CardWare®
for Windows 3.x
R 7.00
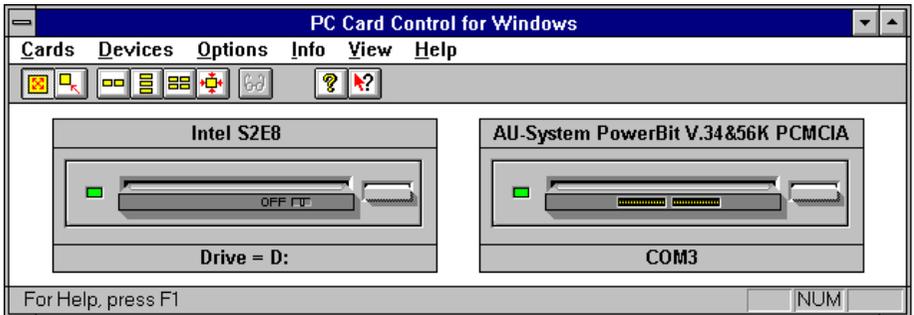
User's Guide

Copyright Notice and Disclaimer

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CardWare 7.00

Evaluation and Registration

You are licensed to use CardWare free-of-charge during a 14-day period for evaluation purposes only. Any use of the CardWare evaluation software other than evaluation, represents a breach of this license and may result in legal prosecution.

See the README.TXT file in you CardWare installation directory for information about how to contact APSoft and how to license CardWare.

The Serial Number

APSoft issues the serial number when you purchase CardWare. Once entered, it will transform the evaluation version of CardWare into a full retail version. The serial number is valid for free updates during a period of one year. Any update of CardWare released by APSoft during this time can be installed using the same serial number. After the annual expiry date the serial number will still be able to use your copy of CardWare without time limitation, but you will not be able to upgrade any longer free-of-charge.

If you want to continue to receive free updates of CardWare, you will need to purchase an upgrade. You will receive a remainder two weeks before the serial number expires. For details on our upgrade policy and price please check our WEB site http://www.tssc.de/web/policies.htm.

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Quick Install

In most cases, this quick install is all you need to know about CardWare. Once installed, CardWare automatically configures your system to recognize almost all PC Cards, with no intervention needed on your part. If you have special installation requirements, see Chapter 3 for a detailed description of the process.

How to install CardWare:

1. Remove all PC Cards from your system.

2. Start Windows 3.X.

Depending on the source of CardWare, - CD ROM or downloaded self-extracting file from the APSoft WEB site http://www.tssc.de:

- *CD ROM installation*:

    a) Insert the CardWare CD-ROM into your computer and the AUTORUN program will start.

    b) Please choose "Install CardWare" and the CardWare setup will automatically start.

- *Installation from the WEB:*

    a) In the download products area of APSoft's WEB, click on the floppy icon to start the download. If you are using Microsoft(R) Internet Explorer, the File Download window will open. Click on 'Save' to store the file onto your harddisk. After download please run this executable file.

When the splash screen appears choose "Copy CW Setup on HDD". The installer will automatically unpack the self-executable file to your temporarily sub-directory and then copy disks images to the directory you select. For start the CardWare Setup please run SETUP.EXE from \DISK1 directory.

3. Move through the first screens, selecting to "Continue the installation".

5. Review the list of platforms. If your system is listed, select it. If you do not find your system in the list, select Controller Autodetect.

6. When asked to choose the installation type, select Express installation.

7. When asked about modifying system boot files, select Let Setup do modifications for you.

8. When the program ends, restart your system. CardWare should load and automatically detect insertion and removal of PC Cards any time during system operation.

To install CardWare under MS-DOS you should run INSTALL.EXE from the \DISK1 directory.

CardWare Basics

This chapter gives an overview of how CardWare, using your computer resources, makes PC Cards work for you.

What Is CardWare?

CardWare is a PC Card standard total software solution. It is designed to painlessly manage the complexity of plugging and unplugging the latest generation of PC Cards.

More specifically, CardWare offers two kinds of services to your PC:

1. CardWare provides an industry standard application-programming interface (API). This API allows third party software (network drivers, for instance) to communicate with PC Cards in an orderly manner. The API consists of both socket and card services and complies with the PC Card standard.

    This level of support requires third-party software that can install and configure PC Cards. Such software would then use the services of CardWare to manage the card(s).

2. CardWare can also install and configure PC Cards on your system, so standard software, not just PC Card-specific software, can access the card. The CardWare PCENABLE module performs this generic installation of PC Cards.

Additionally, CardWare allows you to use storage cards (memory cards and PC Card ATA flash disk and hard disk drives) as if they were normal floppy or hard disk drives.

CardWare works in the background in both DOS and Microsoft Windows. Thus both DOS and Windows applications can make use of your PC Cards.

In spite of the well-documented PC Card standards, not all PC Cards are perfectly compatible. CardWare attempts to recognize and configure as many PC Cards as is possible. Even when it does not fully recognize a card, CardWare still attempts to configure it. CardWare also gives you every opportunity to fine-tune its ability to recognize a given card.

CardWare offers a special capability: individual configuration of PC Cards. The PCCard Control program lets you specifically tailor the configuration of any PC card. You may never need this feature, as an increasing number of PC Cards conform to the PC Card standard. However, if a card does deviate, or if you prefer a different configuration, CardWare gives you exceptional power combined with unparalleled ease.

A Word about CardWare in DOS and in Windows 3.x

Once, installed, CardWare works in the background in both DOS and Microsoft Windows 3.x. This means that both DOS and Windows applications can make use of your PCMCIA cards (PC Cards).

A Special Note about Windows 3.x
To gain the full benefits of CardWare, you should first familiarize yourself with Windows. This manual assumes you know how to use Windows and uses Windows specific terminology throughout. For help with Windows, see your Windows documentation.

Key Concepts

To understand how CardWare recognizes and configures PC Cards, it is important to be familiar with the following three key concepts:

1. **Generic**. A *generic* card conforms to PCMCIA standards for one of several types of PC Cards and has a data field that informs CardWare of its function. Generic cards recognized by include fax/modem, ATA data storage, LAN, SCSI, and some multifunction cards.

2. **Auto Configured.** A card is *auto configured* if the generic I/O card enabler (PCENABLE) determines how to install the card and uses this information for setting up the card**.**

3. **Configured**. A *configured* card is successfully installed and set up in your system.

By default, CardWare tries to auto-configure all PC Cards inserted in your system. In most cases, CardWare determines the correct setup for your card. If you need greater control, the PCCard Control program lets you change the configuration of each card.

You also can use PCCard Control to instruct CardWare **not** to configure a card, in cases where your card comes with its own configuration software.

Terminology

The glossary defines most of the technical terms in this manual. However, several terms are vital to understanding how CardWare works:

- **CIS**. PC Cards that comply with industry standards contain a card information structure (CIS) that consists of information about the card, its purpose, and the resources it needs.

- **Registered**. CardWare has recorded information used to identify the card when inserted in an internal database.

- **System resources**. To operate, CardWare must be assigned system resources. System resources include:

  - Memory address space
  - Interrupt ReQuest (IRQ) levels
  - I/O address space
  - DMA channels

  When a card is inserted, CardWare assigns resources to the card from the pool of available resources. These system resources must be excluded from use by other system software such as memory managers and Windows.

- **Device**. The identity of a collection of *system resources* that the PC Card uses once it is configured. For instance, a COM port, such as COM1, is a device that uses I/O memory range 3F8-3FFh and IRQ 4 as *system resources*.

- **Associated devices**. An ordered preference list of devices that CardWare uses to configure a PC Card from the available system resources.

- **Installing a PC Card**. A process including these steps:

  1. Mapping memory ranges from the PC Card into the system memory space.

  2. Mapping I/O ranges from the PC Card into the system I/O space.

  3. Routing an Interrupt from the PC Card to a system interrupt.

Where to find information

- This manual contains basic information about CardWare. Use it as your first information source.

- While using the PCCard Control in Windows, you can press F1 to get online help for nearly every dialog box in the program.

- Check the CardWare installation directory for a README file. This file contains the latest information about CardWare.

- Check APSoft WEB site (http://www.tssc.de) for the latest information on CardWare releases, Tech. Support, troubleshooting, FAQs…

NOTE: Throughout this manual are references to lines required in your CONFIG.SYS. One line in particular includes reference to a device driver, SSxxxxxx.yyy. This line is a generic reference to software that supports a specific type of socket controller. The x's and y's are specific to a certain type of controller, while SS means socket services.

System Requirements

Component	Description
Microprocessor	80386 or higher
RAM	2MB
PC Card controller	At least one socket using one of the supported controller ICs (check the README file for the latest information)
Hard Disk	Approximately 1.5 MB free space
Floppy Disk	3.5-in FDD drive (during install process)
Video	EGA or higher
DOS	Version 3.2 or newer. Using PCDISK requires version 5.0 or newer.
Windows	Version 3.x. NOT Windows 95

How CardWare Recognizes a PC Card

When you insert a PC Card into your system, CardWare reads the CIS from the card. The CIS normally supplies detailed information about the type of card (e.g., LAN or modem), and the system resources it requires. If CardWare can't read the CIS, it cannot recognize or configure the card.

Next, CardWare searches its internal database for a record of this *specific* card. If such an entry exists, CardWare tries to configure the card with one of its associated devices.

If no record exists, CardWare checks whether the card is *generic*. If it is, CardWare tries to configure the card with one of the devices associated with the generic card.

If the card is neither *specific* nor *generic*, CardWare tries to *auto-configure* the card with a pre-defined device. If this fails, CardWare tries to create a device on the fly and to configure the card with this new device.

**First-Time
Insertion of a
PC Card**

There are three possibilities when a new PC Card is inserted for the first-time:

1.   The card is a *generic* type of PC Card and, if the resources are available, CardWare automatically installs it (or not, if the card's definition directs CardWare to ignore it).

     The CARDWARE.INI file lists and defines generic cards.

2.   CardWare *auto-configures* the card because the card is not generic (such as a LAN card) or it is a generic card that cannot be configured with the associated devices (because the requested resources are not available).

3.   CardWare cannot configure the card because either the requested resources are not available, or the CIS structure on the card does not include enough information to recognize the card and to register it for future use.

Generic Cards

Many, but not all, PC Cards contain standard information that CardWare can read. One piece of information that may be present is the function of the PC Card. If CardWare recognizes a new PC Card as a generic type, it configures the card according to the devices associated with its particular generic type.

By default, generic modems are set up as the next available COM port. Generic ATA flash disks and hard disks use the logical drive letter assigned to the PC Card socket where the card was inserted.

You can change the devices associated with generic modems with PCCard Control for Windows, the card display and configuration utility. Redefining devices is described in Chapter 4 and also in CardWare online help.

Auto-Configured

Some PC Cards can be recognized even if they do not include all the required CIS information. These cards are auto-configured by default. You have to ensure that the software intended for these cards is configured according to these settings. If you are running PCCard Control, you can determine the settings by right clicking on the device name displayed below the socket (see Chapter 4). From DOS you can type DOSCARD /D to get this information.

Other Configuration Options

If you **do not** want a card to be auto-configured by CardWare, use PCCard Control to change the way CardWare tries to configure the card.

If a card has enough information in the CIS to be recognizable each time it is inserted, it is possible, by carefully using PCCard Control (see Chapter 4), to configure the card properly. This process enters the card into the CardWare internal database and makes it a *specific* card.

You can also tell CardWare not to configure the card at all, in case the card comes with its own software. This procedure is described in Chapter 4 and in CardWare online help.

Not Recognizable

Some PC Cards (which are not truly PCMCIA-compliant) cannot be recognized because there is not enough information on the card to act as a unique identifier.

Of Mice, Serial Ports and System Resources

Even when CardWare recognizes a PC Card, it may not be able to configure it, because system resources described in the associated devices are not available when you insert the PC Card. Usually, another PC Card or system peripheral is currently using the resources described in the device(s).

For example, suppose you insert a fax/modem PC Card associated with the devices COM1 and COM2. Because the system already has COM1 and COM2 devices on the motherboard, CardWare cannot configure the newly inserted card.

Using PCCard Control, you may change the card's definition to COM3 or COM4. Or you may disable one or both onboard COM ports to make COM1 or COM2 available to the PC Card.

Unfortunately, if your system has a serial mouse, removing the mouse from COM1 or COM2 is not an attractive alternative - especially in Windows. And assigning a fax/modem to COM3 or COM4 may cause a conflict with a mouse plugged into COM1 or COM2. The problem is that COM3 and COM1 use the same IRQ (IRQ4), as do COM4 and COM2 (IRQ3). And two COM ports *cannot share an IRQ!*

For example, an IRQ conflict could cause your serial mouse to freeze when you send or receive a fax. If you are in Windows, you could not get your mouse to function without quitting and then restarting Windows.

You can avoid COM port conflicts by configuring COM3 and COM4 use different IRQs. To change your port settings in Windows:

1.   Open the Control Panel (usually found in your Main Windows group) and select Ports. You should see icons for ports COM1-4.

2.   Choose the port you wish to reconfigure.

3.   Next, select Settings. Review the fax/modem settings for the baud rate, data bits, etc. You probably don't need to change them.

4.   Then, select Advanced. The IRQ and base I/O address for the selected COM port appears. The most common alternative IRQ selection for either COM3 or COM4 is IRQ 5 (by default, assigned to a second parallel port).

Other often-available IRQs are 10 and 11.

You probably don't need to change the I/O address.

5.   Select <u>O</u>K and complete the configuration.

Fortunately, most new computers have a dedicated mouse port (usually PS/2). If your mouse has a circular, not rectangular or D-shaped, connector, it's probably a PS/2 mouse. Then do **not** associate any PC Card with IRQ 12.

CardWare Features

Multi-Function Cards

CardWare uses the same basic logic for multi-function cards as for single-function cards. Upon detecting a multi-function card, CardWare configures each separate function as if it were a separate PC Card. When editing a multi-function card, the following dialog box pops up, asking you to select the function you wish to edit.
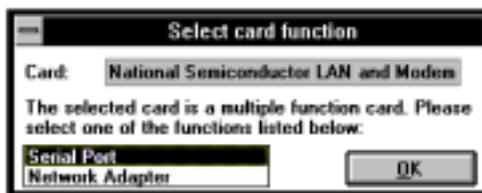
Hot Swapping and Hot Docking

CardWare supports hot swapping and hot docking.

