

Tiny Turbo 286

ONE-YEAR WARRANTY

TinyTurbo 286 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.

OF GENERAL INTEREST

Orchid Technology manufactures a range of innovative add-on products for PCs, XTs, ATs, and compatibles.

In addition to the Pcturbo 186 and Pcturbo 286e accelerators/coprocessors, Orchid products include ECCELL, Conquest, and CramRAM multifunction boards with EMS Memory and other unique features; PCnet, the leading low-cost local area network; and a full line of high-performance graphics products.

Orchid has a reputation as a leading high-technology company with a commitment to excellence and customer support.

Tiny Turbo 286™ User's Manual

High-Speed Half-Slot Accelerator for PCs, XTs and 8088 Compatibles

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WARRANTY INFORMATION

The booklet packed with your board, Commitment to Support, contains information on these important legal matters:

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

Please consult this booklet to find your rights and responsibilities in these matters.

Please send in the **Warranty Card**. It allows us to process any warranty repair more quickly and it allows us to notify you of offerings for preferred customers, software and hardware upgrades, and new-product announcements. Finally, it helps us to understand more about your computing needs so that we can design more powerful and useful products in the future.

We want to establish a lasting customer relationship that can benefit both of us for years to come. So please take a few moments now to fill in your registration card.

Your Comments

If you have any comments about the product or its documentation, or have a compatibility problem, please write and let us know. Our product management and technical support groups are standing by to serve you.

INTRODUCTION

Congratulations on your purchase of Orchid's TinyTurbo 286 High-Performance Accelerator for IBM PCs, XTs, and 8088-based compatibles. The TinyTurbo was designed to give you AT performance at a very affordable price.

The TinyTurbo 286 speeds up your system by replacing its 8088 processor with an 80286--the same processor used by the IBM AT. TinyTurbo's advanced design makes your system run faster than the AT.

For complete compatibility, TinyTurbo allows the 8088 to remain in your system. With the 8088 plugged into the socket on the TinyTurbo, you can switch back to normal operation if you happen to encounter a program that requires the exact characteristics of the original PC.

INSTALLATION

The TinyTurbo 286 works in computers that are hardware compatible to the IBM PC and IBM XT, and that contain an 8088 microprocessor on a socket. TinyTurbo fits in a normal IBM expansion slot and uses the host computer's 8088 socket. It consumes about 7 Watts of power.

CAUTION: Do not install the TinyTurbo in a computer that contains an 8086, 80186, or 80286 microprocessor. You might damage the TinyTurbo.

JUMPER SETUP

Before installing the TinyTurbo in your computer, make sure the jumpers are set for your configuration.

The factory configuration of the TinyTurbo is as follows:

- o 5MHz 80287 math chip
- o Caching enabled
- o A host computer with 640K of memory

You can change the configuration by moving the jumpers as required. The jumpers on the TinyTurbo are clearly marked. Their functions are given below.

To install a jumper, the black plastic sleeve must cover two opposite pins, with a pin in each hole of the sleeve. If it is hard to get a grip on a jumper, try using the IC extractor tool that comes with your TinyTurbo.

80287 MATH COPROCESSOR CHIP

The TinyTurbo 286 comes with a socket for an 8MHz or 5MHz 80287 math chip. To install it on the board, follow these steps:

1. Insert it in the socket so that the indentation on the end of the top surface of the chip is at the same end of the socket as the socket's indentation.
2. Make sure all of the pins are aligned with their corresponding holes in the socket and press down firmly.

Be careful not to allow any pins to bend. If you bend some, be careful straightening them, because the pins can only be flexed a few times before breaking.
3. Install the jumper on the pins that correspond to the 80287's clock frequency, either 5MHz or 8MHz.

The chips are usually marked as follows:

8MHz - 80287-8
5MHz - 80287-3 or 80287

CACHE DISABLE/ENABLE (W1)

This jumper will normally be left in the factory-default setting with W1 installed so that caching is enabled. It will need to be removed for operation in some of the less compatible workalikes.

- o With cache enabled (W1 installed) the TinyTurbo runs programs in its cache memory for highest performance.
- o With cache disabled (W1 removed), TinyTurbo runs programs in normal PC memory, without caching.

HOST COMPUTER MEMORY SIZE (W2-W5)

These jumpers are needed if caching is enabled. They tell the TinyTurbo how much host memory to cache.

