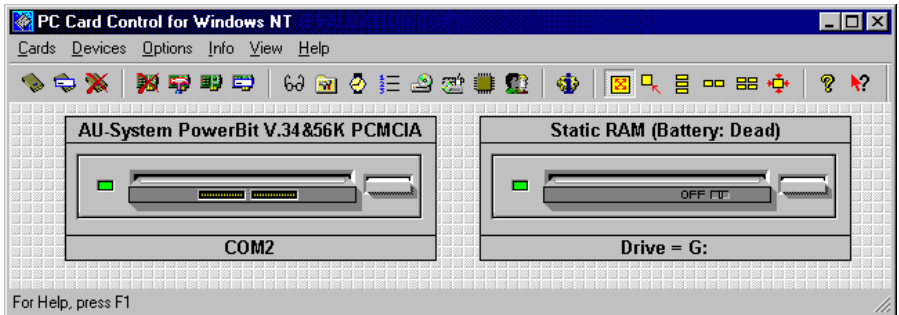


CardWare[®] for Windows NT

R 7.00



User's Guide

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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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Introduction

Intention of this Manual

This manual provides an overview of CardWare for Windows NT. It does not fully describe all functions of CardWare. If you are looking for a complete description, please consult the online help of the product by selecting **CardWare Help** or **MCView Help** from the CardWare Group in the start menu, or by pressing F1 while PC Card Control or MCView is running.

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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 “**Installing CardWare**” for a detailed description of the process.

1. Remove all PC Cards from your system.
2. Start Windows NT.

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.
 - b) When the splash screen appears choose "Install CardWare". The installer will automatically unpack the self-executable file to your temporarily sub-directory and will start the CardWare Setup automatically.
3. Follow the prompts through the first screens, clicking **Next** or **Finish** to move from screen to screen.

4. **IMPORTANT!** When you come to the list of platforms, select ***your platform*** from the list. If, ***and only if***, your system is not on the list, select the generic **Platform with PCIC compatible controller**.
5. When asked to choose the installation type, select **Express Setup**.
6. When the program ends, restart your system. CardWare should load and automatically detect insertion and removal of PC Cards any time during system operation.

For details, see Chapter “CardWare Installation Options”, page 19.

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 total software solution for PC Cards that complies with the PC Card Standard. 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 industrial 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 Standards.

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 format, erase, and eject card(s), as well as edit the contents directly in a HEX editor. Read/write cards formatted by Microsoft FFSII standard, and easily copy files to/from the card using standard Drag-n-Drop, or Copy-Paste operations, etc.

CardWare works in the background so applications can use your PC Cards.

In spite of the well-documented PC Card Standard, not all PC Cards are 100% compatible. CardWare attempts to recognize and configure as many PC Cards as 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. Three CardWare programs, PC Card Control, PCTray and MCView, let 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.

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 PC Card Standard for one of several types of PC Cards and has a data field that informs CardWare of its function. Recognized generic cards include fax/modem, ATA/ATAPI 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 configuration for your card. If you need greater control, PC Card Control and PCTray let you change the configuration of each card.

You also can use PC Card Control and PCTray 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 can identify an inserted card using information registered in an internal database.
- **System resources.** To operate, CardWare must be assigned system resources, comprising these:
 - Memory address space

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

When a card is inserted, CardWare cooperates with the Windows NT operating system in locating and allocating system resources to the card.

- **Device.** The term assigned to a collection of *system resources* that the PC Card uses once it is configured.
- **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 (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).

Where to find information

- This manual contains basic information about CardWare. Use it as your first information source.
- While using PC Card Control, PCTray or MCView, 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 system registry. One line in particular includes reference to a device driver, SSxxxxx.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.*

When specific entries for your system registry are mentioned they are explained in a table, as shown below:

Parameter:	<parameter name and syntax>
Key Tree	<location in registry>
Name	<key name>
Type	<key type: REG_SZ or REG_NUM>
Data	<actual value to assign to the key>

This format explains the entries for the registry and the place within the registry where these entries need to occur.

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 the original Windows NT database for PC Cards. If the card is listed in this database and a driver for this card is installed, CardWare uses the settings required by the driver to configure the card in *NT compatible mode*.

If no entry exists in the original NT database, 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* and cannot be configured in *NT compatible mode*, 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 two possibilities when a new PC Card is inserted for the first-time:

1. CardWare configures the card. If the resources are available, CardWare automatically installs the PC Card (or not, if the card's definition directs CardWare to ignore it) and installs/starts the appropriate device driver.

2. 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.

Configuration Classes

CardWare can recognize and configure a PC Card using any of several different methods.

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/ATAPI flashdisks and harddisks use the logical drive letter assigned to the PC Card socket where the card was inserted.

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 PC Card Control, you can determine the settings by right clicking on the device name displayed below the socket (see Chapter “**PC Card User Interfaces**”). From a command line shell, you can type `DOSCARD /D` to get this information.

Other Configuration Options

If you do not want a card to be *auto-configured*, use PC Card Control or PC Tray 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 PC Card Control or PCTray (see Chapter “**PC Card User Interfaces**”), 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 compliant with the PC Card Standard) cannot be recognized because there is not enough information on the card to act

as a unique identifier. Also, in some hardware configurations, recognition fails. Usually this situation is also related to noncompliant cards. For the latest information, see the README file on CardWare Disk or open it from the CardWare group in the Start menu.

CardWare Features

CardWare 7.0 for Windows NT supports any PC Card supported by the Microsoft Windows NT operating system, any PC Card that may work in Windows NT using a driver supplied by the card manufacturer, and all other PC Cards supported by CardWare for DOS/Windows 3.x. It even supports many PC Cards with an incomplete, damaged, or missing CIS.

In addition to the default Microsoft Windows NT PC Card solution, CardWare 7.0 for Windows NT provides these features:

- Hot swapping modem PC Cards
- Hot swapping ATA/ATAPI and ATA flash PC Cards
- Hot swapping SRAM PC Cards
- Hot swapping flash PC Cards (FFS and FTL supported)
- Hot swapping LAN PC Cards
- Hot swapping SCSI PC Cards
- Hot swapping zoomed video PC Cards
- Hot swapping DMA PC Cards
- Hot swapping multifunction PC Cards
- Hot swapping combo PC Cards
- 5.0 and 3.3 volt PC Cards
- Slot-naming
- Cold, warm, and hot docking with multiple (dis)similar controllers
- CardBus PC Cards with device details listed above
- 16-Bit PC Cards with device details listed above
- Support for all types of memory cards. SRAM, FLASH and ATA/ATAPI cards are supported.
- The FLASH cards support includes support of FTL (Flash Translation Layer) and FFSII (Microsoft Flash File System II).
- Allows you to use storage cards (memory cards and PC Card ATA/ATAPI flashdisk and harddisk drives) as if they were normal floppy or hard disk drives.
- An InstallShield based installation program
- An uninstall utility (InstallShield based) which completely removes the product from the hard drive
- Intuitive and easy-to-use user interface with complete Help facilities
- Translation support for national languages.
- Integration of Advanced Power Management support with LAPTOP.SYS

- Intuitive and easy to use UI with complete Help facilities
- Integration of Advanced Power Management support with LAPTOP.SYS
- Socket power management (socket off on-demand)
- Plug and Play configuration method

Multiple-Function Cards

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

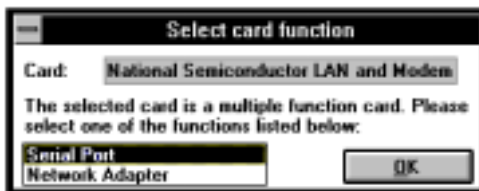


Figure 1: Multiple-Function Cards

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 full functional operating mode. By design, PC Cards support hot swapping; however, some software does not.

Prior to removing the card from the system always power off a card by selecting Slot Power Off from the PCTray menu.



Even though CardWare supports the removal of LAN and SCSI cards that use the standard Windows NT device driver, you should always power off the slot before removing a card, to allow CardWare to unload the card driver.

Hot docking is inserting (or removing) a mobile computer into/from a docking station while both the computer and the docking station are in full power, and in full 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 can support hot docking if the mobile system where CardWare is loaded has a Plug and Play BIOS that supports hot docking and CardWare has been integrated onto this system.

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 Standard, 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.

Most Windows NT systems do not have full APM functionality. If your system manufacturer preinstalled or upgraded CardWare, they have already configured power management options. If you are installing CardWare yourself, then power management most likely does not work, due to restrictions in the OS.

What the Beeps Mean

Beep tones are the way CardWare notifies 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 generic card enabler (PCEnable) has recognized the PC Card.
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 that signal card insertion and recognition.

NOTE: *PC Card Control and PCTray (described in Chapter 4) let you disable the beep tones that signal card insertion, recognition, and configuration; determine the current state of any installed PC Card, and 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. Chapter 4 describes configuring your PC Cards with PC Card Control and PCTray and includes a discussion about assigning system resources for devices.

There are five common types of PC Cards:

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

As described in Chapter 1, CardWare attempts to configure a PC Card whenever one is inserted. To view the status of your cards, start the PC Card 7.0 option from the CardWare group, or double click the PCTray icon in the system tray (see Figure 2, below). A graphical representation opens, showing the number of available sockets and the cards plugged into each. Displayed below each occupied socket is text identifying the type of device detected (such as a fax/modem) and the system resource associated with it (such as COM3).

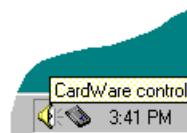


Figure 2: PCTray Icon in System Tray

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 after system power-on, three beeps sound, signifying that the card was successfully installed and is now active.

You can remove your modem card at any time, as long it is not used by an application (e.g., HyperTerminal).

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: *Generic modems are not named in the card list when you choose the Cards | Edit command in PC Card Control. To change the configuration for a generic modem, edit the associations for the Generic Modem card (see Chapter “PC Card User Interfaces”).*

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 COM A, COM D, and COM C, respectively, then when the card is inserted CardWare attempts first to configure the card as COM A. If COM A is already in use, the software attempts to configure the card as COM D, and then COM C (if necessary) next.

NOTES: *CardWare always lists the name of the assigned Windows NT COM port and not the name of the device used to configure the card in PC Card Control*

Few third-party fax and telecommunication programs can detect the difference between an ISA BUS modem or serial modem, and a modem PC Card. Insert your modem before you run any third-party fax or telecommunication software. We do not recommend 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 after system power-on, three

beeps sound, signifying that the card was successfully installed and is now active. If the driver for the particular card is already installed, CardWare starts the driver; otherwise, CardWare gives you the options of installing the driver.

To remove your LAN card while your system is running, power off the slot first. Use **Slot Power Off** from the PCTray menu to power off the slot and allow CardWare to unload the driver for the card.



If you have set CardWare to 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: *Generic LAN cards are not named in the Card-list when you choose the Cards | Edit command in PC Card Control. To change the configuration for a generic LAN card, edit the associations for the Generic LAN card.*

SCSI Cards

You can insert a SCSI card into the PC Card socket either before or after you turn on your system. If you insert the SCSI card after system power-on, three beeps sound, signifying that the card was successfully installed and is now active.

If the driver for the particular card is already installed, CardWare starts the driver; otherwise, CardWare gives you the options of installing the driver

To remove your SCSI card while your system is running, power off the slot first. Use **Slot Power Off** from the PCTray menu to power off the slot and allow CardWare to unload the driver for the card.



Due to limitations of Windows NT, it is recommended to insert a SCSI card before boot to ensure all necessary device drivers are loaded.

