C8002
User Guide

DRAFT EDITION - July 1980

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CONTENTS

INTRODUCTION

INTRODUCTION

CONTENTS OF THIS GUIDE

THE C8002 is a compact and easy-to-use computer manufactured by
ONYX Systems, Inc. This Guide tells you what you need to know
about the equipment itself. The Guide assumes a minimum of
knowledge of computer systems on the part of the reader.
Separate manuals describe the software designed to run on the
C8002. Manuals published by ONYX Systems are listed in
Appendix C.

HOW TO USE IT

This Guide is set up so that you can skip chapters that do not
pertain to your use of the C8002. For example, the person
installing the C8002 needs to read only Chapters 1 and 2. The
person using the C8002 initially needs to read Chapters 1, 3,
and parts of 5. He will have to refer to Chapters 4 and 5 only
when certain situations arise during the use of the C8002.

UPDATES

This is a draft version of the User Guide; a final copy of the
Guide will be mailed to you upon its completion. To receive
new editions as they are published, fill out the "Request for
Updates" form in Appendix E. Tear the form out and mail it to
ONYX Systems. ONYX will then place your name on the
distribution list for the C8002 User Guide and for any special
bulletins pertaining to the C8002.

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Chapter 1

THE C8002

GENERAL DESCRIPTION

The C8002 is a rugged, easy-to-use computer system. It has a
minimum of components that you need to be familiar with. On
the front panel, you will use or refer to the:

        keyswitch,
        power-on indicator, and
        tape cartridge opening.

On the back panel, you will use or refer to the:

        reset switch
        fuse holder
        power cord and connector.

On the I/O Connector Panel you'll use or refer to:

        J101   Console Connector
        J102 ⎫
        J103 ⎪
        J107 ⎪
        J108 ⎬   Terminal Connectors
        J109 ⎪
        J110 ⎪
        J111 ⎭
        J104   Modem Connector
        J105   Serial Printer Connector
        J106   Parallel Port Connector
        J112   RS 422 Interface Connector
        J113   Diagnostic Terminal Connector
        J114   Disk Expansion Connector

In addition to the computer itself, ONYX Systems supplies a
Software Distribution Tape with every C8002.

Figure 1-1 shows each of these components. The discussion that
follows describes each one in turn.

1-1

KEYSWITCH

This is a two position, locking switch that is operated by a key. The left position is the power OFF position, the right is power ON. You can remove the key when the switch is turned to the ON or OFF position. The C8002 is then locked in that mode. We recommend that you remove the key and store it in a safe place except when turning the C8002 on or off. This will prevent anyone from accidentally turning the C8002 off. Removing the key will also allow you to control access to your machine.

POWER-ON INDICATOR

This lamp, which is located to the right of the keyswitch, will be lit whenever the system is on. The lamp will need replacing after roughly 15,000 hours of use. Chapter 5, "Maintaining the C8002", describes how to replace the lamp.

CARTRIDGE OPENING

The C8002 uses magnetic tapes for removable storage. The opening for tapes is located below the keyswitch and the power-on indicator. Insert tapes into the opening by sliding the tape cartridge in with the metal side down. You will encounter some resistance when the tape is inserted partway. Continue to push the cartridge in firmly until you hear a buzzing sound, which indicates that the tape drive is automatically rewinding the tape. The tape is now ready to be read from or written on by the C8002. Only "3M" tapes designed for use at 6400 BPI can be used on the C8002.

Chapter 3, "Using the C8002", goes into more detail on which tape cartridges to use on the C8002 and how to operate the tape drive.

RESET SWITCH

This is a red pushbutton on the rear panel. Pressing it momentarily resets the C8002 to its initial state.

WARNING: Do not reset the C8002 while a program is running. Doing so may destroy data on the system disk.

CONSOLE CONNECTOR

This is a 25-pin, "D" connector on the rear panel that is wired to accept the plug from a terminal. Chapter 2, "Installing the C8002", describes the specific pin assignments.

TERMINAL CONNECTORS

These are a number of 25-pin, "D" connectors on the rear panel which are wired to accept the plug from a terminal. Chapter 2, "Installing the C8002", describes the specific pin assignments.

MODEM CONNECTOR

This is a 25-pin, "D" connector on the rear panel that is wired to accept the cable from a modem. Chapter 2, "Installing the C8002", describes its specific pin assignments. NOTE: Terminal 2 Connector (J103) and Modem Connector (J104) may not both be used at the same time.

SERIAL PRINTER CONNECTOR

This is a 25-pin, "D" connector on the rear panel that is wired to accept the plug from a serial printer. Chapter 2, "Installing the C8002", describes its specific pin assignments.

PARALLEL PORT CONNECTOR

This is a 37-pin, "D" connector on the rear panel that provides a general purpose, bidirectional parallel interface to the C8002. You will typically use this connector to attach a line printer to the C8002. To do so, you will need a special cable that is wired for printers with a "Centronics" interface. The cables are available from ONYX Systems by special order.

Chapter 2, "Installing the C8002", describes the specific pin assignments for the parallel port connector.

RS 422 INTERFACE CONNECTOR

This is a 37-pin, "D" connector on the I/O Connector Panel which provides a high-speed serial interface in accordance with the IEEE RS 422 Specification. Chapter 2, "Installing the C8002" describes the specific pin assignments.

DIAGNOSTIC TERMINAL CONNECTOR

This is a 25-pin, "D" connector on the I/O Interface Panel which may be used to connect a terminal or an asynchronous modem to the Mass Storage Controller in the C8002. The documentation provided with the C8002 Diagnostics provides instructions on the use of this port.

FUSE HOLDER

Located near the power cord connector, this receptacle contains the main fuse for the C8002. Chapter 5, "Maintaining the C8002", tells how to change the fuse.

POWER CORD AND CONNECTOR

This three-prong, detachable cord is plugged into the connector near the fuse holder.

SOFTWARE DISTRIBUTION TAPE

This tape, which is supplied with every C8002, contains several utility programs. You will need to use this tape only in the following cases:

* when you suspect that the C8002 is malfunctioning;

* when you have destroyed data on the system disk; and

* when you want to verify the version number and release date of the software supplied by ONYX.

Chapter 4, "Diagnosing and Handling Problems", describes how to use the Software Distribution Tape.