Hot swapping is inserting a card in a socket while the computer is in full power and fully functional operating mode. By design, PC Cards support hot swapping; however, some driver software does not. Do not insert or remove

• A fax/modem card while your telecommunication software is loaded

• A network interface card (LAN card) while a network connection is active

Hot docking is inserting (or removing) a mobile computer into a docking station while both the computer and the docking station are in full power and fully functional operating mode. CardWare now recognizes the addition or removal of a docking station after a docking event and adds or removes support for any PC Card sockets on the station.

CardWare support of hot docking depends on two conditions:

- Your mobile system where CardWare is loaded must have a Plug and Play BIOS that supports hot docking.

- The Card Services driver and PCRM.EXE (if any) must load *before* the Socket Services driver.

In previous versions of CardWare, the Socket Services driver loaded before the other CardWare files. The installation software you receive with this manual now loads CardWare modules in the correct sequence to support hot docking. See Chapter 5 for details about the loading sequence of CardWare modules.

Using Battery Operated Computers

Many battery-operated computers have Advanced Power Management (APM) software that monitors system activity, shutting down various components (and even the computer itself) whenever they have been idle for a set period of time. APM can make a significant difference in the length of time you can work before having to recharge the battery.

Most APM-equipped computers are PC Card aware and can detect the presence of a PC Card and can notify CardWare and other PC Card support software when system power is about to be turned off. However, some computers do not comply with PC Card standards, even though they have one or more PC Card sockets.

If your computer and system software are not PC Card aware, we suggest that you disable APM *suspend mode* while you are using your PC Cards. Just as you wouldn't pull the plug to your VCR from the electrical outlet while recording a TV program, you don't want to allow the "plug" to be pulled on your card while it is live or connected to your computer.

What the Beeps Mean

Beeps tones are the standard way of notifying you that certain events have occurred.

By default, CardWare uses the system speaker to signal recognition and configuration of installed PC Cards, as follows:

1. A single beep signals the insertion of a PC Card.

2. A second, slightly higher pitched beep indicates that the PC Card has been recognized by the generic card enabler (PCEnable).

3. Finally, a third beep, at an even higher pitch, indicates the recognized PC Card is configured using an associated device.

4. A two-tone warning sounds twice if a recognized PC Card cannot be configured because none of the associated devices are available. This warning comes after the initial two beeps signal card insertion and recognition.

NOTE: *You can disable the beep tones that signal card insertion, recognition and configuration by the card display and configuration utility (PCCard Control). The current state of any installed PC Card can be determined by viewing the program's display. In the Windows PCCard Control program (described in Chapter 4), you can select sound files (.wav files) to signal PC Card events.*

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Types of PC Cards

This chapter introduces common types of PC Cards. Follow chapters are describe configuring your PC Cards with PCCard Control for Windows and includes a discussion about assigning system resources for devices.

There are four common types of PC Cards:

1. Fax/modem cards
2. LAN cards
3. ATA data storage cards
4. Memory cards

CardWare attempts to configure a PC Card whenever one is inserted. You can view the status of your cards in both DOS and Windows:

1. In DOS, use the DOSCARD /ID command to display the current device, or type PCCARD at the DOS prompt to enter the PCCard Control program.

2. In Windows, double click on the PCCard Control icon. A graphical representation opens, showing the number of available sockets and the cards plugged into each. The text identifying the type of device detected (such as a fax/modem) and the system resource associated with it (such as COM3) is displayed below of each occupied socket.

NOTE: *See also the Appendix chapter "Specific PCMCIA Cards" for the information about known non-conforming PC Cards and their recommended settings.*

Fax/Modem Cards

You can insert a modem card into the PC Card socket either before or after you turn on your system. If you insert the modem card before system power-on, three beeps at the end of the POST messages signify that the card was successfully installed and is now active. If you insert the card at the DOS prompt or under Windows, the system also sounds three beeps on successful recognition.

CardWare automatically recognizes and installs your modem PC Card as a modem if it has a valid CIS that conforms to PC Card standard specifications. If your CIS is not valid, or has been damaged, CardWare cannot configure the card.

NOTE: *If your modem is a generic modem, it does not appear by name in the card list when you choose the* Cards | Edit *command. To change the configuration for a generic modem, edit the associations for the Generic Modem card (see Chapter 4).*

If a specific or generic fax/modem has more than one associated device, CardWare attempts to configure the card dynamically, trying each device in the same order as it appears in CardWare's internal database. For example, if you associated the card with COM1, COM4, and COM3, respectively, then when the card is inserted, CardWare attempts first to configure the card as COM1. If COM1 is already in use, the software next attempts to configure the card as COM4, and then COM3 (if necessary).

NOTE: *Few third-party fax and telecommunication programs can detect the difference between an ISA BUS modem and a modem PC Card. Insert your modem before you run any third-party fax or telecommunication software. We recommend against removing or hot-swapping PC Cards during the operation of such a software package (i.e., replacing the modem with a different type of card.*

Network Adapter Cards

You can insert a LAN card into the PC Card socket either before or after you turn on your system. If you insert the LAN card before system power-on, three beeps at the end of the POST messages signify that the card was successfully installed and is now active. If you insert the card at the DOS prompt, the system sounds three beeps on successful recognition.

NOTE: If you plan to use LAN cards while in Windows, insert the LAN card before you start Windows, so Windows can properly allocate and recognize resources.

Most types of network software must be running before you start Windows, so Windows can recognize the availability of a LAN and reserve the resources.

Because very few network operating systems support PC Card hot swapping, **NEVER** remove a LAN card while the system is connected to the network. Log out before you remove the card from the socket.

By default, CardWare ignores LAN cards, because most current LAN PC Cards come with their own software.

However, if you have CardWare configure your LAN PC Card, the resulting card configuration emulates conventional ISA bus LAN cards, and you can use standard network operating system card drivers.

NOTE: If your PC Card already comes with client software that does not require CardWare to configure the card, associate the device name [Do not configure] with the card, so you are not prompted to configure this card in the future.

ATA Flash disk and Hard disk Cards

You can insert an ATA flash disk or hard disk card into the PC Card socket either before or after turning on your system. If you insert the ATA card before system power on, three beeps at the end of the POST messages signify that the card was successfully installed and is now active. If you insert the card at the DOS prompt or under Windows, the system also sounds three beeps on successful recognition.

Your ATA PC Card is automatically recognized and installed as a disk drive if it has a valid CIS that conforms to PC Card standards. If the card's CIS is not valid, or has been damaged, CardWare cannot configure it.

NOTE: If your ATA drive is a generic drive, its name does not appear in the Card list when you choose the Cards | Edit command. To change the configuration for a generic drive, edit the associations for the Generic ATA Disk card.

To change the configuration for an ATA PC Card, see Chapter 4. CardWare attempts to configure the card dynamically using the devices in the same order as they appear in the Associations box for the card.

The manufacturer usually formats ATA PC Cards. If your card is not formatted or you wish to change the format, use the same commands you would use to format an internal hard drive (e.g. FDISK and Format).

Memory Cards

You can insert a memory card in the PC Card socket either before or after you turn on your system. If you insert the memory card before system power-on, three beeps at the end of the POST messages signify that the card was successfully installed and is now active. If you insert the card at the DOS prompt or under Windows, the system sounds three beeps on successful recognition.

SRAM Cards

You can use SRAM cards the same way you use diskettes.

If your SRAM card is not already formatted, run FORMAT before copying files to your memory card. You can also use the Windows File Manager for formatting and copying.

Flash Cards

To use a flash memory card, you need to install software for it on your system and prepare the card, if it is new.

System Software

You need two system software components for a flash memory card:

- *A flash filing system (FFS).* APSoft now supplies a PC Card-compliant Flash Translation Layer driver with CardWare, or you may use Flash-File-System II (FFS II), purchased separately from Microsoft. *See also Appendix, chapter "Legacy* Devices Resource Assignment

- The industry-standard PC AT bus uses a scheme of permanent device resource assignments, shown below:

Device	Interrupt	Address (hex)
COM1	4	3F8-3FF
COM2	3	2F8-2FF
COM3	4	3E8-3EF
COM4	3	238-2EF
LPT1	5	3BC-3BF (monochrome display and printer adapter only)
LPT1/LPT2	7	378-37F
LPT2/LPT3	5	278-27F
VGA	-	3C0-3CF, 3D0-CDF
IDE HDD		

Primary	14	1F0-1F7, 3F6, 3F7
Secondary	15	
SCSI HDD	11	270-277
Floppy drive	6	3F2, 3F4, 3F5, 3F71
PS/2 mouse	12	-

- Using Flash Cards With CardWare*".*

- *A media technology driver (MTD)* for your specific card. APSoft now includes flash MTDs for all current flash cards from AMD, Intel, and Hyundai (and their compatibles) in a new driver, PCFLASH.EXE.

CardWare includes the FTL driver and MTDs in its automatic installation process.

After installation, a section of your CONFIG.SYS file should look like this:

```
DEVICE = C:\CARDWARE\DPMS.EXE
DEVICE = C:\CARDWARE\PCCS.EXE
DEVICE = C:\CARDWARE\SSxxxxxx.EXE
DEVICE = C:\CARDWARE\PCENABLE.EXE
DEVICE = C:\CARDWARE\PCFLASH.EXE
DEVICE = C:\CARDWARE\PCDISK.EXE
```

Card Preparation

Preformat a *new* card by running the CardWare PCDISK utility from the DOS prompt with the /ES:n switch. See Chapter 5 for details about PCDISK. NOTE that even though PCDISK is included in the CONFIG.SYS example above, you must run it as a utility at the DOS prompt (**NOT** a DOS session in Windows) to preformat flash cards.

After preformatting, format the new card, just as you would format a floppy disk, using the DOS FORMAT utility or equivalent.

After your flash card is formatted, you can use it the same way you use diskettes. The procedure for copying and deleting files on a flash card is the same as that for an SRAM card. You can also use Windows File Manager.

PC Card Resource Requirements

This section lists the devices associated with each type of PC Card and their default resource requirements.

Fax/Modem Cards

A fax/modem card is a type of serial I/O peripheral.

Associations	COM1, COM2, COM3, COM4
I/O range	3F8h, 2F8h, 3E8h, 2E8H
Length (bytes)	8
Memory range	None
IRQ	None, Any, 2 - 15
Defaults	COM1: 3F8h, 8 bytes, No memory range, IRQ 4
	COM2: 2E8h, 8 bytes, No memory range, IRQ 3
	COM3: 3E8H, 8 bytes, No memory range, IRQ 4
	COM4: 2E8h, 8 bytes, No memory range, IRQ 3

Network Adapter Cards

Network cards are commonly referred to as LAN1, LAN2, etc. However, because of the variety of network topographies, protocols and architectures, a wider range of resources is available for this type of card. By default, a network card is set to [Do not configure].

I/O range	None, Any, 100h - 3E0h
Length (bytes)	8, 16, 32, 64
Memory range	None, Any, C800h - EC00h
Length (KB)	None, 4, 8, 16, 32, 64
IRQ	None, Any, 2 - 15
Defaults	LAN1: 300h, 32 Bytes, None memory range, IRQ 5
	LAN2: 300h, 32 Bytes, D000h, 16 Kbytes, IRQ 5
	IBM 3270: 2D0h, 16 Bytes, CE00h, 8 Kbytes, IRQ 9

ATA Flash disk and Hard disk Cards

The standards defining this type of PC Card are an extension to the standards for conventional fixed disk drives. As such, the principal requirement for configuring such a device is to allocate it a drive letter.

I/O range	Any
Length (bytes)	16
Memory range	None
IRQ	None
Defaults	The above are the defaults and cannot be changed.

Memory Cards

Just as the ATA settings, above, are fixed, so too are those allocated to memory cards. Note that while CardWare should automatically detect a memory card as a flash or SRAM card and configure it accordingly, PCCard control lists the card type as Unknown.

Installing CardWare

This chapter tells how to install CardWare

The Windows installation includes formation of a CardWare program group on your Windows desktop, and it includes more installation options.

NOTE: *In some cases, your system may come with CardWare already installed. Before going through the installation procedure described in this chapter, check to see if CardWare is already installed.*

If you are replacing PC Card software from another vendor, remove the old software completely. See Chapter 5 for instructions.

Before you install CardWare, check the brand and type of your computer or PC Card system.

The Windows installation program is named Setup.exe.
The DOS installation program is named Install.exe.

What Happens During Installation

The CardWare installation process does the following:

1. Lets you specify the location of CardWare.

2. Copies CardWare files to your system.

3. Modifies your CONFIG.SYS and AUTOEXEC.BAT files.

4. Creates a CardWare group in your Windows Program Manager.

5. Gives you options to upgrade or uninstall CardWare.

CardWare Installation Options

1. Download CardWare from APSoft website

The latest version of CardWare is always available in the download area of APSoft's WEB site (http://www.tssc.de). You can always download CardWare from the WEB and use it as an update to a previously purchased version, or as an evaluation software.

In the download area of APSoft WEB, click on the floppy icon to start the download. If you are using Microsoft(R) Internet Explorer, the File Download window will open. Click on 'Save' to store the file onto your harddisk.

If you want to update an existing CardWare version, you will need to uninstall the existing version now.

After download please run this executable file.

When the splash screen appears choose "Copy CW Setup on HDD". The installer will automatically unpack the self-executable file to your temporarily sub-directory and then copy disks images to the directory you select. For start the CardWare Setup please run SETUP.EXE from the \DISK1 directory.

To install CardWare under MS-DOS you should run INSTALL.EXE program from the \DISK1 directory.

If you are using CardWare for product evaluation please note:

- You are licensed to use CardWare free-of-charge during a 14-day period for evaluation purposes only.

• Any use of the CardWare evaluation software other than evaluation, represents a breach of this license and may result in legal prosecution!

Unless you enter the valid serial number at the end of the CardWare installation, the software will function for 14 days in evaluation mode.

If you are satisfied with the result of your evaluation please contact mailto:sales@tssc.de to purchase the serial number.

Once entered, the serial number will transform the evaluation version of CardWare into the full retail version.

