MICROSPACE®

Peripheral Boards

PC/104

PC-CARD / PCMCIA

MSMJ104 /D

#010999-1

DIGITAL-LOGIC®

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REVISION HISTORY:

Prod.-Serialnumber: From: To:	Product Version	BIOS Version	Doc. Version	Date/Vis:	Modification: Remarks, News, Attention:
			V1.1	05.94	88814-TI Chip
			V2.1	11.94	Cirrus Chip
	V2.0		*V3.1*	*02.95*	*Vadem Chip*
			V3.2	07.95	
			V3.21	12.95	Address Table
	V2.1		*V3.3*	*05.96*	*New PC CARD Driver, New Designs*
			V3.4	10.97	Chap.10 J14/18 modified
	V2.1 /1.0		*V3.5*	*03.98 JM*	*MSMJ104D added*
			V3.51	03.98 JM	detailed corrections
			V3.52	03.98 JM	Layout, detailed corrections
			V3.53	03.98 JM	Jumper description added
			V3.54	03.99 TS	Related APP-NOTES
			V3.55	09.99 JM	VG469 specific information

Table of Contents

1   PREFACE

This manual is for integrators and programmers of systems based on the MICROSPACE card family. It contains information on hardware requirements, interconnections, and details of how to program the system. The specifications given in this manual were correct at the time of printing; advances mean that some may have changed in the meantime. If errors are found, please notify DIGITAL-LOGIC AG at the address shown on the title page of this document, and we will correct them as soon as possible.

1.1   How to use this Manual

This manual is written for the original equipment manufacturer (OEM) who plans to build computer systems based on the single board MICROSPACE-PC. It provides instructions for installing and configuring the MSMJ104 board, and describes the system and setup requirements.

1.2   Trademarks

Chips & Technologies	SuperState R
MICROSPACE, MicroModule	DIGITAL-LOGIC AG
DOS Vx.y, Windows	Microsoft Inc.
PC-AT, PC-XT	IBM
NetWare	Novell Corporation
Ethernet	Xerox Corporation
DR-DOS, PALMDOS	Digital Research Inc. / Novell Inc.
ROM-DOS	Datalight Inc.

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1.4   Who should use this Product

- Electronic engineers with know-how in PC-technology.
- Without electronic know-how we expect you to have questions. This manual assumes, that you have a general knowledge of PC-electronics.
- Because of the complexity and the variability of PC-technology, we can't give any warranty that the product will work in any particular situation or combination. Our technical support will help you.
- Pay attention to the electrostatic discharges. Use a CMOS protected workplace.
- Power supply OFF when you are working on the board or connecting any cables or devices.

> **This is a high technology product.**
> **You need know-how in electronics and PC-technology to install the system !**

1.5   Recycling Information

Hardware: **- Print:**   epoxy with glass fiber
                                         wires are of tin-plated copper

              - Components: ceramics and alloys of gold, silver
                                         check your local electronic recycling

Software: **- no problems:**   re-use the diskette after formatting

1.6   Technical Support

1. Contact your local Digital-Logic Technical Support in your country.

2. Use Internet Support Request form on http://www.digitallogic.ch -> support

3. Send a FAX or an E-mail to DIGITAL-LOGIC AG with a description of your problem.

    DIGITAL-LOGIC AG
    Dept. Tech. Support   Fax: ++41-32 681 53 31
    Nordstr. 4F   E-Mail: support@digitallogic.ch
    CH-4542 Luterbach (SWITZERLAND)

1.7   Limited Warranty

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Before returning any product for repair, customers are required to contact the company.

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2   OVERVIEW

2.1   PC/104 PC-CARD V.2.1. Controller Board Features

Controller:	VADEM 468/469
Compatibility:	fully to INTEL 365
Number of PC-CARD Slots:	2
Cascadable Boards:	2 (eq. total 4 slots possible)
Slot Types:	1, 2 and 3
Slot Mounting:	Slot A: external
	Slot B: external (or optionally internal)
Supported PC-CARD Version:	2.1
ExCA Compatibility:	yes
Supported PC-CARD Devices:	SRAM Cards FLASH Cards ATA Harddisk I/O Cards like Modem, LAN, SCSI a.o.
Hot Insertion:	supported
Programming Voltage:	onboard generated
Boot BIOS Extension:	onboard available, with optional Boot-EPROM
Software Support:	SCM included in the installation disk Phoenix Card Manager not included AMI not included AWARD Cardware not included Software Systems not included
Data Transfer:	16 Bit

Data Transfer Rate:	Flash cards: Read: up to 2 MBytes/sec
	                  Write: up to 60 KBytes/sec
	
	SRAM Card: Read: up to 2 MBytes/sec
	                  Write: up to 500 KBytes/sec

Temperature Range:	Operating: -25°C to +80°C Storage: -40°C to +125°C
Power Supply:	5 Volt
Current:	max. 0.2 Amp
Layer:	4 (GND and VCC separate)

Any information is subject to change without notice.

2.2   Ordering Codes

MSMJ104   PC-CARD V.2.1 including software plus 1st slot
MSMJ104A   PC-CARD V.2.1 including software and socketholder assembled
MSMJ104D   DUAL PC-CARD V.1.0 including software and dual slot

Option - 2S   2nd slot to MSMJ104
Option - Boot   additional EPROM (bootable from PC-CARD)

2.3 Related Application Notes

#	Description
21	PCMCIA Controllers
65	MSM386SV and MSMJ104/D, SYSCLK-Loads

➔ *Application Notes are availble at http://www.digitallogic.ch ->support, or on any Application CD from DIGITAL-LOGIC.*

