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# TS-DOS

A Disk-Operating System for the Tandy 100, 102, and 200  
and the NEC PC-8201 and PC-8300

## Welcome to TS-DOS

As you may remember, users of Tandy and NEC notebook computers once were faced with a dilemma: limited room for files and no efficient way of storing and retrieving them. Files could be stored only on cassettes—a slow and not very reliable method. Then disk drives were introduced. They greatly increased the flexibility of notebook computers, but the first disk operating systems left much to be desired.

In this vacuum Traveling Software developed TS-DOS so that notebook computer users could realize much more of the potential of their machines. TS-DOS continues to prove itself as one of our most popular programs for notebook computers.

Though it has undergone various changes since its introduction, TS-DOS retains its original design. It provides menus as easy to use as those built into the computer themselves: the user need only move the bar cursor to select a file and then press a function key to perform a particular operation. By adding the tagging feature, we speeded up those operations that involve several files at once: the user need only tag the files to be copied or deleted and then complete the operation with a keystroke or two.

We also made it possible to leave a small portion of TS-DOS resident in RAM for use with TEXT and BASIC files. When this portion is resident, the user can press a function key to copy a TEXT file to and from disk either from within the file (on Tandy computers) or from the main system menu (on NEC computers). Programmers can use this resident portion to access disks through standard BASIC commands.

And now Traveling Software is pleased to make available this version of TS-DOS, which allows notebook computer A users to store their data directly on an IBM-compatible PC, greatly increasing storage size and ease of use.

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## **Section 1: Using This Book**

### **How to Get Started**

If you are like most people, the question on your mind right now is How do I get the program started?

The answer is, it depends. It depends first on whether you intend to use TS-DOS with a portable disk drive or a PC compatible computer. Then it depends on the version of TS-DOS you purchased—whether on the TS-DOS ROM chip or a 3 1/2 inch disk.

As you soon will discover, the pages of this manual explaining the operation of TS-DOS are few compared with those explaining the steps necessary to getting the program started. Because the getting-started pages cover a variety of situations, it is important that you locate the instructions you need; ignore the rest.

Choose the description that fits you and turn to the sections that will get you started:

**You want to use the ROM chip version of TS-DOS with a portable disk drive:** Turn to Section 2. There you will learn how to install the ROM chip in your computer and make TS-DOS available for use.

**You want to use the disk version of TS-DOS with a portable disk drive:** Whether you intend to use TS-DOS by itself or in combination with the Ultimate ROM II or the T-Word/Sardine chip, turn to Section 3. There you will learn how to prepare the disk drive, run TS-DOS off the master disk, and prepare a disk of your own to run the program

**You want to use the TS-DOS ROM chip with BOOSTER-LINK and a PC-compatible computer:** Section 4 will orient you to the use of TS-DOS with your PC-compatible computer. You will be referred to the pages in Section 2 you need to follow for installing the TS-DOS chip and starting the program

**You want to use the disk version of TS-DOS with BOOSTER-LINK and a PC-compatible computer:** Turn to Section 4 for a general orientation to the use of TS-DOS with your PC-compatible computer. There you will be referred to the parts of Section 3 you need to get TS-DOS started.

**You want to use the disk version of TS-DOS with BOOSTER-LINK and the Ultimate ROM II, the T-Word/Sardine ROM chip, or the Sardine Plus ROM Pack:** Turn to Section 4 for a general orientation to the use of TS-DOS with a PC-compatible computer. As that section explains, you must refer to your BOOSTER-LINK manual and to the manual for the Ultimate ROM II, T-Word/Sardine, or the Sardine Plus ROM Pack to get started.

#### **How to Use the Program**

Once you have TS-DOS running you are ready to learn how to use it.

**Section 5:** The TS-DOS File Menus, begins with a brief overview of the TS-DOS program. The remainder of the for files in your computer (RAM files) and the other for section introduces you to the two TS-DOS menus: one files on disk. The function keys available in each menu are listed and explained.

**Section 6:** Using TS-DOS with TEXT and BASIC, explains how to install and use the resident portion of TS-DOS. Whether working with TEXT files or programming in BASIC, you may find that this small portion of the program will meet your needs. Here you will learn how to use SAMPLE.BA, the sample program that illustrates the use of BASIC commands with the resident portion of TS-DOS.

Also in this book ...

**Appendix A:** An alphabetical list of error messages and steps to recover from them.

**Appendix B:** Instructions on removing the TS-DOS ROM chip from your computer.

**Appendix C:** A listing of SAMPLE.BA, the sample BASIC program included on the master disk as an illustration of how to program with TS-DOS.