2.   Purchase CardWare on CD-ROM:

After inserting the CardWare CD-ROM into your computer, the AUTORUN program will start. Please choose "Install CardWare" and the CardWare setup will automatically start.

In the case the AUTORUN program will not start on your computer, please go to the directory on your CardWare CD-ROM and run SETUP.EXE from the \DISK1 directory.

To install CardWare under MS-DOS you should run INSTALL.EXE program.

The CardWare serial number is located on the inside of your CardWare package.

Evaluation and Registration

You are licensed to use CardWare free-of-charge during a 14-day period for evaluation purposes only.

Any use of the CardWare evaluation software other than evaluation, represents a breach of this license and may result in legal prosecution.

The Serial Number

APSoft issues the serial number when you purchase CardWare. Once entered, it will transform the evaluation version of CardWare into a full retail version. The serial number is valid for free updates during a period of one year. Any update of CardWare released by APSoft during this time can be installed using the same serial number. After the annual expiry date the serial number will still be able to use your copy of CardWare without time limitation, but you will not be able to upgrade any longer free-of-charge.

If you want to continue to receive free updates of CardWare, you will need to purchase an upgrade. You will receive a remainder two weeks before the serial number expires. For details on our upgrade policy and price please check our WEB site http://www.tssc.de/web/policies.htm.

Installation Choices

The first installation screen asks you to name your computer platform and select a setup type.
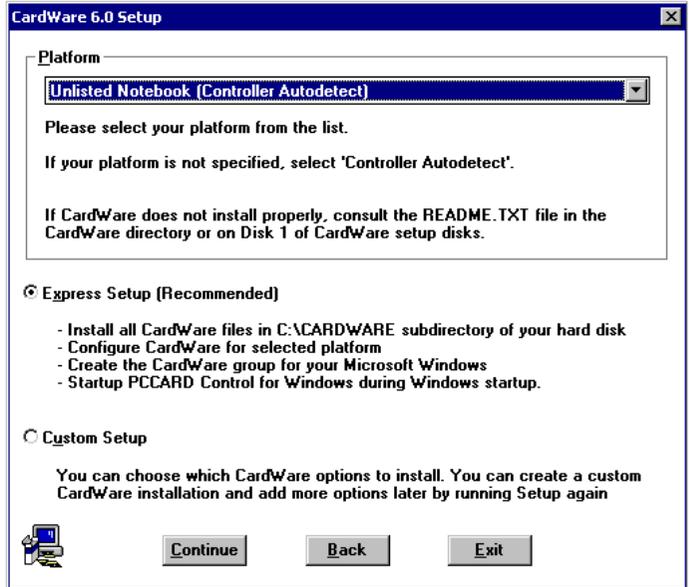
Platform

The *platform* is the type of computer or PC Card system where you are installing CardWare. The installation program can usually automatically detect the platform. If your platform is not in the list of platforms, the default Controller Autodetect should be sufficient.

To change the platform, scroll through the Platform selection window. It lists computers and/or card readers specifically supported by this version of CardWare.

Setup Type

Choose between two different types of setup:

1. Express Setup
2. Custom Setup

Express Setup

Express Setup places all CardWare features on the default drive (C:) and directory (\CARDWARE). It does **not** prompt you to select individual components, but it **does** prompt you about changing your system files, CONFIG.SYS and AUTOEXEC.BAT. If you select Express Setup, skip to *Finishing the Installation* at the end of this chapter.

Custom Setup

This option lets you select the following:

1.   The type of PC Card controller in your system

2.   CardWare modules to install

3.   Location (drive and subdirectory) of CardWare files.

Custom Setup Options
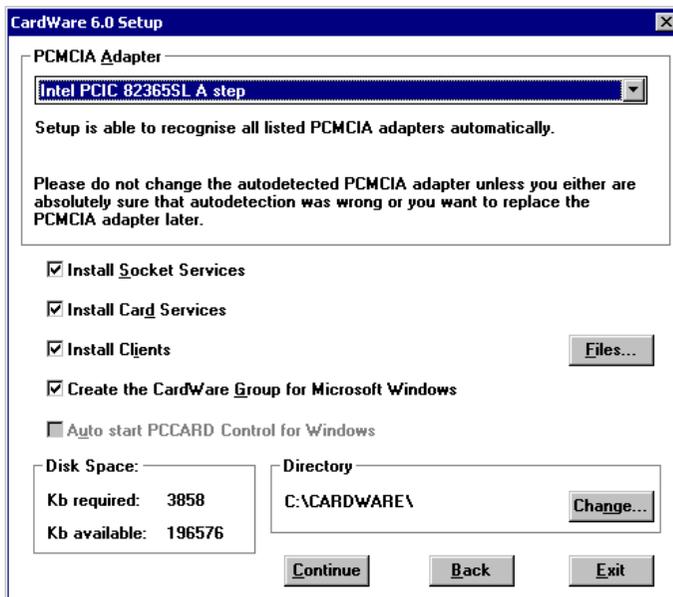
PCMCIA Adapter	This field displays the name of the adapter that CardWare has auto-detected in your system. We recommend that you change the adapter **only** if you are certain the auto-detection has erred or if you know you are going to install a different PC Card controller. To view more selections, scroll through the list.
Install Socket Services	This option installs a driver for your PC Card controller (the PCMCIA Adapter selected in the previous field).
	Even if the PC Card controller in your system has its own proprietary PC Card-compliant Socket Services driver, we recommend that you try the CardWare Socket Services driver first, because CardWare cannot function correctly if the proprietary driver is incompatible. If CardWare is unsuccessful, then try the proprietary driver of the PC Card controller.
Install Card Services	The Card Services driver controls PC Cards. If you have a special PC Card or one with it own proprietary software that is not compatible with the CardWare Card Services driver, then you may not need to install CardWare Card Services. In most cases, however, you should install the CardWare Card Services driver and try it first with the card.
Install Clients	Clients are applications that use Socket and/or Card Services. CardWare includes five clients:

1. Generic I/O Card Enabler — software that recognizes I/O cards when they are inserted.

2. Generic Memory Card Enabler — software that recognizes memory cards when they are inserted. Includes SRAM and ATA media technology drivers (MTDs).

3. PCCard Control for Windows — CardWare Windows interface for configuring PC Cards.

4. PCCard Control for DOS — CardWare DOS interface for configuring PC Cards.

5. Online Help — PCCard Control help and DOS text files.

To see a list of CardWare clients, click

> **Files...**

Select only those clients you want to install. A box at the bottom of the window lets you keep track of available disk space.

Create <u>G</u>roup	The option **Create the CardWare <u>G</u>roup for Microsoft Windows** instructs the program to create a CardWare group in Windows 3.x.
A<u>u</u>to Start ...	The option **A<u>u</u>to Start PCCard Control for Windows** automatically starts PCCard Control each time you begin a Windows session.
Directory	To specify the destination drive and subdirectory for CardWare files, click `Change...`

Modifying System Files

Both Express and Custom setup prompt you about modifying your system boot files, AUTOEXEC.BAT and CONFIG.SYS.

CardWare 6.0 Setup

Setup needs to make the following modifications to your configuration files:

CONFIG.SYS	Add CardWare devices to startup
AUTOEXEC.BAT	Add CardWare directory to your PATH

○ Let Setup do the <u>m</u>odifications for you.

Setup will modify your CONFIG.SYS and AUTOEXEC.BAT automatically. Before doing changes Setup will backup your existing configuration file:

CONFIG.SYS	- to CONFIG.BAK
AUTOEXEC.BAT	- to AUTOEXEC.BAK

○ Let you <u>r</u>eview all changes and make modifications later.

Setup will create files CONFIG.CW and AUTOEXEC.CW in your CardWare directory. You may review changes before updating your configuration files.

○ Do <u>n</u>ot modify configuration files.

Setup will not modify your configuration files. Please use this option with care: CardWare may not operate correctly. You should not select this option if you update the existing CardWare 1.x or 2.x version to CardWare 5.x.

[<u>C</u>ontinue] [<u>B</u>ack] [<u>E</u>xit]

There are three choices:

1. **Let Setup do <u>m</u>odifications for you**
   CardWare makes all necessary changes and backs up the originals, changing their extension to .BAK.

2. **Let you <u>r</u>eview all changes and make modifications later**
   No changes made but modified versions of both files are copied to the installation directory with the extension .CW. You can then inspect the proposed changes and edit as desired before implementing them.

3.   **Do not modify configuration files**

   If you select this option, CardWare may not be able to function properly.

Multiple Configurations

Many non-Windows applications, notably games, require different memory configurations and/or special drivers. Users of DOS 6.x can take advantage of its ability to boot into a menu of system configuration options. Also, to conserve memory in general, you can set up a menu to load infrequently used drivers, such as scanner drivers, only as needed, instead of having to rewrite your CONFIG.SYS file and reboot.

CardWare Setup can detect the multiple configurations and install itself selectively, according to your preferences.

If you have multiple configurations, three choices appear:

1.   You may add CardWare to one of your current configurations.

2.   You may create a new, special configuration for CardWare.

3.   You may add CardWare to all your configurations. Since you probably always want access to your PC Cards, this is your best choice.

Finishing the Installation

Follow the program instructions to complete the installation.

If CardWare does not detect a memory manager such as EMM386.EXE, QEMM386.SYS, etc., you are reminded that, if one is added later, you must configure it NOT to use areas of memory reserved for CardWare's use. See Chapter 5 for an example of configuring a memory manager in your CONFIG.SYS file. Also see CWINI.TXT (in the CardWare subdirectory) for more information. If Setup detects a memory manager, it automatically makes the changes for you.

When the installation of CardWare is complete and your system files updated, remove the CardWare distribution diskette from your floppy drive. Reboot your computer to activate CardWare, unless you did not update your AUTOEXEC.BAT and CONFIG.SYS files.

Uninstalling CardWare

Please see below "Removing CardWare" chapter on page 52.

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PCCard Control for Windows

PCCard Control in Windows presents a graphical representation of the PC Card socket(s) and the PC Card(s) you have inserted. PCCard Control lets you edit PC Card definitions, define their associated devices, reconfigure installed cards, and control the way CardWare runs.

In most cases, you need not run PCCard Control. CardWare reads the CIS from an inserted card and automatically configures it. You hear three beeps, signifying that the card is configured and ready for use. However, in cases where there are conflicts of resources, or when you want to change a card definition, you can use PCCard Control.

CardWare has a powerful online help system that gives you detailed information on all topics. You can get help by choosing Help from the main menu or by simply pressing the key F1 whenever you need help. If you press Shift-F1, the cursor changes to a question mark and you can point to the region for which you need help.

The Main Window

When you open PCCard Control, a window similar to this appears. It has a menu bar and optional tool bar display, and a graphical representation of your PC Card sockets and installed cards:
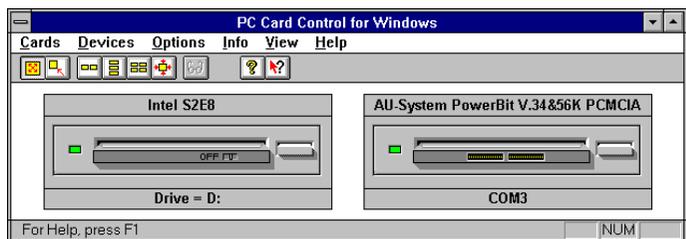
Card Configuration Basics

Before you attempt to use PCCard Control, you should understand these basic concepts of card configuration:

- *Editing PC Cards*. When you edit a PC Card definition, you change the set of attributes that comprise the definition. Each defined PC Card has a name, and its name is recorded in the CardWare database. One of the attributes in a PC Card definition is its associated device(s).

- *Defining devices.* When you define a device, you are collecting and naming a unique set of system resources. Each defined PC Card must have one or more associated devices. A PC Card can have multiple associated devices, but may actively employ only one device at a time.

- *Reconfiguring a PC Card.* When you configure, or reconfigure, a card, CardWare assigns to your existing, installed PC Card the current set of attributes in its definition.

Mouse Functions

- After editing an installed card, click on the card image in the main window to reconfigure the card. Same as selecting Cards | Reconfigure.

- To show card configuration information, click on the card image with the right mouse button.

- To show device information, click and hold the right mouse button on the device name (below the card image) in the main window.

Menu "Cards"

The Cards item on the menu bar lets you edit a PC Card definition, delete or rename a card, run the Advisor, and reconfigure an installed card.

```
Cards
Edit...          Socket 0
Rename...        Any Card
Delete...
Reconfigure
Advisor
```
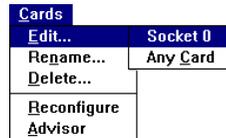
Editing a PC Card Definition

1. From the main menu choose Cards | Edit (or double-click on the card name.)

2. To edit the definition of an installed card, select the socket that contains the card. To edit the definition of an uninstalled card, select Any Card.

3. The Edit Card dialog box opens. If the name of your installed card does not appear immediately in the Card box, click on the scroll arrow on the right side of the box to scroll through the list of cards in the CardWare database.

4. If the card type is unknown, scroll through the Type field and choose an appropriate type. In most cases, you cannot change a card type.
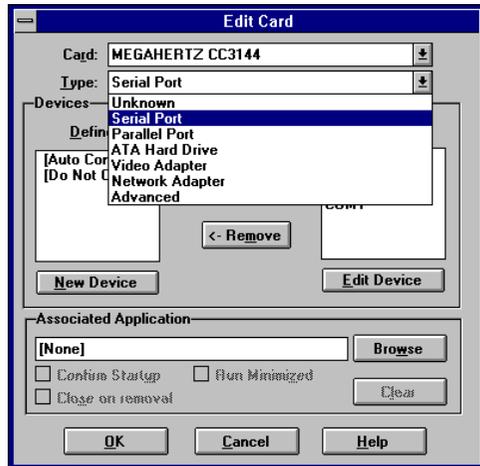
5. Now associate one or more devices with the card.
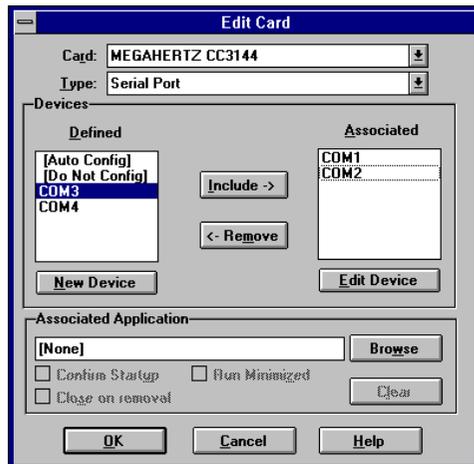
If you need to create a new device for the card, select New Device below the
Defined box. The section *Devices*, following, explains how to define a
new device.

