

PCturbo 286TM

User's Manual

Super High Performance
Accelerator/Coprocessor System
for PCs, XTs, and ATs

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PREFACE

This manual will help you get the most out of your PCTurbo 286e. It will guide you through the installation and operation and it will give you background information for fine-tuning your system to get maximum performance.

Installing the PCTurbo 286e is greatly simplified by the installation program. All you do is run the program and let it be your guide. If you want to know more, this manual follows the programs providing explanations.

How to Use this Manual

This manual assumes you have a basic knowledge of your system, such as how to boot DOS and run a program, but it does not rely on any special knowledge.

The manual contains these sections:

An **introduction** provides a basic overview of PCTurbo 286e and what it does for you. If you are already familiar with these concepts, you can skip this section.

The **installation** sections are a step-by-step guide to getting PCTurbo 286e up and running. These sections supplement the installation program and give you a preview of what to expect while running them.

The **reference** section explains many of the concepts involved with PCTurbo 286e operation.

The **appendices** summarize the jumper settings, software commands, and other technical information.

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- One-Year Hardware and Software Warranty
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- Compatibility
- Product Return Policy
- Product Registration

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ONE-YEAR WARRANTY

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INTRODUCTION

Operating the PCturbo 286e couldn't be easier. There are no new procedures to learn. When you boot your system with the Turbo installed, it will ask if you want to Turbocharge. Simply type Y to enter Turbo mode and the power of the PCturbo 286e will be at your fingertips.

You'll notice immediately how programs and cumbersome spreadsheets are processed with dazzling speed. Once you've experienced the PCturbo 286e you'll never want to be without it.

The PCturbo 286e makes your system up to 200% faster than an AT; up to 500% faster than a PC or XT. It brings this speed increase to your existing programs running under standard DOS. It also allows for the new Lotus Expanded Memory Specification (EMS) and for future Operating Systems that use the Protected Mode of the Intel 80286 Processor.

The PCturbo 286e is a self-contained system with processor and a full complement of RAM memory. Its 80286 processor runs at 8MHz with no wait-states. It will accept an 80287 math coprocessor for even greater speed.

The TurboBus connector allows for future daughtercards--including custom designs for special applications--to be directly connected for highly efficient operation.

The PCturbo 286e plugs into one standard expansion slot in the host system. The host can be an IBM PC, XT, or compatible computer.

When in Turbo mode, the PCTurbo 286e runs DOS and your program. While the Turbo runs your program, the host handles the input/output devices and mass storage: the keyboard, monitor, peripherals, and disks.

The Orchid Productivity Software puts the host's memory to work running RAM disk software, disk caching, and printer spooling. There is no copy protection on the PCTurbo 286e software.

The PCturbo 286e provides these features:

- o The same powerful 80286 CPU found in the IBM AT. Unlike the AT, the PCturbo 286e runs at 8MHz with no wait states for performance up to 200% faster than the AT and up to 500% faster than the PC.
- o Provisions for 80287 Math Coprocessor to speed up floating-point operations. Just buy the chip and plug it in--the PCturbo 286e is ready for it. A separate clock allows the 80287 to run at either 8MHz for maximum performance or 5MHz for a lower-cost.
- o 1 megabyte of RAM memory is standard; 1 megabyte can be added with the optional RAM Daughtercard.
- o Memory that can be configured for Protected Memory, DOS Memory, or Lotus/Intel/Microsoft Expanded Memory Specification (EMS Memory).

EMS Memory ends the DOS 640k memory limitation. Software supporting this standard can address 1 megabyte of memory on the RAM Daughtercard. The Productivity Software included with the PCturbo 286e can use this memory, as well as the hosts's memory, for valuable utilities.
- o Full transparency with the host system's serial and parallel ports.

- o TurboBus II expansion bus which allows daughtercards to be directly connected to the PCturbo 286e. Future expandability is ensured because daughtercards can be added to customize the system. The Technical Reference Manual provides the information you need to design your own daughtercards for special applications.
- o Coprocessing that puts the host system to work in the background handling I/O for maximum dual-processor performance.
- o Parallel Processing capability allows 1 to 4 Turbos to be used in the same system with a different program running on each. You can work with one program, say writing notes with your editor, while another Turbo is processing a long job, such as compiling a large file or sorting a big database. This far outperforms concurrent operating systems, because they force the same processor to do all the work; parallel processing assigns one PCturbo 286e to each program.
- o Runs in the IBM PC, XT, and compatibles.

- o Includes Orchid Productivity Software:

Installation Program - Intelligent setup program guides you through the installation process.

Print Spooling - Output to your printer can be buffered in Host machine's memory: your applications programs are free to keep on running without waiting for the printer. This buffer space does not reduce the space available for your applications running in PCTurbo memory.

TurboDrive RAM Disk - Allows memory to be used as high-speed electronic disk drives.

TurboCache Disk Caching - Uses host memory to speed up conventional disk drives to performance approaching that of RAM disks.

- o RAM Disks and caching can use DOS Memory, EMS Expanded Memory, or Protected Memory. They use the host system's memory so they don't take up the memory being used to run your application program on the Turbo.
- o There is no copy protection on the software supplied with the PCTurbo 286e.

**PCturbo 286e
AT A GLANCE**

Memory Banks

RAM
Daughtercard
Connection

TurboBus II
Connection

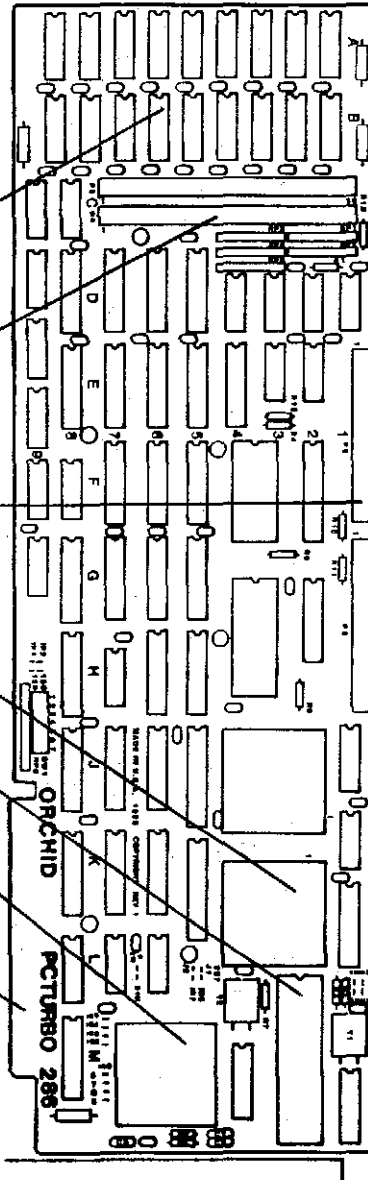
80286 CPU

Socket for 80287
Floating Point Unit

Custom VLSI
Gate Array

Card-Edge
Connector
for PC/XT/AT
Expansion Bus

Accessory
Mounting
Bracket



Jumpers - Appendix A contains a summary of their settings; the next chapter will help you set them.

INTRODUCTION

Memory Banks - 1 megabyte of 120ns RAM for DOS Memory.

RAM Daughtercard (not shown) - Adds 1 more megabyte of memory for use as EMS Expanded Memory or Protected Memory.

TurboBus II - This expansion bus allows future custom daughtercards to be directly connected to the PCTurbo 286e.

80286 CPU - 8MHz 80286 running with no wait states for super-fast processing.

80287 Socket - Provisions for 80287 Math Coprocessor to speed up floating point operations. Accommodates 80287 ICs running at either 5MHz or 8MHz.

Custom VLSI Gate Array - Developed by Orchid Technology, it fits a whole board full of custom circuitry into a small package with low power consumption.

Jumpers - A simple jumper assignment for adaptation to your host system. The hardware installation section of this manual guides you through the setup. Most systems will not require any jumper changes.

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HARDWARE INSTALLATION

Installing the PCTurbo 286e can be as easy as plugging it into the PC--you might not have to move a single jumper. The next sections will help you through this process.

CAUTION: Do not remove the ICs that are covered with heat sinks (black metal fins). These ICs have delicate pins that can easily be damaged when inserting the IC back into its socket. Removing the heat sinks will void your warranty.

JUMPER SETTINGS

The PCTurbo 286e will work in most systems without changing any jumpers from their factory settings. This section will show the factory settings and help you to make any changes that are necessary for your system. Appendix A summarizes the jumper settings.

- o A jumper is a plastic clip placed over a pair of gold pins so that its internal wiper makes electrical contact between the pins.
- o To keep from losing a jumper that is not needed, place it on one of the pins instead of across both of them. The diagram below represents three jumpers in place and one removed and stored on one of the pins.

| This jumper is installed and connects a set of pins.

| This jumper has been removed and stored on one of the pins.

I/O Address

The PCturbo 286e uses eight consecutive I/O addresses. The I/O addresses are jumper selectable. They must be set so that they do not conflict with other peripherals.

- o The factory-set I/O addresses are 300H through 307H (Hex). These are the I/O addresses that the IBM Technical Reference Manual recommends for "Prototype Cards."

You will not have to change the factory setting unless your system contains either a Prototype Card or another peripheral using these I/O addresses.

The I/O address is set by the row of seven jumpers labeled SW1. The jumpers in this row are labeled 1 through 7.

The factory default and several recommended alternatives are shown below. There are many more possible settings. Appendix A shows how to determine the jumper settings for any desired I/O address.

NOTE: The drawing on the next page shows the jumpers as they appear when you hold the board with the card-edge connector facing toward you with jumper 7 on the right. Appendix A shows the jumpers in the opposite direction so they correspond to their meaning.

HARDWARE INSTALLATION

Switch 1 - I/O Address

300H: (Default)

1	2	3	4	5	6	7	SW1
					:	:	
0	0	0	0	0	1	1	

308H:

1	2	3	4	5	6	7	SW1
:					:	:	
1	0	0	0	0	1	1	

310H:

1	2	3	4	5	6	7	SW1
	:				:	:	
0	1	0	0	0	1	1	

318H:

1	2	3	4	5	6	7	SW1
:	:				:	:	
1	1	0	0	0	1	1	

208H:

1	2	3	4	5	6	7	SW1
:						:	
1	0	0	0	0	0	1	

Selecting a Host Interrupt Line for the PCturbo 286e

The PCturbo 286e uses one of the host's interrupt lines for sending interrupts to the host. It can use either IRQ2, IRQ3, IRQ5, or IRQ7.

- o The interrupt line chosen for the Turbo cannot be used by other peripherals in the host system.

The factory-set default is IRQ7.

(IRQ7 is assigned to the parallel port but is not normally used for this purpose. You can disable IRQ7 on the parallel port without affecting its operation.)

If another peripheral requires IRQ7, you must select a different interrupt for the PCturbo 286e.

The interrupt is selected by the row of jumpers labeled IRQ. Each jumper is labeled with numbers corresponding to an interrupt, IRQ2, IRQ3, IRQ5, and IRQ7.

IRQ7 Selected (default)

	IRQ
3	...
7	—
*	...
5	...

HARDWARE INSTALLATION

Place the jumper on the desired interrupt.

- o Chose only one interrupt.
- o Do not use the pins labeled with the asterisk (*).
- o Be sure that no other peripheral in the host system is using the interrupt chosen.