**Appendix D:** The steps to take to recover TEXT files in the event that you accidentally cold start your computer.

## Terms Used in This Book

Listed below are some terms frequently used in this book.

**Byte:** A unit of information. Example: the word random requires six bytes of memory, one for each character. When this manual specifies that a certain operation requires so many bytes free, look at the number in the lower right corner of your computer's main system menu to determine if you meet the requirement. There are 1,024 bytes in one kilobyte (1K).

**Cold Start:** The process by which all the contents of RAM even the date and time are cleared. After a cold start the main system menu of your computer will show only the BASIC, TEXT, TELCOM, ADDRSS, and SCHEDL files (all located in ROM). Cold starts may happen spontaneously, while you are performing some operation on your computer. Or as a last resort you may have to cold start the computer yourself if it locks up and you are unable to use the keys even after pressing the RESET button.

**To cold start a Tandy computer,** make sure the computer is off and then hold down CTRL BREAK while you press RESET. To cold start an NEC computer, make sure the computer is on and then hold down SHIFT CTRL while you press RESET.

**DIP Switches:** The four small switches on the bottom of many models of portable disk drives which determine the rate of transmission between the disk drive and the computer. (DIP is an acronym for Dual In-line Package.)

**Formatting:** The process that prepares a disk to accept data. Only after a disk is formatted can it be used to store and retrieve files. Note: Formatting a disk also erases any information that may be on that disk. Format only blank disks or disks containing information you no longer want to save.

**High Memory:** The part of RAM used by machine-language and some BASIC programs while they are operating. Files located in high memory do not appear on the computer's main system menu-but they eat up memory just the same.

**K:** The abbreviation for kilobyte, a unit of measure that equals 1,024 bytes. If a file is 4K in size, it contains 4,096 characters, spaces, numbers, and symbols.

**RAM:** Random Access Memory, the part of the computer's internal hardware that makes it possible to store and retrieve information. In this book, RAM is used as shorthand for the part of memory in which document and program files are stored.

**ROM:** Read Only Memory. The contents of a ROM chip are set during manufacture and are permanent unless erased by ultraviolet irradiation. The user cannot modify the chip. Information can be read from a ROM chip but not to it.

## Section 2: Getting the ROM Version Started

### Introduction

Follow the instructions in this section, and you will be ready to use the ROM version of TS-DOS.

Once you complete these instructions, skip sections 3 and 4 and move on to sections 5 and 6 for instructions on how to use the program.

Getting the ROM version started requires three steps:

1. Prepare the disk drive
2. Install the chip in your computer
3. Initialize the chip

If you are used to installing and initializing the Ultimate ROM II chip, you are prepared for the TS-DOS chip. These processes are identical for the two chips.

### **Memory Requirements**

The ROM version of TS-DOS places few requirements on the limited memory of your notebook computer. Unlike the disk version, the ROM version does not require that you store the operating program, DOSXXX.CO, on disk or in RAM. This program resides in the ROM chip and is ready for use whenever your chip is installed and initialized.

When you initialize the ROM chip a small file is created to give you access to the program. Other than the few bytes occupied by this file you may never need additional memory to operate TS-DOS.

If you are using TS-DOS to operate a 200K Tandy Portable Disk Drive or, through BOOSTER-LINK, a PC-compatible computer, there are no additional memory requirements for TS-DOS. But if you are using a 100K Tandy or Purple Computing disk drive, you will need a certain number of bytes free to perform a few operations like renaming a file; the memory requirements for these operations are noted wherever in this manual those operations are explained.

### **Software on Disk**

The disk you received with your TS-DOS ROM chip contains several files, only one of which may interest you. The file named SAMPLE.BA is a sample program that demonstrates the use of BASIC commands with TS-DOS. See Section 6 and Appendix C for more information.

The other files on the disk are intended for use with the disk version of TS-DOS. On the ROM version the functions of these files are performed entirely by the ROM chip. (If these files, see page 3-3).

### **Preparing the Portable Disk Drive**

Follow the instructions below to prepare your portable disk drive for TS-DOS.

If you have a 200K Tandy Portable Disk Drive ignore the first step; this drive has no DIP switches. But if you have a 100K Tandy or Purple Computing portable disk drive be sure to follow the instructions in the first step for turning the DIP switches off.