Move each device from the U<u>n</u>derlined <u>D</u>efined to the <u>A</u>ssociated box and vice versa by simply double clicking on the device name, or by selecting a device name and clicking <u>I</u>nclude or <u>R</u>emove.

When associating devices with a PC Card, keep the following in mind:

- When selecting a device for use by an installed card, CardWare proceeds in the order the devices appear in the <u>A</u>ssociated box.

- The system resources in the currently employed device must be available:

  a) They must be physically present in the system
  b) They must be under the control of CardWare (see *Assigning System Resources to a Device*, later in this chapter)
  c) They must not be currently employed by another device
  d) They must match any requirement the card may have (check the CARDINFO.TXT file in your CardWare directory for information about special cards.)

REMEMBER: *If your card comes with its own configuration software, select [Do Not Config]. Then the card's software can correctly control the card.*

6. You can associate an application with this card if you want one to start whenever you insert the card. For example, you might associate fax/data communication software with a fax/modem card.
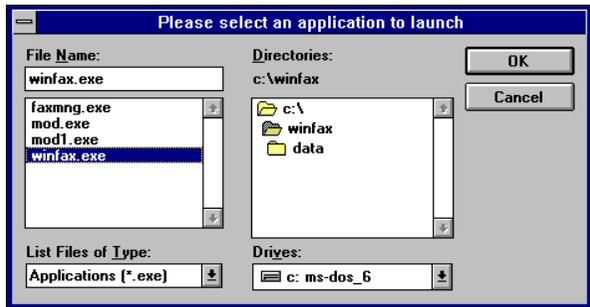
To associate an application, either directly enter the path and startup command in the Associated Application box, or select Browse to locate the application.

If desired, check the boxes that let you confirm the application startup, run it (for instance, for background reception), and close it when the card is removed.

7.   When you have checked the appropriate boxes and are satisfied with the card's configuration, select OK.

8.   CardWare does not automatically reconfigure an installed card after you edit its definition. You must reconfigure it. To reconfigure a card after editing its definition, select <u>C</u>ards | <u>R</u>econfigure or simply click on the card image displayed in the socket.

Reconfigure

<u>C</u>ards | <u>R</u>econfigure causes CardWare to immediately configure or reconfigure a card inserted in the selected slot. CardWare runs through the list of associated devices to find the correct combination of available resources.

Advisor

Perhaps the most powerful features of PCCard Control for Windows are Advisor. Advisor helps you through the process of reconciling resource conflicts.

Advisor

This dialog lets you select options for CardWare Advisor. You may select a behavior of Advisor at card insertion and at start of PCCard.

To specify a behavior at card insertion: select "Always" radio button if you want to check the card on every card insertion. Please note that in that situation Advisor will shows a message only if error is found and will show nothing if no error occurs. Select "Never" radio button to never start Adviser on card insertion. In this situation you can manually start advising from menu "Cards\Advise". Select "If card was not configured" radio button to start Advisor only if CardWare filed to configure a card. This option is selected by default and is recommended.

To specify a behavior at CardWare start: select a checkbox "Check CardWare Integrity" to check a presence of all drivers and applications required for CardWare's correct work. It is not recommended to switch this feature off.

Select a checkbox "Check COM port conflict" to check if parameters of COM ports used in CardWare are conflicted with COM ports used in Windows. It is not recommended to switch this feature off.

Edit

Click <u>E</u>dit to directly edit available resources. See <u>O</u>ptions | <u>R</u>esources, later in this chapter.

Find/Create

Pressing <u>F</u>ind causes CardWare to search all available configurations for one for which all required resources are currently available in your system. If one is

found, <u>F</u>ind changes into <u>C</u>reate. Pressing <u>C</u>reate lets you define a new device (see *Devices,* following).

Once a new device has been defined, reconfigure the PC Card by either selecting <u>C</u>ard | <u>R</u>econfigure or by double-clicking on the card image in the PCCard Control main window.

Menu "Devices"

A device is a named set of system resources. The Device item in the menu bar lets you define a new device or change the definition of an existing device. You may also rename and delete devices.

Devices
<u>N</u>ew...
<u>E</u>dit...
<u>R</u>ename...
<u>D</u>elete...

You may need to define a device in these situations:

- When defining a new PC Card
- When editing an existing PC Card definition.
- When a resource in an existing device must be changed (e.g., changing the memory base address or IRQ)

Defining a Device

To define a new device, choose <u>D</u>evices | <u>N</u>ew from the main menu. For an existing device, choose <u>D</u>evices | Edit.

A New Device

Give a new device a name and select its type from the <u>T</u>ype list. When you have entered the name and selected the type, skip to subsection *Assigning System Resources to a Device* , following.

```
┌─────────────────────────────────────────────────────┐
│ ▄   Device Settings                                  │
├─────────────────────────────────────────────────────┤
│         Name:  My Device                             │
│         Type:  Serial Port                    ▼      │
│  ┌──────────────────────────────────────────────┐   │
│  │           Base (Hex)      Length (Bytes)      │   │
│  │ I/O Range 1: [None]  ▼    [None]     ▼        │   │
│  │         2:   [None]       [None]              │   │
│  └──────────────────────────────────────────────┘   │
│  ┌──────────────────────────────────────────────┐   │
│  │           Base (Hex)      Length (KBytes)     │   │
│  │ Memory Range 1: [None]    [None]              │   │
│  │         2:      [None]    [None]              │   │
│  └──────────────────────────────────────────────┘   │
│  ┌──────────────────────────────────────────────┐   │
│  │   IRQ Level:  [None]  ▼                       │   │
│  └──────────────────────────────────────────────┘   │
│  ┌──────────────────────────────────────────────┐   │
│  │   DMA Level:   [None]                         │   │
│  └──────────────────────────────────────────────┘   │
│   ┌────────┐    ┌────────┐    ┌────────┐            │
│   │   OK   │    │ Cancel │    │  Help  │            │
│   └────────┘    └────────┘    └────────┘            │
└─────────────────────────────────────────────────────┘
```
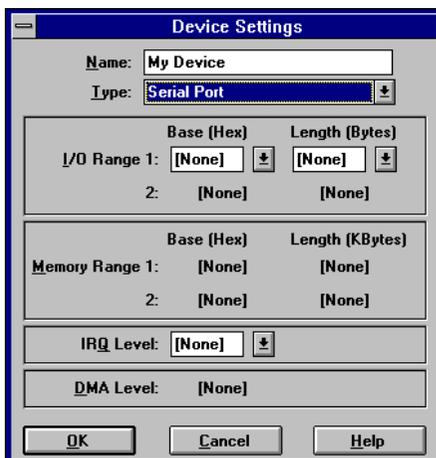
An Existing Device

To edit an existing device, select Devices | Edit from the main menu. Select the device name you wish to edit from the Name list box. Then reassign system resources to this device. The system resource fields display their current assignments for your convenience.

Assigning System Resources to a Device

Each defined device needs at least one of the following system resources.

- Memory address space
- Interrupt ReQuest (IRQ) levels
- I/O address space
- DMA channels

This manual assumes that the user instructions of the PC Card whose device you are defining discusses its system resource requirements. It's especially important to know the resource requirements of any card that is not generic and/or does not completely conform to the PC Card standard.

To understand the resource requirements of various PC Card types, you may find it helpful to review the section *PC Card Resource Requirements* in Chapter 2.

Specifying I/O Ranges or I/O Addresses

I/O resources required by a device are specified by a base address and, in some cases, a length. Some device types, such as serial ports, use a fixed number of

I/O ports. For these types of devices, the length is implied and PCCard Control does not let you specify a length.

Enter the base address of an I/O range in the drop-down combo box. State the address in hexadecimal, typically between 100h and 3FFh. Give the length of an I/O range in bytes, typically as a power of two between 1 and 32.

If the device type lets you enter an I/O range, but the definition does not require an I/O range, then set both the address and length to None. If the definition lets you locate the I/O range wherever space is available, then set the length to the size required and the address to Any.

Some devices may require multiple I/O ranges. PCCard Control allows up to two I/O ranges for a device. If a device uses two I/O ranges, give the base address for both ranges. **Do NOT use the Any entry with multiple I/O ranges**.

Specifying Memory Ranges

When a device requires memory resources, give a base address and a length.

Enter the base address in a drop-down combo box, in hexadecimal units as an Intel x86 segment value, typically in the range of A000h to F000h. Enter the length also in a drop-down combo box, expressed in decimal in kilobyte units, typically as a power of two between 4 and 64.

If the device type lets you enter a memory range, but the definition does not require a memory range, set both the address and length to None. If the definition lets you locate the memory range wherever space is available, set the address to Any and the length to the size required.

If a device requires a second memory range, enter this data on the Memory Range 2 line as you did on line 1.

Specifying IRQ Levels

State an IRQ level as a single decimal value, ranging from 2 to 15. Set the IRQ value in the same kind of combo box used for I/O and memory ranges.

Different types of devices traditionally use certain IRQs. See the appendix for a list of IRQs traditionally assigned to peripheral devices, and Chapter 2 for the resource requirements of each PC Card type. If a device (or its device driver) requires a specific IRQ level, set the IRQ in the IRQ field.

If the device and its driver can use any IRQ level, set the IRQ field to Any. If a device does not require an IRQ level, set it to None.

Menu "Options"

CardWare lets you tailor PCCard Control to your preferences. Type Alt-O or click Options in the menu item.

Options	Info	View	Help
Resource Management...			
Options_PCDiskOptions			
Advisor Options...			
User Level...			
Disable Beeps			
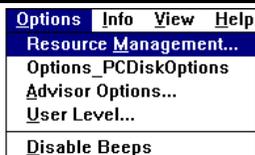
Resource Managegement

A chart containing information about resources available to the system appears, highlighting those being used. Use this chart when configuring unrecognized cards or unique device settings. See the previous section, *Devices*.

PCDisk Options

This Menu is used for setting up the Drive Letter Assignment for Storage Cards.

With the present version of CardWare the dialog is display only.

For changing the Drive Letter Assignment you have to use command line parameter for PCDISK.EXE. You can invoke 'PCDISK.EXE /?' for a complete description of the syntax.

Advisor Options

This dialog lets you select options for CardWare Advisor. You may select a behavior of Advisor at card insertion and at start of PCCARD.

To specify a behavior at card insertion: select "Always" radio button if you want to check the card on every card insertion. Please note that in that situation Advisor will shows a message only if error is found and will show nothing if no error occurs. Select "Never" radio button to never start Adviser on card insertion. In this situation you can manually start advising from menu "Cards\Advise". Select "If card was not configured" radio button to start Advisor only if CardWare filed to configure a card. This option is selected by default and is recommended.

To specify a behavior at CardWare start: select a checkbox "Check CardWare Integrity" to check a presence of all drivers and applications required for CardWare's correct work. It is not recommended to switch this feature off.

Select a checkbox "Check COM port conflict" to check if parameters of COM ports used in CardWare are conflicted with COM ports used in Windows. It is not recommended to switch this feature off.

Disable Beeps

Checking this box suppresses DOS beeps.

Menu "View"

Open the <u>V</u>iew menu item by typing Alt-V or by clicking the mouse directly on <u>V</u>iew in the main menu bar.

The <u>V</u>iew menu lets you change the size and placement of your view of the slots. CardWare offers several different sizes of images of the slots and cards themselves.

<u>V</u>iew <u>H</u>elp
√ <u>T</u>oolbar
√ <u>S</u>tatus Bar
√ 100 %
75 %
50 %
25 %
<u>F</u>ree scale
<u>I</u>conize
Always on t<u>o</u>p
Adjust sockets in <u>l</u>ine
Adjust sockets in <u>c</u>olumn
Adjust sockets to <u>d</u>efault
<u>A</u>djust window to contents
Fra<u>m</u>e settings...
So<u>c</u>ket Settings...   ►
√ Sa<u>v</u>e Settings on exit
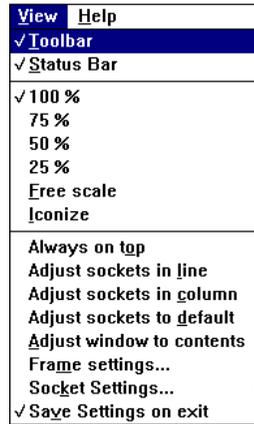
Toolbar

The toolbar is a row of buttons that allow quick access to some of the common functions for scaling and aligning images of your PC Card slots. When Toolbar is checked, the toolbar appears below the main menu.

100% Size

25% Size

Side-by-side

Columns

Default ordering

Size to socket size

Advisor

Display Help Contents

Select object for help data
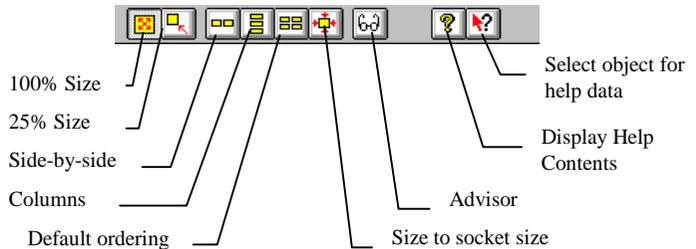
Status Bar

The status bar displays information about the current view. When the item is checked, the status bar appears at the bottom of the PCCard Control window. When not checked, the CardWare display area is smaller.

Scaling

The check mark indicates the current sizing as a percentage of the default size.

Free Scale lets you manually enter the size as a percent.

Iconize changes PCCard Control an icon and places the window in the lower left hand corner of the desktop. The icon still graphically represents the sockets and any cards in them. Only the menus are missing. Double-click on the icon to restore PCCard Control.

Always on top

Checking this option makes CardWare always visible. Even when you are using another Windows application, the card and slot representation are visible.

Adjust sockets in line

Checking this option places the sockets side-by-side.