Power-On
Indicator

Keyswitch

Tape Cartridge
Opening

C8000 Front Panel

J101 CONSOLE	J107 TERM 3	Reset Switch
J102 TERM 1	J108 TERM 4	
J103 TERM 2	J109 TERM 5	
J104 MODEM	J110 TERM 6	
J105 SERIAL PRINTER	J111 TERM 7	
PARALLEL PORT J106	RS 422 INTERFACE J112	Fuse Holder
DIAGNOSTIC TERM J113	DISK EXPANSION J114	

Power
Connector
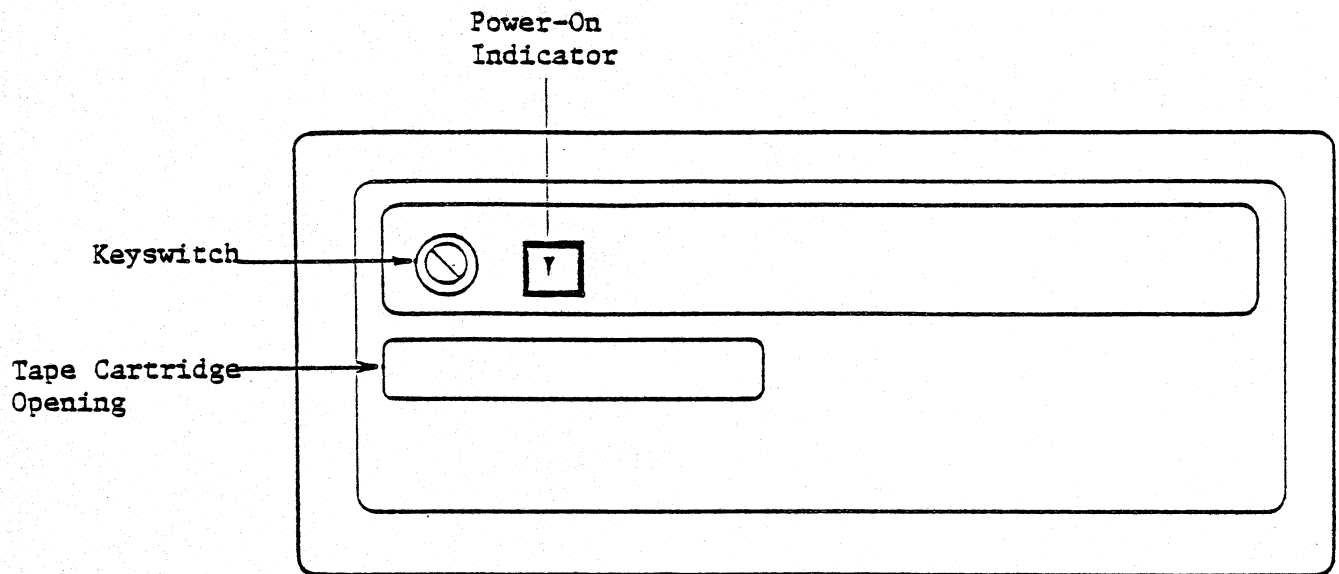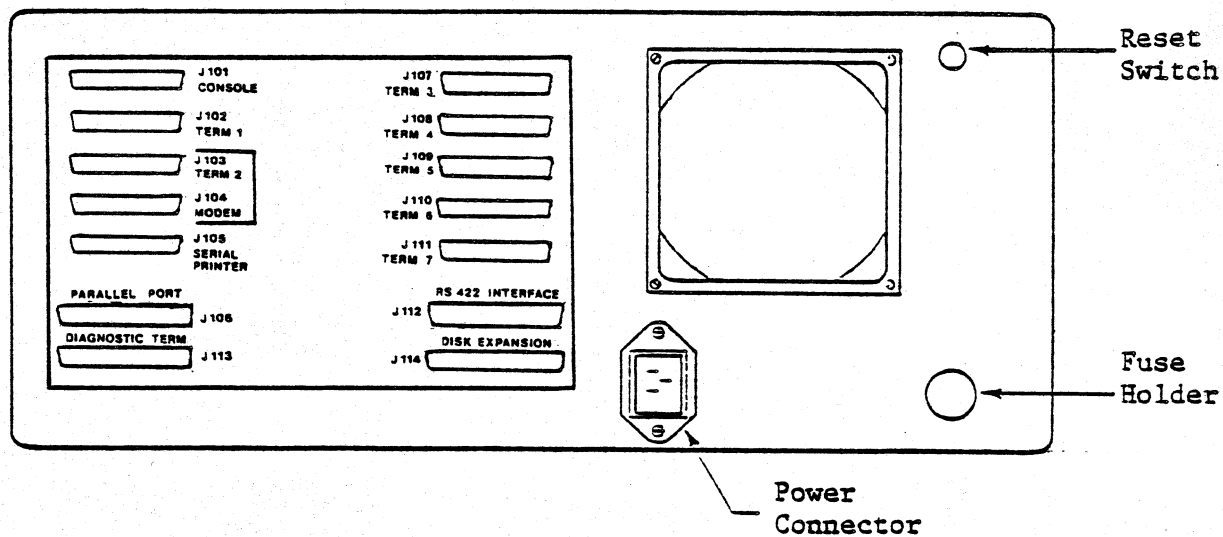
C8002 Rear Panel

Figure 1-1:   COMPONENT LOCATIONS

oOo
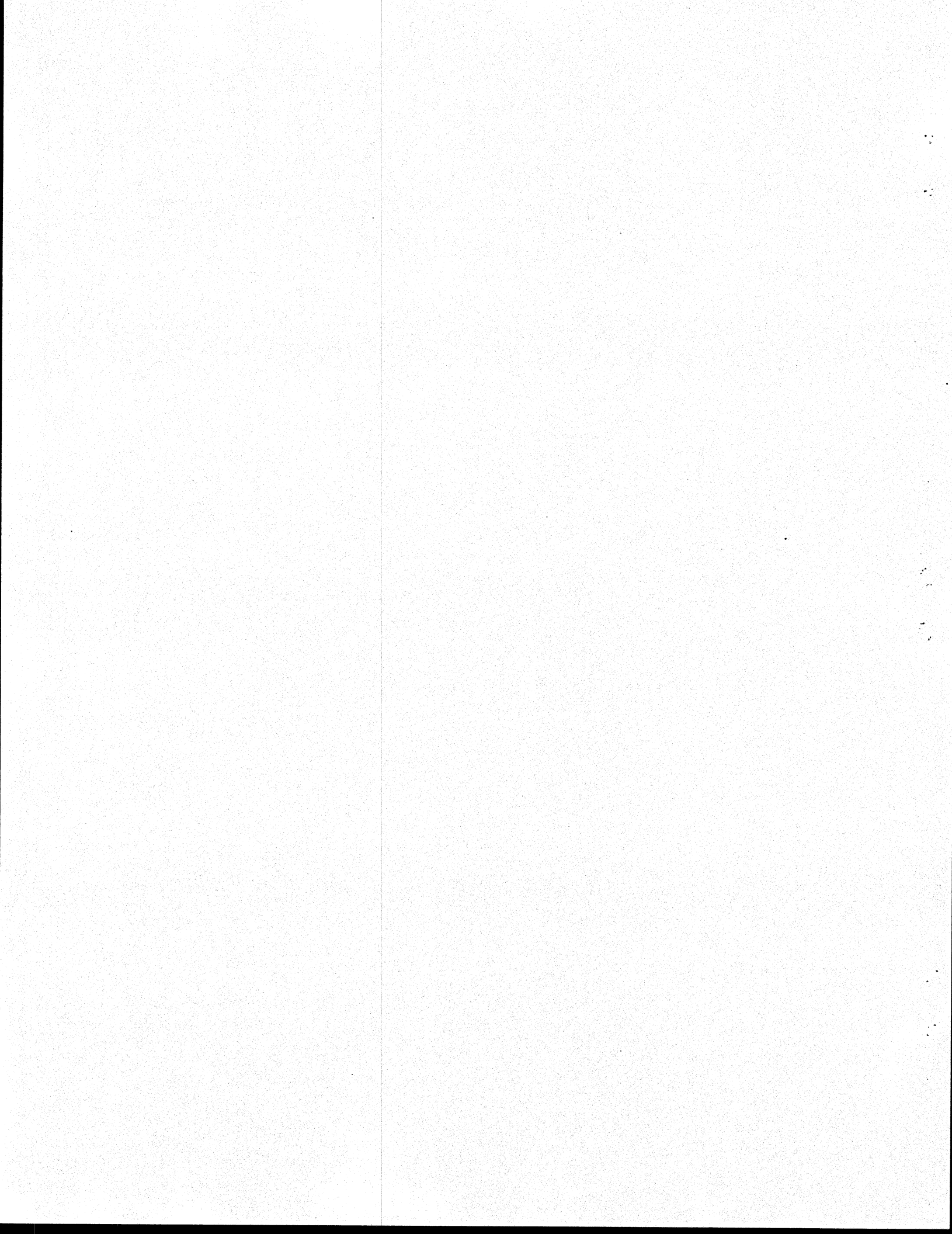
Chapter 2

INSTALLING THE C8002

INTRODUCTION

This chapter describes how to unpack and set up the C8002. It also describes the terms of your warranty.