1. If you have a 100K drive, turn it upside down and locate the small rectangular DIP switch cover. Using a paper clip or the top of a pen, remove the cover and set the four DIP switches to off. Replace the cover and turn the drive right side up.
2. If the disk drive is turned on when you change the DIP switches on your portable disk drive, remember to turn the drive off, wait a few seconds, and turn it on again. The drive will not recognize the new settings otherwise.
3. Connect the disk drive to the computer using the connector cable: the larger end of the cable plugs into the RS-232C port in the rear of the computer; the smaller end plugs into the RS-2320 port in the rear of the disk drive. If either end doesn't go in easily, turn it over and try again. Make the connections secure. Loose connections cause problems!
4. Give power to the disk drive using either four AA batteries or an AC adapter.
5. Turn the ON/OFF switch on the front of the disk drive on. The disk drive is now ready to be used.

### **Installing the Chip**

Follow these steps to install the TS-DOS chip in your computer.

Handle your TS-DOS chip with care. Do not touch the contact pins, and leave the label in place; by removing it, you may destroy the program.

1. Make sure you have exited any application now on your computer and returned to the main system menu. If you are using the Ultimate ROM II chip, remove the chip and its programs before installing the TS-DOS chip. See page 13 of the Ultimate ROM II Installation Guide for instructions.
2. Is there anything in your computer you don't want to lose? Back it up! Something may go wrong, causing your computer to cold start and destroy all of your files. Back up all irreplaceable document files and programs before proceeding.
3. Check the main system menu of your computer; it should have at least one empty file slot and 500 bytes free. Delete files if necessary.
4. Turn the computer off.
5. Turn the computer bottom side up, so that the type on the labels on the bottom is right side up.
6. Locate the ROM module expansion compartment and gently remove the cover.

**Tandy 100:** The ROM module expansion compartment is located at the bottom center of the Tandy 100.

**Tandy 102:** The ROM module expansion compartment is located near the lower right corner of the Tandy 102.

**Tandy 200:** The ROM module expansion compartment is the one at the lower right corner of the Tandy 200.

**NEC PC-8201 or 8300:** The ROM expansion compartment is located at the bottom of the NEC. (Remove the three screws.)

7. Locate the receptacle into which you will place the TS-DOS chip:

**Tandy 100:** The receptacle is the lower of the two in the compartment.

**Tandy 102:** The receptacle is the one on the far right side of the compartment.

**Tandy 200:** The receptacle is the one on the left side of the compartment.

**NEC PC-8201 or 8300:** The receptacle, labeled ROM 1, is the second one from the left side of the compartment.

8. Tandy 100, 102, 200: Evenly and steadily press the TS-DOS chip into the receptacle. If it does not go in easily, turn the chip end for end and try again. There is only one way that the chip will fit into the receptacle properly. The top of the chip should wind up flush with the top of the receptacle.

Though interchangeable with each other, the Tandy 100 and 102 versions of TS-DOS are not interchangeable with that for the Tandy 200. Installing a Tandy 100 or 102 version in a Tandy 200, or vice versa, will cold start the computer and destroy all data in RAM.

**NEC PC-8201/8300:** Hold the TS-DOS chip so that the notch on the chip is toward the small ROM 1 label on the computer, near the receptacle. Align the pins with the receptacle and gently but firmly press the chip into place. Be careful not to bend the pins: they may break! Make sure all the pins are inserted.

9. Replace the cover, turn the machine over, and turn the computer on. If the main system menu

reappears on your computer, the TS-DOS chip is properly seated, and you are ready to initialize it.

If the screen is blank, immediately turn the computer off, return to the ROM module expansion compartment remove the chip, and repeat the entire installation process. If your system has locked up so that the keys are inoperative, press the RESET button on the back of your computer. If that fails, you will have to cold start your computer.

### **Initializing the Chip**

Once your TS-DOS chip is properly installed, you must initialize it before you can begin using the program.

1. Turn your computer on.
2. With the cursor over BASIC, press ENTER
3. Locate the command below that is appropriate to your computer. Type the command and press ENTER:

On the Tandy 100/102: CALL 63013,1

On the Tandy 200: CALL 61167,2

On the NEC 8201/8300: POKE63911,1:EXEC62394

If you have an NEC PC-8201/8300 with more than one memory bank or if you have outfitted your computer with some kind of memory expansion device, you must perform this step for each of the banks in which you want to make TS-DOS available.

4. As soon as you have performed the previous step, you see the TS-DOS RAM File Menu. Turn to Section 5 for an explanation of this menu or press F8 on a Tandy or SHIFT F5 on an NEC to quit the menu.

If the screen is blank immediately turn the computer off, return to the ROM module expansion compartment, remove the chip, and repeat the entire installation process. If your system has locked up so that the keys are inoperative, press the RESET button on the back of your computer. If that fails, you will have to cold start your computer.