Adjust sockets in column

Checking this option places the sockets one above the other. This is the default arrangement.

Adjust sockets to default

This option places the sockets in a column, returns the sockets to their default size, and sizes the window to the socket size. If you have multiple sockets, but not all are visible, selecting this option places all into view.

Adjust window to contents
This option sizes the window so the sockets are centered with the window at its minimum size.

Frame settings
Selecting this option pops-up a window with the current settings for size, location and alignment of the sockets.

Save settings on exit
Checking this option causes CardWare to use the last settings each time Windows and CardWare start.

Lower socket
This option lets you view the settings of the lower socket image.

Upper socket
This option lets you view the settings of the upper socket image.

CardWare Files

CardWare consists of a set of programs, each with a specific function. Most are TSR drivers that you may load in two different ways:

- As device drivers. Include a DEVICE= line followed by the program start-up commands in your CONFIG.SYS file. You may load some by including them in your AUTOEXEC.BAT file.

- As DOS programs. When loaded at the DOS command line, they stay resident in the computer's memory.

If you plan to use PC Cards most of the time, we suggest you load the CardWare files from the CONFIG.SYS file.

Certain programs **must** be loaded as device drivers if you plan to use data storage PC Cards (see the section *Data Storage Card Handlers,* in this chapter).

File Syntax

The following sections describe CardWare files in the order they normally should load. See the following section in this chapter for examples of CONFIG.SYS and AUTOEXEC.BAT files modified to include CardWare device drivers.

DOS Protected Mode Manager (DPMS.EXE)

The protected mode manager uses DOS Protected Mode Services (DPMS) to install and manage CardWare software in extended memory (above 1 MB). This driver allows CardWare to operate with an absolute minimum usage of memory below 640K. It also leaves upper memory space (640 KB to 1 MB) available for loading other software, such as mouse and LAN drivers.

Socket Services (SSxxxxxx.EXE)

A Socket Services driver supports the PCMCIA controller in your computer. CardWare requires only a few different drivers to support a wide range of controllers. Unlike most PC Card software packages, CardWare Socket Services drivers support new PC Card controllers automatically, eliminating the

need for a software upgrade each time a new PC Card controller enters the market.

The file README.TXT matches drivers and controllers. In general, each Socket Services driver name begins with **SS**. The driver can be load into high memory.

Hot Docking SS Drivers (SSPCIC.EXE, SSTCIC.EXE)

SSPCIC.EXE and SSTCIC.EXE Socket Services drivers support hot docking. They are the most commonly used SS drivers.

CardWare supports hot docking only if the mobile system where CardWare is loaded has a Plug and Play BIOS that supports hot docking, and the Card Services driver and PCRM.EXE (if any) load *before* the Socket Services driver. The CardWare installation programs (SETUP, INSTALL) now automatically modify your CONFIG.SYS program to list drivers in the correct order to support hot docking. Earlier versions of CardWare, however, list drivers in the wrong order for hot docking.

Card Services (PCCS.EXE)

The Card Services driver is the interface between the Socket Services driver and the various cards and system software that you use in your computer. Can be loaded into high memory.

During the loading Card Services collects information about resources used by PCI, PNP and Option ROMs. Card Services considers such resources as non-free and excludes them from internal database of system resources.

Card Services also considers next resources as non-free:

1. Resource explicitly excluded via CARDWARE.INI file

2. Memory below 1st MB which are not explicitly included via CARDWARE.INI file (except for [0xD0000-0xDFFFF] memory range)

All other resources are considered to be free and available.

The list of all detected resources is displayed if Card Services is started with /V+ switch. In non-PnP computer Card Services may be not able detect all used resources (e.g. resources used by Legacy ISA devices). In such case you can adjust resources via [RESOURCES] section of the CARDWARE.INI file. For more information about [RESOURCES] section see "CardWare Initialization File Format" chapter.

Resource Manager (PCRM.EXE)

PCRM is a DOS utility that executes a one-time resource inventory and communicates its findings to Card Services. **Do not load in high memory.**

PCRM is no longer required as part of config.sys. It's supported for backward compatibility only.

Place PCRM in your CONFIG.SYS file. When activated at boot-up, it reads the [RESOURCES] section of the CARDWARE.INI file and initializes Card Services. For more information about [RESOURCES] section see "CardWare Initialization File Format" chapter.

If the /AUTODETECT switch is used, PCRM automatically detects free COM ports, free LPT ports and free IRQs.

Syntax:
```
DEVICE=PCRM [/H] [/F=FILE.INI|NONE]
        [/AUTODETECT][/[X]MEM=base,length,share]
        [/[X]I/O=base,length,share,lines]
        [/[X]IRQ=level,share]
        [/[X]DMA=channel, width [,share]]
        [/V]
        [/Q]
        [/E]
```

where:

/H	Print the help text
/AUTODETECT	Enable autodetection features
/F=FILE.INI	Specifies .INI file name (E.g. CARDWARE.INI)
/F=NONE	Do not process any .INI file (default)
/MEM	Add length bytes of memory at base with share
/I/O	Add length bytes of I/O at base with share and lines
/IRQ	Add IRQ level with share
/DMA	Add DMA channel for specified type with share
/XMEM	Exclude length bytes of memory at base with share
/XI/O	Exclude length bytes of I/O at base with share and lines
/XIRQ	Exclude IRQ level with share
/XDMA	Exclude DMA channel for specified type with share
/V	Print Card Services Resource Table
/Q	Print error codes during resource table modification
/E	Silent Mode: No output is performed

NOTE: *Do not load PCRM high. It is unnecessary and can hang your system. It is not necessary to load PCRM high, because it only initializes the Card-Services resource table and it **does not** stay resident.*

PC Card Enabler (PCENABLE.EXE)

This program detects PC Card insertion and removal and manages card configuration and resource allocation. If your PC Card has its own enabling software, you should probably use that instead of PCENABLE.

Load PCENABLE.EXE **after** you load Socket and Card Services. Can be loaded into high memory.

Data Storage Card Handlers (PCDISK.EXE)

PCDISK.EXE and the storage card drivers listed in the table below are required if you have data storage PC Cards. PCDISK includes services such as formatting and partitioning, as well as mediating simple reads and writes. The table below shows currently available data storage cards, with their drivers:

Card	Type	Handler
Hard disk	ATA card	PCATA.EXE
Flash disk	ATA card	PCATA.EXE
SRAM	Memory card	PCSRAM.EXE
Flash	Memory card	PCFLASH.EXE (MTD)

Load storage card programs in this order:
1   **PCENABLE.EXE** (in CONFIG.SYS)
2   **PCATA.EXE, PSCRAM.EXE**, and/or **PCFLASH.EXE**
        (any or all programs in any order, depending on the type
        of storage card(s) you have; in CONFIG.SYS)
3   **PCDISK.EXE** (in CONFIG.SYS or AUTOEXEC.BAT)

You may also run PCDISK at the DOS prompt, as a utility, for a specific purpose (for example, to preformat a flash memory card). **DO NOT** run PCDISK in a Windows DOS session.

Normally, PCDISK needs no switches. It assigns drive letters to each detected partition on data storage cards as you insert them into and remove them from the system.

The choice of switches (if any) that you append to PCDISK determines whether you place it in your CONFIG.SYS or AUTOEXEC.BAT file. See the details, below, about PCDISK switches. In the switches, enter any numeric value as decimal (default form) or hexadecimal (with 0x prefix).

Here is the syntax for PCDISK:

```
PCDISK [/H|?] [/E] [/MS:n] [/ES:n] [/RD:n] [/CM:on]
                        [/XM:off]
                        [QR:off]
                        [/SP:n,<Drive>[,<Drive>...][,AU
                        TO]
                        [/VP:<"VolumeLabel">,<Drive>[,<
                        Drive>
                          ...][,AUTO]
```

where: `/H│?`   Online help.

          `/E`   No screen messages when program loads.

          `/MS:n` n = maximum number of PC Card sockets to handle data storage cards. By default (no switch) PCDISK supports all detected sockets. This switch lets you reserve memory for additional sockets, if you have a Plug 'n' Play (dockable) system. You can reduce the amount of memory PCDISK reserves by reducing the number n of sockets that can handle data storage cards.

          `/ES:n`   Erases (preformats) the whole media of the card in socket n (erased card is then recognized as Unformatted). Use at DOS command line only.

          `/RD:n`   Reserves n drive letters for storage PC Cards. Default = number of sockets as auto-detected or defined in /MS.

> Use this switch **only** in CONFIG.SYS.

          `/CM:on`   Assigns one drive letter per socket. Default = first free drive letter, starting with socket 0.

> Use this switch **only** in CONFIG.SYS.

          `/XM:off`   Disables use of DPMS, if DPMS is present.

          `/QR:off`   Switches off quick reset mode if third-party FFS software doesn't recognize the MTD loaded. Normally you never use this option, and it is not documented in the online help.

The /SP and /VP switches, used when you run PCDISK at the command line or load it in the AUTOEXEC.BAT file, let you override the default PCDISK drive assignment scheme.

          `[/SP:n,<Drive>[,<Drive>...][,AUTO]`

                     Reserves specific drive letter(s) for socket n: AUTO (default) = first available drive letter. Use this switch to reserve multiple drive letters per socket. Note that n cannot exceed the value of LASTDRV in your system.

> **DO NOT** use this switch in CONFIG.SYS.

Example:

```
PCDISK  /SP:0,K,L /SP:1,U,AUTO
```

Meaning:

For socket 0, reserves drive letters K and L. If they are not available, do not configure.
For socket 1 reserve drive U. If drive U is unavailable, use the first available drive letter.

```
[/VP:<"VolumeLabel">,<Drive>[,<Drive> ...]
        [,AUTO]
```

Drive letter(s) to reserve for card with stated volume label. AUTO (default) = use socket preferences as auto-detected or defined in /SP.

> **DO NOT** use this switch in CONFIG.SYS.

Example:

```
PCDISK  /VP:"TOOLS",D,E,AUTO
```

Meaning:

If the card contains volume TOOLS, reserve drive letter D; if D is occupied, reserve E; if E is occupied, use the first available drive letter.

DOSCARD

DOSCARD displays the revision of the installed software and the current configuration of any installed PC Cards.

Syntax: DOSCARD [/H] [/D] [/S:n]

where: /H   Displays the help text

          /D   Displays detailed information about card configuration

          /S:n   Specifies the zero-based socket number *n* if only information about this socket should be displayed (default: display information about all sockets).

Boot File Examples

This section examines the modifications CardWare makes to your CONFIG.SYS and AUTOEXEC.BAT files.

Example CONFIG.SYS Modification

Beyond the obvious addition of the CardWare files, there is also a change to the EMM386.EXE memory manager.

There are three special, and very important, points to observe about the modified listing:

3. Place CardWare lines in the CONFIG.SYS file after any entries that load memory managers such as Quarterdeck's QEMM, Qualitas' 386MAX or Microsoft's EMM386.

4. Place CardWare lines in the CONFIG.SYS file after any entries that load Power Management software.

5. Compare the third line of both CONFIG.SYS listings. Notice that an area of memory has been excluded from the EMM386.EXE memory manager. If you are using any memory management software (QEMM, 386MAX, NetRoom, EMM386, etc), you **MUST** instruct it to exclude the ROM Expansion area assigned to CardWare. Review the MEM= entries in the [Resources] sections of the initialization file (CARDWARE.INI) to determine the area(s) to exclude.

6. To use flash memory cards, you must install a flash filling system (FFS) and a media technology driver (MTD). See sections in chapters 2 and 6 for detailed directions about installing software for flash cards and listing the files in your CONFIG.SYS.

The following listing is an example of a fairly common CONFIG.SYS.

```
DEVICE=C:\DOS\SETVER.EXE
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE RAM
BUFFERS=10,0
FILES=30
FCBS=4,0
DOS=HIGH,UMB
LASTDRIVE=I
SHELL=C:\DOS\COMMAND.COM C:\DOS\ /e:512 /p /f
```

The next listing is the same, but with the CardWare files added:

```
DEVICE=C:\DOS\SETVER.EXE
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE RAM X=CF00-D7FF
BUFFERS=10,0
FILES=30
FCBS=4,0
DOS=HIGH,UMB
LASTDRIVE=I
SHELL=C:\DOS\COMMAND.COM C:\DOS\ /e:512 /p /f
```

```
REM ---- FILES ADDED FOR CARDWARE
DEVICE=C:\CARDWARE\DPMS.EXE
DEVICEHIGH=C:\CARDWARE\PCCS.EXE
DEVICE=C:\CARDWARE\SSxxxxxx.EXE
DEVICEHIGH=C:\CARDWARE\PCENABLE.EXE
DEVICEHIGH=C:\CARDWARE\PCSRAM.EXE
DEVICEHIGH=C:\CARDWARE\PCATA.EXE
REM ---- END OF THE CARDWARE FILES
```

The above listing represents a complete installation of CardWare with the exception of PCDISK.EXE. See the section that covers PCDISK, earlier in this chapter, for detailed information about loading PCDISK and its syntax.

The DPMS driver allows Socket Services (SSxxxxxx.EXE), Card Services (PCCS.EXE), PC Enable (PCENABLE.EXE), and memory card handlers (PCDISK.EXE, PCSRAM.EXE, PCATA.EXE, and PCFLASH.EXE) to load in extended memory (above 1 MB).

You may also use the DEVICEHIGH statement and a memory manager, such as EMM386.EXE or QEMM386.SYS, which provides upper memory blocks, to load all drivers (except PCRM) into upper memory (640 KB to 1 MB). Remember **not** to load PCRM (if any) high, because it only initializes Card Services and does **not** stay resident.

For most efficient memory management, use both DPMS and a memory manager to load drivers.