If you are not already familiar with the components of the C8002, read Chapter 1, "The C8002", before continuing.

PHYSICAL REQUIREMENTS

The C8002 is designed to operate in a normal office environment. Specific requirements are given below.

Size and Weight: The C8002 measures 8 inches (20.3 cm.) high, 17 inches (43.2 cm.) wide, and 22 inches (55.9 cm.) deep. It weighs 65 pounds (29.5 Kg.).

Power: The C8002 requires either a 115 VAC, 60HZ, 5.0 amp line, or a 230 VAC, 50 HZ, 2.5 amp line. The line must be grounded and unaffected by power surges.

Temperature/Humidity: Temperature and humidity need not be specially controlled, although extremes should be avoided. Conditions suitable for normal office work are generally acceptable. The specific limits within which the C8002 is guaranteed to operate are:

Temperature: $10° - 40°C$ ($50 - 104°F$)

Humidity: 20 % - 80 % (without condensation)

CONTENTS OF CARTON

The C8002 was shipped in a carton containing the items listed below. As you are following the unpacking instructions, make sure that you have received everything. If you have not, call either your dealer or ONYX Systems.

C8002 computer chassis (1)

Power cord (1)

System keys (2)

Spare fuse (1)

Software Distribution Tape (1)

Blank tape cartridge (1)

C8002 User Guide (1)

Software manuals (1 set)

Optional parallel printer cable (1)

UNPACKING AND INSTALLING THE C8002

It is extremely important that you follow these instructions exactly. Failure to do so will invalidate your warranty and may cause irreparable damage to the system disk.

Save all packing material for later use, such as moving the C8002 or returning it for service.

1. Remove the chassis from its protective plastic cover.

2. Remove the 10 flat head screws holding the cover in place, and remove the cover.

3. Locate the disk carriage locking screw. This screw is located approximately in the center of the right (viewed from front) side of the disk unit. Unlock the carriage by turning the screw clockwise for approximately 19 turns or until resistance is encountered. Do not overturn as it is possible to damage the lock by applying too much force.

4. Match the transmission (baud) rate of the C8002 to that of

your terminal by setting the switches at the side of the printed circuit board (see figure 2-1). These switches can be set with the point of a pencil or pen. Use the appropriate combination from the table below.

	SWITCH			
Baud Rate	1*	2	3	4
300	OFF*	ON	ON	ON
600	OFF*	ON	ON	OFF
1200	OFF*	ON	OFF	ON
2400	OFF*	ON	OFF	OFF
4800	OFF*	OFF	ON	ON
9600	OFF*	OFF	ON	OFF
19200	OFF*	OFF	OFF	ON
38400	OFF*	OFF	OFF	OFF

The C8002 expects the terminal to be configured with no parity, one start bit, and two stop bits.

AUTOBOOT*

(See table above.) The C8002 will boot automatically when power is turned on if switch 1 on the Baud Rate Select Switch (above) is turned ON. When switch 1 is in the OFF position, the system is booted by entering a command to the System Console. The disk must contain valid information to perform AUTOBOOT.

Printed Circuit
Board (Top View)
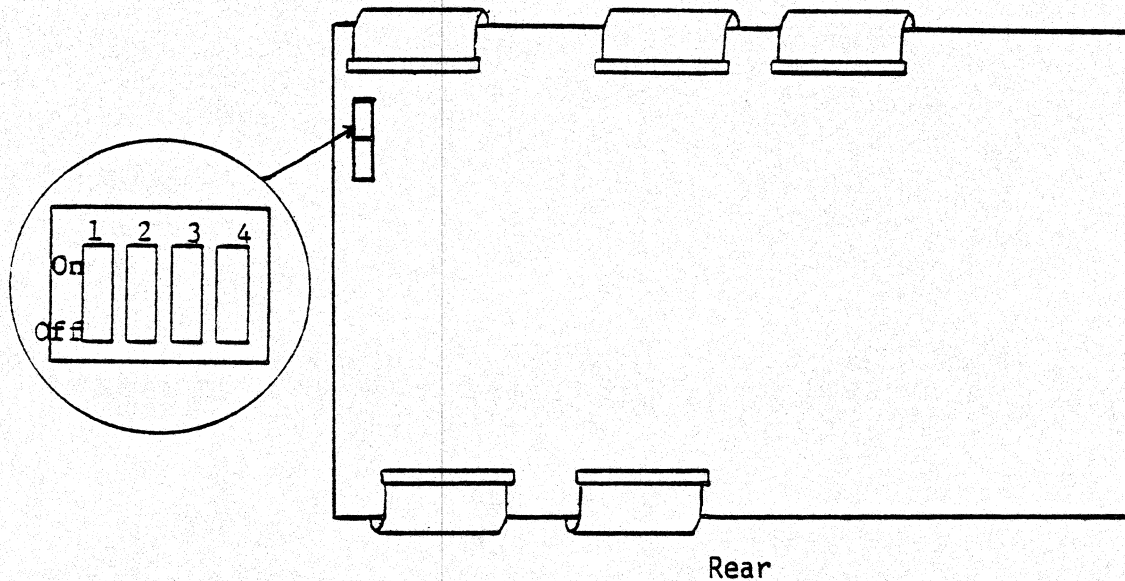
Rear

Figure 2-1   BAUD RATE SWITCHES

5. Replace the chassis cover.

6. Plug the power cord into the Power Connector on the rear
panel and into a nearby wall outlet.

7. Plug your terminal into the connector on the rear panel
marked CONSOLE (J101).

8. Your C8002 was shipped with the power off. Turn it on by
inserting one of the system keys into the keyswitch and turning
the key to the ON position. The power-on lamp will light up.
The C8002 will then automatically test itself to make sure
everything is working. When it successfully completes this
test (this will take about 15 seconds), the C8002 will display:

        C8002 SELF TEST COMPLETED
        <

on your terminal. The left arrow indicates that the C8002 is
ready to accept information from the terminal.

If you have trouble with this step, carefully reread Chapters 1
and 2. If you are still having trouble, read Chapter 4,
"Diagnosing and Handling Problems".

9. Hit the RETURN or CARRIAGE RETURN key on the terminal. This causes the system software to be loaded from disk and executed. Refer to the Software Release Notice supplied with your C8002 to proceed beyond this point.

CONNECTING MODEMS, TERMINALS AND PRINTERS

Connecting modems, terminals, and printers to the C8002 is simply a matter of plugging the equipment into the proper connector. There are several connectors on the rear panel, each clearly marked. Those labeled TERMINAL, MODEM, CONSOLE and SERIAL PRINTER are serial communications ports. The one labeled PARALLEL PORT is a parallel communication port.