3   JUMPERS ON THE MSMJ104 /D

3.1 MSM104J V2.1

MSM104J V2.1
All Dimensions are in millimeters, +/- 0.1

3.2 MSMJ104D V1.0

72

69

Mechanical Dimensions are
in millimeters +/-0.1

14

10

5

DIGITAL-LOGIC AG
MSMJ104D V1.0
JMP-LOCATION
TOP-SIDE 03.98 JM

1   1
J23   J24

J14

1

J13

1

J18
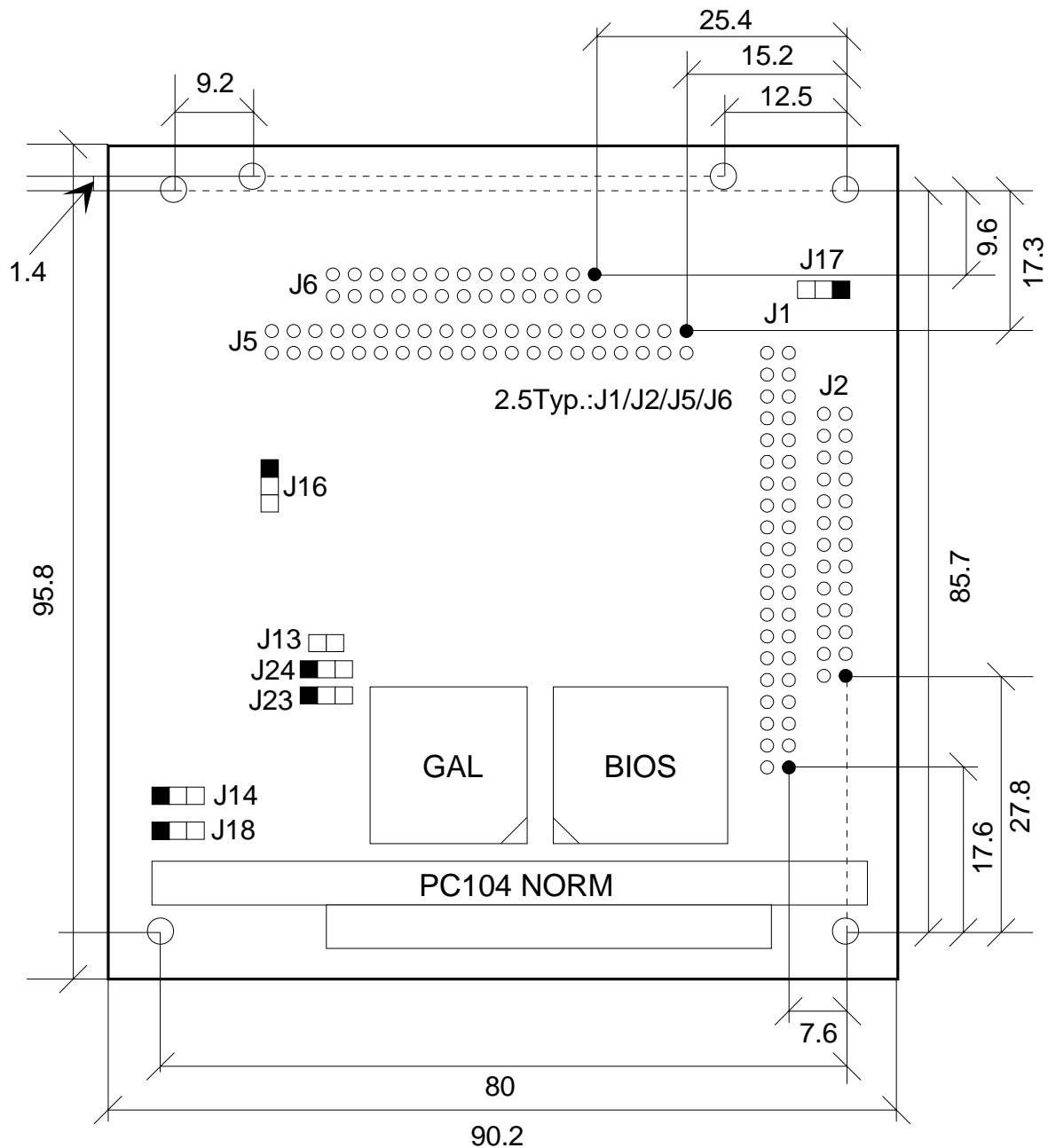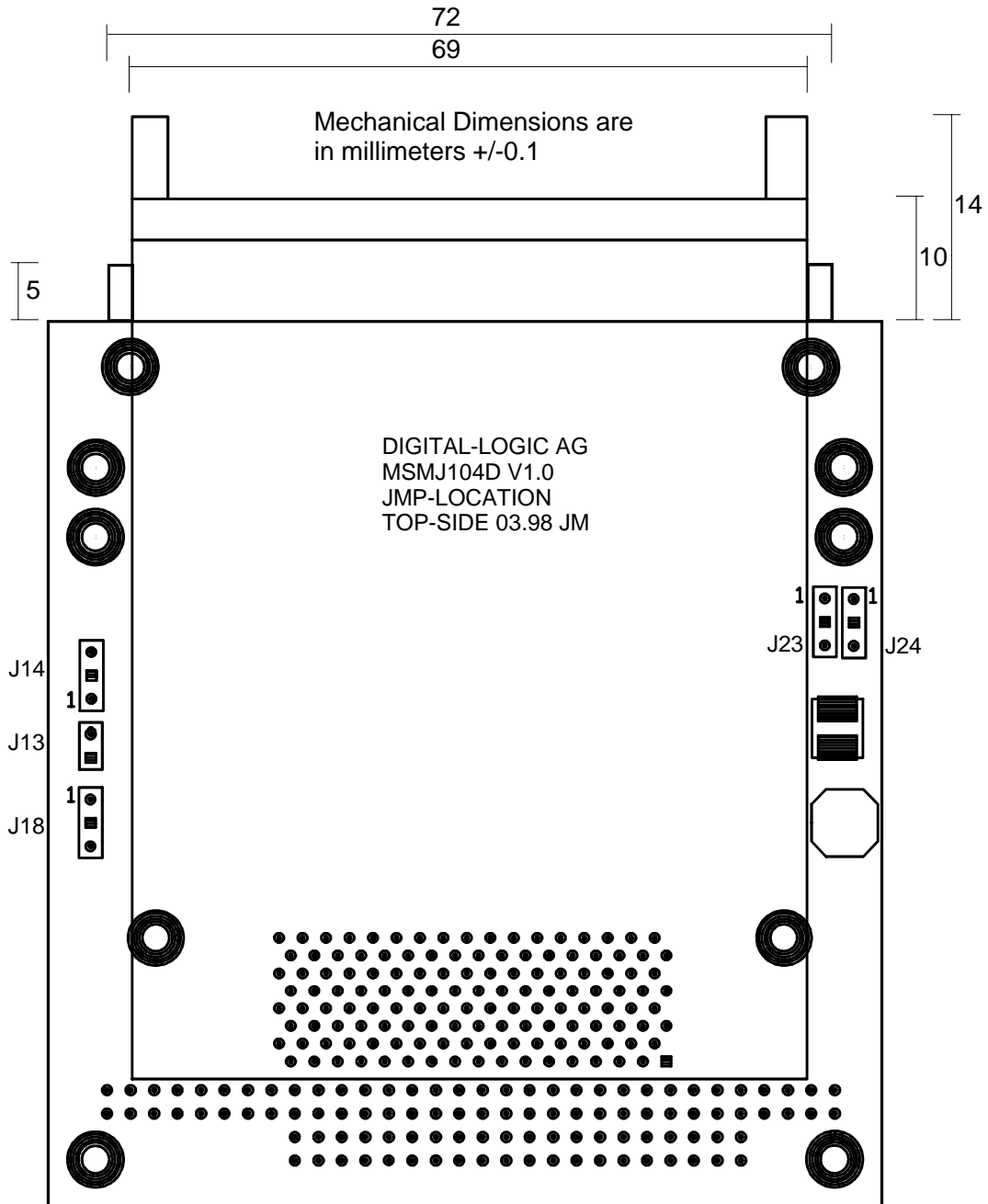
3.2.1 Jumper description

