
TeleVideo® TS 816/40 Computer System Installation and User's Guide



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1. INTRODUCTION

1.1 SYSTEM DESCRIPTION

The TeleVideo TS 816/40 is a compact tabletop multiuser microcomputer which can support up to 16 user stations. An eight-inch Winchester hard disk provides central storage of data for all users, while a tape cartridge allows convenient back-up of the hard disk.

Many combinations of peripheral devices can be attached to the TS 816/40—serial and parallel printers, a service processor terminal, or modem. Figure 1-1 illustrates several of the possible configurations.

1.2 LIMITED WARRANTY

The TS 816/40 is covered by a limited warranty. The terms and conditions of the complete limited warranty are provided in Appendix B.



Read the installation instructions completely before turning on your system. Incorrect installation may void the warranty.

1.3 HARDWARE CONFIGURATION

1.3.1 Hardware Overview

The TS 816/40 is a tabletop computer which contains the following components:

- One 8-inch Winchester hard disk drive

- One tape cartridge drive

Specification details are given in Appendix A.

The TS 816/40 will be referred to as the **service processor**.

1.3.2 Disk and Tape Drives

The TS 816/40 has one 8-inch Winchester hard disk drive and one tape cartridge drive.

The tape drive is located on the left side of the computer. (See Figure 1-1.)

The Winchester disk drive is located immediately to the right of the tape drive.

1.3.3. Disk and Tape Cartridges

The hard disk is permanently sealed in an air-tight enclosure and is not accessible to you. It has a capacity of 42.7 megabytes of unformatted disk storage (formatted 33.2 megabytes). Data can be stored on this hard disk and accessed by all user stations connected to the TS 816/40.

The tape cartridges are 4- by 6-inch cartridges with a capacity of 17.3 megabytes of unformatted storage (formatted 14.5 megabytes). (See Figure 1-2.) The tape cartridges are used for making back-up copies of information stored on the hard disk. The TS 816/40 can use any tape cartridge which meets the specifications given in Appendix I.

Applications programs, text, data, and programs which operate the TS 816/40 can be stored on either the hard disk or tape cartridges.

1. INTRODUCTION

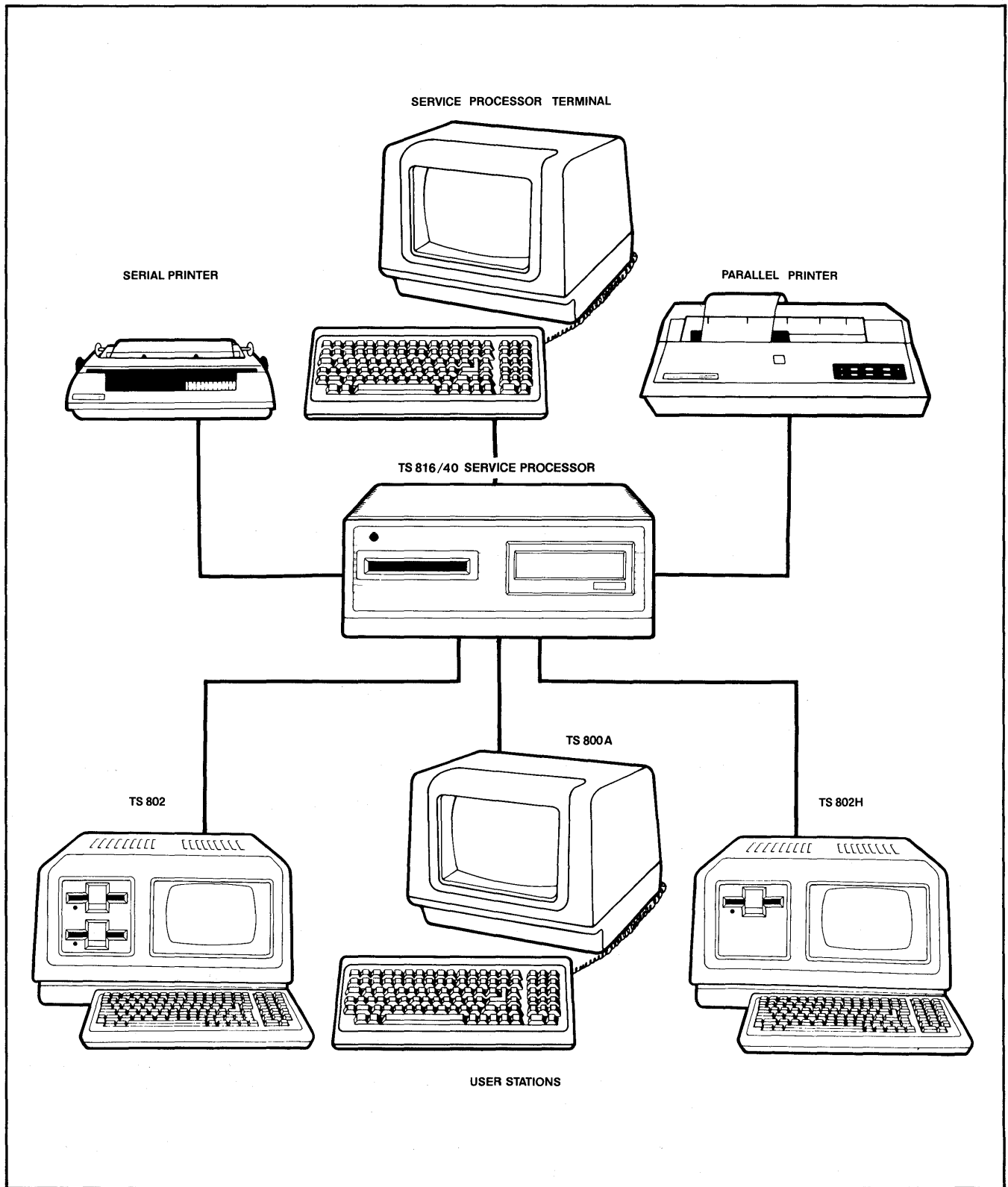


Figure 1-1 Possible TS 816/40 Configurations

1. INTRODUCTION

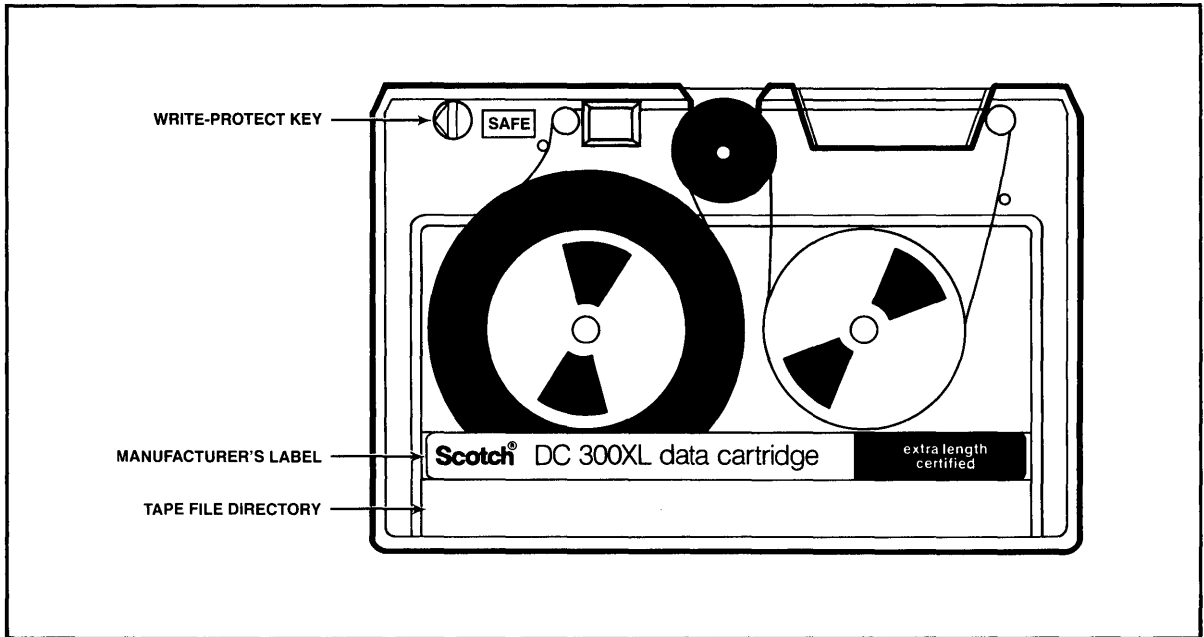


Figure 1-2 Tape Cartridge

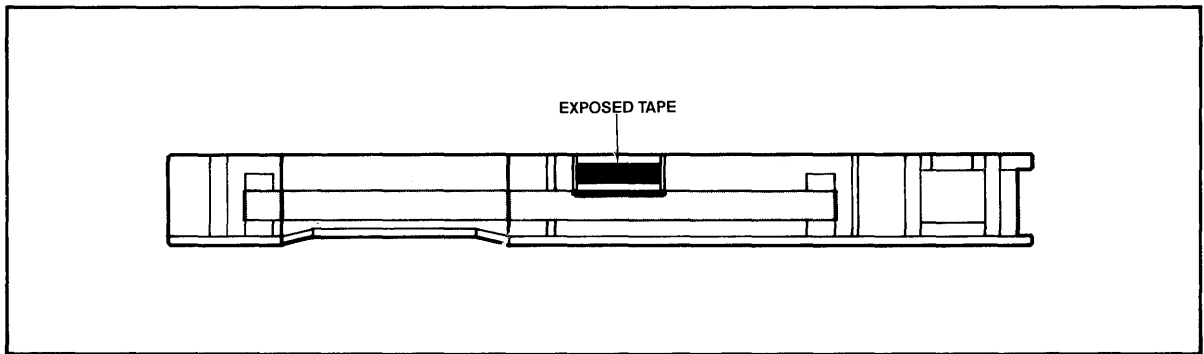


Figure 1-3 Exposed Tape in Tape Cartridge

You can see some of the actual tape inside the cartridge (Figure 1-3). This small portion of the tape is exposed so it can be accessed by the read/write heads in the tape drive. Do not touch the tape since touching it may erase data from the tape.

Figure 1-4 shows the tape cartridge in the removable hard plastic enclosure.

1. INTRODUCTION



Figure 1-4 Tape Cartridge Inside Removable Hard Plastic Enclosure

1.3.4 Peripheral Devices

The ports on the rear of the TS 816/40 allow you to connect a wide variety of peripheral devices.

Up to sixteen user stations can be attached to the TS 816/40. These user stations may (but do not need to) have their own data storage (such as TS 801/802/802H). In addition to the user stations, a service processor terminal is used to run utility programs, run service diagnostics, modify the operating parameters of MmmOST, and monitor the operation of the TS 816/40. A TS 800A/802/802H can operate as a service processor terminal or as a user station. By changing the switch setting on the rear panel of the TS 800A/802/802H, you can use the unit as a user station or service processor terminal. Refer to the operator's manual for location and settings of the switch.

Optional peripheral devices can be shared by all user stations. For hardcopy output, you can connect a serial printer to the port labeled S PRINTER. (This could be a dot matrix, line, or letter-quality printer.) This interface is compatible with most RS232-compatible serial printers currently available on the market, including both character-by-character and buffered printers. This port can be modified for use with another type of serial device.

The port labeled MODEM is configured for use with a modem when the unit is shipped to you.

You can also attach a parallel Centronics-type printer to the P PRINTER port.

Refer to Figure 1-1 where several possible configurations are illustrated.

1. INTRODUCTION



The peripherals described here are all in addition to those which may be connected directly to each user station.

Table 1-1 TS 816/40 Ports

Port	Description
TERMINAL	This 25-pin RS232 port is used to connect a service processor terminal. This port is used for running system utility programs, monitoring the TS 816/40 operation, running service diagnostics, and modifying the MmmOST parameters.
P PRINTER	This 37-pin port can be used to connect a parallel Centronics-type printer.
S PRINTER	This port is configured for use with a serial printer.
MODEM	This port is configured for use with a modem.
RS422	Sixteen high-speed serial ports are available to connect the TS 816/40 to user stations.

1.4 SOFTWARE OVERVIEW

1.4.1 Operating System

Every computer needs instructions in order to operate; these instructions are supplied by a group of programs collectively called the **operating system**.

When the TS 816/40 is turned on, its operating system is loaded into memory from the hard disk and then into the memory of each user station which is turned on. All TeleVideo computers use CP/M (Control Program for Microcomputers) Operating System software, developed by Digital Research.



If you are not already familiar with CP/M, TeleVideo highly recommends that you refer to the reference books listed in Appendix C and become familiar with the basic operation of the CP/M operating system.

When the TS 816/40 is used in a multiuser environment, it also uses a special program called **MmmOST**. MmmOST is an acronym for Multiuser, multiprocessor, multitasking Operating System Technology. MmmOST controls access by the user stations to the files and programs stored in the TS 816/40.

1. INTRODUCTION

1.4.2 Programming Languages

User stations can use any programming language which will run under CP/M. Among these are BASIC, ALGOL, APL, "C," COBOL, CBASIC, FORTH, FORTRAN, MBASIC, PL/I, and RM/COBOL. When these languages are used with MmmOST, modifications which are described in the MmmOST Programmer's Manual allow them to take advantage of the features of MmmOST. In addition, TeleVideo COBOL is available which allows applications programs to be used with MmmOST with little or no modification.

1.4.3 Applications Programs

Applications programs are commercially available for a wide range of tasks, from accounting to security. In addition, you may write your own applications programs in one of the programming languages compatible with CP/M.

Applications programs are normally run in the user stations, not in the service processor.

1.5 USING THE MANUAL

This manual will show you how to successfully install and use your new TS 816/40 regardless of your past experience with computers. Every attempt has been made to present all of the information you will need in a complete and easy-to-understand format.

Your comments about the manual are welcome. To facilitate this, we have provided a Reader Comment Card. Please take a moment to complete and return the card after you have installed your system.

1.5.1 Organization



The manual is organized in the sequence you will need the information. The chapters are as follows:

- 2 Installation: How to unpack and install the TS 816/40
- 3 Operating the Service Processor: How to install CP/M and MmmOST and operate the system
- 4 Operating the User Stations: How to operate user stations in a multiuser environment
- 5 Utility Programs: How to use the tape cartridge and utility programs
- 6 Maintenance and Troubleshooting: How to care for the TS 816/40 and what to do if you have a problem

In the Appendices are the specifications, limited warranty, suggested references, and technical information.

1.5.2 Special Information

Notes will call your attention to information which is of special importance. These categories of notes are used:

1.  General useful information
2.  Important information concerning your safety or possible loss of data. *When you see this, STOP and read the note before proceeding!*

1. INTRODUCTION

1.5.3 Format of Control Commands

Control commands will be shown as ^ plus the control character (e.g., ^C).

1.5.4 Carriage Returns

When you should press the RETURN key on the operator's keyboard, the symbol <CR> for CARRIAGE RETURN will be used. (On Televideo terminals, you can press the ENTER key instead of the RETURN key.)

2. SYSTEM INSTALLATION

2.1 UNPACKING

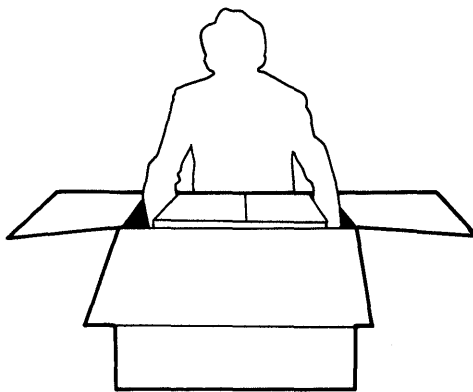
2.1.1 How to Unpack

The TS 816/40 was double-boxed when shipped. Follow the instructions shown here to unpack your system.

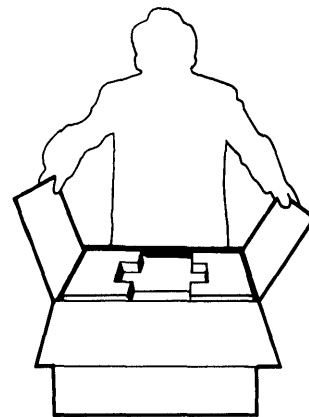


The unpacking process will be easier if two people unpack the TS 816/40.

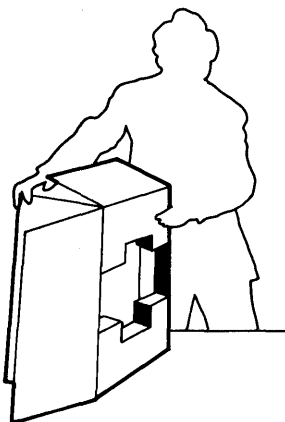
DO NOT USE LONG, SHARP OR POINTED OBJECTS TO OPEN THE INNER BOX AS THEY MIGHT DAMAGE THE ENCLOSED SYSTEM.



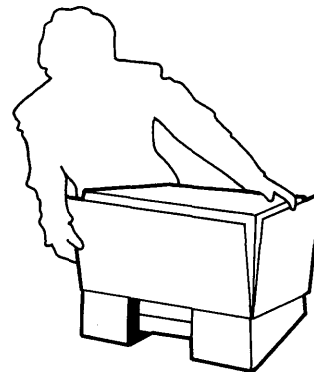
1. After opening outer box, lift inner box containing the TS 816/40. Gently place on floor.



2. Open box containing TS 816/40. There are two plastic foam pieces protecting the system.

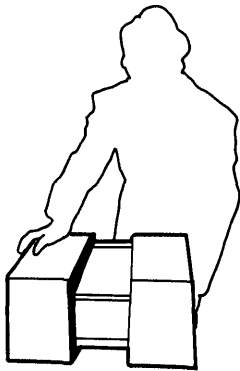


3. Gently turn this box on its side.

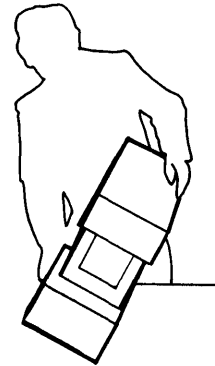


4. Holding the box firmly, gently turn it upside down. Lift the box off the TS 816/40.

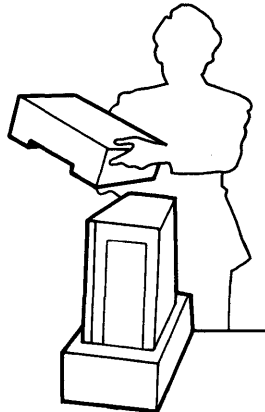
2. SYSTEM INSTALLATION



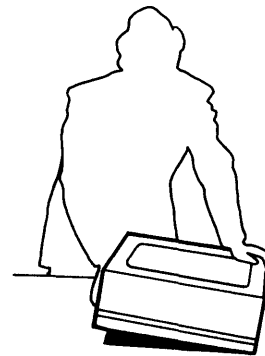
5. TS 816/40 enclosed in two foam pieces.



6. Turn the TS 816/40 (with foam still in place) on its side.



7. Remove the top foam piece.



8. Lift the TS 816/40 away from the bottom foam piece and gently place the TS 816/40 on a sturdy, level table.



Save all packing materials and the cartons in case you need to ship the TS 816/40 in the future.

2.1.2 Checklist of Components

As you unpack, check to make sure you received the following items:

1. TS 816/40
2. Envelope containing the following items:
 - a. TS 816/40 Computer System Installation and User's Guide
 - b. MmmOST Programmer's Manual and software license agreement
 - c. Digital Research CP/M User Manual containing software license agreement and card
 - d. Tape cartridge containing CP/M and MmmOST (referred to as the **system tape cartridge**)

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IF ANY ITEM IS MISSING, CONTACT YOUR DEALER OR DISTRIBUTOR BEFORE PROCEEDING WITH THE INSTALLATION.

2.1.3 Shipping Damage

Check for shipping damage *before* proceeding with the installation. If the system case appears to be damaged, contact your freight carrier immediately. **DO NOT PROCEED WITH THE INSTALLATION IF YOU BELIEVE THERE IS ANY SHIPPING DAMAGE.** If in doubt, contact your dealer or distributor as well as the freight carrier.

2.2 SOFTWARE REGISTRATION

Inside the front cover of the CP/M Manual that accompanies the system is the CP/M Software License and License Agreement, and inside the MmmOST manual is the MmmOST Software License Agreement. Read the agreements and sign them *before* opening the package containing the tape cartridge. Signing the agreement and returning the card will:

1. Entitle you to use the CP/M operating system and MmmOST operating technology on your TS 816/40 and make back-up copies for your own use
2. Register you as a CP/M and MmmOST Owner, allowing you to receive:
 - a. CP/M User's Newsletter
 - b. Notices of updates and enhancements to TeleVideo and Digital Research Software
 - c. TeleVideo and Digital Research Software bug reports and patches
 - d. Discounts on updated versions of Digital Research software



*TeleVideo will provide you with information regarding MmmOST and CP/M updates. **Do not attempt to install any CP/M updates without first contacting TeleVideo.***

2.3 SELECTING THE RIGHT LOCATION

2.3.1 Power Requirements

The TS 816/40 requires a steady supply of power:

- 115 VAC 60 Hertz (domestic) at 3.0 amps or
- 230 VAC 50 Hertz (international) at 2.0 amps



Incorrect or fluctuating line voltages can cause disk error or damage to the system. If you have any doubt about the line voltages at your location, ask your dealer to check out your facility before proceeding with installation.

2.3.2 Physical Requirements

The TS 816/40 and user stations should be within 300 feet of each other. The service processor terminal should be within 50 feet of the TS 816/40. A serial printer should be within 50 feet

2. SYSTEM INSTALLATION

of the TS 816/40. The parallel printer (Centronics-type) should be within 10 feet of the TS 816/40. Refer to the printer instructions for recommended distance.

Leave at least four inches of free space around the enclosure for proper air flow. Place the TS 816/40 on a sturdy, flat, level surface. The dimensions are given in the specifications in Appendix A.

2.3.3 General Environment

The TS 816/40 will operate best at temperatures and humidity levels in which you are also comfortable. Sudden and drastic temperature changes may adversely affect your stored data.

The system requires a clean environment—free of contaminants such as dust, carpet fuzz, and smoke. Excessive moisture or oil particles in the air will hinder the performance of the system. Keep the system away from the floor where dust or carpet fuzz would be more likely to get into the tape drive.

2.3.4 Magnetic Isolation

For optimum performance, locate the system at least five feet from other computing equipment, any electrical appliances, or equipment (such as elevators, radio transmitters, and television sets) which generates magnetic fields.

2.4 INSTALLATION

General directions for all installations are given in this section. The next four subsections give directions for connecting the following peripheral devices:

1. Up to sixteen user stations
2. A service processor terminal
3. Two serial devices (printer or modem)
4. A parallel Centronics-type printer

2.4.1 Cables

To connect the TS 816/40 to a terminal, user station, printer and any other peripheral device (such as a modem), you will need cables. The quantity and types of cables needed are determined by the number and types of devices to be attached. Your dealer or distributor can supply you with the appropriate cables. The technical specifications for each type of cable are shown in Table 2-1. Refer to Appendix J for more detailed cable specifications.

Table 2-1 Cable Specifications

Distance in Feet Between TS 816/40 and Peripherals	Type of Cable
1 to 20	Ribbon cable*
20 to 100	24 gauge twisted pair with at least an overall shield
100 to 300 (maximum)	24 gauge twisted pair (individually and overall shielded)

Note

*This is acceptable as long as the ribbon cable is not placed next to electrical devices or cables that could induce electrical interference into the ribbon cable.

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Cable connectors commonly have D-shaped end connectors. These fit onto a D-shaped pin connector on the rear panel of the system. To install a cable, turn the connector end to fit the pin connector on the device, then gently but firmly push on the connector.

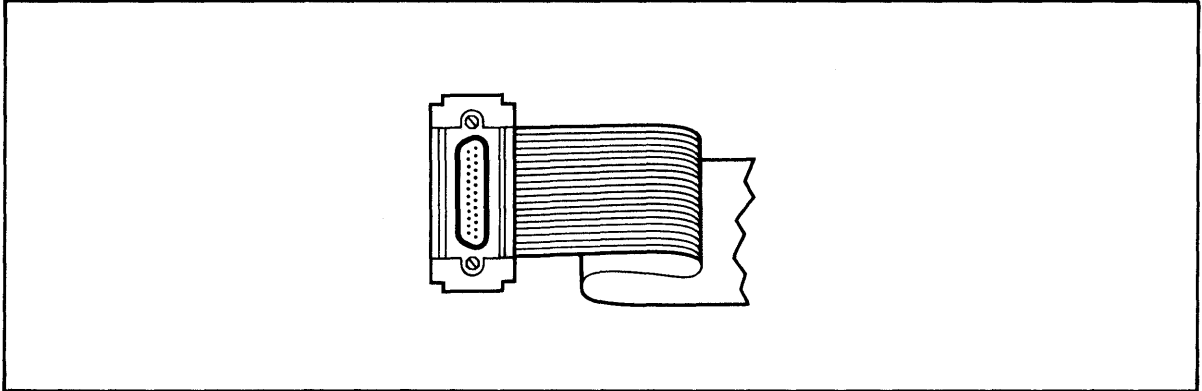


Figure 2-1 Cable Connector

As you connect the cables, leave some slack. If you have excess cable left, coil it loosely and secure it with a rubber band. Place the cable out of the way.



If you are using a ribbon cable, do not roll up the excess cable. Rolled ribbon cable looks nice but it creates an inductor or choke which can adversely affect system performance. Excess ribbon cable should be folded accordion-style as shown in Figure 2-2.

