PCCARD

The PCCard module is a PC/104-*PLUS* Card that provides the 16 Bit PC Card™ - or CardBus™ PC Card interface to an industrial PC with PC/104-*PLUS* interface. The PC Card interface is very flexible and there are a lot of manufacturers on the market which deliver many different PC Cards with many different functions.
There are two standard variants of the PCCard module available:

PCCard -M:	Special form factor for manufacturing into a MPL PIP, without ZV-port and 3.3V switching regulator.
PCCard -P:	PC/104-*PLUS* form factor for all PC/104-*PLUS* compatible PCs, with 3.3V switching regulator, without ZV-port.

At the publication date of this manual, the following MPL products are supported:

- PIP405, PIP5, PIP6, PIP7, PIP8, PIP9
- MIP405

This document describes the PCCard module. Its purpose is to give all the needed information to set up and install the board successfully.

Features

- PC/104-*PLUS* compatible
- 2 PC Card Slots
- 3.3V / 5V PC/104-*PLUS* Bus voltage
- 3.3V / 5V PC Card / CardBus voltage
- Supports 8 / 16 Bit PC Cards and CardBus PC Cards (32Bit PC Cards)
- Supports legacy ISA interrupts
- Activity LED (only PCCard-P)
- On Board 3.3V switching regulator (optional)
- Supports ZV-port (optional)
- For bigger order quantities several assembly options are available. Please feel free to contact MPL AG for further information.

TABLE OF CONTENTS

1. INTRODUCTION

1.1 ABOUT THIS MANUAL

This manual provides all the information necessary to handle and configure the PCCard.
The manual is written for technical personnel responsible for integrating and using the PCCard into their systems.

1.2 SAFETY PRECAUTIONS AND HANDLING

For personal safety and safe operation of the PCCard module, follow all safety procedures described here and in other sections of the manual.

- Remove power from the system before installing (or removing) the PCCard to prevent the possibility of personal injury (electrical shock) and / or damage to the product.
- Handle the product carefully; i.e. dropping or mishandling the PCCard can cause damage to assemblies and components.
- Do not expose the equipment to moisture.
- Read and follow all the instructions and warnings described herein.
- Keep the PCCard module away from all sources of liquids, such as coffee cups, drinking glasses, washing facilities etc.
- Keep this manual available for reference.

For your protection and that of the PCCard module disconnect the power input of the used host system immediately if any of the following conditions exists:

- The power input cable has been damaged.
- Something has been spilt onto the modules.
- The PCCard module has been damaged in any way, e.g. through dropping.
- You suspect that any module requires servicing or repair.

NOTE:

There are no user-serviceable components on the PCCard.

1.3 ELECTROSTATIC DISCHARGE (ESD) PROTECTION

Various electrical components within the product 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!
The PC Card interface is protected against electrostatic discharge but only when the PCCard module is proper installed into a system and the system has a good Ground connection.

1.4 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 your responsibility to protect such equipment when installing this device. MPL accepts no responsibility whatsoever for such defects, however caused.

1.5 RELATED DOCUMENTATION

The following documents are related to this manual.

Reference	Description	Available from
[1]	PCI1520 Datasheet Rev. D	Texas Instruments: **www.ti.com**
[2]	PC/104-*PLUS* Spec. Rev. 2.0	PC/104 Embedded Consortium: **www.pc104.org**
[3]	PCI Local Bus Specification Rev. 2.2.	PCI-SIG: **www.pcisig.com**
[4]	PC Card Standard (Rev. 7.1)	PCMCIA: **www.pcmcia.org**

1.6 ORDERING INFORMATION

Product Name	Function
PCCard-M*	Special MPL AG form factor for manufacturing into a MPL PIP, without ZV-port and 3.3V switching regulator
PCCard-P*	PC/104-*PLUS* form factor for all PC/104-*PLUS* compatible PCs, with 3.3V switching regulator, without ZV-port.
PCCard-MC1	Customer specific assembly with special MPL AG form factor, with 3.3V switching regulator and with left and right ejector buttons for PC Cards

* Available from stock

1.7 REVISION HISTORY

This manual reflects:

- the PCCard-M Rev. A & B
- the PCCard-P Rev. A & B
- the PCCard-MC1 Rev. A & B & C