J13	*SPK*	*insignificant*
J14	I/O Adress selection	see page 23
J16	*measure points*	*insignificant*
J17	*measure points*	*insignificant*
J18	I/O Adress selection	see page 23
J23	BIOS Extension Adress selection	see page 18/19
J24	BIOS Extension Adress selection	see page 18/19

4   PC-CARDs

4.1   Supported PC-CARDs

Card Functionality:	Brand names:	Capacity:
SRAM Cards:	Mitsubishi	1, 2 MBytes
	Fujitsu	1, 2 MBytes
	Seiko	512k, 1MByte, 2MBytes
FLASH Cards:	Intel	1, 4 MBytes Series 1 4, 10, 20 MBytes Series 2
	Seiko / Epson	512 KBytes to 6 MBytes
	Mitsubishi	1, 2 MBytes
	Fujitsu	1, 2 MBytes
	AMD	1, 2, 4 MBytes
	TI	512 KBytes and 1 MByte
FAX/Modem Cards:	Angia	FAX/Modem
	Dr. Neuhaus	FuryCard 2400
	ELSA	Microlink 2460MC
	Hotline	HL9672CC
	Intel	Modem 2400, 9600, 14400
	Megahertz	14400 Data/FAX Modem
	Psion	Goldcard
LAN Cards:	IBM	Ethernet
	IBM	Token Ring
	XIRCOM	CE-10BC Ethernet-S
	SCM	SMC_ET and SCM_TR
ATA Cards:	Calluna	CT80MC
	Integral	Integral 40 MBytes, 80 MBytes, 115 MBytes
	INTEL	ATA 5 MBytes Flash, 10 MBytes Flash
	Maxtor	MXL-105
	Seagate	ST7050
	SunDisk	ST710P5K 10 MBytes ATA Flash
	SunDisk	ST710P, ST720P ATA Flash with 12V Vpp and 10, 20 MBytes

4.1.1   Important information on the different PC-CARDs

MEMORY Cards:

Memory cards are accessed like a normal drive. A drive letter will be assigned by the PC-CARD drivers after the initialization. During the boot sequence, the system will indicate on the screen which drive letter has been assigned to the PC-CARD. Please pay attention to this information.

SRAM and FLASH Cards are normally unformatted. This means that these cards need to be formatted firstly. There is a special memory card format tool. FLASH cards need always a Flash-File-System in order to perform write and read access. The write access is a lot slower than a floppy-write access, due to the Flash write technology.

ATA-Cards:

ATA Cards are available in two versions. One is the ATA harddisk, containing a 1,8" harddisk drive unit with a IDE controller and a PC-CARD interface. The harddisk is accessed with 16 I/O transfers. The second version are ATA-Flash cards. These (intelligent) Flash cards have also integrated a Flash-File-System and a controller to access Flash devices. The ATA-Cards are configured automatically and are accessed by the drive letter, who is assigned on boot time. Normal Flash memory cards are non-intelligent and need an external Flash-File-System (driver) to be accessed.

WARNING: DO NOT PULL OUT ATA-CARDS WHILE AN ACCESS TO THE CARD IS PERFORMED, OTHERWISE DATA MAY BE LOST.

FAX and MODEM Cards:

I/O PC-CARD cards like FAX or MODEM cards are configured automatically. Only the number of the COM-Ports need to be configured. If IRQ3 and IRQ4 are used by the COM1 and COM2 the driver uses IRQ5 for COM3 and IRQ10 for COM4. In this case, the application program must be configured to these new IRQ's. In WINDOWS these port interrupt assignments must be made in the CONTROL-PANEL - PORTS.

LAN Cards:

LAN PC-CARDs are normally sold with a card-enable software. There are two versions of enable-software. A PC-CARD enable-software and the Card Services enable-software. There are some older versions of LAN-PC-CARDs with Socket Service enable which can not be used with the MSMJ104 card.

Card Services enable-software:

This is today the proposed way to interface a LAN PC-CARD. This enable-software communicates with the card services, a driver loaded by the CONFIG.SYS. The card service enable-software must be installed after the socket and the card services are fully installed.

PC-CARD enable-software:

Earlier PC-CARD systems, where no socket services or card services exist, the PC-CARD enable-software accesses directly to the hardware not needing a socket service. Since the MSMJ104 card is fully INTEL PCIC 365SL compatible, all PC-CARD enable-software for INTEL controllers may be used. The PC-CARD enable-software is only used, if the CONFIG.SYS contains no socket or card services.

Other drivers supplied with LAN cards are:

ODI Driver: lsl   (Link Service Layer)
⇨   ODI DRIVER   Ex. PCMDMCS
                         ipxodi   (IPX to ODI)
                         net   (NetWare Driver)

NDIS Driver: (CONFIG.SYS)   device = netprot.dos /i
                           DEVICE = NDIS DRIVER.DOS
                           device = netbeui.dos

The /i option defines a path to the file PROTOCOL.INI, containing configuration data.

Examples: IBM Ethernet LAN Card:

ODI: The file NET.CFG must be modified as follows:

                         Link Driver PCMDMCS
                         FRAME ETHERNET_802.3
                         PC-CARD

4.2   Supported Card Formats

The MSMJ104 supports memory cards in the standard of PC-CARD/JEIDA 4.1. Notebook and palmtop computers with integrated PC-CARD slot support different memory card formats. Current formats are:

PC-CARD FORMAT: Most mobile PCs, which have a PC-CARD slot, support the defined PC-CARD standard format, also known as the Interchangeable-File Format (IFF). This format is specially useful for SRAM-Cards. For Flash Cards this format can only be used in a limited way.