80287 INSTALLATION

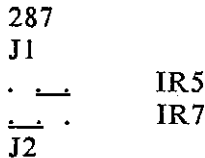
Selecting the 80287's Interrupt

If you are using an 80287 on the P C t u r b o 2 8 6 e, it may require one of the Turbo's interrupts for complete software compatibility. It can use Turbo interrupt 5 or 7. The Turbo will receive interrupts from the 80287 on this line.

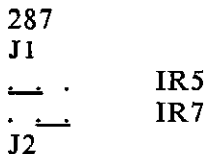
- o This interrupt is on the Turbo card, so it does not conflict with peripherals using the host's interrupts IRQ5 or IRQ7.

The jumper block is constructed so that the P C t u r b o's interrupts 5 and 7 can either be used by the 80287 or can be connected to IRQ5 and IRQ7 on the host.

**80287 is using interrupt 7;
Turbo intercepts host's IRQ5:
(default)**



**80287 is using interrupt 5;
Turbo intercepts host's IRQ7:**





The interrupt used by the 80287 can correspond to the host interrupt used by the PCTurbo 286e, which you chose in the previous section **Selecting a Host Interrupt**.

- o If you chose the host's IRQ7, you can use Turbo interrupt 7 for the 80287.
- o If you chose the host's IRQ5, you can use Turbo interrupt 5 for the 80287.



80287 5MHz/8MHz Jumper

The PCturbo 286e will accommodate 80287 ICs running at either 5MHz or 8MHz. A pair of jumpers is provided to select the speed. Position the jumpers according to the speed of the 80287 you will be using. If you are not using an 80287, the jumper setting does not matter.

5 MHz Operation (default):

8MHZ  5MHZ
 

8 MHz Operation:

8MHZ  5MHZ
 

- o If your IC is labeled 80287-3, use the 5MHz setting.
- o If your IC is labeled 80287 or 80287-8, use the 8MHz setting.

Installing the 80287 IC

Once the jumpers have been set, the 80287 IC can be plugged into the socket provided. The 80287 uses the long socket located near the adapter bracket.

- o The notch in the 80287 aims away from the adapter bracket.
- o Be careful not to bend the pins when inserting the 80287 into the socket.
- o Be sure that every pin goes into a hole in the socket.

INSTALLING THE DAUGHTERCARD

PCturbo 286e accommodates a RAM Daughtercard containing four rows of memory ICs. You can skip this section if you purchased the PCturbo 286e with the RAM daughtercard already installed or if you are not going to use a the daughtercard. You do not need to remove the RAM daughtercard to access the jumpers.

The RAM daughtercard mounts in the middle of the main card. It plugs into the connector parallel to the small daughtercard and the two TurboBus connectors along the top of the main card.

To install the daughtercard:

1. Be sure that the multi-pin connectors mate properly, so that all of the pins are inserted into the mating sockets.
2. Line up the edges of the two boards and press the boards together.

To remove the daughtercard:

Place your thumb and first fingers between the main board and daughtercard and pry the two apart.

- o Be careful not to angle the boards as you separate them--this may damage the daughtercard connector.

1M/2M Jumper

The jumpers labeled 1M and 2M indicate how much memory is available, either 1MB or 2MB.

- o If the RAM daughtercard is not installed, place the jumper in the 1M position.
- o When the RAM daughtercard is installed, place the jumper in the 2M position.

This jumper indicates the amount of memory available for Protected Memory and for operating systems that can use more than 1MB of memory.

RAM Daughtercard NOT Installed:

P
2M . DIM

Daughtercard Installed:

P
2M . DIM

INSTALLING IN THE HOST SYSTEM

1. Turn off the power.
2. Remove the cover from your computer. Unfasten the screws on the back of the computer and slide the cover forward.
3. Remove the adapter bracket from the expansion slot you plan to use for the PCturbo 286e. Save the adapter bracket screw for Step 6.
4. Lower the PCturbo 286e into the desired expansion slot.
 - o It can go in any full-length expansion slot.
 - o Be sure that the card doesn't touch adjacent boards or the metal chassis. You may wish to try different slots so that the PCturbo 286e is not next to wide boards.
5. Be sure that the card-edge connector is directly above the expansion slot connector on the computer's main system board, then firmly push the card down into place.
6. Fasten the Turbo's adapter bracket to the chassis with the screw removed in Step 3. Put the cover back onto the computer and secure it with its mounting screws.

Power Requirements

Be sure that your system provides adequate current for the cards you have installed. The Pcturbo 286e requires the following current from the +5V supply:

- 2.75 Amps with 1.0 MB installed
- 3.00 Amps with 2.0 MB installed

NOTE: Standard IBM PCs may need to be upgraded to the 135 Watt power supply if many adapter boards are used with the Pcturbo 286e. This is the size power supply used in the IBM XT.

1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900

SOFTWARE INSTALLATION

After you have installed the PCturbo 286e in the computer, turn on the system and install the Orchid Productivity Software.

The Installation Program (INSTALL.EXE) will help you modify your boot disk for use with PCturbo 286e. It will add lines to your AUTOEXEC.BAT file and create the HOSTEXEC.BAT, TURBEXEC.BAT, and TURBO.SYS files. The program will also copy the Productivity Software (RAM Disks and Disk Caching) onto your boot disk. This will allow the Productivity Software to be loaded automatically when you turn on the power or reboot your system.

For Safety

For greatest peace of mind, make a copy of your boot disk and put the original away for safekeeping.

If you boot from floppy:

- o Use DOS DISKCOPY to create an identical copy of the boot diskette.

If you boot from a hard disk, create a backup boot disk by formatting a bootable floppy and copying the boot files onto it, as shown below:

1. Log onto the root directory of the hard disk. If the hard disk is drive C, type
c:<Enter>

(The word <Enter> means pressing the Enter key)

2. Place a blank disk in the A: drive and type
format a:/s <Enter>
3. Copy the AUTOEXEC.BAT file by typing
copy autoexec.bat a: <Enter>
4. Copy the system files by typing
copy *.sys a: <Enter>

NOTE: The software supplied with the PCturbo 286e is not copy protected and can be installed on your Turbocharged system as many times as you want. If you change your hardware, re-run the INSTALL program. It will automatically detect that the PCturbo is being re-installed and perform the appropriate steps.

RUNNING THE INSTALL PROGRAM

NOTE: If you are installing a Conquest, CramRAM, or ECCELL multifunction card, run the Software Installation Program included with it before running the PCTurbo 286e INSTALL program. Do not install disk caching, because it will be activated automatically.

The INSTALL Program modifies your AUTOEXEC.BAT file. It also creates new files called TURBEXEC.BAT, HOSTEXEC.BAT, and TURBO.SYS.

- o If these files are not present on the boot disk, this program will create them.
- o If these files are present, it will modify them.

The program can be run more than once. This can be used to alter the system configuration.

For greatest safety, perform the installation on a backup copy of the disk you use for booting. See page 3-1 for instructions on how to create a backup boot diskette.

To run the INSTALL Program:

1. Turn on the system's power and boot DOS.
2. Place the PCTurbo 286e software diskette in the currently logged disk drive and type

install <Enter>

The next section of this manual describes the INSTALL program.

THE INSTALL PROGRAM

Copying the Productivity Software

The INSTALL program will copy the Productivity Software onto your boot disk.

- o If you boot from a floppy, use a bootable disk with at least 120 kilobytes free.

When asked, enter the drive from which you boot.

- o If you boot from a floppy, type A.
- o If you boot from a hard disk, enter the name of the drive, typically C.

The INSTALL program will copy the PCturbo 286e files to the boot disk.

- o If you indicated a hard disk in the previous step, the program will create a sub-directory called \pcturbo and copy the software into that directory. It will add \pcturbo to your command search path so that the system can automatically find the Turbo software.

If the boot disk already has a program with the same name as one of the Turbo's files, INSTALL will ask if you want to quit or overwrite the file.

- o If you are running INSTALL to change an existing configuration, tell it to overwrite the files. It will copy the files from your distribution disk, overwriting the existing copies. This

SOFTWARE INSTALLATION

feature is used to install new releases of the software, but it also can be used to modify your configuration.

- o If you are installing the PCturbo 286e for the first time and it finds existing files, they may be needed by another program. Quit the INSTALL program and copy the files to a different disk or directory. You can then re-run the INSTALL program and tell it to overwrite the files.

The INSTALL program will create three new files in the root directory of your boot disk:

TURBEXEC.BAT
HOSTEXEC.BAT
TURBO.SYS

It will also alter the AUTOEXEC.BAT file. The new set of files configures the operating system for the host and the PCturbo 286e.

- o Your original AUTOEXEC.BAT file will be saved under the name AUTOEXEC.OLD. If you want to start over from the beginning, rename the old file to AUTOEXEC.BAT. You will not have to do this to make simple changes, because the INSTALL program can be used to alter the existing files.

Dual-Port Memory Address

The PCturbo 286e uses a 64K block of the host's address space for communication with the host. This memory "window" can be located at either A000:0, B000:0, C000:0, D000:0, or E000:0 (in hex). The INSTALL program will test your system to determine which address is free and locate the dual-port window there. You will not have to enter any commands or move any jumpers.

Fast Color Mode (Color Display Update Speed)

The PCturbo 286e screen update mechanism can be optimized for either the standard IBM color graphics adapter and equivalents, or for compatible but flicker-free adapters.

If you have any kind of color adapter, this section will automatically test if your adapter is flicker-free or requires special handling. You can experiment with either mode using the Turbo command parameters.

I/O and IRQ Jumpers

The INSTALL program will ask you for the I/O address and the interrupt you jumper-selected during hardware installation.

- o The I/O address must end in 0 or 8; other values will be rejected.

Finishing the INSTALL Program

When you finish the INSTALL program, the PCTurbo 286e is ready to run, but you have not installed all of the Productivity Software, such as RAM Disk or Print Spooling. You can type **TURBO** to try out the PCTurbo 286e, or you can install the Productivity Software first.

If you boot from a hard disk, you will exit from INSTALL into the sub-directory it created, called `\pcturbo`. This sub-directory contains all of the Turbo software.

- o The `\pcturbo` sub-directory will not be in the search path until you reboot, so you will not be able to try out the PCTurbo 286e if you change to a different directory.

INSTALL placed a line in the AUTOEXEC.BAT file to put `\pcturbo` in the command search path. This will take effect when you reboot, so you won't have to be concerned about the `\pcturbo` sub-directory again. To install the new search path, reboot by pressing **<Ctrl>-<Alt>-**.

Changing the Configuration

You can run the INSTALL Program again to change the configuration. Notice that it will copy the Productivity Software from the distribution disk again. Simply tell it to overwrite the files it copied previously.

If you feel comfortable editing the files on your boot disk and understand the command syntax described in Appendix B, you can use an editor to experiment with different configurations.

Placing Commands in HOSTEXEC.BAT and TURBEXEC.BAT

The INSTALL program copies the commands from your AUTOEXEC.BAT file to the HOSTEXEC.BAT file so that they will execute on the host. You can copy commands to the TURBEXEC.BAT file so they will execute on the Turbo. This may be necessary to make some commands (resident programs like SideKick) available in Turbo mode.