NOTE: If you set the jumpers for more memory than the host computer contains, the TinyTurbo will not pass the power-on or cold-boot self test.

Set the jumpers equal to the amount of host memory. The jumper settings are:

Host Memory	Jumpers 2 3 4 5	1=installed 0=removed
64K	0 0 0 0	
128K	1 0 0 0	
192K	0 1 0 0	
256K	1 1 0 0	
320K	0 0 1 0	
384K	1 0 1 0	
448K	0 1 1 0	
512K	1 1 1 0	
576K	0 0 0 1	
640K	1 0 0 1	- Default

The factory default is for 640K.

CABLE LENGTH

The TinyTurbo 286 comes with a 3" cable that connects the Turbo to the PC's 8088 microprocessor socket. Three inches is sufficient for the IBM PC or XT.

NOTE: Some computers require a longer cable because the 8088 socket is farther from the TinyTurbo. An example is the Compaq portable. Orchid provides a 15" cable for such computers. Order the cable using the following part numbers.

Length	Part Number
3"	TM-421-03
15"	TM-421-15

INSTALLING IN YOUR COMPUTER

In this procedure, you will remove the PC's 8088, put it on the TinyTurbo, plug the Turbo's cable into the 8088 socket, and plug in the Turbo.

NOTE: TinyTurbo 286 only works in computers that use 8088 microprocessors.

1. Remove the 8088 from the PC. Use the removal tool supplied with the Turbo or small screwdriver.

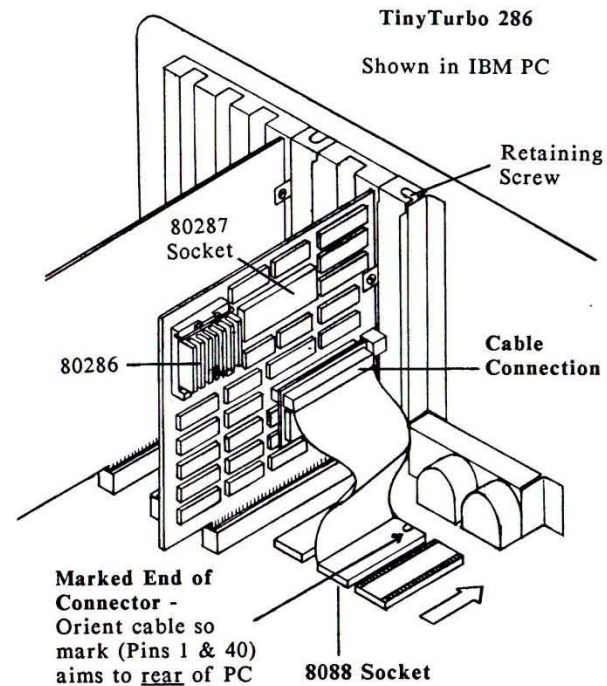
CAUTION: Do not pry up at too much of an angle. Be careful not to bend the pins.

2. Plug the 8088 into the socket on the TinyTurbo's small daughtercard. Make sure the indentation on the end of the 8088 is at the end of the socket marked Pin 40.
3. Plug the TinyTurbo cable into the 8088 socket on the PC.

NOTE: The cable has a mark on the connector indicating Pin 1 and Pin 40. Plug in the cable so that this mark aims toward the indentation on the 8088 socket.

In the IBM PC or XT the marking (on Pin 1 and Pin 40) will aim toward the rear, as shown on the next page.

4. Slide the TinyTurbo into the expansion slot closest to the PC's 8088 socket (J7 or J8 in the IBM XT).



5. Plug the other end of the TinyTurbo cable onto the double row of pins on the TinyTurbo.

If installed properly in an IBM PC or XT, the cable will not have a twist in it.

6. Secure the TinyTurbo by fastening the retaining screw into the adapter bracket and put the system back together.

VERIFICATION TESTING

To verify that the TinyTurbo 286 is working properly, turn on the computer and watch it go through a memory test and load the operating system from the disk. If this process works, you have verified that 95% of the TinyTurbo works.

To verify that the 80287 math coprocessor works (if one is installed), run a program that uses it. If you do not know which program to run, contact Orchid for help. (MS-DOS does not use the 80287 for its own functions, but some programs running under MS-DOS programs do.)