Changes to Your AUTOEXEC.BAT File

It is best to load PCDISK.EXE from the AUTOEXEC.BAT file. It is also possible to load it in the CONFIG.SYS, but this limits some of its special capabilities. When loaded in the AUTOEXEC.BAT file, the syntax is:

```
C:\CARDWARE\PCDISK.EXE
```

Add the CardWare path (usually C:\CARDWARE) to your PATH= statement in your AUTOEXEC.BAT file. The following is an example of a fairly common path statement:

```
PATH=C:\;C:\WINDOWS;C:\DOS
```

To add CardWare to the path, you would modify the above to read:

```
PATH=C:\CARDWARE;C:\;C:\WINDOWS;C:\DOS
```

Installation of Socket and Card Services Only

If you need only the PCMCIA Application Programming Interface (API) and do not want CardWare to enable PC Cards, you need not load PCENABLE.EXE and PCDISK.EXE. In that event, you would only need to add the following four lines in your CONFIG.SYS:

```
DEVICE=C:\CARDWARE\DPMS.EXE
DEVICE=C:\CARDWARE\PCCS.EXE
DEVICE=C:\CARDWARE\SSxxxxxx.EXE
```

Recall that the DPMS driver allows the Socket and Card Services to be located in extended memory for a minimal impact on free DOS memory. Additionally, you can load both high using the DEVICEHIGH statement, but DPMS probably frees more memory. Remember you **cannot** load PCRM (if any) high, because it only initializes Card Services and does **not** stay resident.

NOTE: *Add CardWare lines to the CONFIG.SYS file after any entries that load memory managers such as Quarterdeck's QEMM, Qualitas 386MAX or Microsoft EMM386. Also, you MUST place them after any entries that load Power Management software.*

Modifying Resource Assignments

The CardWare initialization file, CARDWARE.INI, has a default [Resources] section. This section should be customized for the host system. The defaults provided may operate without modification. However, if you encounter any problems with PC Card recognition or configuration, improper resource assignment is the first item to check (see the chapter "CardWare Initialization File Format" for more information).

It is possible (though not recommended) to edit the initialization file (CARWARE.INI) directly with a text-editor capable of editing ASCII files. Be careful when editing the file with a word processing program such as WordPerfect or Microsoft Word. These programs normally do not save files as ASCII and may damage the initialization file.

PCCard Control offers a much better solution for modifying the system resources. Choose Options | Resources from the menu.

NOTE: *If you are using a memory manager, you **MUST** exclude any of the expansion ROM area assigned to CardWare from the memory managed by that program. Review the MEM= entries in the [Resources] sections of CARDWARE.INI to determine the area(s) to exclude. For most memory managers, add a command line argument to the DEVICE= line that loads the manager in the CONFIG.SYS file.*

As an example, Microsoft's EMM386 requires the argument X=mmmm-nnnn, where mmmm is the starting segment address and nnnn is the ending segment address of the area to exclude. See your memory manager documentation for more information.

Installation Information

Uninstalling Other PC Card Software

The CardWare installation programs can detect and replace earlier versions of CardWare but they cannot remove another brand PC Card software if you replace it with CardWare.

This manual describes two other known and documented PC Card software installations and how to remove them. These packages are from Phoenix Technologies, Ltd. and SystemSoft Corporation. Whether you are using one of these or a software package from another software company, the most effective method of removal is an uninstallation program, if one exists. Otherwise, you should check the documentation included with the software for instructions for removal. Failing that, your next best choice is contacting the publisher's technical support.

Inspect your CONFIG.SYS file and either delete or remark out the lines loading the software. By "remark-out," we mean to add the letters REM at the beginning of each line. Note that a space must follow the **M**.

PCM3+
The Phoenix Card Manager Plus version 3 installation adds some or all of the following lines to your CONFIG.SYS:

```
DEVICE=C:\PCMPLUS\CNFIGNAM.EXE /DEFAULT
DEVICE=C:\PCMPLUS\PCMSS.EXE
DEVICE=C:\PCMPLUS\PCMCS.EXE
DEVICE=C:\PCMPLUS\PCMRMAN.SYS
DEVICE=C:\PCMPLUS\PCMSCD.EXE
DEVICE=C:\PCMPLUS\PCMATA.EXE
```

```
DEVICE=C:\PCMPLUS\PCMFFCD.EXE
DEVICE=C:\PCMPLUS\MS-FLASH.SYS
```

Note that the above example assumes the default drive and directory. Your file may have a different drive and directory, depending on your selections during installation.

Additionally, PCM3+ includes PCMWIN.EXE. This provides the Windows interface for PCM3+. Remove it from the Startup Group and/or from the run= line in your Windows WIN.INI.

CardSoft

CardSoft from SystemSoft adds the some or all of the following lines to your CONFIG.SYS:

```
DEVICE=C:\CARDSOFT\SSxxxxxx.EXE
DEVICE=C:\CARDSOFT\CS.EXE
DEVICE=C:\CARDSOFT\CSALLOC.EXE
DEVICE=C:\CARDSOFT\ATADRV.EXE
DEVICE=C:\CARDSOFT\MTSRAM.EXE
DEVICE=C:\CARDSOFT\MTAA.EXE
DEVICE=C:\CARDSOFT\MTAB.EXE
DEVICE=C:\CARDSOFT\MTI1.EXE
DEVICE=C:\CARDSOFT\MTI2.EXE
DEVICE=C:\CARDSOFT\MTDDRV.EXE
DEVICE=C:\CARDSOFT\SSMSFLSH.SYS
DEVICE=C:\CARDSOFT\CARDID.EXE
INSTALL=C:\CARDSOFT\CS_APM.EXE
```

Note that the above example assumes the default drive and directory. Your file may have a different drive and directory, depending on your selections during installation. Also note that the first line contains SSxxxxx.EXE. The xxxxxx is replaced with letters in the name of the Socket Controller in your system.

To disable CardSoft in Windows, remove references to the CardSoft files shown in the example below (\CARDVIEW*.* and \CARDWIZ*.*) from your Windows SYSTEM.INI file by placing a semicolon (;) at the beginning of the lines or deleting the lines.

```
[Boot]
comm.drv=C:\CARDVIEW\SSCOMM.DRV

;comm.drv=comm.drv
```

```
[386Enh]
device=C:\CARDWIZ\SSVRDD.386
device=C:\CARDWIZ\SSVCD311.386
device=C:\CARDWIZ\PCCARD.386
EMMEXCLUDE=D000-DFFF
device=C:\CARDVIEW\SSVRDD.386
device=C:\CARDVIEW\SSVCD.386


;device=*vcd
```

Note the two lines preceded by a semicolon. When you disable the CardSoft lines, remove the semicolons from these two lines.

Disabling CardWare

To temporarily disable CardWare, follow this simple procedure:

- Modify your CONFIG.SYS file using a text editor, such as DOS EDIT, capable of editing ASCII files without changing the format. Locate the following DEVICE= statements:

  ```
  DEVICE=C:\CARDWARE\DPMS.EXE
  DEVICE=C:\CARDWARE\SSxxxxxx.EXE
  DEVICE=C:\CARDWARE\PCCS.EXE
  DEVICE=C:\CARDWARE\PCENABLE.EXE
  DEVICE=C:\CARDWARE\PCSRAM.EXE
  DEVICE=C:\CARDWARE\PCATA.EXE
  DEVICE=C:\CARDWARE\PCDISK.EXE
  ```

NOTE: *The previous assumes that PCDISK.EXE is being loaded in the CONFIG.SYS. If loaded in the AUTOEXEC.BAT, you must remove or remark-out the following line:*

  ```
  C:\CARDWARE\PCDISK.EXE
  ```

- Insert REM at the beginning of each line. Note that there is a space after the letters REM. The case is irrelevant, but the space is required. REM turns each of the four DEVICE= lines into a remark line, thereby preventing CardWare from loading. Remember to save the file.

- Remove the PCCARD.EXE command from the run= line of the WIN.INI. **DO NOT REMOVE** the entire line, just the C:\CARDWARE\PCCARD.EXE portion.

To re-enable CardWare, modify your CONFIG.SYS file using a text editor capable of editing ASCII files without changing the format. Locate the following `REM DEVICE=` statements:

```
REM DEVICE=C:\CARDWARE\DPMS.EXE
REM DEVICE=C:\CARDWARE\SSxxxxxx.yyy
REM DEVICE=C:\CARDWARE\PCCS.EXE
REM DEVICE=C:\CARDWARE\PCENABLE.EXE
REM DEVICE=C:\CARDWARE\PCSRAM.EXE
REM DEVICE=C:\CARDWARE\PCATA.EXE
REM DEVICE=C:\CARDWARE\PCDISK.EXE
```

Delete the `REM` at the beginning of each line. Be sure to remove the space after the letters `REM`. (`REM` turned each of the `DEVICE=` lines into a remark line, thereby preventing the loading of your CardWare.)

Re-enabling CardWare

Again, check your AUTOEXEC.BAT file to determine if PCDISK is being loaded there. Look for:

```
REM C:\CARDWARE\PCDISK.EXE
```

Removing CardWare

Removing CardWare from your system requires the following steps:

Remove the following lines from the CONFIG.SYS file:

```
DEVICE=C:\CARDWARE\DPMS.EXE
DEVICE=C:\CARDWARE\SSxxxxxx.yyy
DEVICE=C:\CARDWARE\PCCS.EXE
DEVICE=C:\CARDWARE\PCENABLE.EXE
DEVICE=C:\CARDWARE\PCSRAM.EXE
DEVICE=C:\CARDWARE\PCATA.EXE
DEVICE=C:\CARDWARE\PCDISK.EXE
```

Remove the CardWare directory from the path command in your AUTOEXEC.BAT file. In the following example, assumes that C:\CARDWARE is your CardWare directory:

If path reads:

```
PATH=C:\;C:\CARDWARE;C:\DOS
```

Change to read:

```
PATH=C:\;C:\DOS
```

(If you installed CardWare in a different directory, substitute the name of that directory for CARDWARE).

If you are loading PCDISK.EXE in your AUTOEXEC.BAT, remove the following line:

```
C:\CARDWARE\PCDISK.EXE
```

Remove all files from your CardWare directory.

Remove PCCARD.EXE from your Windows Startup Group.

Remove the CardWare Group from your Windows Program Manager and/or from the run= line in your Windows WIN.INI.

Helpful Information

Troubleshooting

Occasionally, troubles occur with new software because of incompatibilities with your system's BIOS. We recommend that you confirm that you have the latest system software. Many portable computers have the BIOS in flash memory, which can be easily updated. Most portable computer manufacturers provide special BBS support so you can download an updated BIOS via modem. PC Card support is an evolving area and some systems have better support in newer BIOS versions. Older BIOS versions with limited PC Card support may interfere with CardWare. In most cases, updating your BIOS to the latest release can reduce the potential for problems.

If Socket Services is loaded into a system that already has another socket services installed, a warning message is displayed. Socket Services continues initializing all other hardware, but does not disturb the previous socket settings.

If your system hangs immediately after Socket Services is loaded during CONFIG.SYS file processing, or if your system begins to behave erratically (i.e., beeping, etc.), power-off and restart with a cold boot.

If the PC Card in the socket is not a memory card (e.g., is a modem or LAN card), attempts to read or write data in a file format return an error. However, if an ATA card is loaded when a MemCard Erase (a function of MS-Flash) is issued, an *invalid media message* is received, and the card is totally erased.

Mouse driver interference
When movement of the mouse is erratic or interferes with PC Card activity, this is usually caused by assigning the card to the COM port corresponding to the mouse's COM port (e.g. COM1 and COM3, or COM2 and COM4).

PCCard Control does not notify you of low or dead battery
For a 'low' or 'dead battery' beep warning to function, it must be enabled under the Options | Event... main menu of PCCard Control panel. Also, make sure your speaker is not turned off.

Not ready reading drive DOS error (reading a flash card)

Check to see if your flash card has been formatted. Is the Flash File System device driver in your CONFIG.SYS? The flash card may be damaged. Consult your card documentation.

No beeps

Remove the card from the socket and make a visual inspection of the card and socket rails to insure that there is nothing that could obstruct a connection. If there is an obstruction, remove it and reinsert card FIRMLY. Also, make sure your speaker is not turned off.

Erratic or unstable performance with a desktop card reader

Such a card reader is dependent on the CMOS setup of the base computer. Especially important would be system bus speeds and I/O timings since the reader requires the use of a bus slot. Symptoms would be errors reported by CardWare while the system is booting and the CardWare drivers are loading or errors reported during normal operation.

Frequently Asked Questions

My system works fine when I first turn it on, but if I restart it by pressing the Ctrl, Alt and Delete keys at the same time, my PC Cards don't seem to work properly.

Some computer systems do not reset the PC Card socket controller when they are restarted using the Ctrl-Alt-Delete key sequence. Any configured PC Cards installed when the system is restarted may be incorrectly sensed by the system's BIOS to be peripherals that reside on the motherboard or in an adapter board installed in an expansion bus. The BIOS then believes it should handle the operation of these peripherals, creating a conflict with the CardWare software.

This situation may often be corrected by updating the system's BIOS. When a computer manufacturer realizes that the BIOS fail to reset the socket controller hardware, they typically release a BIOS update that fixes this problem. Until an updated BIOS is available, there are two possible solutions:

- Remove all installed PC Cards before restarting your system with the Ctrl-Alt-Delete key sequence
- Restart your system by cycling the power OFF and then back ON.

Most computers have a Reset button that safely cycles power in such a manner.

What target platforms are currently supported?

Check the README file for list of supported platforms.

Do you support Type III cards?

CardWare supports Type III ATA drives.

How do you deal with a non-PCMCIA compliant card?

On card insertion, the program notifies the user that the information required to configure the card is not available, or cannot be read. Only a single beep tone occurs, indicating that the card was inserted but not recognized by the software.

How hot swapping is handled?

An interrupt is generated by the system on insertion and removal of a PC Card. This interrupt is used to either flag that the card needs to be configured or released.

Can my system boot from a PC Card?

The current PC Card specifications do not provide for booting from PC Cards. However, the PCMCIA committee is working to define a methodology that allows the DOS file structure to be read from a PC Card during boot.

Why isn't support for booting included in current platforms? What part of Socket Services must be included in the BIOS?

The PC Card software specifications are new enough so that in many cases the system vendors have not included the 4K of Socket Service support code in their current BIOS.

Eventually, we expect that all 4K of Socket Service code will migrate into part of the system BIOS. It is reasonable to expect that system vendors will hold off on integrating the Socket Service code into the BIOS until such time as it is possible to boot a system from a PC Card and to execute a program from a PC Memory Card.

What file formats do you support with memory cards?