FLASH-FILE-FORMAT: This format has been invented and standardized for Flash cards to perform read/writes many times and with fast access.

There are two vendors:

SCM_FFS: Supported by MSMJ104   needs SCM_FSS Driver
                                                  included in MSMJ104

MS_FFS: Supported by MSMJ104   needs Microsoft Driver
                                                  not included in the MSMJ104

5   HARDWARE

5.1   Hardware Configuration needed

CPU Module:	PC/104
Processor:	286, 386, 486
BUS:	16 Bit AT-compatible
BUS timing:	max. 8 MHz
Harddisk capacity:	2MByte for all tools and drivers
Base Memory:	640 kBytes
Extended Memory:	used for uploading the FFS driver
Tested Chipsets:	SCATsx, 4021, 4031 and 4041 from C&T
Memory window:	D000 - D2FFh or D800 - DAFFh or DD00 - DFFFh for PC-CARD
	⇨ do not use E000 - EFFFh, since this range is used by the onboard SSD with the E-FFS from DIGITAL-LOGIC AG

6   SOFTWARE SUPPORT OVERVIEW

In general, the PC-CARD support needs different drivers, depending on the type of card being used. Since the MSMJ104 is fully INTEL 365 compatible, different driver products are available.

The I/O addresses of the card are also INTEL compatible:

Register-index: 3E0hex
Data transfer: 3E1hex

1. Slot: Register number00 - 3Fhex
2. Slot: Register number40 - 7Fhex

Software drivers are dependent on the type of card which is being used:

Software driver:	FLASH:	SRAM:	ATA-Drive:	IO-Card:	LAN-Cards:
From DIGITAL-LOGIC AG SCM FFS	**yes**	**yes**	**yes**	**yes**	**yes**
Not included:					
- Socket Service	yes	yes	yes	yes	yes
- Card services	yes	yes	yes	yes	yes
- Resource manager	no	no	yes	yes	yes
- Flash-File-System	yes	(yes)	no	no	no
From card vendor:					
Enable-software	no	no	no	no	yes

PC-CARD-Driver from SCM

With the new PC-CARD Boot-Driver from SCM-Microsystems, it's possible to boot from an ATA-Card and to use the DOS InterLink program to connect a PC-CARD-Drive to another PC.

If the user wants to boot from an ATA-card or use InterLink then he needs to install the new driver otherwise it won't work.

The old driver with the whole SCM-directory must be deleted from the harddisk before installing the new one. The entries from the old SCM-driver in the CONFIG.SYS file must be deleted, too. The installation program is the same as the old one.

There are new tools in order to format a PC-CARD and make it bootable:

MCFORM.EXE   Format all kind of PC memory cards.
                        (ATA, FLASH, EEPROM, SRAM)

MCFORM.EXE -e   Extended mode of the format program (boot function) for all
                        kind of memory cards.

After installing, all files are located on the subdirectory SWAPFTL.

Drivers for PC Memory Cards from SCM

SwapBox driver: **MMCD.EXE**   Version: **2.21**

Boot driver: **MMCD.BIN**   Version: **1.25**

Formatting program: **MCFORM.EXE** Version: **4.57**

7   INSTALLATION

7.1   Hardware Installation

Installation:

1.   Power-off the System.
2.   Install the MSMJ104 on the CPU module.
3.   Install the cable to the PC-CARD Socket adapter.
4.   Install the PC-CARD Socket adapter to the cable.
5.   Check the card jumpers.
6.   Power-on the system. If the System boots, install the software drivers.

7.2   Connections between PC/104 Card and Socket holder
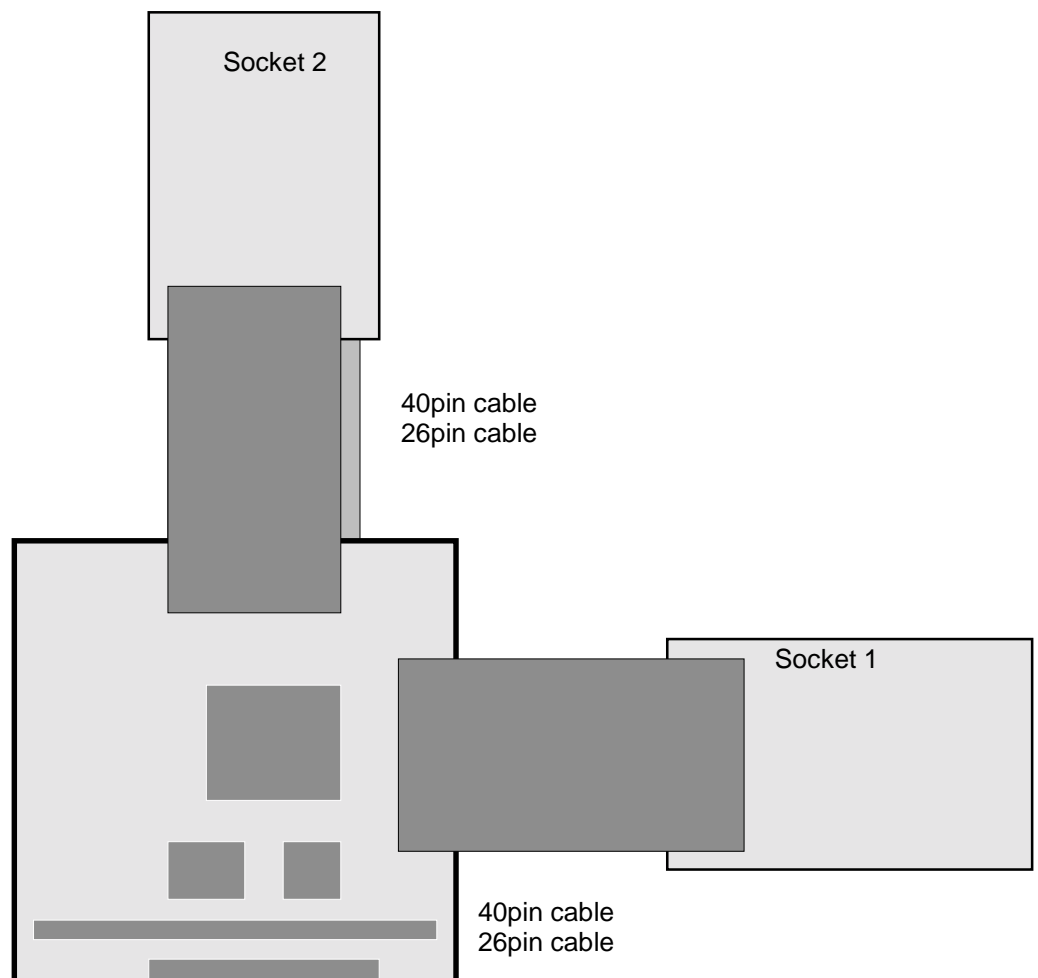
7.3   *Installing the Drivers for PC Memory Cards*