The specific pin assignments for each port are given in the figures below. For more information, contact your dealer or ONYX Systems.

Pin Number	Description	Console/Terminal Serial Printer	Modem
1	Protective ground	-	-
2	Transmitted data	Input	Output
3	Received data	Output	Input
4	Request to send (RTS)	Input	Output
5	Clear to send (CTS)	Output	Input
6	Data set ready (DSR)	On	Input
7	Signal ground (common return)	-	-
8	Carrier detect (CD)	On	Input
9	(Not used)		
10	(Not used)		
11	(Not used)		
12	(Not used)		
13	(Not used)		
14	(Not used)		
15	Transmit clock	Unused	Input
16	(Not used)		
17	Receive clock	Unused	Input
18	(Not used)		
19	(Not used)		
20	Data terminal ready (DTR)	Input	Output
21	(Not used)		
22	(Not used)		
23	(Not used)		
24	(Not used)		
25	(Not used)		

```
Input   - signal to C8002
Output  - signal from C8002
On      - permanently connected to +12 volts in C8002
```

(These assignments conform to EIA Specification RS 232-C

Figure 2-2   SERIAL PORT PIN ASSIGNMENTS

Pin Number	Description	Direction
1	Data Bit 0	Bidirectional
2	Data Bit 1	Bidirectional
3	Data Bit 2	Bidirectional
4	Data Bit 3	Bidirectional
5	Data Bit 4	Bidirectional
6	Data Bit 5	Bidirectional
7	Data Bit 6	Bidirectional
8	Data Bit 7	Bidirectional
9	Unused	Unused
10	Data Strobe*	Output
11	Input Prime*	Output
12	Acknowledge*	Input
13	Paper Empty	Input
14	Busy	Input
15	Select	Input
16	Ready	Output
17	Strobe*	Input
18	No Connection	-
19	No Connection	-
20	Ground	-
21	Ground	-
22	Ground	-
24	Ground	-
24	Ground	-
25	Ground	-
26	Ground	-
27	Ground	-
28	Ground	-
29	Ground	-
30	Ground	-
31	Ground	-
32	Ground	-
33	Ground	-
34	Ground	-
35	Ground	-
36	Ground	-
37	Ground	-

Figure 2-3   PARALLEL PORT PIN ASSIGNMENTS

Pin Number	Description	Function	Direction
1	UNUSED		
2	UNUSED		
3	RESET (A)	System Reset	Output
4	SD (A)	Send Data	Input
5	ST (A)	Send Timing	Input
6	RD (A)	Receive Data	Output
7	RS (A)	Request to Send	Input
8	RT (A)	Receive Timing	Input
9	CS (A)	Clear to Send	Output
10	UNUSED		
11	UNUSED		
12	TR (A)	Terminal Ready	Input
13	RR (A)	Receiver Ready	Output
14-16	UNUSED		
17	+5V	(For External Devices 1 amp max)	
18	+5V		
19	GND		
20	GND		
21	RESET (B)		
22	SD (B)		
23	ST (B)		
24	RD (B)		
25	RS (B)		
26	RT (B)		
27	CS (B)		
28	UNUSED		
29	UNUSED		
30	TR (B)		
31	RR (B)		
32	GND		
33	GND		
34-37	UNUSED		

INPUT = SIGNAL TO C8002

OUTPUT = SIGNAL FROM C8002

Figure 2-4   RS 422 INTERFACE PORT PIN ASSIGNMENTS

WARRANTY TERMS

ONYX Systems will repair or replace any C8002 found to be defective during the 90-day period following delivery. Repairs will be performed at our plant, and we will bear domestic freight charges provided that you first obtain authorization from ONYX to return the machine.

The warranty will not be honored if we determine that the system has been subjected to misuse, abuse, neglect, accident, improper installation, or alteration. The warranty is no longer valid if serial numbers have been removed, defaced, or altered, or if the packing and shipping procedures described below are not followed exactly.

We cannot guarantee the integrity of data recorded on the system disk of a C8002 returned for repair.

RETURN PROCEDURES

1.   Call your ONYX Dealer to obtain authorization to return your C8002. ONYX will supply you with the name of the carrier to use for shipping to your Dealer when he receives authorization to return the machine.

2.   Turn the power off using the keyswitch on the front panel.

3.   Disconnect the power cord and any other cables attached to the rear panel.

4.   If there is a tape cartridge in the tape opening, remove it.

5.   Remove the chassis cover.

6.   Lock the disk head carriage by performing the following procedure:

Locate the disk carriage locking screw. This screw is located approximately in the center of the right (viewed from the front) side of the disk unit. Ensure the carriage is fully retracted (i.e. the heads are at the outer edge of the disk) by tilting the front of the C8002 several inches off the table. Now turn the carriage locking screw counter-clockwise approximately 19 turns or until it stops. Do not attempt to overturn by applying too much force.

7. Replace the chassis cover.

8. Fill out the Warranty Service Request form at the back of this manual. Tear the form out and tape it to the cover of the machine.

9. Insert the C8002 into its original protective plastic cover and tie the opening shut.

10. Place the protected C8002 in its original shipping carton and seal the carton with strong tape.

11. Your Dealer will ship the carton to :

    ONYX Systems, Inc.
    Service Department
    73 East Trimble Road
    San Jose, CA 95131

using the carrier specified by ONYX when he obtained permission to return the C8002.

Chapter 3

OPERATING THE C8002

INTRODUCTION

This chapter describes how to power up and initialize the
C8002, how to use magnetic tapes, and how to update the C8002
software. If you are not already familiar with the components
of the C8002, read Chapter 1, "The C8002", before continuing.

All information on maintaining the C8002 (cleaning the tape
drive, changing the fuse, etc.) is contained in Chapter 5,
"Maintaining the C8002".

POWERING UP AND INITIALIZING THE C8002

Turn the C8002 on by inserting one of the system keys into the
keyswitch and turning the key to the ON position. The power-on
lamp will light up. The C8002 will then automatically test
itself to make sure everything is working. When it
successfully completes this self-test (this will take about 15
seconds), the C8002 will display:

        C8002 SELF TEST COMPLETED
        <

on your terminal. The left arrow indicates that the C8002 is
ready to accept information from the terminal.

Unless you need to reformat the disk or restore the file
system, hit the RETURN or CARRIAGE RETURN key on your console.
The first time RETURN or CARRIAGE RETURN is hit, the boot
program will be loaded. The second time RETURN or CARRIAGE
RETURN is hit, the operating system currently residing on the
disk will be loaded. (Refer to the Software Release Notice
supplied with your C8002 for instructions on how to reformat
the disk or restore the file system.)

The following commands may be entered:

COMMAND	MEANING
<carriage return	boot the system software from the disk
<A	boot alternate system software from the disk
<T	boot the system software from tape
<S<n> <address>	boot the system software from serial channel (J107 Term 3) to memory location specified by <address>. If the <address> is not given, default address 2000 is used.

Note: n = 0 to 6 which corresponds to 300, 600, 1200, 2400, 4800, 9600 and 19,200 baud rate respectively.