If you have CardWare configure your SCSI PC Card, the resulting card configuration emulates conventional ISA bus or PCI bus SCSI cards, and you can use standard operating system card drivers.

NOTE: *Generic SCSI cards are not named in the Card list when you choose the Cards | Edit command in PC Card Control. To change the configuration for a generic SCSI card, edit the associations for the Generic SCSI card.*

ATA Flashdisk and Harddisk Cards

You can insert an ATA/ATAPI flashdisk or harddisk card into the PC Card socket either before or after turning on your system. If you insert the ATA card after system power on, three beeps sound, signifying that the card was successfully installed and is now active.

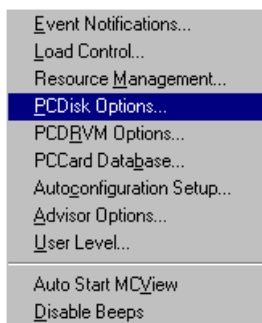
You can remove your ATA/ATAPI card at any time, as long it is not currently accessed (e.g., copying files from/to the card), but power off the slot first.

Use **Slot Power Off** from the PCTray menu to power off the slot and allow CardWare to unload the driver for the card.



Your ATA/ATAPI 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.

NOTES: CardWare dynamically assigns a drive letter for storage cards. Thus a drive letter is only assigned when you insert a storage card into your system
 You can modify the way CardWare assigns a drive letter, right click on the PCTray icon on the task bar and select **PCDisk Options**.



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

To change the configuration for an ATA/ATAPI PC Card, see Chapter “**PC Card User Interfaces**”. 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/ATAPI 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., format). You can use Windows Explorer for formatting and copying.

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 three beeps sound, signifying that the card was successfully installed and is now active.

You can remove your memory card at any time, as long it is not currently accessed (e.g., copying files from/to the card), but you should Power Off the slot first.

Use **Slot Power Off** from the PCTray menu to power off the slot and allow CardWare to unload the driver for the card.

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 Windows Explorer 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. CardWare also supports Flash-File-System II (FFS II).
- *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.SYS.

CardWare includes the FFS and MTDs in its automatic installation process.

Card Preparation

You have three choices for preparing a flash card:

1. Using **PCTRAY**
Insert your flash card and click with the left mouse button on the PCTray icon in the system tray. Then select the **FORMAT** menu.
2. Using **PC Card Control**
Insert your flash card and select the **Cards | FORMAT** menu.
3. Using the command line utility **PCDISK**
Preformat a *new* card by running the CardWare **PCDISK** utility from the command line shell with the **/TL:<DriveLetter>** switch. See Chapter “**Data Storage Card Drivers**” for details about **PCDISK**.

Example

```
PCDISK /TL:E
```

Meaning

Prepares a flash card in drive E: for use in the system, following these steps:

1. Card is erased.
 2. Card is prepared for FTL usage.
 3. The card is formatted. PCDISK starts the operating system format utility automatically to format the card.
5. Using Memory Cards Viewer (MCView)

Insert your flash card and select the **File Access | Format** menu

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 Explorer.

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	COM A, COM B, COM C, COM D
I/O range	3F8h, 2F8h, 3E8h, 2E8H
Length (bytes)	8
Memory range	None
IRQ	None, Any, 2 - 15
Defaults	COM A: 3F8h, 8 bytes, memory range None, IRQ Any COM B: 2E8h, 8 bytes, memory range None, IRQ Any COM C: 3E8H, 8 bytes, memory range None, IRQ Any COM D: 2E8h, 8 bytes, memory range None, IRQ Any

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.

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, memory range None, IRQ 5

LAN2: 300h, 32 Bytes, D000h, 16 Kbytes, IRQ 5
IBM 3270: 2D0h, 16 Bytes, CE00h, 8 Kbytes, IRQ 9

ATA Flashdisk and Harddisk 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/ATAPI 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, PC Card Control lists the card type as **Unknown**.

Installing CardWare

This chapter explains how to install CardWare under Windows NT. Before you start, check the contents of your CardWare package:

- Make sure you have the correct equipment and operating system to install and run CardWare. See the detailed list on the following page.
- If you receive CardWare on CD-ROM, make a backup. Store the original distribution CD in a safe place and use the backup CD.

NOTE:

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

Before you install CardWare, check the brand and type of your computer or PC card reader. You may need this information during the installation.

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 evaluation software.

In the download area of APSoft WEB site, 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 hard disk.

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 "Install CardWare". The installer will automatically unpack the self-executable file to your temporarily sub-directory and will start the CardWare Setup automatically.

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 automatically. 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.

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>.

What Happens During Installation

The CardWare Setup program automatically installs CardWare on your system. The program copies all CardWare components onto your system and modifies the Windows registry as necessary. The installation process does the following:

1. Lets you specify the location of CardWare.
2. Copies CardWare files to your system (for list of installed files see the Appendix).
3. Creates a CardWare program folder and adds program icons to the folder.
4. Asks if you want to update your program, if you are installing CardWare over an old version.

Starting the Program

Before You Start

1. Before you install CardWare for Windows NT, be sure your system meets these minimum requirements:

Component	Description
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 5 MB free space

2. Remove any PC Cards from the card slots.

NOTE:

*If your system **only** has native Windows NT PC Card support, you must **turn off** the system before you remove any PC Cards.*

Adding the Program

During the installation, you can move backward or forward through the screens, until the program starts copying files to the destination drive. At any time during the installation process, you can cancel and exit.

1. Start Windows NT.
2. Open the Windows Control Panel. Click **Add/Remove Programs**. In the **Install/Uninstall** tab, click **Install**.
3. Follow the prompt to insert the CardWare installation medium in the drive.
4. Click **Next**, then confirm or edit the command line for the CardWare installation program. Click **Finish** (this button title is misleading — you are finished with the Windows installation utility, but just starting CardWare installation).

5. Wait while the setup program loads. This screen appears:

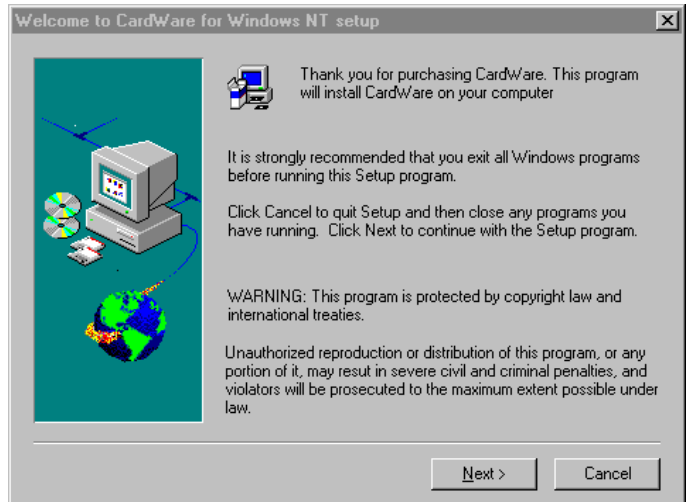


Figure 3: CardWare Setup Welcome

- Click **Next**, read the following informational screens, and click **Next** until you see this screen:

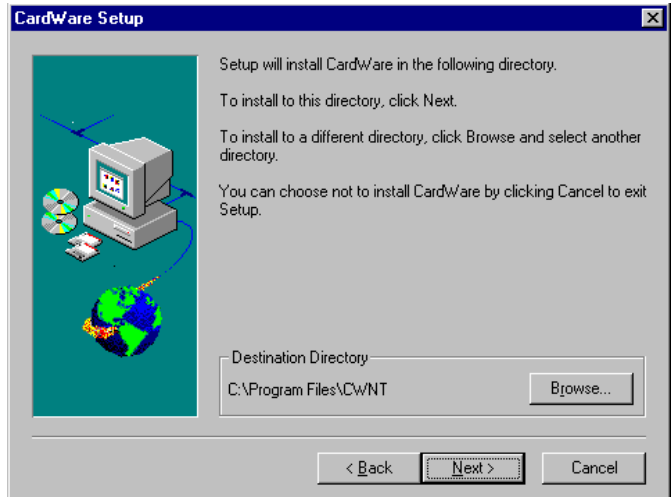


Figure 4: CardWare Setup Destination Directory

- Confirm the destination directory for CardWare or select a different one. Then click **Next**.

Installation Choices

The next screen asks for the name or model of your computer platform and the type of setup you want to run.

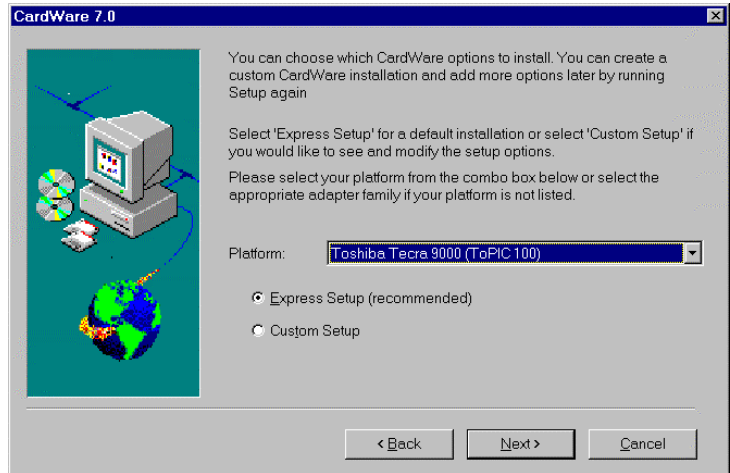


Figure 5: Platform and Setup Type Selections

Platform

The *platform* is your computer or type of PC Card reader.

To change the platform, scroll through the **Platform** selection window. It lists computers and/or card readers that this version of CardWare supports. If your platform is not in the list of platforms, select the generic **Platform with PCIC compatible controller**. Only a few systems contain a TCIC-compatible controller. In this case select **Platform with TCIC compatible controller**.

Setup Type

Choose between two Setup types:

1. Express Setup
2. Custom Setup

Express Setup

Express Setup places all CardWare features on the default drive (C:) and directory (\Program Files\CWNT).

If you select Express Setup, the program begins to copy files to the destination directory. Skip to *Finishing the Installation* at the end of this chapter.

STOP HERE!

*If you selected Express Setup, be sure all your parameters are satisfactory before you click **Next** and begin the file installation process.*

Custom Setup

Custom Setup lets you select the following:

1. Creation of a new hardware profile
2. The type of PC Card controller in your system
3. CardWare modules to install
4. Loading sequence
5. Folder location

Custom Setup Options

Hardware Profile

Confirm the name of the new hardware profile for CardWare or select a different one. Depending on your revision level, this screen may not appear.

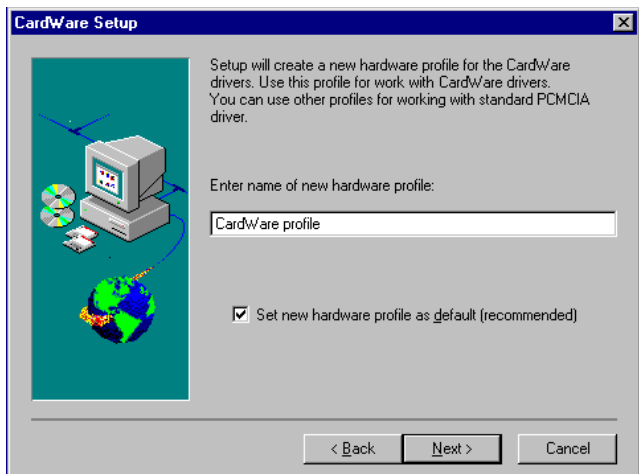


Figure 6: CardWare Setup Profile

To ensure that the indicated profile is the default profile, make sure that **Set new hardware profile as default (recommended)** is checked. If this box is left unchecked then the installation does not change the default profile.