### **Restarting TS-DOS**

To restart TS-DOS anytime after the initialization session, place the bar cursor in the main system menu over TS-DOS and press ENTER

The TS-DOS file is created each time the TS-DOS chip is initialized. This small file must reside in the RAM of your notebook computer if you are to have access to TS-DOS.

### **Removing the Chip**

If you want to replace the TS-DOS chip with another chip be sure to delete (kill) it before removing the chip. See Appendix B for detailed instructions.

## **Section 3: Getting the Disk Version Started**

### **Introduction**

If you intend to use TS-DOS to operate a portable disk drive, the instructions in this section are geared specially to you. But if you intend to use TS-DOS in combination with BOOSTER-LINK to operate a PC-compatible drive, please see Section 4 first; only a few parts of this section apply to you.

### **Operating a Portable Disk Drive**

In any version other than the TS-DOS ROM chip, TS-DOS consists of two programs: an operating program and a program that loads the operating program into the high memory of your notebook computer.

The loading program must reside in your notebook computer before you can start TS-DOS. It can reside there as a separate file or as a function built into one of Traveling Software's ROM products, including the Ultimate ROM II and the T-Word/Sardine ROM chip. If you have one of these ROM products the loading program resides in your notebook computer as soon as you install and initialize the chip. If you lack these ROM products you must follow the procedures outlined later in this section for creating the loading program in your notebook computer; you will then activate this program each time you want to run TS-DOS.

The TS-DOS operating program may reside either in your computer or on a 3 1/2 inch disk in the portable disk drive. Most users prefer to keep the operating program on disk and save the limited RAM in the computer for other files, but the decision is yours.

These are the main steps you must follow to get TS-DOS started:

1. Prepare the disk drive
2. Turn TS-DOS off the master disk
3. Prepare a disk to run TS-DOS
4. Run TS-DOS off the prepared disk

In Preparing the Portable Disk Drive you will find important information about your disk drive and how it must be prepared for TS-DOS.

In Starting TS-DOS for the First Time you will learn how to operate the program from the master disk.

In Preparing to Use TS-DOS you will learn how to prepare a disk of your own to operate the program.

And in Running TS-DOS you will learn how to use that disk to run TS-DOS.

#### **Software on the Master Disk**

The TS-DOS master disk contains four files. Note that if you are using TS-DOS with the Ultimate ROM II or T-Word/Sardine, only the last two files — DOSXXX.CO and SAMPLE.BA — are of interest to you.

**BOOT:** The file that loads the TS-DOS loading program, TSLOAD.CO, from disk into RAM. The BOOT file will remain on the disk, never to be loaded into the computer.

**TSLOAD.CO:** The TS-DOS loading program. It loads the TS-DOS operating program into high memory and runs TS-DOS. Size: about 550 bytes.

**DOSXXX.CO:** The TS-DOS operating program. To run TS-DOS you will load this program into the high memory of your notebook computer — either from your portable disk drive or from your PC compatible. The name of this file differs according to the make of your notebook computer:

Tandy 100/102: DOS100.CO

Tandy 200: DOS200.CO

NEC PC-8201/8300: DOSNEC.CO

Size: about 5,200 bytes.

**SAMPLE.BA:** A sample program included to demonstrate the use of BASIC commands with TS-DOS.

Size: about 4,000 bytes.

#### **Preparing the Portable Disk Drive**

TS-DOS operates a variety of portable disk drives. Regardless of the kind of portable disk drive you have, follow these steps to prepare the drive for TS-DOS:

1. Connect the disk drive to the notebook computer using the connector cable: The larger end of the cable plugs into the RS-232C port in the rear of the computer. The smaller end plugs into the RS-232C port in the rear of the disk drive. If either end doesn't go in easily, turn it over and try again. Make the



connections secure. Loose connections cause problems!

2. Give power to the disk drive using either four AA batteries or an AC adapter.

If you have the Tandy Portable Disk Drive 2 (the 200K version) you are ready to start TS-DOS. Since your disk drive lacks DIP switches, ignore any instructions in this section relating to changes in these switches. Note that this drive is referred to as the 200K drive later in this section

If you have the original Tandy Portable Disk Drive (the 100K version) or the Purple Computing disk drive, continue reading for instructions on setting the DIP switches on these disk drives. Note that these drives are referred to as 100K drives later in this section.

### **Setting the DIP Switches**

There are four switches-called the DIP switches-on the bottom of the 100K Tandy or Purple Computing disk drive. Their settings are vital to the operation of TS-DOS.