TAPE BOOT OR DISK BOOT ERROR CODE

If failure occurred during tape boot or disk boot, a 4 digit number will be displayed with the message "CONTROLLER FAILURE":

CONTROLLER FAILURE XXYY

XX will be 20 or 54, and is the error code:

20 = DISK BOOT ERROR

54 = TAPE BOOT ERROR

YY will be 40 or 80, and will indicate where the failure occurred:

40 = DISK/TAPE PRIMARY BOOT ERROR

80 = PROM ERROR

RESETTING THE C8002

To reset the C8002 to its initial state (before the operating system was loaded), push the reset switch on the back panel. Do not reset the C8002 while a program is running. Doing so may destroy data on the disk. Use RESET only when you:

* are sure all other users have signed off the system;

and you:

* want to boot the operating system;

or you:

* want to recreate the disk.

USING MAGNETIC TAPES

The C8002 uses magnetic tape for removable storage of data.
The information below describes how to use tapes on the C8002.

Types of Tape to Use:

Because the C8002 records data at 6400 BPI, you must use
only tapes designed for use at 6400 BPI. Use tape
cartridges of the 3M DC300 type, so called because 3M
invented them. Several vendors have been licensed by 3M
to manufacture these cartridges, and tapes are available
in 300 and 450 foot lengths. A 450 foot tape will hold
approximately 12 million bytes of data when large blocks
are written. Contact ONYX Systems for the latest
information on vendors and tape specifications.

Inserting Tape Cartridges:

Insert tapes into the tape cartridge opening by sliding
the cartridge in metal side down. You will encounter some
resistance when the tape is inserted partway. Continue to
push the cartridge in firmly until you hear a buzzing
sound, which indicates that the tape drive is
automatically rewinding the tape. The tape is then ready
to be read from or written on by the C8002.

Preparing New Tapes for Use:

Before using a tape, initialize it by executing the Tape
Initialization program supplied by ONYX Systems. This
program will write a volume label at the beginning of the
tape and will check to see that data can be written on and
read from the tape. The program is described in the

software manual provided with your C8002.

It is a good idea to check a few of every batch of tapes you purchase by executing the tape initialization program.

Protecting Tapes from Overwriting:

To protect a tape from accidental overwriting, turn the screw-like fixture located on the corner of the tape cartridge so that the arrow on it points to SAFE. The tape can then be read from but not written on. You can write on a tape only when the arrow points directly away from SAFE.
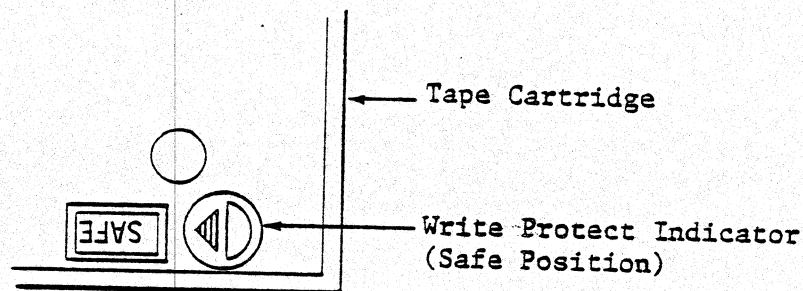

Figure 3-1: WRITE MECHANISM ON TAPE CARTRIDGE

Recording Technique:

The 3M tape cartridge used in the C8002 has four parallel data tracks which run the length of the tape. Only one track can be read or written at a time. Rewinds are done at high speed, so they have minimum impact on system performance.

Error Handling:

When it writes on a tape, the C8002 automatically reads the data back from the tape to verify that it is correct. (This action is referred to as a read-after write check.)
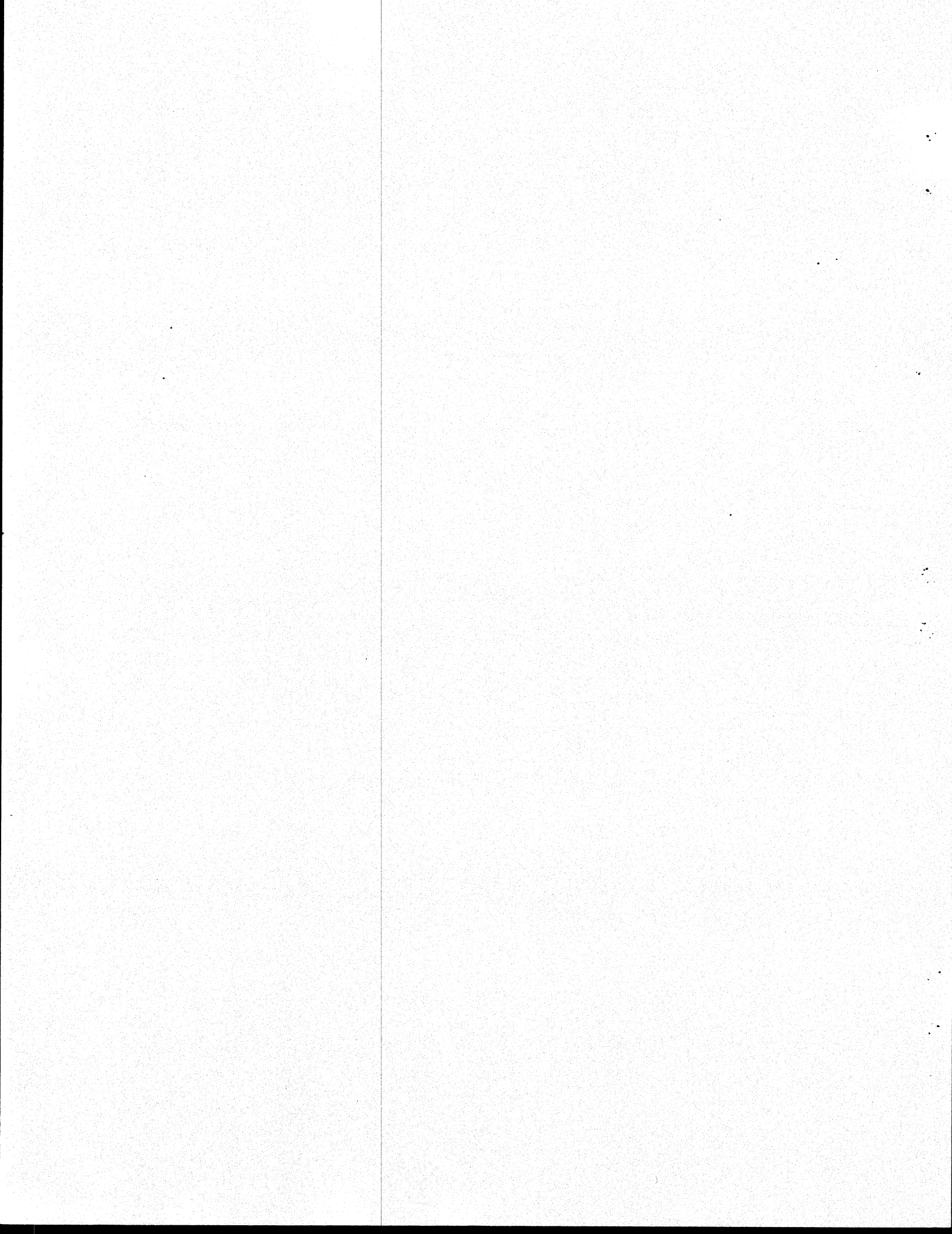
APPLYING UPDATES TO THE SYSTEM SOFTWARE

Updates will be distributed on cartridge tapes along with detailed instructions for applying them.