Installation Options

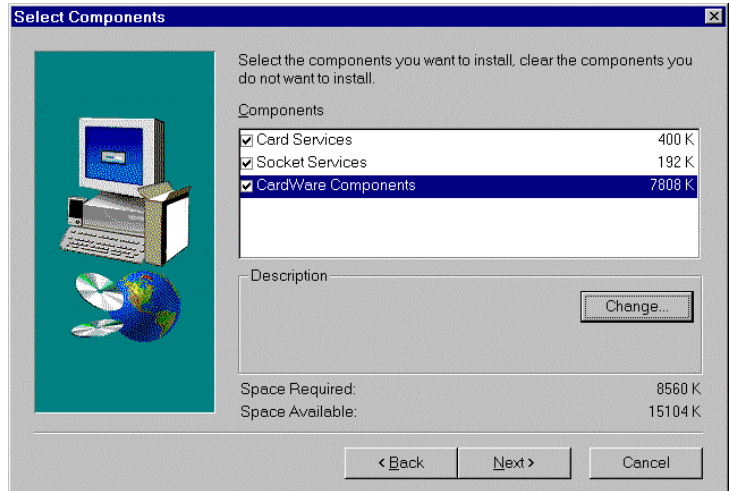


Figure 7: CardWare Setup Options Selection

Now select the CardWare components you want to install. Unless you are installing CardWare for a nonstandard application, we recommend that you leave all fields checked (default installation). Note that a grayed checkmark indicates that only some of the available files have been selected.

A box at the bottom of the window shows required and available disk space.

When you finish selecting options, click **Next**.

Here are the selections:

Socket Services

This option installs a driver for your PC Card controller (the **PCMCIA Adapter** selected in the previous field). Click **Files ...** to display the driver selections.

Most systems have a PCIC compatible controller and use SSPIC.SYS. A few systems have a TCIC-compatible controller and use SSTCIC.SYS.

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.

Card Services

The Card Services driver controls PC Cards. If you have a special PC Card or one with it's 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.

CardWare Components

CardWare Components are applications that use Socket and/or Card Services. Click **Change ...** to display a list of components:

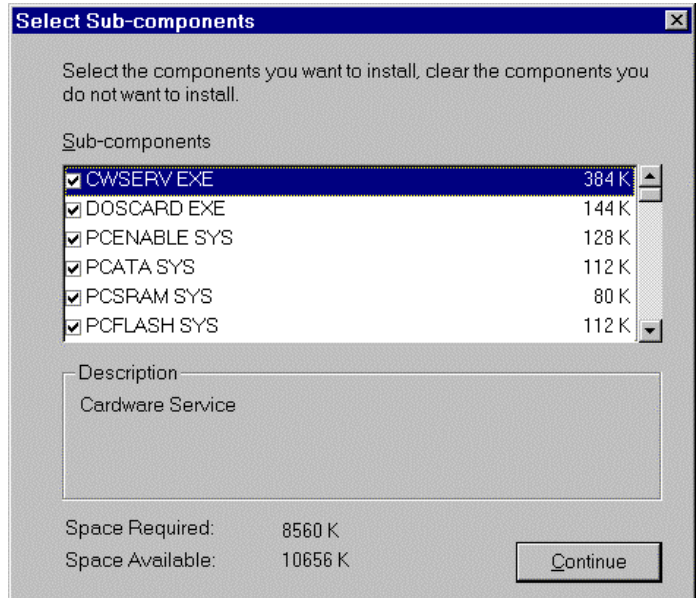


Figure 8: CardWare Setup Clients Selection

Select the components you want to install. You need not install drivers for storage card types you do not plan to use.

- **CWSERV.EXE:**
CardWare Service - manages mode transitions

- **DOSCARD.EXE:**
Console application - utility for viewing PC Card configuration from the command line shell.
- **PCENABLE.SYS:**
Generic I/O Card Enabler - recognizes I/O cards when they are inserted
- **PCATA.SYS:**
ATA/ATAPI card media technology driver (MTD) - driver for ATA/ATAPI memory cards
- **PCSRAM.SYS:**
SRAM card MTD - driver for SRAM memory cards
- **PCFLASH.SYS:**
Flash card MTD - driver for flash memory cards
- **PCFDS.SYS:**
Floppy Disk MTD - driver for floppy drive PC cards
- **PCDISK.SYS:**
Generic storage card enabler - storage card handler; requires driver for each card type (listed above)
- **PCDRVM.SYS:**
Virtual drive manager - manages drive letter creation and SCSI bus enumeration.
- **PCCARD.EXE:**
PC Card Control - utility for configuring PC Cards in Windows.
- **PCTRAY.EXE:**
System tray application - gives you easy access to the most frequently used card control functions.
- **MCVIEW.EXE:**
Memory Cards Viewer (MCView) - is a utility for quick and easy access to several memory card operations.
- **CARDWARE.CHM:**
Online Help - PC Card Control and PCTray help.
- **MCVIEW.CHM:**
Online Help – MCView utility help.

Create CardWare Group

If you omit this option, the installation program does not create a program folder and program icons.

Load Management

After selecting the CardWare options to install, the Load Control screen appears. It shows information about the way that CardWare files load. Only the files you selected for installation are available for load management.

The screen below shows the default load configuration.

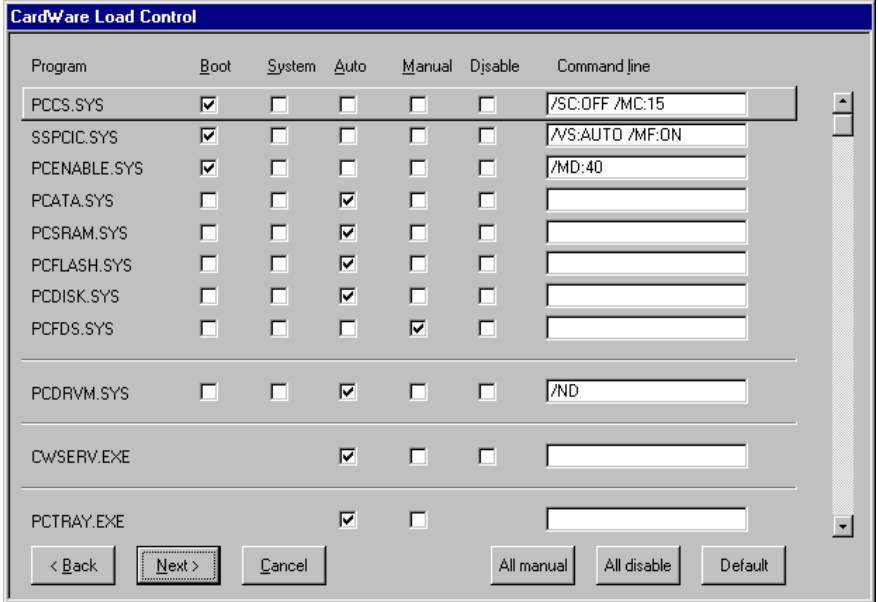


Figure 9: CardWare Load Management

NOTE: *Changing the load sequences of CardWare files can cause program errors. Unless you understand the meaning and consequences of your actions, leave load management at its default settings.*

Click **Default** to restore the default load management.

Here is a brief explanation of the column labels:

Boot, System, Auto

Windows NT has a complex, multi-stage booting process. Place a check mark (✓) in one of these three columns to select the boot stage in which the file loads.

Manual

Instead of loading a file during one of the above boot stages, you may

permit the user to load the file via the control panel **devices applet** or **net start** command. Click the **All manual** button to choose manual loading for all files.

Disabled

User cannot load the file. Click the **All disable** button to disable loading of all files.

Command line

Enter command line switches as desired for each file. See Chapter “**CardWare Files**” for the descriptions of command line switches for CardWare .EXE and SYS files.

STOP HERE!

Use the **Back** button to check that all your parameters are satisfactory before you click **Next**. Depending on the options selected, you may have one more screen (below), or the file installation process may begin immediately.

Program Folder

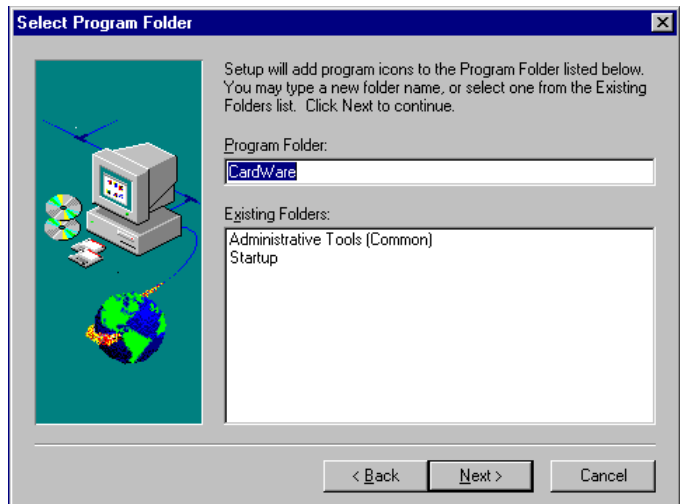


Figure 10: CardWare Setup Group Selection

Confirm or edit the name of the program folder here. If you did not check **Create CardWare Group** in the *Installation Options* screen (page 27), this screen does not appear.

Finishing the Installation

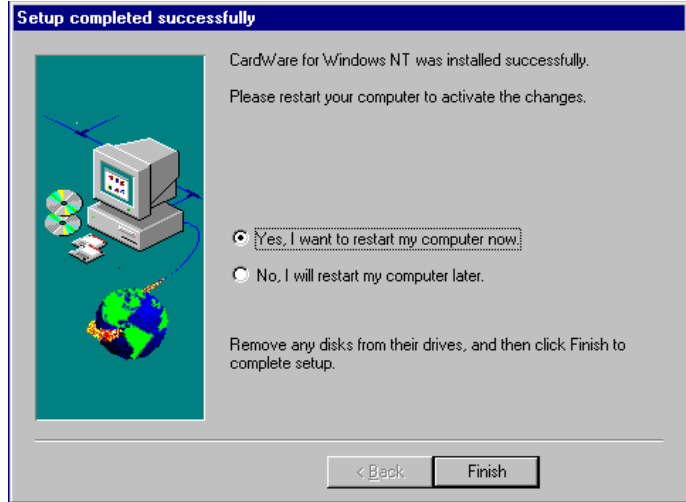


Figure 11: CardWare Setup Completed

Follow the program instructions to complete the installation. When the installation of CardWare is complete and your system files updated, remove the installation medium and reboot your computer to activate CardWare.

Resolving Resource Conflicts

If CardWare is not working properly, the reason is normally a resource conflict of IRQs or memory ranges. You can resolve such problems by modifying the resources CardWare is using. To make these changes choose **Options | Resource Management** from the main menu of PC Card Control (see the section Resource Management on page 51).

Changing the Status Change Interrupt

If your system does not recognize insertion and removal of PC Cards, the reason is normally a wrong IRQ assignment for the status change interrupt. You can change the status change interrupt separately for each PC Card controller in your system by using the `/SC:n,m` option switch for the Socket Services (SSPIC or SSTCIC) driver, with *n* specifying the controller number (normally 0) and *m* specifying the IRQ (range 2–15).

