Burroughs

B 26/B 28 Systems Diagnostics

Operations Guide

Relative To Release Levels 2.0 **(B 28)** and 4.0 **(B 26)**
Priced Item
June 1986

Distribution Code SA
Printed in U.S.A
1201068

Burroughs

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How This Guide Works

This guide assumes that you have experienced a problem with your B 26/B 28 system, a problem that you think is not caused by any error in a program you have been running. The guide asks you a series of questions about your system, leading you along a diagnostic path to the discovery of the failing part of your system or to a point when you know you need the services of a trained technician. When you have found the failing module or know you need technical help, call your Burroughs Customer Support Center or the dealer from which you purchased your B 26/B 28 system.

In addition to this guide, the B 26/B 28 Diagnostic Kit contains two sets of programs on two floppy disks. Depending on your path through this guide, you may or may not need to use the disks.

Two Versions of the Diagnostics

There are two diagnostic kits. They contain the same manual and floppy disk diagnostic programs. One kit contains *loopback plugs*. These plugs are to be used with the diagnostic program (RS232 Communication Diagnostics) that tests the circuitry involved with this kind of communication. If you have the kit without these plugs, you will not be able to use the RS232 Communication Diagnostic program.

Note: *The Teller Extension Module (TEM) Diagnostic requires three loopback plugs. Call your Burroughs office to obtain these.*

What You Should Have on Hand

This kit contains everything you need for most situations. However, you may be directed to clean the heads of your floppy disk drive using a disk cleaning kit. You should be doing this anyway after about 40 hours of drive operation. It is important that you use a Burroughs authorized disk cleaning kit; otherwise, you risk serious damage to your drive. Call your Burroughs office to get the correct kit. See Section O for the proper head cleaning procedure.

You may also be asked to use a keyboard or a memory expansion module that you know to be good. If no functioning B 26/B 28 is available from which you can borrow these components, call Burroughs or your dealer.

The B 26/B 28 System

The complete B 26/B 28 system consists of the following pieces or *modules* (see Figure 1). Your system has all or some of these.

- CPU (Central Processing Unit—80186 or 80286) module
- Graphics module (optional)
- TEM (Teller Extension Module) (optional)
- Main disk module: dual floppy or floppy/Winchester module
- Disk expansion module or disk upgrade module (optional)
- Video monitor (monochrome or color)
- Power module(s)
- Keyboard
- MCR (Magnetic Card Reader) (optional)
- Memory expansion module(s) (the CPU diagnostic memory test requires at least one module)
- 1/4-inch tape streamer (optional)
- X-Bus to F-Bus adapter (optional)
- Four-port I/O (optional; requires X-Bus to F-Bus adapter)
- LAN (optional; requires X-Bus to F-Bus adapter)

The Diagnostic Flow Diagram isolates a faulty module of the basic system. The basic system represents the minimum amount of equipment needed to have a functioning B 26/B 28 and includes a CPU module, main disk module, keyboard, and video monitor, or an optional graphics module installed between the CPU and the main disk module. If you have a system other than this, you may have to do some swapping around of modules as you move through the flow diagram. Figures 2, 3, and 4 give examples of how the screen looks when it shows an error message, a diagnostic ID, and a diagnostic menu.

Figure 1 **The B 26/B 28 System**

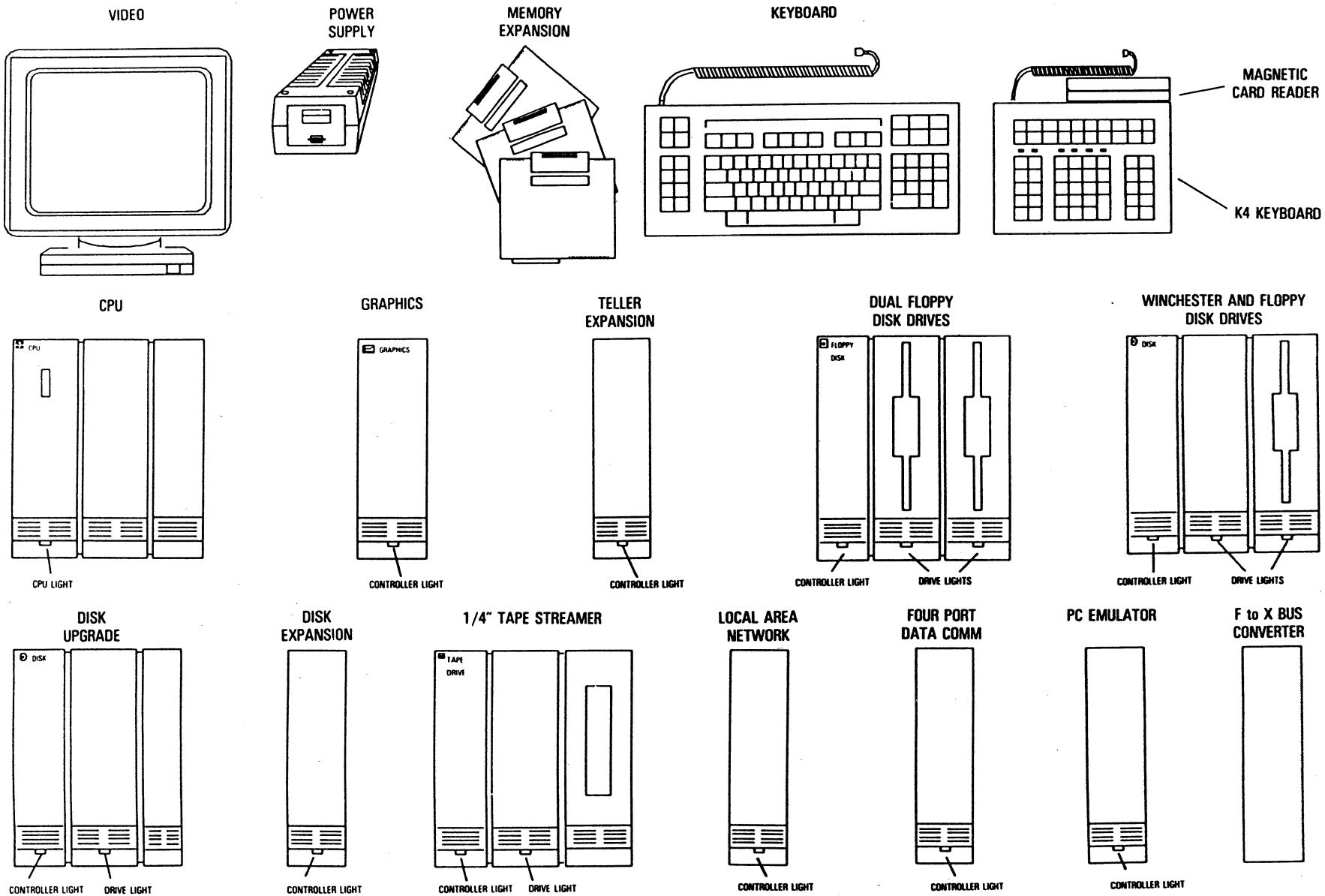

Figure 2 **Error Message Example**

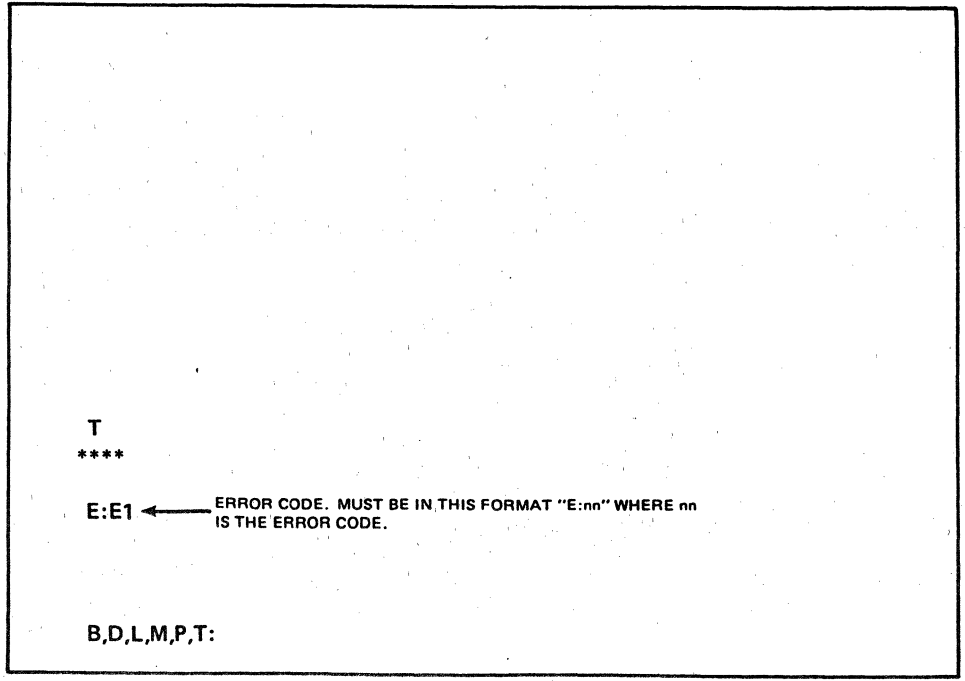

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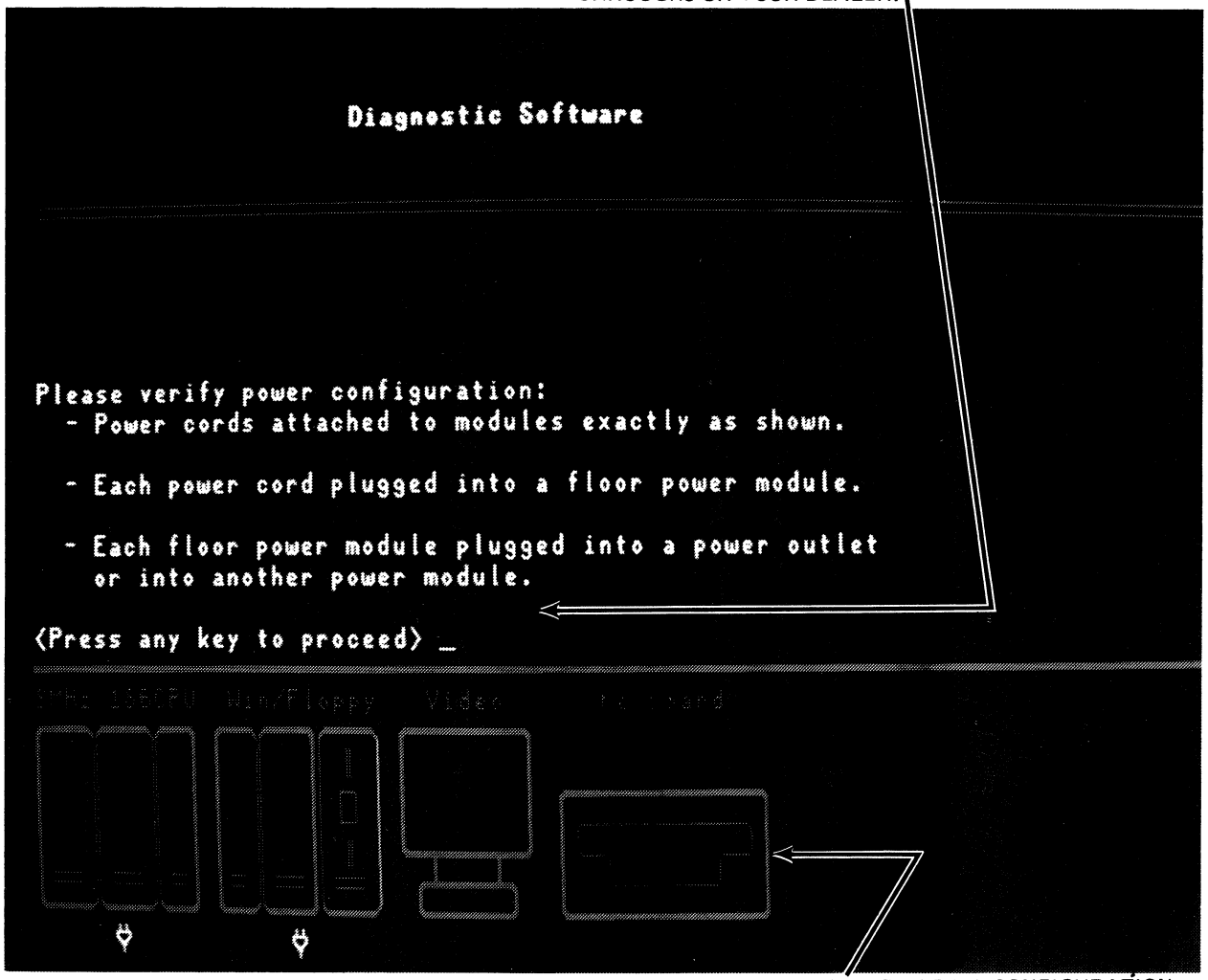
Figure 3 **Diagnostic ID**

IF ANY PART OF THIS SCREEN IS MISSING, YOU SHOULD ANSWER NO TO THE FLOWCHART QUESTION, "DOES SCREEN DISPLAY THE DIAGNOSTIC ID."

IF ANY ERROR CODES (SEE FIGURE 2) OR ERROR MESSAGES ARE DISPLAYED IN THIS SECTION OF THE SCREEN, CALL BURROUGHS OR YOUR DEALER.



E5718

THIS SECTION SHOULD DISPLAY THE ACTUAL CONFIGURATION OF YOUR SYSTEM. IF IT DOESN'T, CHECK THAT YOU ARE USING THE CORRECT NUMBER OF POWER MODULES AS ILLUSTRATED BY THE FLASHING PLUGS, THEN CALL BURROUGHS OR YOUR DEALER.

Figure 4 **Diagnostic Menu**

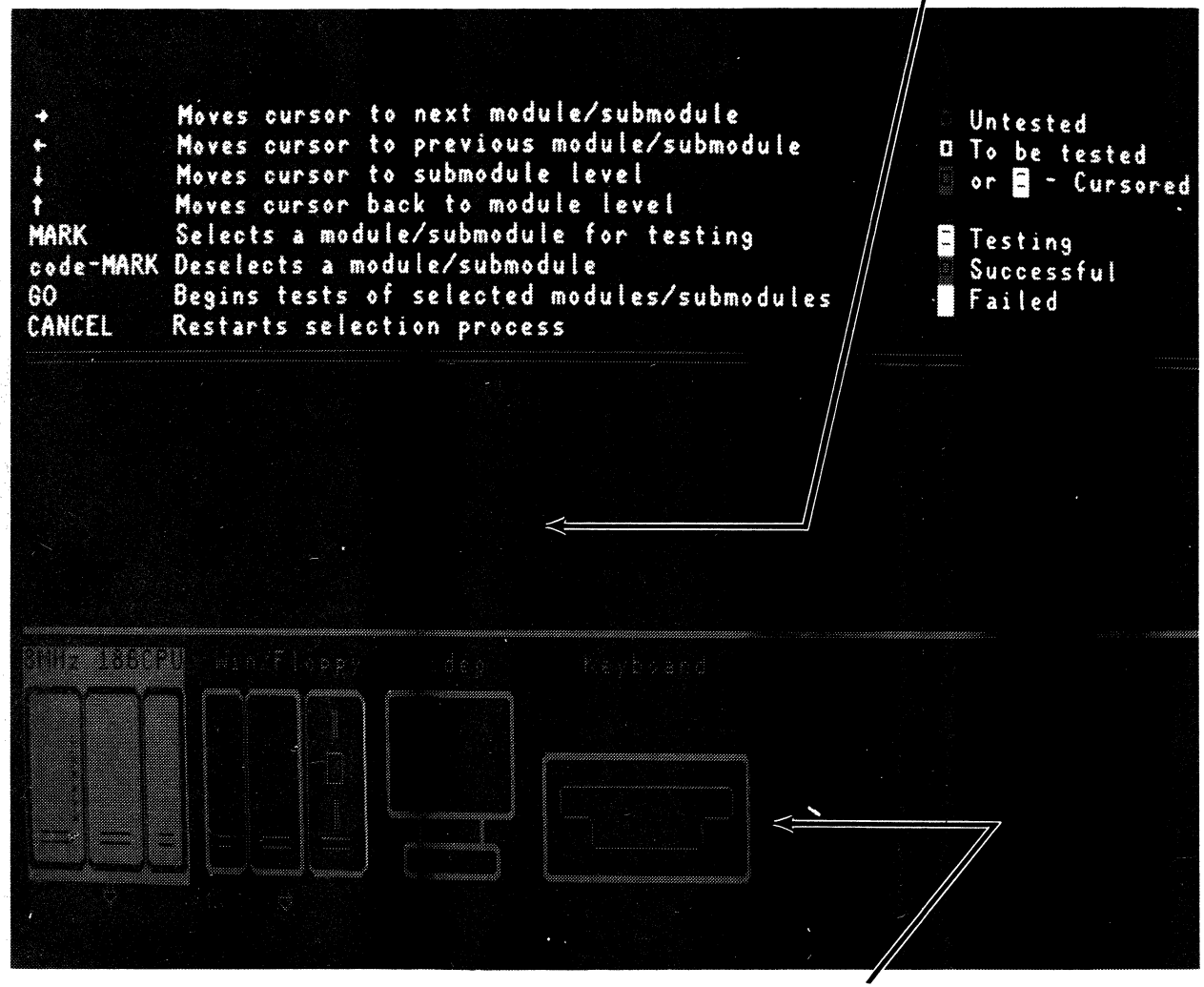


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Table 1 **Standard and Extended Diagnostics**

Disk #1 (Standard Diagnostics)

CPU
Graphics
Keyboards
TEM
MCR
B 26 Tape Streamer
Monitors
Disk drives
Dual floppy
Hard disk and floppy
Expansion drives

Disk #2 (Extended Diagnostics)

B 27 LAN
B 27 Tape Streamer
B 27 4-Port I/O
PC Emulator

Copying the Diagnostics onto a Hard Disk

If you want to put the floppy disk diagnostics onto the hard disk of a B 26/B 28, refer to the procedure in Appendix A. Copying the diagnostics onto the hard disk of a master workstation allows the members of the cluster to share the diagnostics. Copying the disk diagnostics onto the hard disk of a standalone workstation allows you to use the diagnostics if your floppy drive is inoperable.

Terms to Know

There is a glossary at the end of this guide to help you understand terms with which you may be unfamiliar. Here are three terms that you will want to know before you begin the flow diagram.