STEP	SCREEN	COMMENT
Insert PC-CARD driver disk into drive		
Type *A:INSTALL* and press ENTER key		
Select language (German or English) -> N ENTER		
Press ENTER to skip the first screen	1	Read the information on the first screen. Press [ENTER] to go to the next screen.
Press ENTER to confirm the location of files	2	Enter the following data: - Source drive/path with install disk - Target drive/path - Path for the CONFIG.SYS Press [ENTER] to go to the next screen.
Press ENTER to confirm the memory addresses and slot numbers	3	- Memory window for the MSMJ104 /D → D000h and [TAB] - Start address of the I/O Window → 170 and [TAB] - Select "Dual Slot Drive" with the arrow keys Press [ENTER] to go to the next screen.
Press ENTER to confirm to use memory cards	4	Normally leave the screen the way it is. Press [ENTER] to confirm and to go to the next screen.
Press ENTER to confirm the inputs -> installation is started		Check all inputs. Press [ENTER] to confirm. The installation process starts.
Press [ESC] to restart the setup entries		Re-boot the MICROSPACE PC.

The installation program will automatically set the correct parameters for most systems. It assumes the following resources:

- min. 1 MByte free harddisk space
- min. 2 MBytes Memory (RAM)
- Availability of HIMEM.SYS or other Memory Manager for Extended Memory

In case no Extended Memory Manager is found, the device driver will notify the user at boot time and load into the Main memory. This may cause some limitations, like large applications may not run due to not enough memory.

The interface to the Memory Card is handled through the DOS device driver MMCD.SYS

On the MSMJ104 the device driver MMCD.SYS assigns two DOS drive designators. These drive designators are used to access memory cards and ATA-Cards in the PC-CARD slots of the MSMJ104. The assigned drive designators are listed in a message, which is displayed at boot time. For example, if your system has two hard disks, C: and D:, the next character E: will be assigned to the first PC-CARD slot and F: to the second PC-CARD slot.

Note:

If the memory card cannot be accessed via an assigned drive designator the reason may be that the card is not correctly or not fully formatted. Formatting can be performed with MCFORMAT.EXE, which is included in the MMCD software disk.

7.4   Formatting Memory Cards

There are two possibilities to format a card. With the MCFORMAT or the MCFORM.

1. SRAM memory cards:	Needs to be formatted only once. They can be erased like any other removable media. Use MCFORM.EXE -e
2. Flash memory cards:	Needs to be formatted only once. With the SCM Flash-File-System they can be erased like any other removable media. Use MCFORM.EXE -e
3. ATA-Cards:	Needs to be formatted only once, like a harddisk. Use MCFORM.EXE -e

Note:

The MCFORM.EXE program requires the device driver MMCD.SYS. Before a memory card can be formatted, the installation of this driver is absolutely necessary.
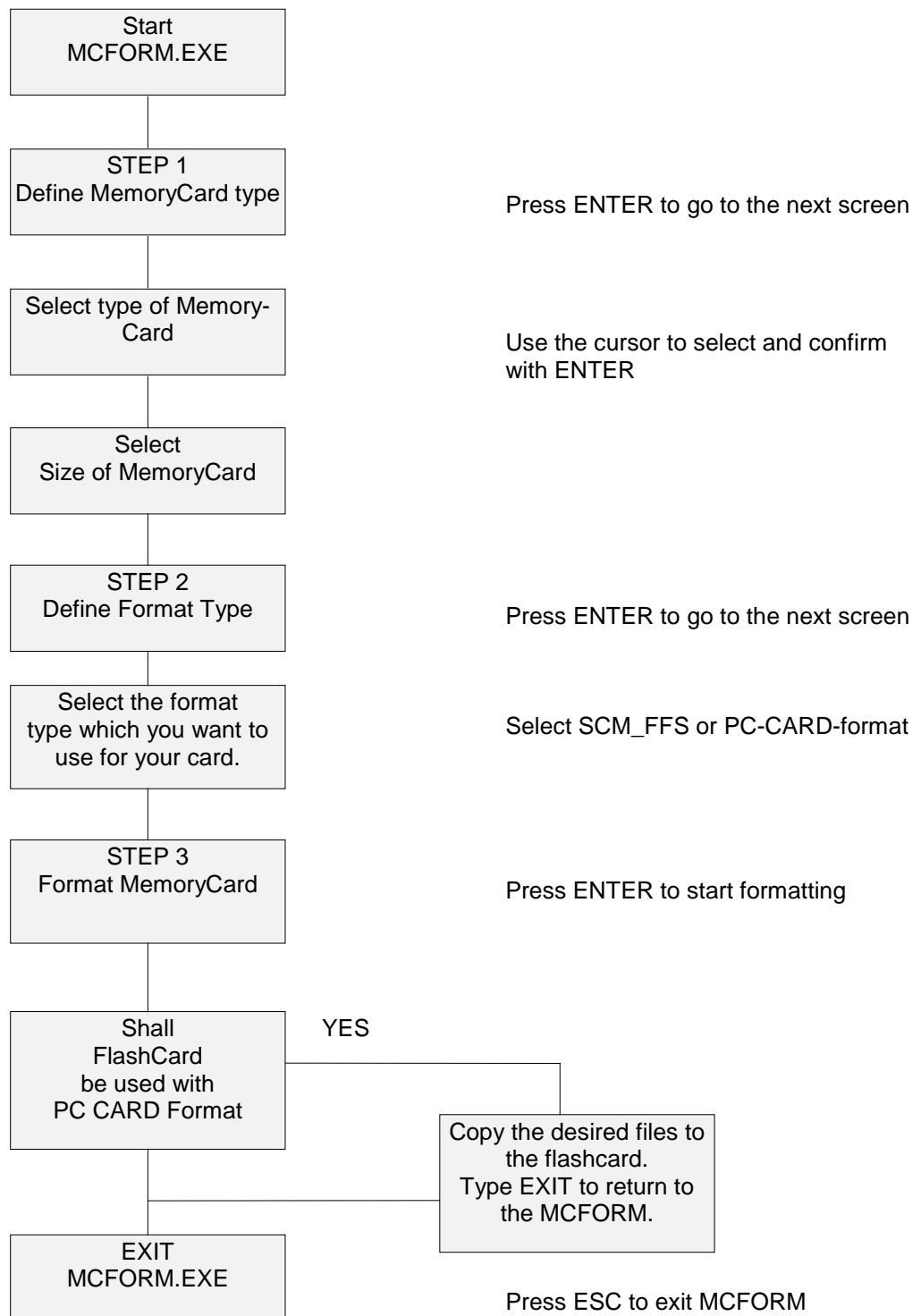