Parameter	/SC:n,m
Key Name	SYSTEM\CurrentControlSet\Services\SSPIC\Options
Name	CommandLine
Type	REG_SZ
Data	/SC:0,10 /SC:1,15

Page 4 contains a description of the fields in this table.

Example

If your system is equipped with two controller chips and you want to use IRQ=10 for the first and IRQ=15 for the second controller use the following option switches: /SC:0,10 /SC:1,15.

Disabling the Status Change Interrupt

If your system has not enough IRQs available, you can switch off the status change interrupt(s). CardWare then uses a polled mode, installing a handler in the Timertick that checks regularly for changes of the socket status. The status change interrupt can only be switched off for all PC Card controller chips in your system. Use the /SC:OFF parameter for Card Services (PCCS) to switch off the status change interrupt(s).

Parameter	/SC:off
Key Name	SYSTEM\CurrentControlSet\Services\PCCS\Options
Name	CommandLine
Type	REG_SZ
Data	/SC:off

NOTE:

You can use the PCRM utility at the command prompt to display the currently used resources. If no PC Card is inserted in your system, the IRQs used reflect the status change interrupts.

Uninstalling CardWare

To remove CardWare from your system, use the CardWare Uninstall program:

1. Start Windows.
2. Select **Uninstall** from the CardWare group.
3. Follow the program prompts.
4. After the program is removed, delete any remaining CardWare files and directories.

PC Card User Interfaces

CardWare under Window NT gives you a choice of interfaces for PC Card configuration:

- The native Window NT interface in the Control Panel
- PCTray, a Windows NT desktop utility
- PC Card Control, for full control of PC Card configuration
- Memory Cards Viewer (MCView), a utility for quick and easy access to several memory card operations

This chapter describes the interfaces.

Windows NT

The Windows NT PC Card utility is available through the Control Panel:



Figure 12: Control Panel

When you click the PCMCIA icon, a screen similar to this opens:

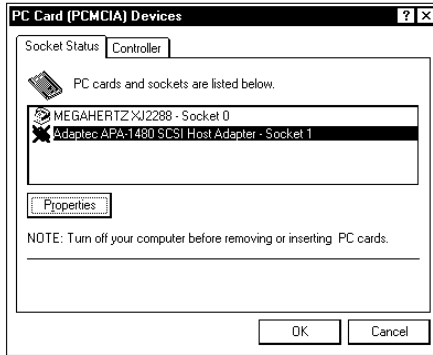


Figure 13: PCMCIA Devices

You can view the configuration of your PC Cards and the system PC Card controller. Through the Properties button, you can view the configuration in greater detail (as shown below) and, in some cases, make some configuration changes.



Figure 14: PCMCIA Device Properties

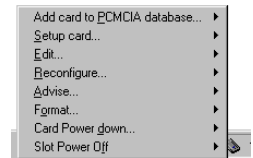
PCTray

PCTray is a desktop utility that gives you easy access to the most frequently used card control functions. The menus and commands available in PCTray vary, depending on the type of PC Cards you are using.

The PCTray icon, a small representation of a PC Card, is in the system tray area of the Windows NT taskbar. When your cursor rests on the PCTray icon for a few moments, a message box pops up, saying **CardWare Control**. You can activate program functions by clicking the left or right mouse buttons. Double-clicking with the left mouse button opens PC Card Control.

Left Single Click

If you click once with the left mouse button on the PCTray icon, a command menu opens, similar to this:



This menu varies, depending on the kind of PC Card(s) currently inserted. For example:

- If no PC Cards are inserted at all, then no menu appears
- If you are using a storage card (e.g., SRAM, flash or ATA/ATAPI), the menu contains a format option.

Select the command you want to execute.

Add card to PCMCIA Database ...

Adds information about the card to the Windows NT PC Card database.

Setup card ...

Setup card helps you install and load any drivers the PC Card needs. For example, for a network PC Card, **Setup card** launches the Network Properties Control Panel application. From this application simply follow directions to install network drivers so you can connect to your network.

Edit ...

The PC Card Control **Edit Card** window opens, as shown on page 42.

Reconfigure ...

CardWare immediately configures or reconfigures the card in the selected slot. CardWare runs through the list of associated devices to find the correct combination of

available resources.

Advise ...

CardWare Advisor asks you to select a socket and then checks the configuration of the selected card. Advise auto-configures the selected card if it is not already configured. If the card could not be configured, Advisor provides information about the possible reason.

Format ...

Format (not pictured) helps you prepare storage cards for use. Depending on the type of storage card you have inserted in the PC Card slot, either the Windows NT Format command starts or the flash card Erase command starts, followed by the Windows NT Format command.

If a flash card is inserted in the socket, the Format command first erases the flash card and prepares it with a Flash Translation Layer (FTL) standard-compatible format, and then starts the Windows NT Format command to format the card.

Card Power down

Card Power down (not pictured) reduces the power of the PC Card socket. This command helps you minimize power usage and extend the life of the battery in your computer.

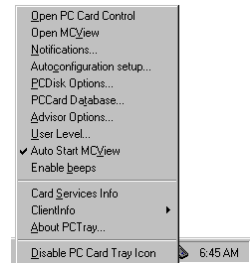
Note that a PC Card may need a little more time than usual to start operating again after the Card Power down command, because the socket must power up first. For example, if you attempt to read from an ATA/ATAPI PC Card after power-down, the first read command takes a little more time than normal, but subsequent reads should execute normally

Slot Power Off

Slot Power Off turns the PC Card socket power off. You need to reinitialize the socket before using the PC Card again. Before powering off the socket, CardWare unloads the device driver for the card if possible, thus allowing removal of SCSI and LAN cards.

Right Single Click

If you right click once on the PCTray icon, a list of CardWare control options pops up:



You can choose from these options:

Open PC Card Control	Launches the PC Card Control utility (same function as left double-click)
Open MCView	Starts MCView. See description of Memory Cards Viewer utility below.
Notifications	Opens the CardWare Notifications window (shown on page 49)
Autoconfiguration setup	Lets you configure the card auto-setup feature
PCDisk Options	Lets you configure the options for storage cards (drive letter assignment, write cache, LBA mode)
PCCard Database	Lets you enter information about the card into the Windows NT PCCard database.
Advisor Options	This dialog lets you select options for CardWare Advisor. For details, see below.
User Level	This dialog lets you specify a user's skill level.
	<i>Every menu item in CardWare has associated user levels.</i>
Auto Start MCView	If this option is on, then MCView will be started automatically on PCMCIA memory card insertion.
Enable beeps	Lets you turn on/off the card insertion/removal beep tones
Card Services Info	Provides information about Card Services
ClientInfo	Provides a list of the currently loaded client

	drivers
About PCTray	Gives you information about CardWare control
Disable PC Card Tray Icon	Turns off PCTray

Left Double Click

PC Card Control for Windows NT, described in the following section, opens.

PC Card Control

PC Card Control presents a graphical representation of the PC Card socket(s) and the PC Card(s) you have inserted. PC Card 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 PC Card 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 PC Card Control.

Card Configuration Basics

Before you attempt to use PC Card 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.

Navigating in PC Card Control

You can use the mouse for shortcuts like this in PC Card Control:

- After editing an installed card, double-click the card image in the main window to reconfigure the card. It's the same as selecting **Cards | Reconfigure**.
- To show a card description, click the card name with the right mouse button and hold down the button.
- To show device information, click and hold the right mouse button on the device name (below the card image) in the main window.

Getting Help in PC Card Control

PC Card Control 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.

PC Card Control Main Window

When you open PC Card Control, a window similar to this appears. It has a menu bar, optional tool bar (please note, we show *all* of possible toolbar buttons), optional status line, and a graphical representation of your PC Card sockets and installed cards:

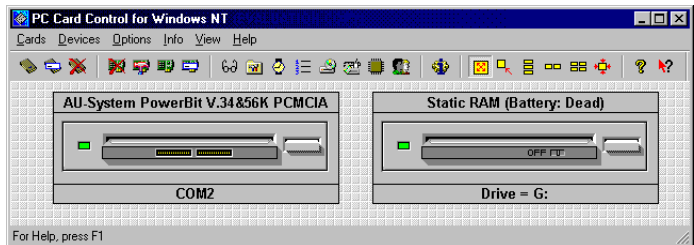
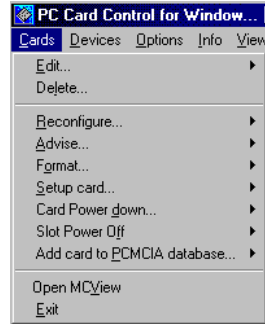


Figure 15: PC Card Control Main Window

Menu “Cards”

The Cards item on the menu bar lets you edit a PC Card definition, delete or rename a card, reconfigure an installed card, and format a storage card. Note that the Cards menu may vary, depending on the installed cards.



Editing a PC Card Definition

1. From the main menu choose Cards | Edit (or double-click 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 Card Associations editing window opens (shown below). If the name of your installed card does not appear immediately in the Card box, click the scroll arrow on the right side of the box to scroll through the list of cards in the CardWare database.
4. Now you can associate one or more devices with the card.

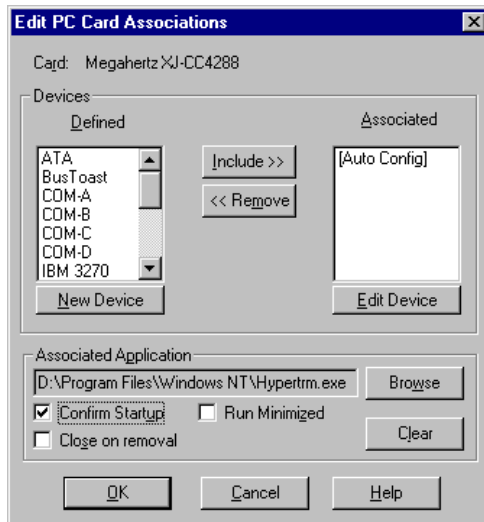


Figure 16: PC Card Associations

To create a new device for the card, select **N**ew Device below the **D**efined box. The section *Devices*, on page 45, explains how to define a new device.

Move each device from the **D**efined to the **A**ssociated box and vice versa by simply double clicking on the device name, or by selecting a device name and clicking **I**nclude or **R**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 **A**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 not be currently employed by another device
 - c) They must match any requirement the card may have.

REMEMBER:

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

5. 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.

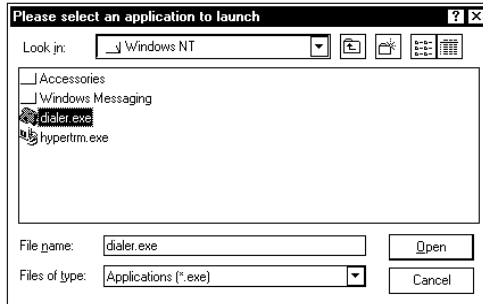


Figure 17: Selecting an Application to Launch

To associate an application, either enter the path and startup command in the **Associated Application** box directly, or select **Browse** to locate the application.

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

6. When you have checked the appropriate boxes and are satisfied with the card's configuration, select **OK**.
7. 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 **Cards | Reconfigure** or simply click on the card image displayed in the socket.

Reconfigure

Cards | Reconfigure 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.

Format

Cards | Format lets you prepare storage cards for use. Depending on the type of storage card inserted in the PC Card slot, either the Windows NT Format command starts or the flash card Erase command starts, followed by the Windows NT Format command. If a flash card is inserted in the socket, the Format command first erases the flash card and prepares it with a Flash

Translation Layer (FTL) standard-compatible format, and then starts the Windows NT Format command to format the card.