DIAGNOSING PROBLEMS

Refer to Chapter 4, "Diagnosing and Handling Problems".

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Chapter 4

DIAGNOSING AND HANDLING PROBLEMS

TABLE OF COMMON PROBLEMS

The table below describes how to correct the more common problems you may encounter in installing and setting up the C8002. Where appropriate, see the Software Release Notice for instructions on how to recreate the disk.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Power does not come on:	1. Power cord not plugged in properly	1. Plug the power cord into a convenient outlet and into the power connector on the rear panel.
	2. Fuse blown.	2. Replace the fuse. See Chapter 5.
	3. Power supply dead, keyswitch broken, etc.	3. Have the system serviced.
Power-on lamp does not come on:	1. Power is not on.	1. See above.
	2. Lamp burned out.	2. Change the lamp. See Chapter 5.
No power-on message displayed:	1. Terminal is not connected properly.	1. Check that terminal cable is firmly connected to CONSOLE connector and your terminal.

	2. Terminal power off.	2. Turn it on.
	3. Terminal not "ON-LINE".	3. Put it on-line.
	4. Baud rate, parity and/or stop bits set incorrectly.	4. See Unpacking Instructions in Chapter 2 and set terminal up accordingly.
	5. Loose internal connector, component failure, etc.	5. Have the system serviced.
Errors detected during self-test:	1. Component failure, loose connector, etc.	1. Have the system serviced.
Cannot load from disk:	1. Corrupted data on disk.	1. Restore the Software Distribution Tape in accordance with instructions contained in the Software Release Notice.
	2. Loose connectors, component failure, etc.	2. Have the system serviced.
	3. If at unpacking, head arm not unlocked.	3. Follow the unpacking instructions exactly!
Excessive tape errors:	1. Dirty read/write heads.	1. Clean heads. See Chapter 5.
	2. Worn, damaged or wrong tape or tape cartridge.	1. Replace the cartridge.
	3. Component failure, loose connector, etc.	3. Have the system serviced.

Figure 4-1   TABLE OF COMMON PROBLEMS

MEMORY PARITY ERRORS

The C8002 is equipped with circuitry to notify the user in the
event of a memory failure. If a parity error is detected
during the execution of a program, the operating system will
display a message indicating the area of memory in which the
error occurred.

POWER FAILURES

The C8002 constantly monitors the AC power line for
interruptions long enough to cause loss of system memory. When
power is restored, the C8002 will automatically begin its
self-test sequence.

C8002 SELF TESTS

When the C8002 system is powered up, a series of self
diagnostic tests are performed on both the Mass Storage
Controller and the Z8000 board.

Failures detected on the Z8000 board during any of these tests
are identified by a combination of LED readouts, and the
CONSOLE CRT displays the results indicated by the LED´s located
on the right side (looking from the front) of the Z8000 board,
next to the Baud Rate Select switches.

Following is a table with LED displays and the corresponding
message output on the terminal. Following the table is a
description of the meaning of each message.

		LED1	LED2	LED3	LED4	MESSAGE
1)	PROM	ON	ON	ON	ON	PROM FAILURE
2)	STATIC MEM	ON	ON	ON	OFF	S MEM FAILURE
3)	SIO	ON	ON	OFF	ON	SIO FAILURE nn
4)	CTC	ON	ON	OFF	OFF	CTC FAILURE nn
5)	PIO	ON	OFF	ON	ON	PIO FAILURE nn
6)	MMC	ON	OFF	ON	OFF	MMC FAILURE 01
7)	PARITY	ON	OFF	OFF	ON	PARITY nnnn
8)	DYNAMIC MEM	ON	OFF	OFF	OFF	D MEM FAILURE
9)	DMA	OFF	ON	ON	ON	DMA FAILURE nn
10)	APU	OFF	ON	ON	OFF	APU FAILURE 01

1) PROM CHECKSUM TEST

   The C8002 system will halt if a failure occurred in the
   PROM checksum test.

2) STATIC MEMORY TEST

   The C8002 system will halt if a failure occurred in the
   static memory test.

Note: If tests (1) or (2) above fail, the system halts completely.
If tests (3) through (10) fail, hitting any terminal key will cause
the next test to be executed.

3) SERIAL I/O TEST (SIO)

   The 2 digit number which is displayed on the console next
   to the error message indicates which of the 4 SIO chips
   has failed. The number is the sum of the codes below, and
   is displayed in hexadecimal form.

```
01    SIO 1 failed

02    SIO 2 failed

04    SIO 3 failed

08    SIO 4 failed
```

Since the above codes are added, the sum uniquely indicates which of the chips failed. For example, a sum of "OD" (13) implies that SIO 1, 3 and 4 have all failed.

4) COUNTER TIMER CIRCUIT (CTC)

The 2 digit number which is displayed on the console next to the error message indicates which of the 3 CTC's failed. The number is the sum of the codes below:

```
01    CTC 1 failed

02    CTC 2 failed

04    CTC 3 failed
```

5) PARALLEL I/O TEST (PIO)

The 2 digit number which is displayed on the console next to the error message indicates which of the 4 PIO's failed. The number is the sum of the codes below:

```
01    PIO 0 port A failed

02    PIO 0 port B failed

04    DMAPIO port A failed

08    DMAPIO port B failed
```

6) MEMORY MANAGEMENT CONTROLLER (MMC)

The value 01 is displayed on the console if failure occurred during the MMC test.

7) PARITY TEST

When a main memory parity error occurred during the parity test, the physical address of the parity error will be displayed on the system console. The first digit is the bank number; the remaining 3 digits are the upper 12 bits of the address in the bank.

8) MAIN DYNAMIC MEMORY TEST

The value 01 will be displayed on the console if failure occurred during the dynamic memory test.

9) DIRECT MEMORY ACCESS TEST (DMA)

The 2 digit number which is displayed on the console next to the error message indicates which part of the DMA controller failed. The number is the sum of the codes below:

01   load source address port

02   load destination address port

04   load transfer count port

10) ARITHMETIC PROCESSOR UNIT TEST (APU)

The value 01 will be displayed on the console if failure occurred during the APU test.

MASS STORAGE CONTROLLER TEST (MSC)

The Mass Storage Controller is a Z80 based intelligent peripheral controller including its own self test, parity test, memory test, etc.