Currently we are supporting DOS FAT, Microsoft Flash File System II and Flash Translation Layer (FTL). See also " Legacy Devices Resource Assignment" below.

How are you going to support new cards as they are released?

For a card to comply with PC Card standards, it must have a Card Information Structure (CIS). Since our software uses the CIS information to configure the card, any card that is PC Card compliant will automatically be recognized and supported by our software.

In addition, APSoft has established a Card Review Program designed to promote the review and testing of card manufacturers' CIS with CardWare.

How do you update the CARDWARE.INI file? What is the information format so that I (end-user) can modify or troubleshoot it?

When a card is configured specifically for the first time, CardWare stores this configuration information in the CARDWARE.INI file. CARDWARE.INI is an ASCII text file, similar in structure to a conventional Windows INI file. Thus any simple ASCII text editor should be capable of editing it.

However, this does not mean that it should be altered by any means other than by CardWare itself. If you wish to attempt any manual change to this file, please first read the chapter "CardWare Initialization File Format". At the very

least, you should always back-up the CARDWARE.INI file before attempting any changes.

Legacy Devices Resource Assignment

The industry-standard PC AT bus uses a scheme of permanent device resource assignments, shown below:

Device	Interrupt	Address (hex)
COM1	4	3F8-3FF
COM2	3	2F8-2FF
COM3	4	3E8-3EF
COM4	3	238-2EF
LPT1	5	3BC-3BF (monochrome display and printer adapter only)
LPT1/LPT2	7	378-37F
LPT2/LPT3	5	278-27F
VGA	-	3C0-3CF, 3D0-CDF

IDE HDD
    Primary
    Secondary
	
	14
	15
		
		1F0-1F7, 3F6, 3F7[1]

SCSI HDD	11	270-277
Floppy drive	6	3F2, 3F4, 3F5, 3F7[1]
PS/2 mouse	12	-

Using Flash Cards With CardWare

CardWare provides full built-in FTL support.

The FTL support lets you work with flash cards the same way you work with other disk drives, using many of the standard programs (for example, you can use format, dir, etc.). But keep in mind that the storage card is only emulating a disk drive. For this reason it makes no sense to run SCANDISK or a disk defragmentator on such a card.

To use built-in FTL support, you must first prepare an FTL partition on the flash card. If there is no FTL partition on the card, create one by running the CardWare utility 'PCDISK.EXE /TL:DrvLetter' at the DOS prompt, where DrvLetter is the drive letter assigned to the flash card. After creating the

partition, format the card as you would any other disk. Then the flash card should be accessible and usable.

CardWare also supports the following Flash File Systems (FFS):

1. Microsoft FFS-II

The FFS-II is not part of the CardWare package and must be purchased separately from Microsoft.

If you already own the FFS-II, install the MS-FLASH.SYS drive AFTER PCDISK.EXE in your CONFIG.SYS.

Your CONFIG.SYS should look like this:

```
DEVICE = C:\CARDWARE\ssxxxxxx.yyy²
DEVICE = C:\CARDWARE\PCCS.EXE
DEVICE = C:\CARDWARE\PCENABLE.EXE
DEVICE = C:\CARDWARE\PCATA.EXE
DEVICE = C:\CARDWARE\PCSRAM.EXE
DEVICE = C:\CARDWARE\PCFLASH.EXE
DEVICE = C:\CARDWARE\PCDISK.EXE
DEVICE = C:\CARDWARE\MS-FLASH.SYS
```

Consult the documentation of the FFS for further information.

CardWare can not read flash cards with the write-protect switch set to **ON**. DOS returns the error message 'Invalid Media...'. So always set the WP switch to **OFF**.

2. SCM FFS

The SCM FFS is not part of the CardWare package and must be purchased separately.

SCM Vertriebs GmbH
Pettenkoferstr. 7
D-85276 Pfaffenhofen
Phone: +49/(0)8441/830 01
Fax: +49/(0)8441/828 84

Consult the documentation of the SCM FFS for further information.

---

[2]SSxxxxxx.yyy is name of device driver. This line is a generic reference to software that supports a specific type of socket controller. The x's and y's are specific to a certain type of controller, while SS means socket services.

3. Datalight FFS

The Datalight FFS is not part of the CardWare package and must be purchased separately.

Datalight
307 N. Olympic Ave Str 201
Arlington, WA 98223
USA
Phone: +1/206-435-8086
Fax: +1/206-435-0253

Specific PCMCIA Cards

This chapter contains information about some specific PCMCIA cards and how to setup CardWare for using these cards.

The cards are grouped by functions:

A. LAN Cards
B. ATA Harddisk Cards
C. OTHER (like SCSI)

Please setup the needed Devices as listed.

Please ensure that you have the resources available. If you have to edit the [Resources] section of the CARDWARE.INI file consult the chapter "CardWare Initialization File Format" for an additional information.

A. LAN Cards

By default CardWare will not configure LAN cards because they are usually configured by the driver coming with the card. Such driver is usually working as Card Services client.

1. IBM TokenRing Card

Device: [Do not configure]

Remark: The card will be configured by the driver which comes with the card. This driver works as a card services client.

The requested I/O-address of 0xA20 is masked to 0x220-0x227. The card needs two memory windows (one with 8KB and one with 16KB). Make sure that the memory range from 0xD0000-0xDFFFF is available to Card Services.

Example: Example for a Novell ODI driver:

```
                      **** STARTNET.BAT
                      lsl
                      token
                      ipxodi
                      netx
                      **** NET.CFG
                      link support
                         BUFFERS 1 9000
                      Link Driver TOKEN
                        PCMCIA
                        DATA RATE 16
                        INT 5
                        MEM #1 DA000    ; 8KB window
                        MEM #2 DC000    ;16KB window

                      **** TOKEN.COM
                      IBM Token-Ring MLID  v1.28 (930824)
                      (C) Copyright 1991 - 1993 Novell, Inc.  All Rights
Reserved.
```

2. IBM Ethernet Card
Device: [Do not configure]

Remark: The card will be configured by the driver which comes with the card. This driver works as a card services client.

3. IBM 3270 Card
Device: IBM 3270

```
              Type:      Network Adapter
       I/O Range 1:      2D0             16
               2:        [None]          [None]
    Memory Range 1:      CE00            8
               2:        [None]          [None]
         IRQ Level:      9
```

Remark: You must use the settings in the IBM-3270 device, because the 3270-Emulation software is expecting this hardware setting.

Please ensure that the required resources are available!

The [Resources] section of the CARDWARE.INI file should include lines which insert the following Memory- and I/O-Ranges (Remember to exclude the added Memory ranges for use by an EMM-Manager in your CONFIG.SYS!):

```
              MEM=0xCD000,0x3000,E

              I/O=0x2D0,0x20,E,10
```

Note: On boards which are using the Texas Instruments PCMCIA controller (TACT 88412 CCU), this PC Card can only be used in the slots "A" and "B".

4. New Media Ethernet

Device: [Do not configure]

Remark: The card will be configured by the driver which comes with the card. This driver works as a card services client. Use the driver V1.52 or later without the /R switch.

```
CLIENT:  DEVICE=NMCLAN2.SYS
```

5. XIRCOM CE-10BT Creditcard Ethernet Adapter

Device: [Do not configure]

Remark: The card will be configured by the driver which comes with the card. This driver works as a card services client. Use the latest XIRCOM drivers and update your CIS as described in the XIRCOM documentation. The card (CIS Rev E) was tested with CardWare and the following software configuration:

```
**** STARTNET.BAT
cecfg.exe driver=odi
lsl
ceodi
ipxodi
netx
**** NET.CFG
link driver ceodi
   frame ethernet_802.3
   frame ethernet_II
   int 5
   port 300
   mem d0000
**** CECFG
Xircom CreditCard Resource Manager, V2.42, (931123)
**** CEODI
Xircom CreditCard Ethernet Adapter MLID V2.02 (931122)
(C) Copyright 1993 Xircom. All Rights Reserved.
**** IPXODI
NetWare IPX/SPX Protocol  v2.12 (931007)
(C) Copyright 1990-1993 Novell, Inc.  All Rights Reserved.
**** NETX.EXE
NetWare Workstation Shell  v3.32 (931117) PTF
(C) Copyright 1993 Novell, Inc.  All Rights Reserved.
```

Note: The CECFG driver V4.23 and later may not be compatible with the Card Services release 2.1. This driver will report that the card was configured by PCENABLE even if the card was set to [Do not configure]. You can solve the problem by loading the CECFG driver prior to PCENABLE in CONFIG.SYS. Please contact your supplier of the PC Card for an updated software.

6. XIRCOM PS-CE2 Creditcard Ethernet Adapter

Device: [Do not configure]

Remark: The card will be configured by the driver which comes with the card. This driver works as a card services client. Use the latest XIRCOM drivers and update your CIS as described in the XIRCOM documentation. The card was tested with CardWare and the following software configuration:

```
**** STARTNET.BAT
ce2cfg.exe driver=odi
lsl
ce2odi
ipxodi
netx
**** NET.CFG
link driver ce2odi
    frame ethernet_802.3
    int 5
    port 300
    mem d1000
**** CE2CFG
Xircom CreditCard Resource Manager, V4.41, (940722)
**** CE2ODI
Xircom CreditCard Ethernet Adapter IIps MLID V1.02 (930617)
**** IPXODI
NetWare IPX/SPX Protocol  v2.12 (931007)
(C) Copyright 1990-1993 Novell, Inc.  All Rights Reserved.
**** NETX.EXE
NetWare Workstation Shell  v3.32 (931117) PTF
(C) Copyright 1993 Novell, Inc.  All Rights Reserved.
```

Note: The CE2CFG driver before V4.40 may not be compatible with the Card Services release 2.1. This driver will report that the card was configured by PCENABLE even if the card was set to [Do not configure]. You can solve the problem by loading the CECFG driver prior to PCENABLE in CONFIG.SYS. Please contact your supplier of the PC Card for an updated software.

Because of a hardware problem of the memory chip which is used to store the CIS of the card it may not be possible to configure the card correctly. in such cases you will only hear ONE beep if you insert the card. Contact XIRCOM or use the modified Socket Services from APSoft (SSPCIC.EXE dated later than 26.10.94 19:32).

C. ATA Harddisk Cards

1. Western Digital ATA CU-140
Remark: This card is not PCMCIA compliant because it has no CIS information and no Configuration-Option-Register'. So there is no way for CardWare to support this card. APSoft is working closely together with the card manufacturer to fix the problem for new cards.

D. OTHER Cards

1. New Media Visual SCSI Card
Device: [Do not configure]

Remark: The card will be configured by the ASPI driver which comes with the card. This driver works as a card services client.

```
CLIENT: DEVICE=ASPIMGR.SYS
```

2. New Media SCSI Bus Toaster
Device: [Do not configure]

Remark: The card will be configured by the ASPI driver which comes with the card. This driver works as a card services client.

```
CLIENT: DEVICE=BTASPI.SYS /D /Y
```

3. New Media .WAVjammer
Device: [Do not configure]

Remark: The card will be configured by the driver which comes with the card. This driver works as a card services client.

```
CLIENT: DEVICE=NMCMSSND.SYS /WAVE=300 /V
```

CardWare Initialization File Format

By default the CardWare initialization file is called CARDWARE.INI.

[Resources]
This section describes the system resources that CardWare assigns to PC Cards There are four types of resources: Memory space, I/O space, IRQ levels and DMA channels.

During the loading PCCS collects information about system resources used by PCI, PNP and Option ROMs. PCCS considers such resources as non-free and excludes them from internal database of system resources. The list of all detected resources is displayed if PCCS is started with /V+ switch. In non-PnP computer PCCS may be not able detect all used resources (e.g. resources used by Legacy ISA devices). In such case you can exclude resources manually.

For purpose of backward compatibility PCCS may consider some resources as unavailable if they are not explicitly added via this section (even if they are detected as free). See description of PCCS.EXE for details.

System resources are added or removed by including an entry in this. MEM, I/O, IRQ or DMA entries are used to add each of corresponding resources.

XMEM, XI/O, XIRQ and XDMA are used to remove the respective resources if they have been detected by PCCS incorrectly.

If you have a network or sound adapter that is not a PC Card and it has not been started before PCCS is loaded, you need to add an XIRQ entry to insure PCCS will not use the IRQ level required by such network or sound adapter.

The entry to add a memory range is "MEM=base,length,share", where:

base   is the physical base address (20 bits) of the memory range to add and must be aligned on a 4KByte boundary

length   is the size of the memory range

share   is sharing disposition and normally should be set to 'E'

For example: MEM=0xD0000,0x9000,E

This entry adds 36K from segment D000H to segment D8FFH.

Note: Only memory ranges above A0000H may be added (they must be adjusted to a 4K boundary!) and at least the first 4KByte window will not be available for use by devices, because CardWare is using the first 4K Segment for internal use.

If you are using CardBus adapter - CardWare will assign 4kB memory window for every CardBus socket.

To exclude a MEM range, use XMEM instead of MEM in the above example.

The entry to add an I/O range is "I/O=base,length,share,lines", where:

base   is the physical base address (10 bits) of the I/O range to add

length   is the number of I/O ports in the range

share   is sharing disposition and normally should be set to 'E'

lines   is number of address lines and normally should be set to 10

For example: I/O=0x3E8,8,E,10

This entry adds eight I/O ports based at 3E8H

Note: Only I/O ranges between 100H and 3FFH may be added.

To exclude an I/O range, use XI/O instead of I/O in the above example.

The entry to add an IRQ level is "IRQ=level,share", where:

level   is the IRQ level to add (2 thru 15)

share is sharing disposition and normally should be set to 'E'

For example: IRQ=10,E

This entry IRQ level 10

Note: To exclude an IRQ, use XIRQ instead of IRQ in the above example.

If you change this any entries in this section you must restart your system for the change to take effect.

[AutoConfig]
This section contains a list of PCI device handles of the PCI devices which configuration should be modified.

The order in which PCI devices are specified is important. All PCI devices are processed one by one and therefore configuration specified for one PCI device (for example, for PCI-2-PCI bridge) can affect on the PCI device handles of the devices under this bridge and, therefore, on the section names for these devices.

The [AutoConfig] section must contain NumberOfRecords variable, which indicates the number of listed PCI devices.