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.



New

To define a new device, choose **Devices | New** from the main menu. Enter a new device a name.

Edit

For an existing device, choose **Devices | Edit**. 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.

Rename / Delete

You can also rename or delete a device.

Defining a Device

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).

The *Devices* menu lets you configure a new or existing device in this window:

PC Card Device Settings

Name:

I/O Ranges

	None	Any:	Edit:	Base (Hex):	Length:
Range 0:	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="text"/>	<input type="text"/>
Range 1:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="text"/>

Memory Ranges

	None	Any:	Edit:	Base (Hex):	Length:
Range 0:	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="text"/>	<input type="text"/>
Range 1:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="text"/>
Range 2:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="text"/>
Range 3:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="text"/>
Range 4:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="text"/>

None Any: Edit:

IRQ:

DMA:

Flags

System

Read Only

Figure 18: Defining a Device

System Resources

Every 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 instructions for the system resource requirements of the PC Card are defined in the respective user manual. It's especially important to know the resource requirements of any card that is not generic and/or does not completely conform to PC Card Standards.

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.

As you enter data in the Device Settings window, the values are constantly evaluated for correctness. If you enter a value that is not valid, the **OK** box is grayed out as a signal that you need to correct the value. For example, the *Memory Range* fields need to receive **Base** values in hexadecimal format, using the top 24 bits of a flat 32-bit system address, such as D4000h (not D400h; note the additional zero).

I/O Ranges

To define an I/O range, select one of the three buttons (**None**, **Any**, **Edit**).

If the device definition does not require I/O ranges, select **None** for both ranges.

Select **Any** if the device can use any available system address.

To define a specific memory range, select **Edit**. Specify I/O address ranges as a *base* and a *length*. Enter the base as a hexadecimal number and the length as a count of bytes or addresses (typically as a multiple of eight).

For example, to define an I/O range of 16 bytes (or addresses) at system I/O address 310h, enter a base of 310h (or 0x310) and a length of 16.

Memory Ranges

As with the I/O ranges, select **None**, **Any**, or **Edit** for each range.

If the device definition does not require memory ranges, select **None** for all ranges.

Select **Any** if the device can use any available system address.

To define a specific memory range, select **Edit** and then enter an address for the memory range. Specify memory address ranges as a base and length. Enter the base in hexadecimal format as the top 24 bits of the system address and the length (typically) as a multiple of 4 kilobytes (4Kbyte). For example, to define a memory range of 8 kilobytes at system memory address D8000000, enter a base of D8000h (or 0xD8000) and a length of 8K.

IRQ and DMA

Again, select **None**, **Any**, or **Edit** for each range.

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

If the device and its driver require a specific IRQ, select **Edit** and then select a specific IRQ number from the drop-down list of IRQs.

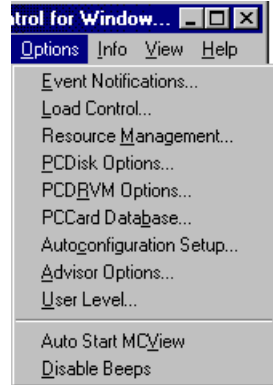
If the device and its driver do not require a DMA channel, select **None** for the DMA.

If the device and its driver can use any available DMA channel, select **Any** for the DMA.

If the device and its driver require a specific DMA channel, select **Edit** and then select a specific DMA channel from the drop-down list of DMAs.

Menu “Options”

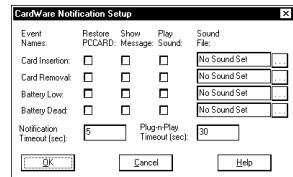
Contains various CardWare and PC Card Control preference settings



Event Notifications

Select Event Notifications to instruct CardWare to interrupt your work when the following events occur:

1. Card insertion/removal
2. Battery low /dead



CardWare can respond to each event with up to three actions:

1. Restore the Card Control window.
2. Display an appropriate message.
3. Execute a WAV file.

Selecting **Sound File** associates a WAV file with each event. You may also find it convenient to turn the PC Card Enable beeps off (see below).

Load Control

Use this dialog box to configure when and how the selected program is started.

You can change device's startup type:

- Boot starts the device when the computer starts.
- System starts the device after Boot devices when the system starts.
- Automatic starts the device automatically after Boot and System devices when the system starts.

- Manual allows the device to be started by a user or a dependent device.
- Disabled prevents the device from being started by a user, although it can be started by the system.

NOTE:

*Applications can be started only manual or automatic.
Some programs can only be loaded in the definite order.
Changing the startup type of a Boot or System device can destabilize the system.*

Resource Management

Resource Management lets you review and customize the resource allocations in your computer. You can review all resources reported in use by system devices (including PC Cards) and mark resources as in use. Note, that the resources reported in use by non-PCMCIA devices (and non-user defined) cannot be edited because they are reported directly to the operating system.

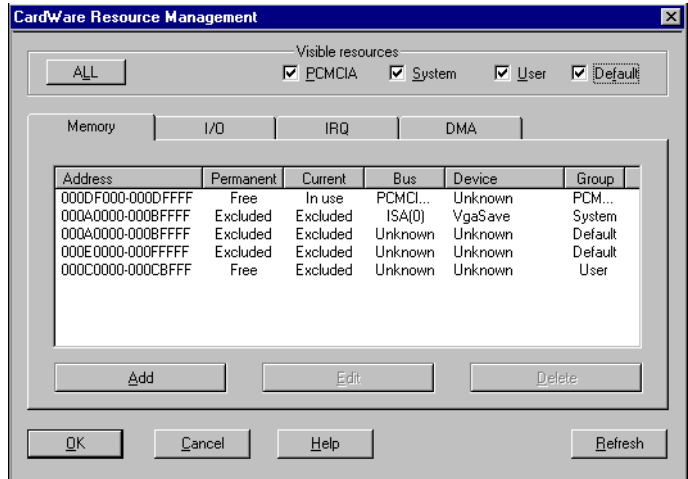


Figure 19: CardWare Resource Management

NOTE: Do not change Resource Management values unless you are certain that you should. Errors in resource allocation can cause total system failure.

Understanding the Information

The information layout is identical for all resource types. The first column shows the resource address range (Memory and I/O), IRQ, or DMA channel. The other columns in the window are Permanent and Current attributes associated with the resource; the system Bus to which the resource is allocated; and the Device that has claimed (is using) the resource. Last is the Group with which the resource is identified. Group data is for your information only.

Adding Resource Definitions

When you find that a driver has not reported all the resources it uses, you can add resource definitions. For example, some system audio devices need to use I/O range 800h–80Fh, but the drivers for those devices do not report that usage to the operating system. The operating system does not know that this resource is in use and believes it can allocate the resource to another device. When you insert a PC Card that requests this range, the audio may stop working AND the PC Card does not work at all. To get around this situation, add range 800h–80Fh and define it as excluded.

To add a resource definition, first select the appropriate resource tab (Memory, I/O, IRQ, DMA). For example, to define an I/O range, select the I/O tab. Now click on the Add button and enter the values for the resource.

Enter I/O resources in hexadecimal format as an inclusive range. For example, to enter the range 810h through and including 80Fh (in other words, I/O base address 80Fh for 16 bytes/addresses), enter ‘800-80F’ and press Enter.

Enter memory resources in hexadecimal format as an inclusive range. Include the complete address. For example, to exclude 16 kilobytes in the range starting at address 000D4000, you would enter ‘000D4000-000D4FFF’

Enter IRQ resources and DMA resources as a single decimal number.

Last, declare whether the resource is shareable (**Dynamic**), should be completely blocked from use (**Excluded**), or is completely available (**Free**). Double-click the column until the appropriate action appears – **Dynamic**, **Excluded**, **Free**.

PCDisk Options

This dialog allows you to modify different setting for PCDISK and the MTDs. You can use this dialog to avoid editing registry settings manually. You can modify settings for either the current session, or you can make permanent modification that will be saved in the registry.

NOTE:

In order for the new Stored Settings to take affect, you have to reboot the computer.

PCDRVM Options

CardWare is able to detect and start the SCSI devices (CD-ROMs, Disks, etc.) connected to your SCSI PC Card adapter after boot of the system. To detect new devices CardWare must automatically or by user request perform re-enumeration of SCSI bus. This dialog allows you to change the configuration of PnP subsystem of CardWare.

Rescan Mode:

Manual Performs re-enumeration only by user request.

Auto Performs re-enumeration automatically based upon the time interval specified by the "Auto Rescan Interval".

Intelligent The same as "Auto", but interval will gradually increase.

Auto Rescan Interval: Interval between the rescan cycles (sec.).

Max Rescan Time: In some cases the re-enumeration of SCSI bus can occupy a long time. CardWare will automatically disable the "Auto" and "Intelligent" re-enumeration if it detects that the duration exceeds the "Max. rescan time" interval (tenths of a second).

Disconnect network resources: Enables\Disables automatic disconnection of network resources by CardWare. If this feature is enabled, CardWare will automatically disconnect network resources (remote disks, printers) after removal of network card, this can considerably reduce time to open such windows as "My computer", "File open", etc. When network card is reinserted, CardWare will try to restore connections.

Rescan bus with claimed device: Enables or disables repeated re-enumeration of SCSI bus with claimed device. If this option is enabled, the additional selection of "Rescan SCSI bus" command from the menu of PCTRAY will detect the connection of an additional SCSI device (if it has a unique SCSI ID). However, such re-enumeration can influence the working SCSI devices

PCCard Database

The PC Card database is part of Microsoft's original PC Card support for Windows NT. The database has two main functions:

- The database record provides a connection between particular PC Card and Card driver.
- The database record provides the possibility to override improper data in the Card Information Structure (CIS) if required.

For compatibility reasons CardWare 7.0 fully supports the PC Card database. In addition to CIS overrides defined by Microsoft, CardWare provides several additional overrides allowing additional flexibility for support of cards with improperly designed CIS.

NOTE: *This dialog is for advanced users only and must be used with utmost care.*

Autoconfiguration Setup

By default, when you insert a new PC Card in your computer, CardWare tries to determine which drivers the card requires and installs them. This procedure is done as many times as specified by the value entered in «Default number of auto-configuration retries.» The Reset button near this entry resets the number of auto-configuration retries to the default value (3).

This dialog allows you to enable and disable the autoconfiguration procedure, change the retry counter for any particular card (select the card using the combo box), reset this counter to 0, and modify the default number of auto-configuration retries

User Level

This dialog lets you specify a user's skill level. Every menu item in CardWare has associated user levels. A menu item will be shown only to users of that level, or for more experienced users. This feature will help inexperienced users to avoid possible problems.

Auto Start MCView

If this option is on, then MCView will be started automatically on PCMCIA memory card insertion.

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 or PCTRAY.

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 show a message only if an error is found and will show nothing if no error occurs. Select "Never" radio button if you don't want Adviser to start 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 failed to configure a card. This option is selected by default and is recommended.

Disable Beeps

Checking this box suppresses beeps. If you have assigned WAV files to card events, you may wish to turn the beeps off. Note that even if you MUTE the system speaker (through the speaker icon in the system tray) while beeps are enabled (box not checked), the PC Card beeps remain enabled.

Menu “Info”

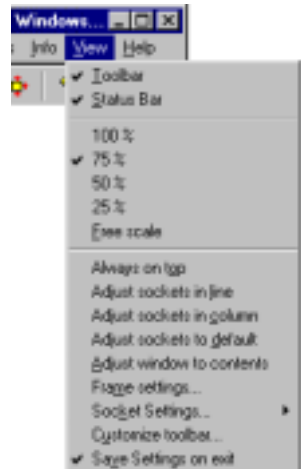
In the Info menu you can view information about PC Cards and about each PC Card Client.