Main disk module. Disk unit closest to the CPU module. It can be a dual floppy or a floppy/hard disk unit.

Upgrade disk module. Any disk unit (or tape unit) used in addition to the main disk module that increases the storage capacity of your system. This document assumes that the upgrade disk module is installed to the right of the main disk module.

Expansion disk module. A hard disk unit that adds to the storage capacity of your system but must be paired with a main disk or upgrade module.

Before You Begin the Diagnostic Flow Diagram

Caution: *Always turn the system off and unplug the power supply from the ac wall outlet before detaching or attaching modules, cords, or cables.*

Make sure that the modules in your system are connected in the correct sequence and that all cables and cords are plugged in at the appropriate places. The *BTOS Systems Hardware Installation Guide* provides you with this information.

When disconnecting and reconnecting modules, check for bent, misaligned, or broken pins on the side of the module. These pin conditions could cause malfunctions in one or more modules.

Refer to your *BTOS Systems Hardware Installation Guide* for information about disk handling procedures, maintenance tips, and the location of the connectors, controls, and switches.

Note: If the B 26/B 28 diagnostic software can be loaded and the screen displays the diagnostic ID (see Figure 3), you can bypass the Diagnostic Flow Diagram and proceed to Section N.

The Diagnostic Flow Diagram assumes that no modules are connected beyond the main disk module. Disconnect all generic X-Bus (and/or F-Bus) and I-Bus modules to reduce your particular configuration to a basic system (see page 2). X-Bus modules are modules such as CPU, Graphics, and Tape Streamer that are connected to the B 26 or B 28 with an X-Bus connector. F-Bus modules are modules such as Four-Port Input/Output Device, Local Area Network, and B 27 Tape Streamer that are connected to the B 26 or B 28 with an X-Bus to F-Bus converter (also known as "X-F adapter"). I-Bus modules are modules such as Magnetic Card Reader (MCR) and Mouse that connect to the keyboard.

Proceed with the Diagnostic Flow Diagram if your basic system is not functioning properly.

If your basic system is functioning properly, do one of the following:

If the next modules that you intend to connect are X-Bus modules, go to Section J. This section also covers F-Bus modules if necessary.

If the next module to be connected is an X-Bus to F-Bus Converter, go to Section G.

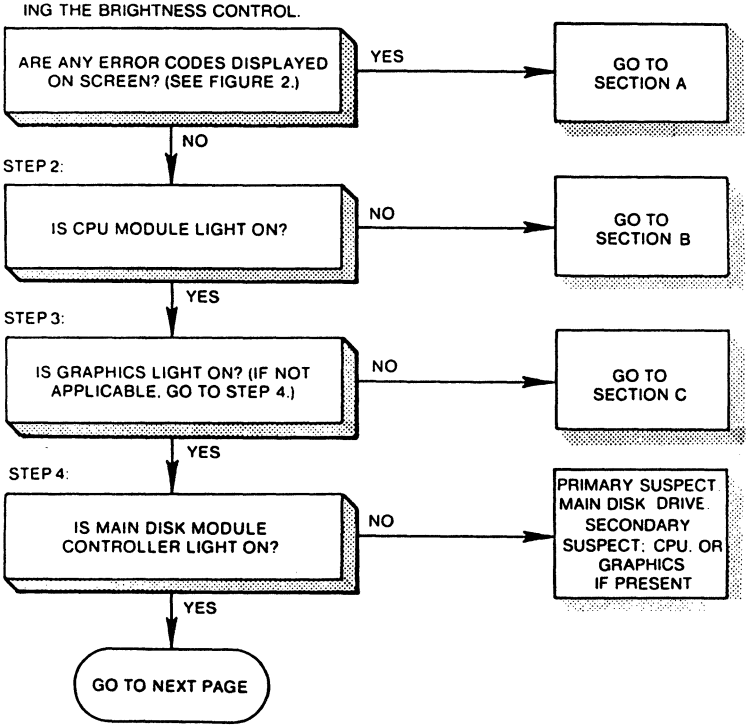
If you suspect a faulty input device, such as an MCR, see Section K to determine the defective module.

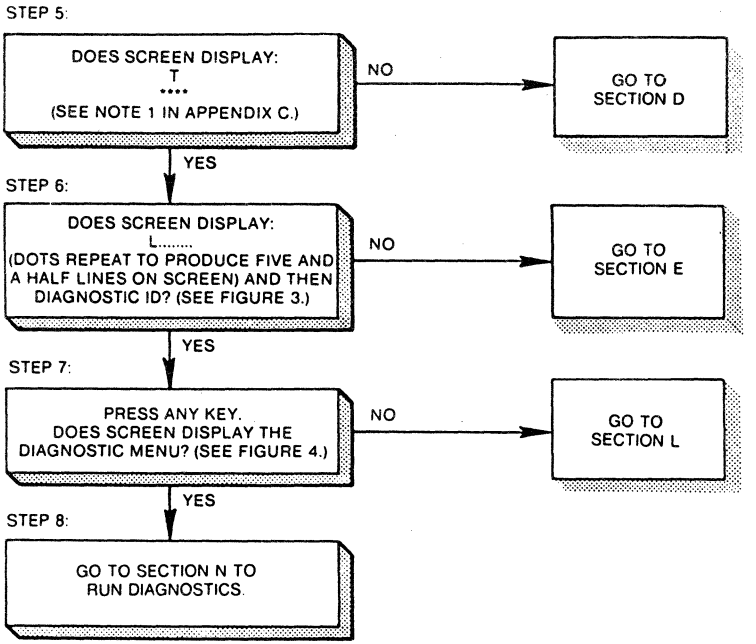
Any module attached to the system but not displayed in the diagnostic ID or the diagnostic menu is considered a faulty module. If this occurs, you don't have to use the diagnostic flow diagram or the diagnostic software.

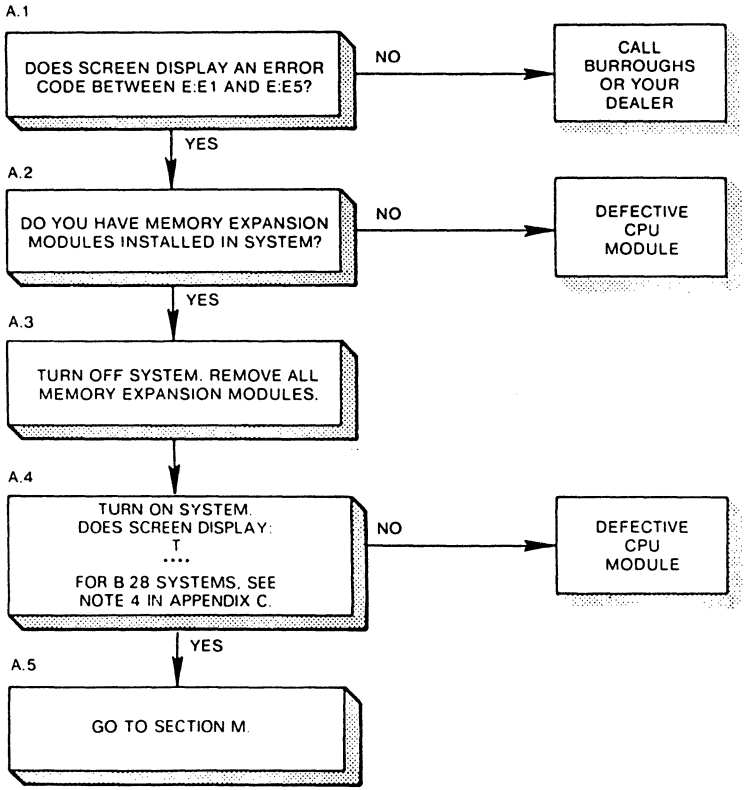
Now begin the flow diagram.

STEP 1.

A. INSERT THE DIAGNOSTIC DISK WITH WRITE-PROTECT NOTCH UP INTO DRIVE F0 (USUALLY THE FLOPPY DRIVE CLOSEST TO THE CPU).
B. PLUG IN THE POWER SUPPLY TO THE AC WALL OUTLET.
C. TURN THE SYSTEM ON AND CLOSE THE DRIVE DOOR.
D. ADJUST SCREEN BRIGHTNESS TO A COMFORTABLE LEVEL BY TURNING THE BRIGHTNESS CONTROL.

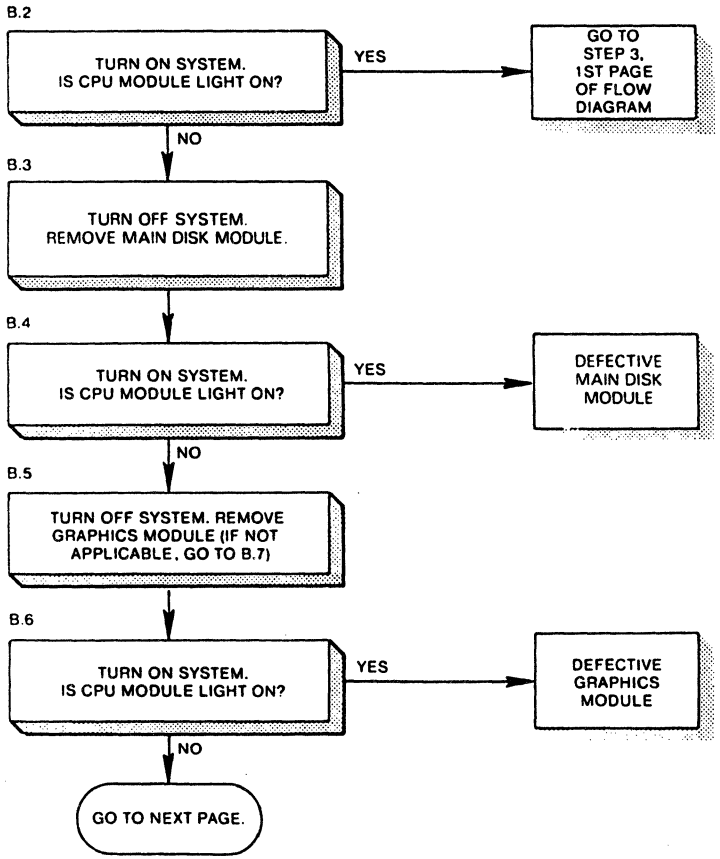


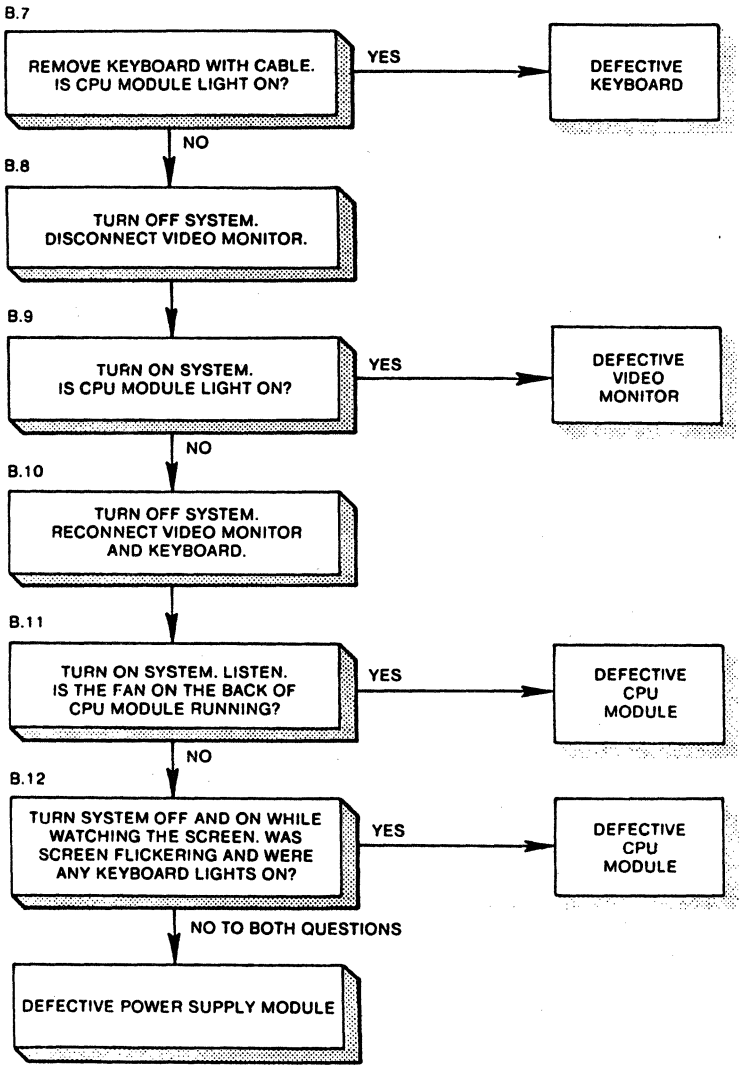

STEP 5:
DOES SCREEN DISPLAY:
T
••••
(SEE NOTE 1 IN APPENDIX C.)
NO
GO TO SECTION D
YES
STEP 6:
DOES SCREEN DISPLAY:
L.....
(DOTS REPEAT TO PRODUCE FIVE AND A HALF LINES ON SCREEN) AND THEN DIAGNOSTIC ID? (SEE FIGURE 3.)
NO
GO TO SECTION E
YES
STEP 7:
PRESS ANY KEY.
DOES SCREEN DISPLAY THE DIAGNOSTIC MENU? (SEE FIGURE 4.)
NO
GO TO SECTION L
YES
STEP 8:
GO TO SECTION N TO RUN DIAGNOSTICS.

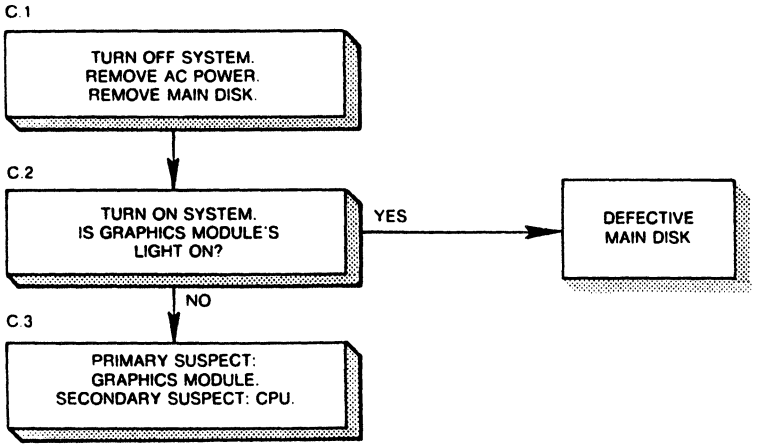

A.1
DOES SCREEN DISPLAY AN ERROR CODE BETWEEN E:E1 AND E:E5?
NO
CALL BURROUGHS OR YOUR DEALER
YES
A.2
DO YOU HAVE MEMORY EXPANSION MODULES INSTALLED IN SYSTEM?
NO
DEFECTIVE CPU MODULE
YES
A.3
TURN OFF SYSTEM. REMOVE ALL MEMORY EXPANSION MODULES.
A.4
TURN ON SYSTEM.
DOES SCREEN DISPLAY:
T
....
FOR B 28 SYSTEMS, SEE NOTE 4 IN APPENDIX C.
NO
DEFECTIVE CPU MODULE
YES
A.5
GO TO SECTION M.

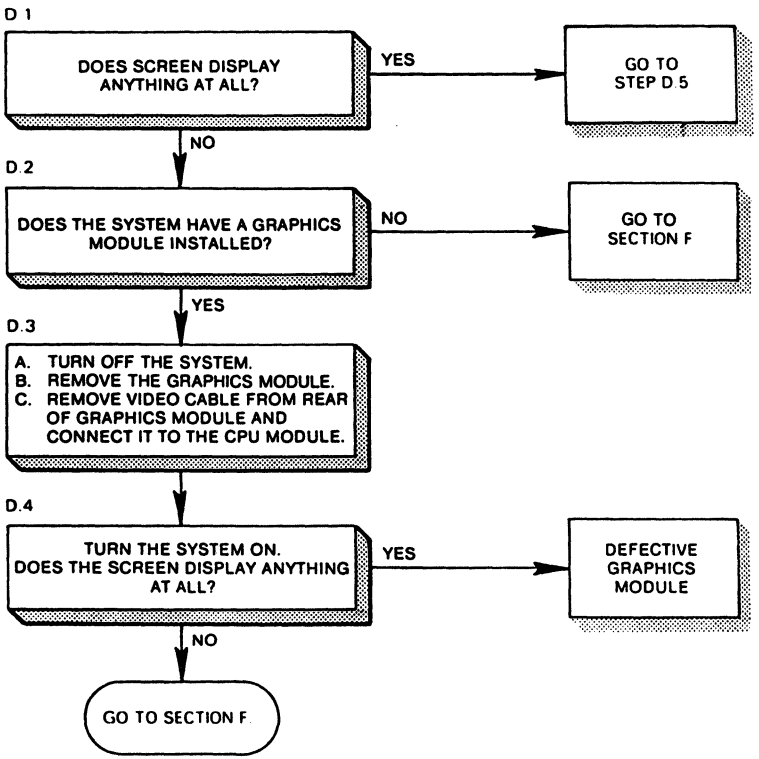
B.1

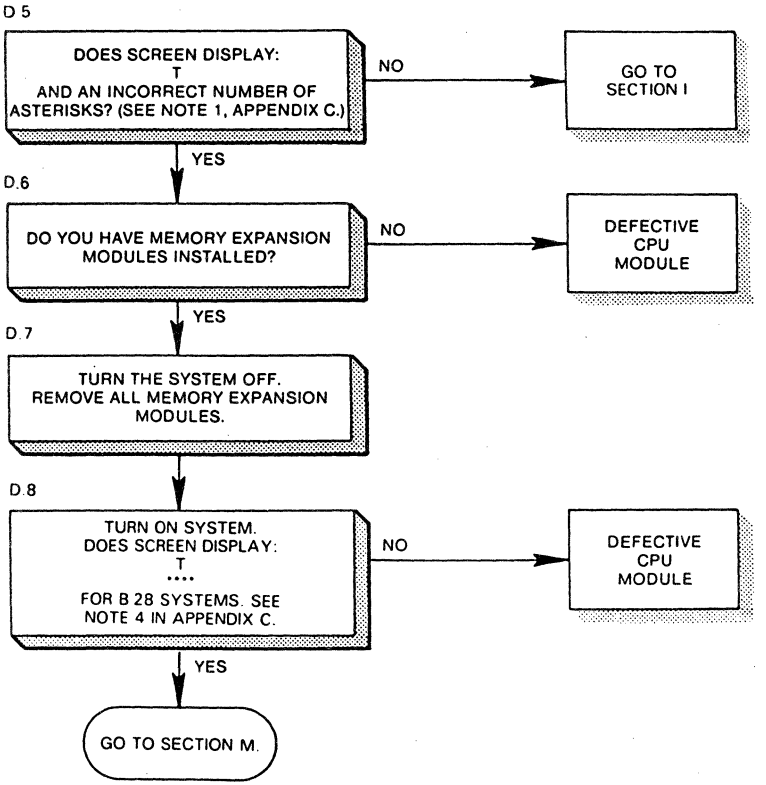
A. TURN OFF SYSTEM.
B. TEST AC WALL OUTLET BY PLUGGING IN AND TURNING ON A KNOWN GOOD ELECTRICAL DEVICE, SUCH AS A LAMP.
C. ENSURE CONNECTION FROM WALL OUTLET TO POWER MODULE(S) AND CONNECTION FROM POWER MODULE TO CPU MODULE.