WARNING

During formatting with the MCFROM.EXE all data stored on the memory card will be erased.

7.5   Formatting a PC Memory Card with MCFORM.EXE

STEP	COMMENT
Change directory to PC-CARD drivers on the harddisk (SWAPFTL)	
Type MCFORM [DRIVE]: and press ENTER.	Start the MCFORM.EXE with the drive designator: D: or E: or F:.
Select language (German or English) -> N ENTER	
Define type of memory card (menu point 1, ENTER).	First select point 1 to define the type of card (ATA, SRAM, FLASH or EEPROM).
Select type and size of card and press ENTER to confirm.	Select type and size of card (ATA, SRAM, FLASH or EEPROM) with cursor up/down and press ENTER to confirm.
Quit submenu with ESCAPE key	
Select menu point 2 to format the memory card	**(all datas will be lost!!!)**
Press ESC key to quit the program	

The following flowchart shows the formatting steps using MCFORM:

Flowchart	Description
Start MCFORM.EXE	
STEP 1 Define MemoryCard type	Press ENTER to go to the next screen
Select type of Memory-Card	Use the cursor to select and confirm with ENTER
Select Size of MemoryCard	
STEP 2 Define Format Type	Press ENTER to go to the next screen
Select the format type which you want to use for your card.	Select SCM_FFS or PC-CARD-format
STEP 3 Format MemoryCard	Press ENTER to start formatting
Shall FlashCard be used with PC CARD Format — YES → Copy the desired files to the flashcard. Type EXIT to return to the MCFORM.	
EXIT MCFORM.EXE	Press ESC to exit MCFORM

7.6   Installing the AUTO-BOOT Option

The AUTO-BOOT installation steps are summarized as follows:

1. Prepare a DOS-system PC memory card.
2. Copy driver and startup-files to PC-CARD.
3. Enable the AUTO-BOOT BIOS extension on the MSMJ104 or MSMJ104D board.

Step 1: Prepare a DOS memory card

1.   Type in MCFORM -e [drive letter] and press ENTER.
2.   Select menu option 1 and read out the CIS (type and size) of the card with
        option 5. Press ENTER.
3.   Confirm the read-out with ENTER.
4.   Leave menu with ESCAPE.
5.   Select menu option 4 to format the card with DOS system files. Press ENTER.
6.   Type in the drive letter which contains your DOS system (A, C) and press the ENTER key.
        Now the card will be formated with the DOS system.
7.   Quit the MCFORM program by pressing the ESCAPE key.

Step 2: Copy driver and startup files to the card

On the PC-CARD Tooldisk from DIGITAL-LOGIC AG are 4 subdirectories with the required system files to make a memory card bootable. If the drive designator from the PC-CARD memory card is D, then copy all files from subdirectory SYS-D to the system formated memory card.

Address Table of the MSMJ104:

Boot from PC-CARD	J23	J24	Address of **BIOS-EXTENTION**	Address of **MEMORY WINDOW** to access PC-CARD
off	1-2	1-2	-	D0000-D3000
on	1-2	2-3	D8000-D9FFF	DA000-DAFFF
on	2-3	1-2	D0000-D1FFF	D2000-D2FFF
on	2-3	2-3	DD000-DEFFF	DF000-DFFFF

Now the CONFIG.SYS file on the PC memory card is configured to boot from memory window DA000. If the user wants to change this value then he has to change the /F:DA00 value from MMCD.EXE to another value.

If a memory manager such as EMM386 is in use, then the memory address range of the memory window and BIOS extension must be excluded.

Example:

EMM386 NOEMS *X=D800-DAFF*

Step 3: Enable the AUTO-BOOT BIOS extension on the MSMJ104 /D board

1. Power-down the PC.
2. Install Jumpers J23 and J24 (see table step 2).
3. Power-up the PC with PC-CARD bootable memory card in the slot.

7.7   Installing the AUTO-BOOT Option manually

The AUTO-BOOT installation steps are summarized as follows:

1.   Prepare a DOS system memory card.
2.   Modify CONFIG.SYS and AUTOEXEC.BAT files.
3.   Copying the AutoBoot files to the memory card.
4.   Enable the AUTO-BOOT BIOS Extension on the MSMJ104 card as follows:

Address Table of the MSMJ104 /D:

Boot from PC-CARD	J23	J24	Adress of **BIOS-EXTENTION**	Adress of **MEMORY WINDOW** to access PC-CARD
off	1-2	1-2	-	D0000-D3000
on	1-2	2-3	D8000-D9FFF	DA000-DAFFF
on	2-3	1-2	D0000-D1FFF	D2000-D2FFF
on	2-3	2-3	DD000-DEFFF	DF000-DFFFF

The procedure is only valid for SRAM cards and FLASH cards with the SCM Flash-File-Format (SCM_FFS).

STEP 1:   Prepare a DOS memory card:

Before you can transfer system files to a Memory Card it needs to be reformatted. Follow these steps to format the Memory Card for system files:

- Type in MCFORM [drive letter] –e and press the [ENTER] key.
- Select menu option 1 and choose the type and size of the Memory Card you are formatting.
- Select menu option 3 to format Memory Card for systems files.
- Type the drive letter which contains your DOS system files (C:) and press the [ENTER] key. Now the system files and the COMMAND.COM will be copied to the Memory Card.
- Leave the formatting program by pressing the ESC key.

Note: When using dual slot systems on the MSMJ104 card, you need to enter the drive designator of the slot which you intend to use for formatting.