Publication Date : June 2005

Manual Revision	Date	Description
A	27.01.2003	- Initial Write
B	07.06.2005	- Insert chapter 1.5, 1.6, 1.7, 5.1 and 5.5 - Change Module Slot Selection for PCB Rev. B (chapter 5.2)

2. SPECIFICATIONS

2.1 PC104 / PC/104-*PLUS* INTERFACE

- 33MHz, 32Bit
- Accepts 3.3V and 5V interface voltage
- Needs 3.3V and 5V (PCCard-M) or needs only 5V (PCCard-P) Power Supply from PC/104-*PLUS*
- Supports parallel PCI - and parallel ISA Interrupts
- PCCard-X Rev. B and above and PCCard-MC1 Rev. C and above supports for the PC/104-*PLUS* module slot 3 its own PCI REG/GNT pair (PC/104-*PLUS* spec 2.0).
- For special PC Cards (e.g. old flash cards with 12V programming voltage) 12V must be supported from PC/104-*PLUS*

If 12V is needed by any used PC Card, the 12V must be delivered from the PC/104-*PLUS* connector!

2.2 PC CARD INTERFACE

- Supports 3.3V or 5V, 8 bit or 16 bit PC Cards and also 32 bit CardBus PC Cards
- The two card slots are short circuit protected
- The two slots are totally independent of each other
- Every PC Card slot can draw maximum:
  - 1A from the supply voltage
  - 100mA from the programming voltage
- The PC Card interface controller is the TI PCI1520
- Supports PC Cards with ZV-Port (optional), the ZV-Port can be directly connected to the MPL ZV-Port connector on the MPL's PIP family products

DMA function for legacy PC Cards is not longer supported by the PCMCIA standard and also not by the PCCard!

2.3 ENVIRONMENT

- Temperature range 0 °C .. 70 °C
- Extended temperature range with screening –40 °C .. 75 °C (optional)
- Relative humidity 10 % .. 90 %, not condensing

3. PARTS LOCATION

3.1 CONNECTORS

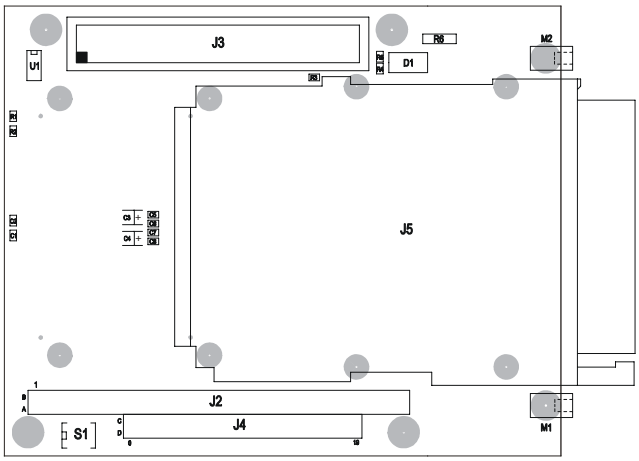

Figure 1: PCCard-M For Manufacturing Into A PIP Case

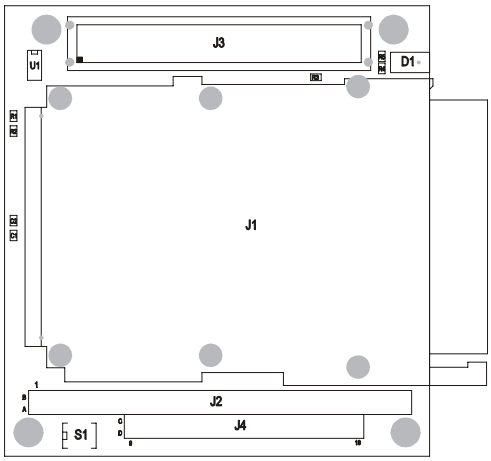

Figure 2: PCCard-P For A PC/104-*PLUS* System

D1	Slot activity LEDs (PCCard-P only)
J1	PC Card interface connector (PCCard-P)
J2 / J4	PC104 connector
J3	PC/104-*PLUS* connector
J5	PC Card interface connector (PCCard-M)
S1	Select switch for PC/104-*PLUS* Module socket

3.2 SLOTS

Turn the PCCard Module until you look directly into the PC Card slots. The lower slot is Slot A (or Slot 1) and the upper Slot is Slot B (or Slot 2).