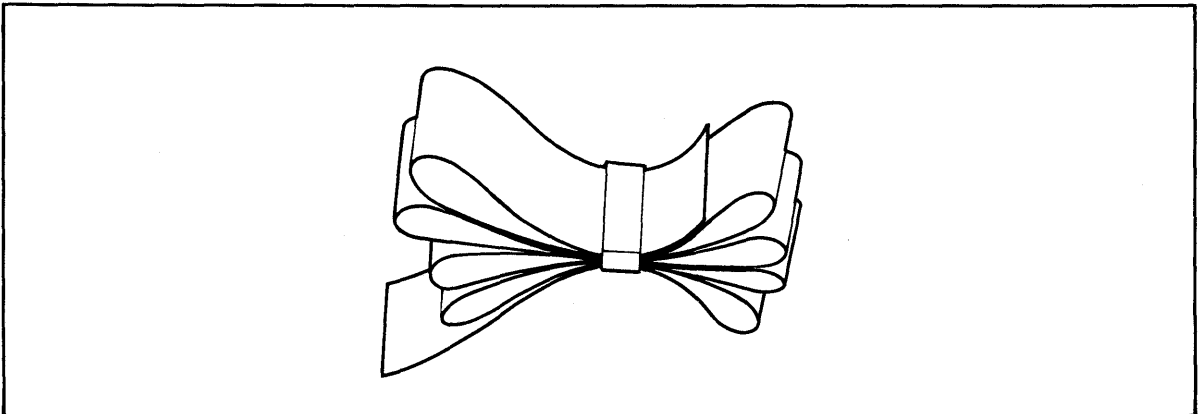


Figure 2-2 Correctly-Folded Excess Ribbon Cable

2. SYSTEM INSTALLATION

2.4.2 Power Configuration

The system will be configured for your power requirements at the factory (either 115 or 230 VAC). A three-prong plug is provided. If you use it with an adapter, ground it with a *pigtail*. The power cord wires are color-coded as follows:

Green	Earth ground
Black	Primary power (hot)
White	Primary power return (neutral)

2.4.3 Releasing the Hard Disk for Operation



Before proceeding with the installation, you must release the lock which held the hard disk in place during shipment. Failure to release it before you use the system will damage the system. Such damage will not be covered by the warranty.

To release the lock on the hard disk, follow these steps:

1. Using a Phillips screwdriver, remove the screws that secure the top cover. There are five screws on each upper side of the system and two screws on each lower side. (Refer to Figure 2-3.) To lift off the cover, pull the front panel forward and then slide the cover away from the rest of the system.

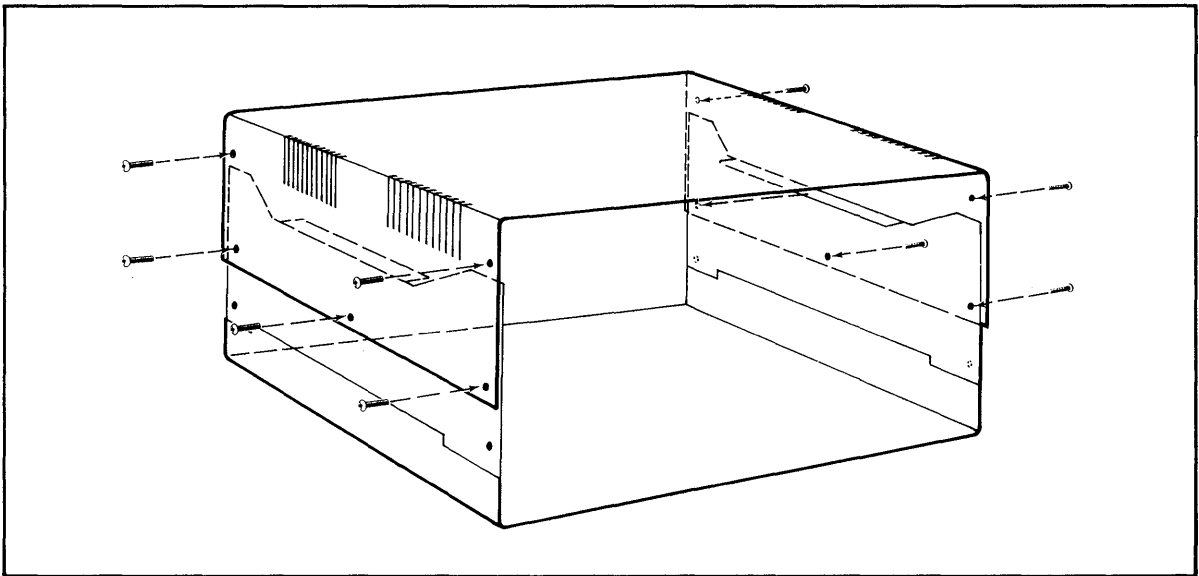


Figure 2-3 Location of Screws in TS 816/40 Case

2. Find the hard disk locking lever (shown in Figure 2-4) in the locked position.

2. SYSTEM INSTALLATION

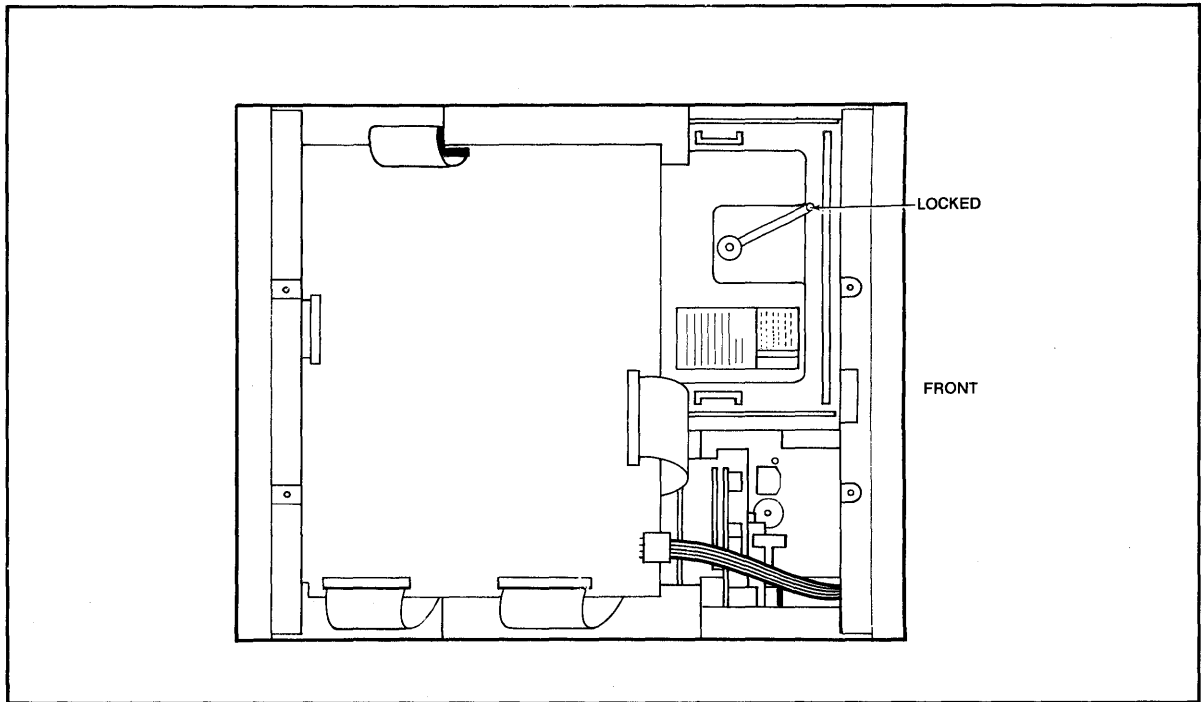


Figure 2-4 Hard Disk Locking Lever in the Locked Position

3. Move the hard disk locking lever to the *FREE* position (shown in Figure 2-5).

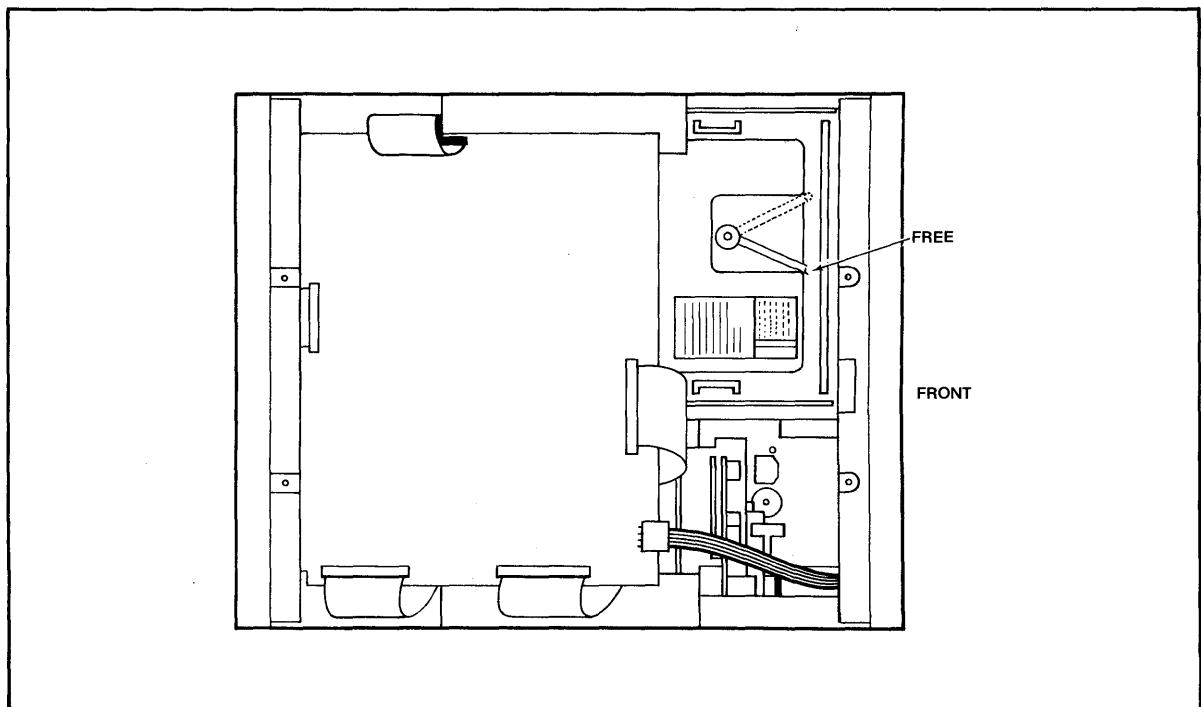


Figure 2-5 Hard Disk Locking Lever in Free (Operating) Position

2. SYSTEM INSTALLATION

- Carefully replace the top cover and reinsert the screws. Do not overtighten the screws.



Should you need to reship the TS 816/40, follow the special instructions in Chapter 6. The instructions for locking the disk are different than those for unlocking it.

2.4.4 Connecting a Service Processor Terminal

To connect a service processor terminal to the TS 816/40, follow these steps:

- Attach one end of an RS232 interface cable to the pin connector labeled **TERMINAL** on the rear of the TS 816/40. (See Figure 2-6.)
- Attach the other end of the cable to the RS232 pin connector on the rear of the terminal. (Refer to the terminal operator's manual if necessary to locate the appropriate connector.)

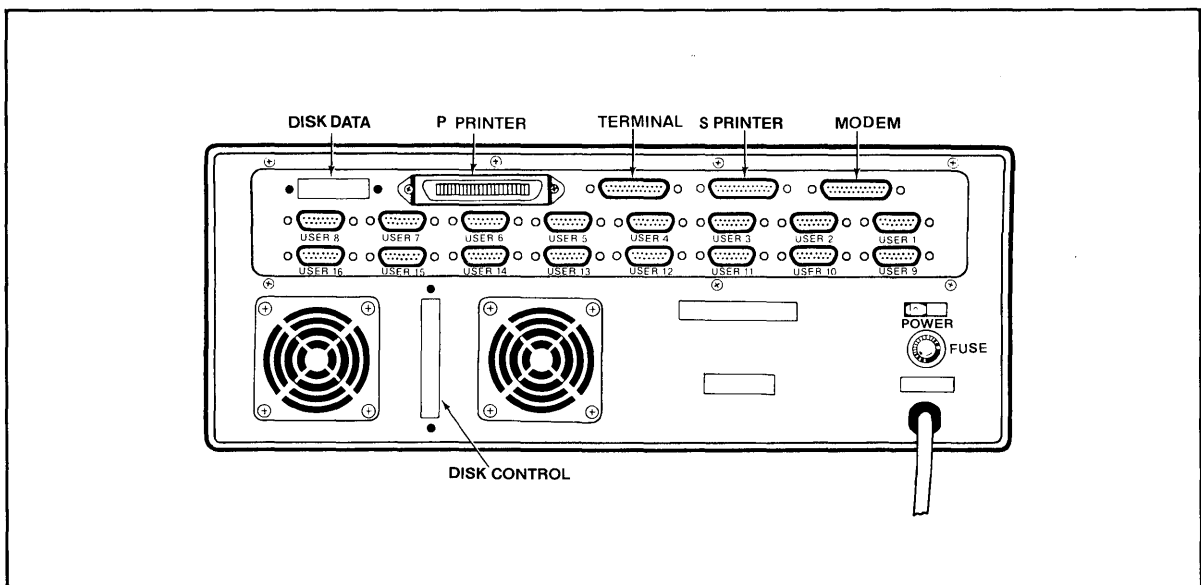


Figure 2-6 Rear Panel of the TS 816/40

The TS 816/40 is shipped with the terminal baud rate preset at 9600 baud. Unless your service processor terminal requires a different baud rate, no changes are necessary.

Should you need to change this baud rate, follow these steps:

- Open the TS 816/40 case as described in Step 1 of 2.4.3.
- Locate switch SW1 on the TS 816/40 logic board as shown in Figure 2-7.

2. SYSTEM INSTALLATION

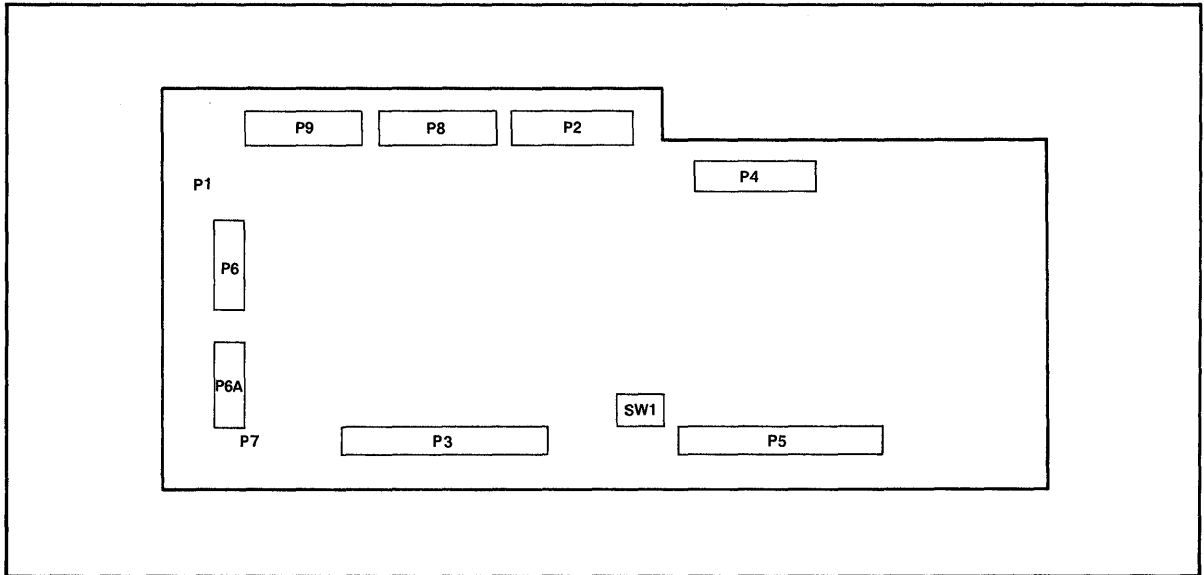


Figure 2-7 Location of Internal Switch SW1

3. Set dipswitches 1 through 3 using the settings described in Tables 2-2 and 2-3. (Figure 2-8 illustrates closed and open dipswitches.)
4. Replace the cover as described in Step 5 of 2.4.3.

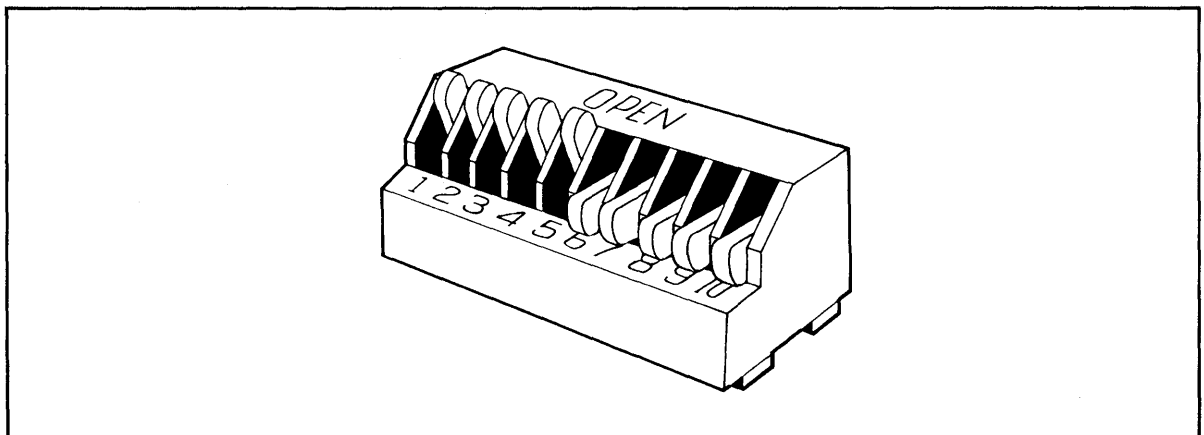


Figure 2-8 Dipswitches 1 through 5 Open; 6 through 10 Closed

2. SYSTEM INSTALLATION

Table 2-2 Switch Settings for RS232 Terminal Port Switch SW1

Dipswitch No.	Function
1	Baud rate for TERMINAL (service processor terminal) port; see Table 2-3
2	Baud rate for TERMINAL (service processor terminal) port; see Table 2-3
3	Baud rate for TERMINAL (service processor terminal) port; see Table 2-3
4, 5, 6 7, 8	Unused

Table 2-3 Setting Baud Rate of Terminal Port on Switch SW1

Dipswitch No.			Baud Rate
1	2	3	(Bits per second)
0	0	0	19200
1	0	0	9600
0	1	0	4800
1	1	0	2400
0	0	1	1200
1	0	1	600
0	1	1	300
1	1	1	150

0 = Switch closed 1 = Switch open

2.4.5 Connecting User Stations

To attach a user station to the TS 816/40, follow these steps:

1. Attach one end of an RS422 interface cable to one of the pin connectors labeled **User 1** through **User 16** on the rear panel of the TS 816/40. (See Figure 2-6.)
2. Attach the other end of the cable to the appropriate RS422 port on the back of the user station. Refer to the user station operating manual for the location of this pin connector.



If you are connecting several user stations, they may be connected to any of the TS 816/40 user station pin connectors. It is not necessary to use User 1 pin connector first, then User 2, etc. You could, for instance, use User 2, User 5, and User 7.

2.4.6 Connecting Serial Printer or Modem

The TS 816/40 can be connected to two auxiliary serial devices, such as a printer and a modem.

2. SYSTEM INSTALLATION

The RS232 pin connector which is labeled **S PRINTER** is configured for a serial printer when the TS 816/40 is shipped from the factory. The default baud rate value of the printer port is 1200; this value can be changed through the software.

The RS232 pin connector which is labeled **MODEM** is configured for a modem when the TS 816/40 is shipped from the factory.

2.4.7 Connecting a Parallel Centronics-Type Printer

To attach a parallel Centronics-type printer, follow these steps:

1. Attach one end of a Centronics-type interface cable to the pin connector labeled **P PRINTER** on the back of the TS 816/40.
2. Attach the other end of the cable to the appropriate pin connector on the back of the printer.

2.4.8 Plugging in the TS 816/40

After you have connected the TS 816/40 to all the peripheral devices, make sure the power switch is off. Then plug it into a grounded wall outlet. *Do not turn it on yet.*

2.5 CHECKLIST OF INSTALLATION INSTRUCTIONS

After the installation is complete, review this checklist before installing the operating system and using the system.

1. Did you check the TS 816/40 for possible shipping damage?
2. Is the location which you selected
 - a. Magnetically isolated?
 - b. Supplied with steady line voltage?
 - c. Within comfortable temperature and humidity levels?
 - d. Clean?
 - e. Spacious enough for good ventilation around the case and on a sufficiently large and stable table?
3. Is the power plug correct for your wall outlet?
4. Is the outlet grounded?
5. Did you move the hard disk locking lever from the LOCKED position to the FREE position?
6. Are peripheral devices within the distance limits specified?
7. Did you use the correct cables according to the specifications in Table 2-1?
8. Did you check the printer baud rate compatibility?
9. Did you plug the TS 816/40 and peripherals into the wall outlet?

If your installation satisfies this checklist, you are ready to install the operating system and MmmOST.

3. OPERATING THE SERVICE PROCESSOR

3.1 INTRODUCTION

This chapter is designed for the person who prepares the service processor for initial operation and uses it on a daily basis.



All of the operations described in this chapter require a service processor terminal.

3.2 INITIAL START UP

Now that all peripheral devices are installed and the TS 816/40 is plugged in, you are ready to turn it on and install CP/M and MmmOST.

3.2.1 Power On

1. Make sure the tape drive is empty before proceeding.



ALWAYS MAKE SURE THAT THE TAPE DRIVE IS EMPTY WHEN YOU TURN THE TS 816/40 ON OR OFF. IF A TAPE IS IN THE DRIVE, RESULTING POWER SURGES MAY DESTROY THE INFORMATION STORED ON THE TAPE.

2. Locate the ON/OFF switch on the right side of the rear panel of the TS 816/40. (Figure 3-1). This is a rocker-type switch.
3. Push the end which has a white dot on it to turn on the TS 816/40.

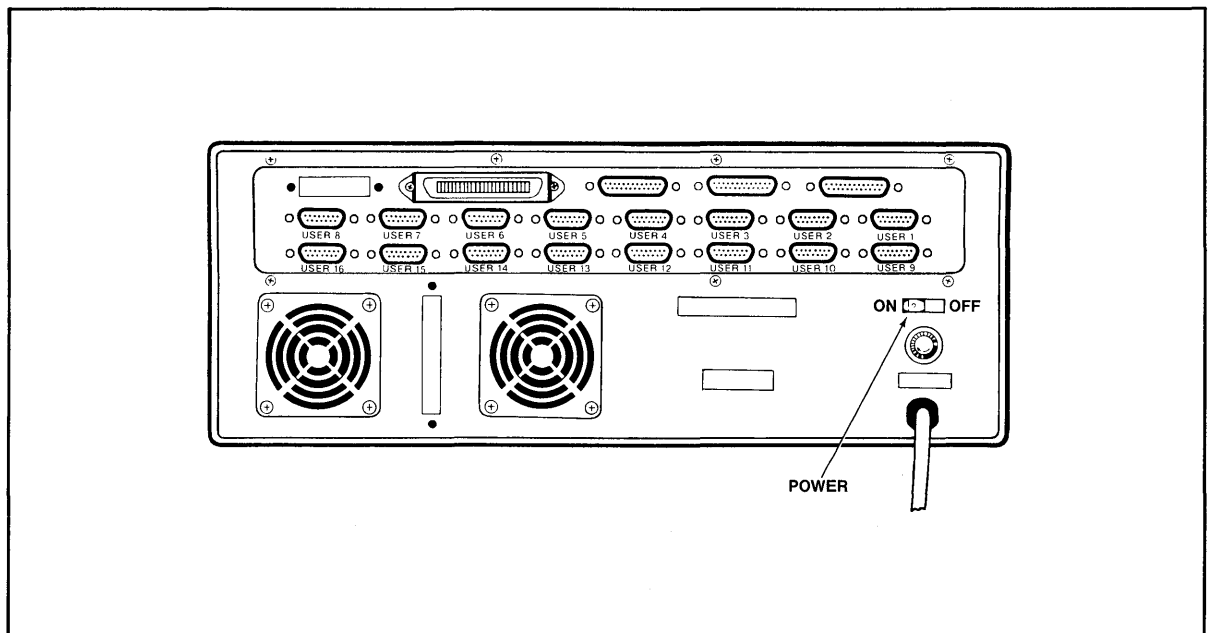


Figure 3-1 On/Off Switch on Rear Panel

3. OPERATING THE SERVICE PROCESSOR

3.2.2 Installing the System Disk Image

Your system is shipped with a copy of the system disk image (which includes CP/M and MmmOST) on the system tape. This section explains how to install (transfer) a copy of these programs to the hard disk.

3.2.2.1 Booting Up—The process of transferring the operating system programs to the service processor's or user station's memory is called **booting** or **booting the system** from the expression to "pull oneself up by one's bootstraps."

Booting the service processor the first time after you turn on the power is called a **cold boot, cold start, or reset**. A cold boot clears the memory and loads the operating system programs into it again. While a cold boot does not affect data already stored on the hard disk or on the tape cartridge, *any data in memory will be lost*. A cold boot is normally used if you have a problem with your program and wish to start over or if your system is not responding correctly.

To cold boot (reset) the TS 816/40, press the red reset button located at the left front of the computer (Figure 3-2).