STEP 2: Modify CONFIG.SYS and AUTOEXEC.BAT files

A few lines in your CONFIG.SYS and AUTOEXEC.BAT must be modified or added before copying the system files to a MEMORY CARD. If you are using Flash cards with SCM-FFS, then use modification A for your CONFIG.SYS. If you are using SRAM cards, then use modification B for your CONFIG.SYS.

Modification of CONFIG.SYS:

```
          DEVICE = MMCD.SYS  /B:3e0  /F:zzzz  /R:3  /P:170  /U:1
          SHELL   = y:\COMMAND.COM  y:\ /P
```

y   stands for the drive designator of the memory card slot, from which you intend to boot (D:, E:, F:)
zzzz   is the memory window for access PC-CARD-Card → see table 4.3 (D200, DA00, DF00)

Modification of AUTOEXEC.BAT:

```
y                       (must be the first line entry)
.........
.........
vector.bat              (must be the last line entry)
```

y   is the logical drive designator of the MMCD as described above.

STEP 3: Copy the AUTO-BOOT files to the MEMORY CARD

- Copy the REVECTOR.COM and VECTOR.BAT from the installation disk to the memory card.
- Copy the device driver MMCD.SYS to the Memory Card.
- Copy the modified files CONFIG.SYS and AUTOEXEC.BAT to the Memory Card.

STEP 4: Enable the BIOS Extension on the MSMJ104 /D card

- Install the Enable jumper on the MSMJ104 card to enable the BIOS extension (→ see Address Table of MSMJ104).

Starting application programs automatically:

If you want to have your application program started right after booting, you need to modify the file VECTOR.BAT. The file VECTOR.BAT contains on the installation disk only REVECTOR. Your modification could be as follows:

File VECTOR.BAT:

```
REVECTOR
............
Program 1
Program 2
```

8   MEMORY

8.1   Used Memory by the PC-CARD

When you are using a memory manager, such as EMM386, you must protect the Memory Address range of the MEMORY WINDOW and the BIOS EXTENSION *! SEE ADDRESS TABLE OF MSM104J.*

Example:

When using a memory manager (e.i. EMM386), the memory address range must be protected for the MMCD memory window. For example, if the **MEMORY WINDOW** is set to address D000, the size of the window is 16kByte and you use EMM386, the required device entry in CONFIG.SYS under MS-DOS is the following:

DEVICE = path \ EMM386.EXE NOEMS X=D000-D300

8.2   Used Memory by the FFS and PC-CARD

Attention

Although all Flashdisks are disabled, above mentioned memory areas are not free and may not be used by other hardware or extension boards!
For example: **Do not use in config.sys DOS = HIGH, DOS=UMB and himem.sys without**   **Device=C:\dos\emm386.exe noems i=B000-B7FF x=CC00-CFFF x=E000-EFFF x = D000-D300**

Example:

If XMS Memory is needed and a lot of drivers are used to be loaded in high memory areas. In order to generate a maximum of place in the high memory area, follow these steps:

1.   Edit **CONFIG.SYS** and make sure, that the following lines appear in CONFIG.SYS:

Device=C:\dos\himem.sys   *Device=C:\dos\emm386.exe noems i=B000-B7FF x=CC00-CFFF x=D000-EFFF*

There is not only the MEMORY WINDOW part, but we exclude the whole ADDRESS TABLE of MSMJ140 D000-EFFF in order to have no problems when we change the Jumpers J23/J24 to another address.

WARNING: **Memory managers, which erase the entire RAM area during initialization, such as 386MAX, cannot be used in the AUTO-BOOT mode.**

9   OVERVIEW OF THE FILES

INSTALLS.EXE   Autoinstaller of the software

MMCD.SYS   DOS Device driver for IFF, SCM_FFS and ATA-Cards into the CONFIG.SYS as:

/F:zzzz   This parameter specifies the Memory window address. The default value is D000, if no parameter is used. The Memory window location can be changed and will always use 4 KB of space.

> **Note:**   Because of possible conflicts with other system components, normally the Memory window should be in the range of C800-EF00.
>
> Example: MMCDFTL.SYS or MMCD.SYS driver, if the Memory window E000-E0FF should be used:
> DEVICE = ...\MMCD.SYS /F:E000

/B:xxx   This parameter specifies the I/O address of the PC-CARD controller. All Intel 82365SL compatible PC-CARD controllers use the default I/O address 3E0. This parameter can only be changed if the controller PCB supports different I/O addresses.

Example: MMCDFTL.SYS or MMCD.SYS driver, if the I/O address 300 should be used:

DEVICE = ...\MMCD.SYS /B:300

/P:zzz   This parameter specifies the I/O address used for ATA Cards. You must change this address if another hard disk in your system uses the default address 170.

Example: MMCDFTL.SYS or MMCD.SYS driver, if the ATA I/O address 200 should be used:
DEVICE = ...\MMCD.SYS /P:200

Note: If you are having problems by formatting ATA-Cards please change I/O adress to 200 !

/R:z   This parameter allows the selective drive letter allocation for slots.

Example: /R:1   First Slot
             /R:2   Second Slot only
             /R:3   First and second Slot
             /R:4   3rd Slot only
             /R:5   First and 3rd Slot ...and so on

/N   Do not use XMS for the driver.

/W   The driver works with zero wait states (Standard = 3 wait states).

/U:2   Initializes 2 partitions for PC-CARDs (can be used only with SRAM and ATA Cards).

MCFORM.EXE   Formats the Memorycards, ATA/Drives, Flashcards use MCFORM -e to enter in the extended mode.
MCFORM [drive] [-e]

ATAFRMT.EXE   Formats ATA-Harddisk or Sundisk Flash cards

SETMODEM.EXE   Modemcard Setup

SETMODEM [/P] [/W] [/I]
/P = 1,2,3,4   assigns the COM-Port number
/W = C800, ... , EF00   setting of the memory windows
/I = 0,1,2,3...15   defines the used interrupt for the modem

Recommended: SETMODEM /P4 /WD000 /I5

10   THE REGISTERS OF THE VG-468/469

Boot Option for selecting the Index Base Addresses:

J18 INTR:	J14: SPKROUT:	Index Base:	I/O Address:	Comment:
1-2 (vcc)	1-2 (vcc)	00h	3E0h/3E1h	DEFAULT
1-2 (vcc)	*2-3 (gnd)*	*80h*	*3E0h/3E1h*	***
2-3 (gnd)	1-2 (vcc)	00h	3E2h/3E3h	(needed on ELAN400 boards)
2-3 (gnd)	*2-3 (gnd)*	*80h*	*3E2h/3E3h*	***

* only on VADEM VG468 controller available !