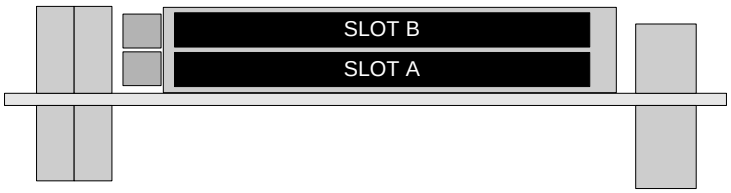

Figure 3: Slot Counting

4. CONNECTORS

4.1 J2 / J4 PC104 CONNECTORS

The PC104 connector is a standard 2.54mm stack through connector. Only the power pins and the legacy ISA interrupt pins are used on this connector.

Number	Row A	Row B	Row C	Row D
0	--	--	GND	GND
1	/IOCHCK	GND	/SBHE	/MEMCS16
2	SD7	RSTDRV	LA23	/IOCS16
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	/ENDXFR	LA17	/DACK0
9	SD0	+12V	/MEMR	DRQ0
10	IOCHRDY	NC	/MEMW	/DACK5
11	AEN	/SMEMW	SD8	DRQ5
12	SA19	/SMEMR	SD9	/DACK6
13	SA18	/IOW	SD10	DRQ6
14	SA17	/IOR	SD11	/DACK7
15	SA16	/DACK3	SD12	DRQ7
16	SA15	DRQ3	SD13	+5V
17	SA14	/DACK1	SD14	/MASTER
18	SA13	DRQ1	SD15	GND
19	SA12	/REFRESH	NC	GND
20	SA11	SYSCLK	--	--
21	SA10	IRQ7	--	--
22	SA9	IRQ6	--	--
23	SA8	IRQ5	--	--
24	SA7	IRQ4	--	--
25	SA6	IRQ3	--	--
26	SA5	/DACK2	--	--
27	SA4	TC	--	--
28	SA3	BALE	--	--
29	SA2	+5V	--	--
30	SA1	OSC	--	--
31	SA0	GND	--	--
32	GND	GND	--	--

Pin Out

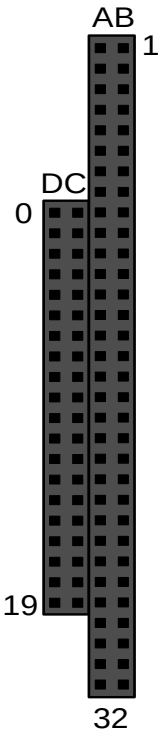

Figure 4: PC104 connector

Table 1: PC104 Connector Pin Out

Note:

- Only the shaded pins are connected, all other pins are not connected on the PCCard
- If a PC Card needs 12V for proper operation, 12V must be delivered through the PC/104-*PLUS* connector, 12V on the PC104 connector is not connected

4.2 J3 PC/104-*PLUS* CONNECTOR

The PC/104-*PLUS* connector is a standard 2mm stack through connector.

Number	Row A	Row B	Row C	Row D	Pin Out
1	GND (5V Key)	NC	+5V	AD0	
2	+5V	AD2	AD1	+5V	
3	AD5	GND	AD4	AD3	
4	C/BE0	AD7	GND	AD6	
5	GND	AD9	AD8	GND	
6	AD11	+5V	AD10	GND (M66EN)	
7	AD14	AD13	GND	AD12	
8	+3,3V	C/BE1	AD15	+3,3V	
9	SERR	GND	NC (SBO)	PAR	
10	GND	PERR	+3,3V	NC (SDONE)	
11	STOP	+3,3V	NC (LOCK)	GND	
12	+3,3V	TRDY	GND	DEVSEL	
13	FRAME	GND	IRDY	+3,3V	
14	GND	AD16	+3,3V	C/BE2	
15	AD18	+3,3V	AD17	GND	
16	AD21	AD20	GND	AD19	
17	+3,3V	AD23	AD22	+3,3V	
18	IDSEL0	GND	IDSEL1	GND	
19	AD24	C/BE3	+5V	IDSEL2	
20	GND	AD26	AD25	IDSEL3	
21	AD29	+5V	AD28	AD27	
22	+5V	AD30	GND	AD31	
23	REQ0	GND	REQ1	+5V	
24	GND	REQ2	+5V	GNT0	
25	GNT1	+5V	GNT2	GND	
26	+5V	CLK0	GND	CLK1	
27	CLK2	+5V	CLK3	GND	
28	GND	INTD	+5V	RST	
29	+12V	INTA	INTB	INTC	
30	NC (-12V)	REQ3 (please refer to chapter 5.1)	GNT3 (please refer to chapter 5.1)	GND (3.3V Key)	