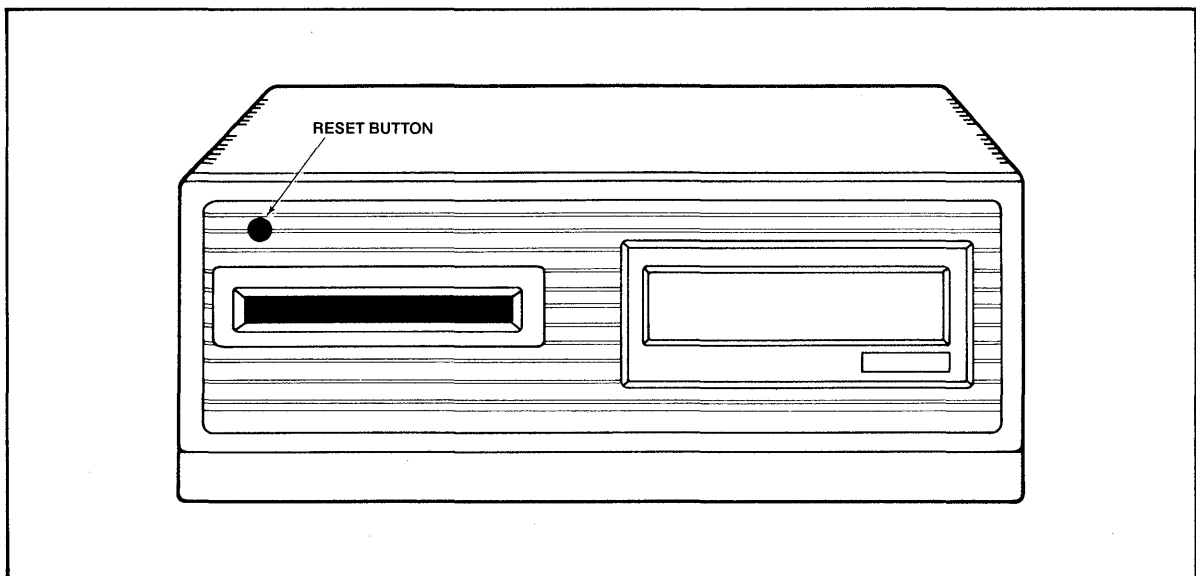


Figure 3-2 Location of Reset Button

A **warm boot** loads the CP/M operating system programs into the system again *yet does not affect the TS 816/40 memory areas*. To warm boot the TS 816/40, press the CTRL and C keys simultaneously (^C) on the service processor terminal keyboard.

Whenever the service processor is warm booted, MmmOST is cancelled and user stations are not operable. To reinstate MmmOST, either press the TS 816/40 reset button, or enter

```
MmmOST1 <CR>
```

after the A>. Be sure to type MmmOST1 and not MmmOST.

3. OPERATING THE SERVICE PROCESSOR



BEFORE YOU WARM OR COLD BOOT THE SERVICE PROCESSOR, MAKE SURE ALL USER STATIONS ARE OFF OR NOT IN USE. IF USER STATIONS ARE OPERATING WHEN THE SERVICE PROCESSOR IS BOOTED, DATA WILL BE LOST FROM THE USER STATION MEMORY.

3.2.3 Procedure for Installing the System Disk Image

When setting up your system, you must install the system disk image (which includes CP/M and MmmOST). After the initial installation, you should not have to repeat this procedure unless you have problems with the hard disk.

When the TS 816/40 is powered on, you will find software already installed on the hard disk. **Disregard this software and follow the procedure below to install the new software contained on your system tape.**

1. Make sure the hard disk lever was unlocked as described in 2.4.3.



DO NOT INSTALL THE SYSTEM DISK IMAGE ONTO THE HARD DISK UNLESS YOU ARE SURE YOU HAVE UNLOCKED THE HARD DISK LOCKING LEVER. (If you have any doubt at all, refer to 2.4.3 and Figure 2-5 and check the lever now.)

2. Turn on the service processor terminal and adjust the screen contrast if necessary. (Refer to the terminal's operator manual for instructions if necessary.) Make sure the service processor terminal is turned on before the TS 816/40 is turned on.



If you have already turned on the TS 816/40, press the reset button.

3. Insert the system tape cartridge into the tape drive. Immediately put your finger on the escape key, BUT DO NOT PRESS IT YET.
4. Look for the following message on the service processor terminal's screen:

Self-testing in process. (TS-816/40 PROM V X.X)
HIT ESCAPE KEY TO BOOT FROM TAPE



This display is generated by the internal diagnostic PROM in the TS 816/40 and is not dependent upon CP/M and MmmOST being on the hard disk.

5. Press the escape key immediately (within 5 seconds after display occurs).
6. If you pressed the escape key within five seconds after the message appeared, refer to Step 10. If you did not press the escape key within five seconds, refer to Steps 7 through 9.
7. If you do not press the escape key within five seconds, you will hear a humming sound as the system attempts to boot from the hard disk.
8. If you hear this sound, press the red reset button on the front of the TS 816/40.
9. You should see the message shown in Step 4 once again. Press the escape key on the service processor terminal's keyboard *within five seconds*.

3. OPERATING THE SERVICE PROCESSOR



If you do not press the escape key within 5 seconds the second time, repeat Steps 7 through 9 again.

10. After pressing the escape key within the 5 second limit, you will see the following message on your terminal screen:

System IPL from Tape Drive in Progress*

TELEVIDEO SYSTEM TS-816/40
Restore disk image from tape, V1.0
14 Megabyte on 1/4" tape cartridge

Do you want to run disk diagnostics? ("Return" if No, "Y" if Yes)

11. This message is generated through the utility program TAPEDUMP which allows you to install the system disk image onto the hard disk. Refer to Chapter 5, TAPEDUMP Procedure B, Step 4b, for additional instructions.



This message is generated through the utility program TAPEDUMP which allows you to install the system disk image onto the hard disk.

3.2.4 System Message

Once you have installed CP/M and MmmOST, the service processor terminal will display a system message whenever the TS 816/40 is cold booted (turned on or reset). Figure 3-3 illustrates the first part of the system message.

```
Self-testing in process. (TS-816/40 PROM V X.X)
HIT ESCAPE KEY TO BOOT FROM TAPE*
System IPL from hard disk in progress *
TeleVideo Systems TS 816/40
64K CP/M Vers. x.x Winchester Disk Supported
Quantum Q-2040
authorized dealer: TVI license: 0000000
MmmOST VX.X
Copyright 1982 TeleVideo Systems, Inc XX/YY/ZZ
```

Figure 3-3 Service Processor Terminal System Message



The system message is visible only on a service processor terminal (not on a user station).

3. OPERATING THE SERVICE PROCESSOR

3.2.5 Self-Tests During System Loading

Before you see the system message, the system performs some diagnostic self-tests of the hardware. These diagnostics are run whenever you turn on or reset the service processor. Should the system fail any part of these tests, you will see the following message on the service processor terminal's screen:

Hardware Error (_____); Call Your Distributor

Within the parentheses will be an abbreviation designating the source of the hardware error, as listed in Table 3-1.

Table 3-1 Hardware Error Abbreviations

Abbreviation	Description
DMA	Direct memory access controller
CTC	Counter timer circuit
SIO #1	Serial I/O controller
SIO #2	Serial I/O controller
WDC	Winchester disk controller

If you see this message, push the reset button once or twice. If the message still appears, call your dealer or distributor. If you are unable to see the system message or the hardware error message, or if you see obviously incorrect or garbled information, refer to Chapter 6, Maintenance and Troubleshooting.

4. OPERATING THE USER STATIONS

4.1 INTRODUCTION

Your user station may be one of many user stations connected to the service processor. In most ways your user station operates as it would in a single-user system. This chapter explains how to use your user station in the multiuser environment and take advantage of the many features offered by the system.

4.2 TURNING ON THE USER STATION

Before operating your user station, you must be sure the TS 816/40 is turned on. To verify that the TS 816/40 is on, turn on your user station and look for a message similar to this:

```
TeleVideo CP/M VX.X  
DISTRIBUTED PROCESSOR X.X  
Proc. ID XX <=> Y  
A>
```

Whenever you see this message after cold booting your user station, you will know the TS 816/40 is also turned on.

The A> is called the **prompt**. Prompts vary from one computer system to another but almost always indicate that the operating system is ready for your response. While you are using an applications program, you may see a different prompt symbol; this will be explained in the applications program instructions.

4.3 TYPES OF DRIVES IN THE MULTIUSER ENVIRONMENT

4.3.1 Physical and Logical Drives

The hard disk drive and the tape drive of the TS 816/40 are physical objects and are called **physical drives**.

The physical hard disk is divided into several imaginary drives. These drives are called **logical drives**. A logical drive does not have any physical qualities (as opposed to the hard disk and tape drives). A logical drive serves as a recognizable area of the hard disk on which the computer can store and organize information.

The number of logical drives may vary from computer to computer. The TS 816/40 hard disk has four logical drives; they are designated A, B, C, and D.

You can tell which logical drive is being used (is active) by looking at the letter before the prompt (i.e., A>). For example, B> would mean that drive B is active.

Table 4-1 illustrates the logical drive designations and their corresponding physical drives in a multiuser environment. These designations can be changed later; refer to MmmOST Programmer's Manual.

4. OPERATING THE USER STATIONS

Table 4-1 TS 816/40 Logical and Physical Drives

Logical Drive	Configuration When Shipped*	Corresponding Physical Drive
A	Private	Hard disk
B	Public (Shared)	Hard disk
C	Public Only	Hard disk
D	Public Only	Hard Disk
M,N O,P	Local	User stations' physical drives (hard disk and/or floppy disk drives)

Note

*See 4.3.2 for explanation of private and public.

Whenever you cold boot your user station, you automatically access drive A. This is called the **default drive** since it is accessed in the absence of other instructions.

It is important to correctly identify logical drives when using CP/M commands and utility programs.

The capacities of the TS 816/40 logical drives are shown in Table 4-2.

Table 4-2 Logical Drive Capacities

Logical Drive	Approximate Formatted Capacity*	Maximum Directory Entries
A	8.176	4096
B	8.192	512
C	8.192	512
D	8.128	512

Note

*In megabytes (millions of bytes)

Each user station can access logical drives A, B, C, and D contained on the TS 816/40 hard disk. If the user station has a storage device of its own (such as a TS 801/802/802H), the logical drive designations for those physical drives will be M, N, O, or P.

The tape drive does not have a logical drive designation since it is used only to transfer (back-up) data to and from the hard disk. You cannot write (record data) to a tape from a user station or from a service processor terminal as you can to the hard disk. Tape cartridges are only used for making back-up copies of the information stored on the logical drives of the hard disk and restoring information from the tape to the hard disk.

4.3.2 Private and Public Drives

A **private drive** is a logical drive on which each user station has its own private area to store and access information. A **public drive** is a logical drive to which all user stations have access.

When the system tape is shipped, logical drive A is designated as a private drive and drives B, C, and D are public drives. CP/M and MmmOST are stored on drive A. CP/M and MmmOST programs and commands are located on public drives B and C.

4. OPERATING THE USER STATIONS

Public drive B has the capacity of containing files that are shared. Shared files are those to which several users may write simultaneously. This does *not* mean that a user may write to the same *record* (a single listing of information in a file; i.e. one employee's information in a company's payroll file) at the same time as another user. However, by using shared files, the second user does not have to wait until the first user completes all updates to the whole file. Rather, as soon as the first user completes updating a record, the second user may read the updated record and use it.

For more information on public and shared files, refer to the MmmOST Programmer's Manual.

4.3.3 Private and Password Directories

Logical drive A contains sixteen **private default directories** (one for each user station) and sixteen **private password directories**. These directories can be reconfigured; refer to the MmmOST Programmer's Manual.

A private default directory is the area which is accessed by a particular user station when it is first turned on (unless the operator had previously logged onto another directory).

A private password directory is a directory accessible only when a password is entered. You can access a password directory from any user station attached to the TS 816/40. A password can, if desired, be assigned to a private default directory. This would allow you to access your default directory from either your user station or from any user station (using the assigned password).

Each password directory has a preassigned password when MmmOST is shipped; these can be changed. Refer to the MmmOST Programmer's Manual.

4.4 BOOTING THE USER STATION

You can warm boot the user station by pressing ^C when it is the first character entered in response to a system prompt and in applications programs when allowed.

If you are not familiar with the term "boot," refer to 3.2.2.1.

4.5 WORK HABITS

When working near the system, do not remove staples or leave paperclips, food, or beverages on or near the system. Foreign objects (such as staples, paperclips, and liquids) which get inside the system are the most common causes of computer failure.



Contamination of the system by foreign objects will be considered neglect under the terms of the limited warranty.

When creating or editing a file in a word processing program, save your work (through the appropriate program command) periodically. If you plan on leaving your user station for a long period of time, enter the program command which allows you to save the file you are working in and to exit to the system (CP/M) (i.e. ^KD followed by X or ^KX in WordStar) before you leave.

4. OPERATING THE USER STATIONS

When you return, enter

^C

in response to the A> before operating the user station. This procedure will assure you that the TS 816/40 is operational.

4.6 COMMUNICATING WITH THE SYSTEM

4.6.1 Entering Commands

The computer system will recognize either upper or lower case letters, but you should use blank spaces and punctuation carefully. If the system fails to respond to your command, doublecheck your command—it might simply be misspelled.

4.6.2 Input Line Editing

If you make an error while typing, press the BACKSPACE key and the cursor will move to the left. For every character position the cursor moves to the left, one character will be deleted. When you get to the error, just retype the information.

If you are editing previously-typed information and accidentally use the space bar instead of one of the cursor keys to advance the cursor, you will enter spaces where your information used to be. DO NOT USE THE SPACE BAR TO ADVANCE THE CURSOR . . . UNLESS YOU WANT SPACES.

If your typing is of the hunt-and-peck variety, you may not normally pay attention to whether you hit the number *one* (1) or a lowercase *L* (l) when you mean *one*. Although they look alike, they are not interchangeable.

Likewise, the number zero (0) is not the same as the capital character *oh* (O). The CRT will display a zero with a slash through it (although your printer may not make the difference obvious).

4.7 OPERATING UNDER MmmOST

When you are operating in a multiuser environment using MmmOST, you will notice a few differences in the methods used to access directories and to print files. These next sections describe how to perform those functions using MmmOST.

4.7.1 Accessing Directories

When you turn on your user station (providing the TS 816/40 has already been turned on), you will see the following display:

```
TeleVideo CP/M VX.X
DISTRIBUTED PROCESSOR VX.X
Proc. ID XX <=> Y
A>
```

As explained in 4.2, the A> is a prompt which tells you that the user station is accessing logical drive A. To change to a different logical drive, enter the letter designation for the drive you want, followed by a colon and <CR>.

4. OPERATING THE USER STATIONS

For example, if you are in logical drive A and want to access drive B, enter

```
B:<CR>
```

You will see the following display:

```
B>
```

4.7.2 Calling Up a Directory

To call up a directory, enter

```
DIR<CR>
```

in response to the system prompt.

If you want a directory on a different logical drive, enter

```
dir [drive:]<CR>
```

where drive: is the drive on which the directory you want to access is located.

If the user station is turned off and then on, while the TS 816/40 continually operates, the user station will access the directory it was in prior to being turned off. For example, if the user station was in its password directory when turned off (and the TS 816/40 remained on), it will access the same password directory when turned on again. Likewise, if the user station was in its default directory when turned off (and the TS 816/40 was still on), it will access that default directory when turned on again.

To find out which directory the user station is in when turned on, call up a directory. By looking at the directory files names you created, you can tell which directory you are accessing. If you discover your user station is in its private password directory, enter

```
LOGON <CR>
```

to change to the private default directory.

For more information on using the CP/M command DIR (calling up a directory) and on accessing different drives, refer to the Digital Research CP/M User Manual.

4.7.3 Using LOGON

To access your private password directory, you will use a program called **LOGON**.

When the system tape is shipped, LOGON is stored on public drives B and C. (The program can be moved to your private default or password directory through the CP/M program PIP). To locate LOGON, you can use the normal CP/M dir command.

To use LOGON, enter one of the following commands

```
[drive 1:] LOGON [drive 2:] [password]<CR>
```

or

```
[drive 1:] LOGON [drive 2: or *:]<CR>
```

where:

[drive 1:] is the logical drive on which LOGON is stored (if it is not on the drive which you are currently accessing).

4. OPERATING THE USER STATIONS

[drive 2:] is the drive on which the directory or file you want to use is stored. If you enter both drive 2 and a password, you will have access to drive 2 only if your password is valid for a directory on that drive.

If you do not specify drive 2, you will have access to directories or files on all private directories on all drives that contain directories for which that password is valid.

If the second form of the LOGON command is entered (drive or asterisk), do not enter a password. You will be prompted

*

by the system.

After you see this prompt (*), enter your password. Your password will not be displayed on the user terminal screen as you type it. (Deletions are not allowed.) This method allows you to keep your password a secret from bystanders.

The system will respond:

```
End of Execution  
A>
```

To determine if you have accessed your password directory, enter

```
DIR<CR>
```

The system will respond by displaying the file directory of your private password directory.

For example, if

you are currently on drive B

LOGON is on your default directory on drive A

you wish to access your password directory which is named PERSONAL and is on drive A:

your entry would be as follows:

```
A:LOGON PERSONAL<CR>
```

or

```
A:LOGON [A: or *:]<CR>
```

You will see the following display if you successfully executed LOGON:

```
End of Execution  
A>
```

If you enter

```
DIR<CR>
```

you will now see your password directory named PERSONAL which is on drive A.

Until you create your private default and password directories by creating and storing files, you will not see a list of files on those directories. The space for that directory is there, but since no files have been stored yet, the display will respond with NO FILE when you try to call up a directory.

4. OPERATING THE USER STATIONS



If you enter incorrect information when executing LOGON (such as incorrect password/drive association or an invalid password) or if you try to access a password directory when it is already in use, you will see this message in response to the LOGON command:

*Unsuccessful
End of Execution*

Check your input, make necessary corrections, and re-enter the LOGON command.

4.7.4 Directory Configurations

When shipped, the TS 816/40 logical drive A provides for sixteen private default directories and sixteen private password directories. These configurations can be changed through the MmmOST program GENPARMS; refer to the MmmOST Programmer's Manual.

Possible directory configurations include the following:

1. User has only a private default directory.
2. User has a private default directory and a separate password directory.
3. User has only a private default directory which has been assigned a password.
4. User has a private default directory (which has been assigned a password) and a separate password directory.

Assigning a password to your default directory allows you to access that directory from any user station attached to the TS 816/40.

4.8 WORKING WITH MmmOST

MmmOST is a special program which works with CP/M and enables multiple users to share applications programs, peripheral devices (such as printers), and the hard disk. (Refer to the MmmOST Programmer's Manual for more detailed information.)

When the TS 816/40 is turned on or reset, MmmOST is loaded into its memory. When a user station is also turned on, CP/M is loaded into the user station's memory from the TS 816/40. At this point, you will see the user station message

```
TeleVideo CP/M VX.X  
DISTRIBUTED PROCESSOR VX.X  
Proc. ID XX <= > Y  
A>
```

4.8.1 Printing with MmmOST

MmmOST allows users to share a printer connected to the TS 816/40. When you want to print a file, you can use any of the following commands:

1. CP/M PIP
2. CP/M ^P
3. A word processing applications program print command (e.g., p in WordStar)

4. OPERATING THE USER STATIONS

When a user enters one of these print commands while using MmmOST, a delay will occur before the desired file is actually printed out. This delay is due to the print spooling process which occurs within MmmOST. **Print spooling** is the process in which a temporary file is created to store the data before it is printed. This temporary file is called the **print spool file**.

The printer prints the contents of the print spool file in the sequence in which the files are received. If another user has sent text to the print spool file before you did, his text will print out first. Print spooling under MmmOST works on a first-come, first-served basis.

- 4.8.1.1 Using PIP to Print**— To print using the CP/M PIP command, enter the following in response to the prompt:

```
PIP LST: = <source drive:>file name<CR>
```

where:

LST: is the designation of the logical printer device

source drive: is the logical drive on which the file is presently located

file name is the name of the file to be printed

Refer to the Digital Research CP/M User Manual for more information on PIP.

- 4.8.1.2 Using ^P to Print** — To print a file using the CP/M command ^P, enter ^P followed by another command (such as TYPE or DIR). These commands tell the system what to print. For example, if you want to print a file while “typing” it, enter

```
^P TYPE <file name><CR>
```



^P will not be displayed on the user station terminal screen.

Once a ^P is given along with another command, the print spooling process starts creating the temporary print spool file. You will see the file on the user station screen. When you come to the end of the file or text to be printed, enter another ^P. This second ^P will send the print spool file to the printer, and the printing process will begin.

Refer to the Digital Research CP/M User Manual for more information on ^P.

- 4.8.1.3 Using Print Command in a Word Processing Program**—To print a file using a word processing application program such as WordStar, use the print command in that program. Once you have entered the command and answered program-prompted questions, the temporary spool file is created. At this point, the user will probably see the main word processing menu on the screen.

To begin the actual printing process, you must warm boot the system using the appropriate “exit to system” command (i.e. X in WordStar).

4. OPERATING THE USER STATIONS



Remember, there will be a delay between the moment the first print command is entered and when the actual printing begins (due to print spooling). This applies to each example (PIP, ^P, and word processing print command) in this section.

For additional printing features, refer to the MmmOST Programmer's Manual.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

5.1 INTRODUCTION

This section suggests procedures for using and storing the tape cartridges to avoid loss of data and provides detailed instructions for using the utility programs supplied on the system tape.



To use any of the utility programs, you must use a service processor terminal. Utility programs cannot be run from a user station.

5.2 TAPE CARTRIDGES

The tape cartridge which you received with the TS 816/40 is the system tape. It contains your master copy of CP/M and MmmOST. You will use this tape cartridge to load CP/M and MmmOST onto the TS 816/40's hard disk.

You will use similar blank tape cartridges to back-up the contents of your hard disk and also to transfer data from the tape back to the hard disk. Appendix I provides specifications for blank tapes.

While the cartridge is easy to use, proper use and care of the tape cartridge is essential to prolong the life of the tape and the information stored on it.

5.2.1 Caring for Tape Cartridges

Although tapes look sturdy, they can be damaged by scratches, fingerprints, magnetic fields, or liquids. If the tape is damaged, the system can no longer *read* the tape.

Tapes are made of magnetically-treated mylar. Even temporary exposure to magnetic fields can erase the data. Magnetic fields surround many items commonly present in an office environment, such as:

- Telephones
- Magnetic paperclip holders
- Typewriters
- Adding machines
- Television sets

To prolong the life of your tape, carefully follow the rules listed below:

1. Keep your fingers off the exposed tape.
2. Leave on the clear plastic covering (cartridge) surrounding the tape.
3. Use only the programs DISKDUMP and TAPEDUMP to tighten loose tape; do not attempt to tighten it manually.
4. Store cartridges in the plastic storage containers in which they are shipped. Keep this container in a cool place. Tape cartridges left in direct sunlight or in a hot place can be damaged and data may be lost. There are many convenient tape cartridge storage units available which will protect your tape cartridges.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

5.3 BACKING UP THE HARD DISK

To protect your investment of time and effort, periodically make a back-up copy of the information stored on the hard disk using the utility program DISKDUMP (5.6.2). DISKDUMP copies all of the information on the hard disk onto tape. When the hard disk works perfectly, it is difficult to understand the importance of making a back-up copy of your files. But when the hard disk does not work perfectly and you discover that information has been lost, you will be glad you took the time to back-up the disk.

DISKDUMP allows you to quickly back up entire logical drives instead of one file at a time.

Follow a regular system for backing up your files. One of the more common methods uses one or two back-up copies as shown in Figure 5-1.

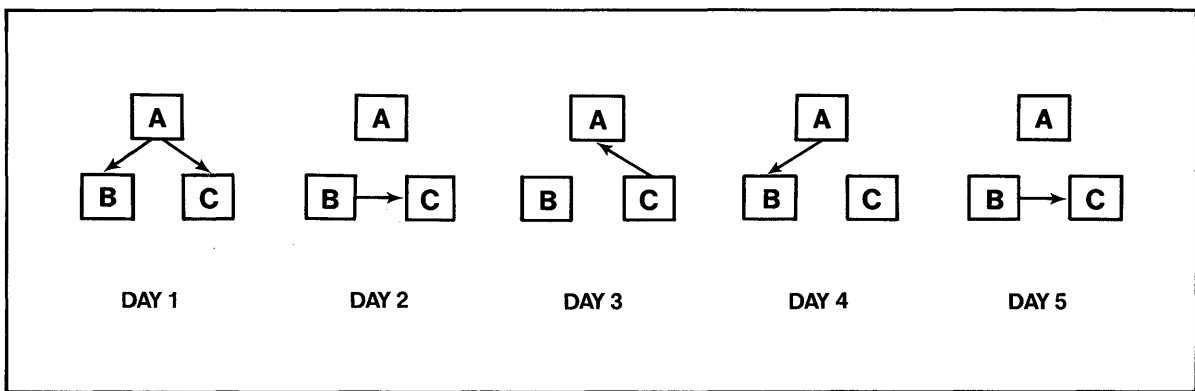


Figure 5-1 Typical Back-Up System

Of all the habits which you can develop as a computer user, the careful handling of tape cartridges and the faithful backing up of data are probably the most desirable.

5.4 SUMMARY OF GOOD HANDLING PROCEDURES

1. Handle tape cartridges gently and store them in a cool, protected environment. Always store them in the plastic container.
2. Do not leave a tape cartridge in the tape drive when turning the system on or off.
3. Make a back-up copy of all updated files at least once a day (e.g., before you go to lunch or home).
4. Do not eat, smoke, drink, or remove staples near the system.

5.5 USING A TAPE CARTRIDGE

Locate the system tape cartridge which arrived with the TS 816/40. Take the tape cartridge out of the hard plastic storage container. (Figure 5-2.)