Menu “View”

Open the View menu item by typing Alt-V or by clicking the mouse directly on View in the main menu bar.

The View 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.



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.

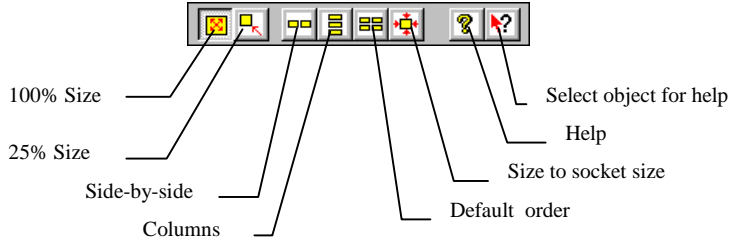


















Figure 20:Default PC Card Control Toolbar

Additionally you may add the following buttons to the toolbar:

-  - Edit Card definition for any card (menu "Cards")
-  - Delete card definition (menu "Cards")
-  - Delete Device Definition (menu "Devices")
-  - Edit existing Device Definition (menu "Devices")
-  - Create new Device Definition (menu "Devices")
-  - Rename Device Definition (menu "Devices")
-  - Specify the options for the Configuration Advisor (menu "Options")
-  - Adjust auto-configuration options (menu "Options")
-  - Specify Event Notification method (menu "Options")
-  - Edit the load order of the CardWare drivers (menu "Options")
-  - Edit PCCard database (menu "Options")

-  - Edit options for PCDisk (menu "Options")
-  - Edit options for PCDRV (menu "Options")
-  - Adjust Card Services resources (menu "Options")
-  - Call user level dialog (menu "Options")
-  - Get Card Services Info (menu "Info")

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 PC Card Control window. If not checked, the CardWare display area is smaller.

Percentage

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

Free scale

You can manually enter the size as a percent.

Always on top

Checking this option causes CardWare to remain visible. Even when you are using another 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 PC Card control to use the last settings each time it starts.

Memory Cards Viewer (MCView)

MCView is a memory cards control utility designed as a GUI application. Following memory card operations are available from MCView interface.

- Gather card information
- Raw access to card memory
- Edit card contents directly with HEX editor
- Read/Write cards formatted by Microsoft FFSII
- Easy copy files to/from card using standard Drag-n-Drop or Copy-Paste operations
- Re-assign drive letters
- Format card
- Erase card
- Eject card (if your adapter supports this operation).

MCView Main Window

MCView main window consists of two panes – left and right.

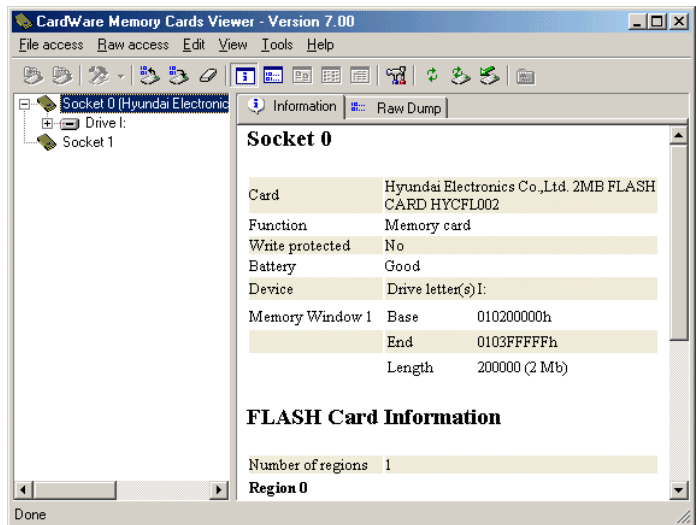


Figure 21: MCView Main Window

The left pane represents explorer-style devices/folders tree. All available PC Card sockets reside on upper level.

If any memory card is inserted into the socket, its name will be shown on the same level with the socket. The next level represents a drive, assigned to the card. If the card is formatted for any supported file system (like FFSII or FAT), and if it contains any directories structure, the tree of directories will be shown under the drive item. The right pane is used to show card information, card's memory raw dump, files stored on the card, etc. In order to choose one of the information sub-panes, you just have to click on the corresponding tab at the top of right pane.

Gathering Card Information

In order to gather any card information, you first should insert memory card to one of the available PC Card sockets, wait until the end of card installation process and then open the MCVIEW window. MCVIEW supports Windows PnP notifications and will detect inserted card automatically without additional user intervention.

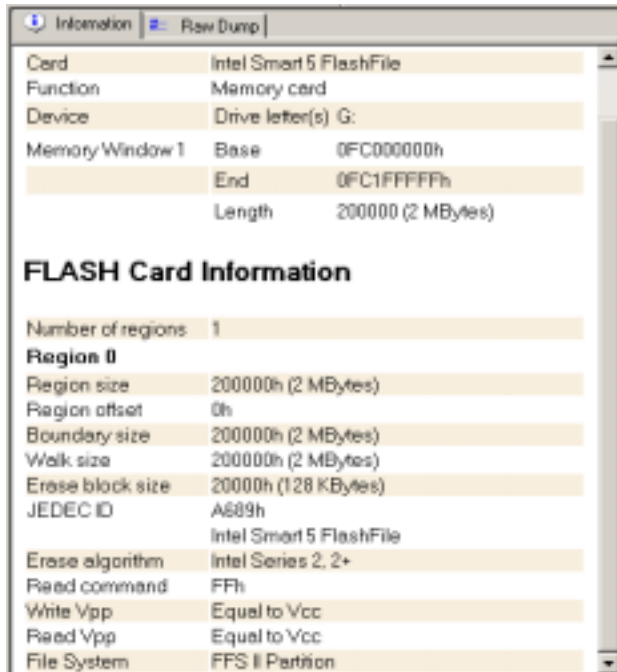


Figure 22a: Card Information

If there is no card inserted to one of the supported PC Card sockets, MCView will show 'No supported memory card detected' in the 'Information' sub-pane. All other sub-panes ('Raw dump', 'File list', etc.) will be unavailable.



Figure 13b: Alternative Info...

Depends on the type of the card (FLASH or SRAM), different card information will be shown.

For FLASH cards, it's usually:

- Name or Manufacturer of card;
- Function;
- Assigned drive letter;
- List of memory windows;
- List or regions with detailed information for each region like size, offset, etc.

For SRAM cards, the information is similar except that the description of each region is less detailed. It contains just region size and region offset.

For ATA cards, the information of the socket is the same, plus it shows specific ATA card information, e.g.:

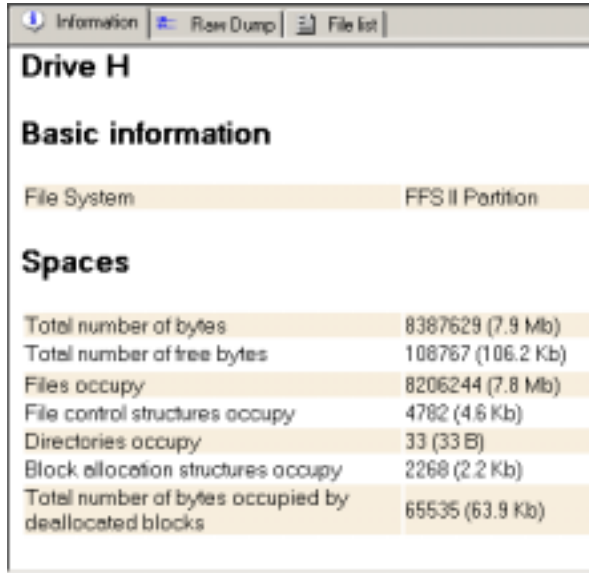
- Serial number
- Firmware revision
- Model number
- Number of cylinders
- Number of heads
- Number of sectors per track
- Current capacity in sectors
- Etc.

ATAPI cards additionally show decoded ATAPI information, if present:

- Device type
- Removable media
- ATAPI version
- Vendor information
- Product ID
- Product revision level

Gathering Drive Information

If card inserted in the socket is formatted with one of the supported formats (FFSII or FAT, for example), MCView will be able to show a drive information table for this card.



Drive H	
Basic information	
File System	FFS II Partition
Spaces	
Total number of bytes	8387629 (7.9 Mb)
Total number of free bytes	108767 (106.2 Kb)
Files occupy	8206244 (7.8 Mb)
File control structures occupy	4782 (4.6 Kb)
Directories occupy	33 (33 B)
Block allocation structures occupy	2268 (2.2 Kb)
Total number of bytes occupied by deallocated blocks	65535 (63.9 Kb)

Figure 23: Drive Information

In order to show drive information, you should insert a card, choose 'Information' tab and in the left tree select a drive. If card is not formatted with one of the supported formats, then message "Drive information is unavailable" will be shown.

Independently of type of the card (FLASH or SRAM), drive information will be the same:

Drive geometry:

- Number of cylinders
- Number of tracks per cylinder
- Number of sectors per track
- Number of bytes per sector

Drive spaces:

- Total number of bytes

- Total number of free bytes
- Files occupy (for FFSII only)
- File control structures occupy (for FFSII only)
- Directories occupy (for FFSII only)
- Block allocation structures occupy (for FFSII only)
- Space occupied by de-allocated blocks

Raw Dump

Raw dump of card's memory is available whenever card is inserted into the PC Card socket.

Offset	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	0%
00000000	FA	33	C0	8E	D0	EC	00	7C	8E	F4	50	07	50	1F	FE	FC	.3.....P.P...
00000010	BF	00	06	B9	00	01	F2	A5	EA	1D	06	00	00	BE	BE	07
00000020	B3	04	80	3C	80	74	0E	80	3C	00	75	1C	83	C6	10	FE	...<t...<u...
00000030	CB	75	EF	CD	18	8B	14	8B	4C	02	8B	EE	83	C6	10	FE	u.....L.....
00000040	CE	74	1A	80	3C	00	74	F4	EE	8E	06	AC	3C	00	74	0E	t...<t...<t...
00000050	56	EE	07	00	B4	0E	CD	10	5E	EE	F0	EE	FE	BF	05	00	V.....
00000060	EE	00	7C	B8	01	02	57	CD	13	5F	73	0C	33	C0	CD	13W...s.3...
00000070	4F	75	ED	EE	A3	06	EE	D3	BE	C2	06	BF	FE	7D	81	3D	0u.....}=
00000080	55	AA	75	C7	8B	F5	EA	00	7C	00	00	49	6E	76	61	6C	U.u.....Inval
00000090	69	64	20	70	61	72	74	69	74	69	6F	6E	20	74	61	62	id partition tab
000000A0	6C	65	00	45	72	72	6F	72	20	6C	6F	61	64	69	6E	67	le.Error loading
000000B0	20	6F	70	65	72	61	74	69	6E	67	20	73	79	73	74	65	operating syste
000000C0	6D	00	4D	69	73	73	69	6E	67	20	6F	70	65	72	61	74	m.Missing operat
000000D0	69	6E	67	20	73	79	73	74	65	6D	00	00	00	00	00	00	ing system.....
000000E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
000000F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00000100	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00000110	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00000120	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Figure 24: Raw Dump

Raw dump is only the physical view of the card's memory. The window where raw dump is shown contains three columns. The first column represents offset on the card, the second column contains hexadecimal view of card's memory, and the third column contains ASCII view of card's memory. There is a difference between raw dumps for SRAM and FLASH cards. For SRAM cards and FLASH cards without FTL format, raw dump is actually the physical dump of card's memory. For FLASH cards with FTL format, the raw dump can be 'physical' and 'logical'. Logical dump represents card contents 'over' the FTL marks and does not include FTL-specific data. You will see a card like formatted floppy disk. Physical dump will show the actual physical dump of the card's memory as with SRAM cards or FLASH cards without FTL. To switch between raw dump modes, you should choose menu 'Tools | Options', select 'Read/Write' pane and press 'Enable FTL support' button. To enable FTL support for read/write raw operations, button should be in pressed state (checked).