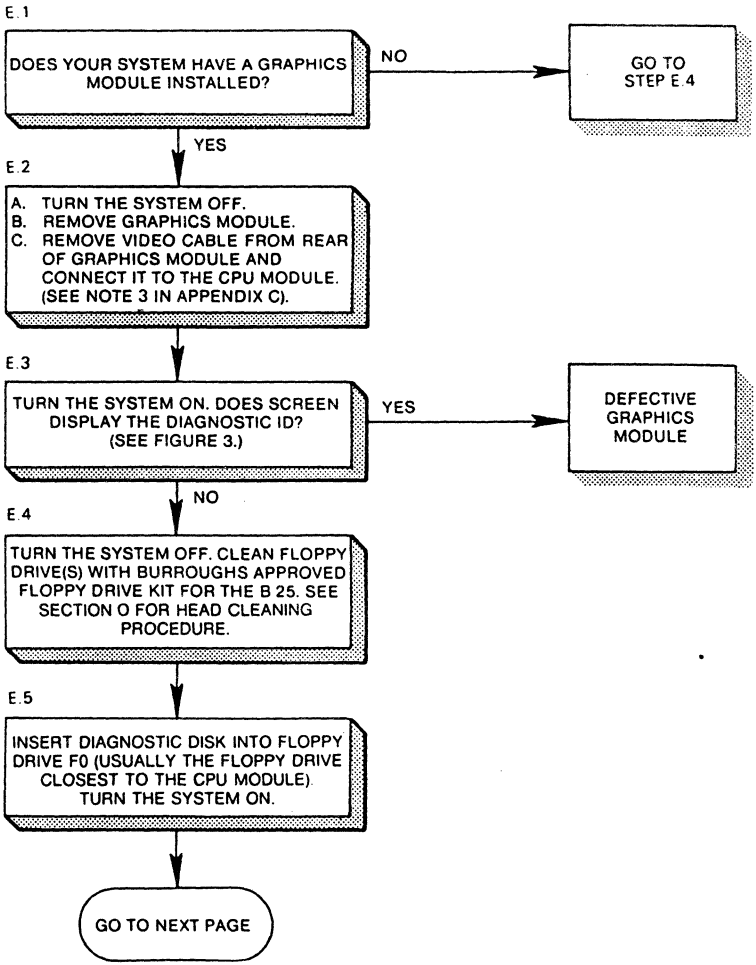


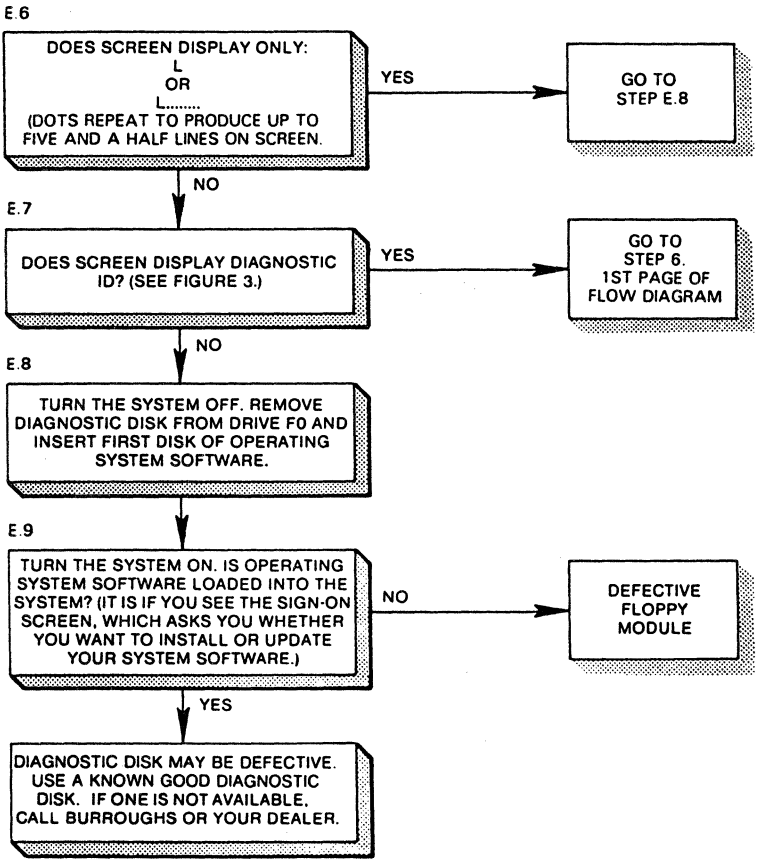

B.7
REMOVE KEYBOARD WITH CABLE. IS CPU MODULE LIGHT ON?
YES
DEFECTIVE KEYBOARD
NO
B.8
TURN OFF SYSTEM. DISCONNECT VIDEO MONITOR.
B.9
TURN ON SYSTEM. IS CPU MODULE LIGHT ON?
YES
DEFECTIVE VIDEO MONITOR
NO
B.10
TURN OFF SYSTEM. RECONNECT VIDEO MONITOR AND KEYBOARD.
B.11
TURN ON SYSTEM. LISTEN. IS THE FAN ON THE BACK OF CPU MODULE RUNNING?
YES
DEFECTIVE CPU MODULE
NO
B.12
TURN SYSTEM OFF AND ON WHILE WATCHING THE SCREEN. WAS SCREEN FLICKERING AND WERE ANY KEYBOARD LIGHTS ON?
YES
DEFECTIVE CPU MODULE
NO TO BOTH QUESTIONS
DEFECTIVE POWER SUPPLY MODULE

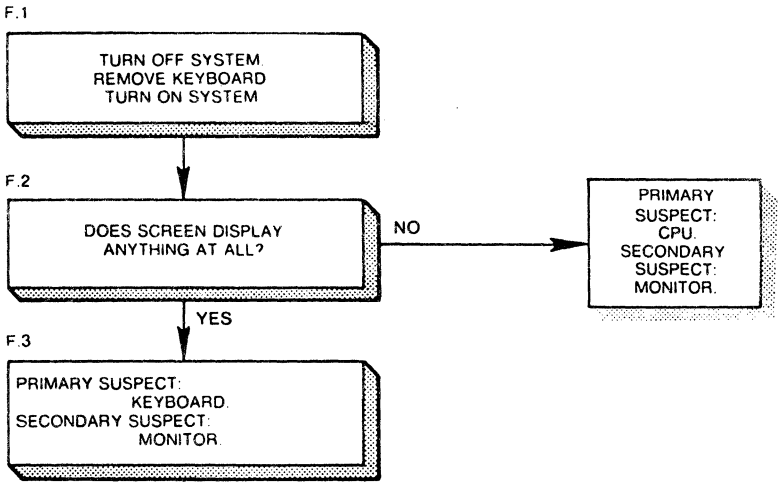

C.1
TURN OFF SYSTEM.
REMOVE AC POWER.
REMOVE MAIN DISK.
C.2
TURN ON SYSTEM.
IS GRAPHICS MODULE'S
LIGHT ON?
YES
DEFECTIVE
MAIN DISK
NO
C.3
PRIMARY SUSPECT:
GRAPHICS MODULE.
SECONDARY SUSPECT: CPU.

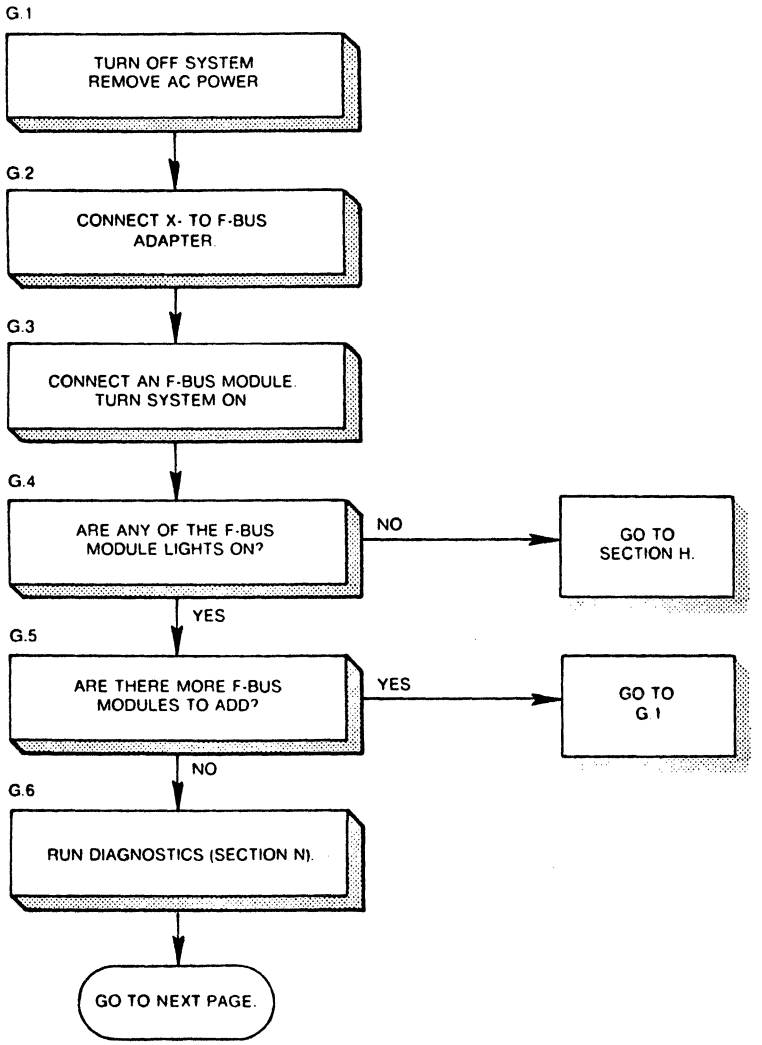

D 1
DOES SCREEN DISPLAY ANYTHING AT ALL?
YES
GO TO STEP D 5
NO
D.2
DOES THE SYSTEM HAVE A GRAPHICS MODULE INSTALLED?
NO
GO TO SECTION F
YES
D.3
A. TURN OFF THE SYSTEM.
B. REMOVE THE GRAPHICS MODULE.
C. REMOVE VIDEO CABLE FROM REAR OF GRAPHICS MODULE AND CONNECT IT TO THE CPU MODULE.
D.4
TURN THE SYSTEM ON. DOES THE SCREEN DISPLAY ANYTHING AT ALL?
YES
DEFECTIVE GRAPHICS MODULE
NO
GO TO SECTION F


D 5
DOES SCREEN DISPLAY:
T
AND AN INCORRECT NUMBER OF
ASTERISKS? (SEE NOTE 1, APPENDIX C.)
NO
GO TO
SECTION I
YES
D.6
DO YOU HAVE MEMORY EXPANSION
MODULES INSTALLED?
NO
DEFECTIVE
CPU
MODULE
YES
D.7
TURN THE SYSTEM OFF.
REMOVE ALL MEMORY EXPANSION
MODULES.
D.8
TURN ON SYSTEM.
DOES SCREEN DISPLAY:
T
....
FOR B 28 SYSTEMS. SEE
NOTE 4 IN APPENDIX C.
NO
DEFECTIVE
CPU
MODULE
YES
GO TO SECTION M.

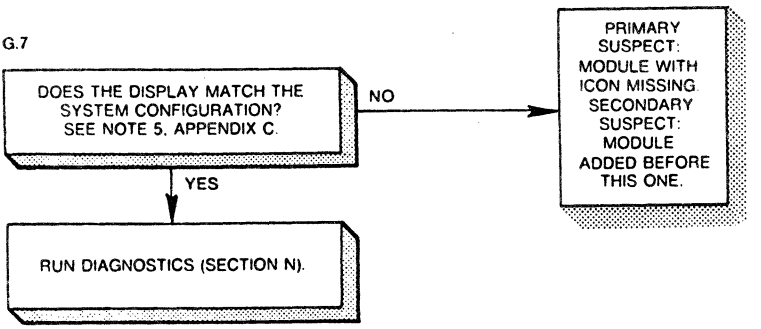

E.1
DOES YOUR SYSTEM HAVE A GRAPHICS MODULE INSTALLED?
NO
GO TO STEP E.4
YES
E.2
A. TURN THE SYSTEM OFF.
B. REMOVE GRAPHICS MODULE.
C. REMOVE VIDEO CABLE FROM REAR OF GRAPHICS MODULE AND CONNECT IT TO THE CPU MODULE. (SEE NOTE 3 IN APPENDIX C).
E.3
TURN THE SYSTEM ON. DOES SCREEN DISPLAY THE DIAGNOSTIC ID? (SEE FIGURE 3.)
YES
DEFECTIVE GRAPHICS MODULE
NO
E.4
TURN THE SYSTEM OFF. CLEAN FLOPPY DRIVE(S) WITH BURROUGHS APPROVED FLOPPY DRIVE KIT FOR THE B 25. SEE SECTION O FOR HEAD CLEANING PROCEDURE.
E.5
INSERT DIAGNOSTIC DISK INTO FLOPPY DRIVE F0 (USUALLY THE FLOPPY DRIVE CLOSEST TO THE CPU MODULE). TURN THE SYSTEM ON.
GO TO NEXT PAGE

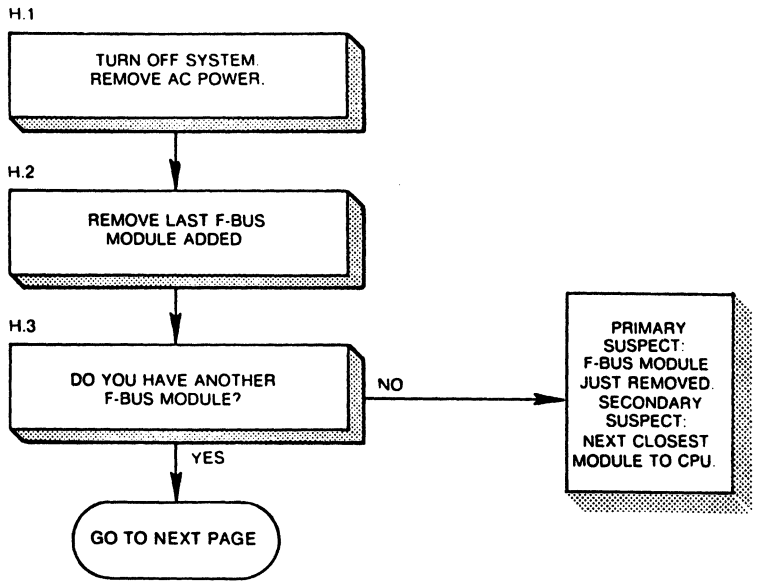

E.6
DOES SCREEN DISPLAY ONLY:
L
OR
L.....
(DOTS REPEAT TO PRODUCE UP TO FIVE AND A HALF LINES ON SCREEN.
YES
GO TO STEP E.8
NO
E.7
DOES SCREEN DISPLAY DIAGNOSTIC ID? (SEE FIGURE 3.)
YES
GO TO STEP 6. 1ST PAGE OF FLOW DIAGRAM
NO
E.8
TURN THE SYSTEM OFF. REMOVE DIAGNOSTIC DISK FROM DRIVE F0 AND INSERT FIRST DISK OF OPERATING SYSTEM SOFTWARE.
E.9
TURN THE SYSTEM ON. IS OPERATING SYSTEM SOFTWARE LOADED INTO THE SYSTEM? (IT IS IF YOU SEE THE SIGN-ON SCREEN, WHICH ASKS YOU WHETHER YOU WANT TO INSTALL OR UPDATE YOUR SYSTEM SOFTWARE.)
NO
DEFECTIVE FLOPPY MODULE
YES
DIAGNOSTIC DISK MAY BE DEFECTIVE. USE A KNOWN GOOD DIAGNOSTIC DISK. IF ONE IS NOT AVAILABLE, CALL BURROUGHS OR YOUR DEALER.


F.1
TURN OFF SYSTEM.
REMOVE KEYBOARD
TURN ON SYSTEM
F.2
DOES SCREEN DISPLAY
ANYTHING AT ALL?
NO
PRIMARY
SUSPECT:
CPU.
SECONDARY
SUSPECT:
MONITOR.
YES
F.3
PRIMARY SUSPECT:
KEYBOARD.
SECONDARY SUSPECT:
MONITOR.


G.1
TURN OFF SYSTEM
REMOVE AC POWER
G.2
CONNECT X- TO F-BUS
ADAPTER.
G.3
CONNECT AN F-BUS MODULE.
TURN SYSTEM ON
G.4
ARE ANY OF THE F-BUS
MODULE LIGHTS ON?
NO
GO TO
SECTION H.
YES
G.5
ARE THERE MORE F-BUS
MODULES TO ADD?
YES
GO TO
G.1
NO
G.6
RUN DIAGNOSTICS (SECTION N).
GO TO NEXT PAGE.

G.7


DOES THE DISPLAY MATCH THE SYSTEM CONFIGURATION? SEE NOTE 5, APPENDIX C.
NO
PRIMARY SUSPECT: MODULE WITH ICON MISSING. SECONDARY SUSPECT: MODULE ADDED BEFORE THIS ONE.
YES
RUN DIAGNOSTICS (SECTION N).


H.1
TURN OFF SYSTEM.
REMOVE AC POWER.
H.2
REMOVE LAST F-BUS
MODULE ADDED
H.3
DO YOU HAVE ANOTHER
F-BUS MODULE?
NO
PRIMARY
SUSPECT:
F-BUS MODULE
JUST REMOVED.
SECONDARY
SUSPECT:
NEXT CLOSEST
MODULE TO CPU.
YES
GO TO NEXT PAGE

H.4

CONNECT THIS OTHER F-BUS MODULE AND TURN SYSTEM ON.