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Figure 5-2 Removing Tape Cartridge from Plastic Container

Once the tape is removed from the storage container, some parts of the tape will be exposed.



Avoid touching the exposed portion of the tape with your hands or the tape itself (and data on it) may be damaged.

Whenever you transfer information from the hard disk to the tape, the hard disk writes the data onto the tape. This new data will write over any data previously on the tape, erasing the old data permanently.

5.5.1 Write Protection

To prevent any data from being erased, you can **write protect** a tape cartridge so that no data can be transferred from the hard disk to this tape.

Write protection is imposed by a **SAFE indicator** on the tape cartridge. The SAFE indicator is a small circle containing an arrow on the top left hand corner of the tape cartridge. This SAFE indicator controls whether the system can write on the tape.

Find the SAFE indicator on the upper left-hand side of the tape cartridge (Figure 5-3). It is easy to verify whether or not the tape cartridge is write protected. When the arrow of the SAFE indicator points to SAFE, the tape is write protected. When the indicator points away from SAFE, the system can write to the tape.

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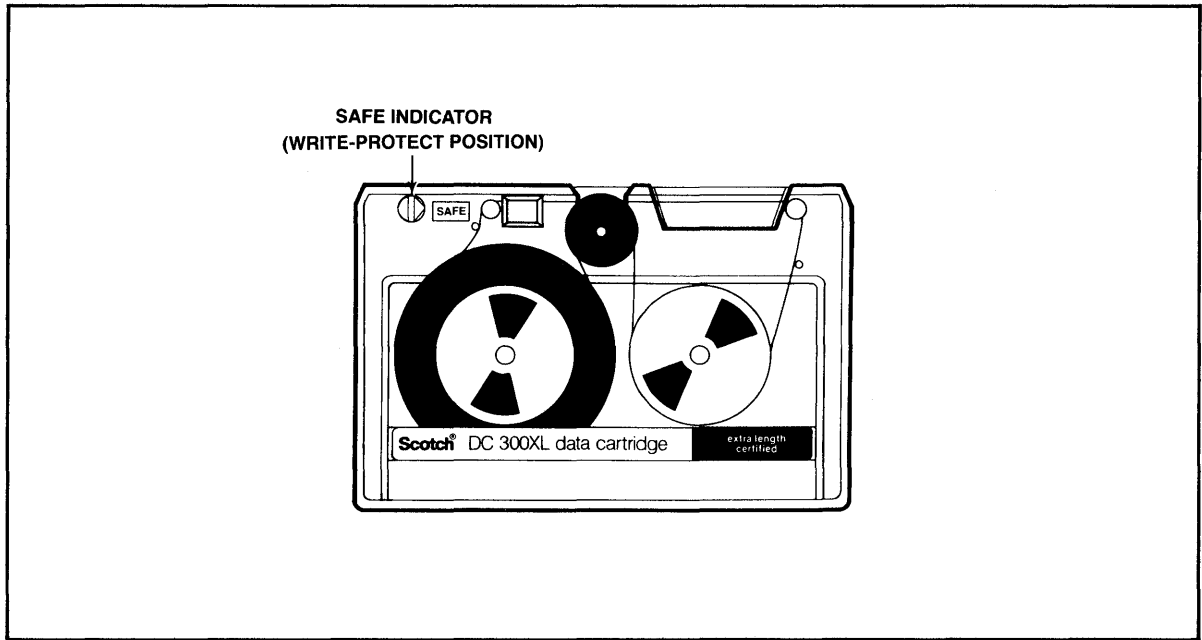


Figure 5-3 Write-Protect Indicator on Tape Cartridge



When the system tape is shipped, it is write protected. Do not move the SAFE indicator on the system tape. Since the system tape contains your only copy of CP/M and MmmOST, leave the system tape write protected so it cannot be accidentally erased.

To write to a tape cartridge, turn the arrow away from the word SAFE. To turn the arrow, insert a small screwdriver into the indentation connected to the arrow. Turn the arrow gently.

5.5.2 Holding the Tape Cartridge

Turn the tape cartridge so that the label is near you and facing up. The SAFE key should be on the left side of the cartridge. See Figure 5-4. Remember to avoid putting your fingers on the exposed tape while you are holding the cartridge.

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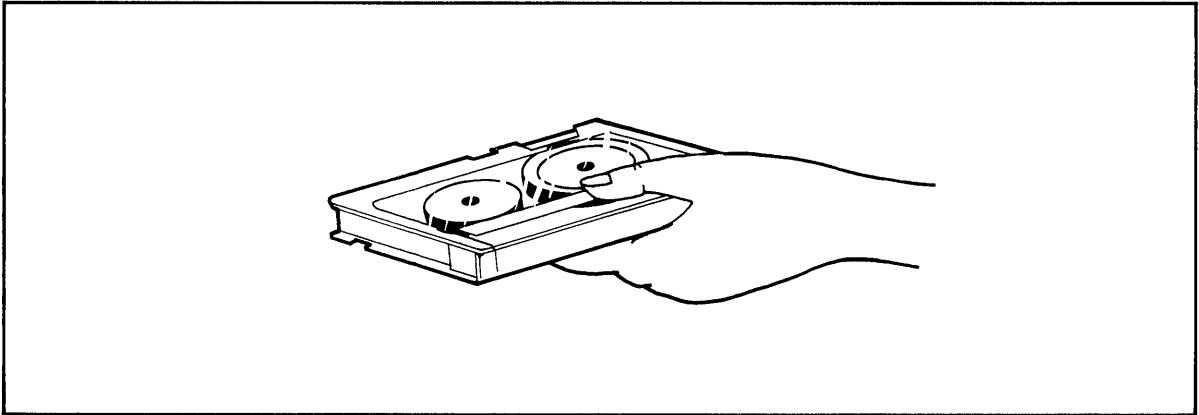


Figure 5-4 Holding Tape Cartridge Before Insertion



MAKE SURE THE TS 816/40 POWER SWITCH IS TURNED ON BEFORE YOU INSERT THE TAPE CARTRIDGE. OTHERWISE, RESULTING POWER SURGES COULD DESTROY DATA ON THE TAPE.

Holding the tape cartridge level, insert it in the opening of the tape drive as shown in Figure 5-5. Using the tips of your fingers, push it gently in the rest of the way.

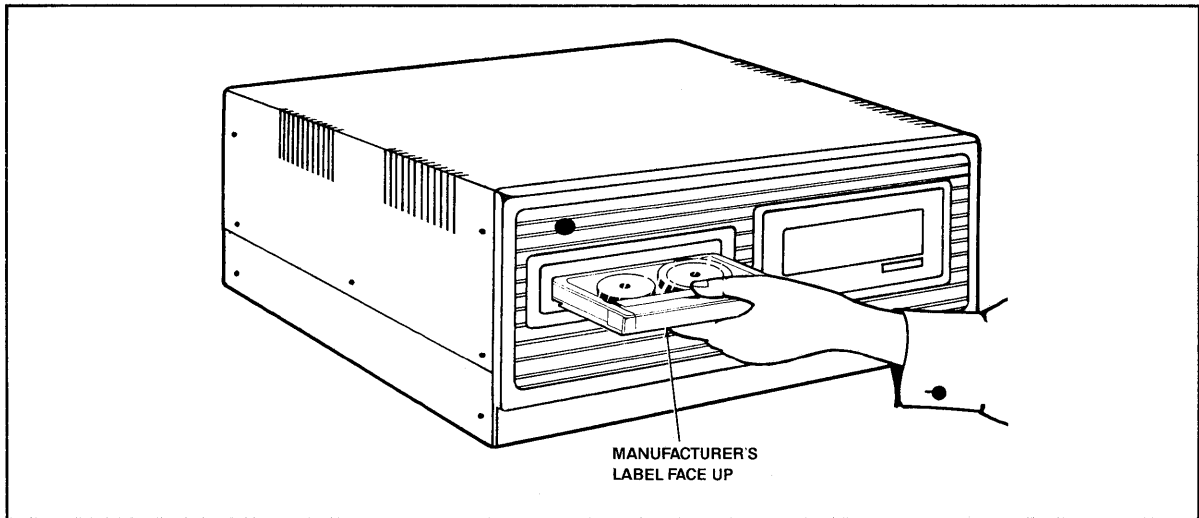


Figure 5-5 Inserting the Tape Cartridge into the Tape Drive

5.6 USING THE UTILITY PROGRAMS

Included on your system tape are several utility programs. These programs are used to maintain your system.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

5.6.1 General Instructions for Utility Programs

To run any of the utility programs listed in Table 5-1, you must connect a service processor terminal, bypass the MmmOST software, and operate only under the CP/M operating system. Once MmmOST is bypassed, user stations connected to the TS 816/40 are inoperable.

Table 5-1 Utility Programs Run From a Service Processor Terminal

DISKDUMP	MODBIOS
SCANDUP	CNFGUSER
FIXDISK	GENPARMS
TAPEDUMP	MODBOOT
SYSGEN	



These utilities can be run only from the service processor terminal. During the time utility programs are being run (executed) on the service processor terminal, the user stations cannot be used. Refer to the MmmOST manual and the CP/M manual by Digital Research for utility program descriptions not included in this chapter.

Follow these steps before you execute a utility program:

1. Enter a ^C on the service processor terminal. (This warm boots the TS 816/40 and bypasses MmmOST.)
2. Look for the following message on the service processor terminal screen:

```
End of Execution  
A>
```

3. Run the utility program as directed in the program description.
4. After all utility programs are run, press the reset button or enter
MMMOST1

after the system prompt to restore MmmOST. Be sure to type MMMOST1 and not MMMOST. User stations are operable after a warm boot.

Table 5-2 shows the format used in the utility program descriptions.

Table 5-2 Utility Program Format

UTILITY	Name of the program, version number, release date, and copyright information.
PURPOSE	Description of what the utility is used for; tells when and how it should be used.
EXECUTION	Detailed explanation of how to call up the program and how to respond to each screen prompt.
COMMENTS	Additional useful information provided.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

The following utilities are among those included on your system tape:

<i>Name</i>	<i>Function</i>
DISKDUMP	Backs up entire contents of hard disk onto tape.
FIXDISK	Scans the hard disk for bad sectors. When a bad sector is found, it is assigned to a "dummy file." Dummy files stop the system from writing onto bad sectors. It is used in conjunction with SCANDUP.
SCANDUP	Scans the hard disk for duplicate directory entries created by FIXDISK.
TAPEDUMP	Transfers information from tape to the hard disk.
TOD	Allows you to set and examine the time and date for user stations. Time and date will appear on user station screens.

5.6.2 Utility Program Descriptions

The following pages contain descriptions of the individual utility programs. The programs are listed in alphabetical order. *READ ALL USER INSTRUCTIONS BEFORE ENTERING ANY COMMANDS.* All user responses are shown in bold print.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

UTILITY DISKDUMP
For TS 816/40
Configuration: Service Processor Terminal
Version 1.0
Release date 4 September 1981
Copyright TeleVideo Systems, Inc. 1981

PURPOSE DISKDUMP allows you to back-up all files on the hard disk onto tape.

DISKDUMP should be used on a daily basis in order to have a copy of current files.

When you run DISKDUMP, use a new tape or a tape with obsolete data. Any data on the tape used will be erased by DISKDUMP.



DISKDUMP WILL NOT WORK IF YOUR TAPE CARTRIDGE IS WRITE PROTECTED. MAKE SURE THE ARROW IS POINTED AWAY FROM THE WORD "SAFE."

EXECUTION

USER:

1. Enter

[drive:]DISKDUMP<CR>

where

[drive:] is the drive on which DISKDUMP is located if other than the currently active drive



The program TAPEDUMP.DAT AND TPUTILI.DAT must also be on the currently active drive in order for DISKDUMP to be run successfully.

SYSTEM:

2. Displays

DISKDUMP image to tape. V 1.0
14 Megabyte on 1/4" tape cartridge

*****CAUTION: ALL DATA ON THE CARTRIDGE TAPE WILL BE DESTROYED*****

Insert Cartridge tape into Drive

Type "Return" when ready, or "Control C" to Abort the program

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

- USER: 3. Insert a tape cartridge into tape drive.
4. Press
<CR>
- SYSTEM: 5. Displays
Tape Retention? ("Return" if NO, "Y" if YES)
- USER: 6. Enter
Y
- SYSTEM: 7. Displays
Tape retention in progress
Enter tape label (alphanumeric only), at end type "RETURN"
- USER: 8. Enter the name you wish to give the tape. The name could include
your name, date, time, etc. Restrict tape name to one line.
9. Press
<CR>
- SYSTEM: 10. Displays
The current logical drives in the hard disk are:
Drive A: Size of data image = xxx : Kilobyte
Drive B: Size of data image = xxx : Kilobyte
Drive C: Size of data image = xxx : Kilobyte
Drive D: Size of data image = xxx : Kilobyte
Hit "Control-C" to abort the program, or . . .
Enter drive name(s) (A, B, C, D, . . .) and hit "RETURN":
- USER: 11. Enter one (or all) of the drive names that you want to copy onto tape.
12. Press
<CR>

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

- SYSTEM: 13. Displays
Total size of data image on drive(s) (x,x,x,) is: ####
(This message tells how many megabytes of data are on the drive(s) to be copied to tape.)
CAUTION; ALL DATA ON THE CARTRIDGE TAPE WILL BE DESTROYED
Type "Return" when Ready or "Control-C" to Reselect Drive Name(s)
- USER: 14. a. Press
<CR>
if you have typed in the correct drive names
b. Press
^C
if you have typed incorrect drive names. In this case, you will be prompted to reselect drives.
- SYSTEM: 15. Displays
Tape Reinitialization in progress
Dump disk image in progress
Current hard disk track number is: xxx
16. Displays different track numbers as DISKDUMP progresses.
17. Displays
Dump disk to tape completed
A>
18. Once DISKDUMP is complete, the tape will automatically rewind itself. Any commands entered during the rewinding process will not be recognized by the system.



If you receive an error message during DISKDUMP, refer to Table 5-3.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

Table 5-3 DISKDUMP Error Messages

The following error messages may occur during the execution of DISKDUMP. Follow the user instructions to get back into the program.

ERROR MESSAGE 1

- SYSTEM:
1. Displays
DRIVE DOES NOT EXIST IN SYSTEM Hit "Control C" to abort the program, or
...
Enter drive name(s) (a, b, c, d . . .) and hit "Return":
- USER:
2. Check your entry to the system prompt in Step 10 (refer to the description of DISK-DUMP). You entered a drive name the system did not recognize. Your response should have been A, B, C and/or D.
 3. Press
<CR>
to reselect drive names
or
press
^C
to stop the program.

ERROR MESSAGE 2

- SYSTEM:
1. Displays
FILE "TAPEDUMP.DAT" CANNOT BE FOUND
(The file TAPEDUMP.DAT is not on the currently-selected drive. In order for DISKDUMP to run, TAPEDUMP.DAT must be on the same drive.)
- USER:
2. Call up a directory (DIR) on each drive to locate TAPEDUMP.DAT.
 3. Use the CP/M PIP utility program to transfer this file to the drive on which DISKDUMP is located.
 4. Run DISKDUMP again.

ERROR MESSAGE 3

- SYSTEM:
1. Displays
FILE "TPUTILI.DAT" CANNOT BE FOUND
(The file TPUTILI.DAT is not on the currently-selected drive. in order for DISKDUMP to run, TPUTILI.DAT must be on the same drive.)
- USER:
2. Call up a directory on each drive to locate TPUTILI.DAT.
 3. Use the CP/M PIP utility program to transfer this file to the drive on which DISKDUMP is located.
 4. Run DISKDUMP again.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

Table 5-3 Continued

ERROR MESSAGE 4

SYSTEM: 1. Displays
DISK SELECT ERROR

USER: 2. Run DISKDUMP again
or
run TAPEDUMP to perform disk diagnostics (the read test).

ERROR MESSAGE 5

SYSTEM: 1. Displays
DISK READ ERROR

USER: 2. Run DISKDUMP again
or
run TAPEDUMP to perform disk diagnostics (the read test).

ERROR MESSAGE 6


SYSTEM: 1. Displays
TAPE WRITE ERROR

USER: 2. Remove the tape cartridge and insert a new one.
3. Run DISKDUMP again.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

UTILITY	<p>FIXDISK For TS 816/40 Configuration: Service Processor Terminal Version 1.0 Release date: 4 September 1981 Copyright TeleVideo Systems, Inc. 1981</p>
PURPOSE	<p>FIXDISK inspects the hard disk for defective data areas. It builds a file called FILE.BAD containing the pointers associated with the defective data blocks. This file has a CP/M user designation of User 15 and the attributes of Read Only and System (no directory listing).</p> <p>FIXDISK can be used on any CP/M-compatible disk drive. The program should be run immediately after formatting or whenever a disk is suspected of having defective areas. During the execution of the program, no data is destroyed. Directory areas are not scanned.</p> <p>Run the program from the service processor terminal.</p>
COMMENTS	<p>While the program does not retrieve data which may already be on bad data blocks, it does prevent the system from using those areas for future data storage. This program is designed to be used in conjunction with the program SCANDUP. SCANDUP lists the files containing any resulting duplicate block pointers, allowing you to save and delete those files.</p>
EXECUTION	
USER:	<ol style="list-style-type: none">1. Enter [drive:]FIXDISK <drive name:><CR> where [drive:] is the drive on which FIXDISK is located if other than the currently active drive <drive name:> is the specified disk drive to be checked. Use A: for drive A and B: for drive B, etc. If no drive is specified, FIXDISK will check the currently-selected disk drive.
SYSTEM:	<ol style="list-style-type: none">2. Displays FIX DISK PROGRAM VER X.Y CURRENT SCANNING BLOCK:#__3. Displays the block numbers as they are scanned by the program.4. Displays FIXDISK COMPLETED WITH xxx DATA BLOCKS ERROR
USER:	<ol style="list-style-type: none">5. Run the program SCANDUP if the number of defective data blocks is other than 0000 and if there were files on the disk before you ran FIXDISK.6. Press ^S^C to abort the program any time during execution.

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- UTILITY SCANDUP
For TS 816/40
Configuration: Service Processor Terminal
Version 2.0
Release date: 24 February 1982
Copyright TeleVideo Systems, Inc. 1982
- PURPOSE SCANDUP searches for duplicate data block pointers which may exist on the directories of the specified logical disk drive. Duplicate pointers indicate that two files are attempting to "own" the same data, an improper and potentially harmful condition. (The pointers may be those placed by the program FIXDISK. FIXDISK places all pointers to bad disk blocks in a file named FILE.BAD.)
- SCANDUP lists the names of files which contain duplicate pointers so they can be erased. No data on the disk will be affected by running SCANDUP. SCANDUP should be run immediately after FIXDISK.
- EXECUTION
USER: 1. Enter
 [drive:]SCANDUP<CR>
 where
 [drive:] is the logical drive on which SCANDUP is located, if other than the currently active drive
- SYSTEM: 2. Displays
 SCAN DRIVE?
- USER: 3. Enter the logical drive that you wish to scan — A, B, C, etc. SCANDUP scans one drive at a time, so only enter one drive name.
4. Press
 <CR>
- 
- This program cannot be aborted.*
- SYSTEM: 5. Displays (if no duplicate pointers are found)
 no allocation blocks are duplicated in directory
 End of Execution
 A>
 or
 Displays (if duplicate pointers are found in the directory) a list of the files that contain the duplicate pointers.
-

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

- USER: 6. Enter
TYPE <filename> <CR>
to determine which file contains incorrect information.
7. Erase the file(s) that contains incorrect data.
8. Press
^C
(this enables the service processor to read the latest directory)

The example below shows SCANDUP run on a drive that had two files with identical data block pointers.

- USER: 1. Enter
SCANDUP<CR>
- SYSTEM: 2. Displays
SCAN DRIVE?
- USER: 3. Enter
A<CR>
- SYSTEM: 4. Displays
- | block | count | sector | entry | filename | user |
|-------|-------|--------|-------|----------|------|
| 035A | 2 | 14 | 2 | TEXT DOC | 00 |
| 035B | 2 | 14 | 2 | TEXT DOC | 00 |
| 035C | 2 | 14 | 2 | TEXT DOC | 00 |
| 035D | 2 | 14 | 2 | TEXT DOC | 00 |
| 035A | 2 | 14 | 3 | FILE BAD | 15 |
| 035B | 2 | 14 | 3 | FILE BAD | 15 |
| 035C | 2 | 14 | 3 | FILE BAD | 15 |
| 035D | 2 | 14 | 3 | FILE BAD | 15 |
- 4 allocation blocks are duplicated in directory
End of execution
A >

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS



Block refers to the disk allocation block number that is owned by multiple files in filename.

The term **count** indicates the number of times the block is owned (if more than once).

The **sector** tells the user the directory sector number where **filename** is located.

Entry is an index into the directory sector for **filename**.

Filename is the file which owns the block, and **user** is the CP/M-assigned user number that owns this file.

The error message tells the user that blocks 035A, 035B, 035C, and 035D are pointed to by the files TEXT.DOC and FILE.BAD. This indicates that TEXT.DOC has a bad sector.

- USER: 5. Transfer the file TEXT.DOC to drive B or C.
6. Erase TEXT.DOC from drive A. *DO NOT ERASE FILE.BAD.*
7. Enter
- TYPE <drive:> TEXT.DOC <CR>**
- to read the file and to determine how much incorrect data it contains.
8. Press
- [^]**C**
- SYSTEM: 9. Displays
- A>
- USER: 10. Enter
- DIR<CR>**
- SYSTEM: 11. Displays the latest directory.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

UTILITY TAPEDUMP
For TS 816/40
Configuration: Service Processor Terminal
Version 1.0
Release Date: February 1982
Copyright TeleVideo Systems, Inc. 1982

PURPOSE TAPEDUMP performs three functions:

1. Executes disk diagnostics to find and fix bad sectors on the hard disk
2. Transfers the system disk image (which includes CP/M and MmmOST) from tape to hard disk
3. Transfers files (by drive) from tape to hard disk.

The above TAPEDUMP functions are divided into three separate procedures. They are as follows:

Description	Refer to
Running disk diagnostics	Procedure A
Installing CP/M and MmmOST from tape to hard disk	Procedure B
Transferring files from tape to hard disk	Procedure C

PROCEDURE A RUNNING DISK DIAGNOSTICS

Disk diagnostics should be run:

- a. When you install the system disk image (which includes CP/M and MmmOST). By running diagnostics during system disk image installation, any bad sectors will be fixed before data is on the hard disk.
- b. If you have been storing data on the hard disk, and now suspect it contains defective areas.

The program offers the choice of running one of the following diagnostic checks: (a) the read test, (b) the write test, or (c) the format test.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

Read Test

The read test reads all the sectors on the hard disk. If a bad sector is found, it is reassigned to another area on the hard disk. The read test should be run whenever you suspect the hard disk has defective areas. When the read test is executed, data contained in the bad sector(s) is destroyed. Remaining data on the hard disk is not affected. The read test takes approximately 7 minutes to complete.

Write Test

The write test program performs an extensive write test followed by the read test. If a bad sector is found, it is reassigned to another area on the hard disk. The write test should be run the first time CP/M and MmmOST are installed. It should also be run if you have executed the read test (to fix bad sectors) and the hard disk still malfunctions. When the write test is executed, all data on the hard disk is destroyed. Be sure to back-up all files before running the write test. The write test takes approximately 12 minutes to complete.

Format Test

The format test program formats the hard disk and then performs the write test. The format test should only be executed if the read and write tests failed to fix the hard disk. When the format test is executed, all data on the hard disk is destroyed. Be sure to back-up all files before running the format test. The format test takes approximately one-half hour to complete.

Follow this procedure to run a diagnostic check during TAPEDUMP.

USER: 1. Enter

[drive:]TAPEDUMP<CR>

where

[drive:] is the drive on which TAPEDUMP is located if other than the currently active drive

SYSTEM: 2. Displays

TELEVIDEO SYSTEM TS 816/40
Restore disk image from tape, V1.X
14 Megabyte on 1/4" tape cartridge

Do you want to run disk diagnostics? ("Return" if No, "Y" if Yes)

USER: 3. Enter

Y

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

SYSTEM: 4. Displays
SELECT DIAGNOSTIC WINCHESTER HARD DISK??

Type "I" to select Internal Winchester hard disk
Type "E" to select External Winchester hard disk
Type "A" to Abort the diagnostic mode
<—Select the function above

USER: 5. Enter
I to run diagnostics on the TS 816/40 internal hard disk
or
E to run diagnostics on the TS 816H/40 external hard disk

SYSTEM: 6. Displays
DIAGNOSTIC FUNCTIONS

Type "R" to select Read-test
Type "W" to select Write-test
Type "F" to select Format disk
Type "A" to reselect Winchester hard disk
<—Select the function above



BE SURE TO BACK-UP ALL FILES ON THE HARD DISK BEFORE RUNNING THE WRITE OR FORMAT TEST. THESE TESTS WILL DESTROY ALL DATA ON THE HARD DISK.

USER: 7. Enter
R to run the read test
W to run the write test
F to format the hard disk
or
A to reselect the drive
(If you enter **A**, you will see the menu titled "SELECT DIAGNOSTIC WINCHESTER HARD DISK??".)