File List

'File list' information sub-pane becomes available when inserted card is formatted with one of supported file system formats, like FAT or FFSII.

Information can be viewed in three different formats:

- Icons
- List
- Details

Using this pane, you can 'walk' through directories structure on the card to see its contents.

Card Access

MCView supports two types of operations named 'File access' and 'Raw access'. File access operations provide access to a card on drive/file system level. Raw access operations provide access to a card on physical (binary) level.

File access operations:

- Open
- New
- Rename
- Delete
- Properties
- Assign drive letter
- Force media change
- Format card
- Full drag'n'drop and cut/copy/paste support
- Eject card

Raw access operations:

- Read/Write raw data
- HEX Editor
- Erase card
- Go to
- Find data

Refer to MCView help file for obtain more detailed information

CardWare Files

CardWare consists of a set of programs, each with a specific function. Most are drivers that are loaded as operating system extensions.

Socket Services

A Socket Services driver (SSxxxx.SYS) supports the PC Card host controller in your computer. CardWare requires only two drivers, described below, to support a wide range of controllers.

The APSoft Socket Services drivers have proprietary hot-docking support. They provide the full functionality described in the PC Card Standards, with no limitations or restrictions.

NOTE: *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 load before the Socket Services driver. The CardWare installation program (SETUP) automatically modifies your system registry to load drivers in the correct order to support hot docking.*

SSPCIC.SYS

Description	Socket Services driver for the Intel family. SSPCIC is implemented as a HAL extension and provides a hardware abstraction layer between Card Services and the PC Card socket controller. This is NOT a utility program.
Location of installed file	%SystemRoot%\system32\drivers\

SSTCIC.SYS

Description	Socket Services driver for the Databook family. SSTCIC is implemented as a HAL extension and provides a hardware abstraction layer between Card Services and the PC Card socket controller. This is NOT a utility program.
Location of installed file	%SystemRoot%\system32\drivers\

Card Services Service

CWSERV.EXE

Description	The PC Card Services service (CWSERV.EXE) is a key component of the CardWare for Windows NT package. This service provides the mechanisms by which PC Card Control communicates with Card Services.
Location of installed file	This is NOT a utility program. %SystemRoot%\system32\

Card Services Driver

PCCS.SYS

Description	<p>The Card Services driver (PCCS.SYS) is the interface between the Socket Services driver and the various cards and system software that you use in your computer. The driver is responsible for resource management (in cooperation with the Windows NT resource manager) and client notification. The Card Services driver with APSoft proprietary hot-docking support functionality provides the full functionality described in the PC Card Standards, with no limitations or restrictions.</p> <p>CardBus and ZV-port support are implemented in the current driver release.</p>
Location of installed file	This is NOT a utility program. %SystemRoot%\system32\drivers\

PC Card Enabler

PCENABLE.SYS

Description	<p>The card enabler (PCENABLE.SYS) 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 it instead of PCENABLE.</p> <p>The generic I/O enabler (PCENABLE) is responsible for the configuration of I/O PC Cards (e.g., network, modem, fax card). The generic I/O enabler provides typical full functionality:</p> <ul style="list-style-type: none">• PC Card configuration using specific associations• PC Card configuration using generic associations• Plug and Play mode auto-configuration
Location of installed file	<p>This is NOT a utility program.</p> <p>%SystemRoot%\system32\drivers\</p>

Data Storage Card Drivers

PCDISK and Memory Technology Drivers (MTDs) add complete PC Card Plug and Play functionality to your computer. They work cooperatively with the operating environment to provide the full functionality of a data storage disk. CardWare storage card features include the following:

- Dynamic assignment of drive letter
- Recognition of data storage cards, using a unique detection algorithm
- ATA/ATAPI, SRAM and flash data storage card support
- Plug-in support for new flash cards
- Built-in support for Flash Translation Layer (FTL) standard
- Built-in support for Flash File System II.
- Supports standard operating system utilities (for file transfer, format, etc.)
- Erases whole card
- Comprehensive on-line help and information
- Raw data transfer (read/write of unformatted data from storage card)

The table below shows currently available data storage cards and their associated drivers:

Card	Type	MTD Name
Harddisk Flashdisk	ATA/ATAPI	PCATA.SYS
SRAM, ROM	Memory	PCSRAM.SYS
Flash memory	Memory	PCFLASH.SYS
FDD controller	Floppy disk	PCFDS.SYS

PCDISK

CardWare for Windows NT includes two PCDISK files:

- **PCDISK.SYS.** A generic data storage card driver that, together with memory technology drivers (MTDs), supports data storage PC Cards. Its services include formatting and partitioning, as well as mediating simple reads and writes.
- **PCDISK.EXE.** A command line utility that is the interface between the user and the functionality of PCDISK.SYS. It gives users information about the cards and lets them change the settings of PCDISK.SYS and initiate operations (erase, format, copy, etc.)

Raw Read/Write Support

The following examples show how to copy binary data to/from a memory card. They are especially useful when working with a card that has no file system.

Example

```
PCDISK /DF:TEST /RS:0 /A:0x200 /L:0x1000
```

Meaning

Copy 0x1000 bytes from the memory card in socket 0, beginning at card offset 0x200, to the file TEST.BIN. If this file already exists you are asked if you want to overwrite it.

Example

```
PCDISK /DF:C:\DATA\DATA.DST /WS:1
```

Meaning

Copy contents of file C:\DATA\DATA.DST to card in socket 1.

There are two limitations:

1. For ATA/ATAPI cards, parameters must be a multiple of sector size. Currently PCDISK uses a sector size of 512 bytes.
2. If you work with FTL partitions, disable FTL support to avoid re-mapping requests by the FTL driver.

FTL Partition Support

PCDISK and PCFLASH.SYS have built-in FTL support. FTL support lets you work with flash cards as if they were ordinary data storage disks; using many functions from standard OS programs (e.g., you can use FORMAT, DIR, SCANDISK, etc.). Keep in mind this is only an emulation. For this reason, it makes no sense to run SCANDISK or Disk Defragmentator on such card.

To use built-in FTL support, first prepare the flash card to have an FTL partition. If the flash card does not have an FTL partition, create one with PCDISK.EXE.

Example

PCDISK /TL:0 (or PCDISK /TL:F)

Meaning

Create FTL partition on the flash card in socket 0 (or Drive F:). You can then use any formatting utility to format the card for any sector-based file system (e.g., FAT, NTFS etc.). Note that you can use this option only for flash cards. PCDISK starts the operating system format utility automatically in order to format the card.

FFSII Support

Flash File System II (FFS2) support allows you to read and write files on an FFS2 partition, format flash cards in FFS2 format, and check the FFS2 structure. CardWare FFS2 support is fully compatible with the Microsoft FFS2 version. Here are some examples:

Example

PCDISK /DD:0

Meaning

Display contents of the root directory of FFS2 partition on the card in socket 0.

Example

PCDISK /DD:1 /CD:TEST

Meaning

Display contents of .\TEST directory of FFS2 partition on the card in socket 1.

Example

PCDISK /CH:0

Meaning

Check internal FFS2 structures for the FFS2 partition on the card in socket 0.

Example

PCDISK /CF:0 /CD:N:\TEST

Meaning

Copy all contents of the card in socket *n* to the directory structure N:\TEST

Example

PCDISK /CC:0 /CD:N:\TEST

Meaning

Copy all contents of the directory structure N:\TEST to the card in socket 0.

PCDISK.EXE

Description: Storage card command line utility. Formats and erases storage cards as well as allowing adjustment of PCDISK.SYS runtime features.

Location of installed file: CardWare Install directory (default: C:\Program Files\APSoft\CardWare)

Syntax: PCDISK [/H?] [/E] [/WC:on|off] [/ES:n] [/LS:on|off] [/DI:n] [/FC:n] [/Y] [</TL:n>] [/FS:FileSys] [</DF=filename> </RS:n | WS:n>] [/A:n] [/L:n]] [</FF:n | /CH:n | /CF:n /CC:n | /DD:n>] [/CD=path]]

where:

- /H | ? Online help
- /E Silent mode: no video output to display
- /WC:on Enable Write Delay cache for PCDISK drives. (default: off — Write Cache disable)
- /LS:off Disable usage of LBA for ATA/ATAPI cards. (default: autodetect whether supported by PC Card)
- /DI:n Display 'Identify Drive' information for the card in the socket 'n'
- /FC:n Force media change in the socket 'n'. (Reset socket 'n').
- /Y Assume Yes on all queries.

FTL support

- /TL:n** Create FTL partition on card 'n'. This parameter can be used only with flash memory cards
- /FS:FileSys** Specifies the type of file system (FAT, NTFS or NONE).
(default: FAT)
FAT — Normal DOS-style FAT file system
NTFS — NT file system
NONE — No file system
Note that for either FAT or NTFS then the format program (FORMAT.COM) is invoked with the appropriate parameters to format the partition with the indicated file system.
This option can only be used together with the /TL option on flash cards.

Support Read/Write for storage cards that do not have any file-system data

- /DF:filename** Specifies data file to write to (for /RS) or read from (for /WS) when processing raw data transfer.
(default extension is .BIN).
- /RS:n** Read raw data from the card in socket 'n'.
- /WS:n** Write raw data to the card in socket 'n'.
- /A:n** The card address at which to transfer raw data in bytes (default: 0).
- /L:n** The length (amount of raw data) to transfer in bytes.
(default: For /RS card size
For /WS file size)

Flash File System II (FFS-II) support

- /FF:n** Format card in socket/drive 'n' with FFS-II
Note: You can use the socket number (zero based) or the drive letter to identify the card.
- /CH:n** Check directory and file structure for the card in socket/drive 'n'.
Note: You can use the socket number (zero based) or the drive letter to identify the card.
- /CF:n** Copy all contents of card in socket/drive 'n' with directory to the target directory (specified by '/CD').
Note: You can use the socket number (zero based) or the drive letter to identify the card.
- /CC:n** Copy all content of the source directory (specified by '/CD') with directory structure to the card in socket/drive 'n'.
Note: You can use the socket number (zero based) or the drive letter to identify the card.
- /DD:n** Print directory list for the card in socket/drive 'n'. The directory can be specified by '/CD' option.
Note: You can use the socket number (zero based) or the drive letter to identify the card.
- /CD=path** Specifies the path:
- If '/CF' — the target directory to copy to.
 - If '/CC' — the source directory to copy from.
 - If '/DD' — the path on the card with the FFS-II partition.

Notes:

1. To increase speed Windows NT uses Write Delay Cache. Unfortunately Windows NT doesn't disable Write Cache for removable media. This can result in lost data if the media is removed before Windows NT flushes the cache. To prevent this situation PCDISK disables Write Cache for PCDISK drives by default. But if you want to increase writing speed and if you are absolutely sure what you are doing you can enable Write Cache.
Example:
Disable Write Cache : PCDISK /WC:off
Enable Write Cache : PCDISK /WC:on
2. Any numeric value could be entered as decimal (default form) or hexadecimal (with 0x prefix) number.