It is a good idea to try running the command on the Turbo before placing it in the TURBEXEC.BAT. Some commands run only on the host, and should be left in the HOSTEXEC.BAT file. The DOS command MODE is an example.

Most memory-resident programs, like SideKick, should be placed in the TURBEXEC.BAT file. If you mainly operate in Turbo mode, move as many commands from the HOSTEXEC.BAT to TURBEXEC.BAT as possible. This will leave the host's memory free for caching, RAM disks, and print spooling.

Installing Productivity Software

The PCTurbo 286e comes with Productivity Software to improve your system's performance. This software includes TurboCache Disk Caching, TurboDrive RAM Disk, and Print Spooling.

- o Disk Caching is automatically installed when ever you enter Turbo mode, so you will not have to type the command.
- o You can edit your CONFIG.SYS file to install RAM Disks in the host's memory. RAM Disks placed in host memory will be available in Turbo and Host mode. (RAM Disks placed in TURBO.SYS will be in the Turbo's memory and will be available only in Turbo mode.) The command syntax is given in Appendix B.
- o Print Spooling can be invoked from the HOSTEXEC.BAT file or typed from the keyboard while in host mode. It will spool printouts made in Turbo and host mode. The command syntax is in Appendix B.

SECRET

OPERATION

Operating the PCTurbo 286e is almost completely transparent to the user. The basic procedures are outlined on this page. Appendix B, the Command Summary, goes into detail about the many software options available.

When you first boot your system, you will be asked if you wish to Turbocharge. If you answer yes, the PCTurbo 286e will boot up and you can begin using it. If you answer no, you will continue operating the host.

You can switch between the host and the Turbo any time the DOS prompt is displayed:

- o Type **TURBO** to execute on the Turbo
- o Type **UNTURBO** to return to the host.

REBOOTING YOUR SYSTEM

If you reboot (<Ctrl>-<Alt>-) your system while executing on the host, only the host will be affected; the next time you invoke the **TURBO** command, if it had already been invoked once since power on, it will return to its previous state.

If you reboot your system while executing on the PCTurbo, both the PCTurbo and the host system will be rebooted (both will cold boot).

REBOOTING WITHOUT LOSING RAM DISK DATA

RAM-Intact Warm Boot allows you to reboot without losing the contents of RAM disks placed in the Turbo's memory or host's EMS Memory.

A warm boot is actuated by pressing <Ctrl>-<Alt>- or <Ctrl>-<Alt>-<Ins>, causing the computer to reset. This is similar to what happens when you turn on the power, except that it doesn't go through the entire power-on self test and it doesn't clear memory. A cold boot clears memory and runs the computer's power-on self test.

When RAM-Intact Warm Boot is active, pressing <Ctrl>-<Alt>- or <Ctrl>-<Alt>-<Ins>, will display a message instructing you to press W for a warm boot or C for a cold boot.

- o The contents of the Turbo's memory and the host's EMS and Protected Memory will remain intact if you select W for a warm boot.
- o All Memory will be cleared if you select C for a cold boot.

NOTE: RAM-Intact Warm Boot is not effective on RAM disks placed in the host's DOS Memory. (Data in the host's DOS Memory will be lost when rebooting.)

You can disable this feature using the command syntax given in Appendix B. It must be used on the first RAM disk installed in Protected or EMS Memory. This will disable it for all RAM disks in Protected and EMS Memory.

PARITY ERRORS

The PCturbo 286e has XT compatible parity error detective circuitry. If there is a parity error on the PCturbo 286e, you will have a chance to save your data before shutting down the system.

When a parity error occurs, the screen will display a warning message. You will be given two choices:

- 1) Cold boot by pressing <Ctrl>-<Alt>-
- 2) Press F1 to return to the interrupted PCturbo environment, with parity DISABLED.

Cold booting is the safest choice if you have recently saved your data to disk.

If you have not recently saved your data, you can Press F1 to return to the interrupted program and try to save your work.

NOTE: Press F1 at your own risk--you will not have any kind of error protection and you will already have one error affecting your system. **Do not keep working any longer than is necessary to save your data to disk.** There are two concerns:

- o The error may have affected your data. Save it under a new file name so that you will not erase your last copy of the file.

- o In some instances, an error may cause the system to behave uncontrollably, possibly even destroying data on disk. You should use a blank, formatted floppy to save your work so that you will not risk modifying a disk with valuable files.

The parity error may have caused the system to halt so you cannot save your data. In this case, you will have to cold boot using <Ctrl>-<Alt>-.

REFERENCE

GENERAL THEORY OF OPERATION

Host System and the PCTurbo 286e

The PCTurbo 286e converts your host computer into a true dual-processor system. They work together to speed up your applications. The Turbo's processor runs DOS and your applications in the Turbo's high-speed memory while the host processor performs all system I/O--keyboard, disk, peripherals. Called **coprocessing**, this efficient operation is one reason for the unequalled speed of the PCTurbo 286e. This unique design gives you the highest throughput of all accelerators available.

The PCTurbo 286e can access all of the host's peripherals and block devices, such as RAM disks, floppy disks, and hard disks. The host's memory can be used for RAM disks, caching, and printer spooling. This leaves the Turbo's memory free for the programs it is running.

DOS

The host and the Turbo each run their own DOS. This doesn't mean that the Turbo requires a special DOS--it boots from the same disk you currently use. It simply means that there are two systems, each running DOS. You can even run programs on the host or the Turbo; with special Parallel Processing software, you can run programs on the host and the Turbo simultaneously.

The host and the Turbo run copies of DOS that are independent of each other. For example:

- o You can change drive and directories in Turbo mode without affecting the host mode. Similarly, you can log onto a different drive in host mode and not affect the Turbo mode.
- o When you switch from Turbo to host, you will be return to the same drive and directory you were in when you were last in host mode.
- o When you switch from host to Turbo, you will return to the same drive and directory you were in when you were last in Turbo mode.

Booting

When you boot your system, the host loads DOS into its memory from your boot disk. The first time you enter Turbo mode, DOS is loaded into the memory on the PCturbo 286e.

When you boot a standard PC system, the following things happen:

- o The operating system is loaded into memory from the boot disk.
- o If the boot disk contains a file called CONFIG.SYS, DOS will read this file and install any device drivers it contains. This configures your system, for example, by installing RAM disks and device drivers required by some peripherals.

REFERENCE

- o If the boot disk contains an AUTOEXEC.BAT file, this batch file will be executed. This file can contain any command that can be typed from the keyboard and some special batch-file commands. You can use it to change the DOS prompt, set the search path DOS uses to find programs and configure the serial and parallel ports. It can also automatically execute a program.

The INSTALL program, which you will use to set up the system, will create three new files:

- o HOSTEXEC.BAT - This file will replace the AUTOEXEC.BAT files function. Commands in HOSTEXEC.BAT will only be executed when the host system is booted.
- o TURBEXEC.BAT - This file acts as the PCTurbo's AUTOEXEC.BAT file. It is executed when the PCTurbo 286e is booted.
- o TURBO.SYS - This file is the PCTurbo's version of the host's CONFIG.SYS file. It contains a special device driver that provides access to all host block devices.

The INSTALL program changes the AUTOEXEC.BAT file so that it functions as a switch. When the host boots, the AUTOEXEC invokes the HOSTEXEC file. When the PCTurbo 286e boots, the AUTOEXEC invokes the TURBEXEC file.

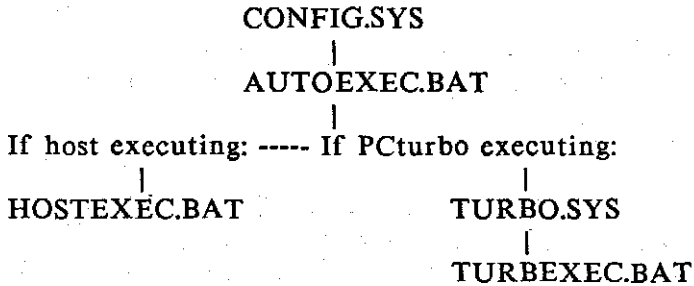
When you boot a system with a PCturbo 286e installed, the following things happen:

- o The operating system is loaded from the boot disk into the host's memory.
- o DOS will look for and install the contents of the CONFIG.SYS file in the host.
- o The AUTOEXEC.BAT file will be executed. It will determine that the host is being booted and invoke the HOSTEXEC file.

The HOSTEXEC file will execute and perform the commands in your original AUTOEXEC file. It will then ask you if you want to Turbocharge.

- N If you answer No, you will exit the batch file and return to the operating system where you will be given the DOS prompt.
- Y If you answer Yes, DOS will be loaded into the Turbo's memory.
 - o The TURBO.SYS file will be installed to configure the Turbo's DOS.
 - o The AUTOEXEC.BAT file will be executed again. It will determine that the PCturbo is booting and will invoke the TURBEXEC file.

Here is a flow chart of what happens:



If you choose not to enter Turbo mode when asked, you can do so at later by using the **TURBO** command. The first time you enter Turbo mode, DOS will be loaded onto the Turbo and the **TURBO.SYS** and **TURBEXEC.BAT** files will be installed.

NOTE: The **HOSTEXEC.BAT** file can be modified to take you directly into Turbo mode. Remove the **ASK** command and the **IS ERRORLEVEL** command immediately following it and replace them with the command **TURBO**.

Switching Between Host and Turbo

Sometimes you may have a special application that can only be run on the host, such as showing your friends how slow your old system was. The Pcturbo 286e makes this easy. You can switch between the host and the Turbo any time the DOS prompt is displayed.

To switch to the Turbo, type
turbo

To switch back to the host, type
unturbo

TYPES OF MEMORY

To understand the Turbo, it is helpful to know the types of memory available in your system.

Memory is organized as follows:

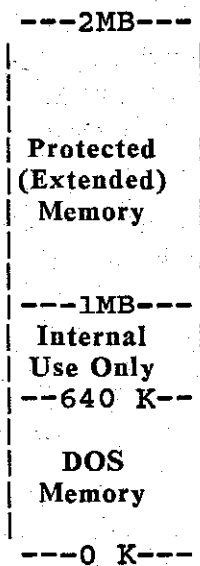
The first 640 kilobytes (the memory between the addresses 0K and 640K) is called **DOS Memory** because it is compatible with PC-DOS and MS-DOS. Some systems, like the AT, have memory above 1 megabyte, called **Protected Memory**.

- o Protected Memory is frequently referred to as Extended Memory, but this manual will use the term Protected Memory.

The DOS memory between 640K and 704K (64 kilobytes) can be used as DOS memory if the /D=704 flag is specified in the Turbo command. This is provided as an option because certain DOS programs will not operate correctly in a system with more than 640 kilobytes.

DOS Memory can be used by your existing programs running under DOS. Protected memory can be used by software written specifically for AT-compatible systems using 80286.