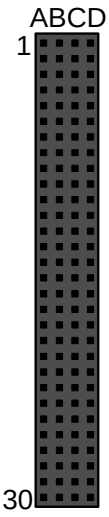

Figure 5: PC/104-*PLUS* Connector

Table 2: PC/104-*PLUS* Connector Pin Out

Note:

- All the shaded signals are **not** connected on the PCCard
- M66EN is connected to GND on the PCCard

4.3 J6 ZV-PORT CONNECTOR (OPTIONAL)

The zoomed video (ZV) port is an one directional video bus between a video source and a VGA controller. The PC Card specification provides (optional) such a ZV-Port to connect special ZV-Port PC Cards directly with a VGA controller.
Connector J6 allows access to the ZV-Port of the PC Card interface. It can be directly connected to the ZV-Port on the PIPx Products from MPL AG.

Pin number	Signal	Description	Pin Out
1	D0	Video data 0	
2	NC (VCC3)	+3,3V voltage (not connected)	
3	D1	Video data 1	
4	GND	Ground	
5	D2	Video data 2	
6	GND	Ground	
7	D3	Video data 3	
8	NC (VCC5)	+5V voltage (not connected)	
9	D4	Video data 4	
10	GND	Ground	
11	D5	Video data 5	
12	GND	Ground	
13	D6	Video data 6	
14	NC (VCC3)	+3,3V voltage (not connected)	
15	D7	Video data 7	
16	GND	Ground	
17	D8	Video data 8	
18	GND	Ground	
19	D9	Video data 9	
20	NC (VCC5)	+5V voltage (not connected)	
21	D10	Video data 10	
22	GND	Ground	
23	D11	Video data 11	
24	GND	Ground	
25	D12	Video data 12	
26	NC (VCC3)	+3,3V voltage (not connected)	
27	D13	Video data 13	
28	GND	Ground	
29	D14	Video data 14	
30	NC (RESET#)	System reset (not connected)	
31	D15	Video data 15	
32	NC (VCC5)	+5V voltage (not connected)	
33	VREF	Vertical Reference	
34	HREF	Horizontal Reference	
35	GND	Ground	
36	VCLK	Video Clock	
37	GND	Ground	
38	NC (PCLK)	Pclock (not connected)	
39	NC (SMB_D)	SM Bus data (not connected)	
40	NC (SMB_CLK)	SM Bus clock (not connected)	

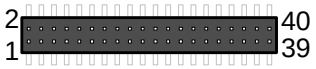

Figure 6: ZV-Port Connector

Table 3: ZV Port Connector Pin Out

Note:

- The shaded pins are not connected on the PCCard

5. CONFIGURATION

5.1 DIFFERENCES IN PCCARD REVISIONS

5.1.1 PCCARD-M & PCCARD-P

PCCARD-M & PCCARD-P	Description
Rev. A (PCB Rev. A)	- Old PC/104-*PLUS* module slot selection - Module Slot 2 and 3 shares the PCI REQ/GNT pair (both on PCI REQ2/GNT2)
Rev. B and above (PCB Rev. B)	- PC/104-*PLUS* module slot selection according to other MPL AG products - Module Slot 2 and 3 have their own PCI REQ/GNT pairs (Slot 2: PCI REQ2/GNT2 and Slot 3: PCI REQ3/GNT3)

5.1.2 PCCARD-MC1

PCCARD- MC1	Description
Rev. A & B (PCB Rev. A)	- Old PC/104-*PLUS* module slot selection - Module Slot 2 and 3 shares the PCI REQ/GNT pair (both on PCI REQ2/GNT2)
Rev. C and above (PCB Rev. B)	- PC/104-*PLUS* module slot selection according to other MPL AG products - Module Slot 2 and 3 have their own PCI REQ/GNT pairs (Slot 2: PCI REQ2/GNT2 and Slot 3: PCI REQ3/GNT3)

5.2 PC/104-*PLUS* MODULE SLOT SELECTION

For the PCCard-M Rev. B and above, the PCCard-P Rev. B and above and the PCCard-MC1 Rev. C and above the decoding of the module slot selection was adapted to that on other MPL AG PC/104-*PLUS* cards.