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

- SYSTEM: 8. Displays
Type "Return" when Ready, Control-C to reselect
- USER: 9. Press
<CR>
if you entered the correct test
or
press ^C to reselect the test.
- SYSTEM: 10. Displays one of the following (depending on the test you selected)
Read test in progress
Current hard disk track number is:
xxxx
or
Write test in progress
Current hard disk track number is:
xxxx
or
Format disk in progress
Current hard disk track number is:
xxxx
- SYSTEM: 11. Displays
(Read, Write or Format) test complete
DIAGNOSTIC FUNCTIONS

Type "R" to select Read-test
Type "W" to select Write-test
Type "F" to select Format disk
Type "A" to reselect Winchester hard disk
<—Select the function above

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

- USER: 12. Enter
A
to stop the diagnostics. Go to step 13.
or
enter
R, W, or F
to run a different test. If another test is run, refer to steps 8 through 11.
- SYSTEM: 13. Displays (once A is entered)
****SELECT DIAGNOSTIC WINCHESTER HARD DISK??****

Type "I" to select Internal Winchester hard disk
Type "E" to select External Winchester hard disk
Type "A" to Abort the diagnostic mode
 <—Select the function above
- USER: 14. Enter
A
- SYSTEM: 15. Displays
Insert Cartridge tape into drive Type "Return" when Ready, "Control-C" to Abort the program
- USER: 16. Enter
^C
to stop the program
or
<CR>
to install CP/M or MmmOST (Procedure B) or restore files from tape to the hard disk (Procedure C).

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

PROCEDURE B INSTALLING CP/M AND MmmOST

CP/M and MmmOST must be installed on the hard disk

1. The first time you operate the TS 816/40
2. If you run the write or the format test to correct a malfunctioning hard disk

Follow this procedure to install CP/M and MmmOST.

USER: 1. Enter

[drive:]TAPEDUMP<CR>

where

[drive:] is the drive on which TAPEDUMP is located if other than the currently active drive

SYSTEM: 2. Displays

TELEVIDEO SYSTEM TS 816/40
Restore disk image from tape, V1.X
14 Megabyte on 1/4" tape cartridge

Do you want to run disk diagnostics? ("Return" if No, "Y" if Yes)

USER: 3. a. Press

<CR>

if you have already run a diagnostic test. Go to Step 5.

or

b. Press

Y

if you are using the TS 816/40 for the first time. Refer to Procedure A and run the write test. All system prompts and user responses are listed. Once the write test is completed, return to Step 4 of this procedure.

SYSTEM: 4. Displays

Insert cartridge tape into drive
Type "Return" when ready, "Control-C" to Abort the program

USER: 5. Insert the system tape into the tape drive.

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6. Press
<CR>
7. Displays
Tape Retension? ("Return" if NO, "Y" if YES)
8. Enter
Y
9. Displays
Tape Retension in progress
Reading of tape label in progress
Label of current tape is:
<system will read tape label>
Correct tape? ("Return" if NO, "Y" if YES)
- USER: 10. Read the tape label.
11. Make sure this is the system tape.
12. Enter
Y
if it is the correct tape
or
press
<CR>
if it is the incorrect tape. Insert the correct tape into the tape drive.
You will receive the prompt in Step 4 again.
- SYSTEM: 13. Displays
Restore system image onto disk from tape, ("Return" if NO, "Y" if YES)
- USER: 14. Enter
Y
- SYSTEM: 15. Displays
Restore system complete
Continue? ("Return" if NO, "Y" if YES)

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- USER: 16. Press
Y
- SYSTEM: 17. Displays
Restore disk A: from tape, ("Return" if NO, "Y" if YES)
- USER: 18. Press
Y
- SYSTEM: 19. Displays
Restore disk B: from tape, ("Return" if NO, "Y" if YES)
- USER: 20. Press
Y
- SYSTEM: 21. Displays
Restore disk C: from tape, ("Return" if NO, "Y" if YES)
- USER: 22. Press
Y
- SYSTEM: 23. Displays
CAUTION: ALL DATA ON SPECIFIED DISK(S) WILL BE DESTROYED
Type "Return" when ready, or "Control-C" to reselect drive
- USER: 24. Press
<CR>
- SYSTEM: 25. Displays
Restore from tape in progress
Current hard disk track number is:
xxxx
Self-testing in progress (TS-816/40 PROM VX.X)
HIT ESCAPE KEY TO BOOT FROM TAPE
26. Do not press the escape key; wait five seconds.

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27. Listen for a humming sound after five seconds have passed. The system is booting from the hard disk.

PROCEDURE C TRANSFERRING FILES FROM TAPE TO THE HARD DISK

Follow this procedure to transfer data files from tape to the hard disk.

- USER: 1. Enter
 [drive:]TAPEDUMP<CR>
 where
 [drive:] is the drive on which TAPEDUMP is located if other than the currently active drive
- SYSTEM: 2. Displays
 TELEVIDEO SYSTEM TS 816/40
 Restore disk image from tape, V1.X
 14 Megabyte on 1/4" tape cartridge
 Do you want to run disk diagnostics?
 ("Return" if No, "Y" if Yes)
- USER: 3. Press
 <CR>
- SYSTEM: 4. Displays
 Insert cartridge tape into drive
 Type "Return" when Ready, "Control-C" to Abort the program
- USER: 5. Insert the tape cartridge containing the data to be copied to the hard disk into the tape drive.
6. Press
 <CR>
- SYSTEM: 7. Displays
 Tape Retension? ("Return" if NO, "Y" if YES)
- USER: 8. Enter
 Y

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

- SYSTEM: 9. Displays
Tape Retension in progress
Reading of tape label in progress
Label of current tape is:
<system will read tape label>
Correct tape? ("Return" if NO, "Y" if YES)
- USER: 10. Read the tape label. This name was given to the tape during the DISKDUMP process.
11. Make sure this is the tape that contains the data you want to transfer.
12. Enter
Y
if it is the correct tape
or
press
<CR>
if it is the incorrect tape. Insert the correct tape into the tape drive.
You will receive the prompt in Step 4 again.
- SYSTEM: 13. Displays
Restore system image onto disk from tape, ("Return" if NO, "Y" if YES)
- USER: 14. Press
<CR>
- SYSTEM: 15. Displays
Continue? ("Return" if NO, "Y" if YES)
- USER: 16. Enter
Y

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

SYSTEM:

17. Displays

Restore disk A: from tape, ("Return" if NO, "Y" if YES)
Restore disk B: from tape, ("Return" if NO, "Y" if YES)
Restore disk C: from tape, ("Return" if NO, "Y" if YES)
Restore disk D: from tape. ("Return" if no, "Y" if yes)



The only "Restore" . . ." prompts which you will see on the screen are the ones which apply to the tape. For instance, if drive A and drive C were the only drives originally copied to the tape, you will see the following:

*Restore disk A: from tape, <etc.>
Restore disk C: from tape, <etc.>*

These prompts will appear one at a time. If you elect to restore the data on the drives, the data will be restored to the original drives on the hard disk. (Data originally from drive A will be restored to drive A.)

USER:

18. Look at the restore prompt on your screen.

19. Enter

Y

to copy the drive to the hard disk

or

press

<CR>

to bypass the drive.

20. Follow the procedure in Step 20 for each restore prompt you see.

21. To stop the program at this point, press

<CR>

for all restore prompts.

SYSTEM:

22. Displays


*****CAUTION: ALL DATA ON SPECIFIED DISK(S) WILL BE DESTROYED*****

Type "Return" when ready, or "Control-C" to reselect drive

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

- USER: 23. Press
 <CR>
 if you correctly selected the drive(s)
 or
 press
 ^C
 to reselect drives.
- SYSTEM: 24. Displays
 Restore from tape in progress
 Current hard disk track number is:
 xxxx
25. Displays (if system was booted from the hard disk)
 Restore disk image from tape completed
 or
 displays (if system was booted from the system tape)
 Self-testing in progress. (TS-816/40 PROM VX.X)
 HIT ESCAPE KEY TO BOOT FROM TAPE
- USER: 26. Do not press the escape key if you received the second prompt in
 Step 25.
27. Wait five seconds.
28. Listen for a humming sound after five seconds have passed. The
 TS816/40 is booting from the hard disk. When the sound stops, user
 stations are operable.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

UTILITY	TOD For TS 816/40 Configuration: Service Processor Terminal/User Station Version 3.0 Release Date: September 1982 Copyright TeleVideo Systems, Inc. 1982
PURPOSE	<p>The TOD utility program allows you to examine and set the correct time and date on your screen. When you power on or reset your system, the local time and date are reset to 0. Use TOD to change this initial value, at your option, to the current date and actual time.</p> <p>The date is represented as a month value in the range from 1 to 12, a day value in the range of 1 to 31, and a four-digit year value.</p> <p>Time is represented as a twenty-four hour clock, with the hour value from 00 to 11 for morning, and 12 to 23 for the afternoon.</p>
COMMENTS	You must specify a four-digit value for the year (yy). If a two-digit value is entered, the program will assume that the specified year is to be relative to the year 1900.
EXECUTION	<p>There are three ways to use this program:</p> <ol style="list-style-type: none">1. To set the time and date from service processor terminal or user station2. To display the time and date continuously on a user station3. To call up the time and date on a user station or service processor terminal <p>To set the time and date on the system:</p>
USER:	<ol style="list-style-type: none">1. Enter TOD S>mm/dd/yy hh:mm:ss<CR> where mm/dd/yy = month/day/year hh:mm:ss: = hour:minute:second
	<p style="text-align: center;"></p> <p><i>This can be done at a service processor terminal or at a user station.</i></p>
SYSTEM:	<ol style="list-style-type: none">2. Displays Press any key to set time and date
USER:	<ol style="list-style-type: none">3. When the time you specified in your command occurs, press any key. TOD begins timing at that instant. The system time has been set at this point.

5. USING TAPE CARTRIDGES AND UTILITY PROGRAMS

To display local time (previously set in user stations at power on/reset) continuously on the user station screens, enter the following command:

USER: 1. Enter
 TOD P<CR>

SYSTEM: 2. Displays
 Current date and time is:
 mm/dd/yy/ hh:mm:ss
 (This message will remain on the screen until you press another key.)

After setting the time and day at power on, user stations can call up the local and system current date and time using the following command:

USER: 1. Enter
 TOD<CR>

SYSTEM: 2. Displays
 Current system date and time is: mm/dd/yy hh:mm:ss
 Current local date and time is: mm/dd/yy hh:mm:ss

6. SYSTEM TROUBLESHOOTING AND GENERAL MAINTENANCE

6.1 CARE

Periodic preventive maintenance will prolong the useful life of your TS 816/40.

6.1.2 Cleaning

Clean the TS 816/40 periodically. The parts which need the most attention are the case and the tape drive components. To clean the case, use a soft, lint-free cloth and a commercial detergent. *Do not use solvent-based or abrasive cleaners.* To clean the tape drive components, read 6.2.

6.2 TAPE DRIVE CLEANING

Three components of the tape drive require periodic maintenance in order to ensure overall system reliability:

1. Erase/read/write heads
2. Tape cleaner
3. Motor capstan

Refer to Figure 6-1 for the location of these components when cleaning and maintaining the tape drive.

6.2.1 Erase/Read/Write Heads

The magnetic erase/read/write heads should be cleaned daily if you use the tape drive often. Dirty heads can cause data dropouts (a condition in which data is not read in its entirety) and error conditions during read or write operations.

To clean the erase/read/write heads, follow these steps:

1. Using a noncorrosive cleaning agent which does not leave residue and a cotton swab, dip the cotton swab into the cleaning agent.
2. Squeeze the cotton of any excess cleaning agent. (The swab should be wet but not dripping.)
3. Locate the erase/read/write heads (refer to Figure 6-1).
4. Gently clean the heads with the swab.
5. Wipe off any cleaning liquid that may have dripped from the swab.
6. Allow the heads to dry before operating the unit.

6.2.2 Tape Cleaner

The tape cleaner in the drive removes loose tape oxide and other foreign materials from the tape itself before it contacts the head. This foreign material accumulates in and around the tape cleaner and must be removed periodically if the tape cleaner is to function properly.

Follow these steps to clean the tape cleaner:

1. Insert a folded sheet of paper in the bottom of the cleaning slot of the tape cleaner (Figure 6-1).

6. SYSTEM TROUBLESHOOTING AND GENERAL MAINTENANCE

2. Lift the paper up against the bottom of the tape cleaner. This will lift the foreign material gathered around the tape cleaner. You could also use an air brush or compressed air to blow the residue out.

6.2.3 Motor Capstan

To clean the motor capstan, follow these steps:

1. Using isopropyl alcohol and a cotton swab, dip the cotton swab into the alcohol.
2. Follow Steps 2 through 6 of 6.2.1



DO NOT ALLOW CLEANING SOLVENTS TO CONTAMINATE THE DRIVE MOTOR (shown in Figure 6-1).

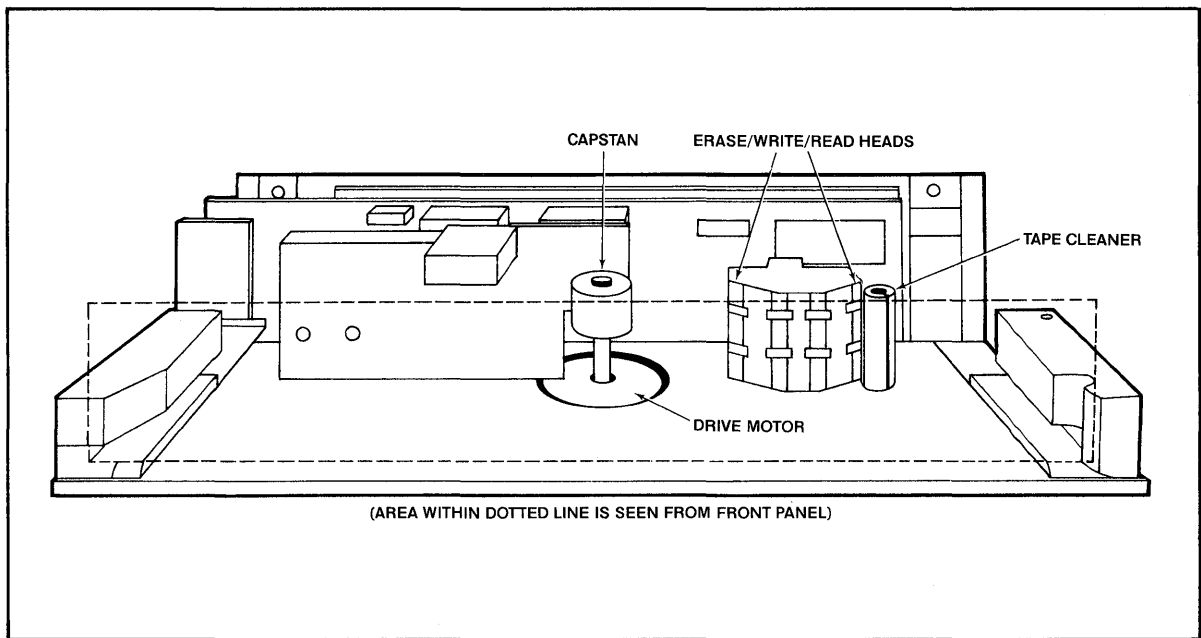


Figure 6-1 Tape Drive Components Requiring Cleaning

Table 6-1 Troubleshooting Procedures

1. IF THE TS 816/40 IS NOT ON AFTER POWER SWITCH IS TURNED ON AND
 - a. TS 816/40 DOES NOT MAKE ANY NOISE (FAN IS OFF)
 - Unplug power cord and plug it in again.
 - Plug something else into the same wall outlet and test for power.
 - Check the line fuse (as described in 6.3) and replace it if necessary.

6. SYSTEM TROUBLESHOOTING AND GENERAL MAINTENANCE

Table 6-1 Continued

- b. FAN IS ON BUT SYSTEM PROMPT DOES NOT APPEAR ON SERVICE PROCESSOR TERMINAL SCREEN
Push the reset button on the TS 816/40.
- c. SERVICE PROCESSOR TERMINAL SCREEN DISPLAYS SYSTEM PROMPT BUT DOES NOT RESPOND TO OPERATOR COMMAND
Push the reset button on the TS 816/40.
2. *TS 816/40 IS ON, BUT THERE IS NO RESPONSE FROM ANY USER STATION*
Check the power specifications in Appendix A. Make sure they are correct.
Check the fuses in the TS 816/40 and in the user stations. The TS 816/40 has one exterior fuse. See 6.3.
Make sure cables used are appropriate (refer to Appendix J).
Check the cable connections. Make sure they are secure.
Make sure the peripherals are connected to the correct ports on the rear panel of the TS 816/40.
Check to see if the TS 816/40 is operational; follow these steps:
- (1) Connect a terminal to the TS 816/40 TERMINAL port.
 - (2) Press the TS 816/40 reset button. The system should then boot from the hard disk. Either the system message will be displayed on the service processor terminal screen (verifying the TS 816/40 is operational) or a hardware error message will be displayed (TS 816/40 is not operational).



IF THERE IS STILL NO RESPONSE, TURN OFF ALL POWER AND CALL YOUR DEALER. THE HARD DISK MAY BE DEFECTIVE.

3. *TS 816/40 IS ON, BUT THERE IS NO RESPONSE FROM AN INDIVIDUAL USER STATION*
Check the cable connecting the nonfunctioning user station to the TS 816/40; make sure it is secure.
Replace the cable with a new cable.
Check the fuse at the nonfunctioning user station; is it good or burned out? See 6.3.
To check the communications controller contained in the USER port to which the unresponsive station is connected, follow these steps:
- (1) Turn off the power to two user stations—the unresponsive user station and a working user station.
 - (2) Disconnect the unresponsive user station's RS422 cable from its USER port on the TS 816/40 and from the appropriate port on the rear of the user station.
 - (3) Disconnect the working user station's RS422 cable from its USER port on the TS 816/40 unit and from the appropriate port on the rear panel of the user station.
 - (4) Connect the unresponsive user station to the responsive user station's TS 816/40 port.
 - (5) Connect the responsive user station to the unresponsive user station's TS 816/40 port.
 - (6) Turn on the power to the two user stations.
- If the originally unresponsive user station now works and the originally working user station does not work, the problem is with the communications controller associated with the malfunctioning USER port on the TS 816/40. *CALL YOUR DEALER.*
-

6. SYSTEM TROUBLESHOOTING AND GENERAL MAINTENANCE

6.3 Changing the Exterior Fuse

The exterior fuse of the TS 816/40 is located on the rear panel.

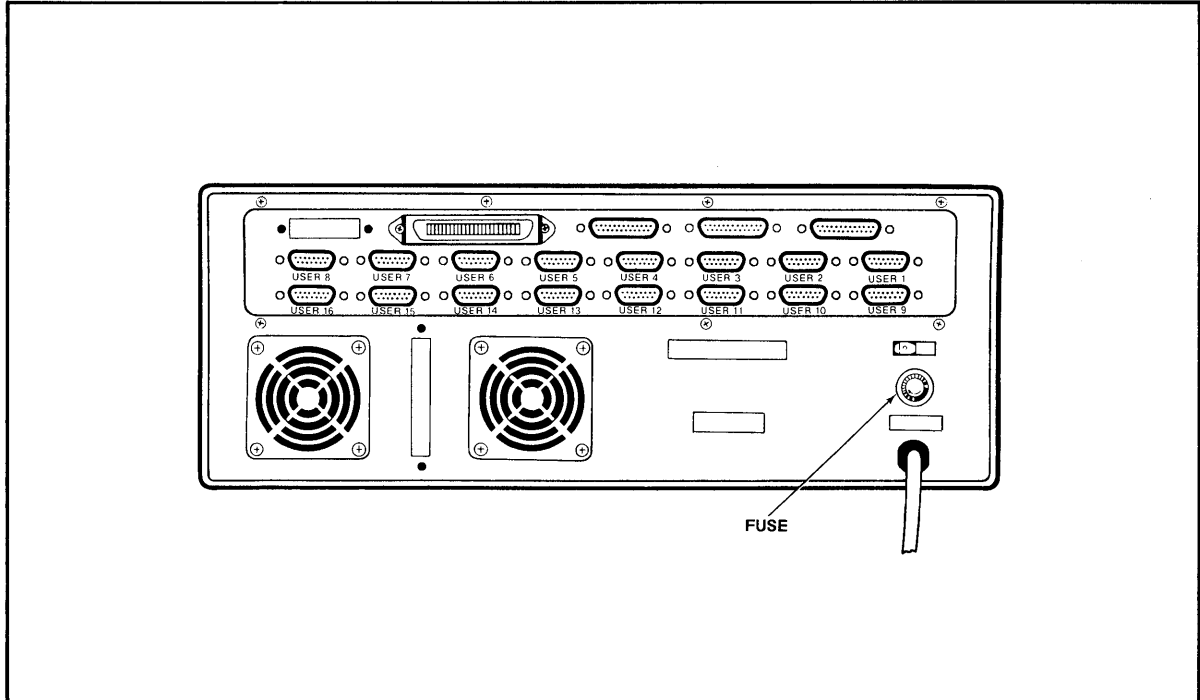


Figure 6-2 Location of Exterior Fuse

To check and/or change this fuse, unscrew the fuse holder (see Figure 6-2). The fuse is a small glass cylinder. If the thin wire inside the fuse is still intact, the fuse should be functional. If the thin strip is broken and/or if the glass is slightly black, the fuse is burned out and must be replaced. If the glass is totally black, do not replace the fuse. The problem could be with the system or with the wall outlet. Call your dealer.

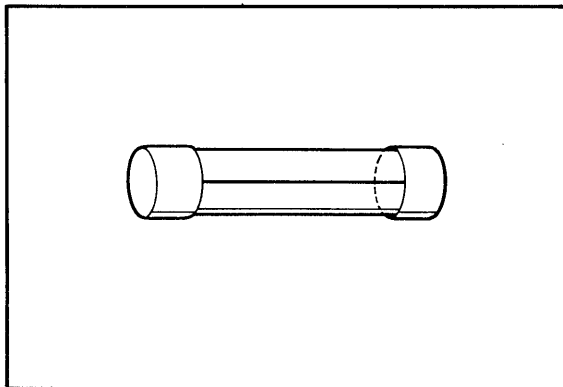


Figure 6-3 Good Fuse

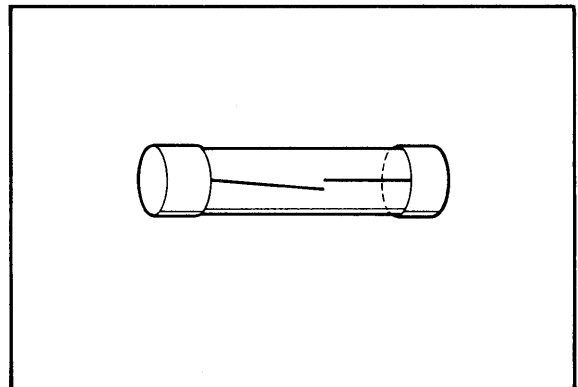


Figure 6-4 Burned Out Fuse

6. SYSTEM TROUBLESHOOTING AND GENERAL MAINTENANCE

To replace the fuse, slip it out of the fuse holder and insert a new fuse. The fuse rating is shown on a label above the fuse holder. You can purchase new fuses from your dealer.

If the newly replaced fuse burns out immediately, do not replace it with another. Call your dealer.

6.4 HOW TO GET SERVICE

6.4.1 During Warranty

If you need service on your computer while it is under TeleVideo's limited warranty, call your dealer and he will obtain a Return Material Authorization number for you. (Refer to the Limited Warranty in Appendix B for a detailed description of service provided under warranty.) In cases of extreme emergency, you might want to either pay for overnight delivery to and from TeleVideo's factory or have the unit serviced by one of the third-party maintenance centers. If a maintenance center repairs it under warranty, you will be invoiced by the maintenance center for labor charges. Your dealer can help you arrange for emergency warranty repair.

6.4.2 On-Site Service After Warranty

You can obtain on-site service after warranty from any of the maintenance centers in the United States.

6.4.3 Information Needed for Service

When you call for service, you will be asked for the serial number of your system. The serial number is located on a label at the top center of the rear panel (Figure 6-5). For future reference, note the serial number, the date you took delivery, and the name and phone number of your dealer and service center in the space below.

Model TS 816/40 Serial No. _____ Delivery Date _____

Dealer _____ Phone No. _____

Service Center _____ Phone No. _____

Should your company require a purchase order for out-of-warranty repairs, have the purchase order number ready when you call in. One purchase order may cover several repairs but we will give each unit its own individual RMA number. This allows us to return each item quickly and not hold up the entire purchase order because of one item.

6. SYSTEM TROUBLESHOOTING AND GENERAL MAINTENANCE

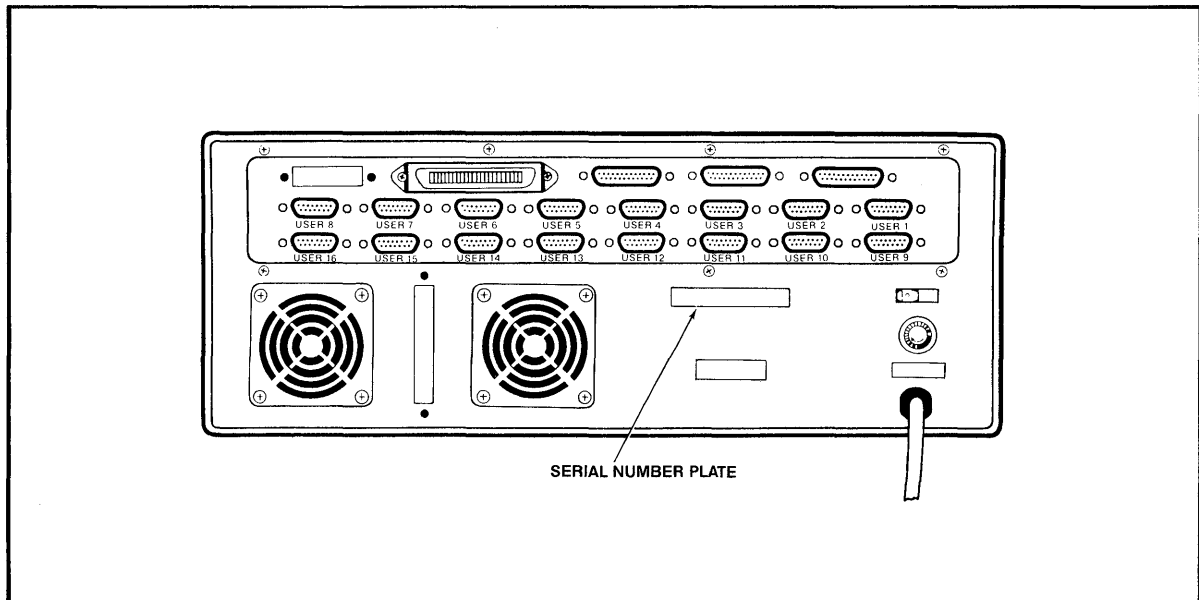


Figure 6-5 Location of Serial Number on Rear Panel

6.4.4 Reshipping the TS 816/40

Should you need to reship the TS 816/40, follow this procedure:

1. If the TS 816/40 is turned on, turn it off. Wait about 20 seconds and turn the power on again. If the TS 816/40 is turned off, turn it on.
2. About 23 seconds after the power is turned on, you will hear a humming sound from the hard disk. Turn off the power within 3 seconds after hearing the sound.
3. Remove the top cover with a Phillips screwdriver as described in 2.4.3.
4. Find the hard disk locking lever (shown in Figure 2-6). The lever should be in the FREE position if you have been using your TS 816/40.
5. Move the hard disk locking lever to the LOCKED position.
6. Carefully replace the top cover and reinsert the screws. Do not overtighten the screws.



DO NOT ATTEMPT TO MOVE OR SHIP THE TS 816/40 WITHOUT FIRST MOVING THE HARD DISK LOCKING LEVER TO THE LOCKED POSITION.

7. Repack the TS 816/40 in the original TeleVideo shipping container or other suitable materials.

6.4.5 Technical Assistance

If you have any technical problems with your system, call your dealer or distributor.

APPENDICES

- A. TS 816/40 SPECIFICATIONS
 - B. STATEMENT OF LIMITED WARRANTY
 - C. SUGGESTED REFERENCES
 - D. DEVICE ASSIGNMENTS
 - E. CONNECTOR ASSIGNMENTS OF THE TS 816/40 BOARD
 - F. PARALLEL PORT PIN ASSIGNMENTS
 - G. PIN ASSIGNMENTS OF RS232 CONNECTIONS (P2, P8, P9)
 - H. PORT ASSIGNMENTS
 - I. BUYING ADDITIONAL TAPE CARTRIDGES
 - J. CABLE SPECIFICATIONS
 - K. USING THE TIME AND DATE CAPABILITY IN APPLICATIONS PROGRAMS
-
-

APPENDIX A TS 816/40 SPECIFICATIONS

Microprocessor	Z80A 4 MHz
Memory	Two banks of 64K RAM for a total of 128K dynamic RAM 4K EPROM
OFF LINE STORAGE	
Type	1/4-inch tape cartridge
Technology	Start/Stop
Data Transfer	192 Kbits/sec
Capacity	17.3 Mbytes (unformatted) 14.5 Mbytes (formatted)
ON LINE STORAGE	
Type	8-inch hard disk
Technology	Winchester
Capacity	42.7 Mbytes (unformatted) 33.2 Mbytes (formatted)
Access Time	30 ms (minimum) 70 ms (average) 140 ms (maximum)
Data Transfer	593 Kbits/sec
Operating System	MmmOST with CP/M
Ports	One parallel Centronics-type Three RS232 serial: One TERMINAL (restricted service) Two for modem or printer (9600 baud, eight data bits, one stop bit) Sixteen high-speed RS422 user ports (800 Kbits/sec)
Power Requirements	115/230 \pm 12 VAC, 50/60 Hertz, 200 Watts
Power Consumption	3 amp maximum at 115 VAC 2 amp maximum at 230 VAC
ENVIRONMENTAL REQUIREMENTS	
Temperature	Computer: 32–120 degrees Fahrenheit (0–50 degrees Centigrade) Tape Cartridge: 50–85 degrees Fahrenheit
Humidity	Computer: maximum 95 percent relative noncondensing
Altitude	Maximum: 10,000 feet above sea level
Dimensions	Width: 17.5 in. (43.8 cm.) Length: 21.0 in. (52.5 cm.) Height: 7.25 in. (18.2 cm.) Weight: 52.0 lbs. (23.64 kg.)

APPENDIX B LIMITED WARRANTY

TeleVideo Systems, Inc. ("TeleVideo") warrants to Buyer that products, except software, manufactured by TeleVideo will be free from defects in material and workmanship. TeleVideo's obligations under this warranty will be limited to repairing or replacing, at TeleVideo's option, the part or parts of the products which prove defective in material or workmanship within 90 days after shipment by TeleVideo, provided that Buyer gives TeleVideo prompt notice of any defect and satisfactory proof thereof. Products may be returned by Buyer only after a Return Material Authorization number (**RMA**) has been obtained from TeleVideo by telephone or in writing. Buyer will prepay all freight charges to return any products to the repair facility designated by TeleVideo and include the RMA number on the shipping container. TeleVideo will deliver replacements for defective products or parts on an exchange basis to Buyer, freight prepaid to the Buyer. Products returned to TeleVideo under this warranty will become the property of TeleVideo. With respect to any product or part thereof not manufactured by TeleVideo, only the warranty, if any, given by the manufacturer thereof, will apply.

EXCLUSIONS

This limited warranty does not cover losses or damage which occurs in shipment to or from Buyer, or is due to (1) improper installation or maintenance, misuse, neglect or any cause other than ordinary commercial or industrial application or (2) adjustment, repair or modifications by other than TeleVideo authorized personnel or (3) improper environment, excessive or inadequate heating or air conditioning and electrical power failures, surges or other irregularities or (4) any statements made about TeleVideo's products by salesmen, dealers, distributors or agents, unless confirmed in writing by a TeleVideo officer.

THE FOREGOING TELEVIDEO LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL, WRITTEN, EXPRESS, IMPLIED OR STATUTORY. IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WILL NOT APPLY. TELEVIDEO'S WARRANTY OBLIGATIONS AND BUYER'S REMEDIES HEREUNDER ARE SOLELY AND EXCLUSIVELY AS STATED HEREIN. TELEVIDEO MAKES NO WARRANTY WHATSOEVER CONCERNING ANY SOFTWARE PRODUCTS, WHICH ARE SOLD "AS IS" AND "WITH ALL FAULTS."

TELEVIDEO'S LIABILITY, WHETHER BASED ON CONTRACT, TORT, WARRANTY, STRICT LIABILITY OR ANY OTHER THEORY, SHALL NOT EXCEED THE PRICE OF THE INDIVIDUAL UNIT WHOSE DEFECT OR DAMAGE IS THE BASIS OF THE CLAIM. IN NO EVENT SHALL TELEVIDEO BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF USE OF FACILITIES OR EQUIPMENT, OR OTHER INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

APPENDIX C SUGGESTED REFERENCES

The following books will be useful references:

1. Fernandez, Judi N. and Ruth Ashley, *Using CP/M: A Self Teaching Guide*, John Wiley and Sons, 605 Third Avenue, New York, New York, 1980, \$8.95.

(This is an excellent self-teaching guide, highly recommended for the user unfamiliar with CP/M but perhaps familiar with computers. Assumes no prior knowledge about operating systems.)

2. Hogan, Thom, *Osborne CP/M User Guide*, Osborne/McGraw-Hill, 630 Bancroft Way, Dept. UB, Berkeley, CA 94710, \$12.99.

(A complete book for the beginning computer operator. Covers all aspects of computer operation and CP/M use. Organization and presentation are outstanding.)

3. Zaks, Rodney, *The CP/M Handbook with MP/M*, SyBex, 2344 Sixth Street, Berkeley, CA 94710 (415/848-8233), 1980, \$13.95.

(Giving very complete details of CP/M, this book gives more detail than many beginners will want.)

4. *CP/M Summary Guide for Versions 1.4 and 2.X*, edited by Bruce Brigham, The Rosetta Stone, Post Office Box 35, Glastonbury, CT, 06025, 203/633-8490, \$6.95 plus \$1.00 postage and handling.

5. Murtha, Stephen M. and Mitchell Waite, *CP/M Primer*, Howard W Sams & Co., Inc, 4300 West 62nd St., Indianapolis, Indiana 46268, \$14.95.

(An excellent introduction to both CP/M and microcomputers.)

6. Townsend, Carl, *How to Get Started with CP/M*, Dilithium Press, Post Office Box 606, Beaverton, Oregon 97075, \$9.95

(A succinct discussion of CP/M. Also includes a listing of CP/M software suppliers.)

TeleVideo welcomes comments from you about these books as well as names of others which you find useful.

APPENDIX D DEVICE ASSIGNMENTS

Console field (bit 0,1). System default console device (CRT:)

- 0 Console is assigned to the console printer (TTY:)¹
- 1 Console is assigned to the CRT device (CRT:)²
- 2 Batch mode. Use the reader as the console input, and the list device as the console output (BAT:)³
- 3 User-defined console device (UC1:)⁴

Notes

1. When the console device is assigned as TTY:, the TS 816/40 CP/M BIOS will use the "first" serial printer port for CP/M console I/O handling.
2. When the console device is assigned as CRT:, the TS 816/40 CP/M BIOS will use the "service" terminal port for CP/M console I/O handling.
3. When the console device is assigned as BAT:, the TS 816/40 CP/M BIOS will use the reader device as the console input and the list device as the console output.
4. UC1: is not implemented in the TS 816/40 CP/M BIOS.

BIOS Return Code is A-Register = 0FFH (output not busy condition) for console status read

A-Register = 1AH (end of file code) for reading console input data.

Simply return for console output data.

Reader field (bit 2,3). System default reader device is RDR:

- 0 Reader is the teletype device (TTY:)¹
- 1 Reader is the highspeed reader device (RDR:)²
- 2 User-defined reader device No. 1 (UR1:)³
- 3 User-defined reader device No. 2 (UR2:)³

Notes

1. When the reader device is assigned as TTY:, the TS 816/40 CP/M BIOS will use the RS232 service processor terminal port as the input device for the reader device.
2. When the reader device is assigned as RDR:, the TS 816/40 CP/M BIOS will use the RS232 serial port No. 1 as the input device for the reader device.
3. UR1: and UR2: are not implemented in the TS 816/40 CP/M BIOS.

BIOS Return Code is A-Register = 1AH (immediate end-of-file) is used for reading the reader device input data

Punch field (bit 4,5). System default punch device is PUN:.

- 0 Punch is the teletype device (TTY:)¹
- 1 Punch is the highspeed punch device (PUN:)²
- 2 User-defined punch device No. 1 is UP1:)³
- 3 User-defined punch device No. 2 is UP2:)³

Notes

1. When the punch device is assigned as TTY:, the TS 816/40 CP/M BIOS will use the RS232 service processor terminal port as the output device for punch.
2. When the punch device is assigned as PUN:, the TS 816/40 CP/M BIOS will use the RS232 serial port No. 1 as the output device for punch.
3. UP1: and UP2: are not implemented in the TS 816/40 CP/M BIOS. The punch routine will simply return.

APPENDIX D DEVICE ASSIGNMENTS

List field (bit 6,7). System default list device is TTY:.

- 0 List is the teletype device (TTY):¹
- 1 List is the CRT device (CRT):²
- 2 List is the line printer device (LPT):³
- 3 User-defined list device is UL1:⁴

Notes

1. When the list device is assigned as TTY:, the TS 816/40 CP/M BIOS will use the RS232 serial port No. 1 as the output device for list.
2. When the list device is assigned as CRT:, the TS 816/40 CP/M BIOS will use the service processor terminal port as the output device for list.
3. When the list device is assigned as LPT:, the TS 816/40 CP/M BIOS will use the parallel output port (Centronics-type printer interface) as the output device for list.
4. UL1: is not implemented in the TS 816/40 CP/M BIOS for reading status; it simply returns with output ready. For outputting data to the list device, simply return.

APPENDIX E CONNECTOR ASSIGNMENTS ON THE TS 816/40 BOARD

CONNECTOR NO.	DESCRIPTION
P1	POWER
P2	RS232C, TERMINAL INTERFACE
P3	CARTRIDGE TAPE INTERFACE
P4	CENTRONICS-TYPE PRINTER INTERFACE
P5	WINCHESTER DISK DRIVE INTERFACE
P6	TS816/40U BOARD INTERFACE (1ST BOARD)
P6A	TS816/40U BOARD INTERFACE (2ND BOARD)
P7	RESET INTERFACE
P8	RS232C # 1 Printer
P9	RS232C # 2 Modem

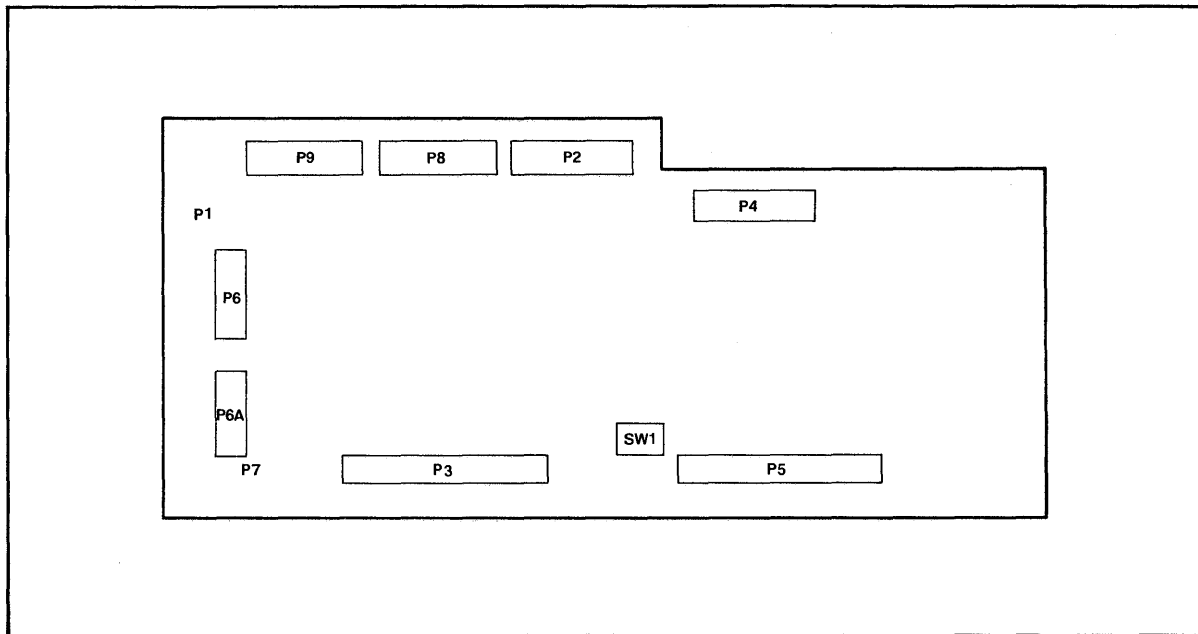


Figure E-1 Connector Assignments

APPENDIX F P4 PIN ASSIGNMENTS (PARALLEL PORT)

Pin No. On Rear Panel		Pin No. On TS 816/40 Board		Z80A PIO Data Bus Description (Port/ Data Bit)	Description ²
1	19	1	2 ¹	D0/0	–Data strobe
2	20	3	4 ¹	D1/0	Data 0
3	21	5	6 ¹	D1/1	Data 1
4	22	7	8 ¹	D1/2	Data 2
5	23	9	10 ¹	D1/3	Data 3
6	24	11	12 ¹	D1/4	Data 4
7	25	13	14 ¹	D1/5	Data 5
8	26	15	16 ¹	D1/6	Data 6
9	27	17	18 ¹	D1/7	Data 7
10	28	19	20 ¹	BSTB/PIO	–Acknowledge
11	29	21	22 ¹	D0/5	Busy
12		23		D0/4	Paper Empty (1)
	30	24			Unused (2)
13		25		D0/6	Select (3)
	31	26		D0/1	Unused (4)
14		27			Unused (5)
	32	28		D0/3	–Fault (6)
15		29			Unused
	33	30		D0/2	Light detect (6)
16		31			Ground
	34	32			Unused
17		33			Ground
	35	34			Unused
18		35			Unused
	36	36			Unused
		37–40			Unused

1 Return pin

2 – = active low

- (1) Grounded (no paper empty) if Jumper “W5” is connected.
- (2) Grounded if Jumper “W6” is connected.
- (3) Always High (select enabled) if Jumper “W4” is connected.
- (4) “Input Prime” is generated if Jumper “W8” is connected.
- (5) Grounded if Jumper “W7” is connected.
- (6) Grounded (no light detect) if Jumper “W2” is connected.

APPENDIX G P2, P8, P9 PIN ASSIGNMENTS (RS232)

Pin No.	Description
1	FRAME GROUND
2	- TRANSMIT DATA
3	- RECEIVE DATA
4	+ REQUEST TO SEND
5	+ CLEAR TO SEND
7	SIGNAL GROUND
8	+ DATA CARRIER DETECT
15	+ TRANSMIT CLOCK INPUT (ONLY IN P9)
17	+ RECEIVE CLOCK INPUT (ONLY IN P9)
20	+ DATA TERMINAL READY
24	+ TRANSMIT CLOCK OUTPUT (ONLY IN P9)
25	(IN P2, RESERVED FOR MANUFACTURER'S USE) (IN P8 & P9, NO CONNECTION)

NOTES:

1. P9 is configured for connection to a modem.
P8 is configured for connection to a serial printer.
P2 is configured for connection to a terminal.
2. Polarity of Data Signals: - (Negative): True
Polarity of Control Signals: + (Positive): True

APPENDIX H PORT ASSIGNMENTS

Description	Address Bit No.								Hex Value
	7	6	5	4	3	2	1	0	
TAPE STATUS BYTE 1	0	0	0	0	0	0	0	0	00
TAPE STATUS BYTE 2 AND DIAGNOSTIC MODE	0	0	0	0	0	0	0	1	01
TAPE OUTPUT LATCH BYTE 2	0	0	0	0	0	1	0	0	04
TAPE OUTPUT LATCH BYTE 1	0	0	0	0	0	1	0	1	05
INDICATOR LOAD (LED)	0	0	0	0	0	1	1	1	07
SIO No. 0:									
CHANNEL A									
DATA	0	1	0	1	0	X	0	0	50
COMMAND/STATUS (RS232 TERMINAL)	0	1	0	1	0	X	1	0	52
CHANNEL B									
DATA	0	1	0	1	0	X	0	1	51
COMMAND/STATUS (TAPE INTERFACE)	0	1	0	1	0	X	1	1	53
SIO No. 1:									
CHANNEL A									
DATA	0	0	0	1	0	X	0	0	10
COMMAND/STATUS (USER 1)	0	0	0	1	0	X	1	0	12
CHANNEL B									
DATA	0	0	0	1	0	X	0	1	11
COMMAND/STATUS (USER 2)	0	0	0	1	0	X	1	1	13

APPENDIX H PORT ASSIGNMENTS

Description	Address Bit No.								Hex Value
	7	6	5	4	3	2	1	0	
SIO No. 2:									
CHANNEL A									
DATA	0	0	1	0	0	X	0	0	20
COMMAND/STATUS (USER 3)	0	0	1	0	0	X	1	0	22
CHANNEL B									
DATA	0	0	1	0	0	X	0	1	21
COMMAND/STATUS (USER 4)	0	0	1	0	0	X	1	1	23
SIO No. 3:									
CHANNEL A									
DATA	0	0	1	1	0	X	0	0	30
COMMAND/STATUS (USER 5)	0	0	1	1	0	X	1	0	32
CHANNEL B									
DATA	0	0	1	1	0	X	0	1	31
COMMAND/STATUS (USER 6)	0	0	1	1	0	X	1	1	33
SIO No. 4:									
CHANNEL A									
DATA	0	1	0	0	0	X	0	0	40
COMMAND/STATUS (USER 7)	0	1	0	0	0	X	1	0	42
CHANNEL B									
DATA	0	1	0	0	0	X	0	1	41
COMMAND/STATUS (USER 8)	0	1	0	0	0	X	1	1	43
SIO No. 5:									
CHANNEL A									
DATA	0	0	0	1	1	X	0	0	18
COMMAND/STATUS (USER 9)	0	0	0	1	1	X	1	0	1A

APPENDIX H PORT ASSIGNMENTS

Description	Address Bit No.								Hex Value
	7	6	5	4	3	2	1	0	
CHANNEL B									
DATA	0	0	0	1	1	X	0	1	19
COMMAND/STATUS (USER 10)	0	0	0	1	1	X	1	1	1B
SIO No. 6:									
CHANNEL A									
DATA	0	0	1	0	1	X	0	0	28
COMMAND/STATUS (USER 11)	0	0	1	0	1	X	1	0	2A
CHANNEL B									
DATA	0	0	1	0	1	X	0	1	29
COMMAND/STATUS (USER 12)	0	0	1	0	1	X	1	1	2B
SIO No. 7:									
CHANNEL A									
DATA	0	0	1	1	1	X	0	0	38
COMMAND/STATUS (USER 13)	0	0	1	1	1	X	1	0	3A
CHANNEL B									
DATA	0	0	1	1	1	X	0	1	39
COMMAND/STATUS (USER 14)	0	0	1	1	1	X	1	1	3B
SIO No. 8:									
CHANNEL A									
DATA	0	1	0	0	1	X	0	0	48
COMMAND/STATUS (USER 15)	0	1	0	0	1	X	1	0	4A
CHANNEL B									
DATA	0	1	0	0	1	X	0	1	49
COMMAND/STATUS (USER 16)	0	1	0	0	1	X	1	1	4B

APPENDIX H PORT ASSIGNMENTS

Description	Address Bit No.								Hex Value
	7	6	5	4	3	2	1	0	
SIO No. 9:									
CHANNEL A									
DATA	0	1	0	1	1	X	0	0	58
COMMAND/STATUS (RS232 #1 — PRINTER)	0	1	0	1	1	X	1	0	5A
CHANNEL B									
DATA	0	1	0	1	1	X	0	1	59
COMMAND/STATUS (RS232 #2 — MODEM)	0	1	0	1	1	X	1	1	5B
DIP-SWITCH READING	0	1	1	0	0	X	X	X	60
DMA	1	0	0	1	0	X	X	X	90
WDC									
DATA	1	0	1	0	0	0	0	0	A0
ERROR/PRECOM	1	0	1	0	0	0	0	1	A1
SECTOR COUNT	1	0	1	0	0	0	1	0	A2
SECTOR NUMBER	1	0	1	0	0	0	1	1	A3
CYLINDER LOW	1	0	1	0	0	1	0	0	A4
CYLINDER HIGH	1	0	1	0	0	1	0	1	A5
SIZE/DRIVE/HEAD	1	0	1	0	0	1	1	0	A6
STATUS/COMMAND	1	0	1	0	0	1	1	1	A7
CTC 1:									
CHANNEL 0 (BAUD RATE — TERMINAL)	1	0	0	0	0	X	0	0	80
CHANNEL 1	1	0	0	0	0	X	0	1	81
CHANNEL 2	1	0	0	0	0	X	1	0	82
CHANNEL 3	1	0	0	0	0	X	1	1	83
CTC 2:									
CHANNEL 0 (BAUD RATE — PRINTER)	1	1	0	0	0	X	0	0	C0
CHANNEL 1 (BAUD RATE — MODEM)	1	1	0	0	0	X	0	1	C1
CHANNEL 2	1	1	0	0	0	X	1	0	C2
CHANNEL 3	1	1	0	0	0	X	1	1	C3

APPENDIX H PORT ASSIGNMENTS

Description	Address Bit No.								Hex Value
	7	6	5	4	3	2	1	0	
PIO									
CHANNEL A									
DATA	1	1	0	1	0	X	0	0	D0
COMMAND/STATUS	1	1	0	1	0	X	1	0	D2
CHANNEL B									
DATA	1	1	0	1	0	X	0	1	D1
COMMAND/STATUS	1	1	0	1	0	X	1	1	D3
SET 'ET DRAM' LATCH	1	1	1	0	0	X	X	X	E0
RESET 'EN DRAM' LATCH	1	1	1	1	0	X	X	X	F0
SET '2ND BANK' LATCH	0	1	1	0	1	X	X	X	68
RESET '2ND BANK' LATCH	0	1	1	1	1	X	X	X	78

Legend: X = 0 or 1

APPENDIX I BUYING ADDITIONAL TAPE CARTRIDGES

SOURCES

Any TeleVideo Systems dealer or distributor.

SPECIFICATIONS

Any new tape cartridges should meet these specifications to ensure data integrity:

Type	1/4 inch width
Size	6 inches × 4 inches 450 feet long
Density	6400 bits per inch (or more)

RECOMMENDED BRAND(S)

Scotch DC300XL Data Cartridge Extra Length

QUALITY

You should purchase the best quality tape cartridges available to ensure data integrity.

LIFE EXPECTANCY

Depending on the care and amount of use given your tape cartridges, they may last for several years. Many users automatically phase out tapes periodically. Factors such as number of tape accesses, care, etc. can significantly affect tape life. One of the first signs of tape wear will be incorrect data. The care with which you handle and store tapes is probably the most important single factor in life expectancy of tape cartridges.