PROBLEMS WITH REINSTALLATION

You can remove your TinyTurbo 286 and reinstall it in another computer. We recommend against frequent reinstallation because of the chance of damage to the Turbo's cable due to flexing. Frequent flexing can prematurely break one of the connectors and render the cable useless. If you reinstall your Turbo and it doesn't work, suspect the cable or the new host computer.

OPERATION

There are no new procedures to learn to operate the TinyTurbo 286. Once TinyTurbo is installed, your system will work just the way it did before, only faster.

THE TURBO SWITCH

TinyTurbo has a switch on the back of the metal adapter bracket. This switch allows you to change back to normal PC operation for timing-sensitive software like games and some copy-protection programs.

UP = TURBO (80286) mode
DOWN = PC (8088) mode

In the up position you are running on the Turbo's 7.2 MHz 80286 CPU; in the down position you are running on the PC's 4.77 MHz 8088 CPU.

The Turbo switch acts like a reset switch: When you flip the switch, the system waits two seconds and does a cold boot.

This is a useful feature if a program crashes and pressing <Ctrl>-<Alt>- won't cause a warm boot. Simply flip the switch back and forth to reset the system. This is better for the PC than flipping the power switch.

CAUTION: Do not flip the Turbo switch while you are running a program unless you have saved your data to disk.

TURBO VERSUS PC MODE

Normally, you should be operating in Turbo mode, with the Turbo switch in the up position. This allows your PC to run faster than an IBM-AT in compute-intensive operations. Speed may vary because some applications do not allow the Turbo to take advantage of its internal high-speed cache memory.

Occasionally, you may have trouble running some timing-sensitive programs. Examples are games and older copy-protected programs from floppy disk. For these programs, you should flip the Turbo Switch to the down position to cold boot the computer, and try again.

COMPATIBILITY

Aside from copy-protected programs and some games, TinyTurbo is not known to be incompatible with any software. Should compatibility questions arise, please call Orchid.

Games

Most games are compatible with the TinyTurbo, but, like all software, they run much faster on the TinyTurbo. To run them at their normal speed, simply switch back to PC mode by putting the switch on the adapter bracket in the **down** position.

Copy Protection

Install copy-protected programs onto your hard disk (if one is available) while in PC mode, then switch to Turbo mode so you can run the programs from hard disk rather than floppy.

Compatibles

Changing the cache jumpers will cure some hardware incompatibilities. Removing jumper W1, to disable caching, allows the TinyTurbo to run in some compatibles in which it would not otherwise work.

Boards from Other Manufacturers

Adapter boards that manipulate the memory below 640K may conflict with TinyTurbo's caching. To avoid this conflict, either:

- o Disable caching by removing jumper W1. You will not get the benefits of TinyTurbo's caching, but your system will still run much faster than a normal PC.
- o Set TinyTurbo's jumpers W2 - W5 to indicate a memory size below the addresses used by the conflicting board.

For example: If the other board uses addresses between 512K and 640K for a non-standard version of EMS Memory, try setting the TinyTurbo's jumpers for 512K of system memory.

READ ME

TinyTurbo 286tm

Update Bulletin

The Latest Information On:

- ▲ Compatibility with other products
- ▲ Troubleshooting procedures
- ▲ Documentation updates

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TinyTurbo 286 Update Bulletin

INTRODUCTION

February 3, 1987

Dear Orchid Customer:

This Update Bulletin is designed to bring you important compatibility information, specific changes, and additions concerning your Orchid product. It provides the latest information to help you further optimize your product's performance.

TC-401-UB4

TinyTurbo Installation

Installing the Cable

Be careful when installing the cable.

- Both ends of the cable must be installed exactly as described in the manual. The marking on the cable aims toward the indentation on the 8088 socket, which is toward the rear of an IBM PC.
- Be sure that every pin is in its socket.

Unusual Conditions When Cold-Booting

Problem: Your computer will switch into 80286 mode but will not cold boot (or switch) into 8088 mode.

- This is an installation error. The 8088 is installed incorrectly, usually backwards. The 8088 processor should be installed with the notch towards the board's adapter bracket (or "fill-plate").

Installing in Slot J7 or J8 of an XT

TinyTurbo comes with a short cable requiring you to install it in one of the slots closest to the XT's 8088 socket, close to the power supply. In the XT, slots J7 and J8 are close enough for the cable to reach. If possible, install TinyTurbo in J7, but not J8.