Memory Map



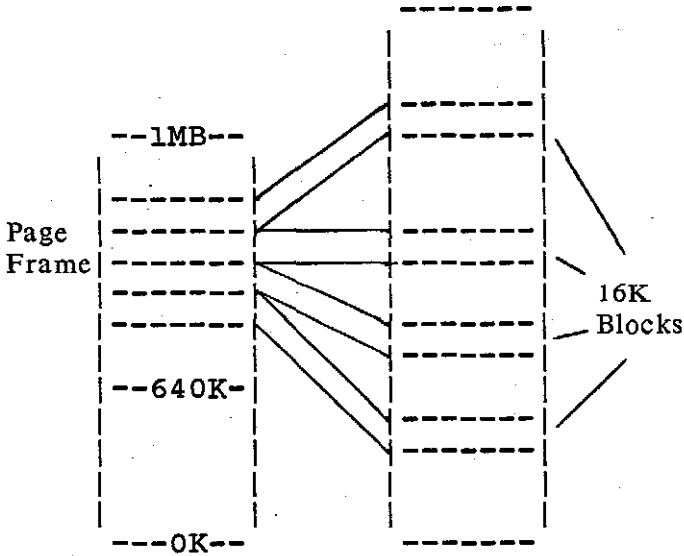
Lotus/Intel/Microsoft Expanded Memory Specification (EMS)

The Lotus/Intel/Microsoft Expanded Memory Specification, or simply EMS Memory, allows large amounts of memory to be used by programs running under DOS.

A technique called "paging" allows programs to address EMS Memory through a 64K block of memory called the "page frame." The page frame is located at a range of addresses where it can be accessed from DOS but does not interfere with applications software. It is divided into four 16K pages, each of which can be used as a window to view any 16K page of EMS Memory.

Notice that paged memory does not have a fixed address; the hardware makes it appear at an address accessible from DOS. This makes EMS different from Protected Memory, which is not paged and occupies the addresses above 1 MB.

Page Frame Window



DOS Memory

EMS Memory

Addressed through
the EMS driver.

Using DOS, EMS, and Protected Memory

Your application programs need not support EMS Memory or Protected Memory to benefit from the PCturbo 286e. The Orchid Productivity Software can use this memory for disk caching and RAM disks. This software runs in the background to increase the efficiency of your application programs. This makes memory available for caching and RAM disk without using up the DOS Memory needed by the application you are running.

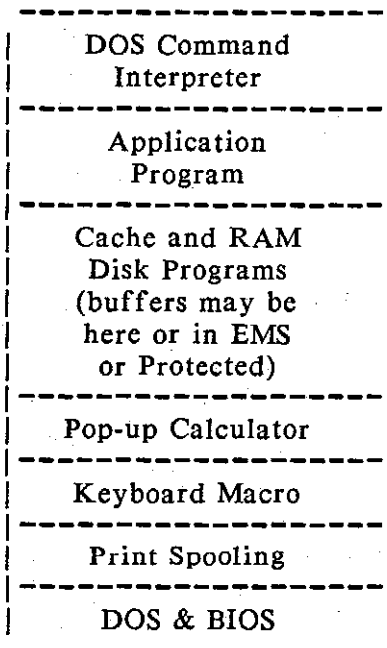
ALLOCATING MEMORY

Memory Usage

The Orchid Productivity Software uses part of memory for utilities such as RAM disks and disk caching. When allocating memory to these utilities, remember to leave room for the other programs that must reside in memory.

DOS Memory will typically contain the application program you are running, any other utilities that reside in memory (such as Sidekick) and the operating system. If you use DOS Memory for the Orchid Productivity Software, be sure to leave room for any other utilities that will be placed in DOS Memory.

640K



0K

EMS Expanded Memory can only be used by programs that support this standard, such as Symphony, Framework, and the Orchid Productivity Software.

If you have no other programs that support EMS, all of it can be used for the Orchid Productivity Software. (You will mainly be concerned with allocating EMS Memory to RAM Disks, since Print Spooling uses only DOS Memory and Disk Caching automatically uses any of the host's memory that is available.)

If you will be using an application program that supports EMS, decide how much EMS memory to allocate to RAM Disks and how much to leave for the application program.

The host's Protected Memory can be used for caching and RAM disks, but it cannot be used by other software running under PC-DOS or MS-DOS. If you have application programs that can use EMS Memory and you need all of the EMS you have available, you may wish to use Protected Memory for caching and RAM disks.

Even when Productivity Software is placed in Protected or EMS Expanded Memory, it still uses some DOS Memory. For example, a cache buffer of 8 megabytes requires approximately 150 kilobytes of DOS Memory for the program and information about the buffer. Remember to account for this when allocating DOS Memory.

Installing Software

When installing the Orchid Productivity Software, you will allocate parts of memory for RAM Disks and Print Spooling.

- o RAM Disks can be placed in DOS, Protected, and EMS Memory. Print Spooling goes in DOS Memory. It can use either the host's memory or the Turbo's memory. By placing these utilities in the host's memory, the Turbo's memory will be available for your application program.
- o Be sure to leave room in DOS Memory for the operating system and any other utilities, such as pop-up calculators or keyboard macros. To see if you have enough DOS memory left for your application program: install the Productivity Software, reboot, and use the DOS command CHKDSK.
- o If you have any applications programs that support EMS Expanded Memory (such as 1-2-3 or Framework), leave room in EMS Expanded Memory for them. For example, do not use all of your EMS memory for RAM disks, as this will leave no EMS memory for your application program.

NOTE: When you enter Turbo Mode, all of the host's available memory will be used for caching. When you return to the host, caching will be disabled and its memory will be available to the application program you wish to run.

Example: You may want to use 360K for a RAM disk, 240K for caching drive C:, and 40K for spooling LPT1. This would equal 640K, which would fill up all of DOS Memory, leaving no room for DOS and the application programs. The PCTurbo allows you to use the host's EMS Expanded Memory for RAM disk and caching so they don't use up DOS Memory. This could be achieved with the following commands:

in the CONFIG.SYS file:

```
device=ramdisk.sys 360 /x
```

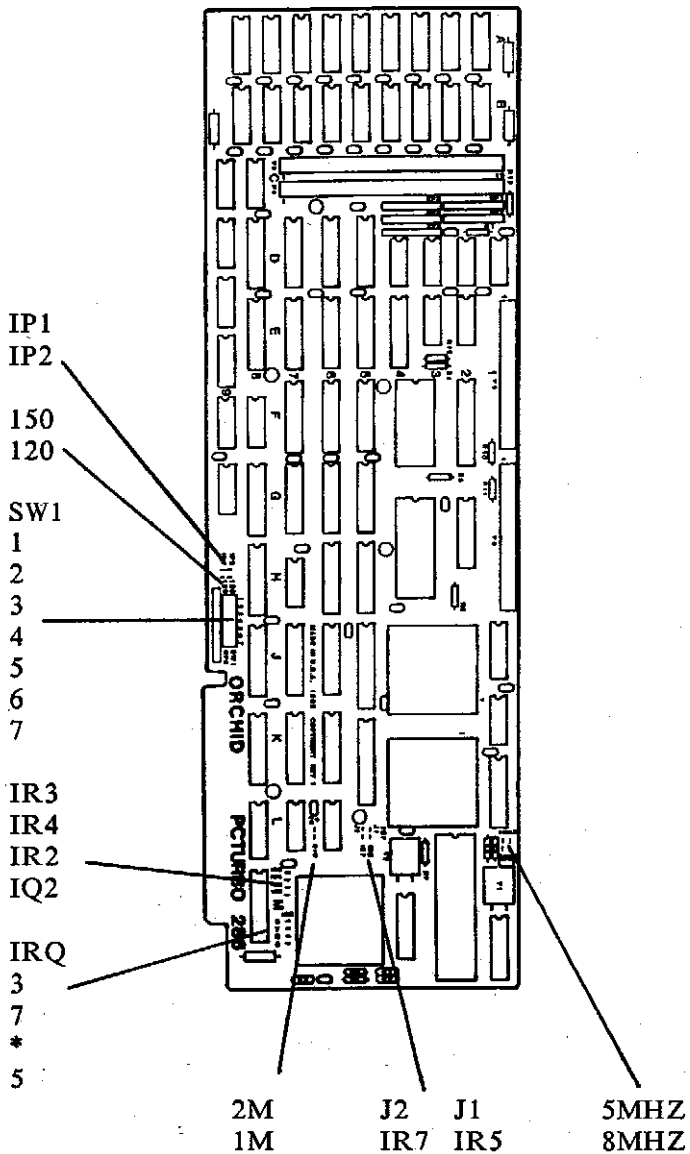
in the HOSTEXEC.BAT file:

```
cache c x=240  
prtspool lpt1: /m=40
```

NOTE: The cache command in the HOSTEXEC.BAT file invokes caching in host mode. You do not need a cache command for caching in Turbo mode.

APPENDICES

APPENDIX A - JUMPERS



JUMPERS

| **NOTE:** Factory settings are shown in bold with
| a line in the left margin.

P/2M RAM Daughtercard is installed
D/1M RAM Daughtercard is not installed

150 150ns RAM installed (1 wait state)

| 120 120ns RAM installed (0 wait state)

| 5MHz 80287 runs at 5MHz

8 80287 runs at 8MHz (must use 80287)

**These jumpers connect the Turbo to the host's
device interrupt's:**

| **IR2** Connects PC's IRQ2 to Turbo's Int.2

| **IR3** Connects PC's IRQ3 to Turbo's Int.3

| **IR4** Connects PC's IRQ4 to Turbo's Int.4

| **IR5** Connects PC's IRQ5 to Turbo's Int.5

J1 80287 connected to Turbo's Int. 5

| **J2** 80287 connected to Turbo's Int. 7

IR7 Connects PC's IRQ7 to Turbo's Int.7

**These jumpers select the host interrupt used
by PCturbo:**

IRQ

2 **IRQ2**

3 **IRQ3**

| 7 **IRQ7**

* **I/OCHCK**

5 **IRQ5**

| **IP1** **Normal interrupt**

IP2 **I/OCHCK**

Determining I/O Addresses

The PCTurbo 286e uses eight consecutive I/O addresses. The addresses used by the PCTurbo 286e can not be used by other peripherals.

- o The I/O addresses can start at any multiple of eight.

In hexadecimal, the starting address are:
100, 108, 110, 118, 120, 128... up
through 3E0, 3E8, 3F0, 3F8.

Notice that the starting address must end
in 0 or 8 in hexadecimal.

The I/O address is set by the row of seven jumpers labeled SW1 at the lower edge of the PCTurbo board. The jumpers in the row are labeled 1 through 7.

Each jumper corresponds to one bit of the address in binary. The address has 10 bits, but only the 7 most significant bits are jumpered. The 3 least significant bits are set to 0 so that the address will always end in a multiple of 8.

- o Jumper 1 corresponds to the highest bit of the address in binary, the 512's place.
- o Jumper 7 corresponds to the fourth bit from the lowest, the 8's place.
- o Installing a jumper sets the bit to 0. Removing a jumper sets the bit to 1.

P C t u r b o 2 8 6 e

In the diagram below, SW1 is shown in reverse so that the jumpers are positioned as they are in binary notation. Hold the board with the card-edge connector aiming away from you so that Jumper 7 is on your left.

			SW1					Fixed at 0		
7	6	5	4	3	2	1		0	0	0
:	:	:	:	:	:	:				

Value of Bit in Binary:										
512	256	128	64	32	16	8	4	2	1	
Hex Digits:										
\	/	\			/	\			/	
1st			2nd				3rd			

300h (default):

1	1	0	0	0	0	0	0	0	0	0
:	:									
7	6	5	4	3	2	1	SW1			

308h:

1	1	0	0	0	0	1	0	0	0	0
:	:					:				
7	6	5	4	3	2	1	SW1			

310h:

1	1	0	0	0	1	0	0	0	0	0
:	:				:					
7	6	5	4	3	2	1	SW1			

318h:

1	1	0	0	0	1	1	0	0	0	0
:	:				:	:				
7	6	5	4	3	2	1	SW1			

208h:

1	0	0	0	0	0	1	0	0	0	0
:						:				
7	6	5	4	3	2	1	SW1			

APPENDIX B - COMMAND SUMMARY

NOTE: The commands presented in this section conform to the following conventions:

Optional parameters are enclosed in square brackets: []. These brackets are not typed as part of the command.

Lower case letters are used to indicate numbers that can take a range of values. For example, part of the cache command is shown as **D=kkkk**. You could use **D=360** to assign 360K of DOS Memory for caching.

When showing exactly how the screen will look, including the DOS prompt or system response, the part you type is shown in **bold face lower case**. The computer's response is shown in upper case letters that are not bold.

The TURBO Command

COMMAND:

TURBO.COM

FORMAT:

**TURBO [/S] [/D] [/C] [/R] [/V] [/B]
[/H] [/F] [/A=h]**

USAGE:

To begin running on the PCturbo 286e.

This is the command you use to transfer from the host to the Turbo. (To return to the host system, type UNTURBO.)

The first time you type TURBO after turning on the system, these things will happen:

- DOS will be loaded onto the PCturbo
- The AUTOEXEC.BAT file will be executed
- Operation will transfer to the PCturbo
- The TURBEXEC.BAT file will be executed

The display will indicate the system status. (If it displays an error message, see Appendix G - PCturbo Messages.) The TURBEXEC.BAT is the PCturbo's equivalent to the AUTOEXEC.BAT file. It will only be executed the first time you enter Turbo Mode in any computing session. After that, you can switch back and forth between the host and the Turbo without altering system status. When you switch back to the Turbo, even the current sub-directory will remain the same as when you left.

NOTE: If the TURBO command is used while already in Turbo Mode, it will display a message indicating that Turbo Mode is already active.

Options

The TURBO command has several options that can be specified when the command is invoked. They are not necessary for normal operation, but are provided for special situations, such as special hardware and software. To specify the options, type TURBO followed by a slash (/) and the letter used to indicate the option.

- o The options can be placed in any order and more than one can be specified at a time. When using more than one option, place a slash before each option.

All of the options remain in effect until the next time you go back to the host. This means that you must specify any options you want each time you enter Turbo mode.

/S - Enable Scroll Lock

/S enables the Scroll Lock key to function as a Pause key in Turbo Mode. The standard DOS system does not provide a scroll lock function. Some software requires direct access to the Scroll Lock key, so this use of /s is provided as an option.

/D=kkk - Set DOS Memory

This option sets DOS memory. It changes the size of Pcturbo system memory available for DOS. The value of kkk is the DOS memory size in kilobytes. The default is /D=640, which reserves 640K for DOS. TURBO /D=704 allows DOS to occupy 704K.

Some application software will not execute properly in 704K of DOS memory. Try all software using the default 640K before experimenting with the 704K value.

/C, /R - Setting Disk Cache Status

By default, the Pcturbo automatically enables hard disk caching. Hard disks (and "intelligent" removable disks like the Iomega Bernoulli Box) are automatically cached in normal Pcturbo operation. Removable drives (floppy disks) can be cached using the /R option. Some users may also wish to disable disk caching entirely, with the /C option. These are the caching options:

default	Hard Disk Caching Enabled
/C	All Caching Disabled
/R	Hard Disk and Removable Caching Enabled

WARNING: If you specify removable caching, you must <Alt>-<Left Shift>-<F> to flush the cache buffers whenever you change a removable disk. Failure to do this may result in serious data loss.

If the Orchid cache program CACHE.EXE is already installed on the host, typing TURBO will not install cache again. Caching automatically uses all DOS, EMS, and Extended Memory available on the host.

/C - Disable All Caching

This option disables all disk caching; neither removable nor fixed disks (hard disks) are cached when this option is used.

/R - Cache Removable Drives

This option allows removable disks (floppies and cartridges) to be cached in addition to hard disks and intelligent removables.

This option can add extra speed to many applications if used correctly. But it must be used with caution. There is a danger of losing valuable data if the floppy diskette is replaced without informing the cache of the change.

Before you change a floppy diskette or cartridge, press <Alt>-<Left Shift>-<F> from the DOS prompt. This will inform the PCTurbo of the change so that it can flush its buffers and prepare for a new disk.

IMPORTANT NOTE: When using /R (either TURBO /R or CACHE /R), it is the user's responsibility to press <Alt>-<Left Shift>-<F> to inform the PCTurbo whenever removable diskettes or cartridges are changed. Failure to do so may result in loss of data.

Removable media caching is not recommended for the novice. If you use removable caching, test it on backup copies of your applications software and data disks. Some programs appear to work but will fail when asked to perform some rarely used function such as a monthly or yearly report. Be sure to test every area of the program before using removable caching with your real data.

/V - Verbose Mode

The verbose option, /V, displays the settings of the installation parameters, such as jumper settings.

/B - Cold Boot

This option cold boots the PCturbo 286e upon entering Turbo mode, forcing it to re-execute the AUTOEXEC, TURBEXEC, and TURBO.SYS files.

Any change in the TURBO.SYS file will become effective when the Turbo is cold booted.

/H - Hard Boot Override

This option overrides the boot drive specified during the INSTALL program. It forces the PCturbo to boot from your hard disk without checking first to see if there is a floppy disk present.

/F - Floppy Boot Override

This option overrides the boot drive specified during the INSTALL program, forcing the PCTurbo to boot from the floppy drive. This is useful in cases where you are booting a non-DOS disk such as a copy-protected game onto the PCTurbo.

/A=h - Address of Dual-Port Window

The location of the dual-port memory is determined by the INSTALL program. This option allows you to use different locations for special applications. The lower case **h** is replaced by the desired starting address in hex, as follows:

/A=A	-	A000:0
/A=B	-	B000:0
/A=C	-	C000:0
/A=D	-	D000:0
/A=E	-	E000:0

NOTE: Be sure that no other peripherals are using the 64K segment starting at the address chosen.

The UNTURBO Command

COMMAND:

UNTURBO.COM

FORMAT:

UNTURBO

USAGE:

The UNTURBO command is used whenever you wish to transfer from the Turbo back to the host system.

If invoked while already on the host, the command informs you that you are already executing on the host.

It is important to remember that both the host and the P C t u r b o 2 8 6 e are running separate, independent copies of DOS. This means that if you are working in Turbo Mode, move into a sub-directory, and then invoke UNTURBO to go back to the host, you will no longer be in the same sub-directory. In fact, you will be returned to the directory you were in when you last involved the Turbo command. If you return once again to the Turbo, you will again be in the sub-directory you were using when you last involved UNTURBO. Therefore, it is recommended that you always check the current directory after switching between the Turbo and the host.

DOS provides the convenient capability of allowing you to change the prompt to include extra information (besides just the current

COMMAND SUMMARY

drive letter). You can read up on the PROMPT command in the Disk Operating System manual from your PC. As an example, the following command will display the complete current directory, including the full path name, behind the "is greater than" symbol (>):

prompt \$p\$q\$g

If you like the effect of this prompt symbol, you may wish to include it in the HOSTEXEC.BAT or TURBEXEC.BAT file for everyday use.

The RUNHOST Command

COMMAND:

RUNHOST.COM

FORMAT:

RUNHOST [string]

Maximum string length: 15 characters
including blanks and separators.

USAGE:

To change execution to the host and run
the program specified on the command line.

This command works like the UNTURBO command,
except that the string on the command line is
placed in the keyboard buffer. This is just
like having the string automatically typed
after typing UNTURBO. This means that you can
change operation to the host and run a program
all in one step. Notice that the string is
limited to 15 characters, including any spaces
or separators.

Example:

To change into host mode and run a program
called TEST.COM, type the following from the
DOS prompt:

```
runhost test
```

The program named on the command line can be a
batch file. The contents of the file will be

COMMAND SUMMARY

executed by the host. If the file ends with the TURBO command, execution will automatically return to the PCTurbo after executing the contents of the file.

TurboDrive RAM Disk

COMMAND:

RAMDISK.SYS

FORMAT:

Used as a device driver in a CONFIG.SYS file as follows:

**DEVICE=RAMDISK.SYS ssss [dddd]
[/D] [/E] [/X] [/W]**

ssss - Size of drive in kilobytes.

dddd (optional) - Maximum number of directory entries. Adjusting the number of entries will save some memory; allowing more entries allows more files in each RAM disk. (default = 64)

Use either:

/D - to place RAM disk in DOS Memory (default)

- or -

/E - to place RAM disk in Protected Memory

- or -

/X - to place the RAM disk in EMS Expanded Memory

/W - Disables RAM-intact warm boot. (When you specify /W you will not keep the contents of the RAM disk after warm booting.)

DEFAULT:

RAM disks will be placed in DOS Memory. RAM-Intact Warm Boot is active for all RAM disks placed in Protected and EMS Memory (so you won't lose the contents of the RAM disk when warm booting)

USAGE:

As a device driver in a CONFIG.SYS (or TURBO.SYS) file only.

CAUTION:

Data left in a RAM disk will be lost when you turn off the power. For safety:

Use RAM disks for read-only data (programs or data bases that are not being updated).

-or-

Copy the contents of your RAM disks onto fixed or floppy disks as soon as you finish with them.

NOTES:

You can have as many drives as DOS will allow. Consult the manual for the version of DOS you are using. (In DOS 3.0, this number can be changed by placing `lastdrive=n` in your CONFIG.SYS file, where `n` = the letter assigned to the last drive.) Remember that DOS limits the total number of drives, including any fixed and floppy drives that are already installed in your system.

Each drive can be in either DOS, Protected, or EMS Memory on the host or the Turbo. The Turbo can access disks in its own memory and in the host's memory, but the host cannot access disks in the Turbo's memory.

- o To place a RAM disk in the host's memory, place the command in the CONFIG.SYS file. Disks in the host's memory will be available in Turbo mode and host mode.
- o To place a RAM disk in the Turbo's memory, place the command in the TURBO.SYS file. Disks in Turbo memory will be available in Turbo mode only.
- o If a RAM disk is to be in EMS memory, be sure that the EMS device driver appears in the CONFIG.SYS before the RAM disk command.

The best place for a RAM disk is in EMS Memory on the host, if it is available. RAM Disks placed there will not take DOS Memory away from applications running on the host or the Turbo. They will be available in both Turbo and host modes.

If the host does not have EMS Memory, the best place for RAM Disks is in the host's DOS Memory.

Specify only one type of memory (either DOS or EMS) for each drive. You can have some drives in each type of memory.

COMMAND SUMMARY

Use one command line for each drive you wish to install. For example, to install a 120K drive in DOS Memory, a 360K drive in Protected Memory, and a 360K drive in EMS Expanded Memory, use these commands (system has 2 megabytes of EMS on 1 PCturbo 286e and nothing using C000:0):

```
device=ramdisk.sys 120 /d
device=ramdisk.sys 360 /e
device=ramdisk.sys 360 /x
```

RAM-intact warm boot is available only on RAM disks in Protected and EMS Expanded Memory, not DOS Memory. If you have more than one RAM disk in Protected or EMS memory, the first one in Protected or EMS Memory specified in the CONFIG.SYS file will determine the status for all of them.

EXAMPLE:

All examples are CONFIG.SYS files.

All examples using EMS Memory require that the first line of the CONFIG.SYS file is the device driver installing EMS. See the manual for the EMS Memory board you are using.

- 1) 360K RAM disk in DOS Memory:
(maximum of 64 directory entries by default)
(/d is optional because DOS Memory is the default)

```
device=ramdisk.sys 360 /d
```

- 2) 360K RAM disk in EMS Expanded Memory:
(by default: maximum 64 directory
entries; RAM-Intact Warm Boot is active)

`device=ramdisk.sys 360 /x`

- 3) 360K RAM disk in EMS Expanded Memory;
RAM-Intact Warm Boot is disabled; maximum
of 100 directory entries:

`device=ramdisk.sys 360 100 /x /w`

- 4) 100K RAM disk in DOS Memory; 360K and 1
megabyte RAM disk in EMS memory;
RAM-Intact Warm Boot is disabled for both
disks in EMS memory:

`device=ramdisk.sys 100 /d`

`device=ramdisk.sys 360 /x /w`

`device=ramdisk.sys 1024 /x`

NOTE: The order in which the drives are
listed determines the letters they are
assigned. If the above example is used
in a system with two floppy disks, the
drives will be assigned as follows:

the floppy drives	- A: and B:
100K disk in DOS memory	- drive C:
360K drive in EMS memory	- drive D:
1MB drive in EMS memory	- drive E:

TurboCache Disk Caching

NOTE: The cache program is automatically executed by the TURBO.COM command. This description is provided for full reference only. You do not need to type CACHE or place it in the TURBEXEC.BAT file. You may want to use this command to cache programs running on the host.

COMMAND:

CACHE.EXE

FORMAT:

**CACHE a,b,c,... [D=kkkk] [E=kkkk]
[X=kkkk] [/R] [/U] [/D]**

a,b,c,... - Names of drives that will be cached. Specify only fixed disks unless /R is used. The commas between the drive names are optional and can be omitted. Do not leave spaces between the drive names.

D=kkkk - kilobytes of DOS Memory used for caching.

E=kkkk - kilobytes of Protected Memory used for caching.

X=kkkk - kilobytes of EMS Expanded Memory used for caching.

/R - Allows removable media (floppies and removable hard disks) to be cached. When this option is active, simultaneously pressing <Alt>-<Shift>-F will clear the cache buffers.

/U - Uninstalls caching so that more memory is available for your applications program. This option is used only in host mode to remove caching that was installed for a program that was being run on the host.

NOTE: Caching must be the last resident program installed in host mode to use the /U option.

This command is useful if you have a program that must be run on the host and can benefit from caching. You can make a batch file that will install caching, run the program, then remove caching.

/D - Don't install the cache. When you include this option, you will see how the cache would have been configured, but it will not actually be installed.

DEFAULTS:

All drives are cached. The cache will rely on the driver to determine when the media has been changed to flush the cache buffers. If /R is specified (either TURBO /R or CACHE /R), you must press <Alt>-<Left Shift>-F to flush the cache buffers before changing disks.

If a drive is specified but D=kkkk, E=kkkk, and X=kkkk are not specified, all available EMS Expanded Memory will be assigned to caching.

COMMAND SUMMARY

USAGE:

This command is automatically called when you enter Turbo mode. (It can also be placed in HOSTEXEC.BAT or typed from the keyboard in host mode to invoke caching in host mode.)

Caching improves the speed of disks by saving disk data in RAM memory where it can be accessed instantly. Caching is somewhat like a RAM disk that is automatically saved onto a real disk. It is almost as fast as a RAM disk and it is not volatile.

The Orchid CACHE program uses an intelligent algorithm to determine the data that is likely to be needed soon. It keeps this data in memory ready for instant access. It bases its determination on such factors as: the most recently used data; the data that is logically adjacent to it; and data that was recently written to disk.

NOTES:

All available memory on the host system will be allocated for caching while you are using the PCTurbo 286c. When you switch back to the host by typing `unturbo`, the cache will disappear to leave memory for the program you will be running on the host.

Typing `CACHE` with no parameters displays a list of the current configuration.

When /R is specified (either TURBO /R or CACHE /R), press <Alt>-<Left Shift>-F to flush the cache buffers before changing removable media. Always clear the buffers when /R is used:

- 1) Before changing a floppy disk.
- 2) Before changing a removable hard disk, like an Iomega. (The latest version of the Iomega will automatically inform the CACHE program when the disk is changed.)
- 3) When a disk error occurs.

NOTE: Caching removable media, such as floppy disks, requires a great deal of care on behalf of the operator and is not recommended.

EXAMPLE:

These examples can be typed from the keyboard or placed in HOSTEXEC.BAT.

Any example using EMS Expanded Memory requires the EMS device driver to be the first line in the CONFIG.SYS file.

- 1) Cache fixed drive C: using 64K of DOS Memory:

cache c d=64

- 2) Cache removable drives A: and B: and fixed drive C: using 1MB of EMS Expanded Memory:

cache a,b,c x=1024 /r

Print Spooling

COMMAND:

PRTSPOOL.COM

USAGE:

In **HOSTEXEC.BAT** file or typed from the keyboard while executing on the host (host mode).

PRTSPOOL will buffer a program's printer output in memory and hold it until the printer is ready for it. This frees your computer to go on running without waiting for the printer.

The **PRTSPOOL** command can be typed from the keyboard while in host mode. You can add this command to your **HOSTEXEC.BAT** file so that spooling is automatically invoked when you boot your system.

NOTE: You must be executing on the host to invoke **PRTSPOOL** or change its parameters. To switch back to the host, type **unturbo**. (Some options cannot be changed without rebooting, so they can't be typed from the keyboard if **PRTSPOOL** has been invoked by your **HOSTEXEC.BAT** file.)

FORMAT:

For clarity, the options for PRTSPOOL are shown here in four separate groups:

Parallel Port, Serial Port, Memory Allocation, and Page Reprint. When you use them, the Memory Allocation and Page Reprint options can be combined with Serial or Parallel spooling. The examples at the end of this section show some of the combinations.

Spooling Parallel Port -

PRTSPOOL LPTn: - LPTn: indicates the parallel port that is being spooled. LPT1, LPT2, or LPT3 can be specified.

Spooling Serial Port -

PRTSPOOL LPTn:=COMn: /RATE=n, [parity], [databits], [stopbits], [/ON=protocol] [/OFF=protocol]

LPTn:=COMn: - This part of the command indicates that output sent to the parallel port LPTn is being redirected to serial port COMn.

- o The application program (word processor, spread sheet, etc.) should send its printer output to the parallel port specified (LPT1, LPT2, or LPT3).
- o PRTSPOOL will buffer this output and send it to the serial port specified (COM1 or COM2).

When output sent to LPT1 is redirected to a serial port, the device connected to LPT1 will respond as LPT2 and LPT2 will respond as LPT3. The following diagram shows the assignment:

application program sends output to logical port:	output goes to device connected to physical port:
LPT1	COM1 or COM2
LPT2	LPT1
LPT3	LPT2

In the preceding explanation, it is useful to distinguish between logical and physical devices.

- o The logical printer ports are programming conventions that PC-DOS provides.
- o The physical ports can be thought of as the hardware: the connector on the back of your computer and its associated circuitry.

When a program that adheres to DOS conventions has output for a printer, it sends the output to the logical port. DOS then directs the output to the physical port. DOS provides the MODE command to redirect output from a parallel port to a serial port. The redirection described above is similar to the MODE command. It uses the same

syntax; the difference is that PRTSPOOL buffers the output before sending to the physical port.

/RATE=n indicates baud rate, either 110, 150, 300, 600, 1200, 2400, 4800, 9600, or 19200. Typing **/rate=** is optional; you can just type the number.

PARITY (optional) - The first letter after the rate indicates parity; either **n** for no parity, **o** for odd parity, or **e** for even parity. Use a comma to separate it from the other options. The default is even.

DATABITS (optional) - Indicates the number of data bits; either 7 or 8. Use a comma to separate it from the other options. Default is 7.

STOPBITS (optional) - Indicates the number of stop bits; either 1 or 2. Use a comma to separate this option. Default is 2 at a rate of 110 baud, otherwise it is 1.

/ON=protocol and **/OFF=protocol** (optional) - These options turn on and off various protocols, such as:

xon - XON/XOFF
dcd - DCD handshake
dsr - DSR line
cts - CTS line

Default is **DSR** and **CTS** on; **DCD** and **XON/XOFF** off.

Example: `/on=xon` turns on the XON/XOFF protocol.

Memory Allocation Options -

Program Memory - The DOS Memory that PRTSPOOL uses to hold printer output is not available for your application program. If your program requires a large amount of memory, PRTSPOOL can reserve memory for your program.

`/U=kkk` - Reserves at least kkk kilobytes for DOS Memory for the application program. This leaves room for the program you will run after you invoke PRTSPOOL.

The default is 64K, which means that there will always be at least 64 kilobytes of DOS Memory available for your application program.

Check your application program's manual for the amount of memory it requires. If it requires 128K (and you are spooling LPT1:), type:

PRTSPOOL lpt1: /u=128

Spool Buffer Size - A bigger buffer allows bigger printouts to be held in memory. Printouts larger than the buffer can be spooled, but spooling is more efficient if the buffer is larger than the printout. (With a small buffer, the application program will send output to the buffer until it is full; the program will then have to wait until the buffer empties enough to hold the rest of

the output.) Buffers less than 16 kilobytes are not recommended.

/M=kkk - Allocates kkk kilobytes of DOS Memory for buffering the output sent to the printer. The default is 64K. This means that 64K of output can be stored in memory by PRTSPOOL. If your printouts are typically larger than this, specify a larger value. If they are shorter and you wish to save memory for other applications, specify a smaller value.

For example, to spool LPT1 using 100 kilobytes to store output to the printer, type:

```
prtspool lpt1: /m=100
```

/M - When the number of kilobytes is not specified, this option reserves all available DOS Memory for the spool buffer.

To spool LPT1 using all available DOS Memory for holding output to the printer, type:

```
prtspool lpt1: /m
```

NOTE: Once you have invoked PRTSPOOL, you cannot change either of the memory allocation options (/U= or /M=) without rebooting. If you want to change their defaults, leave PRTSPOOL out of your HOSTEXEC.BAT file. You can then type the spooling command from the keyboard including any parameters you want.

Page Reprint Options -

You can stop the printout and restart at the top of the current page or the previous page. This allows you to adjust the paper in the printer and correct paper jams.

Page reprint commands are executed during the printout, but you must use the /B option when invoke PRTSPOOL to enable the reprint feature. (You may also wish to set a page length different than the default 66 lines per page, as shown below.) If you place PRTSPOOL in the HOSTEXEC.BAT file, be sure to include the /B option.

To enable page reprint, type:

```
prtspool lpt1: /b
```

LPT1: is shown as an example; any valid assignment could be used.

/LPP=nn - Page Length: This indicates the number of lines per page of printed output. It helps PRTSPOOL keep track of where pages begin.

PRTSPOOL passes output to the printer with no changes. It keeps track of the number of lines and pages printed (by counting Line Feeds and Form Feeds). This allows you to stop a printout and restart from the beginning of the current page or the previous page.

Most printed output has 66 lines per page. If you frequently print with a different number of lines per page, you can specify it with the option /LPP=. For example, if you use 44 lines per page (and are spooling LPT1), type:

```
prtspool lpt1: /lpp=44 /b
```

Commands Typed While PRTSPOOL is Running -

The following commands can be typed from the keyboard while PRTSPOOL is running to stop and restart printouts:

To stop a printout, type PRTSPOOL/S from the DOS prompt.

To continue where you left off, type PRTSPOOL/C.

* To restart a printout at the beginning of the current page, type PRTSPOOL/R.

* To restart at the beginning of the previous page, type PRTSPOOL/RP.

To stop a printout and purge the print buffer (erasing all data that it holds), type PRTSPOOL/P.

To check the status of your Print Spooling, type PRTSPOOL.

* You must invoke PRTSPOOL with /B before you can use the commands indicated with an asterisk.

COMMAND SUMMARY

EXAMPLES:

These examples can be typed from the keyboard or placed in the HOSTEXEC.BAT file.

- 1) Spooling parallel printer LPT1:

```
prtspool lpt1:
```

By default: the spool buffer is 64K; at least 64K is reserved for the application program; page reprint is not active.

- 2) As above, but spooling LPT2:

```
prtspool lpt2:
```

- 3) Spooling LPT1 with 100K of DOS Memory used as a spool buffer:

```
prtspool lpt1: /m=100
```

- 4) Redirecting output sent to LPT1 to serial port COM1 setting baud rate at 9600:

```
prtspool lpt1:=com1: /rate=9600
```

In addition to the defaults in Example 1, the serial port will be configured with these defaults:

```
even parity  
7 databits  
1 stopbit (110 baud - 2 stopbits)  
DSR and CTS protocol on
```

- 5) Redirecting LPT1 to COM2, setting baud rate at 1200, and setting up a 120-kilobyte buffer to hold printer output:

```
prtspool lpt1=com2 /rate=1200 /m=120
```

EXAMPLES:

The next examples use more advanced options.

- o You can type these commands from the keyboard even if you have already invoked PRTSPOOL.

- 1) Redirecting LPT2 to COM1 with a baud rate of 9600:

```
prtspool lpt2:=com1: /rate=9600
```

- 2) Redirecting LPT1 to COM1 and configuring the serial port to 2400 baud, no parity, 7 databits, 1 stopbit:

```
prtspool lpt1:=com1: /rate=2400,n,7,1
```

- 3) Redirecting LPT1 to COM1 and configuring the serial port to 2400 baud, no parity, 7 databits, 1 stopbit, shutting off the default DCD and DSR protocols and turning on CTS protocol:

```
prtspool lpt1:=com1: /rate=2400,n,7,1  
/off=dcd,dsr /on=cts
```

EXAMPLES:

The final examples use special options that cannot be changed without rebooting.

- 1) Spooling LPT1 using all available DOS Memory for buffering printer output:

```
prtspool lpt1: /m
```

- 2) Spooling LPT1 reserving at least 128 kilobytes of DOS Memory for your application program:

```
prtspool lpt1: /u=128
```

- 2) Spooling LPT1 setting up a 120K spooling buffer and reserving at least 256K of DOS Memory for your application program:

```
prtspool lpt1: /m=120 /u=256
```

- 3) Redirecting LPT1 to COM1; configuring the serial port to 9600 baud, even parity, 8 databits, and 1 stopbit; setting up a 120K spooling buffer; reserving at least 256K of DOS Memory for your application program; and enabling page reprints:

```
prtspool lpt1:=com1 /rate=9600,e,8,1 /m=120  
/u=256 /b
```

INTERACTIVE BATCH FILES

The ASK Command

NOTE: You do not need to know how this command works to use the Turbo. It is documented here because it is a handy command you may want to use in your own batch files.

FORMAT:

ASK [/R] message

ARGUMENTS:

/R (optional) - Requires a carriage return after the response. The user must press <Enter> after typing Yes or No.

message - The message will be displayed during batch file execution. This will usually be a question with a Y/N answer.

USAGE:

Can be used in batch files you create to ask the user if a command should be performed. The message placed after the ASK command will be displayed prompting the user to respond by typing Y or N (and pressing <Enter> if /R is specified).

Typing Y (upper or lower case) in response to the question will cause ASK to set the DOS error level to 1. This does not mean that an error has occurred, simply that a variable called error level is set to 1.

The next line of your batch file should contain the command that will be executed if the appropriate errorlevel is returned. You can indicate commands that will be executed if the response is yes or no. See the examples below for the correct usage.

EXAMPLE:

Batch file to display a directory of the currently logged drive if you answer yes:

```
echo off
ask Do you want to see a directory?
if errorlevel 1 dir
echo on
```


ISHOST and ISTURBO Commands

Format:

**ISHOST
IF ERRORLEVEL 1**

Usage:

In AUTOEXEC.BAT or any other Batch File.

Both the host and the PCTurbo load the AUTOEXEC.BAT file once upon starting up. However, not all commands in the AUTOEXEC.BAT need to be executed in both modes. For example, if the AUTOEXEC.BAT contains a command line that selects a printer redirection using the MODE command, it should only be invoked by the host. Invoking it again in the Turbo Mode may cancel out the redirection. There are several other situations where you may need to precede a command line in the AUTOEXEC with either the ISHOST or ISTURBO command. These commands allow you to determine which mode the computer is in and then proceed with the next step or skip to the one after it.

The easiest way to accomplish this separation of host mode and Turbo mode is to use the HOSTEXEC.BAT and TURBEXEC.BAT files. However, there are some advanced applications where it might be preferable to use the AUTOEXEC.BAT exclusively.

Both the ISHOST and ISTURBO commands take no arguments. Their output is in the form of the DOS Batch "errorlevel" value. The errorlevel will be set at 1 if the last command returned

a true condition or a 0 for a false condition. The command line is usually followed by a conditional command, which will be executed if the ERRORLEVEL is as specified.

ISHOST - The errorlevel will be set to 1 if the batch file was executing on the host or a 0 if it was on the Turbo.

ISTURBO - The errorlevel is set to 1 if the batch file is executing on the Turbo, or a 0 if it was in the PC Mode.

NOTE: Refer to the DOS manuals for details in using the errorlevel commands. Because the errorlevel command tests for values equal to or greater than the value specified, you should never test for 0. Always use

IF NOT ERRORLEVEL 1 ...

instead of

IF ERRORLEVEL 0 ...

Here's an example of a Batch File:

```
echo off
isturbo
if errorlevel 1 echo EXECUTING ON THE PCturbo
isturbo
if not errorlevel 1 echo EXECUTING ON THE PC
```

This batch file can be executed on either the PC or PCturbo and will display the appropriate message.

COMMAND SUMMARY

Here's another example. Say you wanted to set a display mode, go into turbo mode, and then execute a program called MYPROG. Your batch file might look something like this:

```
echo off
date
prompt $p$q$g
ishost
if errorlevel 1 MODE C080
ishost
if errorlevel 1 TURBO/P
isturbo
if errorlevel 1 MYPROG
```

Using the ISHOST and ISTURBO commands to determine which CPU is currently running, the batch file can take the user through all the steps of getting started every morning without having to remember which commands are needed or their sequence. Together with the ASK command, fully customized batch files can be setup easily for all your boot diskettes.

**APPENDIX C - FILES USED BY THE
PCturbo 286e**

HOSTEXEC.BAT I
TURBEXEC.BAT I
TURBO.SYS I
TURBODEV.SYS C

TURBO.COM C
UNTURBO.COM C

ASK.COM C
ISTURBO.COM C
ISHOST.COM

CACHE.EXE C
RAMDISK.SYS C
PRTSPOOL.COM C

INSTALL.EXE

- I - Created by INSTALL (Not on distribution disk)
- C - Copied from distribution disk to boot disk by INSTALL

Minimum number of files for the standard system created by INSTALL:

AUTOEXEC.BAT
HOSTEXEC.BAT
TURBO.COM
TURBO.SYS
TURBODEV.SYS
TURBEXEC.BAT
ASK.COM
ISTURBO.COM

APPENDIX D - REPLACING THE PCturbo 186 WITH THE PCturbo 286e

If you are replacing Orchid's PCturbo 186 with the PCturbo 286e, follow these procedures:

1. Remove the PCturbo 186
2. Erase all copies of the following files on your boot disk:

TURBO.SYS
TURBO.COM

3. Install the PCturbo 286e using the procedures described in the sections titled **HARDWARE** and **SOFTWARE INSTALLATION**.
4. The **INSTALL** program may ask if you want to overwrite the old Turbo files or quit. Answer **Yes** to overwrite the old Turbo files.

APPENDIX E - HOST and TURBO

The INSTALL program will copy the commands in your AUTOEXEC.BAT file to the HOSTEXEC.BAT file. These commands will execute on the host when you boot the system. You may want some of these commands to run on the Turbo so that they will be available in Turbo mode. To make a command automatically execute on the Turbo, copy it to the TURBEXEC.BAT file. It is a good idea to try running the command on the Turbo before placing it in the TURBEXEC.BAT.

- o Some commands run only on the host, and should be left in the HOSTEXEC.BAT file. The DOS command MODE is an example.
- o Most memory resident programs, like SideKick, should be placed in the TURBEXEC.BAT file.
- o If you mainly operate in Turbo mode, move as many commands from the HOSTEXEC.BAT to TURBEXEC.BAT as possible. This will leave the host's memory free for caching, RAM disks, and print spooling.

APPENDIX F - COMPATIBILITY

SOFTWARE

PCturbo 286c provides one or two megabytes of memory compatible with DOS, Protected Memory, and the Lotus/Intel/Microsoft Expanded Memory Specification. Programs using these types of memory will run on the PCturbo 286c if there are no other conflicts.

PRTSPOOL is compatible with programs that output to the printer through DOS. Some software ignores DOS and writes directly to the output port. This is very common when a piece of software sets its own parameters for the serial port or implements its own spooling. Usually this conflict can be avoided by having the application program output to the parallel port and using PRTSPOOL to redirect the output to the desired serial port.

CACHE.EXE works with all fixed disks that are compatible with DOS 2.0 or higher.

The PCturbo 286c is compatible with the latest versions of Advanced Super Lock copy protection from Soft Guard Systems, used by Lotus 1-2-3 Release 2 and Symphony Version 1.1. The Turbo is too fast for the timing requirements of earlier versions of Superlock. Early releases (dated 1984 or earlier) of dBASE III Version 1.1 or Framework Version 1 should be updated.

NOTE: Only the floppy-disk versions have trouble. Once the program has been installed on a hard disk it will work properly. Install the program on the hard disk in host mode. From then on, you can run it in Turbo mode.

HARDWARE

PCturbo 286e requires the exclusive use of one of the host's interrupt lines, either IRQ2, IRQ3, IRQ5, or IRQ7. The interrupt chosen for the PCturbo 286e cannot be used by other peripherals in the host system.

The PCturbo 286e uses eight consecutive I/O addresses. The default is 300 - 307 hex.

The 80287 math chip uses one of the Turbo's interrupts, either 5 or 7. This does not conflict with devices in the host system using either of these interrupts.

The PCturbo 286e uses a 64K block of the host's memory for dual port memory. It can be located at either A000:0, B000:0, C000:0, D000:0, or E000:0. The INSTALL program will check to see which one of these blocks is available.

The current version of the Turbo does not work with networks, but the Turbo can be in a system that is on a network as long as you do not enter Turbo mode while on the network.

The standard Turbo does not run AT-specific software, such as UNIX and programs that use AT I/O hardware. The current version does not allow multiple Turbos in the same system.

The PCturbo 286e will work with the Enhanced Graphics Adapter when the EGA is emulating the standard graphics adapter, but it does not work in high-resolution graphics mode with the Enhanced display.

Programs running on the Turbo can't use EMS Memory on the host.

USING WITH OTHER CARDS

PCturbo 286e can be used in the same system with peripheral cards made by other manufacturers if there are no conflicts of I/O or interrupts.

Use IRQ5 when installing the PCturbo 286e in the Compaq 286 Portable.

APPENDIX G - MESSAGES

Program may not be compatible with 80286 Processor

There are two possible causes for this message:

- o The applications program you are running uses instructions that are not supported by the 80286 processor. Ask your dealer if there is a version that is compatible with the IBM AT or run the program on the host.
- o If you are a programmer developing software, this may indicate a bug in your software.

80287 Numeric Processor installed

If you have installed the 80287 math chip, you should see this message when you first enter Turbo mode. If you do not see it, check the 80287 IC and the jumpers.

Cannot Access 286 Card. Please check all board jumpers and try again.

This means that the system cannot find the dual port memory or the I/O address.

- o Check the I/O jumper setting.
- o Check that the card is securely seated in the host.
- o Re-run INSTALL, making sure that the I/O address you enter corresponds to the I/O jumper setting.

286 Card not Responding. Please check all board jumpers and try again.

This means that the system cannot access the PCTurbo 286e at all.

- o Check all jumper settings.
- o Check that the card is securely seated in the host.
- o Re-run INSTALL, making sure that you enter the correct jumper settings.
- o Check that the interrupt line selected for the PCTurbo is not used by any other board in the system.

STARTUP ERROR - Not enough memory to load

This means that the host does not have enough memory. The PCTurbo 286e requires at least 128K of memory on the host.

HARDWARE ERROR (PARITY CHECK)
has occurred.

This error requires that the machine be RESET.

You should REBOOT the system IMMEDIATELY.

This message indicates a parity error on the
PCturbo 286e. You should reboot by pressing
<Ctrl>-<Alt>-.

If you want to try to save your work, press
F1, save your work on a blank, formatted
floppy, then reboot immediately.

CAUTION: It is very risky to continue
working after seeing this message.
Reboot as soon as possible. Even the
disk you use to save your work is at
risk, so use a disk that doesn't contain
any valuable files.

APPENDIX H - TURBOBUS PINS

<u>P5</u>	<u>SIGNAL</u>	<u>P6</u>	<u>SIGNAL</u>
01	D14	01	AL8
02	D15	02	-MWTC
03	D12	03	A14
04	D13	04	A15
05	D10	05	A19
06	D11	06	A18
07	D08	07	A17
08	D09	08	A16
09	IOD7	09	PBA0
10	-LBHE	10	BS1
11	IOD6	11	AL3
12	-MUX	12	AL4
13	IOD5	13	AL5
14	-IORC	14	AL6
15	IOD4	15	AL7
16	-IOWRTDLY	16	IR7
17	IOD3	17	IR5
18	-IOWC	18	PBA1
19	IOD2	19	IR4
20	-IORDDLY	20	LEN
21	IOD1	21	PBA2
22	DAUGHRDY	22	PBA3
23	IOD0	23	PBA4
24	-DAUGHCS	24	PBA5
25	A20	25	PBA6
26	ABEN	26	PBA7
27	ABON	27	PBA8
28	-MRDC	28	PBA9
29	BUSPCK	29	PBA10
30	-S0+-S1	30	PBA11
31	-SYSRES	31	PBA12
32	IR2	32	PBA13
33	-IOS16	33	A23
34	IR3	34	A21
35	+5V	35	A22
36	+5V	36	-S1
37	GROUND	37	CLK
38	-BHE	38	-BUSMEMEN
39	GROUND	39	M/-IO
40	LM/-IO	40	-S0

APPENDIX I - I/O, MEMORY, and INTERRUPT TABLE

I/O Address

Jumper set - 8 consecutive addresses,
ending in 0 or 8 in hexadecimal notation.
Factory set to 300h.

Used For:

Communicating with the host system.

Memory

64K block starting at either:
A000:0, B000:0, C000:0, D000:0 or E000:0

Used For:

Dual Port Memory for communicating with
the host system

Interrupt

IRQ 2 or 3 or 5 or 7

Used For:

Communication with the host system

APPENDIX J - SPECIFICATIONS

Hardware

- Function:** Software accelerator, Coprocessor type; runs IBM programs
- Host:** IBM-PC, XT, AT, or compatible computer with 128K of memory; single long slot required
- CPU:** 80286
- Clock:** 8MHz, no wait states
- Memory:** 120 nanosecond, 256Kb DRAM chips, dual ported with two-bank interleaving; 1MB Standard, Additional 1MB optional, EMS compatible
- Math:** 80287 math coprocessor socket; selectable 5 or 8 MHz clock
- Host I/O:** All I/O to standard peripherals handled by host computer
- I/O Bus:** Host accesses shared Turbo memory via 8-bit data path of PC bus
- TurboBus:** Dual 40-pin ribbon cable connectors extend all major CPU and bus signals to daughter card and/or other peripheral cards, or to other Turbo boards.
- Control:** Interrupt and I/O lines to/from host are user configurable; 64K window into Turbo memory set by the INSTALL program. (See Appendix I)

P C t u r b o 2 8 6 e

PC Board: 6-layer with ground and power planes
for noise immunity

Max #: Up to 4 Turbo boards in a system,
depending on power and cooling

Size: 13.5" X 4.5" X 7/8"

Power: 13 Watts (2.75 Amps at 5 Volts) with
1 MB without the 80287.

17.5 Watts (3.5 Amps at 5 Volts),
max with 2MB RAM and 80287 (may
require additional cooling or
stronger power supply);

Temp: Operation from 0 to 70 degrees C
Storage from -40 to 100 degrees C

Humidity: Operation from 25% to 80%
Storage from 0% to 95%

SPECIFICATIONS

Software

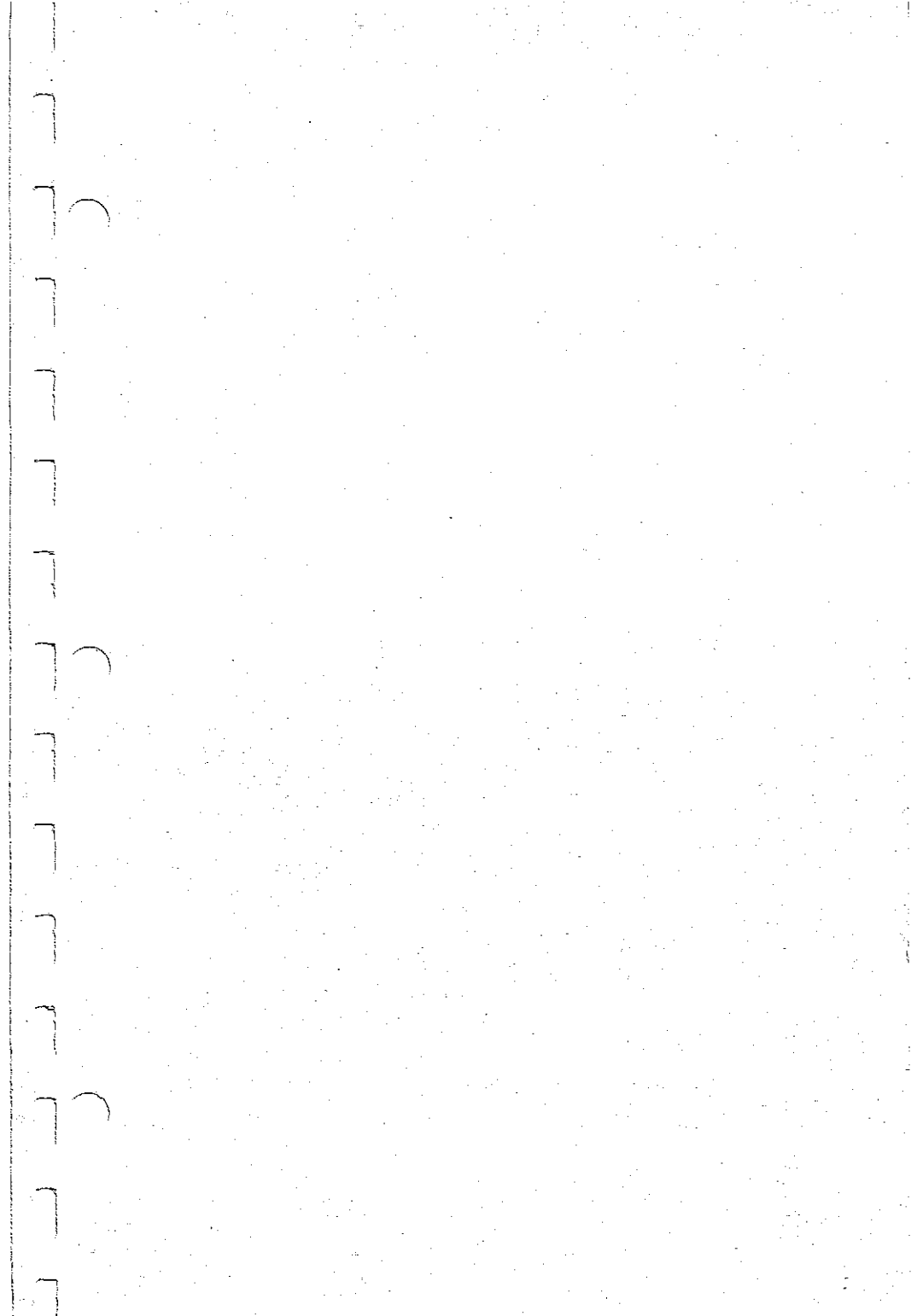
- Installation:** Program for first time configuration, user friendly
- Operation in PC/XT:** Host program to handle I/O in an XT host for single Turbo
- Operation in AT:** Host program to handle I/O in an AT host
- Emulation:** Turbo normally emulates IBM XT; Optional emulation of IBM AT allows Turbo to run UNIX
- Multiple Turbos:** Optional host and emulation software to coordinate operation of multiple Turbos in host computer.
- Productivity Software:** Disk Cache, Print Spool, and RAM Disk software standard

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ONE-YEAR WARRANTY

PCturbo 286e comes with a one-year hardware warranty. The accompanying booklet, Commitment to Support, explains the warranty in detail, as well as many other aspects of Orchid's customer-protection policies. Please consult this booklet for warranty information.

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