While the Z8000 self test is running, the MSC is also running a self test which reports the results of its test on the Z8000 console. Should the MSC fail, the message:

CONTROLLER FAILURE XXXX

will display on the console. The possible values of XXXX are:

0400	Z80 Disk Interface failure
0800	Z80 Tape Interface failure
1000	Z80 RAM failure (Parity)
2000	Z80 RAM failure (Bank 0)
4000	Z80 RAM Failure (Banks 1, 2 or 3)
8000	Z80 PROM Checksum failure

oOo
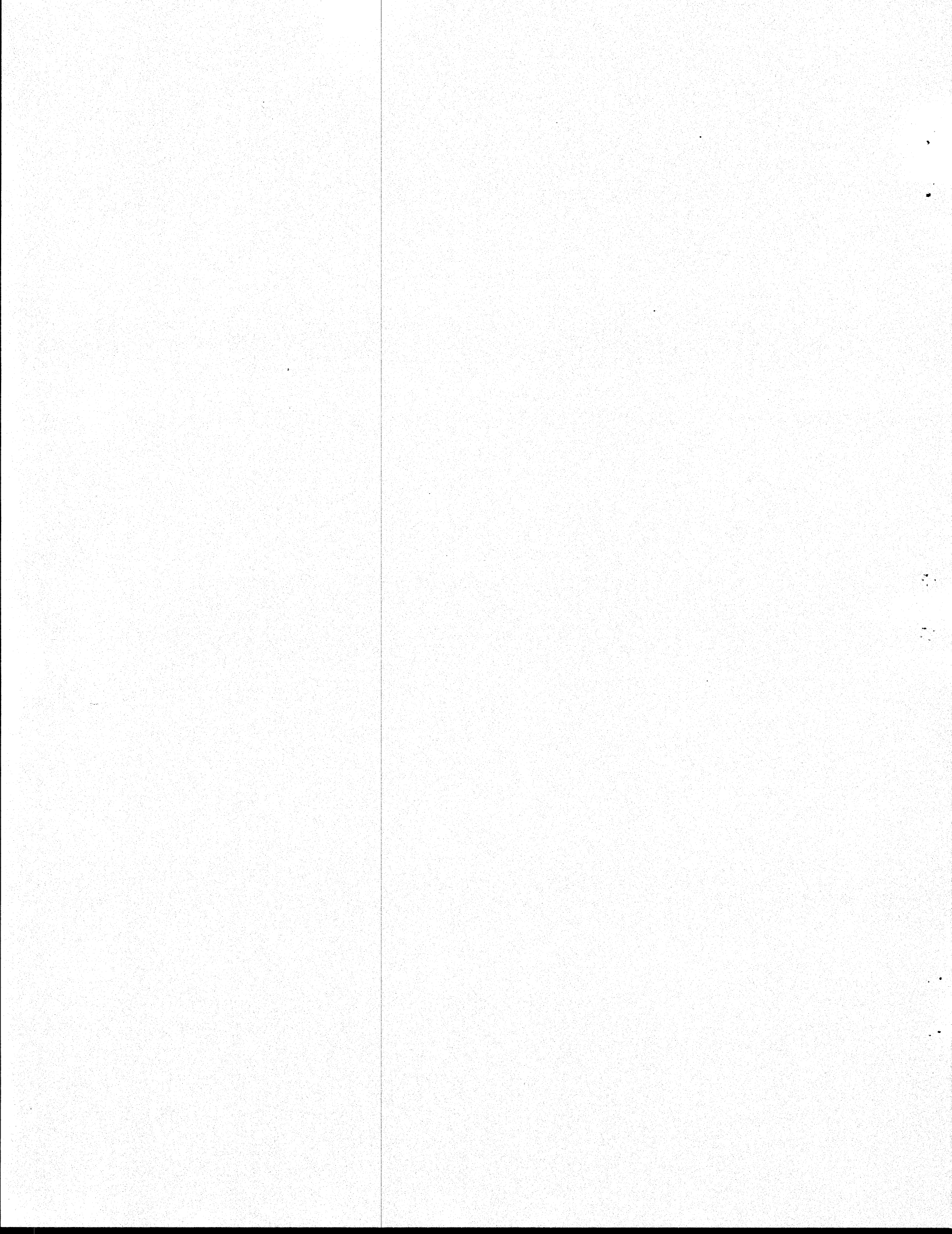
Chapter 5

MAINTAINING THE C8002

INTRODUCTION

The C8002 requires very little care. This chapter gives some
guidelines for general maintenance, then describes the few
simple maintenance procedures with which you need to be
familiar.

GENERAL MAINTENANCE

To ensure the best service from your C8002, follow these
guidelines:

> * Do not put drinks or other liquids on top of the
> chassis. Spilled liquids can enter the C8002 through
> openings in the chassis and damage the system.
>
> * Keep the ventilation opening in the chassis clear.
> Blocking the front, rear, or bottom vents may cause the
> system to overheat.
>
> * Keep the area around the tape drive as free from dust as
> possible. Dust can contaminate the tape head and cause
> errors during read and write operations.
>
> * Use only soap and water or a mild detergent to clean the
> external surfaces of the C8002. Do not use cleaners
> containing solvents, and do not use excessive water.

CLEANING THE TAPE HEADS

The read/write heads in the tape drive pick up oxide from tapes
during normal operation. Eventually, this buildup of oxide
interferes with the reading and writing of data. To avoid this
condition, clean the tape heads regularly.

FREQUENCY: The frequency with which you clean the heads depends on how often you use tapes and how many of them are new. (New tapes have more loose oxide.) If you typically use the tape drive only once a day, clean the heads once a week. If you use the tape drive more frequently, or if you have experienced excessive read/write errors, clean the heads more often.

PROCEDURE: (See figure below.) Do not touch the tape heads or the capstan with your fingers. Use a long-handled polyurethane swab such as Tex Wipe #TX 700 dipped in 91 percent Isopropol Alcohol solution to wipe the tape heads. First wipe back and forth in the direction that the tape moves (left to right), and then wipe up and down. Use firm pressure when wiping. Occasionally, use a dry swab to wipe the capstan.
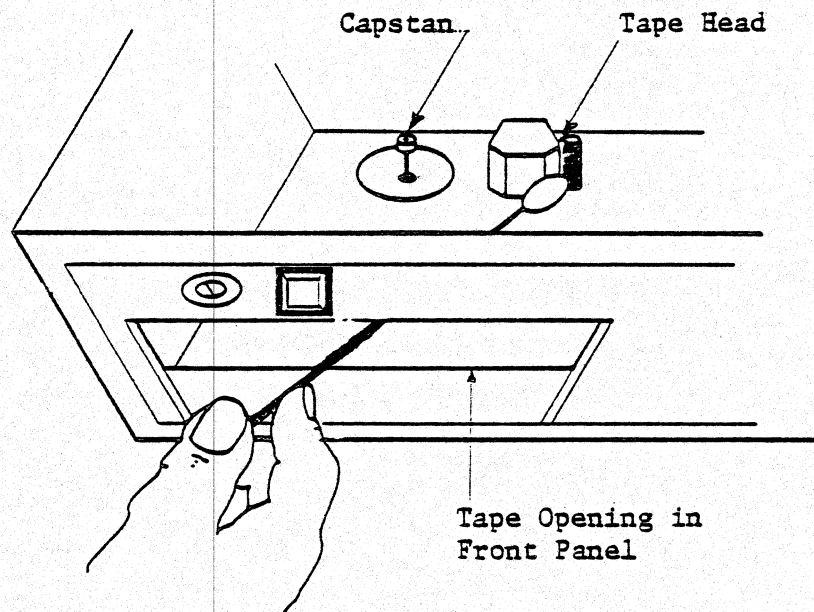

Figure 5-1:   TAPE HEAD CLEANING PROCEDURE

REPLACING A FUSE

The fuse in your C8002 prevents it from drawing excessive power from the AC line. To replace the fuse, follow these steps:

1.   Unplug the C8002 from the AC line.

2.   Unscrew the cap from the fuse receptacle on the rear
panel by turning counter-clockwise one-quarter turn.

3.   Remove the blown fuse from the cap and insert a new
one.

4.   Screw the fuse holder cap back in place by pressing in
and turning clockwise one-quarter turn.

WARNING: If you replace a fuse and it blows right away, do
not continue using the C8002. Have it serviced
immediately.