H.5

ARE ANY LIGHTS OF THIS MODULE ON?

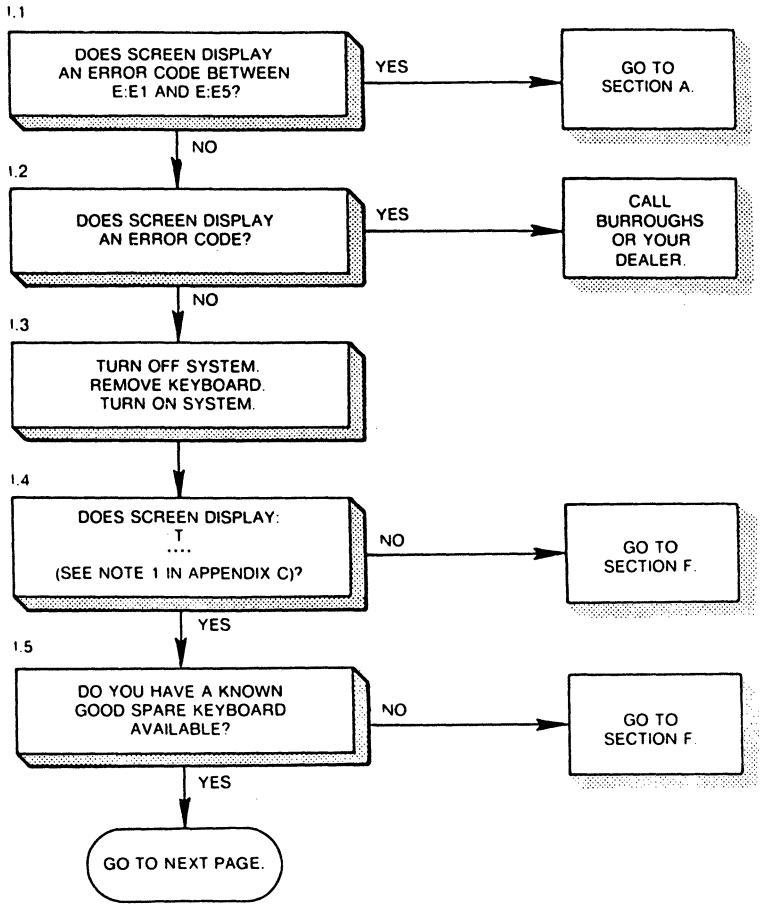
YES

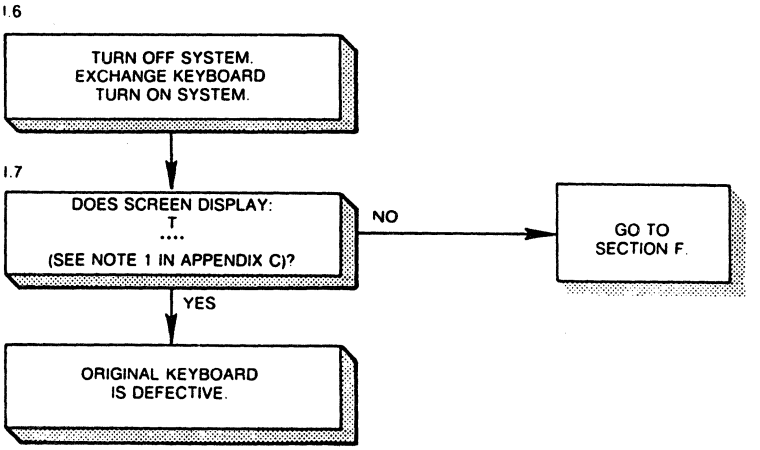
MODULE REMOVED IN STEP H.2 WAS DEFECTIVE. MARK IT AND RETURN TO G.6.

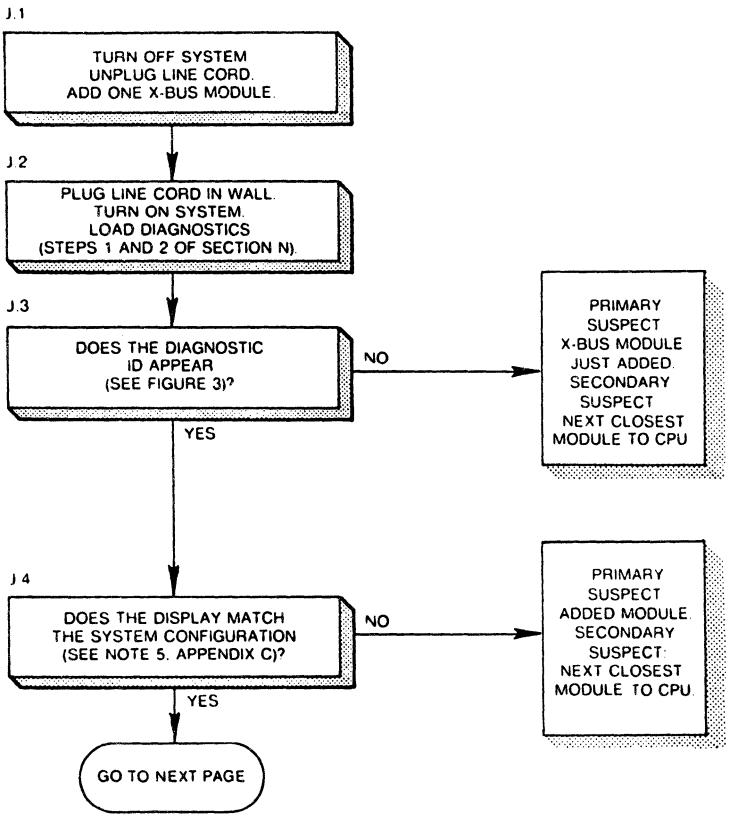
NO

H.6

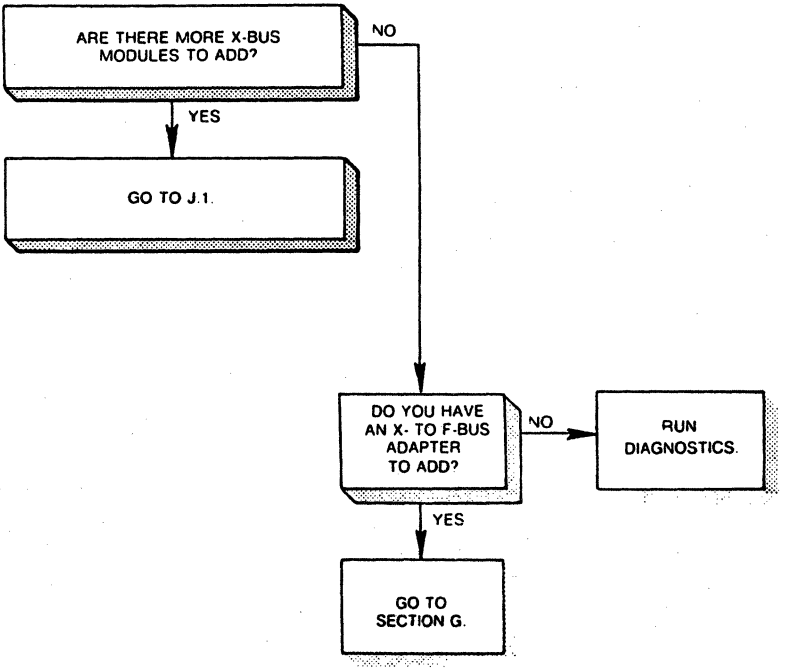
PRIMARY SUSPECT: F-BUS MODULE REMOVED IN STEP H.2.
SECONDARY SUSPECT: F-BUS MODULE JUST ADDED TO CONFIGURATION.

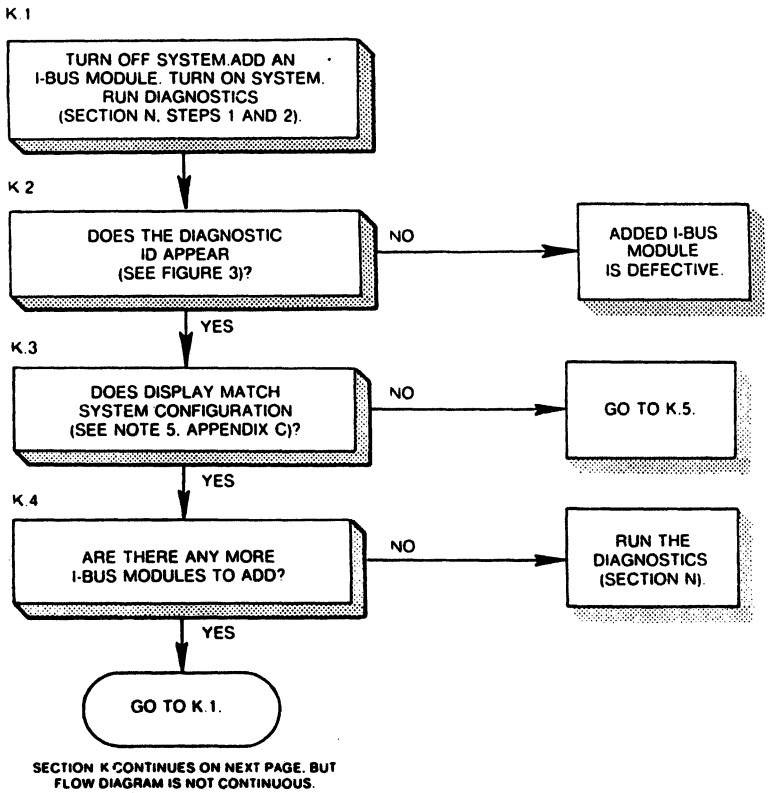

I.1
DOES SCREEN DISPLAY AN ERROR CODE BETWEEN E:E1 AND E:E5?
YES
GO TO SECTION A.
NO
I.2
DOES SCREEN DISPLAY AN ERROR CODE?
YES
CALL BURROUGHS OR YOUR DEALER.
NO
I.3
TURN OFF SYSTEM. REMOVE KEYBOARD. TURN ON SYSTEM.
I.4
DOES SCREEN DISPLAY: T .... (SEE NOTE 1 IN APPENDIX C)?
NO
GO TO SECTION F.
YES
I.5
DO YOU HAVE A KNOWN GOOD SPARE KEYBOARD AVAILABLE?
NO
GO TO SECTION F.
YES
GO TO NEXT PAGE.


I.6
TURN OFF SYSTEM.
EXCHANGE KEYBOARD
TURN ON SYSTEM.
I.7
DOES SCREEN DISPLAY:
T
....
(SEE NOTE 1 IN APPENDIX C)?
NO
GO TO
SECTION F.
YES
ORIGINAL KEYBOARD
IS DEFECTIVE.

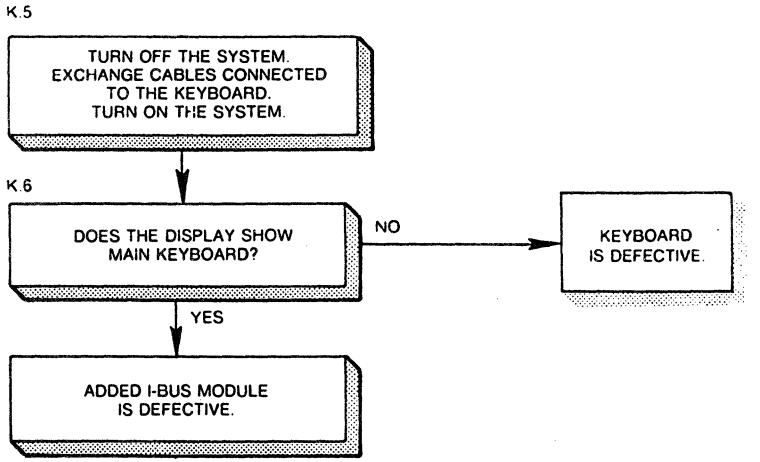

J.1
TURN OFF SYSTEM
UNPLUG LINE CORD.
ADD ONE X-BUS MODULE.
J.2
PLUG LINE CORD IN WALL.
TURN ON SYSTEM.
LOAD DIAGNOSTICS
(STEPS 1 AND 2 OF SECTION N).
J.3
DOES THE DIAGNOSTIC
ID APPEAR
(SEE FIGURE 3)?
NO
PRIMARY
SUSPECT
X-BUS MODULE
JUST ADDED.
SECONDARY
SUSPECT
NEXT CLOSEST
MODULE TO CPU
YES
J.4
DOES THE DISPLAY MATCH
THE SYSTEM CONFIGURATION
(SEE NOTE 5, APPENDIX C)?
NO
PRIMARY
SUSPECT
ADDED MODULE.
SECONDARY
SUSPECT:
NEXT CLOSEST
MODULE TO CPU.
YES
GO TO NEXT PAGE

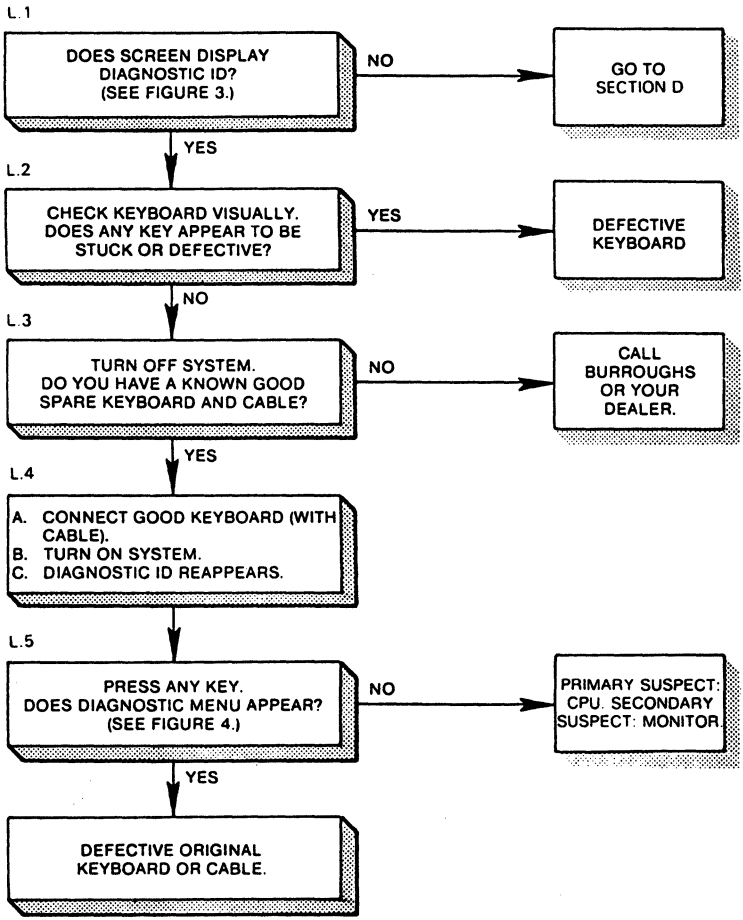
J 5


ARE THERE MORE X-BUS MODULES TO ADD?
NO
YES
GO TO J.1.
DO YOU HAVE AN X- TO F-BUS ADAPTER TO ADD?
NO
RUN DIAGNOSTICS.
YES
GO TO SECTION G.



SECTION K CONTINUES ON NEXT PAGE. BUT FLOW DIAGRAM IS NOT CONTINUOUS.


K.5
TURN OFF THE SYSTEM.
EXCHANGE CABLES CONNECTED
TO THE KEYBOARD.
TURN ON THE SYSTEM.
K.6
DOES THE DISPLAY SHOW
MAIN KEYBOARD?
NO
KEYBOARD
IS DEFECTIVE.
YES
ADDED I-BUS MODULE
IS DEFECTIVE.


L.1
DOES SCREEN DISPLAY DIAGNOSTIC ID? (SEE FIGURE 3.)
NO
GO TO SECTION D
YES
L.2
CHECK KEYBOARD VISUALLY. DOES ANY KEY APPEAR TO BE STUCK OR DEFECTIVE?
YES
DEFECTIVE KEYBOARD
NO
L.3
TURN OFF SYSTEM. DO YOU HAVE A KNOWN GOOD SPARE KEYBOARD AND CABLE?
NO
CALL BURROUGHS OR YOUR DEALER.
YES
L.4
A. CONNECT GOOD KEYBOARD (WITH CABLE).
B. TURN ON SYSTEM.
C. DIAGNOSTIC ID REAPPEARS.
L.5
PRESS ANY KEY. DOES DIAGNOSTIC MENU APPEAR? (SEE FIGURE 4.)
NO
PRIMARY SUSPECT: CPU. SECONDARY SUSPECT: MONITOR.
YES
DEFECTIVE ORIGINAL KEYBOARD OR CABLE.

THIS SECTION APPLIES TO B 26 SYSTEMS ONLY. FOR B 28 SYSTEMS, SEE NOTE 4 IN APPENDIX C.

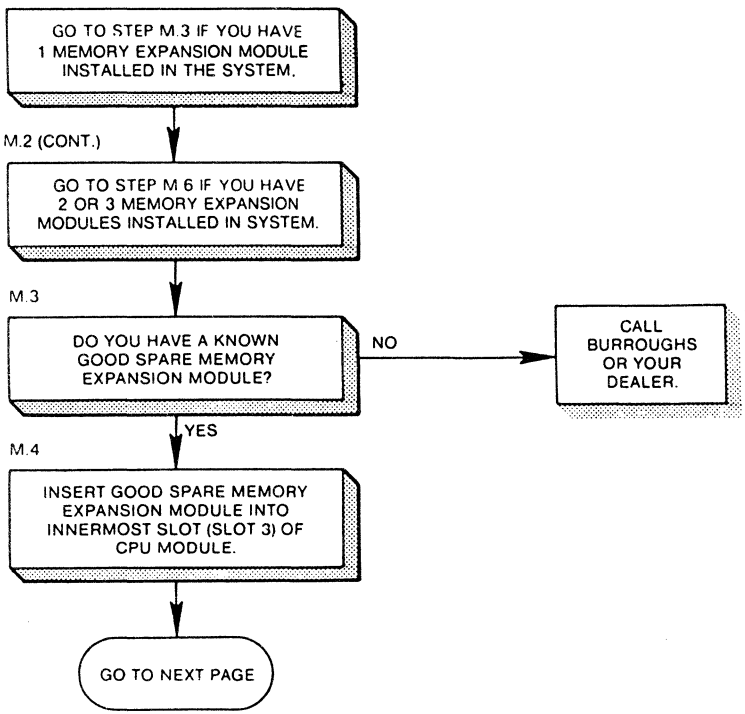
T

****	(4 ASTERISKS) WITH 0 MEMORY EXPANSION MODULES INSTALLED.
********	(8 ASTERISKS) WITH 1 MEMORY EXPANSION MODULES INSTALLED).
************	(12 ASTERISKS) WITH 2 MEMORY EXPANSION MODULES INSTALLED.
****************	(16 ASTERISKS) WITH 3 MEMORY EXPANSION MODULES INSTALLED.

