNECTION

The MCDISK requires a power input of +5 VDC (+/- 5% , typ. 120mA) and +12VDC (±5%, min. 1mA). When providing power for the unit, take into account the additional current consumption of the cards to be used!

The power connector J6 is located at the rear of the unit. This 4-pin keyed connector accepts standard connectors of various manufacturers. The pin-out of connector J6 is shown in Figure 2.7.1.

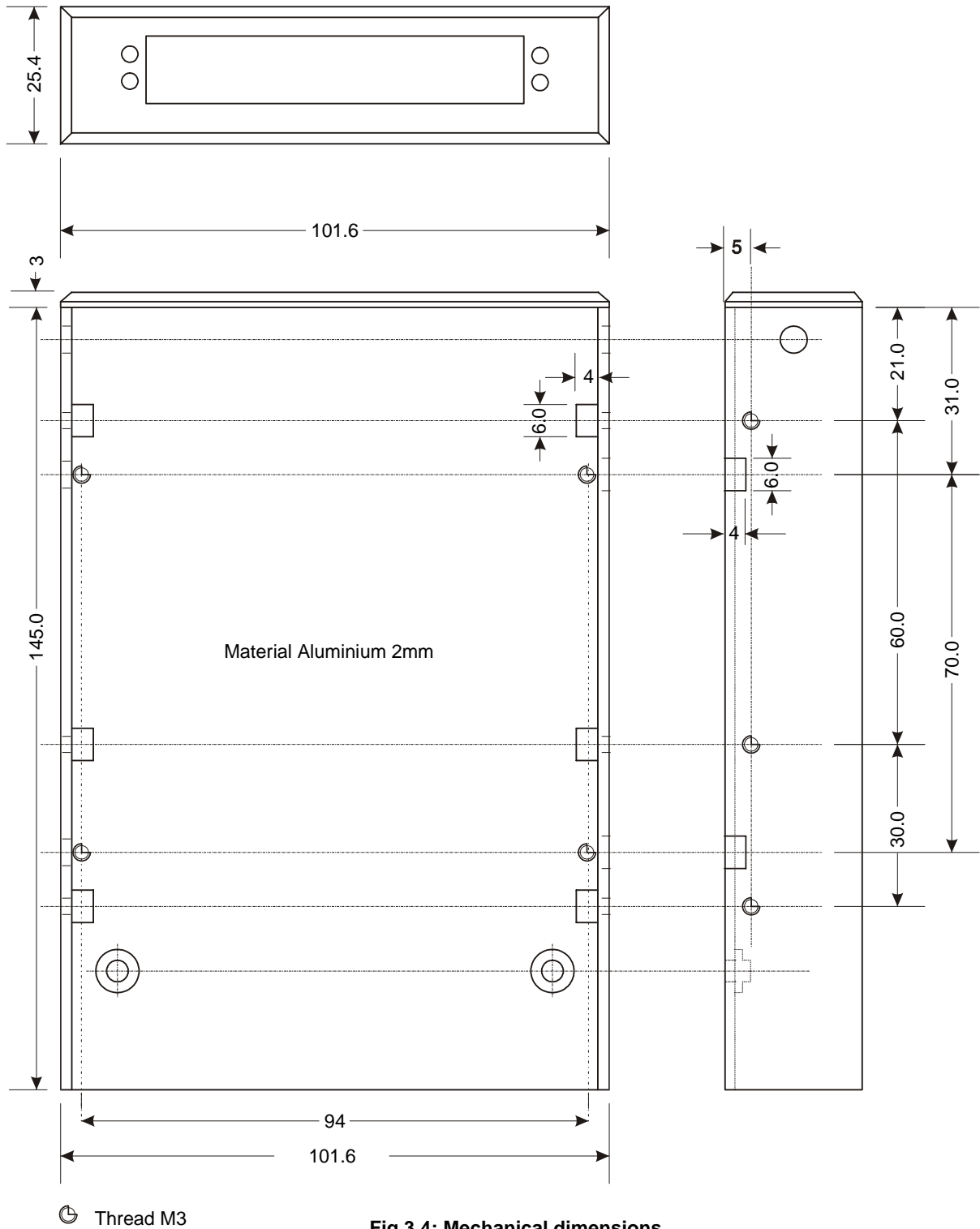
## 2.8 DC VOLTAGE MONITOR

The MCDISK-E monitors the voltage level of the +5 VDC supply. The unit resets/runs at the following voltage levels:

- 4.70 VDC: In power-up, the +5 VDC supply has to rise above this level, otherwise MCDISK-E stays reset and will not operate.
- 4.45 VDC: If the voltage drops below this level, the unit resets.

**2.9 MECHANICAL DIMENSIONS**

Figure 3.4 shows the unit frame including front panel, with mounting locations and dimensions indicated.



**Fig.3.4: Mechanical dimensions**

### 3.MCDISK-E-5 DESKTOP VERSION

#### 3.1 SPECIFICATIONS

**Performance:**

Transfer rate	2.5 MByte/sec
Average throughput with SRAM card	2.0 MByte/sec
Latency	0 ms

**Interfaces:**

SCSI standard	SCSI-2		
SCSI connectors	2		
SCSI bus connectors	50-pin	delta	ribbon
connectors			
SCSI bus configuration	8-bit/single-ended		
PCMCIA standard	Release 2.1		
PCMCIA card slots	2		
PCMCIA card types	Type I - III		

**Power Requirements**

100-240VAC / 15W max. 50-60 Hz.

**Operating Environment:**

Temperature	0°C ... 70°C
Relative humidity (non-condensing)	10% ... 90%

#### 3.1.1 PHYSICAL DIMENSIONS

Height	56 mm (1.42")
Width	179 mm (4.32")
Lenght	215 mm (5.46")
Weight	0.43 kg (0.95 lbs)

#### 3.2 RADIO AND TELEVISION INTERFERENCE

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 or 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 which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded cables and I/O cords must be used for this equipment to comply with the relevant FCC and CE regulations.

This equipment has also been tested for CE conformity. It complies to the following standards:

- EN 55022: 1994 (Class B)
- EN 50082-1: 1992
- IEC 1000-4-2: 1995
- IEC 1000-4-3: 1995 (incl. ENV 50204)
- IEC 1000-4-4: 1995

Changes or modifications not expressly approved in writing by MPL AG may void the user's authority to operate this equipment.

### 3.3 SET-UP

This chapter provides the information required to configure the MCDISK-E reader/writer. It describes the setting of the SCSI ID and configuring the SCSI termination. If you have any doubts on configuration, contact your MCDISK-E supplier or an authorized dealer of your host computer.



**WARNING:** Before you begin, review and observe the safety precautions described at the beginning of this manual to avoid personal injury or damage to equipment.

#### 3.3.1 SET-UP OVERVIEW

Set-up of MCDISK-E-5 is a step by step procedure:

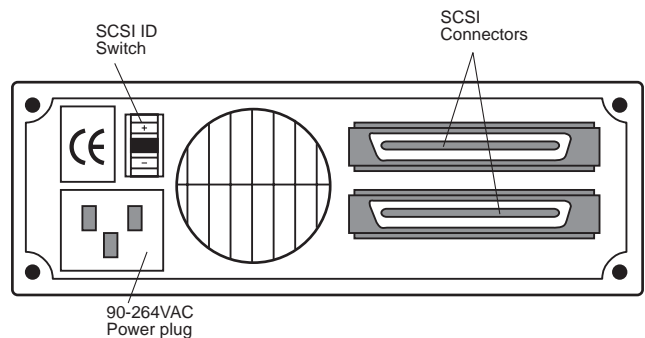
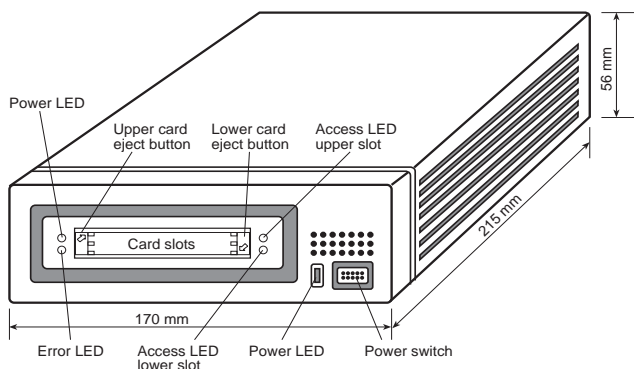
1. Remove the drive from its packing.
2. Set the unit's SCSI ID (see chapter 3.3.3).
3. Terminate the SCSI bus if required (see chapter 3.4).
4. Connect the unit to the host computer
5. Connect the AC power and switch the unit on.

The default factory settings are as follows:

- SCSI ID = 3
- Parity disabled
- Single SCSI ID
- Full CIS mode
- Termination enabled
- Termpower enabled

#### 3.3.2 PARTS LOCATIONS

The following figures shows the location of the SCSI ID pushwheel, power supply and SCSI connector as well as a view of the front with the power switch, the LEDs and the card slot.



#### 3.3.3 SCSI ID

In the desktop case only the SCSI ID is available via a pushwheel on the rear panel. Through simple pressing with a pencil or something similar on the + or - button the SCSI ID can be changed. All other changes or features must be done the same way as in the open frame case. Please refer to chapters 2.3 and 2.4 for detailed information.

#### 3.4 TERMINATION

##### 3.4.1 SCSI BUS TERMINATION

Both ends of the SCSI bus cable must be terminated. Generally, one end is terminated at the host computer. The other end must be terminated by the last SCSI device on the SCSI bus.



**WARNING:** Ensure that no more than two devices on the SCSI bus are terminated. Otherwise serious corruption of data and/or damage to the SCSI bus devices may result!

When the MCDISK-G-5 is the last device on the SCSI bus, it must be terminated by installing a terminator on one SCSI connector or by installing the corresponding jumper in the device. For a detailed description refer to chapter 2.5.1 "SCSI bus termination" (open frame version).

#### 3.5 OPTIONAL FEATURES

All optional features like Dual SCSI, special CIS mode and SCSI parity must be done the same way as in the open frame version. Please refer to chapter 2.4.

#### 3.6 MECHANICAL DIMENSIONS

Please refer to chapter 3.3.2 "Parts Location" .

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