The DIP switches must all be in the off position when you are operating TS-DOS. But to begin loading TS-DOS the first time many users will have to set the DIP switches temporarily to the on position. Only users of Traveling Software's Ultimate ROM II or the T-Word/Sardine ROM are exempt from this.

If you have the Ultimate ROM II or T-Word/Sardine ROM chip set all the DIP switches to the off position.

If you do not have the Ultimate ROM II or the T-Word/Sardine ROM chip, set all the DIP switches temporarily to the on position. (You will be instructed to reset them once you have completed the initial loading process.)

Follow these steps to set the DIP switches:

1. Turn the disk drive upside down and locate the small rectangular DIP switch cover. Using a paper clip or the top of a pen, remove the cover.
2. Set the DIP switches as instructed above. Replace the cover and turn the drive right side up.
3. Turn the disk drive off for a few seconds and then on again.

If the disk drive is turned on when you change the DIP switch settings, remember to turn the drive off, wait a few seconds, and turn it on again. Otherwise the drive will not recognize the new settings.

### **Starting TS-DOS for the First Time**

You are about to learn how to operate TS-DOS from the master disk. To do so, you must load the operating program, DOSXXX.CO, into the high memory of your notebook computer.

How you load DOSXXX.CO into high memory depends on the form of the loading program you have at your disposal:

- If you have the Ultimate ROM II or the T-Word/Sardine ROM chip, you will use the software on that chip to load DOSXXX.CO into high memory. See Starting with the Ultimate ROM II or T-Word/Sardine, below.
- If you lack the Ultimate ROM II or T-Word/Sardine, you must create the loading program, TSLOAD.CO, in your notebook computer. With that program you can then load DOSXXX.CO into high memory.

Once you have completed either of these sets of instructions, you are ready to prepare your own disk for TS-DOS.

### Starting with the Ultimate ROM II or T-Word/Sardine

You are about to use your Ultimate ROM II or T-Word/Sardine ROM chip to load the TS-DOS operating program into the high memory of your notebook computer.

Make sure you have installed your ROM chip and initialized the programs according to directions in the manual for the chip. Then follow these steps:

1. Check the portable disk drive. If your disk drive has DIP switches, make sure they are all off. The disk drive must be on and connected by cable to the computer.
2. Check your computer. Are there any machine-language programs you cannot risk losing? If so, back them up before proceeding! By installing TS-DOS in high memory, you will very likely remove any other machine-language programs.
3. Look at the back side of the master disk (the side with the round metal circle in the middle). The write-protect tab in one of the corners should be set to let you see through a small window. With the tab set thus, you cannot accidentally destroy files on this disk.
4. Turn the disk over, and with the label end toward you, insert the disk into the drive. The disk will click into place. Press down on the bar just above the disk to close the drive door.
5. In the main system menu of your computer, make sure that you have at least 6,500 bytes free. Kill files if necessary.
6. If you have the Ultimate ROM II place the bar cursor over UR-2 and press ENTER to call up the Ultimate ROM II menu. If you have T-Word/Sardine, place the bar cursor over TWORD+ and press ENTER twice to call up the T-Word file-selection screen.
7. In the Ultimate ROM II menu place the bar cursor over TS-DOS and press ENTER. In the T-Word file selection screen press F7 on a Tandy or SHIFT F2 on an NEC.

The disk access light on the disk drive should light, indicating that TS-DOS is being loaded. After a few seconds, you will see the RAM File Menu of TS-DOS.

(If your computer beeps or if you see a Can't message on the screen see step 4) DOSXXX.CO is temporarily loaded into high memory; it will not appear in the main system menu when you exit the Ultimate ROM II or T-Word/Sardine.

Sometimes when you select TS-DOS, you will see this message: Change HIMEM? (Y/N)? If you have backed up your machine-language programs (step 2), press Y to start TS-DOS. Otherwise, press N, save the programs, and repeat the above steps.

8. Remain in the RAM File Menu and turn to Preparing to Use TS-DOS.

### Booting from Disk

If you do not have the loading program built into the Ultimate ROM II or the T-Word/Sardine ROM chip you must load the loading program, TSLOAD.CO, into your notebook computer from the TS-DOS master disk. Once that program is in your computer you can load the operating program into high memory.

If you intend to operate a portable disk drive rather than a PC compatible, these are the procedures you are about to undertake:

1. Create a BASIC program IPL.BA
2. Run IPL.BA to load TSLOAD.CO into RAM
3. Run TSLOAD.CO to load the operating program into high memory