PCDISK.SYS

Description The memory card client driver (PCDISK) is responsible for disk-like formatted storage card support. From the point of view of Windows NT, this is a low-level device driver. This driver supports all file systems supported by Windows NT, as well as installable file systems (e.g., flash filing systems). The storage card client driver uses media technology drivers (MTDs) for physical access to the PC Card.

Location of installed file This is NOT a utility program.
%SystemRoot%\system32\drivers\

MTDs

PCSRAM.SYS

Description PCSRAM.SYS is the MTD for SRAM PC Cards. It must be used together with PCDISK. APSoft MTDs fully support the PC Card Standard MTD specification, as well as an extended proprietary interface.

Location of installed file This is NOT a utility program.
%SystemRoot%\system32\drivers\

PCFLASH.SYS

Description PCFLASH.SYS is the MTD for flash PC Cards. It must be used together with PCDISK. APSoft MTDs fully support the PC Card Standard MTD specification, as well as an extended proprietary interface. The flash MTD includes built-in FTL and FFS2 support.

Location of installed file This is NOT a utility program.
%SystemRoot%\system32\drivers\

PCFDS.SYS

Description PCFDS.SYS is the MTD for floppy disk controller cards. It must be used together with PCDISK. APSoft MTDs fully support the PC Card Standard MTD specification, as well as an extended proprietary interface.

Location of installed file This is NOT a utility program.
%SystemRoot%\system32\drivers\

User Interface Files

PCTRAY.EXE

Description	Desktop program for quick information and configuration. PCTray lets you edit PC Card definitions, define their associated devices, reconfigure installed cards, and control the way CardWare runs.
Location of installed file	This is NOT a utility program. CardWare Install directory (default: C:\Program Files\APSoft(CardWare))

PCCARD.EXE

Description	This is the CardWare for Windows NT user interface program. PCCARD Control presents a graphical representation of the PC Card socket(s) and the PC Card(s) you have inserted. PC Card Control lets you edit PC Card definitions, define their associated devices, reconfigure installed cards, and control the way PC Card Control runs.
Location of installed file	This is NOT a utility program. CardWare Install directory (default: C:\Program Files\APSoft(CardWare))

DOSCARD.EXE

Description	DOSCARD displays the revision of the installed software and the current configuration of any installed PC Cards.
Location of installed file	This is a utility program. CardWare Install directory (default: C:\Program Files\APSoft(CardWare))
Syntax	DOSCARD [/H] [/D] [/S:n]
where:	
/H	Print help text
/D	Detailed information with 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)

Screen shot

```

C:\Program Files\APSoft\CardWare>dosc card /d
DOSCARD/Windows NT Version 5.00
(C) Copyright 1992-2000 by APSOFT
All rights reserved. Disassembly or decompilation prohibited.

This software is provided under a signed non-disclosure agreement
for evaluation purposes only. It is intended for distribution or
disclosure only to parties of that agreement.

Card Services Release 5.02, Revision 5.00
Client 0: PCENABLE, Release 5.00
Client 1: PCATA, Release 5.00
Client 2: PCDISK, Release 5.00
Client 3: PCFLASH, Release 5.00
Client 4: PCSRAM, Release 5.00
Client 5: CWSERV, Release 5.00
Registry:
\REGISTRY\MACHINE\SYSTEM\CURRENTCONTROLSET\SERVICES\PCENABLE

Installed sockets: 4

Socket: Socket 0
Card: Intel International faxed
Voltages: Vac : 5.0 V Vpp1: 5.0 V Vpp2:
5.0 V
Function: Serial Port
Device: COM2
IO-Range 1 : Base = 2F8h Length =
8 bytes
IRQ : 3
Configured by: PCENABLE

Socket: Socket 1
Card: No Card inserted

Socket: Socket 2
Card: ELSA Ashen Germany MicroLink 28.8MC
Voltages: Vac : 5.0 V Vpp1: 5.0 V Vpp2:
5.0 V
Function: Serial Port
Device: AUTO
IO-Range 1 : Base = 3E8h Length =
8 bytes
IRQ : 7
Configured by: PCENABLE

Socket: Socket 3
Card: Xircom CreditCard 10Base-T
Voltages: Vac : 5.0 V Vpp1: 5.0 V Vpp2:
5.0 V
Function: Network Adapter
Device: LAN2
Memory-Range 1: Base = D0000h Length =
16 kB
IO-Range 1 : Base = 300h Length =
16 bytes
IRQ : 5
Configured by: PCENABLE

C:\Program Files\APSoft\CardWare>

```

PCRM.SYS

Description The Card Services Resource Manager utility (PCRM.EXE) informs Card Services about system resources that may not be used (or may be used with special sharing considerations) for configuration of PC Cards and displays the current resource settings for Card Services. Resources (memory pages, I/O ports, IRQ levels or DMA channels) are initialized according to settings on the PCRM command line and affect only the current session.

Location of installed file This is a utility program. Open at a command line shell.
CardWare Install directory (default: C:\Program Files\APSoft(CardWare\))

Syntax

```
PCRM  [/H] [/V] [/E] [/Q]
      [/[X]MEM=base,length[,share]]
      [/[X]I/O=base,length[,share,lines]]
      [/[X]IRQ=level[,share]]
      [/[X]DMA=channel,width[,share]]
```

where

```
/H    Print this help text
/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 of 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 of 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
```

Notes

- Valid Share types: E - Exclusive, D - Dynamic, T - Time Multiplexed
- Valid DMA width: B - 8-bits, W - 16-bits, A - Both: 8 & 16-bits
- I/O ranges may be used exclusively or with Dynamic share
- MEM ranges may be used exclusively or with Time Multiplexed share
- If Share omitted, default value Exclusive is used
- Default value of I/O parameter Lines is 10

Screen shot

```

C:\Program Files\APSoft\CardWare>PCRM /V
PCRM/Windows NT Version 5.00
(C) Copyright 1992-2000 by APSOFT
All rights reserved. Disassembly or decompilation prohibited.

This software is provided under a signed non-disclosure agreement
for evaluation purposes only. It is intended for distribution or
disclosure only to parties of that agreement.

Detect Card Services Driver Release 5.02

List of system resources in use by Card Services

Mem range from A0000h to BFFFFh - Range is excluded (may
not be used)
Mem range from D0000h to D3FFFh - Range is in use
(exclusively)
Mem range from DF000h to DFFFFh - Range is in use
(shared)
Mem range from E0000h to FFFFFh - Range is excluded (may
not be used)
I/O range from 2E8h to 2EFh - Range is available
(exclusively)
I/O range from 2F8h to 30Fh - Range is in use
(exclusively)
I/O range from 3E8h to 3EFh - Range is in use
(exclusively)
IRQ Level 3 - Range is in use
(exclusively)

C:\Program Files\APSoft\CardWare>

```

MCVIEW.EXE

Description: CardWare Memory Cards Viewer. It is a GUI application that gives the user access to all memory card operations through a standard user interface.

Location of installed file: CardWare Install directory (default: C:\Program Files\APSoft\CardWare\)

CSDLL.DLL

Description: CSDLL.DLL is Card Services interface library. Any Win32 application can access Card Services via DoCS function call

Location of installed file: %SystemRoot%\system\

MCDLL.DLL

Description This DLL implements all memory card operations for MCVIEW application.
Location of installed file This is NOT a utility program.
 %SystemRoot%\system\

MCUNINST.DLL

Description Memory Cards Viewer uninstallation library
Location of installed file %SystemRoot%\system\

CARDWARE.CHM

Description: PCCARD Help file.
Location of installed file: CardWare Install directory (default: C:\Program Files\APSoft\CardWare)

MCVIEW.CHM

Description: CardWare Memory Cards Viewer Help file.
Location of installed file: CardWare Install directory (default: C:\Program Files\APSoft\CardWare)

Helpful Information

Troubleshooting

Occasionally, problems occur with new software because of incompatibilities with your system's BIOS. Older BIOS versions with limited PC Card support may interfere with CardWare. In many cases, updating your BIOS to the latest release can reduce the potential for problems. Many portable computers have the BIOS in flash memory, which can be easily updated.

Mouse driver interference

Erratic movement of the mouse, or interferes with PC Card activity is usually caused by assigning the card to the COM port corresponding to the COM port of the mouse (e.g., COM1 and COM3, or COM2 and COM4).

PC Card Control does not notify you of low or dead battery

Be sure the 'low' or 'dead battery' beep warning is enabled in PC Card Control's **Options | Event...** menu. Also, be sure your speaker is turned on.

No audio notifications

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

What target platforms are currently supported?

Check the README file for information about supported platforms.

Do you support Type III cards?

CardWare supports Type III ATA/ATAPI 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 software did not recognize the inserted card.

How is hot swapping of cards 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.

What file formats do you support with memory cards?

Currently we support FAT for SRAM cards. For FLASH cards we support Disk-like FAT, Microsoft Flash File System II (FFSII) and Flash Translation Layer (FTL) with any file system supported by Microsoft Windows.

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 compliant with PC Card Standards is automatically 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 system registry? 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 system registry. You can edit the registry with the registry editor, REGEDIT. APSOFT recommends that only service personnel personnel or advanced users attempt to edit the system registry.

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

How to Manually Deinstall CardWare

WE STRONGLY DO NOT RECOMMEND MANUAL DE-INSTALLATION

CardWare can be installed either to the main hardware profile or to the special (CardWare) hardware profile. If you install to the separate profile **WE WILL NOT ADVISE YOU TO REMOVE IT MANUALLY**. If you really need to do it you have to:

1. Shut down PCTRAY.EXE, PCCARD.EXE and MCVIEW.EXE (if open).
2. Stop CWSERV service via Control Panel / Services.
3. Remove the entire registry tree
HKEY_LOCAL_MACHINE\Software\APSoft\CardWare and
HKEY_LOCAL_MACHINE\Software\APSoft\MCView.
4. Remove following keys from
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services:
 - a. PCCS
 - b. PCENABLE
 - c. SPCIC (or SSTCIC)
 - d. PCATA
 - e. PCSRAM
 - f. PCFLASH
 - g. PCDISK
 - h. CWSERV
 - i. PCDRVM
5. Change startup value of PCMCIA driver to Boot (0) or enable it for selected hardware profile.
6. Manually delete CardWare profile via ControlPanel\System.
7. We also write updates to the PCMCIA.SYS database. Please search REG.INI for the word 'Database' for complete listing.
8. Delete subdirectory C:\Program Files\APSoft\CardWare.
9. Remove from %SystemRoot%\System32 following files:
 - a. CWSERV.EXE
 - b. CSDLL.DLL
 - c. CSVDD.DLL

10. Remove from %SystemRoot%\System32\Drivers following files:

- a. PCCS.SYS
- b. PCENABLE.SYS
- c. SSPCIC.SYS (or SSTCIC.SYS)
- d. PCATA.SYS
- e. PCSRAM.SYS
- f. PCFLASH.SYS
- g. PCDISK.SYS
- h. PCDRVM.SYS

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 Attachment** 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 registry until the user employs *PC Card 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:

5. Mapping memory ranges from the PC Card into the system memory space (if required).
6. Mapping I/O ranges from the PC Card into the system I/O space (if required).
7. Routing an interrupt from the PC Card to a system interrupt (if required).
8. 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 Interrupt **ReQuest (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.

PC Card Control

PC Card Control is the program for configuring your PC Cards. To run PC Card 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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