GENERAL SETUP:

Registers:	00	RO	Socket A: = 00	Socket B: = 40h

D7:6	Interface Type
D5:4	reserved
D3:0	Chip Revision: 0011 = Intel, 1011 = Vadem

INTERFACE STATUS:

Registers:	01	RO	Socket A: = 01	Socket B: = 41h

D7	GPI Pin	
D6	PC-CARD power Actv:	0 = power off, 1 = power on
D5	Ready/Busy:	0 = PCCard is busy, 1 = PCCard is ready
D4	Write protect:	0 = R/W, 1 = PCCard is write protected
D3:2	Card Detect:	complement of the values CD[1:2]
D0:1	Battery Voltage Detect:	00:= battery is dead, 11:= battery is good

---

POWER AND RESETDRV CONTROL:

Registers:	02	RW	Socket A: = 02	Socket B: = 41h

D7	Output Enable	
D6	Disable resume resetdrv	
D5	Auto Power Switch Enable	
D4	PC-CARD Power Enable]	
D3:2	00 = Vpp = open	01 = Vpp = Vcc
	01 = Vpp = +12V	11 = Vpp reserved
D1:0	00 = Vcc = open	01 = Vcc = Vcc
	01 = Vppcc +12V	11 = Vpp reserved

POWER AND RESETDRV CONTROL:

| Registers: | 03 | RW | Socket A: = 03 | Socket B: = 43h |

D7	Output Enable
D6	Disable resume resetdrv
D5	Auto Power Switch Enable
D4	PC-CARD Power Enable
D3:2	00 = Vpp = open 01 = Vpp = Vcc
	01 = Vpp = +12V 11 = Vpp reserved
D1:0	00 = Vcc = open 01 = Vcc = Vcc
	01 = Vppcc +12V 11 = Vpp reserved

CARD STATUS CHANGE REGISTER:

| Registers: | 04 | RW | Socket A: = 04 | Socket B: = 44h |

D7	Activity Timeout
D6:5	Reserved
D4	PC GPI Change
D3	Card Detect Change
D2	Ready Change
D1:	Battery Warning
D0:	Battery is dead

ADDRESS WINDOW REGISTER:

| Registers: | 05 | RW | Socket A: = 05 | Socket B: = 45h |

D7:6	I/O Window Enable
D5	MEMCS16 Decode
D4:0	Memory Window Error

ADDRESS WINDOW:

| Registers: | 06 | RW | Socket A: = 06 | Socket B: = 46h |

D7:6	I/O Windows Enable
D5	MEMCS16 Decode
D4:0	Memory Window Enable

ADDRESS START WINDOW Lowbyte:

Registers:	Window 0:	10h	RW	Socket A: = 10h	Socket B: = 50h
	Window 1:	18h	RW	Socket A: = 18h	Socket B: = 58h
	Window 2:	20h	RW	Socket A: = 20h	Socket B: = 60h
	Window 3:	28h	RW	Socket A: = 28h	Socket B: = 68h
	Window 4:	30h	RW	Socket A: = 30h	Socket B: = 70h

D7:0	System Memory Window Start Address A19 : 12

ADDRESS START WINDOW Highbyte:

Registers:	Window 0:	11h	RW	Socket A: = 11h	Socket B: = 51h
	Window 1:	19h	RW	Socket A: = 19h	Socket B: = 59h
	Window 2:	21h	RW	Socket A: = 21h	Socket B: = 61h
	Window 3:	29h	RW	Socket A: = 29h	Socket B: = 69h
	Window 4:	31h	RW	Socket A: = 31h	Socket B: = 71h

D7	Data Size	0 = 8bit	1 = 16 bit
D6	Zero Wait State	0 = 1WS	1 = 0WS
D5:4	Scratch bits		
D3:0	System Memory Window Start Address A23 : 20		

ADDRESS STOP WINDOW Lowbyte:

Registers:	Window 0:	12h	RW	Socket A: = 12h	Socket B: = 52h
	Window 1:	1Ah	RW	Socket A: = 1Ah	Socket B: = 5Ah
	Window 2:	22h	RW	Socket A: = 22h	Socket B: = 62h
	Window 3:	2Ah	RW	Socket A: = 2Ah	Socket B: = 6Ah
	Window 4:	32h	RW	Socket A: = 32h	Socket B: = 72h

D7:0	System Memory Window Start Address A19 : 12

ADDRESS STOP WINDOW Highbyte:

Registers:	Window 0:	13h	RW	Socket A: = 13h	Socket B: = 53h
	Window 1:	1Bh	RW	Socket A: = 1Bh	Socket B: = 5Bh
	Window 2:	23h	RW	Socket A: = 23h	Socket B: = 63h
	Window 3:	2Bh	RW	Socket A: = 2Bh	Socket B: = 6Bh
	Window 4:	33h	RW	Socket A: = 33h	Socket B: = 73h

D7:6	Zero Wait State
D5:4	Scratch bits
D3:0	System Memory Window Stop Address A23 : 20

CARD MEMORY OFFSET ADDRESS Lowbyte:

Registers:	Window 0:	14h	RW	Socket A: = 14h	Socket B: = 54h
	Window 1:	1Ch	RW	Socket A: = 1Ch	Socket B: = 5Ch
	Window 2:	24h	RW	Socket A: = 24h	Socket B: = 64h
	Window 3:	2Ch	RW	Socket A: = 2Ch	Socket B: = 6Ch
	Window 4:	34h	RW	Socket A: = 34h	Socket B: = 74h

D7:0	Card Memory Offset Address A19 : 12

CARD MEMORY OFFSET ADDRESS Highbyte:

Registers:	Window 0:	15h	RW	Socket A: = 15h	Socket B: = 55h
	Window 1:	1Dh	RW	Socket A: = 1Dh	Socket B: = 5Dh
	Window 2:	25h	RW	Socket A: = 25h	Socket B: = 65h
	Window 3:	2Dh	RW	Socket A: = 2Dh	Socket B: = 6Dh
	Window 4:	35h	RW	Socket A: = 35h	Socket B: = 75h

D7	Write Protect
D6	REG Active
D5:0	Card Memory Offset Address A25 : 20

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