Example:

[AutoConfig]
NumberOfRecords = 1
1=[0:A:1]

Here, [0:A:1] is the handle of PCI device which configuration should be modified. The handle has [Bus:Device:Function] format. All PCI device handles are relative to original PCI subsystem configuration. This configuration can be shown by SSPCIC.EXE using /V+ switch.

The new configuration of PCI device should be described in the separate section, which is named with PCI handle of this device. For example, in order to modify IRQ number of the PCI device [0:A:1], the following new section should be added to CARDWARE.INI:

[0:A:1]
IRQ=11

Variables' names are depended on the device type.

For CardBus adapters, the following variables are defined: 'IoFilter0', 'IoFilter1', 'MemFilter0', 'MemFilter1', 'ExCABase', 'LegacyBase', 'IRQ', 'ISAEnable', 'VGAEnable'.

For PCI-to-PCI bridges, the following variables are defined: 'IoFilter', 'MemFilter', 'PreFilter', 'IRQ', 'ISAEnable', 'VGAEnable'.

MemFilter, PreFilter, MemFilter0, MemFilter1

These parameters define the CardBus or PCI-to-PCI bridge memory filter base and limit (or size) both memory filters (prefetcheable and non-prefetcheable).

The CardBus base and size values should have 4K alignments according to Yenta specification and limit (maximum address) should be aligned to 4K minus one.

Following formats could be used to specify bridge memory filter ranges:

BaseAddress:Limit. This means that we define the first and exactly the last integer number in a range (e.g., 0xA0000000:0xA0000FFF specifies 4K ranges). If you wish to disable positive decoding of PCI-to-PCI bridge's filter range, please specify something like: 200000:1fffff.

If you prefer to specify filter size rather than filter max address you should use BaseAddress,Size format, where Size by default is a literal decimal number. In this case you also could use 'M' or 'K' postfixes (e.g., 0xA0000000,1M specifies 1M memory filter starting at 0xA0000000 address).

Attention! All values are treated as hexadecimal even if there is no "0x" prefix.

Examples:

```
MemFilter0=A0000000h:A0000fffh    4K memory range
MemFilter0=A0000000h,4K          4K memory range
MemFilter0=A1000000h:A1001fffh,Pre 8K pref. memory
MemFilter0=A1000000h,8K,Pre       8K pref. memory
```

IoFilter, IoFilter0, IoFilter1

This is the bridge I/O range base and limit (or size). For CardBus base and size values must have double-word alignment.

Examples:

```
IoFilter = 0xD000:0xD00F          16-bytes I/O range
```

IRQ

CardBus interrupt line settings. According to PC/AT architecture this value must not exceed 15.

```
IRQ = 10                          10th interrupt
```

ISAEnable

Control setting of ISA Enable bit in Bridge Control Register. Valid values are 0 and 1.

Example:

```
ISAEnabe = 1                            Set ISA Enable bit
```

VGAEnable

Control setting of VGA Enable bit in Bridge Control Register. Valid values are 0 and 1.

Example:

```
VGAEnabe = 0                            Reset VGAEnabl bit
```

ExCABase

This option is used to mountain CardBus socket register/ExCA registers base address register. Available values: any 32-bit hexadecimal number aligned to 4K boundaries.

Example:

```
ExCABase = D8000000h
```

LegacyBase

This is PC Card 16-Bit IF legacy mode base address. Available values: any 16-bit hexadecimal number aligned to double-word boundary.

Example:

```
LegacyBase = 3e0h
```

PrimaryBus, SecondaryBus, SubordinateBus

These options control bus number assignments for PCI-to-PCI and CardBus bridges. Available values: any decimal number not greater than 255.

Example:

```
[0:A:0]                              TI PCI1131 socket
PrimaryBus      = 0
SecondaryBus    = 1                  Set sec. bus to 1
SubordinateBus  = 2                  Set sub. bus to 2

; Now socket 0 of TI PCI1131 CardBus adapter accepts
; I/O requests to buses from 1 to 3 inclusive

[0:A:1]                              TI PCI1131 socket
PrimaryBus      = 0
SecondaryBus    = 3                  Set sec. bus to 3
SubordinateBus  = 4                  Set sub. bus to 4
```

[Flash_Cards_Table]

This section allow to add FLASH card not yet supported by CardWare. In order to add new card you need to find JedecID, card size and size of the erase block in FLASH card documentation. You may also need to add manufacturer code to the [Flash_Manufacture_ID] section of CARDWARE.INI.

If you modify FLASH support table you may turn InternalTablePriority setting to zero. It will force CardWare to use CARDWARE.INI FLASH table first and the internal FLASH table - second.

If you modify number of table entries, please also remember to modify the NumberOfRecords setting.

[Cards]
This section is intended for use only by CardWare. It should not be edited. It is used to describe the specific card recognized by CardWare. Current up to twenty cards may be defined.

[GenericCards]
This section is intended for use only by CardWare. It should not be edited. It is used to describe PC Card that are recognized by just a Function ID tuple. If a card does not have a Function ID tuple used in this section, it must have a specific card definition in the [Cards] section.

[SpecificAssociations]
This section is intended for use only by CardWare. It should not be edited. It is used to describe the logical device definitions used by card definitions in the [Cards] section.

[GenericAssociations]
This section is intended for use only by CardWare. It should not be edited. It is used to describe the logical device definitions used by card definitions in the [GenericCards] section.

[LogicalDevices]
This section is intended for use only by CardWare. It should not be edited. It is used to describe the device definitions used to configure PC Cards. Do not change none of the first 5 devices. It is essential for CardWare to have those devices in the given order.

Following IRQ values are reserved for CardWare own use:

    0xFFFF   = use no IRQ
    0x0   = use [Any] IRQ

[CWNOT \ Notification]

This section is intended for use only by CardWare. It should not be edited. It describes the type of event notifications that should be made when particular PC Card related event occur. These include card insertion and removal.

[Socket_Mapping]

This section may be used to change the relationship between the socket displayed by PCCard Control and the way in which the hardware designer has connected the socket controller hardware to a PC Card connector. If your system displays inserted cards in the wrong socket on the PCCard Control display, this section needs to be changed.

By default, 0=0 and 1=1.

To reverse the relationship between the physical socket and the display set 0=1 and 1=0. If you change this entry you must restart PCCard Control for the change to take effect.

[Socket_Names]

This section lets you assign a name to a particular socket. This name is used by CardWare to inform you of socket related events. This allows you to assign a more significant name than socket 0 or socket 1. Instead you could say, 'Rear Socket' or 'Top Socket'. If you change this entry you must restart PCCard Control for the change to take effect.

[PCCARD \ Socket_Size]

There are three sizes of PC Cards. Type I and Type II cards fit in what appears to be the same size socket. Type III card require a socket twice as big. This section allows the size of the displayed socket to match the socket type on the host system. Each socket may be a different size. Use 0 for the thinner Type I and II sockets and 1 for Type III sockets. If you change this entry you must restart PCCard Control for the change to take effect.

[Options]

This section records options selected from the PCCard Control interface. At present time the only selection is DOSBeep. To turn off beep signalling set this entry to 0. To turn beep signalling on set this entry to 1 If you change this entry you must restart your system for the change to take effect. If this option is changed by PCCard Control, it is changed immediately.

All other sections are reserved for PCCard Control for Windows and should not be touched manually.

Glossary

Adapter

The hardware that connects a computer bus to PC Card sockets.

Also: Certain PC Cards are commonly called adapters.

Associated

The relationship between a device and a defined PC Card. CardWare uses **associated** devices to configure a PC Card with the appropriate system resources.

See also: System Resources, Device

ATA

Acronym for **AT A**ttachment specification. The industrial standard for interfacing to Integrated Drive Electronics (IDE) hard drives and flash drives.

Auto-Configure

CardWare automatically attempts to configure each PC Card inserted. It does this by reading the CIS. If the CIS does not contain enough information, CardWare attempts to logically configure the PC Card. However, even if successful, CardWare does not update CARDWARE.INI until the user employs *PCCard Control* to configure the card.

Card

A PCMCIA-compliant card. Also known as a PC Card.

See also: PC Card

Card Definition

Card Definitions are used by CardWare to determine how to configure a PC Card. A definition includes a card name, information from the Card Information Structure (CIS) that is used to recognize the card when it is inserted, and a list of associated devices.

See also: Configure, Card Information Structure, Associated, Device

Card Information Structure

See CIS.

Card Type

The type of the function performed by a PC Card. Examples is: ATA hard drive, Network Adapter, Parallel Port, Serial Port and Other.

See also: PC Card

CIS

PC Cards that complies with industrial standards contains the card information structure (**C**ard **I**nformation **S**tructure) that consists of information about the card, its purpose, and the resources it needs.

The CIS is a memory area inside certain PC Cards. This memory area is divided into Tuples (fields of data) that allow the system and application programs to know what are required to properly use that PC Card.

See also: Tuple

Configure

The act of programming a socket and PC Card for use in a system. When a PC Card is inserted, CardWare uses a card definition to recognize the card. Once a card is recognized, associated devices are used to determine the system resource required and how the card is configured.

See also: PC Card

Device

In CardWare: A named collection of system resources that a PC Card uses when it is configured by CardWare. More generally: A peripheral, or subsystem in a computer system. Examples are hard drives, serial ports and network adapters.

See also: Device type

Device type

The card type the device is intended to support. Card definitions may only be associated with devices of the same type. Different device types use different combinations of system resources.

See also: Associated

DMA

DMA channels are used for highspeed transfer of data. Typically these are used by audio PC Cards. If a PC Card needs a DMA channel, CardWare configures the card socket to route the card's DMA channel signals to an available DMA channel in the system.

IDE

Acronym for **I**ntegrated **D**rive **E**lectronics. Used to describe hard drives with an on-board controller. The interface to the controller is described in the ATA specification.

Installing a PC Card

A process including these steps:

1. Mapping memory ranges from the PC Card into the system memory space (if required).
2. Mapping I/O ranges from the PC Card into the system I/O space (if required).
3. Routing an interrupt from the PC Card to a system interrupt (if required).
4. Routing a DMA channel from the PC Card to a system DMA channel (if required).

Generic

Common PC Cards that conforms to the PC Card specification containing information that identifies each card according to its function. For such *generic* cards, CardWare does not need to develop a specific, individual definition. Instead, CardWare configures the card according to its generic type, using pre-defined devices appropriate to the card's function. Generic card recognition greatly reduces the number of required card definitions and allows a class of cards to be handled in a standard manner with automatic configuration from the first insertion.

CardWare recognizes such common generic card types as ATA data storage, fax/modem, SCSI, and LAN.

GPS

Acronym for **G**lobal **P**ositioning **S**ystem. GPS is a navigational system using satellites. GPS receivers may be implemented as PC Cards. GPS PC Cards typically have a serial port interface.

Hot Docking

Inserting (or removing) a mobile computer into a docking station while both the computer and the docking station are in full power and full functional operating mode. CardWare supports hot docking if the mobile computer has a Plug and Play BIOS that supports hot docking.

Hot Spot

An area on the display screen where clicking with a mouse results in a move to another area of the help file. The cursor changes from an arrow to a small hand when positioned over a hot spot.

Hot Swapping

Inserting a PC Card in the socket while the computer is in full power and full operational mode. All PC Cards support hot swapping; but some software, notably telecommunication packages and network operating systems, do not.

Interrupts

Interrupts are used to get the system's attention. If a PC Card generates interrupts, CardWare configures the card socket to route the card's interrupt signal to an available **I**nterrupt **R**e**Q**uest (**IRQ**) level in the system.

See also: System Resources

I/O Ports

Ports have a port number, or address, and are used to pass information to or from peripheral devices. Port address space is separate from memory address space. CardWare configures PC Cards with I/O ports to use unoccupied port address space.

See also: System Resources

IRQ

See Interrupts.

Memory

Memory is the place used to store information while it is being used. Computer memory is organized as a number on individual locations, each identified by an address. Memory address space is the sum of all locations identified by an address. The memory address space is often much larger than the actual amount of memory available to store data. *See also:* System Resources

MTD

Acronym for Memory Technology Driver. An MTD is responsible for manipulating the physical media on a storage (memory or ATA) PC Card. The generic storage card software (PCDISK) uses the MTDs.

Multiple Function PC Card

A PC Card that integrates two distinct functions, such as a LAN function and a modem function, into a single PC Card. There are two styles of cards having more than one function: Those that are designed using the MFC extensions defined in the 11/95 release of the PC Card Standards (these are called MFCs) and those that are designed for the 2.10 release of the PC Card Standards (commonly called Combo Cards).

PC Card

Term used to describe cards compliant with the PCMCIA PC Card Standards. About the size of a credit card, but varying in thickness, these cards plug into a 68-pin socket and expand the capability of your system. PC Cards can add additional storage using memory devices or ATA flash and hard drives. Other types of cards are specialized devices, such as modems, network adapters or GPS receivers. Some cards are actually interfaces through which your system can access even more devices.

PCCard Control

PCCard Control is the program for configuring your PC Cards. To run PCCard Control, click on the Icon in the CardWare group or left double click on tray icon.

PCMCIA

Personal **C**omputer **M**emory **C**ard **I**nternational **A**ssociation has created and documented a series of specifications to allow you to plug-in and use almost any compliant PC Card.

Recognized

To CardWare, recognized means that a PC Card is identified when it is inserted. A PC Card must be *recognized* before it can be configured using an associated device.

See also: Associated

Registered

CardWare can identify an inserted card using information registered in an internal database.

Socket

The 68-pin slot, into which the PC Card is inserted to make physical and electrical connection to the PC Card adapter.

See also: Adapter

System Resources

A system interacts with its world through four resources:

- Memory
- Interrupts
- I/O ports
- DMA channels

Devices describe the set of resources used by a PC Card once it is configured.

See also: I/O, Interrupts, Memory

Tuple

Tuples are special fields in the internal memory of certain PC Cards. PCMCIA-compliant tuples describe the configurable characteristics of Memory-Only and I/O Cards.

See also: CIS

WAV Files

A *WAV* (pronounced *wave*) file is a file of digitized sound (like on a CD). Because the extension of the file name (the three characters following the period in the file name) is WAV (e.g. SOUNDS.WAV) these segments of sound have become known as WAV files.

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