If You Must Use Slot J8

J8 is the closest slot to the 8088. It is not a normal slot because IBM intended it to be used for connection to an expansion chassis. Therefore, TinyTurbo must be specially configured for installation in J8. Even then, some systems may not operate properly. Here are the ramifications:

Jumper W1 not installed: If W1 is not installed (the factory configuration), some XTs will display an 1801 error message when you cold boot the system with TinyTurbo in J8. You may press the **(F1)** key to continue the boot process and TinyTurbo will work fine in the system. The message indicates that the system thinks the expansion unit is connected but not functioning, but of course this is not so. This is the preferred installation configuration if you receive no error during boot.

Jumper W1 installed: If you receive the 1801 error message during boot, and you do not want to have to press **(F1)** to continue the startup, then you need to install jumper W1. A subsequent topic on Jumper W1 explains how to do this. In some system configurations, however, installing W1 may cause an I/O address conflict with other boards installed.

I/O Address Conflict: The I/O address conflict occurs when another add-in board in your system is commanded via I/O addresses 200-21F. With W1 installed, TinyTurbo uses them to prevent the 1801 error message. These addresses are used by some game ports and some EMS boards. In some systems, you can tell the conflict exists because the EMM driver cannot find the EMS memory during the boot sequence. Check the user manuals for the add-in boards in your system. If you are using TinyTurbo with Orchid's Conquest EMS card or other boards that use those addresses, simply install TinyTurbo in slot J7.

CAUTION: Placing TinyTurbo in slot J8 when using add-on cards that require I/O addresses 200 - 21F hex causes an I/O conflict in IBM XTs. The solution is simply to put TinyTurbo in slot J7 and remove jumper W1.

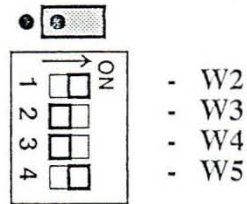
Check the manuals of your other add-on cards to verify that no I/O conflict exists before placing TinyTurbo in slot J8 of an IBM XT. You will void your warranty if you allow such a condition to exist.

TinyTurbo Product Changes

Cache Disable/Enable - Jumper W1

Jumper W1 is no longer used for enabling and disabling the cache. Please disregard the section in the manual on page 4 titled "Cache Disable / Enable." You need not worry about disabling the cache; TinyTurbo should run with the cache enabled for maximum performance.

W1



SW2

Jumper W1 - New Usage

TinyTurbo is shipped from the factory with jumper W1 removed and stored on one of the pins. Leave the jumper in this setting when installing TinyTurbo in IBM PCs and compatibles (or when installing it in IBM XT in a slot other than J8.)

- TinyTurbo installed in the IBM PC or compatibles:
(factory setting)



Place the jumper labeled W1 over *both* of the pins when installing TinyTurbo in slot J8 of the IBM XT.

- TinyTurbo installed in slot J8 of an IBM XT:



Host Computer Memory Size

TinyTurbo 286 is now being shipped with a 4-position DIP switch for host computer memory size. This replaces jumpers 2 through 5 (sometimes referred to as W2 through W5) described on pages 4 and 5 of the TinyTurbo User's Manual.

The DIP switch, labeled SW1, is located next to the adapter bracket near the card-edge connector.

Positions 1 through 4 on the DIP switch correspond to the jumpers labeled 2 through 5.

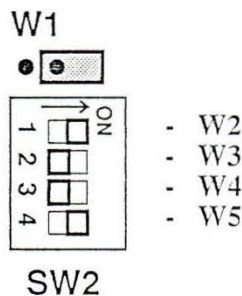
The TinyTurbo is shipped from the factory set for systems with 640K of DOS memory. If your system has a different amount of DOS memory, set the switch as shown below.

To set the switch for DOS memory size:

Slide the switches toward the adapter bracket to put them in the ON position, which corresponds to the what the manual calls "installing" the jumper.

The switch settings are as follows:

Host Memory	JUMPERS:			
	2	3	4	5
64K	off	off	off	off
128K	on	off	off	off
192K	off	on	off	off
256K	on	on	off	off
320K	off	off	on	off
384K	on	off	on	off
448K	off	on	on	off
512K	on	on	on	off
576K	off	off	off	on
640K	on	off	off	on - Default



ON is the same as having the jumper INSTALLED

OFF is the same as having the jumper REMOVED

The factory default is for 640K.