Figure 7: Module Slot Selection Slide Switch S1

S1_1	S1_2	PC/104-*PLUS* Module Slot	
		PCCard-X Rev. A / PCCard-MC1 Rev. A & B	PCCard-X Rev. B and above / PCCard-MC1 Rev. C and above
OFF	OFF	0	0
OFF	ON	2	1
ON	OFF	1	2
ON	ON	3	3

Table 4: DIP-Switch S1 Settings

The used decoding of the DIP switches is also described on the PCB itself near the connector J4.
On the PCCard-M & -P Rev. A and PCCard-MC1 Rev. A & B the PC/104-*PLUS* Module Slot 2 and 3 shares the PCI REQ/GNT pair (both on PCI REQ2/GNT2). That means that only one bus master module can be plugged either into slot 2 or 3 and the other module must not be a bus master module.
On the PCCard-M & P Rev. B and PCCard-MC1 Rev. C the PC/104-*PLUS* Module Slot 2 and 3 have their own PCI REQ/GNT pairs (Slot 2: PCI REQ2/GNT2 and Slot 3: PCI REQ3/GNT3). Means that four bus master modules can be used on the PC/104-*PLUS* bus if the host that supports (compliant to PC/104-*PLUS* spec. 2.0).

5.3 LEGACY ISA INTERRUPTS

The Legacy ISA interrupts are routed to the PC104 bus for compatibility with older 8 / 16 bit PC Cards and their drivers. The configuration of the interrupt numbers is done with either the BIOS or via the operating system drivers. See the appropriate manual of the PC for more information.

5.4 LEGACY DMA

The Legacy DMA function is no longer supported by the PC Card Specification (Rev. 7.2 and above) and so also not by the PCCard Module.

5.5 MPL SPECIFIC

A PIP6 under Win98SE with CAN controller enabled at address $8000 and IRQ5 can have some problems with Interrupt routing configuration for PCMCIA hard disks. The PCMCIA hard disks can't be mounted then. The problem can be fixed with CAN controller IRQ configured to IRQ9. Then Win98SE can configure the PCMCIA hard disk proper.

6. DRIVERS

6.1 LINUX

Under LINUX the kernel PCMCIA system with the yenta socket driver can handle the PCI1520 with 16Bit and 32 Bit PC Cards. The most of the major Linux distributors like Slackware, Debian, Red Hat, Caldera, SuSE has the PCMCIA package included in their distributions.
More information and the latest Linux PCMCIA Package you can find on the following homepage:

http://pcmcia-cs.sourceforge.net/

6.2 WINDOWS

Windows 2000, Windows ME and Windows 98SE recognize the PCI1520 as a generic CardBus Controller. The device will function properly using this driver. The PCI1520 is natively supported by Windows XP. Under Windows NT4.0 the PCI1520 can be used with SystemSoft's Card Wizard software. For more information have a look at their homepage:

http://www.systemsoft.com/

APSoft's CardWare was also tested with MPL's PIP family and the PCCard. More Information about CardWare you will find at:

http://www.tssc.de/

6.3 TESTED OPERATING-SYSTEMS

The following operating systems are tested in the lab with several 16 Bit and 32 Bit PC Cards:

PIP405:	With the PIP405 Linux Distribution from MPL
PIP5:	SuSE Linux 7.3 (Kernel 2.4), WIN98SE, NT4.0 (SP6) with CardWizard (5.20.06) from SystemSoft
PIP6:	SuSE Linux 7.3 (Kernel 2.4), Win98SE, NT4.0 (SP6) with CardWizard (5.20.06) from SystemSoft, NT4.0 (SP6) with CardWare (7.00.002) from APSoft
PIP7:	Win98SE, WinXP, NT4.0 (SP6) with CardWizard (5.20.06) from SystemSoft, NT4.0 (SP6) with CardWare (7.00.002) from APSoft

6.4 NEEDED BIOS VERSIONS OF MPL SBC'S

PIP5:	V4.00 or later
PIP6:	All Versions can be used
PIP7:	V1.10 or later, For MS Windows OS V1.00 should also work
PIP8:	V1.10 or later, For MS Windows OS V1.00 should also work

7. MOUNTING

The PCCard shall only be mounted by qualified personnel. MPL AG accepts no responsibility for any damage to the host system or the PCCard module caused by the mounting procedure.