APPENDIX J CABLE SPECIFICATIONS

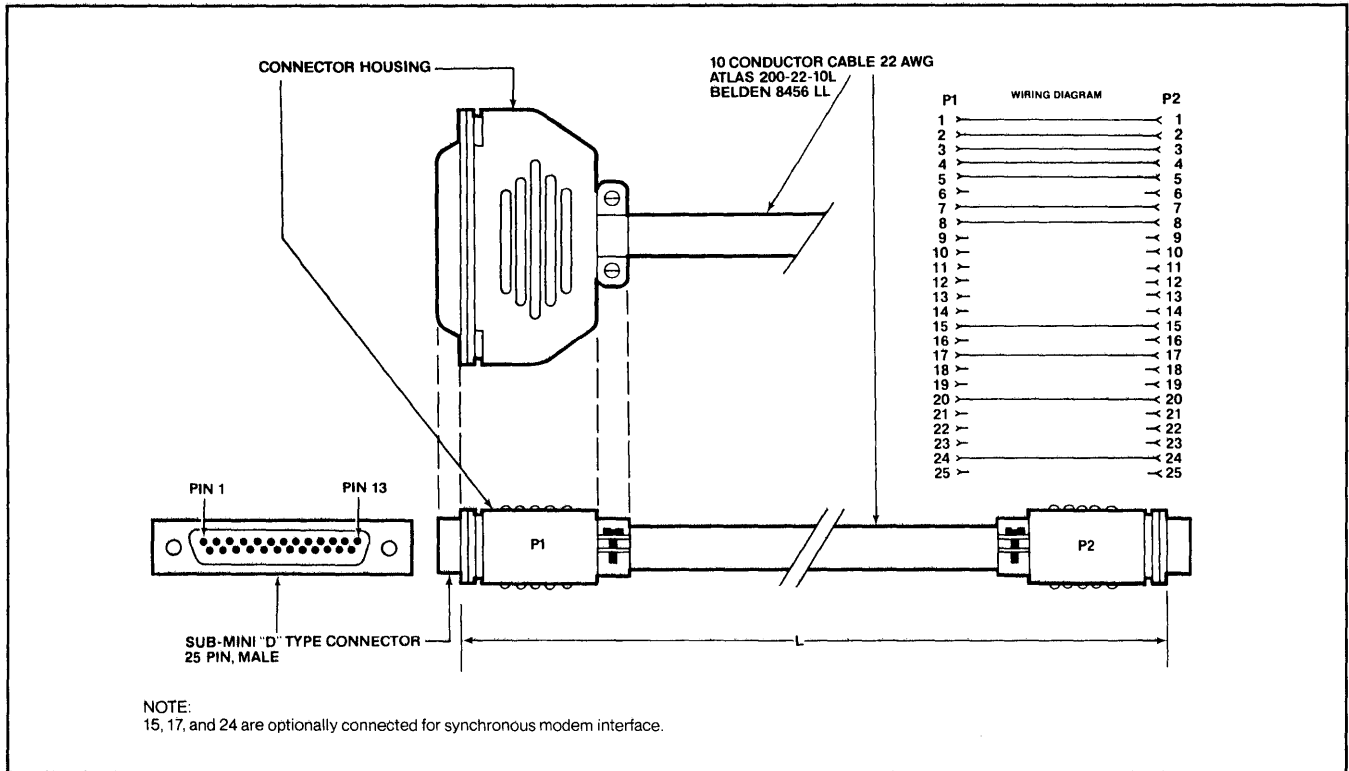


Figure J-1 RS232C

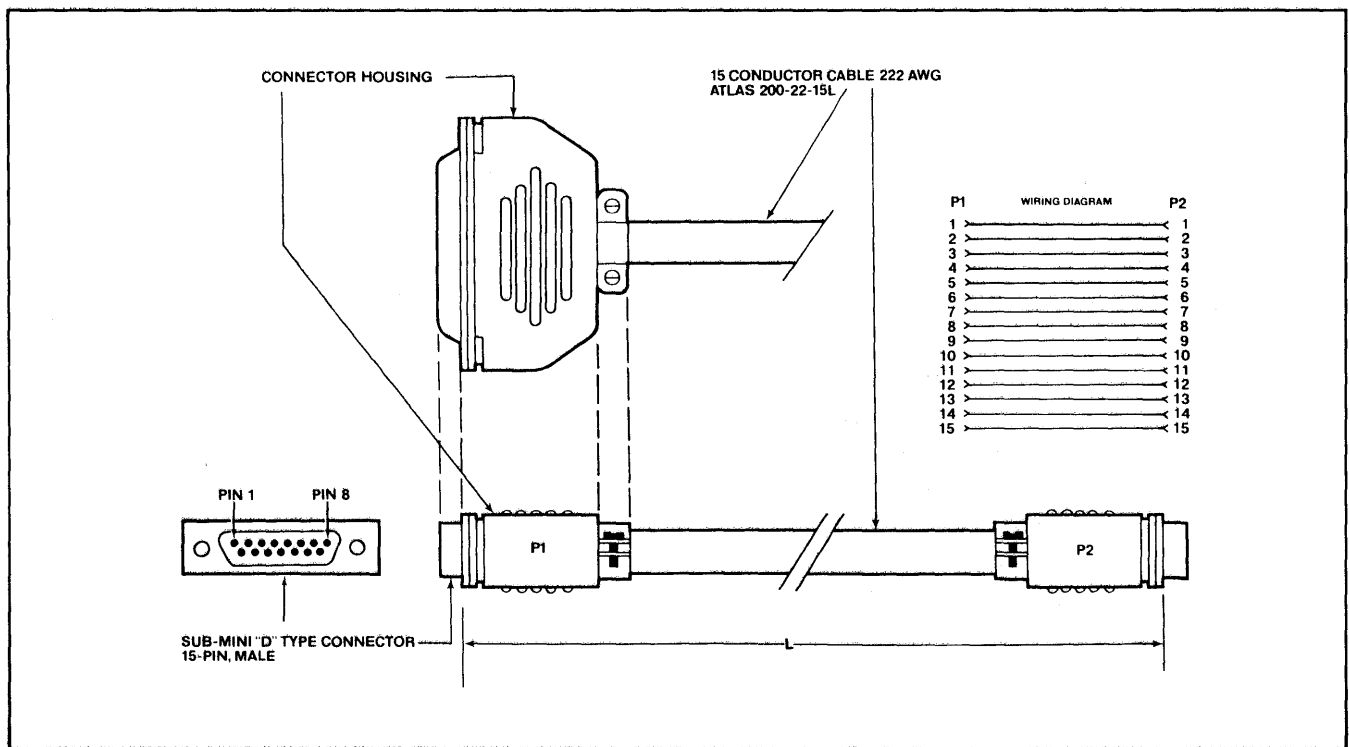


Figure J-2 RS422

APPENDIX K USING THE TIME AND DATE CAPABILITY IN APPLICATIONS PROGRAMS

To access the local time and date, a user program must first read a two-byte address from location 001BH and 001CH (LSB,MSB). Then add the offset 19 (13H) to it. The sum is the address of the date and time function.

Call this address to GET/SET current date and time.

Entry		Return
C = control	local date and time function	A = error flag
DE = buffer pointer		DE = buffer pointer

TO GET THE CURRENT TIME AND DATE:

Upon entry, a user program sets C-res = 0 and DE = address of the 22-byte, user-defined, date and time buffer.

Upon return, the buffer will contain the current date and time as follows:

```
buffer
      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
      M M x D D x Y Y Y Y x H H x M M x S S x N N
```

Note: The set date and time routine will not alter the characters in position "x" of read buffer; users can define their own field delimiter in position "x" of read buffer.

- If error flag = 0 then date and time are initialized,
- If error flag = 1 then date and time are not initialized.

TO SET CURRENT TIME AND DATE:

Upon entry, a user program sets C-res = 1 and DE = address of the 22-byte, user-defined, date and time buffer.

```
buffer
      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
      M M x D D x Y Y Y Y x H H x M M x S S x x x
```

Note: x = not defined

Upon return, the local time and date are set as specified in the buffer, and 1/100 of second counter is reset to zero.

TO INTERFACE TO THE SYSTEM TIME AND DATE THROUGH MmmOST:

The system date and time in TS 816/40 is available to all user stations through a special file named "MULTI.SYS," record #6 in drive "B:."

To set the system date and time from a user program:

- a) Open "B:MULTI.SYS" file
- b) Set current date and time into write buffer (first 22 bytes only)
- c) Write buffer to "B:MULTI.SYS" record #6

To read the system date and time from a user program:

- a) Open "B:MULTI.SYS" file
- b) Read "B:MULTI.SYS" record #6
- c) Current system date and time are now in read buffer (first 22 bytes only)

```
Buffer
      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
      M M ? D D ? Y Y Y Y ? H H ? M M ? S S ? N N
```

Note: ? = field delimiters are undefined upon return from read record #6 operation

TS 816/40 USER'S GUIDE ADDENDUM

Addendum Part No. 2226403

Date Issued: June 13, 1983

Addendum for: TS 816/40 Computer System
Installation and User's Guide

Date Issued: October 1982
Document No.: 2226400

READ THESE PAGES BEFORE POWERING UP THE SYSTEM. This document contains the correct procedure for unlocking the TS 816/40 hard disk (replacing pages 2-6 through 2-10), correct picture of the dip switch on the logic board, new procedures for the programs DISKDUMP(pages 5-8 through 5-10), and TAPEDUMP (pages 5-5-28), and reshipping the system (replacing part of page 6-6). New information includes an addition to the utility program section, and appendices on reconfiguring the modem port for serial printer connection, and changing the default baud rates for the three serial ports.

The following pages replace pages 2-6 through 2-10 in the TS 816/40 manual.

2.4.3 Unlocking the Hard Disk Drive for Operation

Once you've unpacked the TS 816/40 and placed it on a flat surface, do not power up the system. The hard disk drive must be unlocked before the system is powered up. Once the drive is unlocked, the system is ready for operation. To unlock the drive, follow the procedure below. **DO NOT TURN THE SYSTEM ON UNTIL YOU HAVE COMPLETED THE FOLLOWING PROCEDURE.**

STOP!

Failure to unlock the hard disk drive before you use the system will damage the system. Such damage will not be covered by the warranty.

1. Place a cloth or a rectangular piece of soft foam along the right side of the TS 816/40.
2. Slowly tip the system until it stands on its right side.

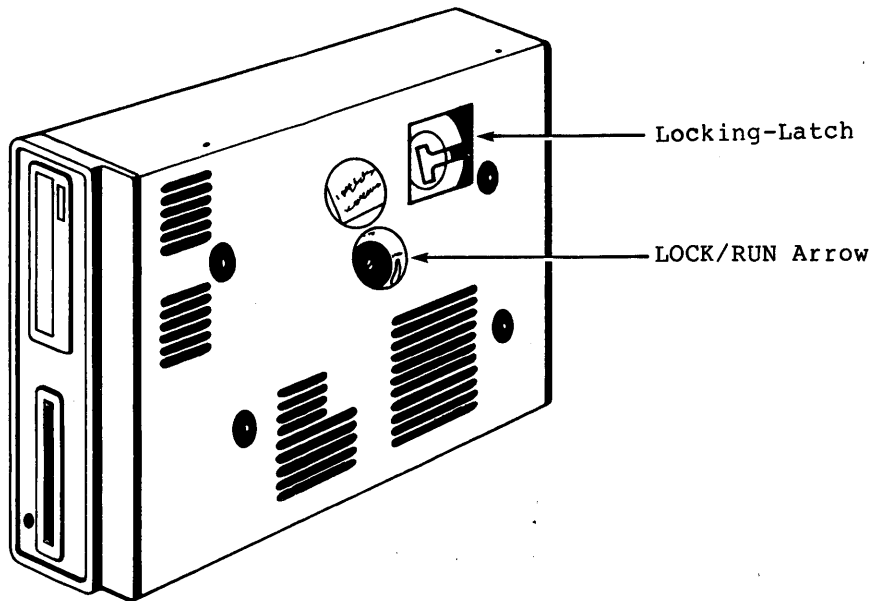


Figure 2-3 Bottom of the TS 816/40 Case

3. Locate the silver locking latch. It is in a diagonal position and attached to a round disk. The latch is now in the locked position. See Figure 2-4.

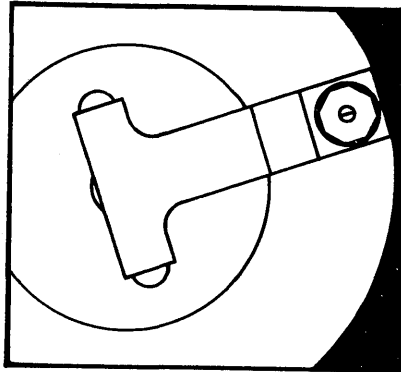


Figure 2-4 Locking Latch in Locked (Diagonal) Position

STOP!

IF THERE IS A COVER WHERE THE LATCH SHOULD BE, REMOVE THE COVER WITH A PHILLIPS SCREWDRIVER. THE LATCH IS UNDER THIS COVER.

4. With a nutdriver (size: 11/32 inch), turn the nut in the upper right hand corner until the latch is loose. The nut should be turned until the latch is loose enough to be lifted out of the two holes in the round disk. Do not loosen the nut completely. When using the nutdriver, be careful not to drop the nut inside the system.

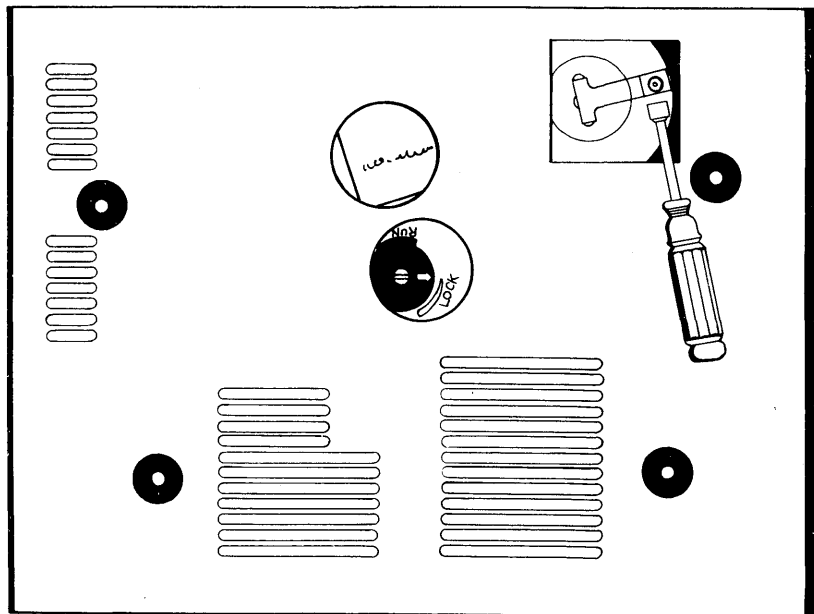


Figure 2-5 Loosening the Nut

5. Lift the latch from the round disk and place it in the vertical position illustrated in Figure 2-6. This is the unlocked position.

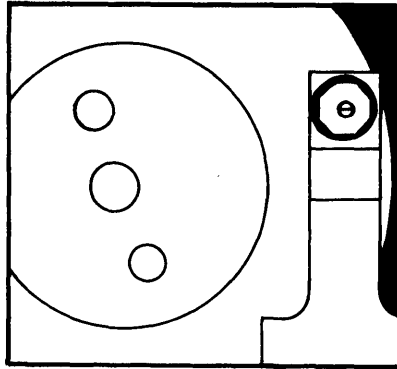


Figure 2-6 Locking Latch in the Unlocked (Vertical) Position

6. Tighten the nut and replace the locking-latch cap.
7. Locate the round opening containing the lock/run arrow in the middle of the case.
8. With a flat-head screwdriver, move the arrow to the RUN position (Figure 2-7).

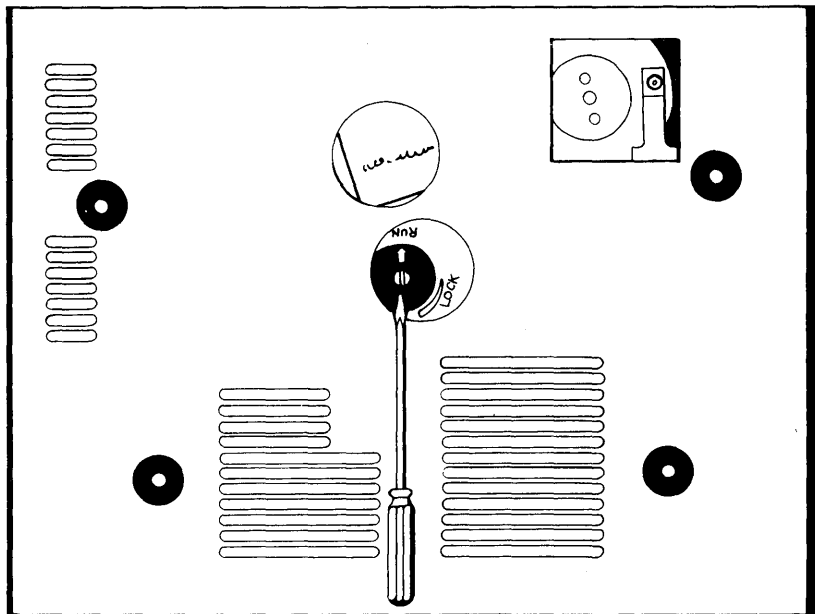


Figure 2-7 Arrow in the RUN position

9. Gently lower the TS 816/40 to lie flat on the table.
10. Power up the system.

STOP!

IF YOU NEED TO RESHIP THE TS 816/40, FOLLOW THE SPECIAL INSTRUCTIONS IN CHAPTER 6. THE INSTRUCTIONS FOR LOCKING THE DISK ARE DIFFERENT THAN THOSE FOR UNLOCKING IT.

2.4.4 Connecting a Service Processor Terminal

To connect a service processor terminal to the TS 816/40, follow these steps:

1. Attach one end of an RS-232C interface cable to the pin connector labeled "TERMINAL" on the rear of the TS 816/40. (See Figure 2-8.)
2. Attach the other end of the cable to the RS-232C pin connector on the rear of the service processor terminal. A service processor terminal is a user station (or TS 800A) in the terminal mode. The terminal mode is selected through the switch settings on the rear of the user station. Refer to your user station manual.

Note!

If you are using a TS 800A as a service processor terminal, set SW2-7 down.

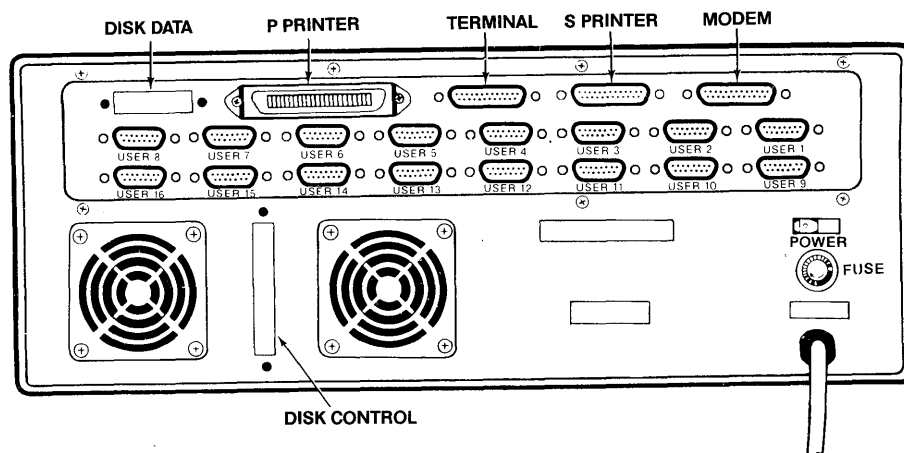


Figure 2-8 Rear Panel of the TS 816/40

The TS 816/40 is shipped with the terminal baud rate preset at 9600 baud. Unless your service processor terminal requires a different baud rate, no changes are necessary. Should you need to change this baud rate, you can change it through the software (see Appendix M of this addendum) or follow these steps:

1. Open the TS 816/40 case. There are seven screws on each side of the computer case. Using a Phillips screwdriver, remove the top five screws that secure the top cover; do not remove the lower two. (Refer to Figure 2-9.) To lift off the cover, pull the front panel forward and then slide the cover away from the rest of the system.

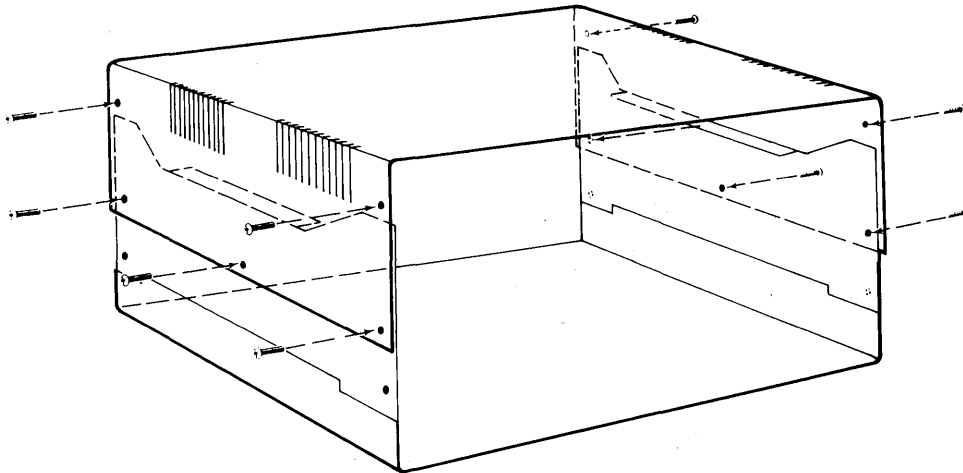


Figure 2-9 Location of the Top Five Screws in TS 816/40 Case

2. Locate switch SW1 on the TS 816/40 logic board as shown in Figure 2-10.

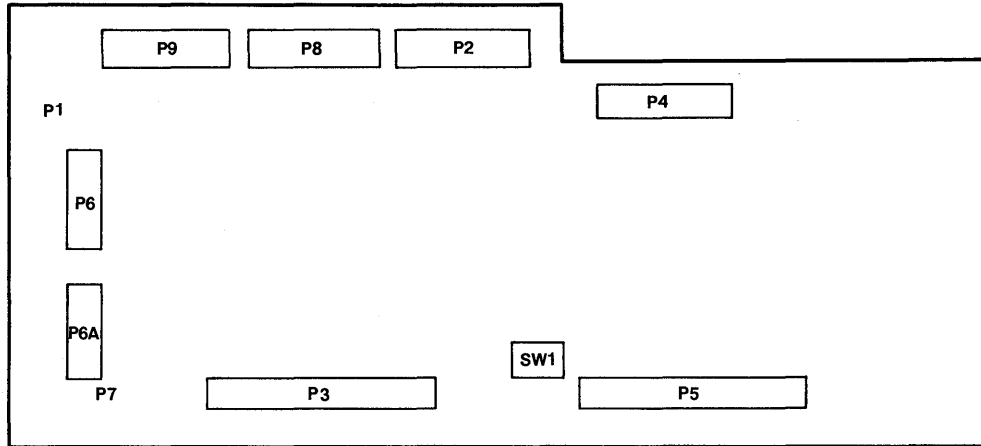


Figure 2-10 Location of Internal Switch SW1

3. Set dipswitches 1 through 3 using the settings described in Tables 2-2 and 2-3. (Figure 2-11 illustrates closed and open dipswitches.)

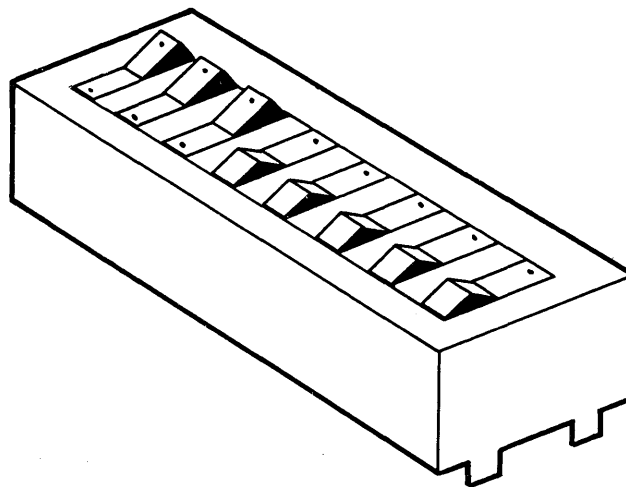


Figure 2-11 Dipswitches

1-3 are Open; 3-8 are Closed

4. Carefully replace the top cover and reinsert the screws. Do not overtighten the screws.

Table 2-2

Switch Settings for RS-232 Terminal Port Switch SW1

Dipswitch No.	Function
1	Baud rate for TERMINAL (service processor terminal) port; see Table 2-3
2	Baud rate for TERMINAL (service processor terminal) port; see Table 2-3
3	Baud rate for TERMINAL (service processor terminal) port; see Table 2-3
4, 5, 6, 7, 8	Unused

Table 2-3

Setting Baud Rate of Terminal Port on Switch SW1

Dipswitch No.			Baud Rate (Bits per second)
1	2	3	
0	0	0	19200
1	0	0	9600
0	1	0	4800
1	1	0	2400
0	0	1	1200
1	0	1	600
0	1	1	300
1	1	1	150

Legend

- 0 = Switch closed
- 1 = Switch open

The following pages replace pages 5-8 through 5-10.

UTILITY DISKDUMP

PURPOSE DISKDUMP allows you to back-up all data on the hard disk onto tape(s). DISKDUMP should be used on a daily basis in order to have a copy of current files.

When you run DISKDUMP, use a new tape or a tape with obsolete data. Any data on the tape used will be erased by DISKDUMP.

STOP!!

DISKDUMP WILL NOT WORK IF YOUR TAPE CARTRIDGE IS WRITE PROTECTED. MAKE SURE THE ARROW IS POINTED AWAY FROM THE WORD "SAFE."

USER: 1. Connect a service processor terminal to the TS 816/40 computer and insert a clean tape cartridge into the tape drive.

 2. If MmmOST is running, enter
 ^C

SYSTEM: 3. Displays
 Enter Y to Cancel

USER: 4. Enter
 Y
 to cancel MmmOST.

SYSTEM: 5. Displays
 A>

USER: 6. Enter
 [drive:]DISKDUMP<CR>
 where:
 [drive:] is the drive on which DISKDUMP is located if other than the currently active drive

SYSTEM: 7. Displays

DISKDUMP (TS 816/40) Zx.y
(c) 1983 TeleVideo Systems, Inc.
14 Megabyte on 1/4" tape cartridge
***CAUTION: ALL DATA ON THE CARTRIDGE TAPE
WILL BE DESTROYED***
Insert Cartridge Tape into Drive
Type "Return" when ready, or "Control C" to
Abort the program

USER: 8. Insert a tape cartridge into the tape drive.

9. Press

<CR>

SYSTEM: 10. Displays

Tape Retension? ("Return" if NO, "Y" if YES)
(The TS 816/40 will tighten the tape for you.)

USER: 11. Enter

Y

SYSTEM: 12. Displays

Tape retension in progress
Enter tape label (alphanumeric only), followed by
"RETURN"

USER: 13. Enter the name you wish to give the tape. The
name could include your name, date, time, etc.
Restrict tape name to one line.

14. Press

<CR>

SYSTEM: 15. Displays

The current logical drives in the hard disk are:

Drive A: Size of data image = xxx : Kilobyte
Drive B: Size of data image = xxx : Kilobyte
Drive C: Size of data image = xxx : Kilobyte
Type "Control-C" to abort the program, or. . .

Enter drive name(s) (A,B,...) and type "RETURN":

(This message varies according to your
configuration.)

USER: 16. Enter one (or all) of the hard disk drive names that you want to copy onto tape. The system only recognizes drive names currently in the system.

17. Press
<CR>

SYSTEM: 18. Displays
Total size of data image on drive(s) (x,x,x,) is:####

(This message tells how many kilobytes of data are on the drive(s) to be copied to tape.)

CAUTION; ALL DATA ON THE CARTRIDGE TAPE WILL BE DESTROYED

Type "Return" when Ready or "Control-C" to Reselect Drive Name(s)

USER: 19. a. Press
<CR>

if you have typed in the correct drive names

b. Press
^C

if you have typed incorrect drive names. In this case, you will be prompted to reselect drives.

SYSTEM: 20. Displays
Tape Reinitialization in progress
Dump disk image in progress
Current hard disk track number is: xxxx

21. Displays different track numbers as DISKDUMP progresses. This entire process takes about seven minutes.

22. Displays
Dump disk image to tape completed
Continue backup to another tape? (Y=yes, N or Return-No)

23. a. Press

Y

to continue the back-up process. Go back to Step 8.

b. Press

N or <CR>

to end the program. Go to Step 24.

24. Once DISKDUMP is complete, the tape will automatically rewind itself. Any commands entered during the rewinding process will not be recognized by the system.

The following pages replace pages 5-17 through 5-28.

UTILITY TAPEDUMP

PURPOSE TAPEDUMP can perform three functions:

1. Executes disk diagnostics to find and fix bad sectors on the hard disk. There are three diagnostic checks: a) the read test, b) the write test, and c) the format test.

Read Test

The read test reads all the sectors on the hard disk. If a bad sector is found, it is reassigned to another area on the hard disk. The read test should be run whenever you suspect the hard disk has defective areas. When the read test is executed, data contained in the bad sector(s) is destroyed. Remaining data on the hard disk is not affected. The read test takes approximately 7 minutes to complete.

Write Test

The write test program performs an extensive write test followed by the read test. If a bad sector is found, it is reassigned to another area on the hard disk. The write test should be run the first time CP/M and MmmOST are installed. It should also be run if you have executed the read test (to fix bad sectors) and the hard disk still malfunctions. When the write test is executed, all data on the hard disk is destroyed. Be sure to back-up all files before running the write test. The write test takes approximately 12 minutes to complete.

Format

The format program formats the hard disk and then performs the write test. The format test should only be executed if the read and write tests failed to fix the hard disk. When the format test is executed, all data on the hard disk is destroyed. Be sure to back-up all files before running the format test. The format test takes approximately one-half hour to complete.

2. Transfers the operating system (CP/M and MmmOST) from tape to hard disk
3. Transfers files (by drive) from tape to hard disk.

All the above TAPEDUMP functions are executed when you are installing a new TS 816/40. When you are restoring data to an existing system, you run only a diagnostic check and restore a particular drive(s).

This section is divided into two procedures:

Procedure 1 shows hows to use TAPEDUMP to perform diagnostics, install the operating system, and transfer files to a new hard disk.

Procedure 2 shows how to restore the contents of a tape to an existing system.

PROCEDURE 1 INSTALLING A NEW SYSTEM USING TAPEDUMP

- USER: 1. Connect a service processor terminal to the TS 816/40 computer.
2. Insert the system tape that was shipped with the TS 816/40 into the tape drive. Press the red reset button.
- SYSTEM: 3. Displays the system message (which specifies the boot is from the tape drive) followed by
- A>
- USER: 4. Enter
- TAPEDUMP<CR>
- SYSTEM: 5. Displays
- TAPEDUMP (TS 816/40)
 (c) 1983 TeleVideo Systems, Inc.
 Restore disk image from tape, Vx.y
 14 Megabyte on 1/4" tape cartridge
- Do you want to run disk diagnostics?
 (Y-Yes, N or "Return"-No)
- USER: 6. Enter
- Y
- SYSTEM: 7. Displays
- **SELECT DIAGNOSTIC FOR WINCHESTER HARD DISK**
-
- Type "I" to select Internal Winchester hard disk
 Type "E" to select External Winchester hard disk
 Type "A" to Abort the diagnostic mode
 <--- Select the function above

USER: 8. Enter
I
to run diagnostics on the TS 816/40 internal hard disk. The E is for running diagnostics on the TS 816H/40 external hard disk.

SYSTEM: 9. Displays

SELECT DISK DRIVE SIZE

Type "1" to Select 10 Mbyte Disk Drive
Type "2" to Select 20 Mbyte Disk Drive
Type "3" to Abort the Diagnostic Mode

<--- Select the function above

USER: 10. Enter
1
if you have a TS 816 (20-megabyte drive)
or
2
if you have a TS 816/40 (40-megabyte drive)

SYSTEM: 11. Displays

** DIAGNOSTIC FUNCTIONS **

Type "R" to select Read-test
Type "W" to select Write-test
Type "F" to select Format disk
Type "A" to reselect Winchester hard disk
<--- Select the function above

USER: 12. Enter
F
and go to Step 13
or
A to reselect the drive (I or E)

(If you enter A, you will see the menu titled "SELECT DIAGNOSTIC FOR WINCHESTER HARD DISK**". Refer to Step 7. If you enter another A, the system displays

Type "Return" when Ready, Control-C abort the program.

If you enter a ^C, the program aborts.

SYSTEM: 13. Displays

***CAUTION: ALL DATA ON THE SPECIFIED PHYSICAL
DISK WILL BE DESTROYED***
Type "Return" when Ready, or Control-C to reselect

USER: 14. Press

<CR>

SYSTEM: 15. Displays

Format disk in progress
Current hard disk track number is:
xxxx

16. Displays

Format disk completed

** DIAGNOSTIC FUNCTIONS **

Type "R" to select Read-test
Type "W" to select Write-test
Type "F" to select Format disk
Type "A" to reselect Winchester hard disk
<--- Select the function above

USER: 17. Enter

W

STOP!

THIS TEST MUST BE RUN AFTER THE FORMAT TEST.

SYSTEM: 18. Displays

***CAUTION: ALL DATA ON THE SPECIFIED PHYSICAL
DISK WILL BE DESTROYED***
Type "Return" when Ready, Control-C to reselect

USER: 19. Press
 <CR>
 if you entered the correct test
 or
 press ^C to reselect the test.

SYSTEM: 20. Displays
 Write test in progress
 Current hard disk track number is:
 xxxx

SYSTEM: 21. Displays
 Write test complete
 ** DIAGNOSTIC FUNCTIONS **

 Type "R" to select Read-test
 Type "W" to select Write-test
 Type "F" to select Format disk
 Type "A" to reselect Winchester hard disk
 <--- Select the function above

USER: 22. Enter
 A
 to stop the diagnostics.

SYSTEM: 23. Displays (once A is entered)
 SELECT DIAGNOSTIC WINCHESTER HARD DISK??

 Type "I" to select Internal Winchester hard disk
 Type "E" to select External Winchester hard disk
 Type "A" to Abort the diagnostic mode
 <--- Select the function above

USER: 24. Enter
 A

SYSTEM: 25. Displays
 Insert Cartridge tape into drive
 Type "Return" when Ready, "Control-C" to Abort
 the program

USER: 26. Insert the tape cartridge containing the data to be restored. Press
 <CR>

SYSTEM: 27. Displays
 Tape Retension? (Y-Yes,N or "Return"-No)

USER: 28. Enter
 Y

SYSTEM: 29. Displays
 Tape Retension in progress
 Reading of tape label in progress
 Label of current tape is:
 <system displays tape label>
 Correct tape? (Y-Yes, N or "Return"-No)

USER: 30. Read the tape label. This name was given to the tape during the DISKDUMP process.

31. Make sure this is the tape that contains the operating system and the data you want to transfer.

32. Enter
 Y
 if it is the correct tape
 or
 press
 <CR>
 if it is the incorrect tape. Insert the correct tape into the tape drive. You will receive the prompt in Step 25 again.

SYSTEM: 33. Displays
 Restore system image onto disk from tape,
 (Y-Yes, N or "Return"-No)

USER: 34. Press
 Y

SYSTEM: 35. Displays
Restore system complete.
Continue? (Y-Yes, N or "Return"-No)

USER: 36. Enter
Y

SYSTEM: 37. Displays a "Restore . . ." prompt that applies to the drives on the tape. For instance, if drive A and drive B were the only drives originally copied to the tape, you will see the following:
Restore disk A: from tape, (Y-Yes, N or "Return"-No)
Restore disk B: from tape, (Y-Yes, N or "Return"-No)
These prompts will appear one at a time. If you elect to restore the data on the drives, the data will be restored to the original drives on the hard disk. (Data originally from drive A will be restored to drive A.)

USER: 38. Look at the restore prompt on your screen.
39. Enter
Y
for all of them.

NOTE!

To stop the program at this point, press <CR> for all restore prompts.

SYSTEM: 40. Displays
*** CAUTION: ALL DATA ON SPECIFIED LOGICAL DRIVE(S) WILL BE DESTROYED***
Type "Return" when ready, or "Control-C" to reselect drive

USER: 41. Press
<CR>

SYSTEM: 42. Displays
Restore in progress, drive x:
Restoring directory area
Restoring data area

Restore disk image from tape completed
Continue restore from another tape?
(Y=yes, N or "RETURN"-no)

USER: 43. Decide whether or not to restore another tape.
If you select Y, you will receive the message in
Step 25.

**PROCEDURE 2 RESTORING A DISK DRIVE ONTO AN EXISTING SYSTEM
USING TAPEDUMP**

USER: 1. Connect a service processor terminal to the
TS 816/40 computer.

2. If MmmOST is running, enter

^C

SYSTEM: 3. Displays
Enter Y to Cancel

USER: 4. Enter
Y
to cancel MmmOST.

SYSTEM: 5. Displays
A>

USER: 6. Enter
[drive:]TAPEDUMP<CR>
where
[drive:] is the drive on which TAPEDUMP is
located if other than the currently active
drive

SYSTEM: 7. Displays
TAPEDUMP (TS 816/40)
(c) 1983 TeleVideo Systems, Inc.
Restore disk image from tape, Vx.y
14 Megabyte on 1/4" tape cartridge
Do you want to run disk diagnostics?
(Y-Yes, N or "Return"-No)

USER: 8. Enter

Y

SYSTEM: 9. Displays

SELECT DIAGNOSTIC FOR WINCHESTER HARD DISK

Type "I" to select Internal Winchester hard disk
Type "E" to select External Winchester hard disk
Type "A" to Abort the diagnostic mode

<--- Select the function above

USER: 10. Enter

I to run diagnostics on the TS 816/40 internal hard disk. The E is for running diagnostics on the TS 816H/40 external hard disk.

USER: 11. **SELECT DISK DRIVE SIZE**

Type "1" to Select 10 Mbyte Disk Drive
Type "2" to Select 20 Mbyte Disk Drive
Type "3" to Abort the Diagnostic Mode

<--- Select the function above

USER: 12. Enter

1

if you have a TS 816 (20-megabyte drive)

or

2

if you have a TS 816/40 (40-megabyte drive)

SYSTEM: 13. Displays

** DIAGNOSTIC FUNCTIONS **

Type "R" to select Read-test
Type "W" to select Write-test
Type "F" to select Format disk
Type "A" to reselect Winchester hard disk

<--- Select the function above

USER: 14. Enter

R

or

A

to reselect the drive. (If you enter A, you will see the menu titled "SELECT DIAGNOSTIC FOR WINCHESTER HARD DISK**". Refer to Step 9. If you enter another A, the system displays

Type "Return" when Ready, Control-C abort the program

If you enter ^C, the program aborts.

SYSTEM: 15. Displays

Type "Return" when Ready, Control-C to reselect

USER: 16. Press

<CR>

if you entered the correct test

or

press ^C to reselect the test.

SYSTEM: 17. Displays

Read test in progress
Current hard disk track number is:
xxxx

18. Displays

Read test completed

** DIAGNOSTIC FUNCTIONS **

Type "R" to select Read-test
Type "W" to select Write-test
Type "F" to select Format disk
Type "A" to reselect Winchester hard disk
<--- Select the function above

USER: 19. Enter

A

to stop the diagnostics.

SYSTEM: 20. Displays (once A is entered)

```

**SELECT DIAGNOSTIC FOR WINCHESTER HARD DISK**
-----
Type "I" to select Internal Winchester hard disk
Type "E" to select External Winchester hard disk
Type "A" to Abort the diagnostic mode
      <--- Select the function above

```

USER: 21. Enter

A

SYSTEM: 22. Displays

```

Insert Cartridge tape into drive
Type "Return" when Ready, "Control-C" to Abort
the program

```

USER: 23. Insert the tape cartridge containing the data to be restored into the tape drive. Press

<CR>

SYSTEM: 24. Displays

```

Tape Retension? ("Return" if NO, "Y" if YES)

```

USER: 25. Enter

Y

SYSTEM: 26. Displays

```

Tape Retension in progress

Reading of tape label in progress
Label of current tape is:
<system displays tape label>
Correct tape? ("Return" if NO, "Y" if YES)

```

USER: 27. Read the tape label. This name was given to the tape during the DISKDUMP process.

28. Make sure this is the tape that contains the data you want to transfer.

29. Enter

Y

if it is the correct tape

or

press

<CR>

if it is the incorrect tape. Insert the correct tape into the tape drive. You will receive the prompt in Step 22 again.

SYSTEM: 30. Displays

Restore system image onto disk from tape,
(Y-Yes, N or "Return"-No)

USER: 31. Press

<CR>

SYSTEM: 32. Displays

Continue? (Y-Yes, N or "Return"-No)

USER: 33. Enter

Y

SYSTEM: 34. Displays "Restore . . ." prompts that apply to the tape. For instance, if drive A and drive B were the only drives originally copied to the tape, you will see the following:

Restore disk A: from tape, ("Return" if NO,
"Y" if YES)

Restore disk B: from tape, ("Return" if NO,
"Y" if YES)

These prompts will appear one at a time. If you elect to restore the data on the drives, the data will be restored to the original drives on the hard disk. (Data originally from drive A will be restored to drive A.)

USER: 35. Look at the restore prompt on your screen.

36. Enter

Y

to copy the drive to the hard disk

or

press

<CR>

to bypass the drive.

37. Follow the procedure in Step 36 for each restore prompt you see.

NOTE!

To stop the program at this point, press <CR> for all restore prompts.

SYSTEM: 38. Displays

*** CAUTION: ALL DATA ON SPECIFIED DISK(S)
WILL BE DESTROYED***

Type "Return" when ready, or "Control-C" to
reselect drive

USER: 39. Press

<CR>

if you correctly selected the drive(s)

or

press

^C

to reselect drives.

SYSTEM: 40. Displays

Restore in progress, drive x:
Restoring directory area
Restoring data area

Restore disk image from tape completed.
Continue restore from another tape?
(Y=yes, N or "RETURN"-no)

USER: 41. Decide whether or not to restore another tape.
If you select Y, you will receive the message in
Step 22. If you select N or RETURN, you are
returned to the operating system.

Error Messages

This section describes error messages which may appear while DISKDUMP or TAPEDUMP are in progress. In this section, the error message which may appear will be shown first. Below this message will be a description of the possible cause and the remedy to the problem.

1. BIOS READ ERROR ON [drive]
TRACK = (), SECTOR = ()
WDC STATUS = ()H, WDC ERROR = ()H

This message indicates there was a read error from the TS 816/40 disk while DISKDUMP was running.

2. BIOS WRITE ERROR ON [drive]
TRACK = (), SECTOR = ()
WDC STATUS = ()H, WDC ERROR = ()H

This message indicates there was a write error (on the TS 816/40 disk) while TAPEDUMP was running.

4. UNRECOVERABLE DATA TRANSMISSION ERROR

The appearance of this message indicates a breakdown in communications while data was being transferred. This is a hardware error. If this message appears, call your distributor or dealer.

5. TAPE WRITE ERROR

This message indicates that the tape cartridge is defective. Replace the tape cartridge being used and start the program over with a new cartridge.

7. ***TAPE CARTRIDGE IS WRITE PROTECTED***

Please remove the cartridge and turn the ARROW away from the word SAFE

The tape cartridge is write protected. Turn the arrow away from the word SAFE. Rerun the program.

8. ***DRIVE DOES NOT EXIST IN SYSTEM***
Type "Control C" to abort program, or . . .

Enter drive name(s) (a,b,c,..) and type "RETURN":

Check your drive designation entries. You entered a drive name the system did not recognize.

9. DISK SELECT ERROR

You entered the wrong drive names. Run the program again.

10. TAPE WRITE ERROR

Remove the tape cartridge and insert a new one. Run the program (DISKDUMP) again.

The utility program MAKESYS has been included on the TS 816/40 installation tape. Include this program at the end of section 5.6.2.

UTILITY

MAKESYS

For: TS 816/40, TS 806/20

Configuration: Service Processor Terminal

PURPOSE

MAKESYS creates a system on the first two tracks of the hard disk, drive A.

Use this program after modifying the operating system.

EXECUTION

USER:

1. Enter

MAKESYS<CR>

SYSTEM:

2. Displays

MAKESYS Version x.y
Destination Drive?

USER:

3. Enter

A

SYSTEM:

4. Displays

Bootstrap Filename (Or RETURN to Skip)

USER:

5. Enter

TS16BOOT.COM<CR>

SYSTEM:

6. Displays

BDOS Filename (Or RETURN to Skip)

USER:

7. Enter

CPM59.COM

SYSTEM:

8. Displays

BIOS Filename (Or RETURN to Skip)

USER: 9. Enter
 816BIOS.COM<CR>

SYSTEM: 10. Displays
 MAKESYS completed
 A>

The modified operating system is now on drive A.

Note: When reconfiguring the TS 816/40 system parameters, be aware that the system is capable of handling ten logical drives only. DISKDUMP and TAPEDUMP utility programs work with a maximum of ten logical drives.

This following replaces part of page 6-6 in the TS 816/40 manual.

6.4.4 Reshipping the TS 816/40

If you need to reship the TS 816/40, follow this procedure:

1. If the TS 816/40 is turned on, turn it off. Wait about 20 seconds and turn the power on again. If the TS 816/40 is turned off, turn it on.
2. About 23 seconds after the power is turned on, you will hear a humming sound from the hard disk. Turn off the power within 3 seconds after hearing the sound.
3. Stand the TS 816/40 on its right side. Locate the locking latch. It is in the unlocked vertical position. See Figure 2-6.
4. With a nutdriver (size: 11/32 inch), loosen the nut in the upper right hand corner until the locking latch can be moved. Move the latch to the left until the holes in the round disk line up with the metal catches on each side of the latch head. Gently press the catches into the holes.
5. Tighten the nut.
6. With a flat-head screwdriver, move the LOCK/RUN arrow to the LOCK position.
7. Repack the TS 816/40 in the original TeleVideo shipping container or other suitable materials.

APPENDIX L USING THE MODEM PORT FOR PRINTER OUTPUT

Although the serial port labeled MODEM is configured for asynchronous modem connection, it can be reconfigured for serial printer connection. To reconfigure this port, construct a special cable according to the specifications in Table L-1. The first column in the table lists the pin the cable wire corresponds to in the TS 816/40 modem connector, and the second column lists the pin the same cable wire corresponds to in the printer pin connector.

Table L-1 Pin Assignments

TS 816/40 MODEM Connector Pins	RS-232C Printer Connector Pins
1	1
2	3
3	2
5	20
20	6, 8
7	7
4	5
8	4

The baud rate of the printer should be set at 9600 since 9600 is the TS 816/40 default baud rate. If the printer will not operate at this speed, you can modify the TS 816/40 baud rate; refer to Appendix M.

To use the second printer port, enter the following command before printing:

```
A>STAT LST:=CRT:
```

To print a file from the new printer port, enter

```
A>PIP LST:=FILENAME
```

where

FILENAME is the name of the file to be printed.

APPENDIX M CHANGING THE BAUD RATE FOR THE SERIAL PORTS

The default baud rate for the TERMINAL and S PRINTER ports is 9600, and the default baud rate for the MODEM port is 1200. The following procedure shows how to change the baud rate for these ports. Your responses to system messages depend on which port baud rate you are modifying. Pay particular attention to the steps that offer you a choice among the modem, terminal and printer ports.

If you have reconfigured the modem port for a serial printer, this procedure still applies; enter the responses for the MODEM port when a choice is offered.

Note: This procedure assumes the TS 816/40 has been booted from the hard disk.

USER: 1. Connect a service processor terminal to the TS 816/40.

2. Enter

^C

SYSTEM: 3. Displays

Enter Y to cancel

USER: 4. Enter

Y

to cancel MmmOST

SYSTEM: 5. Displays

A>

USER: 6. Enter

SYSGEN<CR>

SYSTEM: 7. Displays

TELEVIDEO SYSGEN VER. x.y

SOURCE DRIVE NAME (RETURN TO SKIP)

USER: 8. Enter

A

APPENDIX M continued

SYSTEM: 9. Displays
SOURCE ON A:, THEN TYPE RETURN

USER: 10. Enter
<CR>

SYSTEM: 11. Displays
FUNCTION COMPLETE
DESTINATION DRIVE NAME (OR RETURN TO REBOOT)

USER: 12. Enter
<CR>

SYSTEM: 13. Displays
A>

USER: 14. Enter
SAVE 58 CPM-TEST.816<CR>

SYSTEM: 15. Displays
A>

USER: 16. Enter
DDT CPM-TEST.816<CR>

SYSTEM: 17. Displays
DDT VERS x.y
NEXT PC
3B00 0100
-

APPENDIX M continued

- USER: 18. To change the baud rate of the S PRINTER port, enter
S20A0
or
to change the baud rate of the MODEM port, enter
S20A4
or
to change the baud rate of the TERMINAL port, enter
S209C
- SYSTEM: 19. Displays
20A0 04
if you are changing the S PRINTER port baud rate
or
20A4 20
if you are changing the MODEM port baud rate
or
209C 04
- USER: 20. The 04 and 20 in the messages above represent the present values (9600 and 1200) controlling the baud rate for that port. You will substitute this value with another value corresponding to the desired new baud rate. Table M-1 shows the different baud rates and values.

APPENDIX M continued

Table M-1 Baud Rate Values

Baud Rate	Value
19.2K	02
9600	04
4800	08
2400	10
1200	20
600	40
300	80
150	00

21. Enter

the value<CR>

where

the value is a two-digit number from Table M-1

SYSTEM: 22. Displays

20A1 C1

if you modified the S PRINTER port

or

20A5 01

if you modified the MODEM port

or

209D C0

if you modified the TERMINAL port

USER: 23. Enter

.<CR>

SYSTEM: 24. Displays

-

APPENDIX M continued

USER: 25. Enter
GØ<CR>

SYSTEM: 26. Displays
A>

USER: 27. Enter
SAVE 58 CPM-TEST.816<CR>

SYSTEM: 28. Displays
A>

USER: 29. Enter
SYSGEN CPM-TEST.816<CR>

SYSTEM: 30. Displays
TELEVIDEO SYSGEN VER. x.y
DESTINATION DRIVE NAME (OR RETURN TO REBOOT)

USER: 31. Enter
A

SYSTEM: 32. Displays
DESTINATION ON A:, THEN TYPE RETURN

USER: 33. Enter
<CR>

SYSTEM: 34. Displays
FUNCTION COMPLETE
DESTINATION DRIVE NAME (OR RETURN TO REBOOT)

USER: 35. Enter
<CR>

APPENDIX M continued

SYSTEM: 36. Displays

A>

The new port rate for the TERMINAL, MODEM or S PRINTER port is now stored on the hard disk. Reset the TS 816/40 and test the baud rate.

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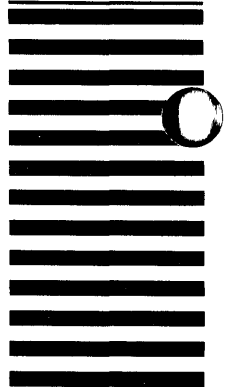
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