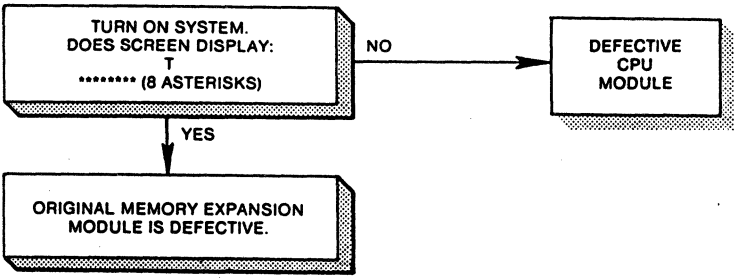
M.1

A. TURN OFF SYSTEM. .
B. REMOVE ALL MEMORY EXPANSION MODULES.
C. REMOVE MAIN DISK MODULE AND ALL OTHER MODULES TO THE RIGHT OF THE MAIN DISK MODULE.

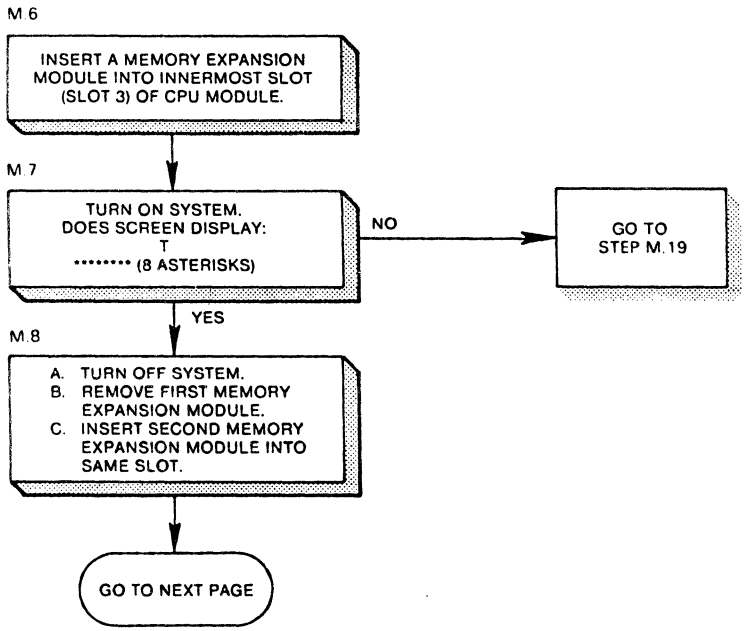
M.2

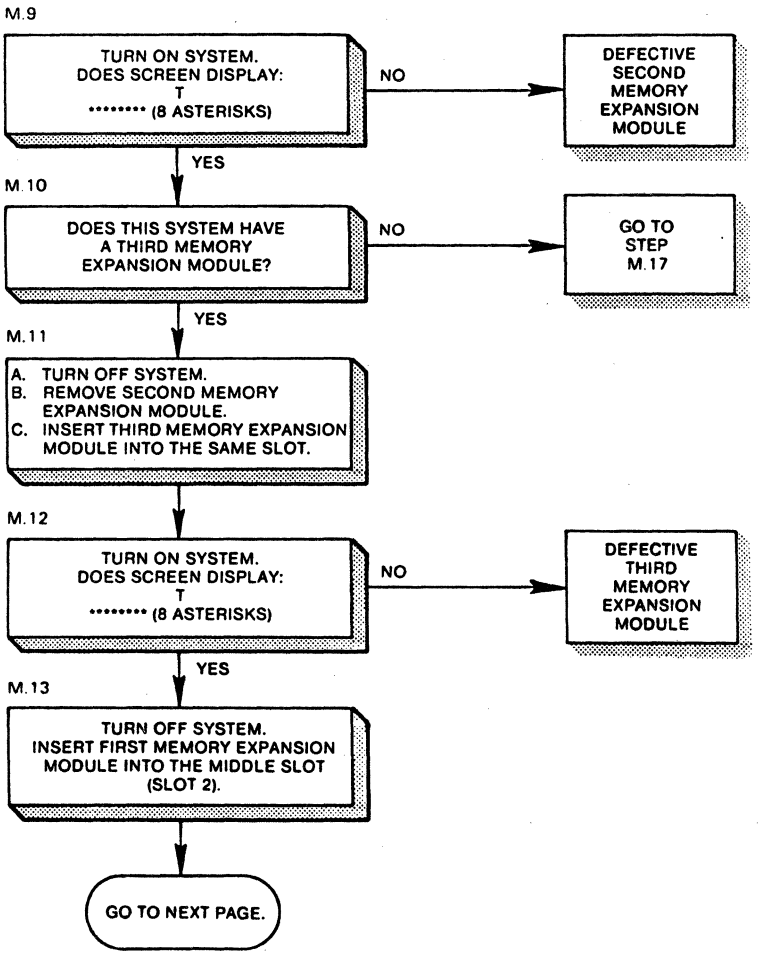


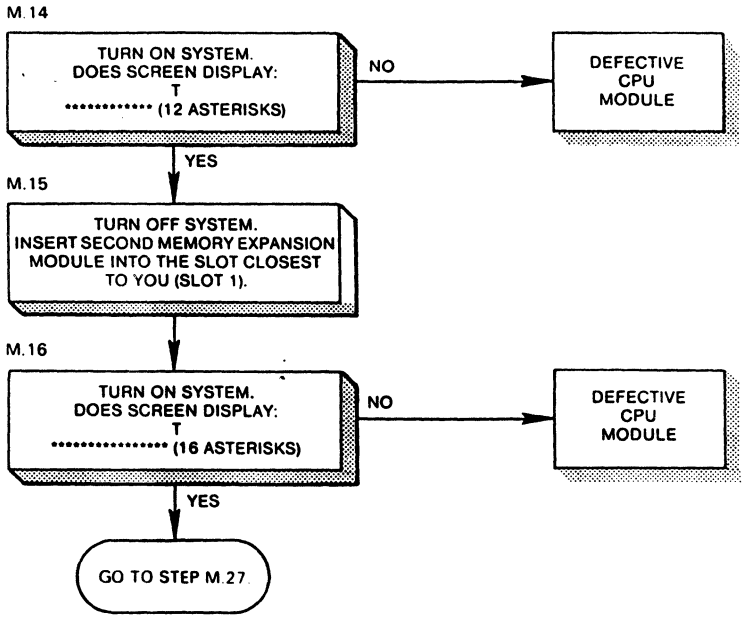
M.5

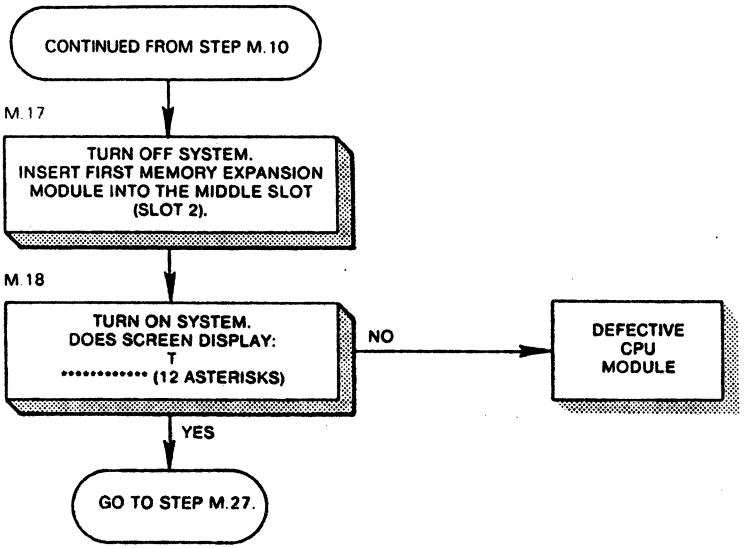


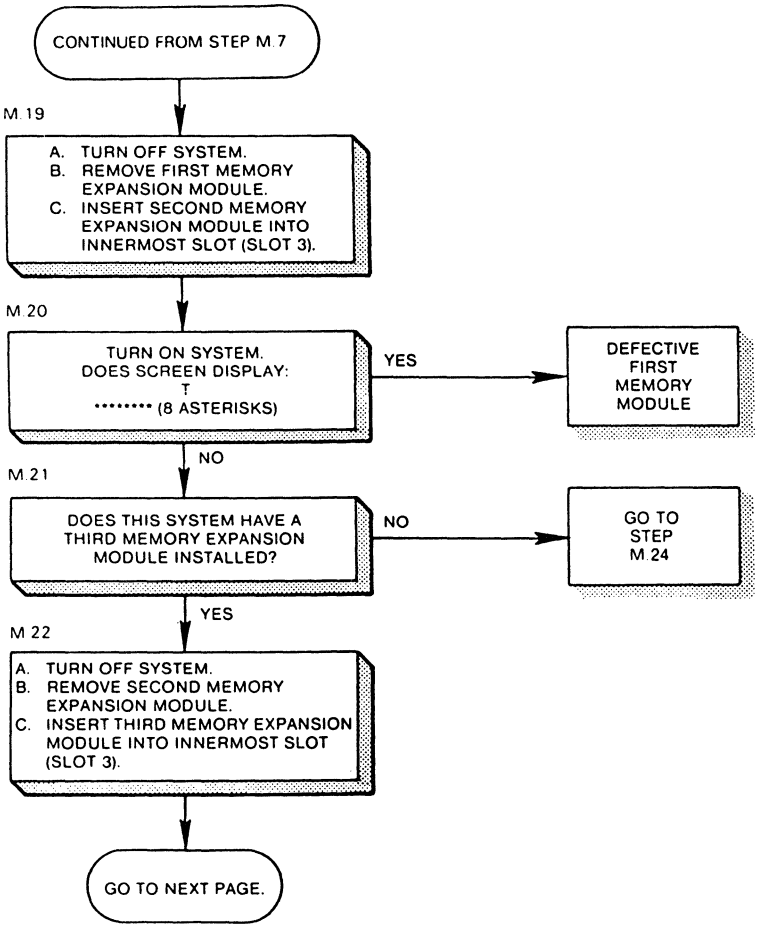
SECTION M CONTINUES ON NEXT PAGE, BUT
FLOW DIAGRAM IS NOT CONTINUOUS.

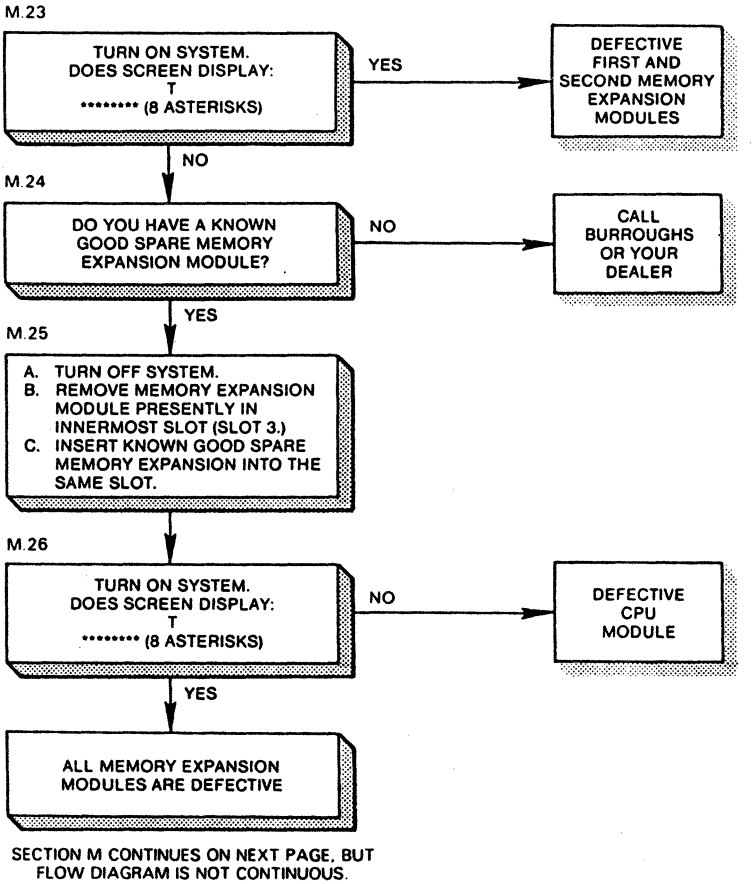

M.6
INSERT A MEMORY EXPANSION MODULE INTO INNERMOST SLOT (SLOT 3) OF CPU MODULE.
M.7
TURN ON SYSTEM. DOES SCREEN DISPLAY: T ******** (8 ASTERISKS)
NO
GO TO STEP M.19
YES
M.8
A. TURN OFF SYSTEM.
B. REMOVE FIRST MEMORY EXPANSION MODULE.
C. INSERT SECOND MEMORY EXPANSION MODULE INTO SAME SLOT.
GO TO NEXT PAGE


M.9
TURN ON SYSTEM.
DOES SCREEN DISPLAY:
T
******** (8 ASTERISKS)
NO
DEFECTIVE SECOND MEMORY EXPANSION MODULE
YES
M.10
DOES THIS SYSTEM HAVE A THIRD MEMORY EXPANSION MODULE?
NO
GO TO STEP M.17
YES
M.11
A. TURN OFF SYSTEM.
B. REMOVE SECOND MEMORY EXPANSION MODULE.
C. INSERT THIRD MEMORY EXPANSION MODULE INTO THE SAME SLOT.
M.12
TURN ON SYSTEM.
DOES SCREEN DISPLAY:
T
******** (8 ASTERISKS)
NO
DEFECTIVE THIRD MEMORY EXPANSION MODULE
YES
M.13
TURN OFF SYSTEM.
INSERT FIRST MEMORY EXPANSION MODULE INTO THE MIDDLE SLOT (SLOT 2).
GO TO NEXT PAGE.

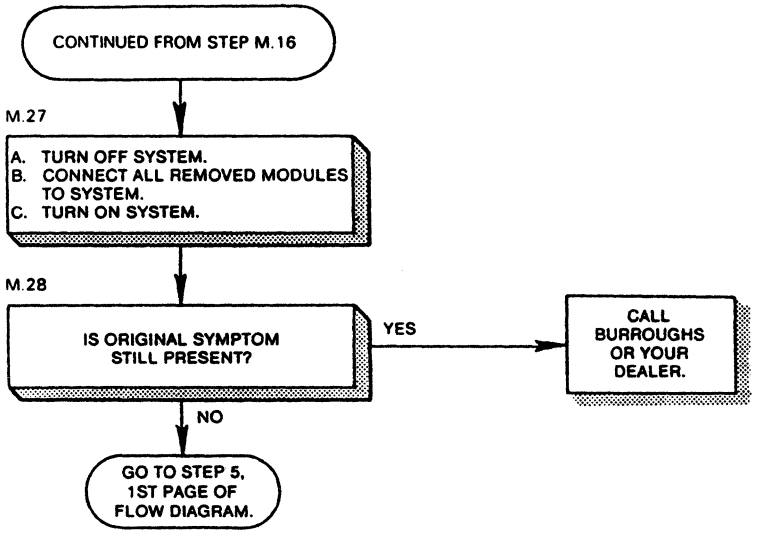

M.14
TURN ON SYSTEM.
DOES SCREEN DISPLAY:
T
********** (12 ASTERISKS)
NO
DEFECTIVE
CPU
MODULE
YES
M.15
TURN OFF SYSTEM.
INSERT SECOND MEMORY EXPANSION
MODULE INTO THE SLOT CLOSEST
TO YOU (SLOT 1).
M.16
TURN ON SYSTEM.
DOES SCREEN DISPLAY:
T
********** (16 ASTERISKS)
NO
DEFECTIVE
CPU
MODULE
YES
GO TO STEP M.27


CONTINUED FROM STEP M.10
M.17
TURN OFF SYSTEM.
INSERT FIRST MEMORY EXPANSION
MODULE INTO THE MIDDLE SLOT
(SLOT 2).
M.18
TURN ON SYSTEM.
DOES SCREEN DISPLAY:
T
•••••••••••• (12 ASTERISKS)
NO
DEFECTIVE
CPU
MODULE
YES
GO TO STEP M.27.


CONTINUED FROM STEP M.7
M.19
A. TURN OFF SYSTEM.
B. REMOVE FIRST MEMORY EXPANSION MODULE.
C. INSERT SECOND MEMORY EXPANSION MODULE INTO INNERMOST SLOT (SLOT 3).
M.20
TURN ON SYSTEM.
DOES SCREEN DISPLAY:
T
******** (8 ASTERISKS)
YES
DEFECTIVE FIRST MEMORY MODULE
NO
M.21
DOES THIS SYSTEM HAVE A THIRD MEMORY EXPANSION MODULE INSTALLED?
NO
GO TO STEP M.24
YES
M.22
A. TURN OFF SYSTEM.
B. REMOVE SECOND MEMORY EXPANSION MODULE.
C. INSERT THIRD MEMORY EXPANSION MODULE INTO INNERMOST SLOT (SLOT 3).
GO TO NEXT PAGE.



SECTION M CONTINUES ON NEXT PAGE, BUT FLOW DIAGRAM IS NOT CONTINUOUS.


CONTINUED FROM STEP M.16
M.27
A. TURN OFF SYSTEM.
B. CONNECT ALL REMOVED MODULES TO SYSTEM.
C. TURN ON SYSTEM.
M.28
IS ORIGINAL SYMPTOM STILL PRESENT?
YES
CALL BURROUGHS OR YOUR DEALER.
NO
GO TO STEP 5, 1ST PAGE OF FLOW DIAGRAM.

Running Diagnostics

The diagnostic programs contained on the floppy disk that came with this kit test the internal circuitry of the modules in your B 26/B 28 system. The diagnostics run automatically after you answer some preliminary questions. These questions are technical. Do not panic. You will be helped in answering them. You have the option of recording your answers permanently in a customized diagnostic package (see Appendix B). This simplifies running the diagnostics in the future.

After you put the diagnostic disk in drive f0 and turn the system on, you will see graphic symbols displayed on the screen that represent the modules in your B 26/B 28 system. (See Appendix C, Note 5.) These symbols appear in the lower third of the screen and are individually illuminated at various times to let you know what part of the system has been selected for testing or is being tested .

If during the course of a test the diagnostics detect a failure, the symbol representing the module flashes. You may also be informed of a failure by a screen message. Although the error message may be technical in nature, you will have no difficulty in recognizing it as an error message. Another way you may become aware of a failure is by comparing what you see on the screen with the illustrations in Appendix D. If a failing module is found, call Burroughs or your dealer. If you have an obvious problem (such as a flickering screen) but the diagnostics do not detect a failure in your system, call Burroughs or your dealer.

Step 1

a Turn off the system.
There are two diagnostic diskettes that contain software to test system modules. Refer to Table 1 (page 6) to determine which diskette to use. Both diskettes will display the system configuration. However, if you select a module not supported by the loaded diskette, a message will direct you to use the other diskette.

b Insert the diagnostic disk with the write-protect notch up into drive F0 (usually the floppy drive closest to the CPU module).

Step 2

a Turn the system on and observe the symbols that represent your system, including the flashing plugs (see Figure 3).

If the display does not correspond to the actual configuration, check that you have the appropriate number of power modules. A specific number of power modules must be used to meet the power requirements of your system. Use the *BTOS Systems Hardware Installation Guide* to determine the number of power modules your system needs. The system may ignore one or a group of modules if you have too few power modules.

b Check for an error message.
If a configuration rule has been violated, such as exceeding the allowed number of modules, a message describing the violation appears on the screen. If such a message is displayed, refer to *BTOS Systems Hardware Installation Guide* to resolve your problem.

Step 3

a Remove the diagnostic disk from the floppy drive and put it in its protective jacket.

b Put a blank disk into each of the floppy drives.

c If you have the kit that came with loopback plugs, insert one into each of the RS-232 ports (channel A and channel B), which are located adjacent to the memory expansion module slots on the left side of the CPU module.

d If you have a TEM module, insert three loopback plugs into the TEA, TEB, and TES ports located in the back of the module.

Step 4

Press any key to continue. The screen displays the Diagnostic Menu (see Figure 4). This display is divided into three parts, or windows. (Note that the symbol of the CPU module is half-bright indicating that the cursor is on it.)

- The top window contains a menu describing the user's options and the meaning of display terms in the bottom window.
- The middle window displays questions pertaining to the test routines. This window scrolls up as the diagnostics proceed.
- The bottom window displays the symbols representing the modules in your system and the current state of the test. Errors are written under each module after the test has been run completely. Also, failed modules are indicated by flashing symbols.

Step 5

Note: If the keyboard icon is visible on the bottom of the screen when you perform this step, but you are unable to select modules or submodules, the keyboard is defective.

Do the following to select the modules to be tested:

a Press the MARK key to select the CPU module. (The symbol representing the module to be tested becomes full bright.)

b Press the RIGHT ARROW key to move the cursor to the next module.

c Press the MARK key to select that module.

d Repeat Steps b and c for each module that is to be tested.

e Press the GO key to start the diagnostic tests.

You can select an entire module to be tested, and you can test submodules, that is, groups of circuitry that make up a module. If you have the kit without the RS232 loopback plugs, go down to this submodule level in the CPU module to avoid testing the RS232A and RS232B circuitry so that no error occurs. Use the procedure that follows to do this. Repeat this procedure for all three ports in the TEM module, if you have one. Some modules, such as the keyboard, have no submodular levels.

a Press the RIGHT ARROW key to position the cursor over the CPU module.

b Press the DOWN ARROW key to descend to the submodule level.

c Press MARK to select memory expansion modules for testing if they are part of your system. Notice that the x's representing this submodule are now illuminated.

d Press the RIGHT ARROW key three times to bypass the RS232 tests.

e Use the MARK and RIGHT ARROW keys to select the remaining submodules.

f Press the UP ARROW key when you return to the memory expansion submodule. This returns you to the module level.

g Press the RIGHT ARROW key to move to the next module to be selected or press GO to begin the test.

When using the K4 keyboard, refer to Appendix E for the default layout of its keys.

Step 6

The diagnostics tests discussed as follows are based on a system that contains a CPU module, graphics module, Winchester (hard disk)/floppy module, monochrome (one color, usually green) video monitor, and keyboard. If you have other types of disk modules, you can substitute the following answers given for your particular disk configurations.

When you have selected all the modules to be tested and pressed the GO key, the middle window displays the following:

MEMORY DIAGNOSTIC PRELIMINARY DIALOG

Stop diagnostics on a memory error?

Press the N key and then RETURN. Another question appears on the screen.

Do you want to run Galpat test rather than the standard memory test?

Press the N key and then RETURN.

Proceed through the questions associated with each module. Fill in the answers (Y for Yes and N for No) and then press RETURN. Ignore the Y's and N's that appear in angle brackets next to the questions. They are not necessarily the answers you should give.

If you enter the wrong answer and have not pressed RETURN, backspace and type in the correct answer. If you have pressed RETURN, then you must start the selection procedure from the beginning. Press FINISH and go to Step 1.

RS232 COMMUNICATION DIAGNOSTIC PRELIMINARY DIALOG

Remember that this test works only with the kit that contains the RS232 loopback plugs. If you attempt to run this test without the loopback plugs installed, the x's representing this submodule inside the CPU module will flash indicating that the subtest has failed. See Step 5 to avoid selecting this submodule.

Do you want to run:

Asynchronous mode test? ..... Y

Character sync crc-16 test? ..... Y

Bit sync data transfer test? ..... N

Bit sync abort/idle test? ..... N

Stop on communications error? ..... N

RS422 CLUSTER DIAGNOSTIC PRELIMINARY DIALOG

Do you want to run:

Cluster maintenance mode test? ..... Y

Interprocessor data transfer test? ..... N

Stop on communications error? ..... N

Fast cluster communications? ..... Y

PARALLEL PRINTER PORT DIAGNOSTIC PRELIMINARY DIALOG

Do you want to run:

Barber pole test(without interrupts)? ..... N

Barber pole test(with interrupts)? ..... N

Max printer wait time (ms)? ..... Press RETURN

Bypass any error and continue with diagnostics? ..... Y

286 OPTIONS DIAGNOSTIC PRELIMINARY DIALOG (B 28 SYSTEMS ONLY)

Test software finger? ..... Y

Test LOADALL? ..... Y

GRAPHICS DIAGNOSTIC PRELIMINARY DIALOG

The graphics test displays images on the screen that you can compare with the illustrations in Appendix D. If you want to hold an image on the screen to examine it, press PREV PAGE when the image appears. Press NEXT PAGE to continue the test.

List all errors found? ..... Y

Delay (1-10)? 10

FLOPPY DIAGNOSTIC PRELIMINARY DIALOG

Note: Make sure that the diagnostic disk is removed and blank floppy disks are in the floppy drives being tested. Any information that may be contained on these disks will be lost!

Stop Diagnostic on a disk error? ..... N

Run quick verification? ..... N

Run full verification? ..... Y

Change detail parameters? ..... N

HARD DISK DIAGNOSTIC PRELIMINARY DIALOG (FLOPPY/WINCHESTER, DISK UPGRADE, DISK EXPANSION)

Caution: You must give the following questions especially close attention because a wrong answer—Y instead of N to destructive tests—will result in the loss of all the information on your hard disk!

Drive vendor code ... Press letter corresponding to the circled letter on bottom of disk module.

Stop diagnostic on a disk error? ..... N

Run quick verification? ..... DESTRUCTIVE ..... N

Run full verification? ..... DESTRUCTIVE ..... N

Recalibrate test ..... Y

Sequential seek test ..... Y

Format disk ..... DESTRUCTIVE ..... N

Random seek with ID scan test ..... Y

Write/read all tracks ..... DESTRUCTIVE ..... N

Sequential write/read single sectors .... DESTRUCTIVE .... N

Random write/read single sectors ..... DESTRUCTIVE ..... N

Sequential write/read multiple sectors ... DESTRUCTIVE ... N

Function-Display/modify sector ..... N

Function-Read boot ROM ..... N

Function-loop on track format ..... N

Function-loop on sector read ..... N

Function-loop on sector write ..... N

Function-read sequential tracks ..... Y

Function-loop on full track read ..... N

Change detail parameters? ..... N

Press RETURN to proceed

1/4-INCH TAPE BACKUP

Run quick verification? ..... N

Stop diagnostics on error? ..... Y

TELLER EXTENSION MODULE

The Teller Extension Module has four or five submodules you can test separately. When you press the down arrow key, the DES submodule (if present, otherwise the CMOS submodule) is displayed in reverse video and the name (DES or CMOS) of the submodule replaces the name (TEM) of the whole module above the icon. You can then use the right arrow and left arrow keys to move about within the module. From left to right you will find the following submodules: DES (if present), CMOS, TEM-A, TEM-B, TEM-S.

DES DIAGNOSTIC PRELIMINARY DIALOG

Do you want to run the DES destructive test? ..... N

(If you type Y, the following prompt appears; answer N.)

Do you want to load from dumb terminal? ..... N

CMOS DIAGNOSTIC PRELIMINARY DIALOG

CMOS retention destructive test
(1 : skip, 2 : test, 3 : verify)? 1

Do you want to run the CMOS destructive test? ..... N

RS232 COMMUNICATION DIAGNOSTIC PRELIMINARY DIALOG

You need to use a special loopback plug to run this test successfully.

Do you want to run:

—Asynchronous mode test? ..... N

Stop on a communications error? ..... Y

SBUS COMMUNICATION DIAGNOSTIC PRELIMINARY DIALOG

You need to use a special loopback plug to run this test successfully.

Stop on communication error ..... Y

PC EMULATOR DIAGNOSTIC PRELIMINARY DIALOG

Stop on PC Emulator Error?	N
Test PC Emulator memory from main CPU?	Y
Test PC Emulator memory from coprocessor?	Y
Test PC Emulator video dirty bits?	Y
Test PC Emulator video trapping?	Y
Test PC Emulator I/O trapping?	Y
Test PC Emulator interrupts?	Y
Test PC Emulator timer?	Y

VIDEO DIAGNOSTIC PRELIMINARY DIALOG

The video test displays images on the screen that describe themselves or that require you to compare them with the illustrations in Appendix D. If you want to hold an image on the screen to examine it, press PREV PAGE when the image appears. Press NEXT PAGE to continue the test.

List all errors found? ..... Y

82586 LAN COPROCESSOR DIAGNOSTIC PRELIMINARY DIALOG (Requires X- to F-Bus Adapter)

Stop diagnostics on a LAN Coprocessor error? ..... N

LAN MEMORY DIAGNOSTIC PRELIMINARY DIALOG

Stop diagnostics on memory CPU error? ..... N

LAN 80186 DIAGNOSTIC PRELIMINARY DIALOG

Stop diagnostics on CPU error? ..... N

82586 LAN COPROCESSOR DIAGNOSTIC PRELIMINARY DIALOG

Stop diagnostics on a LAN Coprocessor error? ..... N

Are both terminators connected to the LAN module? ..... N

FOUR-PORT I/O DIAGNOSTIC PRELIMINARY DIALOG (Requires X- to F-Bus Adapter)

Is loopback plug connected at Port 1? ..... N

Is loopback plug connected at Port 2? ..... N

Is loopback plug connected at Port 3? ..... N

Is loopback plug connected at Port 4? ..... N

1/4-INCH TAPE STREAMER BACKUP (Requires X- to F-Bus Adapter)

Run quick verification? ..... N

Stop diagnostics on error? ..... Y

KEYBOARD DIAGNOSTIC PRELIMINARY DIALOG

Do you want to run keyboard echo test? ..... N

Stop diagnostics on keyboard error? ..... N

Display all hex codes that come from the keyboard? ..... N

Note: The screen message returned by this test, 'No device attached,' is not an error if your keyboard functions only as a keyboard and not as a point of attachment for other devices.

MAGNETIC CARD READER DIAGNOSTIC PRELIMINARY DIALOG

How many cards do you want to read? 1

Stop diagnostics on MCR error? ..... Y

EXITING TEST SELECTION

Enter the number of times to run the diagnostics 1

Enter bootrom after running diagnostics? ..... N

Diagnostic tests are performed automatically after you enter the last response. If the diagnostics detect a failure, a message appears on the screen or a module symbol flashes. A failure may also become apparent after you compare the screen with the screen illustrations at the end of this guide. If you encounter an error, call Burroughs or your dealer.

Floppy Drive Head Cleaning Instructions

Follow the instructions supplied with the floppy drive head cleaning kit or use the instructions that follow.

1 Remove perforated tab of cleaning disk to expose the porous cleaning material.

2 Soak the cleaning material with the solution provided with the kit.

3 Insert the cleaning disk into the floppy drive with index hole (small hole) facing up.

4 Turn the system on, wait 15 seconds, and turn the system off. Repeat this step.

5 Remove the cleaning disk. Make a mark on the label each time you use the cleaning disk.

Copying the Diagnostics onto a Hard Disk

Use the following procedures to copy the floppy disk diagnostics onto a hard disk of a master or standalone B 26/B28. If you want to copy from a volume other than [f0] to a volume other than [!D0] or to a directory other than <sys>, make those substitutions in the appropriate places.

Enabling Clustered B 26/B 28 Systems to Share a Master B 26/B 28 System's Diagnostics

1 Copying from floppy disk to master hard disk:

```
Command COPY
Copy
   File from        [F0]<sys>sysimage.sys
   File to       [!D0]<sys>ws100>sysimage.sys
   [Overwrite ok] no
   [Confirm each] no
```

2 Running the diagnostics from a cluster workstation:

a Hold down the space bar when you turn on the clustered machine.

b B,D,L,M,P,T: T RETURN

c OS: 100 RETURN

d B,D,L,M,P,T: B RETURN

The diagnostics are now loaded.

Running Diagnostics from Your Standalone Hard Disk

1 Copying from floppy disk to workstation hard disk:

```
Command COPY
Copy
   File from          [F0]<sys>sysimage.sys
   File to            [D0]<sys>cp.run
   [Overwrite ok]    no
   [Confirm each]    no
```

2 Running the diagnostics:

```
Command BOOT
Bootstrap
   File name    [D0]<sys>cp.run
```

The diagnostics are now loaded.

Diagnostics Selection Program

The Diagnostic Selection Program (SP) is a program that came on your diagnostic disk. Each disk has its own SP program: one for standard diagnostics (Sp.run) and the other for extended diagnostics (x SP.run). Use the appropriate disk as shown in Table 1 (page 6). Note that steps 1 through 6 below describe the standard diagnostics procedure.

Specifically, SP can be used to:

- Change the default responses to diagnostic prompts, so that the most frequently used responses can be selected by simply pressing RETURN.
- Completely suppress some or all diagnostic queries, so that the default values you specify will always be used. The tests can then be run without your input.
- Replace the normal module selection process with a preselection program arranged by module type. In this way, the preconfigured diagnostics tests any number of preselected modules, without requiring you to mark them for testing.

Step 1

Before running SP it is necessary to copy it over to the hard disk of a master or standalone system. You must copy it to the same volume and directory as you copied cp.run, as described in Appendix A.

1 Copying from floppy disk to hard disk

a Copying from floppy disk to master hard disk:

```
Command COPY
Copy
   File from          [F0]<sys>sp.run
   File to            [!D0]<sys>sp.run
   [Overwrite ok]     no
   [Confirm each]     no
```

Repeat this procedure copying:

[f0]<sys>iwsdiag.font to [!D0]<sys>iwsdiag.font

and

[f0]<sys>t1diag.font to [!D0]<sys>t1diag.font

b Copying from floppy disk to workstation hard disk

```
Command COPY
Copy
   File from          [F0]<sys>sp.run
   File to            [D0]<sys>sp.run
   [Overwrite ok]   no
   [Confirm each]   no
```

Repeat this procedure copying:

[f0]<sys>iwsdiag.font to [D0]<sys>iwsdiag.font

and

[f0]<sys>t1diag.font to [D0]<sys>t1diag.font

2 Running SP

```
Command RUN
Run
   Run file   [D0]<sys>sp.run
```

SP is now running.

Step 2

At the beginning of the program, SP asks you to specify both input and output files. The input file is called [sys]<sys>CP.run. It is the name of the standard diagnostic programs that you copied over in Appendix A. The output file, called cp.run-new, is the custom diagnostics designed by you. You use this name in the BOOT command (See Step 6). The SP does not change the standard programs of cp.run in any way. You may still use it by using its name in the BOOT command of Step 6.

Input file spec: [sys]<sys>cp.run RETURN
Output file spec: [cp.run-new] RETURN

Step 3

SP then displays the following questions:

```
Do you want the custom diagnostic to:

Pause for power configuration check?    Y or N and RETURN

Stop on a configuration violation?      Y or N and RETURN

Allow user to do his own selections?    Y or N and RETURN
```

If you want to create custom diagnostics that will not pause for a check of the power module configuration, press N.

If you want to create custom diagnostics that will not pause for an overall check of the configuration of your system (such as a check of whether too many disk modules are being used), press N.

The third question affects the manner in which the modules are chosen for testing. The default, Y, lets you select the modules to be tested. If you answer N, the user is not given the opportunity to select modules; instead, only modules of a type already selected are tested.

Step 4

After you enter the final RETURN in Step 3, you are shown a display that is similar to that of the standard diagnostics. However, SP shows all the various types of hardware modules available for the system, not just those present at the time you run the diagnostics.

There are more modules in the SP display than fit across the bottom of the screen, as indicated by three dots (...) at the right edge. The display scrolls when the cursor is moved off the right edge, revealing more modules. When the cursor is moved off the left edge, the display scrolls back.

SP allows modules to be marked and the questions answered as in the standard diagnostics.

After you mark the modules and press GO, SP proceeds with the initial dialogue for each marked module. Instead of running tests, however, SP merely records the responses to the questions in an output file. When you have answered all the questions, SP writes your choices to the output file and then exits the program.

Step 5

SP provides the ability to eliminate user intervention for one or all of the diagnostic questions. This feature is invoked by pressing CODE-S instead of RETURN as the response to any of the questions. The result is the suppression of any query during the execution of the custom diagnostics. For example:

Enter the number of times to run the diagnostic: [10]

If you press CODE-S, the diagnostic runs 10 times without asking you for permission. Properly used, this feature makes it possible to set up custom diagnostics that run entirely unattended. This is particularly useful in systems that do not have a keyboard.

Caution: *Since any question can be suppressed with CODE-S, potentially dangerous custom diagnostics can be created. If used unknowingly, they could destroy important disk data. Be careful with the distribution of these custom diagnostics so that data accidents do not occur.*

CODE-S can be used at any time, including during the standard diagnostics. Used in this way, CODE-S means "do not ask me this prompt again." However, rebootstrapping the diagnostics restores the original default values, unaffected by CODE-S.

Step 6

To run your customized diagnostics use the following command:

```
Command BOOT
Bootstrap
   File name [d0]<sys>cp.run-new
```

Your customized diagnostics are now running.

Notes

Note 1:

If the system is a B 26, the screen displays four asterisks (****) when no memory expansion modules are installed in the system. The screen displays four additional asterisks (****) for each memory expansion module installed. If the system is a B 28, the screen displays 16 asterisks.

Note 2:

A specific number of power modules must be used to meet the power requirements of your system. Make certain that the proper number is maintained when subtracting or adding modules to the system. Use the *BTOS Systems Hardware Installation Guide* to determine the number of power modules your system needs.

Note 3:

Connecting a video cable of a color monitor to a CPU module, rather than to a graphics module, is not a normal operating configuration, but for the purpose of this flow diagram it can be done without damage to the system. The screen display in this configuration is green.

Note 4:

On the B 28 system, the display is:
T
********** (16 asterisks)

If 16 asterisks are not displayed and there are no RAM expansion modules, then the CPU is defective. If there are RAM expansion modules installed and there are less than 16 asterisks displayed, do the following:

1 Switch power off.

2 Remove all RAM modules.

3 Switch power on.

4 Check for 16 asterisks.

5 If there are less than 16 asterisks, the CPU is defective.

6 Switch power off.

7 Insert one RAM module.

8 Switch power on.

9 Check for 16 asterisks. If 16 asterisks are not displayed, the RAM module installed is defective.

10 If 16 asterisks are displayed, repeat steps 6 through 9 to test the other RAM modules you have.

Note 5:

Since the X- to F-Bus adapter is "transparent" to software, the adapter icon will not be displayed when diagnostics is running.

Illustrations of Video and Graphics Tests

Figure 5 **Monochrome Video—Video Memory Test**

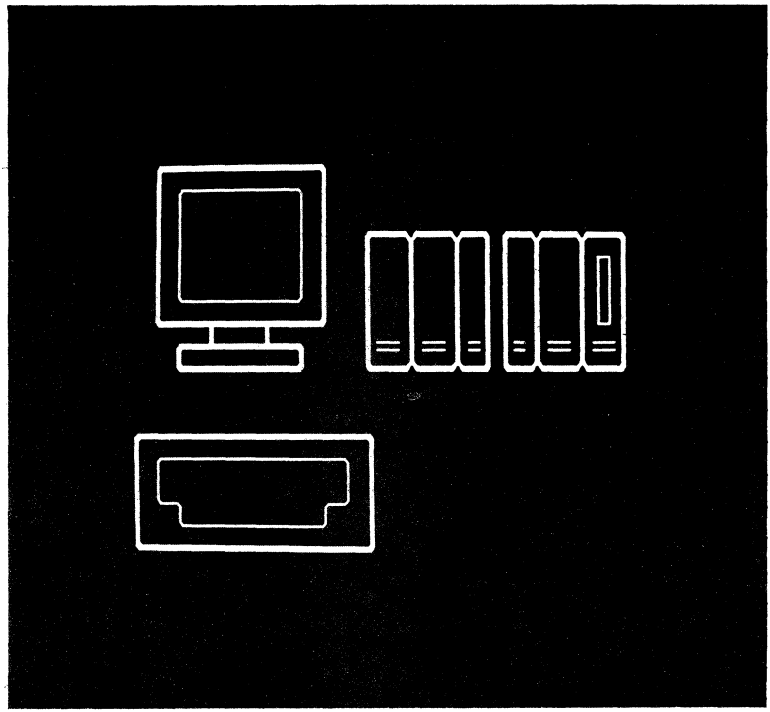
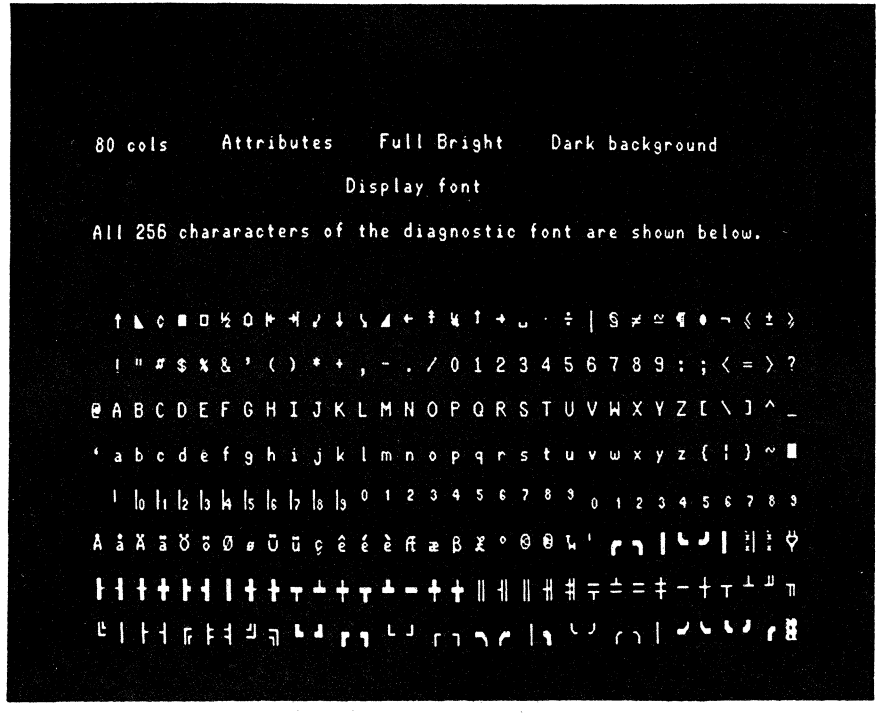


Figure 6 **Monochrome Video—Display Font Test**



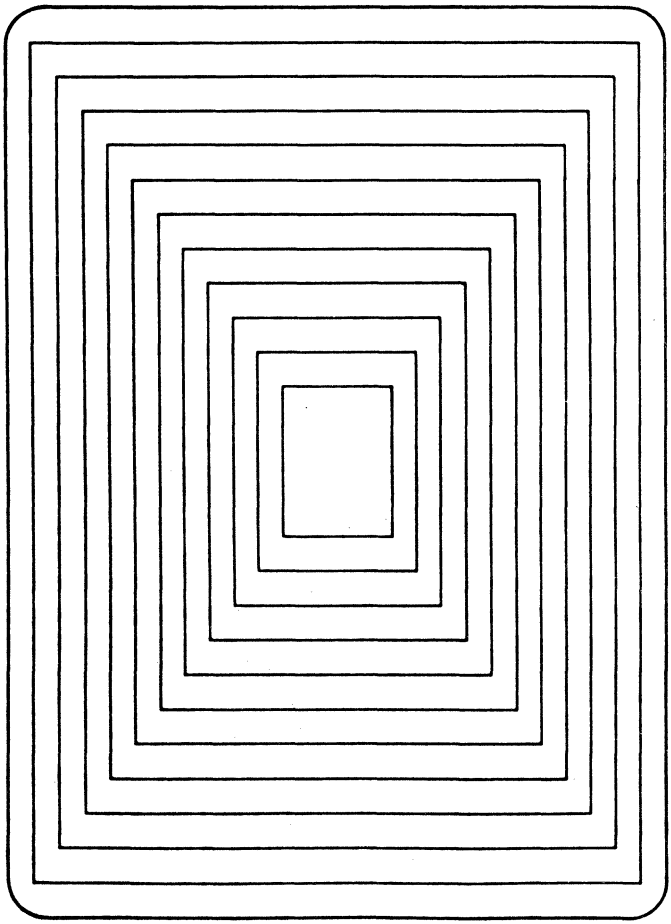
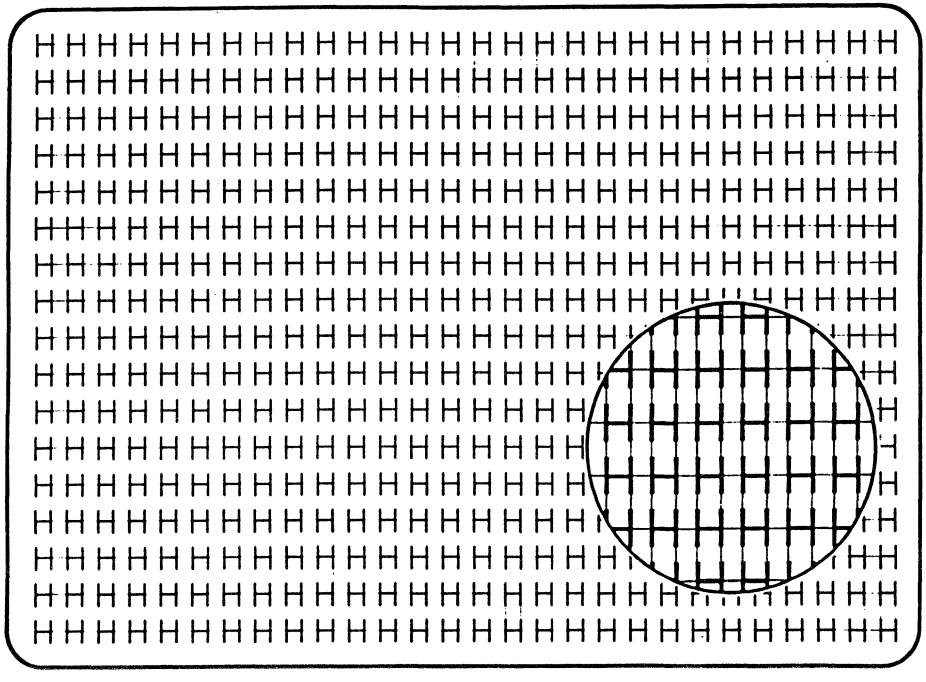


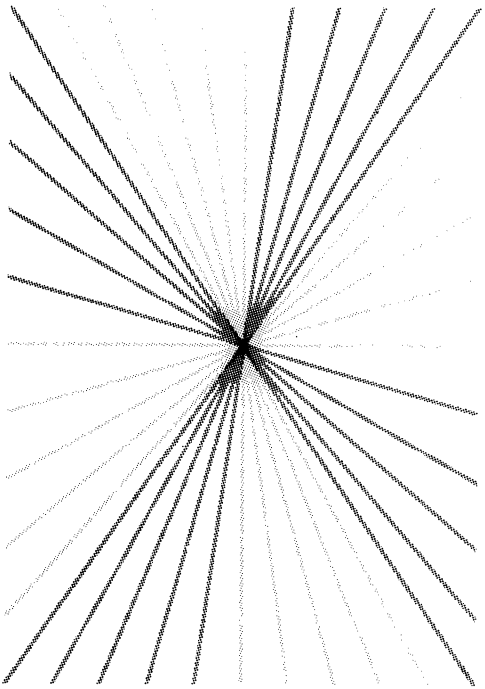
Figure 7 Graphics Modules—Concentric Rectangles (Red Rectangles When Testing Color Monitors)

Figure 8 **Graphics Module—Overlapping Lines Test (Same for Color Monitor Test)**



E5723

Figure 9 **Monochrome Graphics Module—Line Drawing Test**



E5724

Figure 10 **Graphics Module—Pattern and Vector Mode Test (Same for Color Monitor Test)**

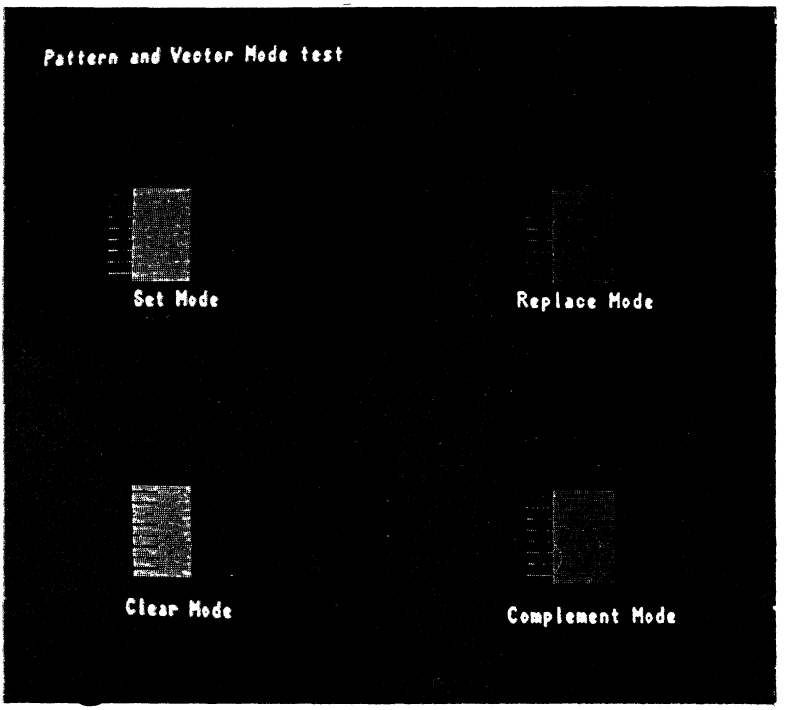
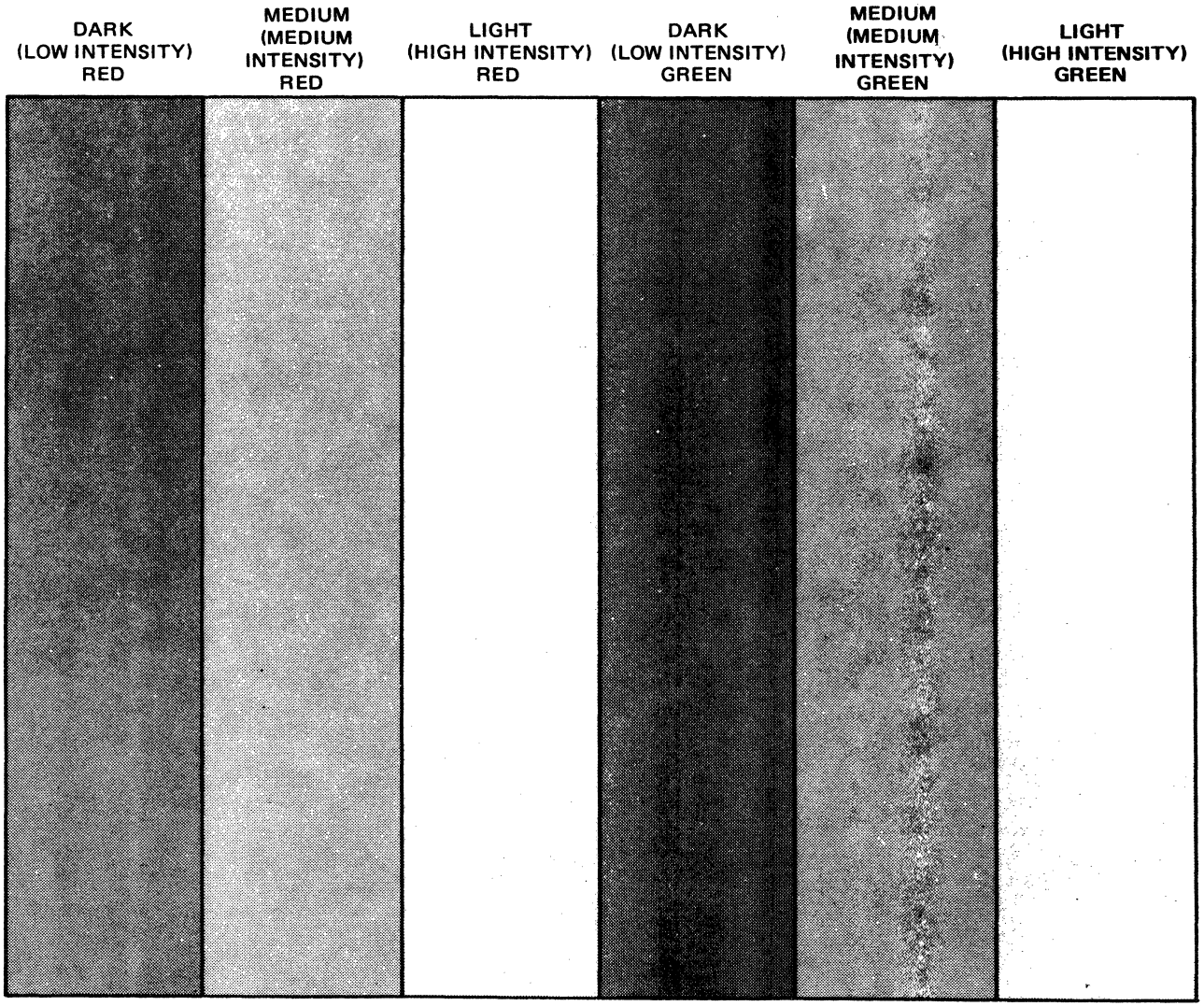


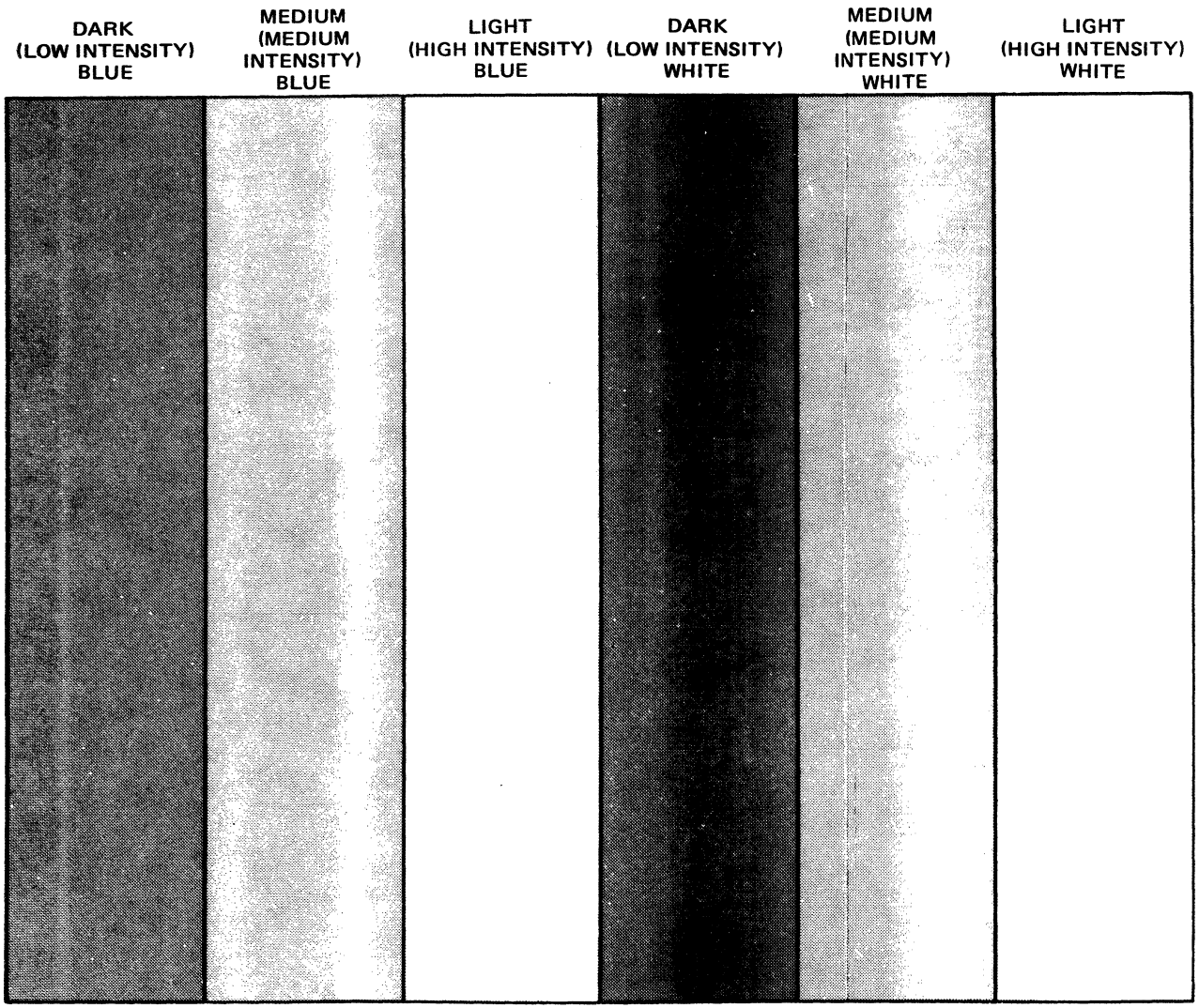
Figure 11 **Color Video—Color Bar Test #1**



E5726

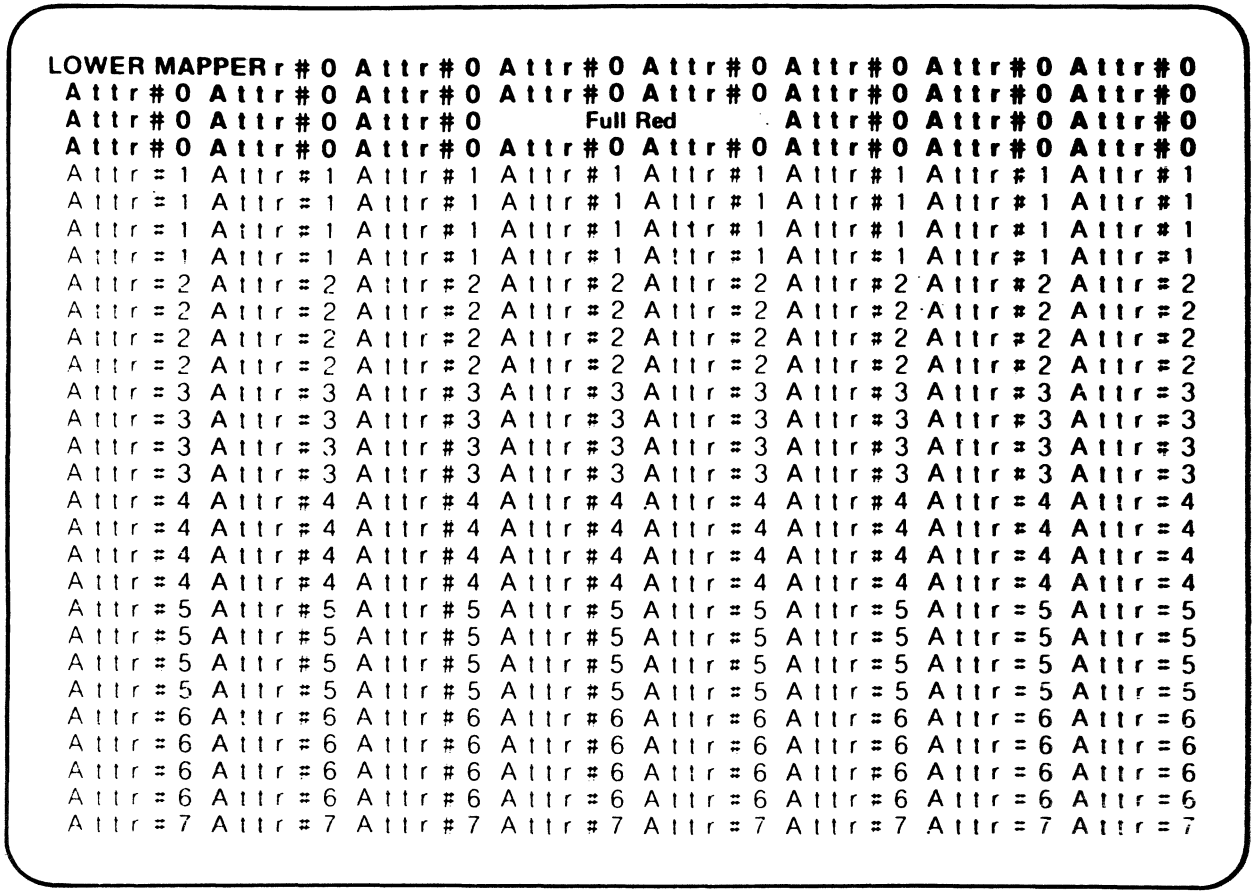
This test presents a block of color divided in half, each side showing three variations of the same color. The left half is three shades of red, and the right half is three shades of green. Approximation of the three shades of each color is sufficient to prove that the color monitor works.

Figure 12 Color Video—Color Bar Test #2



This test presents a block of color divided in half, each side showing three variations of the same color. The left half is three shades of blue, and the right half is three shades of white. Approximation of the three shades of each color is sufficient to prove that the color monitor works. The colors of the right half are considered white by the workstation, but they will appear to you as three shades of gray. This is normal and does not represent a failure of the color monitor or the diagnostics.

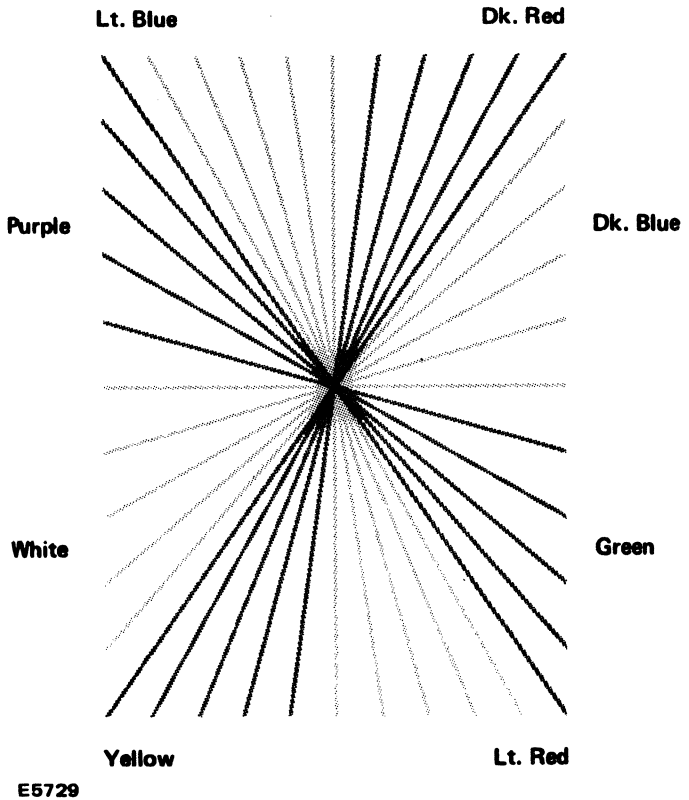
Figure 13 **Color Graphics Module—Color Control Test**



E5728

Each group of four lines (and the last line) is cycled through green, blue, and red at medium, full, and low intensity. This cycle of colors and intensities is also repeated in full screen displays.

Figure 14 **Color Graphics Module—Color Line Drawing**



Default Layout of K4 Keyboard

a F1	b F3	c F5	d F7	e F9	f <	g >	h ,	⇧	⇩
i F2	j F4	k F6	l F8	m F10	n [	o]	p :	⇦	⇨

q Cancel	r Move
w NextP	x PrevP
y Help	z Delete
Action	Over Type
Finish	Copy

E6321

s *	t +	u –	v /
' 7	(8	) 9	BackS Tab
$ 4	% 5	& 6	Space
! 1	" 2	# 3	Next
0	? :	.	

Code	Go
– =	Shift
Mark	Bound
@ ^	1/4 1/2
Scroll Up	Scroll Down

bad spot. Any part of a hard disk drive that is faulty and cannot record information.

bad spot data. Information written on the bottom of the hard disk module that is entered into the diagnostics to prevent an unnecessary failure of the tests. The diagnostics skips over the known bad spots when they are encountered, allowing a diagnostic test to fail only on a previously undiscovered flaw.

bit map. A memory location storing a graphics image inside the graphics module.

bootstrap. Loading the diagnostics into your workstation through a power-up or reset of your system. The diagnostics can be bootstrapped from a floppy disk drive or from a workstation where it has been previously installed. See also **reset**.

character attribute. Special features of a character, such as blinking.

cluster. Local resource-sharing network consisting of a master workstation and one or more clustered workstations.

color mapper. Hardware inside the graphics controller module that selects the colors available for display during the diagnostics.

configuration. Arrangement of the modules, submodules, and hardware that make up your workstation. The configuration determines which tests can be run with the diagnostics and which icons appear on the screen.

configuration rule. A guideline for the proper operation of your workstation. If a configuration rule is violated and not corrected, your workstation may malfunction.

converter. Translates one protocol into another protocol so that devices which operate under different protocols can communicate.

cylinder. A set of tracks on a storage device that can be accessed together as a unit.

default. A value that is assumed by the diagnostics when no other value is given. A default remains in effect until it is changed or until the diagnostics is rebootstrapped.

diagnostics. A collection of tests designed to detect improper operations or malfunctions of your workstation.

dialogue. A sequence of questions and answers initiated by the diagnostics before, during, and after the tests are run. The dialogue consists of queries and prompts. See also **query** and **prompt**.

DMA (Direct Memory Access). Hardware that allows a peripheral device to transfer data to or from memory without using the CPU.

error. Any mistake registered by the diagnostics. There are two kinds of errors. Soft errors occur intermittently; hard errors occur every time a test is run.

error code. See **status code**.

error message. A message containing information about specific errors during the diagnostics. It contains the applicable status codes, the controller status, and the number of hard and soft errors.

expansion disk module. A single hard disk unit that must be used with a main disk or an upgrade module.

four-port I/O (input/output) module. A module that provides for physical connection between the B 26 or B 28 and printers, plotters, and communication equipment.

galpat test. A galloping pattern test. An extensive test of system memory (RAM) which could take several hours to run.

hard disk (Winchester disk). A device that functions similarly to a floppy disk, but it cannot be removed from the disk unit and stores much more data.

icon. A pictorial representation of a module or submodule in your workstation configuration. See also **configuration.**

icon menu. A pictorial representation of all the modules and submodules in your workstation configuration. You use the icon menu to select the tests and display the attribute states of the diagnostics. See also **icon** and **attribute state.**

initialize. Placing a module or device in its initial (start-up) state.

legend. A chart describing the attribute states, cursor movement keys, and type of CPU module used in the diagnostics. The legend is located in the top window of the screen.

local area network. A data communications network of multiple nodes using peer-to-peer protocol over moderate distances.

loopback connector. An interface plug wired to specific pins so that an external port can be looped back to itself, completing a circuit. A loopback connector is necessary in order to run certain diagnostic tests.

magnetic card reader. Reads characters printed on cards in magnetic ink.

main disk module. The disk unit closest to the CPU module. It can be a dual floppy or a hard/floppy disk unit.

memory expansion module. A module that contains RAM memory. Three memory expansion modules can be added to a CPU module to add 1M byte of RAM.

menu. Provides a choice of commands or operations that are available at a given time.

mode. The state of an application system or device set up to perform a specialized function. Each mode generally excludes the characteristics of any other mode.

module. Any one of several separate, identifiable units that connect your workstation and make up its configuration.

parallel (printer) I/O. An 8-bit parallel port used for I/O communications between your workstation and high-speed devices, such as high-speed printers.

parameter. Provides the boundaries for an operation and allows you to enter or change information within those boundaries.

PIN keypad. Used to enter a personal identification number (PIN) prior to a transaction operation.

program. A set of instructions to a computer for accomplishing a task.

prompt. A message from the diagnostics that tells you what actions to take before, or while running, the diagnostic tests. See also **dialogue**.

query. Any question asked by the diagnostics. See also **dialogue**.

RAM (Random Access Memory). A collection of internal components that the B 26/B 28 uses to store information.

register. A temporary memory location for data.

reset. Returns you to the original default values of the Diagnostics. you can reset manually by holding down the spacebar and pressing the reset button on the back of the CPU. Alternatively, you can turn off the power and rebootstrap the system. See also **bootstrap**.

ROM (Read-Only Memory). A program contained in a hardware component.

RS232C. A designation that refers to an industry specification developed to standardize the interface between different types of communications equipment.

RS422. A high speed communications standard used to link cluster workstations.

S-Bus. A serial data line used by the control unit to communicate with the arithmetic/logic unit and primary storage.

scratch disk. Any blank or unneeded disk that can be erased or written to by the diagnostics. A scratch disk is placed in a floppy disk drive during the floppy disk drive tests.

sector. The smallest addressable portion of a track or band on a hard or floppy disk.

status code. A code number that reports the success or failure of a diagnostics operation. It appears on the screen as a two-, three-, or four-digit number and acts as a key to a technically trained person to the type of error or malfunction that is encountered.

submodule. A definable component within a module that can be identified and tested independently of other components. An example is an RS-232 port, which can be tested independently of other ports or submodules inside the CPU module. See also **module** and **RS-232-C**.

tape streamer module. A module that provides magnetic tape backup of disk information.

TEM module. A teller extension module.

upgrade disk module. A single hard disk unit. It is assumed throughout this document that the upgrade disk module is installed to the right of the main disk module.

window. A distinct portion of the screen that is used to display a particular item or carry out a specific task. The diagnostics screen contains three windows.

Errata Sheet

Errata change for document:

B 26/B 28 Systems Diagnostics Operations Guide
Relative to release level 2.0 (B 28) and 4.0 (B 26)
Form 1201068
June 1986

This errata is for software release levels 3.0 (B 28) and 5.0 (B 26).

Disregard all references to Appendix B. Appendix B describes the use of the Selection Program, which has been removed from this diagnostic package.

To run extended diagnostics, you must create a new "bootable" diagnostic disk from the diagnostic disk supplied with this package. To create this new disk, do the following:

1. Insert the diagnostic disk into the leftmost floppy disk drive.
2. Use the Path command to set the path to [sys]<sys> or [d0]<sys>.
3. Type **Software Install** on the Command line, press GO, and follow the prompts on the screen.

Use this new disk to run the extended diagnostics. Use the original disk (supplied with the diagnostic package) to run the standard diagnostics.

These two disks should be copied to other disks to be used as working copies for the actual diagnosis.

Use the working copy of the original disk to test the following modules:

- CPU
- Graphics
- Keyboards
- Teller Extension Module (TEM)
- Magnetic Card Reader (MCR)
- B 26 Tape Streamer
- Monitors
- Dual floppy disk drives
- Hard disk and floppy drives
- Expansion drives

Use the working copy of the disk you created (extended diagnostics) to test the following modules:

- B 27 LAN module
- B 27 Tape Streamer
- B 27 4-Port I/O
- PC Emulator

Errata Sheet

Errata change for document:

B 27 Systems Diagnostics Operations Guide
Relative to release level 4.0
Form 1201076
May 1986

Please add the following information to your copy of the manual described above:

********** page 55 **********

Insert the following note under the heading "LAN 80186 Processor Diagnostic Preliminary Dialog":

Note: *If the system abnormally halts or "hangs" during the running of the LAN diagnostics, the LAN module is faulty.*

********** page 65 **********

The first two steps in the procedure under Note 3 should read:

1. Turn the system off. Unplug the line cord from the wall.
2. Remove optional modules. (See the introductory section "The B 27 System" for a list of optional modules.)

Title: _____

Form Number: _____ Date: _____

Burroughs Corporation is interested in your comments and suggestions regarding this manual. We will use them to improve the quality of your Product Information.

Please check type of suggestion: ☐ Addition ☐ Deletion ☐ Revision ☐ Error

Comments: _____

_____

_____

_____

Name _____

Title _____

Company _____

Address _____
Street City State Zip

Telephone Number ( ) _____
Area Code

Title: _____

Form Number: _____ Date: _____

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Please check type of suggestion: ☐ Addition ☐ Deletion ☐ Revision ☐ Error

Comments: _____

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Name _____

Title _____

Company _____

Address _____
Street City State Zip

Telephone Number ( ) _____
Area Code

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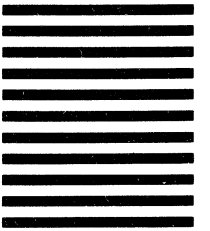

BUSINESS REPLY CARD

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Burroughs Corporation
Production Services – East
209 W. Lancaster Avenue
Paoli, Pa 19301 USA

ATTN: Corporate Product Information

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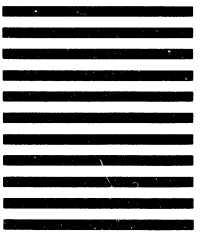
UNITED STATES



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