ONYX Systems shipped one spare fuse with your C8002. If
you need another, buy 3AG, 6.25 AMP SLO-BLO for 115 volt
operation, and 3AG, 3 AMP SLO-BLO for 230 volt operation.

REPLACING THE POWER-ON INDICATOR LAMP

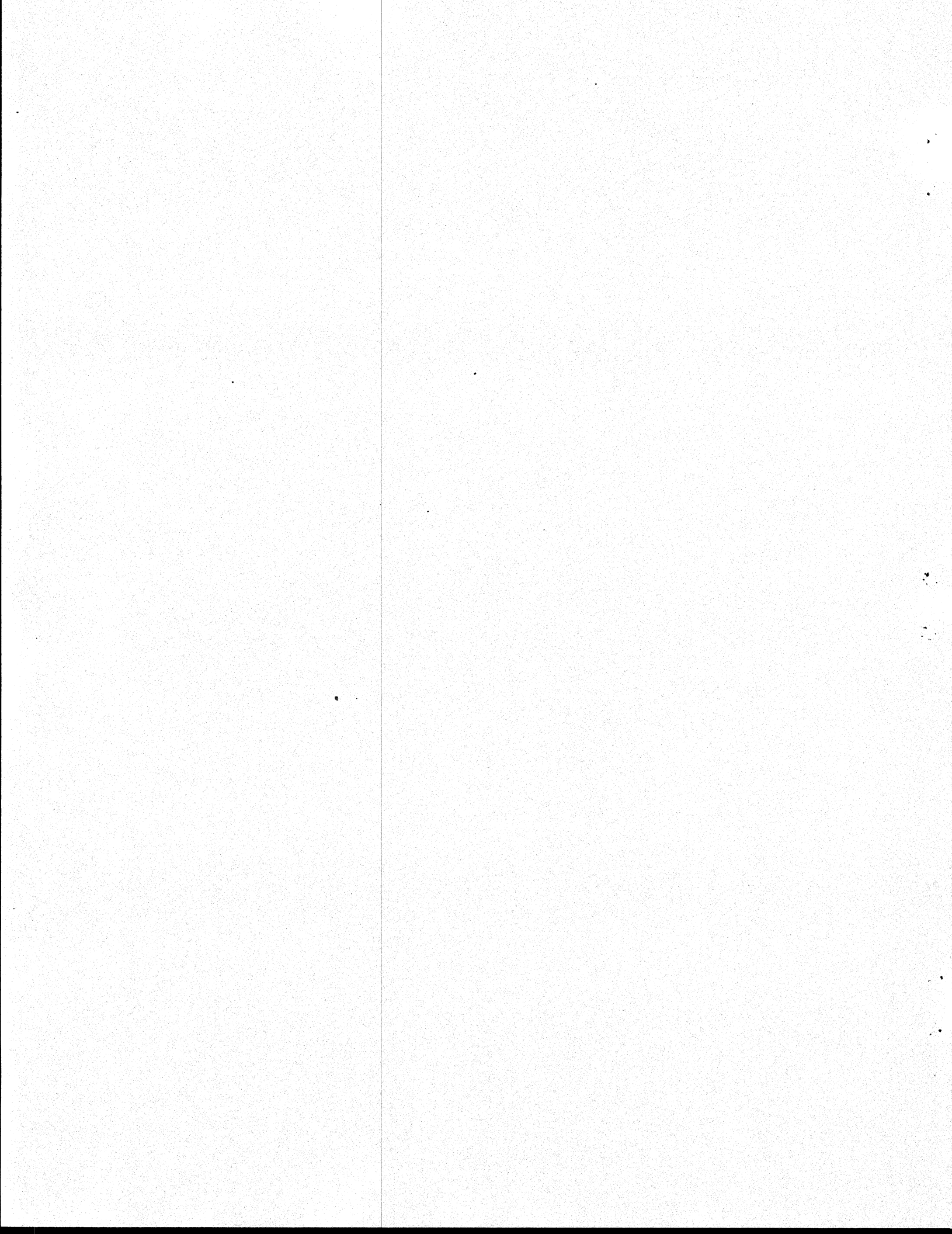If you need to replace lamps, follow these steps:

1.   Pull the white lens out of the lamp assembly.

2.   Remove the faulty lamp from the lens and replace it
with the spare.

3.   Push the lens back into the lamp assembly until it
snaps firmly into place.

MOVING THE C8002

If you are moving the C8002 other than a short distance, repack
it as if you were returning it to the factory. See Chapter 2,
"Installing the C8002", for instructions.

Failure to observe this precaution may damage the C8002 and is
considered neglect under the terms of the ONYX warranty.

oOo

Appendix A
LIST OF FIGURES

Processors		*Main*	*Mass Storage Controller*
	CPU	Z8002	Z80A
	Word Size	16 bits	8 bits
	Cycle Time	250 ns	250 ns
	DMA	Yes	Yes

Memory			
	Size (bytes)	128K to 512K	64K
	Parity	Yes	Yes

Integral Mass Storage Devices		*Disk*	*Tape*
	Technology	Fixed Winchester; closed loop track following servo system; 8 inch disks.	4 track 3M DC300 type. 6400 bpi recording density.
	Capacity (formatted)	10, 18 or 40 Mbytes	12 Mbyte
	Speed	3600 R.P.M.	30 ips (90 ips search)
	Transfer Rate	648K bytes/sec	198K bits/sec
	Access Time	35 ms	30 seconds

Power	
115 VAC, 4 amps	
220 VAC, 2 amps	

Environment		
	Temperature	10° - 40°C
	Relative Humidity	20% - 80%

Physical		
	Height	8.0 in/20.3 cm
	Width	17.0 in/43.2 cm
	Depth	22.0 in/55.9 cm
	Weight	60 lbs/27.0 kg

Appendix C

LIST OF SOFTWARE MANUALS

*   C8002 User Guide

*   UNIX* Programmer's Manual, Seventh Edition,
         Volumes 1, 2A and 2B

*UNIX is a Trademark of Bell Laboratories.

Appendix D

WARRANTY SERVICE REQUEST

Please complete and attach this form to the cover of your C8002
before shipping to factory for repair.

To aid up in diagnosing the problem, please supply as much
information as possible about the conditions under which the
failure occurred (for example, diagnostic information which is
displayed on the terminal after parity errors).

NAME OF PERSON MOST FAMILIAR WITH PROBLEM:

COMPANY:

ADDRESS:

PHONE:

DATE:

Appendix E

REQUEST FOR UPDATES

Tear out this form and mail it to ONYX Systems and we will then place your name on the distribution list for the C8002 USER GUIDE and for any special bulletins pertaining to the C8002.

NAME:

COMPANY

ADDRESS:

PHONE:

Mail to:

Onyx Systems, Inc.

73 East Trimble Road

San Jose, CA 95131

Appendix F

READER COMMENT FORM

We are interested in your suggestions about the usefulness and
readability of the C8002 USER GUIDE. We would also like to
know about any errors. Write your comments below, indicating
page numbers where appropriate. If you wish, attach a copy of
the pages affected and show your suggestions.

COMMENTS:

NAME:

COMPANY:

ADDRESS:

PHONE:

DATE:

Mail to:

Onyx Systems, Inc.

73 East Trimble Road

San Jose, CA 95131