NOTE:

Before starting, verify that the host system is switched off and disconnected from the main power. Review and observe the safety precautions description at the beginning of this manual to avoid personal injury or damage to equipment.

7.1 PARTS NEEDED FOR MOUNTING

- PCCard module
- 4 M3 x 6mm screws

7.2 MOUNTING DESCRIPTION

1. Plug the PCCard module to its place and **insure that no pin is bent**
2. Insert and secure the screws at the mounting holes

7.3 MECHANICAL DIMENSIONS

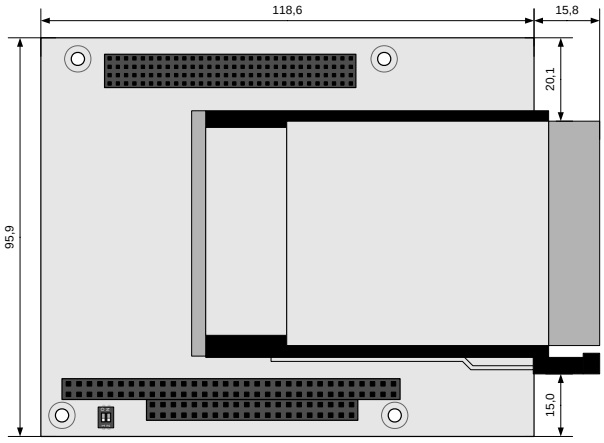

Figure 8: PCCard-M

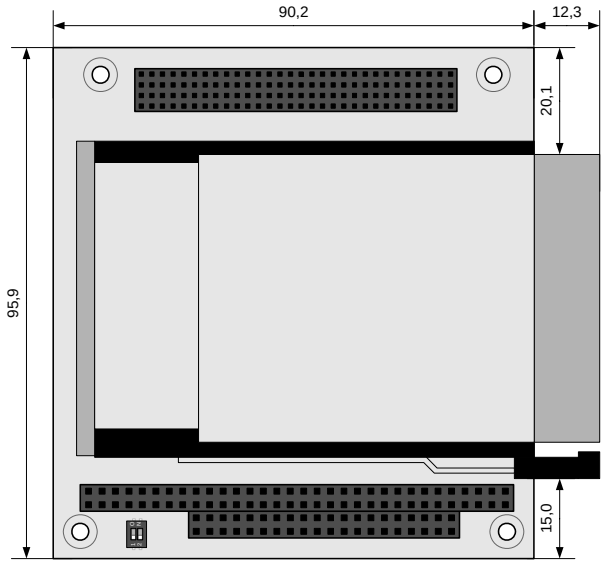

Figure 9: PCCard-P

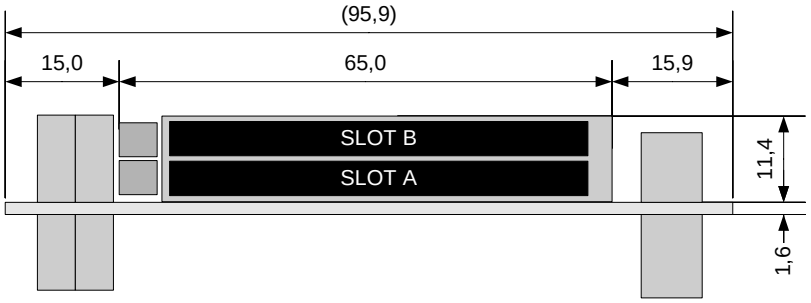

Figure 10: PCCard-X Side View

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8. COPYRIGHT

9. DISCLAIMER

MPL AG has fully tested the PCCard module and reviewed the documentation. However, MPL AG makes no warranty or representation, either expressed, or implied, with respect to this product, its quality, performance, merchantability, or fitness for a particular purpose.

In no event will MPL AG be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect in the product or its documentation, even if advised of the possibility of such damages. In particular MPL AG shall have no liability for any parts connected to this product.

MPL AG reserves the right to make changes to any product herein to improve reliability, function or design.

10. SUPPORT

In case of questions please feel free to contact us at our homepage (**www.mpl.ch**) or per email (**support@mpl.ch**).

Our local Distributor: